New Look
The Regional Transportation Plan

Chapter 1
Regional Transportation Policy Framework For the Portland Metropolitan Region

[Note: This is a provisional draft recommended to guide development and analysis of the rest of the plan during Phase 3 from March to August 2007. The framework will be updated and refined to respond to the results of the analysis in summer 2007.]

RECOMMENDED DRAFT

February 15, 2007

METRO
PEOPLE PLACES • OPEN SPACES

Metro
People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Kathryn Harrington, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Suzanne Flynn

Metro's web site: www.metro-region.org

Project web site: www.metro-region.org/rtp (Click on "2035 RTP Update)

Executive Summary

Transportation shapes our communities and our daily lives in profound and lasting ways. What we plan for today will affect the health of our economy, communities and environment for many years and generations to come.

Public investment in transportation has been shaping our economy and our region for centuries. The Portland metropolitan region has one of the best performing transportation systems in the nation. This region has developed pioneering approaches to land use and transportation planning in the past, and we have the leadership, knowledge and public will to develop a transportation system that will allow us to compete in the global economy and protect our enviable quality of life.

Framing the Crossroads

The Portland metropolitan region is at an important crossroads. Investments in our transportation system are needed to respond to powerful trends and challenges so we can benefit from them and thrive:

- **About a million more people are expected to live here in the next 25 years – an unprecedented rate of growth.** They will all need to get to work, school and stores, more than doubling the amount of freight, goods and services that will need to travel to this region by air and over bridges, roads, water and rails. Growing congestion is expected to accompany this growth, affecting the economic competitiveness of our region and the State of Oregon, our environment and quality of life.

- **The Portland-Vancouver metropolitan region is a global transportation gateway and West Coast domestic hub for trade and tourism.** An international airport, river ports, rail connections and an interstate highway system make this region both a global transportation gateway and West Coast domestic hub for freight and goods movement, and tourism-related activities. The 2005 study, *Cost of Congestion to the Economy of the Portland Region,* estimated potential losses in the region of $844 million annually in 2025 from increased freight costs and lost worker productivity due to increases in travel time if our investments do not keep pace with growth.

- **Geopolitical instability will continue to drive up transportation costs, affecting project costs and household expenditures.** Rising prices for all petroleum products—not just fuel—are here to stay. For example, the price of liquid asphalt jumped 61 percent in Oregon during the first seven months of 2006—from $207 a ton to $333 a ton—doubling project costs in some cases. In addition, transportation costs per household in the region are also increasing. This is the second highest household expense after housing, with lower-income households spending a higher percentage of their income on transportation costs.

- **Federal and state transportation sources are not keeping up with growing needs.** At current spending levels and without new sources of funding, the federal highway trust fund will go broke in 2009. State purchasing power is steadily declining because the gas tax hasn't increased since 1993. As a result, there is increasing competition for transportation

funds, yet fewer dollars to maintain the infrastructure we have, let alone fund new expensive projects. Meanwhile, maintenance of our aging system of roads and bridges is being deferred and existing backlogs are expected to grow.

Where We Go From Here

Many of these issues are not new or unique to transportation planning in this region or in other major cities across the country. However, the Portland metropolitan region has a history of innovation, and these challenges pose an opportunity for the region to continue this tradition to thrive – mainly because we already have such solid, well-integrated transportation and land use systems in place, whereas other regions do not. We are fortunate because our region is so well positioned to take advantage of these new realities if we invest accordingly, whereas other regions are struggling to catch up. If we adapt to these new fiscal, social and economic realities – and develop a new approach to transportation that is consistent with the tools and aspirations of the 21st Century – then our region is positioned to prosper.

This important work begins with updating the policy framework to re-define the responsibility of the Regional Transportation Plan (RTP) to keep this region a great place to live and work for everyone, and preserve its unique qualities and natural beauty. The RTP must be different because the future will be different and it must respond to the values held by the residents of this region:

- **Land use choices and transportation planning are inextricably linked**. Transportation planning can be a powerful tool to promote efficient land use—and vice-versa—translating into greater personal convenience and a more efficient use of our transportation system.

- **Our region's environment and its economic health are inextricably linked**. Residents of the region tell us they want transportation plans to minimize environmental impacts. In recent public opinion research, nearly two-thirds of the region's respondents put protection of air and water quality at the top of their list transportation planning priorities. Transportation plans, they said, must protect fish habitat, our drinking water, the air we breathe and our great Northwest landscape. Likewise, the future of our region also depends on our ability to support the growth of sustainable businesses and family-wage jobs through strategic infrastructure investments.

- **A balanced transportation system that serves everyone and supports our goals for land use, economy, the environment and equity.** System balance is important because it provides all residents of the region – regardless of age, income or abilities - the opportunity to choose safe, reliable and more sustainable and affordable ways to get around. System balance is important to the relationship between an efficient transportation system and economic health because it relieves the burden off any one mode of travel – most notably highways and regional arterials. This not only keeps business and commerce moving reliably, but does so with designs that foster safety for bicyclists and pedestrians.

- **The RTP must aspire and inspire action, while also being pragmatic and responsible.** Federal regulations stipulate that we produce a "fiscally constrained" plan, meaning that the total cost of the projects in the plan must correspond with "reasonably available" funding projections. Furthermore, the public expects us to maintain what we have first, before building anything new. So while we aspire to a plan that includes projects that cost more than we expect to have, we must first demonstrate to the public that the existing transportation system works at maximum efficiency before asking them to support new funding sources.

  At that point we can develop a plan for new funding sources in cooperation with the private sector. We also need to make choices about what types of investments are most important

and be strategic to maximize the return on any public investments that are made. We simply do not have enough money to address all the transportation needs in the region. The RTP policy framework defines the vision of what we want the regional transportation system to look like and achieve in the future, setting the stage for future actions that will be needed to achieve that vision.

A Recommended Framework to Guide the Region's Response

This draft policy framework is a proposed new Chapter 1 of the RTP that will eventually replace nearly 70 pages of current policy language. The result is a dramatically simplified, more concise statement of intent for the plan that will guide planning for and investment in the region's transportation system.

The purpose of this new plan is to sharpen the focus of the RTP on those transportation-related actions that most affect the implementation of the Region 2040 Growth Concept and will respond effectively to the powerful trends and challenges facing our region today. This framework reflects the continued evolution of regional transportation planning from a primarily project-driven endeavor to one that is framed by the larger set of outcomes that affect people's everyday lives, commerce and the quality of life in this region.

An outcomes-based plan requires careful monitoring to ensure that incremental decisions to implement the plan through land use decisions and corridor and project planning are consistent with the plan vision, as measured by specific outcomes. The plan must also be flexible enough to adapt to the challenges of the 21st century.

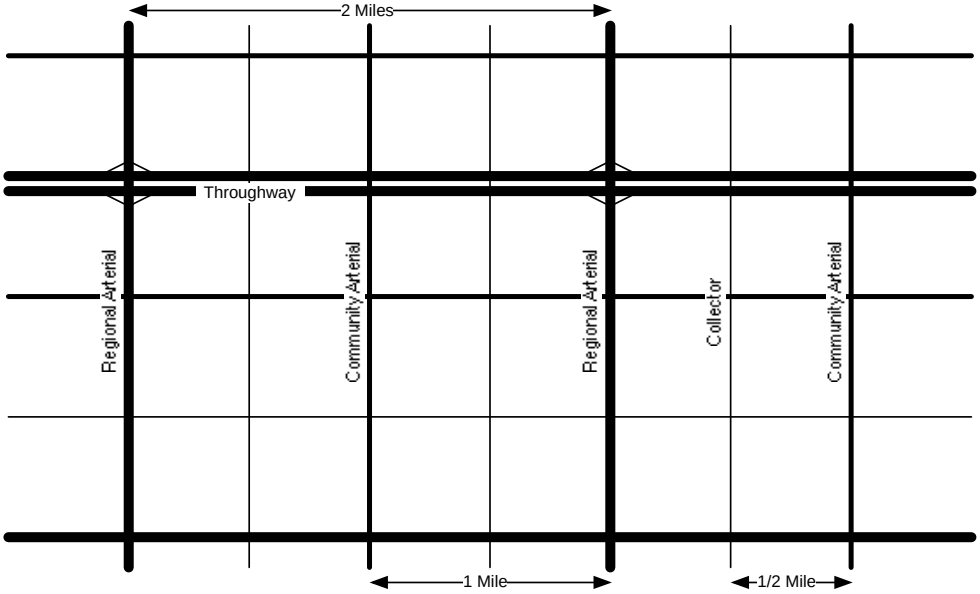
To simplify the RTP policy and better respond to the six 2040 Fundamentals and trends affecting this region, four key refinements to the existing RTP policy framework have been included to guide development of the remaining chapters of the 2035 RTP during Phase 3. These refinements represent a fundamentally different approach for the design, management and governance of the regional transportation system:

1. **A new focus on outcomes that are tied directly to the Region 2040 vision, as embodied in the 2040 Fundamentals.** The RTP blueprint described in this chapter relies on the 2040 Fundamentals, as an expression of what the residents of this region value to provide focus for what the plan will address and monitor over time.

2. **A more holistic, systems approach for how the transportation system is designed, managed and governed**. The framework calls for looking at the transportation system as an integrated and seamless system that supports all modes of travel - motor vehicle, transit, pedestrian, bicycle and freight. The framework also further elevates the physical design and efficient management of the regional transportation system as critical for achieving objectives to increase safety, travel options and traffic optimization, and as a result improve system performance and reliability for all users. This approach is based on basic transportation planning and engineering principles for building a complete and well-connected system as conceptually illustrated in the two diagrams below.

The Throughway and Arterial Network Concept diagram is for illustrative purposes only, showing an idealized spacing of throughway access points and multi-modal arterial streets when possible.

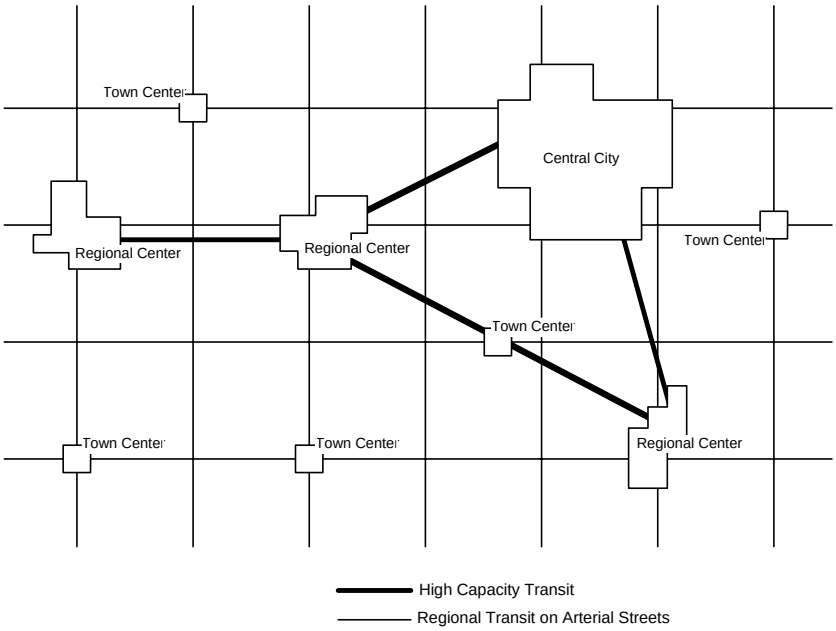
Throughway and Arterial Network Concept



Most of the region's travel occurs off the throughway system, and on a network of multi-modal arterial streets. The RTP policy places a new emphasis on ensuring that arterial networks are fully developed as the region grows, helping both local circulation and preserving highway capacity for cross-regional and statewide travel. Collectors are not part of the regional transportation system, but provide an important link between the local street and arterial networks for all modes of travel.

The Regional Transit Network Concept diagram is also for illustrative purposes only, showing idealized service connections to support the 2040 Growth Concept land uses and goals identified in the plan.

Regional Transit Network Concept



The Region 2040 plan set forth a vision for connection the central city to regional centers like Gresham, Clackamas and Hillsboro with light rail. The RTP expands this vision to include a complete network of local transit along local streets to better serve suburban communities.

This more holistic, systems approach responds in part to recent policy direction from the federal and state levels to better link system management to planning for the region's transportation system as well as development of a transportation system that supports a variety of trip types on the regional motor vehicle system that include personal errands, commuting to work or school, walking, bicycling, commerce, freight and goods movement and transit.

In addition, this approach:

- Recognizes that new transit and road capacity are needed to achieve the Region 2040 vision and support the region's economic vitality.
- Recognizes that despite the varied ownerships and responsibilities for different parts of the system, the public expects the transportation system to operate as a cohesive network.
- Considers land use and transportation as inextricably linked, and that land use actions must be considered in the context of the transportation system.
- Builds on livable streets principles to further promote safety, community livability and congestion management through a well-designed transportation system that supports a variety of travel options to serve local, regional, intra-state and interstate travel needs for the movement of people and goods.

- Expands on the transportation system management and operations (TSMO) and transportation demand management (TDM) work currently underway in the region to further emphasize these programs and strategies to improve safety, mobility and the efficiency of the overall transportation system.

- A renewed focus on a web of regional and local transit options that allows convenient movement between 2040 centers that is a viable alternative to the automobile in terms of convenience and travel time. It gives particular attention to transit-supportive development and pedestrian access needed to support transit service.

  The RTP policy framework retains the transit service elements in the current RTP, but integrates them in a different way to serve changing needs. The plan also calls for exploring opportunities for possible future passenger rail service corridors to neighbor cities, such as Milwaukie-Lake Oswego-Tualatin-Sherwood-McMinnville service as well as extension of Westside Commuter Rail to Salem to expand transit connections from the region to the rest of state.

- Builds on Tri-Met's current strategy to focus on the total transit system, bolstering existing service, reliability, passenger infrastructure, customer information and access is another tool to help leverage higher density development and ridership to support higher levels of transit service. This type of investment emphasizes management of the existing system to optimize the return on public investment.

- Continues to ensure a safe, continuous and attractive network of bikeways and pedestrian facilities on all regional arterials in the region. The regional street design guidelines and livable streets handbooks will continue to guide the design of streets in the region to promote innovative stormwater and stream crossing practices and walking, biking and access to transit in the region.

3. **A new method for defining transportation needs and an increased focus on managing capacity.** This change in focus recognizes the region's ability to expand capacity is limited due to fiscal, environmental and land use constraints. This change is consistent with recent amendments to the Oregon Transportation Plan and federal legislation, which also recognize the limitations inherent with traditional approaches to dealing with congestion.

   This change broadens how the RTP proposes to identify transportation needs and manage growing congestion in the region. The current method for determining transportation needs relies almost exclusively on level-of-service (LOS), which often results in the same roads and intersection "hot spots" identified as being congested. Consistently, research has demonstrated that even after capacity projects are constructed, these roads will eventually become congested again in the future as more drivers take advantage of the significant travel time savings or because of additional population growth. The RTP recommends addressing congestion and safety in a broader context that moves beyond simply fixing "hot spots." This multi-faceted strategy includes:

   - expanding current efforts to manage existing and new capacity as a precious resource and using such strategies as incident management, signal timing, ramp meters and access management to optimize system performance and reliability, particularly during peak periods;

   - targeting road and transit capacity and bike and pedestrian facilities to areas of the region that lack system connectivity for some or all modes of travel to in order to better spread out traffic and provide a variety of options;

- expanding on current efforts to increase use of travel options by providing incentives and increasing awareness for travel options in order to help optimize system performance;

- fostering compact urban form and locating housing, jobs and services in close proximity to reduce the need to drive longer distances for daily needs.

In order to realize this, the RTP must move away from level-of-service (LOS) as a single tool used to evaluate and prioritize transportation needs at the system planning level. Instead, the policy framework uses multi-modal system design concepts to define transportation system needs over time, including the addition of new road capacity as well as needed sidewalks, bikeways and transit service. Reliability of the system, particularly for commuting and freight and goods movement, is emphasized and will be evaluated and monitored through an integrated multi-modal corridor perspective.

LOS still serves an important purpose for road system performance and is a good indicator of current and projected service conditions of a facility. Traditional LOS measures (e.g., demand-to-capacity ratios and travel speeds) in addition to travel time reliability and other measures are recommended to be used as diagnostic tools to evaluate and monitor performance of the system over time (including peak hour spreading), identify congestion "hot spots," and inform the timing and phasing of transportation capacity investments needed to implement the regional street system concept.

This new emphasis also highlights the need to more aggressively manage our transportation system meaningfully consider strategies such as value pricing to better manage capacity and peak use on the throughways in the region. Similar variable charges have been used in other industries such as airline tickets, telephone rates and electricity rates. The current RTP calls for consideration of pricing only when new capacity is proposed for the throughway system. To date, this tool has not been applied in the Portland metropolitan region despite successful application of this tool in other parts of the U.S. and internationally. In addition, value pricing may generate revenues to help with needed transportation investments. Much more work is needed to gain public acceptance of and support for use of this tool.

