Volume 7

1000 FRIENDS OF OREGON

Making The Connections

A summary of the LUTRAQ project

Integrating land-use and transportation planning for livable communities

Produced by 1000 Friends of Oregon
February 1997

ACKNOWLEDGMENTS

Many organizations and individuals contributed to the LUTRAQ project. Thanks must first go to those that funded the project, the agencies and private foundations listed below. In addition to financial support, many staff members within these organizations provided invaluable assistance. Of particular note are Rachel Finson and the other staff at The Energy Foundation.

LUTRAQ also benefited greatly from the contributions of the project's advisory committees, a listing of which is contained at the end of this report. The members of the National Technical Advisory Committee – Jeff Zupan, George Crandall, Elizabeth Deakin, Fred Ducca, Michael Replogle, and Will Schroeer – are especially deserving of thanks. They provided critical direction and advice on the project's research program. That program was executed by dedicated staff at Calthorpe Associates, Cambridge Systematics, ECONorthwest, and Parsons Brinckerhoff, under the able direction of project manager Sam Seskin. Providing valuable peer review were Gordon Shunk of the Texas Transportation Institute, Susan Handy of the University of Texas School of Architecture, Karl Quackenbush of the Central Transportation Planning Staff in Boston, Meeky Blizzard of Sensible Transportation Options for People, Ron Eash of the Chicago Area Transportation Study, Valerie Broadwell of the U.S. Environmental Protection Agency, and Daniel Carlson of the Institute for Public Policy and Management at the University of Washington.

Thanks also go to the staff at the Oregon Department of Transportation for their willingness to think "out of the box" and consider non-traditional approaches. Finally, we offer sincere gratitude to Sensible Transportation Options for People and the hundreds of citizens who believe that quality of life means something other than more asphalt and parking lots.

Major funding provided by

The Energy Foundation

The Nathan Cummings Foundation

Surdna Foundation, Inc.

Federal Highway Administration

United States Environmental Protection Agency

Additional funding provided by

ARCO Foundation

David Evans & Associates, Inc.

Home Builders Association of Metropolitan Portland

The Joyce Foundation

Key Bank of Oregon

Kurt Koehler

Lincoln Institute of Land Policy

Metro

National Endowment for the Arts

The New-Land Foundation

Pacific Development, Inc.

Portland General Electric Co.

Tri-County Metropolitan Transportation District of Oregon

Printed on post-consumer recycled paper with vegetable-based ink

TITLE PAGE

MAKING THE CONNECTIONS

A summary of the LUTRAQ project

Volume 7

Integrating land-use and transportation planning
for livable communities

Produced by 1000 Friends of Oregon
February 1997

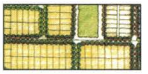


TABLE OF CONTENTS

PREFACE

In 1988, a new land-use and transportation alternative and an innovative research program began to take shape in metropolitan Portland, Oregon. What started with opposition to the proposed Western Bypass suburban freeway, evolved into the project this report reviews, Making the Land Use, Transportation, Air Quality Connection (LUTRAQ).

Spearheaded by 1000 Friends of Oregon, a public interest group that monitors land-use planning across Oregon, the LUTRAQ project was created to challenge auto-based transportation projects and auto-dependent development patterns. With funding from the Federal Highway Administration, the Environmental Protection Agency, The Energy Foundation, and others, the project ultimately achieved its primary objective: to influence policymakers to replace the proposed bypass with an alternative that emphasizes transit improvements and complementary changes in land-use policy.

Between 1991 and 1997, LUTRAQ produced 11 technical reports on topics including integrated land-use and transportation modeling, urban design, and market feasibility of transit-oriented development. The project created an alternative land-use and transportation plan for Washington County (the project's study area), published research on the impacts of pedestrian-friendly design, and produced a set of design and zoning guidelines for transit-oriented development.

It is the project's secondary objective – to promote development patterns that reduce land consumption, vehicle trips, and air pollution nationwide – that is the mission of this report. As traffic congestion presses in on metropolitan areas across the country, more and more communities are searching for solutions. The lessons of the LUTRAQ project, gleaned from years of research, analysis, and grassroots involvement, are as relevant in Portland, Maine, as they are in Portland, Oregon.

This booklet reviews the history and key findings of the LUTRAQ project in the Portland area and gives examples of how other cities are addressing similar problems. It is intended to provide citizens, policymakers, and planners with a summary of the process, methods, and findings from the project without elaborating on technical details. Information about the methods and models used in the project may be found in the following technical reports:

Vol. 1, Modeling Practices, 1991.

Vol. 2, Existing Conditions, 1991.

Vol. 3, The LUTRAQ Alternative, 1992.

Vol. 3A, Market Research, 1992.

Vol. 4, Model Modifications, 1996.

Vol. 4A, The Pedestrian Environment, 1993.

Vol. 4B, Building Orientation, 1994.

Vol. 5, Analysis of Alternatives, 1996.

Vol. 6, Implementation, 1995.

Vol. 8, Making the Connections: Technical Report, 1997.

Site Design and Travel Behavior: A Bibliography, 1993.

This booklet is organized into three sections. The first section describes the problems the LUTRAQ project sought to address: dispersed land-use patterns that encourage auto use and reliance on new highway capacity to relieve congestion. The second section reviews the project's technical and political processes, focusing on three key factors in developing integrated land-use and transportation solutions: land-use plans and design standards, transportation investments, and market strategies. The section addresses several topics associated with LUTRAQ, including the design of transit-oriented development and the impact of the pedestrian environment on travel choices. The final section makes the connection between LUTRAQ and similar projects in North America.

We hope this booklet will help you "make the connections," too, as you work to build better communities in your region.

THE CHALLENGE OF GROWTH

Driven To Crisis

The high price of suburban sprawl

Metropolitan areas across the United States are facing problems fueled by decades of suburban sprawl and heavy dependence on the automobile: traffic congestion, long commutes, loss of natural resource land, vanishing open spaces, air and water pollution, neighborhood and inner city deterioration, and the rising cost of public services.

Demand for land and mobility continue to increase, driven by many factors, including population, household, and employment growth in metropolitan areas, rising income, and stable fuel prices. At the same time, governments are facing the fact that they can no longer provide the highways and other public services that new development requires at the quantity, quality, and price citizens now expect.

Congestion is worsening in most metropolitan areas. A recent study shows that between 1986 and 1990, total hours of delay increased in 39 of the 50 cities reported (Bureau of Transportation Statistics 1994). Solutions that add more highway capacity can be expected to provide only temporary relief. Few planners or engineers believe congestion can be reduced or even maintained at current levels. As the cost of highway expansions is rising, taxpayers' willingness to pay those costs is decreasing. Add to that the high cost of maintaining existing highways, and governments are hard pressed to finance new projects. The American Public Works Association (1996) reports that it would cost approximately $290 billion to eliminate existing highway and bridge deficiencies in the United States.

In most metropolitan areas, the suburbs have absorbed the lion's share of growth. In 1950, nearly 70 percent of the population in metropolitan areas lived in central cities. By 1990, that situation had reversed, with more than 60 percent living in suburbs (Rusk 1993). Beyond the urban core, land has been less expensive, and new highway capacity to serve it has been relatively easy to add. As a result, developed land area and vehicle use has increased much faster than population growth (Federal Highway Administration 1993). This suburban growth pattern has kept single-family housing prices within the range of many households, but often at the price of longer commutes. Moreover, some evidence sug-

Percent Change in Population and Daily Vehicle Miles Traveled (VMT) for Selected Urbanized Areas, 1989–1994

Urbanized Areas	Population	Daily VMT
New York	2.3%	4.6%
Los Angeles	7.0%	5.2%
Chicago	5.5%	22.2%
San Francisco	7.1%	3.9%
Dallas-Ft. Worth	6.4%	25.2%
Houston	4.8%	4.2%
Phoenix	14.1%	32.1%
Seattle	13.8%	11.4%
Denver	3.4%	30.3%
Portland-Vancouver	11.6%	19.2%
Sacramento	15.8%	11.6%
Las Vegas	148.3%	59.3%
Spokane	7.6%	29.0%

Note: Urbanized areas comprise one or more central places and the adjacent urban fringe having a density of at least 1,000 persons per square mile. Areas defined as "urbanized" grow as surrounding land develops to this minimum density.

Source: Federal Highway Administration (1990, 1995)

National Journey to Work Comparisons, 1980 & 1990

Percent of All Workers	1980	1990	Change
Driving Alone	64.4%	73.2%	13.7%
Carpooling	19.7%	13.4%	-32.0%
Public Transit	6.4%	5.3%	-17.2%
Other Modes	1.6%	1.3%	-18.8%
Walking or Working at Home	9.5%	6.9%	-27.4%

Source: Volpe National Transportation Systems Center, as reported by Pisarski (1990)

Percentage Growth in Population and Population Density for Selected Metropolitan Areas, 1950–1990

Urbanized Area	Growth in Population	Change in Density
New York	30%	-45%
Los Angeles	185%	26%
Chicago	38%	-38%
San Francisco	80%	-41%

Note: Density is in terms of persons per square mile. Urbanized areas comprise one or more central places and the adjacent urban fringe having a density of at least 1,000 persons per square mile. Areas defined as "urbanized" grow as surrounding land develops to this minimum density.

Source: U.S. Census Bureau, as reported in Cox (1996)

The costs of sprawl

Numerous studies have addressed the costs of sprawling versus compact development. While results are varied, many conclude that infrastructure costs are lower in high-density communities.

- A 1995 review of three major studies summarized the relative infrastructure costs of compact versus standard development patterns.

Relative Infrastructure Costs of Compact Development Relative to Standard Development Patterns

Findings From Three Major Studies				
Type of Facility	Duncan 1989	Frank 1989	Burchell 1992	Synthesis[a]
Roads	40%	73%	76%	75%
Schools	93%	99%	97%	95%
Water & Sewer	60%	66%	95%	95%
Other	102%	NA	NA	100%

[a] Represents a synthesis or consensus from the three studies, as reported by Burchell and Listokin.

