



7. Performance Monitoring System

connecting
REDMOND

Transportation Master Plan

Introduction

Contents of this Chapter

- ✓ Introduction
- ✓ Annual Mobility Report Card
 - Tracking Measures
 - Level of Service Objectives
 - Other Objectives
 - Concurrency Determination
- ✓ Five Year Update Report
 - Tracking Measures
 - Level of Service Objectives
 - Other Objectives
 - Concurrency Determination

This chapter establishes the performance monitoring system that will be used by the City to track implementation of the Transportation Master Plan (TMP). Multimodal objectives and concurrency standards will be tracked through an Annual Mobility Report Card and a Five Year Transportation Status Report.

The City will use these reports to provide accurate information to the public about the City's progress implementation of the TMP and the current condition of the transportation system. This will also set the stage for future updates of the TMP.

This chapter provides a number of graphics that have been designed as templates for data in future reports.

Annual Mobility Report Card

Five categories reporting and monitoring topics will be included in the annual Mobility Report Card.

Tracking Measures

These report data that describes general transportation trends in Redmond. The data does not represent objectives, but serves to provide context for the outcomes on the objectives.

Level of Service Objectives

These describe levels of service expected by 2022 for each transportation mode.

Other Objectives

These describe other characteristics of travel and transportation in Redmond, but are not descriptions of service levels.

Concurrency Determination

The Mobility Report Card will also provide a routine "concurrency determination." As provided in the Transportation Element (Chapter 2) the City will make determinations of transportation concurrency at least once a year, but more often than that if development is proceeding at an accelerated rate (as defined in the Concurrency Ordinance).

The first Mobility Report Card will be published in 2006 for the year 2005.

Five Year Transportation Status Report

Once each five years, the City will combine the previous Mobility Report Cards into a summary report. Certain additional data items will be measured only in the Five Year Update. The Status Report will serve as the technical basis for the next update of the Transportation Master Plan.

The first Five Year Transportation Status Report will be published in 2010 for the years through 2009.

Using the Graphs and Charts

The graphs and charts in this section have been designed for use in future reports. These are templates and there are placeholders in most of for data to be added.

The figure at the right is provided as an example of the format used in many of the figures in this chapter.

The middle column will be labeled for the year of the report. For now it is just labeled as “report year.” For example, in the 2007 Mobility Report Card, this column would be labeled 2007.

The data entry above the column is currently shown as “tbd” (to be determined). In future reports the actual data entry would be made and the column would be a solid color. It is shown fading upward now because the amount is not yet known.

In many of the figures, there are blue and yellow horizontal bars. In each case, the yellow bars represent a 2022 forecast or objective with which the item is being compared. The blue bars represent the actual data for the report year. Many of these also are labeled “tbd” in this chapter, but will have actual data in future reports.

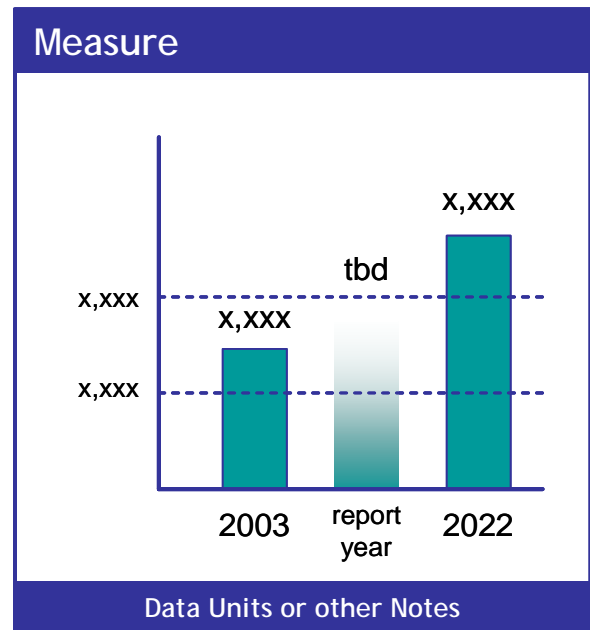


Figure 7.1 Example

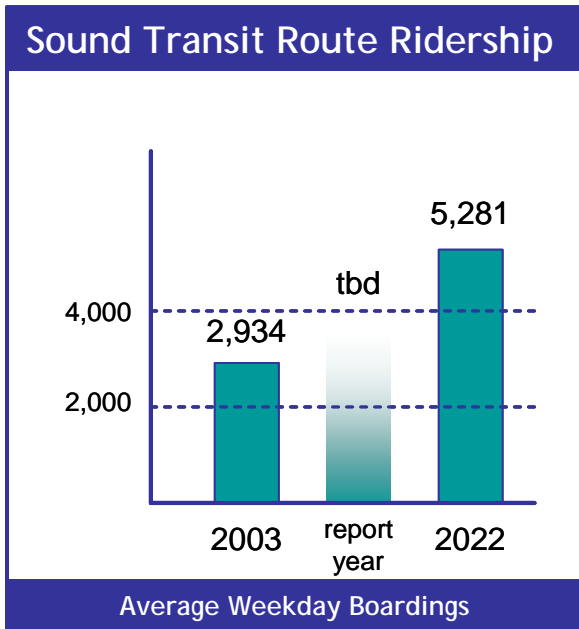


Figure 7.2 Sound Transit Route Ridership

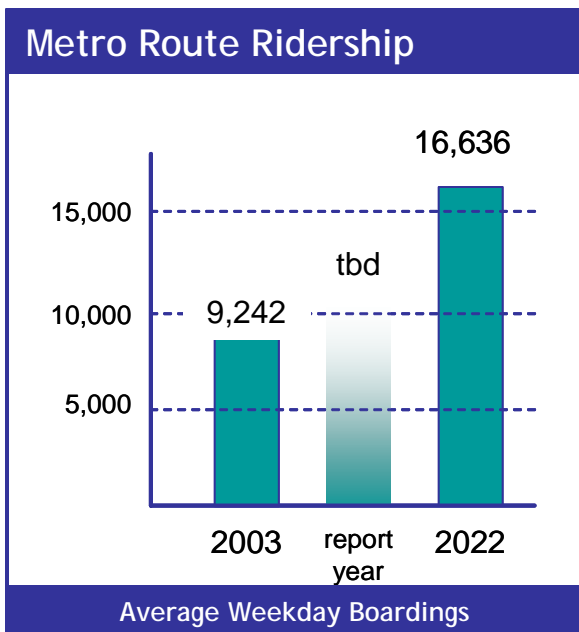


Figure 7.3 Metro Route Ridership

Mobility Report Card

Tracking Measures

Average Daily Transit Ridership - Sound Transit Routes (Figure 7.2)

This data is obtained from Metro, which operates these routes for Sound Transit and reports the data quarterly.

Only two routes are included in the 2003 data - the 540 and 545. However, the data will also include any additional regional ST routes and any High Capacity Transit systems that connect to and serve Redmond in the future.

Transit ridership is a bottom-line measure that indicates whether Redmond is making progress toward its mode share objectives.

Average Daily Transit Ridership - Metro Routes (Figure 7.3)

This data is also obtained from Metro, which reports the data quarterly.

Note that it is common for routes to be added, discontinued or changed. The criterion for inclusion in this data set is whether the route has at least one stop or transit station within the Redmond city limits.

Routes included in the 2003 data are:

216	220	222	225	229	230
232	233	238	242	245	247
249	250	251	253	254	256
261	265	266	268	269	291
922	929	997	998		

7. PERFORMANCE MONITORING SYSTEM

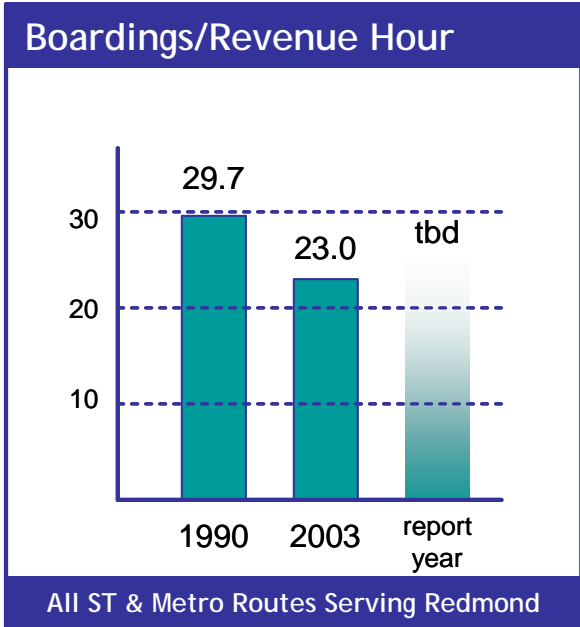


Figure 7.4 Boardings/Revenue Hour

Boardings per Revenue Service Hour - Metro and Sound Transit (Figure 7.4)

This is reported by Metro for each Sound Transit and Metro route. The data is an average for all routes (the same routes as are included in Figures 7.2 and 7.3). Thus, this represents the boardings per hour for all routes combined.

