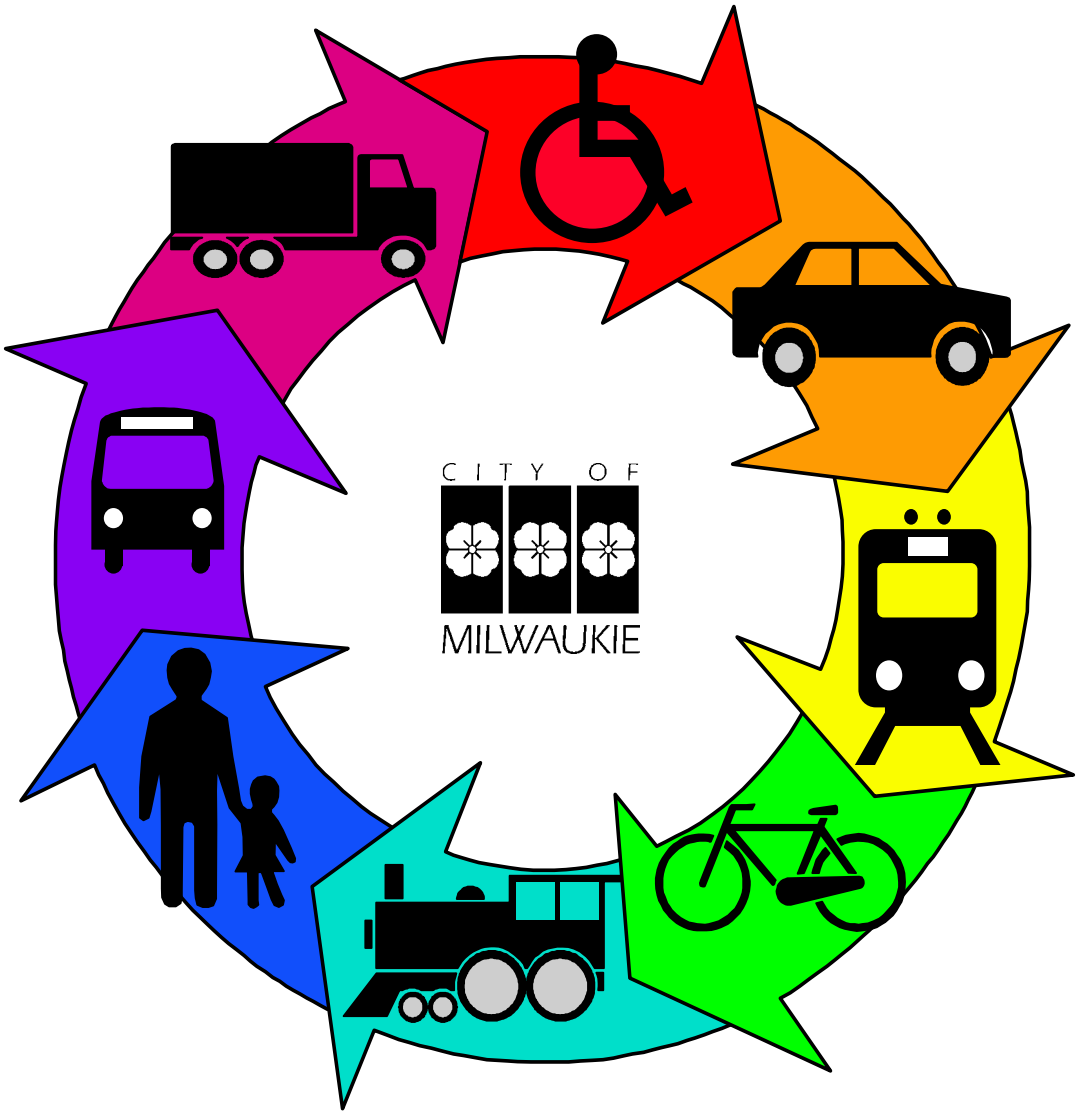
City of Milwaukie

Transportation System Plan

Adopted Ord. #1820 July 15, 1997



prepared by the City of Milwaukie
in association with DKS Associates

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The contents of this document do not necessarily reflect the views or policies of the State of Oregon.

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Chapter 1
Introduction

Milwaukie is a city of 20,000 people and 4.6 square miles bounded by the City of Portland to the north, the Willamette River to the west, and highly urbanized unincorporated areas to the east and south. (See Figure 1.1.) Milwaukie is one of eight areas designated as Regional Centers in the Metro 2040 Urban Growth Management Concept Plan, which means that a more dense urban form is anticipated in the future. Metro estimates the population will reach approximately 25,000 in 2015. Originally a riverfront shipping yard, Milwaukie was an agricultural-dependent town of less than 2,000 people until the 1940s. During the 1950s and 1960s, suburban growth led to large annexations for the City. Recently new growth has located further from Portland, and Milwaukie has become an inner ring city in the region.

Two State highways and two railway lines run through Milwaukie, impacting local traffic and land use patterns. Planning is underway for a High Capacity Transit (light rail) line from the Clackamas Town Center through downtown Milwaukie to Portland. The City maintains over 70 miles of paved roadway. The foundations have been laid for bikeway and walkway networks that will provide safe travel locally and ultimately connect with regional networks and destinations. Milwaukie has a downtown Transit Center and is a hub for bus service in Clackamas County and to Portland. State highways serve regional truck freight and automobile traffic.

In June 1995, the Milwaukie City Council adopted a Vision Statement to guide an improved quality of life for residents into the year 2015. The transportation system is an integral component of Milwaukie's future vision which is addressed in this Plan. Key components within the Vision Statement include the following:

- Milwaukie's Expanded City Center is anticipated to be linked by pedestrian networks and provide a pedestrian atmosphere.
- Transit options will be readily available with the return of public rail transit to complement bus services.
- Neighborhoods will be linked through safe and attractive bikeways and walkways. These linkages will also occur between neighborhoods and the Expanded City Center. The existing grid pattern will support many travel modes and provide more effective east-west vehicular travel corridors.

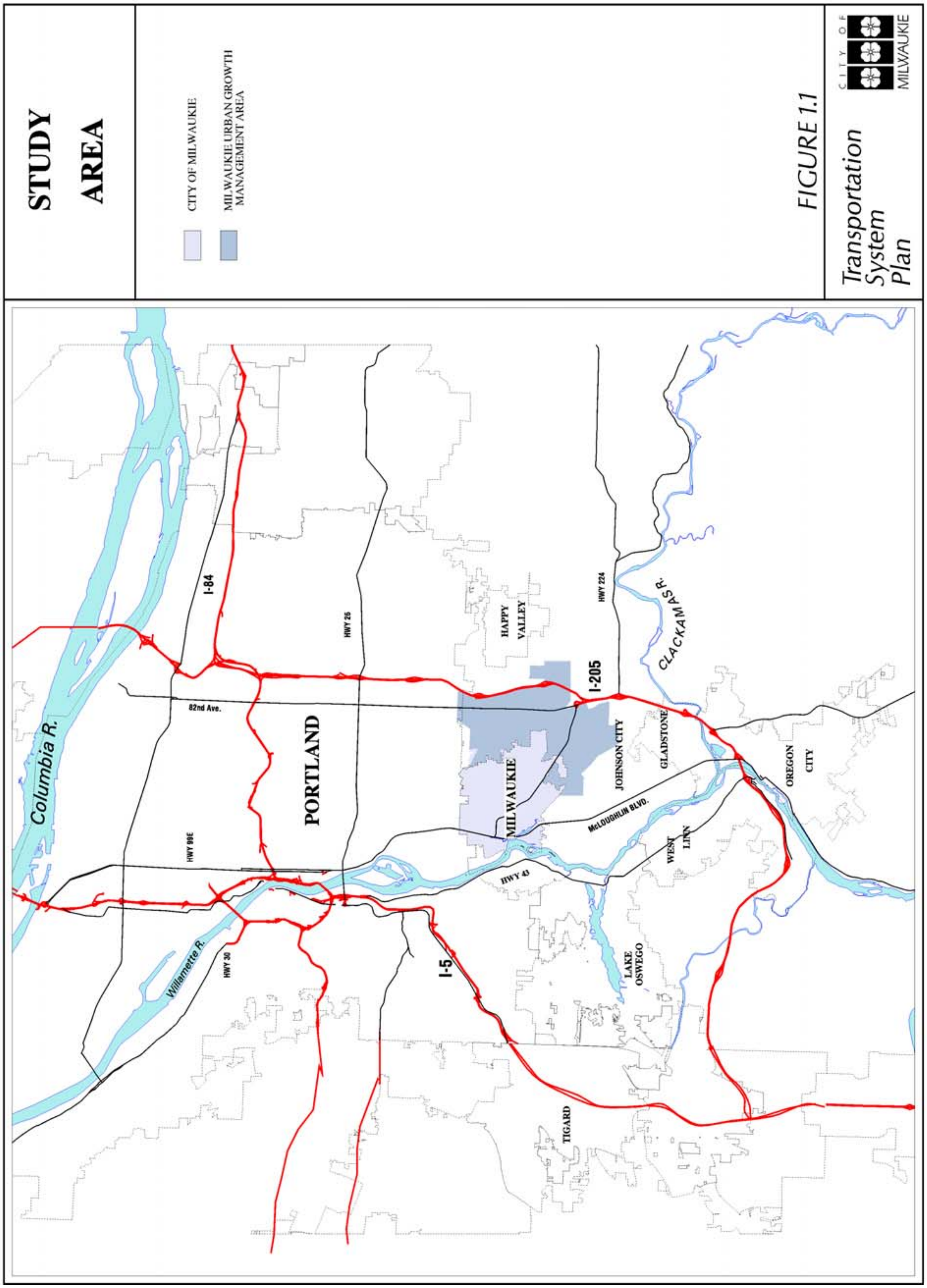
Milwaukie has not previously undertaken a comprehensive multimodal transportation system review. In the 1970s and 1980s, the City completed a number of transportation-related plans and studies at the time of a major update of the Comprehensive Plan. The Comprehensive Plan update included changes to the

Transportation Element. However, these changes were focused on the movement of cars and transit, and did not comprehensively address other modes such as walking and bicycling. The State adopted the Transportation Planning Rule in 1991, which requires that the City complete a comprehensive multimodal transportation plan. The Rule mandates comprehensive transportation planning for cities in Oregon. This Transportation System Plan (TSP) has been prepared to meet the Rule's mandate, and to fulfill Statewide Planning Goal 12 for transportation planning in Milwaukie.

Milwaukie's first draft TSP was prepared in November 1995, after a year of extensive planning, engineering and public involvement, and was distributed for public review and comment. The process began with a widely advertised public meeting to introduce the project and begin to obtain public feedback and participation on transportation needs. Three Citizen Working Groups were formed: Pedestrian/Bicyclist, Roads, and Transit. (See Appendix 1 for list of working group participants.) These committees met throughout the project process to review data collected and technical analyses and provide public opinions on different modal needs, priorities and plan recommendations. (See Figure 1.2 for flow chart on the Milwaukie TSP process.) There has been additional public involvement since November 1995, with a follow-up meeting of the Citizen Working Groups, and presentations before Neighborhood District Associations, the Traffic Safety Board and Planning Commission, and the City Council. There were also two public open houses held in February 1996 and February 1997.

The TSP strives to: determine existing problem areas for all modes of transportation, look~~s~~ into the future to identify the needs created by growth, and provide~~s~~ solutions to existing and future needs along with guidelines to develop the desired multimodal transportation system. The identification of specific transportation system needs will help the City guide its future transportation system investments, and determine how land use and transportation decisions can be brought together beneficially for the City.

Each section of the TSP (after the Existing Conditions Chapter) includes a set of goals intended to be the criteria for measuring all improvements to determine if they are consistent with and advance the intended vision of the City of Milwaukie. A series of strategies has been developed for allocating resources to accomplish the improvements suggested in each chapter. Chapters 3-6 include long-range master plans and also action plans. The latter address those transportation improvements that should be made during the next ten years. The final prioritization of transportation system improvements will be determined by the Milwaukie City Council as part of the capital improvements planning and budgeting process.


STUDY AREA
CITY OF MILWAUKIE
MILWAUKIE URBAN GROWTH MANAGEMENT AREA
FIGURE 1.1
Transportation System Plan
CITY OF MILWAUKIE
Columbia R.
I-84
HWY 26
HAPPY VALLEY
HWY 224
I-205
CLACKAMAS R.
82nd Ave.
PORTLAND
MILWAUKIE
JOHNSON CITY
GLADSTONE
OREGON CITY
McLOUGHLIN BLVD.
WEST LINN
HWY 99E
HWY 43
Willamette R.
HWY 30
I-5
LAKE OSWEGO
TIGARD

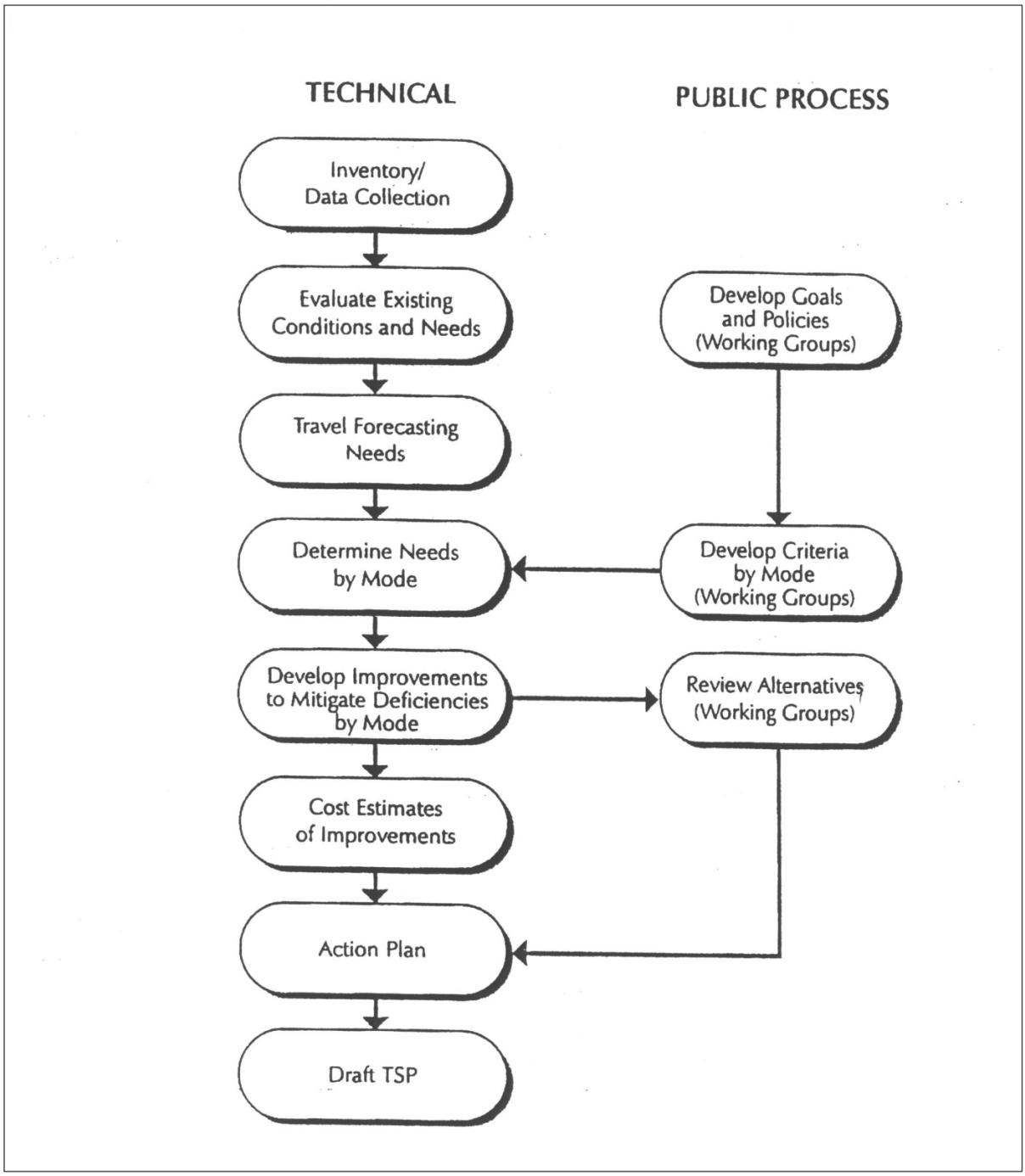


Figure 1.2
Milwaukie TSP

EXECUTIVE SUMMARY

In order to be a comprehensive multimodal plan, the TSP addresses the various transportation modes found in Milwaukie: walking, bicycling, transit, automobiles, rail, and truck freight. The plan also includes Arterial and Collector roadways in Milwaukie's Urban Growth Boundary Management Area (UGBMA) as set forth by the regional planning agency, Metro. Figure 1.1 highlights the UGBMA as a shaded area around the present City limits. The TSP provides identification of various future (20 year horizon) transportation system needs. For each mode, a master plan was developed to guide the long-term implementation of transportation facilities. In addition, actions plans were developed to identify shorter-term priorities of the travel modes. The following sections provide a chapter by chapter summary of the TSP.

Chapter 2 - Existing Conditions

Milwaukie has an established street network with mostly local streets that carry moderate volumes of traffic at moderate speeds. Two State highways traverse Milwaukie: ORE 99E (McLoughlin Boulevard) and ORE 224 (Milwaukie Expressway). These principal highways carry both local and regional traffic to destinations within and outside of Milwaukie. Most of Milwaukie's current roadways serve traffic adequately. There are a few links and intersections that can experience congestion during peak travel times, such as ORE 99E by downtown Milwaukie, the crossing of ORE 224, and the intersection of Linwood Avenue and Johnson Creek Boulevard.

Pedestrian walkways (mainly sidewalks) are unevenly dispersed throughout the City. While many sidewalks exist, there are large gaps in the continuity of the walkways network. Some walkways are in need of handicap ramps, and better intersection crossings are needed for pedestrians, especially at intersections with State highways. The City's bikeway network is more complete than the walkway network, but there are still gaps in bikeway corridors that need connecting. In addition, bikeways need to be continually maintained and kept in good functioning condition without debris and ponding.

Milwaukie is fortunate to have a comprehensive transit system with 14 bus routes serving the area and taking transit riders throughout the City, to Portland, Clackamas Town Center and other destinations. Downtown Milwaukie is the location of a Transit Center where service routes converge. Special transit services are also available for special populations such as handicapped and older adults.

Two active railroad tracks traverse Milwaukie, the Southern Pacific mainline and branchline. A minimum of six inbound (toward Portland) and six outbound freight trains run through Milwaukie daily. In addition, four Amtrak passenger trains pass through but do not stop in Milwaukie each day. There are no airports or water transportation services in Milwaukie.

This chapter also reviews existing plans, policies and standards affecting Milwaukie's transportation system, and the recommendations from previous transportation studies. Summaries of existing traffic control devices and accident statistics are provided.

Chapter 3 - Pedestrian Needs and Priorities

The TSP recommends a Walkways Network Master Plan and Action Plan to implement solutions to pedestrian needs over the next twenty years. Residents of Milwaukie want a primary walkway system that provides continuity by filling in existing gaps, provides improvements at high accident locations, and provides walkways near elementary schools. It is important to provide adequate pedestrian connections to transit, off-road trails, parks, residential and commercial areas. It is also necessary to retrofit existing facilities and ensure that future facilities are accessible to all pedestrians, especially the elderly and disabled. Walking-related goals, objectives and policies are found in Chapter 8.

The goals for pedestrian improvements are:

1. Provide a continuous citywide network of safe and convenient walkways integrated with other transportation modes.

2. Maintain and enhance existing and future pedestrian facilities to encourage use.

3. Increase the use of walking for all travel purposes.

4. Reduce the number of pedestrian-related accidents by increasing the safety and security of pedestrians.

Chapter 4 - Bicyclist Needs and Priorities

The TSP recommends a Bikeways Network Master Plan and Action Plan to implement solutions to bicyclist needs over the next twenty years. Residents of Milwaukie want a primary bikeways network that allows extended travel within the City, provides safe travelways, and provides bikeways near schools. It is also important to provide adequate bikeway connections that support popular commuter routes, connections to transit, off-road trails, parks, residential and commercial activity areas. Providing support facilities such as bike racks and locker rooms with showers at popular bicyclist destinations, including employment and transit centers, is crucial for a successful increase in bicycling as a travel mode. Enforcement of traffic safety laws and education of bicyclists and motorists about their rights and responsibilities are encouraged, as is an increase in bicycling for all travel purposes. Bicycling-related goals, objectives and policies are found in Chapter 8.

Goals for bicycling improvements are:

1. Provide a continuous citywide network of safe and convenient bikeways and routes that is integrated with other transportation routes.

2. Maintain and enhance existing and future bicycle facilities to encourage use.

3. Increase the use of bicycles for all travel purposes.

4. Reduce the number of bicyclist-related accidents by increasing safety and security of bicyclists.

Chapter 5 - Public Transit Needs and Priorities

Improvements to existing services and facilities, along with planning and implementation of future anticipated transit needs, are of primary importance. Integration of transit with other travel modes is essential for creating a balanced transportation system. Milwaukie participates with other jurisdictions in Clackamas County in an established annual process to submit publicly-identified transit service needs to Tri-Met. The City should continue its coordination with Tri-Met to ensure that transit system needs and priorities are addressed over time. A current example of coordination is the planning effort for High Capacity Transit to Milwaukie via the South/North Light Rail Study. The funding of existing and expanded transit services and facilities should continue as a cooperative effort between the City, Tri-Met and other jurisdictions and agencies. Transit-related goals, objectives and policies are found in Chapter 8.

Goals for transit improvements are:

1. Work with Tri-Met to provide local citizens with a convenient and accessible public transit system that is integrated with other transportation modes and transit-supportive land use development.

2. Ensure that Tri-Met maintains and enhances existing and future transit facilities and services to encourage use.

Chapter 6 - Automobiles and Streets

As part of developing the TSP, the existing functional classification of Milwaukie's streets was reviewed. The existing classifications were defined predominantly by the number of cars that travel on a street. A revised functional classification is offered that would reflect the City's desire and the State's mandate for a multimodal transportation system. Adjacent land use is also taken into consideration in determining how a street should be designed, based on modal priorities. For example, a street in a commercial/industrial area that is a truck route but also a bikeway corridor should have wide travel lanes and bike lanes to accommodate both of these modes. Chapter 6 includes sample roadway design standards.

Recommended actions for implementing a revised Functional Classifications System are:

1. Include design standards in a City Roadway Manual to reflect the proposed system;

2. Update the Subdivision Ordinance to reflect the proposed system; and

3. Bring the proposed functional classification in line with Comprehensive Plan future land use designations.

Traffic volumes for the next twenty years were projected by estimating future population growth using the regional travel demand forecasting methodology. Analysis of the results shows that traffic circulation in Milwaukie will deteriorate by the year 2015 unless key improvements are made to the roadway system. Of particular concern are State Highways 99E and 224. Both regional facilities will be congested in the future, and will cause added congestion on Milwaukie roadways such as 17th Avenue, 32nd Avenue and Johnson Creek Boulevard. Other roadways and intersections will need to be improved by increasing capacity from two to three lanes or by adding traffic signals at intersections. The TSP

recommends an Automobile Master Plan and Action Plan to address these needs. Automobile/street-related goals, objectives and policies are found in Chapter 8.

The TSP recommends that the two State highways be made limited access routes, to increase their capacity and reduce conflicts with the local roadway system. Corridor studies of ORE 99E and ORE 224 are needed in the short term to plan and begin improvements before traffic congestion significantly impacts Milwaukie's street system. It is also appropriate to conduct corridor studies as part of a coordinated effort with current multimodal planning activities, e.g. South/North Light Rail. While access controlled roadways can be viewed as barriers to a community; without the change to limited access on ORE 224, the highway would have to be widened and several of Milwaukie's streets would be impacted by diverting traffic. Adequate advance planning can lessen the barrier effect of the highway.

Goals pertaining to automobiles are:

1. Provide an accessible transportation system that links different transportation modes to destinations within the City and to regional destinations using the regional transportation network.

2. Provide a safe, well-maintained, cost-effective and convenient transportation system.

Public streets in Milwaukie must be maintained to provide safe functioning for automobiles and other transportation modes. The TSP reports the results of a Pavement Management study recently completed by the City whereby a Pavement Quality Index (PQI) was established and pavement needs and associated costs for improvements were identified. The goal was to maintain all paved City streets in Good to Excellent condition. An overall amount of approximately $350,000, above the existing expenditures for street maintenance, will be needed for the City to achieve its goal.

The TSP also discusses Neighborhood Traffic Management (primarily traffic control devices) and recommends that design standards and program criteria for these devices be included in the Roadway Design Manual which will be developed and adopted by the City following TSP adoption. The Revised Functional Classification System for City roadways includes a new classification called "Neighborhood". Neighborhood designated roadways are recommended as the most appropriate routes to be considered for Neighborhood Traffic Management consideration.

Transportation Demand Management (TDM) may be necessary to help the City meet its Transportation Planning Rule requirement for a reduction in vehicle miles traveled over the next twenty years. The TSP recommends that the City serve as a model for local businesses through implementation of its own TDM measures for City employees.

Access management on Arterial and Collector streets should be looked at for maintaining traffic flow and mobility. The Oregon Department of Transportation (ODOT) Access Management Classification System should be incorporated as Milwaukie's standard. New driveway placement should be in accordance with standards developed for the Roadway Design Manual.

Parking requirements in the Regional Center area should be reviewed and modified as necessary to ensure that an overall reduction in the number of parking spaces needed per capita in the next twenty years meets Transportation Planning Rule and Metro 2040 reduction requirements.

Chapter 7 - Rail and Truck Freight Needs and Priorities

At-grade crossings are the primary concern of commercial and passenger railroad companies and the City of Milwaukie. Railroad crossings with streets need to facilitate the efficient movement of goods and passengers with a minimum of conflict with other travel modes. The City is also concerned about the existence of asphalt crossings, because they deteriorate more quickly than concrete or rubber crossings and can be hazardous for pedestrians and bicyclists to cross.

The movement of trucks in and through Milwaukie was evaluated in developing the TSP. The existing regional routes (State highways and interstates) serve the movement of trucks through Milwaukie. Local preferred minor routes are proposed for trucks delivering or picking up goods in Milwaukie or for local businesses providing services to locations in Milwaukie. If adopted, these routes should be advertised to known truck-oriented businesses that frequent Milwaukie. Wayfinding signs posted at selected locations would also facilitate use of these routes. Rail and truck freight-related goals, objectives and polices are found in Chapter 8.

Goals for rail and truck freight are:

1. Ensure a safe, accessible and efficient rail freight system that facilitates the movement of goods to Milwaukie and through the region and State while minimizing conflicts with other travel modes.

2. Ensure a safe and efficient passenger rail system through Milwaukie that minimizes conflicts with other travel modes.

3. Provide a safe, cost-effective and efficient truck route system that facilitates the movement of goods to Milwaukie and through the region.

Chapter 8 - Goals, Objectives and Policies

The policies in this chapter will guide the City of Milwaukie in meeting the needs, priorities and plans identified in the five preceding modal element chapters. This chapter contains a comprehensive set of goals, objectives and policies which address infrastructure improvements as well as policies and programs to be implemented to achieve the City's overall goal: ***to promote livability by establishing a safe, efficient, balanced and diverse transportation system that reduces the total automobile vehicle miles traveled in the next twenty years***. Each travel mode is covered in this chapter. The specific goals, objectives and policies developed are a result of significant public participation and the desire to correct existing and future identified transportation system needs. Central themes that are noticeable in each of the modal sections are: completing modal system connections and related infrastructure needs; securing additional funding sources to make modal improvements; coordinating with other local, regional and State entities to achieve physical improvements and system-wide connectivity; promoting safety; and encouraging the use of other travel modes besides the automobile.

Chapter 9 - Plan Implementation

This section determines how best to implement all of the identified transportation system projects over the next twenty years in a manner that is consistent with and complements Milwaukie's Vision, major plans such as the Regional Center Master Plan, and Council Goals. It makes sense to combine individual modal projects into multimodal projects for implementation when there is more than one modal need associated with a particular location or corridor.

Besides specific projects, plan implementation includes recommendations for: conducting studies of ORE 99E and ORE 224 capacity and circulation needs; studying Regional Center future parking needs; establishing Neighborhood Traffic Management and Transportation Demand Management programs in the City's budget; and continued coordination with Tri-Met on developing costs and funding sources for implementing transit-related improvements.

It is projected that over $90 million will be needed to make all identified Plan improvements, over the next 20 years. This chapter details funding for transportation system improvements. First, existing and potential revenue sources for transportation system improvements are described. Examples are: Gas Tax, Local Improvement Districts, Vehicle Fees, and System Development Charges. The City needs to be creative and work with Neighborhood District Associations, adjacent jurisdictions and agencies to develop funding sources to implement needed improvements.

Chapter 9 includes guiding principles to assist the City Council with the final project prioritization process for multimodal projects. These guiding principles are derived from the State Transportation Planning Rule, Region 2040 Growth Concept Plan, the adopted Milwaukie Vision Statement and citizen participation in TSP development.

Chapter 2
Existing Conditions

This chapter summarizes existing traffic and transportation conditions in the City of Milwaukie. It describes the street network in terms of classification, traffic system characteristics, safety issues, key travel routes, average vehicle occupancy, and parking. The existing conditions for walking, bicycling, transit, freight trucks and rail are also discussed. Other topics that are included in this chapter are: population and employment; environmental constraints (natural and cultural); existing plans, policies and standards; and previous transportation studies. The aforementioned items are included because they define Milwaukie as it exists today.

An inventory of existing transportation system related conditions was undertaken beginning in the fall of 1994. The data collected serves as the base information for all subsequent analyses. This chapter begins with sections that define Milwaukie. Discussions on the existing street network and different travel modes in the City follow.

POPULATION AND EMPLOYMENT

Milwaukie's population in 1996 was approximately 20,065 people.[1] According to Metro, Milwaukie had 8,446 households and 13,593 employees in 1994.

ENVIRONMENTAL RESOURCES

Milwaukie is a mostly developed City that has limited remaining natural and cultural resources. Any future transportation system improvements affecting these resources must be reviewed according to City and other Plan policies and standards.

The City is committed to wisely managing remaining natural resources as is evident by policies and maps contained in the Milwaukie Comprehensive Plan and implementation standards contained in the Milwaukie Zoning Ordinance. A natural resources inventory was completed by the City in the late

[1] PSU Center for Population Research and Census.

1980's. The inventory included areas with unique and diverse natural and botanical features, areas important for wildlife habitat, and areas with soil and/or wetness constraints which may contribute to erosion control, aquifer recharge, or other natural value.

The main natural resource areas within the City are: areas along Kellogg Lake, parts of Kellogg Creek, some riparian areas along the Willamette River, the steep slopes south of Lake Road, small bands of riparian vegetation along Johnson Creek, parts of Spring Creek, and other scattered wetland and upland resources having sufficient natural vegetation to allow the natural processes of habitat development and vegetative successive stages to occur. In addition, Elk Rock Island, near Milwaukie on the Willamette River, offers good wildlife habitat. An Elk Rock Island Natural Resource Management Plan was recently adopted by the City.

Designated natural areas have been approved by the City and are identified on a Natural Resources Property List and corresponding map in the Comprehensive Plan (see Appendix 2). These natural areas are protected from degradation through Plan policies, regulations such as the Natural Resources Overlay Zone, and management activities.

Natural hazards are also addressed in the Milwaukie Comprehensive Plan. Specifically of interest are the 100 year flood plain and severe construction rated areas within the City. Map 3 of the Comprehensive Plan denotes these critical environmental features. Limited construction activity can take place in these areas, and special attention is paid to construction techniques and potential impacts, so as not to significantly alter or make worse the natural conditions.

The City also values its historic resources. The City protects historic and cultural resources through its Plan policies, regulations such as an Historic Resources Overlay Zone and Historic Review Commission activities. In the late 1980's, a revised historic resources inventory was completed in the City and measures were developed to ensure resource protection. The Historic Resources Property List and corresponding Historic Resources Map were adopted into the Comprehensive Plan (see Appendix 3).

Homes built in Milwaukie during the late 1800s reflect certain architectural elements such as low-pitched gable roofs. Most of the historic resources are residences. There are a few other types of structures on the City's inventory list, including: public, civic, religious and educational institutions, commercial uses and a cemetery. Many of Milwaukie's historic resources are located in the downtown area or on streets radiating out from the downtown. The first interurban electric rail car came through and stopped in Milwaukie on its route between Portland and Oregon City in the 1890's.

The primary parks and recreation facility in Milwaukie is North Clackamas Park, which is a multiuse regional park located off of Rusk Road near ORE 224. Other smaller neighborhood parks in the City include: Century, Dogwood, Scott, Ardenwald, Furnberg, Water Tower and Spring. The newly paved Springwater Corridor trail, which is part of the regional 40-mile loop, is fast becoming a popular recreational facility. This facility serves walkers and bicyclists and is also used for work commuting. There are a few limited trail opportunities near the Willamette River in the downtown area. There is also a public boat ramp along the Willamette River, in this same area, that serves area boaters.

Significant scenic areas can be viewed when looking toward the Willamette River from viewing sites in the downtown area. Private residential properties are located near the river bank. The viewing of Kellogg Lake from Dogwood Park is also considered scenic. Preservation of scenic views is repeatedly emphasized in Comprehensive Plan policies that relate to open space and the Willamette River Greenway.

PLANS, POLICIES AND STANDARDS

Existing plans, policies and standards that shape transportation system planning and facilities in Milwaukie are found in local plans and regulations such as the Comprehensive Plan and Zoning Ordinance. They are also found in regional and State plans and requirements. Milwaukie must maintain consistency with State and regional land use and transportation plans, policies and requirements as part of growth management coordination in Oregon. Chapter 8 includes specific new goals, objectives and policies that update transportation priorities as envisioned over the next twenty years. These goals, objectives, and policies are derived from the interaction of local needs with regional and State plans.

Transportation planning is ever-changing in Oregon and the Portland metropolitan region. The State is completing a series of updated and new transportation related plans for different modes of transportation. In July 1996, the regional government, Metro adopted its State required transportation planning update of the Regional Transportation Plan. Other local jurisdictions are completing elements of their Transportation System Plans, including Milwaukie's neighbors, Portland, Happy Valley, and Clackamas County.

Milwaukie's Transportation Plans, Policies and Standards

Chapter 5 of **Milwaukie's Comprehensive Plan** contains a **Transportation Element**. This is the primary element for City transportation policies in the Comprehensive Plan. There are nine objectives and associated policies in the Transportation Element. Transportation related objectives and policies are also located in other elements of the Comprehensive Plan. Appendix 4 includes a summary of all the transportation related language and includes commentary on the appropriateness of the current language. Overall, many transportation related policies are relevant and applicable and should be continued in the Comprehensive Plan. There are some policies that are outdated or no longer applicable and these policies should be deleted. Additional language is needed to address alternative modes of transportation, especially bicycling, walking and transit.

In May 1994, Milwaukie amended its **Zoning and Subdivision Ordinances** to implement State Transportation Planning Rule requirements. In the Zoning Ordinance, the City amended Section 500, Off-Street Parking and Loading, to add sections on bicycle, carpool and vanpool parking. The bicycle parking section covers applicability, number of spaces required, space standards and racks, locational criteria, covered parking and lighting. The Carpool and Vanpool parking section sets a 10 percent minimum standard for parking spaces in new commercial, industrial and institutional developments with 50 or more employees.

The May 1994 amendments also included the establishment of a new section in the Zoning Ordinance, (Section 1400: Transportation Planning, Design Standards, and Procedures). This section is the heart of the City's Transportation Planning Rule implementation. The Section established a development review procedure, sets applicability standards for the types and scale of development and redevelopment projects subject to a Transportation Planning Review and includes the criteria for project review. Section 1400 provides the standards for roadway improvements that incorporate pedestrian, bicycle and transit oriented facilities. Project design standards are included to ensure safe internal circulation for pedestrians along with connections to adjacent developments and sidewalks. The new regulations contain standards related to transit streets that provide for specific building orientation, and Tri-Met's review of applications for transit stops.

The changes to the Subdivision Ordinance that implement the Transportation Planning Rule are found in Section 17.28: Design Standards. These amendments included a table with the same roadway improvement standards in Section 1400, and amended language that encourages through streets and limits the creation of cul-de-sacs, limits the length of blocks and specifies pedestrian way requirements.

In October 1994, Milwaukie amended its Zoning Ordinance again, by making a major update to Section 500, Off-Street Parking and Loading. The revision to this section did not alter the language for the sections described above. However, the revisions did add more Transportation Planning Rule related language to reduce the number of parking spaces in off-street parking areas. A new section (503.4) was created and offers incentives for a reduction in required parking. Another new section (503.5) allows for alternative parking plans that could permit less than the number of required parking spaces identified in the uses list, provided the City approves supporting evidence. In Sections 503.13 and 503.14, enhanced pedestrian access through parking areas is provided, and park-and-ride facilities are encouraged for certain uses respectively. The last new section related to the Transportation Planning Rule is Section 507, Structured Parking. This section provides for permitted zones, height, design standards and incentives. Structured parking can be a design asset in more densely developed mixed-use areas, especially near transit routes. It is being explored as part of the Regional Center Master Plan effort.

Another document that affects Milwaukie's transportation planning is the **Roadway and Traffic Safety Management Plan**, from 1978. The Plan summarized the results of roadway and traffic inventory in the City and makes recommendations for managing traffic in an efficient and safe manner and for maintaining and improving roadways. The Plan is divided into six chapters: problem identification program, traffic safety programs, improvement projects, priority, finance, and scheduling program, roadway planning program and an evaluation and update continuation program.

The Roadway and Traffic Safety Plan provides good historical data as to the nature of transportation facilities and problems in the late 1970s. The Plan was used in the TSP project to evaluate the extent of improvements that have been made to the transportation system since 1978, and to evaluate those problem areas that may not have been improved since 1978, to see if transportation needs and improvements still exist today. Other data contained in the Plan, such as traffic movement summaries, are outdated and new counts and analyses were conducted for the TSP.

The City completed a **Public Facilities Plan: 1988-2008**, in August 1988. The Public Facilities Plan's (PFP) purpose was to ensure that adequate public facilities are provided within Milwaukie over a twenty year period. The Plan reviewed existing major public facility systems and identified needed improvements to support development consistent with the Comprehensive Plan. The PFP implements Statewide Goal #11, the provision of public facilities planning. It also has served as a tool to implement policies from the Comprehensive Plan.

Section 3 of the Public Facilities Plan is devoted to transportation. The section describes the existing transportation situation in the City and the need to maintain the functioning of the highest volume roads to minimize traffic impacts on other streets. Most of the roads that need special attention are State and County major roadways. Also, the need to increase capacity through the City was cited with the consideration of a new east-west collector street. The Plan suggested that the City consider safety improvements that are relatively small projects such as left-turn lanes, traffic control devices and the construction of sidewalks and bicycle lanes. The structural capacity and maintenance of the existing roadways and transit service routes in Milwaukie were also identified as areas that should be investigated.

The Public Facilities Plan contained a section with objectives and policies that serve as guidelines for implementing transportation facilities. The basic intent is to implement the goal of the Transportation Element of the Comprehensive Plan. The objectives and policies listed in the PFP were included in the City's Comprehensive Plan. The Comprehensive Plan does include a few more policies than the PFP, most likely due to more recent updates of the Comprehensive Plan.

The PFP includes Table A - Proposed Transportation Facilities Projects and a corresponding map and list of project descriptions. The table individually listed projects, the type of improvement, range of years for implementation, priority of improvement, jurisdiction responsible for improvement, funding and a cost estimate. To date, a number of projects have been completed. Examples are Harmony Road Phases I and II and Linwood Avenue/King Road improvements.

The data and recommendations offered in the Public Facilities and Roadway and Traffic Safety Management Plans are outdated and will be replaced by an adopted TSP.

Regional Plans

The City of Milwaukie is part of the Portland metropolitan region and is a jurisdictional member of Metro, the regional government. Metro is responsible for the regional aspects of land use and transportation planning among other programs. In 1995, Metro adopted the **Interim Federal Regional Transportation Plan (federal RTP)** to meet federal requirements. In July 1996, the Metro Council adopted an updated version of the 1992 Regional Transportation Plan policies designed to implement the Region 2040 Growth Concept and to fully comply with State and federal requirements. Work is continuing on the system component of the RTP update to translate the new policies into a 20-year plan for specific improvements to the regional transportation system. The updated RTP will serve as the Transportation Element of the Regional Framework Plan.

Metro's Regional Transportation Plan is a 20-year blueprint for the region's transportation system that addresses how best to move people and goods in and through the region. Chapter 1 of the plan establishes guiding principles for a balanced regional transportation system as well as goals and objectives for all ways of traveling in and through the Portland region. These goals and objectives are

important because they will form the basis for future decisions about what transportation projects will be funded, as well as guide local jurisdictions in the development of their local transportation plans.

The Regional Transportation Plan is updated every three years. In May 1995, the Regional Transportation Plan Citizen Advisory Committee was appointed by the Metro Council as part of the update process. The 21-member group provided citizen perspectives on transportation issues and is advisory to the Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council.

To meet the challenge of increased population, Metro developed the 2040 Growth Concept. Adopted by the Metro Council in 1994, the 2040 Growth Concept is a plan that establishes a vision for how the region should grow during the next 50 years. In general, the 2040 Growth Concept envisions compact development throughout the region, concentrating new jobs, services and housing in a hierarchy of centers. The following are the land use components defined in the 2040 Growth Concept:

- Central City
- Regional Centers
- Industrial Areas
- Station Communities
- Town Centers
- Main Streets
- Corridors
- Employment Areas
- Inner Neighborhood
- Outer Neighborhood

These centers vary in terms of size and types of activities present. Town centers, for example, are envisioned to provide housing with shopping and other commercial services within a two- to three-mile radius.

Transportation investments that support town centers and the other land use components defined in the 2040 Growth Concept are a key part of making the concept work. This means spending money on transportation projects that will provide the right mix of road, pedestrian, bus, bicycle and freight improvements to support this more compact urban form.

The Regional Transportation Plan addresses how best to move people and goods in and through the region. To do this, the Plan identifies existing and future transportation needs and the projects or programs needed to address those needs. Policies established in Chapter 1 of the Regional Transportation Plan set both short- and long-term priorities for funding of regional transportation projects.

The Regional Transportation Plan focuses on integrating regional transportation policies and the 2040 Growth Concept. Successful implementation of the 2040 Growth Concept hinges on transportation policies and investments that encourage and support the land use components envisioned by the 2040 Growth Concept.

A basic assumption of the Plan is that transportation systems do more than meet travel demand; they have a significant effect on the areas they serve. As such, the goal of the Regional Transportation Plan is to tie investments in the region's transportation system to regional and community goals and values

in order to maintain the quality of life that area residents presently enjoy. To this end, the Regional Transportation Plan will balance investments in highways, streets, transit, freight, bikes and pedestrians, so that regional funds go to transportation projects that support the land use components in the 2040 Growth Concept.

State Plans

In 1992, the State adopted the **Oregon Transportation Plan** (OTP) which sets the general direction for transportation development statewide for the next twenty years. The routes in Milwaukie and future growth area which are affected by the OTP are: ORE 99E, ORE 224, ORE 213, and I-205. The goal of the Plan is to guide development of a safe, convenient and efficient transportation system that promotes economic prosperity and livability. The OTP contains two elements: Policy and Systems. Key aspects of the OTP focus on a transportation system that is balanced, efficient, accessible, environmentally responsible, has connectivity among places, modes and carriers, is safe, and financially stable. See Appendix 5 for OTP policies that specifically relate to Milwaukie.

Clackamas County Plans

In 1992, Clackamas County updated the Transportation Element of its Comprehensive Plan which sets the direction for transportation development within the County over the next twenty years. The Plan recognizes that Clackamas County is increasingly becoming a densely urbanized area. Many two lane roads within the Urban Growth Boundary will need to be brought up to urban standards with sidewalks and bicycle lanes. The key aspect of this Plan is that the County's transportation system must emphasize a balance between safety, highways, transit, and pedestrian/bikeways. The County has started its next update, to implement the Transportation Planning Rule requirements. The updated Plan is expected to be completed by January 1998.

PAST STUDIES

In recent years, there have been a number of previous studies which have dealt with transportation issues in Milwaukie. These studies provide extensive background into transportation needs and opportunities in the area, and have been important resources for conduct of the current study. A list of recommendations is provided from each study. TSP development incorporates these and other transportation needs. The key studies are summarized below:

Annotated Bibliography

Roadway and Traffic Safety Management Plan, **by Transportation Planning and Management, Inc. for City of Milwaukie, Oregon, 1978.** The purpose of this report was directed at minimizing traffic accidents and fatalities and to improve traffic movement and roadway conditions. The result was a series of improvement programs, including 1) Problem Identification Program 2) Traffic Safety Programs 3) Improvement Projects 4) Priority, Finance and Scheduling Programs 5) Roadway Planning Program and 6) An Evaluation and Update Continuation Program.

Recommendations:

- Widen Harrison Street east of ORE 224 to 5 lanes with left turn.
- Widen Johnson Creek Boulevard at 42nd Avenue. Install left turn lane.
- Improve alignment of Johnson Creek Boulevard. Widen to two 12 foot lanes. Provide shoulders.
- Sign to allow free-flow on Harrison Street-42nd Avenue-King Road route.
- Reconstruct intersection at Railroad Avenue/37th Avenue. Realign Adams Street to meet Railroad Avenue closer to a 90 degree angle.
- Reconstruct Monroe Street at 52nd Avenue to improve traffic lane definition.
- Channelize Harrison Street near 23rd Avenue. Install School Bus refuge area.
- Widen Railroad Avenue to two 12 foot lanes between 37th Avenue and 60th Avenue.
- Realign intersection at 28th/Monroe. Restrict parking along Monroe from 21st Avenue to ORE 224.
- Improve 37th Avenue, railroad tracks to Harrison Street, to collector street standard.
- Improve Sellwood Street, 35th Avenue, Edison Street at ORE 224 (34th Avenue to 37th Avenue) to collector street standard.
- Improve Washington Street and 34th Avenue, Oak Street to Lake Road, to collector street standard.

Public Facilities Plan, 1988-2008, **Kampe Associates, Inc., Planning Resources, Inc. and Tom R. Lancaster, P.E., August, 1988.** This Public Facilities Plan (PFP) was developed as part of the City's periodic review of its comprehensive plan and development ordinances to ensure that adequate public facilities are provided within the city of Milwaukie. A number of policies were developed relating to seven transportation objectives (Roadways Classification), Regional Traffic, Roadway Construction and Improvements, Freight Movement and Business Operation, Regional Transit Opportunities, Local Transit Opportunities, Rail and Pedestrian/Bikeway). In addition, a list of proposed Transportation Facilities Projects was developed, with each project as either a 0-5 year priority or a 5-20 year priority.

Recommendations:

- Relocate International Way at west end to intersect 37th Avenue several hundred feet north of ORE 224.
- Reconstruct ORE 99E from Harrison Street to railroad trestle. Improve signals, striping.
- Reconstruct intersection of Railroad Avenue/37th Avenue/Adams Street.
- Restrict parking along Monroe Street (21st Avenue to ORE 224). Realign Monroe Street at 28th Avenue.
- Reconstruct 37th Avenue between railroad tracks and Harrison Street as a 3-lane roadway.
- Improve the curves in Oatfield Road between Park Street and Lake Road.
- Upgrade ORE 224 to either an expressway or a freeway.
- Improve intersection at ORE 99E/River Road.

- Reconstruct Lake Road to add continuous left-turn lane.
- Reconstruct Sellwood Street/34th Avenue/Edison Street to ORE 224 to improve traffic circulation (no lanes added).
- Reconstruct 42nd Avenue between Monroe Street and Railroad Avenue (no lanes added).
- Reconstruct Linwood Avenue between King Road and Harmony Road (no lanes added).
- Reconstruct Railroad Avenue between 37th Avenue and Linwood Avenue. Some left turn lanes will be added where needed.
- Reconstruct Sparrow Street between River Road and Spring Park.

***Southeast Corridor Study*, Metro, April, 1989.** The primary objective of the Southeast Corridor Study was to analyze the growth in the east/west traffic (east of McLoughlin Boulevard) which was forecast to occur in lower southeast Portland and in Milwaukie within 20 years and then recommend a transportation improvement program for the study area. The study committees recommended a Southeast Corridor transportation improvement plan, consisting of seven projects addressing existing transportation problems, improving local traffic accessibility into and out the study area, improving access to Johnson Creek industrial area and facilitating east/west travel movements. The recommended projects within Milwaukie are listed below.

Recommendations:

- Widen 42nd Avenue and King Road in the vicinity of Harrison Street/42nd Avenue/King Road
- Conduct preliminary engineering for improving capacity on Harrison Street between ORE 224 and 32nd Avenue
- Upgrade Johnson Creek Boulevard between 45th Avenue and 82nd Avenue
- Widen intersections on King Road at Linwood Avenue, Stanley Avenue and Bell Avenue

***SE 32nd Avenue Transportation Network Study, Volume I*, Mackenzie Engineering, Inc., December, 1992.** This study was undertaken to provide input on short, medium and long-term transportation related improvements in the vicinity of 32nd Avenue near Harrison Street. At the time, construction on the City's Public Safety Facility was underway and there was a strong need to tie the Milwaukie Marketplace and Oak Street to Providence Milwaukie Hospital on 32nd Avenue. Four levels of development were analyzed (existing and five, ten and fifteen years into the future) using Metro's Emme/2 model and assumptions about development in the area. Five transportation network schemes were developed and two were selected for further analysis. Based upon the projected growth of development and traffic within the study area, it was anticipated that the proposed improvements to the road system would provide an acceptable level of service.

Recommendations:

- Construct a raised or depressed over(under)-crossing for Harrison Street at the railroad tracks and ORE 224. New roadway (crossing) would connect to King Road to the east, eliminating need for Harrison Street, 42nd Avenue, King Road route.
- Widen westbound Harrison Street near 32nd Avenue.
- Eliminate northbound Railroad Avenue west of 32nd Avenue. Southbound Railroad Avenue west of 32nd Avenue becomes stop controlled.

Regional Street Classifications: A Demonstration Project, **McKeever/Morris, Inc. and Kittelson & Associates, Inc., June, 1993.** The purpose of this report was to develop a tool to assist local jurisdictions, including Milwaukie, in evaluating their functional classification systems. The model links functional transportation systems with the land uses they serve. Street standards were not developed as part of the model, but standards corresponding to the model were to be developed at a later time.

Monroe Street Traffic Analysis, **Tom R. Lancaster, P.E., August, 1993.** This study arose out of citizen concern for the appropriate function on Monroe Street between the Milwaukie Expressway (ORE 224) and downtown Milwaukie. The particular issues were through truck usage and the appropriate function of Monroe Street. The impact of placing various restrictions on Monroe Street were evaluated on nearby streets (particularly Harrison Street, since it would receive most of the diverted traffic). The results of the study showed that Monroe Street should probably function as a collector, rather than as a minor arterial as it is now classified, and that Harrison Street would continue to function at acceptable levels of service if Monroe Street were to be closed to through traffic. Eventually, ODOT may close Monroe Street anyway as part of an upgrading of the Milwaukie Expressway.

Recommendations:

- Reclassify Monroe Street from a Minor Arterial to a Collector.
- Remove signal at Monroe Street/ORE 224.

McLoughlin Boulevard Reconnaissance Study, **DKS Associates, December, 1993.** This study was aimed at providing data to aid in planning future improvements on McLoughlin Boulevard (ORE 99E). Research was performed regarding McLoughlin Boulevard's role in local and regional plans. Currently all signalized study area intersections operate at level of service "D" or better. In the future, under the year 2010 scenario, the McLoughlin Boulevard/17th Avenue/Harrison Street intersection would operate at level of service "F" without further improvements.

34th Street Traffic Analysis, **Tom R. Lancaster, P.E., January, 1994.** This study was undertaken because residents on 34th Avenue had reported problems with excessive traffic volumes and speeds on 34th Avenue, believed to be caused by through traffic. The purpose of the study was to determine how much of the existing traffic is indeed through and to evaluate the likely effectiveness of several roadway design feature and traffic control devices aimed at reducing traffic volumes and speeds. It was determined that, over the course of the six-hour survey period, approximately 46% of all traffic has neither an origin or a destination along 34th Avenue and is therefore considered through traffic. The roadway design features and traffic control devices evaluated included full or partial closure of 34th Avenue, traffic circles, speed humps, curb extensions, speed zone signs, stop signs, increased enforcement and street extensions. The report concluded that installation of traffic circles or speed humps, or a combination of the two would provide the best potential for controlling traffic volumes and speeds.

***SE Johnson Creek Boulevard/SE Linwood Avenue/SE Flavel Drive Intersection Traffic Study Report*, Kittelson & Associates, Inc., August, 1994.** This study analyzed the traffic volume and operation at each of ten intersections in the vicinity of Johnson Creek Boulevard/Linwood Avenue/Flavel Drive under four safety alternatives at that intersection. The recommendations included installing left turn lanes on all four legs, signalizing the intersection with left turn phasing on Johnson Creek Boulevard and Flavel Drive should remain as the fourth leg of this intersection (several of the alternatives included

modifications to this leg of the intersection). Bicycle lanes and sidewalks were included in the proposed recommendations.

Other Recommendations:

Source: ***Clackamas County Five Year Transportation Capital Improvement Program (Fiscal Years 1992-93 to 1996-97) and Long-Range Transportation Capital Improvement Plan (1992 to 2010)*****, Clackamas County Department of Transportation and Development, December, 1992.**

- **Long-Term Capital Improvement Plan:** Widen Johnson Creek Boulevard to 3 lanes between 45th Avenue and 82nd Avenue. Widen bridge. Improve Linwood Avenue/Monroe Street intersection. Includes improving horizontal alignment. Improve Oatfield Road/Park Avenue intersection. Includes installing traffic signal, adding left-turn lanes. Reconstruct Lake Road from ORE 224 to Milwaukie City Limits. Widen and add turn lanes.
- Reconstruct River Road between Milwaukie and Gladstone. Widen roadway.

Source: ***Clackamas County Comprehensive Plan, Map V-2b*****, Clackamas County, Revised June, 1992.**

0 - 5 Year Projects:

- Downtown Milwaukie Circulation Study.
- Improve intersection at ORE 99E/Jefferson Street.
- Improve intersection at ORE 99E/River Road.
- Realign, upgrade, signalize Harrison Street/42nd Avenue/King Road intersection.
- Upgrade King Road/Stanley Avenue intersection. Add left-turns.
- Add flashing light at Linwood Avenue/Monroe Street intersection.

5 - 10 Year Projects:

- Upgrade, widen ORE 99E in Milwaukie.
- Upgrade ORE 224 from McLoughlin Boulevard to I-205. Improve capacity, consolidate signals.