Source: Burchell and Listokin (1995)

- The American Farmland Trust (1995) found that distributing the same amount of population growth between 1995 and 2040 over slightly less than one-half million acres, instead of slightly more than one million acres, would create cumulative savings for taxpayers of $29 billion. The low-density growth pattern would produce a cumulative local government deficit of over $1 billion.
- Another recent report (Bank of America et. al. 1995) found that the social, environmental, and economic costs of sprawl threaten to inhibit economic growth and degrade quality of life in California.

gests that the full costs of development in the suburbs are not paid by the people who choose to live and work there.

Citizens surveyed about growth consistently cite concern over congestion, air quality, sprawl (including loss of farmland, open space, and community), and change. They also report that they don't want growth to strip them of a sense of neighborhood and community, qualities they value. While citizens perceive the problems of metropolitan growth, they are skeptical that current policies and institutions can solve them (Deakin 1989, ECONorthwest 1994, Myers 1987). In short, many people believe that land development and traffic growth threaten their quality of life, and they question the ways in which that growth has been accommodated.

Seeking Solutions

Planning for livable communities

Planners and policymakers have long known that land development, transportation investment, and air quality are related, but for both technical and political reasons, simultaneously planning for all of them has rarely occurred. In the last five years, planners in metropolitan areas have increased their efforts to bring together different agencies, with different responsibilities, to develop integrated regional plans. The LUTRAQ project explored ways to achieve such integration.

The LUTRAQ project began with the assumption that good planning for metropolitan areas must integrate three key elements: land-use policy, transportation investments, and supportive market strategies.

- **Land-use policy**. Land-use planning is logically, and traditionally, at the core of a metropolitan area's efforts to create its future. While most traditional land-use plans set standards for new development, many of these standards actually work to facilitate, or even promote, sprawl. To avoid a sprawled future, land-use plans need to promote more compact development, reduce reliance on the automobile, and protect open spaces.
- **Transportation investments**. While many resources are currently allocated for highways, integrated planning must explore the benefits of investing in alternative modes of transportation (transit, bicycle, and pedestrian). Metropolitan areas are now encouraged to do this by the planning requirements and flexible funding of the Intermodal Surface Transportation Efficiency Act.

- **Market strategies**. Many public policies affect the market climate in which growth and transportation choices occur, thereby influencing the type and location of land development and the mode and destination of trips. In integrated planning, market strategies need to be employed to support the land-use and transportation objectives noted above. These strategies could include one or more of the following: parking pricing, congestion pricing, carpooling and transit incentives, economic development incentives for targeted locations, infrastructure fees, and tax policies.

Metropolitan areas face complex land-use, transportation, and environmental-quality problems that cannot be solved with simple measures. Change can occur, however, by addressing the issues from new perspectives and by weaving together a number of mutually supportive strategies.

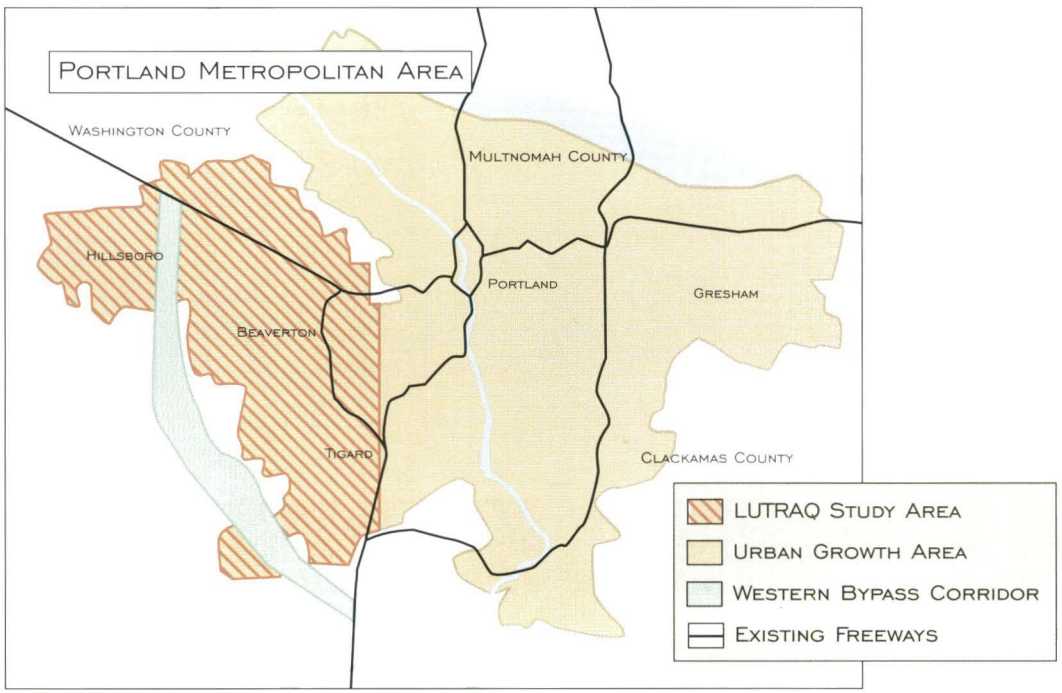
Land use and population growth

- Chicago metro area population grew by 4 percent between 1970 and 1990, but the region's land area grew by 35 percent (Northeastern Illinois Planning Commission 1995).
- Seattle metro area population grew by 38 percent between 1970 and 1990. During the same period, the region's land area increased by 87 percent and vehicle miles traveled ballooned by 136 percent (Arrington 1996).
- Kansas City's urban and suburban population expanded by 29 percent from 1960 to 1990, while total land area grew 110 percent (Kansas City Star 1995).

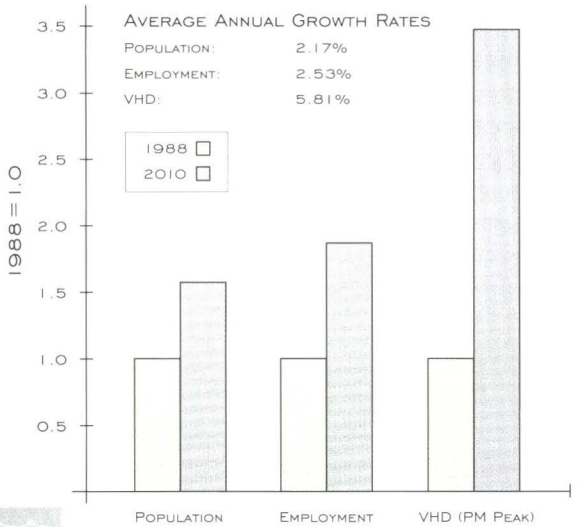
Portland At The Crossroads

Trouble in paradise

Expanses of forest and fertile farmland, rushing rivers, and striking mountains surround the Portland metropolitan area. Nestled in the northwestern corner of Oregon, the region encompasses portions of three Oregon counties with a combined population of 1.2 million people. By the year 2040, the population is expected to increase by 760,000.



Population, Employment & Vehicle Hours of Delay – LUTRAQ Study Area (1988 & 2010)



SOURCE: OREGON DEPARTMENT OF TRANSPORTATION (1995)

This farmland, which lies in the path of the proposed Western Bypass, is as productive as it is beautiful; in 1995 Washington County farms produced more than $183 million in sales, putting the county fifth among Oregon's 36 counties.

Leading the region in growth is Washington County with an urban area of approximately 100 square miles in the western part of the metropolitan area. By 2010, the county will be home to 150,000 new residents and 100,000 new jobs.

Washington County has developed according to a typical auto-oriented, low-density, single-use development pattern. Only 3 percent of work trips are by transit, compared with 7 percent for the region as a whole. The county's segregated land-use patterns separate people's homes from the places they need to go; most people must use their cars to get to every destination.

Rapid growth, dispersed development patterns, and almost exclusive reliance on the automobile have combined to create heavy traffic and congestion. According to forecasts, traffic on main highways is expected to grow at twice the rate of population over the next 20 years. With traffic worsening, the initial political response was "build a new freeway."

Challenging assumptions

In 1988, the Oregon Department of Transportation (ODOT) and the political leadership of Washington County were close to agreement on building a new freeway, the Western Bypass. In response, 1000 Friends of Oregon initiated the LUTRAQ project.

By challenging conventional assumptions, the LUTRAQ project charted new territory in land-use and transportation planning. LUTRAQ did not accept the assumptions that providing mobility to a growing population required highways on an ever larger scale, that alternative modes would never provide significant relief from the need for auto trips, or that the number and length of trips could not be reduced by changes in land-use and other policies. Instead, LUTRAQ presented new assumptions that were tested by careful analysis of market and demographic trends. The result was the LUTRAQ alternative, a different plan for land use and transportation that was added to ODOT's environmental impact statement process for the Western Bypass and, ultimately, adopted as part of the region's vision for the future.

A vision of choice

The LUTRAQ alternative envisions suburban neighborhoods where adults and children can choose how they travel to and from life's destinations. It suggests new residential and commercial patterns that emphasize connected streets, sidewalks, convenient and comfortable access to transit, mixed uses, human-scale design, and open space.

To transform that vision into a reality, LUTRAQ proposed three principles for public action:

- Land-use plans should direct higher intensity development to locations well-served by transit and should ensure that development is designed for pedestrians, bicyclists, and transit riders, as well as auto drivers.
- The transportation system should serve and reinforce the nature of that development.
- Market strategies should further support that development by correcting some of the current distortions in the pricing of the transportation system and other public facilities.

Retail commercial development can be designed in a number of ways. Options include auto-dependent designs that lack human scale and connections to homes, schools, and other key destinations and pedestrian-friendly designs that invite walking and bicycle travel.

Transit-oriented development objectives

- Increase use of existing urbanized areas accessible to transit through:
  Infill – putting new development on passed-over vacant parcels in existing developed areas;
  Redevelopment – replacing older structures with new ones of different and denser uses in existing developed areas.
- Reduce the number of auto trips by creating opportunities to walk, bike, and use transit.
- Create a local street network that allows direct connections to local destinations without diverting extra traffic onto the arterial and highway system.
- Protect the natural environment and community character by reducing the need for roadway expansions.
- Reduce air pollution and conserve energy.
- Provide a range of housing types to serve diverse households.
- Foster a vital, connected, and secure community.