4. **A new focus on equity, stewardship and getting the best return on public investments** by linking land use and transportation decisions and designing and managing the transportation system so that it performs as safely and efficiently as possible for all modes of travel. This emphasis also requires consideration of land use, economic, environmental and public impacts and benefits of actions as well as public (and private) dollar costs, to the extent possible. It also requires that we place a priority on maintaining and optimizing what we have because dollars are limited and we simply do not have enough to do everything we want.

   The policy framework places the highest priority on cost-effective transportation investments that achieve multiple goals identified in this plan as the primary method for achieving the best return on public investments. The updated framework will also direct future actions to stabilize transportation funding in this region. This will include raising new revenue for needed infrastructure – a critical step to achieving the Region 2040 vision and specific goals described in this chapter.

Implementation of this new framework will be both challenging and exciting, requiring a new level of collaboration between the Metro Council, public and private sector leaders, community groups, businesses and the residents of the region. Our success in addressing these complex challenges will be measured in many ways and by many people – including future generations who will live and work in the region.

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Regional Transportation Plan For the Portland Metropolitan Region

NOTE: Eventually this will be the Table of Contents for the full RTP. For this draft, it just shows the details of the organization for Chapter 1 with titles for the remaining chapters that will be developed during Phase 3.

TABLE OF CONTENTS

CHAPTER 2 - LAND USE AND TRAVEL DEMAND

This chapter will summarize current trends and issues affecting travel in the region and expected growth in population, the economy and travel for the year 2035.

CHAPTER 3 - NEEDS ASSESSMENT

This chapter will apply the RTP System Design and Management Concepts described in Chapter 1 to the existing transportation system to identify gaps and regional transportation needs for all modes of travel.

CHAPTER 4 - FINANCIAL FORECAST

This chapter will describe reasonably anticipated transportation revenue sources that will serve as the basis for development of a "financially constrained" RTP.

CHAPTER 5 - SYSTEM ANALYSIS

This chapter will analyze the impact of future growth on the “financially constrained” and "illustrative" systems to evaluate how well the project and program investments achieve the goals and measurable objectives identified in Chapter 1.

CHAPTER 6 - RECOMMENDED INVESTMENTS

This chapter will describe the set of regional project and program investments recommended for the year 2035.

CHAPTER 7 - IMPLEMENTATION

This chapter will describe the processes through which this plan will be implemented. This chapter will define statewide goal and local comprehensive plan compliance procedures, establish a process to update, refine and amend the RTP and describe outstanding issues that remain unresolved at the time this plan is adopted.

I. INTRODUCTION

A. Overview

The Regional Transportation Plan is a 20-year blueprint for the transportation system serving the Portland metropolitan region. The plan deals with how best to move people and goods in and through the region. As the federally designated Metropolitan Planning Organization, Metro is responsible for updating the plan every four years in coordination with the implementing agencies and jurisdictions that own and operate the region's transportation system.[1]

The primary mission of the Regional Transportation Plan is to implement the Region 2040 vision. This chapter presents the overall policy framework of goals and measurable objectives for the design, management and governance of the regional transportation system in support of that mission. The plan sets a direction for future planning and decision-making by the Metro Council and the implementing agencies, three counties and 25 cities in the Portland metropolitan region.

The RTP also serves as a long-range capital plan that will guide the public and private expenditure of billions of dollars from federal, state, regional and local revenue sources. As a result, the policy framework described in this chapter will form the basis for transportation projects and programs and other implementation strategies that will be recommended in this plan. Local transportation plans are required to be consistent with the RTP under state law.

The updated plan is anticipated to be approved by JPACT and the Metro Council in November 2007, pending air quality analysis.

B. Chapter Organization

This chapter represents a statement of the desired outcomes for the region's transportation system to best support the Region 2040 vision. This chapter identifies 9 goals for the regional transportation system and multi-modal system design and management concepts that will guide the identification of regional transportation needs in Chapter 3. The goals are complemented by more detailed measurable objectives that establish how a particular goal will be implemented. Performance measures will be used to make a determination of whether the proposed transportation system is adequate to serve planned land uses during the plan period in Chapter 5.[2] This draft identifies some potential strategies for implementation from the current RTP. Additional actions will also be identified during Phase 3 of the process that will more specifically direct implementation of the plan.

Eventually, this policy framework will become a chapter in the updated Regional Transportation Plan that will direct all transportation planning and project development activities in the Portland metropolitan region.

This chapter is organized as follows:

- **Section I** provides an overview of the purpose and organization of this chapter.

[1] These partners include the region's 25 cities, three counties, Oregon Department of Transportation, Oregon Department of Environmental Quality, Port of Portland, TriMet, South Metro Area Rapid Transit (SMART), Washington Regional Transportation Council, Washington Department of Transportation and other Clark County governments.
[2] The Oregon Transportation Planning Rule, subsection 060, requires the RTP to include performance measures that ensure the transportation system is adequate to serve planned land uses.

- **Section II** describes the history and values surrounding the region's long-term vision for growth – Region 2040 - and the RTP as a key tool for implementing the Region 2040 vision.
- **Section III** describes the nine goals and corresponding measurable objectives that represent the blueprint to guide the design, management and governance of the regional transportation system. The goals and measurable objectives are a positive statement of what the transportation system would look and function like in the future, if the goals are achieved. These positive future outcomes reflect public opinion and support what the residents of the region value most. The goals and measurable objectives will be used to prioritize critical transportation investments that best support the long-term Region 2040 vision. Performance measures are also proposed for each objective to assess the degree of success when evaluating investment alternatives and making decisions about future transportation investments. The goals and measurable objectives will also be the basis for prioritizing investments in the regional transportation system and monitoring performance of the plan over time. Through evaluation and monitoring, the region can be sure that investments in the transportation system are achieving desired outcomes.
- **Section IV** describes network and design concepts that will guide the identification of transportation needs during Phase 3 of the RTP update.

A **glossary** of terms is provided at the end of the document for reference.

II. REGIONAL POLICY CONTEXT

A. Metro Charter

In 1978, the voters within the metropolitan areas of Clackamas, Multnomah and Washington counties approved a ballot measure that made Metro the nation's first directly elected regional government. That vote gave Metro the responsibility for coordinating the land use plans of the 28 jurisdictions in the region as well as other issues of "regional significance." In 1992, the voters of the region approved a charter that gave Metro jurisdiction over matters of metropolitan concern and required the adoption of a Regional Framework Plan.

> *We, the people of the Portland area metropolitan service district, in order to establish an elected, visible and accountable regional government…that undertakes,* ***as its most important service, planning and policy making to preserve and enhance the quality of life and the environment for ourselves and future generations****…*[3] *(emphasis added)*

This preamble, especially the emphasized passage above, lays the groundwork for all of Metro's regional planning activities to directly address sustainability and the region's quality of life, including development of the Regional Transportation Plan (RTP).

B. 2040 Growth Concept

Adoption of the 2040 Growth Concept in 1995 responded to the mission called out in the Metro Charter and established a new direction for planning in the Portland metropolitan region by linking transportation investments to desired outcomes for urban form, the economy and the environment.

[3] Metro. *Preamble of Metro Charter as approved in 1992 and amended in 2000.*

The unifying theme of the 2040 Growth Concept is to preserve the region's economic health and livability while planning for expected growth in this region in an equitable and fiscally sustainable manner. This new direction reflected a regional commitment to implementation of a long-term strategy to protect the things that the residents of the Portland metropolitan region have consistently said they value: vibrant communities, a strong regional economy, access to jobs, affordable housing and nature, protecting habitat and the environment for wildlife and people, transportation choices and resources for future generations.

The 2040 Growth Concept contains a series of land-use building blocks that establish basic design types for the region as shown in **Figure 1**. The 2040 Growth Concept land-use components, called 2040 Design Types, are grouped into a hierarchy that serves as a framework to prioritize RTP investments. Of these, the central city, regional centers, industrial areas, intermodal facilities and station communities components are most critical in terms of regional significance and their role in supporting implementation of the other growth concept design types. Substantial public and private investment will be needed in these areas over the long-term to realize the 2040 Growth Concept vision. These areas provide the best opportunity for public policy to shape development, and are, therefore, the best candidates for more immediate transportation system investments. The second highest investment priority land uses for transportation investments are the secondary land use components.[4] In this framework, the primary and secondary land-use components are the priority for regional transportation investments.

Table 1 lists each 2040 Design Type, based on this hierarchy.[5] The hierarchy applies to developed and developing areas inside the urban growth boundary (UGB) and undeveloped areas added to the UGB in 1998 and 2002 with adopted concept plans. These UGB additions include the Pleasant Valley and Springwater areas in the City of Gresham, the city of Damascus in Clackamas County and North Bethany area in northern Washington County, which will also require substantial public and private infrastructure investments to realize the 2040 Growth Concept visions.

Table 1. Hierarchy of 2040 Design Types

Primary land-use components	Secondary land-use components	Other urban land-use components
Central city	Employment areas	Inner neighborhoods
Regional centers	Town centers	Outer neighborhoods
Industrial areas	Corridors	
Freight and Passenger Intermodal facilities	Main Streets	
Station Communities		

Within the hierarchy shown in Table 1, the RTP recognizes that different parts of the region are at different stages of achieving the 2040 Growth Concept vision, and, as a result, may have different transportation investment priorities during the plan period to achieve the best return on public investments made in the region. **Table 2** shows investment priorities for each stage of 2040 implementation.

[4] The New Look planning process may refine these priorities as it moves forward. Refinements will be addressed to the extent possible in this RTP, but may also be addressed during future updates to the RTP.
[5] More detailed descriptions of the land use and transportation elements of each 2040 Design Type can be found in the Regional Urban Growth Goals and Objectives and Regional Framework Plan.

Figure 1. 2040 Growth Concept Map

Table 2. Stages of 2040 Implementation and Priorities for Infrastructure Investment

Stage of Development	Developed Areas *Areas of the region that are primarily developed, with most new development occurring through a combination of retaining existing jobs and homes, refill and redevelopment and use of brownfields.*	Developing Areas *Areas of the region where new development will be primarily a combination of retaining existing jobs and homes, refill and redevelopment, use of brownfields and greenfield development.*	Undeveloped Areas *Areas of the region that are primarily new communities and recent additions to the urban growth boundary. New development will be primarily a combination of retaining existing jobs and homes and greenfield development.*
Investment Priorities	• Managing the existing transportation system to optimize performance for all modes of travel. • Leveraging refill, redevelopment and use of brownfields. • Completing missing links to address barriers, safety deficiencies and bottlenecks (e.g., bike and pedestrian connections, transit service, new street connections).	• Managing the existing transportation system to optimize performance for all modes of travel. • Building an urban transportation system (e.g., new arterial capacity and connections, bike and pedestrian facilities, transit service) • Completing missing links to address barriers, safety deficiencies and bottlenecks (e.g., bike and pedestrian connections, transit service, new street connections).	• Preserving right-of-way for future transportation system. • Establishing a basic urban transportation system (e.g., new arterial capacity and connections that include bike and pedestrian facilities, transit service). • Managing new transportation system investments to optimize performance for all modes of travel. • Completing missing links to address barriers, safety deficiencies and bottlenecks (e.g., bike and pedestrian connections, transit service, new street connections).

Table 2 should guide the identification of investment priorities for different parts of the region in combination with the broader RTP goals and measurable objectives that are described in Section 3 of this chapter.

Decisions about land use and transportation are inextricably linked and cannot be separated. Success of the 2040 Growth Concept, in large part, hinges on achieving the regional transportation goals and objectives identified in this plan, particularly in those 2040 design types that are the highest priorities.

C. 2040 Fundamentals

In 1996, the Metro Council approved policies[6] *(actions)* to implement the 2040 Growth Concept and committed to monitoring the progress of these actions. In 1997, the growth concept vision was condensed into eight fundamental values that express the region's vision for implementation of the 2040 Growth Concept and desired outcomes for urban form and the health of our communities, our economy and our environment.

[6] Metro. Urban Growth Management Functional Plan.

Adopted by the region in 1997 as part of the Regional Framework Plan, the 2040 Fundamentals focused the scope of efforts to monitor implementation of the Region 2040 plan and the degree to which the actions taken are achieving the Region 2040 vision over time. The 2040 Fundamentals embrace the ethics of sustainability described earlier for all Metro's planning and 2040 implementation activities.

The Regional Transportation Plan is a key tool for implementing the 2040 Growth Concept vision as well as other federal and state mandates for transportation planning.[7] Planning and investments in the transportation system are the means to an end - residents of the region do not measure their quality of life by how good a plan is or how many bike lanes or highway miles are constructed in their community. Quality of life is measured by how well they live, the extent to which where they live is economically prosperous and affordable, how reliably people and goods can travel and the quality of the natural, community and social environments. These elements are what people value and transportation planning and investments are a means to assure the region's quality of life and economy are protected.

The Regional Transportation Plan (RTP) blueprint described in this chapter relies on the 2040 Fundamentals as an expression of what the citizens of this region value to provide focus for what the RTP will address and monitor over time and to measure whether the plan is helping to maintain regional quality of life for its citizens. For purposes of the RTP, the 2040 Fundamentals have been consolidated into the 6 fundamentals:

1. **Vibrant Communities** - *A vibrant place to live and work, and compact development that uses both land and infrastructure efficiently and focuses development in 2040 centers, corridors, and industrial and employment areas.*

2. **Healthy Economy** - *A healthy economy that generates jobs and business opportunities and sustains the region's agricultural industry.*

3. **Healthy Environment** - *Forests, rivers, streams, wetlands, air quality and natural areas are restored and protected.*

4. **Transportation Choices** - *An integrated transportation system that supports land use and provides reliable, safe and attractive travel choices for people and goods.*

5. **Equity** - *Equitable access to affordable housing, jobs, transportation, recreation and services for people in all income levels is provided.*

6. **Fiscal Stewardship -** *Stewardship of the public infrastructure ensures that the needs and expectations of the public are met in an efficient and fiscally sustainable manner.*

To ensure integration of these fundamentals into the RTP and desired outcomes the implementation of the plan is trying to achieve, the following goals and objectives must be the foundation for all planning activities governed by the RTP.

[7] Development of the Regional Transportation Plan must also respond to a variety of mandates included in Oregon Transportation Plan, Oregon Transportation Planning Rule, and federal legislation such as the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

III. GOALS AND OBJECTIVES

A. Overview

The Regional Transportation Plan (RTP) is the blueprint for achieving a regional transportation system in the Portland metropolitan region that is consistent with the six 2040 Fundamentals. The regional transportation system is defined as the interconnected network of throughways, arterials, air, marine, pipeline and rail systems, high capacity and regional transit services, regional multi-use trails with a transportation function and bicycle and pedestrian facilities that are located on or connect directly to other elements of the regional transportation system.

The plan establishes the framework for the design, management and governance of all regional system investments, and is a statement of aspirational outcomes that reflect public opinion and support what the residents of the region value most. The RTP also serves as a long-range capital plan that will guide the public and private expenditure of billions of dollars from federal, state, regional and local revenue sources. Local transportation plans are required to be consistent with the RTP under state law.

This RTP reflects the continued evolution of regional transportation planning from a primarily project-driven endeavor to one that is framed by the larger set of outcomes that affect people's everyday lives and the quality of life in this region.

An outcomes-based plan requires careful monitoring to ensure that incremental decisions to implement the plan through corridor and project planning are consistent with the plan vision, as measured by specific outcomes, and flexible enough to adapt to the challenges of the 21st century.

B. Organizational Structure

To achieve the 2040 Vision articulated by the 2040 Fundamentals, the RTP policy framework is organized into a series of *goals* and *measurable objectives* that have been identified to guide the design, management and governance of the region's transportation system to best support the six 2040 Fundamentals.

- ***Goals*** are statements of purpose that describe long-term desired outcomes for the region's transportation system to support and implement the Region 2040 vision.
- ***Measurable objectives*** comprise two elements - an objective statement and a performance measure – that represent even more specific outcomes the RTP is trying to achieve.
    - ***Objectives*** are similar to goals as they also represent a desired outcome. However, an objective is an intermediate, shorter-term result that must be realized in the plan period to reach the long-term goals the RTP is trying to achieve.
    - ***Performance measures*** characterize the objective with quantitative or qualitative data to assess how well objectives are being met. They can be applied at a system level and project level, and provide the planning process with a basis for evaluating alternatives and making decisions on future transportation investments. They can also be used to monitor performance of the plan in between updates to determine whether refinements to the policy

framework or other plan elements are needed. This draft framework includes potential performance measures that will be refined during Phase 3 of the RTP update.