Source: ***Regional Transportation Plan*****, Metro, 1992 Revision of the 1989 Update.**

- Improve ORE 99E through Milwaukie (Harrison Street - RR Crossing)
- Widen ORE 224 to six lanes from McLoughlin to 37th Avenue/Edison Street
- Widen ORE 224 to six lanes from Webster Road to Johnson Road
- Reconstruct 37th Avenue/Edison Street at ORE 224
- Construct a signal intertie from Harrison Street to Johnson Road on ORE 224
- Widen ORE 224 to six lanes from 37th Avenue/Edison Street to Webster Road
- Improve the Harrison Street/King Road/Monroe Street/43rd Avenue intersections

Source: ***Transportation Needs*, City of Milwaukie Transportation System Plan Citizen Working Groups Report, December 23, 1994.**

- Improve the intersection of Johnson Creek Boulevard/Linwood Avenue/Flavel Drive
- Improve Johnson Creek Boulevard, east of Tacoma Avenue
- Connect Monroe Street to Oak Street by the railroad tracks
- Remove hill on Monroe Street near 60th Avenue
- Make improvements from Oak Street onto ORE 224 (similar to what was done on Johnson Road and ORE 224) (Make signal split phase)
- Improve Webster Road and ORE 224 intersection, so that there is a lane for traffic heading through the intersection and a lane for vehicles (trucks) turning onto ORE 224
- Install turn signals at the intersections of Harrison Street/ORE 224 and Oak Street/ORE 224
- Improve intersection of Oak Street/Railroad Avenue
- Improve connections between ORE 99E and 82nd Avenue other than ORE 224
- Close Jackson Street between Main Street and 21st Avenue to automobile traffic, for a transit/pedestrian mall
- Resurface shoulders on Oatfield Road for a smoother surface
- Reconstruct bicycle lanes on Lake Road as part of resurfacing

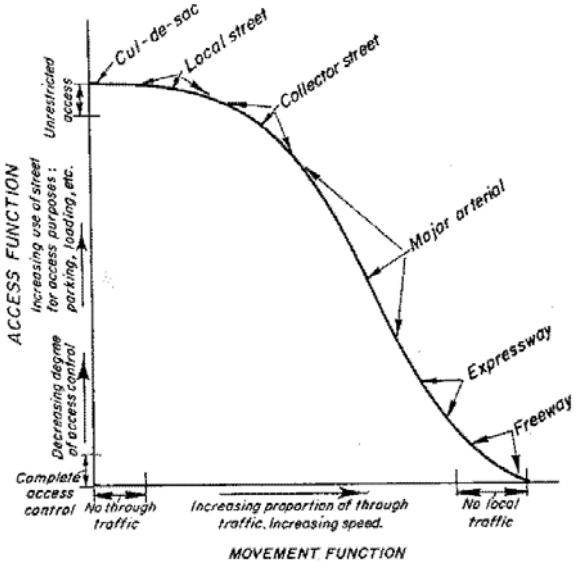
STREET NETWORK

The Transportation Planning Rule requires that classification of streets within the City be provided.[2] The classification must be consistent with state and regional transportation plans for continuity between adjacent jurisdictions. The City of Milwaukie has an existing street classification system. This system was developed as part of the City of Milwaukie Roadway and Traffic Safety Management Plan of 1978.[3] The following section discusses the functional classification system in Milwaukie as it exists today. A refined definition of functional classification at the Collector/Local level is currently being considered and will be discussed later in the TSP.

Functional Classification

Roadways have two functions, to provide mobility and to provide access. From a design perspective, these functions can be incompatible since high or continuous speeds are desirable for mobility, while low speeds are more desirable for land access. Arterials emphasize a high level of mobility for through movement; local facilities emphasize the land access function; and collectors offer a balance of both functions. Figure 2.1 shows the relationship of the functional classification to access and mobility.

The existing functional classification of streets in Milwaukie is represented by Figure 2.2. The TSP will update the current classifications. Any street not designated as either an arterial or collector is considered a Local street. Some streets have more than a single classifications, since their current function changes over their length.



Source: *A Policy On Geometric Design of Highways and Streets*, AASHTO

Figure 2.1

Traffic volumes on the different classifications of streets vary depending on the number of traffic lanes. The *Transportation Planning Rule* requires that the street classification not be arbitrary, but that it match the actual use of the street. Much of the use of any street depends on its adjacent land use.

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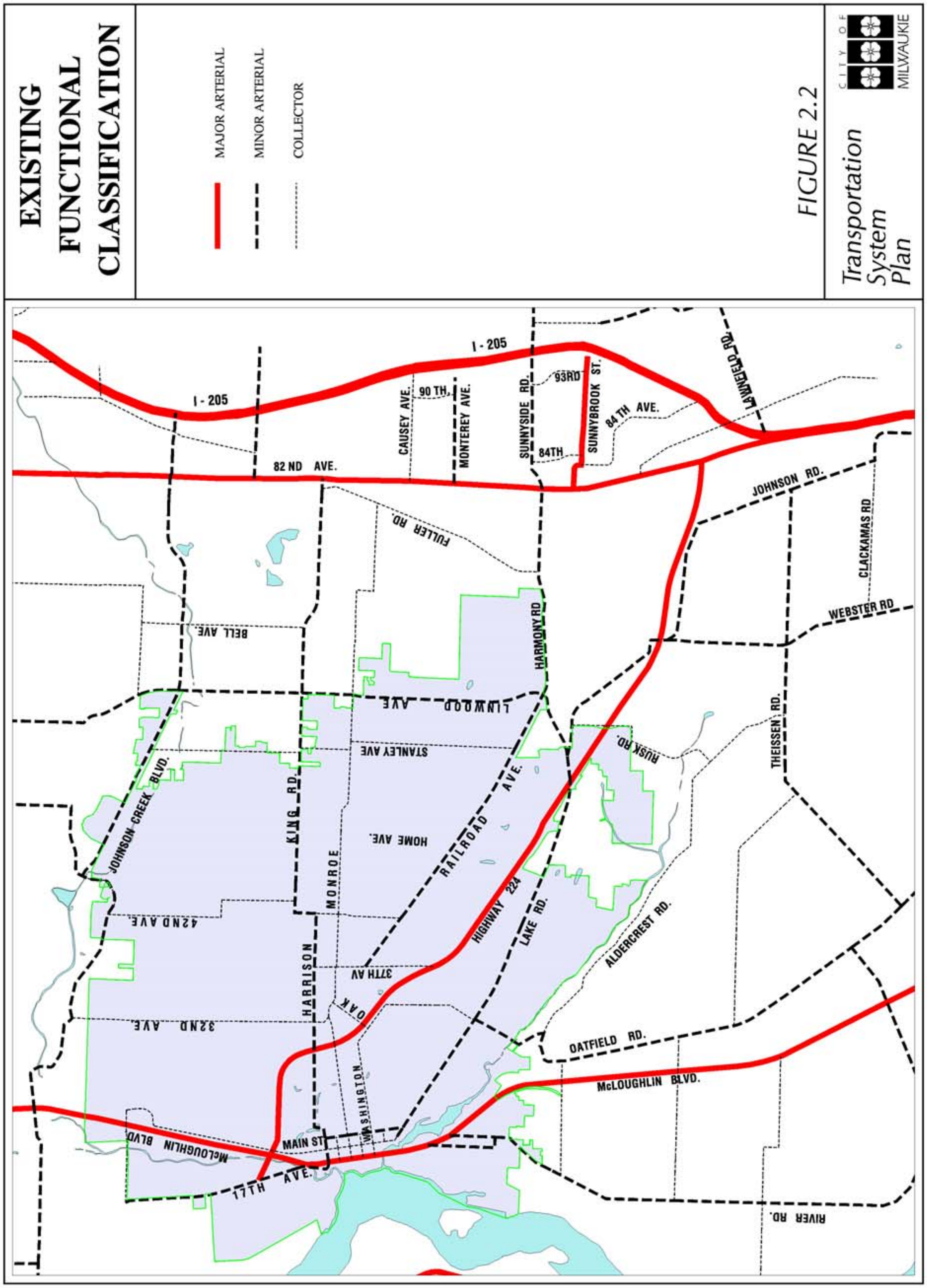
2 *Transportation Planning Rule*, State of Oregon, Department of Land Conservation and Development, Section 660-12-020(2)(b), May, 1991.

3 *Roadway and Traffic Safety Management Plan*, by Transportation Planning and Management, Inc., for City of Milwaukie, 1978.


EXISTING
FUNCTIONAL
CLASSIFICATION
MAJOR ARTERIAL
MINOR ARTERIAL
COLLECTOR
FIGURE 2.2
Transportation
System
Plan
CITY OF
MILWAUKIE
I - 205
82 ND AVE.
CAUSEY AVE.
90 TH.
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84TH
84 TH AVE.
LAWNFIELD RD.
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
FULLER RD
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
MONROE
HIGHWAY 224
LAKE RD.
42ND AVE.
HARRISON
37TH AV
ALDERCREST RD.
OAK
32ND AVE
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLVD.
MAIN ST
17TH AVE.
RIVER RD.

Clackamas County roadway classifications are generally consistent with City of Milwaukie designations. The only discrepancy between the two jurisdictions is Harmony Road, which is classified as a Major Arterial by Clackamas County and as a Minor Arterial by the City of Milwaukie. A table summarizing functional classification of Milwaukie streets by other jurisdictions is shown in Appendix 6 of this report.

ODOT and **Metro** only classify roads that are of statewide or regional significance, respectively. These classifications are compatible with Milwaukie classifications, although the specific classification names may differ. ODOT and Metro classifications can be found in the *Roadway Functional Classification According to Jurisdiction* table in the Appendix of this report. Figure 2.3 shows which jurisdictions own and maintain various roadways in Milwaukie.

Traffic Speed and Volume

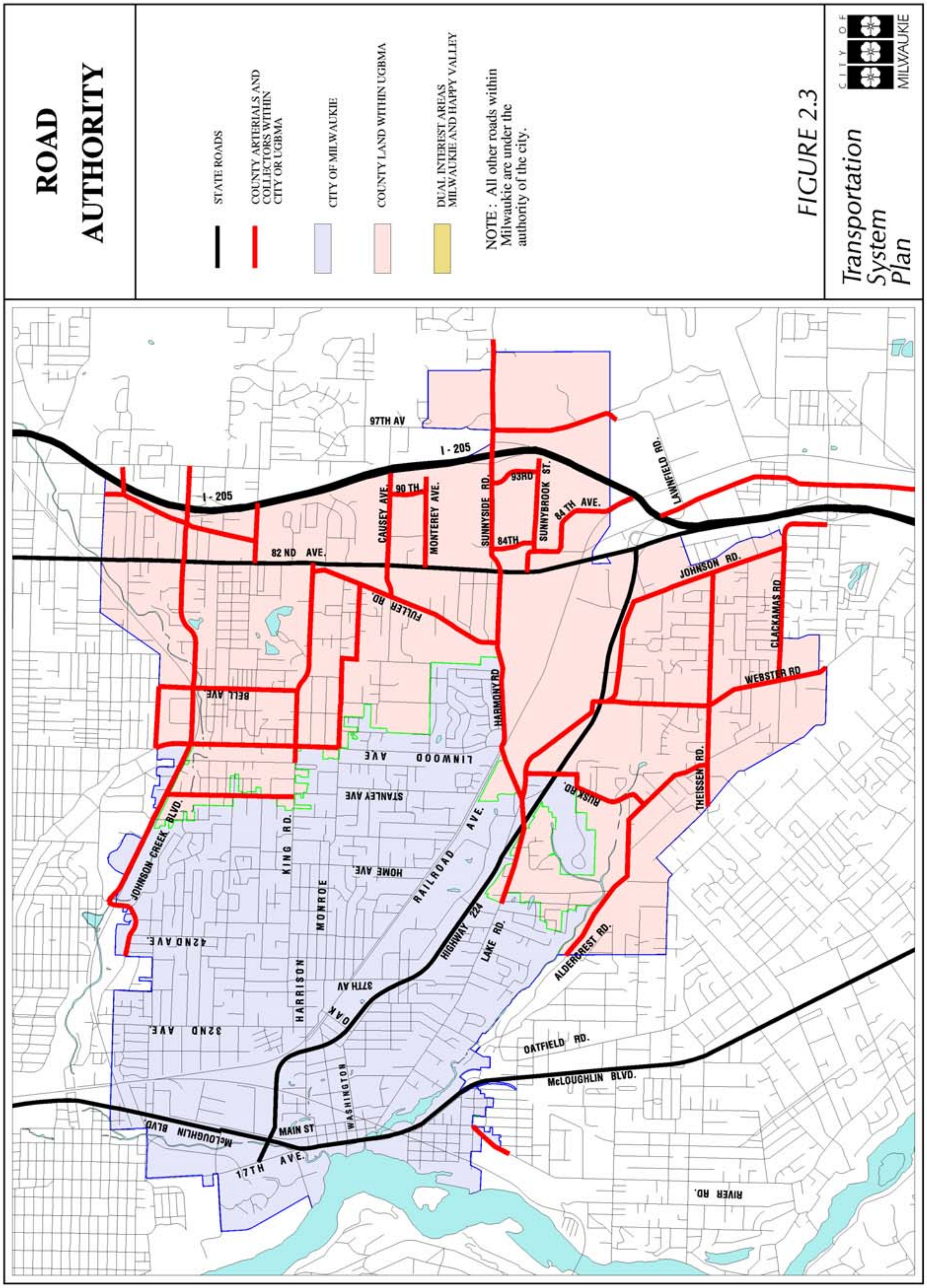
Speed zones on Arterials and Collectors within the City of Milwaukie are indicated in Figure 2.4. Speed zones are set by the Oregon State Speed Control Board (SSCB). The SSCB is an independent board that sets speed zones for city streets, county roads and state highways passing through cities. The SSCB conducts engineering studies and considers many factors such as roadway width, surface, lanes, shoulders, signals, intersections, roadside development, parking, accidents and 85th percentile speed.[4]

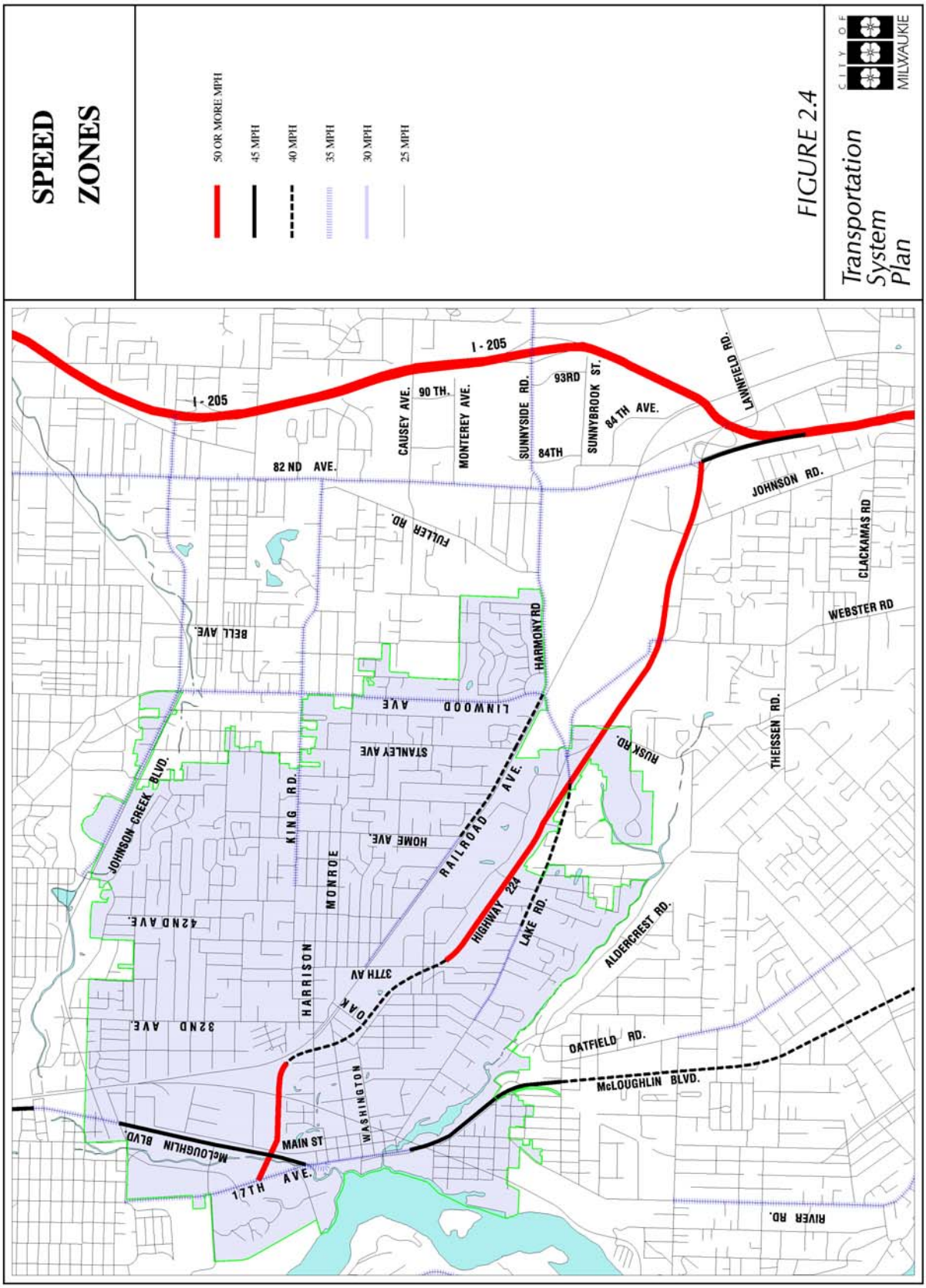
Vehicle speeds on several collector and residential streets are a concern for the community. Streets such as Lake Road, River Road, 22nd Avenue and 32nd Avenue are locations mentioned in discussions with local residents. In most cases, speeding becomes very noticeable when it is above 30 to 35 miles per hour. Speeding can usually be expected on local streets which are wide and straight for long stretches or where downhill grades are extended.

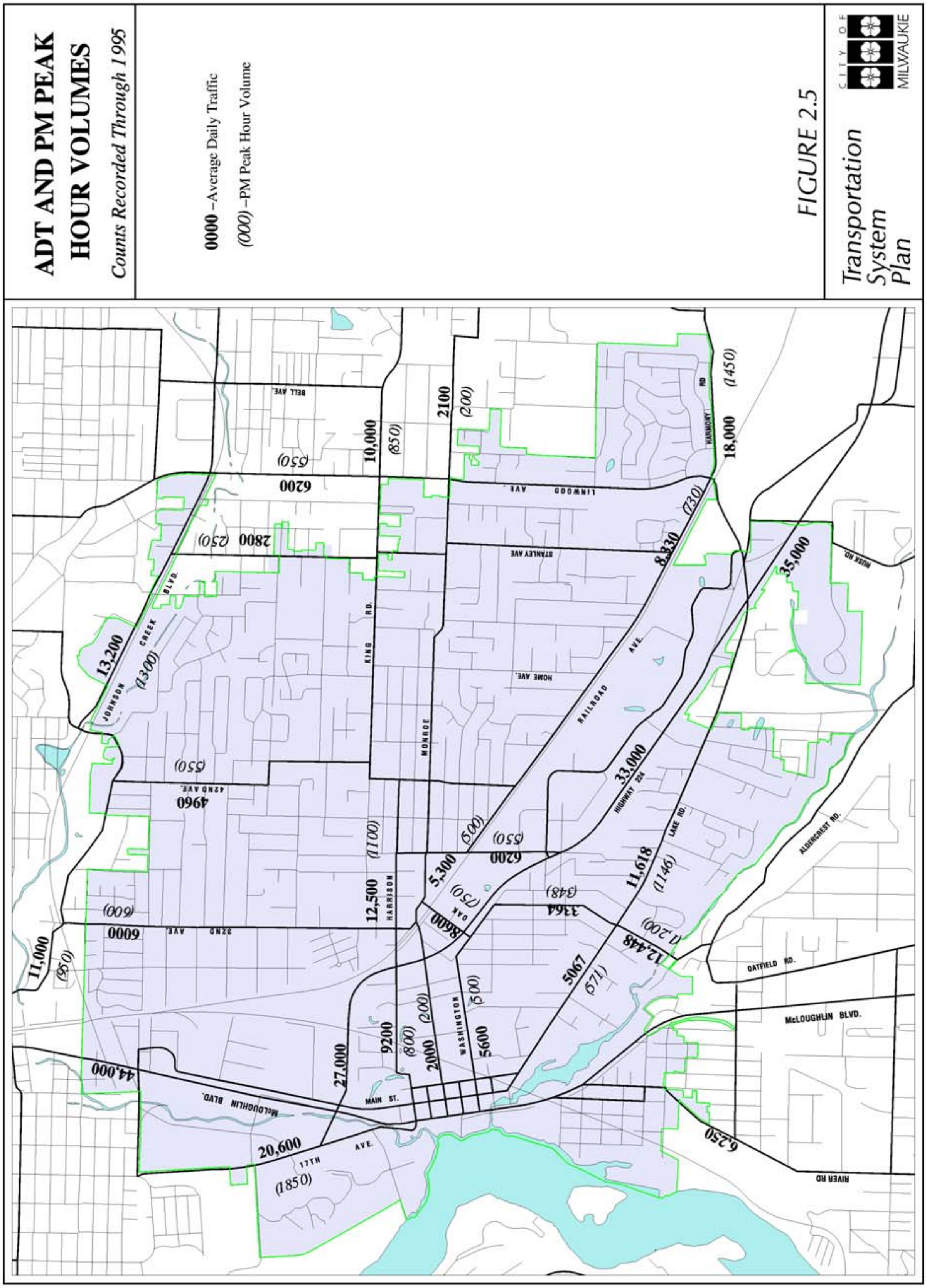
A complete inventory of peak traffic conditions was performed in the fall of 1994 as part of the Milwaukie Transportation System Plan. The traffic counts were conducted as part of this inventory and provide the basis for analyzing existing problem areas as well as establishing a base condition for future monitoring. City staff determined key study intersections and the consultant team conducted evening (4-6 PM) peak period turning movement counts at 19 locations to determine intersection operating conditions. Figure 2.5 shows the existing average daily and peak hour traffic volumes on several key routes in Milwaukie.

On a typical day, ORE 224/Milwaukie Expressway and ORE 99E are the most heavily traveled roadways in Milwaukie. East of ORE 99E, ORE 224 carries about 26,000 vehicles per day (two-way), and west of ORE 213 it carries about 52,000 vehicles per day (two-way). ORE 99E carries approximately 39,000 ADT north of Harrison Street/17th Avenue.[5] These two routes carry the greatest amount of traffic in Milwaukie. Other examples of traffic volumes on routes in Milwaukie include Johnson Creek Boulevard (12,500 ADT west of Brookside Drive), Harrison Street (12,500 ADT at 31st Avenue), Linwood Avenue (6,200 ADT south of Johnson Creek Boulevard), Stanley Avenue (2,800 south of Johnson Creek Boulevard) and Monroe Street (2,000 ADT near 25th Avenue). Figure 2.6 illustrates examples of typical fluctuations of traffic over the course of a day.

[4] *Speed Zoning: Who Decides?*, State Speed Control Board, April 1992.
[5] 1992 Traffic Volume Tables, Transportation Research Section, ODOT, Published December, 1993.


ROAD AUTHORITY
STATE ROADS
COUNTY ARTERIALS AND COLLECTORS WITHIN CITY OR UGBMA
CITY OF MILWAUKIE
COUNTY LAND WITHIN UGBMA
DUAL INTEREST AREAS MILWAUKIE AND HAPPY VALLEY
NOTE: All other roads within Milwaukie are under the authority of the city.
FIGURE 2.3
Transportation System Plan
CITY OF MILWAUKIE
97TH AV
I - 205
I - 205
90 TH
93RD
CAUSEY AVE.
MONTEREY AVE.
SUNNYSIDE RD.
SUNNYBROOK ST.
84 TH AVE.
84TH
LAWNFIELD RD.
82 ND AVE.
JOHNSON RD.
FULLER RD
CLACKAMAS RD
WEBSTER RD
BELL AVE
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
MONROE
42ND AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HARRISON
37TH AV
OAK
32ND AVE.
OATFIELD RD.
McLOUGHLIN BLVD.
WASHINGTON
MAIN ST
McLOUGHLIN BLVD
17TH AVE.
RIVER RD.


SPEED ZONES
50 OR MORE MPH
45 MPH
40 MPH
35 MPH
30 MPH
25 MPH
FIGURE 2.4
Transportation System Plan
CITY OF MILWAUKIE
I - 205
82 ND AVE.
CAUSEY AVE.
90 TH.
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84TH
84 TH AVE.
LAWNFIELD RD.
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
THEISSEN RD.
RUSK RD.
ALDERCREST RD.
OATFIELD RD.
McLOUGHLIN BLVD.
RIVER RD.
FULLER RD.
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
HOME AVE.
RAILROAD AVE.
HIGHWAY 224
LAKE RD.
KING RD.
MONROE
HARRISON
OAK
37TH AV
42ND AVE.
32ND AVE.
JOHNSON CREEK BLVD.
MAIN ST
WASHINGTON
17TH AVE.


ADT AND PM PEAK HOUR VOLUMES
Counts Recorded Through 1995
0000 –Average Daily Traffic
(000) –PM Peak Hour Volume
FIGURE 2.5
Transportation System Plan
CITY OF MILWAUKIE
BELL AVE.
LINWOOD AVE.
STANLEY AVE
HOME AVE.
JOHNSON CREEK BLVD.
KING RD.
MONROE
HARRISON
WASHINGTON
OAK
42ND AVE.
32ND AVE.
RAILROAD AVE.
HIGHWAY 224
LAKE RD.
HARMONY RD
RUSK RD.
ALDERCREST RD.
OATFIELD RD.
McLOUGHLIN BLVD.
MAIN ST.
17TH AVE.
RIVER RD
2100
(200)
10,000
(850)
6200
(650)
2800 (250)
18,000
(1450)
8,330
(730)
35,000
13,200
(1300)
4960
(550)
33,000
11,618
(1146)
12,448
(1200)
3364
(348)
6200
(550)
5,300
(500)
8600
(750)
12,500
(1100)
6000
(600)
11,000
(950)
5067
(571)
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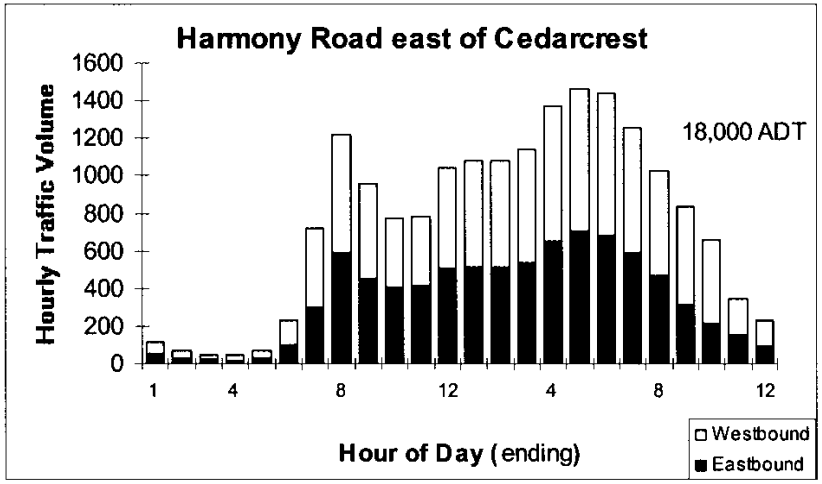
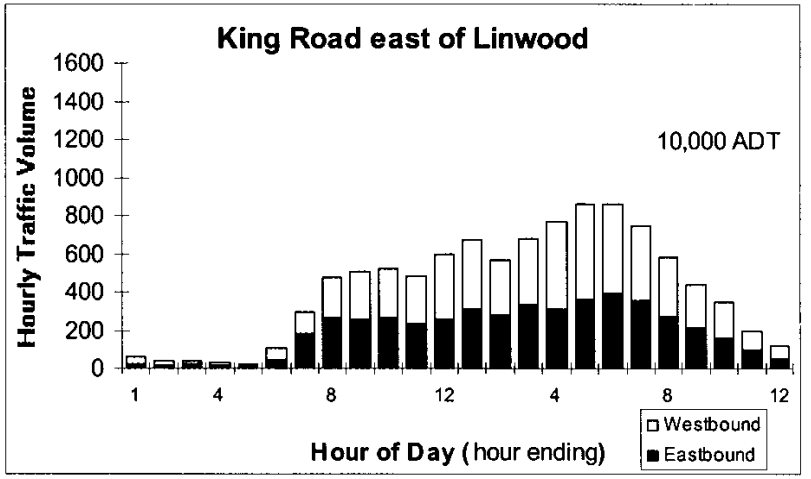
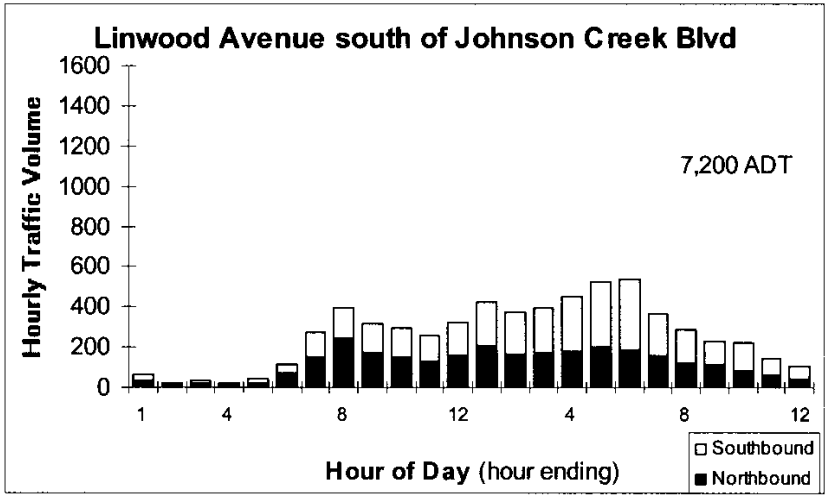
(500)
2000
(200)
9200
(800)
27,000
44,000
20,600
(1850)
6,250







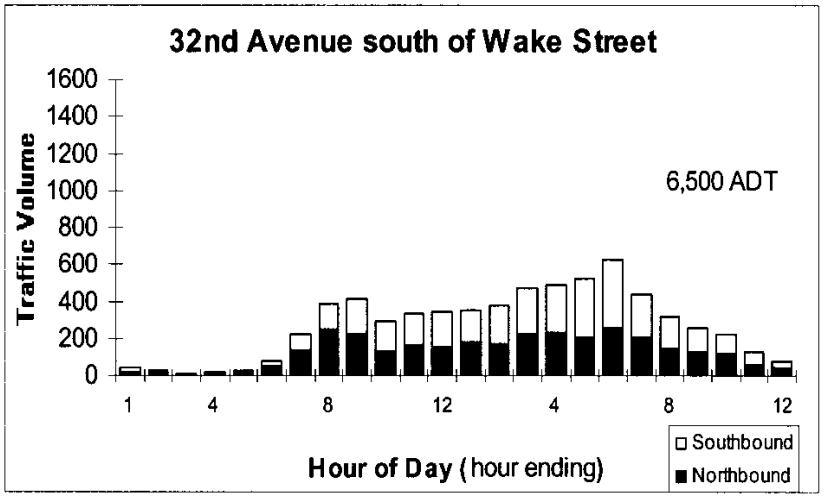


Figure 2.6
Weekday Hourly Volume Summaries

Traffic Control

Milwaukie has approximately 61 signalized intersections (including area within the Urban Growth Boundary Management Area), with the majority on Arterial streets. Those traffic signals which are located on state highways are maintained and operated by ODOT. All others within Milwaukie's Urban Growth Boundary Management Area (UGBMA) are operated and maintained by Clackamas County through an agreement between the City and the County. Figure 2.7 shows signalized locations. Traffic signals are valuable devices for the control of vehicle and pedestrian traffic. Traffic control signals, properly located and operated, can have one or more of the following advantages:

- They provide for the orderly movement of traffic
- Where proper physical layouts and control measures are used, they can increase the traffic handling capacity of the intersection
- They reduce the frequency of certain types of accidents, especially right angle type
- Under favorable conditions, they can be coordinated to provide continuous or nearly continuous movement of traffic at a definite speed along a given route
- They permit minor street traffic, vehicular or pedestrian, to enter or cross continuous traffic on the major street

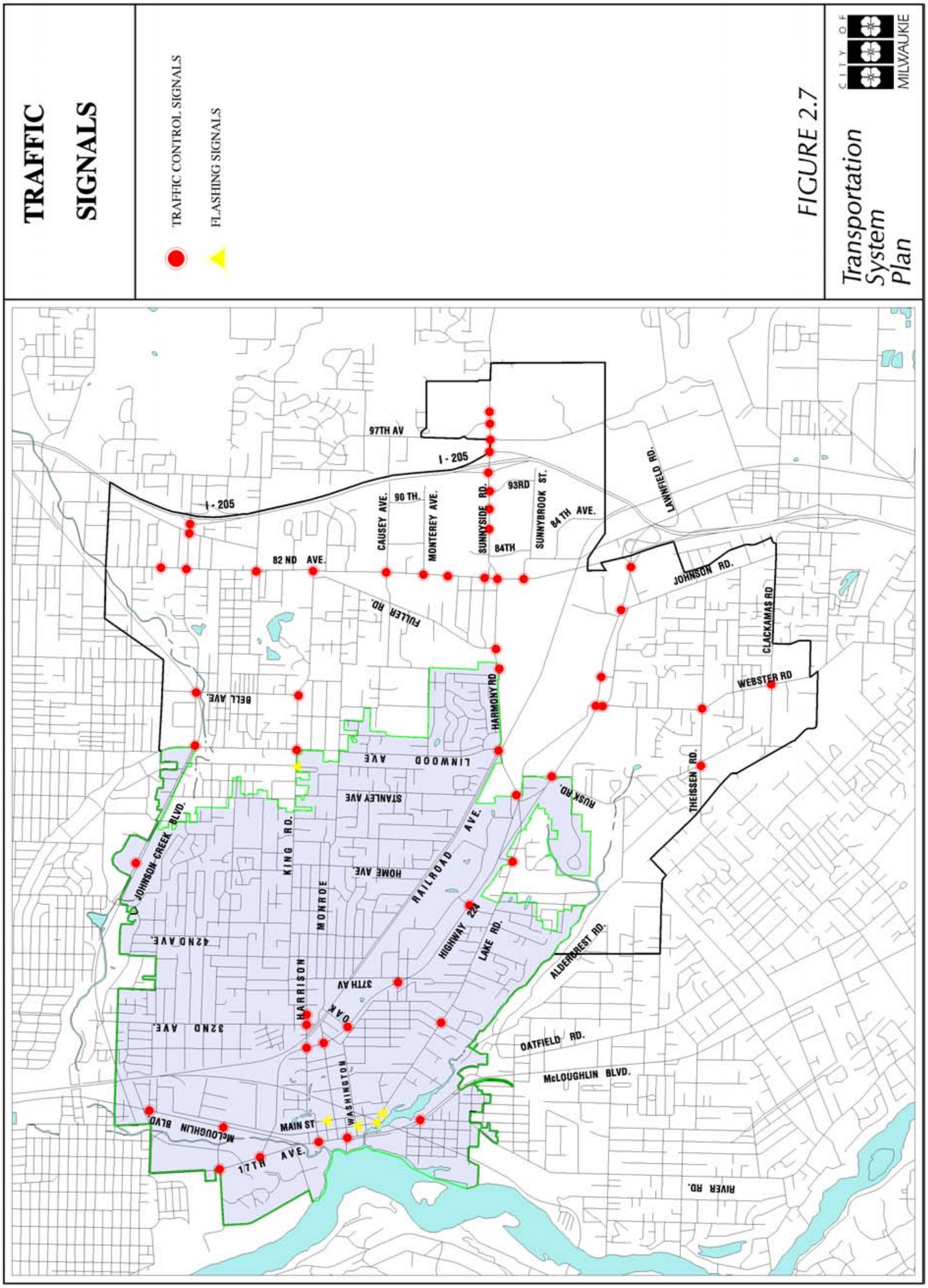
Improper or unwarranted signal installations may cause:

- Excessive delay
- Disobedience of signal indications
- Circuitous travel of alternative routes
- Increased accident frequency, particularly rear-end type

Consequently, it is important that the consideration of a signal installation and the selection of equipment be preceded by a thorough study and based on consistent criteria. The study must identify the need for left turn phasing, lanes and phase type. The justification for the installation of a traffic signal at an intersection should be based upon the warrants stated in the *Manual on Uniform Traffic Control Devices*[6] (MUTCD). The MUTCD has been adopted by the state of Oregon and is used throughout the nation.

The same conditions hold true for installation of stop sign traffic controls. Specific criteria identify conditions which may warrant two-way or multiway stop sign installations. A stop sign is not a cure-all; nor is it a substitute for other traffic control devices. Guidelines and warrants for stop sign installations are outlined in the MUTCD.

[6] *Manual on Uniform Traffic Control Devices for Streets and Highways*, US Department of Transportation, Federal Highway Administration, 1988, pages 4C1-4C12.


TRAFFIC SIGNALS
TRAFFIC CONTROL SIGNALS
FLASHING SIGNALS
FIGURE 2.7
Transportation System Plan
CITY OF MILWAUKIE
97TH AV
I - 205
I - 205
93RD
90 TH.
CAUSEY AVE.
MONTEREY AVE.
SUNNYSIDE RD.
SUNNYBROOK ST.
84TH AVE.
84TH
LAWNFIELD RD.
82 ND AVE.
FULLER RD.
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
MONROE
42ND AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HARRISON
37TH AV
OAK
32ND AVE.
OATFIELD RD.
McLOUGHLIN BLVD.
WASHINGTON
MAIN ST
McLOUGHLIN BLVD
17TH AVE.
RIVER RD.

Safety Issues

Safety issues related to streets can be determined best by identifying high accident locations. Figures 2.8 through 2.10 summarize reported accidents in Milwaukie, by year. The marked reduction in accidents in 1996 can be attributed to enhanced enforcement efforts according to the Milwaukie Police Department. Table 2.1 summarizes the accidents reported by year for 1994, 1995, and 1996.

Table 2.1
Milwaukie Accident Summary

Year	Auto-Only Accidents	Motorcycle Accidents	Pedestrian Accidents	Bicyclist Accidents	Total Accidents
1994	233	0	6	5	244
1995	275	1	4	1	281
1996	125	0	1	0	126

In general, the accidents reported are spread out within Milwaukie; without high, single-point concentrations. Overall, most accidents occurred along busy thoroughfares such as ORE 99E and ORE 224 or at intersections with these roadways.

Most frequently identified accident locations were where the highest volumes of traffic occur, such as ORE 99E and downtown Milwaukie, ORE 224/Oak Street/Washington Street near the Milwaukie Marketplace shopping center, and the Linwood Road/Harmony Road/Lake Road intersection.

Maintenance and Operations

There are 70 miles of mostly improved roadways in Milwaukie. The City has a Streets Division in its Public Works Department that maintains City streets. Currently, there are six full-time employees and an FY '97/'98 budget of $1.7 million for this program. Staff responsibilities include: patching, sealing, overlays, sweeping, mowing, brush cutting, signing, striping, and signal maintenance. Street lights are maintained by PGE. Through cooperative understandings and agreements, ODOT and Clackamas County assist the City with the latter three maintenance and operations items. The Streets Division also works with other Public Works Department staff and private contractors, to complete major overlays and road reconstruction projects.

Milwaukie has recently completed a study of pavement conditions for City streets. Preliminary finding suggest that nearly 35% of the roads need resurfacing today. If the current budget for maintenance is held constant over the next five years, for example, maintenance needs will increase. Current staffing and equipment is adequate to implement the present program budget. Additional engineering staff is needed to assist with current road maintenance and improvement projects.

Another issue that plagues full maintenance of streets is bringing streets up to current standards. City staff estimates that almost half of City streets need to be reconstructed to meet current standards. This could cost upwards of $35 million to complete.

REPORTED AUTOMOBILE ACCIDENTS 1/94 - 6/94

- PEDESTRIAN INVOLVED
- BICYCLE INVOLVED
- MOTOR VEHICLE ACCIDENT

SUMMARY

There were 244 reported accidents in 1994.

6 Accidents Involving Pedestrians

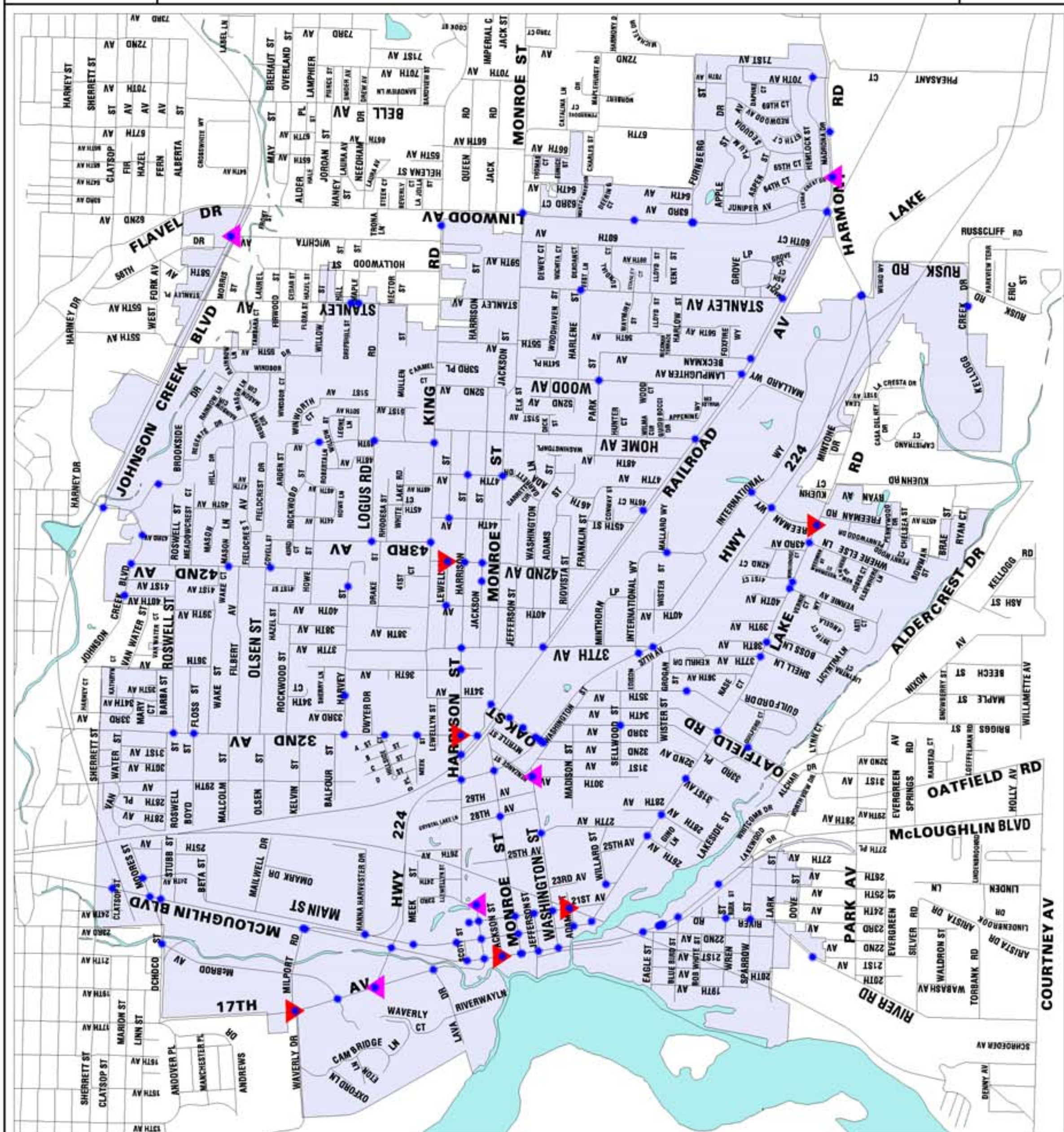
5 Accidents Involving Bicyclists

NOTES:

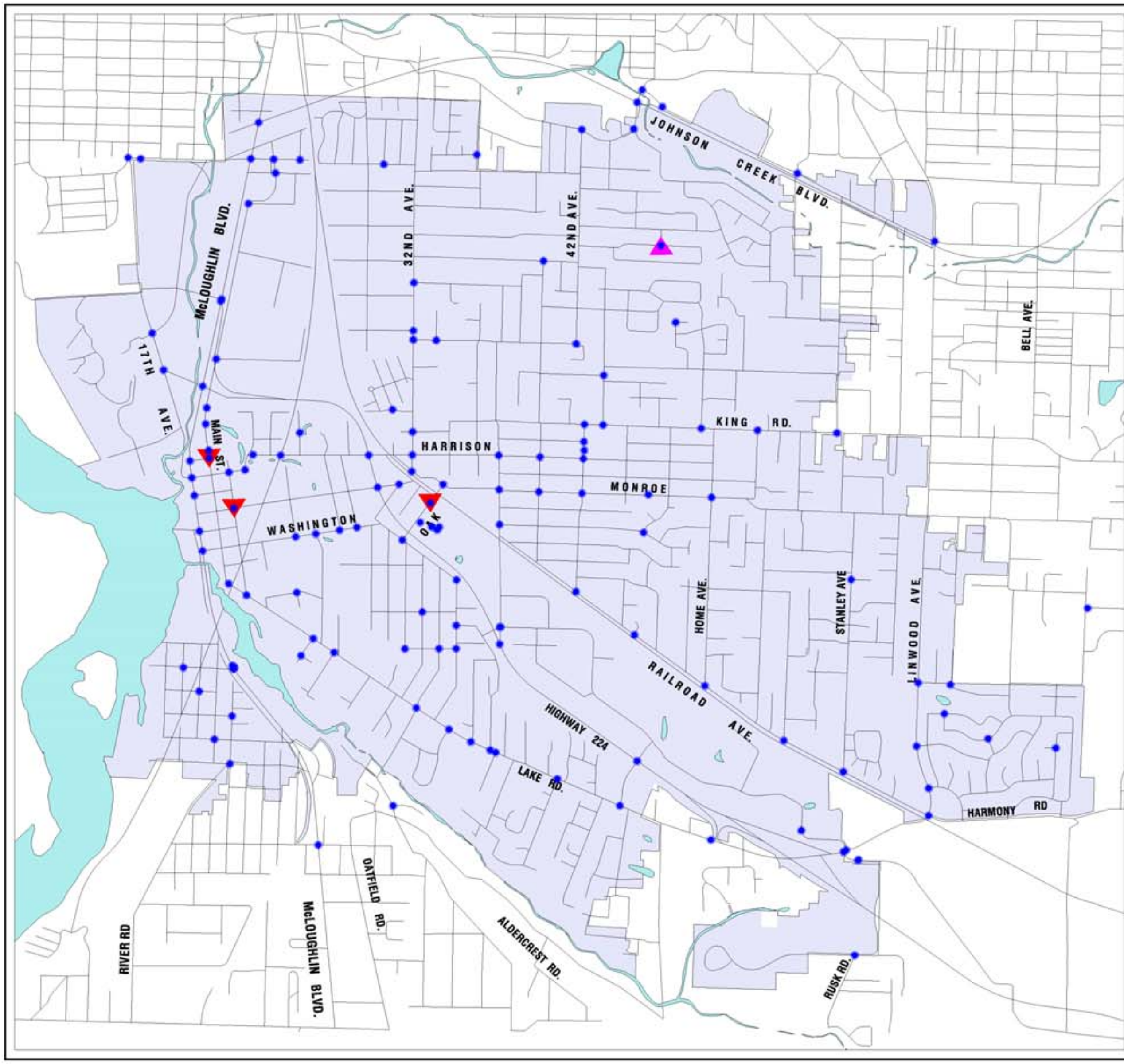
1. The accidents represented on this map are only those reported to the City of Milwaukie Police Department. Accidents causing property damage of less than $500, or only involving a single vehicle are not reported.
2. Where numerous accidents occur at a location, symbols appear larger.

FIGURE 2.8

Transportation System Plan



REPORTED AUTOMOBILE ACCIDENTS 1995



▼ PEDESTRIAN INVOLVED

▲ BICYCLE INVOLVED

• MOTOR VEHICLE ACCIDENTS

SUMMARY

There were 281 reported accidents in 1995

4 Accidents involved Pedestrians

1 Accident involved a bicycle.

NOTES:

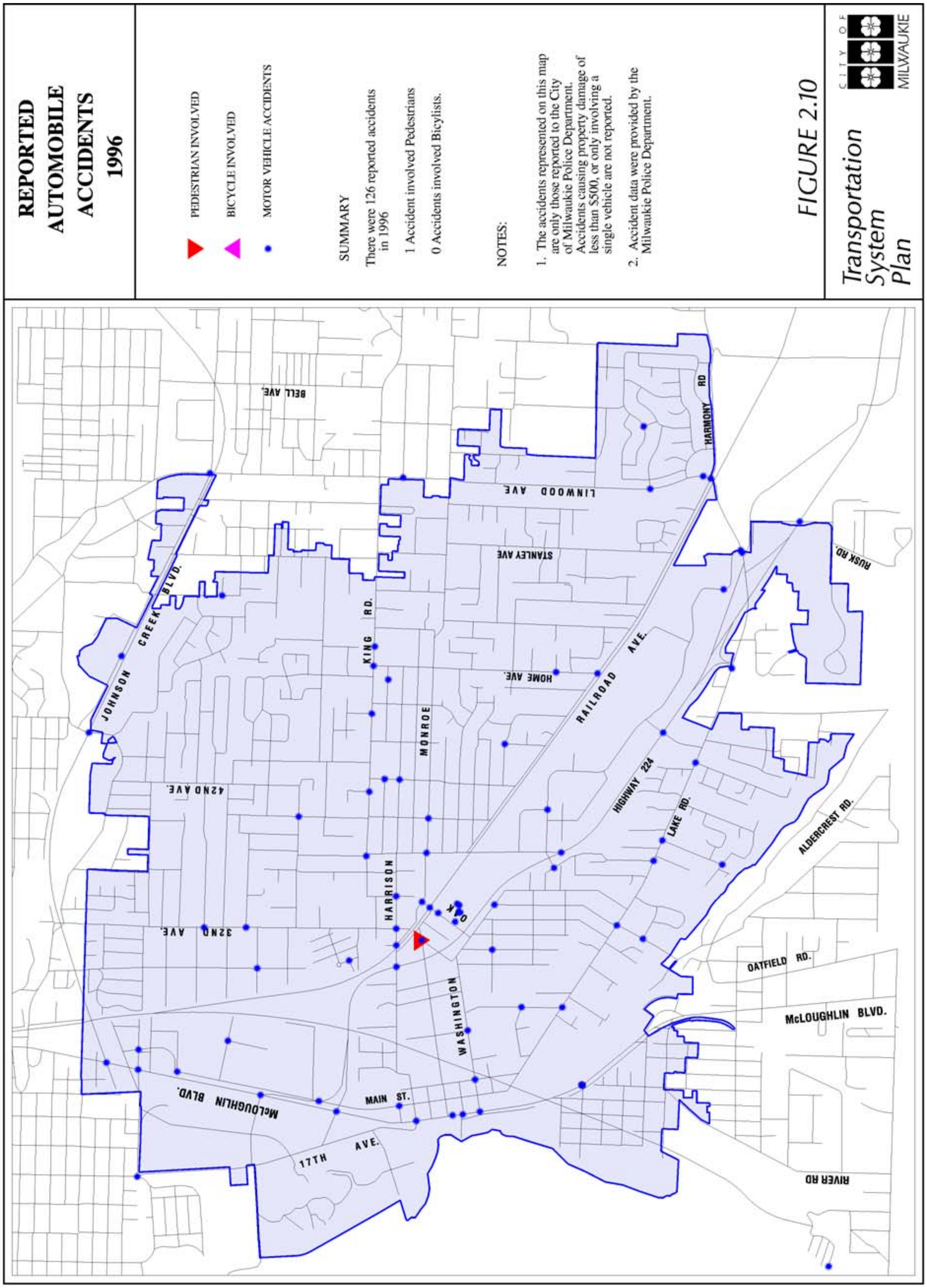
1. The accidents represented on this map are only those reported to the City of Milwaukie Police Department. Accidents causing property damage of less than $500, or only involving a single vehicle are not reported.

2. Accident data were provided by the Milwaukie Police Department.

FIGURE 2.9

Transportation System Plan

CITY OF MILWAUKIE


REPORTED
AUTOMOBILE
ACCIDENTS
1996
PEDESTRIAN INVOLVED
BICYCLE INVOLVED
MOTOR VEHICLE ACCIDENTS
SUMMARY
There were 126 reported accidents in 1996
1 Accident involved Pedestrians
0 Accidents involved Bicylists.
NOTES:
1. The accidents represented on this map are only those reported to the City of Milwaukie Police Department. Accidents causing property damage of less than $500, or only involving a single vehicle are not reported.
2. Accident data were provided by the Milwaukie Police Department.
FIGURE 2.10
Transportation System Plan
CITY OF MILWAUKIE
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
MONROE
42ND AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HARRISON
OAK
32ND AVE.
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLVD.
MAIN ST.
17TH AVE.
RIVER RD

Summary of Key Routes

The following section details key routes in Milwaukie. Information provided below includes functional classification status, traffic volumes, number of travel lanes, adjacent land use (including schools), intersection level of service, arterial level of service and general observations. Figure 2.11 shows the number of lanes on key routes in Milwaukie. The roadways are grouped by north/south routes and east/west routes. Travel time runs (which provided the data for the arterial level of service analysis) are shown graphically in Figures 2.12 and 2.13. Areas where arterial level of service is D or worse are identified on these figures. Arterial level of service is calculated according to the *1985 Highway Capacity Manual*.[7] Intersection level of service is provided in tables for each key roadway. Intersection level of service ranges from A (good, desirable level of service) to F (poor, congested level of service). Typically, level of service D is considered the minimum desirable level of service. All analysis was performed for the PM peak hour. Level of service for unsignalized intersections is reported by major street and minor street movements. More information on level of service descriptions and calculations (both arterial and intersection) as well as travel time run methodology can be found in Appendices 7 and 8.

