OREGON
TRANSPORTATION PLAN

TRANSPORTATION NEEDS ANALYSIS
2005-2030 SUMMARY REPORT

July 14, 2005

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Table of Contents

Foreword.....1

Introduction.....2

Summary Tables.....4
- 2005-2030 Modal Needs and Growth Forecast Summary Table.....4
- 2005-2030 Highway-Related Programs Summary Table.....5
- 2005-2030 Local Road and Bridge Needs Summary Table.....5

Air Freight and Passenger.....6
Intermodal Connectors.....12
Maritime and Ports.....13
Natural Gas and Petroleum Pipelines.....17
Public Transportation.....22
Rail Freight and Passenger.....30
Transportation Options.....37

State Highway-Related Needs.....41
- **State Highway Modernization**.....41
- **State Highway Preservation**.....46
- **State Highway Bridge**.....51
- **State Highway Operations**.....58
- **State Highway Traffic Safety**.....66
- **State Highway Landslide and Rockfall**.....69
- **State Highway Maintenance**.....71
- **Special Programs**.....74
  - Access Management Program.....74
  - Fish Passage Culvert Program.....75
  - Large Culvert Program.....76
  - Scenic Byways Program.....78
  - Transportation Enhancement Program.....78
  - Transportation and Growth Management Program.....80
- **Bicycle and Pedestrian Program**.....81
- **Highway Division Administration and Indirect Program**.....84
- **State Transportation Program Development**.....85
- **State Transportation Safety Division**.....86
- **Driver and Motor Vehicle Services**.....88
- **Motor Carrier Transportation**.....93

Central Services 104

Local Transportation System 105

Appendix A: Summary of Modal Forecasts 110
Air Passenger and Freight 111
Intermodal Connectors 113
Maritime and Ports 115
Public Transit 117
Rail Passenger and Freight 119
State Highway 121
Local Road and Bridges 123

FOREWORD

The Oregon Transportation Plan is the state's long-range multimodal transportation plan and overarching policy document that focuses on the state, local, and public aspects of Oregon's transportation system.

Identifying the statewide transportation needs is a major component of development of the Oregon Transportation Plan. The Transportation Planning Rule (TPR) and the federal Transportation Equity Act (TEA-21) require that a minimum 20-year needs analysis be conducted. TEA-21 identifies factors that must be considered in the planning process, but the manner in which they are to be addressed is left to states and metropolitan areas. Oregon Administrative Rule 660-012-0030, Determination of Transportation Needs, provides that "The transportation system plan shall identify transportation needs relevant to the planning area and the scale of the transportation network being planned including: (a) State, regional, and local transportation needs." OAR 660-012-005 defines state transportation needs as "needs for movement of people and goods between and through regions of the state and between the state and other states."

The gap between needs and revenues is a barometer for how well Oregon is funding transportation programs. In the OTP, the needs analysis is being used to determine funding priorities and investment strategies for the state.

INTRODUCTION

This report summarizes the statewide transportation needs for years 2005 to 2030 for air freight and passenger, intermodal connectors, maritime and ports, natural gas and petroleum pipelines, public transportation, rail freight and passenger, transportation options, state highways and the associated programs (including the state bicycle and pedestrian program), and the local transportation system. Tables 1, 2 and 3 on pages 4 and 5 summarize the forecasted mode growth, current funding, average annual feasible needs and the gap between the two.

Methodology

The identified transportation needs are based on a concept of feasible needs. While feasible needs vary for each mode or program, in general, feasible needs refer to the funding that maintains the system at a slightly more optimal level than current levels, replaces infrastructure and equipment on a reasonable life-cycle, brings facilities up to standard, or adds capacity in a reasonable way. The standards applied to describe a "slightly more than current level" of maintenance are based on a concept of reasonableness, and in most cases the data is drawn from existing agency or program plans. This includes modal plans, capital improvement plans, and master plans. With some of the modes, such as maritime and pipeline, the feasible needs are narrowly defined because either the mode is privately owned and information is not available or the level of economic activity is low. For example, most pipelines and railroads in Oregon are privately owned. In the case of maritime, the needs for only those ports with waterborne commerce were assessed.

The base year for most of the collected data is 2004. If cost data was from earlier years, the need dollar amount was adjusted to 2004 dollars in order to create a consistent dollar-year. The need amount was then forecasted out to 2030 using a 3.1 percent annual dollar inflation rate and a demand growth rate unique to the mode or program. The mode growth forecasts were developed for the OTP based on national trends or they were derived from the *Oregon Commodity Flow Forecast Report, April 2005* where the data was more current. The current annual expenditures, current annual revenue, and forecast revenue were also collected and calculated in order to show the current funding gaps and future funding gaps over the plan period. The forecast methodology is described in detail in the *OTP Mode Growth Forecasts Technical Memorandum* available on the OTP Website, Publications Page under the Key OTP Development Documents Section located at http://www.oregon.gov/ODOT/TD/TP/otpPubs.shtml. The *Oregon Commodity Flow Forecast* is available on the ODOT Freight Mobility Section Website, Publications Page located at http://egov.oregon.gov/ODOT/TD/FREIGHT/Publications.shtml.

Coordination

The program administrators or mode operators for each program or mode participated in the needs assessment. The various ODOT divisions, including the Highway Division, Rail Division and Public Transit Division were interviewed and assisted. In addition, the U.S. Army Corp of Engineers, Oregon Department of Aviation, Oregon Department of Economic and Community Development, Department of Land Conservation and Development, Port of Portland, Metropolitan Planning Organizations, and transit districts contributed data. The Oregon Ports Association reviewed and contributed to the maritime needs report. A technical advisory committee (TAC) was formed with the assistance of the League of Oregon Cities and the Association of County Governments to guide the local system needs assessment and in particular, to assist with the methodology.

TABLE 1 - 2005-2030 MODAL NEEDS AND GROWTH FORECAST SUMMARY (Millions of 2004 dollars)

Mode	Annual Growth Rate	Current Annual Expenditures	Average Annual Feasible Needs	Annual Gap
Air Freight and Passenger[1]	2.62% - freight tons 4.24% - passengers			
Portland Int. Airport[2]		$44.4	$115.3	$70.9
Major Modernization[3]		$13.9	$15.1	$1.2
Other Airports – Mod and Pres[4]		$10.7	$47.4	$36.7
Intermodal Connectors[5]	1.35% - total hwy travel 1.35% - pass. hwy travel 1.40% - freight hwy travel	N/A	$11.3	N/A
Maritime and Ports[6]	0.97% - deep draft freight 0.29% - shallow draft freight	$51.3	$56.2	$4.9
Natural Gas and Petroleum Pipelines[7]		N/A	N/A	N/A
Public Transportation[8]	3.16% - ridership	$510.0	$812.0	$302.0
Rail Freight and Passenger[9]	1.83% - freight tons 3.6% - passengers			
Mainlines		N/A	$8.82	N/A
Short Lines		more than $6.7	$10.0	less than $3.3
Passenger Rail[10]		$4.8	$9.0 - $57.0	$4.2 to $52.2
Safety Programs		$1.6	N/A	N/A
ODOT Rail Division Admin.		$0.42	$0.42	$0
Transportation Options		$2.8	$3.6	$0.8

Notes:

[1] Needs forecast address capital needs at Oregon's 101 public use airports.
[2] Based on PDX Master Plan Alternative.
[3] Identified for 8 airports other than PDX where growth is expected to exceed capacity.
[4] Based on 2000 Oregon Aviation Plan needs.
[5] NHS Intermodal Connectors are located in Astoria, Boardman, Coos Bay/North Bend, Eugene, Portland and Medford.
[6] Needs forecast address 9 port districts that have economic activity associated with waterborne commerce.
[7] Primarily private facilities – no cost information available.
[8] Feasible needs are consistent with Oregon Public Transportation Plan Level 3 recommendation to increase overall ridership.
[9] Only public expenditures available. Needs are inclusive of both public and private facilities. Freight rail needs include capital costs for rehabilitation and enhancements of short line, mainline and on-site rail facilities at ports.
[10] Includes capital and operating costs for increased service. A range of costs are given since multiple proposals currently exist.

TABLE 2 – 2005-2030 HIGHWAY-RELATED PROGRAMS SUMMARY
(2004 dollars or average 2004 dollars)

Program	Current Annual Funding	Average Annual Feasible Needs	Annual Gap
State Highway Modernization Program	$108,100,000	$330,300,000	$222,200,000
State Highway Preservation Program	$118,000,000	$160,000,000	$42,000,000
State Highway Bridge Program	$71,000,000	$129,600,000	$58,600,000
State Highway Operations Program	$30,350,432	$45,627,257	$15,276,825
State Highway Traffic Safety Program	$20,800,000	$40,510,000	$19,710,000
State Highway Landslide and Rockfall Program	$6,930,000	$15,000,000	$8,070,000
State Highway Maintenance Program	$143,000,000	$192,192,000	$49,192,000
ODOT Special Programs			
Access Management Program	$2,100,000	$16,600,000	$14,500,000
Fish Passage Culvert Program	$3,600,000	$9,380,000	$5,780,000
Large Culvert Program	$2,400,000	$33,000,000	$30,600,000
Scenic Byways Program	$217,900	$523,700	$305,800
Transportation Enhancements Program	$3,000,000	$8,000,000	$5,000,000
Transportation & Growth Management Program	$4,400,000	$4,000,000	-$400,000
ODOT Bicycle & Pedestrian Program	$3,456,600	$9,930,000	$6,474,000
ODOT Highway Division Administration and Indirect Program	$78,600,000	$78,600,000	$0
ODOT Transportation Program Development	$29,900,000	$29,900,000	$0
ODOT Transportation Safety Division	$19,000,000	$19,000,000	$0
ODOT Driver and Motor Vehicle Services	$60,882,490	$63,200,000	$2,317,510
ODOT Motor Carrier Transportation Division	$25,594,765	$26,441,689	$846,924
ODOT Central Services	$55,200,000	$55,200,000	$0
Total	**$786,532,187**	**$1,267,004,646**	**$480,472,459**

Forecasted annual growth rate for total highway travel (VMT) is 1.35% (1.35% for passenger highway travel and 1.40% for freight highway travel)

Notes:

$0 gap assumes funding increases with inflation.

TABLE 3 - 2005-2030 LOCAL ROAD AND BRIDGE NEEDS SUMMARY
(2004 dollars on an annual basis)

	Current Spending	Feasible Needs	Gap
Local Road and Bridge Needs	$718 million	$1 – $1.2 billion	$282-$482 million

Travel on the local transportation system is expected to reflect the growth in travel on the state highway system (VMT) and the growth in public transportation ridership shown above.

Air Freight and Passenger

Description of Services

Oregon's statewide system of airports consists of over 400 public- and private-use airports. Of these 101 are public-use airports. Services are provided to airline passengers, general aviation travelers, air cargo, air ambulance and military users and for numerous businesses, agricultural and resource management activities including fire suppression. Most air transportation services are provided by the private sector. However, the airports used by businesses are primarily owned and managed by public entities including the state, city and county governments, ports, and federal agencies.

Fifty-seven of Oregon airports are of national interest and are included in the National Plan of Integrated Airport Systems (NPIAS). The NPIAS designation allows eligibility for federal funding. A total of 70 airports define "Oregon's Core System of Airports" with 28 of those airports in state ownership.

Portland International Airport (PDX), located in northeast Portland and owned by the Port of Portland, dominates Oregon's air service, providing about 90 percent of the state's commercial passenger service and 97 percent of the state's enplaned cargo.[11] The other commercial service airports in Oregon are located in Eugene, Klamath Falls, North Bend, Redmond, Medford, and Pendleton. The Eugene and Medford airports handle a large portion of the balance of the passenger and air cargo enplaned in the state. Declining commercial service is an issue that faces most of the state. Newport, Corvallis, and other locations no longer have commercial air service but did at one time.

Current Spending

Portland International Airport

The 2002/03 annual capital expenditures for Portland International Airport inflated to 2004 dollars was $44.44 million, representing a typical year of expenditures. Table 1 below shows the categories of spending. Land acquisition costs, while an important element to achieve growth, have not been included in the expenditure (or need) figures in order to achieve consistent reporting between the airports included in this report.

[11] 2000 year data from ODOT Intermodal Freight Planning, *Interesting Airport Facts*, www.odot.state.or.us/intermodal-freight/InterestingFacts/airportfacts.htm.

Table 1 – PDX Annual Capital Improvement Expenditures

Facility	2004 dollars ($ in millions)
Terminals/T-Hangars	$25.24
Parking	$ 0.43
Runway/Taxiway	$11.43
Roads & Transit	$ 3.20
Other	$ 4.14
Total	**$44.44**

Major Modernization Needs for Eight Selected Airports

In order to capture the planned modernization airport improvements beyond those identified in the *2000 Oregon Aviation Plan*, the major modernization needs of eight airports have been included. Airports not included have been adequately addressed through the Aviation Plan or have adequate capacity through the OTP 2030 plan horizon. In most cases, the modernization needs are for terminals or hangers rather than for increased runway capacity. Table 2 shows the current average annual spending for modernization (capital) improvements. This information has been included to provide comparisons between current spending and the anticipated spending for growth not reflected in the *2000 Oregon Aviation Plan.*

Table 2 – Current Average Annual Major Modernization (Capital) Expenditures for Eight Selected Airports

Airports *	Expenditures (2004 dollars)
Aurora	$ 645,000
Bandon	$ 411,000
Bend	$ 15,000
Hillsboro	$ 5,257,000
Independence	$ 955,000
Redmond	$ 4,690,000
Medford	$ 1,600,000
The Dalles	$ 288,000
Total	**$ 13,861,000**

* Airports with growth that exceeds the capacity needs identified in the *2000 Oregon Aviation Plan*.

Other Oregon Airports in Statewide System

The current capital and operating expenses for airports in Oregon other than PDX and those listed in Table 2 is $32.07 million (2004 dollars) per year. The $10.65 capital

expenses (state and local airport capital spending from Table 3) are devoted primarily to system preservation.

Table 3 – Oregon Airports Current Average Annual Capital and Operational Expenditures

Category	Capital Expenses (2004 dollars in millions)	Operating Expenses (2004 dollars in millions)
Portland International Airport	$44.44	(data not collected)
Major Modernization of Eight Airports	$13.86	(data reflected in "Other Airports" category below)
Other Airports		
Local *	$7.18	$18.51
State **	$3.47	$ 2.82
Subtotal	$10.65	$ 21.42

* Source: Exhibit V-21, Estimated Oregon Local Airport Revenue for 1997, 2000 Aviation Plan with costs adjusted to 2004 dollars.

** Source: Department of Aviation, Fiscal Manager, January 21, 2005

Feasible Needs

Portland International Airport

Portland International Airport's needs are based on the *2000 Portland International Airport Master Plan*, completed by the Port of Portland in 2000. The future airport needs data reflects the low growth rate to meet the identified baseline needs. The number of enplaned passengers is expected to more than double from 1998 levels by 2030. Air cargo is predicted to nearly triple from 1998 levels by 2030 despite predicted declines in average freight yield. The total number of operations (takeoffs and landings) at PDX is expected to increase by 49 percent from 1998 levels by 2030. Airplane operations include passenger aircraft, all-cargo aircraft, general aviation aircraft and military aircraft. The modernization need costs are based on the Decentralized Alternative, the preferred master plan alternative. The Decentralized Alternative includes terminal expansions, a second passenger terminal, and a new access roadway. The estimated landside surface transportation costs are based on the 1997 cost estimates from the *Portland Transportation Improvement Plan* for decentralized terminal roadways needs (inflated to 2004 dollars). An additional $193 million (constrained list) and $201 million (unconstrained list) have been identified in the *Metro Regional Transportation Plan* for Columbia Corridor (airport area) surface transportation improvements. (These improvements are included in the OTP local transportation needs report.) Table 4 below summarizes the PDX needs.

Table 4- Estimated Cost of PDX Improvements Through 2030

Facility	Estimated Cost (1997 $ in millions)	Estimated Cost (2004 $ in millions)
Terminals	$1,477	$1,829
Parking	$ 489	$ 606
Runway	$ 376	$ 466
Roads and Transit	$ 285	$ 353
Other	$ 165	$ 204
Total	**$2,792**	**$ 3,457**

- **Funding Sources**

PDX airport improvements are expected to be funded without state funds. Improvements will be funded through Federal Aviation Administration (FAA) grants, airport facility fees, and other airport funds. The exception to state funding may be the surface transportation improvements identified in the regional transportation plan (addressed in separate report) or the local transportation improvement program.

Major Modernization Needs in Statewide System

An annual $15.1 million (2004 dollars) is needed for major modernization at the eight selected airports. Table 6 shows the cost of the planned modernization needs.

Table 5 – Eight Selected Airport Modernization Needs

Airport	Modernization Need (2004 dollars)	Plan Period	Average Annual Modernization Need (2004 dollars)
Aurora	$ 5,270,000	2004-09	$ 1,318,000
Bandon	$ 2,390,000	2004-09	$ 598,000
Bend	$ 4,000,000	2004-09	$ 1,000,000
Hillsboro	$90,000,000	2005-25	$ 4,500,000
Independence	$ 1,110,000	2004-09	$ 278,000
Medford	$35,000,000	2000-20	$ 1,750,000
Redmond	$99,875,000	2005-30	$ 4,994,000
The Dalles	$ 2,645,000	2004-09	$ 661,000
Total			**$ 15,099,000**

Other Oregon Airports

An estimated $47.4 million (2004 dollars) per year is needed to address the preservation and modernization needs of the 100 airports in the Oregon system.[12] This amount is in addition to the needs of Portland International Airport and the modernization needs of the eight selected airports. Of the total, an estimated $11.7 million is focused on preservation needs and an estimated $35.7 million is for modernization to address compliance with FAA dimensional standards.[13]

A major need identified in the Aviation Plan is runway pavement preservation. The $11.7 million annual need possibly overestimates the current need because it does not include the 1999 (or subsequent) fuel tax increases or the expanded use of federal fuel tax for pavement preservation. The use of the federal fuel tax was liberalized to include pavement subsequent to the Aviation Plan adoption. This provision has allowed a portion of the backlog of pavement needs in Oregon to be addressed.

Summary

This report considers the airport needs of 101 airports. The Portland International Airport (PDX) is one of seven airports in Oregon that provide commercial service. PDX provides 90 percent of the passenger service and 97 percent of the air cargo service in Oregon. Its on-site improvements over the plan period are estimated to cost $3.46 billion (2004 dollars with no inflation added) and are expected to be funded through Federal Aviation Administration grants, airline funds, and airport funds. Airport growth is in terms of facilities rather than the number of runways. Portland International Airport demand for a third runway is beyond the OTP 2030 time horizon and has not been included. The total annual need for PDX is $115.3 million.

The *2000 Oregon Aviation Plan* identifies aviation needs with the objective of preserving a core system of airports based on a 1998 system preservation level. In order to capture the planned modernization airport improvements beyond those identified in the *2000 Oregon Aviation Plan*, eight airports were inventoried and the estimated annual need for FAA compliance was applied to the 70 core airports. The eight airports were selected on the basis that the forecasted growth exceeds the current facility capability to serve the growth. The annual need for the other 100 airports in the system is $62.5 million per year. See Table 6.

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[12] *2000 Oregon Aviation Plan,* p. 79. Dollars are inflated to 2004.

[13] Preservation data is from the *2000 Oregon Aviation Plan,* Table V-30, page 79 with dollars inflated to 2004. The $35.7 modernization figure is based on $30.9 million average amount distributed to the 56 qualifying airports between 2002 and 2004 (PDX is addressed separately) and the $4.8 in modernization from Table V-30.

Table 6 – Summary of Oregon Aviation Current Annual Spending and Need

Existing Capital Annual Spending	**2004 dollars**
Portland International Airport	$44.4
Major Modernization	$13.9
Other Oregon Airport System	$10.7
Total	**$69.0 million/yr.**

Feasible Annual Capital Needs to 2030	**2004 dollars**
Portland International Airport	$115.3
8 Selected Airports Modernization	$ 15.1
Other Oregon Airports – Preservation	$ 11.7
Modernization	$ 35.7
Total	**$ 177.8 million/yr.**

Intermodal Connectors

Description of Services and Needs

Intermodal facilities are transfer points from or to truck, bus, air, rail and marine transportation that serve passenger or freight movements. Examples include airports, rail stations, bus terminals, marine terminals, and truck-rail facilities. The needs associated with intermodal facilities are addressed by mode or as a part of the local system needs report. The focus of this report is on the needs of the "intermodal connectors," the roads that connect major intermodal facilities with the major roadway system.

The National Highway System-designated intermodal connectors in Oregon total almost 60 miles of city, county and state roadways. These NHS intermodal connectors are located in Astoria, Boardman, Coos Bay/North Bend, Eugene, Portland, and Medford. Non-NHS intermodal connectors are included in the local system needs report.

The total feasible needs are estimated to be $282.5 million (2005 to 2030 in 2004 dollars) with well over half identified for the Portland area's Intermodal Connectors. Due to the relatively short road lengths and the diversity of jurisdictions, it was not possible to collect current spending information. Based on 25 years, the annual feasible need is $11.3 million per year (2004 dollars).

The $282.5 million feasible need for Intermodal Connectors is based on the National Highway System Conditions and Investments Study (1998). While many of the deficiencies identified have been addressed, it is assumed that the identified deficiencies provide a reasonable proxy to estimate the improvement costs for Intermodal Connectors over the 2005-2030 plan period. The National Highway System Condition and Investment Study was based on a survey of 63 connectors. The purpose of the study was "to characterize the nature and extent of physical and operational problems on freight connectors" and necessary investments for the 1999 Oregon Highway Plan.

Summary of Current Expenditures and Feasible Needs Per Year

NHS Intermodal Connectors	Current Annual Expenditure	Annual Average Feasible Need ($ in 2004 dollars)
Total	data not available	$ 11.3 m

Maritime and Ports

Description of Services

The majority of marine freight in Oregon moves on the Columbia River below Portland and on the Willamette River in Portland. The Columbia-Snake River System is navigable by barge above Portland as far as Lewiston, Idaho, 465 miles from the Columbia's mouth. Much of the material moved by barge is transloaded to/from ships, primarily in Portland.

Of Oregon's 23 port districts, nine ports move freight through intermodal marine terminals. Deep-draft freight terminals are located in the Coos Bay-North Bend area and at Newport on the Oregon Coast. In addition, three deep-draft marine terminals operate on the Oregon side of the Columbia River at Astoria, in the St. Helens area and in Portland. Shallow-draft freight terminals are located along the Columbia River at The Dalles, Arlington, Boardman (Morrow) and Umatilla. These nine ports are those identified for the Oregon Transportation Plan transportation needs assessment.

Waterborne freight accounts for nearly 9 percent of the total 37.1 million tons of freight in Oregon. Waterborne goods move about 4.6 percent of the total value of freight. Ocean going vessels on the Columbia River transport annually about $14 billion worth of U.S. products to world markets.[14] Grains, forest products, and petroleum are the primary commodities shipped on the Columbia-Snake River System. Grain accounts for about 40 percent of the tonnage moved through terminals in Portland.[15]

Current Spending

The current annual average spending for the identified port needs is slightly over $50 million, funded primarily by federal money with a small amount of money from bonds. The spending is for capital improvements necessary to get goods to and from the facility. The four categories of identified needs are maintenance dredging, channel deepening, road access projects, and specific marine-related projects. Administrative costs are not included, and the $9 million recently allocated to initiate the Columbia River deepening has not been included in the current expenditures. See Table 1.

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[14] Port of Portland, "Columbia River Channel Deepening Project," http://www.portof portland.com/ChannelProject.htm.

[15] Oregon Department of Transportation, Freight Moves the Oregon Economy, July 1999, p. 6.

Feasible Needs

Assumptions

The marine-related transportation needs have been identified for the nine ports with economic activity associated with waterborne commerce (listed under the Description of Services above). Marine-related needs include the improvements necessary to get goods to and from the facility. The categories include maintenance dredging, channel deepening, road access projects, and specific marine related projects (terminal barge deepening, crane, barge slip deepening). Marine-related airport, rail and intermodal connector needs are in other reports.

On-site improvements are not included with the exception of cranes and on-site road access improvements to existing facilities. Not included are on-site needs such as dock and pier replacement, property acquisition, water and sewer lines, environmental restoration and administrative costs. Additional marine port needs exist beyond what has been identified as part of the Oregon Transportation Plan, in particular, coastal port maintenance dredging for commercial fishing and recreational activities and infrastructure costs for currently vacant, industrial sites located in close proximity to marine ports.

Data Sources

The marine port data sources are port improvement plans, business plans, capital improvement plans, local and regional transportation system plans, and needs lists developed for federal funding requests. Oregon Economic and Community Development Department (OECDD) staff in cooperation with the Executive Director of the Oregon Public Ports Association (OPPA) collected the marine transportation needs directly from the nine ports. The Corp of Engineers provided the dredging maintenance and jetty cost data. The Port of Portland data was provided by the Port of Portland.

- **Maintenance Dredging**

The Corps of Engineers conducts maintenance dredging in five areas related to the ports of interest. The average annual cost of maintenance dredging for the five areas is $35.25 million. These projects are for the Columbia and Lower Willamette Rivers (affecting the Port of Portland, Port of Astoria, Port of St. Helens), Columbia River at the Mouth (affecting all of the Columbia River ports), Vancouver to The Dalles (affecting The Dalles, Port of Morrow), Coos Bay, and Yaquina Bay and Harbor. The estimated cost of future dredging is based on a five-year annual average of past spending.

- **Roadway/Access and Marine Port Projects**

In addition to roadway/access improvements, this category includes port entrance gates, cranes, and dockside dredging. The dredging is in addition to the federal dredging (discussed above). The road projects include both on-and off-site improvements which have not also been listed in local or regional transportation system plans. The listing has not occurred because the nature of the need is on-site, the project is beyond the local plan horizon but within the OTP 2030 plan period, or the need has not been accepted into the local plan. The projects in this category total $118.50 million for road-related projects and just over $156.9 million for cranes, dockside dredging, and entrance gates. The projects are geographically dispersed, but the most significant in cost are Port of Portland projects which are 70 percent of the $275.4 million total need. On an annual basis, this is $11.02 million per year over the plan cycle.

- **Jetty and Pile Dike Monitoring, Repair and Reconstruction**

The Corp of Engineers spends about $2.45 million annually to monitor and maintain the mouth of the Columbia River, Yaquina Bay, and Coos Bay jetties. Reconstruction of these jetties is estimated at $19 million, $19.45 million, and $450,000 respectively. An additional $45,000 is spent to monitor seven other jetties along the coast. About $200,000 per year is spent monitoring and maintaining the Columbia River pile dikes which serve to keep the channel from shifting locations. Their replacement cost is an estimated $7 million. The total annual monitoring and maintenance cost of the coastal jetties and pile dikes is $3.18 million. The replacement cost of the three jetties is $38.9 million. The total annual cost for this category is $125.40 million (2004 dollars) per year.

- **Columbia River Deepening - Modernization**

The project to deepen the Columbia River is estimated to cost $150.5 million. The 600-foot wide channel will be deepened by 3 feet between the Mouth and Vancouver. The states of Oregon and Washington are each responsible for $27.7 million in funding for matching funds.[16] The remainder, about 65 percent of the cost, will be federally funded. The annual average dollar cost for channel deepening over the plan cycle (2005-2030) in 2004 dollars is $6.02 million.

Summary and Conclusions

Oregon's unique location along the Pacific Ocean and Columbia-Snake River System provides valuable links for waterborne freight movement and commerce. Waterborne freight is nearly 9 percent of the total 37.1 million tons of freight in Oregon. Grains, forest products, and petroleum are the primary commodities shipped on the Columbia-

[16] Port of Portland, "Columbia River Channel Deepening Project", http://www.portof portland.com/ChannelProject.htm.

Snake River System. Ocean going vessels on the Columbia River transport annually about $14 billion worth of U.S. products to world markets.[17] Oregon has five deep freight terminal ports of which Portland is the most significant, and four shallow-draft freight terminals located along the Columbia River.

The scope of the identified needs focuses on district ports with waterborne commerce and improvements that are necessary to get goods to and from the port terminal. The on-site facility needs have been limited to access roads to existing facilities, cranes, and conveyors. There are additional marine port-related needs beyond what have been identified in this report. These include facility and infrastructure improvements associated with hundreds of acres of both developed and undeveloped land owned by the port districts and the private marine businesses. In the future, it may be appropriate to identify needs associated with short sea shipping. None per se have been identified as part of this report.

The marine port needs for the nine ports including the maintenance and deepening of the Columbia River over the 25-year plan period total $1.4 billion or $56.24 million per year.

