LAND USE MODELS WORKSHOP PROCEEDINGS

November 20-21, 1995, Salem, Oregon

Prepared for:

Oregon Department of Transportation

Prepared by:

Parsons, Brinckerhoff, Quade and Douglas, Inc.
400 SW Sixth, Suite 802
Portland, OR 97204

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PURPOSE OF THE MEETING - Brian Gregor, ODOT

Brian opened the workshop by outlining ODOT's interest in land use models. He stated that ODOT is not a land use planning agency, but it needs good land use information. ODOT works with communities to develop transportation plans and needs forecasts of land use and population to do this. They are engaged in regional transportation planning, such as for the Willamette Valley, and need to know how communities will grow and how transportation improvements will affect land use patterns. At the statewide level, they are responsible for the Oregon Transportation Plan and corridor plans and need to understand the interaction between land use and transportation. ODOT is interested in forecasting land uses, not in setting land use policies.

WHAT ARE MPOs DOING IN LAND USE FORECASTING

Each of the MPOs then discussed their current land use forecasting procedures and issues that concern them.

Metro, Portland MPO - Sonny Conder, Scott Higgins

Metro currently has four models or procedures for forecasting land use.

1. The Spatial Allocation Model (SAM) is a spreadsheet model that allocates population and employment to 100 zones, using linear relationships. The model incorporates density constraints, the acreage of land available for different land uses, and transportation accessibility. The model estimates zonal population and employment in five year increments. SAM was used to model the Base Case in the Region 2040 planning. The model was not very sensitive to transportation inputs, a standard problem of these models. Basically the model followed trends. There is no land market within the model.

2. The Real Estate Location Model (RELM) is a market-based model of the land market that is currently being calibrated. It uses separate, not simultaneous, equations to model population, employment, land use, and transportation. Its purpose is to see the effects of constraints that the Region 2040 growth concept is imposing on urban systems. How will Region 2040 policies affect the cost of housing? How many people will move outside the urban growth boundary? What types of land uses will change? The model is currently being calibrated with stated preference research data, which is not very sensitive to accessibility, probably because all the choices were within a 20 minute trip time. Sonny expects revealed preference data to show more sensitivity to accessibility measures.

3. Metro also uses a modified Delphi method. Control totals of households and employment are calculated for 20 large districts using trendlines for single family, multi family, and other uses and capacity constraints. GIS is used to inventory the types of land by quarter acres. Households and employment are then allocated to quarter acre grids based on this information and the expertise of local planners. The tools are good for an

analysis of supply and for communicating with planners and policy makers, but do not directly link transportation and land use as required by ISTEA.

4. DRAM/EMPAL is being used for modeling work for FWHA and LUTRAQ. The model has been adjusted to include the effects of the urban growth boundary (UGB) based on previous work done by Metro. For LUTRAQ the model will also be run without the UGB constraint on land supply.

Keith Lawton said the Metro used a true Delphi process in the early 1980s. This is better than the political process now in use and could be useful for smaller jurisdictions.

There was discussion about the size of the Portland region. This is a matter of some controversy. Some think it is only inside the metropolitan UGB. Sonny and Keith prefer a broader region. The survey data being used to calibrate RELM comes from the six county metropolitan area that includes Clark County.

There was a discussion about the sensitivity of models to transportation. Bill Davidson thought that DRAM/EMPAL over-reacts to transportation. Sonny said that SAM had more variables for transportation; so should have a more accurate forecast. Putman is working on better relationships between transportation and land use within DRAM/EMPAL. There still remains the problem of only 100 zones in DRAM/EMPAL and many more zones for transportation analysis.

A question was raised about how the models incorporate redevelopment. RELM uses land values. As land values increase and existing uses depreciate, the market dictates that land uses turn over. The GIS model can be used to predict redevelopment thresholds; that is, if improvements fall below a certain value, the land is considered ready for redevelopment. This mostly affects commercial properties along arterials. For residential redevelopment, the assumption is that single-family lands will become multi-family. However, the planning rules may have created a surplus of land designated for multi-family. As a result some land planned for multi-family is actually used for single family.

It was pointed out that a cross sectional model like SAM only allocates new people and jobs every five years. The existing population does not explicitly move and areas cannot decline. Sonny said this was considered, but the zones were so large, they did not think it would make much difference.