This is a measure of effectiveness and performance that Metro uses to evaluate which routes are productive and which should be discontinued. While Redmond ridership has grown since 1990, it has not grown as fast as service, leading to the decline in average boardings per hour.

The objectives described in Chapter 4 and the strategies included in Chapter 5 are designed to reverse this trend and begin increasing the overall productivity of the routes that serve Redmond. This will be of direct benefit to the regional transit system and will also begin to set the stage for extension of High Capacity Transit to Redmond.

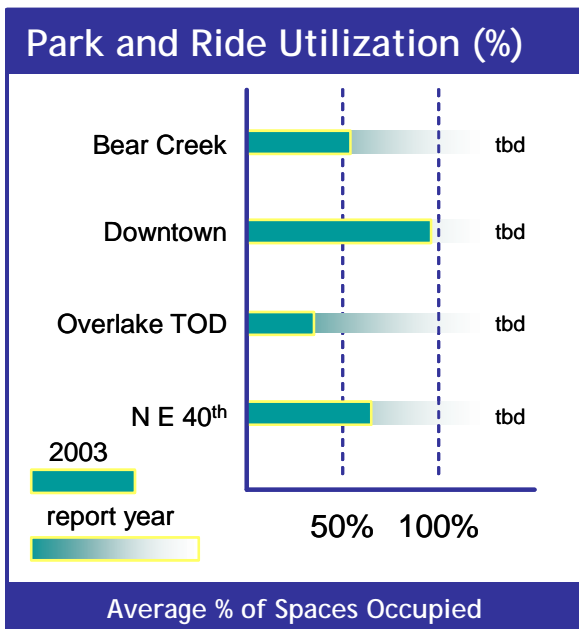


Figure 7.5 Park and Ride Utilization

Park and Ride Utilization (Figure 7.5)

This data is also reported quarterly by Metro.

There are a number of conventions that could be used to summarize the data which is collected hourly on survey dates within each quarter. Figure 7.4 reports the data exactly as reported by Metro.

As time goes by, the effect of implementing this TMP should be to increase the utilization of parking at these facilities. Thus, this measure can be interpreted as an indirect indication of the success of the City's efforts to support King County Metro and Sound Transit in development of regional transit patronage and performance.

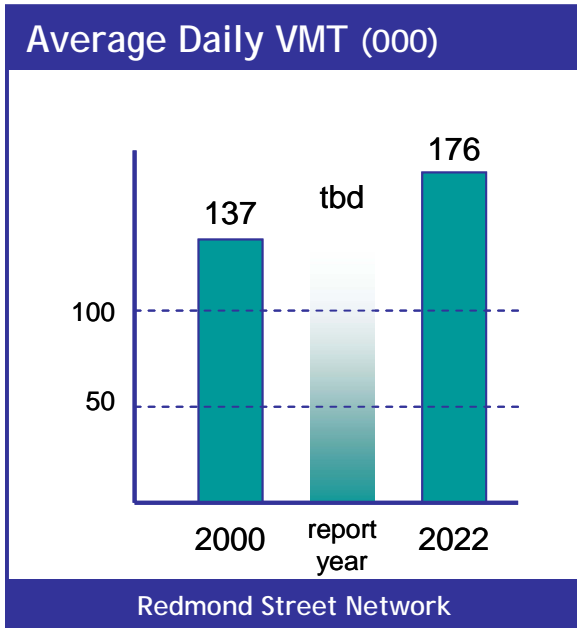


Figure 7.6 Average Daily VMT

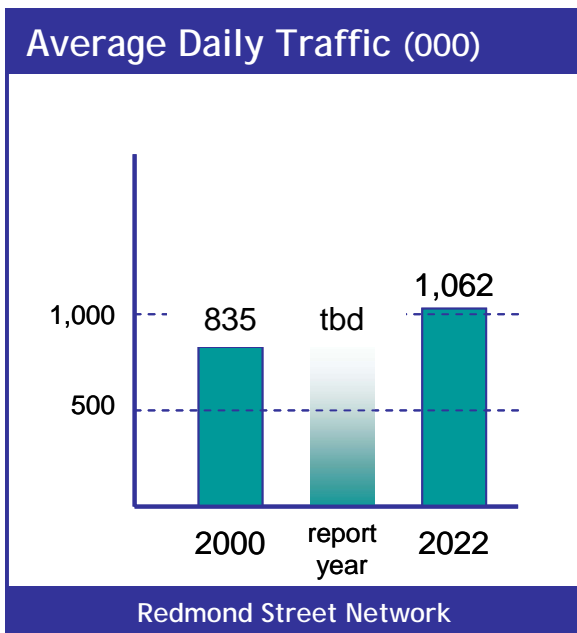


Figure 7.7 Average Daily Traffic

Average Daily Vehicle Miles of Travel (Figure 7.6)

One “vehicle mile of travel” (VMT) represents one vehicle traveling one mile within the City on the Redmond arterial street network (including state routes).

This measure cannot be directly observed or counted and thus must be estimated from other data. The estimate is for an average annual 24-hour weekday.

VMT is the best variable for measuring trends in the amount of daily vehicular traffic in Redmond. It is also utilized in estimating air pollution, congestion and other dependent variables.

Total vehicle miles of travel in Redmond can be obtained most readily by running the City’s new traffic model (an updated version of the BKR model) for the report year. If this is not possible or does not occur, the data can be estimated using trends observed in the annual count program data.

This measure does not include travel on local streets. Most such travel shows up on arterials and it is not necessary to count traffic in both places to discern the overall trend. The traffic model that will be used in most instances to produce this data does not model traffic on local streets. Actual total VMT, including travel on local streets, would be slightly higher than this.

Average Daily Traffic (Figure 7.7)

Average daily traffic represents the number of vehicle trips that travel on some portion of the Redmond arterial street network (including state routes) on an annual average 24-hour weekday.

Again, this cannot be directly observed from count data because many vehicles will travel through more than one count station as part of a trip, leading to double counting of trips.

The best source of this data is the City’s new traffic model (an updated version of the BKR model) for the report year. If an annual update of the model does not occur, the data can be estimated using trends observed in the annual count program data.

7. PERFORMANCE MONITORING SYSTEM

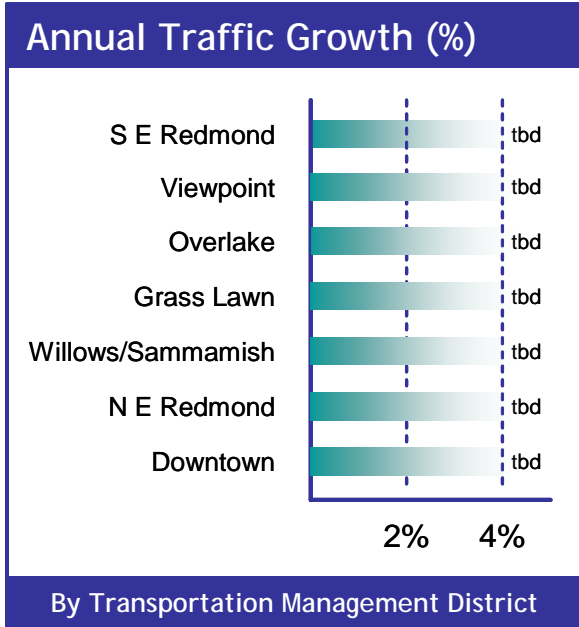


Figure 7.8 Annual Traffic Growth

Annual Traffic Growth by TMD (Figure 7.8)

This data is obtained from the City’s annual traffic count program. Count locations are summed within Transportation Management Districts and compared to the previous year. Data is for the arterials only; local streets are not included in this measure.