- ***Potential Actions*** are identified for each objective. A final recommended set of actions will be developed during Phase 3 of the RTP update to describe specific planning activities, strategies, regulations and coordination needed to achieve the objectives during the plan period. The actions will be included in Chapter 7 of the plan. Specific projects and programs will also be developed and recommended in Chapter 6.

The goals and measurable objectives are further divided into two categories:

1. **System Design and Management** – Goals and measurable objectives that define desired outcomes for the physical design and management of the transportation system over time to best support the Region 2040 vision.

2. **Governance** - Goals and measurable objectives that define desired outcomes for jurisdictional and fiscal governance of the transportation system to ensure meaningful public involvement, maximization and equity of public investments and accountability to the public to build and maintain public trust in government.

Table 3 summarizes the goals.

Table 3. Regional Transportation Plan Goals

System Design and Management
Goal 1 Great Communities Decisions about land use and multi-modal transportation infrastructure and services are linked to promote an efficient and compact urban form that fosters good community design, optimization of public investments and encourages jobs, schools, shopping, services, recreational opportunities and housing proximity.
Goal 2 Sustainable Economic Competitiveness and Prosperity Multi-modal transportation infrastructure and services support a diverse, innovative and sustainable regional and state economy through the reliable and efficient movement of people, freight, goods, services and information.
Goal 3 Transportation Choices Multi-modal transportation infrastructure and services provide all residents of the region with affordable and equitable access to affordable housing, jobs, services, shopping, educational, cultural and recreational opportunities and business access to the workforce.
Goal 4 Reliable People and Goods Movement Multi-modal transportation infrastructure and services provide a seamless and well-connected system of throughways, arterials, freight systems, transit services and bicycle and pedestrian facilities to ensure effective mobility and reliable travel choices for people and goods movement.
Goal 5 Safety and Security Multi-modal transportation infrastructure and services are safe and secure for the public and goods movement.
Goal 6 Human Health and the Environment Multi-modal transportation infrastructure and services foster physical activity and protect and enhance the quality of human health and natural ecological systems.
Governance
Goal 7 Effective Public Involvement All major transportation decisions are open and transparent, and grounded in meaningful involvement and education of the public, including those traditionally under-represented, businesses, institutions, community groups and local, regional and state jurisdictions that own and operate the region's transportation system.
Goal 8 Fiscal Stewardship Regional transportation planning and investment decisions maximize the return on public investment in infrastructure, preserving past investments for the future, emphasizing management strategies and prioritizing investments that reinforce Region 2040 and achieve multiple goals.
Goal 9 Accountability The region's government, business, institutional and community leaders work together so the public experiences transportation services and infrastructure as a seamless, comprehensive system of transportation facilities and services that bridge institutional and fiscal barriers.

Effective design, management and governance of the regional transportation system support many desired outcomes, as set forth in the 2040 Fundamentals. **Table 4** shows this relationship.

Table 4
Relationship of 2040 Fundamentals and RTP Goals

2040 Fundamental	RTP Goal
Vibrant Communities	Goal 1. Great Communities
Healthy Economy	Goal 2. Sustainable Economic Competitiveness and Prosperity Goal 4. Reliable People and Goods Movement
Healthy Environment	Goal 6. Human Health and the Environment
Transportation Choices	Goal 3. Transportation Choices Goal 5. Safety and Security
Equity	Goal 7. Effective Public Involvement Goal 9. Accountability
Fiscal Stewardship	Goal 8. Fiscal Stewardship

Purpose of the RTP Goals and Measurable Objectives

Collectively, the RTP goals and measurable objectives described in this chapter will be used to prioritize critical transportation investments that best support the long-term Region 2040 vision for our region and the broader sustainability mission identified in the Metro Charter. The goals and measurable objectives will also be the basis for developing screening criteria to evaluate and prioritize investments in the regional transportation system and monitoring performance of the plan over time. Through evaluation and monitoring, the region can be sure that investments in the transportation system are achieving desired outcomes and getting the best return on public investments.

C. RTP Goals and Measurable Objectives

Overview

Since the adoption of the Region 2040 Growth Concept in the mid-1990s, the region has embarked on an aggressive effort to further define urban form through design and management of the transportation system. For transportation, this effort has included a new emphasis on an interconnected multi-modal network and facility design and management that reinforces planned urban form, supports a healthy economy, protects natural systems and rural reserves and serves access needs for all people, including children, seniors and people with disabilities.

Regional street design guidelines contained in Metro's Livable Streets handbooks[8] address federal, state and regional transportation planning mandates with street design concepts intended to

[8] The handbooks are: Creating Livable Streets: Streets for 2040, Green Streets: Innovative Solutions for Stormwater and Stream Crossings and Trees for Green Streets.

support local and regional implementation of the 2040 Growth Concept. In addition, the evolution of new design and operations practices is allowing for better management of stormwater runoff and the impact of transportation systems on wildlife habitat and migration corridors.

The following goals and measurable objectives define the vision for the design, management and governance of the regional transportation system to support the Region 2040 vision for the Portland metropolitan region.

Goal 1 Great Communities

Goal Statement	Objectives	Potential Actions
Decisions about land use and multi-modal transportation infrastructure and services are linked to promote an efficient and compact urban form that fosters good community design, optimization of public investments and supports jobs, schools, shopping, services, recreational opportunities and housing proximity.	**Objective 1.1 Compact Urban Form and Design -** Leverage Region 2040 land uses to reinforce growth in and access to 2040 centers, industrial areas, intermodal facilities, corridors, station communities and employment areas. Potential Performance Measures: • *Average trip length.* • *Acres of land developed.* • *Jobs and homes per acre.* • *Average distance traveled from home to work.* • *Vehicle miles traveled (VMT) per person and total VMT.* • *Vehicle miles traveled per employee.* • *Percent of population, jobs and homes attracted to UGB (capture rate).*	• *Promote the use of shared parking for commercial and retail land uses.* • *Establish minimum and maximum parking ratios for off-street parking spaces.* • *Develop plans to manage and optimize the efficient use of public and commercial parking in the central city, regional centers, town centers, corridors, station communities, main streets and employment areas.* • *Locate housing, jobs, schools, parks and other destinations within walking distance of each other whenever possible.* • *Support the development of innovative tools including transit-oriented development, car sharing, location efficient mortgage and others.* • *Coordination land use and transportation decisions to ensure the identified function, design, capacity of transportation facilities are consistent with applicable regional system concepts and supports adjacent land use patterns.*
	Objective 1.2 2040 Implementation - Place the highest priority on investments that provide access to and within the Central City, regional centers, station communities and intermodal facilities. Potential Performance Measures: • *Percent of transportation investments in highest priority land uses (by 2040 land use).*	• *Promote transit-supportive design and infrastructure in 2040 primary and secondary land use components and along designated transit corridors.* • *Provide landscaping, pedestrian-scale lighting, benches and shelters and other infrastructure to serve pedestrians and transit users in the in 2040 centers, station communities and main streets.*

Goal 2 Sustainable Economic Competitiveness and Prosperity

Goal Statement	Objectives	Potential Actions

Multi-modal transportation infrastructure and services support a diverse, innovative and sustainable regional and state economy through the reliable and efficient movement of people, freight, goods, services and information.	**Objective 2.1 Regional Freight Connectivity –**Ensure efficient connections between freight and passenger intermodal facilities and destinations in and beyond the region to promote the region's function as a gateway for trade and tourism.
	
	Potential Performance Measures:
	• *Percent of Industrial areas and freight intermodal facilities served by direct arterial connections to throughways.*
	• *Access to rail measure.*
		• *Consider the movement of freight when conducting transportation studies.*
		• *Identify regional freight routes that ensure direct and convenient access from industrial and employment areas to the throughway network.*
		• *Identify and correct existing safety deficiencies on regional freight routes relating to:*
		  • *roadway geometry and traffic controls;*
		  • *bridges and overpasses;*
		  • *at-grade railroad crossings;*
		  • *truck infiltration in neighborhoods; and*
		  • *congestion on interchanges and hill climbs.*

Goal Statement	Objectives	Potential Actions
	Objective 2.2 Freight Reliability – Place the highest priority on transportation investments that maintain travel time reliability for time sensitive trips on the regional freight network and provide freight access to regionally significant industrial areas and freight intermodal facilities. Potential Performance Measures: • *Variability of travel times regional freight routes during peak and off-peak periods.* • *Traffic congestion and delay on regional freight routes during peak and off-peak periods.*	• *Where appropriate, consider improvements that are dedicated to freight travel only.* • *Work with the private transportation industry, Oregon Economic Development Department, Portland Development Commission, Port of Portland and others to identify and realize investment opportunities that enhance freight mobility and support the state and regional economy.* • *Continue management strategies that increase person-trip capacity on congested freight corridors such as ramp metering, ridesharing.* • *Expand development and use of traveler information tools and other management strategies to increase system reliability.*
	Objective 2.3 Reliable Market Area Access - Ensure that businesses in 2040 Centers, Industrial Areas and Employment areas have adequate access to suppliers, customers and work force. Potential Performance Measures: • *Auto and transit travel time contours for the Central city and selected regional centers, industrial areas and employment areas during peak and off-peak periods.* • *Truck travel time contours for regionally significant industrial areas during peak and off-peak periods.*	• *Ensure that jurisdictions develop local strategies that provide adequate freight loading and parking strategies in the central city, regional centers, town centers and main streets.*
	Objective 2.4 – Job Retention and Creation - Create and retain sustainable businesses. Potential Performance Measures: • *Cost of congestion masure.* • *Percent of jobs retained and created in 2040 centers and industrial areas.*	• *Develop measures that consider the economic value of freight and goods movement, 2040 centers and other priority land uses and bike tourism and other recreational uses.*

Goal 3 Transportation Choices

Goal Statement	Objectives	Potential Actions
Multi-modal transportation infrastructure and services provide all residents of the region with affordable and equitable access to affordable housing, jobs, services, shopping, educational, cultural and recreational opportunities.	**Objective 3.1 Travel Choices** - Achieve Non-SOV modal targets for increased walking, bicycling, use of transit and shared ride and reduced reliance on the automobile and drive alone trips. Potential Performance Measures • *Percent of trips to work by walking, biking, transit and shared ride (by 2040 land use) to monitor progress toward Non-SOV Modal Targets.*	• *Consider the bicycle, pedestrian and transit needs when conducting transportation studies.* • *Conduct empirical research to better define the user preferences and behavioral responses on bikeways on low and high traffic streets.* • *Consider bicycle boulevards part of the regional system when arterial right-of-way is constrained or when the regional street system does not meet arterial spacing standards.* • *Develop travel-demand forecasting for bicycle use and integrate with regional transportation planning efforts.* • *Coordinate with TriMet and large public and private facilities to improve pedestrian facilities and access to transit.* • *Coordinate with TriMet and large public and private facilities to improve pedestrian and bicycle access and secure bicycle long and short-term parking at existing and future regional activity centers, light rail stations, transit centers and park-and-ride lots, educational institutions and employer campuses.* • *Continue individualized marketing and employer outreach forming public/private partnerships such as Transportation Management Associations to increase education of transportation choices and support meeting non-SOV targets by land use type.* • *Increase development and use of traveler information tools to inform choices.* • *Look for opportunities to include possible future passenger rail service corridors to the neighboring cities, such as Milwaukie-Lake Oswego-Tualatin-Sherwood-McMinnville service as well as extension of Westside Commuter Rail to Salem.*

Goal Statement	Objectives	Potential Actions
	Objective 3.2 Equitable Access and Barrier Free Transportation - Affordable and equitable access to travel choices and serves the needs of all people and businesses, including people with low income, children, seniors and people with disabilities. Potential Performance Measures: • *Percent of homes within 30 minutes travel time of employment by auto and transit during peak periods.* • *Percent of jobs within 30 minutes of travel time to workforce by auto and transit during peak periods.* • *Percent of homes and parks within one-quarter mile of regional multi-use trail system.* • *Percent of homes and parks within one-half mile access (via neighborhood streets) of bikeways.* • *Percent of seniors and people with disabilities within one-quarter mile of regional transit service via continuous sidewalks/protected crosswalks.* • *Percent of environmental justice target area households within one-quarter mile of regional transit service.* • *Percent of homes and jobs within one-quarter mile of regional and community transit service.* • *Percent of homes and jobs within one-half mile of high capacity transit service.* • *Percent of household income (by quintile) spent on transportation.* • *Percent of arterial network with intersections with ADA-compliant ramps, adequate and unobstructed sidewalks and transit stops that are accessible.*	• *Provide transit service that is accessible to the mobility impaired and provide para-transit to the portions of the region without adequate fixed-route service to comply with the Americans with Disabilities Act of 1990.* • *Serve the transit and transportation needs of the economically disadvantaged in the region by connecting low-income populations with employment areas and related social services.* • *Provide ADA compliant pedestrian facilities, including ramps on regional facilities.* • *Provide for audible signals, curb cut tactile strips and appropriately timed signalized crosswalks at major retail centers or near bus stops on arterial streets, high volume neighborhood circulators or other major roadways near elderly or disabled facilities or in neighborhoods with significant elderly or disabled populations.* • *Complete gaps in the bicycle and pedestrian networks.* • *Provide short and direct pedestrian crossings at transit stops and marked crossings at regional transit stops.* • *Provide continuous sidewalks along both sides of all arterials that connect to side streets, adjacent sidewalks and buildings.*

Goal 4 Reliable People and Goods Movement

Goal Statement	Objectives	Potential Actions
Multi-modal transportation infrastructure and services provide a seamless and well-connected system of throughways, arterials, freight systems, transit services and bicycle and pedestrian facilities to ensure effective mobility and reliable travel choices for people and goods movement.	**Objective 4.2 System Connectivity -** A seamless and well-connected system of throughways, arterials, collectors, local streets, freight systems, transit services and bicycle and pedestrian facilities to ensure mobility and accessibility, consistent with Regional System Concepts. Potential Performance Measures: • *Percent of throughway network complete.* • *Percent of arterial network complete.* • *Percent of regional bike network complete.* • *Percent of regional pedestrian network complete.* • *Percent of all transit stops with connecting sidewalks.* • *Intervals of controlled crossings of regional arterials.* • *Percent of regional multi-use trails with a transportation function completed.*	• *Provide a network of limited-access throughways to primarily serve interstate, intercity and inter-regional people and goods movement, consistent with Arterial Network Concept.* • *Provide a network of arterials at one-mile spacing, with regional transit service on most regional arterials, consistent with Regional Arterial Network Concept.* • *Provide a network of high capacity transit service that connects the Central City, Regional Centers and passenger intermodal facilities, consistent with Regional Transit Network Concept.* • *Provide a complementary network of community bus and streetcar service connections that serve 2040 Growth Concept centers, industrial areas, employment areas and corridors, and provide access to the regional high capacity transit network, consistent with Regional Transit Network Concept.* • *Provide a network of local and collector street systems to reduce dependence on regional arterials and throughways for local circulation, consistent with Local Street System Concept.* • *Provide a continuous network of safe, convenient and attractive bikeways and pedestrian facilities on all arterials and improve access to transit facilities, consistent with Bike and Pedestrian System Concept.* • *Provide a continuous network of regional multi-use trails with a transportation function that connect priority 2040 land uses, on-street bikeways, pedestrian and transit facilities.*
	Objective 4.1 Regional Mobility - Maintain total person-trip and freight capacity and reasonable travel times along regional mobility corridors. Potential Performance Measures: • *Total person-trip capacity and freight*	• *Consider a full range options for meeting this objective, including different modal options, and policies for making more efficient use of existing capacity as well as small and larger scale capacity investments.*

	capacity and volumes for regional mobility corridors in peak and off-peak periods. • *Auto, truck and transit travel times for peak and off-peak periods.* • *Traffic congestion and delay on regional mobility corridors.* • *Percent of time system is congested.* • *Percent of vehicle miles traveled in congestion.*	• *Use system and demand management techniques to optimize performance of the system and improve mobility.* • *Consider the use of value pricing, high occupancy vehicle lanes and other strategies to improve system reliability and manage congestion.* • *Develop interchange area management plans (IAMPs) for all throughway access points that are approved by state, regional and local agencies.* • *Use interchange zoning (as a base zone and/or overlay zone) to regulate the type of development that may take place at an interchange or along arterials connecting to the interchange.* • *Use access management and site design standards for interchange areas to preserve traffic efficiency and function, while ensuring safety by all modes of travel. The standards should include guidelines for pedestrian and bicycle access, access restrictions, gateway treatments at interchanges, use of medians, landscaping minimums and other design considerations.*
	Objective 4.3 System Management – Place the highest priority on strategies that optimize the regional transportation system to enhance mobility, reliability and safety, consistent the system management concept. <u>Potential performance measures</u>: • *Share of traffic control devices under active management.*	• *Implement an integrated, regional advanced traffic management system program.* • *Enhance transportation system data collection and monitoring for the throughways and regional arterial networks.*
	Objective 4.4 Demand Management – Place the highest priority on services, incentives, supportive infrastructure and awareness of travel options to reduce drive alone trips and enhance mobility and access, consistent the system management concept. <u>Potential Performance Measures</u>: • *Share of large employers in the region with employer-based trip reduction programs in place.* • *Vehicle miles of travel reduced within program as a result of shifting behavior to non-drive-alone trips.* • *Increased carpool matches and vanpool ridership.*	• *Promote private and public sector programs and services that encourage employees to use non-SOV modes or change commuting patterns, such as telecommuting, flexible work hours and/or compressed work weeks.* • *Continue rideshare tools and incentives from areas or at hours of the day under-served by transit.* • *Consider vanpool strategy to incubate new transit service.* • *Conduct further study of market-based strategies such as parking pricing and employer-based parking-cash outs and restructuring parking rates.*