RELM is market-based because prices drive the model. Prices determine the demand for different locations and types of dwelling units for various types of household (determined by income and age group). Supply is based on land prices, transaction costs, and the price people are willing to pay.

Sonny indicated that equilibrium matters if the region is running out of developable land. He thought model stability and consistency in housing demand and supply were more important considerations in building a model.

Dick Walker said that Metro had a dilemma. The Region 2040 policies provided a rich set of development policies to model, but all the simulation tools available have shortcomings. How can we understand the effects of polices? Clearly better tools are needed.

Mid-Willamette Valley Council of Governments - Michael Jaffe

MWVCOG (population about 180,000) makes their base land use forecast using the following data:

1. Regional population control totals from the Center for Population Research and Census at PSU
2. Available land supply by type by Transportation Analysis Zone (TAZ)
3. Comprehensive plan designations
4. Some redevelopment for larger parcels

Adjustments to the households and employment allocations are then negotiated with local planners who know the local conditions such as where sewer and water will be provided and which owners will not develop their land. There is no link with transportation planning. The process works better for residential than for employment forecasts. Planners have difficulty predicting employment location beyond five years in the future.

MWVCOG would like better control data that is based on an integrated model of population and employment. They would like to their forecasts to be more than trendline extrapolations. However, the main area where ODOT could help is in modeling the Willamette Valley as an entity. How does growth in McMinnville affect Salem and vice versa? No one is looking at these sorts of issues.

Lane Council of Governments - Jim Carlson

The Lane Council of Governments (population 215,000) has a GIS-based model. They know existing land uses and the amount and location of vacant and underdeveloped land. They have coded employment by location using data from the State Employment Division. They have assigned the State Employment Division numbers to actual addresses (not corporate addresses) for a number years and therefore have series data on employment location. They develop their own control totals in house. They make one 20-year projection of land use using a spreadsheet. They start with current employment and households by TAZ. Planners provide information on development in the pipeline. They hand allocate development to some special sites, mainly large industrial sites. Housing allocation is based on supply.

They are currently modeling two scenarios--the base case and a change to a more nodal development using 63 identified nodes. A Land Use Measures Task Force has identified type and density of development for the nodes. They are trying to model how this would change the travel patterns. One complication is that most nodes are on the boundaries of TAZs. GIS helps with the identification of parcels and the assignment of people and jobs to these parcels. The plans also call for more mixed uses which raises questions about how much of what types of activities to assign to these areas.

This method has no feedback for transportation. There are no measures of attractiveness. There is little redevelopment and what is included is mostly downtown. Almost all trips within the urban area are 20 minutes or less in length; accessibility, therefore, is unlikely to be a major factor.

Except for specialized districts, employment and density are allocated evenly. This does not work well for industrial uses where the supply of developable land is large. Existing built densities are being used for most residential areas without any consideration of the relative attractiveness of different areas.

LCOG would like more information on interurban commuting. How many workers and University of Oregon students are coming from outside the metropolitan area? Given these flows, how would improvements in transportation affect land use within the metropolitan area and in other communities?

Rogue Valley Council of Governments - Arnold Waters

RVCOG (population less than 100,000) uses maps and planner agreement to allocate land uses. They use population estimates from PSU and employment estimates from the state employment division. They are trying to develop an information system for the area.

Outside MPOs - Bill Upton, ODOT

Like RVCOG they assign employment division numbers to TAZs using the payroll office address. Housing is based on windshield surveys and maps. Forecasting is an ad hoc process.

Regional Transportation Council, **Clark County, Washington - Shinwon Kim**

The interdependence of the areas on both sides of the Columbia River is a fact, but also a political/emotional issue. RTC starts with three control totals--the Washington State, the Clark County, and the Metro estimates. They use Metro's travel model and now have a GIS land use database as a result of work required by the Growth Management Act. A judgmental/modified Delphi process is used to determine the 20 year forecast of land uses. The political climate changes allocations. Changes in employment can also have dramatic effects. For example, more employment within Clark County lowers forecasts for light rail ridership into Portland.

Puget Sound Regional Council, Washington - Steve Fitzroy, Formerly Director of Research and Forecasting

In Washington state, counties must use the state population forecasts for planning under the Growth Management Act. The Washington State Office of Financial Analysis will be producing high, medium, and low forecast for each county in about six months giving local areas a choice about the appropriate numbers to use.