Occasionally, specific count locations are unavailable due to construction or for other reasons. Also, from time to time the City will revise count locations. When this occurs, the annual comparison should be made using only data from count stations represented in both data sets.

Annual Traffic Growth at Screenlines (Figure 7.9)

The map on the next page shows the eleven screenlines utilized in the Transportation Master Plan. Annual traffic growth across each of these screenlines is the sum of traffic on selected arterial links that cross the screenline. The same links will be counted each year as part of the City’s annual traffic count program. The growth percentages measure the change from the previous year.

These screenlines are the same as the screenlines used in monitoring the City’s traffic volume-to-capacity ratios in the service objectives. Thus, this data helps provide context for interpreting changes in the screenline service levels (Figure 7.20, page 15).

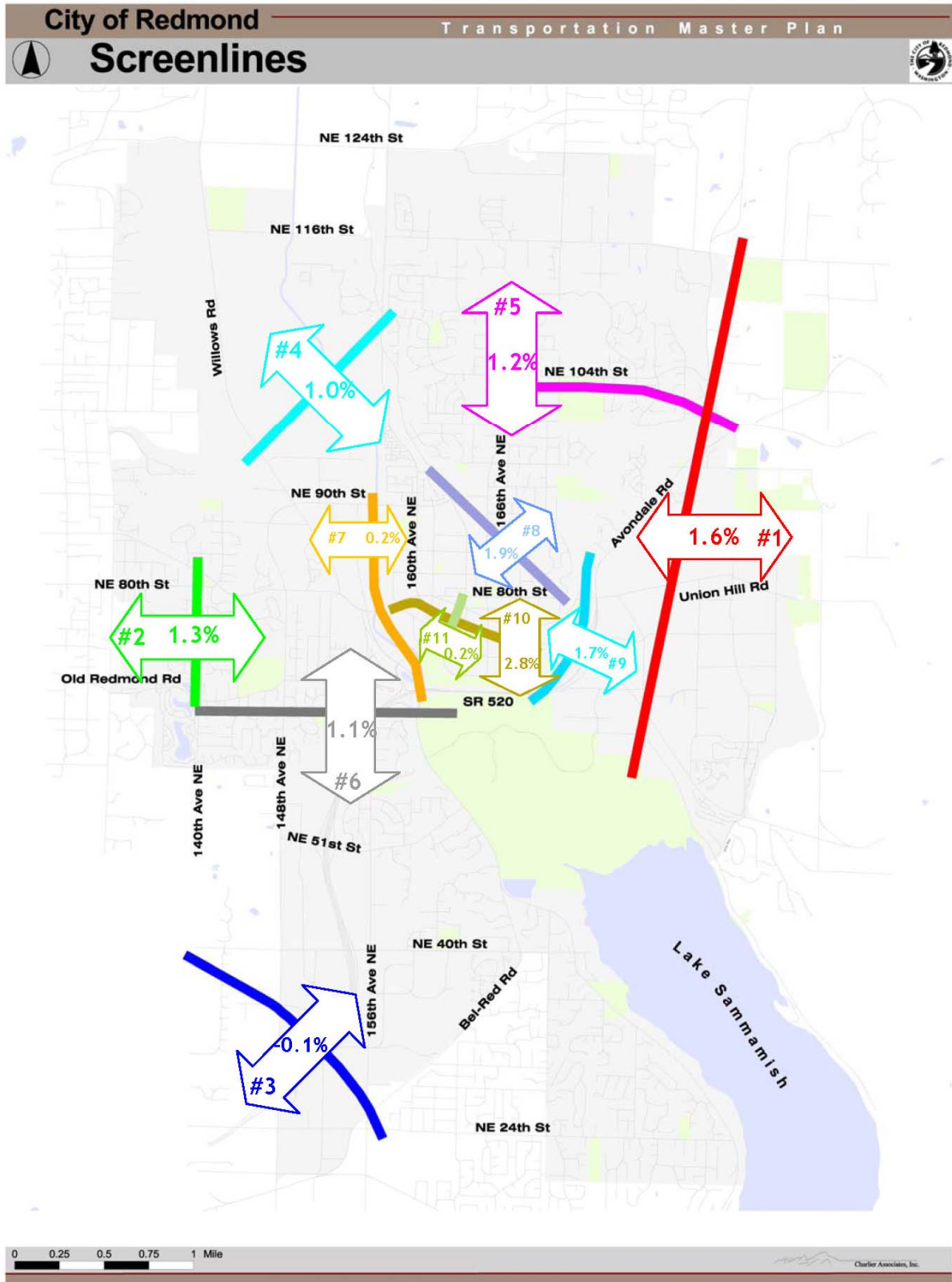


Figure 7.9 Annual Traffic Growth at Screenlines_2003-2022

7. PERFORMANCE MONITORING SYSTEM

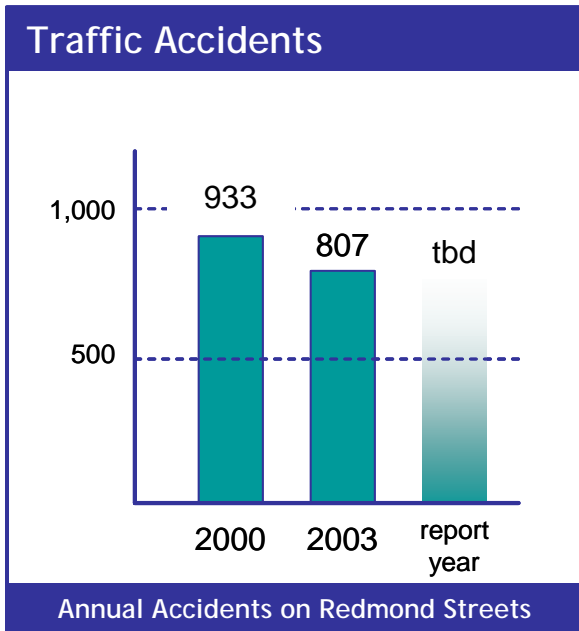


Figure 7.10 Traffic Accidents

Annual Traffic Accidents (Figure 7.10)

This information is provided by software utilized by the Public Works Department. It summarizes data contained in accident reports compiled by the Police Department.

There is considerable year-to-year fluctuation in this data, so care should be taken to view the long-term trends. For that reason, the recommended format would add years by adding columns to the figure.

Redmond has set public health and safety as a primary objective of the Transportation Master Plan. This measure reports whether the City's efforts are reflected in actual on-the-street safety.

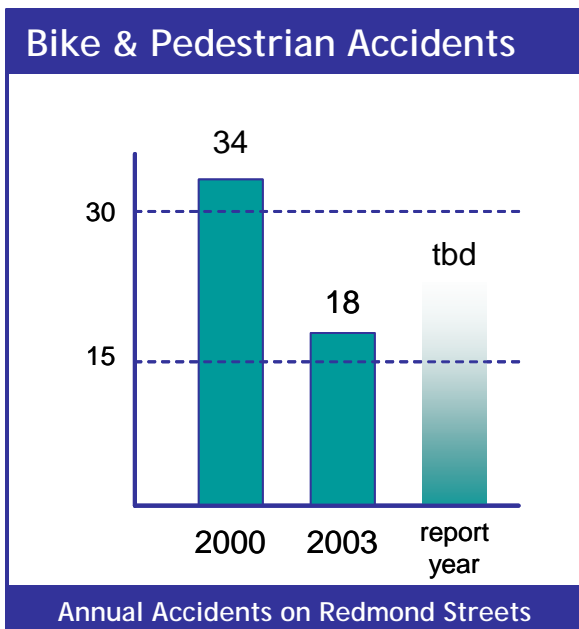


Figure 7.11 Bike & Pedestrian Accidents

Annual Bicycle and Pedestrian Accidents (Figure 7.11)

This data has the same source as the data in Figure 7.10.

Again, there is fluctuation in the annual data, and a cumulative trend should be shown in the figure in future Mobility Report Card reports. Many bicycle and pedestrian "incidents" (minor accidents and near misses) go unreported. Generally, this measure will provide information only about those accidents where there was personal injury resulting in an accident report being filed by the Police Department.

Improving safety for pedestrians and bicyclists is an important objective. Many of the projects and programs that would improve safety for non-motorized travelers will also encourage travel by these means.