Table 1 - Summary of Current Expenditures and Feasible Needs Per Year

Maritime Project Category	**Current Annual Expenditure (2004 dollars)**	**Total Cost 2005-2030 (in millions)**	**Annual Average Feasible Need Over 25 years (2004 dollars)**
Maintenance Dredging	$35.25	$881.25	$35.25
Roadway / Access and Maritime Projects	$12.88	$275.40	$11.02
Jetty and Pile Dike Monitoring and Repair	$3.18	$79.50	$3.18
Jetty and Pile Dike Reconstruction	0	$45.90	$1.84
Columbia River Channel Deepening (Federal portion)	0	$96.00	$3.84
Columbia River Channel Deepening (State of Oregon portion)	0	$27.70	$1.11
Total	**$ 51.31**	**$1,405.75**	**$56.24 million/yr.**

[17] Ibid.

Natural Gas and Petroleum Pipelines

Description of Services

Pipeline facilities play an important role in delivering petroleum and natural gas resources throughout Oregon. Pipelines are the least expensive method to transport these fuels followed by tanker, rail and truck. Oregon pipelines generally run in a north-south direction serving the state's major population areas and connecting areas of production to the north to major areas of consumption to the south, especially California. Pipeline networks are a key component in many of the state's major transportation corridors, such as the Interstate 5 corridor west of the Cascades, the U.S. 97 corridor in Central Oregon, and the eastern portion of the Interstate 84 corridor in Northeast Oregon. All petroleum commodities must be imported to the state; pipeline moves approximately 90 percent of these products. Most natural gas is moved by pipeline and is currently available to about 80 percent of Oregon's population.[18]

Two companies operate natural gas transmission pipelines and three others operate local natural gas distribution lines that span nearly 14,000 miles across Oregon.[19] In addition to the natural gas network, there are four petroleum pipeline operators in the state responsible for approximately 320 miles of petroleum product pipelines. There are no crude oil pipelines in Oregon. Since no refineries are located in the state, Oregon depends heavily on the Olympic Pipeline connecting refineries north of Seattle with the distribution terminals in Portland. This pipeline carries approximately 12 million gallons of fuel each day.

Because pipeline facilities are entirely privately owned and operated, it is difficult to obtain and assess accurate cost information for the future needs of pipeline facilities as was done for other modes of transportation in the Oregon Transportation Plan (OTP) process. Research conducted for the needs analysis work identifies pipeline industry trends and outlook, along with several key pipeline projects in the region.

Current Spending

Natural Gas Pipelines

The capacity and reach of the U.S. natural gas pipeline network has grown significantly over the past decade, driven by a 17 percent increase in natural gas consumption.[20] Annual expenditures on pipeline development nationwide exceeded $1.4 billion in the

[18] Oregon Department of Transportation, *Transportation Key Facts 2002*, p. 22.
[19] American Gas Association, *The Natural Gas Industry in Oregon*, http://www.aga.org.
[20] James Tobin, *Natural Gas Transportation – Infrastructure Issues and Operational Trends*, Energy Information Administration, Natural Gas Division, October 2001, p. 22.

late 1990s.[21] In addition to adding capacity, the industry has transformed the way in which it conducts business in order to increase efficiency and meet the growing customer demand.

Petroleum Pipelines

The majority of existing petroleum pipelines were constructed during the 1950s, 1960s and 1970s. Only 9 percent and 7 percent of existing pipeline infrastructure was constructed in the 1980s and 1990s respectively.[22] Much of the current petroleum pipeline investment focuses on maintenance and efficiency improvements on existing lines. Factors such as a growing, shifting population, maintenance issues on older pipelines and heightened expectations on pipeline operators, especially involving pipeline safety and environmental issues, may prompt the need for the industry to invest at a greater rate in the future.[23]

Feasible Needs

Natural Gas Pipelines

Forecasts predict even greater growth in natural gas demand over the next several decades; making it more likely that new pipelines and expansions will continue to be needed throughout the country, potentially at an increased rate.[24] U.S. natural gas consumption is expected to grow from 22.8 trillion cubic feet in 2000 to 34.7 trillion cubic feet in 2020, a 52 percent increase. A primary factor for the projected increase in demand is linked to the continuing growth in gas-fired electric power generation plants.[25] To meet the growing demand, forecasts predict that a 22 percent increase in interregional pipeline capacity will be added between 1999 and 2020. To date, the U.S. natural gas pipeline industry has been able to finance and install the additional infrastructure needed to accommodate significant growth in demand.

Adding natural gas pipeline capacity often does not require establishing a new line. In many situations, capacity improvements can be achieved by increasing the compression of the existing system or looping an existing line. Looping involves the integration of a parallel pipeline with all or a portion of the existing line. Compression and looping improvements are the least expensive and quickest alternatives available to pipeline

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[21] Energy Information Administration, Office of Integrated Analysis and Forecasting, *U.S. Natural Gas Markets: Recent Trends and Prospects for the Future*, May 2001, p. xi.
[22] Richard A. Rabinow, "The Liquid Pipeline Industry in the United States: Where It's Been, Where It's Going," A Report for the Association of Oil Pipe Lines, April 2004, p. 44.
[23] Ibid. pp. 44-45.
[24] Tobin. p. 22.
[25] Energy Information Administration, Office of Integrated Analysis and Forecasting, p. xiii.

operators for adding capacity, while minimizing potential opposition to infrastructure expansion.[26]
Industry experts note that the methodical process by which a new pipeline or expansion is developed from concept to installation has worked exceedingly well in the past and should continue to be able to handle the growth expected over the next 20-25 years. However, delays in acquiring approval for these projects could result in short-term local deficiencies in capacity and affect service to customers.[27]

The expansion of local distribution lines is a market driven activity, occurring with new residential, commercial and industrial development. The expansion of transmission pipelines is also market driven, but at a much larger scale. Both of these expansion activities are occurring in Oregon. Major transmission pipeline projects planned, under construction, or nearing completion throughout Oregon include the construction of a new line between a NW Natural gas storage field near Mist and an existing main line near Molalla, and the construction of a new line connecting the Coos Bay area to existing lines in the Interstate 5 corridor near Roseburg.[28]

Petroleum Pipelines

According to the U.S. Energy Information Administration, petroleum consumption in the United States is expected to increase 1.2 percent annually, reaching 24.7 million barrels per day by 2020, up from 19.7 million barrels per day in 2000.[29] The increased demand for petroleum products will lead to significant growth in the liquid pipeline industry during the next 25 years, although this growth will not be as significant as in natural gas pipelines.[30] Capacity management techniques on existing petroleum product pipelines such as raising operating pressure, improving product scheduling and utilizing new technologies are important industry practices, especially as demand increases and the costs of new pipelines become more restrictive.[31]

Over the next 25 years, investment in inland pipeline improvements will replace some existing capacity, but much of the existing pipeline infrastructure will remain in service. The existing infrastructure will continue to age, requiring additional maintenance and repair along with technological and operational improvements. The industry's ability to expand the pipeline network and update aging facilities will become more difficult with increasing improvement costs. Projects that do move forward will be more expensive and

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[26] Tobin, pp. 16-17.
[27] Ibid. p. 22.
[28] Oregon Department of Transportation, Transportation Development Division, Planning Section, *Freight Moves the Oregon Economy*, July 1999, pp. 100-101.
[29] Energy Information Administration, "Petroleum Products," *Energy Information Sheets*, p.1, http://www.eia.doe.gov/neic/infosheets/petroleumproducts.htm.
[30] Rabinow. p. 3.
[31] Ibid. p. 37.

take longer to develop due to costly right-of-way acquisition especially in urban areas, and increasing environmental and safety concerns throughout the industry.[32]

Petroleum pipeline capacity in Oregon generally appears adequate to meet both current and near-term needs. However, as the state's population and economy continue to grow, pipeline operators may need to install larger lines or improve operational efficiency to meet increasing demand in the region.[33] Capacity issues on the existing Olympic Pipeline connecting the oil refineries north of Seattle to terminals in Portland will likely affect the future ability to meet petroleum needs in Oregon, including jet fuel delivery to the Portland Airport. A $105 million Cross-Cascade pipeline between the Puget Sound Region and the Tri-Cities area in Central Washington has been proposed to help free up capacity on the existing line running between Puget Sound and Portland.[34,35] The construction of this pipeline may also reduce barge shipments to Umatilla, which may force petroleum products to be supplied more expensively by other modes, including truck. As capacity issues become more prevalent, trucks or barges may increasingly need to serve future unmet petroleum needs in other areas of the state.[36]

Summary and Conclusions

An extensive network of pipeline facilities plays an important role in delivering petroleum and natural gas fuels throughout Oregon. Nearly 14,000 miles of transmission and distribution pipelines make natural gas available to about 80 percent of the state's population. Approximately 320 miles of petroleum product pipelines distribute fuel products in the state. Since there are no petroleum refineries in the state, Oregon relies heavily on the Olympic Pipeline connecting refineries north of Seattle to the major population centers of Oregon and points south.

Consumption of natural gas in the U.S. is expected to increase 52 percent between 2000 and 2020, making it likely that new pipelines, expansion projects and efficiency improvements will be needed throughout the country. To date, the U.S. natural gas pipeline industry has been able to finance and install additional infrastructure to accommodate significant growth rates. Utilizing current expansion methods, the natural gas industry should continue to be able to handle the growth anticipated over the next 25 years.

Petroleum consumption in the U.S. is expected to increase 1.2 percent annually over the next two decades, leading to significant growth in the liquid pipeline industry over the

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[32] Ibid. p. 54.
[33] Oregon Department of Transportation, Transportation Development Division, Planning Section, p. 99.
[34] Larry Lange, "Salmon Among Core Issues for Pipeline," *Seattle Post Intelligencer*, March 27, 1999, http://seattlepi.nwsource.com/local/pipe27.shtml.
[35] Oregon Department of Transportation, *Final ODOT Economic and Bridge Options Report*, August 22, 2003, p. E-4.
[36] Ibid. p. E-4.

next 25 years, although not as rapid as for natural gas pipelines. Despite these increases, petroleum pipeline capacity in Oregon generally appears adequate to meet current and near term demands. As the state's population and economy continues to grow, pipeline operators may need to install larger lines or improve operational efficiency to meet increasing demand. Capacity concerns on the Olympic Pipeline will likely affect the future ability to meet petroleum needs in Oregon. A Cross-Cascade pipeline project in Washington has been proposed to help free up capacity on the existing Olympic line. As pipeline capacity issues such as these become more prevalent, trucks or barges may increasingly be needed to serve unmet petroleum demand around the state.

Public Transportation

Description of Services

There are more than 230 public transportation providers in Oregon, including large transit districts, local governments, and non-profit and for-profit organizations such as privately-owned intercity bus service operators. Over 120 million trips were provided during a one-year period spanning 2002-03, using about 1,558 vehicles for light rail, fixed route bus, demand response, special needs transportation, intercity bus and transportation options management/rideshare services. Transportation option needs are discussed in a later section of this report.

Public transportation services vary significantly between Oregon's large urban centers, small communities and rural areas. In Oregon's larger urban areas, such as the Portland, Salem, Eugene, and Medford areas, transit agencies provide the majority of public transportation services. Public transportation systems in urban areas provide services often through a combination of light rail vehicles (Portland metro area), bus systems, transportation demand management (TDM), and demand response services. Smaller cities and rural areas are served by community public transportation services and subsidized taxi services. The main focus of public transportation in small communities and rural areas is to provide mobility options for those who cannot drive, typically through local bus, van or dial-a-ride services.

Public transportation services overseen by ODOT include public transit, special needs transportation, transportation options, intercity passenger transportation, and planning and capital programs. ODOT also coordinates the public transportation program with other state agencies' programs (e.g. Department of Environmental Quality, Department of Health and Human Services and Department of Land Conservation and Development).

Table 1 presents the major public transportation services and their governance and state, local, and regional roles.

Table 1 – Public Transportation Services and Governance

Service	Governance	ODOT/State Role	Local/Regional Role(s)
Intercity Passenger Rail	Amtrak	Coordination, planning, funding	Coordination
Intercity Bus	Private providers	Coordination, planning, and minor funding	Coordination
Metropolitan Area Transit	Public transit agencies	Coordination (fleet management), funding	Metropolitan planning (MPOs), local government integration/coordination
Rural/Small City Transit	Local agencies/private providers	Coordination, funding	Planning and integration, coordination with metro area transit agencies where applicable
Special Needs	Local providers (public and private)	Coordination and funding	Coordination

Intercity Service

Intercity passenger service in Oregon includes Amtrak passenger rail and intercity bus services. Amtrak operates the Amtrak Cascades corridor service between Eugene and Vancouver, BC, as well as the long-distance service that serves some communities in Oregon. Corridor train service is supplemented by Amtrak Thruway bus service in the Eugene-to-Portland corridor and connecting corridors. Private bus operators provide limited intercity bus services in Oregon, both scheduled regular route and commuter type services. (Passenger rail needs are included in the Freight and Passenger Rail report).

The most comprehensive intercity transportation services are between cities in the Willamette Valley on the I-5 corridor (specifically, Eugene, Albany/Corvallis, Salem, and Portland). Smaller communities, particularly those outside the I-5 or passenger rail corridors, have limited access to services. The intercity passenger bus system serves the state with very little financial support from state or federal sources. There are several areas and corridors where service is lacking or the service does not meet the 1992 Oregon Transportation Plan level of service standards.

Large Urban Area Transit

Urban mass transit is provided by transit districts in Oregon's metropolitan areas (i.e., areas with populations greater than 50,000). Table 2 below describes transit services in the metropolitan areas in Oregon. These districts provide fixed route services and Americans with Disabilities Act (ADA) services. Two of the districts, Tri-Met and Lane Transit, obtain significant revenue from payroll taxes, while Salem Area Transit and Rogue Valley obtain local funding only from property taxes.

Table 2 – Public Transit Agencies in Oregon Metropolitan Areas

Metro Area/System	Services	Annual Ridership (2002)
Portland/Tri-Met	Bus, Light Rail	100,219,462
Eugene/Lane Transit	Bus, Bus Rapid Transit (planned)	8,692,496
Salem/Salem Area Transit	Bus	4,829,278
Medford/Rogue Valley Transit	Bus	922,847
City of Corvallis Transit System	Bus, Trolley	493,229
City of Bend Transportation	General Public Demand Response, Fixed Route planned	NA for 2002

Source: National Transit Database (www.ntdprogram.com)

Small City and Rural Transit

Several smaller communities in Oregon have transit districts that offer regular, fixed-route and demand-responsive transit services for the general public (e.g., Basin Transit Service in the Klamath Falls area). Other smaller communities have demand-responsive services or offer subsidized taxi service. Generally, transit in small communities provides mobility to those persons that don't have the option to drive (in contrast to larger urban systems that effectively offer both mobility for non-drivers and a mobility choice for others who have an option to drive). The City of Wilsonville, while in the Portland metropolitan area, operates a transit system separate from Tri-Met that provides fixed route services in Wilsonville that connect with Tri-Met park and ride lots as well as service to Salem.

Special Needs Transportation

There are special needs transportation providers in every Oregon county. They provide specialized transportation services for the elderly and people with disabilities who cannot drive or afford to drive. Under the American Disabilities Act (ADA), transit districts must offer special needs transportation in all routes/corridors with regular transit services. Special needs transportation services are provided by transit districts, local government agencies, and private services. ODOT oversees grants to transit districts, local governments and other providers to support and improve the quality and quantity of special needs transportation services.

Current Spending

Operating expenses represent over half of the public transit cost in Oregon. The estimated current annual operating spending is $337 million (2004 dollars). Capital expenditures follow, at an estimated $155 million based on a 5-year annual average (year of dollar varies with 2000 as average dollar year). Current vehicle replacement cost is estimated at an additional $25.6 million per year (2002 dollars). This is a cost estimate of current spending based on the assumption that the large systems replace their vehicles on a 15-year cycle at $300,000 per vehicle and that the smaller, community level system vehicle replacement is on a five-year cycle at $60,000 per vehicle. Oregon's diverse public transit is currently provided by 1,558 vehicles. Some experts in the field feel that Oregon is not keeping pace with vehicle replacement and the fleet is older than the recommended replacement cycle. The total current annual spending for operating, capital, and vehicle replacement is about $510 million per year (2004 dollar). The Portland area TriMet public transit provider is by far the largest service provider in the state representing 77 percent of the current total operating expenses and 92 percent of the 5-year average annual capital expenses. See Tables 3 and 4.

Administrative Costs

Administrative costs are included in the operating cost. Primarily reflected in the Small Communities and Transportation Options programs is the ODOT Public Transit Division's $2,558,758 (2002) program cost. These costs include ODOT staff salaries, equipment, central administrative support and managerial services. The amount will increase over time with inflation and additional staff.

Table 3 - Public Transit Current Annual Operating and Vehicle Replacement Costs

Service Type (2002 average dollar year)	Vehicles Operated	Operating Cost	Vehicle Replacement Cost	
Large Urban Systems/MPO			$20,000,000	
Portland (Streetcar)	4	$1,081,468		
Tri-Met	799	$243,377,611		
Lane Transit District	120	$24,298,010		
Salem Area Transit District	82	$14,527,794		
Rogue Valley Transit District	45	$3,706,495		
Corvallis	12	$1,318,000		
Bend	16	$1,088,667		
SMART Transit (Wilsonville)	12	$1,741,688		
Small Communities	132	$9,960,831	$1,584,000	
Demand Response/Special Needs	336	$5,422,600	$4,032,000	
Intercity Bus		$10,000,000		
Total 2002	**1,558**	**$316,523,164**	**$25,616,000**	
Operating and Vehicle Replacement Costs Inflated to 2004 dollars		**$337 million**	**$27 million =**	**$364 million**

Major Source: National Transit Database (www.ntdprogram.com) and individual programs.

Table 4 - Average Annual Capital Expenditures Summary (in millions)

Transit Districts	1998	1999	2000	2001	2002	Average	Inflated to 2004 $
TriMet	214.1	110.8	128.5	118.1	139.6	$142.22	
LTD	9.0	7.6	2.5	3.1	5.0	$ 5.44	
Salem	1.2	2.5	0.8	0.7	0.4	$ 1.12	
RVTD	0.4	0.3	0.1	0.2	n/a	$ .25	
Subtotal	$224.7	$121.2	$131.9	$122.1	$145.0	$149.05	
Other: Remainder of system						6.0	
					Subtotal	$155.05	
Less Vehicle Replacement *						$ -25.62	
					Total	**$129.43**	**$146**

Source: Federal Transit Administration Annual Reports
* Vehicle replacement costs are subtracted from the subtotal because the vehicle replacement cost is included in each of the service provider expenses.

Total Annual Operating and Capital Costs: $ 510 million (2004)

Feasible Needs

By 2030, Oregon's population is projected to grow by about 37 percent over 2004 levels to nearly 4.9 million. If funding for public transportation were to remain constant at the current $510 million spending level, per capita ridership would fall an estimated 26 percent by the year 2030. Today there is one public transportation vehicle for every 2,250 Oregonians. If funding were to stay at current levels, there would only be one vehicle for every 3,140 Oregonians in 2030. Under this scenario (Level # 1, Table 5) costs, fleet size, services and performance would remain frozen at the 2004 year level for the planning period (2005-2030). This assumes no adjustment for inflation or population would be made and the per capita ridership levels would decline as population increases.

To keep pace with population growth to 2030 (Level # 2, Table 5), Oregon's public transportation system would provide an additional 45 million trips annually, operating a fleet with an additional 615 vehicles. This would allow for per capita ridership to remain steady at 35 trips per capita through 2030. Overall system ridership would grow to over 170 million trips annually by 2030. Keeping service and performance in pace with population growth would allow the metropolitan (MPO) areas' operating and capital costs to be based on the local Regional Transportation Plans (RTPs) constrained scenarios and cost an estimated $561 million per year. Non-urban area costs would be based on population growth

The Level #3 (Table 5) is the recommended, OTP feasible need service and investment level for public transportation. Level #3 investment allows public transportation to expand consistent with the metropolitan (MPO) areas' preferred Regional Transportation Plans (RTPs). (This is beyond the constrained plans but not fully to the level of the unconstrained plans. The constrained level appears to be consistent with Level #2 at 35 trips per capita and service and investment at the unconstrained level appears to be close to the Level #3 of 42 trips per capita).

Under Level #3 service level fleet size would grow to nearly 2,700 from the current 1,558 vehicles. Per capita ridership would increase from 35 trips to 42 trips per capita by the end of the planning cycle (2005-2030) creating a 60 percent increase in overall transit ridership. By 2030, public transportation would be providing over 205 million trips annually and the total cost to operate and expand the system would be $812 million per year.

Level #3 is consistent with the Oregon Public Transportation Plan (OPTP) recommended service levels. The OPTP recommends Level #3 in order for public transportation "to contribute effectively to the success of these visionary planning measures" (Transportation Planning Rule, Oregon Benchmarks, Metro's 2040 Plan, Eugene's Trans Plan and the Oregon Transportation Plan listed).[37]

[37] Executive Summary, Oregon Public Transportation Plan adopted in April 8, 1997, an element of the Oregon Transportation Plan, page I-1.

Table 5 – Summary of Public Transportation Scenarios in Year 2030*

Public Transit Service	Service Level 1 Freeze Service at Base Year Levels	Service Level 2 Keep Pace with Population Growth	Service Level 3 Oregon Public Transportation Plan Recommended Service Level # 3 (Feasible Need)
Annual ridership in million trips	127	172	205
Trips per capita	26	35	42
Vehicles in fleet	1,558	2,175	2,675
Annual Cost (1997 $ in millions)	$342	$525	$764
Annual Cost (2004 $ in millions)	**$364**	**$558**	**$812**

*Based on scenarios in 1997 Oregon Public Transportation Plan. Number of rides inflated based on 2005-2030 timeframe and conversion to 2004 dollars shown.

Summary of Public Transportation Service Level Assumptions

Service Level # 1 Assumptions

- Services remain frozen at base year levels for the planning period (2005-2030).
- Performance remains frozen at base year levels for the planning period.
- Costs remain frozen at base year levels.
- No adjustment is made for population growth.
- Per capita ridership levels decline as population increases.
- Fleet size remains constant for the planning period.

Service Level # 2 Assumptions

- Performance changes as services increase and population grows.
- Costs increase as services increase and population grows.
- Per capita ridership remains steady as population increases.
- Urban areas operating and capital costs are based on the constrained scenarios found in local Regional Transportation Plans (RTPs) (where available).
- Non-urban area costs are based on population growth.
- Capital replacement for small community systems and demand response/special needs transportation services are based on a 5-year useful vehicle life at an average cost of $60,000 per vehicle, uninflated.
- Population increases are based on OEA projections.

Service Level # 3 Assumptions (Feasible Need)

- Ridership increases with population growth and service increases to reach the per capita target.
- Costs increase over the planning cycle with population and service increases needed to reach the per capita ridership target.
- Capital costs in urban areas increase based on the preferred scenarios in local RTPs (where available).
- Fleet size increases are based on ridership increases associated with the increase in service needed to reach the per capita ridership target.
- Non-urban capital costs increase based on the per capita ridership target.
- Population increases are based on OEA projections.

Summary and Conclusions

Public transit service in Oregon is diverse with more than 230 public transportation providers ranging from large transit districts, local governments to non-profit and for-profit organizations. Large urban areas systems provide transportation options that include light rail vehicles (Portland metro area), bus systems, and demand response services managed in combination with Transportation Options (demand management) programs. The focus of service in small communities and rural areas is to provide mobility options for those who cannot drive using community public transportation services and subsidized taxi services.

The public transportation needs assessment defines "feasible needs" as Level #3 expanding service through 2030 consistent with the regional transportation plans. Growing public transportation service consistent with metropolitan (MPO) areas' Regional Transportation Plans (RTPs) provides 42 trips per capita by the end of the planning cycle (2005-2030) creating a 60 percent increase in overall transit ridership. Capital costs in urban areas increase based on the preferred scenarios in Regional Transportation Plans (where available). By 2030, public transportation would be providing over 205 million trips annually and the total cost to operate and expand the system would be $812 million per year.

Rail Freight and Passenger

Description of Services

Oregon's rail system is comprised of 22 railroads and 2,413 miles of track. About 53 percent (1,277 miles) are publicly or privately-owned short line railroads. The other 1,136 miles are main lines owned by Union Pacific (UP) and BNSF Railway Company (formerly the Burlington Northern & Santa Fe). In 1999 these railroads carried over 63,000 tons of freight. The major commodities were farm products, lumber and wood products, chemicals and allied products, and various pulp, paper and food products.

Amtrak operates passenger trains on the Union Pacific north-south tracks from Washington to California. Current state-sponsored service is two daily passenger train round trips between Portland and Eugene with a minimum one-way travel time of 2 hours and 35 minutes. Amtrak's *Coast Starlight* also carries passengers between Seattle and Los Angeles each direction once daily. State-sponsored Amtrak Thruway bus services connect 16 communities to train services with varying degrees of coordination.

The Oregon Department of Transportation's Rail Division ensures compliance with state and federal regulations related to the safety of public road-railroad crossings and the safety of railroads and rail transit operations in Oregon. The Division manages passenger and freight rail service programs including the development of passenger and freight rail transportation opportunities and railroad improvement projects.

Current Spending

Freight Rail

According to the Surface Transportation Board, the federal agency charged with financially regulating the rail industry, no U.S. railroad was revenue adequate for the year 2003. A railroad is considered revenue adequate if it achieves a rate of return on net investment (ROI) equal to at least the current cost of capital for the industry, which was 9.4 percent for 2003. Oregon's two major carriers, Union Pacific and BNSF Railway Company, posted a 2003 return on investment of 7.3 percent and 6.2 percent, respectively, well short of the cost of capital. Nevertheless, UP and BNSF are able to make significant annual capital expenditures to maintain their core systems and provide for some capacity improvements. Overall, Oregon's main line network in 2004 is in relatively good shape.

On the other hand, Oregon's short lines, which operate 53 percent of the state's route miles, are capital deprived. The principal reason for this is that small carriers operate low-density lines with inherently low revenues, which means they are marginally

profitable and do not generate much capital. Moreover, many of the short lines inherited a maintenance deficit from the previous operators, which in most cases were large railroads. Spinning low-density lines off to small carriers was the preferred alternative to abandonment. The strategy did improve the economics because short lines generally enjoy lower costs and more productive work forces, but it wasn't a cure-all. Very few, if any, Oregon short lines generate enough capital to renew their physical plants on a systematic basis, let alone overcome deferred maintenance and/or address issues related to safe and efficient handling of the new generation of heavier (286,000 lbs. gross) railroad cars.

For the 2001 and 2003 biennia, Oregon invested state funds totaling $4 million in short line infrastructure projects. For the 2001 biennium, state money leveraged an additional $1.3 million in private funds for a total rail investment of $5.3 million; this ratio, 58 cents for each dollar, is projected to continue through the 2003 biennium.

In addition, the 2003 Oregon Legislature created the Industrial Rail Spur Fund. The fund's purpose is financing grants and loans for industrial rail spurs. The fund comes from the sale of lottery bonds but may also include other sources of funds. Proceeds from $8 million in lottery bonds are available for projects.

Passenger Rail

The primary objective of the state's passenger rail program is to provide faster, more frequent, and more reliable passenger service in the Willamette Valley. Oregon is part of the Pacific Northwest Rail Corridor from Eugene, Oregon, to Vancouver, British Columbia, one of the 11 "high speed rail corridors" identified in the Intermodal Surface Transportation Efficiency Act (1991) and its successor, the Transportation Equity Act for the 21st Century (1998). In 2003 the two state-supported trains making daily trips between Portland and Eugene carried 93,475 passengers. ODOT's goal is to increase service frequency to five-eight round-trip trains daily and decrease travel time from 2 hours and 35 minutes to less than 2 hours through capital improvements. The capital improvements would provide capacity benefits to Union Pacific rail freight traffic movements as well.

Expenditures for passenger train services, Thruway and connecting bus services and administration for the 2003-2005 biennium average $4.8 million/year. The major proportion of these expenditures goes to Amtrak trains budgeted at about $375,000 per month.

ODOT Railroad Safety and Rail Crossing Safety Programs

The ODOT Railroad Safety Program provides safety inspection services for tracks, locomotives and rail cars and insures compliance with regulations related to hazardous materials and railroad operating practices. Rail staff members also inspect railroad sidings and yards to insure safety of railroad workers in and around railway walk areas,

loading docks and bridges. The program is also responsible for overseeing the safe operation of Tri-Met's light rail operation as well as other rail fixed guideway operations in the state. The safety inspection program is funded by an assessment on all railroads based on annual gross operating revenues generated in the Oregon Rail Fund. The transit safety oversight program is funded by an assessment of the rail fixed guideway operations.