Goal 5 Safety and Security

Goal Statement	Objectives	Potential Actions
Multi-modal transportation infrastructure and services are safe and secure for the public and for goods movement.	**Objective 5.1 Improve Safety -** Reduce traffic fatalities, serious injuries and crashes per capita for all modes of travel by placing the highest priority on investments that address safety-related deficiencies to Potential Performance Measures: • *Per capita traffic crashes, serious injuries and fatalities (by mode).* • *Percent and number of Safety Priority Index System (SPIS) locations addressed in past five years.* • *Per capita bicycle and pedestrian crashes, serious injuries and fatalities.* • *Number of reoccurring SPIS intersections and segments from year-to-year as identified in ODOT Highway Safety Action Plan.* • *Number of crashes, serious injuries and fatalities in identified safety corridors by mode.* • *Number of crashes, serious injuries and fatalities involving bicyclists and pedestrians within one-quarter to one-half mile of a school.*	• *Promote safety in the design and operation of the transportation system.* • *Develop and implement safety and education programs.* • *Coordinate efforts to promote safe use of roadways by motorists, bicyclists and pedestrians through a public awareness program.* • *Work with local jurisdictions, ODOT and other public agencies to collect and analyze data identify high-frequency bicycle and pedestrian related crash locations and improvements to address safety concerns in these locations.* • *Complete gaps in the bicycle and pedestrian networks and address bottlenecks on the motor vehicle system.*
	Objective 5.2 Energy Independence - Reduce reliance on unstable energy sources. Potential Performance Measures: • *Measure of energy independence.*	• *Reduce the region's transportation-related energy consumption through increased use of transit, telecommuting, zero-emissions vehicles, carpooling, vanpooling, bicycles and walking and through increasing efficiency of the transportation network to diminish delay and corresponding fuel consumption.*
	Objective 5.3 Improve Security - Reduce vulnerability of the public, goods movement and critical transportation infrastructure to crime and emergencies (e.g., severe storms, earthquakes, landslides and flooding). Potential Performance Measures: • *Measure of personal safety.*	• *Explore opportunities for increased system monitoring for operations management and security.* • *Identify critical infrastructure in the region, including bridges.* • *Work with local, state and regional providers to develop coordinated regional emergency response plans.* • *Use security cameras and other means for monitoring regional transportation infrastructure and services.*

Goal 6 Human Health and the Environment

Goal Statement	Objectives	Potential Actions
Multi-modal transportation infrastructure and services reduce greenhouse gas emissions and protect, restore and/or enhance the quality of human health, fish and wildlife habitats, and natural ecological systems.	**Objective 6.1 Natural Environment –** Protect ecological systems, habitat conservation areas and water quality, and avoid or minimize undesirable impacts on wildlife and fish habitat conservation areas. Potential Performance Measures: • *Acres of environmentally-sensitive land impacted by new transportation infrastructure.* • *Number and percent of culverts on regional road system that inhibit fish passage.* • *Acres of riparian corridors impacted by new transportation infrastructure.* • *Percent of street system with street trees that provide canopy for interception of precipitation.* • *Percent of street system with infiltration capacity.*	• *Reduce the environmental impacts associated with transportation system planning, project development, construction and maintenance activities.* • *Locate new transportation and related utility projects to avoid fragmentation and degradation of components of regionally significant parks, habitat, natural areas, open spaces, trails and greenways.* • *Implement a coordinated strategy to remove or retrofit culverts on the regional transportation system that block or restrict fish passage.* • *Seek opportunities to incorporate green street designs and green development practices into community design and infrastructure plans.* • *Support the implementation of Green Streets practices through pilot projects and regional funding incentives.*
	Objective 6.2 Clean Air – Improve air quality so that as growth occurs, human health and visibility of the Cascades and the Coast Range from within the region is maintained and greenhouse gas emissions are reduced. Potential Performance Measures: • *Tons per year of smog forming, particulate and air toxics pollutants released.* • *Tons per year of carbon/green house gas emissions.* • *Rates of asthma or other air-quality-related health incidents.*	• *Encourage use of all modes of travel (e.g., transit, telecommuting, zero-emissions vehicles, carpooling, vanpooling, bicycles and walking) that contribute to clean air.* • *Ensure timely implementation and adequate funding for transportation control measures, as identified in the State Implementation Plan.* • *Monitor air quality.*
	Objective 6.3 Human Health - Increase physical activity, reduce noise impacts and support efficient trip-making decisions in the region. Potential Performance Measures: • *Number of trips per capita per day.* • *Daily vehicle miles traveled per person.* • *Walk and bike trips to school.* • *BTU's consumed per capita for transportation.*	• *Locate housing, jobs, schools, parks and other destinations within walking distance of each other whenever possible.* • *Provide a continuous network of safe, convenient and attractive bikeways and pedestrian facilities.* • *Design transportation system to minimize noise impacts through pavement techniques, traffic calming and other design features.*

Goal 7 Effective Public Involvement

Goal Statement	Objectives	Potential Actions
All major transportation decisions are open and transparent, and grounded in meaningful involvement and education of the public, including those traditionally under-represented, businesses, institutions, community groups and local, regional and state jurisdictions that own and operate the region's transportation system.	**Objective 7.1 Meaningful Input Opportunities** Provide meaningful input opportunities for interested and affected stakeholders, including people who have traditionally been underrepresented, resource agencies, business, institutional and community stakeholders, and local, regional and state jurisdictions that own and operate the region's transportation system in plan development and review. Potential Performance Measures: • *Inclusiveness of planning process and opportunities for involvement.*	• *Develop a detailed public involvement work plan consistent with the regional public involvement policy for each transportation plan, program or project that includes timelines, key decision points and opportunities for meaningful input throughout the decision-making process consistent with Metro's adopted public involvement policy for transportation planning.* • *Provide opportunities for public input.* • *Create a record of public comment received and agency response regarding draft transportation plans and programs at the regional level.*

Goal 8 Fiscal Stewardship

Goal Statement	Objectives	Potential Actions
Regional transportation planning and investment decisions maximize the return on public investments in infrastructure, preserving past investments for the future, emphasizing management strategies and prioritizing investments that reinforce Region 2040 and achieve multiple goals.	**Objective 8.1 System Maintenance, Preservation and Management –** Place the highest priority on the cost-effective maintenance, preservation, and management of existing transportation services and infrastructure. Potential Performance Measures: • *Condition of transportation system (by type).* • *Percent of road maintenance and preservation needs funded at local and state levels.*	• *Develop strategy to cost-effectively address maintenance, preservation, and management of existing transportation services and infrastructure.* • *Develop methods to consider life-cycle cost of facilities in the evaluation process.*
	Objective 8.2 Maximize Return on Public Investment - Place the highest priority on cost-effective investments that achieve multiple goals and ensure land use decisions protect public investments in infrastructure. Potential Performance Measures: • *Cost per vehicle hours of delay reduced.* • *Cost per lane miles of congestion reduced.* • *Transit trips per transit revenue hour.* • *Relative cost comparison for roadway and transit system operations and maintenance.* • *Percent of funding spent on high-priority projects that achieve multiple goals.* • *Cost per person trip.* •	• *Develop project solicitation process and procedures that place the highest priority on investments that achieve multiple goals.* • *Implement access management and other strategies to preserve the function of transportation facilities.* • *Develop agreements between transit service providers and local jurisdictions on the provision of transit service and the build-out of priority 2040 land-use areas and related street infrastructure.*
	Objective 8.3 Stable and Innovative Funding - Stable funding for operations, maintenance and preservation activities and priority regional transportation investments for all modes of travel. Potential Performance Measures: • *New transportation funding secured beyond existing resources, including those forecasted as necessary for the financially constrained and the illustrative systems.* • *Transportation investments by funding source or strategy.* • *Public and private commitments to pursue appropriate revenue sources.*	• *Develop innovative public and private partnerships to advance long-term Region 2040 vision and establish appropriate revenue sources and financing mechanisms.* • *Develop regional finance strategy and seek opportunities at the state and federal levels to secure stable funding.* • *Define roles and responsibilities for financing the regional transportation system.*

Goal 9 Accountability

Goal Statement	Objectives	Potential Actions
The region's government, business, institutional and community leaders work together so the public experiences transportation services and infrastructure as a seamless, comprehensive system of transportation facilities and services that bridge institutional and fiscal barriers.	**Objective 9.1 Representative Decision-Making-** Ensure representation in regional decision-making is equitable. Potential Performance Measure: • *Percent of population in cities and unincorporated area represented on JPACT and MPAC.*	• *Review JPACT membership for adequacy of smaller city and transit district representation in the region.*
	Objective 9.2 Coordination and Cooperation - Improve coordination and cooperation among the local, regional and state jurisdictions that own and operate the region's transportation system to remove barriers so the system can function as one system and to better provide for state and regional transportation needs. Potential Performance Measure: • *Percent of regional roadways connected to central operations center and ODOT operations center.*	• *Expand on current system and demand management coordination efforts at regional level.* • *Explore possibility of a regional approach for managing and operating bridges of regional significance.*
	Objective 9.3 Environmental Justice - Benefits and impacts of investments are equitably distributed. Potential Performance Measure: • *Distribution of transportation investments (by environmental justice target area).*	• *Evaluate benefits and impacts of recommended investments on environmental justice target areas.* • *Provide opportunities for public input.*

IV. CONCEPTS FOR SYSTEM DESIGN AND MANAGEMENT

Overview

This section describes the transportation system concepts that will guide the design and management of the regional transportation system. The design and management of the transportation system has profound and lasting impacts on a community. The regional transportation system concepts reflect the fact that each element of the transportation system may perform many functions.

Each transportation system concept serves as an aspirational ideal, guiding how to build and manage a regional transportation system that best serves the Region 2040 vision. As an aspiration, application of each concept will be tailored to respect existing development and neighborhoods and the natural environment. Implementation of the system concepts is intended to promote community livability by balancing all modes of travel and addressing the function and character of surrounding land uses when designing and managing roads of regional significance. Together, the implementation of the concepts will provide a well-designed system of throughways, arterials, local and collector streets, transit services, freight routes, bicycle and pedestrian facilities to make the transportation system safer and more effective for all modes of travel to support the Region 2040 vision.

The system concepts are organized into:

- **network concepts** that establish basic transportation planning and engineering principles for building a complete and well-connected regional transportation system that supports all modes of travel and emphasizes both accessibility and mobility for the movement of people and goods;
- **design concepts** that set forth principles of physical design of the system that help foster great communities throughout the region; and
- **management concepts** that establish the "toolkit" of programs and strategies that will allow the region to better use the existing transportation system, and any new capacity that is provided, to benefit all users.

The system concepts are the basis for the system needs analysis that follows in Chapter 3 of this plan, and recommended system investments shown in Chapter 5 of the plan.

A. Network Concepts

Arterial Network Concept

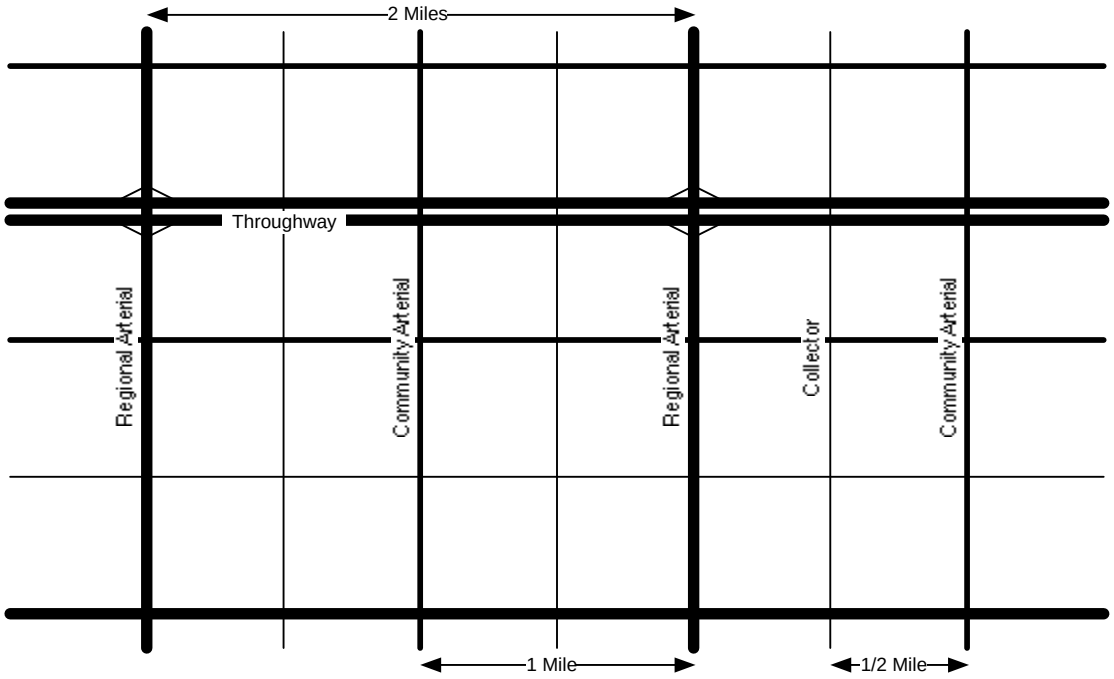
Though our region has changed dramatically over the past century, the shape of our street network serving our region has changed little. Most of our regional arterials were once farm-to-market roads, many established along Donation Land Claim boundaries at half-mile or mile spacing. Where it exists, this inherited network has proven to be an adequate match for accommodating the changing travel demands of our growing region.

A modern system of throughway and transit mobility routes built from the 1960s through today complements the regional arterial system, carrying longer trips separately from the surface network. The regional street concepts seek to apply these proven networks to developing and undeveloped areas, while seeking opportunities to bring existing developed urban areas closer to this ideal.

Accessibility

The arterial network concept calls for one-mile spacing of 4-lane regional arterials, with 2-lane community arterials at half-mile spacing whenever possible, recognizing that existing development, streams and other natural features may limit the provision of these connections. Shown in **Figure 2**, the illustrative arterial network is complemented by a well-connected system of collector and local streets. This system is multi-modal in design, serving automobiles, motorcycles, trucks, transit, bicycles and pedestrians. The 4-lane arterial design reflects an optimal compromise for all of these modes, accommodating urban levels of traffic, while also allowing for safe and convenient bicycle and pedestrian travel and crossings at major intersections.

Figure 2
Throughway and Arterial Network Concept



Note: Idealized concept for illustrative purposes only, showing ideal spacing of arterial facilities and illustration of multi-modal corridors for system analysis. Most of the region's travel occurs off the throughway system, and on a network of multi-modal arterial streets. The RTP policy places a new emphasis on ensuring that arterial networks are fully developed as the region grows, helping both local circulation and preserving highway capacity for cross-regional and statewide travel. Collectors are not part of the regional transportation system, but provide an important link between the local street and arterial networks for all modes of travel.

Traditionally, throughways and streets are classified into a functional hierarchy that focuses primarily on traffic movement and vehicle access to surrounding properties. In general, the transportation system should be designed to provide opportunities for through-travel on arterial streets and throughways, and to support local travel to community destinations on collector and

local streets. Traffic speeds, access and street level of connectivity should vary depending on the function of the street. This approach results in a traffic hierarchy of:

- throughways (e.g., limited-access facilities such as I-85, US 26, I-5, I-205 and I-405)
- arterial streets (e.g., examples include Cornell Road in Washington County, Halsey Street in the City of Portland and Sunnyside Road in Clackamas County).
- collector streets
- local streets

The traditional traffic classifications for throughways, arterials and other streets are a good starting point for spreading out traffic in communities, and avoiding overly wide roads as a community grows. However, when designing transportation facilities it is important to not only consider the roadway's traffic function, but also other modes of travel and character of the surrounding community that the facility will serve.

Though the individual design of throughways, arterials, collectors and local streets is almost always uniquely tailored to specific site conditions, there are unifying features that are necessary to most urban settings, and thus a basic construct common to most urban transportation systems. The local and collector street system remain an important complement to the regional transportation system, but are a local responsibility.