The PSRC includes 3 million people in 4 counties. Their models have 250 land use zones and 850 TAZs.

PSRC uses a highly stylized DRAM/EMPAL model for land use forecasting. They have a regional econometric simultaneous equation model calibrated for the region that includes 49 sectors. They used the regional model to recalibrate DRAM/EMPAL for their Vision 2020 analysis. Composite impediences that include auto and transit are incorporated.

Currently the Clean Air Act requires that they redo the forecasts every three years; once the region becomes an attainment area, they will redo the forecasts every five years.
One difficulty with DRAM/EMPAL is that as land is used up, the model mainly becomes an accounting model indicating where people can be accommodated. The forecasts actually become negotiated after 2010 as the land supply is used up. In the near-term (19952005), local jurisdictions have already issued permits that exceed the forecasts in some areas creating credibility problems.

They have worked with the Federal Highway Administration and the ECONorthwest to develop scenarios for how to grow and how and when infrastructure investments need to be made. In this analysis they were asking, when we get to 3.5 million people, what does that mean for capital investments?

PSRC is doing a panel survey of 2,000 household over a five year period. This provides revealed preference data on people's household and workplace choices. The National Personal Transportation Survey will have a 300 household overlap with the regional dataset. PSRC is currently using the survey for trip generation and mode choice analysis. Academic researchers are using the data for other analysis.

Forecasting Control Totals - Dennis Yee, Metro

The Center for Population Research and Census at PSU uses a cohort component method calibrated to the 1990 census data. The census provides birth and death rates. Dennis was not sure how migration is forecast--PSU does not have an econometric model.

The Oregon state economist does a six year forecast of employment using a structural model based on national assumptions about the relationships between population, employment, and income. This office has recently hired a state demographer.

The Washington State Office of Financial Analysis uses a gravity model to distribute households to counties. Washington has its own model for estimating employment based on input/output analysis.

Metro does a regional forecast. They forecast population using the cohort component method and estimates of migration from their economic model. Jobs are forecast using a model like the State's, but with more inter-industry connections and linkages between. population and income.

Summary of Issues

Sam Seskin summarized the land use forecasting issues that need to be addressed as follows:

1. Including redevelopment in forecasting procedures
2. Improving base case forecasts and effectively modeling other scenarios
3. Procedures for allocating employment past the near term
4. Procedures for allocating population and employment to "mixed-use" areas

5. Ways to move beyond assuming the build out of the comprehensive plan ("plancasting") to include attractiveness, accessibility, and other factors
6. Procedures for modeling the effects of state, regional, and local polices such as reducing VMT and limiting the supply of urbanizable land
7. Better regional control totals based on an integrated employment and population model
8. Forecasts for individual cities and parts of counties
9. Forecasts for non-MPO areas
10. Inter-regional modeling and forecasts (Willamette Valley, Coast, Central Oregon, bi state)

THE STATE-OF-THE-ART IN LAND USE MODELS - Paul Waddell, University of Texas at Dallas

Paul reviewed the state of the practice in land use models, discussed emerging requirements and approaches, and made some recommendations about land use model development. (See Appendix A for copies of the overheads.) The following types of models have been developed:

- Spatial Interaction – Lowry Gravity Models – DRAM/EMPAL is of this type
- Models using input-output techniques – MEPLAN and TRANUS
- Models based on Random Utility/Discrete Choice such as Metrosim and Boyce's model
- Regression models (no longer in use)
- Models using microsimulation techniques
- Models integrated with GIS

The most widely used model in the U.S. is DRAM/EMPAL, a spatial model that can be run in iteration with travel demand forecasting models. This model has a number of limitations including a cross-sectional approach that reassigns all households and workplaces in every iteration, the use of only 4 or 5 types of employment, no market constraints on land uses, and outdated assumptions about commuting. The decision maker's choices are not explicit in the model, making it difficult to incorporate clear policy variables.

Models are needed that incorporate urban decision makers and their decisions. The decision-makers include households, workers, businesses, developers, lenders, municipalities, transportation agencies, school districts, and other local, state, and federal agencies. Each makes a variety of decisions. For example, workers decide whether to participate in the work force, work full-time or part-time, change jobs, work multiple jobs, where to work, wages, mode of transportation, and other travel behavior.