North/South Routes:

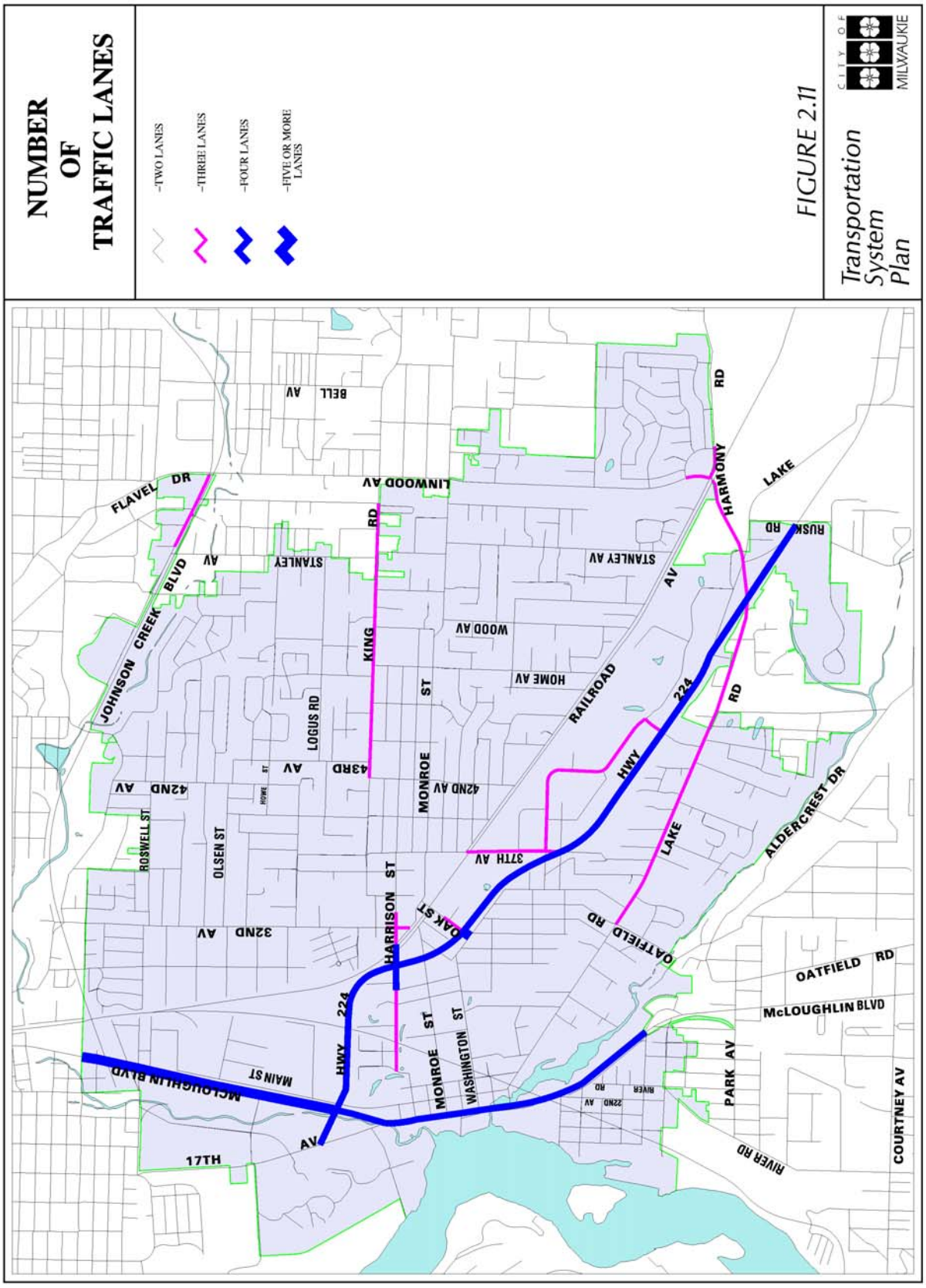
ORE 99E/McLoughlin Boulevard provides regional access to the City of Milwaukie, but also serves as a key route for Milwaukie circulation. ORE 99E connects Milwaukie with cities to the north and south in the Portland Metropolitan Area. It is classified by Milwaukie, Clackamas County and Metro as a major arterial and by the City of Portland as a Regional Trafficway. It is classified by ODOT as an Urban Highway of Statewide importance (category 3) north of ORE 224 and as an Urban Highway of District importance (category 5) south of ORE 224. North of ORE 224, it has three lanes in each direction. South of ORE 224, it has two through lanes in each direction with left turn lanes at intersections and carries approximately 39,000 ADT north of Harrison Street/17th Avenue.[8]

Category 3 highways generally have limited access control and partial median control. Access is provided to adjacent land uses when restricting access would be cost prohibitive. Generally Category 3 highways have at grade intersections, but interchanges may also be appropriate. Access spacing between public roads should be at least 1/2 to 1 mile. Category 5 highways generally have partial access control and no median control. These facilities provide reasonable balance between direct access and mobility needs. Access spacing between public roads should be at least 1/4 mile.

Land uses adjacent to ORE 99E tend to be mostly industrial and commercial with some residential. ORE 99E tends to be congested southbound near Harrison Street/17th Avenue in the evening peak hour, but otherwise flows smoothly under restricted ability to maneuver. ORE 99E was recently widened to three lanes in each direction between ORE 224 and Portland city limits.

[7] *1985 Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington, D.C., 1985, Chapter 11.

[8] 1992 Traffic Volume Tables, Transportation Research Section, ODOT, Published December 1993.


NUMBER OF TRAFFIC LANES
-TWO LANES
-THREE LANES
-FOUR LANES
-FIVE OR MORE LANES
FIGURE 2.11
Transportation System Plan
CITY OF MILWAUKIE
BELL AV
FLAVEL DR
LINWOOD AV
RD
HARMONY
LAKE
RUSK RD
JOHNSON CREEK BLVD
AV
STANLEY
STANLEY AV
AV
KING
WOOD AV
HOME AV
RAILROAD
224
HWY
RD
LOGUS RD
ST
MONROE
43RD AV
42ND AV
42ND AV
ROSWELL ST
OLSEN ST
HOWE ST
37TH AV
LAKE
ALDERCREST DR
HARRISON ST
OAK ST
OATFIELD RD
32ND AV
OATFIELD RD
McLOUGHLIN BLVD
MAIN ST
HWY 224
MONROE ST
WASHINGTON ST
PARK AV
COURTNEY AV
RIVER RD
22ND AV
RIVER RD
17TH AV

NORTH - SOUTH TRAVEL TIME ROUTES

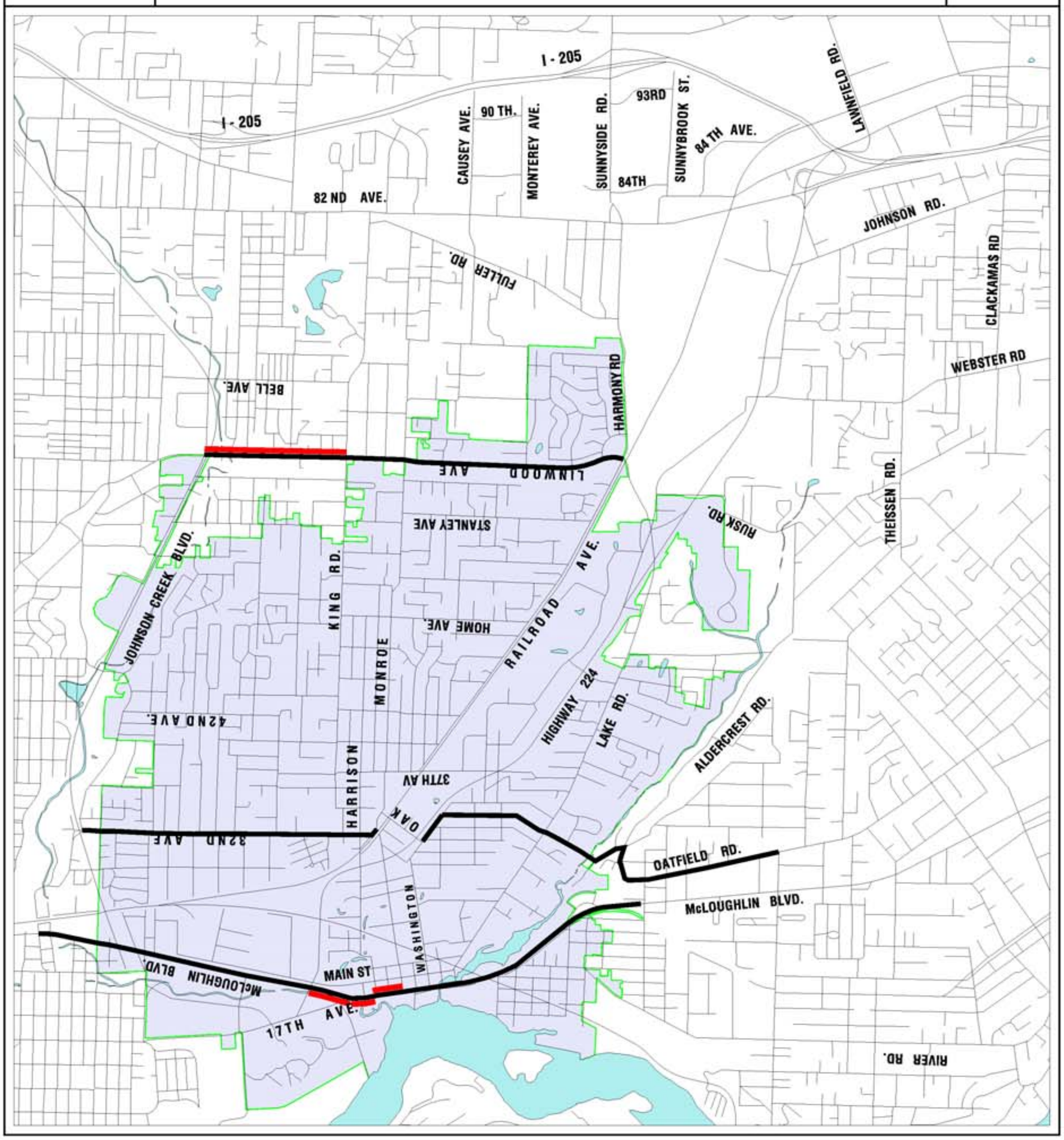
During PM Peak Travel Hours

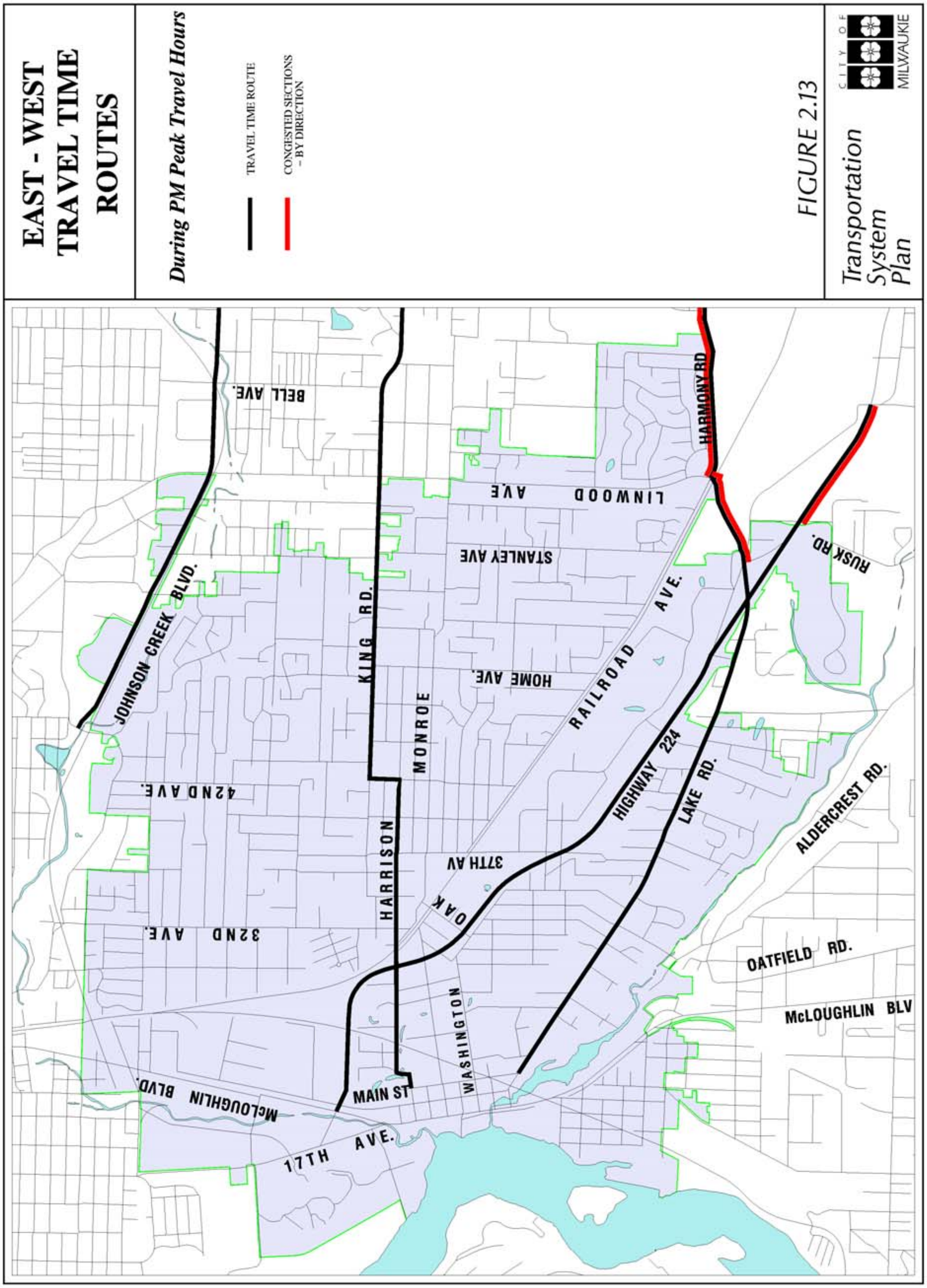
- TRAVEL TIME ROUTE
- CONGESTED SECTIONS – BY DIRECTION

FIGURE 2.12

Transportation System Plan

CITY OF MILWAUKIE




EAST - WEST
TRAVEL TIME
ROUTES
During PM Peak Travel Hours
TRAVEL TIME ROUTE
CONGESTED SECTIONS
– BY DIRECTION
FIGURE 2.13
Transportation
System
Plan
CITY OF
MILWAUKIE
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
JOHNSON CREEK BLVD.
KING RD.
RAILROAD AVE.
HOME AVE.
MONROE
42ND AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HARRISON
37TH AV
OAK
32ND AVE.
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLV
MAIN ST
McLOUGHLIN BLVD.
17TH AVE.

Signalized intersection levels of service are shown in the table below. See Appendix 7 for more detail. Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). At the unsignalized intersections along ORE 99E, level of service is worse for the major street left turns which conflict with two lanes of through traffic in the opposing direction. At Jackson, Monroe and Washington Streets, no left turn movements are permitted from the cross streets which eliminates the movement that would be most impacted from heavy traffic on ORE 99E. At Jackson Street, left turns are prohibited from ORE 99E (southbound), therefore level of service A is experienced on the major street. Unsignalized intersection levels of service are shown in the table below.

Signalized Intersection	**LOS**	**Average Delay[9] (Seconds)**	**Demand/ Capacity**
ORE 99E/Harrison Street	E	45.3	1.02
ORE 99E/Jefferson Street	B	6.8	0.79

Unsignalized Intersection	**LOS**
ORE 99E/Jackson Street	A/A[10]
ORE 99E/Monroe Street	D/A
ORE 99E/Washington Street	D/A

Arterial level of service was also determined, based on speed, along ORE 99E. Arterial level of service along ORE 99E was generally acceptable (better than D, 14-17 mph; average over a segment for this type of facility), except southbound between ORE 224 and Harrison Street/17th Avenue (F, <10 mph for this type of facility), between Monroe Street and Jefferson Street (D) and northbound from Monroe Street to Harrison Street/17th Avenue (F - for northbound left turn only).

SE 17th Avenue serves Milwaukie traffic traveling to the north, linking to Tacoma Street and the Sellwood Bridge as well as other locations in Southeast Portland. It is a two-lane, two-way roadway which carries approximately 20,600 ADT south of McBrod Avenue. Just past its intersection with ORE 224 it ends in an intersection with ORE 99E and Harrison Street. 17th Avenue is classified by Milwaukie and Clackamas County as a minor arterial and as a neighborhood collector by the City of Portland. These classifications are currently inconsistent, since roadways which cross jurisdictional boundaries should generally be classified the same near the jurisdictional border (although the classification names may differ). The land uses adjacent to 17th Avenue consist of industrial, commercial and residential uses in Milwaukie, but are generally residential and commercial north of the city limits. Access is fairly limited in Milwaukie, but north of the city limits, there are numerous driveways due to adjacent residential land uses. The level of service for the intersection at 17th Avenue/ORE 224 is shown in the table below.

[9] Average Delay equals the averaged stopped delay per vehicle.
[10] A/A means major street movement/minor street movement.

The City of Milwaukie, City of Portland and Oregon Public Utilities Commission are proceeding with a project (to be completed in summer 1997) to improve the railroad crossing at 17th Avenue/Ochoco Street.[11] The project will improve the railroad crossing of 17th Avenue, provide crossing gates, better define intersection alignment and provide sidewalks on all four corners of the intersection.

Signalized Intersection	LOS	Average Delay (Seconds)	Demand/ Capacity
17th Avenue/ORE 224	C	22.6	0.86

SE River Road is classified as a minor arterial by both Milwaukie and Clackamas County. It is the northbound part of a one-way couplet (from Sparrow Street to ORE 99E) which serves local traffic traveling south to areas in unincorporated Clackamas County. 22nd Avenue is the southbound part of the couplet (from ORE 99E to Sparrow Street). It intersects with ORE 99E to the south providing access to I-205. The adjacent land uses along River Road are generally residential. A number of complaints have been received by the City about speeding on 22nd Avenue just south of ORE 99E. Also, there is a perception by residents along River Road that it is used as a through route by those traveling south to Gladstone, Oregon City and possibly I-205.

SE Linwood Avenue is classified as a minor arterial by Milwaukie, Clackamas County and Metro. It provides local north-south access, linking King Road to Harmony Road and eventually to ORE 224. To the north of King Road, it is unclassified. It is a two-lane, two-way roadway (with left-turn lanes at King Road and Harmony Road), which carries approximately 6,200 ADT south of Johnson Creek Boulevard. Adjacent land uses to Linwood Avenue are primarily residential with two elementary schools nearby, as well as commercial sites near intersections. Linwood School is between Aspen Street and Furnberg Street on the west side of Linwood Avenue and Wichita School is on King Road just west of Linwood Avenue. Residents and City staff have concerns about the dagmires (buttons) that separate the bicycle lanes from the travel lanes on Linwood Avenue as obstructions.

Signalized intersection levels of service are shown in the table below.

Signalized Intersection	LOS	Average Delay (Seconds)	Demand/ Capacity
Linwood Avenue/King Road	C	20.1	0.66
Linwood Avenue/Harmony Road/ Railroad Avenue	D	31.1	0.92

[11] Based on letter by Richard N. Hatch, Railroad Specialist, Crossing Safety Section, Oregon Public Utilities Commission, Project Reference RX661: In the Matter of the Alteration of the Railroad-Highway Grade Crossing at SE 17th Avenue and EAST PORTLAND TRACTION COMPANY, main track, in Portland and Milwaukie, Multnomah and Clackamas County, Oregon.

Recently, Clackamas County rebuilt the intersection of Linwood Avenue/Johnson Creek Boulevard to include signalization and left turn lanes on all approaches.

Arterial level of service on Linwood Avenue is generally good (above level of service D, 9-12 mph for this type of facility).

SE Oatfield Road is classified as a minor arterial by Milwaukie, Clackamas County and Metro. Oatfield Road serves traffic traveling to the south and to the east. It links Milwaukie to areas in unincorporated Clackamas County, Gladstone and I-205 to the south. To the north it connects to SE 34th Avenue, a collector providing access to downtown Milwaukie and local destinations to the north such as Milwaukie Marketplace (a commercial development). It is a two-lane, two-way roadway which carries approximately 12,800 ADT north of Kellogg Creek Bridge. Land uses adjacent to Oatfield Road are primarily residential.

Signalized intersection level of service is shown in the table below.

Signalized Intersection	LOS	Average Delay (Seconds)	Demand/ Capacity
Oatfield Road/34th Avenue/ Lake Road	D	31.9	0.90

This is consistent with the arterial level of service southbound on 34th Avenue approaching Oatfield, which is also D.

SE Oak Street is classified as a collector by Milwaukie from Washington Street to Monroe Street. It carries approximately 8,600 ADT at Railroad Avenue and is two lanes with turn lanes for ORE 224 and Milwaukie Marketplace. It provides access to Milwaukie Marketplace and residences along its frontage.

Oak Street intersects with ORE 224 at a signalized intersection which operates at level of service C. There are also unsignalized intersections at Campbell and Washington Streets, which are shown below. Both operate at acceptable levels of service. However, the arterial level of service at both the northbound and southbound approaches to ORE 224 are congested (at level of service F) due to traffic signal delay.

The short distance between ORE 224 and Washington Street on Oak Street causes confusion for drivers. In particular, some drivers believe that a westbound right turn from Washington Street onto Oak Street requires that a subsequent right turn be made onto ORE 224, rather than changing lanes in the short distance between Washington Street and ORE 224 to go across ORE 224.

Signalized Intersection	LOS	Average Delay (Seconds)	Demand/ Capacity
Oak Street/ORE 224	C	18.3	0.83

Unsignalized Intersection	LOS
Oak Street/Campbell Street	A/C
Oak Street/Washington Street	A/C

East/West Routes:

ORE 224/Milwaukie Expressway provides regional access to the City of Milwaukie, connecting ORE 99E to I-205. It is classified by Milwaukie and Clackamas County as a Freeway/Expressway, by Metro as a Principal Arterial and by ODOT as an Urban Highway of Statewide importance (Category 2). Oregon Highway Access Management Category 2 facilities generally exhibit full access and median control. Intersections are generally at grade, however grade separations may be considered for high volume cross streets.[12]

ORE 224 carries approximately 26,000 ADT east of ORE 99E on four lanes (two in each direction).[13] There are a few at grade intersections near downtown Milwaukie, but further to the east, there are few access points. Land uses adjacent to ORE 224 generally consist of industrial and commercial on the north side and residential on the south side.

[12] *1991 Oregon Highway Plan*, Highway Access Management Categories, Appendix B, Table 1, by Oregon Department of Transportation, June 1991.

[13] 1992 Traffic Volume Tables, Transportation Research Section, ODOT, Published December 1993.

Signalized intersection levels of service on ORE 224 are shown in the table below. Arterial level of service along ORE 224 is generally good, with poor level of service (E, F) occurring only in the eastbound direction approaching Lake Road/Webster Road. Arterial level of service is D approaching Harrison Street eastbound and approaching Oak Street westbound.

Signalized Intersection	LOS	Average Delay (Seconds)	Demand/ Capacity
ORE 224/37th Avenue	B	11.4	0.79
17th Avenue/ORE 224	C	22.6	0.86
ORE 224/Harrison Street	C	22.2	0.87
ORE 224/Oak Street	C	18.3	0.83

SE Johnson Creek Boulevard is an east-west arterial along Milwaukie's northern border. To the west, it connects to Tacoma Street, leading to southeast Portland and the Sellwood Bridge. To the east, it provides access to I-205. Johnson Creek Boulevard is classified by Milwaukie, Clackamas County and Metro as a minor arterial and by the City of Portland as a neighborhood collector. Johnson Creek Boulevard is one of the only east-west routes connecting ORE 99E and I-205 within several miles. Johnson Creek Boulevard is a two-lane, two-way roadway and carries approximately 13,200 ADT west of Brookside Drive. There is very little access control on Johnson Creek Boulevard, with many residences and businesses having direct access to it. Trucks are not permitted on Johnson Creek Boulevard between 32nd and 45th Avenues.

There is a current City of Portland project to improve Johnson Creek Boulevard between 32nd Avenue and 45th Avenue. The final design includes 32 foot curb-to-curb roadway, including five foot bicycle lanes with a 6.5 foot sidewalk on the south side. The travel lanes are 11 feet wide. The project will be completed in two phases. Phase I includes construction between 32nd Avenue and 36th Avenue. Phase II includes construction between 36th Avenue and 45th Avenue. Phase I was completed in 1996 by the City of Portland.[14] Phase II construction will be completed by the City of Milwaukie with the assistance of Clackamas County and the City of Portland. The section east of 37th Avenue and 45th Avenue is under Clackamas County's maintenance jurisdiction.

Unsignalized intersections along Johnson Creek Boulevard are shown in the table below. The Linwood Avenue/Johnson Creek Boulevard intersection was signalized in 1995.

Unsignalized Intersection	LOS
Stanley Avenue/Johnson Creek Boulevard	B/E

[14] *Resolution No. 6-1995*, City of Milwaukie, adopted by the Milwaukie City Council on February 7, 1995.

All-way stop controlled intersection levels of service along Johnson Creek Boulevard are shown in the table below. Levels of service are shown for each approach to the intersection (northbound, southbound, eastbound, westbound). See Appendix 7 for more discussion of All-Way Stop Control level of service. Note that the * indicates that no approach exists in that direction.

All Way Stop Controlled Intersection	LOS
32nd Avenue/Johnson Creek Boulevard	B/F/*/A
42nd Avenue/Johnson Creek Boulevard	B/*/C/B

The southbound direction of 32nd Avenue operates at level of service F (that is, traffic coming from the west on Tacoma Street). Based on field observation,[15] this condition only occurs for an approximately 10-15 minute period during the evening peak hour.

Arterial level of service along Johnson Creek Boulevard is generally acceptable during the PM peak period. However, level of service D is experienced eastbound at the approach to 32nd Avenue. Level of service E is experienced westbound at the approach to 82nd Avenue and level of service F is experienced eastbound at the approach to 82nd Avenue, both due to traffic signal delay.

SE Harrison Street/SE King Road function together as an east-west route through Milwaukie. At 42nd Avenue, the route jogs between the two roadways. The route is classified as a minor arterial by Milwaukie and Clackamas County. This route links downtown Milwaukie (at the west end of Harrison Street) with major retail centers to the east (at the east end of King Road) and 82nd Avenue.

King Road carries approximately 10,000 ADT east of Linwood Avenue and Harrison Street carries approximately 12,500 near 31st Avenue. Both Harrison Street and King Road are generally three lanes (including a center left turn lane) with additional turn lanes on Harrison at ORE 224. A recent project improved King Road, east of 42nd Avenue to 82nd Avenue, to 3 lanes with bicycle lanes and some sidewalks. The adjacent land uses of these roadways include residential and commercial uses. Wichita School (elementary) is on the north side of King Road west of Linwood Avenue and Milwaukie Junior High School is on the south side of Harrison Street east of 21st Avenue.

The signalized intersection level of service is shown in the table below.

Signalized Intersection	LOS	Average Delay (Seconds)	Demand/ Capacity
32nd Avenue/Harrison Street	B	14.6	0.38

[15] Based on discussions with Paul Roeger, City of Milwaukie, on January 18, 1995.

The unsignalized intersection levels of service are shown in the table below.

Unsignalized Intersection	LOS
43rd Avenue/King Road	A/E
Stanley Avenue/King Road (west)	A/D
Stanley Avenue/King Road (east)	A/C

Two all-way stop controlled intersections are also located on this route. These intersections are reported by approach (northbound, southbound, eastbound, westbound).

All Way Stop Controlled Intersection	LOS
42nd Avenue/Harrison Street	D/C/C/A
42nd Avenue/King Road	C/*/A/B

Arterial level of service along this route is generally acceptable. However, westbound Harrison Street operates at level of service E between 32nd Avenue and ORE 224 and at level of service F between 21st Avenue and ORE 99E, both due to traffic signal delay. Eastbound, Harrison Street operates at level of service D as it approaches Main Street and as it approaches 32nd Avenue. The segment on 42nd Avenue between Harrison Street and King Road operates at level of service D and the segment on King Road as it approaches 82nd Avenue operates at level of service E.

SE 21st Avenue/SE Lake Road/SE Harmony Road function as an east-west route serving the southern portion of Milwaukie and providing access to retail centers at either end (downtown Milwaukie on the west and 82nd Avenue and Clackamas Town Center on the east). This route is classified by Milwaukie and Metro as a minor arterial. The route is classified as a major arterial east of ORE 224 by Clackamas County. The route is generally a two-lane, two-way roadway west of Linwood Avenue and a three-lane roadway (including a center left turn lane) east of Linwood Avenue. Harmony Road carries approximately 18,000 ADT, east of Cedarcrest Drive.

The land uses adjacent to this route are mostly commercial along 21st Avenue, mostly residential along Lake Road and a mixture of residential, industrial and commercial along Harmony. Residences along this route are generally accessed by side streets, but some direct access is provided. Milwaukie High School is located northeast of Lake Road near 22nd Avenue and there is a middle school on the south side of Lake Road near Shell Lane. Some concern has been expressed regarding the need for a center turn lane on Lake Road. Due to the number of left turning vehicles and the volume of traffic on Lake Road, many vehicles use the bike lane/shoulder to pass vehicles waiting to turn left. The Lake Road Multimodal Connections Study addresses these issues and includes specific proposals for enhanced roadway safety and efficiency while promoting neighborhood livability.

The Southern Pacific railroad trestle over Lake Road near 21st Avenue limits the ability for trucks to use Main Street as the through route because of the height restriction. As a result, 21st Avenue has become the through route into downtown Milwaukie from Lake Road since there is no height restriction.

The signalized intersections at Oatfield Road/34th Avenue and at Linwood Avenue/Railroad Avenue both operate at level of service D, as shown in the table below. This is acceptable, however, each of these intersections is very close to level of service E. These intersections should be monitored for unacceptable operating conditions, particularly with planned light rail transit alignments near Harmony Road/Lake Road/Linwood Avenue/Railroad Avenue.

Signalized Intersection	LOS	Average Delay	Demand/ Capacity
Oatfield Road/34th Avenue/ Lake Road	D	31.9	0.90
Harmony Road/Linwood Avenue/ Railroad Avenue	D	31.1	0.92

Arterial level of service along this route is generally acceptable, with congested areas (level of service E) occurring both eastbound and westbound at Linwood Avenue/Railroad Avenue. Level of service F is experienced at the eastbound approach to 82nd Avenue due to congestion and traffic signal delay.

SE Railroad Avenue serves as an east-west route through Milwaukie, classified by both Milwaukie and Clackamas County as a minor arterial. It is a two-lane, two-way roadway. Its adjacent land uses include industrial uses along the railroad tracks to the south and residential uses to the north. There are no access points to the south between 37th Avenue and Linwood Avenue (due to the railroad tracks) and access to residences to the north is generally provided by side streets. Hector Campbell School (elementary) is north of Railroad Avenue between 47th Avenue and 48th Avenue.

Unsignalized intersections along Railroad Avenue are shown in the table below. Both of these intersections operate at acceptable levels of service.

Unsignalized Intersection	LOS
Oak Street/Monroe Street/ Railroad Avenue	A/B
37th Avenue/Railroad Avenue	A/C

SE Monroe Street is classified by both Milwaukie and Clackamas County as a minor arterial between 21st Avenue and 37th Avenue and as a collector to the east. It provides local east-west access to Milwaukie residents. Monroe Street carries approximately 2,000 ADT near 25th Avenue and is a two-lane, two-way street. The land uses adjacent to Monroe Street are generally commercial and residential.

The intersections analyzed on Monroe Street include ORE 99E, which operates at level of service D/A, and Oak Street/Railroad Avenue, which operates at level of service A/B. Both of these intersections were discussed previously in this section. The table below shows an additional intersection on Monroe which is all-way-stop controlled.

All Way Stop Controlled Intersection	LOS
37th Avenue/Monroe Street	B/A/C/A

Average Vehicle Occupancy

Vehicle occupancy provides an indication of the level of carpool/vanpool activity. A general indication of multiple-occupant versus single-occupant vehicles is gleaned by measuring average vehicle occupancy (AVO, the number of persons per vehicle) at select locations. Average vehicle occupancy was measured at three locations in Milwaukie during the PM peak hour (3:00 PM to 6:00 PM).[16] These locations were eastbound Harrison Street (west of 42nd Avenue), westbound King Road (west of Linwood Avenue) and northbound Linwood Avenue (south of King Road). Overall AVO measured in Milwaukie (between the three locations) is 1.29 persons per vehicle. This rate is similar to observed typical ranges of auto occupancy (over all time periods and trip purposes) which range from about 1.31 to 1.54.[17]

Figure 2.14 shows the percentage of vehicles with one, two or greater than two occupants for each survey site. It also shows the AVO for each site.

[16] Counts performed for DKS Associates on December 13 through 15, 1994.

[17] *Calibration and Adjustment of System Planning Models*, US Department of Transportation and Federal Highway Administration, December 1990.

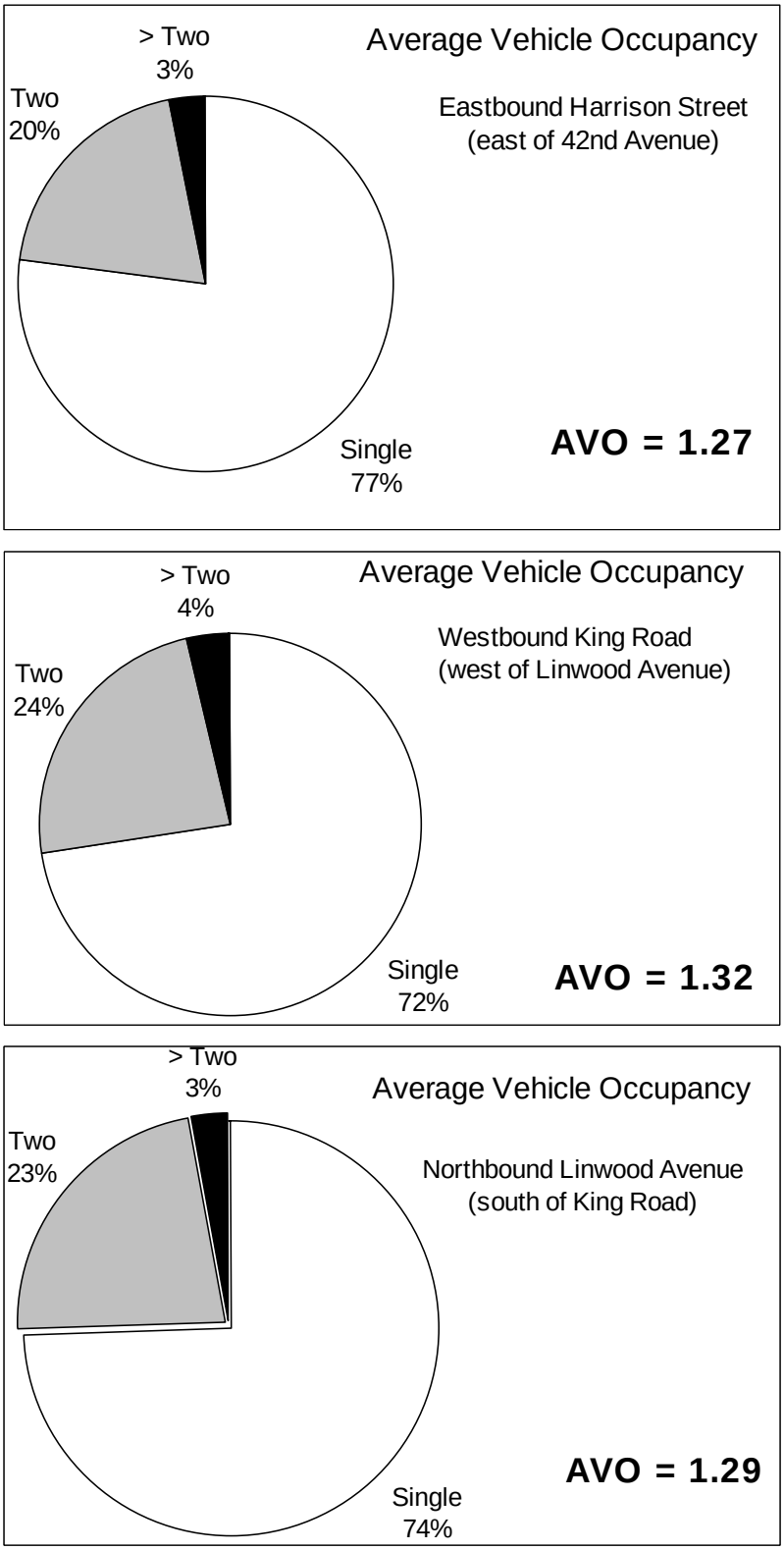


Figure 2.14
Average Vehicle Occupancy in Milwaukie

Parking

On-street parking is generally available in residential areas of Milwaukie. In commercial areas, on-street parking is generally available and off-street parking is required by zoning ordinance. Milwaukie's Zoning Ordinance was revised in October of 1994 and incorporated both minimum and maximum parking requirements based on specific uses. The Oregon Department of Environmental Quality (DEQ) has provided a considerable amount of research on parking conditions locally.[18] DEQ has been working on decreasing the amount of parking provided at individual facilities in an effort to help reduce overall vehicle miles traveled (VMT).

In addition to the on-street parking provided in Milwaukie and the off-street parking provided in commercial areas by local businesses, three downtown parking lots operate on a permit system. This parking permit program became effective in October of 1993 and affects 140 parking spaces downtown. These three lots include the following:

- Chevron Lot — East of McLoughlin Boulevard between Jackson and Monroe
- City Hall Parking Lot — West of Main Street between Harrison and Jackson
- Railroad Parking Lot — Railroad right-of-way bounded by Monroe and Washington between 21st and 25th

WALKWAYS

Sidewalks are the predominant walkways in the City. An inventory of sidewalk location suggests that some areas of the City have a more comprehensive coverage of sidewalks while other areas severely lack sidewalks or other walkways. The downtown area and neighborhoods to the east of downtown have the most sidewalks. Elsewhere, sidewalks are generally piecemeal, a result of installation when new developments occur. However, sidewalks are continuous along a few arterial and collector streets such as 32nd Avenue and King Road. This is a result of recent major road improvement projects. Existing walkways (e.g. sidewalks) in Milwaukie are shown in Figure 2.15.

The width of sidewalks in Milwaukie varies from four feet to ten feet, depending upon location and when the sidewalks were constructed. Downtown Milwaukie has the widest sidewalks (10 feet) to serve this pedestrian friendly commercial district and transit hub. Elsewhere, most of the existing sidewalks are four feet wide.

Most of the sidewalks are in good to excellent condition. Examples of sidewalks in very good or excellent condition are SE 37th Avenue near Milwaukie Marketplace, and Meadowcrest Court. Sidewalks occur in the public right-of-way. However, in the City, it is the responsibility of the adjacent property owner to repair sidewalks in poor condition. Generally, the City requests sidewalk improvements of property owners as complaints are received at specific locations.

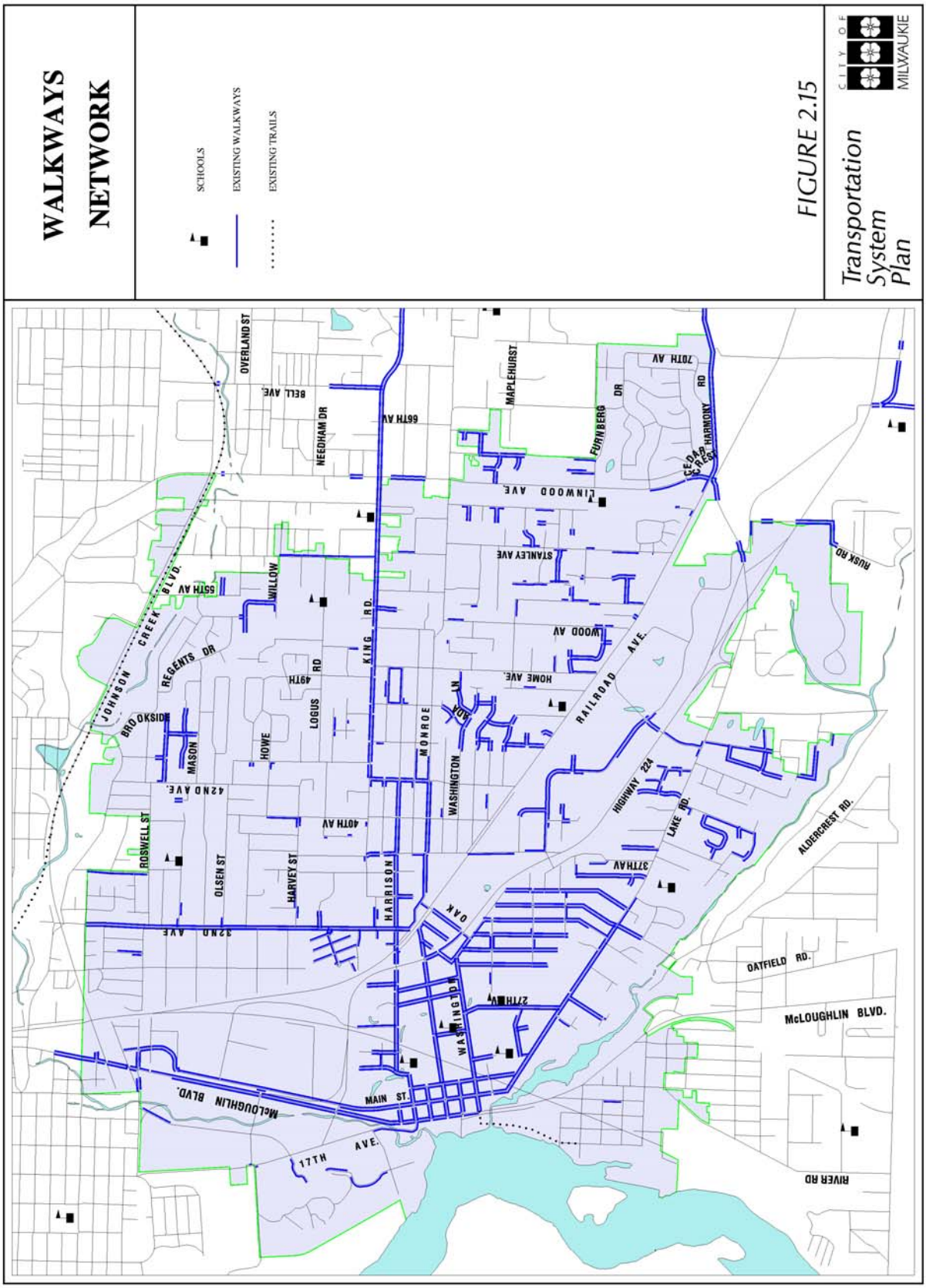
[18] *Peak Parking Space Demand Study: Technical Report*, by JHK & Associates, Inc., for the Oregon Department of Environmental Quality, June 1995.

Currently, the US Postal Service delivers mail to Milwaukie residents via rural route delivery from their vehicles. Because of this, there are cases where mailboxes obstruct sidewalks in the City, especially where older, more narrow, sidewalks exist. A second concern for pedestrian accessibility, especially with older and handicapped individuals, is the varying condition and widespread use of asphalt for railroad crossings along sidewalks (an example is the crossing at Oak Street).

Wheelchair ramps have not been consistently installed at intersections with sidewalks. Since 1991, when the Americans with Disabilities Act (ADA) was enacted, the City has been requiring and implementing wheelchair ramps with sidewalk projects. Over the past few years, the City has retrofitted numerous intersections in the downtown area with wheelchair ramps. There are still a number of intersections that have partial or no ramps and need to be retrofitted.

Pedestrian crosswalks exist primarily at signalized intersections and crossings. Most intersections have crosswalks on all legs of the intersection, but there are a few locations where certain legs do not have crosswalks. An example of a complete crosswalk is Harrison Street/ORE 224. An example of a partial crosswalk intersection is at ORE 99E/Jefferson Street.

Off-road walkways exist along the downtown riverfront area on the Kellogg Creek Trail. This is a paved multiuse trail, 7.5 feet wide, that connects the riverfront area to Eagle Street. The recently paved Springwater Corridor trail provides pedestrian access in northern Milwaukie. There is also an I-205 paved path that is located in the freeway right-of-way to the east of the City.


WALKWAYS NETWORK
SCHOOLS
EXISTING WALKWAYS
EXISTING TRAILS
FIGURE 2.15
Transportation System Plan
CITY OF MILWAUKIE
OVERLAND ST
BELL AVE
NEEDHAM DR
66TH AV
MAPLEHURST
FURNBERG DR
70TH AV
HARMONY RD
CEDAR CREEK
LINWOOD AVE
STANLEY AVE
RUSK RD
WOOD AV
HOME AVE
RAILROAD AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
37TH AV
OATFIELD RD.
McLOUGHLIN BLVD.
RIVER RD
27TH AV
MAIN ST.
17TH AVE.
OAK
WASHINGTON
MONROE
HARRISON
HARVEY ST
OLSEN ST
ROSWELL ST
32ND AVE
40TH AV
42ND AVE.
MASON
HOWE
LOGUS
49TH
KING RD.
WILLOW
55TH AV
JOHNSON CREEK BLVD.
REGENTS DR
BROOKSIDE

BIKEWAYS

There are a limited number of existing bikeways in Milwaukie. On-road facilities occur on arterial and collector streets. Off-road bikeways are also limited. The Springwater Corridor Trail serves as a major east-west connector for bicyclists through northern Milwaukie. Table 2.2 summarizes information on the width, condition, jurisdiction and other comments related to existing bikeways in Milwaukie.

Table 2.2
Bikeways in Milwaukie

Location	Width	Condition	Jurisdiction	Comments
King Road (42nd Avenue to Fuller)	4.5 feet to 5 feet	Excellent	Milwaukie, Clackamas County	Bike lanes
Linwood Avenue (King Road to Harmony Road)	5 feet (east side) 6 feet (west side)	Fair to Good	Milwaukie	Bike lanes, has dagmires and curb separators, shared with pedestrians
Lake Road/Harmony Road (Oatfield Road to 82nd Avenue)	5 to 8 feet	Fair to Very Good	Milwaukie, Clackamas County	Bike lanes, Oatfield to City limits needs reconstruction, uneven surface due to construction, ponding after rains, storm sewer grates throughout, especially east of Linwood Avenue
22nd Avenue (ORE 99E to Sparrow Street)	7.5 feet West Side	Good	Milwaukie	Shared with pedestrians, has dagmires
River Road	8 feet West Side	Good	Milwaukie	Shared with pedestrians, has dagmires
Oatfield Road (Lake Road to City Limits)	5.5 feet West Side 4.5 feet East Side	Good	Milwaukie	Bike lanes, has dagmires, extends into Clackamas County
Webster Road (Lake Road to south of Clackamas Road)	5 to 9 feet	Excellent	Clackamas County	Bike lanes, recently resurfaced
ORE 99E (East side - Washington St. to SP Overpass, West side - River Road to City Limit)	6 feet	Good	ODOT	High volume Highway
ORE 224 (17th Ave. to Harrison St. and Oak St. to I-205)	5 feet 12 feet	Excellent	ODOT	Wide shoulder, high volume and high speed highway
Johnson Creek Boulevard (80th Ave. to I-205)	5 feet	Excellent	Clackamas County	Bike lanes
Springwater Trail (28th Ave. to Harney Rd.)	10 feet	Excellent	City of Portland	Multiuse trail
Kellogg Creek Trail (downtown area to Eagle Street)	7.5 feet	Excellent	Clackamas County Service District 1	Multiuse path
17th Avenue (McLoughlin to Ochoco)	TBD	TBD	Milwaukie	Bike lanes

These streets provide limited north/south and east/west corridors for bicycle accessibility to local and regional activity centers and destinations. Existing north/south corridors include 17th Avenue, River Road, Oatfield Road and Linwood Avenue. The latter two north/south corridors connect to east/west bikeway connections such as King Road, Lake Road and Harmony Road. In addition, there are three multiuse trails that enhance bicyclist accessibility in Milwaukie and vicinity. The regionally significant Springwater Corridor parallels Johnson Creek in Milwaukie, there is a riverfront trail in the downtown

riverfront area, and the I-205 multiuse path serves north/south bicycle travel to the east of the City in the interstate right-of-way. Existing bikeways and trails are detailed in Figure 2.16. Bicycle loop detectors are not currently implemented in Milwaukie. In general, bicycle facilities are limited in Milwaukie, and therefore it is difficult for bicyclists to access activity centers and other destinations in Milwaukie due to the lack of continuity.

The surface conditions of bikeways are generally good to excellent. Safety concerns with the on-road bikeways includes the shared use of the lanes with pedestrians where sidewalks do not exist, and the existence of dagmires. Dagmires are large round buttons that were installed years ago, as mandated by the Federal Highway Administration, to separate bicyclists and pedestrians from automobiles. The dagmires create an obstruction which should be removed.

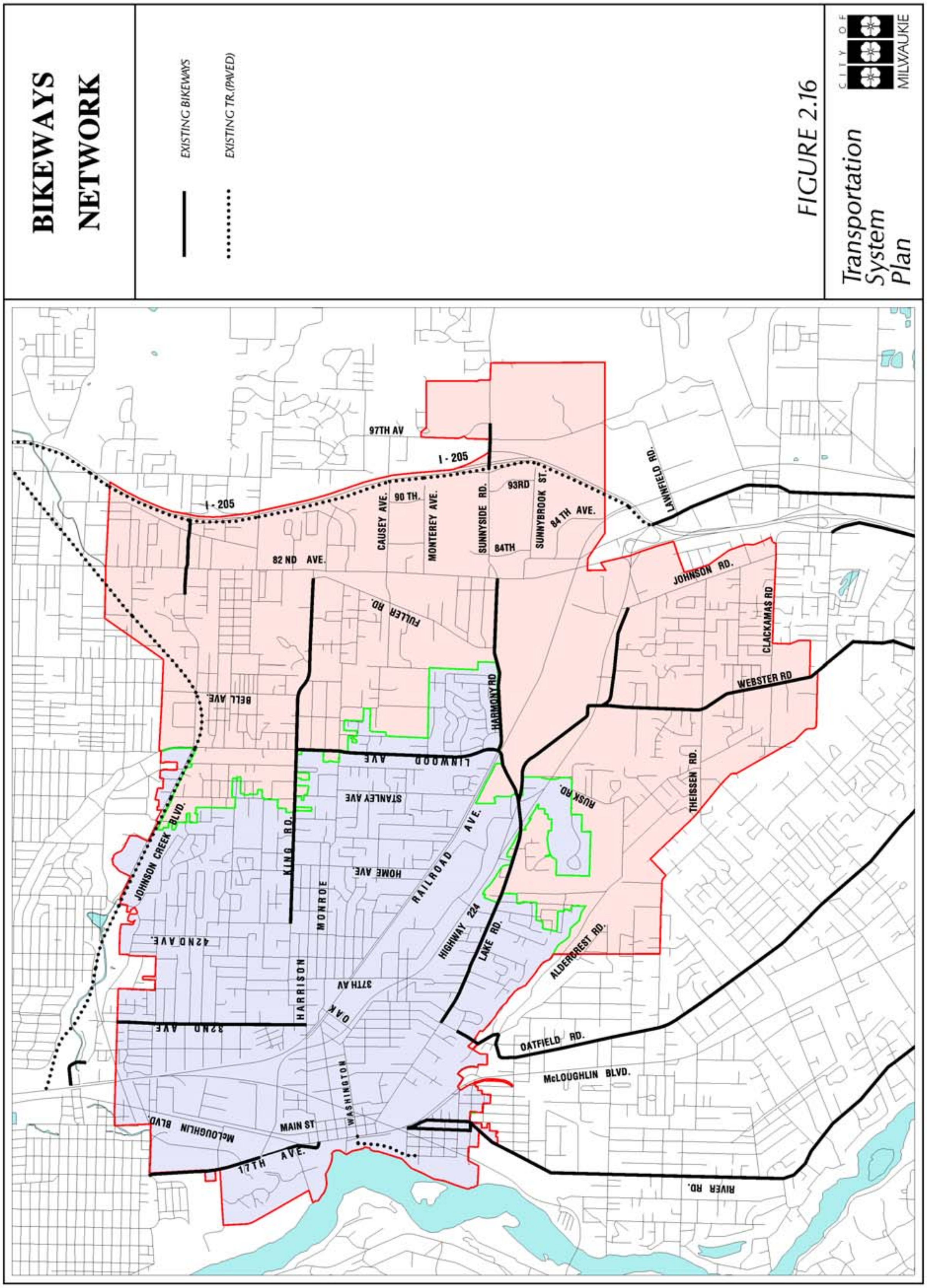
TRANSIT

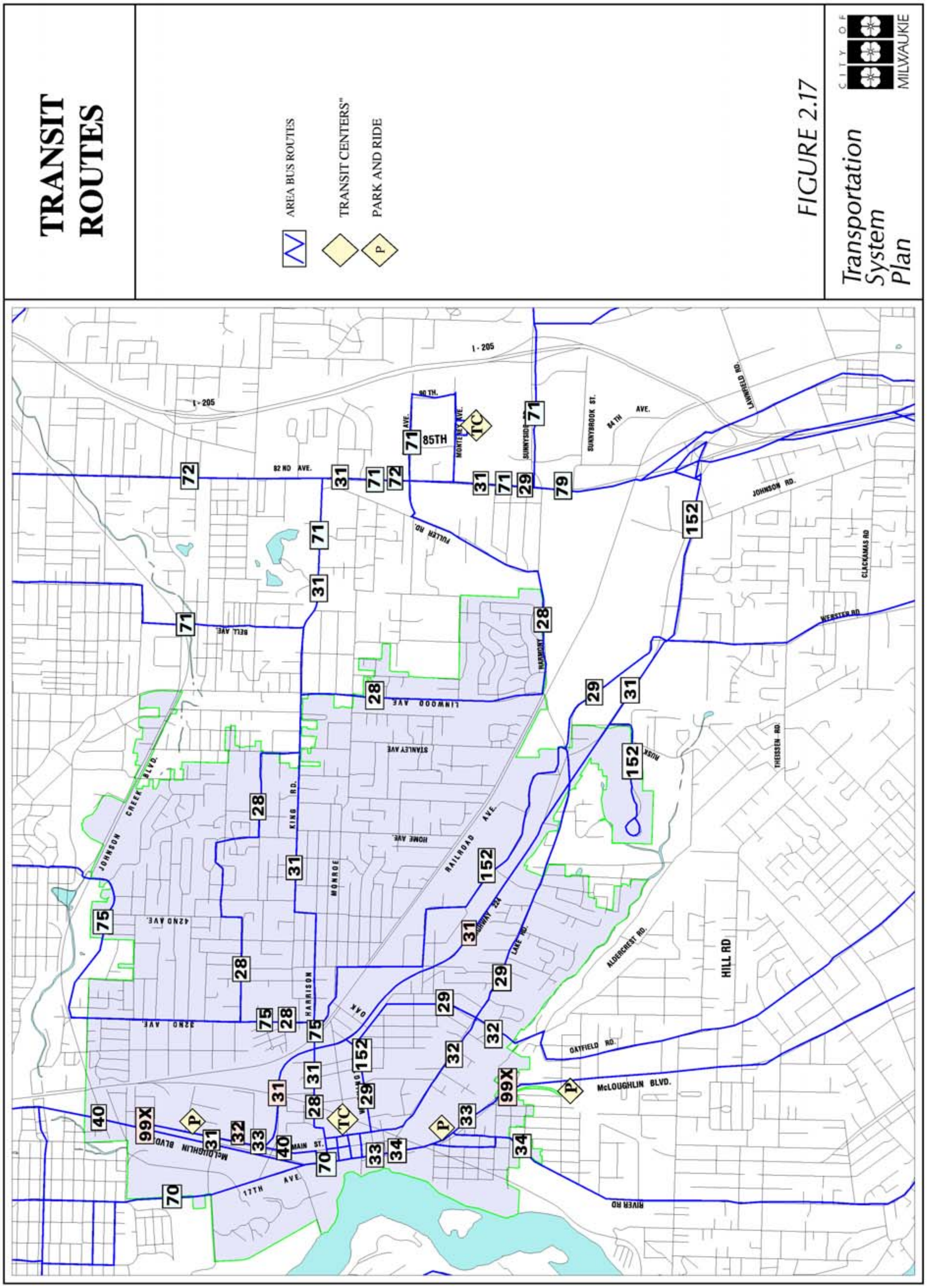
Milwaukie is served by Tri-Met's public transit system. Transit routes in Milwaukie are shown in Figure 2.17 and 1990 Transit Ridership is summarized in Table 2.3.[19] There are 11 Tri-Met buses that travel through Milwaukie, not including dial-a-ride and paratransit services. These routes, their local destinations, and approximate frequencies are summarized in Table 2.4. Bus stop locations are shown in Figure 2.18. For most routes, the most frequent service occurs during peak commute hours and the least frequent service occurs on weekends, particularly Sundays when many routes do not provide service. The existing bus routes transport Milwaukie residents and visitors to a number of local and regional destinations including: Clackamas Town Center, downtown Milwaukie, downtown Portland, Oregon City, Clackamas Transit Center, Coliseum Transit Center, Lloyd Center, St. John's, Clackamas Community College and the Milwaukie Center. Two bus transit centers benefit Milwaukie residents, one in downtown Milwaukie and one at Clackamas Town Center. See Table 2.5 for existing transit capacity and conditions.

