OVERALL WORK PROGRAM
Fiscal Year 2009

Revision #2

Revision #2 with Administrative Modifications
Effective December 29, 2008

FTA Section 5303 Metropolitan Planning Program
HI-80-X017
FHWA Project PL-052(31)

Prepared by

OAHU METROPOLITAN PLANNING ORGANIZATION

In Cooperation with
Its Participating Agencies

State of Hawaii Department of Transportation
State of Hawaii Department of Business, Economic Development, and Tourism
City and County of Honolulu Department of Transportation Services
City and County of Honolulu Department of Planning and Permitting

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Overall Work Program Revision #2

WORK ELEMENT 201.50-05

Land Use Model Enhancement and Demonstration

Objective

To enhance OahuMPO's land use simulation model by improving the definition and spatial representation of land use in the model and to demonstrate the capabilities of the model in land use and transportation planning.

Products

This work element will produce an updated land use simulation model, based on the UrbanSim framework, capable of realistically representing the full range of land use activities encountered in land use and transportation planning, including residential and specific non-residential uses, such as hotel, office, retail, industrial, public, military, and agriculture. The updated model will include a revised database, organized around smaller spatial units of analysis. The model will also include re-specified and re-estimated models for the prediction of land values, household and employment location choices, and developer decisions.

Previous and Ongoing Related Work

An experimental land use model was developed as part of the larger OahuMPO Model Development project. The model is based on UrbanSim, a land use modeling program developed by researchers at the University of Washington that simulates the dynamics of the real estate market, taking into account the actions of households, employers, and developers. The City and County of Honolulu Department of Planning and Permitting (DPP) is in the final stages of completing Work Element 201.39-04 (Land Use File Update System), which will develop the database needed for the land use model.

Identification of Need

Land use and demographics reflect the spatial patterns of the regional economy and are essential inputs to the OahuMPO regional travel demand model. DPP supplies OahuMPO with both base-year and forecast-year land use and demographic data, summarized at the level of the traffic analysis zone (TAZ), of which there are 764 covering Oahu. DPP's current model produces forecasts based on aggregate zonal data, using the gravity model construct to capture the observed historical development trends. The development of the experimental land use simulation model based on UrbanSim was intended to explore the possibility of producing forecasts at the disaggregate level, capturing the locational behavior of the individual household and firm, in a construct that is consistent with economic theory. Part of this theory is the notion of accessibility between households and businesses, as represented by the regional transportation network.

The UrbanSim-based model developed to date accomplishes these general goals; however, there are at least two structural improvements that must be made in order for the model to provide the

desired analysis capabilities. In its current form, the simulation utilizes generalized definitions of "development types" based solely on the number of residential units and non-residential square footage within a 150-meter square grid cell. In other words, each cell can have only one land use; and that use is classified only on the basis of the number of residential units and non-residential floor area. These generalized development types are insufficient for representing the myriad of land uses that characterize the island, such as resort areas, mixed-use corridors, military installations, and agricultural lands. Moreover, 150-meter grid cells (approximately 5.6 acres) have proved to be too coarse to represent development within the Honolulu urban core. Revising the definition of these development types and the use of smaller grid cells or more realistic spatial units, such as the parcel, are needed to provide the resolution needed to analyze development patterns in Honolulu.

Impact of Work Element

Redefinition of development types and the use of smaller grid cells are necessary in order to analyze current and alternative future development policies. Once these enhancements have been made, the land use model will be able to address such issues as:

- Impacts of alternative transportation plans on local land uses;
- Impacts of land development plans on the transportation system;
- Analysis of alternative land use restrictions and growth management policies.

Tasks

1. Consultant to redefine development types based on residential densities and non-residential building types and floor area, including but not limited to hotel/resort, office, retail, industrial, public, agricultural, and military facilities.
2. Consultant to re-specify, re-estimate, and re-calibrate the UrbanSim sub-models that use development types, including the land price model, household location choice model, employment location choice model, and developer model. An essential sub-task under this is preparation of estimation/calibration data sets, if needed to augment what was used previously.
3. Consultant to re-create the model database tables that define/restrict or use development types, including tables related to allowable transitions, development constraints, space requirements for jobs, and committed and proposed development events.
4. Consultant to convert the existing spatial unit from150-meter square grid cell to the parcel (of varying size). Consultant to reduce grid cell size to 65 meters (roughly one acre) if parcel representation is shown to be not feasible.
5. Consultant to re-allocate the base-year grid cell attributes to the new spatial units, including the placement of base-year housing units, non-residential square footage, household locations, job locations, land value, improvement value, and environmental attributes, such as presence of open space, steep slopes, water courses, wetlands, flood plains, and roadways.
6. Consultant to demonstrate the capabilities of the enhanced model by generating year 2035 land use forecasts based on alternative growth assumptions.

7. OahuMPO and DPP to review and comment on Consultant deliverables.

Estimated Completion Date

June 2011

Estimated DBE Opportunity

None

Estimated Cost By Funding Source

Total	FTA	FHWA	STP	Local M	Local S
200,00		160,000		40,000	

Estimated Staff/Other Costs

Agency	Staff	Person Months	Cost
DPP	Planner	4.5	30,000
	Other		
OahuMPO	Consultant		170,000
		Total	200,000

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