The emerging requirements for land use models include

- Land use-transportation-environmental interaction
- Application at varying geographic scales
- Disaggregation of chooser and their choices
- Integration with GIS
- Applications to strategic planning, policy analysis, and impact assessment

Paul recommended that models be integrated with GIS for spatial analysis, visualization, database management and integration, and network and raster modeling. Models should include the demand size characteristics of residential mobility and location choice and employment mobility and location choice. On the supply side, they should include existing development, projects in the "pipeline", and development policies. A land market clearing mechanism is needed to balance demand and supply.

AFTERNOON DISCUSSION OF NEEDED TOOLS, TECHNIQUES AND COPERATIVE RELATIONSHIPS

In the afternoon the group discussed 1) what they would need to a better jobs of forecasting or allocating land use and 2) what ODOT could do improve the state of the practice. The summary below is grouped by topic, although the discussion did not necessarily occur in this order.

Geographic Scale

Both the morning's discussion and current transportation modeling indicate a need for land use forecasting at several geographic scales. These include:

1. Statewide
2. Substate regions like the Willamette Valley, Coast, and Central Oregon
3. Urban areas
    - MPOs with and without air quality attainment status
    - non MPOs with and without air quality attainment status

Toolbox of Methods

Given the diversity of geographic scales, a variety of tools are needed so that individual areas can pick what is more appropriate for them. Ideas discussed included:

Guidelines on How Much Analysis Different Areas Need To Do

The state is interested in the impacts of major transportation improvements. Large MPOs need to know about their labor sheds. Cities may have more limited objectives. Federal policies like ISTEA and CAAA and state policies like the Transportation Planning Rule and the Oregon Transportation Plan also need to be considered. The State could help by spelling out the requirements for different places.

The National Association of Regional Councils has developed a manual on the state of the practice in land use and travel demand forecasting that could be used as a starting point. This manual outlines both basic practices and advanced practices.

Non-Modeling Tools

Given that good data is available about land use supply, could expert opinion be used to estimate demand? Some issues like intercity commuting might be better addressed with a model because no one is an expert on this.

Five year forecasts need to be in line with development in the pipeline to be useful and credible. After five years, the simpler methods include trend analysis and spatial allocation.

Sketch Planning Tools like SAM

Spatial allocation models like SAM are fairly simple to operationalize and take advantage of the good data available on the supply side. With the addition of some market behaviors, they can capture basic behaviors provided there is no redistribution within the area. There was discussion about whether they work for areas like Bend-Redmond-Sisters and Lane County where people are commuting for quality of life? There is a need to know how far people are willing to commute and what are the effects on land uses. It was suggested that such a model could be calibrated with 1990 journey to work data from the Census.

State and Regional Models

There is a need to understand intercity transportation in order to know what happens inside urban growth boundaries. ISTEA also requires that the movement of freight and goods be evaluated. This analysis is also needed to determine economic viability of an area. MEPLAN and TRANUS are based on input-output analysis between sectors and could model state and subregional areas. They represent small economies interacting with each through the flows of people, freight, and economic interaction. These models can be used in data scarce situations and as well as with rich data sets.

Why Models Are Needed

Brainstorming on the need for models produced the following list:

- Evaluate whether transportation investments can satisfy land use policies
- Evaluate alternative packages of transportation and land use policies to achieve goals
- Evaluate the sensitivity of alternatives to prices
- Look for trade-offs
- Determine the outcomes of different policy scenarios
- At the state level, examine the flow of goods and economic development patterns
- At the metropolitan level, evaluate policies to limit the supply of land -- How does this affect affordable housing? How many people will settle outside the UGB? How can redevelopment and infill be included?
- At the project level, evaluate the spatial impacts of the project (often need to include a larger area than a single jurisdiction might have control over)
- Determine how transportation investment change the 30 minute drive time contour
- Evaluate whether jurisdictions can achieve the goals of TPR and other policies
- Evaluate how well jurisdictions are doing in achieving the goals of the TPR
- Evaluate how congestion and congestion pricing affect land use
- Evaluate the transportation impacts of various land use scenarios

There was some discussion about whether land use or transportation models or integrated models were needed for each of these issues.