The South-North light rail transit line is currently being planned to serve Milwaukie and Clackamas County. In addition, Milwaukie is designated as a Regional Center in Metro's *Region 2040 Plan*,[20] which means that it will be a focus area for transit improvements in the region. For example, the alternatives being considered include plans for significant upgrades to and collocating the transit center with a light rail station in downtown Milwaukie.

[19] Note that routes 152 and 99X were not in service in 1990; therefore, data was not available. Route 28 - Linwood was in service at that time; however, specific ridership data was not available from Tri-Met.

[20] *Region 2040: Recommended Alternative Decision Kit*, Metro, September 1994.


BIKEWAYS NETWORK
EXISTING BIKEWAYS
EXISTING TR.(PAVED)
FIGURE 2.16
Transportation System Plan
CITY OF MILWAUKIE
97TH AV
I - 205
I - 205
90 TH.
CAUSEY AVE.
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84 TH AVE.
84TH
82 ND AVE.
LAWNFIELD RD.
JOHNSON RD.
CLACKAMAS RD
FULLER RD.
BELL AVE.
HARMONY RD
WEBSTER RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
MONROE
HIGHWAY 224
LAKE RD.
42ND AVE.
HARRISON
37TH AV
ALDERCREST RD.
OAK
32ND AVE
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLVD.
McLOUGHLIN BLVD.
MAIN ST
17TH AVE.
RIVER RD.


TRANSIT ROUTES
AREA BUS ROUTES
TRANSIT CENTERS
PARK AND RIDE
FIGURE 2.17
Transportation System Plan
CITY OF MILWAUKIE
I - 205
82 ND AVE.
85TH
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
LINWOOD AVE
STANLEY AVE
HOME AVE.
RAILROAD AVE.
KING RD.
MONROE
HARRISON
42ND AVE.
32ND AVE
JOHNSON CREEK BLVD.
LAKE RD.
ALDERCREST RD.
HILL RD
OATFIELD RD.
McLOUGHLIN BLVD.
MAIN ST.
17TH AVE.
RIVER RD
FULLER RD.
BELL AVE
HARMONY
THIESSEN RD.
LINWOOD
SUNNYBROOK ST.
84TH AVE.

In a recent survey of citizens in Milwaukie,[21] it was observed that a majority of transit users walk to board public transportation. Because of this, it is important that public transit reach residential and commercial areas and that sidewalks are available to safely access bus routes. In the Milwaukie area, bus routes are concentrated near downtown Milwaukie and in the vicinity of 82nd Avenue, leaving other areas in Milwaukie farther than one-quarter mile from any bus routes.

There is no intercity bus or rail transportation provided with stops in Milwaukie other than the bus service provided by Tri-Met, which is described in this chapter.

Table 2.3
1990 Daily Transit Ridership in Milwaukie

Route	Inbound			Outbound			Total		
	Ons	Offs	Tot	Ons	Offs	Tot	Ons	Offs	Tot
29 - Lake Webster	9	108	117	157	15	172	166	123	289
31 - Estacada	230	139	369	148	250	398	378	389	767
32 - Oatfield	102	139	241	129	169	298	231	308	539
33 - McLoughlin	371	190	561	240	359	599	611	549	1160
34 - River Road	9	111	120	119	6	125	128	117	245
40 - Tacoma	432	30	462	29	451	480	461	481	942
70 - 12th Avenue	46	326	372	294	16	310	340	342	682
75 - 39th Avenue	77	309	386	271	64	335	348	373	721

Source: Tri-Met

[21] *Public Transit Needs*, City of Milwaukie Transportation System Plan Citizen Working Group Report, March 21, 1995.

Table 2.4—Transit Service in Milwaukie

Existing Public Transit Service in Milwaukie					
	Weekday		Weekend		
Line #/Name	Schedule	Approx Freq (Min)	Schedule	Approx Freq (Min)	Places Served (partial list)
28 – Linwood	6:00 - 9:00 AM 9:00 AM - 3:00 PM 3:00 - 6:30 PM	30 60 30			Milwaukie Transit Center Clackamas Transit Center
29 - Lake/Webster	5:30 - 9:00 AM 9:00 AM - 3:00 PM 3:00 - 6:30 PM	30 60 30			Milwaukie Transit Center Clackamas Town Center Transit Center
31 – Estacada	6:00 AM - 10:00 PM	30	**Sat:** 6:30 - 8:30 AM 8:30 AM - 7:00 PM 7:00 - 10:00 PM **Sun:** 7:30 AM - 6:30 PM	60 30 60 60	Milwaukie Transit Center Clackamas Town Center Transit Center Downtown Portland (some times)
32 – Oatfield	6:00 - 10:30 AM 10:30 AM - 3:30 PM 3:30 - 6:30 PM 6:30 - 9:30 PM	30 60 30 60			Milwaukie Transit Center Clackamas Community College Downtown Portland (11 peak hour trips) Oregon City Transit Center
33 – McLoughlin	5:00 - 6:30 AM 6:30 - 8:30 AM 8:30 AM - 6:00 PM 6:00 - 11:00 PM	30 15 30 60	**Sat:** 6:30 AM - 7:00 PM 7:00 - 11:00 PM **Sun:** 7:00 AM - 10:00 PM	30 60 60	Clackamas Community College Downtown Portland Oregon City Transit Center Milwaukie Transit Center
34 - River Road	6:00 - 8:30 AM 8:30 AM - 3:30 PM 3:30 - 7:00 PM	30 60 30	**Sat:** 9:00 AM - 7:00 PM	60	Oregon City Transit Center Milwaukie Transit Center
40 – Tacoma	6:00 - 8:00 AM 8:00 AM - 3:00 PM 3:00 - 6:00 PM 6:00 - 9:00 PM 9:00 PM - 12:00 AM	20 30 20 30 60	**Sat:** 6:00 - 8:00 AM 8:00 AM - 7:30 PM 7:30 PM - 12:30 AM **Sun:** 6:00 AM - 12:00 AM	60 30 60 60	Milwaukie Transit Center Downtown Portland
70 - 12th Avenue	5:00 - 6:00 AM 6:00 AM - 8:00 PM 8:00 - 9:30 PM	30 15 30	**Sat:** 9:00 AM - 7:00 PM 7:00 - 10:00 PM **Sun:** 9:00 AM - 7:00 PM	15 30 30	Milwaukie Transit Center Coliseum Transit Center Lloyd Center
75 - 39th Avenue/Lombard	5:00 - 6:00 AM 6:00 - 8:00 AM 8:00 AM - 9:30 PM	30 10 15	**Sat:** 6:30 - 7:30 AM 7:30 AM - 7:00 PM **Sun:** 6:00 AM - 7:00 PM	30 15 20	Milwaukie Transit Center St. John's
99X - McLoughlin Express	6:30 - 8:30 AM 3:30 - 6:00 PM	30 30			Clackamas Community College Downtown Portland
152 - Milwaukie Shuttle	6:30 - 8:30 AM 8:30 AM - 3:30 PM 3:30 - 5:00 PM	30 60 30			Milwaukie Transit Center Clackamas Town Center Transit Center Milwaukie Center (5 trips each way)

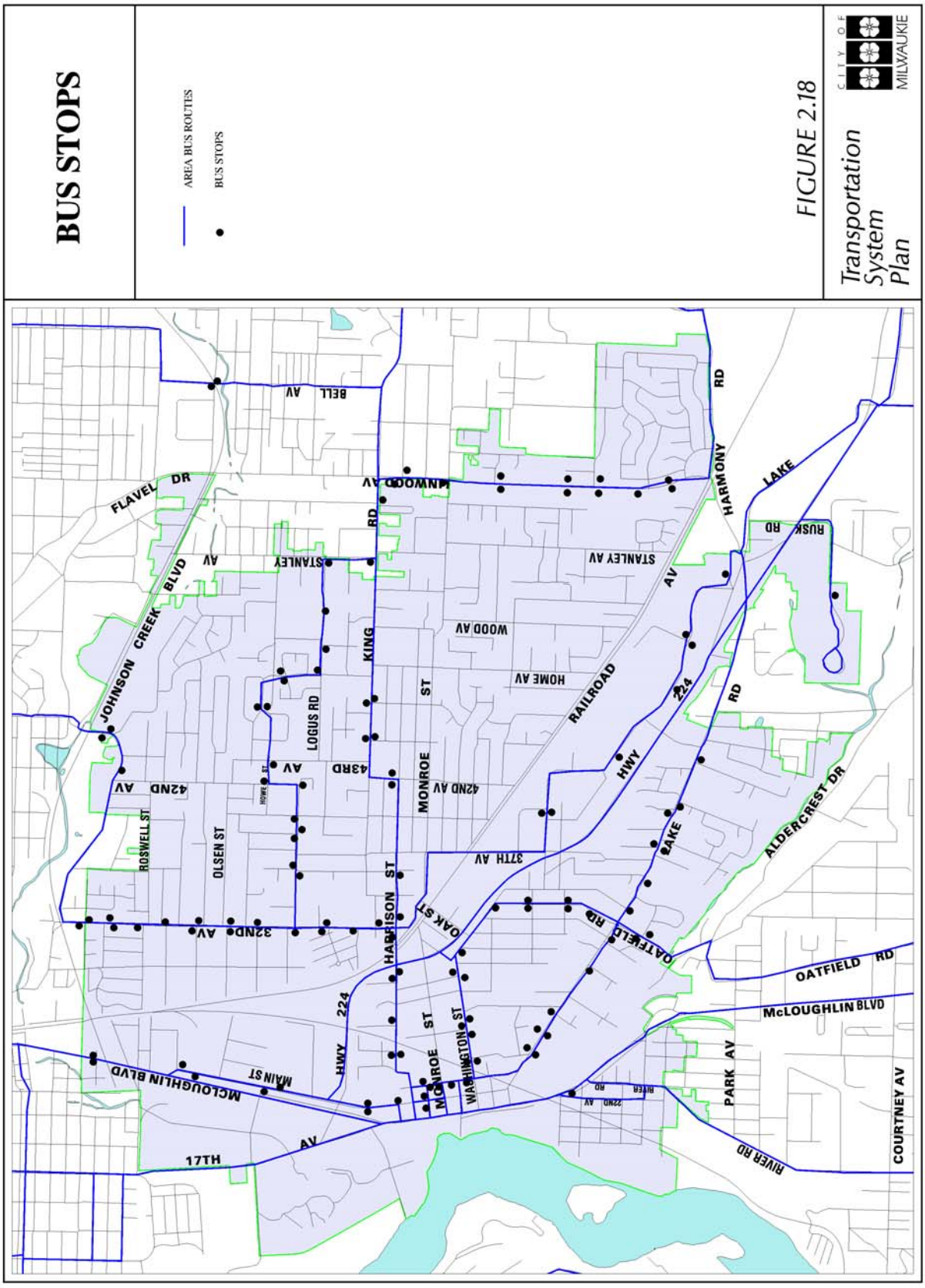

BUS STOPS
AREA BUS ROUTES
BUS STOPS
FIGURE 2.18
Transportation System Plan
CITY OF MILWAUKIE
BELL AV
FLAVEL DR
JOHNSON CREEK BLVD
STANLEY AV
KING RD
LOGUS RD
WOOD AV
HOME AV
STANLEY AV
HARMONY RD
LAKE RD
RUSK RD
RAILROAD AV
HWY 224
42ND AV
43RD AV
MONROE ST
ROSWELL ST
OLSEN ST
32ND AV
HARRISON ST
OAK ST
37TH AV
OATFIELD RD
ALDERCREST DR
LAKE RD
MAIN ST
MCLOUGHLIN BLVD
17TH AV
WASHINGTON ST
PARK AV
RIVER RD
COURTNEY AV

Table 2.5
Existing Transit Capacity and Conditions

Bus Route	Max No of Buses Operating During Day	Bus Type	Bus Cap	Bus Cond
28 - Linwood	2	30 foot, 1600-38	35	Good
29 - Lake/Webster	2	30 foot, 1600-38	35	Good
31 - Estacada	5	30 foot, 500-600-35	64	Good
32 - Oatfield	2	40 foot, 500-600-35	64	Good
33 - McLoughlin	5	40 foot, 500-600-35	64	Good
34 - River Road	1	40 foot, 1600-38	35	Good
40 - Tacoma	6	40 foot, 500-600-35	64	Good
70 - 12th Avenue	6	40 foot, 500-600-35	64	Good
75 - 39th Avenue/Lombard	12	40 foot, 500-600-35	64	Good
99X - McLoughlin Express	5 each during AM and PM peak hours	300-21	56	Fair
152 - Milwaukie Shuttle	1	Van - 15	23	Good

SPECIAL TRANSIT SERVICES

Special transit services are available to residents of Milwaukie through the Milwaukie Center Transportation Program, and Tri-Met Lift and Shuttle services. The Milwaukie Center Transportation Program is part of the Clackamas County Transportation Consortium which is dedicated to providing coordinated transportation services to seniors and ADA-eligible persons. The users of this transportation system are primarily seniors who are too frail to drive or take fixed route buses.

The Milwaukie Center program provides 7,500 one-way rides per year, 38% of which are for residents of Milwaukie. The program operates two buses that seat approximately twenty passengers, both are equipped with lifts. The buses operate Monday through Friday, from 8:30 AM to 5:00 PM. Eligible riders live within the service area for the North Clackamas Parks and Recreation District. Most riders are participants in the Milwaukie Center's nutrition program. However, this program does provide rides to shopping, recreational, medical and personal errand locations.

Tri-Met, the primary public transportation provider in the region, has two special transit programs for Milwaukie residents. The Tri-Met Lift Program provides small bus transportation services that are equipped to handle persons with disabilities. Those eligible for program service have physical or mental disabilities that prevent their use of regular transit service (Americans with Disabilities Act). This service is available seven days per week and fares are $.75 each way. The Tri-Met service area is a 0.75 mile radius around existing bus routes. Eligible users are to call in advance to schedule for Lift Program pick-up.

Tri-Met also provides shuttle bus service with the Milwaukie Shuttle - #152. The Milwaukie Shuttle functions currently as a fixed route, serving the Milwaukie Transit Center, the International Way business and industrial area north of ORE 224, and Clackamas Town Center. The Shuttle makes a couple of deviations from its fixed route. There are two trips per day to the Hillside Manor residential development off of SE 32nd Avenue, and two trips per day to the Milwaukie Center, located on Rusk Road. The shuttle trips to Hillside Manor and the Milwaukie Center, serve the special needs population.

FREIGHT TRUCKS

The freight routes in Milwaukie are shown in Figure 2.19. These routes generally include major arterial roadways in Milwaukie and areas where concentration of industrial land uses encourages truck traffic (i.e. Johnson Creek Boulevard between 45th Avenue and 82nd Avenue). Trucks in Milwaukie generally have full accessibility, but there may be some areas that need improvement to specifically serve truck needs. An example is Webster Street/ORE 224. It should be widened to include a through lane and a turn lane to facilitate movement for trucks and automobiles. A widened turn radii should be provided at ORE 99E/17th Avenue for adequate maneuvering of large trucks.

RAIL

Freight Trains

The rail routes through Milwaukie are shown in Figure 2.20. There are an average of six inbound trains and six outbound trains at Brooklyn Yard (in southeast Portland) to and from the south per day, including weekends.

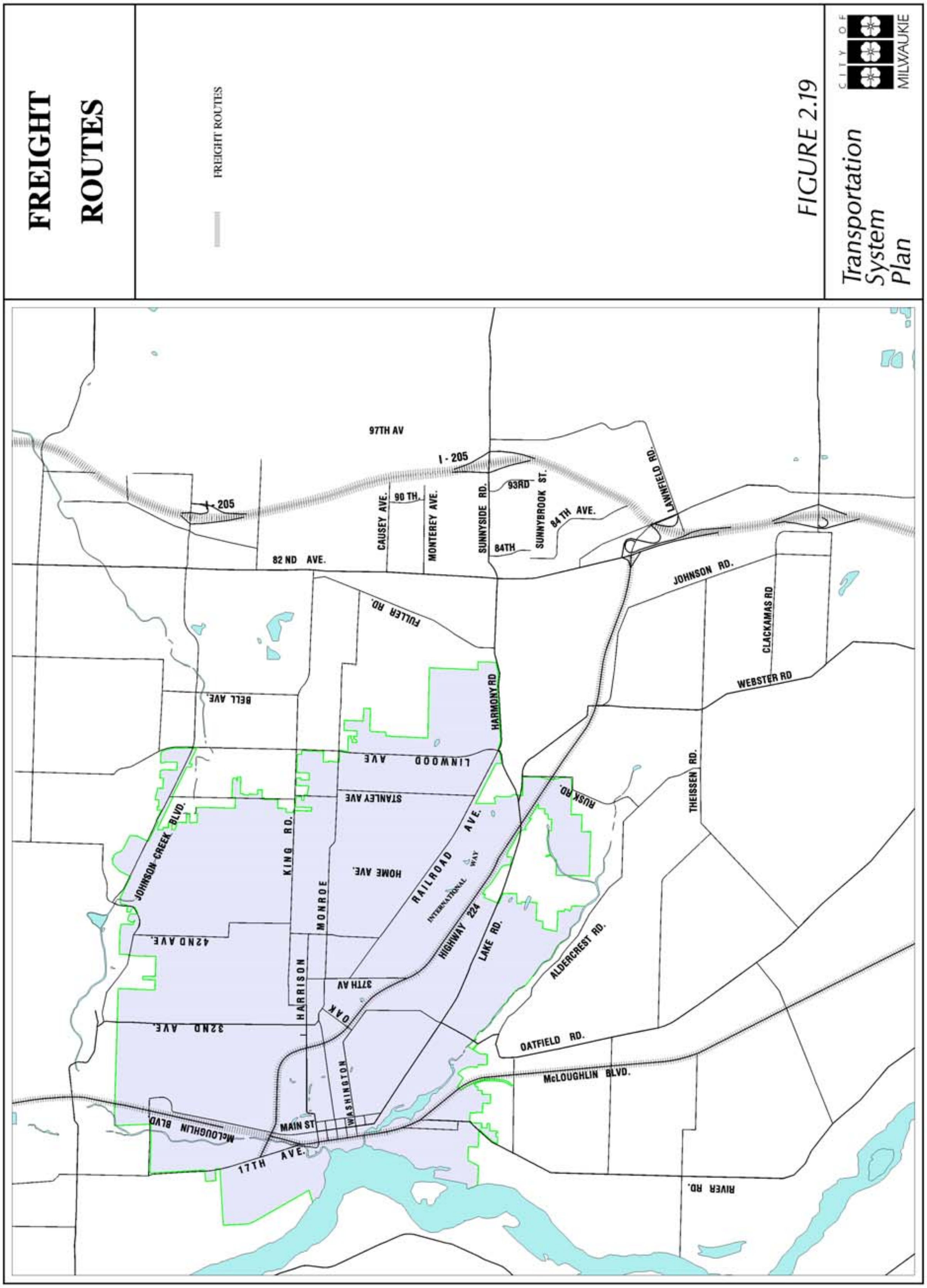
Outbound trains generally leave Brooklyn Yard heading south around 12:30 AM, 2:00 AM and 8:00 PM. Inbound trains arrive around 4:00 AM, 8:30 AM and 10:00 AM.

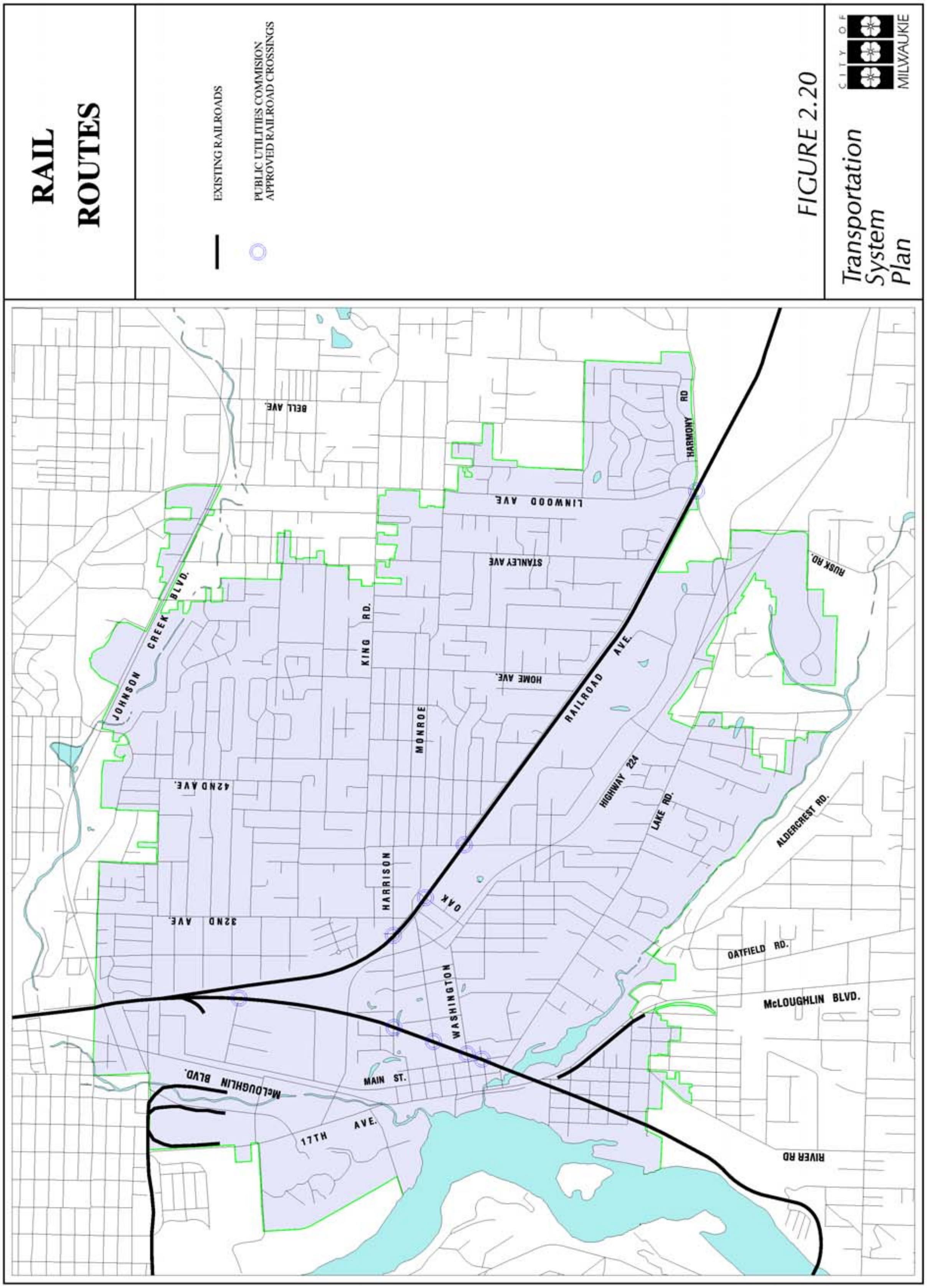
Approximately half of the trains are intermodal trains with containers, or trailer beds. The remaining trains are box-car-type. The trains can be mixed intermodal and box-car.

There are also non-Southern Pacific trains, including one Union Pacific and one Burlington Northern that travel through Milwaukie on a daily basis, including weekends. These trains generally come through Milwaukie between 3:00-8:00 PM and 6:00-7:00 AM, respectively. Two other freight trains that travel to Eugene, leaving between 6:00-10:00 AM and between 3:00-9:00 PM.

Additionally, there are other trains that come into Brooklyn Yard in southeast Portland to be serviced. One train comes from Clackamas County (Oregon City) and one Burlington Northern train comes from each direction.

The East Portland Traction Company, a short-haul freight railroad, operates within the northwest industrial area in the vicinity of 17th Avenue and McBrod. There are operating sidings provided for many of the buildings in this heavy industrial/warehousing and distribution area.


FREIGHT ROUTES
FREIGHT ROUTES
FIGURE 2.19
Transportation System Plan
CITY OF MILWAUKIE
97TH AV
I - 205
I-205
93RD
SUNNYBROOK ST.
84 TH AVE.
LAWNFIELD RD.
CAUSEY AVE.
90 TH.
MONTEREY AVE.
SUNNYSIDE RD.
84TH
82 ND AVE.
JOHNSON RD.
CLACKAMAS RD
FULLER RD.
WEBSTER RD
BELL AVE.
HARMONY RD
LINWOOD AVE
THEISSEN RD.
STANLEY AVE
RUSK RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
INTERNATIONAL WAY
MONROE
HIGHWAY 224
LAKE RD.
42ND AVE.
ALDERCREST RD.
HARRISON
37TH AV
OAK
32ND AVE.
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLVD.
MAIN ST
McLOUGHLIN BLVD
17TH AVE.
RIVER RD.


RAIL
ROUTES
EXISTING RAILROADS
PUBLIC UTILITIES COMMISION
APPROVED RAILROAD CROSSINGS
FIGURE 2.20
Transportation
System
Plan
CITY OF
MILWAUKIE
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
MONROE
42ND AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HARRISON
OAK
32ND AVE.
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLVD.
MAIN ST.
17TH AVE.
RIVER RD

Passenger Trains

Four Amtrak trains pass through Milwaukie daily on the Southern Pacific mainline. The trains are the Mount Rainier, both inbound (#750) and outbound (#751), and the Coast Starlight, both inbound (#14) and outbound (#11). The departure and arrival times in Portland are shown below. Trains pass through Milwaukie either shortly before (inbound) or after (outbound) the scheduled time in Portland.

Train	Portland Arrival	Portland Departure
Mount Rainier	8:45 AM	9:10 PM
Coast Starlight	4:00 PM	1:45 PM

Source: Amtrak Train Schedule, Portland Oregon.

Planned Improvements

Improvements to tracks and at intersections are made as needed or as requested by the City. There are no specific improvements planned at this time. Southern Pacific Transportation Company staff has identified the need to widen and improve the mainline railroad crossing at 37th Avenue and Railroad Avenue. Concern has also been expressed for needed improvements along Railroad Avenue to improve vehicular and railroad safety.

The Brooklyn Train Yard has recently been renovated to handle more intermodal transport. These improvements may increase the amount of goods shipped intermodally by trains. It is unknown at this time whether more trains will be generated or longer trains will be employed, compared to the existing operations.

Chapter 3
Walking

This chapter summarizes identified existing and future pedestrian needs of walkers and those using mobility aids such as wheelchairs in the City of Milwaukie. It outlines the criteria to be used in evaluating these needs and provides a number of strategies for implementing a pedestrian plan that addresses citywide goals and creates a local walkway network. The needs, criteria and strategies were identified to a great extent by the City's Pedestrian/Bicyclist Working Group. This citizen committee provided input regarding the transportation system in Milwaukie, with special emphasis on pedestrian needs. The pedestrian plan was developed by combining citizen and staff input with specific Transportation Planning Rule requirements. [1]

OVERALL NEEDS

The most frequently identified existing pedestrian need in Milwaukie is continuous sidewalks that include appropriate facilities for the elderly and disabled. Another commonly identified need is the maintenance of sidewalks without obstacles and in good repair. [2] Other specific existing needs that were identified include: the provision of pedestrian-related facilities at key locations, an increase in walking for all travel purposes; and the reduction of pedestrian-related accidents through activities that enhance safety and security.

WALKWAY NETWORK

Needs

Walkway network needs can be best understood by looking at popular pedestrian routes in Milwaukie. Several key "north-south" and "east-west" walkway corridors are identified in Table 3.1.

[1] *Transportation Planning Rule*, State of Oregon, Department of Land Conservation and Development, Section 660-12-020(2)(d), 660-12-045-3.

[2] *Transportation Needs*, City of Milwaukie, December 23, 1994.

Table 3.1
Key Walkway Corridors in Milwaukie

North-South Corridors	East-West Corridors
17th Avenue	Johnson Creek Boulevard
ORE 99E	King Road/Harrison
32nd Avenue	Lake Road
Linwood Avenue	Monroe Street
Stanley Avenue	Logus Road
37th Avenue	Springwater Trail
Regional Center Area	

In order to achieve an interconnected walkway network, walkways (in this case sidewalks) need to be constructed by the City when completing roadway projects and by new development as required in local Transportation Planning Rule regulations. In addition, walkway construction priorities that reflect the most immediate needs and priorities of the City need to be established.

Criteria

City staff, with the input of the Pedestrian/Bicyclist Working Group, created a set of goals, objectives and policies to guide transportation system development in Milwaukie. See Chapter 8 for specific Goals, Objectives and Policies. The following four goals are directed at pedestrian needs:

Goal 1 Provide a continuous citywide network of safe and convenient walkways that is integrated with other transportation modes.

Goal 2 Maintain and enhance existing and future pedestrian facilities to encourage use.

Goal 3 Increase the use of walking for all travel purposes.

Goal 4 Reduce the number of pedestrian-related accidents by increasing the safety and security of pedestrians.

The above goals and their related policies are the criteria that all pedestrian improvements in Milwaukie should be measured against to determine if they are consistent and advance the intended vision of the City.

Strategies

Several strategies were developed by City staff for future walkway projects in Milwaukie. These strategies are aimed at providing the City with priorities to direct its funds toward walkway projects that meet the goals, objectives and policies of the City.

Strategy 1 - "Do Nothing"

This alternative does nothing to meet the existing and future pedestrian needs of the City of Milwaukie beyond requiring developments to provide new sidewalks and walkway connections from new development to adjacent uses and the right-of-way. This approach would continue a pattern of significant gaps in the City's walkway network. Since this strategy would not meet the policies of the City and encourages greater auto dependency, it was rejected.

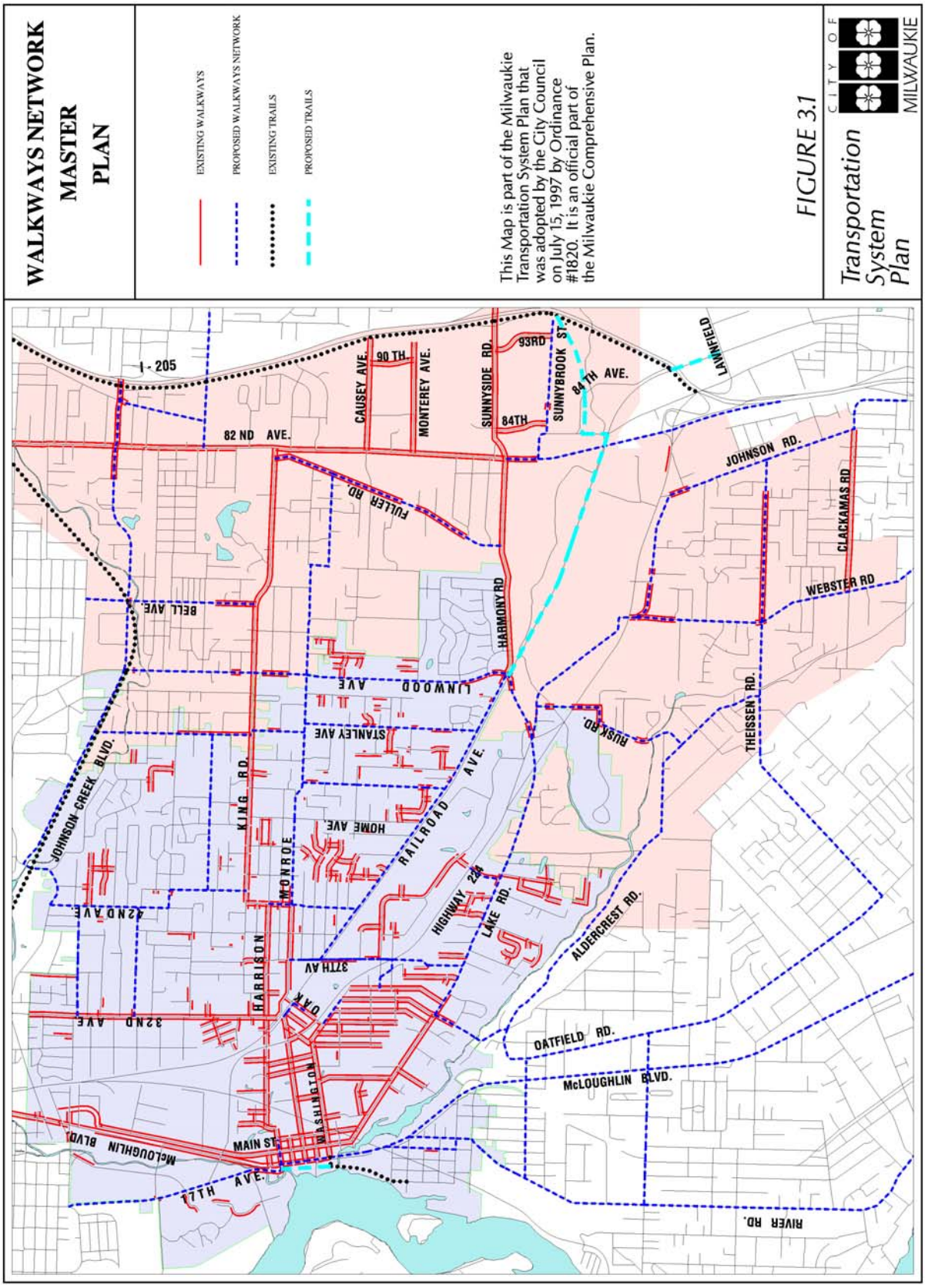
Strategy 2 - "Fill in Gaps where Some Sidewalks Exist"

Key walkway corridors throughout Milwaukie were designated by the Pedestrian/Bicyclist Working Group. These corridors are defined in the Walkways Network Master Plan. See Figure 3.1. Strategy 2 would construct walkways which eliminate gaps between existing sidewalks on these key routes. This strategy would provide key walkway linkages across Milwaukie at relatively short intervals in both the north-south and east-west directions. It is important that this strategy includes the elimination of gaps at intersections where handicapped ramps do not exist. This will make walkway corridors accessible to all. Improved crossings for pedestrians at intersections should also be examined and addressed during walkway construction projects.

Implementation: It should be noted that as a requirement of the *Oregon Transportation Planning Rule*,[3] any newly constructed or reconstructed arterial or collector roadway must provide sidewalks and bike lanes on both sides of the street. Therefore, any arterial or collector roadways that are improved in Milwaukie should automatically include sidewalks and bike lanes as part of their design. The only exception would be if there were physical constraints or cost prohibitions that would affect the final project design. The City's goal is to implement the State requirements with every project. In addition, local Transportation Planning Rule implementation in Milwaukie requires new development to include sidewalks and connecting walkways (along with bike lanes) as part of roadway improvements.

The City should seek traditional and non-traditional funding sources for walkway-related transportation improvements that eliminate gaps in the identified Walkway Network Master Plan. Furthermore, the City should establish a Walkways Fund in the Capital Improvements Program (CIP) to address identified walkway and pedestrian facility improvements. A second fund should be established in the CIP for a grant program where neighborhoods, perhaps through the establishment of a local improvement district, can apply for matching funds for local walkway priority improvements (as identified in the master plan). This program should be developed by and coordinated with the City and the Neighborhood District Associations. The City should also coordinate with adjacent jurisdictions and other agencies to complete walkway improvements that complete the local and regional walkways networks and connect to other travel modes, especially public transit.

[3] *Oregon Transportation Planning Rule*, OAR 660-12, April 1995.


WALKWAYS NETWORK
MASTER
PLAN
EXISTING WALKWAYS
PROPOSED WALKWAYS NETWORK
EXISTING TRAILS
PROPOSED TRAILS
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
FIGURE 3.1
Transportation System Plan
CITY OF MILWAUKIE
I - 205
82 ND AVE.
CAUSEY AVE.
90 TH
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84TH AVE.
84TH
LAWNFIELD
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
FULLER RD
BELL AVE
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE
RAILROAD AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
42ND AVE
MONROE
37TH AV
HARRISON
OAK
32ND AVE
OATFIELD RD.
McLOUGHLIN BLVD.
WASHINGTON
MAIN ST.
17TH AVE.
RIVER RD.

Strategy 3 - "Address Locations with Relatively High Pedestrian Accident Rates"

This strategy focuses resources on locations with high pedestrian accident rates. This strategy relates back to Goal 4 and its objective of reducing pedestrian-related accidents. The City mapped reported accidents from January 1992 through June 1994 and found that there were 14 accidents involving pedestrians reported during this period. These accidents were dispersed throughout the city, with no one location demonstrating a frequency of accidents involving pedestrians. More accidents may have occurred, but would not have been reported to the Milwaukie Police Department.

Implementation: The City should continue to map accident reports periodically by travel modes to learn if any specific locations are experiencing a higher number of accidents involving pedestrians. If a location or corridor is identified as problematic, the City should investigate the situation further. If it is found that a walkway-related improvement is necessary as a remedy to the problem, then the City should develop a plan for the improvement and place it as a priority project in the CIP.

Strategy 4 - "Complete Corridors to Major Pedestrian Uses such as the Springwater Corridor and the Expanded City (Milwaukie Regional) Center"

This strategy places emphasis on linking on-road and off-road walkways in Milwaukie. This strategy also emphasizes walkway linkages from neighborhoods to and within the Milwaukie Regional Center.

Completion of the regional Springwater Corridor trail has proved to be a popular draw for pedestrians. In addition, the Willamette riverfront area in downtown Milwaukie is anticipated to become a more popular pedestrian destination as trails and other uses are constructed in the future.

Implementation: The City should continue to work with the City of Portland, Metro, Clackamas County, and other jurisdictions and agencies to complete local and regional on-road and off-road walkway connections that link major pedestrian uses to local and regional destinations.

It is stated in Milwaukie's adopted Vision Statement that:

> "By 2015, ...the Expanded City Center, which extends from the upland geography near 37th Avenue to the shoreline of the Willamette River, will be a larger scale complex of residential, commercial, office and medical uses that will provide walkway linkages and a pedestrian-oriented atmosphere."

Therefore, Milwaukie's efforts should focus on pedestrian accessibility improvements to and through the Regional Center (Expanded City Center) and ensure that new development and redevelopment encourages pedestrian travel by locating and orienting buildings close to adjacent streets and by connecting walkways and other pedestrian-supportive amenities.

Strategy 5 - "Connect to Major Transit Locations"

This strategy puts priority on providing walkway linkages to major transit locations. It acknowledges that the multimodal link between walkways and transit facilities is an important one. Walking is the most popular way for people to travel to public transit services.

Implementation: The City should continue to coordinate with Tri-Met and adjacent local jurisdictions on the construction of walkways and related facilities, such as crosswalks and pedestrian signals at intersections, that connect pedestrians to major transit locations. This includes the existing Milwaukie Transit Center and future high capacity transit stations which are currently being planned through the South-North Light Rail project.

The City should also continue to coordinate with Tri-Met to ensure that needed pedestrian-supportive facilities such as bus shelters and benches are provided at transit locations.

Strategy 6 - "Complete Corridors Commuters Might Use"

This strategy provides walkways to employment destinations in Milwaukie to encourage more people to walk to work. The most significant employment destinations in Milwaukie are downtown Milwaukie, industrial parks including Omark, institutions such as Milwaukie Providence Hospital, and large commercial centers like the Milwaukie Marketplace. The Regional Center area, which includes some of the previously mentioned destinations, will become a more frequented commuter destination over the next twenty years as redevelopment occurs, since the majority of new jobs are expected to locate there.

Implementation: The City should make it a priority to eliminate gaps and complete walkway connections along arterial and collector streets that lead to significant employment destinations in the City. The City should also encourage major employment areas that do not have an adequate walkways network to form local improvement districts to construct needed pedestrian facility improvements.

Strategy 7 - "Connect to Schools, Parks, Residential and Commercial Areas"

This strategy focuses on providing pedestrian linkages to key activity centers including schools, parks, residential and commercial areas. These types of activity centers have been found to be popular pedestrian origins and destinations. Children frequently walk to these locations so this strategy emphasizes added safety by installing walkway improvements along popular corridors and intersections. The City of Milwaukie has made pedestrian safety around schools a priority and is studying pedestrian needs around all of the local elementary schools in the City.

Implementation: The City should develop and prioritize walkway projects from the recommendations received from the study of pedestrian needs around schools, and from the Regional Center working groups, and include these walkway projects in the Capital Improvements Program.

Table 3.2 provides an assessment of how each of the strategies meets the requirements of each of the goals.

Table 3.2
Walkway Strategies Comparison

Strategy	Goals			
	1	2	3	4
1. Do Nothing	○	○	○	○
2. Fill in Gaps on Where Some Sidewalks Exist	★★★	★	★★	★★
3. Address Locations with Relatively High Pedestrian Accident Rates	★	★	★★	★★★
4. Complete Corridors to Major Pedestrian Uses Such as the Springwater Corridor and the Expanded (Regional) City Center	★	★	★★	★
5. Connect to Major Transit Locations	★★	★	★★	★★
6. Complete Corridors that Commuters Might Use	★★	★	★★	★★
7. Connect to Schools, Parks, Residential and Commercial Areas	★★★	★	★★	★★

○ Does not meet criteria
★ Partially meets criteria
★★ Mostly meets criteria
★★★ Fully meets criteria

RECOMMENDED PEDESTRIAN FACILITY PLAN

Pedestrian/Bicyclist Working Group members assisted staff in identifying walkway construction priorities. They completed an *Improvement Prioritization Questionnaire* and ranked the strategies presented above according to their own priorities and the proposed transportation goals and policies related to walking. The ranking of these strategies follows, from most important to least important, although all were considered by the group to be important:

- Fill in gaps where some sidewalks exist
- Areas with relatively higher pedestrian accident rates
- Corridors that connect to major pedestrian uses
- Corridors that connect to major transit locations
- Corridors that commuters might use
- Connect to trip generators such as schools, parks, residential and commercial areas

One other improvement strategy was provided by the group:

- Reconstruct existing pedestrian facilities to meet current City standards

Based on a review of potential strategies and corresponding needs, there is consistency in City staff and citizen-determined overall pedestrian improvement priorities. The City's priorities should be to eliminate gaps in the walkway network; to provide pedestrian connectivity to major pedestrian uses such as elementary schools, transit locations and known commuter corridors; and to address problem areas with higher accident rates. The City should also reconstruct existing intersections that are in need of handicapped ramps to improve accessibility for all pedestrians.

Potential Walkway Improvements

The Pedestrian/Bicyclist Working Group identified many specific pedestrian needs for the City's transportation system as well as a method of prioritizing needs where desired improvements exceed the City's ability to fund them. Following are the specific needs identified by this group prioritized by their ranking of pedestrian strategies and in order of most to least important:

- Sidewalks along both sides of Linwood Avenue between Railroad Avenue/Harmony Road and Johnson Creek Boulevard
- Sidewalks along both sides of Stanley Avenue between Railroad Avenue and Johnson Creek Boulevard
- Sidewalks along both sides of Logus Road between 43rd Avenue and Stanley Avenue
- Sidewalks along both sides of Olsen Street between 32nd Avenue and 42nd Avenue
- Sidewalks along both sides of Monroe Street between 42nd Avenue and UGBMA boundary
- Sidewalks along both sides of Railroad Avenue between 37th Avenue and Linwood Avenue
- Sidewalks along both sides of 17th Avenue between Ochoco Street and ORE 99
- Sidewalks along both sides of ORE 99E between Harrison Street/17th Avenue and UGBMA boundary to the south of Milwaukie
- Sidewalks along both sides of 37th Avenue between Monroe Street and Lake Road
- Intersection improvements at ORE 99E/Harrison Street
- Intersection improvements at Main Street/Harrison Street
- Intersection improvements at 21st Avenue/Harrison Street
- Intersection improvements at ORE 99E/Jefferson Street
- Intersection improvements at 21st Avenue/Washington Street
- Intersection improvements at ORE 224/Harrison Street
- Intersection improvements at ORE 224/Monroe Street
- Intersection improvements at ORE 224/Oak Street
- Intersection improvements at 37th Avenue/ORE 224
- Intersection improvements at Freeman Way/ORE 224
- Intersection improvements at 42nd Avenue/Harrison Street
- Intersection improvements at 42nd Avenue/King Road

Note: Intersection improvements include pedestrian crosswalks, handicapped ramps at curbs, potentially curb extensions and traffic signals that provide adequate walk indication for pedestrians to cross the intersection.

- Sidewalks along both sides of Flavel Drive between UGBMA to north and Johnson Creek Boulevard
- Sidewalks along both sides of Roswell Street between 32nd Avenue and 42nd Avenue
- Sidewalks along both sides of 42nd/43rd Avenues between Johnson Creek Boulevard and King Road
- Sidewalks along both sides of Home Avenue between Railroad Avenue and King Road

- Sidewalks along both sides of Freeman Way between Lake Road and ORE 224
- Sidewalks along both sides of 22nd Avenue between ORE 99E and Sparrow Street
- Sidewalks along both sides of River Road between ORE 99E and UGBMA to the south
- Sidewalks along both sides of Oatfield Road between UGBMA to the south and Lake Road

WALKWAYS NETWORK ACTION PLAN

Staff evaluated the list of potential walkway improvements suggested by the Pedestrian/Bicyclist Working Group against the improvement priorities previously discussed. Figure 3.2 depicts the recommended Walkways Network Action Plan as the priority walkway corridors to be constructed in Milwaukie and vicinity. The Action Plan includes projects to be done during the next five to ten years.

The Walkways Network Action Plan will eliminate gaps along primary streets and will enhance pedestrian safety and accessibility by locating improvements near elementary schools and transit corridors and by connecting walkways to the Springwater Corridor and Regional Center.

One of the most important actions which can be taken to implement walkway planning is through land development. Each project, through conformance with the Zoning and Subdivision Ordinances should provide direct, continuous and conflict-free walkways along right-of-way and from the right-of-way to building entrances and to parking areas, adjacent uses, and public transit.

PEDESTRIAN FACILITIES MAINTENANCE

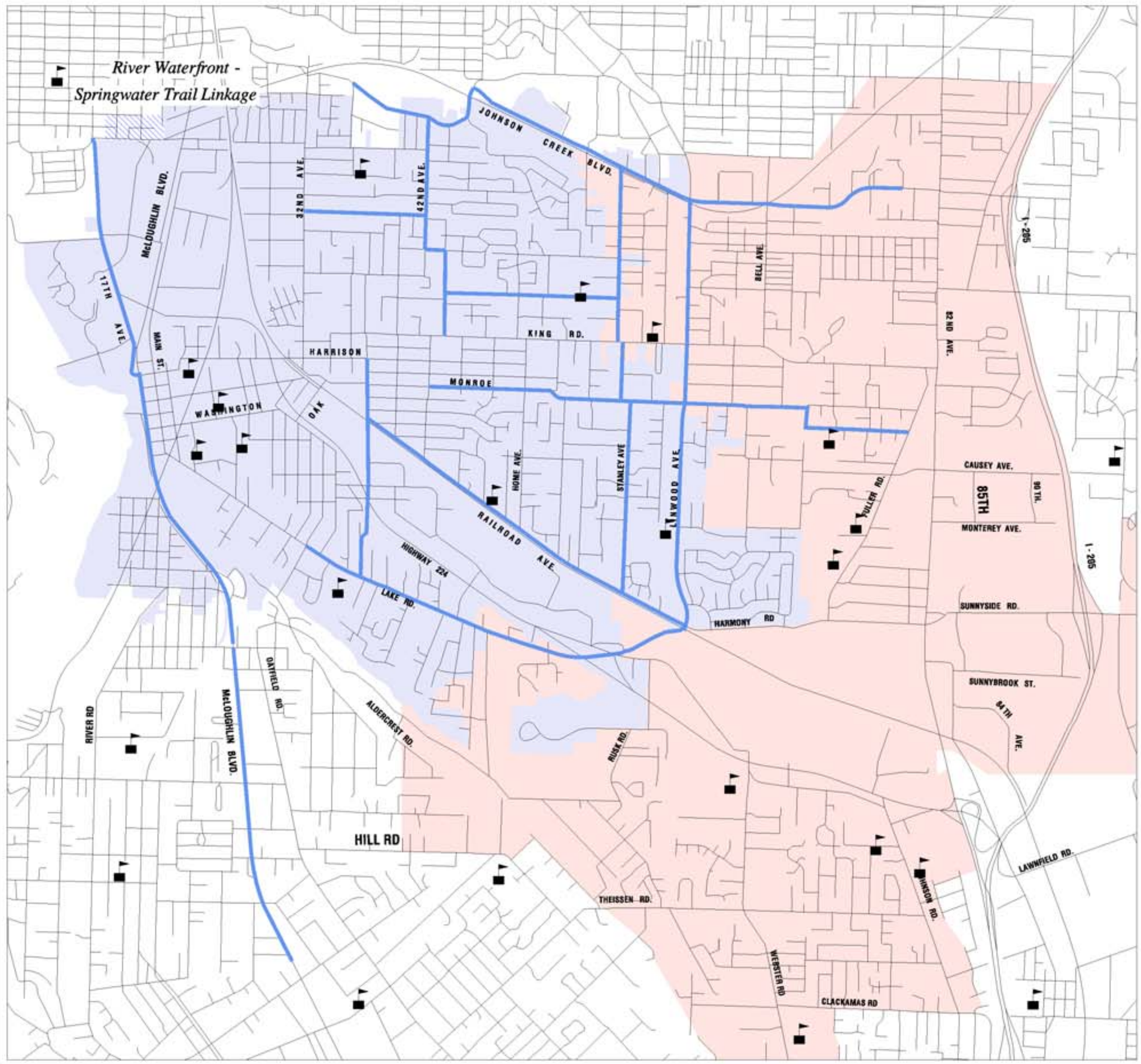
Needs

Once walkways are constructed they need to be properly maintained for safety and to encourage pedestrian use. Other facilities such as crosswalks, pedestrian signals, benches, covered shelters, water fountains, trash receptacles and the like which serve pedestrians also need to be kept in good condition. The City needs to take responsibility for its facilities as do other agencies, jurisdictions, employers, businesses, residential property owners, and citizens.

The City through its implementation of the Transportation Planning Rule is requiring new development and redevelopment to address pedestrian facility needs on-site. As pedestrian facilities are provided through this process, they also need to be properly maintained.

The City's action on pedestrian facility and maintenance needs will fulfill two of the City's Transportation System Plan walking goals (maintenance of existing and future facilities and increasing the use of walking for all travel purposes). If pedestrian-related facilities are properly located and maintained, it is anticipated that the number of people choosing to walk will increase.

WALKWAYS ACTION PLAN



WALKWAY IMPROVEMENTS

SCHOOLS

This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.

FIGURE 3.2

Transportation System Plan

CITY OF MILWAUKIE

Strategies

For Milwaukie, pedestrian facility maintenance along City road rights-of-way involves crosswalk and intersection repairs. Clackamas County and ODOT are responsible for similar maintenance activities along their jurisdictional roadways. Sidewalk maintenance is the responsibility of adjacent property owners. The City's Code Enforcement Program follows up with adjacent property owners when sidewalk segments need to be repaired. The City is responsible for maintaining pedestrian facilities at all its public places such as City Hall and the Ledding Library.

As for sidewalks in the right-of-way, the City should monitor existing conditions through individual Neighborhood District Associations (NDA) and enlist NDA cooperation to work with property owners to properly maintain their sidewalks. The City should also develop written material for residents and businesses to inform these individuals of their responsibilities for walkway maintenance on or in front of their property. The City should also advertise periodically the need for residents and businesses to maintain their walkways in a safe and functional condition. The City should maintain and advertise a public comment feedback program to receive information and follow-up on walkway disrepair and other pedestrian-related concerns.

The City should also ensure that City-owned public places provide proper pedestrian-related facilities such as benches, water fountains, public rest rooms, and locker rooms with showers for employees, as appropriate. The City should continue to request developers and public agencies to offer similar facilities, as is practical.

The City should encourage existing employers and businesses to provide pedestrian-related facilities such as benches and locker rooms with showers to encourage walking by employees and customers. Employers can promote walking to work by providing incentives and rewards for employees who walk to work. Employees could take advantage of flexible work hours and receive special discounts or prizes for walking to work on a regular basis.

PEDESTRIAN SAFETY AND SECURITY

Needs

Pedestrian safety has traditionally been addressed through engineering practices of constructing walkways and crosswalks. More recently, speeding and reckless motorists pose an additional threat to pedestrian safety, especially where walkways or adequate crossings do not exist along streets. Neighborhood traffic calming is another engineering and construction approach that can positively impact pedestrian safety by slowing motor vehicle traffic through devices such as curb extensions and speed humps.

There is more that can be done besides engineering and construction of facilities to ensure pedestrian safety. The education of all citizens: young and old, pedestrians, bicyclists and motorists is important. Everyone should know traffic safety laws as they relate to all modes of travel and abide by these laws to increase safety for all travelers.

Another component to pedestrian safety is the enforcement of traffic safety laws. Examples would be citing a pedestrian for not crossing a street at an intersection or crosswalk or ticketing a motorist for not allowing a pedestrian to cross an intersection first on the "walk" signal.

A final component to pedestrian safety and security is adequate street lighting and security measures at locations such as transit centers and large shopping centers. Additionally, land use development can improve pedestrian safety by defining conflict-free walkways from the right-of-way to a building entrance and throughout the site as appropriate.

Strategies

The City should encourage pedestrian safety education programs, especially for children. The City should coordinate with Clackamas County to encourage the North Clackamas School District to establish an ongoing pedestrian traffic safety education program for elementary-age school children that provides both classroom and on-street training. The City should coordinate with Clackamas County and Metro to distribute pedestrian safety information to local schools and community organizations. Milwaukie's staff resources are limited; proper coordination with the above-mentioned entities will assist the City in meeting pedestrian safety goals and objectives.