Transit-oriented development characteristics

The right location. Proximity to transit is a key factor in TOD site selection.

Connected streets. TODs provide an internal, interconnected system of tree-lined, reduced-speed streets that link local destinations, thereby reducing congestion on nearby arterials.

A walkable environment. TODs bring many destinations in close proximity, reinforcing the opportunity to run errands in a short period, without a car.

A mixture of uses. TODs incorporate residential and commercial uses, parks, and public facilities that can be reached without driving.

THE PROCESS OF CHANGE

Land Use That Supports Multi-Modal Transportation

Transit-oriented development

The characteristics of transit-oriented development (TOD) aren't new. They are, in fact, similar to those of American urban neighborhoods developed in the first half of this century. Families can walk a few blocks to buy groceries, mail a package, or share a meal. Houses are closer together, with front porches that create opportunities for connections with neighbors. Cars are parked behind houses in garages located off alleyways. Traditional street grids, rather than cul-de-sacs, provide direct connections to local destinations.

Denser, mixed-use developments also make it more likely that people will use transit for trips that are too far for walking. With more people living close to light-rail or bus transit centers, transit providers can offer a convenient alternative to automobiles by providing more frequent service. LUTRAQ's analysis illustrated that linking a series of these developments to a reliable transit network can significantly reduce the number of car trips by providing a convenient, reliable alternative to driving.[1]

The LUTRAQ alternative focuses on three general varieties of transit-oriented developments, each with its own purpose and qualities: Mixed-Use Centers, Urban TODs, and Neighborhood TODs.

Mixed-Use Centers

Mixed-Use Centers incorporate new commercial, office, and residential uses into existing "city centers" and emerging employment and retail centers. These areas are planned to contain the highest commercial intensities and residential densities, as well as the greatest mix of shopping, jobs, and housing within walking distance of transit. All are served by existing or planned light-rail transit.

The LUTRAQ analysis aimed to allocate about 40 percent of the land in Mixed-Use Centers for residential development

[1] See LUTRAQ Vol. 8: *Making the Connections: Technical Report* for details of the modeling and assumptions that led to this conclusion.

(ranging from 12 to 50 units per net acre), 15 percent for retail commercial (primarily in ground-floor locations), 30 percent for high-intensity employment such as offices, and 15 percent for low-intensity employment such as light industrial.

Urban Transit-Oriented Developments

Urban TODs are planned for lands located outside Mixed-Use Centers in areas that are more appropriate for residential uses than office and employment centers. They are situated around light-rail stations and express-bus stops. The LUTRAQ analysis aimed for residential densities in Urban TODs ranging from three-story apartment buildings (30 units per net acre) to small-lot single-family houses (seven units per net acre), with an average of 15 units per net acre.

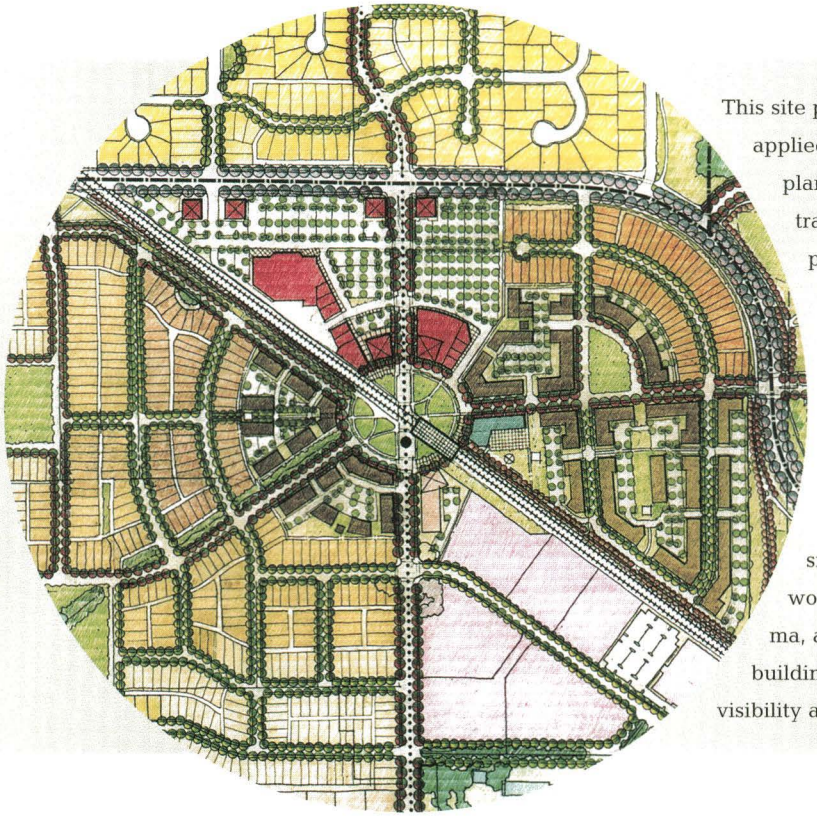
Transportation Impacts Of Transit-Oriented Development

	Standard Suburban Development	Transit-Oriented Development
Auto Ownership		
Percentage of Homes Owning 0-1 Autos	29.4%	44.1%
Average No. of Autos/ Household	1.91	1.63
Work Trip Mode Choice:		
Walk/Bike	2.8%	5.0%
Transit	7.5%	28.2%
Carpool	14.0%	17.2%
Drive Alone	75.8%	49.6%
Vehicle Trips/Household	7.53	5.79

Source: LUTRAQ Vol. 5: Analysis of Alternatives

Neighborhood Transit-Oriented Developments

Neighborhood TODs are planned for lands located on feeder bus lines within 10 minutes of light-rail or express-bus stops. These areas place a greater emphasis on residential uses and locally oriented shopping than the other development



This site plan demonstrates how TOD principles might be applied to a Washington County site that surrounds a planned light-rail stop. The area currently has large tracts of vacant and underutilized land in close proximity to the light-rail station at 170th Avenue. Most existing housing is single family, with some pockets of multi-family housing and industrial and institutional uses. The site plan establishes a new neighborhood center with retail and civic uses adjacent to the planned light-rail station. This center is surrounded with moderate and high-density residences and various forms of small-lot single-family housing. The retail center would contain a major grocery store, a six-plex cinema, ancillary shops, and a small professional office building, arranged to provide convenient access and visibility along the arterial.

types. As with all TODs, the interconnected street system focuses trips to the core commercial area, rather than exclusively to the arterial street system.

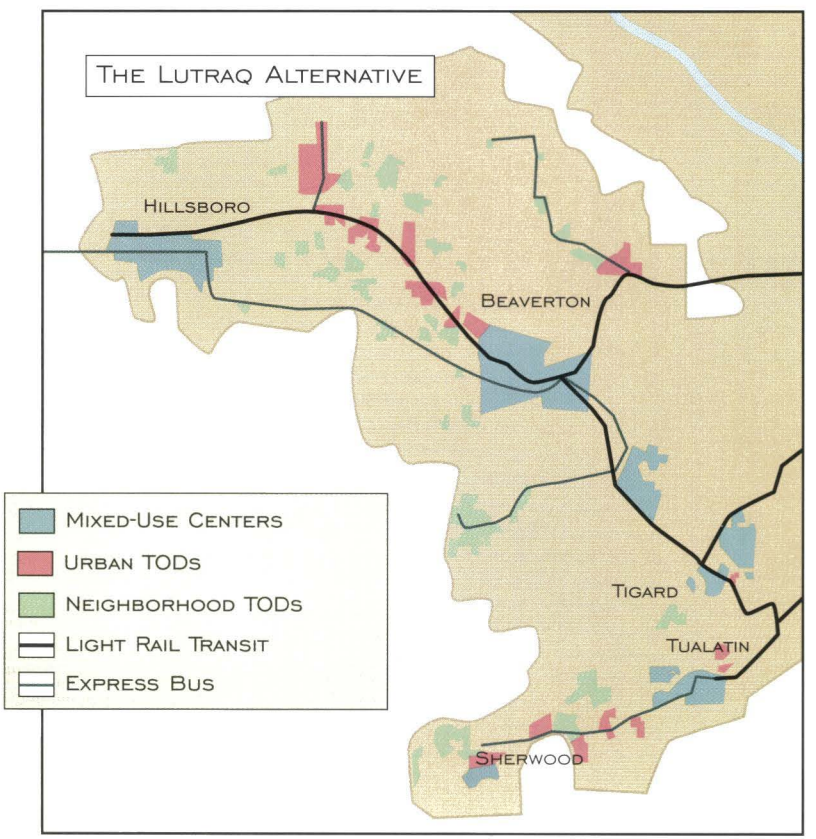
For residential uses in Neighborhood TODs, the LUTRAQ analysis assumed densities ranging from town houses (20 units per net acre) to standard single-family houses (five units per net acre), with an average of eight units per net acre.

From principle to practice

Incorporating transit-oriented development into an alternative for an environmental impact statement process required thorough analysis of demographic projections, vacant and underutilized lands, and market trends. The analysis revealed several factors favoring development of TODs:

- Increasing demand for multi-family housing
- Rapid growth in retail employment
- A good supply of land in proximity to existing or planned transit routes

The LUTRAQ land-use plan incorporates the three types of transit-oriented developments. Mixed-Use Centers include the most intensive configuration of jobs, retail, and housing. Urban TODs include moderate to high residential densities and a core area of commercial retail and services. Neighborhood TODs include moderate-density residential and local-serving retail.