The Crossing Safety Program authorizes all changes at public highway-railroad crossings, inspects all public crossings, enforces laws related to crossing blockages, and manages crossing safety improvement programs. It is funded 50 percent from the Rail Fund and 50 percent from the Grade Crossing Protection Account. Crossing improvement projects are funded primarily by federal highway funds dedicated to the elimination of highway-railroad crossing hazards, with state matching funds provided by the Grade Crossing Protection Account.

Average 2003-2005 expenditures for both programs were $1.6 million a year.

ODOT Rail Division

Administration and other expenditures for the ODOT Rail Division Program were an average $420,570 per year in 2003-2005.

Feasible Needs

Freight Rail

- **Short Lines.** As part of the development of the 2001 Oregon Rail Plan, ODOT surveyed the 16 short line railroads then in Oregon to determine future needs. The needs of the eight respondents principally involved rehabilitation of track and bridges, but also included needs for some equipment and debt refinancing. Much of the rehabilitation need was related to the use of 286,000-pound cars, which are about nine percent heavier than previous maximum car weights. These cars are popular with shippers and Class I railroads (mainline railroads – the BNSF Railway Company and the Union Pacific) because they present opportunities to maximize loads and minimize operating costs. However, many short lines do not have the underlying track and structures capable of supporting these heavier cars. The needs identified in the survey responses totaled $70 million, due mostly to deferred maintenance exacerbated by the 286,000-pound car issue.

  To quantify total statewide needs for all short lines, the Rail Plan based needs estimates on national rail studies. Just to keep up with normal attrition for ties ending an average 40-year life cycle, Oregon's short lines need to collectively install more than 100,000 new ties each year at an estimated cost of about $5.5 million. This amount is for ties only and does not consider replacing and upgrading rail,

rehabilitating bridges and tunnels, or other capital needs relating to locomotives, rolling stock, maintenance facilities and maintenance equipment. If all rail sections with 90-pound rail and less were replaced, short lines would require $185.7 million (in 2004 dollars). Bridges would add another $60 million, for a total need of over $250 million (2004 dollars), exclusive of equipment, debt financing and other items.

- **Main Lines.** The two main line railroads have identified needs related to tunnel clearances on their roughly parallel I-5 corridor routes in Oregon. These routes link the Pacific Northwest with Southern California and the Southwest. Improved tunnel clearances would allow two 9-foot 6-inch containers stacked one on top of another, a configuration required to enhance the attractiveness of these routes for traffic currently moving by truck. The BNSF has identified needed improvements to five tunnels with a preliminary estimate of totaling $6.3 million. The Union Pacific has 20 clearance-restricted tunnels in Oregon; needed improvements are estimated at $10 million.

  Shippers have indicated that rail transit time must also be enhanced if the railroads are to be successful in attracting I-5 truck traffic. Specifically, shipments from Seattle must have "second-morning delivery" in Los Angeles. Although cost estimates for improvements to the total Oregon route have not been made, the I-5 Rail Capacity Study (2003) identified needed improvements in the Portland area. Those total about $174 million (2004 dollars) and would increase train speeds and improve access to critical yards and junctions.

- **Port Facilities.** Outside the Portland area, the Port of Coos Bay identified a need for $25 million in improvements to the Coos Bay Rail Bridge phase II rehabilitation and additional rail infrastructure on the North Spit. The Port of Morrow needs improvements to its Terminal 3 rail, a rail extension and a rail spur costing $2.8 million. The Port of St. Helens business Plan contains $2.2 million in rail siding and rail loop needed improvements. The Port of Umatilla has identified a $50,000 need for railroad rehabilitation. These needs total $30.05 million for the foreseeable future or $1.2 million a year for the next 25 years.

Altogether, these improvements amount to about $470 million over the next 25 years or about $18.8 million annually. The estimates assume that short lines need to upgrade their track to handle the heavier rail cars, that main line railroads need to offer services competitive to interstate truck services, that the I-5 rail capacity improvements are made in the Portland area to reduce congestion and train interference and that smaller ports should upgrade their rail capacity.

Passenger Rail

- **Willamette Valley Rail.** The goal for ODOT's Willamette Valley corridor operations is to increase the number of daily round trips, increase train speeds to 79

mph operation where feasible, and reduce travel time between Portland and Eugene to two hours or less. Planners estimate that the necessary track and signal improvements and closing of hazardous crossings to achieve this goal will cost at least $100 million, but these figures are several years old and costs are likely to have increased due to inflation and the dynamic nature of the freight network.

The cost to purchase additional train sets is unknown and will depend upon the number of sets being purchased, the type of equipment being purchased, and whether Oregon's purchase can be made in conjunction with other states to leverage the available dollars toward a larger number of train sets.

Operating expenses for the first four trains would require operating subsidies, and depending on a number of operational factors including equipment used and times of operation, the break-even point may be reached with the fifth train. With additional ridership, train revenue are expected to result in a net gain.

Two trains cost about $4.8 million to operate in 2003; an additional train in 2011 would bring costs to $6.5-7 million a year in 2003 dollars. A fourth train added in 2013 would bring operating costs to $8.5 million. The fifth train in 2015 initially would raise operating costs to $10 million, but increased ridership would bring the costs to break-even by 2022 and to a net gain by 2030.

The Portland-Eugene Thruway bus program making two round trips daily serving four cities in the corridor costs about $40,000 a year in 2003, but historically has been self-supporting. That program would be phased out as trains are added to the schedule. Thruway buses also transport passengers in 16 communities across the state and support the train schedules. The total cost for all buses is $361,000 a year, of which $160,000 is funded by intercity transit grants. (Intercity bus is included in the Public Transportation report.)

- **Commuter Rail.** Commuter rail from Wilsonville to Beaverton will cost $105 million in capital expenditures and $2 million annually for operations. Extending this service to Salem within the next 20 years would cost about $85 million in capital expenditures and $4 million yearly for operations.

- **Passenger Services to Eastern Oregon.** From 1977 to 1997, Amtrak's *Pioneer* train operated on the south side of the Columbia River serving communities from Portland to Ontario and on to Boise and Salt Lake City. Following discontinuance of service in 1997, a task force estimated resuming daily service between Portland and Boise would require approximately $5 million in operating support, excluding necessary infrastructure upgrades and equipment acquisition. Should services from Portland to Boise be reinstituted, track improvements are estimated to cost about $15 million and two sets of equipment to serve the population, an additional $16 million. If service is reconsidered, an additional study will be needed to update costs.

Summary and Conclusions

Oregon's rail system, comprised of 22 railroads and 2,413 miles of track, serves both freight and passengers. The freight system is owned by the Union Pacific and BNSF Railway Company and 20 short line railroads. Amtrak operates one passenger train between Seattle and Los Angeles and two state-sponsored trains between Portland and Eugene each day. In 1999 the railroads carried over 63,000 tons of freight. In 2003 the two state-supported trains carried 93,475 passengers. The ODOT Rail Division ensures compliance with state rail-related regulations, manages and markets inter-city passenger rail operations, and manages railroad improvement projects.

Although Oregon's mainlines are in relatively good shape, its short lines have inherited a maintenance deficit and do not generate enough capital to maintain their facilities or fund improvements to handle heavier rail cars. Needs for replacing rails and bridges total close to $250 million (2004 dollars). Needed improvements to tunnels on the mainlines and to the rail facilities in the Portland area total $190.6 million. Outside the Portland area, the Ports of Coos Bay, St. Helens Morrow and Umatilla have identified needs costing $30.05 million.

Expenditures for passenger services for the Willamette Valley trains will steadily increase as trains are added, but operating expenditures are expected to break even when the fifth train is added. Expenditures for the Beaverton-Wilsonville commuter rail line reflect the expected opening of the line in 2008. For the purposes of this needs analysis, expenditures for the Wilsonville-Salem commuter line begin in 2020 and re-institution of services from Portland to Boise in 2022.

Table 1 – Summary of Current Expenditures and Feasible Needs Per Year (2004 dollars)

	Current Expenditures		Feasible Needs (over 25 yrs)
	Public	Private	Public and/or Private
Freight			
• Mainlines*	no data	no data	$ 8.82 m.
• Short lines	$6 m.	more than $.67 m.	$10 m.
Passenger	$4.8 m.	no data	Range from $9-$57 m./yr. including reasonable estimate for track improvements and train sets
Safety Programs	$1.6 m.	no data	
ODOT Admin.	$0.42 m.		$0.42 m.

*Includes port rail facilities

Data Sources

2001 Rail Plan; Pacific NW Rail Corridor, Oregon Segment; I-5 Rail Capacity Study (February 2003); and interviews and correspondence with ODOT Rail Division staff and Ports managers

Transportation Options

Description of Services

Oregon's Transportation Options (TO)[38] program coordinates and promotes travel options including transit, rideshare, cycling and walking. The state TO program centers are housed in ODOT's Public Transit Division and Department of Energy with six additional programs located in the major metropolitan areas. The programs are a part of the state's management of the transportation system to reduce the hours of travel delay caused by congestion and improve air quality.[39] Major objectives are to help employers with 50+ employees develop employee transportation plans to reduce reliance on the automobile and apply available Business Energy Tax Credit. Other program services and activities are listed below with a map of the major areas served.

Program Services

- Providing education and outreach that includes mass marketing, employee, and individualized programs to promote to promote transit, rideshare, cycling, walking and rural-to-urban mobility
- Marketing and sales of employee group transit passes
- Maintaining rideshare carpools and vanpools databases
- Promoting employer telework programs
- Assisting with transit, corridor, and transit-oriented development planning; and community design related issues
- Assisting with Safe Routes to School planning and coordination
- Promoting community health through walking and cycling and appropriate community design

Areas primarily served by Oregon's Transportation Options program are shaded.

[38] Program formerly known as Transportation Demand Management.

[39] The Transportation Planning Rule requires regional and local transportation system plans include demand management elements based on targets to reduce vehicle miles traveled (VMT).

Business Energy Tax Credit Program

The Department of Energy's contribution towards Oregon's Transportation Options program consists of the Business Energy Tax Credit, (BETC) program. Organizations may receive a tax credit for purchasing transit passes for riders, vehicles for vanpooling or carpooling, bicycles for commuting, equipment for transit shelters or bicycle storage, equipment to allow employees to telework, and vehicles for transporting riders. Other incentives that encourage employees to carpool, take transit, walk or bike also may be eligible for a tax credit, as are membership fees for transportation management services, carsharing and transportation operation costs, and parking cash-out. The tax credit is 35 percent of the eligible project cost.

Another aspect of the BETC program is the Pass-through Option which allows the benefit to pass-through to another party. Participants may be an Oregon business with tax liability, Oregon public entity, or non-profit organization with no tax liability.

Table 1 - Business Energy Tax Credit Project Costs *

Year	# of Projects	Project Cost (approved)	Cost After Tax Credit
2000	36	$ 1,745,583	$ 1,501,234
2001	39	$ 1,903,966	$ 1,741,212
2002	67	$ 4,544,603	$ 3,857,040
2003	66	$ 4,447,430	$ 3,210,154
2004	179	$28,671,887	$10,342,576
Totals	387	$41,313,469	$20,652,216

* As of April 27, 2005

Vehicle Miles Reduced

An estimated 209,000,000 vehicle miles[40] traveled or six percent of the statewide annual total are removed from Oregon's roads due to the availability of alternative transportation modes and TO program efforts. This reduction equals one cent per VMT removed.[41] Table 2 below shows reduction in VMT by region based the ODOT portion of the TO program.

[40] VMT reduction figures represent typical results during 2001 through 2004. Data is not available for all years, hence a representative, versus comparative figures.

[41] Based on the 2002 program costs of $2.45 million.

Table 2 - Estimate of Avoided Vehicle Miles Traveled (VMT) in 2002

Region	2002 Region VMT in Program Areas[42] (million miles)	VMT Avoided (million miles)	Percent of Region VMT	Public Transit 2002 STIP Funding Amounts	Cost per VMT Avoided (Budget/VMT)
1	6,844.	183.5	2.68%	$1,794,000	$0.01
2	5,491.	24.5	.45%	$ 453,000	$0.02
3	985.	.4	.04%	$ 126,000	$0.30
4	963.	1.0	0.11%	$ 77,000	$0.07
Total	**1,428 million miles**	**209 million miles**	**1.47%**	**$2,450,000**	**$0.01**

Current Spending

Current annual spending for Public Transit TO programs is $943,000[43]. This supports one Public Transit Division staff and an $850,000 marketing program. Funding to support the regional programs come from a variety of sources. Portland uses a portion of the region's federal CMAQ funds, but receives no funding from ODOT; programs in Regions 2, 3, and 4 receive funding from ODOT Operations program. Table 3 shows the ODOT program fund categories and distribution by Region. Oregon Department of Energy program is self-supporting. The program is administered by two, half-time position that are paid for through the tax credit application fee.

Private Sector Spending and Benefits

The private sector also invests in public transit and TO measures that net significant benefits. A primary benefit is the availability of developable land resulting from reduced parking demand. For example, the Lloyd District Transportation Management Association in Portland estimates that 1,433 vehicles are removed from the district due to the availability of alternative modes. This results in a $62 million return on investment from land developed in lieu of constructing and maintaining parking.[44] An additional benefit is a larger pool of applicants for employers.

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[42] Figures represent 2002 annual VMT in counties that have TO programs; Clackamas, Multnomah and Washington in Region 1; Benton, Lane, Linn, Marion, Polk and Yamhill in Region 2; Jackson in Region 3; Crook, Deschutes and Jefferson in Region 4. There is no TO program in Region 5. Data available at http://www.oregon.gov/ODOT/TD/TDATA/tsm/vmtpage.shtml#Oregon_VMT_by_County

[43] Based on 2002 spending and projected 2005 spending averaged and converted to 2004 dollars. Forecasted 2005 spending was used to include 2003 legislative increase.

[44] Based on employee surveys, the Lloyd District TMA determined that 1,433 drive-alone trips are eliminated daily via transit, telework, bicycling, walking and carpooling. Therefore, 1,433 parking spaces are now available for shoppers in the heavily retail-oriented area. Assuming that each parking space is used four times in an eight-hour workday by shoppers, the result is 5,732 potential shopping trips daily. Using $20 as the average amount spent by each customer per trip, this equates to $34,392,000 in potential annual revenue ($20 x 5,732 x 300 shopping days). Parking development costs were arrived at by multiplying 1,433 spaces by $20,000 per space, which totals $28,660,000.

Table 3 - Current Spending (2002)

Central Office - Program Management	$ 93,000
Central Office - Marketing	$ 850,000
Region 1	$1,309,000
Region 2	$ 345,000
Region 3	$ 146,000
Region 4	$ 86,000
Region 5	$0
Total	**$2,829,000**

Feasible Needs

An estimated average of $3.62 million (2004) per year will be needed to maintain the current program to 2030. This amount is based on the current $2.83 million annual cost adjusted for a 1.9 percent growth in statewide population.

Summary and Conclusions

Transportation Options programs are carried out at the state, regional, and local levels. Collectively, the TO programs achieve a 209 million mile annual reduction in vehicle miles. Effectively, the state spends one cent for each VMT removed. To keep pace with population growth and maintain the current programs, an estimated $3.62 million average annual investment in TO programs will be needed over the plan period. The current spending is $2.83 (2004) leaving a $790,000 annual funding gap.

Table 4 - Summary of Current Expenditures and Feasible Needs Per Year (millions of 2004 dollars)

	Current Annual Expenditure	Annual Average Feasible Need	Annual Gap
Transportation Options	$2.83	$ 3.62	$.79

STATE HIGHWAY-RELATED NEEDS

State Highway Modernization

Description of Services

The Modernization Program funds capital construction projects which add capacity to the system, either through adding lanes or building new facilities such as bypasses. Projects include highway reconstruction with major alignment improvements or major widening, widening of bridges to add travel lanes, grade separations, intersection improvements, and high-occupancy vehicle lanes.

Current Funding

ORS 366.507 requires ODOT to dedicate the equivalent of its share of $.04 per gallon of State Highway Fund revenues (roughly $51 to $53 million per year) for highway modernization work. In recognition of the need to focus funds on preserving the state's existing infrastructure, the OTC has reduced the Modernization Program to the minimum level allowed under the law. As a result, few new modernization projects have been considered during the past several years. The exception is the $250 million Modernization Program funded in 2001 though the Oregon Transportation Investment Acts (OTIA) I and II.

In 2003 the total for Modernization projects including preliminary engineering (P.E.) and right-of-way acquisition (ROW) was $59.2 million with an additional $19.6 million for state Modernization projects coming from local, federal and other funds. OTIA I and II added almost $34.4 million to the Modernization Program. These total $113.2 million. In 2004 the Modernization Program (including P.E. and ROW) was $78.1 million with an additional $30 million from OTIA I and II, totaling $108.1 million.

OTIA III is funding $250 million per year for the Modernization Program in 2008 and 2009 through bonds. The bonds will have to be repaid from the Modernization Program beginning in 2008 at $25 million per year. That will reduce the state-funded program to $26.5 million per year. This means that the Modernization Program will total $276.5 million in 2008 and 2009, but total only about $26.5 million a year from 2010 until the bonds are repaid in 2033. This figure does not include any federal earmarked funds, but does include P.E. and ROW costs as well as $3.5 million per year for the Immediate Opportunity Fund.

Immediate Opportunity Fund

The Immediate Opportunity Fund (IOF) supports primary economic development in Oregon by building and improving street and roads in strategic locations. The IOF only funds strategic projects that require a quick response and commitment of funds because other sources are unavailable or insufficient. It is a discretionary program. The maximum amount available for a single project is $1 million.

Feasible Needs

The dataset used for the analysis of modernization needs was originally developed for the Oregon Highway Plan. The dataset covers 100 percent of the state highway system network and represents a snapshot of the entire Oregon State Highway System as of 1995. Two modeling tools used this dataset to identify highway needs for the *1999 Oregon Highway Plan (OHP).*

The Highway Performance Monitoring System Analytical Process (AP) was used to develop a list of highway deficiencies. The list of deficiencies was sent to the respective Regions for their review and validation. The Regions added projects from regional and local transportation system plans that had not been identified in the model and deleted identified potential projects that would never be constructed. The model dataset was revised and adjusted according to the recommendations defined through the Region review process.

The Highway Economic Requirements System (HERS) modeling software was originally developed for the Federal Highway Administration as an analytical tool that could simulate improvements based on the relative benefit-cost merits of alternative improvement options. A customized version of the Highway Economic Requirements System (HERS-OR) was developed for the OHP, and all of the later analyses following the Region review were conducted using the HERS-OR model.

HERS-OR initiated the analysis process by evaluating the current state of the highway system assessing both the condition and performance for each section of the highway at the beginning of the analysis period. Using traffic growth projections that were section-specific, the model forecasted future conditions and performance for each five-year funding period, and identified system deficiencies. Deficient sections were further analyzed with engineering standards to identify and list potential improvements. Economic criteria were applied to the analysis in order to select the best improvements; user and agency benefits and costs associated with potential improvements were simulated and used to evaluate the relative merits of the improvements according to the generated net benefits. The HERS model implemented only those improvements that were economically justified, based on a comparison of the construction costs and the lifetime benefits for each improvement.

All improvements simulated in the two models were categorized as either modernization or preservation improvements. Subsequently, only the modernization improvements from HERS-OR were included in the final OHP report. In identifying deficiencies, the HERS-OR model was constrained to allow a highway to be widened by adding only one lane in each direction.
This OTP analysis simply: 1) updated the original (pre-Region review) AP dataset with newer traffic volumes, 2) re-ran the AP analysis to identify deficiencies, and 3) compared the model output with the previous pre-review analysis from AP. In this case, the only adjustments made to the respective datasets were upgrades to the existing and future traffic volumes, based on projected historically grown 2002 counts.

There were several technical problems encountered in attempting to recreate the AP analysis for the OTP update. The process of updating selected data elements within the dataset is quite extensive. In addition, the AP is a mainframe program, so the process of converting the updated datasets to the mainframe environment is fairly complicated and time consuming. Subsequently, in order to keep the evaluation consistent, it was decided that all deficiency analyses should be conducted using the HERS-OR model.

The baseline for all analyses was defined as 1995, based on the original (pre-review) dataset developed for the OHP. The existing and future vehicular traffic volumes were projected forward in time to reflect a new analysis base year for each individual dataset, covering years 1996 through 2002 (a total of seven datasets). The traffic volume growth rates were developed from historical count data.

The HERS-OR model, using identical input parameters, then analyzed the "full needs" for the seven new datasets, and the modeling outputs were combined and evaluated. Using the 1995 deficiencies as a baseline for comparison, a percentage change in deficiencies for subsequent datasets was analyzed and tabulated for the various categories, as shown in **Figure 1**.

Figure 1
Percentage Changes in Projected Deficiencies on the Oregon State Highway System, By Category and Year

IMPROVEMENT / YEAR	95-96	95-97	95-98	95-99	95-00	95-01	95-02
Modernization	0.6%	-5.0%	2.2%	3.3%	3.9%	4.6%	5.6%
Preservation	-0.6%	2.8%	2.4%	2.8%	4.3%	7.1%	8.2%
TOTAL	0.0%	-1.0%	2.3%	3.1%	4.1%	5.9%	6.9%

A comparison of the simulated 20-year modernization deficiencies indicates that the projected growth in deficiencies is about 5.6 percent higher in 2002 than in 1995. Using regression trends, the percentage difference in 2004 is about 7.3. This means that the total 20-year deficiencies for the base year 2004 (2004-2024) are about 7.3 percent higher than

those for the baseline 1995 (1995-2015), all other things being held constant (including improvement costs).

The 20-year 1999 Highway Plan feasible needs investment for modernization is $6.8 billion (in 1997 uninflated dollars). Adding 7.3 percent to that number (about $496 million) increases the feasible modernization needs to $7.3 billion (1997 dollars). With inflation this grows to $8.59 billion in 2004 dollars or over $330.3 million per year from 2005-2030. This figure includes preliminary engineering and right of way costs.

Summary

In 2003 modernization projects including preliminary engineering and right-of-way costs were funded at $59.2 million with an additional $19.6 million for state modernization projects coming from local, federal and other funds. An additional $34.4 million from OTIA I and II brought the total to $113.2 million. In 2004 the Modernization Program (including P.E. and ROW.) was $78.1 million; an additional $30 million from OTIA I and II made it $108.1 million for the year.

OTIA III is funding $250 million for the Modernization Program in 2008 and 2009 through bonds. Since the bonds will have to be repaid from the Modernization Program beginning in 2008 at $25 million per year, the state-funded Modernization Program will be reduced to $26.5 million per year. This means that the Modernization Program will total $276.5 million in 2008 and 2009, but total only about $26.5 million a year from 2010 until the bonds are repaid in 2033. This figure does not include any federal ear-marked funds but does include $3.5 million for the Immediate Opportunity Fund.

The calculation for feasible modernization needs is built upon the detailed analysis done for the *1999 Oregon Highway Plan* using the Highway Economic Requirements System for Oregon. The calculation assumes that population and highway needs have increased faster than the projects built since 1997. It updates the analysis on the basis of the traffic volume growth rates.

The 20-year OHP feasible needs investment for modernization is $6.8 billion (in 1997 uninflated dollars). Adding 7.3 percent for traffic volume growth to that number (about $496 million) increases the feasible modernization needs to $7.3 billion (1997 dollars) inflated to $8.59 billion in 2004 dollars or $330.3 per year until 2030. This figure includes P.E. and ROW costs.

Data Sources

Computer models:

- Highway Performance Monitoring System Analytical Process

- Highway Economic Requirements System for Oregon

ODOT Staff:

- Richard Arnold, Transportation Planning & Analysis Unit
- Jill Vosper, STIP Manager, Highway Finance Office
- Jack Svadlenak, Policy Unit
- Darryl Ficker, Financial Services

State Highway Preservation

Description of Services

ODOT is responsible for almost 7,500 miles of state highways, ranging from eight-lane freeways to two-lane gravel roads. More than 99.6 percent of state highway mileage is paved. ODOT's Preservation Program rebuilds or improves highway facilities to extend their service life, adding useful life to the road without increasing capacity.

The *1999 Oregon Highway Plan* establishes preservation goals and priorities. The plan gives funding priority to Interstate pavement condition and to maintaining Statewide Highways at a higher condition level than Regional and District Highways. District Highways are to be preserved at 60 percent fair-or-better or higher. If there is no increase in state funding, low volume Regional and District Highways are to receive thin treatments rather than thicker rehabilitation pavement treatments. With significantly increased funding, the state's goal is to maintain average pavement condition at an optimal level of 90 percent fair-or-better.

Current Funding

The current funding strategy is intended to maintain the 1997 statewide average pavement condition of 77 percent fair-or-better through 2010. The 2003 statewide average pavement condition of 84 percent fair-or-better was the result of several changes:

- OTIA I and II projects in 2001-2003 improved overall statewide conditions by 1 percent.
- The Low Volume Road Program initiated in 1999 improved overall statewide conditions by 4 percent.
- A change in the rating procedure in 2001 increased statewide conditions by 1 percent.

Without the above changes, 2003 pavement conditions would be expected to be approximately 78 percent fair-or-better statewide, the same as 1998 conditions.

Average annual funding for FY 2001-2007 is $118 million including P.E. and ROW.

Assumptions

The Preservation Program will maintain Interstate Highways at the highest condition level, followed by Statewide Highways. Regional and District Highways will have lower condition targets. Regional and District Highways with less than 2500 average daily travel (ADT) will be maintained by ODOT Maintenance under the Low Volume Road Program. The program also assumes the following:

- The preservation strategy focuses improvements to highways in fair condition before they reach poor.
- The program's "pave mainly" strategy minimizes replacement or rehabilitation of roadway features, but it does include mandatory safety items, Americans with Disabilities Act (ADA) requirements, and "have to" standards.
- The program does not fulfill 3R standards.

Feasible Needs

As outlined by the Oregon Highway Plan, the goal of the Preservation Program is to preserve the state highway system at a condition of 90 percent fair-or-better (FOB) overall on the state highway system by 2015 continuing through 2025. This goal would be achieved through the following targets for each highway classification:

- Interstate 95 percent FOB
- Statewide 93 percent FOB
- Regional (Non-Low Volume) 90 percent FOB
- District (Non-Low Volume) 85 percent FOB
- Low Volume Roads 85 percent FOB

Assumptions

Achievement of 90 percent fair or better pavement condition is based on the following assumptions, including the "pave mainly" strategy. This means that some features will not be brought up to standard or replaced.

- Preservation strategy focuses on highways in fair condition before they reach poor.
- The "pave mainly" strategy which minimizes features (includes mandatory safety items, ADA requirements, and "have to" standards, but not full 3R standards) will continue.
- Regional and District Highways with ADT less than 2500 will be maintained by Maintenance under the Low Volume Road Program at a funding consistent with 2004 funding.
- All Regions will move toward statewide targets.
- Most common treatment at fair-poor line is 4" of asphalt concrete.
- Condition rating procedure does not change through the analysis period. (Visual rating procedure on centerline mile basis; rating of National Highway System (NHS) is detailed; rating of non-NHS is subjective.)
- Base pavement condition year for projection is 2005 and incorporates programmed projects in the Final 2004-2007 STIP.

Low Volume Road Program Assumptions

- Low Volume Road Program funding will maintain existing 82 percent fair-or-better conditions on low volume roads.
- Additional 160 lane miles of paving is needed to achieve 85 percent fair-or-better on low volume roads.
- The shortfall in the Low Volume Road Program funding will be funded in the STIP.

Unit Cost Assumptions

The unit cost assumptions have a very big effect on the needs calculation. The unit costs include paving plus necessary features to meet design standards. The assumption is that the "pave mainly" strategy will continue. This strategy is based on a 4" treatment with 6 percent of funding used for mandatory safety treatments and 6 percent for bridge work with design exceptions sought for other 3R standards. Assumptions for unit costs are listed below:

- The "pave mainly" strategy continues for the long term; ODOT continues to seek other funds or design exceptions for non-mandatory 3R features.
- Culverts are funded by other sources.
- Durable markings are included on Interstate Highways only according to Interstate Maintenance guidelines; they are funded by other sources elsewhere.
- Fair-or-better urban highways are treated with inlays with pavement design exceptions.
- Unit costs are based on the unit costs used to build the 2008-2009 STIP. The costs were deflated back to 2003 dollars.
- The 2008-2009 unit costs came from a unit cost study reviewed by the Statewide Pavement Committee which was based on actual 2000-2003 projects and the 2004-2007 Draft STIP inflated to 2008-2009 dollars. It is assumed that the 2000-2003 costs are typical of the "pave mainly" strategy.
- For rehabilitation of urban highways in poor condition, a pavement reconstruction treatment and unit cost are assumed. Livability enhancements are not included in the unit cost.
- For raising rural highways in poor condition to 90 percent fair or better, the unit cost was increased in an amount equivalent to about 2 inches of additional paving.
- I-405 and I-5 between the Marquam Bridge and I-84 will require complete reconstruction.