The City should urge its local law enforcement officers to warn and ticket pedestrians and motorists who do not obey current traffic safety laws. Furthermore, the City should encourage local law enforcement, private developments with security guards, Tri-Met, and neighborhood watch groups to emphasize the patrol of pedestrian areas and streets in and near transit centers and stations, shopping centers, residential developments and parks, as part of crime prevention efforts.

Chapter 4
Bicycling

This chapter summarizes identified existing and future needs of bicyclists in the City of Milwaukie. It outlines the criteria to be used to evaluate needs and provides a number of strategies for implementing a bicycle plan that addresses bicycling goals and a local bikeway network for the City of Milwaukie. The needs, criteria and strategies were identified to a great extent by the City's Pedestrian/Bicyclist Working Group. This citizen committee provided input regarding the transportation system in Milwaukie, with special emphasis on bicyclist needs.

The goal was to develop a bicycle plan that combined citizen and staff input, addressed specific Transportation Planning Rule requirements[1] and provided continuity to the regional bicycle network. [2]

OVERALL NEEDS

The most frequently identified existing bicyclist need in Milwaukie is bikeways, which are generally bike lanes, on all arterial and collector roadways. These are usually the most direct routes for bicyclists and many bicyclist destinations are located along these streets. Bikeways also include other on-road and off-road accommodations which are open to bicycle travel regardless of whether such provisions are designated for the exclusive use of bicyclists or shared with other transportation modes. The existing bikeway network is incomplete and does not facilitate safe bicycle travel through the City. Other specific existing and future needs that were identified include: bicyclist related facilities at key locations, maintenance of existing and future facilities, an increase in bicycling for all travel purposes, and the reduction of bicyclist-related accidents through activities that enhance safety and security.

[1] *Transportation Planning Rule*, State of Oregon, Department of Land Conservation and Development, Section 660-12-020(2)(d), 660-12-035(3)(e), 660-12-045(3)(b&c).

[2] *Draft 1995, Interim Federal Regional Transportation Plan*, Metro, April 1995.

BIKEWAY NETWORK

Needs

Bikeway network needs can be best understood by looking at routes used by bicyclists in Milwaukie. Several key "north-south" and "east-west" bicycle corridors are identified in Table 4.1.

Table 4.1
Key Bikeway Corridors

North-South Corridors	East-West Corridors
17th Avenue	Harrison Street / King Road
Linwood Avenue	Johnson Creek Boulevard
River Road	Lake Road / Harmony Road
Oatfield Road	Monroe Street
32nd Avenue	Springwater Corridor Trail

In order to achieve an interconnected bikeways network, bikeways need to be constructed by the City when completing roadway related projects and by new development as required in local Transportation Planning Rule regulations. In addition, bikeway construction priorities that reflect the most immediate needs and priorities of the City need to be established.

Criteria

City staff, with the input of the Citizen Working Groups and the Pedestrian/Bicyclist Working Group in particular, created a set of goals, objectives and policies to create a better environment for bicyclists in Milwaukie. See Chapter 8 for bicyclist-related Goals, Objectives and Policies. The following four goals are directed specifically at bicyclist needs:

Goal 1 Provide a continuous citywide network of safe and convenient bikeways and routes that is integrated with other transportation modes.

Goal 2 Maintain and enhance existing and future bicycle facilities to encourage use.

Goal 3 Increase the use of bicycles for all travel purposes.

Goal 4 Reduce the number of bicyclist-related accidents by increasing safety and security of bicyclists.

The above goals and their related policies are the criteria that all bikeway improvements and related activities in Milwaukie should be measured against to determine if they are consistent with and advance the intended long-range vision of the City.

Strategies

Several strategies were developed by City staff for future bikeway projects in Milwaukie. These strategies are aimed at providing the City with priorities for directing its funding toward bikeway projects that meet the goals, objectives and policies of the City. Table 4.2, which follows the discussion of strategies, provides an assessment of how each of the strategies meets the requirements of each of the goals.

Strategy 1 - "Do Nothing"

This strategy does nothing to meet the existing and future bicyclist needs of the City of Milwaukie. Bicyclist needs were determined by the Pedestrian/Bicyclist Working Group to be important in reducing auto dependency and providing increased accessibility within the City's transportation system. The "Do Nothing" approach offers no additional commitment to improve the bicycling environment in Milwaukie. It would continue a pattern of significant gaps in the City's bikeway network. This strategy was therefore rejected.

Strategy 2 - "Fill in Gaps where Some Bikeways Exist"

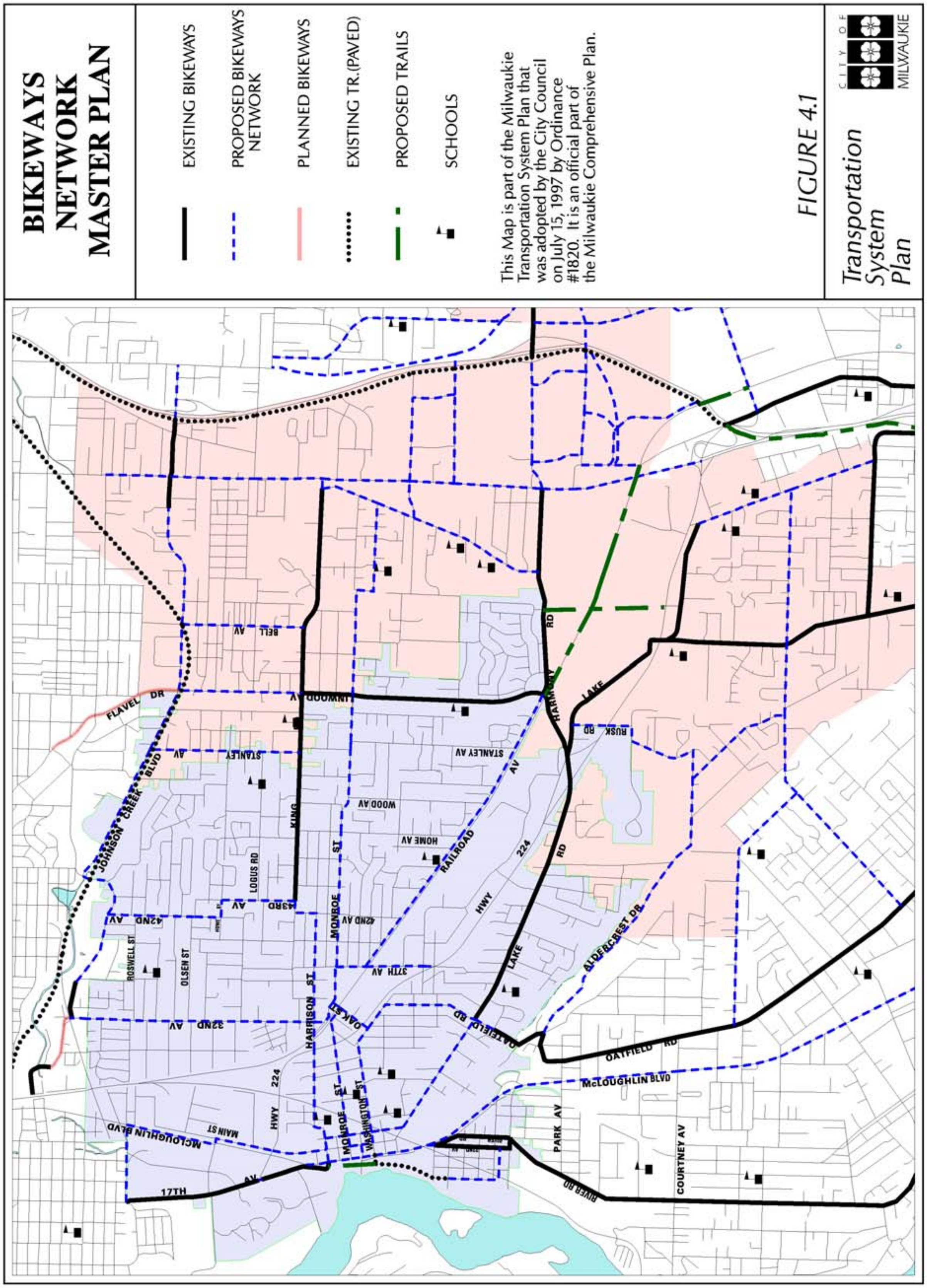
Key bikeway corridors throughout Milwaukie and vicinity were designated by the Pedestrian/Bicyclist Working Group. These corridors are defined as the Bikeways Network Master Plan. See Figure 4.1. They are generally Milwaukie's arterial and collector roadways. Bikeway corridors are depicted in Milwaukie's future growth area (UGBMA) of the unincorporated County. These corridors are consistent with the County's Planned Bicycle Network proposal. Strategy 2 seeks installation of bikeways to eliminate gaps between existing bikeways on these routes. This approach would provide key bikeway linkages across Milwaukie at relatively short intervals in both the north-south and east-west directions. Examples would include Linwood Avenue north of King Road, King Road/Harrison Street west of 43rd Avenue, Lake Road west of 34th Avenue, and ORE 99E in the downtown area.

Implementation: The 1971 Oregon Legislature passed ORS 366.514, "the Oregon Bike Bill", which requires that newly constructed or reconstructed arterial or collector roadways provide sidewalks and bikeways along these streets. Therefore, any arterial or collector roadways that are improved in Milwaukie should automatically include bike lanes and sidewalks as part of their design. The only exception would be physical constraints or cost prohibitions that would affect final project design. The City's goal is to implement the State's requirement with every project. In addition, local Transportation Planning Rule implementation in Milwaukie requires new development to include bike lanes (along with sidewalks) as part of roadway improvements along arterial and collector streets.

The City should seek traditional and non-traditional funding sources for bikeway related transportation improvements that eliminate gaps in the Bikeway Network Master Plan. The City should also reconsider the amount allocated in the Bikeways Fund in the Capital Improvements Program (CIP) and revise the amount to implement identified bikeway project priorities. Finally, the City should coordinate with adjacent jurisdictions and other agencies to complete bikeway improvements that enhance the local and regional bikeway network.

Strategy 3 - "Address Locations with Relatively High Bicyclist Accident Rates"

This strategy focuses resources on locations with high bicyclist accident rates. This strategy relates to Goal 4 and its objective of reducing bicyclist-related accidents. The City mapped reported accidents from January 1992 through June 1994 and found that there were 11 accidents involving bicyclists during the period. These accidents were dispersed throughout the City with no one location demonstrating a frequency of accidents involving bicyclists. Some accidents may have occurred but are not recorded by the Milwaukie Police Department.


BIKEWAYS
NETWORK
MASTER PLAN
EXISTING BIKEWAYS
PROPOSED BIKEWAYS NETWORK
PLANNED BIKEWAYS
EXISTING TR.(PAVED)
PROPOSED TRAILS
SCHOOLS
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
FIGURE 4.1
Transportation System Plan
CITY OF MILWAUKIE
FLAVEL DR
JOHNSON CREEK BLVD
BELL AV
LINWOOD AV
STANLEY AV
KING
LOGUS RD
43RD AV
42ND AV
ROSWELL ST
OLSEN ST
32ND AV
HARRISON ST
MONROE ST
WOOD AV
HOME AV
RAILROAD AV
HWY 224
37TH AV
OAK ST
WASHINGTON ST
MAIN ST
McLOUGHLIN BLVD
17TH AV
HARMONY RD
LAKE RD
RUSK RD
ALDERCREST DR
OATFIELD RD
PARK AV
COURTNEY AV
RIVER RD

Implementation: The City should continue to map accident reports by travel modes periodically to learn if any specific locations are experiencing a higher number of accidents involving bicyclists. If a location or corridor is identified as problematic, the City should investigate the situation further. If it is found that a bikeway-related improvement is necessary as a remedy to the problem, then the City should develop a plan for the improvement and place it as a priority project in the CIP.

Strategy 4 - "Connect to Schools, Parks, Residential and Commercial Areas"

This strategy ensures that bikeways and/or routes (either by the construction of bike lanes on arterials and collectors and off-road trails or by signed routes on local streets) are provided to access local schools, parks, residential and commercial destinations in Milwaukie and vicinity. These are common bicyclist destinations for children and this strategy provides added safety. The safe travel of children to school is a high priority of the City.

Implementation: The City, in cooperation with local Neighborhood District Associations, should study bicycle travel patterns of children in Milwaukie neighborhoods, especially to area schools, and make recommendations for additional bikeway improvements that can be prioritized in the CIP.

Strategy 5 - "Improve Corridors that Commuters Might Use"

This strategy provides bikeways to employment destinations in Milwaukie to encourage more people to ride their bicycles to work. It complements Strategy 2 for filling in gaps in primary bikeway corridors.

Implementation: The City should conduct a survey of Milwaukie bicyclists to ascertain commuter routes and commuter route needs. The most frequently identified bikeway needs should be evaluated for project implementation and prioritized in the CIP. See Strategy 6 below for commuter needs and strategies related to the Milwaukie Regional Center.

Strategy 6 - "Complete Corridors to Major Bicycle Uses Such as the Springwater Trail and the Expanded City (Regional) Center"

This strategy emphasizes the linkage of on-road to off-road bikeways for bicyclist connectivity locally and to the regional network. This strategy also emphasizes bikeway linkages from neighborhoods to and within the Milwaukie Regional Center.

Completion of the regional Springwater Corridor Trail has proven to be a popular draw for both recreational and commuter bicyclists who wish to travel locally and to Portland, Gresham and other regional destinations.

Implementation: The City should continue to work with the City of Portland, Metro, Clackamas County, and other jurisdictions and agencies to complete local and regional on-road and off-road bikeway connections that link major bicycle uses to local and regional destinations.

Milwaukie's adopted Vision Statement describes the City in the year 2015. An important aspect of that future Milwaukie is an expanded city (regional) center area that extends from the upland geography near 37th Avenue to the shoreline of the Willamette River. The expanded city center is an area where there is a greater mix of commercial, office and residential activities with linked pedestrian networks and transit facilities and services, and there are increased employment opportunities. Included in this vision is the

ability of residents to travel safely to work, shopping and social activities by means other than the automobile. This means that trails, bikeways and sidewalks are integral parts of the transportation network.

The Vision Statement foresees that "Milwaukie's stable neighborhoods...are linked through safe and attractive bicycle access." Therefore, linking bikeways between neighborhoods and to and through the expanded city center should be a priority for the City. This is important so that residents can safely access employment, retail uses and transit services by bicycle using the local transportation network.

Strategy 7 - "Complete Corridors to Major Transit Locations"

This strategy puts priority on providing bikeway linkages to transit locations. It acknowledges that the multimodal link between bicycling and transit is an important one. Inherent in this strategy is the provision of bicycle parking including lockers and racks at transit centers and the ability of bicyclists to take their bicycles on public transit. The viability of each travel mode is enhanced under this strategy.

Implementation: The City should continue to coordinate with Tri-Met for provision of bicyclist-related facilities and services at major transit locations. This includes the existing Milwaukie Transit Center and future high capacity transit stations which are being evaluated as part of the South-North Light Rail planning process. If high capacity transit comes to and through Milwaukie, it will most likely impact the expanded city (regional) center. Bicyclist connectivity to major transit locations such as high capacity transit stations is important and is another reason that the expanded city center should be a priority area for bicyclist accessibility and safety.

Table 4.2
Bikeway Strategies Comparison

Strategy	Goals			
	1	2	3	4
1. Do Nothing	○	○	○	○
2. Fill in Gaps on Key Corridors	★★★	★	★★	★★
3. Address Locations with Relatively High Rates of Bicyclist Accidents	★	★	★	★★★
4. Connect to Schools, Parks, Residential and Commercial Areas	★	★	★★	★★
5. Improve Corridors that Commuters Might Use	★★	★	★	★★
6. Complete Corridors to Major Bicycle Uses Such as the Springwater Corridor and Expanded City (Regional) Center	★★	★	★★	★★
7. Complete Corridors to Transit Locations	★★	★	★★	★★

○ Does not meet criteria
★ Partially meets criteria
★★ Mostly meets criteria
★★★ Fully meets criteria

Recommended Bikeways Plan

Pedestrian/Bicyclist Working Group members assisted staff in identifying bikeway construction priorities. They completed an *Improvement Prioritization Questionnaire*, ranked the strategies presented above according to their own priorities, and considered the proposed transportation goals and policies related to bicyclists. Their ranking of strategies follows, with the most important priorities listed first, although all were considered by the group to be important:

- Fill in gaps along roadways where some bikeways exist
- Address areas that have relatively higher bicyclist accident rates
- Corridors near/connecting to schools, parks, residential and commercial areas (tied)
- Corridors that commuters might use (tied)
- Corridors connecting to major bicycle uses such as the Springwater Trail
- Corridors connecting to major transit locations

Working Group members were decisive about the first two priorities, while the remaining priorities were close in ranking. Three additional improvement priorities were suggested by the group:

- Reconstruct existing facilities to current City standards
- Provide more secured bicycle parking at destinations
- Provide regular maintenance program for bikeways

Based on a review of potential strategies and corresponding needs, there is consistency in City staff and citizen-determined overall bicyclist improvement priorities. The City's priorities should be to eliminate gaps in the bikeways network; address areas with higher bicyclist accident rates; provide bikeway connectivity to major bicyclist uses such as schools and other community uses, the Springwater Corridor, commercial, employment and transit locations (with emphasis to and within the Regional Center).

Finally, the City should also require where appropriate, and encourage otherwise, the installation of bicyclist-supportive facilities such as bicycle racks and locker rooms with showers at key destinations (using requirements from the Zoning Ordinance).

Potential Improvements

The Pedestrian/Bicyclist Working Group identified many specific locations for bikeway improvements as part of the City's transportation system and its future growth area. They also assisted staff in prioritizing needs where desired improvements exceed the City's ability to fund them. Following are the specific locations for needed improvements as prioritized by this group, from most to least important:

- Johnson Creek Boulevard between 32nd Avenue and 82nd Avenue
  (note: improvements have since been made as far as 36th Avenue)
- Lake Road between 21st Avenue and Oatfield Road
- Linwood Avenue between Johnson Creek Boulevard and King Road
- ORE 99E Boulevard between Ochoco Street and Harrison Street
- Harrison Street between ORE 99E and 42nd Avenue
- 32nd Avenue between Johnson Creek Boulevard and Railroad Avenue to Monroe Street
- Monroe Street between ORE 99E and Fuller Road
- 42nd/43rd Avenues between Johnson Creek Boulevard and King Road
- Bell Avenue between Johnson Creek Boulevard and King Road
- Ochoco Street between 17th Avenue and ORE 99E
- 21st Avenue between Washington Street and Lake Road
- Washington Street between 21st Avenue and 34th Avenue
- Oak Street between Washington Street and Monroe Street
- 34th Avenue between Washington Street and Lake Road
- Jefferson Street between ORE 99E and Main Street
- Main Street between Monroe Street and Washington Street
- Sparrow Street between ORE 99E and 22nd Avenue
- Aldercrest Road between Oatfield Road and Theissen Road
- Rusk Road between Lake Road and Aldercrest Road
- Theissen Road between Oatfield Road and Johnson Road
- Johnson Road between Lake Road and south of Milwaukie's UGBMA
- Fuller Road between King Road and Harmony Road

- Causey Avenue between Fuller Road and I-205
- Sunnyside Road between 82nd Avenue and I-205

BIKEWAYS NETWORK ACTION PLAN

Staff evaluated the list of potential bikeway improvements suggested by the Pedestrian/Bicyclist Working Group against the improvement strategies previously discussed. Figure 4.2 depicts the recommended Bikeways Network Action Plan as the priority bikeway corridors to be constructed in Milwaukie and vicinity. The Bikeways Network Action Plan will eliminate gaps along primary street and will enhance bicyclist safety and accessibility by location improvements near schools and transit corridors and by connecting to the Springwater Corridor and the Regional Center.

BICYCLE FACILITIES MAINTENANCE

Needs

Once bikeways are constructed they need to be properly maintained for safety and to encourage use by bicyclists. Other facilities that serve bicyclists such as signing and striping, bike racks and storage lockers, changing rooms with showers, and the like also need to be kept in good condition to accommodate bicyclists. The City needs to take responsibility for its facilities as do other agencies, jurisdictions, employers and businesses.

The City through its implementation of the Transportation Planning Rule is requiring new development and redevelopment to address bicycle facility needs on-site. As bicycle facilities are provided through this process, facilities need to be properly maintained.

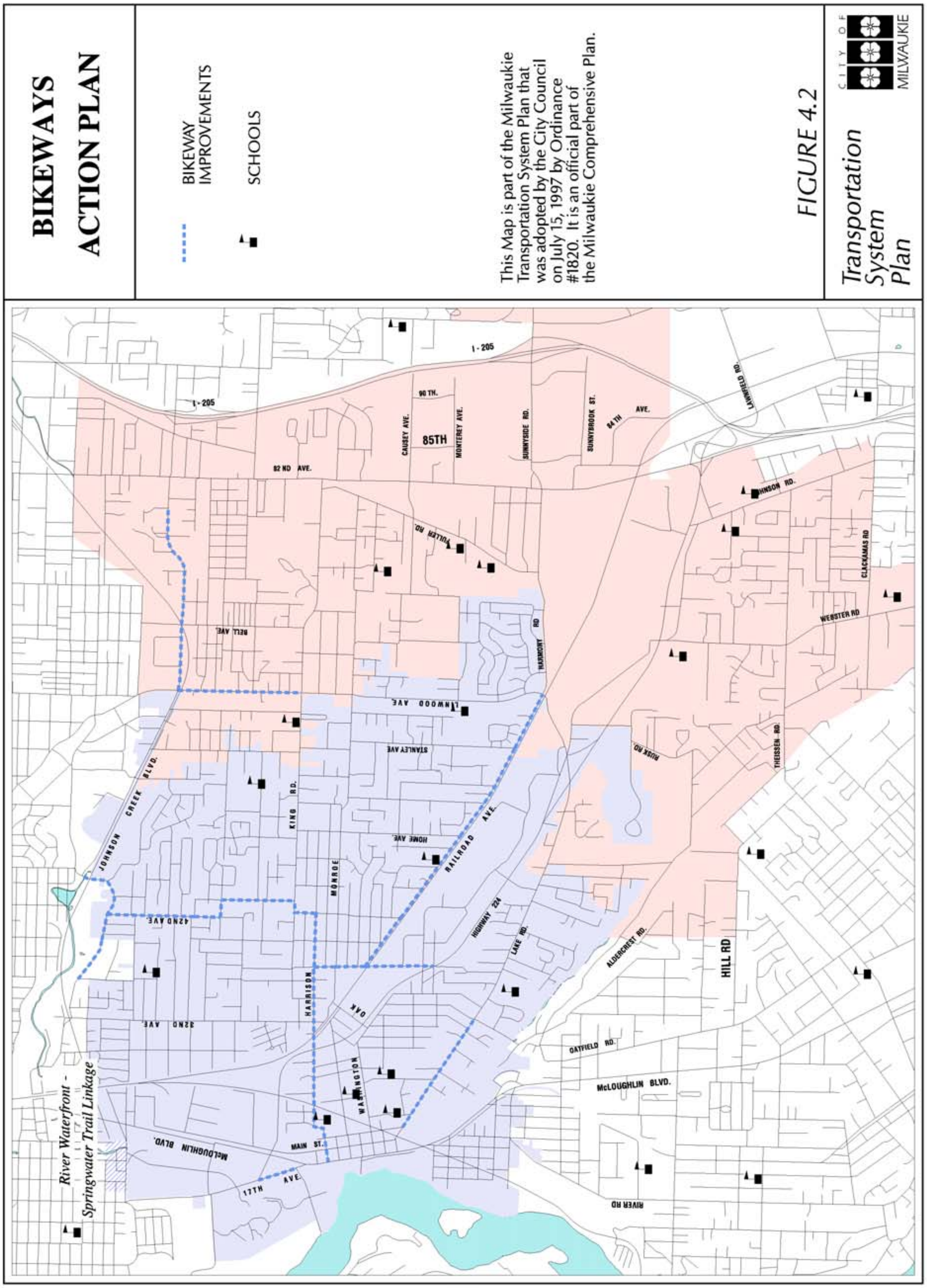
The City's action on bicycle facility and maintenance needs will fulfill two of the City's Transportation System Plan bicycling goals: maintenance of existing and future facilities and increasing the use of bicycles for all travel purposes. If bicycle facilities are properly located and maintained, it is anticipated that bicycle use will increase based on bicyclist-related needs being met.

Strategies

For the City, existing bicycle facility maintenance mainly involves keeping existing bikeways clean of debris and properly marked and signed. In order to ensure that adequate maintenance of bikeways is accomplished, the City's Public Works Department should establish and carry out a maintenance activities schedule as part of an ongoing bicycle facilities maintenance program. This program should also include a public comment mechanism by which citizens can report specific maintenance concerns or suggestions that will be investigated by Public Works Department staff, with a reply to the citizen provided.

The City should also ensure that existing and future bikeways will be properly marked and signed according to State and Federal guidelines.

The City should also ensure that City-owned public places provide proper bicycle facilities such as bike racks, water fountains, public rest rooms, and locker rooms with showers for employees, as appropriate. The City should inventory its public places, determine and complete bicycle- related improvements in a timely fashion through its facilities budget.


BIKEWAYS
ACTION PLAN
BIKEWAY IMPROVEMENTS
SCHOOLS
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
FIGURE 4.2
Transportation System Plan
CITY OF MILWAUKIE
I-205
82 ND AVE.
CAUSEY AVE.
85TH
MONTEREY AVE.
SUNNYSIDE RD.
SUNNYBROOK ST.
JOHNSON CREEK BLVD.
KING RD.
MONROE
RAILROAD AVE.
HIGHWAY 224
LAKE RD.
HARRISON
WASHINGTON
MAIN ST.
McLOUGHLIN BLVD.
17TH AVE.
42ND AVE
32ND AVE
LINWOOD AVE
STANLEY AVE
HOME AVE.
HARMONY RD
WEBSTER RD
CLACKAMAS RD
ALDERCREST RD.
HILL RD
OATFIELD RD.
RIVER RD
River Waterfront - Springwater Trail Linkage

As stated above, the provision of bicycle facilities is thought to positively impact the number of bicycle trips. The City should encourage employers and businesses to provide bicycle facilities such as bicycle racks (or storage areas within buildings) and locker rooms with showers to encourage bicycling by employees and customers. Employers can encourage bicycling to work by providing incentives and rewards for employees who bike to work. Employees could take advantage of flexible work hours and receive special discounts or prizes for biking to work on a regular basis.

The City should consider taking part in a pilot program where bicycle racks are donated by area bike shops or businesses to be installed at key activity center and destinations such as downtown Milwaukie, shopping centers and community centers.

BICYCLIST SAFETY AND SECURITY

Needs

Bicyclist safety has traditionally been addressed through engineering practices of providing bikeways on roads. However, there is more that can be done to ensure bicyclist safety. One component is the education of all citizens: young and old, bicyclists and motorists. Everyone should know the traffic safety laws as they relate to motorists sharing the road with bicyclists and the rights and responsibilities of bicyclists and motorists traveling on roadways in the City, region and state. Organizing a transportation safety program in cooperation with the school district, police, and City staff would be a proactive step towards implementing better education.

A second component of bicyclist safety is the enforcement of traffic safety laws. Examples would be citing children (and their parents) for not wearing helmets when bicycling, and ticketing a bicyclist for riding through a red light. Another example is a bicyclist riding against traffic on the wrong side of the street or riding at night with no lights. Bicyclists are to follow the same rules of the road as motorists. Motorists should also be ticketed for actions that pose a safety threat to bicyclists, such as using a bike lane to illegally pass a turning car, such as happens along Lake Road.

A final component of bicyclist safety and security is for there to be adequate street lighting and security measures provided near bicycle facilities.

Strategies

The City should encourage bicycle safety education programs especially for young bicyclists. The City should coordinate with Clackamas County to encourage the North Clackamas School District to establish an ongoing bicycle safety education program for elementary-age school children, that provides both classroom and on-bicycle training. The City should also assist a community organization in putting on a bicycle safety rodeo event annually. Finally, the City should coordinate with Clackamas County and Metro to distribute bicycle safety information to local schools and community organizations. This should include information on adequate bicycle lighting for night riding. Also, Metro should be encouraged to have an education van that provides regional bicycle, pedestrian and Transportation Demand Management education and information. Milwaukie's staff resources are limited and proper coordination with the above-mentioned entities will assist the City in meeting bicycle safety goals and objectives.

The City should urge its local law enforcement officers to warn and ticket bicyclists and motorists who violate current traffic safety laws. The City should promote motorists' and bicyclists' understanding of rules of the road and sharing the road through ongoing public information pieces.

Furthermore, the City should encourage local law enforcement, private developments with security guards, and neighborhood watch groups to emphasize the patrol of bike rack areas of shopping centers, residential developments and parks, for example, as part of crime prevention efforts.

Chapter 5
Public Transportation

This chapter identifies existing and future public transportation needs in the City of Milwaukie. It outlines the criteria to be used to evaluate needs, provide a number of strategies for implementing a transit plan and recommends a transit plan for the City of Milwaukie. The needs, criteria and strategies were identified in part by working with the City's Light Rail Working Group, which served as the Transit Working Group for TSP development. This citizen committee provided input regarding the transportation system in Milwaukie, with special emphasis on transit system needs and priorities. The goal was to develop a transit plan that combined citizen and staff input, addressed specific Transportation Planning Rule requirements, and provided continuity to the regional transit network.

Needs

A transit questionnaire was administered to three groups as part of transportation system needs identification. It asked respondents about their opinions on existing public transit and their suggestions for improving facilities and services into the future (see Appendix 10 for questionnaire). Respondents included the Transit Working Group, transit users at the Milwaukie Transit Center, and participants at the Milwaukie Center. In total, approximately 100 questionnaires were completed. While this is a relatively small sample, valuable information on existing and future transit needs was generated. The following summarizes the most frequent responses related to existing and future transit service needs:

- More frequent bus service on existing routes
- New bus service to specific destinations
- More accessible (closer) bus service
- Add light rail service to Milwaukie
- More facilities including bus shelters and improved facilities such as the Milwaukie Transit Center

Transit improvement priorities that reflect the most immediate needs of the City should be established.

Criteria

City staff, with citizen review, created a set of goals, objectives, and policies to guide transportation system development in Milwaukie. See Chapter 8 for a specific listing of transit-related goals, objectives, and policies. The two goals directed at transit are:

Goal 1 Work with Tri-Met to provide local citizens with a convenient and accessible public transit system that is integrated with other transportation modes and transit supportive land use development.

Goal 2 Ensure that Tri-Met maintains and enhances existing and future transit facilities and services to encourage use.

These goals, and their related objectives and policies, are the criteria that all transit improvements in Milwaukie should be measured against to determine if they are consistent and further the intended vision of the City.

Strategies

Several strategies were developed by City staff for future transit projects in Milwaukie. These strategies are aimed at providing the City with guidance to direct Tri-Met in its funding of local transit facilities and services that meet the goals, objectives, and policies of the City. Table 5.1 which follows after the discussion of strategies, provides an assessment of how each of the strategies meets the requirements of the aforementioned goals.

Strategy 1 - "Do Nothing"

This strategy does nothing to meet the existing and future public transportation needs of the City of Milwaukie. Transit needs were determined by the Transit Working Group to be important in reducing auto dependency and providing alternative transportation options for the City's transportation system. This approach offers no additional commitment to enhance transit facility and service needs in Milwaukie. This strategy was therefore rejected.

Strategy 2 - "Ensure Continuation Of Existing Levels Of Transit Services Along With Improvements From Annual Needs Identification Process"

This strategy focuses on working with Tri-Met and other local transit providers to ensure that the existing level of transit service is continued and enhanced on existing or amended routes. Tri-Met has instituted an annual needs identification process as part of its continued service delivery planning and coordination. The Clackamas Transportation Coordinating Committee (CTCC), made up of local government representatives, assists Tri-Met by developing a countywide public transit facilities and services needs request report to Tri-Met annually.

The City should continue to participate in the CTCC annual needs identification process and should continue to survey existing and potential transit users as to specific public transit needs that can be included in the CTCC report.

The City should also work with Tri-Met to ensure a streamlined approach for citizens and the City to report and receive feedback on facility maintenance, security, service, or other types of concerns. Tri-Met should periodically advertise a phone number that citizens can call to report needs, concerns, or compliments.

Strategy 3 - " Continue To Work With Tri-Met, Metro, Adjacent Jurisdictions and The Public To Address Future Transit Facility and Service Needs In Milwaukie Including High Capacity Transit"

This strategy focuses on continued coordination with agencies and jurisdictions to ensure that Milwaukie's transit facility and service needs are met into the future. The City has identified priorities such as: facility improvements to the Milwaukie Transit Center; expanding existing service along corridors that have a demand for service but are not presently served; enhancing transit-related facilities such as bus shelters, bike lockers at transit centers and sidewalks along transit corridors; the construction and service of high capacity transit (HCT) to and through Milwaukie; and continued and enhanced transit service for special needs populations.

Since Milwaukie is designated as a Regional Center in Metro's 2040 Growth Concept, it is anticipated that higher densities and intensities of development and a greater mix of uses will be occurring in the expanded City center area over the next twenty to forty years. Under this scenario, public transportation is a critical component of the transportation system to serve the increased number of households, employees, and visitors within and to the City.

In order to accomplish the above list of priorities, the City should coordinate with Tri-Met, Metro, adjacent jurisdictions, and the public. Specific types of agency and jurisdiction coordination are:

- The City should work with the different entities to identify funding sources to pay for needed transit system improvements;
- The City should continue to coordinate with Tri-Met, and require as necessary along transit routes, transit-related improvements such as walkway connections and bus stops from new development, through local Transportation Planning Rule implementation found in the City's Zoning Ordinance; and
- The City should work with appropriate agencies to implement Transit Oriented Development around the existing transit center (and future HCT stations).

The City has been and will continue to be an active participant in the South-North Light Rail Project. Planning efforts are underway and a narrowing of the corridor alignment and design options is taking place as the TSP is being drafted. Figure 5.1 depicts the proposed South-North Light Rail alignments through Milwaukie. The TSP should be amended once a preferred alignment and design option is determined. If and when high capacity transit operates in Milwaukie, the City should coordinate with Tri-Met to ensure that feeder buses to light rail service are convenient and accessible to local transit users, and that local bus service to destinations other than where light rail goes is not being jeopardized.

This HCT strategy will also increase the number of transit riders in Milwaukie. It will hopefully be accomplished through broad coordination efforts, land use pattern changes (e.g., 2040 Growth Concept implementation), transportation system improvements (e.g., more sidewalks and bike lane connections), and other facility and service improvements that make the public transit system more accessible to all who wish to use it. The City should be a leading participant in all of these efforts.

Key issues to be resolved in the HCT planning include:

- alignment and station placement in the downtown area;
- crossing of ORE 224;
- selection of the most cost-effective yet functional route alignment
- bicyclist and pedestrian access to and at stations,
- crossing at Linwood/Harmony/Lake/Railroad; and
- remaining bus transit services and coverage.

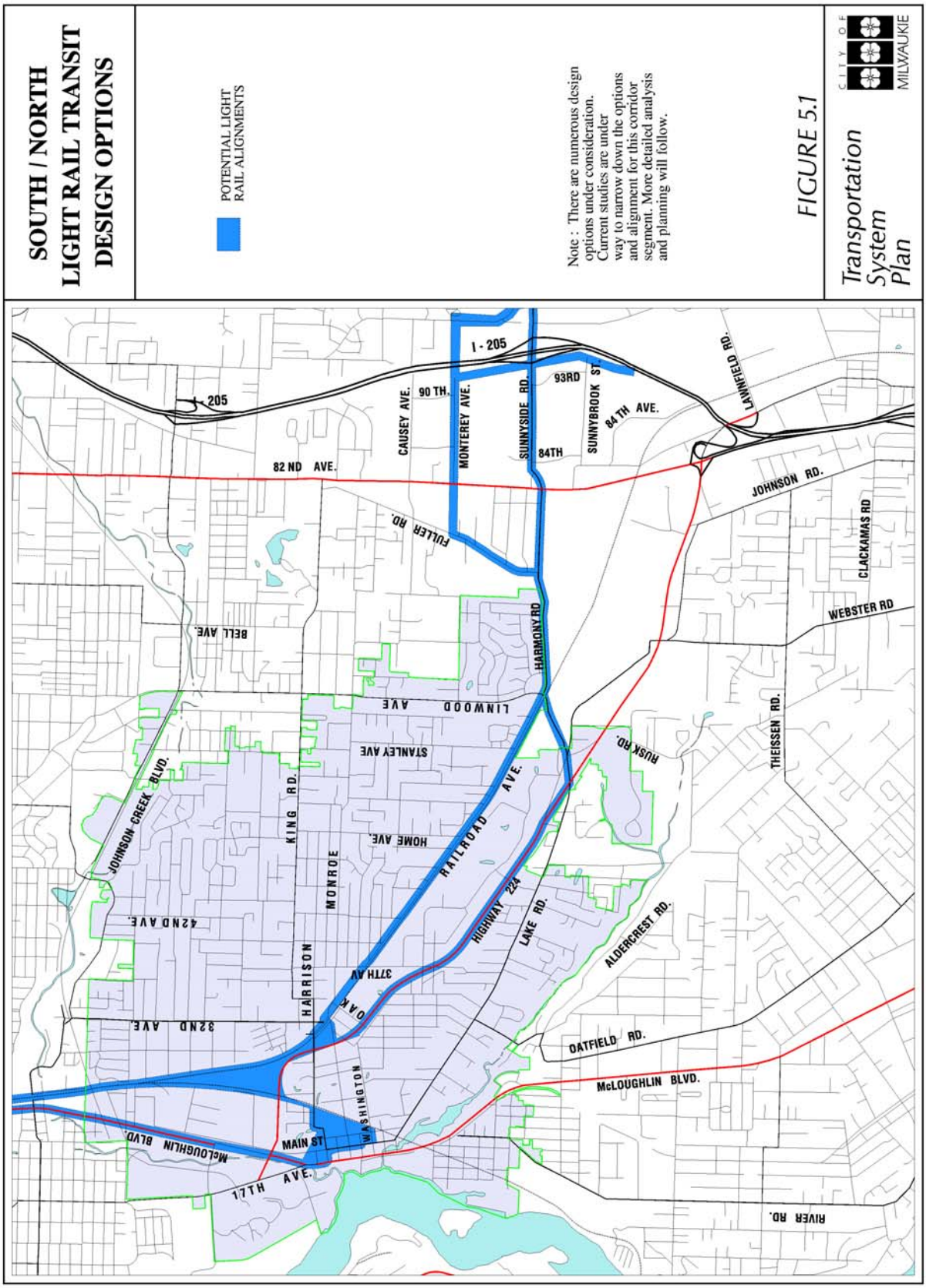
Strategy 4 - "Participate In Development Of Future High Speed Transit Service From Salem To Portland Through Milwaukie"

This strategy focuses on participating in activities that relate to development of a Willamette Valley high speed rail corridor service which may pass through Milwaukie. It presents both potential benefits and impacts to the City. The City should continue to monitor, participate in, and contribute to the decision-making process that may bring high speed transit to Milwaukie and the region. The City should support this mode of transportation provided that significant negative impacts to residents, businesses, and the transportation system are minimized. Examples of impacts include noise, vibration, delays to transportation system, and potential barrier effect of grade separations.

Table 5.1
Public Transportation Strategies Comparison

Strategy	Goals	
	1	2
1. Do Nothing	○	○
2. Ensure Continuation of Existing Levels of Transit Services	★★	★★
3. Continue to Work with Tri-Met, Metro, Adjacent Jurisdictions and the Public To Address Existing and Future Transit Facility and Service Needs	★★	★★
4. Participate in Development of Future HCT in Willamette Valley	★	★

○ Does not meet criteria
★ Partially meets criteria
★★ Mostly meets criteria
★★★ Fully meets criteria


SOUTH / NORTH
LIGHT RAIL TRANSIT
DESIGN OPTIONS
POTENTIAL LIGHT
RAIL ALIGNMENTS
Note : There are numerous design options under consideration. Current studies are under way to narrow down the options and alignment for this corridor segment. More detailed analysis and planning will follow.
FIGURE 5.1
Transportation System Plan
CITY OF MILWAUKIE
I - 205
82 ND AVE.
CAUSEY AVE.
90 TH.
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84 TH AVE.
84TH
LAWNFIELD RD.
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
THEISSEN RD.
RUSK RD.
FULLER RD.
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
HOME AVE.
RAILROAD AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
OATFIELD RD.
McLOUGHLIN BLVD.
JOHNSON CREEK BLVD.
KING RD.
MONROE
HARRISON
OAK
37TH AV
42ND AVE.
32ND AVE
WASHINGTON
MAIN ST
17TH AVE.
RIVER RD.

Recommended Public Transit Plan

The recommended public transit plan has the following five components:

- **The integration of transit facilities and services.** This includes but is not limited to the provision of transit-related facilities at or near transit locations, improvements to roadways that increase the efficiency and use of transit, planning for high capacity transit and high speed rail and their place in the future public transit system.
- **Connectivity of transit facilities and services with other travel modes.** This includes but is not limited to providing bikeways and walkways that lead to or are along transit locations and the provision of park-and-ride or kiss-and-ride locations by which automobile travelers can access public transit.
- **A public transit system that serves the most number of people.** This includes but is not limited to land use implementation strategies in the Milwaukie Regional Center, including higher densities/intensities and a mix of uses around transit centers, stations and major corridors, transit serving major employment areas, moderate income and elderly housing developments, and enhanced services to ensure that special needs populations are adequately served.
- **Evaluate public transit system needs annually and report priority needs to Tri-Met.** This is an ongoing implementation approach for public identification of transit system facility and service needs that is forwarded to Tri-Met. There is an established system of reporting countywide needs annually through a CTCC Service Request Report to Tri-Met. The City continues its participation in this process and also continues to solicit public input to be reflected in CTCC reports. This information will assist the City's coordination with Tri-Met and other jurisdictions and agencies in addressing citizen identified needs.
- **Funding source identification and implementation of public transit system improvements.** This entails cooperative efforts from the City, Tri-Met, Clackamas County, and other jurisdictions and agencies to locate traditional and non-traditional sources of revenue to funding public transit improvements. This is a critical component of the plan that affects the City's ability to meet Transit Goals, Objectives, and Policies.

Potential Improvements

A number of recommended transit system improvements for Clackamas County were collected by the CTCC for submittal to Tri-Met the Fall of 1995 via the annual service needs identification process. It should be noted that the implementation of transit system improvements is subject to the availability of Tri-Met funding. The following identified service need improvements affect Milwaukie and its future growth area (UGBMA), and were recommended by City staff based on public input:

First Priority

- **New Line - ORE 224/Clackamas Town Center:** Serving downtown Milwaukie, Milwaukie Marketplace, Oregon Institute of Technology, Clackamas Community College and Promenade, and destinations further east.
- **New Line - Johnson Creek Boulevard/82nd Avenue:** Serving downtown Portland to Clackamas Town Center via the Sellwood Bridge and Johnson Creek Boulevard. Serves industrial area from 45th Avenue to Bell Avenue.
- **Line Revision - Bus #71 - 92nd Street:** Extend to Clackamas Town Center via 92nd Avenue, Otty Road or Johnson Creek Boulevard and 82nd Avenue.

- **New Line - 82nd/I-205:** Serving Clackamas Town Center, 82nd Drive, Johnson Creek Boulevard, and I-205 to Gateway Center.
- **New Line - River Road/Thiessen Road:** Serving downtown Milwaukie to Clackamas Town Center via River Road, Thiessen Road, and 82nd Drive.
- **New Line - Oregon City/Jennings Avenue:** Serving Oregon City to Clackamas Town Center via McLoughlin Boulevard, Jennings Avenue, Webster Road, ORE 224, 82nd Avenue and Sunnybrook.

Second Priority

- **Bus #32 - Oatfield:** 1) Add Saturday day service 2) Add Saturday evening-plus service.
- **Bus #28 - Linwood:** Add Saturday service.
- **Bus #29 - Lake/Webster:** 1) Increase week/midday frequency, 2) Add Saturday service, 3) Add weekday evening-plus service, and 4) Add Saturday evening service.
- **Milwaukie Shuttle:** Continue to monitor the need for increased frequency of service to specific locations along the route.

Third Priority

- **New Line - Milwaukie Transit Center to Lake Oswego Transit Center:** Direct line on exclusive busway/railroad right-of-way via Southern Pacific Railroad bridge.

Fourth Priority

- **New Line - I-205 Express:** Gateway to Clackamas Town Center and/or Oregon City Transit Center.

Other Recommendations

These CTCC reported recommendations included priorities for Tri-Met in the areas of Marketing, Public Information, and Customer Services. The full list of needs is too lengthy to highlight in this report. Selected specifics follow:

- Upgrade existing transit locations to be safe and accessible to all users
- Install additional bus shelters at transit locations in Milwaukie
- Perform route market analysis for poorly performing routes
- Perform route market analysis for Milwaukie Shuttle to include area and population served
- Perform target market and route promotions for the Milwaukie Shuttle to increase ridership and improve rider awareness
- Coordinate service providers and user groups for better allocation of transportation resources
- Install bicycle racks at transit centers
- Install storage lockers at transit centers
- Incorporate special needs transportation issues with other planning projects
- Develop special event service in cooperation with local jurisdictions for events such as Milwaukie Daze

Chapter 6
Automobiles

This chapter identifies existing and future automobile-related needs in the City of Milwaukie, outlines the criteria to be used in evaluating these needs and provides a number of strategies for implementing an automobile plan. The needs, criteria and strategies were identified in part by the City's Roads Working Group. This committee provided input regarding the transportation system in Milwaukie, specifically exploring automobile, truck freight and roadway needs.

This chapter begins with a discussion of the functional classification system. This is an underlying component for automobile (and other travel modes) affecting movement, accessibility and street design. As part of TSP development, City staff and the consultant identified that the City's functional classification system needed to be revised, so an updated system is proposed in this chapter.

The chapter continues with a section on streets that pertains to: capital-oriented improvements, capacity and circulation, safety, reconstruction, and maintenance/operations. It concludes with discussions on: transportation demand management, neighborhood traffic management, access management, regional center parking, and a recommended automobile facility plan.

FUNCTIONAL CLASSIFICATION

NEED FOR STREET CLASSIFICATION SYSTEM

The need for a functional street classification system, or hierarchy of street designations, arises from the need for both mobility and access. From a design perspective, these functions can be incompatible since high or continuous speeds are desirable for mobility, while low speeds are more desirable for land access. Arterials emphasize a high level of mobility for through movement; local facilities emphasize the land access function; and collectors offer a balance between both functions.

WHY REVISIT MILWAUKIE'S FUNCTIONAL CLASSIFICATION SYSTEM?

Milwaukie's current functional classification system is based on the standard arterial, collector and local system used by many jurisdictions. It has been in place and used for over 20 years under the comprehensive planning process. While it has been useful in defining streets from a traffic perspective, it does not reflect the overall transportation system (relating to other travel modes or land uses). The overall transportation requirements of a street cross-section depend on various functions that the street must perform. For instance, a street with many pedestrians would be designed differently from a street which carries mostly truck traffic.

The current functional classification used by Milwaukie does not differentiate between the types of trips using the street system. The system relies mostly on anticipated vehicular traffic information. Connectivity, traffic volumes and speed continue to be important elements in determining how a street will actually function. However, all modes of transportation and the adjacent land uses which actually generate the traffic on a given street need to be considered to determine the specific design characteristics of that street. This is particularly important at the collector and local street level where land use could have the most impact on the design requirements of a street and the most flexibility is needed to tailor the street to its particular use or function.

A PROPOSED FUNCTIONAL CLASSIFICATION SYSTEM FOR MILWAUKIE

The existing functional classification system used by Milwaukie consists of five basic categories: freeways, major arterials, minor arterials, collectors and local streets. The concept of this system is retained as a statement of traffic function in the proposed new system and is supplemented to address neighborhood streets, land use or multiple travel modes. The refined system will:

- maintain simplicity;
- address functional relationship of land use and access; and
- relate to neighborhood use of streets.

The proposed functional classification system for Milwaukie uses a "Transportation Overlay" approach to determine street cross-sections. See Table 6.1. This process evaluates the necessary street components for each mode and overlays them to better define a street cross-section. It could be applied on a case-by-case basis to determine necessary improvements throughout Milwaukie. The transportation overlay process includes six steps:

- An existing map is created (as part of the Transportation System Plan) to show the facilities available today (i.e., where sidewalks, bikeways and bus stops currently exist)
- A proposed future network map is created and the associated land use map could potentially be based on the City's Zoning Map.
- Optimal plans are developed for each travel mode.
- In order to determine street improvement needs for a particular street (42nd Avenue, for example), the auto, truck/freight, transit, bicyclist and pedestrian needs would be obtained from the proposed overlay maps for 42nd Avenue.

- The combination of needs (i.e., bikeways, sidewalks, etc.) would be evaluated with the adjacent land uses to determine the proposed street cross-section.
- The proposed street cross-section would then be compared to the existing facilities on 42nd Avenue to determine what improvements may need to be made.

Table 6.1 - Functional Classification System Components

Transportation Overlay	Related Street Characteristics
AUTO	• Classification • Number of Lanes • Lane Width • Access Control • Median
TRUCK/FREIGHT	• Lane Width • Curb Radii • Access Control • Number of Traffic Control Devices
TRANSIT	• Bus Stops (Including Shelters and Benches) • Travel Lane Width • Pedestrian Access to Adjacent Land Uses
BICYCLING	• Bikeways • Other Bicycle Facilities (Signage, Bicycle • Sensitive Control Devices)
WALKING	• Walkways • Buffer Feature (Landscape, On-Street Parking) • Other Pedestrian Facilities (Handicapped • Ramps, Pedestrian Signals, Crosswalks)
ADJACENT LAND USE	• Travel Lane Width • Buffer Feature (Landscape, On-Street Parking) • Sidewalks • Medians

Auto

The proposed functional classifications would include arterials (both Principal Routes and Regionally Significant Routes), collectors (three levels), neighborhood routes, and local streets (five types). A discussion follows as to the function of each classification and an initial idea of how individual roadways in Milwaukie might be classified. Figure 6.1 summarizes the proposed revised street functional classification system for Milwaukie.

ARTERIALS

Arterial routes are generally of regional significance and must reflect regional designations of ODOT, Metro and Clackamas County.

PRINCIPAL ROUTES

Certain routes in Milwaukie are of interstate and statewide significance. Interstate routes, such as I-205, move people between cities within states as well as between states. Statewide routes, such as ORE 99E and ORE 224, are used to travel between cities within the state. Statewide routes may be used for travel within cities, but these routes will mostly be used for trips between cities, especially those which are separated by a significant distance. Both interstate and statewide routes should be considered together as principal routes. These routes are planned for, built and maintained by other agencies, such as ODOT, Metro and Clackamas County and serve many cities. Table 6.2 lists principal routes in Milwaukie. This designation matches the regional definition of these roads by Metro and ODOT.

Table 6.2
Principal Routes

Interstate
Interstate 205
Statewide
ORE 99E
ORE 224

REGIONALLY SIGNIFICANT ROUTES

There are also regional routes, such as Johnson Creek Boulevard and the Sunnyside Road/Harmony Road/Lake Road route, which are used to carry vehicles within cities and between adjacent cities in the same metropolitan area. Some of these facilities are also planned for and/or maintained by other agencies, such as ODOT, Metro and Clackamas County, but the City has more of a stake in how they are developed and used. These routes can be called regionally significant routes, and may include not only Johnson Creek Boulevard and Sunnyside Road/Harmony Road/Lake Road, but also the Harrison Street/King Road route. Regionally significant routes generally:

- are continuously three or more lanes wide;
- link two or more cities; and
- provide freeway access

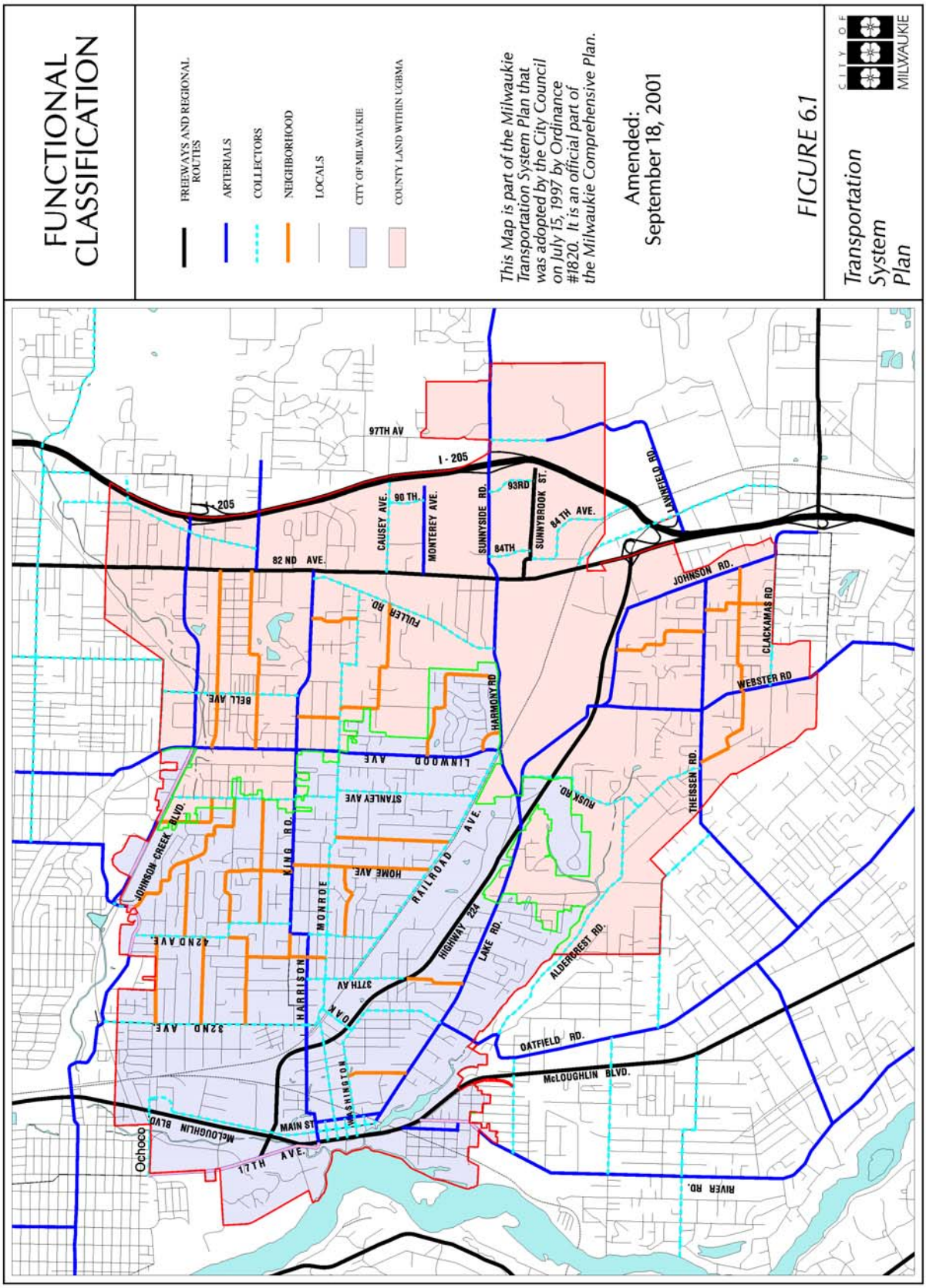

FUNCTIONAL CLASSIFICATION
FREEWAYS AND REGIONAL ROUTES
ARTERIALS
COLLECTORS
NEIGHBORHOOD
LOCALS
CITY OF MILWAUKIE
COUNTY LAND WITHIN UGBMA
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
Amended: September 18, 2001
FIGURE 6.1
Transportation System Plan
CITY OF MILWAUKIE
97TH AV
I - 205
205
90 TH.
CAUSEY AVE.
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84 TH AVE.
84TH
82 ND AVE.
LAWNFIELD RD.
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
FULLER RD.
BELL AVE
HARMONY RD
LINWOOD AVE
STANLEY AVE
HOME AVE
RAILROAD AVE.
PUSH RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
MONROE
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
42ND AVE
32ND AVE
37TH AV
HARRISON
OAK
WASHINGTON
OATFIELD RD.
McLOUGHLIN BLVD.
MAIN ST
Ochoco
17TH AVE.
RIVER RD.