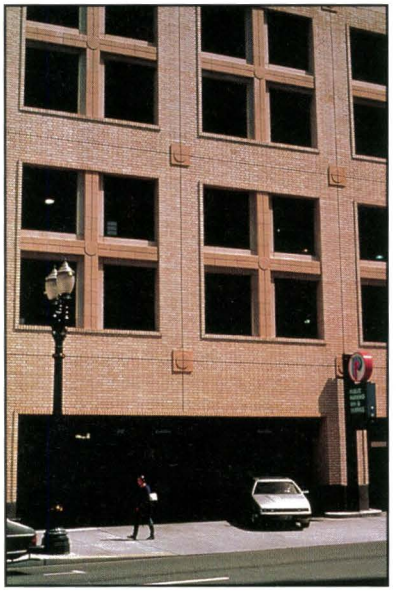


More than 22,000 acres, approximately one-third of the land inside the urban growth boundary in Washington County, were identified as vacant or underutilized. From this supply, unbuildable lands (wetlands, steep slopes, and protected areas) were removed. Of the remainder, lands within one-half mile of the light-rail and express-bus system were considered eligible for Mixed-Use Centers and Urban TODs, lands within two miles of that system were deemed eligible for Neighborhood TODs, and the balance was slated for low-density residential use.

The Transportation Link

The transportation element of the LUTRAQ alternative relies upon existing transit plans for the Portland metropolitan area. The facilities contained in those plans, some of which are already under construction, are designed to serve areas targeted for population and employment growth. Building on these plans, the LUTRAQ alternative includes the following features:

- **Light rail**. New residential and commercial development is oriented along two new light-rail corridors that radiate west from the region's urban center, plus a circumferential light-rail line along the existing suburban beltway.
- **Express bus**. Outlying areas are served by express buses to major activity centers.
- **Local feeder buses**. Feeder buses serve residential areas not directly served by light rail or express buses, providing convenient connections to a trunk line service.
- **Demand-responsive transit**. This program includes dial-a-ride, shared ride, and shuttle services to destinations within a specific subarea at fares equal to regular transit fares.
- **Bicycle and pedestrian improvements**. These facilities include sidewalk networks, safe and convenient street crossings, and bicycle and pedestrian pathways.
- **Roadway improvements**. Modest improvements to the roadway network allow existing roads to be used more efficiently.



Market Strategies

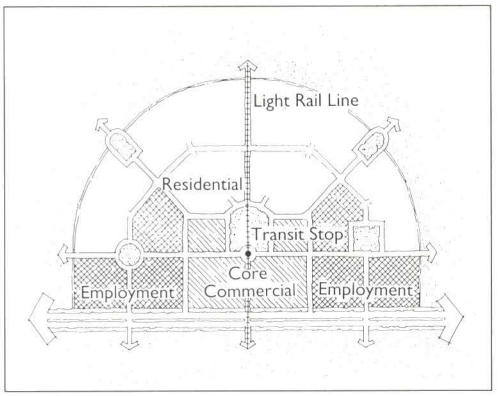
The land-use and transportation elements of the LUTRAQ alternative can be fully successful only if they are supported by other public policies, particularly those that affect market conditions for land development and transportation. Many analysts argue that automobile drivers do not pay the full costs they impose on society. Raising the costs of auto travel, coupled with making alternatives more attractive, creates incentives to reduce auto use. Indirectly, these changes also encourage development in transit-oriented areas.

Transportation costs can be adjusted by increasing the price or reducing the supply of parking, supporting employer programs to encourage carpooling and transit use, and charging for highway use by location and time of day (congestion pricing). The following policies were included in the LUTRAQ alternative:

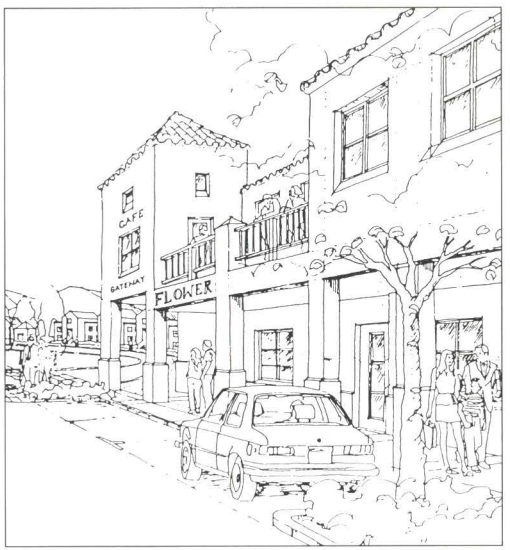
- **A daily parking charge**. This charge applies to all commuters who drive alone to work sites in the study area. The parking charge is $3 per day, approximately one-third the cost of parking in downtown Portland. Carpooling commuters and drivers with non-work destinations are not subject to the charge.
- **A free monthly transit pass**. Everyone working within the study area could ride transit for free. The alternative proposes that this program is at least partially funded by revenue from parking charges.

From Vision To Action

Obviously, planning for transit-oriented developments must occur before they can be built. To build them, local governments must first adopt design guidelines or zoning regulations that encourage, or at least make possible, transit-oriented development. Ideally, new standards should accomplish the following:



- **Transit stops**. Stops should be located adjacent to core commercial areas. Whenever possible, transit stops should be adjacent to commercial buildings, rather than surrounded by large parking lots.
- **Street configuration**. All streets should provide direct auto, bicycle, and pedestrian connections to transit, core commercial areas, schools, and parks. They should be designed and landscaped to make them attractive for users of all transportation modes. The street system should provide multiple routes between core commercial areas and surrounding neighborhoods without requiring use of major arterials.
- **Pedestrian connections**. Pedestrian routes should be adjacent to, or visible from, streets and be linked to local destinations and building entrances. Where street connections are not feasible, short pedestrian paths should be provided.
- **Commercial configuration**. Retail and commercial space should be clustered close to transit stations or stops.
- **Building entries**. Commercial building entrances should be oriented to plazas, parks, or pedestrian-oriented streets, rather than interior blocks or parking lots.
- **Building setbacks**. Building setbacks should be reduced and standardized to provide closure for the street space and to establish a consistent building line.
- **Mixed housing**. Transit-oriented developments should encourage a mix of housing densities, ownership patterns, prices, and building types.
- **Minimum densities**. Minimum densities should be established for both commercial and residential development.
- **Parks and public uses**. Parks and plazas should be placed next to public streets, residential areas, and retail uses to create community focal points. They should not be formed from residual areas, used as buffers to surrounding developments, or used to separate buildings from streets.
- **On-street parking**. All streets except major arterials



should provide on-street parking. Where feasible, landscaping and bikeways should be added to existing streets.

- **Off-street parking**. Off-street parking should be located in surface lots on the side or at the rear of buildings, underground, or in parking structures. It should not be located between a building and a pedestrian route, an adjacent transit street, or a light-rail transit station site.
- **Parking configuration**. Parking lots should not dominate pedestrian-oriented streets or interrupt pedestrian routes. Large surface parking lots should be divided into smaller lots that resemble city blocks.
- **Integrated uses**. Site plans should integrate existing uses by respecting ongoing operations, basic access requirements, and, if appropriate, existing building massing and architecture.
- **Auto-oriented uses**. Auto-oriented uses should be limited or prohibited.

Motivating developers to build transit-oriented developments requires more than supportive design guidelines and zoning ordinances. Economic incentives, which reduce the costs developers must bear, are also helpful. These can include fee reductions, decreased parking requirements, faster permit approvals, density bonuses, master planning and infrastructure development, and public investments in pedestrian facilities and parks.

Comparing The Alternatives

LUTRAQ makes a difference

The LUTRAQ alternative was compared to several more traditional approaches to addressing transportation needs: a "No Build" option, in which population, employment, and travel grew but transportation capacity did not, and a "Highways Only" option, in which new highway capacity, including the Western Bypass, was added to accommodate growth.

The analysis showed that, at the end of 20 years, the LUTRAQ alternative had the potential to be superior to the "Highways Only" option on all key criteria used in the evaluation:

- 22.5 percent fewer work trips made in single-occupant vehicles
- 27 percent more trips made on transit and by walking and biking
- 18 percent less highway congestion with 10.7 percent fewer hours of vehicle travel during the afternoon rush hour
- 21 percent greater access to jobs in the region, as measured by the percentage of the study area within 30-minutes travel of 500,000 jobs
- Reduced emissions of air pollutants: hydrocarbons (-6 percent), nitrogen oxides (-8.7 percent), and carbon monoxide (-6 percent)
- 7.9 percent fewer emissions of greenhouse gases (methane, nitrous oxide, and carbon dioxide)
- 7.9 percent less energy consumed

The advantages of the LUTRAQ alternative over the highway alternative were even stronger for households and businesses located within transit-oriented developments.[2]

LUTRAQ vs. Alternatives

	No Build	Highways Only	LUTRAQ	LUTRAQ TOD Areas Only
Work Trip Mode Choice:				
Walk/Bike	2.8%	2.5%	3.5%	5%
Transit	7.5%	8.8%	18.2%	28.2%
Carpool	14%	13.6%	20.1%	17.2%
Drive Alone	75.8%	75.1%	58.2%	49.6%
Vehicle Trips/Household	7.53	7.5	7.17	5.79
Vehicle Hours of Delay (compared to No Build)	–	-43%	-53.2%	
Vehicle Miles Traveled (compared to No Build)	–	1.6%	-6.4%	

Source: LUTRAQ Vol. 5: Analysis of Alternatives

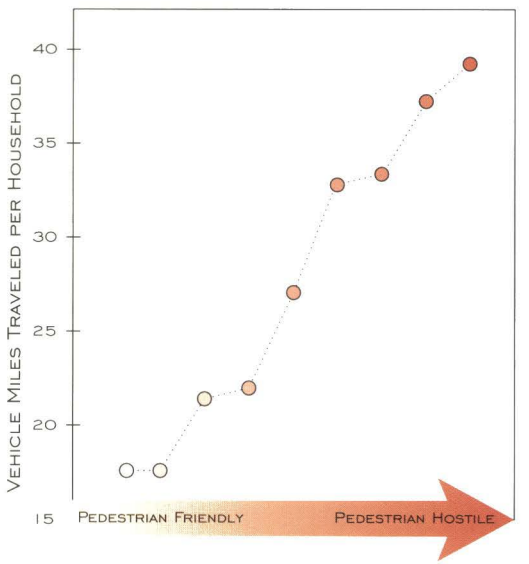
[2] For more information on the results of the LUTRAQ analysis, see LUTRAQ Vol. 5: *Analysis of Alternatives.*

Pedestrian Environment Factor

The Pedestrian Environment Factor (PEF) was created as a new variable to enhance Portland-area travel forecasting. The PEF measure, developed by Metro staff with the LUTRAQ project team, is a composite of four attributes of a neighborhood's natural and built environment – ease of street crossings, sidewalk continuity, local street connections, and topography (slopes).