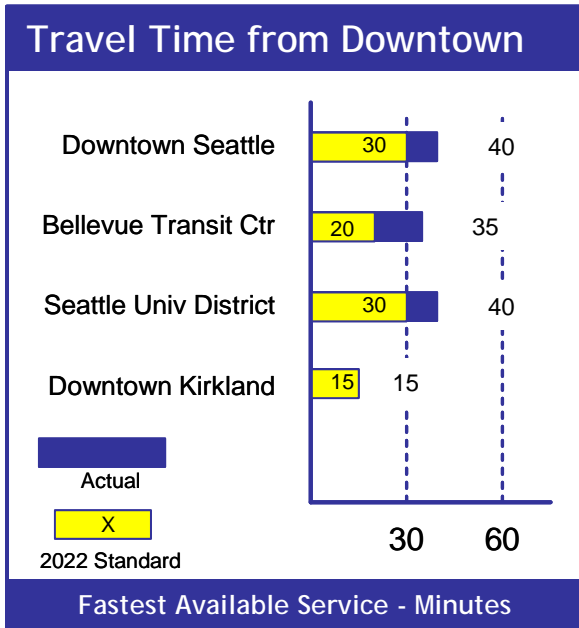


Figure 7.12 Travel Time from Downtown

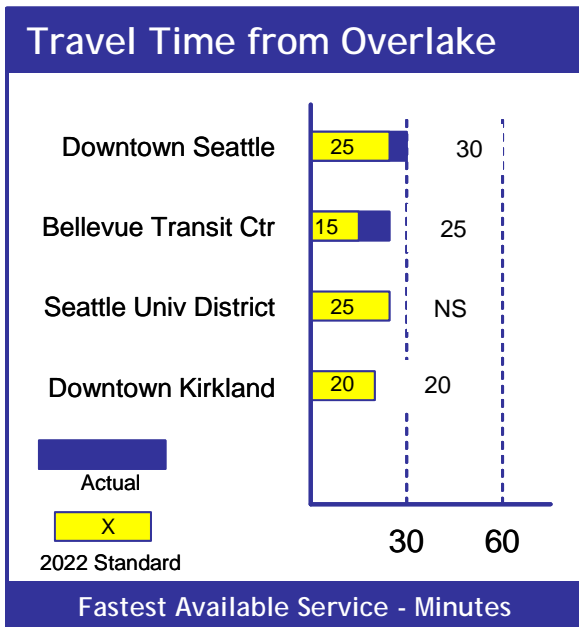


Figure 7.13 Travel Time from Overlake

Mobility Report Card

Level of Service Objectives

The next several figures contain data for transportation objectives established by the City. Additional background on these objectives - what they mean and why they have been established - can be found in Chapter 4.

Regional Transit Travel Time from Downtown (Figure 7.12)

This figure measures the best transit travel time between Downtown Redmond and other centers in the Puget Sound Region. Data is taken from published schedules for Sound Transit routes.

Generally, the schedules are changed only once each year, at the most. Two routes are included in the data - the 540 and 545. However, future data may also reflect any additional regional ST routes and any High Capacity Transit systems that connect to and serve Redmond in the future.

Not all regional centers are represented in this data. Redmond is highlighting those regional transit connections that are most important to the City.

Regional Transit Travel Time from Overlake (Figure 7.13)

This figure measures the best transit travel time between Overlake Transit Center (NE 40th Street) in Redmond and other centers in the Puget Sound Region. Data is taken from published schedules for Sound Transit routes.

As in Figure 7.12, the schedules are normally changed only once each year, at the most. Two routes are included in the data - the 540 and 545. However, future data may also reflect any additional regional ST routes and any High Capacity Transit systems that connect to and serve Redmond in the future.

7. PERFORMANCE MONITORING SYSTEM

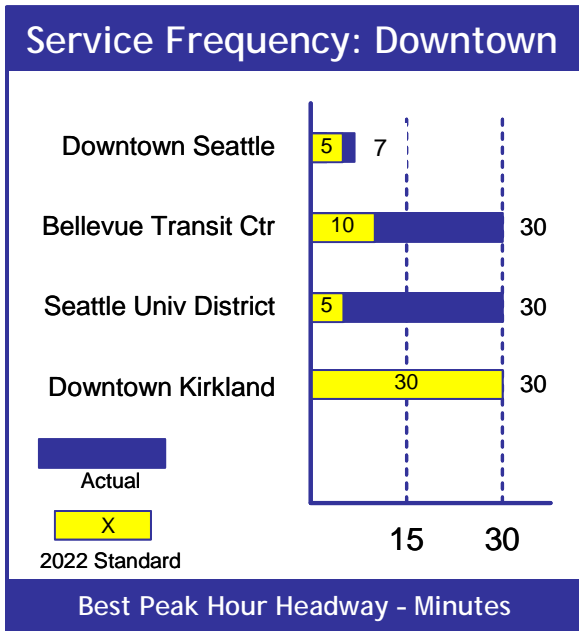


Figure 7.14 Service Frequency: Downtown

Regional Transit Service Frequency—Downtown (Figure 7.14)

This figure measures the best regional transit frequency of service between Downtown Redmond and other centers in the Puget Sound Region. Data is taken from published schedules for Sound Transit routes.

Generally, the schedules are changed only once each year, at the most. Two routes are included in the data - the 540 and 545. However, future data may also reflect any additional regional ST routes and any High Capacity Transit systems that connect to and serve Redmond in the future.

Not all regional centers are represented in this data. Redmond is highlighting those regional transit connections that are most important to the City.

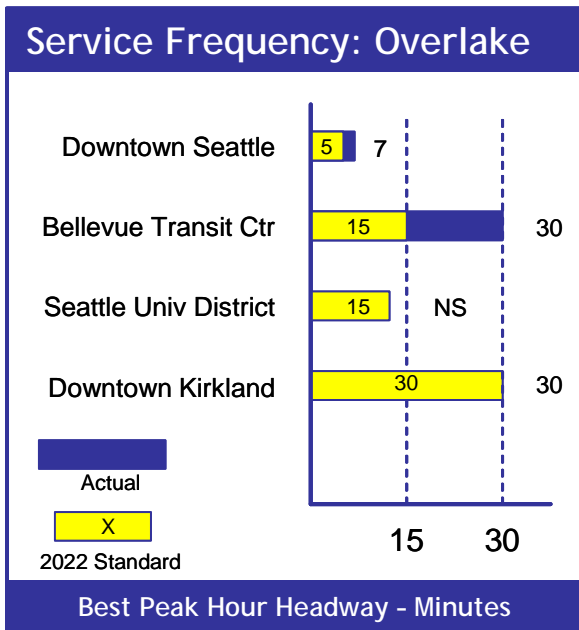


Figure 7.15 Service Frequency: Overlake

Regional Transit Service Frequency—Overlake (Figure 7.15)

This figure measures the best regional transit frequency for service between Overlake Transit Center (NE 40th Street) in Redmond and other centers in the Puget Sound Region. Data is taken from published schedules for Sound Transit routes.

As in previous figures, the schedules are normally changed only once each year, at the most. Two routes are included in the data - the 540 and 545. However, future data may also reflect any additional regional ST routes and any High Capacity Transit systems that connect to and serve Redmond in the future.

All Day Service - Local Weekday Routes					
from \ to	2022 Standard: Hours of weekday service = 18 hours				
	Redmond Town Center	Northeast Redmond	Overlake Transit Center	Overlake Core	Bear Creek Park & Ride
Downtown Transit Center	11 hrs	15 hrs	20 hrs	18 hrs	18 hrs
Redmond Town Center		0 hrs	0 hrs	0 hrs	0 hrs
Northeast Redmond			0 hrs	0 hrs	0 hrs
Overlake Transit Center				20 hrs	13 hrs
Overlake Core					18 hrs

Note: Red text indicates “does not yet meet standard”

Figure 7.16 Hours of Weekday Service - Local Routes

Hours of Local Weekday Transit Service (Figure 7.16)

This figure shows the service characteristics for internal connections within Redmond, based on the “priority connections” set in Chapter 4.

Data is obtained from published Metro and Sound Transit schedules.

This table compares actual hours of weekday service with the LOS objective of 18 hours. Where there is no direct connection between the places listed in the matrix, the entry shows a zero. In some cases, no route operates directly between these places today.