Costs for Feasible Needs

Table 1 - Costs for Feasible Needs

Amount (2004 dollars)	
Interstate	$ 67 million / yr
Non-Interstate	$ 91 million / yr
Total Preservation Need	**$158 million / yr**
Low Volume Road Shortfall	$ 2 million / yr
Total Need with Shortfall in STIP	**$160 million / yr**

Summary

Existing and feasible needs including P.E. and ROW for the Preservation Program are summarized in the following table:

Table 2 - Current Funding and Feasible Needs for Preservation

Existing Preservation Spending (Average from 2001-2007)

Interstate	$ 59 million/yr
Non-Interstate	$ 59 million/yr
Total	**$118 million/yr**

Feasible Preservation Needs (2004 dollars)

Interstate	$ 67 million/yr
Non-Interstate	$ 91 million/yr
Low Volume Road shortfall	$ 2 million/yr
Total Preservation Need	**$160 million /yr**

Although the Preservation Program has steadily improved pavement conditions over the last several years, the largest gains have been to rural highways and low volume highways. In order to optimize treatment timing and condition targets, preservation investments have favored rural highways in fair condition. Highways in poor condition which need extensive rehabilitation or which require costly upgrades to meet current standards are typically too expensive to include in the STIP. Many of these highways are in higher volume urban areas. Raising conditions to feasible needs levels requires a relatively disproportionate increase in funding to make needed improvements to these higher volume but higher cost sections of highway.

Data Sources

John Coplantz, Pavement Management Engineer; the Statewide Pavement Committee; the Pavement Management System, and Jill Vosper, STIP Manager

State Highway Bridge

Description of Services

The state owns and is responsible for 2,680 bridges. These include bridges 20 feet or longer in length, culverts, viaducts, bicycle and pedestrian structures, and movable bridges. Bridge needs include improvements or work needed to rebuild or extend the service life of existing bridges and structures beyond the scope of routine maintenance. Tunnels, retaining walls not associated with a bridge, and culverts with a span of less than 20 feet are now the responsibility of the Geo-Environmental Section.

The scope of bridge services includes:

- Bridge reconstruction/replacement
- Painting, coastal corrosion protection, movable bridges
- Seismic retrofitting
- Overpass screening
- Major bridge maintenance

Current Funding and Feasible Needs

Current funding and feasible needs are heavily influenced by the Oregon Transportation Investment Act (OTIA) III. In late 2002 the Oregon Economic and Bridge Options presentation, prepared for the OTC, presented seven options to address a major investment in bridge rehabilitation and replacement. The final report of the same name was used to identify the work to be done under OTIA III. Bringing the Interstate, Freight, and other key routes up to conditions that allow Single Trip Permit vehicles and the remainder of the state highways to carry Continuous Trip Permit vehicles requires an investment of $3.5 billion.

The actual amount authorized for state highway bridges under OTIA III is $1.3 billion. While this is a very substantial investment, it is less than half of the needs that have been identified to restore vital freight corridors to an acceptable load capacity. For this unfunded need ($2.2 billion) to be met over the period of 2005-2030 of this Transportation Plan, the investment for bridge replacement and rehabilitation should be $84.6 million per year.

The Preservation Unit of the Bridge Section identified a need for $20.5 million dollars a year for paint, movable bridge and corrosion-protection projects. This number does not include preliminary engineering (P.E.) or right of way (ROW). Historically P.E. is 16 percent and ROW is 4 percent of the cost of the project, bringing the total for this program to $24.6 million a year.

Spending on the seismic retrofit program has essentially stopped. However, progress is still being made in this area since the bridges being built under OTIA III and the STIP are built using modern design standards that have incorporated seismic considerations into all new construction.

The Bridge Program Unit has identified the need to program into the STIP a category called Major Bridge Maintenance. The amount programmed has been $20 million for four years or $5 million a year. This will increase to $20 million per year starting in 2008. Major Bridge Maintenance funds are used to fund repairs that are more than routine maintenance, but less than bridge rehabilitation. For example, emergency structural repairs are funded through Major Bridge Maintenance.

The feasible needs can be broken into three categories. First is the remainder of the structural work that was identified in the Bridge Options Report but was not funded through OTIA III. If this were to be accomplished over the period of the Transportation Plan, the cost would be $84.6 million per year. Second, there is a $25 million per year need to maintain historic, moveable, and coastal bridges. Finally, Major Bridge Maintenance requires $20 million per year to accomplish repairs that are above routine maintenance. The feasible needs add up to $129.6 million per year in addition to the investment that has been made through OTIA III. The funding for the State Bridge Program is currently $71 million per year. The State Bridge Program funding will drop to approximately $54 million per year in 2008.

This needs analysis only includes state highway bridges; bridges owned by local agencies and tunnels or culverts that are not part of the National Bridge Inventory are included in other analyses.

The Bridge Population Problem

OTIA III Effects on the State Bridge Program

Part of the debt service for the OTIA program ($31 million per year) will come from the State Bridge Program. The bonding starts in 2008 and lasts for 25 years, ending in 2033. With an aging bridge population, more money will be needed for repairs to maintain the capacity of the structures to carry freight. Beginning in 2008, the funds spent for Major Bridge Maintenance will equal the funds spent on bridge replacement. That leaves approximately $20 million per year for new bridges. From 2008 on, the average number of new bridges built per year is forecast to be six. This assumes one bridge in the $6 million dollar range, and five bridges in the $2-3 million range. This assumption reflects average costs since there are many small bridges that cost well under $1 million dollars, and many bridges where only a fraction of the bridge can be funded with $20 million.

Note: This analysis assumes no increase in either costs or funding levels. For this analysis to be accurate, both costs and funding levels must increase at a similar rate so their effects will be offsetting.

The Bridge Population in 2003

The Oregon Transportation Investment Act (OTIA III) is a $1.3 billion investment in state bridges that will repair or replace approximately 360 bridges in an 8–10 year timeframe. Approximately 280 bridges will be replaced. Figure 1 below shows the population distribution of Oregon bridges in 2003, just as the OTIA I and OTIA II bridges were starting to be built. It shows that the greatest number of bridges was built in the late 1950s and early 1960s during the Interstate Era, 35-50 years ago.

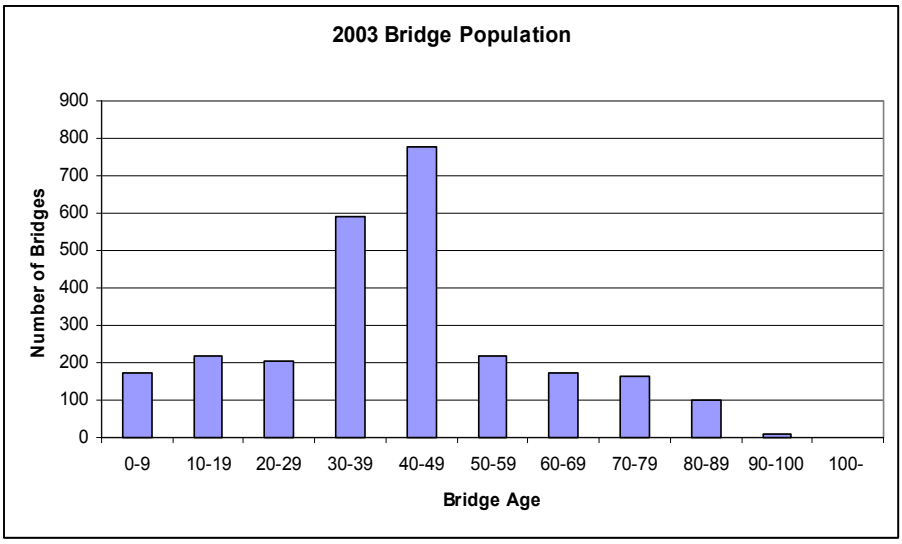

Figure 1 – 2003 Bridge Population

The Bridge Population in 2013

By 2013, the OTIA bridges will have been built. It will be the largest decade of bridge building since the Interstate Era. Figure 2 shows that OTIA has removed the spike in the bridge population, but there still remains a definite bump in the population reflecting bridges built in the 20-year period following the end of the Second World War. Compare the 30-39 and 40-49 year old populations in Figure 1, with the 40-49 and 50-59 year old populations in Figure 2.

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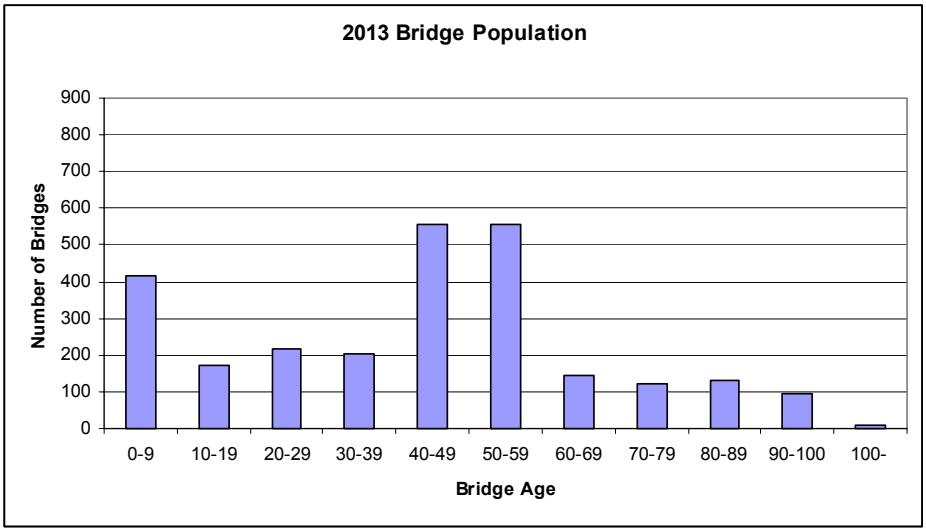


Figure 2 – 2013 Bridge Population

The Bridge Population in 2023

In 2023, near the end of the Transportation Plan period, OTIA III debt service will have been paid for 15 years. Bridges less than 10 years old make up the smallest group of bridges. With such a low replacement rate, the population of Interstate Era bridges is largely unchanged.

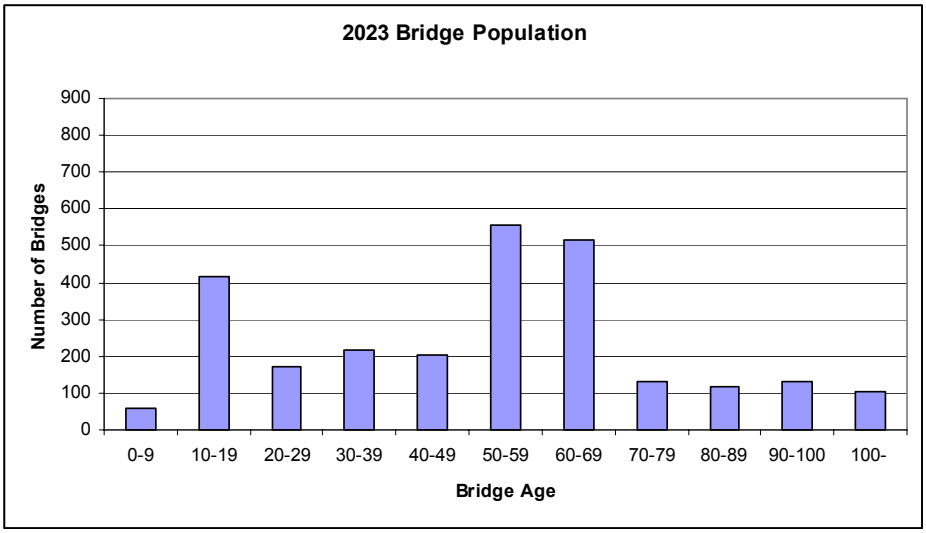


Figure 3 – 2023 Bridge Population

The Bridge Population in 2033

By 2033, the OTIA debt service has been paid off. The effect of the $31 million annual debt service which came from the State Bridge Program can be seen. In Figure 4, there is a low population of new bridges and only a slight reduction in the population of bridges built during the Interstate Era. The Depression Era bridges are now approaching 100 years old and include the historic coastal bridges. These bridges will require more maintenance if they are to remain in service.

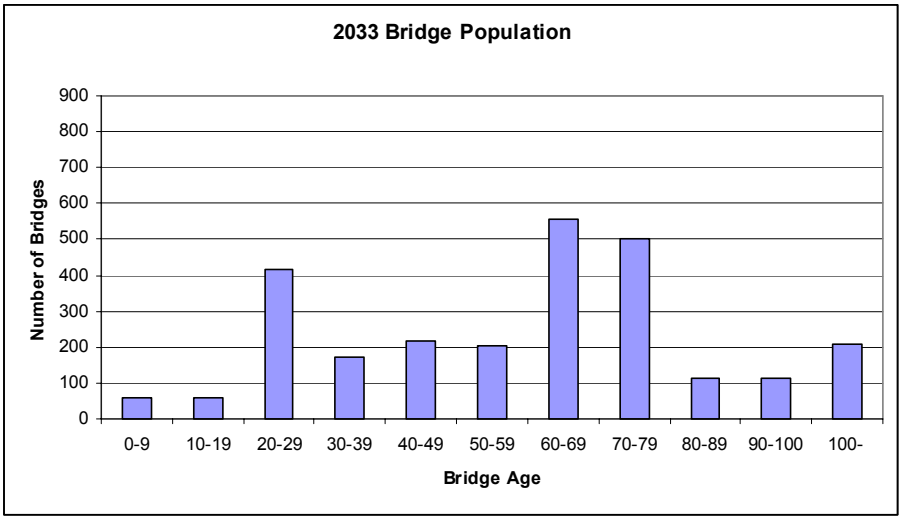


Figure 4 – 2033 Bridge Population

Sustainable Bridge Replacement Rates

Bridges are designed to carry loads for a limited service life. Variations in materials, design, construction, and location all have an effect on the expected bridge life. In about 1975, improvements in design details and construction practices, combined with the wider use of prestressed concrete, increased the life expectancy of concrete bridges to 100 years or more. In optimal conditions, a steel bridge could also last about 100 years.

The majority of Oregon's state bridges were built prior to 1975. Concrete is the most prominent material, with the majority of bridges using a reinforced concrete design with an expected lifespan of 50 years. It would be unrealistic to say that the average expected life span of Oregon's bridges is 100 years. However, using a 100-year average lifespan, with approximately 2600 bridges in the inventory, the replacement rate should be 26 bridges per year. For the years 1973 to 2033, only the OTIA decade (2003-2013) meets or exceeds this rate. For the OTIA III debt service years after 2013, the replacement rate of six bridges per year is less than 25 percent of a sustainable bridge replacement rate.

Conclusion

While the OTIA III program will result in more new bridge construction than at any other time since the Interstate Era, those bridges will have aged in the time it takes to pay off the bonds.

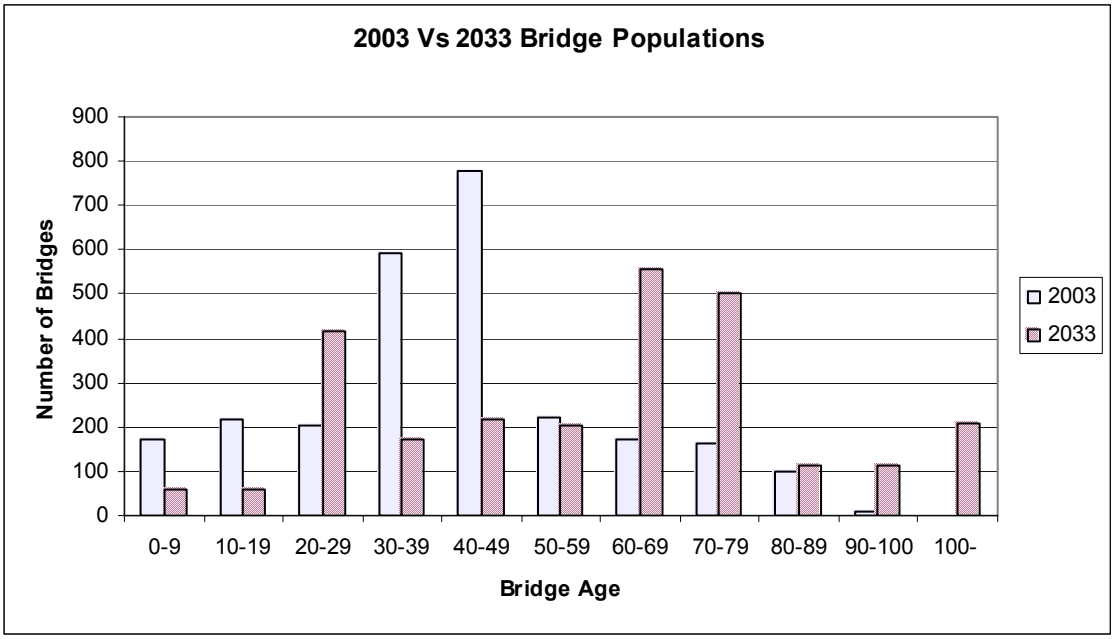


Figure 5 – 2003 vs. 2033 Bridge Populations

Figure 5 shows how the bridge population has shifted from 2003 to 2033. The bridges built in the major bridge building periods still dominate the population although in lesser numbers as they are slowly being replaced. At the current funding levels, even with the money delivered through the Oregon Transportation Investment Act, the bridge population will be older in 2033 than it was in 2003.

<u>Summary</u>

Current funding for the 2004 State Bridge Program is $71 million. The State Bridge Program will be reduced to approximately $54 million when OTIA III debt service begins in 2008.

The analysis identifies feasible needs of approximately $129.6 million per year over the 2005-2030 year period of the OTP in addition to the $1.3 billion investment accomplished through OTIA III. This figure is for state-owned bridges and includes:

1. Replacement or rehabilitation of bridges not part of the OTIA III program.
2. Preservation of historic, moveable and coastal bridges.

3. Major Bridge Maintenance

Although the OTIA program will replace or rehabilitate significant numbers of bridges in the next 10 years, the bridge population in 2033 will be older than it was in 2003.

Data Sources

Bert Hartman and Bridge Section staff

State Highway Operations

Description of Services

Operations projects enhance transportation system efficiency and safety through improvements to system operational characteristics. Project types in this funding category include traffic signals, signs, illumination, Intelligent Transportation System (ITS) devices, slide and rockfall mitigation, and transportation demand management.

Operations projects are varied and cross several branches of ODOT. This report contains only those areas managed by the Traffic Management Section of Technical Services, which includes traffic signals, highway signs, illumination and ITS. Slide and rockfall mitigation will be addressed as a separate program area, and transportation demand management will be covered under the public transportation needs assessment.

Traffic Signals

The Operations portion of the Statewide Transportation Improvement Program (STIP) pays for replacement of traffic signals that reach the end of their useful life and a limited number of new signal projects at problem intersections. New traffic signals that are part of large modernization projects are funded through those projects rather than through Operations. A limited number of signal interconnect projects are funded through Operations. Also funded through Operations are detection replacement, installation of hazard identification beacons and signal timing adjustments.

Traffic Signs

Interstate signs, secondary signs and sign support replacements are included in the Operations category. Signs that are part of larger projects are generally paid for by the funds from other STIP categories. In addition, Maintenance funds pay for sign and sign support replacement of some smaller signs.

Illumination

Illumination projects are generally paid for from other STIP categories as part of larger projects; however, roadway and tunnel illumination replacement are funded through Operations.

Intelligent Transportation Systems

ITS involves the application of advanced technology to solve transportation problems, to improve safety, to provide services to travelers and to implement suitable traffic management strategies. ITS solutions also provide for enhanced data **sharing that**

enables more efficient multi-jurisdictional strategies for operating the transportation system.

Examples of ITS technologies include highway cameras, variable message signs, weather stations, ramp metering, detection equipment, highway advisory radio and remotely operated highway signs. STIP funds are also used for computer hardware, software and communications systems to link these systems to ODOT's four Transportation Operations Centers and to district offices statewide. These information system projects enable implementation of multi-agency operations strategies and enable data sharing with the public. Some examples of this type of project include ODOT's traveler information system, TripCheck, and the statewide transit trip planning project.

Operations Program Goals

Getting the most value from investments in the transportation system requires a strong operations program. Operations funding supports preservation of the existing operations infrastructure and targets projects that meet the growing demands placed on the transportation system. The specific goals of the Operations Program are:

1. Maintain and improve the safety of ODOT facilities and the traveling public. Much of this goal is based on user information, including permanent signs, variable message signs and advanced traveler information services such as TripCheck.

2. Improve mobility and accessibility of the transportation system through maximizing capacity, minimizing delay, improving travel time reliability and supporting multimodal options.

3. Improve agency efficiency and effectiveness by minimizing maintenance needs, providing reliable services, supporting data collection and employing new technologies for addressing many transportation issues.

4. Minimize environmental impacts by developing systems with less impact than conventional construction and deliver systems that minimize emissions and fuel consumption.

Key Strategies and Benefits

<u>Traffic Signals and Signal Systems</u>

The replacement and upgrade of signals and systems improve safety and operational efficiency by reducing accident rates and severity and reducing travel delay and associated costs, including fuel consumption and air pollution. The improvements also benefit the state by reducing maintenance costs and reducing exposure to liability.

Signal systems can respond to highway traffic flow needs at different times of the day, week or season, and be an instrument in providing efficient traffic flow during incidents such as traffic crashes, natural disasters or other emergencies. Generally, the increases in traffic flow resulting from development, the need for adjacent traffic signals, and the need to replace aging or outdated systems results in the need for five new or revamped interconnection systems annually.

Signs

The visibility of highway signs rapidly decreases after 15 years, requiring a replacement cycle to match this time period. In addition to replacing signs that have faded, signs throughout the system must be upgraded to meet changes in uniform standards and meet increased requirements for size and reflectivity, particularly as the number of older drivers increases.

Illumination

Assuring minimum levels of illumination on highways utilizing the most energy efficient lighting fixtures will provide for safe driving environments while maximizing efforts in energy conservation.

ITS

The ITS Program currently has four major initiatives, each supporting the goals established by the Oregon ITS Strategic Plan 1997-2017.

1. Urban Traffic Management projects are targeted primarily at solving problems related to traffic congestion. Through advanced traffic management systems, these tools provide effective means to monitor the highway system, quickly detect problems and manage existing highway capacity more effectively.

2. Rural ITS projects use advanced technology to assist motorists outside of urban areas. Highway cameras, variable message signs, warning systems (i.e. high water) and weather reporting stations help improve traveler safety.

3. Travel Information Services deliver critical information to motorists, helping them make better choices for commuting or avoiding adverse weather conditions. Average monthly usage of the TripCheck system on ODOT's Web site tops 800,000.

4. ITS for Public Transportation seeks to increase mobility of Oregonians and increase accessibility to public transportation options by providing current information to potential users.

Current Funding and Feasible Needs

The Operations Program Strategy has two components: the replacement of aging operations infrastructure and the deployment of projects and new technology to meet increased system demand.

Traffic Signals, Signs and Illumination Replacement Needs

The cost projections in Table 1 are based on annualized replacement needs to bring devices into compliance with current standards or to replace equipment that has exceeded its design life. Outdated equipment results in higher maintenance costs, higher energy costs, greater chance of failure (with an associated safety and liability risk), and increased costs to motorists due to inefficient operations. This analysis is also contingent upon satisfactory maintenance funding for operations-related infrastructure. Deferred maintenance, in many cases, results in increased replacement costs stemming from reduced equipment life expectancy.

While this is an estimate of the costs required to maintain the condition of the operations-related infrastructure, it is important to note that funding is currently provided through other sources to meet some of this need. Some traffic signals, signs and illumination are replaced as part of projects funded from other STIP categories, and maintenance crews replace some signs and hazard identification beacons. Inadequate inventory systems and lack of good performance measures are obstacles to having a better Operations Program and providing more accurate cost estimates for Operations Program funding needs. Funds are needed to complete the implementation of an operations infrastructure inventory system and to establish tools to assess Operations Program performance. Such an "Operations Management System" will be essential in helping ODOT establish goals, monitor performance and allocate resources.

Table 1 - Traffic Signals, Signs, Illumination and ITS Replacement Needs

Devices	Existing Inventory (#)	Expected Life (Years)	Annual Replacement (#)	Unit Cost	Total Cost
Traffic Signals					
Traffic Signals	1,227	40	31	$125,000	$3,834,000
Detection Loops	30,000	10	3,000	$500	$1,500,000
Ramp Meters	110	30	4	$75,000	$275,000
Intersection Flasher	81	20	4	$30,000	$122,000
Hazard Beacons	1,429	20	71	$1,000	$71,000
Signs					
Major Signs	15,700	15	1,047	$1,500	$1,570,000
Minor Signs	163,250	15	10,883	$500	$5,442,000
Sign Supports		30-metal 15-wood	variable		$2,000,000
Illumination					
Roadway Lighting	21,000	40	525	$8,500	$4,462,500
Tunnel Lighting	9	40	0	$1,000,000	$225,000
		Signals, Signs and Illumination Total			**$19,431,000**
ITS					
Variable Message Signs	47	20	2	$100,000	$235,000
Major Structures	47	40	1	$100,000	$118,000
Cameras	130	15	9	$10,000	$87,000
RWIS	61	15	4	$30,000	$122,000
HAR	4	15	0.3	$30,000	$8,000
Snow Zone Signs	7	15	0.5	$65,000	$30,000
Ice Detection	4	15	0.3	$30,000	$8,000
Mobile Home Warning	9	15	1	$30,000	$18,000
Call Box	2	15	0.1	$10,000	$1,000
Wind Warning	5	15	0.3	$30,000	$10,000
				ITS Total	**$637,000**
				Subtotal	**$20,068,000**
				10% PE & ROW	**$2,006,800**
				Total	**$22,074,800**

Tunnel lighting needs are difficult to express as an annualized need although tunnel lighting system upgrades are expensive (approximately $1 million each) and should be planned for accordingly. ODOT owns only nine tunnels with lighting systems and has upgraded many of the tunnel lighting systems recently. However, there are two remaining tunnels in need of upgrades. In priority order, those tunnels are the Salt Creek Tunnel and the Sunset Tunnel.

Traffic Signals, Signs and Illumination New Installation Needs

The cost estimates in Table 2 are for new signals, signs and illumination that are needed to respond to traffic growth on the existing system. While many of these costs are included in projects funded by other STIP categories, a small number of projects are funded from the Operations funding category to correct problems at specific intersections.

Table 2 – Traffic Control Devices Installation Needs

Devices	Annual New Installations	Unit Cost	Total Cost
Traffic Control Devices			
Traffic Signals	11	$150,000	$1,650,000
Traffic Signal Interconnects	4	$100,000	$400,000
Hazard Beacons	3	$30,000	$90,000
		Total	**$2,140,000**

Although some funding for new signs and illumination is provided through projects from other STIP funding categories, the majority are funded through Operations.

Intelligent Transportation System (ITS) Funding Needs

ITS investment represents strategic deployment of technology instead of conventional solutions to cost effectively solve transportation problems. The ITS needs analysis is based on ITS strategic planning efforts. ITS investment is most effective when considered from a system perspective versus the individual roadside device perspective. For example, a single ramp meter on a freeway often improves the point where vehicles merge into the traffic flow but cannot offer appreciable benefit to the entire freeway system. However, a series of ramp meters that adapt to current traffic conditions can cost effectively provide a high benefit to the freeway system.

Approximately $10.2 million per year is needed to meet the strategies outlined in the Oregon ITS Strategic Plan and other planning documents. Funding below this level will lengthen the time required to implement the strategies identified in the plan and cause ODOT to fall further behind in meeting the challenges created by increased vehicle miles traveled (VMT).

Summary

Table 3 summarizes the annual funding requirements for the Operations portion of the STIP. The estimates specifically exclude needs for new signals, signs and illumination which are typically covered by larger, more comprehensive highway construction

projects funded through other STIP categories. This report does provide a realistic picture of annual investment required to replace and upgrade existing operations related infrastructure. However, the amount of this need that is met by Maintenance investment and other STIP construction projects is difficult to estimate.

Table 3 – Annualized Operations Funding Needs by Category

Category	Annual Cost
Signals, Signs and Illumination Replacement	$19,431,000
ITS Device Replacement	$637,000
New Traffic Control Devices	$2,125,000
ITS Strategic Needs	$10,200,000
Total	**$32,393,000**

This report only documents needs for signals, signs, illumination and ITS. This report does not include funding needs for transportation demand management, along with slides and rockfalls, which are also part of the Operations portion of the STIP. The total needs greatly exceed the current investment levels for Operations. Funding has worked satisfactorily to date because many of the operations needs have been met through projects funded from other STIP categories. However as competition for scarce resources increases, it is difficult to estimate how much of the replacement costs documented in this report will continue to be met by Maintenance and other STIP programs. Regardless of funding source, a comprehensive plan to maintain operations infrastructure and to meet operations needs is essential.