Though many other factors go into creating a pedestrian-oriented environment, these four attributes are significant in classifying a neighborhood's pedestrian friendliness. The LUTRAQ analysis revealed that households in neighborhoods with the highest PEF ranking traveled in vehicles less than half as many miles as households in the lowest PEF neighborhoods. When other variables such as household size and income were held constant, the quality of the pedestrian environment still showed a significant effect. The data suggested that transforming a pedestrian-hostile neighborhood into one that is pedestrian friendly could result in a 10 percent reduction in vehicle-miles traveled per household.

Pedestrian Environment/Miles Traveled



Source: LUTRAQ Vol. 4A: The Pedestrian Environment

New land-use and transportation models

The kinds of comparisons shown above were possible, in part, because of analytic procedures developed by the LUTRAQ project. For example, LUTRAQ improved the standard process of travel demand forecasting by quantifying a new concept—the Pedestrian Environment Factor (see sidebar). However, LUTRAQ was less successful in predicting accurately how highway and transit investments affect land-use patterns. New and better tools are still needed to measure the interaction between land use and transportation.

Changing Policy

The LUTRAQ success story

Without the LUTRAQ project, Washington County would likely be headed toward very different transportation solutions. In 1990, the Oregon Department of Transportation was considering only highway, arterial, and "no-build" alternatives for Washington County. In 1992, the LUTRAQ alternative was published, and, with the help of the citizens group Sensible Transportation Options for People (STOP), was included in ODOT's environmental impact statement process.

In May 1995, that process determined the potential impacts of five alternatives, ranging from LUTRAQ to the Western Bypass. The analysis showed that the LUTRAQ alternative was the only option, other than the "no-build" alternative, that would conform with the requirements of the federal Clean Air Act. It also showed that the Western Bypass was inconsistent with Oregon's growth containment policies. In the summer of 1996, ODOT recommended a preferred alternative that includes only limited road improvements and endorses the land-use concepts in the LUTRAQ alternative. The Western Bypass was officially out of the game.

Beyond the borders of Washington County, LUTRAQ has also influenced regional and state policies. In 1994, Metro, the regional planning agency for the Portland metropolitan area, adopted a 50-year land-use and transportation plan (see page 24). The Washington County portion of the plan is virtually identical to the LUTRAQ alternative.

At the state level, the LUTRAQ project affected the content of the Oregon Transportation Planning Rule, which requires that local and regional governments in the Portland area promote compact, pedestrian, and transit-friendly development, reduce per capita vehicle-miles traveled, and evaluate

potential land-use plan changes as part of their transportation planning processes.

Grassroots action

In addition to its technical and policy achievements, LUTRAQ offers a number of valuable lessons about how a grassroots movement can influence regional planning.

- **Plug into the process**. Active involvement in the public process is essential in effecting change. Although working outside the public process can be effective in raising public awareness, it is usually only inside the process that positive alternatives can gain acceptance. In the case of the Western Bypass, 1000 Friends of Oregon and STOP began by filing lawsuits against the project. To be effective in promoting a positive alternative to the bypass, however, it was necessary for the two organizations to participate in the environmental impact statement process.
- **Don't reinvent the process**. LUTRAQ did not spend time creating a new process for developing alternatives. Rather, it followed a process that is typical of planning projects:

  1. Clarify the project scope
  2. Decide who will be involved
  3. Define a range of alternatives
  4. Determine performance measures for comparing alternatives
  5. Simulate alternatives and interpret results
  6. Implement the preferred alternative

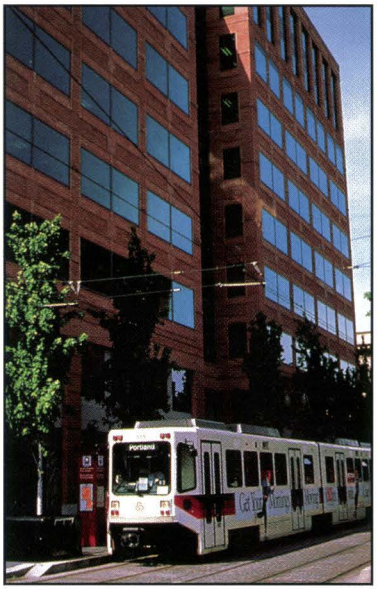
- **Work outside the box**. Working beyond established limitations is as important as playing the game. While working within the environmental impact statement (EIS) process, LUTRAQ was able to expand the typical definition of a transportation alternative to include demand management and land-use changes. LUTRAQ also funded independent analysis of its alternative in a way that allowed the results to feed back into the process. Finally, LUTRAQ extended its reach by carrying the alternative beyond the EIS and into the regional planning process.
- **Approach agencies as allies**. Grassroots organizations and government agencies are not necessarily at odds in the planning debate. However, governments are often limited by procedural and political constraints that do not impede citizens groups. Local grassroots organizations like STOP and 1000 Friends of Oregon were able to propose a solution that moved the debate into new territory.

CASE STUDIES

LUTRAQ is only one of many projects that have contributed to progress in transportation and land-use planning in North America. A number of other examples follow.

Transportation Alternatives

The requirements of the federal Intermodal Surface Transportation Efficiency Act have prompted more metropolitan areas to incorporate non-automobile transportation alternatives into their transportation planning processes. Many regions now emphasize the relationships between these alternatives and land use in their transportation plans.



Rail

Regions considering rail systems today focus on light rail or commuter rail, which are more economical to develop than heavy rapid transit systems. In 1995, 17 U.S. cities had light-rail lines, and extensions were being planned or were under construction in each. At least 12 additional cities were planning or designing light-rail systems. In 1995, 10 U.S. cities had commuter rail lines and all but one were planning, designing, or building extensions. At least eight more cities were planning or designing new commuter-rail systems.

Portland, Oregon

The light-rail system in the Portland metropolitan area opened in 1986 with a 15-mile line from downtown Portland east to the suburban community of Gresham. An 18-mile expansion is currently under construction from downtown Portland west through Beaverton and Hillsboro, both of which are part of the LUTRAQ study area. A third line extending south and north of downtown is being planned.

Land-use planning in the region now concentrates new development near light rail lines. Plans for westside station areas incorporate many of the concepts included in the LUTRAQ alternative.

Busways

Ottawa, Canada

Ottawa boasts one of the most successful transit systems in North America. The city's extensive busways provide service with the frequency and quality of many rapid rail systems. But the system has the flexibility to serve low-density residential neighborhoods with the same vehicles.

Busway service is frequent (three minutes in the peak, five minutes during the day) and fast (45 to 60 km per hour). With ridership at about 200,000 per day, sites adjacent to the busway are very attractive to developers. In fact, Ottawa's regional plan requires that large shopping centers and employment centers with 5,000 or more employees be located within a five-minute walk of busway stations.

Pittsburgh, Pennsylvania

Pittsburgh's busway system, which utilizes surplus railroad properties, has two lines operating and a third under construction. The 6.8-mile Martin Luther King Jr. Busway opened in 1983. A trip the length of the busway takes 10 to 15 minutes compared to 52 minutes for a parallel route on city streets. Ridership is equally divided between people who board at busway stations and those who board non-stop buses to downtown from neighborhood stops.

Bicycling and walking

Davis, California

Bicycles are used for about one-fourth of all commute trips in Davis. While students and employees at University of California-Davis do much of the pedaling, 7 percent of private sector workers use bicycles as their primary mode of commuting. The city and the university encourage bicycle use with an extensive linked network of bike lanes, active enforcement of motor vehicle and bicycle laws, and policies that limit cars on campus.

Minneapolis–St. Paul, Minnesota

The Twin Cities are developing bicycle expressways on abandoned railroad rights-of-way. These expressways provide barrier-free commuting routes that are separated from vehicle traffic. The University of Minnesota, which has 60,000 daily commuters, is developing expressway connections and additional bicycle facilities on its two campuses in an effort to increase bicycle commuting from 5 percent to 20 percent by 2000 (8 percent in winter).

Boulder, Colorado

Walking and bicycling are transportation priorities in Boulder. The city's two popular pedestrian facilities, the Boulder Creek multi-use path and the Downtown Pearl Street Pedestrian Mall, enjoy heavy use. The city's transportation plan includes projects to make the pedestrian environment safer and more convenient and comfortable. This includes a program to bring all sidewalks up to code and create pedestrian-oriented transit facilities.

Pricing Road Use

Congestion pricing

Pricing road use relative to demand is a transportation management strategy being more widely considered. By charging drivers more during peak travel periods, this approach has the potential to impact a number of problems related to congestion, including:

- Overuse of highways
- Excessive travel delays
- Air pollution
- Excessive fuel and resource consumption
- Transit and carpool handicaps
- Inefficient investment in roadway capacity
- Sprawling, auto-based development

Advances in Automatic Vehicle Identification (AVI) systems have provided the collection technology necessary to implement detailed road pricing. Electronic AVI systems use wayside detectors to "read" electronic tags on passing vehicles. Road use charges can then be determined by type of vehicle, time of day, miles traveled, and even weight or length.

In the western United States, Boulder, Seattle, Portland, San Francisco, and Los Angeles have completed or are conducting road pricing studies. Because of its potential benefits, many policymakers are considering how to implement road pricing despite controversy and setbacks. Internationally, road pricing implemented in Singapore, Hong Kong, and Norway has reduced congestion as expected. After years of discussion, the first U.S. road pricing demonstration has been launched on SR-91 in Southern California. AVI systems are now located on SR-91 and will be in place on nine San Francisco Bay Area bridges. AVI systems also operate in some Norwegian cities, and Singapore is using them to automate region-wide variable road pricing without toll gates.

Alternatives to congestion pricing

Some transportation planners recommend pricing measures based on vehicle use or ownership when congestion pricing is not feasible. Frequently suggested vehicle use-based measures include:

- **Parking charges**. Raising parking prices within congested corridors can achieve some of the same effects of road pricing.