The following are the building blocks for creating a well-connected arterial system that effectively distributes traffic, providing multiple routes for travel:

THROUGHWAYS

Throughways are limited-access facilities designed for interstate, intrastate and cross-regional travel. Throughways are classified as a principal arterial and have the function of connecting major activity centers within the region, including the central city, regional centers, industrial areas and intermodal facilities to one another and to points outside the region. These routes also form the primary connection between neighbor cities and the urban area and the region to other parts of the state, California and rest of the Pacific Northwest and Canada.

These routes usually carry between 50,000 to 100,000 vehicles per day and provide for high-speed travel for longer motor vehicle trips within and through the region. Throughways serve as the primary freight routes, with an emphasis on mobility. Throughways are divided into limited-access freeway designs where all intersections have separated grades, and highways and parkways that include a mix of separate and at-grade intersections. Throughway interchanges are spaced no less than two miles apart.

ARTERIALS

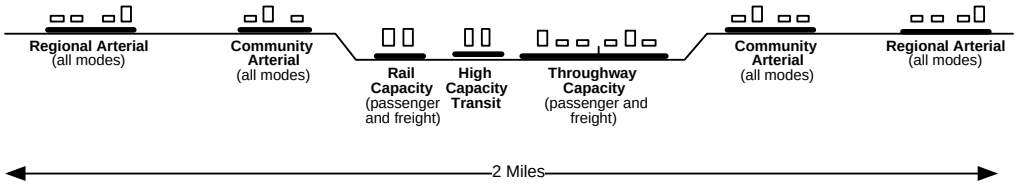
Arterial streets have the function of linking communities within the region and interconnecting major activity centers and industrial areas to the throughway system. These routes link major commercial, residential, industrial and institutional areas. Arterials usually carry between 10,000 and 40,000 vehicles per day and provide for higher speeds than collector and local streets. These facilities are divided into major and minor classifications. Major arterials function to serve longer distance, through trips and serve more of a regional traffic function. Minor arterials function to serve shorter, more localized travel within a community. As a result, major arterials usually carry more traffic than minor arterials. Arterial streets are usually spaced about one mile apart and are designed to accommodate bicycle, pedestrian, and transit travel.

Mobility

The fabric of well-connected arterial and collector streets is designed to allow for efficient, multi-modal travel at the community level. Complementing this fabric is a dispersed network of regional mobility corridors that allow for cross-regional, statewide and interstate travel. Throughways define most of these regional mobility corridors, and are an increasingly precious resourcehaving been largely built with federal subsidies in the 1960s and 70s and with growing congestion in the region.

Today, throughways are typically 6-lane facilities that serve as the backbone of the regional economy. Several throughways are now supplemented with high capacity transit service built since the mid-1980s that provide an important passenger alternative to throughway travel. Parallel arterial streets, heavy rail and regional multi-use trails with a transportation function further complement mobility in these corridors. These facilities are to be considered in conjunction with the parallel throughways for the purpose of system evaluation and monitoring, system and demand management and phasing of physical investments to the individual facilities. The concept of regional mobility corridors is shown in **Figure 3**.

Figure 3
Regional Mobility Concept

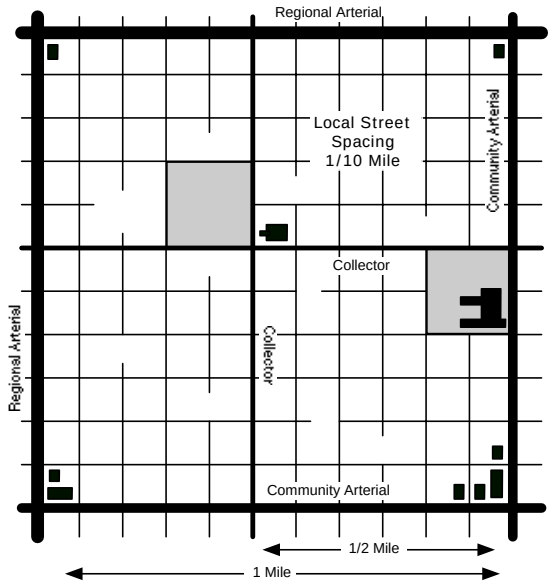


Note: Idealized concept for illustrative purposes showing recommended range of system analysis for the evaluation, monitoring, management and phasing of investments to throughways, arterials and transit service in the broader corridor. The illustration is modeled after I-84 between 12th and 60th avenues in Southeast Portland.

Local Street Network Concept

Local jurisdictions are responsible for defining the fabric of local streets within the mile-spacing network of regional arterials. Since the late 1990s, the region has enforced a minimum level of 1/10 mile for local street connectivity in the interest of minimizing local traffic on regional arterials. Shown in **Figure 4**, this concept promotes bicycle and pedestrian travel and provides for the most direct access from local street systems to community destinations and transit on regional arterials. More frequent bike and pedestrian connections are made where collector and local streets cannot be constructed due to existing development and other topographic or environmental constraints. Local street connectivity also benefits emergency response.

Figure 4
Local Street Network Concept



Note: Idealized concept for illustrative purposes showing desired spacing in residential and mixed-use areas to serve local circulation, walking and bicycling. The illustration is modeled after neighborhoods in Southeast Portland.

Collector and local streets are not part of the regional transportation system, but provide an important complementary role to the design and optimization the regional transportation system. Collector and local streets are general access facilities that provide for community and neighborhood circulation.

COLLECTOR STREETS

Collector streets serve neighborhood traffic and commercial/industrial areas. Collectors provide local circulation alternatives to arterials, balancing movement with access to land uses. They provide both circulation and access within residential and commercial areas, helping to disperse traffic that might otherwise use the arterial system for local travel. As such, collectors carry fewer motor vehicles than arterials, with reduced travel speeds. However, an adequate collector system is needed to serve these local travel needs. Collectors may serve as local bike, pedestrian and freight access routes, providing local connections to the arterial and transit network. Collectors usually carry between 1,000 and 10,000 vehicles per day. Collector streets are usually spaced at half-mile intervals, or midway between arterial streets. Speeds and volumes on collector streets are moderate.

LOCAL STREETS

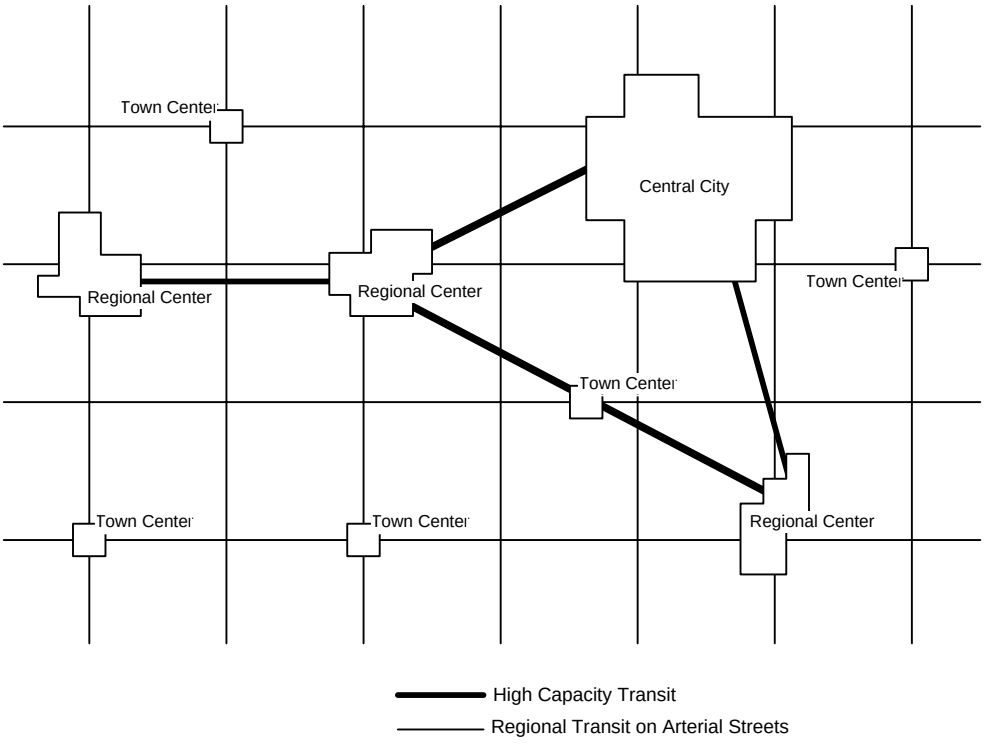
The local street system is used throughout the region to provide for local circulation and access. Local streets connect to collector streets and provide access to small activity centers, homes and neighborhoods. Regional regulations require local street spacing of no more than 530 feet in new residential and mixed-use areas, and cul-de-sacs are limited to 200 feet in length. These connectivity requirements are needed to ensure that a lack of adequate local street connections does not result in the arterial street system becoming congested. In particular, the lack of local

street connections forces local auto trips onto the throughways and the arterial network, resulting in significant congestion on these facilities. Local streets usually carry fewer than 1,000 vehicles per day. Speeds on local streets are relatively low.

Regional Transit Network Concept

The regional road system has carried public transit for more than a century, beginning with the streetcars of the early 1900s, and evolving to a combination of vans, buses, streetcars and light rail trains today. Light rail typically occupies its own right-of-way, though also shares the street in the Portland central city and other centers. The regional transit system concept calls for bus service on the balance of the regional arterial system, with streetcars on some streets in the Portland central city and regional centers. These services require passenger infrastructure at stops and stations, and a pedestrian system that connects to adjacent local and collector streets. The regional transit system concept retains the regional and local transit service elements from the 2004 RTP and integrates them in a different way to serve this growing demand as shown by **Figure 5**.

Figure 5
Regional Transit Network Concept



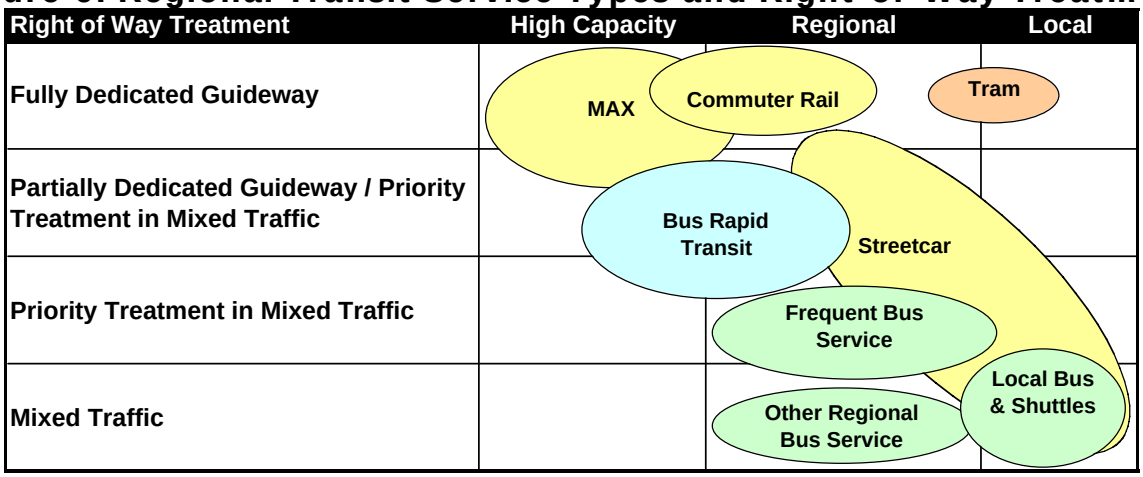
The Region 2040 plan set forth a vision for connection the central city to regional centers like Gresham, Clackamas and Hillsboro with light rail. The RTP expands this vision to include a complete network of local transit along local streets to better serve suburban communities.

The concept shown in **Figure 5** is built around a web of regional and local transit options that allow convenient movement to, from, within and between 2040 centers. In parts of the region where development focuses on regional and town centers, station communities, the RTP will move more toward providing radial systems serving these centers that help leverage higher density development needed to support higher levels of transit service, with overlap and connections providing the complex web of transit options necessary to serve growing demand. In areas where

development focuses on 2040 corridors, main streets and within centers, the RTP focus will be to provide transit-supportive densities and well-connected street and transit systems to allow convenient bicycle and pedestrian access and transfers for multi-destination trips.

The components of the regional transit network have different right-of-way needs and effects on achieving the goals and measurable objectives identified in Section II of this chapter. The transit network has a functional hierarchy similar to the street functional hierarchy. **Figure 6** shows the regional transit service types and right-of-way treatments.

Figure 6. Regional Transit Service Types and Right-of-Way Treatment



Note: Bus Rapid Transit by definition can cover a wider range of application, including fully dedicated guideway. Commuter rail can achieve higher capacity than represented with increased frequencies and train length.

This change in emphasis responds to significant growth in population and jobs in the areas outside of the Portland Central City that are difficult to serve with the current Portland Central City focused hub-and-spoke system that developed for most of the 20th century. Beginning in the 1980's with a major redesign of the eastside Portland bus routes and continued development of transit centers throughout the region, TriMet began to respond to changing travel patterns in the region.

This concept represents a deepening commitment to this approach, especially in parts of the region outside of the older eastside neighborhoods in the City of Portland, where the road infrastructure and topography do not easily lend themselves to such a densely connected street system. RTP background research demonstrated growing demand and desire for a web of convenient travel service connections between suburban areas of the region that remain also linked to the Central City. This is also consistent with changing travel patterns and more demand for transit trips throughout the region that are not destined for the Central City, even though Central City demand remains high.

In addition, possible future passenger rail service corridors to the neighboring cities, such as Milwaukie-Lake Oswego-Tualatin-Sherwood-McMinnville service as well as extension of Westside Commuter Rail to Salem should be explored to expand transit connections from the region to the rest of state.

Regional Freight Network Concept

The regional freight system is a collection of transportation networks connected by intermodal terminals and industrial areas for the purpose of moving goods. River and air routes are global

gateways for the region, the state and the Pacific Northwest economy. Throughways, regional arterials, rail, and pipeline networks are the landside connections that move goods domestically both in and outside the region. **Figure 7** shows these critical components of the regional freight system.

Figure 7

[Place-holder for Freight Concept schematic under development by Regional Freight and Goods Movement planning effort during Phase 3]

Regional Bike and Pedestrian Network Concept

Connectivity of the street system is critical because the arterial, collector and local street networks provide the backbone for bicycle and pedestrian travel in the region. In addition, almost every transit trip begins or ends on an arterial or collector street. Arterials are not always the best routes for bikeways, but are almost always the most direct route and are usually the last connection to destinations in centers and along 2040 corridors. The RTP has a responsibility to provide continuous bicycle and pedestrian connections on all arterials where possible, recognizing there may be locations in the region where existing development, natural features or other circumstances may cause right-of-way constraints. This, in turn, requires designing the transportation system to have a well-connected network of four-lane arterials, where possible, that are supported by a well-connected network of collector and local streets.

For purposes of the RTP, the regional bicycle and pedestrian networks correspond to the arterial street network and identified regional multi-use trails with a transportation function. The regional pedestrian network also includes infrastructure in pedestrian districts that correspond to 2040 centers and station communities. Bikeway gaps on arterials may be addressed through bikeways or bicycle boulevards off the regional system on parallel facilities when right-of-way constraints exist or when the regional arterial system does not meet arterial spacing standards.

System Management Concept

Transportation infrastructure represents a major public investment. Roads, bridges and Port facilities often constitute the largest assets owned by local governments and Port authorities. Despite the effort put into designing an ideal system, the road, freight and transit networks sometimes do not perform up to their true potential. A road or rail line that does not provide good service provides a low return on investment. Therefore, managing the system so that the full potential is realized is a cost-effective way to increase the rate of return on the public's investment in the transportation system.

To accomplish this, many states and metropolitan areas are looking at new models for managing the capacity that already exists on regional transportation systems, and for managing the addition

of new capacity. Strategies that allow the region to better use the existing transportation system benefit all users of it.

The concept of regional system management has two components. The first component includes strategies that focus on making the infrastructure better serve the users. The second component includes programs that enable the users to take advantage of everything the system has to offer. These components are commonly known as system and demand management, respectively.

Application in the Portland Metropolitan Region

In some parts of the Portland metropolitan region, the transportation system is generally complete, while in other parts of the region, especially those where new development is planned, significant amounts of infrastructure will be added. In both contexts, management strategies have great value. Where the system is already built-out, such strategies may be the only ways to manage congestion and achieve other objectives. Where growth is occurring, system and demand management strategies can be integrated before and during development to efficiently balance provision of capacity with demand.