Table 6.3 summarizes regionally significant routes in Milwaukie. These routes are also consistently identified as regional routes by Metro in the Regional Transportation Plan (RTP). Coordination with Metro staff on the Regional Transportation Plan's Regional Functional Classification needs to be completed for River Road/22nd Avenue and 17th Avenue which are regionally significant routes.

Table 6.3
Regionally Significant Routes

Regional
Johnson Creek Boulevard
Linwood Avenue
King Road/Harrison Street
Lake Road/Harmony Road/Sunnyside Road
17th Avenue
Oatfield Road
River Road/22nd Avenue

COLLECTORS

Certain routes are city circulation routes and provide access in and around Milwaukie. These streets should be divided into collectors, neighborhood routes and local streets. They directly involve the City of Milwaukie for planning, building, operating and maintaining. Some of the higher volume routes in this group are operated by Clackamas County.

Collectors can be distinguished from the other two classes by their connectivity and their higher traffic volume within the City. They have higher traffic because they tend to serve as city circulation routes.

For collector facilities, the key factors that relate to street function are:

- They connect areas within the city, providing cross town routes; and
- Adjacent land use.

Where collectors exist in residential areas, measures such as neighborhood traffic management may be needed to protect the neighborhood character and livability of these routes. This should be judged on a case-by-case basis.

The volume of traffic carried by a street, although it does not solely dictate the street cross-section, provides a framework for determining what street cross-section is appropriate. Adjacent land uses play a role in collector street cross-section design. For example, residential land uses would dictate the need for sidewalks along an adjacent collector street. Table 6.4 below lists collectors in Milwaukie that meet the above definition.

Table 6.4
Collectors

Collector Streets		
32nd Avenue	42nd/43rd Avenues	Monroe Street
Washington Street	Main Street	Jackson Street
Jefferson Street	Ochoco Street	Railroad Avenue
34th Avenue	Stanley Avenue	Rusk Road
	Oak Street	

NEIGHBORHOOD ROUTES

Neighborhood routes are generally longer than most local streets (at least 500-1,000 feet) and provide connectivity to collectors or regional routes. neighborhood routes generally have residential frontage, have more traffic than local streets and may be used to leave a neighborhood, but do not serve as citywide circulation. Traffic from cul-de-sacs and other local streets may feed into neighborhood routes to gain access to collectors or regional routes. Because traffic needs are greater than a local street, certain measures such as neighborhood traffic management may be needed to retain the neighborhood character and livability of these routes. Roswell Street, Logus Street and Wood Avenue are examples of streets with characteristics that enable them to be classified as neighborhood routes. Definition of streets designated as neighborhood routes has been based on review by the Roads Working Group. The designation of neighborhood routes should be reviewed and updated as necessary in the future.

LOCAL STREETS

All streets in Milwaukie that are not arterials, collectors or neighborhood routes should be classified as Local streets. Local streets can be further delineated into industrial, residential and commercial to address specific access and functional needs of these land uses. The overwhelming number of these streets are residential.

For local residential streets, various local street designations can be designed to address anticipated traffic level features (i.e., wider or narrower street width). Two or more cross-sections designs may need to be developed depending in part on the volume of traffic the street is expected to carry. Residential streets in a grid network or cul-de-sacs with cut-through paths to link residential areas for pedestrians and bicyclists are potential design options.

For local industrial streets, one cross-section should suffice. These streets would generally have wide travel lanes, and may or may not have on-street parking, minimal width sidewalks and public transportation.

For local commercial streets, one cross-section should also be satisfactory. These streets would be designed to facilitate pedestrian movement within the narrowest street width possible. The street width will vary depending upon the need for on-street parking and enlarged sidewalk areas at intersections.

DIFFERENCES FROM PREVIOUS CLASSIFICATION AND OTHER JURISDICTIONS

Two tables below show the differences between the proposed auto classification and the previous existing classification. Table 6.5 depicts the differences between the proposed auto classification and the functional classification. Table 6.6 indicates the differences between the proposed auto classification and the classification assigned by other jurisdictions to roadways which are classified by both Milwaukie and another jurisdiction.

Table 6.5 - Proposed Classification Comparison with Existing Classification

Roadway	Existing Milwaukie Classification	Proposed Milwaukie Classification
Ochoco Street	Local	Collector
Railroad Avenue	Minor Arterial	Collector
Monroe Street	Minor Arterial/ Collector	Collector
37th Avenue	Minor Arterial	Collector
Home Avenue	Collector	Neighborhood Route

Table 6.6 - Proposed Classification Comparison with Other Jurisdictions

Roadway	Other Jurisdiction's Classification (Jurisdiction)	Proposed Milwaukie Classification
17th Avenue	None (Metro) Neighborhood Collector (City of Portland)	Arterial
Johnson Creek Boulevard	Neighborhood Collector (City of Portland)	Arterial
Railroad Avenue	Minor Arterial (Clackamas County)	Collector

Truck/Freight

Truck freight routes need to ensure the safe and efficient movement of goods locally and through the region. Street accommodation of these larger vehicles include: adequate travel lane width, adequate curb and turning radii, access control, and the number and timing of traffic control devices. A map indicating specific truck/freight routes in Milwaukie is found in Chapter 7 (see Figure 7.1). The aforementioned street improvements that better serve truck/freight movement need to be considered for these routes. Minor Preferred Truck/Freight routes that serve trucking services within the City may require wider lane widths than other City streets.

Transit

Transit routes need to provide for the safe and efficient movement of public transportation within and through Milwaukie. A map was produced showing existing transit routes in Milwaukie (see Figure 2.17 in Chapter 2). Transit improvements may be necessary where existing or proposed transit streets are identified. Those streets designated as transit streets may require wider lanes, bus stop turnouts, bus stops, and walkways along routes and to adjacent land uses.

Bicycling

Bicyclists require specific street facilities for their safe and efficient travel within and through Milwaukie. A Bikeways Network Master Plan has been developed and includes existing and proposed bikeways that will form a primary bikeways network (see Figure 4.1 in Chapter 4). Streets designated as proposed bikeways should include facilities such as bicycle lanes, signing, and bicycle sensitive loop detectors at certain intersections.

Walking

Pedestrians require specific improvements to street facilities for safe movement to destinations. A Walkways Network Master Plan has been developed and includes existing and proposed walkways that will form a primary walkways network (see Figure 3.1 in Chapter 3). Streets designated as part of the network should include walkways such as sidewalks and other pedestrian facilities such as handicapped ramps, crosswalks and pedestrian activated signals. Other features that may be considered on streets are on-street parking and a planting strip provide a buffer between pedestrians and vehicular traffic.

Adjacent Land Use

As part of TSP research, future land use designations from the Comprehensive Plan were mapped adjacent to arterial and collector streets to indicate potential adjacent land use types. In this exercise, street segments were classified as one of eight categories, depending on their adjacent Comprehensive Plan land use classification (see Figure 6.2). Street segments which have uniform land use designations along both sides of their length were defined by that land use. For street segments where use varied or

was different on either side of the roadway or whose use was not known, the following methodology was applied:

- Where only a small portion of the street segment was of a differing land use, the prevailing land use was assigned.
- Where land uses were consistent on each side of the street, but different between sides, the land use that requires more right-of-way was assigned. (i.e., if residential on one side and industrial on the other, industrial would be assigned to accommodate truck movements)
- Where commercial and residential land uses were mixed, mixed use was assigned.
- Where "Resource & Other" was the land use code and the surrounding area was of consistent land use, that land use was assigned.
- State Highways were not evaluated since they are under ODOT's jurisdiction.
- Roadways were segmented where major shifts in land use occurred, unless these shifts occurred a number of times over a short distance, then other criteria were used.
- If a number of types of land use are found on an individual street, the selected design should reflect the predominant land use, with checks on the other land uses to see if they are adequately accommodated.

NEXT STEP STRATEGIES

The next step in implementing a revised functional classification system would be to undertake an assessment of the relationship between modal priorities (as defined in the maps associated with each functional classification component) and the existing right-of-way. This process requires further study since there are many locations in Milwaukie where right-of-way is insufficient or varies along a roadway. The City should use its GIS system to create a database relating the various modal needs to the existing street segments. Table 6.7 identifies proposed street design criteria concepts and Figures 6.3-6.7 depict sample cross-sections for arterial, collector, local, and neighborhood streets.

The following actions should be taken that implement Milwaukie's revised Functional Classification System:

- Include design standards in the City Roadway Manual to reflect the proposed functional classification system;
- Update the Subdivision Ordinance to reflect the proposed functional classification system; and
- Evaluate existing zoning and determine whether it is consistent with the proposed functional classification.

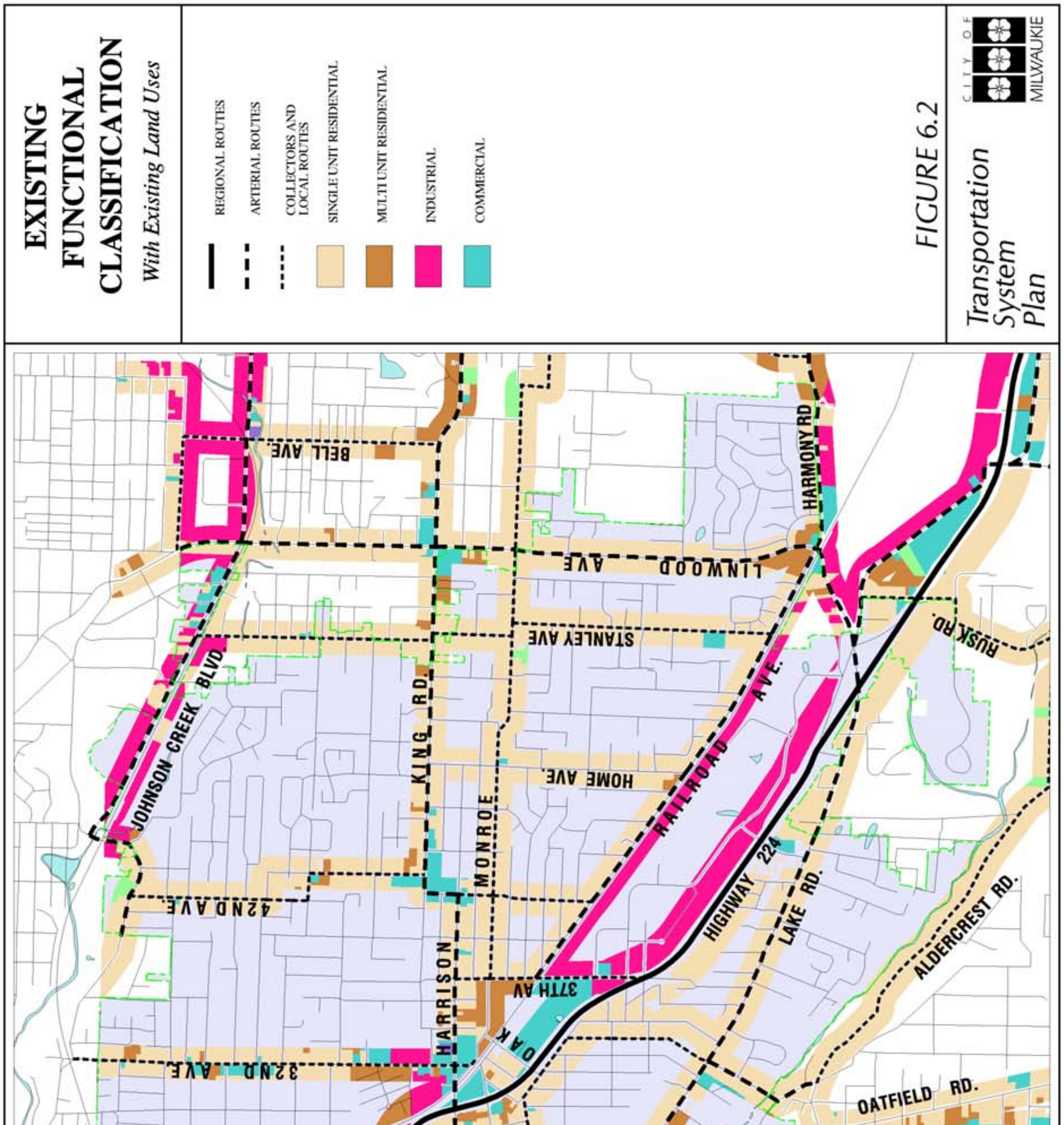

EXISTING FUNCTIONAL CLASSIFICATION
With Existing Land Uses
REGIONAL ROUTES
ARTERIAL ROUTES
COLLECTORS AND LOCAL ROUTES
SINGLE UNIT RESIDENTIAL
MULTI UNIT RESIDENTIAL
INDUSTRIAL
COMMERCIAL
FIGURE 6.2
Transportation System Plan
CITY OF MILWAUKIE
BELL AVE
LINWOOD AVE
HARMONY RD
STANLEY AVE
RUSK RD.
JOHNSON CREEK BLVD
KING RD.
HOME AVE
RAILROAD AVE.
MONROE
42ND AVE
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HARRISON
37TH AV
OAK
32ND AVE
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLV
MAIN ST
McLOUGHLIN BLVD
17TH AVE.

Table 6.7
Proposed Street Design Criteria

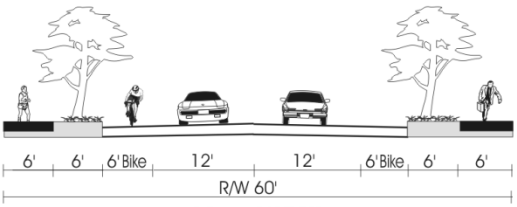
Vehicle Lane Widths: (preferred minimum widths)	Truck Route = 12 feet Bus Route = 12 feet Arterial = 12 feet Collector = 11 feet Neighborhood = 10 feet Local = 9[1] to 10 feet Turn Lane = 10 feet
On-Street Parking:	Residential = 6 to 8 feet Commercial = 7 to 8 feet
Bikeways: (minimum widths)	Bicycle Lanes: New Construction = 6 feet Reconstruction = 5 to 6 feet Combined bicycle and travel lane accommodation = 14 to 15 feet
Curb Extensions for Pedestrians:	Consider on any Pedestrian Route
Sidewalks: (minimum width)	Local = 5 feet[2] Neighborhood = 5 feet[2] Collector = 5 to 8[3] feet Arterial = 5 to 10[3] feet
Landscape Strips:	Residential/Neighborhood = Optional Collector/Arterial = Desirable
Medians:	5-Lane = Required 3-Lane = Optional
Neighborhood Traffic Management:	Local = Consider Under Special Conditions Neighborhood = Should Consider Collectors = Consider Under Special Conditions Arterials = Other Techniques as Appropriate
Transit	Arterial or Collector Streets Neighborhood Streets = Under Special Circumstances
Access Control	Refer to Table 6.13
Turning Lanes	As some intersections when volume exceeds 5,000 vehicles per say, center left turn lane may be warranted.*

1 *9-foot lanes would only be used in conjunction with on-street parking.*

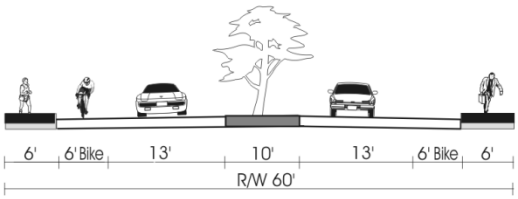
2 5-foot with landscape strip; 6-foot against curb.

3 Larger sidewalks than minimums should be considered for areas with significant pedestrian volumes. Commercial areas where pedestrian flows of over 100 pedestrians an hour are present or forecast; specific analysis should be conducted to size sidewalks appropriately for safe movement.

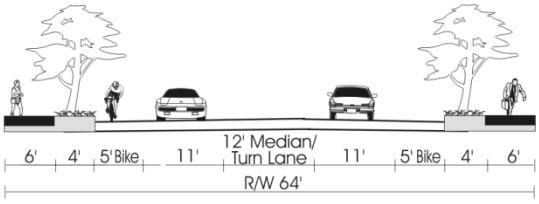
* Turn lane warrants should be reveiwed using Highway rEsearch Record Number 211 (1967), NCHRP Report Number 279 (1985) or other updated/superceding references.



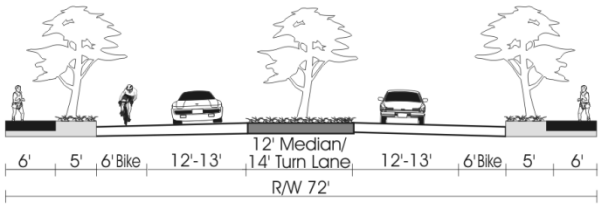
2 Lane 60' R/W



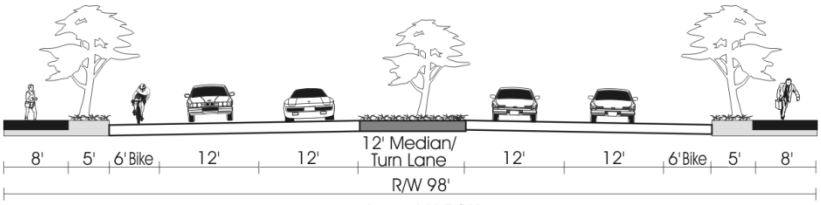
3 Lane 60' R/W With Raised Median/No Turn Lane Shown



3 Lane 64' R/W No Median



3 Lane 72' R/W



5 Lane 98' R/W

Arterial List

Johnson Creek Boulevard
Linwood Avenue
King Road/Harrison Street
Lake Road/Harmony Road/Sunnyside Road
17th Avenue
Oatfield Road
River Road/22nd Avenue

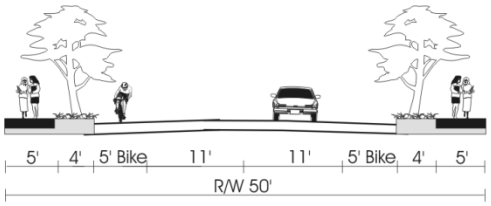
Criteria

Vehicle Lane Widths: (minimum widths)	Truck Route = 12 ft. Bus Route = 12 ft. 11 ft. (12 ft. Preferred)
Bicycle Lanes: (minimum widths)	New Construction = 6 ft. Reconstruction = 5 to 6 ft.
Curb Extensions for Pedestrians:	Consider on any Pedestrian Route
Sidewalks: (minimum width)	6 to 8 ft.
Landscape Strips:	Preferred
Medians:	5-Lane = Required 3-Lane = Optional
Neighborhood Traffic Management:	Other Techniques as Appropriate

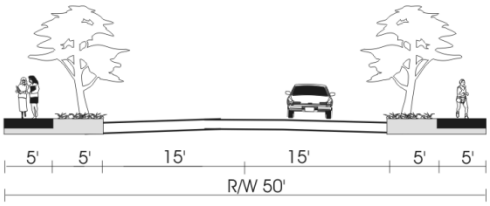
Notes:

1. Space between curb and median minimum 19' with mountable curb design.
2. Selection of placement of sidewalk and planter specific to application. Cross sections show choices for reference.
3. Width of curb is included in sidewalk or planter strip width when adjacent to street.
4. Samples show the desirable applications given number of lanes plus minimum standards can be applied case by case.
5. Typically 6" to 2' is provided from R/W line to edge of concrete surface (for maintenance/utilities).
6. Actual width of street and sidewalk area can be adjusted within R/W based on modal priorities and adjacent land use.
7. Based on minimum distance to travel 3 blocks (1,000+linear ft.) with on-street parking without ducking out of traffic.

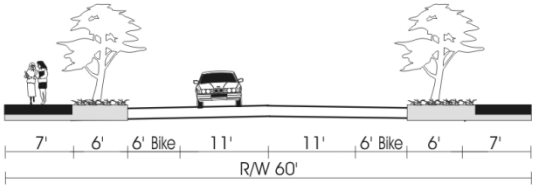
Figure 6.3
ARTERIAL
SAMPLE STREET CROSS SECTIONS



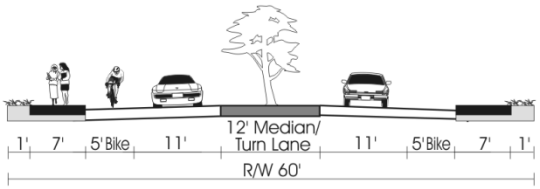
Bike Lane
2 Lane 50' R/W



Bike Accommodation
2 Lane 50' R/W



2 Lane Commercial 60' R/W



3 Lane 60' R/W

Collector List

32nd Avenue	Main Street	Railroad Avenue
Washington Street	Stanley Avenue	Rusk Road
Jefferson Street	Oak Street	37th Avenue
34th Avenue	Monroe Street	
42nd/43rd Avenues	Jackson Street	

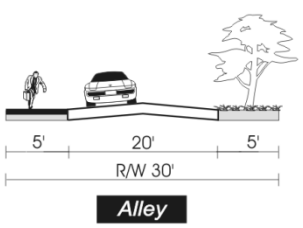
Notes:

1. Space between curb and median minimum 19' with mountable curb design.
2. Selection of placement of sidewalk and planter specific to application. Cross sections show two choices for reference.
3. Width of curb is included in sidewalk or planter strip width when adjacent to street.
4. Samples show the desirable applications given number of lanes plus minimum standards can be applied case by case.
5. Typically 6" to 2' is provided from R/W line to edge of concrete surface (for maintenance/utilities).
6. Actual width of street and sidewalk area can be adjusted within R/W based on modal priorities and adjacent land use.
7. Based on minimum distance to travel 3 blocks (1,000+linear ft.) with on-street parking without ducking out of traffic.
8. Encourage curb extentions at intersections on Commercial Collectors.

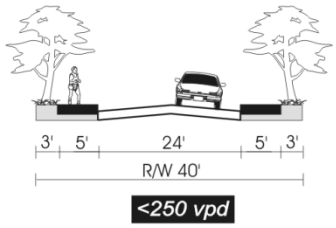
Criteria

Vehicle Lane Widths: (minimum widths)	11 ft.
On-Street Parking	Residential = 6 to 8 ft. Commercial = 7 to 8 ft.
Bicycle Lanes: (minimum widths)	New Construction = 6 ft. Reconstruction = 5 to 6 ft.
Curb Extensions for Pedestrians:	Consider on any Pedestrian Route
Sidewalks: (minimum width)	5 to 7 ft.
Landscape Strips:	Preferred
Medians:	3-Lane = Optional
Neighborhood Traffic Management:	Under Special Conditions

Figure 6.4
COLLECTOR
SAMPLE STREET CROSS SECTIONS



Alley



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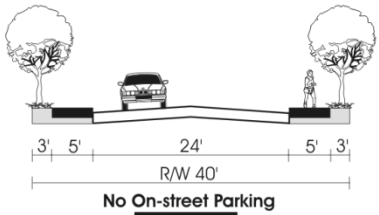
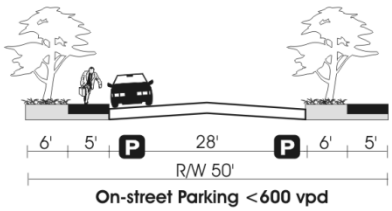
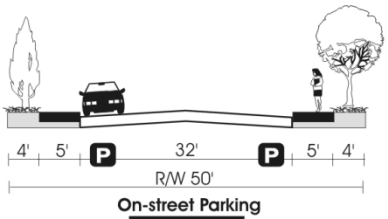


No On-street Parking
<250 vpd



On-street Parking <600 vpd
Oneside On-street Parking >600 vpd
<1500 vpd



On-street Parking
>1500 vpd

Notes:

1. *Space between curb and median minimum 19' with mountable curb design.*
2. *Selection of placement of sidewalk and planter specific to application. Cross sections show two choices for reference.*
3. *Width of curb is included in sidewalk or planter strip width when adjacent to street.*
4. *Samples show the desirable applications given number of lanes plus minimum standards can be applied case by case.*
5. *Typically 6" to 2' is provided from R/W line to edge of concrete surface (for maintenance/utilities).*
6. *Actual width of street and sidewalk area can be adjusted within R/W based on modal priorities and adjacent land use.*
7. *Based on minimum distance to travel 3 blocks (1,000+linear ft.) with on-street parking without ducking out of traffic.*

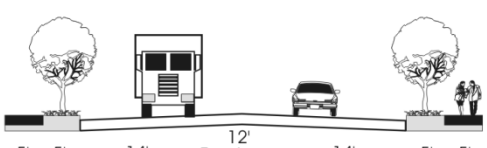
Criteria

Vehicle Lane Widths: (minimum widths)	9 to 10 ft.
On-Street Parking	6 to 7 ft.
Curb Extensions for Pedestrians:	Consider on any Pedestrian Route
Sidewalks: (minimum width)	5 ft.
Landscape Strips:	Preferred
Neighborhood Traffic Management:	Under Special Conditions

P - On-street Parking

<1500 vpd - Guide for Traffic Volume Per Day

Figure 6.5
LOCAL STREET RESIDENTIAL
SAMPLE STREET CROSS SECTIONS



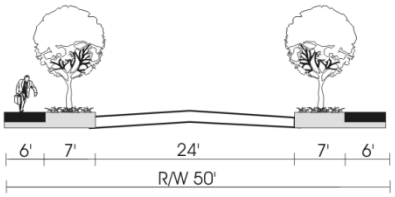
Criteria

Vehicle Lane Widths: *(minimum widths)*	*9 to 10 ft.*
On-Street Parking	*7 to 8 ft.*
Curb Extensions for Pedestrians:	*Consider on any Pedestrian Route*
Sidewalks: *(minimum width)*	*5 ft.*
Landscape Strips:	*Preferred*
Neighborhood Traffic Management:	*Under Special Conditions*

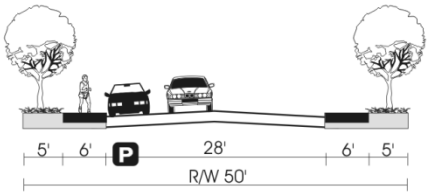
Notes:

1. *Space between curb and median minimum 19' with mountable curb design.*
2. *Selection of placement of sidewalk and planter specific to application. Cross sections show two choices for reference.*
3. *Width of curb is included in sidewalk or planter strip width when adjacent to street.*
4. *Samples show the desirable applications given number of lanes plus minimum standards can be applied case by case.*
5. *Typically 6" to 2' is provided from R/W line to edge of concrete surface (for maintenance/utilities).*
6. *Actual width of street and sidewalk area can be adjusted within R/W based on modal priorities and adjacent land use.*
7. *Based on minimum distance to travel 3 blocks (1,000+linear ft.) with on-street parking without ducking out of traffic.*

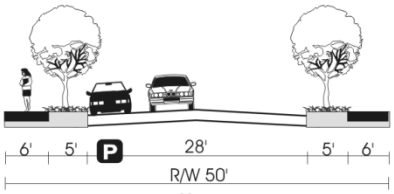
Figure 6.6
COMMERCIAL & INDUSTRIAL LOCAL SAMPLE STREET CROSS SECTIONS



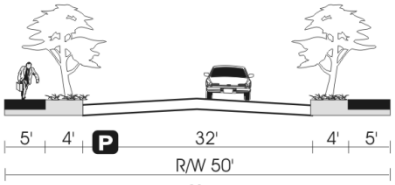
Preservation No Parking



Preservation With Parking



New
<1500 vpd



New
>1500 vpd

Neighborhood List

Roswell Street	Mason Lane	Wood Avenue
Olsen Street	Howe Street	Washington Street/Ada Lane
Harvey Street	Logus Road	Furnberg Drive/71st Avenue
Brookside Drive	27th Avenue	Cedar Crest Drive
Regents Drive/Willow Street	37th Avenue	Home Avenue

Notes:

1. Space between curb and median minimum 19' with mountable curb design.
2. Selection of placement of sidewalk and planter specific to application. Cross sections show two choices for reference.
3. Width of curb is included in sidewalk or planter strip width when adjacent to street.
4. Samples show the desirable applications given number of lanes plus minimum standards can be applied case by case.
5. Typically 6" to 2' is provided from R/W line to edge of concrete surface (for maintenance/utilities).
6. Actual width of street and sidewalk area can be adjusted within R/W based on modal priorities and adjacent land use.
7. Based on minimum distance to travel 3 blocks (1,000+linear ft.) with on-street parking without ducking out of traffic.

Criteria

Vehicle Lane Widths: (minimum widths)	10 ft.
On-Street Parking	6 to 8 ft.
Curb Extensions for Pedestrians:	Consider on any Pedestrian Route
Sidewalks: (minimum width)	5 ft.
Landscape Strips:	Preferred
Neighborhood Traffic Management:	Appropriate when Warranted

P - On-street Parking

<1500 vpd - Guide for Traffic Volume Per Day

Figure 6.7
NEIGHBORHOOD
SAMPLE STREET CROSS SECTIONS

STREETS PLAN

OVERVIEW

A street plan contains several key elements which are shown in Figure 6.8. While all of the streets in Milwaukie are multimodal, there are key elements which address motor vehicle needs that will be addressed in this section. Six key components of the streets plan are:

- Capital-Oriented Improvements (safety, capacity or standard-upgrade issues)
- Maintenance of Streets
- Transportation Demand Management
- Neighborhood Traffic Management
- Access Control
- Parking

CAPITAL-ORIENTED IMPROVEMENTS

To address the needs for capital-oriented street improvements within Milwaukie, capacity and circulation conditions were analyzed for future year 2015 conditions. Safety conditions were analyzed by reviewing existing accident records and future traffic signal warrants. Reconstruction needs were identified by City and County staff. The following sections outline the analysis of needs for capacity, circulation, safety and upgrading facilities. Many of the improvements needed to address safety also improve capacity, providing an opportunity to address multimodal facilities and access control in one project. For the City of Milwaukie to maximize transportation investments, capital-oriented street improvement projects should address several of these needs, rather than a single benefit.

CAPACITY AND CIRCULATION NEEDS

TRAVEL DEMAND FORECASTS

Forecasts of evening peak hour traffic volumes for the Milwaukie area were developed for the year 2015 using Metro's regional travel demand model. The model addresses modal choice in developing a vehicle trip table. The future base roadway network includes existing roadways plus those improvements which are currently funded and would likely be implemented before the 2015 land use scenario is reached; for example, widening Johnson Creek Boulevard to three lanes between 45th Avenue and 79th Avenue. [4]

FUTURE NEEDS

Future transportation conditions were evaluated in a similar manner. Improvements to intersections, roadways between intersections, and new or extended facilities were considered, resulting in a package of recommended street improvements .

[4] *Regional Roadway Project Atlas*, Metro, October 1, 1994.

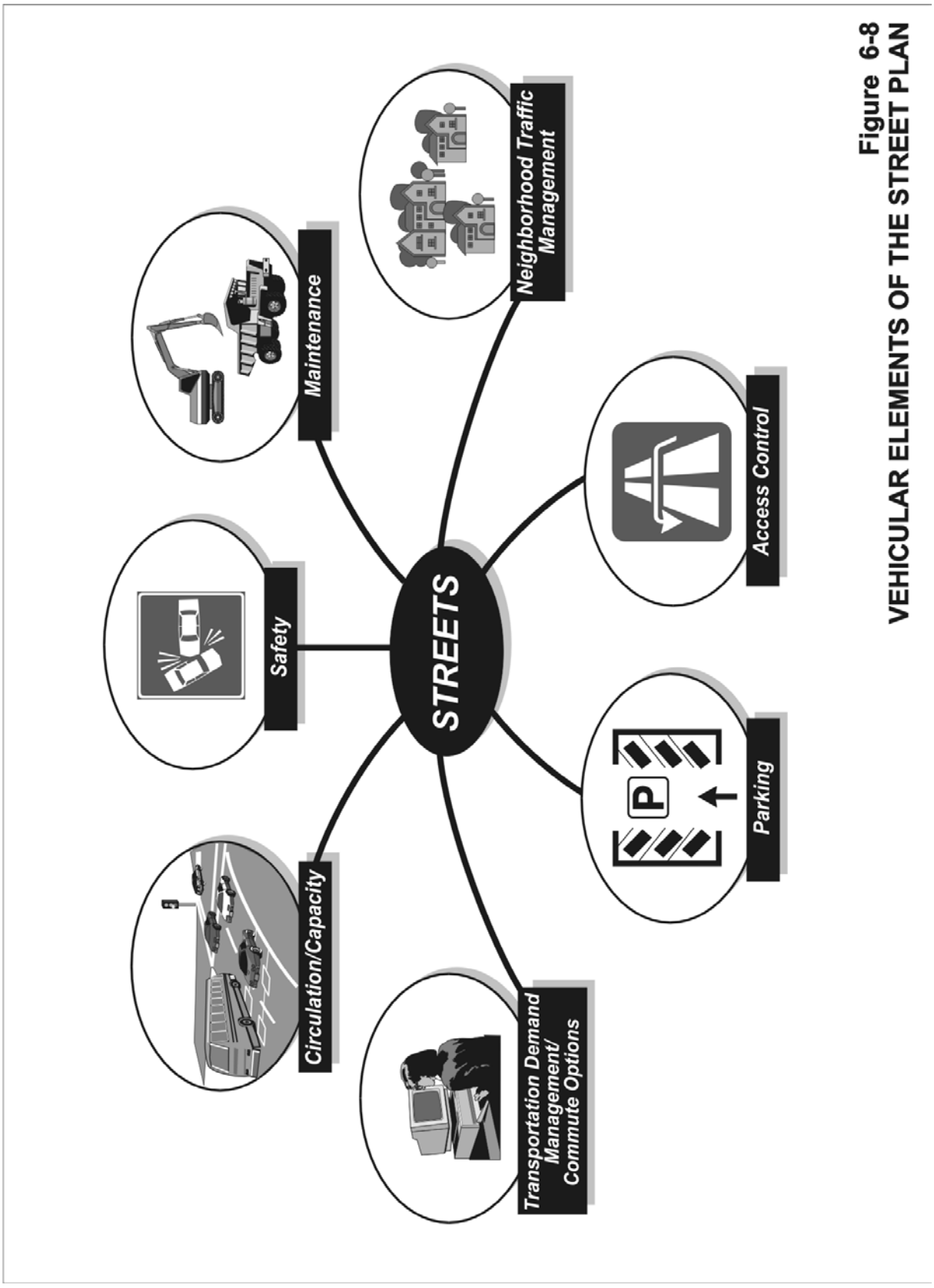


Figure 6-8
VEHICULAR ELEMENTS OF THE STREET PLAN

The plan for street improvements in Milwaukie depends on determining existing needs and needs of future growth. As a first step in assessing future needs, Metro's urban area traffic forecast model was used as a source for determining future traffic volumes in Milwaukie. This model translates land uses into roadway volume projections which form the basis for identifying potential roadway deficiencies and for evaluating alternative circulation improvements.

Projected land uses were developed for all areas within the Urban Growth Boundary Management Area reflecting Milwaukie's Comprehensive Plan land use designations and Metro's land use assumptions for year 2015. Complete land use data sets were developed for Base 1990 Conditions and the Year 2015.

The objective of the transportation planning process is to provide the information necessary for making decisions on when and where improvements should be made in the transportation system to meet travel demands. The development of future traffic system needs for Milwaukie depends on the ability to accurately forecast travel demand resulting from estimates of future population and employment for the City.

City staff inventoried land uses throughout Milwaukie by Traffic Analysis Zones (TAZ), which are geographic groupings. This land use data base includes the number of dwelling units, number of retail employees and number of other employees for each zone. The TAZs used for this study are shown in Figure 6.9. Table 6.8 shows the results of this TAZ inventory for existing and future conditions. These figures differ somewhat from those presented in Chapter 2 because the TAZ figures actually encompass more area than the Milwaukie City limits.

Table 6.8
Milwaukie Area Land Use Summary

Land Use Type	1990 Scenario	2015 Scenario
Households	9,233	11,750
Retail Employees	2,054	2,700
Other Employees	11,587	14,566

Source: Metro and City of Milwaukie

Milwaukie is designated as a Regional Center by Metro in its 2040 Regional Concept Plan. This means that Milwaukie is intended to grow at a higher level of intensity and density than other areas not designated as such. The land uses assumed for 2015 indicate that residential growth will be the most significant in unincorporated areas to the east of Milwaukie (between Milwaukie City limits and I-205), and the retail and non-retail employment will increase in Milwaukie's Regional Center area.

Forecasts of 2015 traffic volumes were developed using Metro's travel demand model. These data were reviewed and refined to produce detailed traffic forecasts at intersections. When assigned to the roadway network, this level of traffic growth is expected to create the need for improvements at several locations. Table 6.9 lists the intersection levels of service under 2015 base future conditions and, where required, under a mitigated scenario. Level of service calculations can be found in Appendix 9.

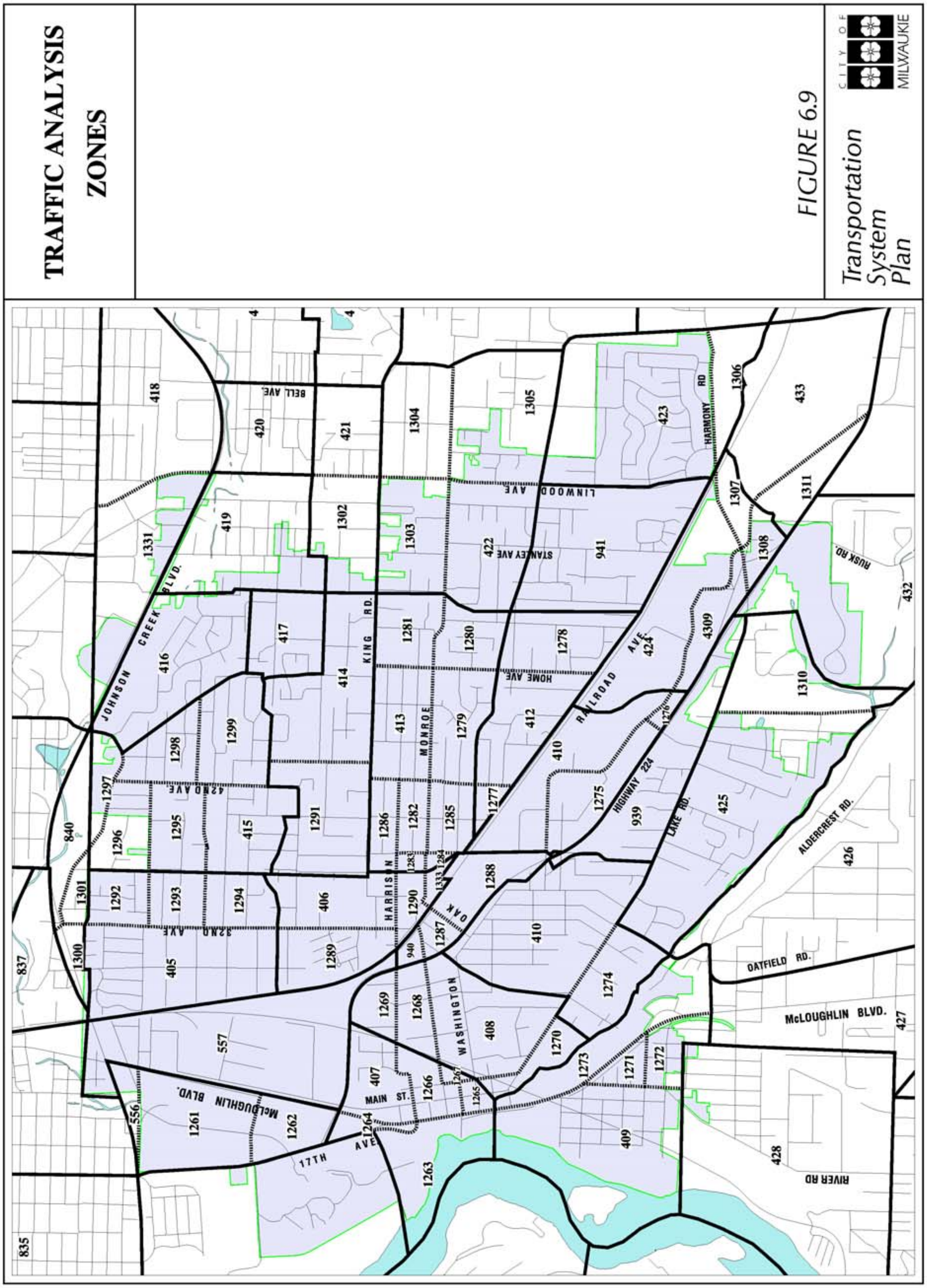

TRAFFIC ANALYSIS
ZONES
FIGURE 6.9
Transportation
System
Plan
CITY OF
MILWAUKIE
JOHNSON CREEK BLVD.
BELL AVE.
LINWOOD AVE
STANLEY AVE
KING RD.
HOME AVE
MONROE
RAILROAD AVE
HARMONY RD
RUSK RD.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
OATFIELD RD.
McLOUGHLIN BLVD.
RIVER RD
42ND AVE
32ND AVE
HARRISON
OAK
WASHINGTON
MAIN ST.
17TH AVE
McLOUGHLIN BLVD.

Table 6.9
2015 PM Peak Hour Intersection Level of Service

Intersection	Existing* LOS Delay V/C	2015* LOS Delay V/C	2015 Mitigated* LOS Delay V/C
32nd Ave/Johnson Creek Blvd	B/F/*/A	B/F/*/B	B 11.7 0.79
42nd Ave/Johnson Creek Blvd	B/*/C/B	B/*/F/C	B 8.1 0.80
ORE 99E/Harrison Street	E 45.3 1.02	F >60.0 >1.00	D 34.9 0.98
ORE 99E/Jackson Street	A/A	A/A	A/A
ORE 99E/Monroe Street	D/A	E/B	E/B
17th Ave/ORE 224	C 22.6 0.86	C 24.6 0.89	C 24.6 0.89
ORE 224/Harrison St	C 22.2 0.87	F >60.0 >1.00	E 58.3 1.11
ORE 224/Monroe St	B 8.4 0.72	D 31.3 >1.00	B 13.8 0.93
ORE 99E/Jefferson St	B 6.8 0.79	B 12.7 0.95	B 14.7 0.95
ORE 99E/Washington St	D/A	E/B	E/B
32nd Ave/Harrison St	B 14.6 0.38	B 14.2 0.45	B 14.2 0.45
42nd Ave/Harrison St	D/C/C/A	E/D/F/A	B 9.6 0.56
42nd Ave/King Road	C/*/A/B	D/*/B/C	D/*/B/C
43rd Ave/King Road	A/E	A/F	B 6.8 0.45
Stanley/King Road (West)	A/D	A/F	B 7.0 0.55
Stanley/Johnson Creek Blvd	B/E	D/E	D/E
Linwood Ave/Johnson Creek Blvd	C/F	E/F	C 17.5 0.83
Stanley/King Road (East)	A/C	C/D	B 7.0 0.55
Linwood Ave/King Road	C 20.1 0.66	D 29.7 0.92	D 35.3 0.93
37th Ave/Monroe Street	B/A/C/A	C/A/D/B	C/A/D/B
Oak St/Railroad Ave	A/B	A/D	A/D
Oak St/ORE 224	C 18.3 0.83	F >60.0 >1.00	E 43.2 1.07
Linwood/Railroad/Harmony	D 31.1 0.92	F >60.0 >1.00	D 32.7 0.88
37th Ave/ORE 224	B 11.4 0.79	E 40.3 >1.00	D 30.5 1.04
Oatfield Rd/Lake Rd	D 31.9 0.90	E 52.8 >1.00	D 32.3 0.85
Oak/Washington	A/C	A/E	A/E
37th Ave/Railroad Ave	A/C	A/C	A/C

* LOS shown for unsignalized intersections (A/A) represents Major Street Approach/Minor Street Approach. All-way stop controlled intersections use a different methodology. Level of services for all-way stop controlled intersections are reported for each approach (northbound, southbound, eastbound, westbound) in this document. Note that asterisks (*) appear where no approach exists.

SUGGESTED IMPROVEMENTS

Traffic signal warrant analyses[5] were performed for all unsignalized intersections operating at LOS E or worse under future base (Year 2015) conditions. See Table 6.10. Traffic volumes should be monitored at these locations and more detailed traffic signal warrant analyses performed before installing any traffic signals. The locations identified are preliminary only; traffic signals may or may not be warranted at these (or other nearby) locations.

Table 6.10
Future (2015) Signal Warrant Summary
Unsignalized Intersections

Intersection	Existing			Future
	MUTCD Warrant 11	ODOT Warrant 1	ODOT Warrant 2	MUTCD Warrant 11
Stanley Avenue/King Road	No	No	No	Yes
43rd Avenue/King Road	No	70%	No	Yes
42nd Avenue/Harrison Street	No	70%	No	Yes
42nd Avenue/Johnson Creek Boulevard	Yes	70%	70%	Yes
32nd Avenue/Johnson Creek Boulevard	No	70%	Yes	Yes
42nd Avenue/King Road	No	No	No	No

Improvements which should mitigate Year 2015 conditions are described in Table 6.11. Prioritization should occur in coordination with the Capital Improvements Program (CIP) process. All improvements on arterials and collectors will include sidewalks for pedestrians, bike lanes for bicyclists, and transit facilities for buses and park-and-riders. Several intersections are noted for signalization. Each of these sites will also need to address improved crossings by pedestrians and bicyclists. All new traffic signals should consider use of protected/permissive left turn signal phasing to reduce vehicular delay.

[5] Traffic signal warrants were checked using MUTCD, Warrant 11, Peak Hour Volume Warrant and ODOT Warrants 1 and 2 (Minimum Vehicular Traffic and Interruption of Continuous Traffic, respectively).

Table 6.11
Future Street Improvements Project List

Number	Location	Description
1	32nd Avenue/Johnson Creek Boulevard	Signalize intersection when warranted because of level of service.
2	42nd Avenue/Johnson Creek Boulevard	Signalize intersection when warranted because of level of service.
3	ORE 99E/Harrison Street Intersection	Add eastbound right turn lane. Restripe westbound from left/through/right to through/right.
4a	42nd Avenue/Harrison Street	Signalize intersection when warranted because of level of service.
4b	43rd Avenue/King Road	Signalize intersection. Consider alternative site at 42nd prior to implementation.
4c	Harrison Street/42nd Avenue/King Road Alignment	This project would improve multimodal connections and traffic flow using Harrison Street and King Road as a through route near 42nd Avenue where the corridor is disjointed presently.
5a	Stanley Avenue/King Road	Signalize intersection. The north and south legs of this intersection are offset by about 50-100 feet. At the time that this intersection warrants signalization, an analysis should be performed to determine the best placement of signal heads and whether or not both the north and south legs of the intersection are to be operated from the same traffic signal.
5b	Stanley Avenue Realignment	Align the north and south approaches of Stanley Avenue as they intersect with King Road to improve safety with future traffic control.
6	Linwood Avenue/Railroad Avenue/Harmony Road Intersection Improvement	Add northbound right turn lane. Add eastbound right turn lane. Add westbound left turn lane (making double left turns and extend five lane Lake Road south toward ORE 224). Coordinate with Tri-Met plans for Light Rail grade crossing and conduct further study to determine optimal operation Tri-Met project will require a grade separation of the railroad tracks and connection of Harmony Road as through route to Lake Road.
7	Oatfield Road/Lake Road	Add eastbound right turn lane.

Number	Location	Description
8	ORE 224 Access Control	Surface intersections will operate at poor levels of service in future without improvement. Even with intersection modifications, adequate operation cannot be maintained in the future. Tri-Met LRT crossing of ORE 224 affects design solutions. A coordinated corridor study of ORE 224/ORE 99E through Milwaukie is needed involving the City, County, ODOT, and Tri-Met (including study of ORE 224, ORE 99E, and adjacent surface streets). Three initial options to ORE 224 have been outlined: 1) Widen ORE 224 as a seven lane major Arterial with signalized intersections. This would not provide access control and would continue to improve significant delays to regional traffic on the State highways (potentially resulting in diversion onto Milwaukie streets, such as 32nd Avenue, Johnson Creek Blvd, 17th Street, and 34th Avenue. 2) Provide access control on ORE 224 through Milwaukie, eliminating signalized intersections and replacing them with an interchange and overcrossing system. In this option ORE 224 would be grade separated from local Milwaukie streets. Right-of-way for up to three lanes each way on ORE 224 should be preserved even though two lanes each way would be sufficient to serve the 2015 forecast. 3) This is similar to option B, except that ORE 224 would be left at grade and Milwaukie streets would be elevated over the State highway.
9	ORE 224/Lake Road/ORE 99E Linkage	Due to future travel demand between the Lake Road/ORE 224 area and the ORE 224/River Road area, a study should be conducted to determine the best transportation alternative to serve this demand. Without improvement, Oatfield Road will be over capacity and greater potential for neighborhood traffic intrusion will exist in this area of Milwaukie. This work should be coordinated with ORE 224 and ORE 99E studies.
10	ORE 99E /Access Control	Capacity constraints of signalized intersections between the Tacoma Street interchange and ORE 224 will require access control with future traffic to avoid diversion of traffic onto Milwaukie streets. For safety and capacity needs, full access control should be considered. Two improvements that need to be made include: (1) the frontage road connection from Milport Road to Tacoma Street, and (2) the overcrossing of Ochoco Street across ORE 99E. Access to future LRT park and ride station must be integrated into the future circulation. Access control consideration may favor placing the LRT station closer to the Tacoma Street overcrossing than to the south. The ORE 99E/ORE 224 Corridor study should address the optimal configuration of local streets and overcrossing.
11	River Road at ORE 99E	Due to accident history and through use of River Road/22nd, reconstruct intersection of River Road. Consolidate access to ORE 99E at River Road to improve safety. Utilize protected/permissive left turn phasing, as appropriate. Close 22nd access to ORE 99E, requiring some out of direction travel via River Road to reduce through travel. Rebuild pedestrian access.
12	ORE 99E in Downtown Area	Pursue Regional Boulevard concept for ORE 99E between Harrison and Washington Street. Five lane capacity of ORE 99E is adequate for 2015; however, some intersection widening at Harrison Street would be necessary (see above #3).
13	Johnson Creek Boulevard Multimodal (32nd Avenue to 45th Street)	Acquire right-of-way and construct improvements that include sidewalk (on the south side) curb, travel lanes with improved alignment, bike lanes, storm drainage and illumination. Direct access provided to Springwater Corridor (Phases I and II). Phase I, 32nd Avenue to 36th Avenue has been constructed by the City of Portland.

Number	Location	Description
14	Johnson Creek Boulevard Multimodal (45th Street to 82nd Avenue)	Reconstruction of roadway to include three lanes, sidewalks, curb, (and bike lanes where needed).
15	17th Avenue Ped/Bike	Design and construct continuous sidewalk on west side of 17th Avenue from Lava Drive to Ochoco Street. Complete bike lane corridor and storm drainage improvements.
16	Linwood Avenue Ped/Bike	Design and construct sidewalks, curb, and bike lanes for 1.1 miles between Harmony Road and Monroe St. Work with County to do same between Johnson Creek Boulevard and Monroe.
17	Harrison Street Boulevard	Construct boulevard and with bicycle lanes and bus system improvements between ORE 99E and ORE 224
18	Railroad Avenue Bike/Ped	Design and construct sidewalk with curb on north side of Railroad Avenue, and bike lanes between SE 37th Avenue and Harmony Road (subject to final South-North Light Rail route selection).
19	37th Avenue Multimodal	Improvements would be between International Way and Harrison Street and would include provisions such as left-turn lanes, bicycle lanes, and sidewalks and would provide connection between shopping area, possible future LRT, industrial areas, and residential areas. Gaps exist in sidewalks presently. Project would widen street, fill gaps in sidewalk between International Way and Railroad Avenue (west side), reconstruct street between Railroad Avenue and Monroe Street (coordination with half street frontage improvement for LRT station should be considered), and provide a bicycle accommodation and an east side sidewalk between Harrision Street and Monroe Street.
20	Stanley Avenue Multimodal	A recent County improvement project built a sidewalk on the east side of Stanley Avenue from King Road to Willow Street. This project would extend the east side sidewalk north to Johnson Creek Boulevard, linking up the Springwater Corridor Trail with the neighborhood, King Road, and schools in the area. A 28-foot roadway would provide for a bicycle accommodation.
21	42nd/43rd Avenues Bike/Ped	Improvements are from Johnson Creek Boulevard to King Road and include bicycle lanes, curb and gutter, and a continuous sidewalk on one-side of the project segment.

SAFETY

NEEDS

City staff have identified locations in Milwaukie which are in need of safety improvements based upon the accident data found in Chapter Two and field observations. These locations are:

- ORE 224/37th Avenue/International Way
- ORE 224/Oak Street/Washington Street
- Oak Street/Railroad Avenue
- 22nd Avenue/River Road/Sparrow Street/ORE 99E
- Milport Road/ORE 99E
- 37th Avenue/Railroad Avenue (barriers hit by trucks)
- 21st Avenue/Lake Road

SUGGESTED IMPROVEMENTS

Most of these locations are included in future street improvements listed in Table 6.12 (e.g., ORE 224 locations). In the short term, specific action plans should be prepared to address whether beneficial improvements at these locations can be made without affecting future plans.