- **VMT charges**. The notion of a flat charge per mile traveled has gained popularity as a long-term replacement for motor fuel taxes.

The LUTRAQ project modeled both a parking charge and an approximation of congestion pricing. In the parking charge scenario, parking was priced at $3 per day for commuters who drive to work alone. This component was included in the LUTRAQ alternative, paired with a transit pass subsidy. Together, these two pricing instruments roughly doubled the transportation impacts of LUTRAQ's transit-oriented developments, having approximately the same impact as the alternative development pattern.

Transportation Impacts Of Congestion Pricing

	No Build	LUTRAQ	LUTRAQ w/ Congestion Pricing	LUTRAQ w/ Congestion Pricing (TOD Areas Only)
Work Trip Mode Choice:				
Walk/Bike	2.8%	3.5%	4%	5.7%
Transit	7.5%	18.2%	21.1%	32.1%
Carpool	14%	20.1%	19.6%	16.4%
Drive Alone	75.8%	58.2%	55.3%	45.7%
Vehicle Trips/Household	7.53	7.17	7.07	5.67
Vehicle Hours of Delay (compared to No Build)	–	-53.2%	-65.9%	
Vehicle Miles Traveled (compared to No Build)	–	-6.4%	-13.2%	

Source: LUTRAQ Vol. 5: Analysis of Alternatives

The congestion pricing scenario added to the LUTRAQ alternative a charge of 15 cents per mile for auto trips made to and from work. This option focused the road pricing charge on vehicles that contribute most of the congestion costs, but did not vary the charge by the roads used. In spite of this limitation, congestion pricing resulted in the largest reduction in vehicle delay and the largest increase in non-auto trips of all the alternatives tested.

New Forms Of Land Development

In response to sprawling suburban development, some designers and planners have suggested new development patterns that draw on styles common in neighborhoods of the early 1900s. These patterns incorporate mixed uses, higher commercial and residential densities, an orientation to transit access, a network of interconnected, pedestrian-friendly streets, and an emphasis on public spaces. The following four communities reflect these ideas.[3]

Fairview Village

Fairview Village is an 88-acre development under construction in the eastern suburbs of the Portland, Oregon metropolitan area. When complete, the village will encompass 600 residential units, 150,000 square feet of retail space, 70,000 square feet of office space, and 15 acres of parks. The vil-

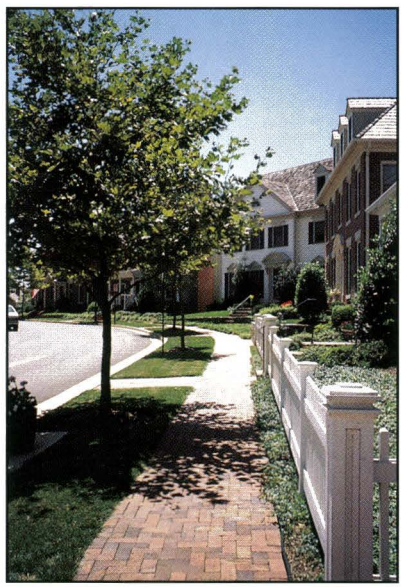
[3] This section focuses on what these new developments look like. An earlier LUTRAQ report, Vol. 3A: *Market Conditions*, forecasted potential market acceptance for this type of development in the Portland area. Since that report was published, these and other similar developments have been built and absorbed into the market at different rates.

lage is designed to attract a diverse community of varying ages and economic statuses. It incorporates a range of housing types and sizes, public spaces, a continuous network of walkways and streets, and a blend of housing, shops, offices, and institutions. Every portion of the village is within a five-minute walk of the core commercial area.

Because existing city zoning codes did not allow for mixed uses and other village features, the developer convinced the city to adopt an entirely new code and a set of design guidelines specifically for the village. These guidelines reflect the craftsman traditions of the 1890s to 1940s and specify roof pitches, chimney materials, window type, and ceiling height. Garages must have rear alley access or be set back from the front facade. Streets are designed to slow traffic, provide an attractive space for pedestrians, connect to other parts of the village, and terminate in a public space, such as a small park or a civic structure. When complete, the village will be completely integrated with the surrounding developed area and will be the location of the Fairview city hall and the local post office.

Fairview Village was designed by William L. Dennis, town architect, and Lennertz, Coyle & Associates, town planners.

The Kentlands



The Kentlands is a 342-acre community in Gaithersburg, Maryland, a suburb of Washington, D.C. The Kentlands is designed for a population of 5,000, with a mix of 1,600 residential units, more than 1 million square feet of retail, 1 million square feet of office space, and 64 acres of open space. Plans for the mixed-use town center include apartments and offices above ground-floor retail. Residences include single-family detached units, carriage houses, townhouses, and apartments. The community includes schools, a library, recreation areas, and open space. Construction began in 1989, and the project was reported to be 75 percent complete in 1996.

Design codes regulate construction materials and design elements used within the community. Residences are oriented to the street with shallow setbacks and front porches. Residential parking is provided on the street or in alley garages, and office parking is provided at the side, rear, or below buildings.

The Kentlands was designed by Andres Duany and Elizabeth Plater-Zyberk.

Laguna West

Laguna West is a 1,045-acre planned community in the Sacramento, California metropolitan area. The community is centered around a transit plaza and a 100-acre mixed-use town center with civic, retail, and commercial uses, as well as townhomes and apartments. Although retail development has been slow, the town center includes a town hall and an Apple Computer facility that employs 1,350 people.

The town center uses a rectilinear street pattern, with curvilinear and cul-de-sac streets in the surrounding residential areas. The street network is designed to provide many connections within the community, with wide walkways and street trees to invite walking.

Design guidelines for residential structures require garages to be recessed at least five feet behind buildings. Porches, front entrances, and setbacks of 12 to 15 feet integrate homes to the streets, provide a safer pedestrian environment, and help create a sense of community. When the community is fully developed, it should have 3,370 residential units.

The community was planned by Calthorpe Associates.

Sunnyside Village

Sunnyside Village is a 368-acre development under construction at the eastern edge of Portland's urban growth boundary in Clackamas County. The village is centered around a 10-acre core of retail and public services with a transit stop. A village green and civic facilities will be located adjacent to this commercial core, with neighborhood parks scattered throughout the village. Residential areas will include apartments, townhomes, and small-lot single-family residences.

Residential areas are linked to the commercial core by a system of interconnected streets that are narrow and tree-lined to encourage walking. Open spaces will be connected by trails and bike paths. Steep slopes, wooded areas, and riparian corridors will be preserved.

Design guidelines require traditional design throughout the village. Single-family residences are required to have front porches and detached garages or attached garages that are set back from the front of buildings. Small retail shops will have street entrances and display windows along pedestrian connections. Apartments may be built above retail uses.

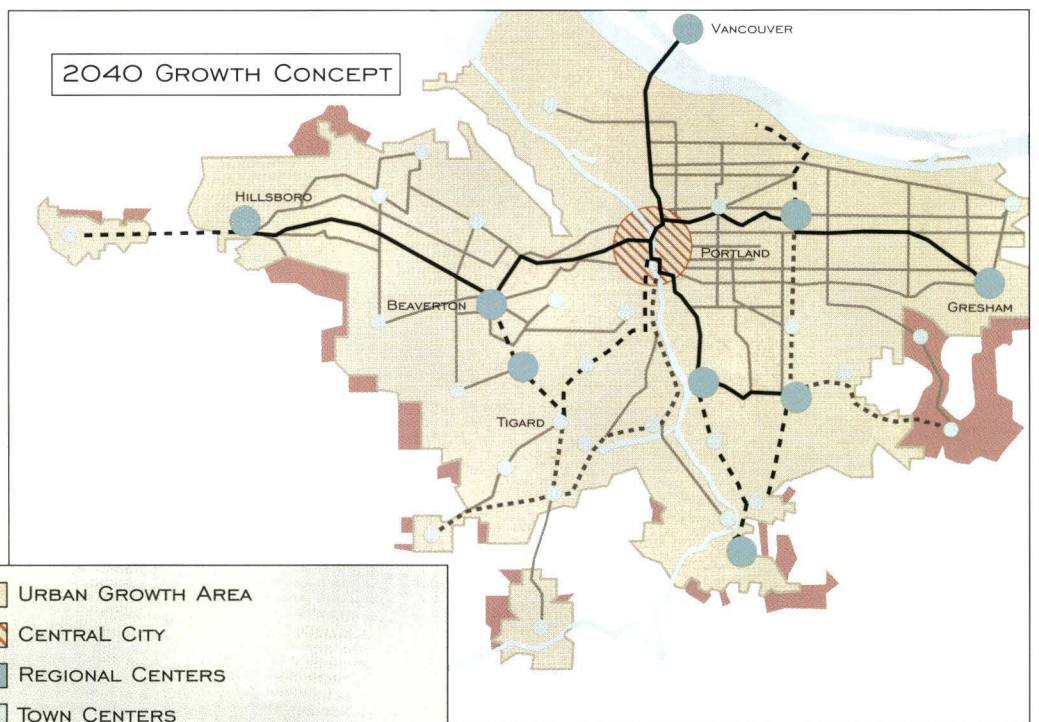
Clackamas County commissioned Calthorpe Associates to develop the Sunnyside Village plan and design guidelines.

Regional Planning

Most large metropolitan areas encompass multiple jurisdictions, each with its own cast of elected officials, citizens groups, planners, developers, regulators, and business interests. Creating a chorus from so many disparate voices is the challenge more regions face as they address the need for comprehensive planning. A number of communities are demonstrating that local governments can, indeed, work together to integrate land-use and transportation planning. While approaches vary, the common thread from region to region is often a strong sense of regionalism and a commitment to cooperation.

Portland, Oregon

In the Portland metropolitan area, responsibility for regional planning rests with Metro, the only directly elected regional government in the country. Oregon law gives Metro authority to develop and implement regional tranportation and land-use plans for the three counties and 24 cities in the region. In practice, however, the agency has worked in partnership with local governments and other agencies to build consensus on how growth will be managed.