Notably, technology is playing an increasing role in the implementation of transportation management strategies. The application of advanced technology to transportation, referred to as Intelligent Transportation Systems (ITS), can multiply the benefits of some strategies and create opportunities where none existed before. For example, a common strategy for managing throughways is to try to respond quickly when an incident occurs. This simple approach to system management does not require any advanced technology, but it benefits from surveillance devices that shorten the time it takes to determine that a crash or breakdown has occurred or communication technology that expedites the dispatching of a tow truck or emergency vehicle, promoting coordination among responders.

Application of demand management increases the benefit of new infrastructure improvements as well as offering travel choices to slower developing areas of the region. For example, individualized marketing applied to a travel corridor in North and Northeast Portland showed a net increase in transit ridership, greater than ridership increases occurring from all other factors. The same project yielded higher levels of other non-drive-alone options and an increase in local trips. An example of demand management serving slower developing areas comes from the regional rideshare program, with 8,000 registrants for carpool matching services and a coordinated vanpool program for commute trips equal to or greater than 10 miles, one-way.

System Governance Concept

Government must be a responsible steward of the public's money. This means we must work in a cooperative and coordinated manner with our partners in the private sector and with local, regional and state governments - including the region's 25 cities, three counties, Oregon Department of Transportation, Oregon Department of Environmental Quality, Port of Portland, TriMet, South Metro Area Rapid Transit (SMART), Washington Regional Transportation Council, Washington Department of Transportation and other Clark County governments. We serve the same constituency and they must know that our mutual goal is provide them with a superior and seamless transportation system.

While this RTP reflects a more pragmatic approach to managing the transportation system, it also seeks to stabilize funding at a strategic level needed to support the Region 2040 Growth Concept and meet the desired outcomes described in the plan. Reaching a consensus on how best to deliver a transportation system that meets public expectations rests on a level of public involvement, fiscal

stewardship and accountability that helps build public trust in government's ability to meet the region's transportation challenges today and in the future.

B. Design Concepts

The previous section described system concepts that should guide the design and management of the regional transportation system. This section describes the individual elements of each the system concepts in more detail. For the purpose of this plan, two three design groupings for throughways and two for arterial streets are shown to illustrate these basic design principles.

Regional Design Concepts

Table 5 summarizes throughway and arterial classifications, design elements and recommended function. Illustrations included in Table 5 show how the multi-modal design elements can be integrated. The typical cross sections are for illustrative purposes only. The specific process for identifying needed exceptions will be set forth in Chapter 7. The classifications are grouped by the function and land use(s) a facility is intended to serve:

- **Principal Arterials** that emphasize motor vehicle and freight travel and connect major activity centers and provide inter-city, inter-regional and inter-state connections, with an emphasis on mobility.

- **Major and Minor Arterials** in mixed-use areas (e.g., 2040 centers, station communities and main streets) that integrate motor vehicles, freight, transit, bicycle and pedestrian modes of travel, with an emphasis on pedestrian, bicycle and transit travel and accessibility.

- **Major and Minor Arterials** in 2040 mixed-use corridors, industrial areas, employment areas and neighborhoods that integrate motor vehicles, freight, transit, bicycle and pedestrian modes of travel, with an emphasis on vehicle mobility and special pedestrian infrastructure on transit streets.

Designs for pedestrians, bicyclists and transit users

In addition, street design can have a significant impact on people's ability to walk, bike and use transit. Sidewalks and bikeways provide a safe route for non-motorized traffic and encourage walking and biking. Where appropriate to support land use objectives, traffic calming measures such as narrower travel lanes, compact intersections, bricked streets and on-street parking can slow vehicle traffic and reduce traffic accidents for pedestrians, bikers and motorists. Painted crosswalks, appropriate use of signs and signals and median islands make it easier for pedestrians and cyclists to cross roads. In addition, curb cutouts, ramps and signals designed for the hearing and sight impaired ensure that people of all ages and abilities can safely cross roadways. Facilities and infrastructure such as street lighting, benches, telephones, waste containers, landscaped buffers that include trees, planters, lampposts and kiosks can make an environment more attractive and create a sense of community and safety that encourages walking, bicycling and use of transit.

Linking street design to stormwater management and natural resource protection

Ecosystems do not conform to political boundaries. Streams and watersheds cross both city and county boundaries, and transportation projects often impact watersheds. In recent years, it has become increasingly important to acknowledge the effect of developing the public right-of-way on the health of our environment, particularly urban waterways. Streets and driveways combine to form the largest source of impervious surfaces in our urban landscape. A particular challenge is

how to address conflicts between planned transportation improvements and identified stream corridors, and how transportation improvements can be located, designed and constructed in concert with stream corridor protection plans.

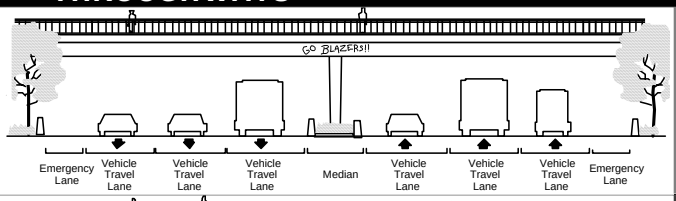
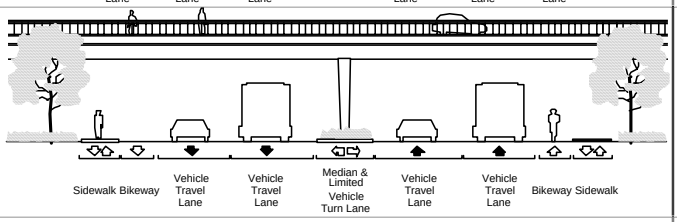
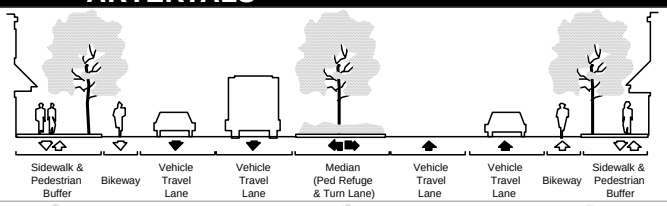
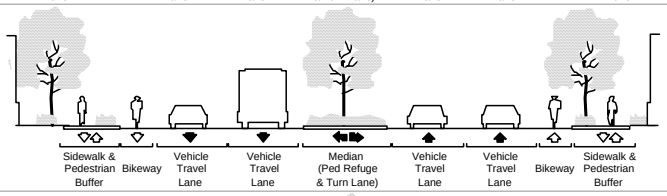
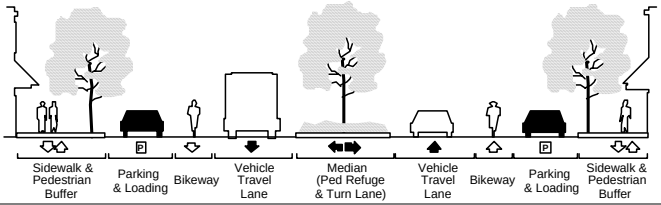
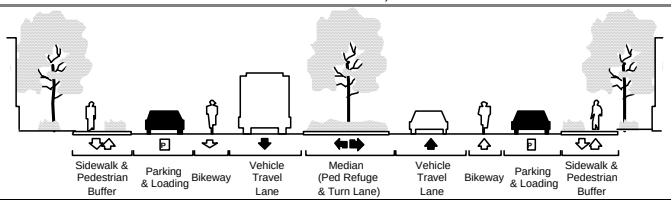
Higher impervious surface coverage has been linked to dramatic changes in the shape of streams, water quality, water temperature and the biological health of waterways. The regional Green Streets program seeks to mitigate this effect on streams over time through a combination of retrofits to existing streets, and design guidelines for new streets that allow stormwater to infiltrate directly into the ground.

As roadways and other types of transportation infrastructure cut across the landscape, they form barriers to natural wildlife movement, disrupting wildlife migration patterns and population dynamics. These conflicts can be minimized through both engineered solutions, such as wildlife-crossing devices/structures, as well as a more holistic approach of calling out specific wildlife corridor acquisition/restoration needs as part of transportation project development.

Infrastructure planning and design should seek avoid fish and wildlife habitat conservation areas first and then identify opportunities to mitigate the effects of transportation infrastructure and services through the application of “green” design treatments where possible. For example, street trees, vegetated swales and other green street treatments can be used to intercept rainwater and convey stormwater in the public right-of-way adjacent to the region’s throughways and arterials, where appropriate. Metro’s Green Streets handbook recommends combining the use of green street elements with a traditional pipe system for arterial streets to avoid safety issues of standing water on major streets during significant storm events. However, the majority of streets in the urban area will be local and, in some cases, may be appropriate for implementation of “pipeless” streets.

In addition, trees intercept rainwater on leaves, branches and trunks and absorb stormwater runoff through their root systems, reducing the amount of water runoff that must be managed in urban areas. Permeable pavement and swale treatments may not be appropriate in all locations due to soil composition, land use and the volume and speed of traffic.

Table 5. Summary of Throughway and Arterial Design Concepts

Trip Type	2040 Design Concept	Network Function	Illustrative Design Concept	Typical number of travel lanes[9]
THROUGHWAYS				
Interstate/ regional	Freeway	Principal arterial		4 to 6 through lanes with grade separated interchanges
Interstate/ regional	Highway	Principal arterial		4 to 6 through lanes with grade separated intersections/ interchanges
Interstate/ regional	Parkway	Principal arterial	[Place-holder for Parkway Concept schematic under development]	4 to 6 through lanes with grade separated intersections/ interchanges
ARTERIALS				
Regional/ City	Regional Boulevard • *2040 centers* • *station communities* • *Main streets*	Major Arterial		4 through lanes with turn lanes
Regional/ City	Regional Street • *Industrial areas* • *Employment areas* • *Corridors* • *Intermodal facilities*	Major Arterial		4 through lanes with turn lanes
City	Community Boulevard • *2040 centers* • *station communities* • *Main streets*	Minor Arterial		2 to 4 through lanes with turn lanes
City	Community Street • *Industrial areas* • *Employment areas* • *Corridors* • *Intermodal facilities*	Minor Arterial		2 to 4 through lanes with turn lanes

[9] The number of through lanes may vary based on right-of-way constraints or other factors that may require additional lanes due to a lack of connectivity in some places the region. The process for identifying needed exceptions will be described in Chapter 7.

For more information about the road network design elements, refer to the design guidelines contained in Metro's Livable Streets handbooks, which address federal, state and regional transportation planning mandates with design guidelines intended to support local and regional implementation of the 2040 Growth Concept and the regional system concepts described in this plan.

Transit Network Design Concepts

TriMet is the primary public transportation provider for the metropolitan region and is committed to providing the appropriate level of transit service to support regional goals and strategies identified in the 2040 Growth Concept and Regional Transportation Plan (RTP). TriMet implements the transit component of the Regional Transportation Plan through annual updates and expansions to their service plan, called the Transit Investment Plan (TIP).

Consistent with the Oregon Transportation Plan, TriMet's TIP focuses on the "Total Transit System," not just service enhancements. In addition to frequent, reliable service throughout the day, other elements of the "Total Transit System" include easy access to bus stops, clear customer information and comfortable places to wait for transit. The TIP outlines where transit will grow in the future following a review for ridership potential, cost, impact on existing service and operational feasibility. Currently, TriMet has no minimum standards for provision of new service, however, regional transit policies, potential ridership and traffic congestion are all considerations in where expanded transit service is most needed. Focusing on the total transit system, bolstering existing service, reliability, passenger infrastructure, customer information and access is another tool to help leverage higher density development and ridership to support higher levels of transit service. This type of investment emphasizes management of the existing system to optimize the return on public investment.

The following are the elements used to plan for and design the high capacity transit, regional transit and local transit networks.

HIGH CAPACITY TRANSIT NETWORK

High capacity transit provides the backbone of the transit network connecting the Central City, Regional Centers, and passenger intermodal facilities. It operates on a fixed guideway or within an exclusive right-of-way, to the extent possible. Service frequencies vary by type of service. High levels of passenger infrastructure are provided at transit stations and station communities including real-time schedule information, ticket machines, special lighting, benches, shelters, bicycle parking, and commercial services. Speed and schedule reliability are preserved using transit signal priority at at-grade crossings and/or intersections. Types of high capacity transit facilities and services include:

- Light Rail
- Commuter Rail
- Bus Rapid Transit
- Intermodal Passenger Facilities (e.g., Amtrak & Greyhound)

REGIONAL TRANSIT NETWORK

The regional transit network relies on transit service headways of 15-minutes or less on most regional arterial roadways (all day and weekends when possible). It also offers coverage and access to primary and secondary land-use components, with streetcar service functioning primarily as connection between primary and secondary land-use components that leverages higher density land uses in these areas. This service also includes preferential treatments at regional transit stops and high ridership locations such as transit signal priority and enhanced

passenger facilities such as covered bus shelters, curb extensions and special lighting. Park-and-ride lots provide important access to this network. Types of regional transit services and facilities include:

- Frequent Bus
- Regional Bus
- Streetcar
- Park-and-Ride Lots
- Regional Transit Stops

COMMUNITY TRANSIT NETWORK

The community transit network provides basic service and access to the regional and high capacity transit networks. Service frequencies vary by type of service. It also offers coverage and access to primary and secondary land-use components, with streetcar service functioning primarily as a local circulator that leverages higher density land use within primary or secondary land uses. Transit preferential treatments and passenger facilities are appropriate at high ridership locations. Sidewalk connectivity and protected crosswalks are critical elements of the community transit network. Types of community transit services include:

- Streetcar
- Tram
- Local Bus
- Mini-Bus
- Para-Transit

Each of these networks plays a different role in leveraging and supporting the Region 2040 vision and land uses as illustrated in **Table 6**.

Table 6. Transit Service Type by 2040 Land Use

	Light Rail	Streetcar	Commuter Rail	Bus Rapid Transit	Frequent Bus	Regional Bus	Local Bus & Shuttles
Primary Land Use Components Central City Regional Centers Industrial Areas Station Communities Intermodal Facilities	•	•	•	•	•	•	•
Secondary Land Use Components Employment Areas Town Centers Corridors Main Streets		•		•	•	•	•
Other Land Use Components Inner Neighborhoods Outer Neighborhoods							•

System Management Design Concepts

System management, which is also known as Transportation System Management and Operations (TSMO), requires a careful balance between safety and performance. Perhaps the most rudimentary example is a four-lane arterial with no signal timing, which does not fully utilize the existing capacity. A common TSMO strategy involves optimizing traffic signal timing to improve performance and safety. Signals, speed limits, access management and many other elements can be managed to improve the safety and performance of existing infrastructure and thereby maximize the value of the public investment and reliability of the system. Some of these strategies are implemented continuously while others are deployed in response to certain events, some of which can be anticipated while others cannot.

OPERATIONAL MANAGEMENT

These are strategies that are carried out continuously, such as traffic signals and ramp meters. Through ongoing management, minor adjustments can be made, sometimes in real-time, to improve system performance. In the transit realm, for example, the location of buses can be monitored so that dispatchers know if one is behind schedule or off route.

INCIDENT MANAGEMENT

These strategies are oriented to situations that may arise at any time and for which operators must be prepared. The most common example is traffic or weather incidents, which includes crashes as well as breakdowns and stalls. When such events occur, the relevant operators are prepared to respond quickly so that traffic can be restored. Other activities that can also been from these strategies include evacuation and security planning efforts.

EVENT MANAGEMENT

These strategies are also oriented to occasional situations but in this case, the events are known in advance, such as a parade, a major sporting event, a work zone or other kind of disruption. For example, with a major sporting event, departing spectators may create a strain on the local roads as well as the transit service. Operators can adjust signal timing, increase transit service and take other measures to limit the disruption.

Demand Management Concepts

Demand management, which is also known as Transportation Demand Management (TDM), focuses on the user of the system, the barriers they encounter and the benefits of traveling efficiently for all trip purposes. TDM helps the system as a whole perform optimally by providing services, incentives, supportive infrastructure and awareness for travel options. Examples of each are: rideshare matching services; employer transit pass incentive programs; flex time programs, end-of-trip facilities like bike racks and showers; and, marketing programs that provide individualized travel information.

Similar to TSMO, these strategies also improve the performance of existing infrastructure and services, and thereby maximize the value of the public investment and reliability of the system. A meaningful way to categorize them is according to the travel choices that individuals make, including when, where, and how to go from one place to another for all types of trips.

TRIP REDUCTION PROGRAMS

These programs promote the concept that by combining trips, a person can save time and money (such as the cost of gas if they are driving). For example, doing several errands on

one trip often requires less driving than making each errand separately. Living near work, school and shopping shortens trip length, allowing for walking trips which increases community health. Working from home via phone or computer is an option for some people to eliminate commute trips.