7. PERFORMANCE MONITORING SYSTEM

Direct Connections - Local Weekday Routes					
from \ to	Note: Red text indicates "does not yet meet standard"				
	Downtown Transit Center	Redmond Town Center	Northeast Redmond	Overlake Transit Center	Overlake Core
Redmond Town Center	Yes				
Northeast Redmond	No	*			
Overlake Transit Center	Yes	*	*		
Overlake Core	No	*	*	Yes	
Bear Creek Park & Ride	Yes	*	*	Yes	No

2022 Standard: Route length < 1.5x most direct route [* = No connection]

Figure 7.17 Directness of Weekday Service Connections - Local Routes

Directness of Local Weekday Transit Connections (Figure 7.17)

This figure shows the connectivity of internal connections within Redmond, based on the "priority connections" set in Chapter 4.

Data is obtained from published Metro and Sound Transit schedules.

The actual routing of the most direct connecting transit route is compared to the LOS objective that this should be no more than 1.5 times the most direct roadway route. Where there is no direct connection between the places in the matrix, the entry shows an asterisk. In some cases, no route operates directly between these places today.

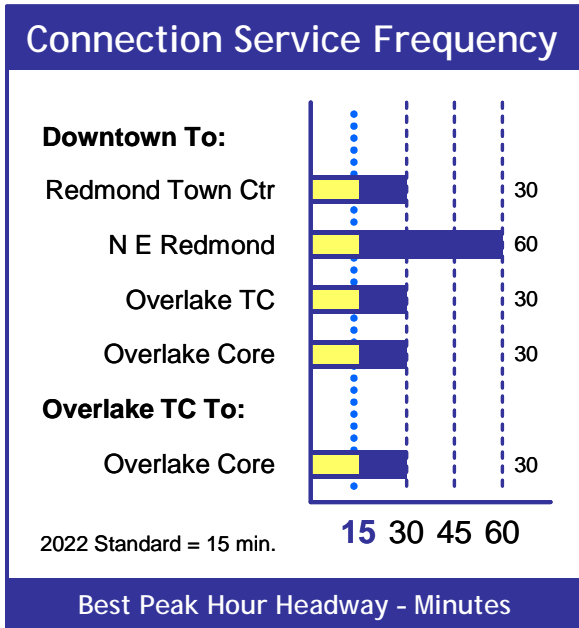


Figure 7.18 Connection Service Frequency

Transit Service Frequency (Figure 7.18)

This figure shows the frequency of weekday transit service for internal connections within Redmond, based on the "priority connections" set in Chapter 4.

Data represents the most frequent service if more than one route is involved.

Data is obtained from published Metro and Sound Transit schedules.

Screenline Map (Figure 7.19)

This map on the next page shows the screenlines used in Figure 7.20 on page 15.

7. PERFORMANCE MONITORING SYSTEM

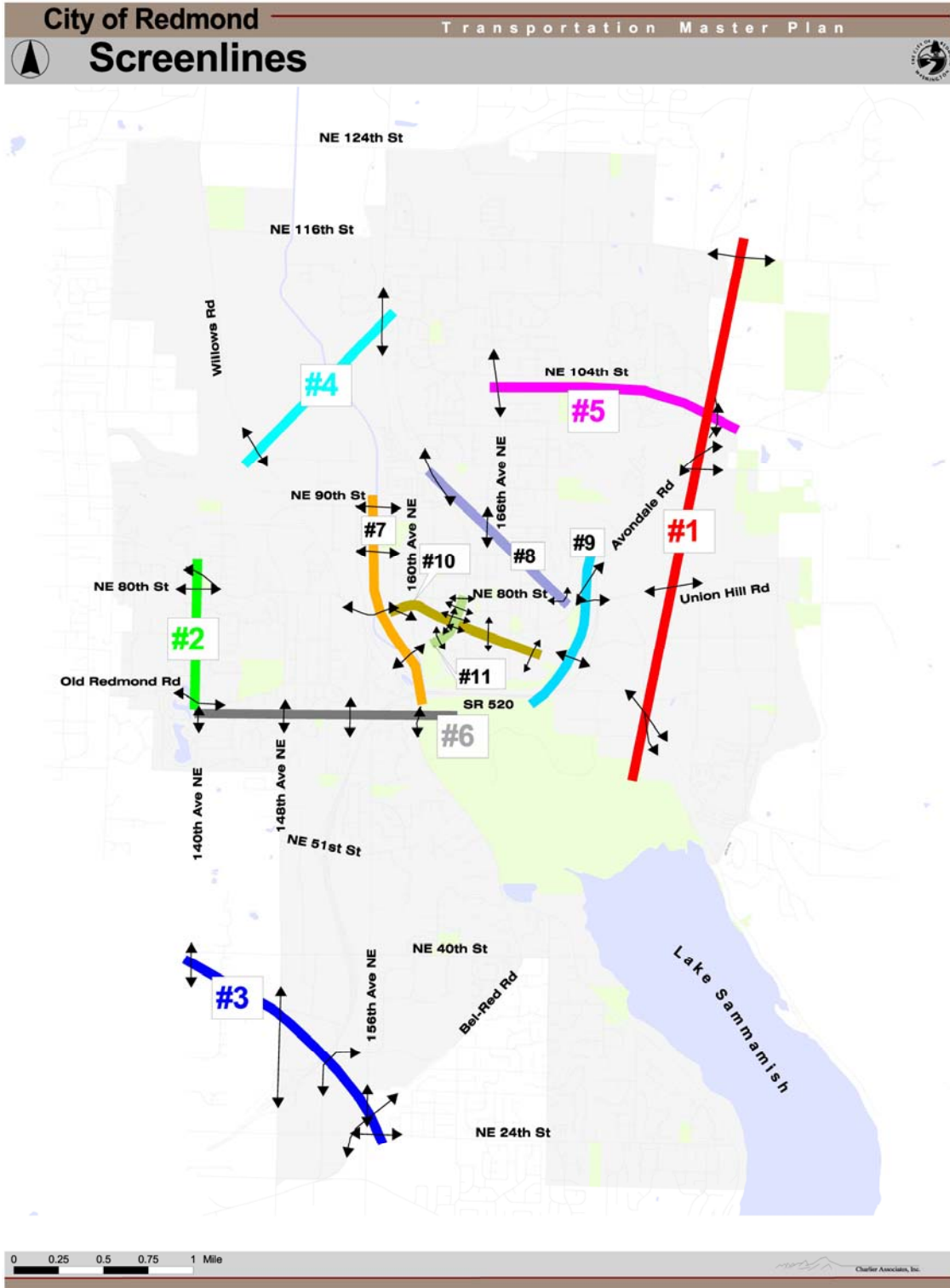


Figure 7.19 Screenlines Map

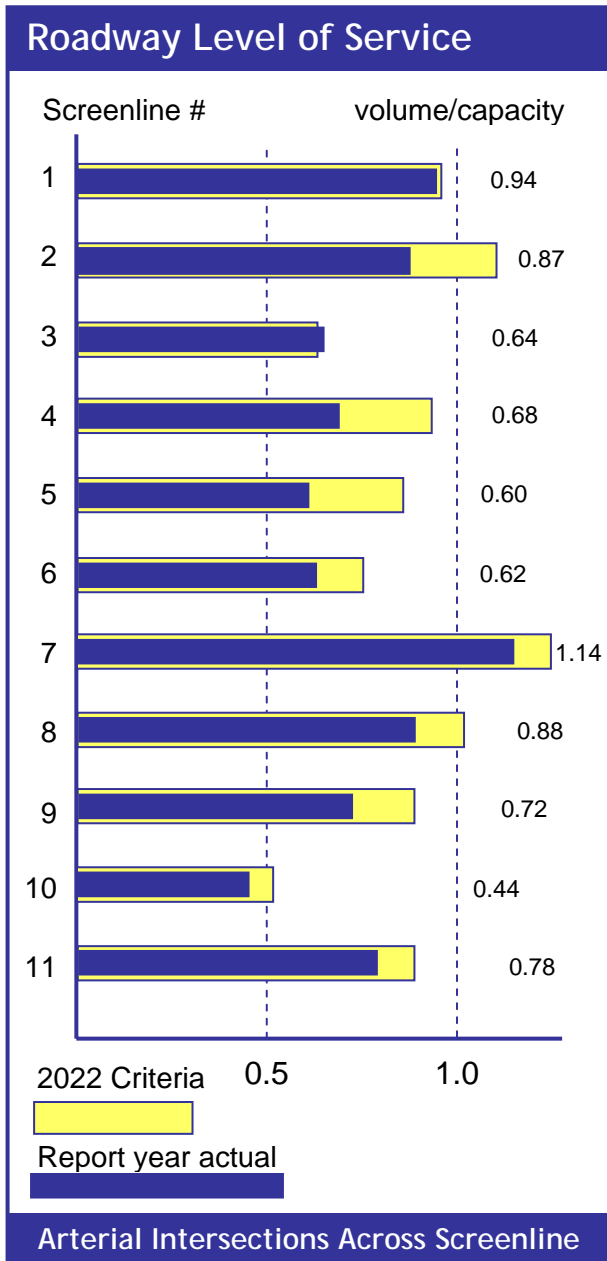


Figure 7.20 Roadway Level of Service

Roadway Traffic Level of Service at Screenlines (Figure 7.20)

LOS objectives for Redmond’s arterial streets have been set by the City. These are described in Chapter 4.