Metro has moved cautiously and incrementally since 1991 to develop and adopt regional land-use goals and objectives and its 50-year land-use and transportation plan, the 2040 Growth Concept. The objective of the plan is to preserve access to nature and build better communities while accommodating 720,000 additional residents and 350,000 more jobs within the urban growth boundary. To accomplish this, the growth concept is designed to reduce automobile reliance, decreasing vehicle miles traveled per person to 5 percent below 1990 levels.

The agency is now working with local governments to develop individual functional plans for implementation. The Metro Council, whose seven members are elected from districts within the region, has approval authority for regional plans. However, those plans are the result of an exhaustive review process that includes local government and citizen advisory committees and broad-based public involvement programs.

Seattle, Washington

While local governments planted the seeds of regional planning in the Seattle area, they took root because of state legislation. Under the direction of the local council of governments, the four-county Seattle metropolitan area developed a vision for land use and transportation, Vision 2020. Though it lacked enforcement authority, Vision 2020 was in the right place at the right time when Washington State passed its Growth Management Act, which requires comprehensive local planning. Local governments now look to Vision 2020 as a framework for local planning.

The state has created transportation planning incentives as well. It has required large employers to develop trip reduction programs, authorized creation of the Regional Transit Authority to encourage coordinated transit planning, and solicited private-sector proposals to manage portions of the state highway system, which has led to road pricing proposals. The state now also requires "least-cost planning" to evaluate transportation options.

Vancouver, British Columbia

In 1966, the provincial government of British Columbia created the Greater Vancouver Regional District (GVRD) to provide regional planning and manage water, sewer, garbage, air quality, and other regional services. In 1975, the GVRD developed a Livable Region Plan that focused development around regional town centers linked with high-capacity transit. The plan, developed with extensive participation of citizens, enjoyed widespread support among GVRD member agencies. Although friction between the GVRD and the provincial government caused the agency's land-use and transit planning authority to be revoked in 1983, the GVRD worked with local governments to update the plan in 1990.

The local ordinances enacted to carry out the plan demonstrate the level of local support. The region now has an advanced rail system (SkyTrain) and a high speed passenger ferry (SeaBus) that connect five of seven thriving regional centers. Economic development programs, zoning ordi-

nances, and the location of government offices support development of the centers.

Minneapolis–St. Paul, Minnesota

In 1967, the Minnesota legislature created the Metropolitan Council to plan and coordinate services for the Twin Cities area. The council, whose members are appointed by the legislature, works closely with local governments, the state legislature, and state agencies to shape development for the area, which is comprised of seven counties and 189 municipalities.

The Council adopted a 1975 urban service boundary that identifies areas where services such as water and sewer will be provided. As a result, urban development has occurred primarily inside the urban service area or in rural centers, and land outside the urban service boundaries has been largely preserved for agriculture. The Metropolitan Council is now working to determine future growth patterns, changes in the urban service boundary location, and infrastructure investments.

Grassroots Involvement

From the 1950s through the 1970s, the heyday of the U.S. interstate highway construction program, citizens had little influence on transportation projects. In recent years, however, the highway monopoly has begun to recede, and citizens groups are demanding input, with some notable successes.

Virginia

A coalition of Virginia citizens groups joined several developers to oppose a new bridge over the James River. The bridge, which was to be located adjacent to Jamestown, would have replaced existing ferry service and opened up large tracts of land to suburban sprawl, all at the expense of one of the nation's most important historical sites. The coalition undertook a technical analysis of the bridge proposal and lobbied the state transportation board and the local metropolitan planning organization to scrap the bridge idea. By the end of 1991, the bridge project was put to rest. The area now enjoys expanded ferry service and a landscape that has remained relatively unchanged since the first English colonists arrived in 1607.

Washington, D.C.

A citizens-based technical analysis was also instrumental in halting consideration of a bypass around Washington, D.C. The analysis, prepared by the Chesapeake Bay Foundation (CBF), showed that the highway would have put 1.1 million acres of open land at risk to sprawl development, with substantial impacts on Chesapeake Bay and the environment. CBF worked with the Chesapeake Bay Commission to remove the bypass from consideration and to institute a new planning process for the existing US 301 corridor with the Maryland Department of Transportation. Using a broad-based task force of citizens, organizations, and public agencies, the US 301 planning effort has sought to integrate land use, open space, urban design, and environmental issues into transportation planning procedures.

Connecticut

When the Connecticut Department of Transportation proposed widening the historic Merrit Parkway in 1990, the Connecticut Trust for Historic Preservation organized citizen opposition. The parkway, which was completed in 1941, was designed to provide a leisurely park-like setting for motorists traveling between New York state and New England. As originally constructed, the parkway featured landscape design by Thayer Chase and art deco bridges. In 1991, the Connecticut Department of Transportation announced that the 50-year-old parkway would not be widened after all. The parkway is now listed on the National Register of Historic Places.

Georgia

The Georgia Department of Transportation was not nearly as accommodating, at least initially, in the case of a four-lane freeway proposed in Atlanta. The Presidential Parkway would have covered several parks in central portions of Atlanta, including three designed by Frederick Law Olmsted. Neighborhood associations in the eight districts that would have been bisected by the Parkway formed a coalition to oppose the project. The transportation department refused to discuss the project despite six years of litigation and a court order to mediate. In 1991, mediation talks finally were held. The result: a 2.1 mile meandering two-lane surface street, designed according Olmsted principles, with low speed limits and bike lanes at one-third the price of the freeway proposal.

CONCLUDING COMMENT

What started as a local effort to consider alternatives to a bypass grew into a project of national reputation. The LUTRAQ story has been referred to in metropolitan planning efforts across the country, and people associated with the project have made dozens of presentations nationwide. In 1996, LUTRAQ received national awards for transportation planning from the American Planning Association and the United States Environmental Protection Agency.

Though the national recognition is a great honor, it is not the greatest source of satisfaction to the organizations that supported LUTRAQ. For 1000 Friends of Oregon and Sensible Transportation Options for People, the true measure of LUTRAQ's success is that it helped change the way transportation and land use will develop in a part of the Portland metropolitan area. It also demonstrated that citizens' efforts can generate ideas and analyses that change the way their regions will grow.

Our hope is that this booklet provides encouragement and guidance to others as they work to secure good land-use and transportation plans in their communities. We wish you good cheer and good luck.

REFERENCES

American Farmland Trust. *Alternatives for Future Urban Growth In California's Central Valley: The Bottom Line for Agriculture and Taxpayers.* Washington, DC: American Farmland Trust, 1995.

American Public Works Association. *Improving the Quality of Life Through Public Works.* Kansas City, MO: American Public Works Association, 1996. http://www.pubworks.org/roads.html.

"Are TNDs Selling?," *Builder Magazine*, August 1993.

Arrington, G.B. *Beyond the Field of Dreams.* Portland, OR: Tri-Met, 1996.

Bank of America, Greenbelt Alliance, California Resources Agency, and Low Income Housing Fund. *Beyond Sprawl: New Patterns of Growth to Fit the New California.* San Francisco: Bank of America, 1995.

Burchell, Robert W. and David Listokin. "Land, Infrastructure, Housing Costs, and Fiscal Impacts Associated with Growth: The Literature on the Impacts of Traditional versus Managed Growth." Presented at the Alternatives to Sprawl Conference, Washington DC, March 22, 1995.

Bureau of Transportation Statistics. *Transportation Statistics Annual Report 1994.* Washington, DC: U.S. Department of Transportation, 1994.

Calthorpe Associates, Leland Consulting Group, and Tashman Associates. *East Sunnyside Village Plan.* Oregon City, OR: Clackamas County Department of Transportation & Development, 1993.

Calthorpe, Peter. *The Next American Metropolis: Ecology, Community, and the American Dream.* New York: Princeton Architectural Press, 1993.

Carlson, Daniel, Lisa Wormser and Cy Ulberg. *At Road's End: Transportation and Land Use Choices for Communities.* Washington, DC: Island Press, 1995.

Christoforidis, Alexander. "New Alternatives to the Suburb: Neo-traditional Developments," *Journal of Planning Literature*, 8 (4), 1994.

Cox, Wendell. *Demographic Briefs: US Urbanized Area Population & Density Trends: 1950-1990.* Belleville, IL: Wendell Cox Consultancy, 1996. www.publicpurpose.com/inf-usua.htm.

Deakin, Elizabeth. "Growth Controls and Growth Management: A Summary and Review of Empirical Research," *Understanding Growth Management: Critical Issues and a Research Agenda.* Washington DC: Urban Land Institute, 1989.

"Divided We Sprawl," *Kansas City Star*, December 17-22, 1995.

ECONorthwest. *Evaluation of No-Growth and Slow-Growth Policies for the Portland Region.* Eugene, OR: ECONorthwest, 1994.

Federal Highway Administration. *Highway Statistics 1989.* Washington, DC: U.S. Department of Transportation, 1990.

-----. *Highway Statistics 1994.* Washington, DC: U.S. Department of Transportation, 1995.

-----. *National Personal Transportation Survey.* Washington DC: U.S. Department of Transportation, 1993.

Holt and Haugh. *Fairview Village Booklet.* Portland, OR: Holt and Haugh.

Kelbaugh, Doug. *The Pedestrian Pocket Book.* New York: Princeton Architectural Press, 1989.

Lane Council of Governments. *Transportation-Efficient Development.* Eugene, OR: Lane Council of Governments, May 1996.

Myers, Dowall. "Internal Monitoring of Quality of Life for Economic Development," *Economic Development Quarterly*, 1 (3), 1987, 268-278.

Northeastern Illinois Planning Commission. *1990 Land Use in Northeastern Illinois Counties, Minor Civil Divisions and Chicago Community Areas*. Chicago: NIPC, 1995.

1000 Friends of Oregon. *Making the Land Use, Transportation, Air Quality Connection*. Portland, OR: 1000 Friends of Oregon:

Vol. 1, Modeling Practices. 1991.

Vol. 2, Existing Conditions. 1991.

Vol. 3, The LUTRAQ Alternative. 1992.

Vol. 3A, Market Research. 1992.

Vol. 4, Model Modifications. 1996.

Vol. 4A, The Pedestrian Environment. 1993.

Vol. 4B, Building Orientation. 1994.