MODE CHOICE PROGRAMS

These programs promote benefits of and balanced transportation choices by, helping people efficiently get to work, school, shopping, and other trip purposes. While some trips may require travel by car, many others are possible by walking, biking or taking transit. Some programs focus on travelers who are not using these options because they lack information that would increase their comfort. For example, many people would like to ride their bikes to work or school but only through individualized marketing did they receive a map that guides them to safer routes. Other programs in this category seek to increase use of options by such means as carsharing, providing rideshare matching services, partially financing vanpools and reserving parking spaces for these vehicles. This example demonstrates that mode choice programs depend on providing services, incentives and supportive infrastructure while raising awareness.

Examples of Trip Reduction and Mode Choice Programs and Strategies

Traveler Information Programs

These programs seek to help travelers find the best route and timing for their trips, and can also help select among modes. For example, some driving commuters take one route out of habit even though another route might be more reliable. The latest version of Google Maps compares transit and auto travel times and cost for trips. Other programs work closely with employers to allow employees to commute before or after the peak travel periods. Information about system performance and travel options helps travelers make more informed choices about routes, time and mode. Such programs depend on public-private partnerships to share knowledge and expertise.

Parking management

Strategies and programs that result in more efficient use of parking resources. Parking management strategies can include shared parking that serves multiple users or destinations, preferential parking or price discounts for carpools and/or short-term parking. When appropriately applied, parking management can reduce the number of parking spaces required in some situations. Implementation of parking management may require changing current development, zoning and design practices, broadening how parking problems and solutions are addressed and activities to improve enforcement and addressing potential spillover impacts.

Value Pricing

Value pricing – sometimes called congestion pricing - involves the application of market pricing (through variable tolls, variable priced lanes, area-wide charges or cordon charges) to the use of roadways at different times of day. Value pricing has been successful in other parts of the U.S. and internationally at managing peak use on limited roadway infrastructure by providing an incentive for drivers to select other modes, routes, destinations or times of day. By shifting discretionary peak hour travel to other transportation modes, routes or to off-peak times of day helps the system to operate more efficiently. In addition, those drivers who choose to pay the toll can benefit from significant savings in time. Similar variable charges have been utilized in other industries such as airline tickets, telephone rates and electricity rates. Value pricing is the only demand management tool that is location and time of day specific, making it uniquely effective in improving mobility and

reliability of the transportation system while limiting vehicle miles traveled and congestion-related auto emissions. In addition, value pricing may generate revenues to help with needed transportation improvements.

GLOSSARY OF TERMS

Accessibility – The ability to move easily from one mode of transportation to another mode or to a given land-use destination. The more places that can be reached, the greater the accessibility. Of equal importance is the quality of travel choices to a given destination. Accessibility is governed by both land-use patterns and the number of travel alternatives provided by the transportation system.

Access management – Measures regulating access to streets, roads and highways from public roads and private driveways. Measures may include but are not limited to restrictions on the siting of interchanges, restrictions on the type and amount of access to roadways, and use of physical controls, such as signals and channelization including raised medians, to reduce impacts of approach road traffic on the main facility.

Alternative transportation mode – This term refers to all passenger modes of travel except for single-occupancy vehicle, including bicycling, walking, public transportation, carpooling and vanpooling.

Americans With Disabilities Act (ADA) of 1990 – Civil rights legislation enacted by Congress that mandates the development of a plan to address discrimination and equal opportunity for disabled persons in employment, transportation, public accommodation, public services and telecommunications. TriMet's ADA transportation plan outlined the requirements of the ADA as applied to Tri-Met services, the deficiencies of the existing services when compared to the requirements of the new act and the remedial measures necessary to bring TriMet and the region into compliance with the act. Metro, as the region's metropolitan planning organization (MPO) is required to review TriMet's ADA Paratransit Plan annually and certify that the plan conforms to the Regional Transportation Plan. Without this certification, TriMet cannot be found to be in compliance with the ADA. ADA also affects the design of pedestrian facilities being constructed by local governments.

Arterials - Streets that have the function of linking communities within the region and interconnecting major activity centers and industrial areas to the throughway system. These routes link major commercial, residential, industrial and institutional areas. Major arterials function to serve longer distance, through trips and serve more of a regional traffic function. Minor arterials function to serve shorter, more localized travel within a community. As a result, major arterials usually carry more traffic than minor arterials. Arterial streets are usually spaced about one mile apart and are designed to accommodate bicycle, pedestrian, and transit travel.

Bicycle – A vehicle having two tandem wheels, a minimum of 14 inches in diameter, propelled solely by human power, upon which a person or persons may ride. A three-wheeled adult tricycle is considered a bicycle. In Oregon, a bicycle is legally defined as a vehicle. Bicyclists have the same right to the roadways and must obey the same traffic laws as the operators of other vehicles.

Bicycle boulevards - Sometimes called a bicycle priority street, a bicycle boulevard is a low-traffic street where all types of vehicles are allowed, but the roadway is modified as needed to enhance bicycle safety and convenience by providing direct routes that allow free-flow travel for bikes at intersections where possible. Traffic controls are used at major intersections to help bicyclists cross major streets. Typically these modifications will also calm traffic and improve pedestrian safety.

Bicycle facilities – A general term denoting improvements and provisions made to accommodate or encourage bicycling, including parking facilities, all bikeways and shared roadways not specifically designated for bicycle use.

Bike lane – A portion of a roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.

Bikeway – A bikeway is created when a road has the appropriate design treatment for bicyclists, based on motor vehicle traffic volumes and speeds. On-road bikeways include shared roadway, shoulder bikeway, bike lane or bicycle boulevard design treatments. Another type of bikeway design treatment, the multi-use path, is separated from the roadway.

Bus Rapid Transit - Bus Rapid Transit (BRT) service uses buses in their own guideway or mixed in traffic with limited stops and a range of transit priority treatments to provide with speed, frequency and comfort. This service runs at least every 15 minutes during the weekday and weekend mid-day base periods. Passenger infrastructure are concentrated at transit centers. Regional rapid bus passenger infrastructure include schedule information, ticket machines, special lighting, benches, covered bus shelters and bicycle parking.

Capacity – The maximum number of vehicles (vehicle capacity) or passengers, bicyclists or pedestrians (person capacity) that can pass over a given section of roadway or transit line in one or both directions during a given period of time under prevailing roadway design and traffic conditions.

Carsharing – A transportation demand management strategy that shares the use of one or more vehicles among a group of people. Reported benefits include a reduction in vehicle ownership, a reduction in parking needs, an increase in non-drive-alone trips and improved accessibility. Implementation in the Portland region includes public/private partnerships and a private sector membership organization.

Central City - The downtown and adjacent portions of the city of Portland. See the Growth Concept map and text.

Collector streets - Collector streets serve neighborhood traffic and commercial/industrial areas. Collectors provide local circulation alternatives to arterials, balancing movement with access to land uses. They provide both circulation and access within residential and commercial areas, helping to disperse traffic that might otherwise use the arterial system for local travel. Collectors may serve as local bike, pedestrian and freight access routes, providing local connections to the arterial and transit network. Collector streets are usually spaced at half-mile intervals, or midway between arterial streets. Speeds and volumes on collector streets are moderate.

Commuter rail - Commuter rail is the use of existing freight railroad tracks either exclusively or shared with freight use, for passenger service. The service is typically focused on peak commute periods but can be offered other times of the day when demand exists and where rail capacity is available. The stations are typically located one or more miles apart, depending on the overall route length. Stations offer basic infrastructure for passengers, bus and LRT transfer opportunities and parking if supported by adjacent land uses.

Concept Planning – A planning process to create a blueprint for the future of land brought inside the urban growth boundary for urbanization. The process is required to address the provisions listed in Title 11 of the Urban Growth Management Functional Plan. These provisions include, but are not limited to a minimum level of residential units per acre, a diversity of housing stock, an adequate transportation system, protection of natural resource areas and needed school facilities.

Corridors (2040 Design Type) - While some corridors may be continuous, narrow bands of higher intensity development along arterial roads, others may be more "nodal", that is, a series of smaller centers at major intersections or other locations along the arterial which have high quality pedestrian environments, good connections to adjacent neighborhoods and good transit service. So long as the average target densities and uses are allowed and encouraged along the corridor, many different development patterns - nodal or linear - may meet the corridor objective.

Developed areas - These are areas of the region that are primarily developed, with most new development occurring through refill and redevelopment.

Developing areas - These are areas of the region where new development will occur through a combination of greenfield, refill and redevelopment.

Cross-regional travel - longer trips that span the region, including interstate and intrastate travel, but occur within the larger metropolitan travelshed.

Exceptional Habitat Quality - "For the purpose of transportation planning, exceptional habitat quality may be defined as (1) riparian-associated wetlands identified under Title 3, locally or regionally significant wetlands, (2) locally or regionally rare or sensitive plant communities such as oak woodlands, (3) important forest stands contributing multiple functions and values to the adjacent water feature habitats of sensitive, threatened or endangered wildlife species, or (4) habitats that provide unusually important wildlife functions, such as (but not limited to) a major wildlife crossing/runway or a key migratory pathway.

Employee Commute Options (ECO) Rules - The rules direct the Department of Environmental Quality to institute an employee auto trip reduction program. The rules require employers with more than 100 employees at a single site to implement a program designed to reduce 10 percent of commute auto trips among their employees. The ECO Rules are part of the region's Ozone Maintenance plan and were originally part of House Bill 2214, adopted by the 1992 Oregon Legislature and written into Oregon Administrative Rules Chapter 340, Division 242.

Employment Areas - Areas of mixed employment that include various types of manufacturing, distribution and warehousing uses, commercial and retail development as well as some residential development. Retail uses should primarily serve the needs of the people working or living in the immediate employment area. Exceptions to this general policy can be made only for certain areas indicated in a functional plan.

End-of-trip Facilities – This part of transportation demand management considers the needs of bikers, walkers, carpoolers and others. Examples include parking spaces striped for rideshare vehicles only, bike parking, locker rooms and showers.

Equitable Access - Having equal opportunities to access the regional transportation system.

Freight intermodal facility – An intercity facility where freight is transferred between two or more modes (e.g., truck to rail, rail to ship, truck to air, etc.).

Freight Mobility - The efficient movement of goods from point of origin to destination.

Frequent Bus: Frequent bus service provides local bus service that is more frequent than rapid bus, but is somewhat slower because it makes more stops, providing corridor service rather than nodal service along selected arterial streets. This service runs at least every 10 minutes and includes transit preferential treatments such as reserved bus lanes and transit signal priority and

enhanced passenger infrastructure along the corridor and at major bus stops such as covered bus shelters, curb extensions, special lighting and median stations.

Green Streets - Streets that are designed to include features like street trees, landscaped swales, pervious curb treatments and special paving materials to limit stormwater runoff, which, in turn, helps improve water quality and protect stream habitat.

Habitat Conservation Areas - Highly ranked riparian habitat areas within the current urban growth boundary identified by the regional fish and wildlife protection program. "Habitat conservation areas" are to be protected by appropriate development standards contained in Title 13 of the Urban Growth Management Functional Plan or through other equivalent approaches by local jurisdictions. As new areas are added to the urban growth boundary, highly valued upland habitat areas will also be identified as habitat conservation areas. Habitat conservation areas are designated based habitat value, with protection level adjusted depending on the area's economic importance to the region.

High Capacity Transit Network - High capacity transit provides the backbone of the transit network connecting the Central City, Regional Centers, and passenger intermodal facilities. It operates on a fixed guideway within an exclusive right-of-way to the extent possible. High levels of passenger infrastructure are provided at transit stations and station communities including real-time schedule information, ticket machines, special lighting, benches, shelters, bicycle parking, and commercial services. Speed and schedule reliability are preserved using transit signal priority at at-grade crossings and/or intersections. This network includes: light rail, commuter rail, bus rapid transit and intermodal passenger facilities (e.g, Amtrak and Greyhound)

Housing Affordability - The availability of housing such that no more than 30 percent (an index derived from federal, state and local housing agencies) of the monthly income of the household need be spent on shelter.

Impervious surfaces - Hard surfaces that do not allow water to filter into the ground, and instead, rely on piped stormwater drainage systems that convey runoff directly to streams. The majority of total impervious surfaces are from roads, sidewalks, parking lots and driveways. A conventional stormwater management approach uses storm sewer pipes beneath the street to quickly convey storm runoff to stream channels that are also managed for stormwater conveyance.

Individualized Marketing – A transportation demand management strategy that increases accessibility by providing customized travel choice information based on a person's interest-level while providing support programs. Examples include TravelSmart™ and SmartTrips. A TravelSmart™ project in North and Northeast Portland provided transit information, bike and walking maps, guided walks and rides, customized trip planning and in-home assistance to help residents get started walking, biking, or riding transit.

Industrial Areas - An area set aside for industrial activities. Supporting commercial and related uses may be allowed, provided they are intended to serve the primary industrial users. Residential development shall not be considered a supporting use, nor shall retail users whose market area is substantially larger than the industrial area be considered supporting uses.

Infrastructure - Roads, sidewalks, water systems, sewage systems, systems for storm drainage, telecommunications and energy transmission and distribution systems, bridges, transportation facilities, parks, schools and public facilities developed to support a community. Areas of the undeveloped portions of the environment such as floodplains, riparian and wetland zones, groundwater recharge and discharge areas and Greenspaces that provide important functions

related to maintaining the region's air and water quality, reduce the need for infrastructure expenses and contribute to the region's quality of life.

Inner Neighborhoods - Areas in Portland and the older cities that are primarily residential, close to employment and shopping areas, and have slightly smaller lot sizes and higher population densities than in outer neighborhoods

Intelligent Transportation Systems – Techniques and strategies that use technology to manage and operate the transportation system. ITS includes managing traffic signal timing along a corridor to minimize stop-and-go driving. ITS also includes transit signal priority, real-time traveler information, and variable message signs that rely on in pavement sensors or video surveillance cameras that quickly detect congestion to warn drivers. Technology also helps to increase transportation safety through the use of monitoring devices collect and transmit real-time weather information that is then shared with the general public. Having accurate information about dangerous conditions on the mountain passes helps fleet dispatch managers steer their drivers away from delays and the risk of loss or damage to the cargo. Dozens of ITS projects have been implemented around the Portland metropolitan area, many of them involving multi-agency coordination.

Intermodal facility – A transportation element that accommodates and interconnects different modes of transportation and serves the statewide, interstate and international movement of people and goods. For example, an intermodal yard is a railyard that facilities the transfer of containers or trailers. See also passenger intermodal facility and freight intermodal facility definitions.

Inter-city bus - Inter-city bus connects points within the region to nearby destinations, including neighboring cities, recreational activities and tourist destinations. Several private inter-city bus services are currently provided in the region.

Level of service (LOS) – A qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience and safety. An LOS rating of "A" through "F" describes the traffic flow on streets and highways and at intersections. The following table describes general traffic flow characteristics for each level of service on a street or highway:

LOS	Traffic Flow Characteristics
A	Virtually free flow; completely unimpeded
B	Stable flow with slight delays; reasonably unimpeded
C	Stable flow with delays; less freedom to maneuver
D	High density but stable flow
E	Operating conditions at or near capacity; unstable flow
F	Forced flow, breakdown conditions
Greater than F	Demand exceeds roadway capacity, limiting volume than can be carried and forcing excess demand onto parallel routes and extending the peak period

Sources: 1985. Highway Capacity Manual (A through F descriptions)

Metro (>F Description)

Light Rail Transit - Light rail transit (LRT) is a frequent and high-capacity service that operates on a fixed guideway within an exclusive right-of-way to the extent possible, connecting the central city with regional centers. LRT also serves existing regional public attractions such as the Washington County Fair Grounds, Civic Stadium, the Oregon Convention Center, Oregon Zoo, Metropolitan Exposition Center and the Rose Garden, and station communities. LRT service runs at least every 15 minutes during the weekday and weekend midday base periods with limited stops and operates at higher speed outside of downtown Portland. A high level of passenger infrastructure are provided at transit stations and station communities including schedule information, ticket machines, special lighting, benches, shelters, bicycle parking and commercial services. The speed and schedule reliability of LRT can be maintained by the provision of transit signal priority at-grade crossings and/or intersections and grade separation where it is appropriate from the surrounding built environment.

Local Bus - Local bus lines provide coverage and access to primary and secondary land-use components. Local bus service runs as often as every 30 minutes on weekdays and may be more frequent during hours of peak demand. Weekend service is provided as demand warrants.

Local streets - The local street system is used throughout the region to provide for local circulation and access. Local streets connect to collector streets and provide access to small activity centers, homes and neighborhoods. Regional regulations require local street spacing of no more than 530 feet in new residential and mixed-use areas, and cul-de-sacs are limited to 200 feet in length. These connectivity requirements are needed to ensure that a lack of adequate local street connections does not result in the arterial street system becoming congested.

Local Transit Network - The local transit network provides basic service and access to the regional and high capacity transit networks. It also offers coverage and access to primary and secondary land-use components. Transit preferential treatments and passenger infrastructure are appropriate at high ridership locations. Sidewalk connectivity and protected crosswalks are critical elements of the local transit network. This network includes: tram, streetcar, local bus, park-and-ride lots, mini-bus and para-transit.