This figure will be produced utilizing data from the City’s annual traffic count program. Chapter 4 provides more information about the calculation of the V/C (volume to capacity) ratios.

Bicycle System Priorities and Implementation (Figure 7.21)

The City has set objectives for completion of specific corridors within the ultimate bicycle system plan shown in Chapter 5. These objectives identify priority corridors to be completed by 2022. The map in Figure 7.21 on the next page provides an annual report of cumulative progress toward these objectives. As segments of the bicycling network are completed, the dashed lines in the map will begin to go away.

Note that while the key shows Construction Initiated and Project Development lines, there no such lines shown on this map template yet. However, they will be, beginning with the first Mobility Report Card.

7. PERFORMANCE MONITORING SYSTEM

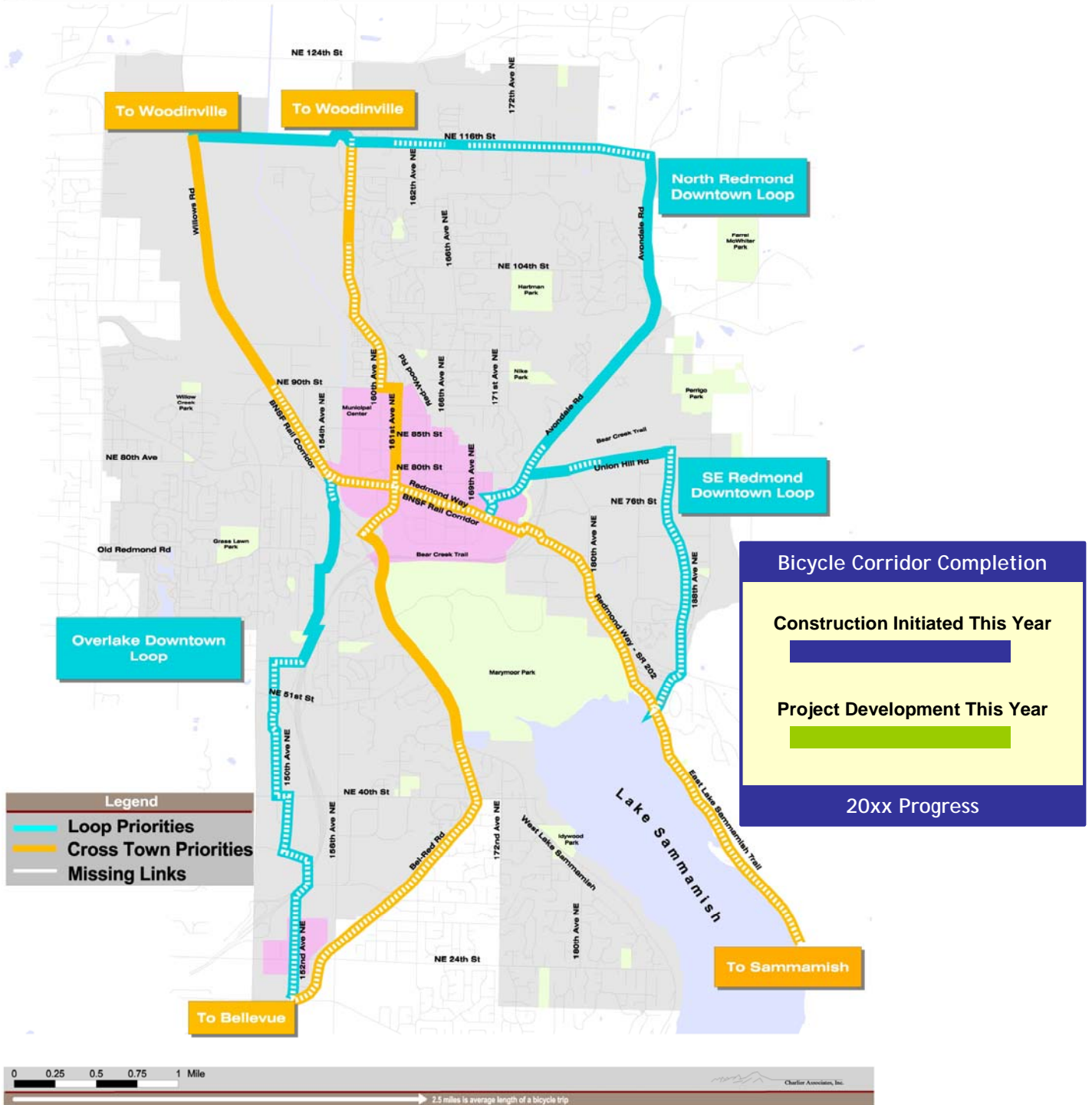


Figure 7.21 Bicycle System Priorities

Pedestrian Environment Adequacy (Figure 7.22)

The City has set objectives for improvements in its pedestrian environment, described in Chapter 4. The highest priorities are the two centers - Downtown and Overlake—and the multimodal corridors. The City wants the two centers and the mixed use and commercial segments of the multimodal corridors to reach “pedestrian supportive” status by 2022. (Other segments of the multimodal corridors are to reach “pedestrian tolerant” status by 2022.)

The data in this table measures the extent to which the affected areas or corridors have attained “pedestrian supportive” status as a percentage of the centerline miles of streets. Standards used in evaluating pedestrian environment are provided in Chapter 5.

Chapter 4 also sets “pedestrian tolerant” status as the objective to be reached by 2022 throughout the City. However, the cost and effort required to measure progress toward this objective for every street in the City requires that it be included only in the Five Year Transportation Status Report. Thus, only the two centers and the multimodal corridors will be reported in the annual Mobility Report Card.

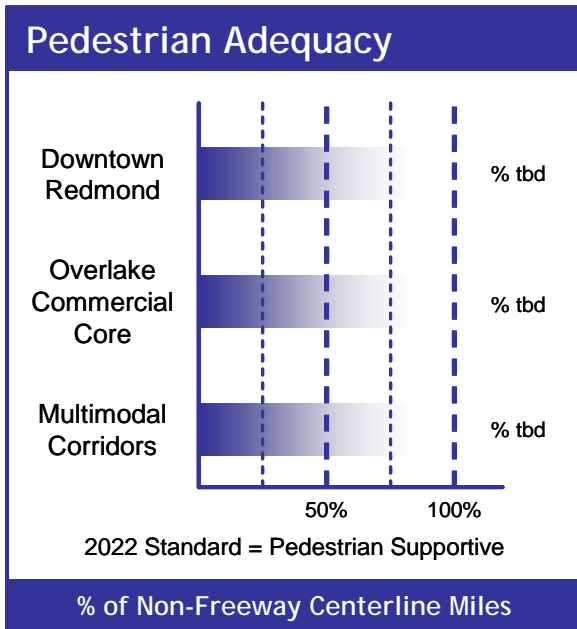


Figure 7.22 Pedestrian Adequacy

Mobility Report Card

Other Objectives

The next several figures contain data for transportation objectives established by the City that are not measures of modal level of service. Additional background on these objectives - what they mean and why they have been established - can be found in Chapter 4.

Commuter Trip Reduction Program - Commute Mode Share (Figure 7.23)

This data is provided through surveys conducted by the City as part of administration of the Commute Trip Reduction program. It measures morning peak period commute travel only, and includes only the commute trips to program employers (generally those with more than 100 employees).