Table 4 – Current Funding and Feasible Needs for Operations

	Category	2004 Funding	2004 Funding`	2004 Feasible Needs	Gap
ITS Program Costs	**Traffic Operations Center and Incident Response**	$5,919,214	$3,836,039	$3,836,039	$0
	Earmarks and Grants		$965,060	$965,060	$0
	ITS Program		$818,115	$818,115	$0
	511 Operations		$300,000	$300,000	$0
Traffic Operations Program Costs	**Signal Timing**	$3,798,218	$284,575	$445,600	$161,025
	Traffic Analysis		$510,402	$510,402	$0
	Traffic Investigations		$1,120,909	$1,120,909	$0
	Speed Zones		$283,578	$383.578	$100,000
	Traffic Operations		$1,598,754	$1,598,754	$0
STIP	**Operations Undistributed**	$20,633,000	$6,893,000	$0	- $6,893,000
	SSI (Signs, Signals and Illumination)		$5,184,000	$23,728,000	$18,544,100
	SSI Replacement			$21,374,100	
	SSI Growth annualized			$2,354,000	
	ITS		$8,040,000	$11,920,700	$3,880,700
	ITS Replacement			$700,700	
	ITS Growth annualized			$11,220,000	
	STIP Transfers		$516,000	$0	- $516,000
	Total	**$30,350,432**	**$30,350,432**	**$45,627,257**	**$15,276,825**

Total operations funding for FY 2004 is $30,350,432. More specifically, ITS program costs, including the traffic operations center and incident response, 511 operations and other program areas total $5,919,214. Traffic Operations Program costs total $3,798,218 in 2003. Program areas under Traffic Operations include signal timing, traffic analysis and investigations, and speed zone assessment. The STIP program areas total $20,633,000 and cover the replacement and increase in signs, signals, operations and ITS infrastructure.

The feasible needs for FY 2004 are $45.6 million. The defined feasible needs are 90 percent of what is required to meet the desired levels of service. The identified budget gap between current funding levels and feasible needs for 2004 is $15.3 million.

Data Sources

Galen McGill, ITS Unit Manager; Traffic Engineering and Operations Section staff

State Highway Traffic Safety

Description of Services

The Highway Traffic Safety Program within ODOT's Traffic Engineering and Operations Section focuses on improvements to address priority safety problems at highway locations and corridors, including the Interstates, in order to reduce the number of fatal and serious injury crashes. Projects funded through this program meet strict benefit/cost criteria and include the following types of improvements:

- Capital improvements such as passing lanes, turn lanes, and wider shoulders
- Access management
- New guardrails
- Illumination, delineation, or signing
- Channelization within the existing roadway at intersections
- Continuous shoulder rumble strips
- Enforcement of traffic laws (separate funding source)

Current Funding

The Region Traffic offices investigate the top 10 percent of the Safety Priority Index System (SPIS) sites (approx. 500 sites) to determine the most effective use of safety dollars to save lives. A typical safety project may include guardrails, signing, intersection improvements, shoulder widening, roadway realignments or railroad crossing improvements. There are more safety needs than the current budget allows.

To maximize the impact of limited safety dollars, money is targeted on STIP projects using the Safety Improvement Program (SIP). SIP categories with few or no fatal or serious injuries crashes receive minimal safety upgrades. Highway projects with greater crash frequency (higher SIP categories) receive more investment in safety; data from SPIS is used to determine specific sites within the project to target funds.

ODOT is participating in the American Association of State Highway and Transportation Officials (AASHTO) Strategic Highway Safety Plan "Lead State" initiative developed by the National Cooperative Highway Research Program (NCHRP) to reduce the number of lane departure crashes in Oregon by implementing the following three NCHRP (Report 500) guide books:

Volume 3: A Guide for Addressing Collisions with Trees in Hazardous Locations
Volume 4: A Guide for Addressing Head-On Collisions
Volume 6: A Guide for Addressing Run-Off-Road Collisions

The nation's goal in highway safety is to cut the fatality rate to 1.0 per 100 million vehicle miles traveled by year 2008.
The average annual funding for the Traffic Safety Program for the past four years was $20.8 million:

Table 1 – Current Funding (Four-year Average)

Hazard Elimination Program (HEP)	$ 2.8 million
Statewide Transportation Improvement Program – Safety Investment Program (STIP-SIP)	$18.0 million
	Total: $20.8 million

In FY 2002 Transportation Safety Division sponsored and granted highway safety funds for a trial emphasis areas program. The program, approved by the OTC and funded by excess state funds from 2001-2003 (initially $2.5 million), was known as the Infrastructure Safety Investment Program (ISIP) and focused on three emphasis areas:

- High speed rear end crashes(left-turn refuges),
- Road departure crashes (rumble strips and profiled durable marking)
- Pedestrian safety improvements (medians, refuges, bulb-outs)

The program was very popular and deemed a success.

Feasible Needs

In 2003, 508 reported traffic fatalities occurred in Oregon, and the state's highway death rate rose to 1.46 people killed per 100 million vehicle miles traveled. The Oregon Transportation Safety Committee's and the Transportation Commission's goal is to reduce the fatality rate to 0.99 by year 2010. This equates to lowering the total fatality count statewide to 370 by that time. This is a reduction of 19.71 fatalities per year. In order to meet the goal by year 2010 and assuming a fatal injury crash value of $1,000,000, a proxy for the amount needed to fix issues related to a fatality, ODOT would need a safety budget of an additional $19.71 million per year until year 2010.

Paralleling Oregon's effort to reduce the fatality rate in the state is ODOT's participation in the AASHTO "Lead State" initiative program for lane departure crashes. Oregon's lane departure fatality and serious injury rate was 2.80 per 100 million vehicle miles in 2003. Oregon's goal is to lower the rate to 2.20 by 2010. This represents a reduction of 69 fewer fatalities and serious injuries per year by 2010. The goal would be achieved through implementation of a strategic action plan to reduce lane departure crashes. Funding for this plan would come from existing safety resources for STIP, OTIA and stand-alone safety projects.

With additional safety funding, ODOT would be able to invest more safety dollars into one of these three options:

A. SPIS Plus – Safety Priority Index System (SPIS) projects not previously addressed due to limited dollars.

B. Emphasis Areas – ODOT would spend the additional safety dollars emphasizing reduction of lane departure crashes which aligns with the AASHTO "Lead State" initiative program.

C. Upgrade Preservation Projects to Enhance Safety – ODOT would replace outdated guardrail end treatments, install durable permanent pavement striping, replace outdated breakaway sign posts, etc.

The Highway Safety Engineering Committee (HSEC) would determine how to distribute these additional funds to the greatest safety benefit of the public.

ODOT is currently not financially able to address all the SPIS sites, but with this additional funding the department would be able to meet the goal by the year 2010.

Summary

The average annual needs for the Highway Traffic Safety Program are as follows:

Table 2 - Current Funding and Feasible Needs for Highway Traffic Safety

Current funding	$20.8 million (four-year average)
Feasible needs	$40.51 million/year to year 2010; $40.51 million/year after year 2010 to maintain the goal.

Data Sources

Tim Burks, Highway Safety Coordinator; Doug Bish, Traffic Engineering Services Unit Manager; Ed Fischer, State Traffic Engineer

State Highway Landslide and Rockfall

Description of Services

The Landslide and Rockfall Program strives to improve the safety and functionality of the state highway system by improving slope stability and addressing problem areas along road cuts. The program identifies and inventories hazardous sites that are prone to rockfalls or subject to landslides. These sites are analyzed and prioritized into different levels of hazard and urgency of repair as warranted by safety and financial feasibility factors, with safety as the top priority for the program. Major projects that are expected to cost more than $100,000 are added to the STIP. The clean up of smaller slides and rockfalls are primarily maintenance activities and are a part of Maintenance budgets.

Current Funding

The Landslide and Rockfall 2003 STIP funding level was $11.76 million, addressing projects in all five ODOT Regions. This total represents an abnormally large funding year. Over a four-year STIP cycle, running from 2002-2005, the Landslide and Rockfall Program averaged about $6.93 million in annual funds. The fiscal year 2003 total is a skewed amount compared with historical averages; $6.93 million in annual funds more accurately reflects the program funding level during a typical fiscal year.

Feasible Needs

A STIP assessment of rockfalls and landslides takes into account the increasing age of rock cuts and slides along critical transportation corridors, the impact that these problem areas are having on level of service requirements, and the increased environmental costs associated with project development activities within ODOT. This assessment used the Rockfall Hazard Rating System to identify and produce a list of high priority rockfall sites and apply an approximate project cost to each problem area. A similar procedure was utilized to identify high priority landslide project locations. The Landslide and Rockfall Program makes three assumptions in the STIP assessment:

- Maintain or improve the current level of safety from rockfall hazards and reduce future risk on high ADT roads.
- Reduce the likelihood of long term (greater than two to three days) road closures due to slides.
- Reduce the ongoing maintenance costs from the road degradation caused by slides.

Typical costs for major landslide and rockfall mitigation projects range from $1 million to $5 million and tend to fall with the order of $3 million. In order to maintain current levels of service and safety while reducing maintenance costs and long term degradation from landslides and rockfalls, the program assumes that at least one major remediation project should be funded in each region per year. That makes the feasible needs for the Landslide and Rockfall Program $15 million per year.

Summary

Table 1 – Current Funding and Feasible Needs for Landslide and Rockfall Program

	Average Annual Funding 2002 – 2005 (Current Funding)	Recommended Annual Funding (Feasible Needs)	Annual Funding Gap Between Current Funding and Feasible Needs
Landslide and Rockfall Program	$6,930,000	$15,000,000	$8,070,000

Table 1 identifies an annual funding gap between current funding levels and feasible needs of $8.07 million for the Landslide and Rockfall Program**.**

Data Sources

Tim Potter and Curran Mohney, Geo/Environmental Section

State Highway Maintenance

Description of Services

The Office of Maintenance leads and supports highway maintenance activities throughout the state by developing and implementing programs to ensure efficient, effective and consistent maintenance of Oregon's transportation infrastructure. Typical maintenance activities include installing or repairing guardrails, applying asphalt treatments, improving drainage, conducting pavement striping and marking, conducting bridge maintenance, maintaining roadside vegetation, maintaining traffic signals, and providing snowplow and road sanding treatments.

In addition to typical roadway maintenance activities, the Office of Maintenance works with ODOT's Regions and Districts to provide expertise in forestry, vegetation management, utility permits, emergency management, field services, training, clean water, and salmon recovery and directly administers the Snowmobile, Sno-Park, Adopt-A-Highway and Youth Litter Patrol programs.

Current Funding

Table 1 – Current Funding (2004) and Desired Level of Service

Program Area	Current Level of Service (2004 Weighted Amounts)	Desired Level of Service (2004 Costs Plus 18 Percent)
Surface and Shoulders	$30,208,847	$35,646,439
Drainage	$10,041,424	$11,848,881
Roadside Vegetation	$27,269,593	$32,178,120
Traffic Services	$31,562,143	$37,243,329
Structures	$8,513,080	$10,045,434
Snow and Ice	$26,120,617	$30,822,328
Extraordinary Maintenance	$5,796,662	$6,840,061
Permits	$3,487,634	$4,115,408
Total	**$143,000,000**	**$168,740,000**

Table 1 shows 2004 funding for the Office of Maintenance program areas. Expenditures for these programs totaled $143 million in 2004. Current expenditure levels are only achieving about 82 percent of the described desired levels of service for the Office of Maintenance programs. The described desired levels of service were developed using a constrained funding environment and are approximately 10 to 12 percent below preferable levels of service. Preferred service levels provide acceptable long term outcomes and lessen chances of catastrophic failure. Not all features in the maintenance portfolio are described in the level of service document. For the purposes of this analysis, the features that are not described are assumed to be maintained at about the same level as the features with described levels of service.

In short, the Office of Maintenance is performing at about 70 to 72 percent of the level of service needed to maintain the highway system over the long term and protect facilities against catastrophic failures.

Feasible Needs

Table 2 describes the preferred level of service, or feasible need, for each program area. The level of expenditures needed to reach the preferred service levels are approximately 34 percent greater than what was expended in 2004. Given the preferred expenditures, ODOT could maintain 100 percent of the preferable service levels for maintenance needs across the system. However, in order to achieve 100 percent of the desired service levels, deferred maintenance would also need to be addressed. Deferred maintenance needs on the system are:

- $20 million for guardrail improvements. Much of the current guardrail is substandard.
- $50 million in culvert improvements. Many high replacement cost culverts account for the backlog in culvert needs.
- $10 million in electrical system upgrades. Older electrical systems are a continual drain on maintenance resources. By addressing this expenditure, ODOT could reduce the ongoing need by $1 to $2 million per year.
- $30 million for rest area needs. Most rest areas are past their serviceable life, and drainfields are inadequate for the volume of traffic in many cases.

Table 2 – Preferred and Feasible Need Level of Service

Program Area	Preferred Level (Feasible Need Level of Service)
Surface and Shoulders	$40,600,690
Drainage	$13,495,674
Roadside Vegetation	$36,650,334
Traffic Services	$42,419,520
Structures	$11,441,579
Snow and Ice	$35,106,109
Extraordinary Maintenance	$7,790,714
Permits	$4,687,380
Total	**$192,192,000**

Summary

Table 3 – Current Funding and Feasible Needs for Maintenance

Program Area	Current Level of Service (2004 Funding)	Desired Level of Service (2004 Costs Plus 18 Percent)	Preferred Level (Feasible Need Level of Service)	Difference Between Current Levels and Feasible Need
Surface and Shoulders	$30,208,847	$35,646,439	$40,600,690	$10,391,843
Drainage	$10,041,424	$11,848,881	$13,495,674	$3,454,250
Roadside Vegetation	$27,269,593	$32,178,120	$36,650,334	$9,380,741
Traffic Services	$31,562,143	$37,243,329	$42,419,520	$10,857,377
Structures	$8,513,080	$10,045,434	$11,441,579	$2,928,499
Snow and Ice	$26,120,617	$30,822,328	$35,106,109	$8,985,492
Extraordinary Maintenance	$5,796,662	$6,840,061	$7,790,714	$1,994,052
Permits	$3,487,634	$4,115,408	$4,687,380	$1,199,746
Total	**$143,000,000**	**$168,740,000**	**$192,192,000**	**$49,192,000**

Table 3 shows a $49.2 million dollar gap between 2004 funding and preferable levels of service, or feasible needs, across the Office of Maintenance program areas. Current funding levels would need to be increased by approximately 34 percent in order to fully address the feasible needs.

In addition to the increased funding needed to meet preferable levels of service, approximately $110 million in deferred maintenance costs would need to be addressed in order to achieve 100 percent of desired levels: $20 million would be needed to improve substandard guard rails. $50 million in backlogged culvert replacement needs would have to be addressed. $10 million would be needed to update older electrical systems that drain current resources. Updating these electrical systems would reduce future needs by $1 to $2 million annually. About $30 million dollars would also be needed to bring rest areas up to desirable levels. Addressing the deferred needs over the 2005-2030 year period of the plan would cost an additional $4.2 million per year.

Data Sources

Darryl Ficker, Maintenance Management System; and Doug Tindall, State Maintenance Engineer

Special Programs

Overview

ODOT has several small special funding programs set up by federal or state legislation.

- Access Management
- Oregon Plan for Salmon and Watersheds: Fish Passage Culvert Program
- Large Culverts
- Scenic Byways
- Transportation Enhancement
- Transportation and Growth Management

Access Management Program

Description of Services

Access management involves permitting driveway and roadway access to state highways and regulating the spacing of existing and new driveways to increase the safety and mobility of the highway. The Access Management Program also works with local governments to develop access management plans, strategies, codes and ordinances that facilitate access management goals.

Current Funding

The FY04 budget for the Access Management Unit and the Region Access Management Engineers is $643,350 in addition to $1.5 million/year for access remedies for permitted accesses. The $1.5 million, set up by SB 86 in 1999, is governed by the Right of Way Section.

Feasible Needs

ODOT staff members working with access management suggest that the $20 million for access management projects and $30 million for the local system allotted by the 1999 Legislature and spent over about a four-year period represent a good proxy for feasible access management needs. That figure translates into $12.5 million a year for project-related access management and could include frontage roads, backage roads and local streets. The biggest deficiency in promoting access management on state highways is the lack of local street networks.

Additional needs include an increased fund for access remedies for permitted accesses of $2.5 million/year and an access management opportunity fund at $1 million/year.

Though not included in the feasible needs total, access management plans need to be supported. Cities are being encouraged to do access management plans, but they are expensive. The Jackson School Road interchange management plan cost $500,000. An interchange management plan in Region 4 cost $10,000-30,000 in-house and $100,000 for consultants.

Summary

Currently, about $2.1 million/year is allocated to the Access Management Program. If ODOT wants to pursue a more aggressive program, up to $16.6 million/year is needed.

Data Sources

Discussion of internal ODOT staff involved in access management and budget figures.

Oregon Plan for Salmon and Watersheds: Fish Passage Culvert Program

Description of Services

The Fish Passage Culvert Improvements Program helps implement *The Oregon Plan for Salmon and Watersheds* by funding culvert restoration on streams where historically there have been fish runs, but where the culvert has created a barrier to fish passage. Because ODOT is legislatively required to provide adequate passage for fish at culverts, this program:

- Inventories and prioritizes culverts;
- Develops the appropriate solution for culverts that need to be modified; and
- Schedules and implements the solution.

Current Funding

The program is currently funded at $3.6 million/year of capital improvement funds that include preliminary engineering, construction engineering and right of way costs.

At the current funding rate, it will take 71 years to accomplish the goal of providing fish passage at all ODOT culvert barriers. The Oregon Department of Fish and Wildlife (ODFW) Culvert Inventory List includes 757 culverts that need to be replaced or retrofitted for fish passage. To date, 26 culverts have been replaced and 46 culverts have been retrofitted. This provides for a 9.5 percent accomplishment in seven years, or 1.4 percent per year. This level of service is not considered good. The program has been financially constrained.

Feasible Needs

Completing the culvert replacements and retrofits in the next 25 years would do much towards satisfying ORS 509.585. There are 685 culverts identified in the ODFW Culvert Inventory remaining to be retrofitted or replaced. Retrofits are a temporary solution to pass fish; when the culvert needs structural repairs, the culvert needs to be replaced, sometimes with a bridge.

- **Assumptions**

  - In the past seven years, 36 percent of culverts have been replaced and 64 percent have been retrofitted.
  - 36 percent of the remaining culverts assumes 247 culverts will be replaced.
  - 64 percent of the remaining culverts assumes 438 culverts will be retrofitted.
  - Assume that about half of the retrofitted culverts will need replacement within the next 20 years, thus an additional 219 sites.
  - Replacements can be divided into 2 categories
    - 200 are potentially difficult: bridge or large box @ $800,000 each
    - 266 are potentially simple: 6 foot pipe @ $250,000 each
  - Replacement costs are $160 million for the difficult
  - Replacement costs are $66.5 million for the simple
  - Retrofits cost $40,000 per culvert or $17.5 million.

Total cost for retrofitting and replacement is $244 million or $9.38 million per year from 2005 to 2030.

Summary

Current funding for the Fish Passage Culvert Program is $3.6 million per year. To replace or retrofit the culverts identified by ODFW as being barriers to fish passage by 2030, the program would have to be increased to $9.38 million per year.

Data Source

Tony Snyder, GeoEnvironmental Unit

Large Culvert Program

Description of Services

The National Bridge Inventory (NBI) is a federal program that mandates inspections and records of information on bridges and very large culverts that are over 20 feet (span width across the creeks). The OTC created the Bridge Fund to work on these structures.

A group of 2500 culverts that are over 6 feet in diameter (but less than 20 feet in diameter and thus too small to be on the NBI list) are known as the non-NBI culverts and the program is now known as the Large Culvert Program. The Large Culvert Program is currently funded at $2.4 million per year to repair and replace the structurally deficient large culverts that are not eligible for NBI funding.

The ODOT bridge inspectors inspect large culverts every four years. The information for the large culverts is maintained by the Bridge Program Unit. Each year the conditions of the culverts are examined and the existing STIP funding is programmed to repair the worst ones first. The large culverts are expensive to repair and bridges are often necessary to meet the fish passage requirements.

Current Funding

The FY 2004 funding for the Large Culvert Program was $2.4 million.

Feasible Needs

Culvert lifespan varies considerably based on the materials and location. A concrete culvert will last 75+ years in a dry desert climate but only 40 years if there are numerous big rocks carried by the stream. Metal culverts last 50 years except in salt water environments where ODOT has to replace them in less than 10 years. Many of ODOT's culverts were installed in the 1940s and 1950s and are thus at the end of their useful life.

- **Assumptions**

  - Currently 5 percent of the large culverts (125 culverts) are in need of replacement.
  - Replacement cost averages $1 million per culvert or $125 million.
  - Currently 5 percent of the large culverts (125 culverts) need major repair.
  - Repair cost averages $50,000 per culvert or $6.3 million.

The total cost of the above scenario is $131.3 million which should be programmed over a four-year period. This works out to be a yearly amount of $32.82 million. This is a large amount of money in a short timeframe.

In other words, assuming that the average life of a culvert is 75 years, to replace the existing 2500 large culverts over the next 75 years, ODOT must replace 33 culverts per year at a cost of $33 million per year. If ODOT replaces fewer than 33 per year, then the state will experience structural culvert failures and unplanned roadway closures.

Summary

The Large Culvert Program is funded with $2.4 million per year. It is apparent that approximately $33 million per year will be needed to replace existing culverts that have

reached the end of their lifespan and to keep up with the anticipated failures each year in the future.

Data Sources

Stacy Jones, Highway Budget Unit; Tony Snyder, GeoEnvironmental Unit; Jill Vosper, STIP Manager

Scenic Byways Program

Description of Services

The state and national Scenic Byways Programs highlight scenic federal, state and local highways and roads throughout Oregon. Oregon has 14 Scenic Byways covering 2,204 miles and 9 Tour Routes covering 580 miles. Five of the state's Scenic Byways have been designated National Scenic Byways and are marketed in national publications. Oregon has four All American Roads, the "best of the best" designation, that are marketed internationally. The Scenic Byway designation means that communities are eligible for federal grants for marketing and Byway management plan implementation.

Current Funding and Feasible Needs

Funding for the Scenic Byway Program was $217,900 in FY 2003/2004.

The Scenic Byway Program is primarily federally funded with a 20 percent match by state and local governments. Using estimates for the Pacific Coast Scenic Byway needs for marketing, restoration and improvement of facilities, parking, access, safety and other improvements, the Program Manager estimated statewide needs for these purposes at $445,000 per year in 1997 dollars ($356,000 federal funds and $89,000 state and local match) or $523,700 in 2004 dollars.

Data Sources

Pat Moran, Scenic Byways Program Manager; Stacy Jones, Highway Budget Unit

Transportation Enhancement Program

Description of Services

The Transportation Enhancement Program, a federal program under the Transportation Equity Act for the 21st Century (TEA-21), funds a variety of projects that have a direct relationship with transportation and fall into one or more of the following categories:

- Pedestrian and bicycle facilities
- Safety and educational activities for pedestrians and bicyclists
- Acquisition of scenic easements and scenic or historic sites
- Scenic or historic highway programs
- Landscaping and other scenic beautification
- Historic preservation
- Rehabilitation and operation of historic transportation buildings, structures and facilities
- Preservation of abandoned railway corridors
- Control and removal of outdoor advertising
- Archaeological planning and research
- Mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity
- Establishment of transportation museums

Recent Oregon Enhancement awards have focused on bicycle/pedestrians projects (84 percent) and historic preservation projects (9 percent). Projects have helped to revitalize main streets or downtowns, support Special Transportation Area designations, provide funds in economically distressed areas, and provide safer walking and/or bicycling routes to school.

Summary of Current Funding and Feasible Needs

TEA-21 allows each state to reserve 10 percent of its Surface Transportation Program (STP) allocation for the Transportation Enhancement Program; for Oregon the full 10 percent set-aside is about $8 million. In FY 2004 and 2005, the Oregon Transportation Commission limited Enhancement funding to $3 million per year in order to make more federal funds available for pavement and bridge preservation, but increased Enhancement funding to $5 million per year beginning in FY 2006. Transportation Enhancement is a reimbursement program requiring a non-federal funding match of at least 10.27 percent.

Project demand has been high. In 2003 ODOT received 80 applications requesting $50 million for the FY 2004-2006 period. In 2004 there were 79 applications requesting more than $50 million for the FY 2007-2008 funding cycle. The ratio of awards to requests is about one in six. If the program were to receive the full 10 percent set-aside of $8 million, more of this demand could be met. Increases in the set-aside will depend on increased federal appropriations and OTC decisions on how much of the overall allocation is available for projects.

Data Sources

Pat Fisher, Transportation Enhancements Program Manager, and 2004-2007 STIP

Transportation and Growth Management Program

Description of Services

The Transportation and Growth Management (TGM) Program provides resources to help Oregon communities prepare transportation and land use plans to respond to pressing transportation-related growth management issues, to develop transportation system plans (TSPs) and plan updates and ordinances that implement the Transportation Planning Rule and the *1999 Oregon Highway Plan*, and to help local governments address transportation needs by considering and adopting changes to land use and transportation system plans.

Current Funding

TGM projects are awarded on a competitive basis within each of the five ODOT Regions. In 2003 the TGM program awarded 35 grants to 27 local governments for transportation system plans and updates, concept planning, downtown redevelopment plans and code amendments. TGM funding in FY 2004 was $4.4 million and responded to 76 percent of the applications received.

Feasible Needs

As the program evolves, planning needs may decline as most of the transportation system plans have been completed. There will be a need to shift the planning effort to preparing transportation projects for funding consideration. The future program will be similar to the current program with slightly decreasing funds, projected at a need of $4 million per year as many TSPs have been completed.

Summary

The current funding level of $4.4 million per year for the TGM program is expected to decline to $4 million per year in the future, reflecting declining needs.

Data Source

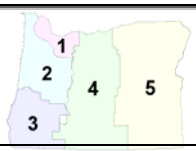
Arlene Santana, TGM Program Coordinator

Bicycle and Pedestrian Program

Description of Services

In urban areas bicycle and pedestrian facilities consist of sidewalks, crosswalks, crossing islands, pedestrian signals, and marked bike lanes. In rural areas the highway shoulders serve as bikeways and walkways. The Oregon Department of Transportation's focus is to provide pedestrian and bicycle facilities primarily on urban state highways. ODOT's Bicycle and Pedestrian Program also assists cities and counties with bicycle and pedestrian funding and planning. It is estimated that 272 miles or about half of the ultimate sidewalk and bikeway system is in place. Table 1 shows the inventory of facilities by ODOT Region and type. No data exists on the number of pedestrian crossing facilities that are in place.

Table 1 – Existing Bike and Sidewalk Facilities on State Highways (in miles)

	Existing Miles of Highway with Bike Lanes and Sidewalks	Existing Shoulder Bikeways	Existing Separated Path within Right-of-Way
Statewide	272	691	21
Region 1	99	112	10
Region 2	104	296	8
Region 3	26	80	1
Region 4	16	89	3
Region 5	28	114	.12

Current Spending

The legal framework for the walkway and bikeway spending is set forth by Oregon Revised Statue 366.514 passed in 1971. It requires ODOT, cities, and counties to spend reasonable amounts of the state Highway Fund on walkways and bikeways. Reasonable is defined as no less than one percent of the highway funds applicable to highway, road or street construction, reconstruction or relocation. The statute allows three exceptions to walkway or bikeway construction: 1) where it would be unsafe, 2) where there is no need, and 3) where the cost is too high in proportion to need. In a typical year, about 75 percent of the available capital funds are spent on the state system and 25 percent on the local

system. The total annual spending on the state system including $200,000 for administration is $3,456,000.[45] Table 2 summarizes the expenditures by category.

Table 2 - Current Spending by Category (2004 Dollars)

SPENDING CATEGORY	
As Part of Construction Projects	
State-owned	$2,512,000
Local	$204,000
Grants	
State-owned	$290,000
Local	$680,000
Quick Fix	
State-owned	$454,000
Administration, publications, etc.	$200,000
2004 Subtotal	$4,340,000
Less local expenditures [46]	-$884,000
Total Annual Spending on State System	$3,456,000

Feasible Needs

An estimated $9.93 million per year is needed for capital and administrative costs to complete the urban "sidewalk warrant areas" presently deficient of sidewalks, curbs, drainage, ADA ramps, and crossings. Of this portion, $9.63 million is for capital improvements with an average of $300,000 per year devoted to administrative costs.[47]

The estimated feasible need is based on the assumption that 525 miles of urban state highways are within "sidewalk warrant areas." These are sections of highway where pedestrian activity can be expected. Currently, 272 miles or 52 percent of the ultimate 525 miles of the sidewalk and bikeway system are in place. The inventory is based on a current database initially developed from a field and video log inventory conducted in 1996. The *Oregon Bicycle and Pedestrian Plan* adopted June, 1995 provides a framework for needed bicycle and pedestrian improvements on the state system.