It was agreed that policy sensitive models are needed for this task. Steps in developing a policy sensitive model include:

1. Inventorying the policies
2. Identify the land use and transportation variables that need to be included in a model to reflect these policies
3. Evaluate whether existing models are up to the task
4. Make incremental changes in existing models or build new ones

In the short term, practical models do what works. In the long term, model structures and data should clearly reflect policy needs. The perfect model will never be built.

Databases

Standards

Who sets standards for databases such as those used in GIS? How can they be structured so that information can be coordinated and shared? Is this a state responsibility?

Steve Fitzroy noted that the federal government is setting metadata standards.

Employment Data

The State Employment Division began to disaggregate by firm location in 1994. Previously MPOs had to survey firms and do this themselves. Although LCOG has time series data on firm location, they have not analyzed it.

Ten to 20 percent of all employment, however, is not in the state employment numbers due to self-employment. Government employment is, ironically, a problem. It is reported by central location such as school district office, not by actual work location.

It was thought that Paul Warner, the state economist, is interested in better linkages between population and employment forecasts. A State Demographer has recently been added to the staff.

Survey work needed for better analysis and model calibration

Panel surveys which interview the same people over time like PSRC's provide the best revealed preference data set. Panel survey data provides information on lagged effects (i.e. changing job location after getting married and moving.) Good data is needed for various local areas.

Need to evaluate what data already exists before undertaking new work. What data do we have that could be analyzed further (such as LCOGs firm data)? Also what do we know from national research? Who should be responsible for additional data--state or local government? It was suggested that modeling work could start with existing data and/or the first year of panel survey data collection.

A small set of household data -- auto ownership, workforce participation and locations, housing characteristics and costs, residential decisions -- can be combined with a GIS database to provide the basis for estimated models with residential and workplace locations.

Summary of Discussion

Bill Upton summarized by saying that ODOT's planning group would like to have a workplan for land use models. They already are developing a guidance document for travel demand modeling. From today's discussion it appears that ODOT should be involved in the following efforts in land use forecasting:

1. Development and use of statewide and regional land use forecasting model.
2. Prepare guidelines for best practices and advanced practices that can service areas of various sizes and expertise
3. Provide guidance on how to collect needed data and how to analyze it.
4. Foster interagency links and cooperation at the state level.
5. Support the Willamette Valley Task Force in its educational and research effort.

PLANNING FOR DAY TWO

A small group met and made plans for the following day. It was agreed that work should focus on policies, tools, and data for three geographic areas--state, sub-state regions, and urban areas of all size. Brian Gregor would prepare a list of relevant policies to begin the discussion. Then both long and short term needs for tools and data for each policy area would be considered.

SMALL GROUP MEETING - TUESDAY A.M. TO DEVELOP COOPERATIVE WORKPLAN

The group began by going over a list of policies from the OTP and TPR that were assembled by Brian Gregor (See Appendix A). OTP Policy 4G was added to the list: "It is the Policy of the State of Oregon to manage effectively existing transportation infrastructure and services before adding new facilities." The discussion identified the following policy requirements that should be included in land use forecasting procedures:

1. User .pricing of transportation facilities (OTP Policy 1 B). How will parking charges, emissions fees, access charges, and other user prices of transportation facilities affect the location of firms and households?

2. Accounting for full costs and benefits of transaortation systems (OTP Policy 1 B). How will the full costs and benefits of transportation systems be measured and included in models?

3. Constraints of acknowledged comprehensive clans (OTP Policies 2A, 2G). How will changes in allowable densities and limited expansions of urban growth boundaries affect land use patterns? How much land use will occur inside urban growth boundaries and how much will be induced outside them?

4. Changes in accessibility by motorized and non-motorized modes (OTP Policy 2B, Urban Mobility and Livability Benchmarks). How will an investment emphasis on transit, pedestrian/bikeways and local roads and streets affect the location of firms and households? How should non-motorized access be measured and included in locational models?

5. Changes in interurban and rural mobility (OTP Policies 2C, 2F, 3E, Economic Prosperity Benchmark). How can access to rural areas and other cities be improved without encouraging development in the urban fringe?

6. Achieving level of service requirements for transportation facilities (OTP Policy 2E, Livability and Economic Prosperity Benchmarks). How does the level of service on transportation facilities affect land use decisions? Are current level of service requirements supportive of land use goals and plans?