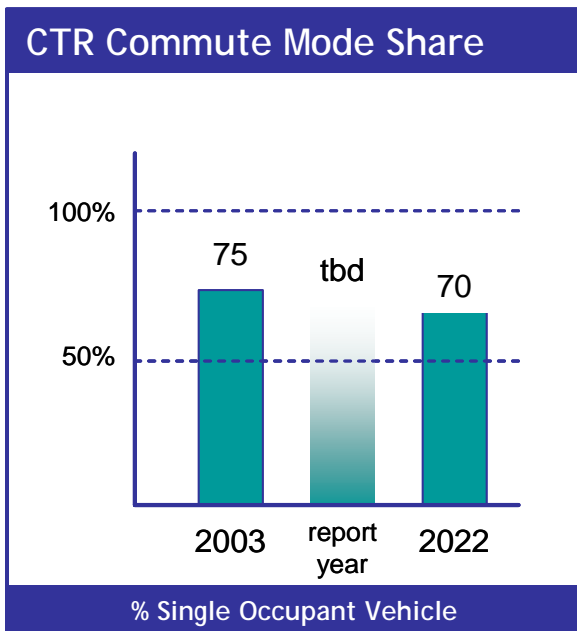


Figure 7.23 CTR Commute Mode Share

Status of Actions Scheduled for 2005 (Figure 7.24)

This table on the next page will report the completion status of all priority action items identified in Chapter 8.

7. PERFORMANCE MONITORING SYSTEM

Status of Actions Scheduled for 2005		
	Action	Status
1. ORDINANCE AND COUNCIL ACTIONS		
1.a	TMP Adoption/Update Transportation Element	
1.b	Concurrency Management	
2. STUDIES AND PLANS		
2.a	Downtown HCT Corridor/Station	
2.b	Impact Fee Update	
2.c	Overlake Plan	
3. PROJECT DEVELOPMENT		
3.a	Bear Creek Parkway Extension	
3.d	85 th 4-lane to 3-lane Conversion	
3.e	164 th 4-lane to 3-lane Conversion	
3.g	Union Hill Road	
3.j	172 nd Extension	
4. CONSTRUCTION PROJECTS		
4.a	SR 520 Bikeway Connection to Sammamish River Regional Trail	
4.b	156th Ave NE Sidewalk Improvements from NE 59th St to NE 61st St	
4.d	NE 116th St Phase I	
4.g	NE 83rd St Improvements from 160th Ave NE to 161st Ave NE	
4.i	Redmond Intelligent Transportation System Phase I (Overlake)	

Figure 7.24 Status of Actions Scheduled for 2005

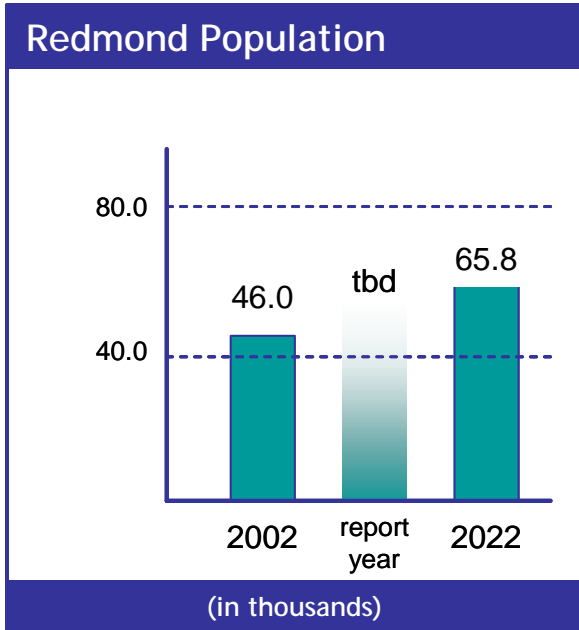


Figure 7.25 Redmond Population

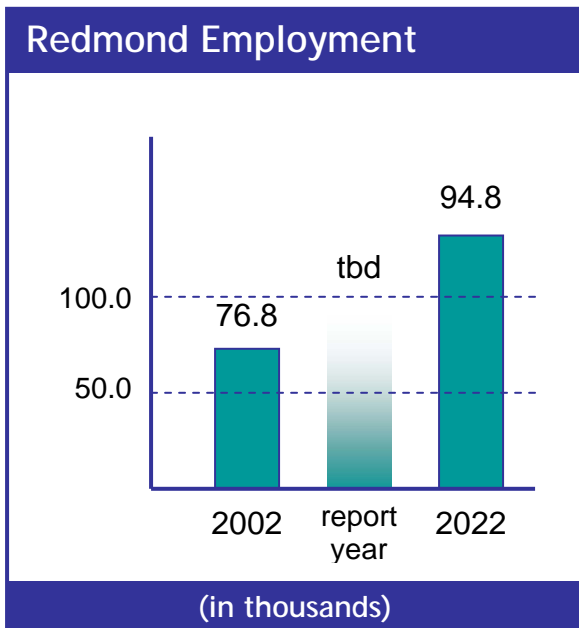


Figure 7.26 Redmond Employment

Mobility Report Card

Concurrency Determination

The next three figures are designed to provide context for the periodic (at least annual) determination by the City of whether transportation concurrency is being met. Further information on this topic may be found in Chapter 4 and in the City's Concurrency Ordinance.

Redmond Population (Figure 7.25)

This data is obtained by the Planning Department from Regional and Census sources. The middle column in the figure will be updated annually to provide context for an assessment of whether the City is growing faster or more slowly than anticipated. This information will, in turn, be utilized to assess whether the pace of Transportation Master Plan completion is proportional to the pace of development.

Redmond Employment (Figure 7.26)

This data is obtained by the Planning Department from State of Washington sources. The data represents full-time equivalent jobs.

The middle column in the figure will be updated annually to provide context for an assessment of whether the City is growing faster or more slowly than anticipated. This information will, in turn, be utilized to assess whether the pace of Transportation Master Plan completion is proportional to the pace of development.

7. PERFORMANCE MONITORING SYSTEM

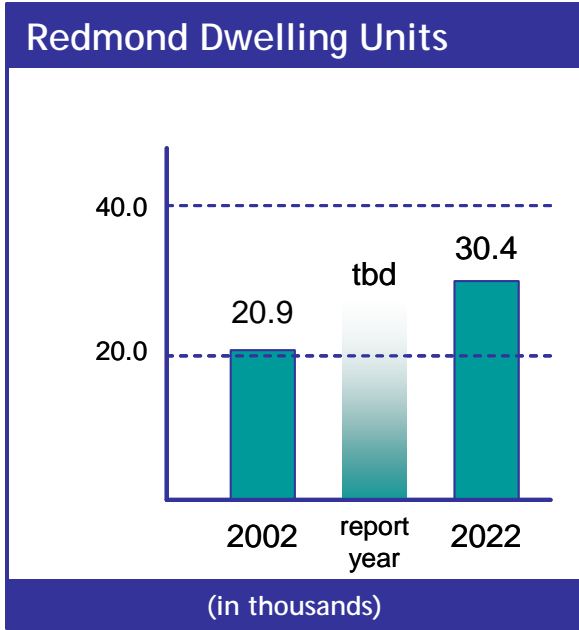


Figure 7.27 Redmond Dwelling Units

Redmond Dwelling Units (Figure 7.27)

This data is maintained by the Planning Department. Dwelling units includes all types of dwellings - single family and multi-family.

The middle column in the figure will be updated annually to provide context for an assessment of whether the City is growing faster or more slowly than anticipated. This information will, in turn, be utilized to assess whether the pace of Transportation Master Plan completion is proportional to the pace of development.

Five Year Transportation Status Report

Tracking Measures

The Tracking Measures contained in the Five Year Report will be the same as those contained in the Annual Mobility Report Card with the addition of the next several figures. Thus the Five Year Report will be similar in appearance to the Annual Mobility Report Card, except that it will contain five years of data (rather than one) and will have the following additional data.

Downtown Pass-Through Traffic (Figures 7.28 and 7.29)

Background on this subject can be found in the Thoroughfare Plan (Section D of Chapter 5).

It is possible to estimate this data by running Redmond's traffic model (a version of the BKR model). However, one purpose of this data is to provide "calibration" (a reality check) for the model. For that reason, data will be obtained by replicating the pass-through traffic study completed by the City in March 2004.