[45] Note: The spending reflects the additional $2 million the Bicycle and Pedestrian Program received from Oregon Transportation Investment Act funds. In 2004, about 85 percent of the $2 million was allocated to state projects and 15 percent to local projects.

[46] Note: 2003 local expenditures were used as a proxy for 2004 expenditures.

[47] It is assumed that the administrative costs will increase from the current $200,000 per year to $400,000 by the end of the 2030 plan period.

Completing 525 miles of the sidewalk and bikeway system is defined as the state's reasonable need for walkways and bikeways. This mileage represents 7 percent of the total state highway system. The estimated costs of walkway and bicycle improvements are listed in Table 3 below. The $700,000 per mile average unit cost is relatively high because the majority of easy-to-construct areas have been addressed. The remaining areas needing retrofitting tend to have more complex construction, right-of-way acquisition, or easement issues. An additional $200,000 per year addresses administration costs.

Table 3 - Estimated Walkway and Bicycle Improvement Cost Estimates (2004 dollars)

Improvement	Amount Needed	Average Unit Cost	Subtotal in Millions
Urban highway sidewalk both sides of road with curbs and drainage (includes P.E. and ROW)	253 miles	$700,000 per mile	$177.10
ADA ramps	2,468	$ 1,000 each	$ 2.47
Pedestrians crossing with median refuge island every one-quarter mile (assumes signal crossing exists every one-half mile)	1,024	$ 65,000 each	$ 66.56
Total			**$246.13**

Summary

The estimated feasible annual need for the walkways and bikeways on specific segments of urban state highway over the plan period is $9.93 million per year (in 2004 dollars). This figure is based on an average unit cost of $700,000 per mile for sidewalk construction with curbs, drainage, crossings, and ADA ramps for both sides of the 253 miles of urban highway. The average unit cost is relatively high because the majority of easy to construct areas have already been addressed. The 253 miles represent 3.5 percent of the total state highway system. Currently, $3.46 million is spent on state bicycle and pedestrian capital improvements and administration of the state program. This leaves a $6.47 annual gap toward meeting the feasible need.

Data Sources

Michael Ronkin, Pedestrian and Bicycle Program Manager

Highway Division Administration and Indirect Program

Description of Services

Administrative costs include the general administration, supervision and other necessary expenses for the management, supervision and administrative control of the Highway Division. Administrative costs include all costs associated with the first and second levels of Division and Region management and all related support staff.

Indirect expenditures are those incurred for common or joint purposes that benefit the agency or portions of the agency as a whole. They cannot be charged to a particular project. They include items like training, financial and clerical support staff, building and maintenance and Asset Management.

The Asset Management System includes not only the established Pavement Management System, Bridge Management System, Congestion Management System, and Safety Management System, but also features such as culverts, guard rails, ITS installations, tunnels, signs, sound and retaining walls, barriers, catch basins, and illumination. The purpose of asset management is to provide quality information for decisions in resource allocation and utilization in the management of the transportation infrastructure.

Summary of Current Funding and Feasible Needs

In FY 2003/2004 administrative costs for the Highway Division construction and maintenance totaled $7.3 million. Indirect costs for Highway Division construction and maintenance were $71.3 million. The Department of Transportation believes that the needs for these activities will increase with inflation in the future, but not increase with the amount of construction activity; that is, spending should increase with inflation.

Data Sources

Darryl Ficker and Stacy Jones, Highway Finance Office

State Transportation Program Development

Description of Services

State and federal laws and regulations require ODOT to conduct planning activities to design and operate an efficient transportation system. Transportation Program Development (TPD) coordinates the future use of transportation resources among federal, state, regional and local agencies. TPD has four major program responsibilities:

1. Statewide plans and special studies. Responsibilities include producing the long-range Oregon Transportation Plan, the Oregon Highway Plan, and individual plans for facilities and highway corridors.

2. Technical assistance and coordination. TPD is responsible for assisting local government with and providing statewide coordination of transportation system planning.

3. Analysis and research. The program includes oversight of the transportation management systems, data, mapping and modeling systems as well as conducting research projects to find new ways to help make the transportation system work better.

4. Statewide Transportation Improvement Program (STIP). TPD is responsible for developing the STIP, Oregon's four-year transportation capital improvement program which identifies the scheduling and funding of transportation projects and programs.

Summary of Current Funding and Feasible Needs

Current funding for FY 2004 is $29.9 million, including consultant and contract payments. The level of feasible needs is projected to remain at $29.9 million per year with increases for inflation.

Data Sources

Ron Riggs, Transportation Development Division; Barbara Fraser, Long-Range Planning Unit Manager; and Jerri Bohard, Planning Section Manager

State Transportation Safety Division

Description of Services

The Transportation Safety Division organizes, plans and conducts a statewide transportation safety program. The Division coordinates activities and programs with numerous partners, including state and local agencies, local governments, health organizations, non-profit groups and the private sector.

Transportation safety is promoted through educational, enforcement and engineering actions. Major programs focus on occupant protection, impaired driving, speed, youthful drivers, pedestrians, bicyclists, motorcyclists, employers, safety corridors and work zone safety. Programs are implemented through more than 550 grants and contracts annually to partners and other service providers and through the volunteer efforts of citizens, organizations and agencies**.**

Current Funding

The Transportation Safety Division expends about $19 million dollars annually on efforts to reduce transportation-related injury and death. Of that amount, about 80 percent of expenditures are for the benefit of local governments and not-for-profit organizations. The funds are used for delivery of programs that seek to reduce transportation-related injury and death through statewide and local level efforts. The remaining 20 percent of expended funds are used to cover overhead associated with developing and delivering the transportation safety program. These funds cover such activities as training, technical assistance, and delivery of educational programs by Transportation Safety Division staff. About 1.5 percent of the total is used for purely administrative or internal uses such as rent, equipment, and other similar uses. Annually a minimum of about 40 percent of expended funds are passed directly to local governments for use in direct delivery of program activity.

Feasible Needs

Feasible needs for Transportation Safety may be described in three ways:

1. In line with the Transportation Safety Action Plan and with the same set of laws, the needs for the Transportation Safety Program are $19 million a year. This figure assumes a flexible program (without federal or state mandates for specific spending categories) and assumes the ability to get to the goal of 0.99 fatalities per 100 million VMT. This funding would not be an increase from current spending.

2. With expected changes including lowering the BAC to .05, developing an intense DUII program, making drivers' education mandatory, and developing other special programs, the program will need a 25-30 percent increase in funding.

3. With added responsibilities to match international programs like those in Sweden, the Netherlands and the United Kingdom, funds would need to double.

For the purposes of the OTP, the feasible needs are $19 million/year with increases for inflation.

Summary

The Transportation Safety Division organizes, plans and conducts a statewide transportation safety program involving educational, enforcement and engineering actions. Both current funding and feasible needs are $19 million a year with increases needed to adjust for inflation.

Data Sources

Troy Costales, Transportation Safety Division Administrator; and Walt McAllister, Transportation Safety Plan Manager

Driver and Motor Vehicle Services

Description of Services

The Oregon Department of Transportation Driver and Motor Vehicle Services (DMV) promotes driver safety, protects financial and ownership interests in vehicles, and collects revenue for Oregon's roads. DMV achieves this mission through two main program areas covering drivers and vehicles in the state. Today in Oregon there are about 4 million registered vehicles and 2.5 million licensed drivers.

DMV's Driver Program monitors driving privileges, issues and renews drivers' licenses, files accident reports, verifies insurance information, reviews driver medical conditions and oversees re-examination testing, suspends driving privileges, records driver convictions and conducts skill tests, among other programs.

DMV's Vehicle Program registers vehicles and manufactured homes, and issues titles, license plates and trip permits.

Current Funding

Assumptions Applying to Both Driver and Vehicle Programs

DMV expects to maintain current customer service levels for the next 20 years throughout both the Driver and Vehicle Program areas. Levels common to both programs include:

- Maintaining a telephone answering time of 45 seconds.
- Maintaining a local office wait time of 15 minutes.
- Maintaining a customer satisfaction rating of 85 percent for employee helpfulness, courtesy, knowledge, efficiency and 60 percent for customer satisfaction with wait times.

DMV expects to continue to operate 64 local field offices across the state to implement responsibilities currently established for the division.

Both the Driver and Vehicle programs assume that DMV will:

- Serve approximately 15,000 customers each day in DMV field offices.
- Maintain approximately 4.2 million driver records and over 5 million vehicle records.
- Provide telephone help for about 1.8 million customers per year.
- Provide access to DMV databases for law enforcement agencies to fulfill over 50,000 daily records requests.

- Fulfill over 4 million DMV record requests each year for individuals, businesses and government.

DMV Driver Program

In addition to customer service levels common throughout the Division, DMV expects to maintain driver safety at 64 percent of Oregon motorists driving safely with incremental improvement for the next 20 years:

DMV makes three major assumptions specific to the Driver Program needs assessment:

- Maintain 418 FTE.
- Issue about 1.1 million driver licenses and ID cards a year (including renewals and replacements).
- Record approximately 550,000 convictions on driving records each year.

Expenditures for DMV Driver Program areas were $30,859,996 during FY 2003.

DMV Vehicle Program

In addition to the customer service levels common for the Division, DMV expects to maintain a vehicle title processing time of 21 days and a mail-in registration renewal process time of 5 days for the next 20 years.

DMV makes these assumptions specific to the Vehicle Program needs assessment:

- Maintain 378 FTE.
- Issue approximately 1.2 million titles every year.
- Issue approximately 2 million registrations every year.
- License approximately 4,200 vehicle and driver-related businesses in the state.

Expenditures for the DMV Vehicle Program area were $27,850,751 during FY 2003. Administrative costs for both the Driver and Vehicle Program areas totaled $2,171,743 for FY 2003.

Feasible Needs

Over the next 20 years, DMV will continue to provide person-to-person services through DMV field offices, by mail, over the telephone and through Internet applications. DMV will be expected to provide these services on a timely and efficient basis. In order to provide those services, DMV will need a long range plan to improve its field office facilities, replace equipment and modify computer programs. These items lay outside of what is normally budgeted for DMV.

Twenty-year feasible needs for the DMV Driver Program are expected to total $33.2 million. Twenty-year feasible needs for the DMV Vehicle Program are expected to total $24.5 million.

More specifically, the feasible needs for DMV Driver and Vehicle Programs are:

1. Computer Programs: For Driver Program: $19.4 million. For Vehicle Program: $18.8 million. DMV core business is reliant on legacy mainframe systems that support the Driver and Vehicle Program areas. These systems are approximately 40 years old, utilize outdated technologies, and contain extensive and irregular code modifications. Current business requirements exceed system capacities and performing the necessary "work-arounds" is increasingly impractical. Support of these systems is progressively more problematic. Additionally, as the technical infrastructure continues to age, replacing the infrastructure will be necessary to provide a foundation for new systems as well as to take advantage of new opportunities offered by modern technology.

   Feasible needs for DMV includes replacement of the drivers and vehicles systems and modernization of the system technology infrastructure. The full scope and timing of systems replacement is subject to systems analysis and project scope evaluation. DMV is estimating that a major change to computer architecture will take place over an eight-year span. This includes:

   a. A replacement of the drivers and vehicles system. Implementation will occur over eight years including systems analysis, vendor acquisition, implementation and business architecture changes.

   b. A modernization of the technology infrastructure for the drivers and vehicles system. Implementation is concurrent with and dependent upon required upgrades identified during systems replacement.

2. Facility Upgrades: For Driver Program: $5.2 million. For Vehicle Program: $4.8 million. DMV will need to continually upgrade and enhance its field office facilities. Due to increasing population and demand for services during the analysis period, DMV will need to upgrade current facilities, relocate to new facilities, or purchase new facilities to meet its customers' needs.

3. Equipment Replacement: Driver Program need: $8.6 million. Vehicle Program need: $0.9 million. DMV will need to replace the equipment devices which are not on a scheduled replacement cycle. These items are automated testing devices in DMV field offices (three times in this 20-year period), remittance processor (twice in this 20-year period), and a chemical-based microfilm archiving system replaced with a digital imaging and a phone switch upgrade.

Description of Methodology for Identifying Feasible Needs

The items included as feasible needs are items that are not included in DMV's base budget. These items must be requested through the budget process. The costs for replacing major computer systems are based on a survey of other states and their costs of replacing major computer systems.

Costs for maintaining the DMV field offices are based on current costs to upgrade, relocate or purchase a facility. The current and past budget allocations for facility upgrades have been inadequate. This has forced much needed upgrades.

The costs for equipment replacement are based on current costs for these items.

Major Assumptions

The need for replacement of major computer systems is based on the age of the current systems and the need to move these systems to a more stable and future-oriented computer environment.

The need for facility upgrades assumes the state will still need the facilities in the next 20 year period. It assumes there will be a need for customers to interact with DMV employees on a person-to-person basis.

The need to purchase equipment replacements for automated testing devices, remittance processor, imaging systems and phone switch upgrade assumes that there will not be substantially different alternatives to these devices over the next 20 years.

Summary and Conclusions

Driver and Motor Vehicle Services (DMV) promotes driver safety, protects financial and ownership interests in vehicles, and collects revenue for Oregon's roads. DMV is in charge of licensing the 2.5 million drivers and registering the 4 million registered vehicles in Oregon. Expenditures for the DMV Driver and Vehicle Services totaled $60,882,490 for FY 2003 and are shown in Table 1.

Table 1 – Current Expenditures

Program	**FY03**
Vehicle	$27,850,751
Driver	$30,859,996
Admin. Costs	$2,171,743
Total	$60,882,490

Needs beyond current expenditures for computer programs, facility upgrades and equipment replacement are expected to cost $57.7 million in 2003 dollars or $2.89 million per year over a 20-year period as shown in Table 2.

Table 2 – 20-Year Feasible Needs (2003 dollars)

Program	Computer Programs	Facility Upgrades	Equipment Replacement	Total
Driver	$19.4 million	$5.2 million	$8.6 million	$33.2 million
Vehicle	$18.8 million	$4.8 million	$0.9 million	$24.5 million
Total	$38.2 million	$10 million	$9.5 million	$57.7 million
Per Year				$2.89 million/year

During the development of this needs analysis, the OTP planning period was extended to 2030 or 26 years rather than the 20 years used above, and the expenditures were changed to FY 2004 dollars. For the purposes of this analysis, the DMV numbers do not change materially. The additional feasible needs were extended over the 2005-2030 plan period and inflated 2.66 percent to 2004 dollars to $59.23 million. That means DMV needs close to $2.3 million per year during the next 26 years in addition to its current expenditures of $60.9 million or a total of $63.2 million per year.

Data Sources

Jon Vorderstasse, DMV Budget Coordinator

Motor Carrier Transportation

Description of Services

The Motor Carrier Transportation Division strives to promote a safe, efficient and responsible commercial transportation industry by simplifying compliance, reducing regulatory requirements, wherever appropriate, preserving the infrastructure, enhancing the private/public partnership, fostering effective two-way communication and delivering superior customer service while recognizing the vital economic interests of the commercial transportation industry.

The Motor Carrier Transportation Division is divided into four primary program areas:

- Field Motor Carrier Services
- Motor Carrier Audit Program
- Safety, Investigations and Federal Programs
- Salem Motor Carrier Services

Field Motor Carrier Services oversees the enforcement of motor carrier requirements through weigh stations, enforcement officers, truck and driver inspections, and similar responsibilities.

The Motor Carrier Audit Program ensures compliance with state regulations for truck taxes and fees by conducting audits and screening accounts.

The Safety, Investigations and Federal Programs Section conducts truck, driver and accident inspections, trains and certifies enforcement officers, manages federal grant dollars, and oversees much of the Green Light (weigh-in-motion) Program.

The Salem Motor Carrier Services Section operates a registration service center in Salem, administers Internet-based platforms for truck-related business and issues various types of truck permits.

Current Funding

Major Assumptions Common to all Motor Carrier Transportation Division Programs

- Approximately 25,000 trucking companies operate in Oregon, including about 9,000 Oregon-based companies.
- Approximately 300,000 trucks are registered to operate in Oregon, including about 50,000 Oregon-based trucks.

Field Motor Carrier Services

Field Motor Carrier Services currently has the following system performance:

- Maintains eight districts statewide for the Motor Carrier Enforcement Officer staff.
- Maintains and operates 81 fixed weigh stations, six Ports of Entry and dozens of portable scale sites to check size and weight of more than 2.5 million trucks each year. Operates the Green Light system to preclear more than one million trucks each year.
- Conducts numerous special operations at bridges around the state to enforce weight restrictions.
- Conducts truck and driver safety inspections at weigh stations.
- Issues more than 16,000 citations for truck weight violations, 2,200 citations for size violations, and 11,000 citations for safety and related violations. Issues more than 24,000 warnings for less-than-critical violations and requires approximately 9,000 vehicles to legalize before proceeding.
- Operate field registration offices from 8 a.m. to 5 p.m. at five field offices–the I-5 bridge office at Jantzen Beach on the Washington border and at the Ports of Entry at Ashland, Klamath Falls, Umatilla and Farewell Bend. Issues approximately 61,000 temporary passes and collect $2.5 million in weight-mile taxes.

Expenditures are based on these major assumptions:

- 140 FTE
- Approximately 10,000 safety inspections conducted by staff each year.
- Approximately 40 weight restricted bridges on major routes in Oregon and dozens of restricted bridges on lesser routes.
- Ten-year highway and bridge rehabilitation program underway, forcing truck traffic to observe numerous size and weight restrictions on structures, as well as detours around construction sites.

FY 2003 expenditures for Field Motor Carrier Services were $8,127,557.

Motor Carrier Audit Program

The Motor Carrier Audit Program currently has the following system performance:

- Ensure motor carrier compliance with state laws regarding truck taxes and fees. Ensures compliance with international agreements regarding truck registration fees and fuel taxes.
- Completes more than 800 weight-mile tax audits and identify more than $5 million in unreported taxes and fees.

- Audits at least three percent of the Oregon carriers participating in the International Registration Plan (IRP) and International Fuel Tax Agreement (IFTA). Completes approximately 150 IRP audits and 140 IFTA audits each year.
- Screens about 13,000 motor carrier accounts each year to determine which warrant close scrutiny.
- Images more than 543,000 documents each year making the documents available for ODOT staff 24-hours a day, 7-days a week.

Expenditures are based on these major assumptions:

- 55 FTE
- Approximately 4,000 Oregon companies participate in the International Registration Plan and International Fuels Tax Agreement.
- Collect approximately $29 million in registration fees owed to other states and provinces.
- Collect approximately $200 million in weight-mile taxes each year.

FY 2003 expenditures for Motor Carrier Audit Programs were $3,235,106.

Safety, Investigations and Federal Programs

Safety, Investigations and Federal Programs have the following current system performance:

- Administer and enforce state and federal trucking safety laws and rules that cover the mechanical condition of commercial trucks, qualifications of truck drivers, securing of cargo and proper shipping of hazardous materials.
- Inspect trucks at weigh stations and along roadsides. Closely track the number of truck drivers found with critical safety violations, which average of more than 300 each month, and track the number of truck-at-fault accidents, which average approximately 40 each month.
- Use computers to record at least 60 percent of inspection information to allow a speedy upload to the national databank.
- Conduct comprehensive audits of trucking companies at their offices.
- Manage the federal Motor Carrier Safety Assistance Program (MCSAP) in Oregon and distribute more than $2.3 million in federal funds each year for truck safety inspections and traffic enforcement done by the Oregon State Police. Also manage the work of more than 40 agencies (city police, county sheriffs and weighmasters) working under non-compensated MCSAP agreements.
- Train and certify all enforcement officers who perform truck, driver and hazardous cargo safety inspections in Oregon.
- Help law enforcement investigate truck accidents to determine cause.
- Use intelligent transportation systems to weigh trucks in-motion and automatically identify them as they approach Oregon's busiest weigh stations.

Expenditures are based on these major assumptions:

- 39 FTE
- Approximately $4.8 million per biennium in Motor Carrier Safety Assistance Program federal grant funds.
- $400,000 per year in Green Light weigh station preclearance maintenance costs.
- Approximately 23,000 safety inspections conducted by staff each year.
- Approximately 500 safety compliance reviews conducted by staff each year.
- Approximately 50 law enforcement officers trained each year.
- Approximately 1,050 truck accidents occurring each year, including approximately 550 truck-at-fault accidents.
- Approximately ten truck accidents investigated each year.

FY 2003 expenditures for Safety, Investigations and Federal Programs were $6,895,792.

Salem Motor Carrier Services

Salem Motor Carrier Services has the following current system performance:

- Operates a registration service center in Salem, including a 24 hours a day, 7 days a week Credentials Service Center.
- Operates an Internet-based service (Trucking Online) for transacting truck-related business.
- Issues truck plates, temporary passes, trip permits and other credentials needed to operate in Oregon.
- Operates an over-dimension variance permitting service in Salem. Issues continuous operation and single-trip permits for trucks exceeding size and/or weight limits.
- Manage the work of five permit agents issuing continuous operation variance permits.

Expenditures are based on these major assumptions:

- 78 FTE
- More than 2,000 companies complete certain transactions online through the Internet-based service called Trucking Online.

FY 2003 expenditures for Salem Motor Carrier Services were $6,197,910.

Feasible Needs

Field Motor Carrier Services

Costs for the 20-year Field Motor Carrier Services feasible needs are expected to total approximately $6.2 million in addition to costs for existing services.

In the future, the trucking industry will continue to expect motor carrier services to be available in both an automated manner and a conventional one. While the Salem Motor Carrier Services Program will fully develop and take advantage of its Trucking Online Internet-based transaction service, the Field Services Program must maintain over-the-counter, phone and fax services from the existing five field offices — the Ports of Entry at Ashland, Klamath Falls, Farewell Bend and Umatilla, and the Portland Bridge Office at Jantzen Beach. Thus, certain core customer service objectives will remain fairly constant for the next 20 years; the feasible need projections for Field Services relate to facilities maintenance and the purchase of modern equipment to check truck size and weight.

Anticipated feasible needs for Field Motor Carrier Services

1. $6 million expense spread from 2005 through 2024 to maintain and upgrade 87 weigh stations, including Oregon's six Ports of Entry. Some of the facilities are aging and long in need of routine maintenance and repair. Several need completely new, larger scale decks to allow for accurate weighing of long combination vehicles.

2. $200,000 in one-time expenses spread over 2014 and 2015 for the purchase of highly-accurate portable weigh-in-motion scales and vehicle classifiers.

Description of methodology for identifying feasible need

Costs for maintaining the weigh stations and Ports of Entry are based on past "betterment" budgets that routinely allotted at least $175,000 annually. This has proved to be inadequate, and it has forced much needed maintenance and repair work to be deferred to the future.

The cost for purchasing portable weigh-in-motion and vehicle classification systems is based on current costs of such systems.

Major assumptions underlying the feasible needs

The need for more resources to maintain weigh stations assumes the state will still need the facilities in the next 20-year period. It assumes there will be no alternative to the current methods for truck size and weight enforcement. One major assumption is that Oregon will continue to be a weight-mile tax state that needs a large network of weigh stations to closely monitor truck traffic and truck weights.

The need to purchase portable weigh-in-motion and vehicle classification systems assumes that highly-accurate systems will be invented in the next ten years. Current systems are based on piezo-electric-cable-technology that has a 20 to 30 percent margin of error when weighing trucks. Better systems will be developed in coming years and Oregon motor carrier enforcement officers can take advantage of that technology as soon as it's available.

Motor Carrier Audit Program

Costs for the 20-year Motor Carrier Audit Program feasible needs are expected to total approximately $2.6 million in addition to costs for existing services.

In the future, the Motor Carrier Audit Program will be challenged to keep up with a growing trucking industry. It's possible that certain technologies, such as satellite-based tracking systems, will come into play and help weight-mile tax auditors. But it will take legislative action to mandate the use of such systems, just as it would take legislation to repeal weight-mile taxes, so the feasible need projections for the Audit Program can't assume much beyond maintaining the status quo.

Anticipated feasible needs for the Motor Carrier Audit Program

1. $213,000 one-time expense in 2005 to automate the analysis of scale crossing data for comparing with weight-mile tax reports to identify underreporting.

2. $2,436,480 in total expenses spread from 2008 through 2024 to add five FTE to handle anticipated increases in weight-mile tax accounts.

Description of methodology for identifying feasible need

Costs for automating the analysis of scale crossing data is based on a detailed estimate by the Motor Carrier Applications Development staff. The work is currently underway as part of the 2005-07 Information Resource Management Plan for the Motor Carrier Division.

Costs for hiring five additional tax auditors are based on the $54,144 per year salary and benefits for a Salary Range 25 position.

Major assumptions underlying the feasible needs

The need to automate the analysis of scale crossing data assumes that Oregon will continue to be a weight-mile tax state that needs to create a large database of scale crossing records for use verifying road-use tax reports. It also assumes that there will be no alternative to these weigh station records. A national satellite-based truck tolling system, for example, could eliminate the need for many existing systems.

There are similar assumptions behind the need for additional weight-mile tax auditors. The introduction of sophisticated truck tolling systems could render such needs moot.

Safety, Investigations and Federal Programs

Costs for the 20-year Safety, Investigations and Federal Programs feasible needs are expected to total approximately $8.3 million in addition to existing program costs.

In the future, the Safety Program will maintain its prime objective of reducing truck-at-fault accidents, which currently average 43 per month. But since most of these accidents are caused by bad driver behavior, such as speeding, tailgating and changing lanes unsafely, as well as fatigue, Oregon must continue to take full advantage of Motor Carrier Safety Assistance Program (MCSAP) federal grant funds for truck safety enforcement work by state law enforcement agencies. Rather than requiring Oregon to match the grant funds with state dollars, this assistance program requires only a "soft" state match. Thus, the feasible need projections for the Safety Program do not need to include budget impacts related to MCSAP.

Anticipated feasible needs for the Safety, Investigations and Federal Programs

The two feasible needs for the Safety Program relate to the maintenance and upgrade of the Green Light weigh station preclearance system, which is managed by the Intelligent Transportation Systems Unit within the Safety Program. Green Light will become increasingly important in managing a growing stream of truck traffic in the future. It screens and preclears the safe truck operators so the remaining trucks pulling into weigh stations are more likely to need a safety inspection.

1. **$400,000 per year from 2004 through 2024 for maintenance of Green Light weigh-in-motion systems.**

2. **$300,000 one-time expense in 2014 to retrofit and upgrade Green Light electronics.**

Description of methodology for identifying feasible need

Green Light maintenance cost estimates are based on actual costs that are currently not incorporated in the Motor Carrier Division budget. The Division currently has a maintenance contract with International Road Dynamics.

Electronics upgrade costs are based on the actual costs of an upgrade in 2004.

Major assumptions underlying the feasible needs

The major assumption underlying maintenance costs is that the Motor Carrier Division will continue to be responsible for its Green Light systems. ODOT administrators are currently considering whether this cost may be more appropriately assigned to the Highway Division

because weigh-in-motion systems are truly part of the highway infrastructure and integral to highway preservation.

The assumption underlying the electronics upgrade is that the current electronics will be functional until 2014.

An assumption underlying both expenses is that the Green Light system will continue to operate with existing technology for the next 20 years. There exists the risk that Oregon's prime contractor, International Road Dynamics, will simply stop supporting the hydraulic load cell weigh-in-motion technology in favor of a newly-invented one. There would be unknown costs involved in changing the existing Green Light systems to one based on new technology.

Another assumption for the Green Light program is that it will not have any costs associated with transponders or other tracking devices in trucks, such as global positioning system (GPS) devices. The program currently distributes transponders at no charge because it still has about 15,000 in stock. When that supply runs out, it will not purchase more. It will expect trucking companies to pay for their own transponders. There is also some likelihood that in the next 20 years truck manufacturers will start installing GPS tracking devices and incorporating that into the purchase price.

Salem Motor Carrier Services

Costs for the 20-year Salem Motor Carrier Services feasible needs are expected to total as much as $4.3 million in addition to costs for existing services.

In the future, the trucking industry will continue to expect motor carrier services to be available in both an automated manner and a conventional one. While the Salem Motor Carrier Services Program will fully develop and take advantage of its Trucking Online Internet-based transaction service, it must also maintain over-the-counter, phone and fax services from Salem Headquarters. Thus, its core customer service objectives will remain fairly constant for the next 20 years, and the feasible need projections relate to improving systems to free existing staff resources to better help that part of the industry that will always want conventional customer service.