Main Streets - Neighborhood shopping areas along a main street or at an intersection, sometimes having a unique character that draws people from outside the area. NW 23rd Avenue and SE Hawthorne Boulevard in the City of Portland are current examples of main streets.

Marine facility – A facility where freight is transferred between water-based and land-based modes.

Mini-bus - Mini-bus service provides coverage in lower density areas by providing transit connections to primary and secondary land-use components. Mini-bus services, which may range from fixed route to purely demand responsive including dial-a-ride, employer shuttles and bus pools, provide at least a 60-minute response time on weekdays. Weekend service is provided as demand warrants.

Mobility – The ability to move people and goods from place to place, or the potential for movement. Mobility reflects the spatial structure of the transportation network and the level and quality of its service. Mobility is determined by such characteristics as road capacity and design speed.

Modal Targets - Targets for increased walking, biking, transit and shared ride as a percentage of all trips. The targets apply to trips *to, from and within* each 2040 Design Type. The targets reflect

mode shares for the year 2040 needed to comply with Oregon Transportation Planning Rule objectives to reduce reliance on single-occupancy vehicles.

2040 Regional Non-SOV Modal Targets

2040 Design Type	Non-SOV Modal Target
Central city	60-70%
Regional centers **Town centers** **Main streets** **Station communities** **Corridors** **Pasenger Intermodal Facilities**	45-55%
Industrial areas **Freight Intermodal facilities** **Employment areas** **Inner neighborhoods** **Outer neighborhoods**	40-45%

Mode Choice – The ability to choose one or more modes of travel, including motor vehicle, walking, bicycling, use of transit and shared ride.

Off-peak period – The hours of the day outside of the primary commuting time periods, generally between 9 a.m. and 3 p.m.

Outer Neighborhoods - Areas in the outlying cities that are primarily residential, farther from employment and shopping areas, and have larger lot sizes and lower population densities than inner neighborhoods.

Para-transit - Para-transit service is defined as non-fixed route service that serves special transit markets, including "ADA" service throughout the greater metro region.

Park-and-ride - Park-and-ride facilities primarily provide convenient auto access to regional transit trunk routes for people from areas not directly served by transit. Vanpools also use park-and-rides as a common meeting place and sometimes a destination. Transit services, transit transfer and passenger drop off and pick-up areas are incorporated in site design. Bicycle and pedestrian access as well as parking and storage accommodations for bicyclists are considered in the siting process of new park-and-ride facilities. In addition, the need for a complementary relationship between park-and-ride facilities and regional and local land use goals exists and requires periodic evaluation over time for continued appropriateness.

Parking cash-out – This term refers to a transportation demand management strategy where the market value of a parking space is offered to an employee by the employer. The employee can either spend the money for a parking space, or pocket it and then use an alternative mode to travel to work. Measures such as parking cash-out provide disincentives for commuting by single-occupancy vehicles.

Passenger intermodal facilities: Passenger intermodal facilities serve as the hub for various passenger modes and the transfer point between modes. These facilities are closely interconnected with urban public transportation service and highly accessible by all modes. They include Portland International Airport, Union Station, Oregon City Amtrak station and inter-city bus stations.

Passenger rail - Inter-city high-speed rail is part of the state transportation system and extends from the Willamette Valley north to British Columbia. Amtrak already provides service south to California, east to the rest of the continental United States and north to Canada. These systems should be integrated with other transit services within the metropolitan region with connections to passenger intermodal facilities. High-speed rail needs to be complemented by urban transit systems within the region.

Peak periods – The hours of the day that correspond to primary commuting time periods, generally between 7 a.m. and 9 a.m. and 4 p.m. to 6 p.m.

Pedestrian – A person on foot, in a wheelchair or walking a bicycle.

Pedestrian connection – A continuous, unobstructed, reasonably direct route between two points that is intended and suitable for pedestrian use. Pedestrian connections include but are not limited to sidewalks, walkways, accessways, stairways and pedestrian bridges. On developed parcels, pedestrian connections are generally hard surfaced. In parks and natural areas, pedestrian connections may be soft-surfaced pathways. On undeveloped parcels and parcels intended for redevelopment, pedestrian connections may also include rights of way or easements for future pedestrian improvements.

Pedestrian district - A pedestrian district is a comprehensive plan designation or implementing land use regulations designed to provide safe and convenient pedestrian circulation, with a mix of uses, density, and design that support high levels of pedestrian activity and transit use. The pedestrian district can be a concentrated area of pedestrian activity or a corridor. Pedestrian districts can be designated within the 2040 Design types of Central City, Regional and Town Centers, Corridors and Main Streets, as designated in local plans. Pedestrian districts emphasize a safe and convenient pedestrian environment, and facilities to support and integrate efficient use of several modes within one area (e.g., pedestrian, auto, transit, and bike).

Pedestrian facility – A facility provided for the benefit of pedestrian travel, including walkways, crosswalks, plazas, signs, signals, illumination and benches.

Pedestrian plaza – A small semi-enclosed area usually adjoining a sidewalk or a transit stop which provides a place for pedestrians to sit, stand or rest. They are usually paved with concrete, pavers, bricks or similar material and include seating, pedestrian scale lighting and similar pedestrian improvements. Low walls or planters and landscaping are usually provided to create a semi-enclosed space and to buffer and separate the plaza from adjoining parking lots and vehicle maneuvering areas.

Plazas are generally located at a transit stop, building entrance or an intersection and connect directly to adjacent sidewalks, walkways, transit stops and buildings entrance or an intersection and connect directly to adjacent sidewalks, walkways, transit stops and building. A plaza including 150-250 square feet would be considered "small."

Pedestrian-scale - An urban development pattern where walking is a safe, convenient and interesting travel mode. It is an area where walking is at least as attractive as any other mode to all destinations within the area. The following elements are not cited as requirements, but illustrate examples of pedestrian scale: continuous, smooth and wide walking surfaces; easily visible from

streets and buildings and safe for walking; minimal points where high speed automobile traffic and pedestrians mix; frequent crossings; storefronts, trees, bollards, on-street parking, awnings, outdoor seating, signs, doorways and lighting designed to serve those on foot; well integrated into the transit system and having uses which cater to people on foot.

Posted Speed – This term refers to the posted speed limit on a given street or the legal speed limit as defined in ORS 811.105 and 811.123 when a street is not posted.

Preliminary design – An engineering design that specifies in detail the location and alignment of a planned transportation facility or improvement.

Principal arterial - These facilities form the backbone of the motor vehicle network. Motor vehicle trips entering and leaving the urban area follow these routes, as well as those destined for the central city, regional centers, industrial areas or intermodal facilities. These routes also form the primary connection between neighbor cities and the urban area. Principal arterials serve as major freight routes, with an emphasis on mobility.

Rail main line – Class I rail lines (e.g., Union Pacific and Burlington Northern/Sante Fe).

Reasonably direct – Either a route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.

Regional bus - Regional bus service is provided on most arterial streets. This type of bus service operates with maximum headways of 15 minutes during most of the day and may be seven days per week with conventional stop spacing along the route. Transit preferential treatments and passenger infrastructure such as bus shelters, special lighting, transit signal priority and curb extensions are appropriate at high ridership locations.

Regional Centers - Areas of mixed residential and commercial use that serve hundreds of thousands of people and are easily accessible by walking, biking and different types of transit service. Local residents, employees and others can meet their needs with relatively shorter trip distances. People from around the region can access these areas. Examples include traditional centers such as downtown Gresham and new centers such as Gateway and Clackamas Town Center.

Regional Mobility Corridors - Transportation corridors centered on state and interstate highways, but more broadly defined to include complementary arterial streets, transit routes and multi-purpose paths that combine to form a larger mobility corridor.

Regional multi-use trails with transportation function: Multi-use paths with a transportation function are paved, off-street facilities connections that accommodate pedestrian and bicycle travel and meet the requirements of the Americans with Disabilities Act. These connections are likely to be used by people walking or bicycling to work or school, to access transit or to travel to a store, library or other local destination. Regional multi-use paths that support both utilitarian and recreational functions are included as part of the regional transportation system. These paths are generally located near or in residential areas or near mixed-use centers. Bicycle/pedestrian sidewalks on bridges are also included in this definition. In terms of design, multi-use paths are physically separated from motor vehicle traffic by open space or a barrier, and are either within the road right-of-way or within an independent right-of-way. Bicyclists, pedestrians, joggers, skaters and other non-motorized travelers use these facilities.

Regional Transit Network - The regional transit network relies on transit service headways of 15-minutes or less on all arterial roadways (all day and weekends when possible). This service also

includes preferential treatments at regional transit stops and high ridership locations such as transit signal priority and enhanced passenger infrastructure such as covered bus shelters, curb extensions and special lighting. This network includes: frequent bus, regional bus, streetcar, park-and-ride lots and regional transit stops.

Regional transit stops - Regional transit stops are intended to provide a high degree of transit passenger comfort and access. Regional transit stops are located at stops on light rail, commuter rail, rapid bus, frequent bus or streetcar lines in the central city, regional and town centers, main streets and corridors. Regional transit stops may also be located where bus lines intersect or serve intermodal facilities, major hospitals, colleges and universities. Regional transit stops shall provide real-time schedule information, lighting, benches, shelters and trash cans. Other features may include real time information, special lighting or shelter design, public art and bicycle parking.

Regional transportation system - The regional transportation system is the interconnected network of throughways, arterials, air, marine, pipeline and rail systems, high capacity and regional transit services, regional multi-use trails with a transportation function and bicycle and pedestrian facilities that are located on or connect directly to other elements of the regional transportation system.

Reload facility – An intermediary facility where freight is reloaded from one land-based mode to another.

Rideshare – A transportation demand management strategy where more than one person shares a trip in a vehicle to a common destination or along a common corridor. Private passenger vehicles are used for carpools and some vanpools receive public/private support to help commuters. Carpooling and vanpooling provide travel choices for areas under-served by transit or at times when transit service is not available.

Right-of-way (ROW) – This term refers to publicly-owned land, property or interest therein, usually in a strip, within which the entire road facility (including travel lanes, medians, sidewalks, shoulders, planting areas, bikeways and utility easements) must reside. The right-of-way is usually defined in feet and is acquired for or devoted to multi-modal transportation purposes including bicycle, pedestrian, public transportation and vehicular travel.

Roads – This term is used to collectively refer to throughways, regional and community arterials, collectors and local streets.

Shared roadway – A type of bikeway where bicyclists and motor vehicles share a travel lane.

Sidewalk – A walkway separated from the roadway with a curb, constructed of a durable, hard and smooth surface, designed for preferential or exclusive use by pedestrians.

Single-occupancy vehicle (SOV) – This term refers to vehicles that are carrying one person.

Station Communities - The area generally within a 1/4- to 1/2-mile radius of light rail stations or other high capacity transit which is planned as a multi-modal community of mixed uses and substantial pedestrian accessibility improvements.

Streetcar - Street cars provide fixed-route transit service mixed in traffic for more locally oriented trips in higher density mixed-use centers or between higher density mixed-use centers. Streetcar services often provide local circulator service and also serve as a potent incentive for denser development in centers. This service runs at least every 15 minutes and includes transit

preferential treatments such as transit signal priority and enhanced passenger infrastructure along the corridor such as covered bus shelters, curb extensions and special lighting.

Stewardship - A planning and management approach that considers environmental impacts and public benefits of actions as well as public and private dollar costs.

Telecommute – Also known as "Telework," this term refers to a transportation demand management strategy whereby an individual substitutes working at home, or a satellite office located closer to home, for commuting to a work site on either a part-time or full-time basis.

Throughways - Limited-access facilities designed for interstate, intrastate and cross-regional travel. Throughways are classified as a principal arterial and have the function of connecting major activity centers within the region, including the central city, regional centers, industrial areas and intermodal facilities to one another and to points outside the region. These routes also form the primary connection between neighbor cities and the urban area and the region to other parts of the state, California and rest of the Pacific Northwest and Canada.

Town Centers - Areas of mixed residential and commercial use that serve tens of thousands of people. Examples include the downtowns of Forest Grove and Lake Oswego.

Traffic – The number of motor vehicles, bikes or pedestrians in a given location at a given point in time.

Traffic calming – A transportation system management technique that aims to prevent inappropriate through-traffic and reduce motor vehicle travel speeds on a particular roadway. Traditionally, this technique has been applied to local residential streets and collectors and may include speed bumps, curb extensions, planted median strips or rounds and narrowed travel lanes.

Transit–oriented development – A mix of residential, retail and office uses and a supporting network of roads, bicycle and pedestrian ways focused on a regional transit stop designed to support a high level of transit use. The key features include:

(a) A mixed use center at the transit stop, oriented principally to transit riders and pedestrian and bicycle travel from the surrounding area;

(b) High density of residential development proximate to the transit stop sufficient to support transit operation and neighborhood commercial uses within the TOD;

(c) A network of roads, and bicycle and pedestrian paths to support high levels of pedestrian access within the TOD and high levels of transit use.

Transportation demand management (TDM) – Actions that are designed to change travel behavior in order to improve performance of transportation facilities and to reduce need for additional road capacity. Methods may include but are not limited to the use of alternative modes, ride-sharing and vanpool programs, car sharing, individualized marketing, and trip-reduction ordinances. Public and private partners of the Regional Travel Options (RTO) Program implement TDM.

Transportation disadvantaged/persons potentially underserved by the transportation system – Individuals who have difficulty in obtaining transportation because of their age, income, physical or mental disability.

Transportation facilities – Any physical facility that moves or assist in the movement of people or goods including facilities identified in OAR 660-012-0020 but excluding electricity, sewage and water systems.

Transportation management associations (TMA) – This term refers to non-profit coalitions of local businesses and/or public agencies dedicated to reducing traffic congestion and pollution and improving commuting options for employees.

Transportation service – A service for moving people and goods, such as intercity bus service and passenger rail service.

Transportation system management (TSM) – Strategies and techniques for increasing the efficiency, safety, capacity or level of service of a transportation facility without increasing its size. Examples include, but are not limited to, traffic signal improvements, traffic control devices including installing medians and parking removal, channelization, access management, re-striping of HOV lanes, ramp metering, incident response, targeted traffic enforcement and programs that smooth transit operations.

Transportation system plan (TSP) – A plan for one or more transportation facilities that are planned, developed, operated and maintained in a coordinated manner to supply continuity of movement between modes, and within and between geographic and jurisdictional areas.

Travel options – The ability to choose one or more modes of travel, including motor vehicle, walking, bicycling, riding transit and carpooling. Telecommuting is sometimes considered a travel option because it replaces a commute trip with a trip not taken.

Truck terminal – A facility that serves as a primary gateway for commodities entering or leaving the metropolitan area.

Undeveloped areas. These are areas of the region that are primarily new communities and recent additions to the urban growth boundary.

Urban form - The net result of efforts to preserve environmental quality, coordinate the development of jobs, housing, and public services and facilities, and inter-relate the benefits and consequences of growth in one part of the region with the benefits and consequences of growth in another. Urban form, therefore, describes an overall framework within which regional urban growth management can occur. Clearly stating objectives for urban form and pursuing them comprehensively provides the focal strategy for rising to the challenges posed by the growth trends present in the region today.

Urban growth boundary – The politically defined boundary around a metropolitan area outside of which no urban improvements may occur (sewage, water, etc.). It is intended that the UGB be defined so as to accommodate all projected population and employment growth within a 20-year planning horizon. A formal process has been established for periodically reviewing and updating the UGB so that it accurately reflects projected population and employment growth.

Urban Growth Management Functional Plan - A regional functional plan with requirements binding on cities and counties in the Metro region, as mandated by Metro's Regional Framework Plan. The plan addresses such issues as accommodation of projected regional population and job growth, regional parking management, water quality conservation, retail in employment and industrial areas and the regional fish and wildlife protection program.

Vehicle miles of travel (VMT) – Automobile vehicle miles of travel. Automobiles, for purposes of this definition, include automobiles, light trucks, and other similar vehicles used for movement of people. The definition does not include buses, heavy trucks and trips that involve commercial movement of goods. VMT includes trips with an origin and a destination within the MPO boundary and excludes pass through trips (i.e., trips with a beginning and end point outside of the MPO) and external trips (i.e., trips with a beginning or end point outside of the MPO boundary). VMT is estimated prospectively through the use of metropolitan area transportation models.

Walkway – A hard-surfaced transportation facility intended and suitable for use by pedestrians, including persons using wheelchairs. Walkways include sidewalks, surfaced portions of accessways, paths and paved shoulders.

Wide outside lane – A wider than normal curbside travel lane that is provided for ease of bicycle operation where there is insufficient room for a bike lane or shoulder bikeway.