The small blue circle in each figure represents Downtown and the larger circle represents the entire city. Because data is obtained from license plate match counts at the periphery of Downtown, the break-down of origins and destinations outside the Downtown cannot be directly observed and must be estimated from other sources.

Because of the cost of replicating the field survey, these figures will not be included in the Annual Mobility Report Card. In any event, the changes in the data from year-to-year will be too small compared to sampling error to make annual production of the data cost-prohibitive.

Five Year Transportation Status Report

Level of Service Objectives

The Level of Service Objectives contained in the Five Year Report will be the same as those contained in the Annual Mobility Report Card with the addition of the next several figures. Thus the Five Year Report will be similar in appearance to the Annual Mobility Report Card, except that it will contain five years of data (rather than one) and will have the following additional data.

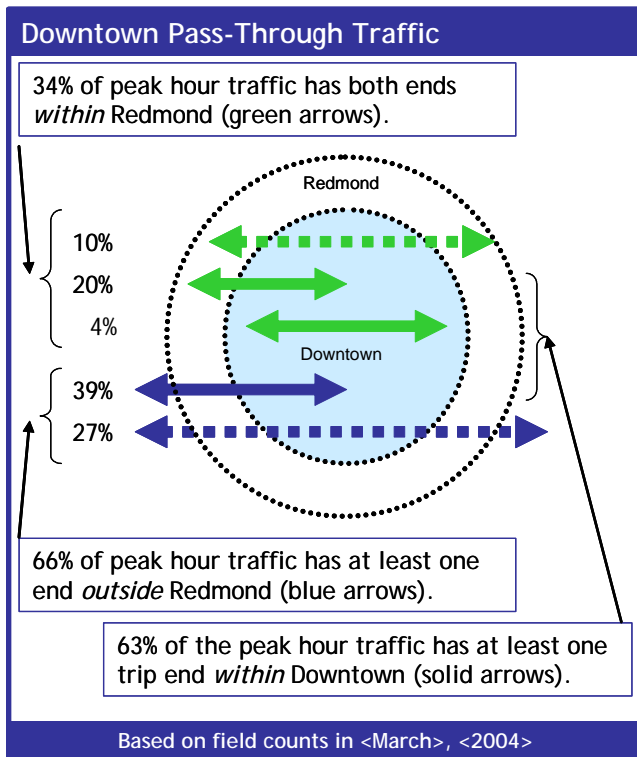


Figure 7.28 Report Year Pass-Through Traffic

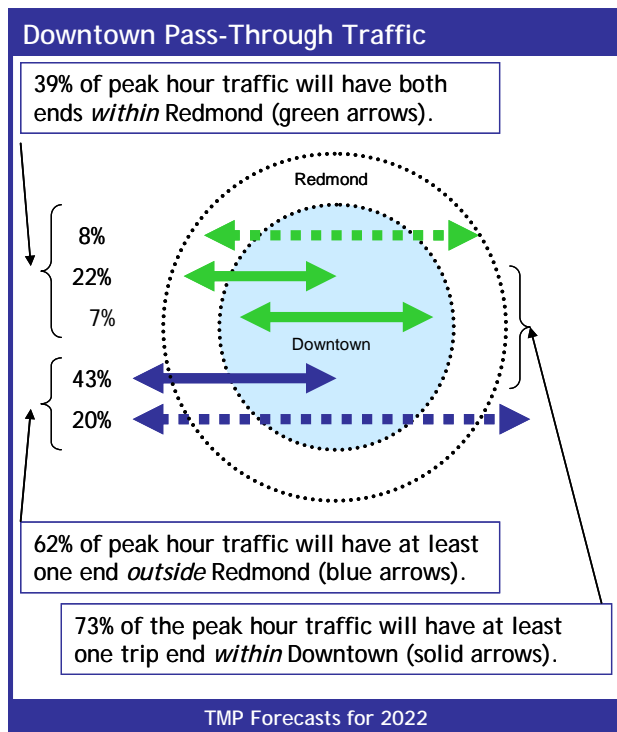


Figure 7.29 2022 Forecast Pass-Through Traffic

7. PERFORMANCE MONITORING SYSTEM

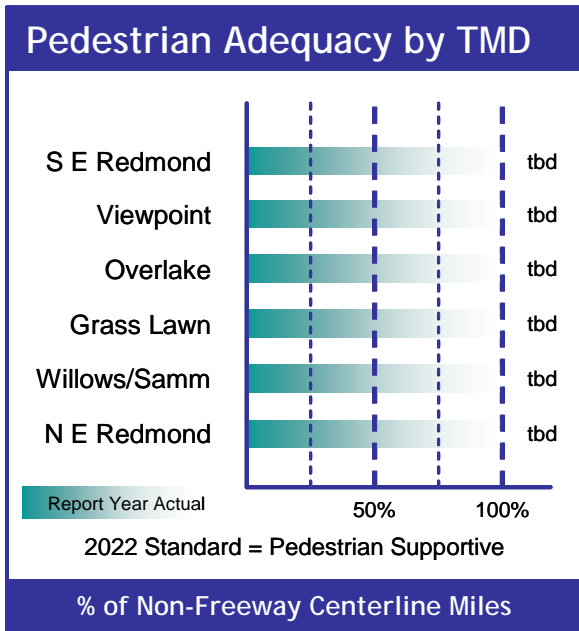


Figure 7.30 Pedestrian Adequacy by TMD

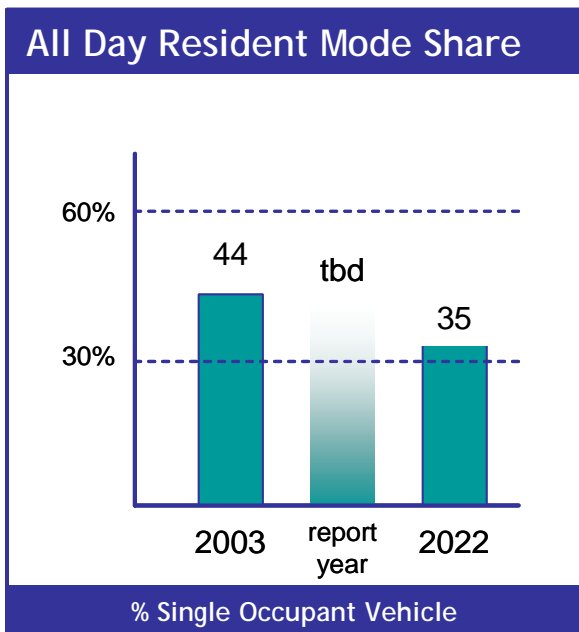


Figure 7.31 All Day Resident Mode Share

Pedestrian Environment Adequacy by TMD (Figure 7.30)

This figure will be coupled with Figure 7.22 to provide a complete picture of the City’s progress toward objectives for the pedestrian environment.

The Downtown TMD is not included in this figure because it is already available in Figure 7.22. However, while Figure 7.22 reports data for the commercial core of Overlake, this figure reports the result for the entire Overlake TMD - a larger area.

Data will be compiled by field surveys in each TMD and (as in Figure 7.22) will be based on a determination of pedestrian adequacy measured by centerline miles of the adjacent streets. The city-wide objective for pedestrian adequacy is “pedestrian tolerant.” Chapter 5 provides the analysis methodology pedestrian adequacy. Because of the cost of conducting a city-wide survey, Figure 7.30 will not be included in the annual Mobility Report Card report, but will be reporting once each five years.

Other Objectives

The Other Objectives contained in the Five Year Report will be the same as those contained in the Annual Mobility Report Card with the addition of Figure 7.30. Thus the Five Year Report will be similar in appearance to the Annual Mobility Report Card, except that it will contain five years of data (rather than one) and will contain the following additional data.

All Day Resident Mode Share (Figure 7.31)

This data will be provided by a resident travel diary study conducted with methodology described in Chapter 3 (the LUTAQH study). The objective for a reduction in single-occupant vehicle mode share is set in Chapter 4.

Concurrency Determination

The Concurrency Determination contained in the Five Year Report will summarize those contained in the annual Mobility Report Cards.

TMP Assessment - Overall Status

Finally, in the Five Transportation Status Report, the City will provide an assessment of trends and conditions, and progress toward objectives. This assessment will then be utilized as a starting point for the Update of the Transportation Master Plan (scheduled for 2010).