<u>Anticipated feasible needs for Salem Motor Carrier Services</u>

1. $4 million one-time expense spread from 2008 through 2011 to automate the over-dimension permitting and routing system. This is the maximum estimated cost, and it is possible that the automated system will cost as little as $1.5 million.

2. $100,000 one-time expense in 2008 to install 20 Internet kiosks at the six Ports of Entry and 14 truck stops near Oregon borders so truck drivers can transact truck-related business via Trucking Online.

3. $200,000 one-time expense in 2008 to replace the Salem Headquarters' phone system, including installation of a voice response system for completing certain truck-related transactions.

Description of methodology for identifying feasible need

Costs for automating the over-dimension permitting and routing system are estimated to range from $1.5 million to $4 million based on Motor Carrier Applications Development staff guidance. Staff has done some relatively cursory analysis of business requirements, and it has examined several automated systems currently used in other states.

Costs for installing 20 Internet kiosks are based on Motor Carrier Applications Development staff guidance and their observation of steadily-declining computer hardware and networking technology costs.

Costs to replace the Salem Headquarters' phone system are based on two-year-old estimates for such a system.

Major assumptions underlying the feasible needs

Automating the over-dimension permitting and routing system could reach the maximum $4 million estimate if it's difficult to build the database necessary for the system's routing component. There is currently no comprehensive database of information related to vertical clearances, widths and other restrictions on highways throughout Oregon's cities and counties. Cost estimates also assume there will be no unusual ongoing costs once that routing system is developed. This assumes there will be automated processes for city and county road authorities to help maintain any new, comprehensive routing database that is created.

Installing internet kiosks assumes there is a continued need to transact Oregon truck-related business online. One key assumption underlying this need is that Oregon will continue to have a weight-mile tax, which brings with it certain credential-related requirements that other fuel tax states do not have. Putting the kiosks at truck stops assumes that a number of truck drivers stopping there will want to use that method for obtaining credentials.

Replacing the Salem Headquarters' phone system assumes that a number of callers will use a voice response system to complete certain truck-related transactions.

Summary

The Motor Carrier Transportation Division strives to promote a safe, efficient and responsible commercial transportation industry. Its programs and services oversee the enforcement of motor carrier requirements; ensure compliance with state regulations for truck taxes and fees; conduct truck, driver and accident inspections; train enforcement officers, conduct the Green Light Program (weigh-in-motion); and register and permit

trucks. The Division serves the approximately 25,000 trucking companies and 300,000 trucks that operate in Oregon.

Table 1 – Current Needs

Program	2003
Admin. – Mgr.	$1,138,400
Field Services	$8,127,557
Audit	$3,325,106
Safety	$6,895,792
Salem Services	$6,197,910
Total	**$25,594,765**

Total expenditures for the Division's four program areas and administrative/manager costs were over $25.59 million in FY 2003.

Field Motor Carrier Services needs additional money to maintain/repair weigh stations and to purchase portable weigh-in-motion scales. The Motor Carrier Audit Program would like to automate scale crossing analysis and add five auditors to the program. Identified needs for the Safety, Investigations and Federal Programs are for Green Light Program maintenance and a Green Light electronics upgrade. Additional funding for the Salem Motor Carrier Services is needed to automate the over-dimension permit and routing system, install Internet kiosks and replace the headquarters' phone system.

Table 2 – Feasible Needs (2003 dollars)

Program	Additional 20-year Needs
Admin. – Mgr.	0
Field Services	$6,200,000
Audit	$2,649,480
Safety	$8,300,000
Salem Services	$4,300,000
Total	**$21,449,480**
Total per year	**$1,072,474/yr**

During the development of this needs analysis, the OTP planning period was changed to 2030 or 26 years rather than the 20 years used above, and the expenditures were changed to FY 2004 dollars. For the purposes of this analysis, the Motor Carrier numbers do not change materially. The additional feasible needs were extended over the 26-year period and inflated 2.66 percent to 2004 dollars to $22.02 million. That means that the Motor Carrier Division needs at least an additional $847,000 per year for feasible needs or a total of about $26.4 million per year during the 26-year period.

Data Sources

Managers of Motor Carrier Transportation Division Services and Programs

Central Services

Description of Services

ODOT's Central Services includes two administrative support divisions—the Central Services Division and the Director's Office. These provide central administrative, support and managerial services to ODOT's seven operating divisions, the Oregon Transportation Commission, external partners and stakeholders. The Central Services Division includes financial services, human resources, information systems support, business services, auditing and the office of civil rights. The Director's Office includes the Director's immediate staff as well as the Communications Division.

Summary of Current Funding and Feasible Needs

Revenues for the Central Services expenditures come from assessments against the various ODOT divisions. The Rail Division and the Public Transit Division assessments have been included in those Division expenditures. The figure here includes assessments involving the Motor Carriers, DMV, Transportation Safety, Transportation Development and Highway Divisions. The average annual budgeted funding for Central Services for 2003-2005 was almost $55.2 million. This amount will increase with inflation and with additional FTE in the future.

Data Sources

Richard Brock, Financial Services; ODOT Program Budget, 2003-2005 Biennium.

Local Transportation System

Description of Services

The local system is an integral part of Oregon's transportation system. It is the portion of the road system most frequently experienced by Oregonians. About one-third of the 33 billion annual vehicle miles traveled in Oregon are on the local portion of the road system; however, the local road system represents 65 percent of Oregon's total road centerline-miles.[48]

This report addresses the maintenance and modernization of city and county roads and streets and the maintenance and replacement of city and county bridges. "Modernization" denotes projects that increase capacity. Bicycle and pedestrian facilities (sidewalks, pedestrian crossings, street trees, etc.) are part of modernization.

Table 1 – Oregon Centerline Miles of Roads

	Paved	Unpaved	Total
County Roads	15,978	17,458	33,436
City Street	8,629	647	9,276
State Highways	7,476	23	7,499
Federal	2,970	8,253	11,223
Other Agency	315	4,471	4,786
Total	**35,368**	**30,852**	**66,220**

Source: ODOT Transportation Key Facts, 2002

Current Spending

Spending categories include expenditures for road and bridge capital construction, preservation, maintenance, administration, debt service, payments to the state, and direct expenditures in the form of projects made by the state on the local system. The largest spending category is $267 million per year for capital outlay (Table 2 data averaged).[49] This category includes the costs for new roads and bridges, signals, signage, sidewalks, catch basins, as well as preservation (paving) and bike path construction. This category is followed in spending by maintenance at $163 million per year. The state makes about $65 million worth of improvements to the local transportation system each year.[50] These projects are carried out by the state with no exchange of funds to the local governments. In 2004 Oregon cities and counties received a 13 percent increase in revenue from the

[48] ODOT, Transportation Key Facts 2002, page 9-10. Centerline miles are the number of miles of two-way roads including paved, unpaved, and multi-lane facilities.

[49] Table 2 spending by category is based on 2000 through 2003 annual data inflated to 2004 dollars.

[50] The $65 million is a 3-year annual average (2001-2003) of state spending inflated to 2004 dollars. The $65 million includes capital outlay for construction, maintenance, and administrative costs.

Oregon Transportation Investment Act (OTIA).[51] On average, $718 million per year is spent on the local transportation system. Tables 2 and 2A summarize the expenditures by category. Table 2A further details the "Capital Outlay" spending category from Table 2. It shows the distinctions in spending between road and bridge construction and preservation.[52]

Table 2 – Local Road and Bridge Annual Expenditures (in millions)

Categories	2000	2001	2002	2003	2004
Capital Outlay	$252	$262	$251	$301	
Maintenance	$155	$161	$165	$169	
General administration and misc.	$72	$77	$80	$85	
Debt service on local obligations	$37	$34	$24	$24	
Payments to State for highways	$5	$2	$3	$3	
Subtotals	**$521**	**$536**	**$544**	**$582**	
2000-03-year average annual = $546				**(inflated) =**	**$589**
State direct expenditures on local system					**$ 65**
Additional OTIA annual funds (2004)					**$ 64**
Totals					**$718**

Sources: Federal Highway Administration #536 and #531 reports. The #536 report was adjusted to include cities under 5,000 in population; and ODOT Report Summary of Transportation Economic and Revenue Forecasts, September, 2004, Table 7B for $64 million OTIA figure.

Table 2A –Capital Outlay Breakdown

Disbursements for Capital Outlay by Category	County	City
Right-of-way and engineering	28%	16%
Construction		
Road	39%	62%
Bridge	4%	7%
Preservation		
Road	23%	13%
Bridge	5%	2%
Bicycle and Foot Path Construction	2%	2%

Source: FHWA reports listed under Table 2.

[51] Between 2004 and 2030 (the end of the plan period) Oregon cities and counties will receive additional revenue from the Oregon Transportation Investment Act (OTIA). During this period, cities and counties will have 12 percent more for spending. The 12 percent is a 6-year annual average forecast (2004-2009) based on 9.21 percent annual average for the counties and 14.73 percent annual average for the cities. (The counties amount is less than the cities because the counties have a greater debt-load associated with bridge improvements).

[52] The Table 3 "Preservation" category is a separate category from "Maintenance" listed in Table 2 and reflects spending on paving.

Feasible Needs

Two methods were used to estimate the local government transportation system needs. One method estimated the local road maintenance and bridge maintenance and replacement costs and the other method estimated modernization. A review of the two methodologies was conducted by Cambridge Systematics.[53] They found the methodologies to be thorough and suitable to the OTP purpose. Explanation of the two methods is described below and information on other local modal needs, such as public transportation or aviation has been assessed in separate reports.

Local Road Maintenance and Bridge Maintenance and Replacement Methodology

The local road maintenance and bridge maintenance and replacement methodology and cost assumptions were based on data refined by the Oregon Association of Counties and League of Oregon Cities from a Washington State study.[54] Modernization needs were not included in this report. The base report provided cost estimates for 10 road types and four bridge types. An Oregon Transportation Plan (OTP) technical committee of city, county, and state staff reviewed the report assumptions to determine the applicability to the OTP feasible needs work. The committee determined the report methodology to be appropriate with two changes to the assumptions.[55] The bridge replacement assumption was changed from a 20 to 50 year cycle. Using the 50-year replacement cycle, over 72 percent of county bridges would require replacement by 2030 because Oregon's bridges are relatively old. This same 50-year replacement cycle was applied to city bridges. The other assumption changed was that the length for bridges over 50-feet would increase during replacement to allow for fish passage. Using the refined Washington Study, Table 4 shows a summary of costs which have been inflated to 2004 dollars.

Regional and Local Transportation Systems Plans

To identify the local transportation modernization needs the Regional Transportation Plans (RTPs) and a sampling of local city and county transportation system plans were used. The 35 plans used were locally adopted and state-acknowledged plans. The RTP cost data includes both the unconstrained and constrained project lists representing a range of needs.[56] The data collected covers nearly 70 percent of the state population and

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[53] Cambridge Systematics, Local Transportation Deficiency Assessment and Needs Report, Final Technical Report, February 28, 2005.

[54] Jon Oshel, County Road Program Manager, Association of Oregon Counties, Oregon *Road Need Estimate Based on Washington State Roadway Needs Study*, Fall 200.

[55] Subsequently it was determined by that the estimated road replacement costs for cities, counties, and the state should not be included in the "needs" report because road replacement on a specific year-cycle is not a practice. Road replacement costs are reflected in the road maintenance and modernization costs.

[56] RTPs and TSPs are based on 20-year time horizons. Only regional transportation plans are required to include constrained project lists. Local transportation system plans are typically unconstrained. Corvallis and Bend, now metropolitan planning organizations (MPOs), were included with data from their local transportation system plans.

includes bicycle and pedestrian improvements. Table 3 provides a summary of the population covered by each of the plan types and the factors used to expand the sample data to the entire state. An inflation rate was used to adjust the local needs data to 2004 dollars. Based on the transportation systems plan, modernization cost range between $217 and $355 million per year. Table 4 shows the modernization range along with the needs summarized from the refined Washington State study.

Table 3 – Local Modernization Need Expansion Factors for RTPs and TSPs

RTP/TSP type	Sampled		Additional		Expansion Factor
	Number	Population	Number	Population	
RTPs	4	1,865,632	0	0	1
TSPs					
Major City	4	146,970	4	142,580	1.97
Minor City	14	107,062	14	105,470	1.99
County[1]	13	238,336	23	815,349	4.42
Total	**35**	**2,358,000**	**41**	**1,063,399**	

Note: County TSPs cover only the rural portions of counties to avoid double-counting.
Source: Cambridge Systematic, *Local Transportation Deficiency Assessment and Needs Report*, Final Technical Report, February 28, 2005.[57]

Table 4 – Local Transportation System Needs Summary ($2004 annual basis)

Category	Total Annual Needs (2004 $ in millions)		
	County	City	Total
Roadway maintenance	$398.43	$246.38	$644.81
Bridge maintenance	$6.69	$1.01	$7.70
Bridge replacement	$124.35	$27.64	$152.00
Road modernization range (constrained and unconstrained RTPs and TSPs)			**$217 to $355**
Total	**$529.47**	**$275.04**	**$1,022 to $1,160**

Sources: AOC, LOC, and Oregon transportation system plans.

[57] The *Local Transportation Deficiency Assessment and Needs Report*, Final Technical Memorandum, Cambridge Systematic, 2005 provides the expansion factor methodology.

Summary

The local road system represents 65 percent of Oregon's road system and generates about one-third of the total statewide vehicle miles. Two methods were used to identify the 25-year local transportation needs. Included in the assessment are city and county road maintenance and modernization and bridge maintenance and replacement costs. Bicycle and pedestrian needs are included in the road modernization category. The needs methodology was reviewed by both a technical committee consisting of city, county, and state staff and by the project consultant team.

The estimated local transportation system need on an annual basis ranges between $1 billion and $1.2 billion ($2004). Road maintenance is the largest category of need at $645 million per year followed by modernization at about half that amount whereas current spending shows the opposite trend of more funds being spent on construction than preservation. Based on the Table 2, Local Road and Bridge Annual Expenditures and Table 4, Local Transportation System Needs Summary there is $282-$482 million annual gap in local spending and local transportation needs.

Table 5 – Summary of Local Transportation System Funding Gap ($2004 annual basis)

Local Need	Current Spending	Gap
$1-$1.2 billion	$718 million	$282-$482 million

Data Sources

Association of Oregon County Governments, League of Oregon Cities, regional and local transportation system plans, FHWA #536 and #532 reports

Appendix A

Summary of Modal Forecasts

Air Passenger and Freight
Summary of Modal Forecasts

Demand

Recommended Forecasts	Base Year Estimate	Forecast Value	Annual Growth Rate
Air Passenger (millions of annual enplanements)	6.7 (2002)	21.5 (2030)	4.24% (2004-2030)
Air Freight (thousands of annual tons)*	318 (1997)	747 (2030)	2.62% (1997-2030)

*** Note: Data from the *Oregon Commodity Flow Forecast, April 2005* used to reflect more recent freight mode growth estimates.**

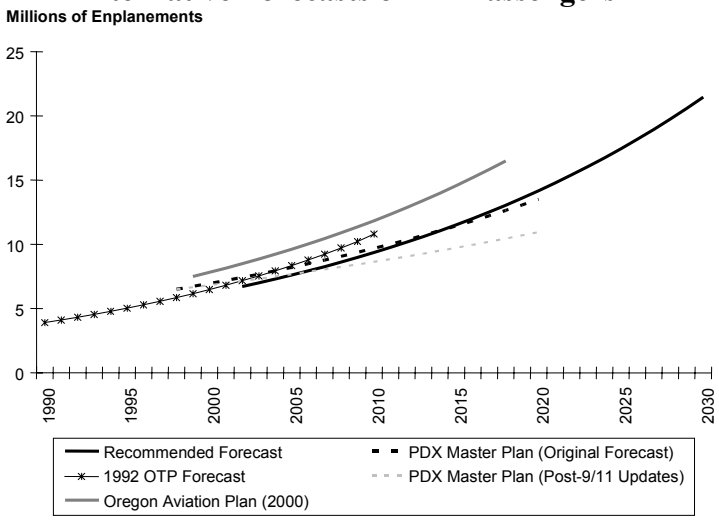
***Key Issues for Demand Forecasts*:**

- The recommended growth rate for air passenger, 4.24 percent per year, is the same as that developed in the *Oregon Aviation Plan*. Although the recommended rate is higher than the 2.4 percent updated annual growth rate adopted by PDX in 2003, the recommendation is consistent with:
  - FAA's annual growth projection of 4.3 percent for nationwide air travel adopted in March 2004, and
  - PDX's actual growth rate of 3.9 percent from 1993 to 2003 (which includes the recession and 9/11).

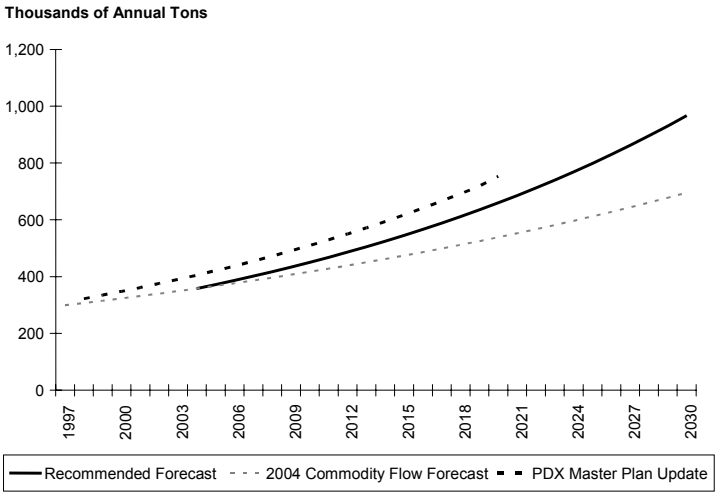
Forecast data collected prior to availability of Commodity Flow Data (See *Note Above):

- *The recommended growth rate for air freight, 3.9 percent per year, is equivalent to the "post-9/11" update to the PDX Master Plan. This forecast is a significant decrease from PDX's original air cargo forecast of 5.1 percent annual growth. Alternative forecasts either did not track well with recent data or appeared to be heavily influenced by international air cargo shipments, which tend to be less of an influence at Oregon's airports due to the very small number of nonstop and direct international flights.*
- *Figures below depict the trend lines suggested by the recommended forecasts (shown as a solid bold line) and other sources that were considered.*

Alternative Forecasts of Air Passengers



Alternative Forecasts of Air Freight



Needs

Feasible Needs per Year (millions of 2004 dollars)	Current Annual Expenditures	Future Annual Average Needs
Portland International Airport	$44.4	$115.3
Major Modernization	$13.9	$15.1
Other Airports – Preservation & Modernization	$10.7	$47.4
Statewide Total	$69.0	$177.8

Key Issues for Needs:

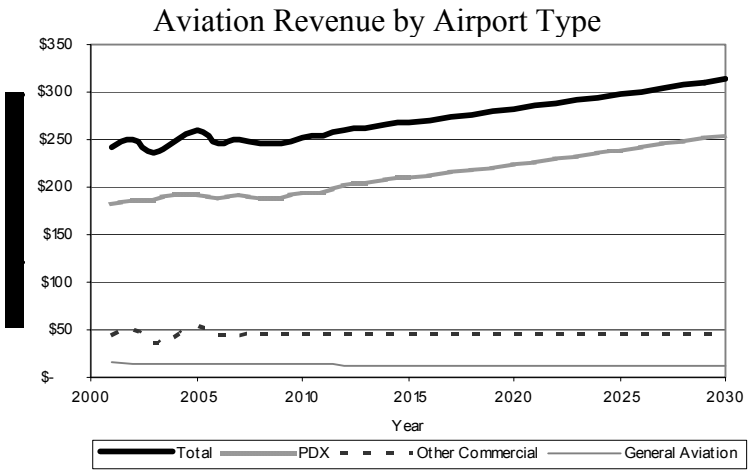
- Needs forecasts address capital needs at Oregon's 101 public use airports.
- Needs at Portland International Airport (PDX) are based on the "Decentralized Alternative" in the *2000 Portland International Airport Master Plan*. This alternative includes terminal expansion, a second passenger terminal, and a new access roadway. As of 2003, PDX also had $654.9 million in outstanding bonds that are not included in this needs analysis.
- Major modernization needs were identified for eight other airports (Aurora, Bandon, Bend, Hillsboro, Independence, Redmond, Medford, The Dalles) at which growth is expected to exceed the capacity needs identified in the *2000 Oregon Aviation Plan*. In most cases, these needs are for terminals or hangers.
- Preservation and modernization needs for Oregon's airports (other than PDX) were based on the *2000 Oregon Aviation Plan*. These needs are in addition to the major modernization needs described above. About 1/3 of this total is devoted to preservation needs and 2/3 for modernization needs.

Revenue

Forecast Revenue per Year (millions of 2004 dollars)	Recent Annual Average Revenue	Future Annual Average Revenue
Aviation Projects	$243.8	$278.3

Key Issues for Revenue:

- Major revenue sources & assumptions include:
  - FAA grants to all airport types – increase at rate of inflation.
  - State grants, primarily to general aviation airports – future growth rates tied to specific source.
  - Passenger facility charges – held constant at current rate of $4.50.
  - Airport-specific fees, leases and airline charges – increase with enplanements.



- **Revenues are for both operations and capital**.
- Statewide commercial airports (non-PDX) based on expanding revenue sample (Klamath Falls, Pendleton and Redmond) using enplanement estimates for each airport.
- Figure above shows revenue trend lines for statewide total (bold line) and airport system components.

Intermodal Connectors
Summary of Modal Forecasts

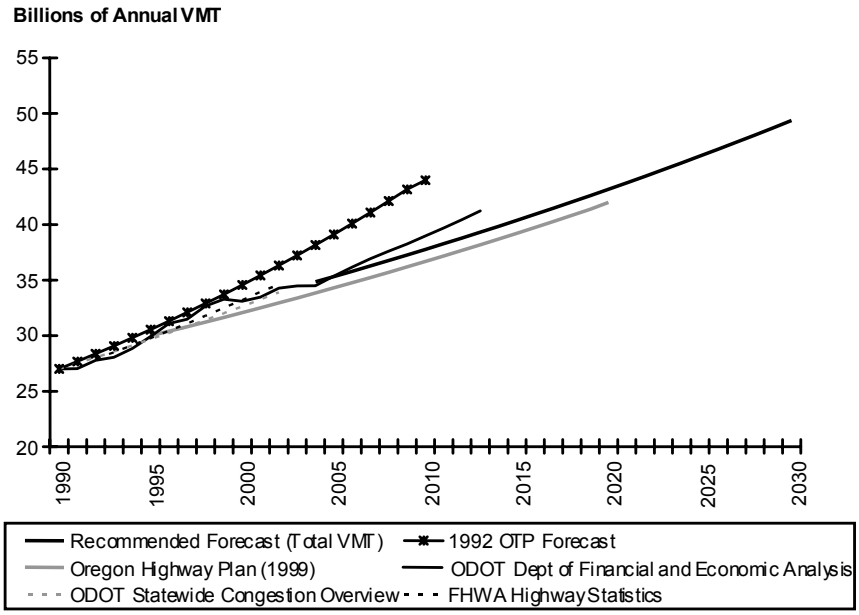
Demand

Recommended Forecasts (billions of annual VMT)	Base Year Estimate (2004)	Forecast Value (2030)	Annual Growth Rate
Total Highway Travel	34.8	49.4	1.35%
Passenger Highway Travel		45.8	1.35%
Freight Highway Travel		3.6	1.40%

Key Issues for Demand Forecasts:

- Demand on intermodal connectors is assumed to be reflected by demand for freight and total highway travel. The recommended growth rate for total highway travel, 1.35 percent per year, is the same as that developed in the *Oregon Highway Plan*. This rate is consistent with the projected statewide population growth rate of 1.20 percent per year, and the observation that vehicle miles traveled (VMT) per capita appears to be stabilizing in Oregon.
- VMT observations for 1990 to 2002 exhibit a fairly tight annual growth rate band between 1.9 percent and 2.2 percent. This growth rate is barely above the annual average population growth rate of 1.87 percent achieved during the 1990s.
- Forecasts for passenger and freight VMT were made by multiplying the total highway VMT forecasts by the projected change in heavy/light vehicle composition. Passenger vehicle VMT has been decreasing in percentage composition since 1990, and this trend is expected to continue.
- The figure at right depicts the trend line suggested by the recommended forecast for total highway VMT (shown as a solid bold line) and other sources that were considered.

Alternative Forecasts of Total Highway VMT



Needs

Feasible Needs per Year (millions of 2004 dollars)	Current Annual Expenditures	Future Annual Average Needs
Intermodal Connectors	N/A	$11.3

Key Issues for Needs:

- Needs forecast focuses on improvements that are necessary to provide access between major intermodal facilities (freight, marine, airport, bus and train terminals), and four roadway systems.
- Intermodal connectors in Oregon are located on city, county and state roads in the areas of Astoria, Boardman, Coos Bay/North Bend, Eugene, Portland, and Medford. Well over half of the connectors identified for improvements are in the Portland area.
- An estimated $282.5 million (2004 $) in improvements have been identified over the 2005-2030 period.
- The feasible needs identified are based on the National Highway System Conditions and Investments Study prepared for the 1999 *Oregon Highway Plan*. Deficiencies identified in the study that have since been addressed are used as a proxy to estimate improvement costs between 2005-2030.

Revenue

Key Issues for Revenue:

- Dedicated revenue streams do not exist for intermodal connectors.
- Since intermodal connectors are an element of the National Highway System (NHS), capital projects on these facilities are eligible for funding under the Federal NHS program.
- Intermodal connectors are also eligible for funding under most programs available for highway modernization, preservation, maintenance, safety, operations programs.

Maritime and Ports
Summary of Modal Forecasts

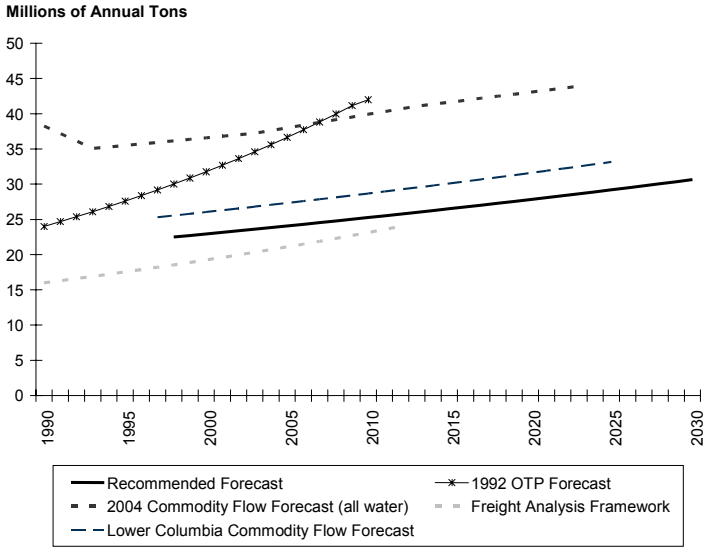
Demand

Recommended Forecasts (millions of annual tons)	Base Year Estimate *(2004)*	Forecast Value *(2030)*	Annual Growth Rate
Deep Draft (Ocean) Marine Freight	23.8	30.6	0.97%
Shallow Draft (Barge) Marine Freight	14.0	15.1	0.29%

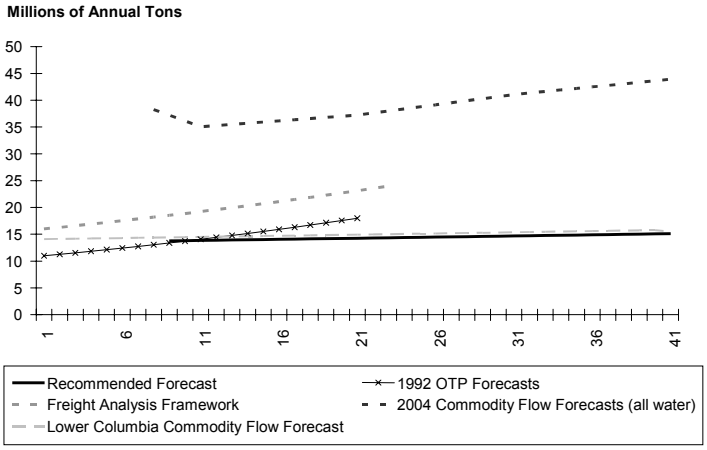
Key Issues for Demand Forecasts:

- Recent Corps of Engineers (COE) data, COE forecasts, and Commodity Flow forecasts all suggest that the 1992 OTP annual growth rates (between 2.5 percent and 5.0 percent) for both deep and shallow draft marine freight were significantly overstated.
- Maritime freight tonnage along the Columbia River declined at an average 1.3 percent rate between 1993 and 2002 due to the recent economic recession and continued shifts in the maritime industry away from bulk shipments towards containerization.
- The recommended annual growth rate is equal to the rate from the recent *Portland/Vancouver Commodity Flow Study* since the source had the closest base year match to recent COE observations, provided separate forecasts for shallow and deep draft tonnage, and provided forecasts out to 2030.
- Figures below depict the trend line suggested by the recommended forecast (shown as a solid bold line) and other sources that were considered.