Vol. 5, Analysis of Alternatives. 1996.

Vol. 6, Implementation. 1995.

Vol. 8, Making the Connections: Technical Report. 1997.

Site Design and Travel Behavior: A Bibliography. 1993.

Oregon Department of Transportation. *Western Bypass Study Alternatives Analysis*. Portland, OR: Oregon Department of Transportation, 1995.

Pisarski, Alan. *New Perspectives in Commuting*. Washington, DC: Federal Highway Administration, Office of Highway Information Management, July 1992.

Rusk, David. *Cities Without Suburbs*. Washington, D.C.: The Woodrow Wilson Center Press, 1993.

Urban Land Institute. "Laguna West, Sacramento, California." *Project Reference File*, 24 (11), 1994.

PHOTO & ILLUSTRATION CREDITS

Keith Bartholomew: pages 7, 11, 12, 17, 18, 20, 22, 23, 28

Meeky Blizzard: page 22

Calthorpe Associates: pages 9, 13, 14, 23

Paul Ketcham: page 6

OC Transpo: page 19

Gordon Price: page 25

ACKNOWLEDGMENTS

About 1000 Friends of Oregon

1000 Friends of Oregon was founded in 1975 as a non-profit public service organization. It conducts research and public education on land-use and growth-management issues, and provides legal advice, technical assistance, and advocacy on planning policies at state and local levels. Executive Director: Robert L. Liberty

For more information about the LUTRAQ project and 1000 Friends of Oregon, contact:

LUTRAQ
1000 Friends of Oregon
534 SW Third Ave., Suite 300
Portland, OR 97204
phone: (503) 497-1000; fax: (503) 223-0073
e-mail: LUTRAQ@friends.org

About Sensible Transportation Options for People

Sensible Transportation Options for People (STOP) is a grassroots citizens organization formed in 1989 to oppose the Western Bypass freeway and promote better transportation options. In 1992, STOP expanded its focus to include educating the general public and elected leaders about LUTRAQ. STOP fulfills its mission to support transportation systems that foster livable communities by participating on regional transportation committees, providing traffic calming resources to communities struggling with traffic problems, and promoting LUTRAQ principles nationally. Executive Director: Meeky Blizzard

For information about STOP, contact:

STOP
15405 SW 116th, Suite 202B
Tigard, OR 97224
phone: (503) 624-6083; fax: (503) 620-5989
e-mail: STOP@teleport.com

LUTRAQ Project Staff

Keith Bartholomew, Project Director
1000 Friends of Oregon

Project Advisory Committees

National Technical Advisory Committee

Jeffrey M. Zupan, Transportation Consultant, Chestnut Ridge, New York (Chair)

George M. Crandall, Principal, Fletcher, Farr, Ayotte, Portland, Oregon

Elizabeth Deakin, Associate Professor, University of California at Berkeley

Frederick Ducca, Federal Highway Administration, Washington, D.C.

Michael Replogle, Transportation Project Co-Chair, Environmental Defense Fund, Washington, D.C.

William Schroeer, Energy Analyst, Air & Engergy Policy Division, U.S. Environmental Protection Agency, Washington, D.C.

Policy Advisory Committee

Meeky Blizzard, Sensible Transportation Options for People

William Blosser, Chair, Oregon Land Conservation and Development Commission

Earl Blumenauer, U.S. Representative, Third District, Oregon

Rex Burkholder, Bicycle Transportation Alliance

Jane Cease, Oregon Department of Transportation

John Charles, Consultant

Michael Hollern, Brooks Resources

Jim Howell, Citizens for Better Transit

Vera Katz, Mayor, City of Portland

Patricia Kliewer, Citizen Participation Organization #10, Washington County, Oregon

Susan McLain, Metro Councilor

Gussie McRobert, Mayor, City of Gresham

Linda Peters, Chair, Washington County Board of Commissioners

John Russell, President, Russell Development Company

James Standring, President, Westland Industries, Inc.

Thomas Walsh, General Manager, Tri-County Metropolitan Transportation District of Oregon

Local Technical Advisory Committee

G.B. Arrington, Director of Long Range and Strategic Planning, Tri-County Metropolitan Transportation District of Oregon

Robert Branan, Parsons Brinckerhoff Quade & Douglas, Inc.

Jon Chandler, Oregon Building Industry Association

Robert Cortright, Transportation and Land Use Planner, Oregon Department of Land Conservation and Development

Andy Cotugno, Transportation Director, Metro

Brent Curtis, Planning Manager, Washington County Department of Land Use and Transportation

Steve Dotterrer, Chief Transportation Planner, City of Portland

Kenneth J. Dueker, Director, Center for Urban Studies, Portland State University

Barrow Emerson, Senior Transportation Planner, OTAK

Brian Gregor, Senior Transportation Planner, Oregon Department of Transportation

Keith Lawton, Assistant Director of Technical Services, Metro

Doug McClain, Land Use and Planning Manager, Clackamas County

Scott Pemble, Transportation Planner, Multnomah County

Robin McArthur-Phillips, Advisor to the Governor on Transportation and Growth Management

Sam Sadler, Energy Analyst, Oregon Department of Energy

Ethan Seltzer, Director, Institute for Portland Metropolitan Studies, Portland State University

Theodore Spence, Consultant

Robert E. Stacey Jr., Ball, Janik & Novack

Ron Weinman, Principal Transportation Planner, Clackamas County

Mike Wert, Principal, W & H Pacific

Project Team

Parsons Brinckerhoff Quade & Douglas, Inc.

Parsons Brinckerhoff Quade & Douglas is the leading provider of transit planning and design services in the United States. The firm has been involved in more than 75 percent of the nation's light rail transit systems in operation or under construction today. The firm's architects have developed concepts for or designed over 200 transit stations in the last 10 years.

Samuel Seskin, lead planner for the firm's Portland, Oregon office, has been the overall technical manager for the LUTRAQ project team. Dr. Judy Davis, Stamatia Petsios, Brent Baker, Cathy Strombom, and Youssef Dehghani worked on the team.

Calthorpe Associates

Calthorpe Associates is known nationally for its innovative work in the design of mixed-used, pedestrian-oriented developments and communities. Projects and plans emphasize amenities for pedestrians which, in combination with the creative development of local street patterns, afford an opportunity to improve local quality of life and reduce traffic congestion.

Key staff for the LUTRAQ project were Peter Calthorpe, Shelley Poticha, and Phil Erickson.

ECONorthwest

ECONorthwest was founded in 1974 and has offices in Eugene, Portland, and Seattle. ECO is an economic consulting firm specializing in development economics, resource economics, planning and public policy, management, finance and banking, and litigation support. ECO has over 20 years experience in advising state and federal agencies, municipalities, service agencies, and private clients in natural resource management and evaluation of public policies, facilities, and services.

Terry Moore, from the firm's Eugene office, participated on the LUTRAQ team, providing management and writing services for the project's final phases, including production of this booklet.

Cambridge Systematics, Inc.

Cambridge Systematics provides planning and management services in the areas of transportation management information systems, economic development, energy, and telecommunications. Since its formation in 1972, the firm has gained a national reputation for applying state-of-the-art analytic techniques to complex problems, and for developing innovative, practical solutions for clients.

Thomas Rossi, Arlee Reno, Robert Lepore, Earl Ruiter, John Suhrbier, and Sam Lawton participated on the LUTRAQ team.

S.H.Putman Associates

S.H.Putman Associates licenses the Integrated Transportation and Land Use Package (ITLUP), the most widely used land-use model system in the United States.

Key staff working with the LUTRAQ project team were Dr. Steven H. Putman and David Stiff.

Michel Gregory Communications

Michel Gregory Communications specializes in environmental and public service communications in the Pacific Northwest. The firm offers a range of services, including communication strategy development and implementation, writing and editing, media relations, and public education campaign creation and management.

Michel Gregory provided writing and editing services for this booklet.

CircleTriangleSquare

CircleTriangleSquare is a design studio experienced in all aspects of graphic design, technical and product illustration, print production, and project management. With clients ranging from start-up companies to large corporations, the firm specializes in product catalogues, corporate identity materials, logo and collateral development, and special events materials.

Partner Heather Barta designed this booklet for the LUTRAQ project.

Craig Holmes Illustration

Craig S. Holmes is an illustrator/designer working with architects, engineers, and other design and communication professionals to picture their visions. The cover art for this report was designed specifically for the LUTRAQ project.

Market Perspectives

Market Perspectives is a residential and commercial real estate consulting firm based in Sacramento, California specializing in analyzing competitive markets, product positioning and marketing strategies, and feasibility/absorption studies. The firm's clientele includes such well-known developers as Grupe Development, The Sammis Company, Taylor Woodrow Homes, Kaufman & Broad, McDonald's Corporation, and Pacific Gas and Electric Company.

Founder and President John Schleimer participated on the project team.

Hébert/Smolkin Associates, Inc.

Hébert/Smoklin Associates, Inc. consults with developers, lenders and investors in real estate market analysis throughout the United States. The firm, with offices in Palo Alto, California and New Orleans, Louisiana, specializes in market and economic feasibility studies for both commercial and residential developments.

The company's founder, John Hébert, worked on the LUTRAQ project team.

Hague Consulting Group

Hague Consulting Group, located in The Hague, Netherlands, is known for its application of travel demand forecasting models worldwide. In The Netherlands, the firm is participating in a national transportation plan, applying an integrated land-use model and other analytic tools to predict travel demand.

Hugh Gunn participated on the LUTRAQ project team.

Gardiner & Clancy, LLC

Gardiner & Clancy serves as financial counsel to governments, non-profits, and public-private ventures in the Pacific Northwest. The firm provides access to a wide range of financial management, analysis, and strategy services, as well as the full spectrum of credit market relations and asset and liability management services. The professionals at Gardiner & Clancy have more than 50 years of combined experience in public finance.

Mark Gardiner worked on the LUTRAQ team.

Blayney Dyett

Blayney Dyett is a California-based consulting firm with broad zonin
percent of the firm's work is for local governments and othe
Downtown Plan, which received a HUD Honor Award, and

Michael Dyett worked with the LUTRAQ project team.