RECONSTRUCTION

NEEDS AND STRATEGIES

The City of Milwaukie conducted an extensive pavement system condition evaluation. City staff have identified priority roads in need of reconstruction, both in Milwaukie and in Clackamas County (within Milwaukie's Urban Growth Boundary Management Area). These roads are:

Milwaukie

- Monroe Street - 42nd Avenue to Linwood Avenue
- 42nd Avenue - Monroe Street to Railroad Avenue; Harvey Street to Johnson Creek Boulevard
- Stanley Avenue - King Road to Railroad Avenue
- Lake Road - Oatfield Road to city limits (21st to city limits if include bike lane improvement)
- 37th Avenue - Railroad Avenue to King Road
- 17th Avenue - Lava Drive to Ochoco Street

Clackamas County

- Johnson Creek Boulevard - 36th to 45th (with Milwaukie and Portland)
- Linwood Avenue - Johnson Creek Boulevard to Monroe Street
- Monroe Street - City limits to Price-Fuller Road
- Bell Avenue - Johnson Creek Boulevard to King Road
- Lake Road - City limits to Harmony Road
- Stanley Avenue - King Road to Johnson Creek Boulevard

Secondary Priorities

- 22nd Avenue and River Road - City limits to ORE 99E
- 42nd - 43rd Avenues - Johnson Creek Boulevard to King Road
- Home Avenue - King Road to Railroad Avenue
- Logus Road - 43rd Avenue to Stanley Avenue
- Roswell Street - 32nd Avenue to 42nd Avenue
- Olsen Street - 32nd Avenue to 42nd Avenue

STREET SYSTEM CRITERIA

Milwaukie's Roads Working Group, in conjunction with City staff, created a set of goals and objectives to guide transportation system development in Milwaukie (see Chapter 8 for specifics). Several objectives pertain specifically to automobiles:

1.1 REGIONAL TRAFFIC: To rely on existing Freeways/Expressways and Major Arterials as the regional streets network, for the through movement of regional traffic.

2.1 ROADWAY CLASSIFICATION: To classify roadways within the City for the multimodal functions and adjacent land uses they serve.

2.2 ROADWAY CONSTRUCTION AND IMPROVEMENTS: To improve the access, circulation and safety of roadways.

2.3 LOCAL TRAFFIC: To ensure that neighborhood and local streets serve local traffic in a safe manner.

2.4 ACCESS MANAGEMENT: To maintain traffic flow and mobility on arterial and collector roadways.

2.5 STREET MAINTENANCE: To maintain city streets in good to excellent condition, as defined by the Pavement Quality Index.

2.6 CONNECTIVITY: To enhance street system connectivity wherever practical and feasible.

These goals, objectives and policies are the criteria that all automobile-related improvements or changes in Milwaukie should be measured against to determine if they conform to the intended direction of the City.

STRATEGIES

Several strategies for future auto/street related projects in Milwaukie were developed in a joint meeting of two Citizen Working Groups (Roads and Pedestrian/Bicyclist). These strategies assist the City in prioritizing projects that implement auto/streets related goals, objectives and policies. Table 6.12 summarizes the types of improvements (i.e., capacity, circulation, safety, upgrade, access control or multimodal) represented by each of the projects listed in Table 6.11.

Table 6.12
Identified Improvements Strategies Comparison

Number	Location	Capacity	Circ	Safety	Upgrade	Access Control	Multi-Modal
1	32nd Avenue/Johnson Creek Boulevard	✓		✓			
2	42nd Avenue/Johnson Creek Boulevard	✓		✓			
3	McLoughlin Boulevard/Harrison Street	✓					
4	42nd Avenue/Harrison Street	✓		✓			
5	43rd Avenue/King Road	✓	✓	✓			
6	Stanley Avenue/King Road	✓	✓	✓			
7	Linwood Avenue/Johnson Creek Boulevard	✓		✓			
8	Linwood Avenue/Railroad Avenue/Harmony Road	✓					
9	Oatfield Road/Lake Road	✓					
10	ORE 224	✓	✓	✓	✓	✓	✓
11	ORE 99E north of Downtown	✓	✓	✓	✓	✓	✓
12	ORE 224/Lake Road/McLoughlin Boulevard Linkage		✓				✓
13	River Road at McLoughlin			✓			✓
14	99E in Downtown Area	✓	✓	✓	✓	✓	✓
15	Lake Road	✓		✓			✓
16	Harmony Road	✓		✓			✓

Strategy 1 - "Do Nothing"

This strategy does nothing to meet the existing and future auto needs of the City of Milwaukie beyond requiring developments to provide new streets within subdivisions and half-street improvements, if necessary. Since this would not meet the objectives of the City, this strategy was rejected.

Strategy 2 - "Multimodal Improvements"

This strategy focuses on providing walkway, bikeway and transit-related improvements. It is consistent with the Transportation Planning Rule's goal to reduce vehicle miles traveled by providing more opportunities for travel by other modes. The key to Milwaukie's success in the future as a livable community and Regional Center is to complete developed walkway, bikeway and transit networks and related facilities that promote the use of these travel modes to popular destinations.

Strategy 3 - "Circulation Enhancements"

This strategy focuses on establishing additional circulation alternatives. This additional circulation could be provided by constructing entirely new roadways or adding capacity on existing roadways, making them feasible alternatives for circulation. (See Strategy 4 for examples of capacity improvements.)

Strategy 4 - "Capacity Improvements"

This strategy focuses on improving capacity on existing roadways. This can be achieved in a number of ways including adding travel lanes, adding turn lanes at intersections, providing traffic signals or improving signal timing on existing traffic signals. This strategy is critical for enhancing capacity of the State highway system. The City should work with ODOT to improve ORE 99E and ORE 224 as limited access freeways.

Strategy 5 - "Safety Improvements"

This strategy aims at providing improvements at locations which are considered to be high accident sites. This could be achieved by improving sight distance, installing a traffic signal, improving roadway conditions or correcting a geometric design problem. Safety improvements should be considered as a priority to the City and should address all modes of transportation along identified corridors or at intersections.

Strategy 6 - "Improve Roadways to City Standards"

This strategy focuses on upgrading existing roadways which do not meet current City standards. This could involve widening to meet the lane width requirements, adding bike lanes or sidewalks, or improving storm drainage at the current City standards.

MAINTENANCE/OPERATIONS

NEEDS

The City hired Pavement Management Systems, Inc. (PMSI) to inventory the existing pavement condition of roadways in the City. They were asked to determine the cost of improving paved roadways identified in poor condition over the next ten years using different funding scenarios.

Preliminary results of the PMSI work suggests that 30 lane-miles of pavement, or 20 percent of paved roadways, in the City are currently in poor condition and in need of rehabilitation. It is estimated that an average of over seven lane miles per year will be in need of rehabilitation between 1996 and 2004. This means an additional 66 lane-miles in the City will need improvements.

STRATEGIES

The City is behind in its street maintenance program for having all paved roadways in good to excellent surface condition. The PMSI study developed two strategies for Milwaukie to rectify this situation.

If nothing is done to improve pavement surface condition, the City's ability to maintain its streets will fall far behind its possible resources as the number of paved roads in good condition diminishes and the amount of lane miles in need of rehabilitation increases. PMSI estimates that up to 80% of the paved lane miles in the City will be in poor condition. This would border on a situation in twenty years where nearly all streets would require reconstruction.

A "need based" strategy seeks to address current and future needs as they arise, so that all roads are maintained in good pavement condition. For example, 30 lane-miles have been identified for pavement rehabilitation in 1996 (estimated cost $2,010,000). In addition, an average annual appropriation of $223,000 above the existing street maintenance budget would need to be allocated to address lane mile needs on an annual basis through 2004. The total cost for the "need based" scenario is preliminarily estimated at $4,280,000.

A "balanced" approach addressing pavement management needs in Milwaukie would spread estimated expenditures over the next ten years. Approximately between $310,000 and $400,000 per year above the existing street maintenance budget of $1.27 million, would be required to address identified roadway needs in each of the next ten years. The total cost for this "balanced" approach is estimated at $3,550,000.

OTHER STREET SYSTEM PROGRAMS

NEIGHBORHOOD TRAFFIC MANAGEMENT

NEEDS

Neighborhood Traffic Management (NTM) is a term that has been used to describe traffic control devices typically used in residential neighborhoods to slow traffic. Residents in Milwaukie regularly complain about speeding traffic through their neighborhoods. The City needs to address neighborhood traffic issues. The Revised Functional Classification System has identified a number of streets as neighborhood routes. (See Figure 6.1) These streets are typically longer than the average local street and would be appropriate locations for possible NTM applications.

A wide range of traffic control devices appropriate for NTM are being tested throughout the region, including such devices as chokers, medians, traffic circles and speed humps. The City of Milwaukie has established standards for NTM and has installed speed humps as a test project on 34th Avenue. NTM traffic control devices are being tested within the confines of Milwaukie to assess their applicability. A critical aspect of NTM projects is building consensus for appropriate application. NTM measures should be applied only where a majority of neighborhood residents agree that it should be done (i.e., via petition).

NTM design standards and program criteria should be included in the Roadway Design Manual that is being developed by the City.

STRATEGIES

Strategies for NTM seek to reduce traffic speeds on neighborhood streets, thereby improving livability in Milwaukie. The role of the TSP as a long range plan should not be to identify the type of improvements that are required to address specific neighborhood traffic needs but rather to address what type of streets are appropriate to be considered for NTM. The proposed functional classification system includes a new category (neighborhood routes), which defines potential streets for application of NTM. The strategy for citywide implementation of NTM could be based on one of the following levels of implementation:

- **Aggressive:** The City would fund a NTM program which allows most requests for NTM measures on neighborhood routes to be installed.
- **Reactive:** The City allocates a certain amount of money per year to install selected NTM projects. The number of projects would be limited. The City could also encourage implementation of NTM projects by private development and neighborhood associations.
- **Do Nothing:** The City would not allocate money toward NTM projects, although it could still provide guidelines if private development or neighborhood associations wanted to install NTM projects.

TRANSPORTATION DEMAND MANAGEMENT

NEEDS

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. TDM measures can be an effective tool in reducing vehicle miles traveled. The City needs to consider implementing a TDM Program to help meet its Transportation Planning Rule requirement for a reduction in vehicle miles traveled per capita over the next twenty years. The following are examples of TDM measures:

- Work with employers to install bicycle racks;
- Work with property owners to place parking stalls for car-poolers near building entrances;
- Provide information regarding commute options to larger employers;
- Encourage linkage of housing, retail and employment centers;
- Encourage flexible working hours;
- Encourage telecommuting;
- Provide incentives to take transit and use other modes (i.e., free transit pass);
- Schedule deliveries outside of peak hours; and
- Provide City staff support to Milwaukie TDM coordination.

DEQ has established ECO (Employee Commute Options) goals for trip reductions and has been developing a program for the region along with Metro. A specific subcommittee, the Transportation Policy Advisory Committee (TPAC), addresses TDM issues regionally. The City of Milwaukie can take a leadership role by implementing its own ECO program, and working within the community with employers on meaningful demand reduction. While many of the programs noted above are passive, with City staff and committee participation these programs can produce short term benefits. This would require funding staff time for this purpose.

STRATEGIES

TDM should be a priority of the City. It can be employed as an interim measure to implement the 2040 Growth Concept and can assist the City in meeting the ten percent Vehicle Miles Traveled (VMT) reduction and parking spaces reduction required by the Transportation Planning Rule. Potential strategies for implementation of TDM are listed below.

- **Aggressive:** The City would allocate a full-time staff position to implement a TDM program in Milwaukie. The City could take specific actions (i.e., ordinances) which would encourage employer TDM programs.
- **Moderately Aggressive:** The City would allocate a part-time staff position to begin implementation of a TDM program.
- **Reactive:** The City would wait for DEQ's ECO (Employee Commute Options) rules and respond to those requirements appropriately.
- **Do Nothing:** The City could opt to not implement TDM in Milwaukie at a citywide level.

ACCESS MANAGEMENT PLAN

NEEDS

Access management is important, particularly on high volume roadways, for maintaining traffic flow and mobility. Where local and neighborhood streets function to provide access, collector and arterial streets serve greater traffic volume. Numerous driveways, or street intersections, increase the number of conflicts and potential for accidents and decrease mobility and traffic flow. There is extensive research indicating the negative safety and capacity impacts of multiple or close access points on high volume streets.[6] Milwaukie, as with every city, needs a balance of streets which provide access with streets and serve mobility. While limits on access do not need to apply to every street, if key collectors and arterials do not have access control, traffic will intrude into neighborhoods causing significant impacts. Table 6.13 summarizes a set of proposed access management guidelines for Milwaukie. This system has been adapted from ODOT's Access Management Manual.

The City needs to develop specific access management plans for arterial and collector streets. For example, the Lake Road Multimodal Connection Study recently completed by the Community Development Department addresses access management for an important arterial street in the City.

[6] *Access Management Manual*, Oregon Department of Transportation, Planning Section, August 1991.

Table 6.13
Access Management Classification System

Access Treatment	Functional Classification	Intersection				Desirable Signal Spacing[7]	Median Control
		Public Road		Private Drive			
		Type	Spacing	Type	Spacing		
Full Control (Freeway)	Arterials[8]	Inter-change	2-3 Mi	None	N/A	None	Full
Partial Control	Arterials[9]	At Grade	1/4 Mi	Lt/Rt Turns	300'	1/4 Mi[10]	Partial/None
Partial Control	Collectors[11]	At Grade	300'	Lt/Rt Turns	150'[12]	1,000’	None

STRATEGIES

The City should act on the following strategies to implement access management in Milwaukie:

- Examine roadways with potential to remove access points. Certain streets should be studied to determine if and where access control measures should be implemented. Examples of potential studies are the ORE 224 corridor through Milwaukie, and ORE 99E to the north of downtown.
- New driveway placement should be in accordance with Table 6.13 and should be included in the City’s Zoning Ordinance and Roadway Design Manual. Access requirements should be evaluated at the site plan review stage and shared access should be considered where feasible.

REGIONAL CENTER PARKING

NEEDS

As stated previously, Milwaukie is designated as a "Regional Center" in Metro's 2040 Growth Concept Plan. A "Regional Center" is intended to become the focus of compact higher density and intensity mixed use development and redevelopment with enhanced transit and highway improvements. Because of this designation, parking needs in Milwaukie may be different from current demands and requirements. Parking standards are being reviewed in light of this designation as part of the City’s Regional Center Management Plan. The City may find it necessary to implement a more extensive parking program to serve the "Regional Center" needs. This could include developing maximum parking ratios which correspond to documented demand data provided by DEQ.[13] In areas near LRT stations,

[7] Generally, signals should be spaced to minimize delay and disruptions to through traffic. Signals may be spaced at intervals closer than those shown to optimize capacity and safety.
[8] ORE 224 would fall into this category.
[9] This would include ORE 99E and all other Arterials in Milwaukie.
[10] Optimization/coordination of signals required.
[11] All collectors in Milwaukie would fit into this category.
[12] On residential streets, 20% of dwelling units fronting onto street would be allowed direct access. No direct property access within 200 feet of any intersection with any other collector or higher classification street.
[13] *Peak Parking Space Demand*: Technical Report, DEQ, by JHK & Associates, June 1995.

research has indicated that lower parking ratios are possible within one-quarter mile of the station.[14] Planning in these station areas should consider variable (reduced) off-street parking ratios as an element toward meeting Transportation Planning Rule requirements.

STRATEGIES

The following strategies should be addressed by Milwaukie:

- Parking needs should be reviewed for individual developments at the site plan review stage. Parking provisions should be compared to demand, as identified by ITE or DEQ.[15]
- Consolidation of parking (i.e., parking structures or shared parking) should be encouraged to avoid excessive use of land for surface parking lots
- The City should seek joint use of Light Rail Station area parking resources in Milwaukie's Regional Center to encourage highest density development (to meet 2040 goals).

RECOMMENDED AUTOMOBILE FACILITY PLAN

The Road and Pedestrian/Bicyclist Working Groups reviewed information on existing and future needs and then ranked the strategies based on their priorities of importance. The ranking of these strategies follows, from most important to least important:[16]

- Street Maintenance
- Multimodal Improvements
- Neighborhood Traffic Management
- Circulation Enhancements
- Capacity Improvements
- Safety Improvements
- Improve Roadways to City Standards

Table 6.14 provides an assessment of how each of the strategies meets the requirements of each of the auto-related goals and objectives.

[14] *Beaverton Creek Transit Overlay District, Parking Evaluation*, Tri-Met, by DKS Associates, March 1995.
[15] *Parking Demand*, 2nd Edition, Institute of Transportation Engineers, 1987, and *Peak Parking Space Demand Study*, Oregon Department of Environmental Quality, by JHK & Associates, June 1995.
[16] Appendix contains the overall scoring system.

Table 6.14
Automobile (Street Facility) Strategies Comparisons

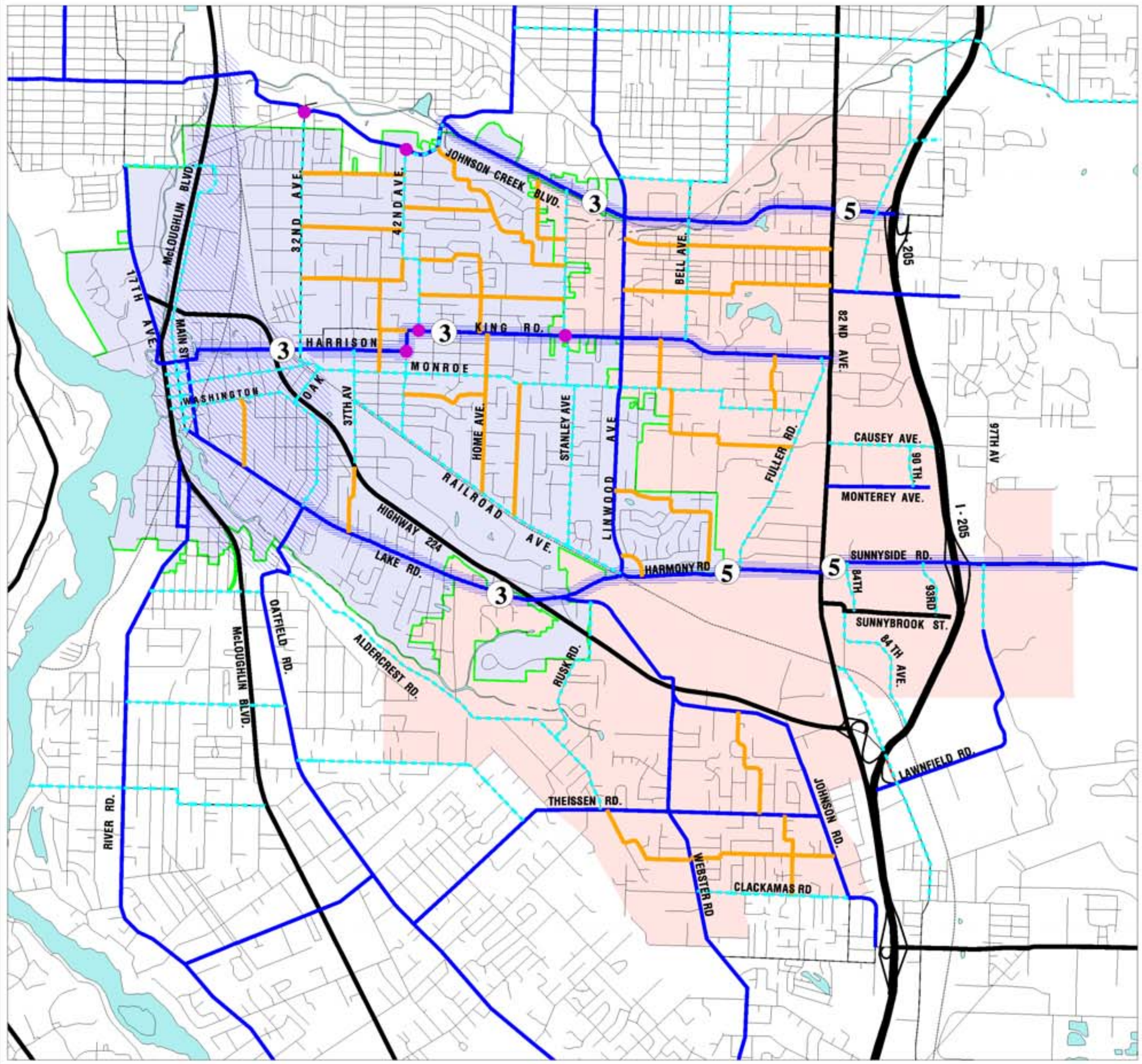
Strategy	Goals					
	1.1	2.1	2.2	3.1	3.2	3.3
1. Do Nothing	○	○	○	○	○	○
2. Maintenance	★★	★	★★	★	★★	★★
3. Multimodal Improvements	★★★	★★	★	★★	★★	★★
4. Neighborhood Traffic Management	★★	★★	★	★	★	★★★
5. Circulation Enhancements	★★	★	★★	★	★★★	★★
6. Capacity Enhancements	★	★	★★	★	★★★	★★
7. Safety Improvements	★	★	★★	★	★★★	★★
8. Upgrading to Current City Standards	★	★	★★	★	★★★	★

○ Does not meet criteria
★ Partially meets criteria
★★ Mostly meets criteria
★★★ Fully meets criteria

City staff generally concurs with the citizen working group prioritization of street improvement priorities. Street maintenance and the implementation of multimodal improvements, especially walkways, should be top priorities. NTM is important and can be an inexpensive program to implement relative to the other strategies. Circulation and capacity improvements should be addressed by the City and in cooperation with adjacent jurisdictions and ODOT. Capacity improvements to ORE 99E and ORE 224 are critical and should be made in the next ten years to protect Milwaukie roadways from overflow traffic especially if traffic flow on these highways continues to deteriorate.

As the City makes improvements to the transportation system, a conscientious effort should be made to bring City streets up to current design standards for all appropriate travel modes.

An Automobile Master Plan and an Automobile Action Plan (capital-oriented improvements) were developed based on identified needs and priorities (Figures 6.10 and 6.11 respectively). The City, through its Capital Improvement Program (CIP), joint funding with other agencies (County, Metro) and development approval should implement the projects listed in Table 6.11 (Future Street Improvements Project List).



AUTOMOBILE MASTER PLAN

- FREEWAYS AND REGIONAL ROUTES
- ARTERIALS
- COLLECTORS
- NEIGHBORHOOD
- LOCALS
- NEW TRAFFIC SIGNALS
- ULTIMATE NUMBER OF LANES
- OREGON 224 / 99E ACCESS CONTROL STUDY AREA

This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.

FIGURE 6.10

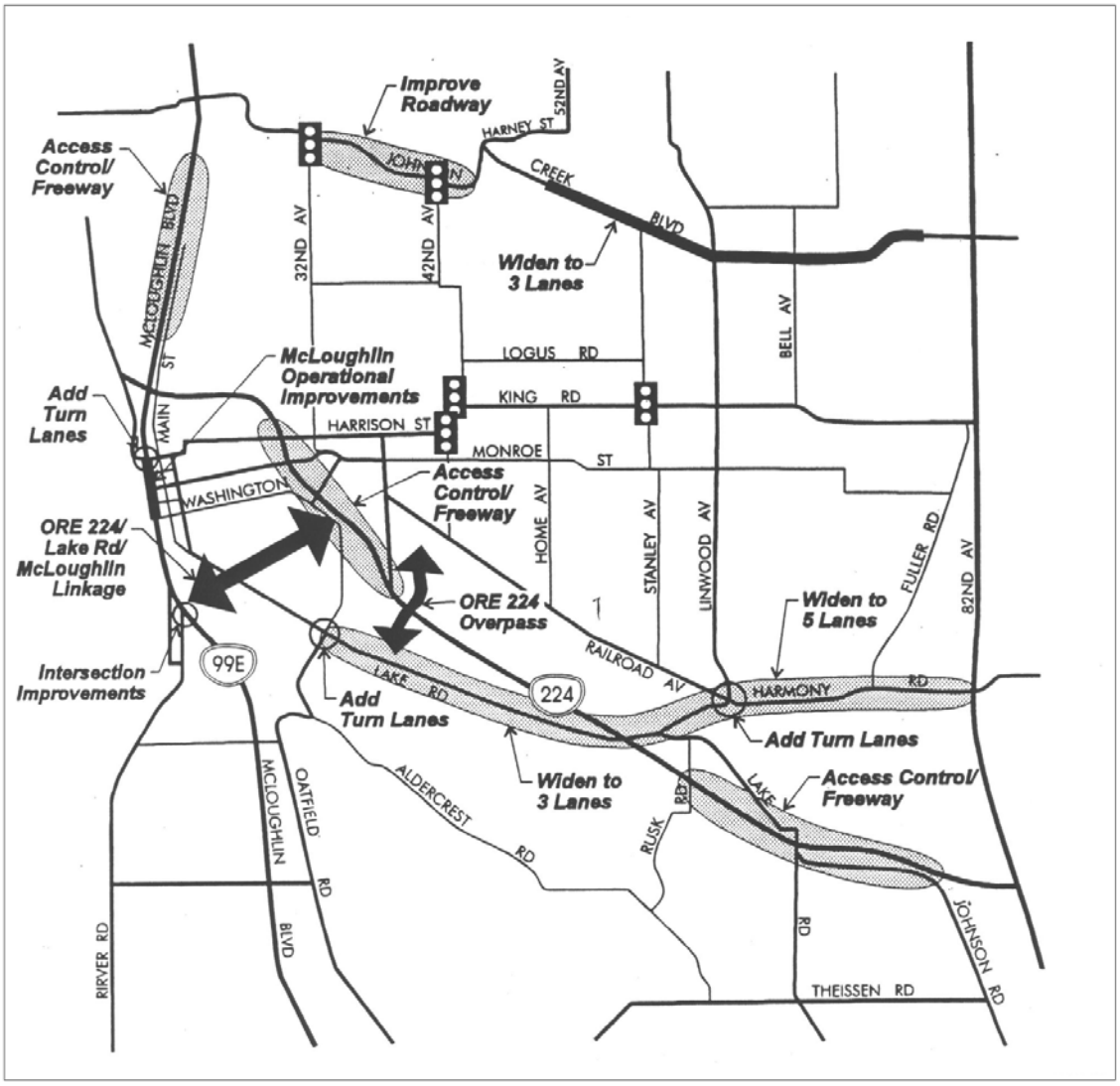
Transportation System Plan

CITY OF MILWAUKIE

DKS Associates

NOT TO SCALE

CITY OF MILWAUKIE



LEGEND

- Install Traffic Signal

Figure 6.11
AUTOMOBILE ACTION PLAN

Generally, the capital-oriented projects can be grouped into four categories. Priority projects for each of these categories is listed below:

- **Signals:** 32nd Avenue/Johnson Creek Boulevard and 42nd Avenue/Harrison Street
- **Intersection Widening:** Linwood Avenue/Harmony Road/Railroad Avenue, McLoughlin Boulevard/Harrison Street/17th Avenue
- **Street Reconstruction:** Johnson Creek Boulevard, Harrison Street, Lake Road
- **Major Projects:** Reconnaissance studies and project development for ORE 224 and ORE 99E

Chapter 7
Rail and Truck Freight

This chapter identifies existing and future rail and truck freight needs in the City of Milwaukie, outlines the criteria to be used in evaluating these needs, provides a number of strategies for implementing rail and truck plans and recommends rail and truck freight plans for the City. Passenger rail transportation is covered in this chapter. The needs, criteria and strategies were identified in part by the City's Roads Working Group. This citizen committee provided input regarding the transportation system in Milwaukie, specifically exploring the movement of goods and services by trucks locally and through the region.

NEEDS

There are two active railroad lines that traverse Milwaukie, connecting the Portland area to the greater region and beyond. Commercial rail transportation uses both of these lines: the Southern Pacific (SP) main line and a branch line. Rail freight traffic is active through Milwaukie, with a minimum of six inbound and six outbound trains per day. The primary need for rail transportation is to have the rail infrastructure, including crossings exist and operate in good to excellent condition. It is also important to minimize conflicts between rail transportation and other modes of travel where they intersect. In the City's broader view of transportation system planning, the City needs to ensure that rail transportation is safely and efficiently conducted and that other modes of transportation are not negatively impacted in their safety and function.

All at-grade railroad crossings in Milwaukie are asphalt. This surface becomes uneven and deteriorates more quickly than concrete or rubberized materials commonly used at railroad crossings elsewhere. Older and disabled citizens, and adults with baby strollers, for example, are experiencing difficulties walking across the asphalt railroad crossings in the City. Bicyclists are also experiencing some difficulties crossing local railroad tracks. Railroad crossings in Milwaukie need to be constructed with concrete or rubberized materials for safer modal travel and a longer lasting crossing surface.

The needs of a local business for pick-up and delivery of goods along the rail system should be addressed by the City, in working with the appropriate rail entities and individual business representatives after a request is made by a local business.

Passenger rail transportation through Milwaukie includes four Amtrak trains that travel daily on the SP mainline through, but not stopping in Milwaukie as they travel to other cities in Oregon and beyond. Passenger rail transportation needs are for the most part the same as for commercial rail transportation. Since there are no rail passenger stops in Milwaukie, the City needs only to address at-grade railroad crossing safety and maintenance issues.

The movement of goods and services by trucks to and from Milwaukie and through the region has different needs than rail freight. The safe and efficient movement of goods is a common goal for both truck and rail freight. However, trucks use different infrastructure, have different land use implications and must be integrated with other modes in the broader transportation system. Commercial trucks have specific travel needs such as adequate lane widths, adequate turning radii at intersections, and adequately designed loading and unloading areas. Truck services also need roadways operating at an adequate level of service so that goods and services can move efficiently through the City, region and state. The Roads Working Group identified many of these needs and also recommended that local truck routes be established for trucks making deliveries in Milwaukie. The Working Group identified the need to minimize truck traffic through residential areas as well as potential safety, noise and roadway condition impacts.

CRITERIA

A set of goals, objectives and policies to guide transportation system development in Milwaukie was developed. See Chapter 8 for a listing of rail and truck-related goals, objectives and policies. The following goals are directed specifically at rail and truck freight and passenger rail:

Goal 1: Ensure a safe, accessible and efficient freight rail system that facilitates the movements of goods to and from Milwaukie and through the region and State while minimizing conflicts with other travel modes.

Goal 2: Ensure a safe and efficient passenger rail system through Milwaukie that minimizes conflicts with other travel modes.

Goal 3: Provide a safe, cost-effective and efficient truck route system that facilitates the movement of goods and services to and from Milwaukie and through the region.

These goals and their related objectives and policies are the criteria that all rail and truck freight and passenger rail improvements in Milwaukie should be measured against to determine if they are consistent and further the intended vision of the City.

STRATEGIES

Several strategies were developed by City staff for future freight-related projects in Milwaukie. These strategies are aimed at providing the City with priorities to direct its funding toward rail and truck freight projects that meet the goals and policies of the City. Table 7.1 which follows the discussion of strategies, provides an assessment of how each strategy meets the requirements of the aforementioned goals.

Strategy 1 - "Do Nothing"

This strategy does nothing to meet the future rail and truck freight needs of the City of Milwaukie.

Strategy 2 - "Improve Railroad Crossings for Pedestrians and Other Travel Modes"

This strategy focuses on reconstructing all asphalt railroad crossings in Milwaukie with concrete or rubberized material so that pedestrians and other travelers such as bicyclists can cross these intersections safely. The replacement of asphalt crossings with concrete or rubberized material will provide a more permanent and even surface and will require less maintenance.

Implementation: The City should request the Southern Pacific Railroad Company and the Oregon Public Utilities Commission (PUC) to replace the existing asphalt railroad crossings with concrete or rubberized material. A schedule of improvements including prioritizing the most needed projects should be accomplished in the short term. The City should coordinate with these entities until all of the asphalt crossings are replaced.

Strategy 3 - "Improve Railroad Crossings For Efficient Movement of Commercial and Passenger Trains"

This strategy focuses on the City coordinating with the Southern Pacific Railroad Company to identify problems with those at-grade crossings that are in need of design changes, and develop mutually agreed upon solutions and construction projects. Once consensus is reached on a railroad crossing solution, the parties should work together to improve the situation.

Implementation: The City should actively participate in railroad crossing improvement planning and construction and in doing so, ensure that other transportation modes are not negatively impacted by railroad crossing improvements. Generally, it is a PUC and railroad goal to eliminate at-grade crossings by closing them or making them grade-separated from a roadway. While this promotes rail safety, it may create a barrier to circulation for pedestrians, bicyclists and others. Railroad needs should be balanced with the needs of all travel modes.

Strategy 4 - "Improve Local Business Accessibility to Railroad Services"

This strategy has the City participating with local businesses who request to work with the Southern Pacific Railroad Company or other appropriate entities, on expanding railroad services to particular businesses.

Implementation: The City should assist a local business, if so requested, by meeting with interested local business and railroad representatives, to investigate local business connectivity into rail system service.

Strategy 5 - "Improve Truck Route Roadways and Intersections To Adequately Serve Trucks"

All truck routes should be designed and built to accommodate the safe movement of trucks through the City and greater region. This strategy requires that necessary roadway improvements be made to local, County and State roadways to facilitate the safe and efficient movement of truck freight. Improvements may be to widen lane widths or modify intersection radii to accommodate truck movement or to coordinate signal timing to reduce the number of times trucks must stop and start (which causes the greatest noise and air impacts).

Critical to the efficient movement of freight trucks is the maintenance of regional trucks routes at adequate levels of service. Highways 224 and 99E are regional truck routes through Milwaukie and are of primary importance to the City. Chapter 6 of the TSP discusses the need to maintain and improve these highways to ensure adequate service capacity and flow of traffic and to deter regional traffic using local streets where congestion exists.

Implementation: The City should coordinate with ODOT and other relevant agencies to plan for and make necessary improvements to the regional truck routes over the next twenty years. As part of this effort, the City should periodically evaluate truck movement needs in the City and coordinate with the appropriate jurisdictions and agencies to ensure that roadway improvements along truck routes are identified and addressed in a timely manner.

Strategy 6 - "Consider Minor Truck Routes in the Delivery of Local Goods and Services"

This strategy suggests that specific roadways within the City be identified as minor truck routes and be the preferred roadways for truck travel in the City when making local deliveries or pickups. Trucks traveling through Milwaukie to destinations elsewhere in the region and State should use regional truck routes such as ORE 99E, ORE 224, and Interstate-205. This TSP includes a Truck Freight Routes Map that shows minor preferred truck routes that should be advertised to companies that frequently serve Milwaukie businesses and residents. The intent is that trucks will use the preferred roadways when traveling to destinations in the City. It is understood and accepted that trucks may need to travel on streets not on the Truck Freight Routes Map to complete local business transactions.

Implementation: The City should notify appropriate freight carriers and businesses of the Truck Freight Routes Map when adopted, that includes preferred minor truck routes for local deliveries. The City should strongly encourage these companies to have their drivers follow the preferred truck routes and not travel on collector, neighborhood and local streets, unless making specific deliveries on one of these streets. The City should consider implementing appropriate comprehensive signing reflecting truck routes in the City.

Table 7.1
Rail and Truck Freight Strategies Comparison

Strategy	Goal		
	1	2	3
1. Do Nothing	○	○	○
2. Improve Railroad Crossings for Pedestrian and Other Travel Modes	★★	★★	★
3. Improve Railroad Crossings for the Efficient Movement of Commercial and Passenger Trains	★	★★★	○
4. Improve Local Business Accessibility to Railroad Services	★★	○	○
5. Improve Truck Route Roadways & Intersections to Adequately Serve Trucks	○	○	★★★
6. Consider Minor Truck Routes in Delivery of Local Goods and Services	★	○	○

○ Does not meet criteria
★ Partially meets criteria
★★ Mostly meets criteria
★★★ Fully meets criteria

RECOMMENDED RAIL AND TRUCK FREIGHT PLAN

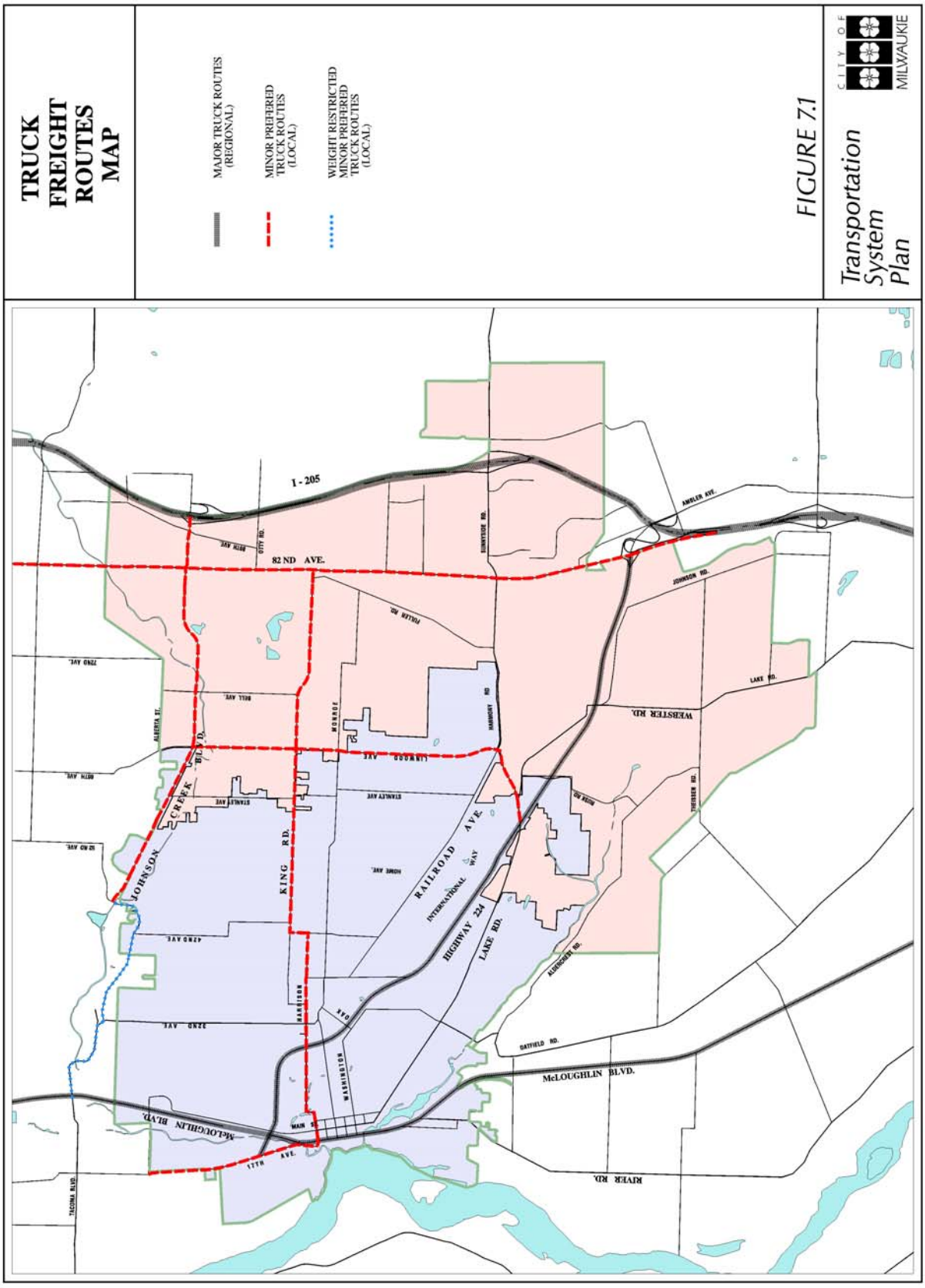
The recommended plan for rail transportation through Milwaukie has as one of its top priorities the reconstruction of all asphalt railroad crossings in the City to concrete or rubberized material. In addition, the City should maintain a ongoing cooperative relationship with the local railroad entities and the PUC to handle specific needs and priorities for commercial and passenger rail and overall transportation system needs and priorities as they arise.

In addition, future land use planning in the City, especially in the Expanded City Center, should consider the active railroad lines that run through it. New development and redevelopment should be reviewed and permitted so that minimum conflicts are created at railroad crossings for the interacting travel modes.

The Truck Freight section of this plan includes specific roadway improvements that benefit truck freight movement and a Truck Freight Routes Map that defines the most suitable corridors for truck freight travel.

The Roads Working Group identified one specific road improvement that would benefit commercial trucks. This is an intersection improvement at ORE 224 and Webster Road, in the City's future growth area (UGBMA). This would need to be an ODOT project since it involves a State highway. Chapter 6 - Automobiles lists specific road improvement priorities for automobiles. Many of these projects will also benefit truck freight travel since these projects coincide with local and regional truck routes. See Chapter 6 for specifics.

The Truck Freight Routes Map depicts the preferred local and regional corridors for truck freight travel in Milwaukie and through the region. See Figure 7.1. The City should take actions to encourage trucks to use the minor preferred routes when conducting business within the City. This includes a periodic reminder of the Map to truck companies and businesses that frequently serve Milwaukie businesses and residents. The City should also consider appropriate street signs to help identify and promote the use of these minor preferred truck routes.


TRUCK FREIGHT ROUTES MAP
MAJOR TRUCK ROUTES (REGIONAL)
MINOR PREFERRED TRUCK ROUTES (LOCAL)
WEIGHT RESTRICTED MINOR PREFERRED TRUCK ROUTES (LOCAL)
FIGURE 7.1
Transportation System Plan
CITY OF MILWAUKIE
I - 205
82 ND AVE.
JOHNSON CREEK BLVD.
KING RD.
RAILROAD AVE
INTERNATIONAL WAY
HIGHWAY 224
LAKE RD.
McLOUGHLIN BLVD.
RIVER RD.
WESTER RD.
JOHNSON RD.
ANGLER AVE.
ELLIOTT RD.
HARRISON
WASHINGTON
MONROE
LINWOOD AVE
STANLEY AVE
ROSE AVE
MAIN ST.
DATFIELD RD.
ALDERSEN RD.
THIESSEN RD.
ROSE RD.
HARMONY RD
ALBERTA ST.
TACOMA BLVD.

Chapter 8
Goals, Objectives and Policies

These goals, objectives and policies represent and guide the City's twenty year vision of transportation system improvements. These goals, objectives and policies replace existing Transportation Element goals, objectives and policies of the Milwaukie Comprehensive Plan. The Transportation Planning Rule requirement to address all modes of transportation has prompted the development of more comprehensive goals, objectives and policies for walking, bicycling, transit, rail and truck freight, in addition to automobile travel. Two additional sections on parking and transportation demand management implement the TPR requirement to work at reducing parking areas and vehicle miles traveled in the Portland metropolitan region by 10% over the next twenty years.

These goals, objectives and policies are a result of widespread citizen participation and technical work by staff and the consultant. Citizen working groups were presented data on the existing transportation system and its future needs based on growth projections over twenty years. Using this information, the working groups assisted staff in developing goals, objectives and policies for each travel mode. They prioritized and translated needs and improvements into policies and objectives to reach overall goals.

The ultimate goal for Milwaukie's Transportation System Plan is to promote livability by establishing a safe, efficient, balanced and diverse system that reduces the overall vehicle miles traveled in the next twenty years

WALKING

GOAL STATEMENT 1: Provide a continuous citywide network of safe and convenient walkways that is integrated with other transportation modes.

OBJECTIVE #1: To integrate pedestrian facilities into all planning, design, construction and maintenance activities.

Policies

1. The City will ensure that walkways and related pedestrian improvements (e.g. crosswalks) are constructed on all identified walkway network roadways, either as separate projects or integrated with other roadway-related improvements. Walkway improvements will be implemented in accordance with current local, regional, State and federal standards.

2. The City will enforce regulations requiring developers to include pedestrian facilities and walkway connections within proposed developments and to adjacent land uses and right-of-way in accordance with adopted policies and standards. Developer agreements for the provision of walkways will be implemented and enforced as needed.

3. The City will retrofit crosswalks with handicapped ramps and other pedestrian facilities along City streets. The City will coordinate with the County and ODOT to retrofit existing crosswalks with handicapped ramps along their jurisdictional roadways in or near Milwaukie city limits.

4. Off-road pedestrian path connections to on-road walkways will be implemented as appropriate, as a means of developing neighborhood pedestrian systems.

5. The City will review its walkway standards periodically to ensure consistency with regional, State and federal standards.

OBJECTIVE #2: To connect local walkways to local destinations such as schools, parks, community centers, libraries with other activity centers including the Milwaukie Regional Center and designated main streets, and to connect to other transportation modes such as public transit that lead to regional destinations and activity centers.

Policies

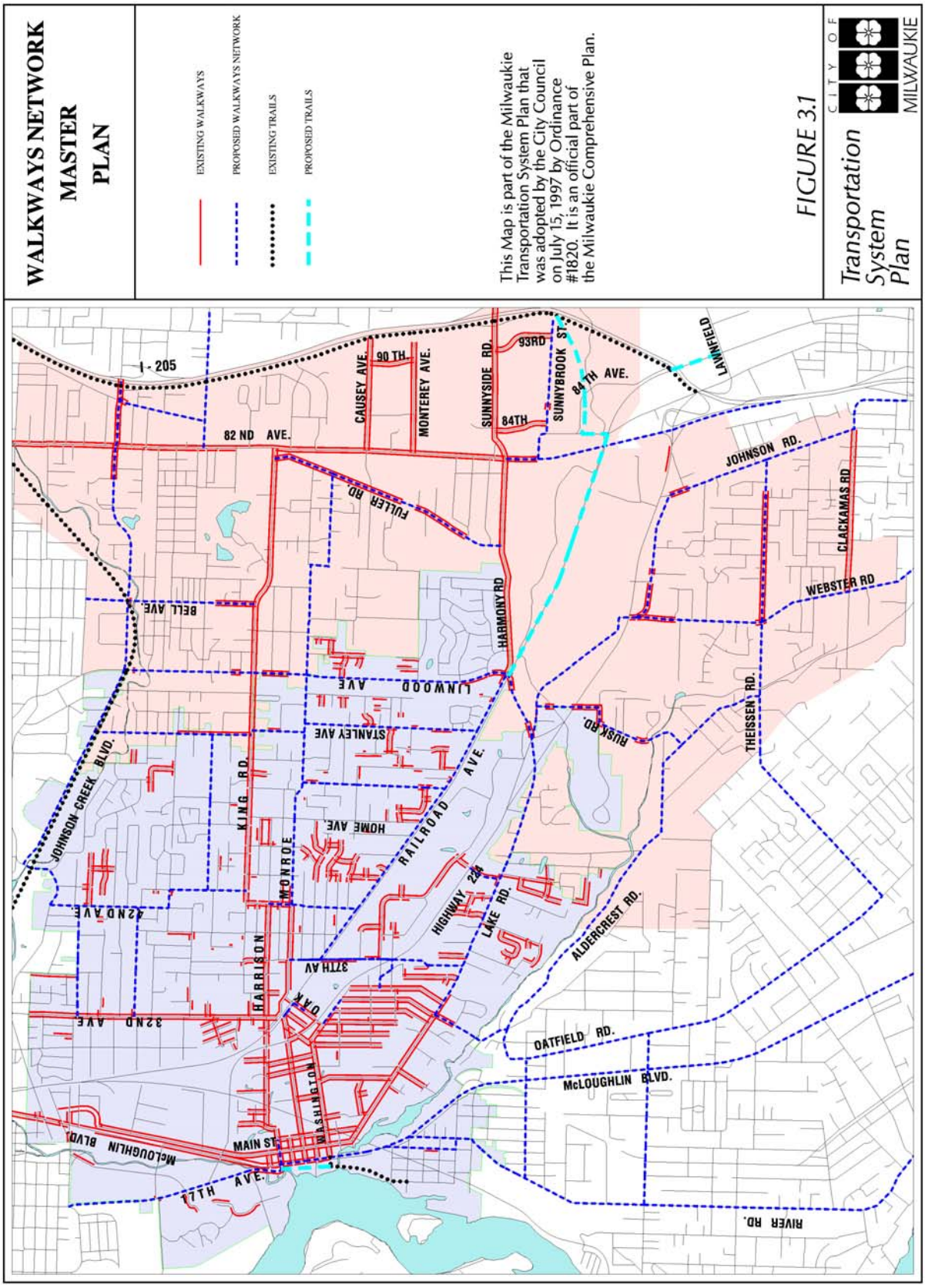
1. The City will ensure that elementary school-related pedestrian projects receive consideration when pedestrian facility improvements are programmed in the Capital Improvements Program.

2. Walkways will be constructed that eliminate gaps in the existing walkway network and provide pedestrian linkages between neighborhoods and to the expanded city center. Preference will be given to eliminating gaps along arterial and collector streets in most cases.

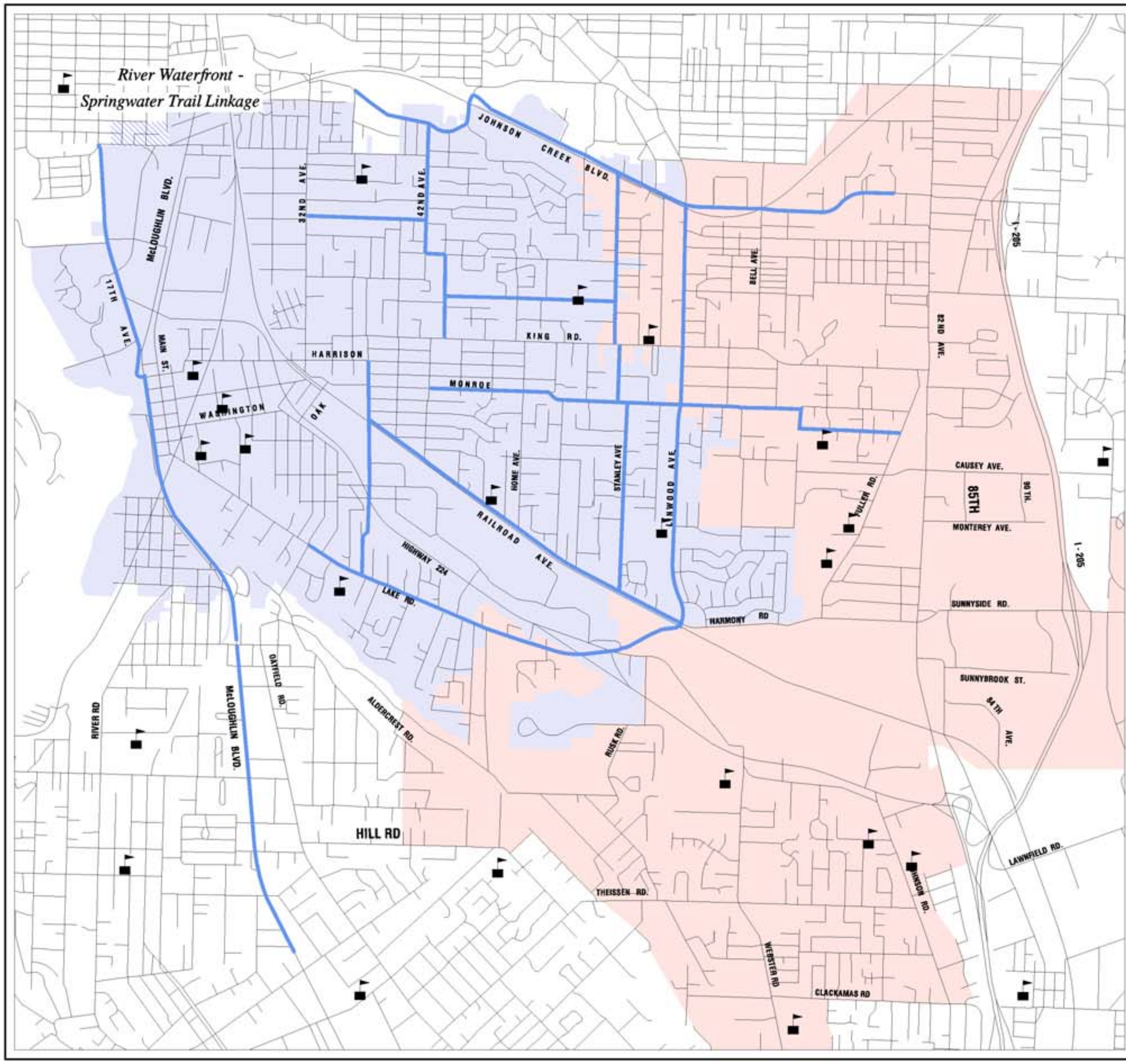
3. The City will implement strategies to reduce pedestrian-related accidents at locations known for increased pedestrian accidents.

4. Walkway projects that connect directly or indirectly to public transit, local and regional destinations, activity centers, parks and multiuse paths, and the regional pedestrian network will be constructed using the adopted Walkways Network Master Plan. See Figure 3.1.

5. The City will implement the adopted Walkways Action Plan which will be updated periodically as walkway projects are completed and walkway priorities change. See Figure 3.2.


WALKWAYS NETWORK
MASTER
PLAN
EXISTING WALKWAYS
PROPOSED WALKWAYS NETWORK
EXISTING TRAILS
PROPOSED TRAILS
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
FIGURE 3.1
Transportation System Plan
CITY OF MILWAUKIE
I - 205
82 ND AVE.
CAUSEY AVE.
90 TH.
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84TH AVE.
84TH
LAWNFIELD
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
FULLER RD
BELL AVE
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE
RAILROAD AVE.
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
42ND AVE
MONROE
37TH AV
OAK
32ND AVE
HARRISON
OATFIELD RD.
McLOUGHLIN BLVD.
WASHINGTON
MAIN ST.
17TH AVE.
RIVER RD.

WALKWAYS ACTION PLAN



WALKWAY IMPROVEMENTS

SCHOOLS

This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.

FIGURE 3.2

Transportation System Plan

CITY OF MILWAUKIE

6. The City will continue to coordinate with Clackamas County, the City of Portland, the North Clackamas School District, the North Clackamas Parks and Recreation District, Metro, Tri-Met and other jurisdictions and agencies to ensure that appropriate local and regional on-road and off-road walkway connections are planned, constructed and maintained.

OBJECTIVE #3: To provide adequate funding for planned walkway network improvements.

Policies

1. The City will coordinate with Clackamas County, ODOT, the North Clackamas Parks and Recreation District, the North Clackamas School District, Metro and other agencies to obtain funding to complete walkway network improvements.

2. The City will apply for transportation funds whenever available, and will seek non-traditional funding sources, to implement planned walkway network improvements.

3. A walkway network fund will be established in the Capital Improvement Program that demonstrates implementation of walkway network and pedestrian facility improvements. Permanent funding sources will be identified and the adequacy of the designated amount will be reviewed and revised at least every three years.

GOAL STATEMENT 2: Maintain and enhance existing and future pedestrian facilities to encourage use.

OBJECTIVE #1: To coordinate an ongoing pedestrian facilities maintenance program.

Policy

1. The City will establish and carry out an ongoing pedestrian facilities maintenance program that informs and educates the public about their responsibilities, and solicits and responds to public comments on specific concerns.

GOAL STATEMENT 3: Increase the use of walking for all travel purposes.

OBJECTIVE #1: To decrease the number of automobiles using roadways in Milwaukie.

Policies

1. Safe, convenient, and well-maintained walkways and related pedestrian facilities will be provided throughout the City.

2. The City will coordinate with Tri-Met on the accommodation of pedestrian needs at transit locations and with transit services.

3. The City will support the expanded use of walking through the review, encouragement and requirement, when appropriate, of pedestrian-friendly design and construction considerations with existing and new developments and redevelopment projects, to encourage walking.

OBJECTIVE #2: To increase the health and physical well-being of Milwaukie citizens through walking.