7. Facility investments for the movement of goods, service, and tourists (OTP Policies 2F,3B, 3E, Economic Prosperity Benchmarks). What impacts do changes in the flow of commodities, services, and tourists have on patterns of land uses?

8. Managing the use of existing facilities before building new facilities (OTP Policy 4G). How will access management, transportation demand management, and congestion management programs affect the location of firms and households?

9. Encouraging the redevelopment of land (TPR 660-12-030). How can redevelopment be incorporated into land use forecasts?

10. Constraints of public facilities plans (TPR 660-12-030). How do financial and geographic limitations on the provisions of public facilities affect land use? What kinds of infrastructure fees and financing approaches support land use and transportation objectives?

1 1. Reducing automobile use (TPR 660-12-035, Urban Mobility Benchmark). How can changes in land use patterns support reduced per-capita vehicle miles traveled?

12. Reducing reliance on the automobile as the principle mode of travel (TPR 660-12-045). How will an emphasis on walking, biking, and transit influence land use?

13. Achieving consistency of land use and transportation plans (TRP 660-12-060). How can land use plans support the functional integrity of transportation facilities and transportation facilities serve planned land uses?

14. Evaluating land use alternatives as a means of meeting transportation needs in the Portland metropolitan area (TPR 660-12-0135). How can land uses be changed to meet transportation objectives?

The group thought that procedures that are sensitive to these Oregon policy goals will meet or exceed all federal ISTEA and CAAA requirements to integrate transportation and land use planning.

Bill Upton reported that models are needed for 23 urban areas. This includes four MPOs, two of which are non-attainment areas, two non-MPOs that are non-attainment areas (2535,000 people), and 17 non-MPOs with no air pollution constraints (30,000 people or less). The State would run models although larger places may want to run them themselves. The State could also provide technical training and liaison which could be similar to the Washington Statewide Technical Committee which provides technical support and information sharing. There is state modeling steering committee, but mainly MPOs participate.

Further discussion focused on other needs or characteristics of the modeling process. The following ideas were generated:

- ODOT needs a program that they can present to the legislature. They currently have funding for 18 months of modeling work.
- Some jurisdictions need immediate help with improving forecasts and can not wait for long term model development.
- Simple procedures that systematically consider factors other than land use plans will satisfy some jurisdictions.
- Program needs to incorporate work already being done such as JHK's work on refining the ITE trip generation standards for pedestrian friendly areas.
- Land use models should interface with EMME/2, the state's standard for travel demand forecasts, and for models for freight analysis.
- Models should consider how market demand interacts with land supply.
- Need incremental steps that provide useful data and tools even if modeling effort is terminated or collapses. Data should be valuable both for judgmental and modeling process. Build the model in modules.
- Get the model structure right first.
- Base case forecasting is like forecasting other scenarios. Ad hoc procedures have lots of hidden assumptions about policies. These assumptions need to be spelled out.
- Incorporate policy variables by including pricing in the models.
- Need an educational program to inform planners and decision-makers at the local level.

From this discussion, the group agreed on the following goal and workplan:

GOAL OF ODOT LAND USE FORECASTING PROCEDURES

ODOT will develop a set of land use forecasting procedures for use by the State, MPOs, counties, and cities to aid in the implementation and evaluation of policy goals in the Oregon Transportation Plan (OTP), the Transportation Planning Rule (TPR), Oregon Benchmarks, Intermodal Surface Transportation Efficiency Act (ISTEA), and Clean Air Act Amendments (CAAA). The land use forecasting procedures must be sensitive both to multi-modal accessibility and to the full costs and benefits of transportation and land use policies. Procedures are needed at both metropolitan and interurban scales.

WORKPLAN

1. Metropolitan/Urban Procedures

In Oregon, all sizes of places with varying technical capabilities and data availability need improved methods for forecasting land use. Improvements are needed to integrate population and employment forecasts in the development of regional control totals. MPOs want better methods of allocating employment to zones and ways to consider redevelopment, mixed uses, and development in nodes when they allocate population and jobs. To meet these varying needs the workplan calls for the development of a guidance document that can be used immediately to improve the quality of base case forecasts. In addition, the workplan calls for the incremental development of a metropolitan land use model that could be applied in a variety of urban areas in the state.