Alternative Forecasts of Deep Draft (Ocean) Freight Tonnage



Alternative Forecasts of Shallow Draft (Barge) Freight Tonnage



Needs

Feasible Needs per Year (millions of 2003 dollars)	Current Annual Expenditures	Future Annual Average Needs
Marine Port Projects	$51.3	$56.24

Key Issues for Needs:

- Needs forecasts address the nine (of Oregon's 23) port districts that that have economic activity associated with waterborne commerce :
  - Deep draft ports in Coos Bay-North Bend, Newport, Astoria, St. Helens and Portland.
  - Shallow draft terminals along the Columbia River at The Dalles, Arlington, Boardman (Morrow), and Umatilla.
- Feasible needs for maritime and ports include:
  - Maintenance dredging
  - Channel deepening
  - Road access
  - Specific marine-related projects (cranes, deepening of terminal barge and barge slips, etc.)
- Needs forecast focuses on improvements that are necessary to get goods to and from the port terminal, and does not include other public and private facility and infrastructure improvements (e.g. dock and pier, environmental restoration, property acquisition, etc) nor administrative costs.

Revenue

Forecast Revenue per Year (millions of 2003 dollars)	Recent Annual Average Revenue	Future Annual Average Revenue
Marine Port Projects	$131.5	$156.5

Key Issues for Revenue:

- Revenue is from public (federal) and private (port) sources (more inclusive than needs)
- Public revenue sources include Harbor Maintenance Trust Fund (HMTF) and Inland Waterways Trust Fund (IWTF)
- Army Corps of Engineer's federal budget appropriations not included
- Port revenue is for shipping activities and does not include activities such as industrial land sales, timber sales, marina revenues, and others
- Excepting Portland, few ports in Oregon receive significant revenues from cargo handling

Public Transit
Summary of Modal Forecasts

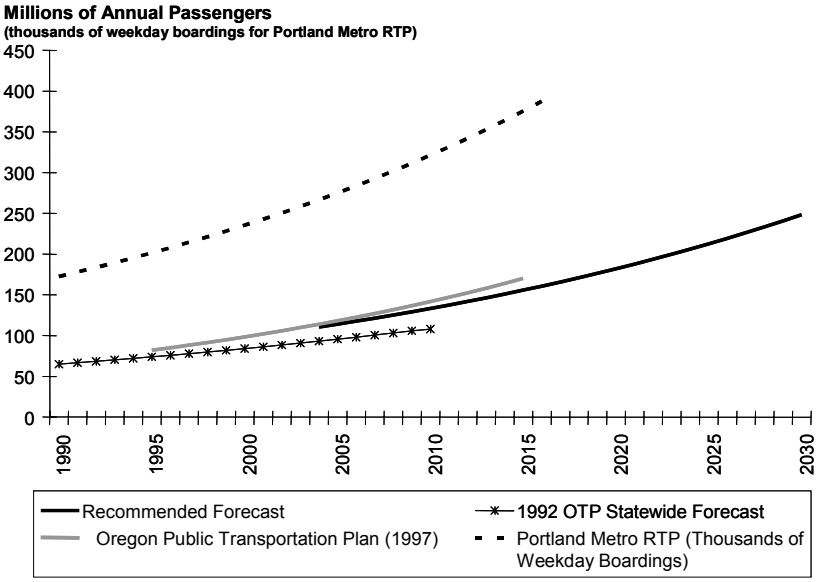
Demand

Recommended Forecasts (millions of annual passengers)	Base Year Estimate *(2002)*	Forecast Value *(2030)*	Annual Growth Rate
Public Transit	104.0	248.5	3.16%

Key Issues for Demand Forecasts:

- The recommended growth rate for public transit, 3.16 percent per year, is the same as that incorporated in Portland Metro's year 2000 *Regional Transportation Plan* financially constrained scenario. Reliance on Metro's growth rate is appropriate since Portland's transit ridership accounts for about 90 percent of statewide transit usage, and this forecast extends to 2020 (the latest of the available alternative forecasts).
- Transit ridership projections from the Metro RTP reflect that Portland's transit market is maturing, with an average annual growth rate that is less than that predicted in the 1997 *Oregon Public Transportation Plan* (OPTP). The recommended growth rate is still two and one-half times larger than the projected population growth rate, which suggests continued increases in per-capita transit usage.
- The figure at right depicts the trend line suggested by the recommended forecast (shown as a solid bold line) and other sources that were considered.

Alternative Forecasts of Public Transit Travel



Needs

Feasible Needs per Year (millions of 2004 dollars)	Current Annual Expenditures	Future Annual Average Needs		
		Feasible Need (OPTP "Level #3" Recommendation)	Keep Pace with Population Growth	Freeze Service at Base Year Levels
Public Transit Projects	$510.0	$812.0	$558.0	$364.0

Key Issues for Needs:

- Forecasts include urban bus and light rail, rural transit, special needs transportation, transportation options management, intercity passenger (bus) transportation, and program planning and administration.
- The feasible needs scenario of $812.0 million per year, which is consistent with the OPTP recommendation, would create a 60 percent increase in overall transit ridership from 2005 to 2030.

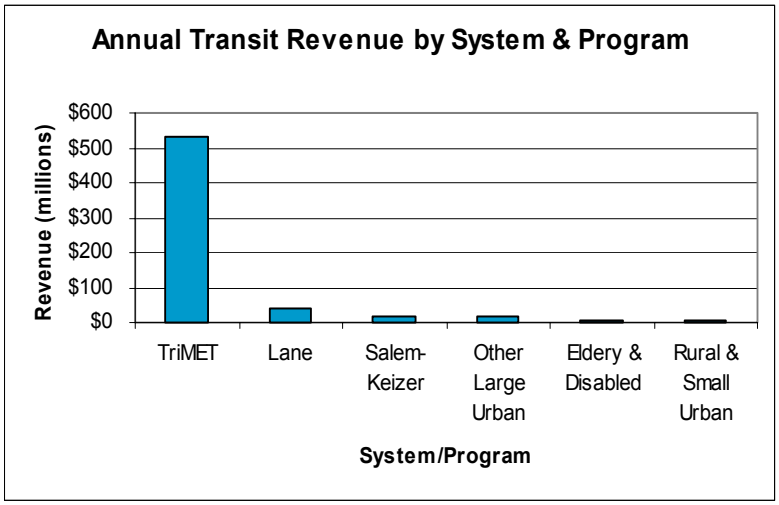
- A 9 percent funding increase over current annual expenditures (from $510.0 million to $558.0 million) would be needed to keep pace with population growth.
- If service levels are kept at 2004 levels, with no adjustments for inflation and population growth, per capita ridership will fall an estimated 26 percent by 2030.
- Under any scenario, providing paratransit service consistent with requirements of the Americans with Disabilities Act will account for a rapidly increasing portion of the total future need.

Revenue

Forecast Revenue per Year (millions of 2004 dollars)	Recent Annual Average Revenue	Future Annual Average Revenue
Public Transit Revenue	$447.4	$612.9

Key Issues for Revenue:

- Major assumptions include:
  - Revenue for major urban transit systems (Tri-Met, Lane, and Salem-Keizer) estimated from constrained plans and revenue forecasts, covering all revenue sources, for these systems.
  - Revenue for other large urban transit systems estimated using the National Transit Database and ODOT's *Financial Assumptions for the Development of Metropolitan Transportation Plans, 2005-2030.* Farebox recovery assumed at 34 percent and local funding at 24 percent of total revenue.
  - For non-urban transit programs, Federal formula and discretionary programs and state grants do not expire and increase at the annual population growth rate of 1.2 percent.
  - TriMET will continue to attract capital funding from the 5309 federal discretionary program consistent with recent history
- Major revenue sources include:
  - Federal Transit Administration (FTA) formula funds (5307, 5310, and 5311 programs), FTA discretionary grants (5309 program) and Congressional earmarks (11 percent of total).
  - State formula and discretionary grants for operations, bus replacement, and elderly and disabled services (18 percent of total).
  - Local and regional taxes (49 percent of total).
  - Farebox revenue (11 percent of total).
- Figure at right shows annual expected revenue for Oregon's public transit programs.



Rail Passenger and Freight
Summary of Modal Forecasts

Demand

Recommended Forecasts	Base Year Estimate	Forecast Value	Annual Growth Rate
Rail Passenger (thousand annual boardings+detrainings)	666 (2004)	1,670 (2030)	3.6% (2004-2030)
Rail Freight (millions of annual tons)*	55.2 (1997)	100.6 (2030)	1.83% (1997-2030)

*** Note: Data from the *Oregon Commodity Flow Forecast, April 2005* used to reflect more recent freight mode growth estimates.**

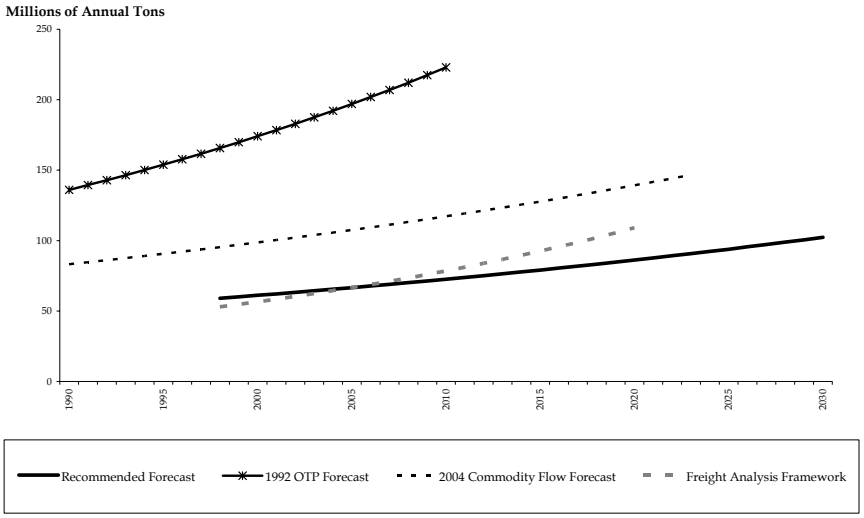
Key Issues for Demand Forecasts:

- The recommended growth rate for rail passenger, 3.6 percent per year, is derived from the 2001 *Oregon Rail Plan*. This recommendation reflects ODOT's continued goal to increase service and reduce travel time between Portland and Eugene, yet acknowledges that the more rapid rate of increase resulting from recent improvements in corridor service are not likely to be sustained for the full 25 years.

Forecast data collected prior to availability of Commodity Flow Data (See *Note Above):

- *The recommended growth rate for rail freight, 1.73 percent per year, is equivalent to the 2004 Commodity Flow Forecast update. This forecast best reflects observed freight rail tonnage growth rates during the 1990s and future population and economic growth rates, and it was the only statewide forecast of the many alternative sources that were considered.*
- *The figure at right depicts the trend lines suggested by the recommended forecast for rail freight (shown as a solid bold line) and other sources that were considered. Alternative forecasts were not available for rail passenger.*

Alternative Forecasts of Rail Freight



Needs

Feasible Needs per Year (millions of 2004 dollars)	Current Annual Expenditures[1]	Future Annual Average Needs[2]
Mainline and Short Lines	$6.0 [3]	$18.8
Passenger Rail	$4.8	$9 - 57
Safety Programs	$1.6	N/A
ODOT Administration	$0.42	$0.42

1 Only Public Expenditures available
2 Inclusive of both public and private needs
3 Only Short Line data available

Key Issues for Needs:

- Freight rail needs include capital costs for rehabilitation and enhancements of short line, main line, and on-site rail facilities at ports. It is assumed that short lines need to upgrade their tracks to accommodate heavier rail cars, that main line railroads need to enhance services and capacity to compete with trucks, and that smaller ports upgrade their rail capacity.
- Passenger rail needs include capital and operating costs for:
  - Willamette Valley Rail corridor with service gradually increasing from 2 to 5 trips per day.
  - Commuter rail along the Beaverton-Wilsonville corridor with service to Salem in 2020.
  - Daily passenger rail services to Eastern Oregon and Boise, Idaho beginning in 2022.
- A range of costs is shown for meeting passenger rail needs since multiple proposals currently exist for future capital and operations.
- Needs forecast focuses on improvements for both public and private rail systems.

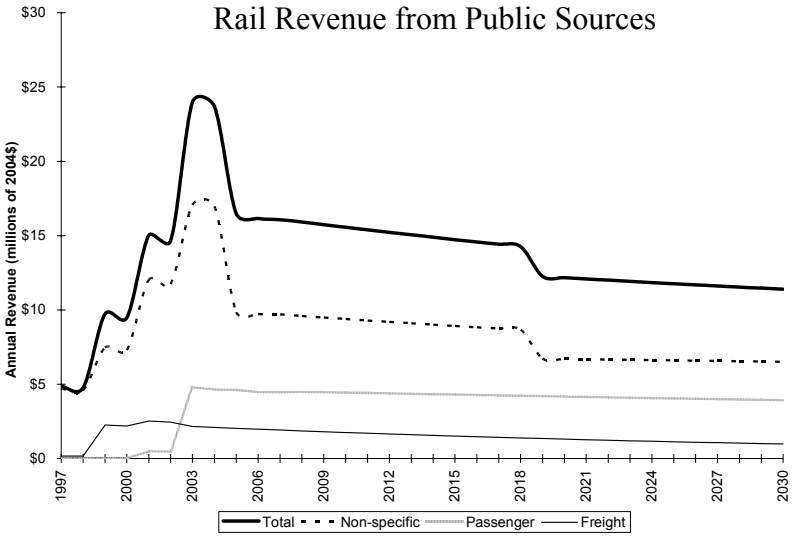
Revenue

Forecast Revenue per Year (millions of 2004 dollars)	Recent Annual Average Revenue	Future Annual Average Revenue
Rail	$17.0*	$17.3

**Four-year average between fiscal years 2000 and 2003, and excludes Revenue Bonds issued 2001-2003.*

Key Issues for Revenue:

- Major future revenue sources include:
  - Federal Railroad Administration grants, and FHWA Section 130 grade crossing elimination funding.
  - State General Fund, fuel tax, and special allocations.
  - Local fees and revenue bonds.
- Major assumptions include:
  - Federal sources increase at inflation rate.
  - State passenger sources keep pace with General Fund growth. Other state sources increase at inflation rate.
  - Local sources increase at inflation rate. Revenue bonds expire in 2018.



  - Only public funding included in the revenue estimate. Private rail company funding for capital upgrades is <u>not</u> included.
  - Passenger rail farebox revenue not included.
- Figure above shows trend line for total amount of public rail funding (bold line) and components.

State Highway
Summary of Modal Forecasts

Needs

Program	2004 Funding	Average Annual Feasible Needs	Annual Gap
Modernization	$108,100,000	$330,300,000	$222,200,000
Preservation	$118,000,000	$160,000,000	$42,000,000
Bridge	$71,000,000	$129,600,000	$58,600,000
Operations	$30,350,432	$45,627,257	$15,276,825
Highway Traffic Safety	$20,800,000	$40,510,000	$19,710,000
Landslide and Rockfall	$6,930,000	$15,000,000	$8,070,000
Maintenance	$143,000,000	$192,192,000	$49,192,000
Special Programs			
Access Management Program	$2,100,000	$16,600,000	$14,500,000
Fish Passage Culvert Program	$3,600,000	$9,380,000	$5,780,000
Large Culvert Program	$2,400,000	$33,000,000	$30,600,000
Scenic Byways	$217,900	$523,700	$305,800
Transportation Enhancements	$3,000,000	$8,000,000	$5,000,000
Transportation & Growth Management	$4,400,000	$4,000,000	-$400,000
Bicycle & Pedestrian Program	$3,456,600	$9,930,000	$6,474,400
Highway Administration and Indirect Program	$78,600,000	$78,600,000	$0
Transportation Program Development	$29,900,000	$29,900,000	$0
Transportation Safety Division	$19,000,000	$19,000,000	$0
Driver and Motor Vehicle Services	$60,882,490	$63,200,000	$2,317,510
Motor Carrier Transportation Division	$25,594,765	$26,441,689	$846,924
Central Services	$55,200,000	$55,200,000	$0
Total	**$786,532,187**	**$1,267,004,646**	**$480,472,459**

Note: A $0 gap assumes that funding increases with inflation.

Demand

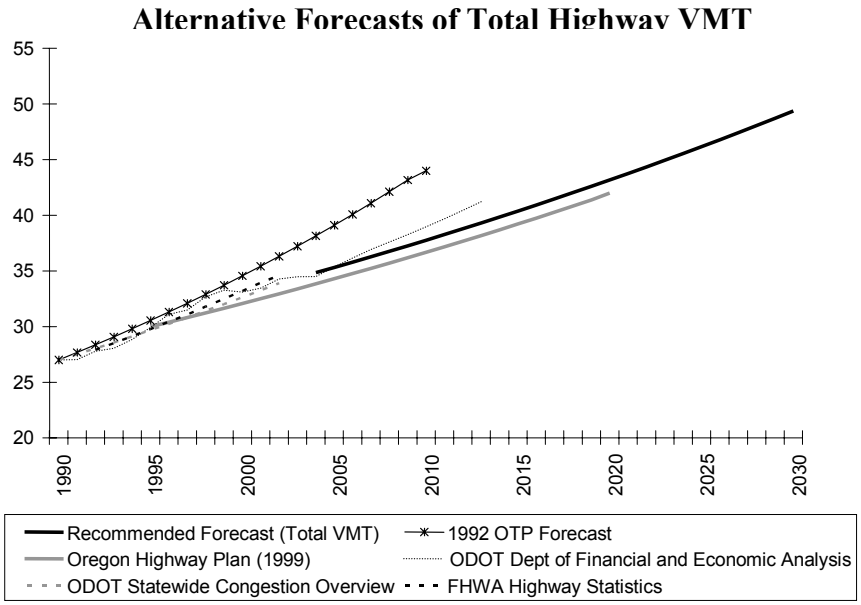
Recommended Forecasts (billions of annual VMT)	Base Year Estimate (2004)	Forecast Value (2030)	Annual Growth Rate
Total Highway Travel	34.8	49.4	1.35%
Passenger Highway Travel		45.8	1.35%
Freight Highway Travel		3.6	1.40%

Key Issues for Demand Forecasts:

- Demand on state highways is provided for both auto and truck (freight) traffic. The recommended growth rate for total highway travel, 1.35 percent per year, is the same as that developed in the *Oregon Highway Plan*. This rate is

consistent with the projected statewide population growth rate of 1.20 percent per year, and the observation that vehicle miles traveled (VMT) per capita appears to be stabilizing in Oregon.

- VMT observations for the 1990 to 2002 time period exhibit a tight annual growth rate band between 1.9 percent and 2.2 percent. This growth rate barely exceeds annual average population growth rate of 1.87 percent achieved during the 1990s.
- Freight VMT forecasts were estimated based on the projected change in heavy/light vehicle composition. In general, the passenger vehicle VMT seems to be decreasing in percentage composition since 1990, and it is believed that this trend will continue.
- The figure at right depicts the recommended forecast and other sources that were considered.

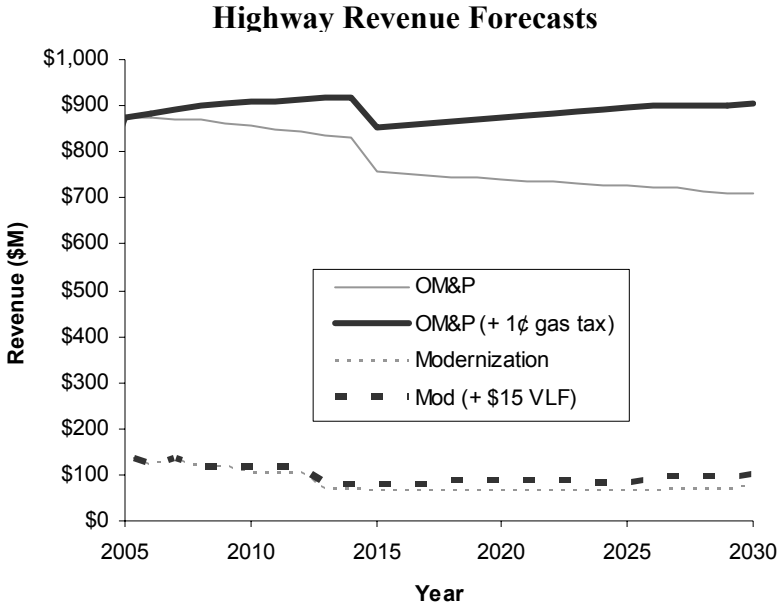


Revenue

Forecast Revenue per Year (millions of 2004 dollars)	Recent Annual Average Revenue	Future Annual Average Revenue
State Highways	$786.3	$988.2

Key Issues for Revenue:

- Major revenue sources and assumptions:
  - Highway user taxes – gas tax, vehicle license fee
  - Federal High Priority Projects Program remains constant over 30 years ($21.6 million per year)
  - Additional 1¢ per year gas tax for Operations, Maintenance and Preservation (OM&P)
  - Additional $15 per biennium vehicle license fee every 8 years for modernization
  - 1% of state highway funds is reserved for bicycle and pedestrian projects
- Figure shows revenue trend line for OM&P (solid) and modernization (dashed) funding separately. Bold lines include additional funding; lighter lines exclude additional funding.



Local Roads and Bridges
Summary of Modal Forecasts

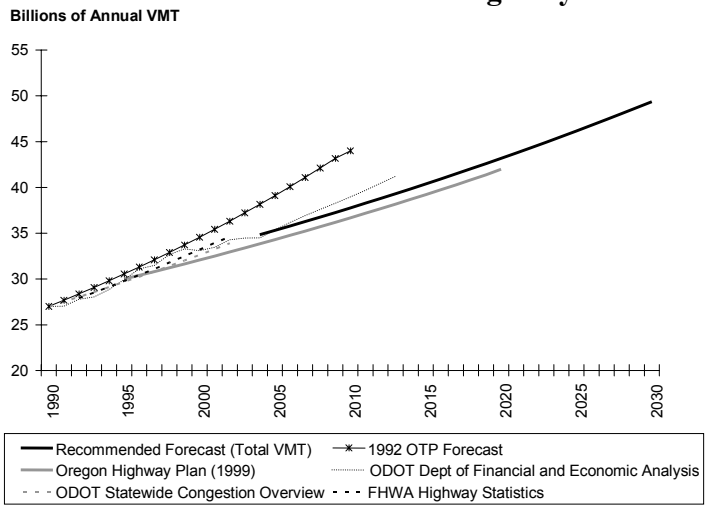
Demand

Recommended Forecasts	Base Year Estimate (year)	Forecast Value (year)	Annual Growth Rate
Total Highway Travel (billions of annual VMT)	34.8 (2004)	49.4 (2030)	1.35%
Public Transit (millions of annual passengers)	104.0 (2002)	248.5 (2030)	3.16%

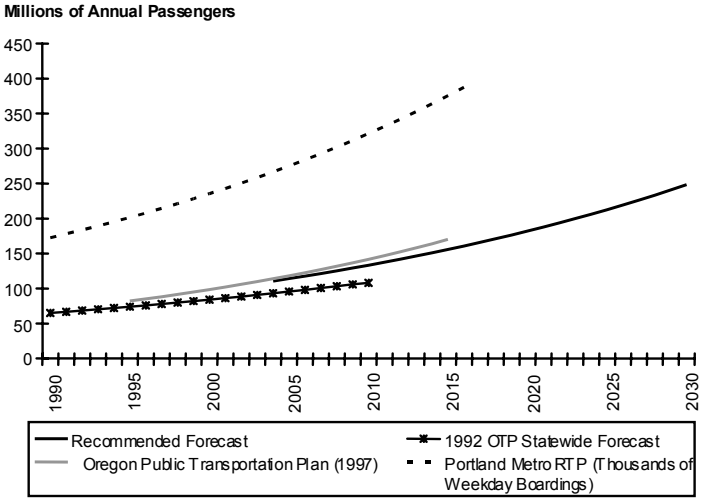
Key Issues for Demand Forecasts:

- Local street network demand is assumed to be reflected by statewide total highway travel. The recommended growth rate for total highway travel, 1.35 percent per year, is the same as that developed in the *Oregon Highway Plan*. This rate is the most consistent with the projected statewide population growth rate of 1.20 percent per year, and the observation that vehicle miles traveled (VMT) per capita appears to be stabilizing in Oregon. The VMT observations for the 1990 to 2002 time period exhibit a fairly tight annual growth rate band between 1.9 percent and 2.2 percent. This growth rate is barely above the annual average population growth rate of 1.87 percent achieved during the 1990s.
- Public transit demand within local jurisdictions is assumed to be reflected by statewide public transit demand. The recommended growth rate for statewide public transit, 3.16 percent per year, is the same as that incorporated in Portland Metro's year 2000 *Regional Transportation Plan*. Reliance on Metro's growth rate is appropriate since Portland's transit ridership accounts for about 90 percent of statewide transit usage, and this forecast extends to 2020 (the latest of the available alternative forecasts).
- Figures below depict the trend lines suggested by the recommended highway and transit forecasts (shown as a solid bold line) and other sources that were considered.

Alternative Forecasts of Total Highway VMT



Alternative Forecasts of Public Transit Travel



Needs

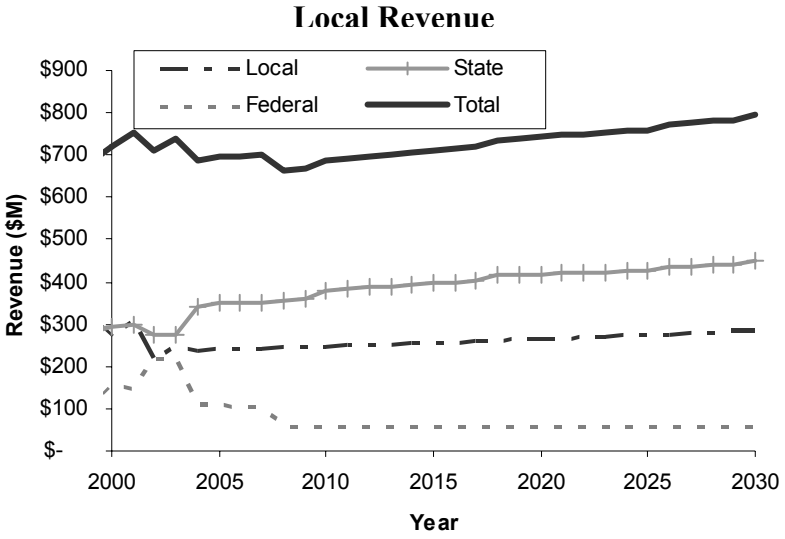
Feasible Needs per Year (millions of 2004 dollars)	County	City	Total
Roadway Maintenance	$398	$246	$645
Bridge Maintenance	$7	$1	$8
Bridge Replacement	$124	$28	$152
Road Modernization			$217 to $355
Total	$529	$275	$1,022 to $1,160

Key Issues for Needs:

- Forecasts address local transportation needs in several categories: Roadway and Bridge Maintenance, Bridge Replacement, and System Modernization (including road modernization and bicycle/pedestrian facilities).
- Roadway maintenance costs are estimated based on lane mileage by functional class and surface type.
- A 50-year replacement cycle is assumed for bridges.
- The cost for bridge replacement is based on a constant cost per square foot; bridge maintenance is based on cost per square footage by bridge type.
- Road modernization needs are based on projects listed in Regional Transportation Plans developed for MPOs, and Transportation System Plans developed for cities and counties. These values are given as a range of constrained to unconstrained needs.

Revenue

Forecast Revenue per Year (millions of 2004 dollars)	Recent Annual Average Revenue	Future Annual Average Revenue
Local Streets and Roads	$687.7	$716.5

Key Issues for Revenue:

- Major revenue sources and assumptions include:
  - Local fees – collections to grow with population; fees increase with inflation
  - State highway user taxes - additional 1¢ per year gas tax and $15 vehicle license fee every 8 years in accordance with ODOT forecasts
  - US Forest Service funding reduced in 2007
  - Local and state general fund receipts are assumed to grow with the state general fund – as forecast by OR Department of Revenue through 2011, 2.6 percent thereafter
  - Includes OTIA revenue (locals receive annual average of 12 percent of OTIA funds each year)
- Figure below shows total revenue (bold line) and components.