A. Short term (12-18 months)

1. Policies and data

- Inventory the policies requirements that the procedures must address.
- Translate the policies into relationships with measurable variables.
- Identify the required data.
- Coordinate with state agencies to develop integrated employment and population control totals.

2. Prepare a guidance document

- Develop a guidance document to improve the quality of forecasts of land use changes and the effects of transportation projects on land use.
- Identify procedures to improve both the collection of data and the analysis of that data.
- Develop a program of providing technical training, support, and information sharing.

3. Develop a long range land use modeling strategy.

- Evaluate existing metropolitan/urban land use models.
- Lay out a long term model development strategy to incrementally make changes in an existing model or develop a new model, if existing models are not satisfactory starting places.
- Develop a data collection strategy for acquiring the data need for model development.

B. Medium Term

1. Develop and demonstrate a metropolitan/urban land use model.
   - Operationalize the relationships using estimated coefficients or rules.
   - Begin process of collecting additional data.
   - Demonstrate use of model for at least one MPO.

C. Long Term

1. Expand use of the model to other metropolitan/urban models.
2. Evolve toward full estimation of the metropolitan modal as data is collected to calibrate relationships.

11. **Interurban Models**

Because the actions taken by a city or metropolitan area impact other cities and rural areas, models are also needed to evaluate land use impacts at the substate and state level. These interconnections were recognized in the Willamette Valley Transportation Strategy. The Strategy calls for the formation of a Valley Livability Council to do research and educate valley leaders and residents about the broad growth issues affecting transportation, land use, and environmental quality throughout the valley. An interurban model would provide valuable information for this effort and could also be used in other regions of the state. The TRANUS model is considered a likely candidate because it models inter-regional flows, is scaleable from a very simple model with little desegregation in households and economic sectors to a much more complex model as data becomes available, and is available for roughly $4,000 plus consulting to calibrate the model.

A. Short Term

1. Evaluate the TRANUS input-output land use model for its suitability in modeling the transportation/land use interactions in a substate region such as the Willamette Valley.
2. Consider how Southwest Washington and other border areas would be included in model.
3. Decide whether to purchase the model or develop an alternative.
4. Assemble data to calibrate the model for the Willamette Valley.

B. Medium Term

1. Refine the model and data for the Willamette Valley
2. Expand or replicate the model for other substate regions in Oregon

The meeting was adjourned at noon.

LAND USE MODELING WORKSHOP ATTENDEES

	NAME	ORGANIZATION	PHONE
*	Bob Cortright	Department of Land Conversation and Development	(503) 373-0084
	Terry Moore	ECO Northwest	(541) 687-0051
	Art Ayre	Economic Development Dept. State of Oregon	(503) 986-0101
	Nick Fortey	Federal Highway Administration	(503) 399-5749
	Fred Patron	Federal Highway Administration	(503) 399-5749
	Jim Carlson	Lane Council of Governments	(541) 687-4436
	Bud Reiff	Lane Council of Governments	(503) 465-2454
*	Sonny Conder	Metro	(503) 797-1592
	Scott Higgins	Metro	(503) 797-1770
*	Keith Lawton	Metro	(503) 797-1784
	Dick Walker	Metro	(503) 797-1765
*	Dennis Yee	Metro	(503) 797-1578
	Michael Jaffe	Mid-Willamette Valley Council of Governments	(503) 588-6177
*	Brian Gregor	Oregon Department of Transportation	(503) 986-4120
*	Bill Upton	Oregon Department of Transportation	(503) 986 4126
	Paul Ceserani	Parsons Brinckerhoff	(503) 274-7223
*	Bill Davidson	Parsons Brinckerhoff	(415) 243-4601
*	Judy Davis	Parsons Brinckerhoff	(503) 274-7219
*	Sam Seskin	Parsons Brinckerhoff	(503) 274-8772
	Shinwon Kim	Regional Transportation Council	(360) 737-6067
*	Arnold Waters	Rogue Valley Council of Governments	(541) 664-6674
*	Paul Waddell	University of Texas at Dallas	(214) 883-2088
*	Steve Fitzroy	Consultant (Former Puget Sound Regional Council)	(206) 323-1197

* Indicates present at Tuesday small group meeting