Policies

1. Schools and community organizations will be encouraged to sponsor walking events periodically.

2. The City will coordinate with Clackamas County, Metro, and community organizations to develop and distribute materials highlighting the benefits of walking.

OBJECTIVE #3: To encourage employers to promote walking among employees and customers.

Policies

1. The City will contact employers and businesses to provide pedestrian related facilities and incentives to encourage walking by employees and customers.

2. The City will coordinate with appropriate agencies, community organizations and neighborhood district associations to improve the streetscape of the City with amenities such as benches, trash receptacles, bus shelters, lighting and newspaper stands.

GOAL STATEMENT 4: Reduce the number of pedestrian related accidents by increasing the safety and security of pedestrians.

OBJECTIVE #1: To promote pedestrian safety education programs for the improvement of traffic skills and observation of traffic laws, and to promote safety for all pedestrians.

Policy

1. The City will coordinate with the County, North Clackamas School District, Metro and community organizations to conduct activities that promote pedestrian safety and education.

OBJECTIVE #2: To reduce pedestrian and motorist violation of traffic safety laws.

Policy

1. The City will promote increased awareness and enforcement of traffic laws as they relate to pedestrians and motorists.

BICYCLING

GOAL STATEMENT 1: Provide a continuous citywide network of safe and convenient bikeways and routes that is integrated with other transportation modes.

OBJECTIVE #1: To integrate bicycle facilities into all planning, design, construction and maintenance activities.

Policies

1. The City will ensure that bikeways are constructed on all identified bikeway network roadways, either as separate projects or integrated with other roadway related improvements. Bikeways will be constructed according to current local, regional, State and federal standards.

2. As opportunities arise, the City will review, pursue and implement smaller scale bikeway improvement projects.

3. Regulations requiring developers to include bicycle facilities and bikeway connections within proposed developments and to adjacent land uses and rights-of-way will be enforced in accordance with adopted policies and standards.

4. The City will periodically review City bicycle facility standards to ensure consistency with regional, State and federal standards.

5. The City will coordinate with Clackamas County and the ODOT to review and consider possible use and installation of bicycle-sensitive control devices (i.e. quadruple loop detectors) which would be identified with appropriate markings and signage for intersection projects.

OBJECTIVE #2: To connect local bikeways and routes for bicyclists to ride to local and regional destinations, activity centers, connections to other transportation modes and the regional bicycle network.

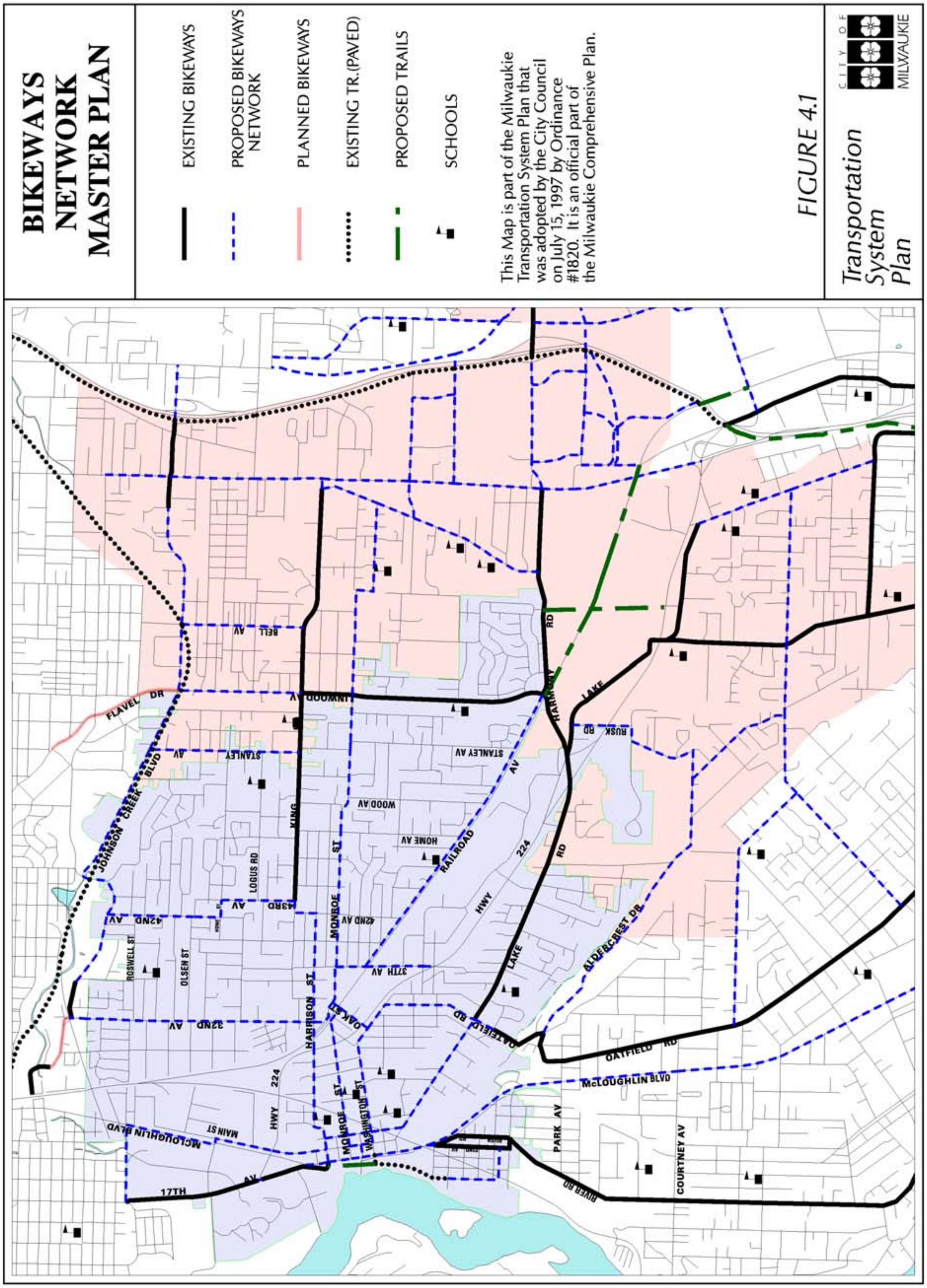
Policies

1. Bikeway projects will be implemented that connect to local and regional destinations, activity centers, transit routes and stations, and the regional bikeway network using the adopted Bikeways Network Master Plan. See Figure 4.1.

2. The City will construct bikeways that fill in gaps in the existing bikeway network.

3. The City will implement strategies to reduce bicycle-related accidents at locations where a high number of bicyclist-related accidents have been reported.

4. The adopted Bikeways Network Master Plan will be updated as needed, to reflect new or revised routes, connections, destinations and activity centers.


BIKEWAYS
NETWORK
MASTER PLAN
EXISTING BIKEWAYS
PROPOSED BIKEWAYS NETWORK
PLANNED BIKEWAYS
EXISTING TR.(PAVED)
PROPOSED TRAILS
SCHOOLS
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
FIGURE 4.1
Transportation System Plan
CITY OF MILWAUKIE

5. The City will implement the Bikeways Action Plan in the Capital Improvements Program which will be updated periodically as bikeways are completed and bikeway priorities change. See Figure 4.2.

6. The City will continue to coordinate with Clackamas County, the City of Portland, the North Clackamas Parks and Recreation District, the North Clackamas School District, Tri-Met, Metro, and other jurisdictions and agencies to ensure that appropriate local and regional bikeway connections, for both on and off-road bikeways, are planned, constructed and maintained.

OBJECTIVE #3: To provide adequate funding for planned bikeway network improvements.

Policies

1. The City will coordinate with Clackamas County, ODOT, the North Clackamas Parks and Recreation District, Metro and other agencies to obtain funding to complete bikeway network improvements.

2. The City will apply for transportation funds whenever available, and seek non-traditional funding sources, to implement planned bikeway network improvements.

3. The City will reconsider the funding amount in the bikeway network fund established in the Capital Improvement Program, so that implementation of bikeway network improvements will be accomplished. Permanent funding sources will be identified and the adequacy of the designated amount will be reviewed and revised at least every three years.

4. Bikeway projects will be periodically updated in the Capital Improvements Program, as new priority projects are identified in the Bikeways Action Plan and as other projects are implemented.

GOAL STATEMENT 2: Maintain and enhance existing and future bicycle facilities to encourage use.

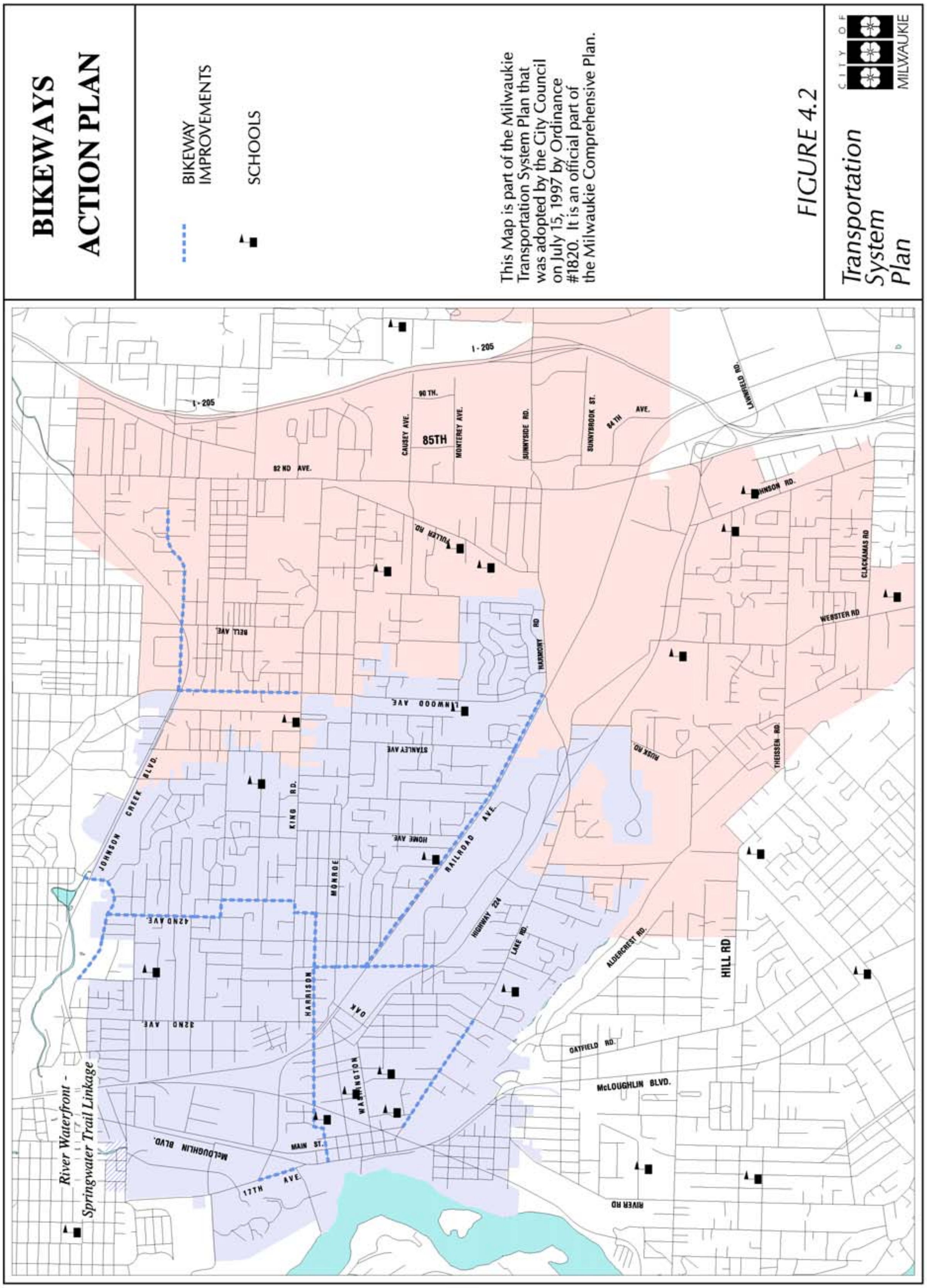
OBJECTIVE #1: To provide an ongoing bicycle facilities maintenance program.

Policy

1. The City will establish and maintain an ongoing bicycle facilities maintenance program that includes a public comment component.

GOAL STATEMENT 3: Increase the use of bicycles for all travel purposes.

OBJECTIVE #1: To provide adequate bicycle support facilities.


BIKEWAYS
ACTION PLAN
BIKEWAY IMPROVEMENTS
SCHOOLS
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
FIGURE 4.2
Transportation System Plan
CITY OF MILWAUKIE
River Waterfront - Springwater Trail Linkage
I - 205
82 ND AVE.
90 TH.
CAUSEY AVE.
85TH
MONTEREY AVE.
SUNNYSIDE RD.
SUNNYBROOK ST.
AVE.
LAWNFIELD RD.
JOHNSON RD.
FULLER RD.
CLACKAMAS RD
WEBSTER RD
BELL AVE.
HARMONY RD
LINWOOD AVE
STANLEY AVE
RUSK RD.
THEISSEN RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
MONROE
42ND AVE
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HILL RD
HARRISON
OAK
32ND AVE
OATFIELD RD.
McLOUGHLIN BLVD.
WASHINGTON
MAIN ST.
17TH AVE.
RIVER RD

Policies

1. The City will require, as appropriate, and encourage the placement of bicycle lockers and bicycle racks at major destinations and activity centers. The City will encourage covered bicycle parking whenever possible.

2. Safe, convenient, and well-maintained bikeways will be provided throughout the City and to the regional bikeway network.

3. The City will coordinate with Tri-Met on the accommodation of bicyclist needs at transit locations and with transit services. Examples of facilities at transit locations include bicycle lockers, bicycle racks, restrooms and water fountains. Examples of bicyclist-related services are bicycles on buses and on high capacity transit.

OBJECTIVE #2: To increase the health and physical well-being of Milwaukie citizens through bicycling.

Policies

1. The City will encourage schools to provide bicycle racks for use by students, faculty and administration.

2. The City will support community sponsored bicycle events as appropriate.

OBJECTIVE #3: To encourage employers to promote bicycle use among employees and customers.

Policies

1. The City will contact major employers about providing bicycle facilities and employee incentives for bicycling to work.

2. The City will coordinate with Clackamas County annually to promote and encourage citizen participation in National Bike-to-Work Week.

GOAL STATEMENT 4: Reduce the number of bicycle-related accidents by increasing safety and security of bicyclists.

OBJECTIVE #1: To promote bicycle safety education programs for the improvement of bicycle handling skills, traffic skills, and observation of traffic laws, and to promote safety for bicyclists of all ages.

Policy

1. The City will participate and/or pursue activities for Milwaukie residents that increase bicyclist safety and reduce the number of bicyclist-related accidents.

OBJECTIVE #2: To promote motorists' understanding of the need for sharing the road.

Policy

1. The City will coordinate with Clackamas County and Metro on the distribution of information to motorists on bicycle traffic laws and sharing the road.

OBJECTIVE #3: To reduce bicyclist and motorist violation of traffic safety laws.

Policy

1. The City will promote an increased awareness and enforcement of motor vehicle and helmet laws as they relate to bicyclists and motorists.

OBJECTIVE #4: To increase security for bicycles and bicyclists.

Policy

1. The City will participate in efforts to increase security for bicycles and bicyclists.

TRANSIT

GOAL STATEMENT 1: Work with Tri-Met to provide local citizens with a convenient and accessible public transit system that is integrated with other transportation modes and transit-supportive land use development.

OBJECTIVE #1: To integrate transit facilities and services, as appropriate.

Policies

1. The City will continue to require that new development along transit routes provide transit and passenger related amenities through the Transportation Planning Review process.

2. The City will actively continue to support and participate in high capacity transit planning and development through Milwaukie and the region.

3. The City will coordinate with Tri-Met to provide benches, bus shelters, bicycle parking, and other passenger amenities at transit facilities to encourage the use of transit by pedestrians and bicyclists.

4. The City will work with Tri-Met and Clackamas County to implement special needs transportation in accordance with the Americans with Disabilities Act (ADA).

5. The City will coordinate with Tri-Met when planning for road improvements on transit routes or arterials and collectors suitable for transit routes, to ensure that structural and design aspects are addressed.

6. The City will participate in the planning of future Fastlink routes through Milwaukie to provide high quality service along busy corridors not served by high capacity transit.

OBJECTIVE #2: To connect local walkways and bikeways to the public transit system that serves regional destinations and activity centers including the Milwaukie Regional Center.

Policies

1. The City will improve pedestrian and bicyclist accessibility along major transit routes and to transit stations using the adopted Walkways and Bikeways Network Master Plans.

2. The City will continue to coordinate with Tri-Met to ensure adequate pedestrian connections to transit routes and station locations.

OBJECTIVE #3: To support a public transit system that is accessible to the largest number of people.

Policies

1. The City will locate transit-oriented development around transit stations, along major transit routes, and in the designated Regional Center area.

2. The City will support more intense and mixed use zoning designations in areas around transit stations, along major transit routes, in the designated Regional Center and along designated Main Street areas identified in the Metro 2040 Growth Concept Plan, through provisions in the Comprehensive Plan and Zoning Ordinance. The City will seek higher concentrations of employment opportunities, residential development and commercial uses in these areas. The City will ensure that development is built consistently with the density allowed by zoning, while protecting the livability of existing neighborhoods.

3. The City will encourage provision of housing for the elderly and moderate income families to be located in close proximity to public transit facilities and services, and interconnected transportation facilities such as walkways and bikeways.

4. The City will coordinate with Tri-Met to ensure that pedestrians and disabled people are accommodated as needed at transit locations and with transit services.

5. The City will continue to coordinate with Tri-Met to ensure that transit opportunities are provided to employees at major employment centers.

6. The City will ensure that transit-oriented public facilities are located along the Primary Transit Network as defined in the Regional Transportation Plan.

GOAL STATEMENT 2: Ensure that Tri-Met maintains and enhances existing and future transit facilities and services to encourage use.

OBJECTIVE #1: To coordinate with Tri-Met on an ongoing transit facilities maintenance program.

Policy

1. The City will coordinate with Tri-Met to ensure that safe, convenient, and well-maintained transit facilities and services are provided by Tri-Met throughout the City.

OBJECTIVE #2: To coordinate with Tri-Met and adjacent jurisdictions on identifying existing and future transit related needs.

Policies

1. The City will coordinate with Tri-Met and adjacent jurisdictions on the annual identification of transit facility and service needs based on public input.

2. The City will coordinate with Tri-Met in long-range transit planning and service delivery including the high capacity transit system and the Primary Transit Network in the Regional Transportation Plan.

OBJECTIVE #3: To support adequate funding for planned transit system improvements.

Policies

1. The City will support Tri-Met, ODOT, Metro, and other agencies that apply for transportation funds to implement planned transit system improvements which affect Milwaukie and the greater region.

2. The City in cooperation with Tri-Met, ODOT, Metro, and other agencies will investigate non-traditional funding sources to implement improvements to the local and regional transit system.

STREETS

GOAL STATEMENT 1: Provide an accessible transportation system that links different transportation modes to destinations within the City and to regional destinations using the regional transportation network.

OBJECTIVE #1: To rely on existing Freeways/Expressways and Major Arterials as the regional streets network, for the through movement of regional traffic.

Policies

1. The City will work with Metro, Clackamas County, the City of Portland and ODOT to ensure that Interstate-205, ORE 224 (Milwaukie Expressway), ORE 99E (McLoughlin Boulevard), and ORE 213 (SE 82nd Avenue) are the primary thoroughfares for regional traffic, and that these corridors are properly maintained and provide adequate capacity so that through traffic does not divert to alternative routes while in the City.

2. The City will continue to work with ODOT, Clackamas County, the City of Portland and Metro to either improve existing routes or develop a new east/west corridor route that functions as a supportive arterial corridor for city-wide traffic through the region.

3. The City will encourage locally provided employment and commercial opportunities in order to lessen the number of locally generated regional work and shopping trips.

4. The City will continue to participate in the regional Joint Policy Advisory Committee (JPACT) to identify solutions to congestion problems along the McLoughlin Boulevard corridor. In evaluating alternatives, the following factors will be considered:

   - Plans for the Regional Center and Riverfront development will be integrated with highway improvements.

   - The opportunity will be taken during any improvement or modification to create new and more efficient vehicular access to the riverfront, as well as bicyclist and pedestrian access not in conflict with motorized transportation.

   - Improved pedestrian and bicyclist connections will be provided between downtown and the riverfront through the provision of walkways and bikeways, amenities, signals, separated crossings, etc., designed to ensure the safety of pedestrians and bicyclists. Options will be considered to minimize traffic impacts through the downtown core area.

GOAL STATEMENT 2: Provide a safe, well-maintained, cost-effective and convenient transportation system.

OBJECTIVE #1: To classify roadways within the City for the multimodal functions and adjacent land uses they serve.

Policies

1. The following definitions will apply for each of the street types listed below:

   Freeway: Freeways provide for high speed and high volumes of traffic efficiently and safely. These facilities generally provide direct land access. Access control and other methods will be used on nearby cross streets in the area of interchanges to preserve and protect the operation of the facility. Freeways connect interstate, inter-regional and intercity origins and destinations and generally carry the largest portion of trips entering and leaving the urban area. Freeways typically do not serve intra-city travel and are not effective in servicing local traffic. The objective of these facilities is to service the longer trips and higher volumes of a region.

   Arterial: Arterials serve to interconnect and support the regional arterial highway system. They serve key regional as well as citywide function of connectivity. Arterials link major commercial, residential, industrial and institutional areas. They are typically spaced about one mile apart to assure mobility and reduce the incidence of traffic using collectors, neighborhood routes, or local streets in lieu of a well placed arterial street. Access control is a key element of arterials, to assure safe and adequate service to transit, automobiles and trucks. Usually, arterials provide access to freeways.

Collector: Collectors provide both access and circulation within residential neighborhoods and commercial/industrial areas. They serve a citywide function of connectivity. Together with arterials, collectors are typically spaced about one-half mile apart. Access control for collectors is not as high a priority as for arterials, but is especially needed near intersections with other collectors or arterials. Collectors serve residential neighborhoods, distributing trips from the local street system and distributing it to and from the arterial street system. Neighborhood traffic management strategies can be appropriate for use on collectors in residential areas. Collector street design can vary by land use type (residential, commercial).

Neighborhood: Neighborhood routes serve to allow local traffic in and out from residential areas to arterials and collectors. They are similar to local streets in design (with residential frontage), but carry more traffic and are routes commonly used by local residents. Neighborhood routes do not provide citywide circulation, but mainly serve an immediate neighborhood. Because their traffic levels are greater then local streets and potential for speeding can be higher, neighborhood traffic management techniques can be appropriate.

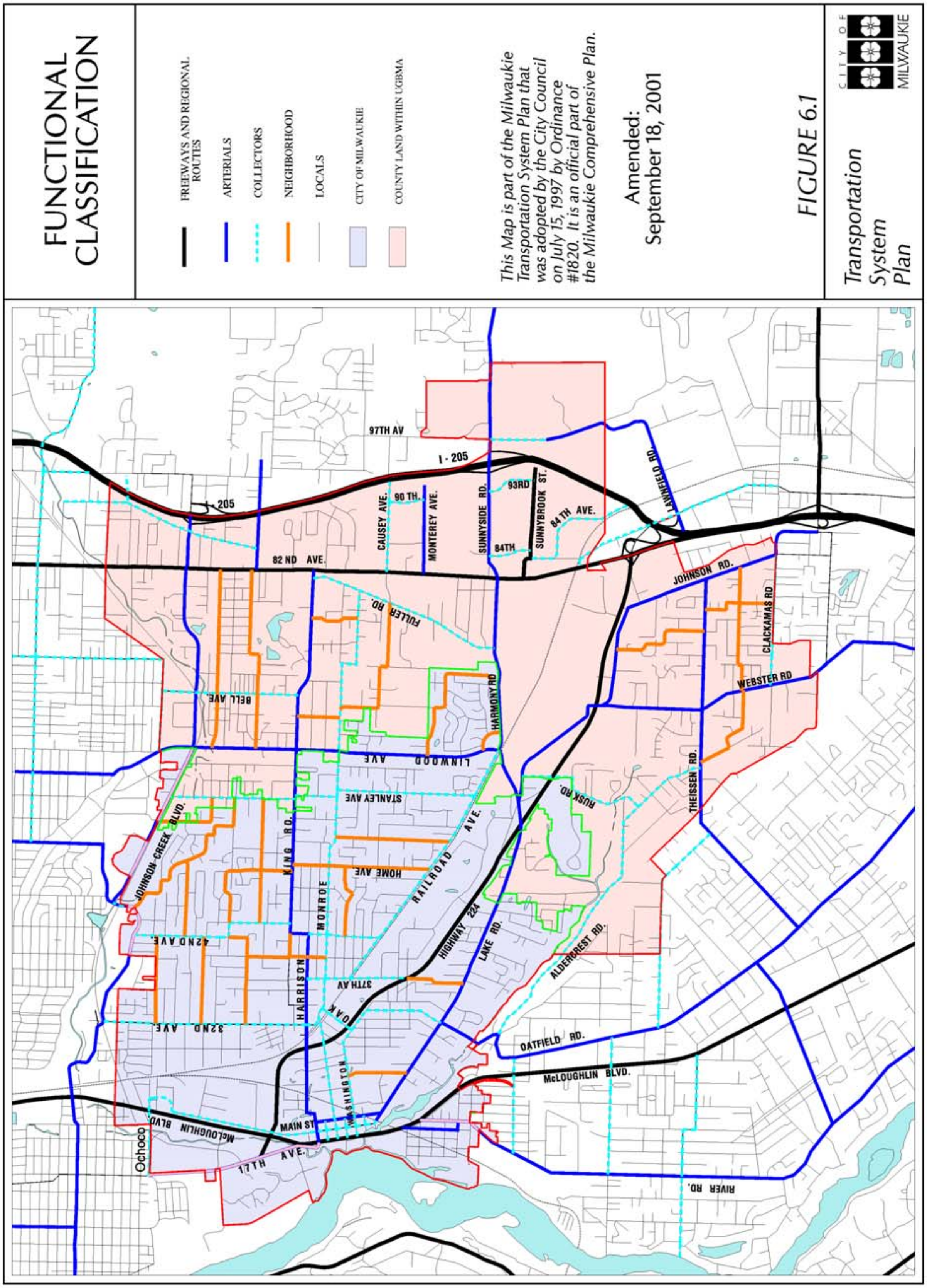
Local: Local streets have the sole function of providing access to immediate adjacent land. These streets do not serve through traffic. Local street design can vary by land use type (e.g., residential, commercial, industrial).

Figure 6.1 shows the classification of streets within the City. Design criteria for these streets are found in the Transportation Improvement Standards Tables of the Zoning and Subdivision Ordinances. Figure 6.10 is the Automobile Master Plan.

2. The City will continue to work with Metro, Clackamas County and the City of Portland to ensure that the road system is maintained, and that compatible classifications and standards are enforced.

3. The City will continuously develop and refine street design standards as necessary to reflect multimodal needs, adjacent land uses, available rights-of-way and changes to regional, State and federal guidelines and standards.

4. Planting strips and street trees between the sidewalk and curb shall be incorporated into the design of arterial, collector and neighborhood routes, and vehicle lane widths shall be minimized whenever feasible and safety is not compromised in order to incorporate walkways, bikeways and parking strips.


FUNCTIONAL CLASSIFICATION
FREEWAYS AND REGIONAL ROUTES
ARTERIALS
COLLECTORS
NEIGHBORHOOD
LOCALS
CITY OF MILWAUKIE
COUNTY LAND WITHIN UGBMA
This Map is part of the Milwaukie Transportation System Plan that was adopted by the City Council on July 15, 1997 by Ordinance #1820. It is an official part of the Milwaukie Comprehensive Plan.
Amended: September 18, 2001
FIGURE 6.1
Transportation System Plan
CITY OF MILWAUKIE
97TH AV
I - 205
205
82 ND AVE.
CAUSEY AVE.
90 TH.
MONTEREY AVE.
SUNNYSIDE RD.
93RD
SUNNYBROOK ST.
84TH
84 TH AVE.
LAWNFIELD RD.
JOHNSON RD.
CLACKAMAS RD
WEBSTER RD
FULLER RD.
BELL AVE.
HARMONY RD
LINWOOD AVE
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32ND AVE
OATFIELD RD.
WASHINGTON
McLOUGHLIN BLVD.
MAIN ST
Ochoco
17TH AVE.
RIVER RD.

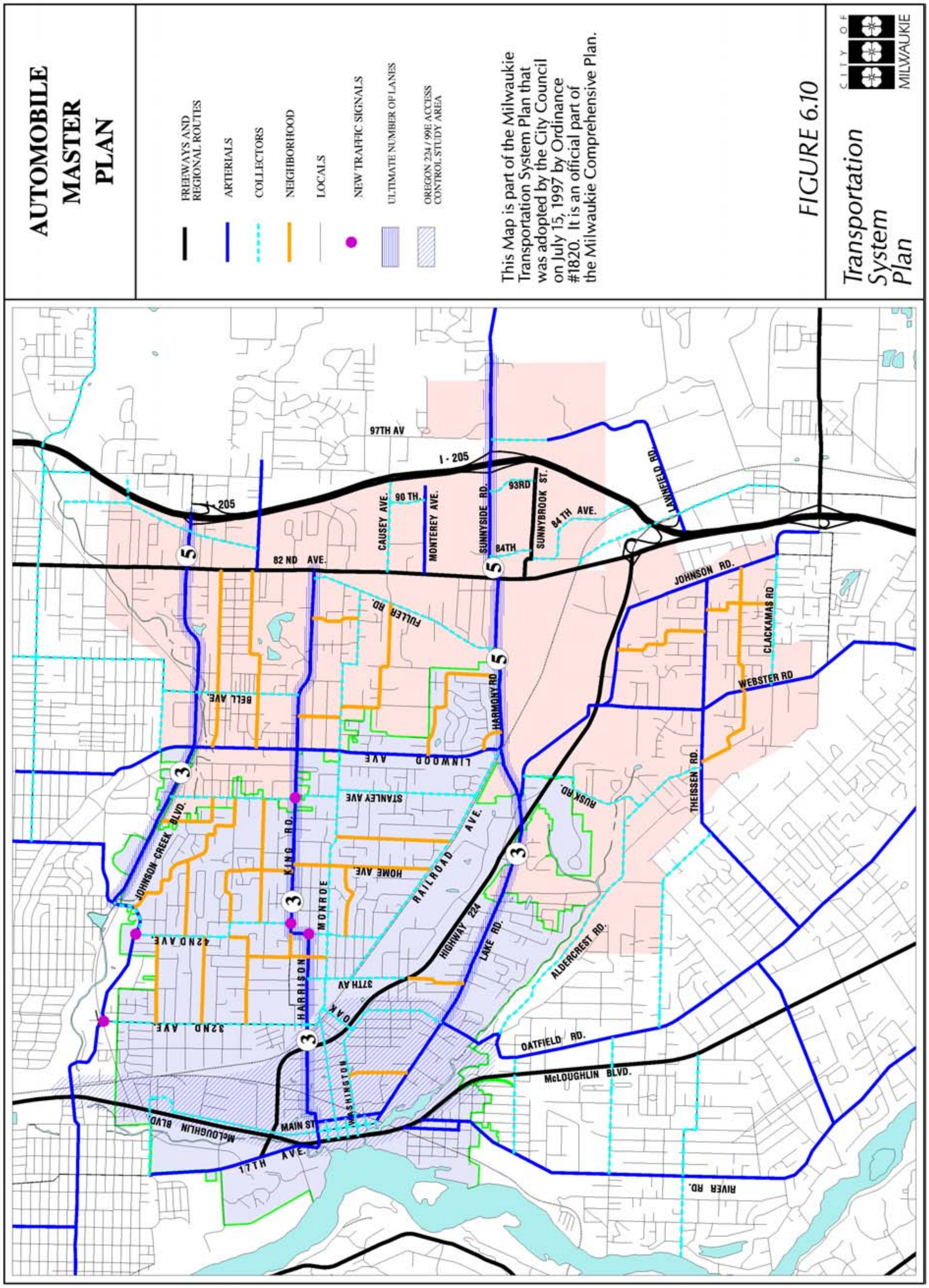
AUTOMOBILE MASTER PLAN
FREEWAYS AND REGIONAL ROUTES
ARTERIALS
COLLECTORS
NEIGHBORHOOD
LOCALS
NEW TRAFFIC SIGNALS
ULTIMATE NUMBER OF LANES
OREGON 224 / 99E ACCESS CONTROL STUDY AREA
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FIGURE 6.10
Transportation System Plan
CITY OF MILWAUKIE
97TH AV
I - 205
205
90 TH.
93RD
84 TH AVE.
84TH
CAUSEY AVE.
MONTEREY AVE.
SUNNYSIDE RD.
SUNNYBROOK ST.
LAWNFIELD RD.
82 ND AVE.
JOHNSON RD.
FULLER RD.
CLACKAMAS RD
WEBSTER RD
HARMONY RD
BELL AVE.
LINWOOD AVE
STANLEY AVE
THEISSEN RD.
RUSK RD.
JOHNSON CREEK BLVD.
KING RD.
HOME AVE.
RAILROAD AVE.
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42ND AVE
HIGHWAY 224
LAKE RD.
ALDERCREST RD.
HARRISON
37TH AV
32ND AVE
OAK
OATFIELD RD.
McLOUGHLIN BLVD.
WASHINGTON
MAIN ST
McLOUGHLIN BLVD
17TH AVE.
RIVER RD.

OBJECTIVE #2: To improve the access, circulation and safety of roadways.

Policies

1. The City will prioritize and complete roadway improvements when funding becomes available that address the following:
   - Improvements for Pedestrians and Transit Riders
   - Improvements at High Accident Locations
   - Street Maintenance Improvements
   - Neighborhood Traffic Calming
   - Improvements for Bicyclists
   - Improvements to Bring Inadequate Travel Lanes up to City Current Standards

2. All transportation-related improvements will be designed and constructed to meet City standards developed in the City's Roadway Manual, the Americans with Disabilities Act (ADA), and to address provisions for bicycling, walking and transit.

3. Transportation improvements will be reviewed and may be required of applicants as part of development and/or redevelopment project approval.

4. The City will consider adoption of a System Development Charge (SDC) for transportation that would be applied to new development.

5. The location, timing, and funding sources for road construction and improvement projects within the City will be guided by the Transportation System Plan.

6. The City will coordinate with ODOT to address improvements to State highways within Milwaukie that will benefit all modes of transportation.

OBJECTIVE #3: To ensure that neighborhood and local streets serve local traffic in a safe manner.

Policies

1. The City will develop and implement a Neighborhood Traffic Management Program and will incorporate guidelines and criteria to be developed in the City's Roadway Manual.

2. Funding sources to help implement the Neighborhood Traffic Management Program will be continuously pursued.

OBJECTIVE #4: To maintain traffic flow and mobility on arterial and collector roadways.

Policies

1. The City will conduct studies, or coordinate on them with appropriate agencies, along Arterial and collector roadways to determine if and where access control measures should be implemented. Priority corridors for study will be ORE 224 and ORE 99E.

2. As part of the development review process, the City will ensure that all new driveway placements along arterial and collector roadways will be in accordance with the City's adopted access management system.

OBJECTIVE #5: To maintain City streets in good to excellent condition as defined by the Pavement Quality Index. [1]

Policies

1. The City will continuously pursue funding sources to help meet street maintenance needs.

2. The City will continue to provide a regular street sweeping and general maintenance program.

3. The City will make maintenance improvements to roadways as funds become available.

4. The City will continue to coordinate with Clackamas County and ODOT to ensure adequate maintenance of their jurisdictional roadways in and near Milwaukie.

OBJECTIVE #6: To enhance street system connectivity wherever practical and feasible.

Policies

1. The City will anticipate opportunities to incrementally extend and connect streets and require street connectivity through the development review process, as appropriate.

2. The City will not permit closed street systems and cul-de-sac designs with new development unless existing lot configurations, topography, or development patterns prevent full street extensions.

3. The City will permit narrow street designs where appropriate, to conserve land, calm traffic or promote connectivity.

RAIL AND TRUCK FREIGHT

GOAL STATEMENT 1: Ensure a safe, accessible and efficient rail freight system that facilitates the movement of goods to Milwaukie and through the region and State while minimizing conflicts with other travel modes.

OBJECTIVE #1: To ensure that commercial rail transportation moves safely and efficiently through Milwaukie and is accessible to Milwaukie businesses, as appropriate.

[1] *PMS Report and Results*, by Pavement Management Systems Inc., for the City of Milwaukie, August 1995.

Policies

1. The City will coordinate with local railroad companies and the Oregon Public Utilities Commission to provide an efficient and accessible commercial railroad system in and through Milwaukie.

2. The City will coordinate with local railroad companies and the Oregon Public Utilities Commission to seek funds that will improve all at-grade railroad crossings in the City from asphalt to concrete or rubberized material.

GOAL STATEMENT 2: Ensure a safe and efficient passenger rail system through Milwaukie that minimizes conflicts with other travel modes.

OBJECTIVE #1: To ensure that passenger rail transportation moves safely and efficiently through Milwaukie.

Policies

1. The City will coordinate with the Oregon Public Utilities Commission and commercial railroad companies to provide an efficient passenger rail system through Milwaukie.

2. The City shall work with other jurisdictions and agencies in the region to plan for and implement if feasible, passenger rail service to and from Milwaukie going to other destinations in the region.

GOAL STATEMENT 3: Provide a safe, cost-effective and efficient truck route system that facilitates the movement of goods and services to Milwaukie and through the region.

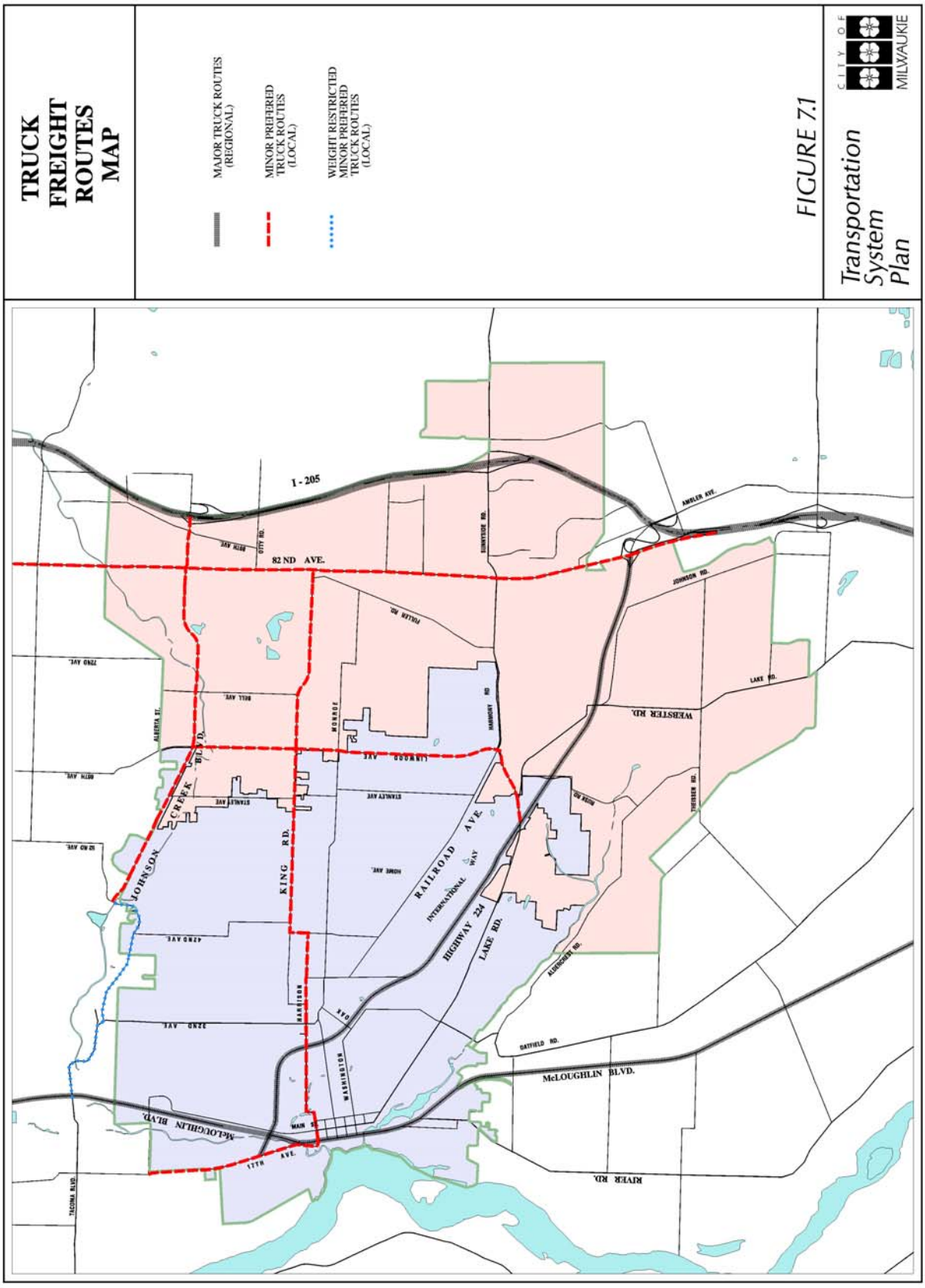
OBJECTIVE #1: To ensure that trucks have appropriate and adequate access within the City and through the region to deliver goods.

Policies

1. The movement of goods and business-oriented truck operations region-wide through Milwaukie will be encouraged to the maximum extent possible to use the Major Truck Routes as identified in Figure 7.1.

2. Trucks that deliver goods and business oriented trucks with destinations within the City will be encouraged to travel on the minor preferred truck routes whenever possible. Trucks should avoid neighborhood and local streets not identified on the map, unless they are delivering to destinations on these streets.

3. Actions to encourage truck usage on identified preferred local routes will include the notification of appropriate freight carriers and a comprehensive system of signs.


TRUCK FREIGHT ROUTES MAP
MAJOR TRUCK ROUTES (REGIONAL)
MINOR PREFERRED TRUCK ROUTES (LOCAL)
WEIGHT RESTRICTED MINOR PREFERRED TRUCK ROUTES (LOCAL)
FIGURE 7.1
Transportation System Plan
CITY OF MILWAUKIE
I - 205
82 ND AVE.
JOHNSON CREEK BLVD.
KING RD.
RAILROAD AVE
INTERNATIONAL WAY
HIGHWAY 224
LAKE RD.
McLOUGHLIN BLVD.
RIVER RD.
WESTER RD.
JOHNSON RD.
AMBLER AVE.
ELLIOTSTON RD.
OTTY RD.
HARMONY RD
WASHINGTON
HARRISON
MAIN ST.
ALDERSEN RD.
DATFIELD RD.
THIESSEN RD.
LAKE RD.

4. The City will coordinate with Clackamas County and ODOT to implement improvements along truck routes on County roads and State highways, as identified in the Transportation System Plan, to ensure safety of truck movement.

5. The City will work with the private sector and public agencies as appropriate to:
   - develop the regional Intermodal Management System (IMS),
   - monitor the efficiency of freight movements on the regional transportation network, and
   - reduce inefficiencies or conflicts on the freight network.

6. The City will implement improvements along truck routes maintained by the City as identified in the Transportation System Plan, to ensure safety of truck movement.

7. The City will ensure that implementing ordinances provide for adequate freight loading and parking areas in commercial and industrial zoning districts and in the Milwaukie Regional Center.

TRANSPORTATION PLANNING RULE

GOAL STATEMENT 1: Improve and enhance the livability of Milwaukie residents by decreasing reliance on the automobile and increasing the use of other modes to minimize transportation system impacts on the environment.

OBJECTIVE #1: To promote bicycling, walking and transit as more accessible modes of transportation through required improvements to the transportation system and land uses connecting to the transportation system.

Policies

1. To implement local, State, and regional transportation plans, the City will conduct development review for new development proposals including any construction, renovation, expansion, alteration, or change of an existing use. The development review process shall be conducted as a limited land use decision process. The Community Development Director shall have the authority to condition development proposals in a manner that will meet transportation planning objectives.

2. For proposed City-initiated transportation facilities, services, and improvements that require review under the Milwaukie Comprehensive Plan, the review process will be coordinated and consolidated with other jurisdictions whenever possible.

3. As part of the next periodic review of the Comprehensive Plan, the City will prepare corridor design plans for commercial corridors in the City. Key locations shall include the ORE 99E (McLoughlin Boulevard) and ORE 224 corridors. The plans will address opportunities for combined access and include new design standards encouraging pedestrian orientation. The specific plan concept will be investigated as a means to implement the corridor plan.

TRANSPORTATION DEMAND MANAGEMENT

GOAL STATEMENT 1: Provide a Transportation Demand Management Program that works with employers and residents in Milwaukie to meet regional air quality and vehicle miles traveled reductions.

OBJECTIVE #1: To develop strategies and implement programs that can provide Oregon Department of Environmental Quality (DEQ) ECO Program compliance assistance to major employers/businesses and can assist the City in meeting Vehicle Miles Traveled (VMT) reductions for destination (i.e., work end) commutes and off-peak travel demand trips.

Policies

1. The City will work with the Oregon DEQ, Tri-Met, Metro and neighboring jurisdictions to provide marketing, technical and program assistance to major employers for ECO Program compliance.

2. The City will develop and implement a local Transportation Demand Management Program that compliments, expands and improves access to regional transit pass subsidies, emergency rides home, and carpool/carpool matching database to major employers.

PARKING

GOAL STATEMENT 1: By 2015, reduce the number of overall parking spaces in the City by 10%.

OBJECTIVE #1: To develop strategies and implement programs/activities that reduce the overall need and number of parking spaces in the City.

Policies

1. The City will evaluate existing and future parking needs and develop a Parking Plan for the designated Regional Center Plan area.

2. The City will coordinate with Clackamas County, the City of Portland, Metro, Tri-Met, and other jurisdictions, agencies and community organizations on strategies and activities to reduce the need for parking spaces.

Chapter 9
Plan Implementation

Modal plans for walking, bicycling, transit, automobile, and rail and truck were developed as part of Milwaukie's Transportation System Plan (TSP) and are the Master Plans for optimizing travel choices in Milwaukie. Integrating these modal elements into a citywide plan requires an approach to prioritization which incorporates both needs and community vision. The adopted Milwaukie Vision Statement calls for development of multimodal linkages within the City and seamless connections between various areas of the City. In addition, Milwaukie's designation as a Regional Center in Metro's 2040 Growth Concept Plan has implications for the prioritization of transportation improvements in Milwaukie.

The following sections of this chapter detail the priority needs developed for each of the TSP modal elements. The Master Plans developed for each mode guide transportation system development in Milwaukie. They were refined into Action Plans which list specific projects that can be undertaken in the next five to ten years to help implement the Master Plans. Projects were identified based on existing and future needs and citizen input. Action Plans represent the highest needs within each travel mode.

Funding options are explored and estimated project costs are provided after the sections on the different modal plans. A process for prioritizing Action Plan elements of the TSP is also covered. Milwaukie's TSP includes a process for reviewing transportation investment options that meet the vision and future land use goals of the City. Milwaukie decision-makers can determine the highest transportation system priorities, balancing technical needs with community vision.

WALKING

The most frequently identified pedestrian need in Milwaukie is the lack of continuous sidewalks constructed on City streets that include appropriate facilities for children, elderly and the disabled. Additionally, the maintenance of existing sidewalks without obstacles and in good repair is a commonly identified need. Other specific needs that were identified by the Pedestrian/Bicyclist Working Group include: pedestrian-related facilities at key locations, an increase in walking for all travel purposes; and the reduction of pedestrian-related accidents through activities that enhance safety and security.

Pedestrian/Bicyclist Working Group members completed an Improvement Prioritization Questionnaire, which was used to rank or prioritize strategies for implementation. The ranking (from highest to lowest) included:

- Fill in gaps where some sidewalks exist
- Address locations with relatively higher pedestrian accident rates
- Complete corridors to major pedestrian uses such as the Springwater Corridor and the Expanded City Center
- Connect to major transit locations
- Complete corridors that commuters might use
- Connect to schools, parks, residential and commercial areas
- Reconstruct existing pedestrian facilities to meet current City standards.
- 42nd/43rd Avenues between Johnson Creek Bloulevard and King Road.

It should be noted that Working Group members thought that all the above mentioned priorities were important and should be addressed.

The Walkways Network Master Plan is shown on Figure 3.1. The Master Plan is the primary walkway network for the City. When it is completed, there will be continuous walkways to major pedestrian destinations such as schools, transit locations, parks and the Regional Center. The primary walkway network will also increase safe pedestrian travel in and between neighborhoods.

A Walkways Action Plan which lists walkway projects that should be implemented within the next 10 years is shown on Figure 3.2. Below is the list of the Walkway Action Plan projects. The Action Plan represents the highest walkway needs of the primary walkway network. Identified corridors in this plan eliminate gaps where some sidewalks exist, address corridors with relatively high accident rates, and lead to major pedestrian destinations.

Walkway Action Plan Projects

- **Linwood Avenue** between Johnson Creek Boulevard and Harmony Road
- **Johnson Creek Boulevard** between 32nd and 79th Avenues
- **Lake Road** between Oatfield and Harmony Roads
- **17th Avenue** between Lava Drive and Ochoco Street
- **37th Avenue** between ORE 224 and Harrison Street
- **Railroad Avenue** between 37th Avenue and Harmony Road
- **Olsen Street** between 32nd and 42nd
- **Logus Road** between 43rd and Stanley Avenues
- **Stanley Avenue** between Willow Street and Johnson Creek Boulevard

Emphasis on the reconstruction of existing pedestrian facilities to meet current City standards should be a focus of the City by allocating funds to retrofit the remaining sidewalk intersections that do not have handicapped accessible ramps that meet Americans with Disability Act (ADA) standards. Also, improved crosswalk facilities should be addressed during the retrofitting program as the budget permits.

BICYCLING

The most frequently identified bicyclist need in Milwaukie is the provision of bikeways, which are generally bike lanes, on all Arterial and Collector streets. These streets are usually the most direct routes for bicyclists and many bicyclist destinations are located along them. The existing bikeway network has gaps which makes it difficult for bicyclists to travel safely. The Pedestrian/Bicyclist Working Group identified this concern and other specific existing and future needs including: bicyclist-related facilities at key locations (e.g. bicycle parking), maintenance of existing and future facilities (e.g. bike lanes), an increase in bicycling for all travel purposes, and the reduction of bicyclist-related accidents through activities that enhance safety and security.

Pedestrian/Bicyclist Working Group members completed an Improvement Prioritization Questionnaire, ranking the strategies presented above according to his or her priorities and considering the transportation goals and policies related to bicyclists. The ranking of the strategies follows, from most important to least important, although all were considered by the group to be important:

- Fill in gaps where some bikeways exist
- Areas with higher rates of bicyclist accidents
- Connect to schools, parks, residential and commercial areas (tied)
- Corridors that commuters might use (tied)
- Corridors to major bicycle uses such as the Springwater Trail and the Expanded City Center
- Corridors to major transit locations

Working Group members were decisive about the first two priorities, while the remaining priorities were close in ranking. Three additional improvement priorities were suggested by the group:

- Reconstruction of existing facilities to current City standards
- More secured bicycle parking at destinations
- Regular street maintenance program

A Bikeways Network Master Plan was created to provide an interconnected bikeway network for bicyclists to use when traveling in and through Milwaukie. The Bikeways Network Master Plan is the overall long-range bikeway system for Milwaukie. It identifies bikeway projects that need to be accomplished for the network to be complete (see Figure 4.1). Projects identified in the Master Plan should be integrated into project development with other street-related projects either when development occurs or when funding for City-initiated projects is realized.

A Bikeways Action Plan was also developed and consists of projects that the City should actively try to fund and construct in the next ten years. These are high priority projects that eliminate gaps in the network, address corridors with relatively high accident rates, and lead to major destinations within the City and region. (see Figure 4.2). The following is a list of potential bikeway projects from the Bikeways Action Plan.

Bikeway Action Plan Projects

- **Linwood Avenue** between Johnson Creek Boulevard and Harmony Road
- **Johnson Creek Boulevard** between 32nd Avenue and 79th Avenue
- **Lake Road** between Oatfield Road and 21st Avenue
- **Harrison Street** between ORE 99E and King Road (via 42nd Avenue)
- **37th Avenue** between ORE 224 and Monroe Street
- **Railroad Avenue** between 37th Avenue and Harmony Road
- **42nd/43rd Avenues** between Johnson Creek Boulevard and King Road

PUBLIC TRANSPORTATION

Tri-Met provides transit service to Milwaukie and the greater Portland metropolitan region. City and County staff work closely with Tri-Met regarding local and countywide service needs. Tri-Met staff incorporate local opinions on transit facility and service needs when they do their annual transit service refinements. This on-going process should continue until all transit-related needs are met. With the progress in planning for South/North Light Rail Transit in Milwaukie, a new era is emerging for an enhanced and accessible public transportation system, with Milwaukie as a regional hub. The Transit Plan for Milwaukie should guide this future and be amended as new decisions regarding transit facilities and services are made. Included in this plan is Milwaukie's continued participation in Light Rail Transit planning.

A transit questionnaire was administered to three citizen groups including the Transit Working Group, as part of transportation system needs identification. It asked respondents about their opinions on existing public transit and their suggestions for improving facilities and services into the future. The questionnaire is shown in Appendix 10. The most frequently responded needs related to public transportation are:

- More frequent bus service on existing routes
- New bus service to specific destinations
- More accessible (closer) bus service
- Add light rail service to Milwaukie
- More facilities including bus shelters and improved facilities such as the Milwaukie Transit Center

The recommended public transit plan has the following components:

- **The integration of transit facilities and services.** This includes but is not limited to the provision of transit-related facilities at or near transit locations, improvements to roadways that increase the efficiency and use of transit, planning for high capacity transit and high speed rail and its place in the future public transit system. In particular, this will require extensive City coordination with Tri-Met/Metro to assure South-North HCT planning and design reflects Milwaukie's overall transportation needs.

- **Connectivity of transit facilities and services with other travel modes.** This includes but is not limited to providing bikeways and walkways that lead directly to transit locations and the provision of Park-and-Ride or Kiss-and-Ride locations for automobile travelers to access public transit.

- **Evaluate public transit system needs annually and report priority needs to Tri-Met.** This is an ongoing implementation approach for public identification of transit system facility and service needs that is forwarded to Tri-Met. There is an established system of reporting county-wide needs annually through a Clackamas County Transportation Coordinating Committee (CTCC) Service Request Report to Tri-Met. The City needs to continue its participation in this process and also continue its soliciting of public input to be reflected in CTCC reports. This information will assist the City's coordination with Tri-Met and other jurisdictions and agencies in addressing citizen identified needs. In particular, planning future bus transit services in Milwaukie in coordination with Tri-Met/Metro on South-North HCT is necessary.

- **Funding source identification and implementation of public transit system improvements.** This entails cooperative efforts from the City, Tri-Met, Clackamas County and other jurisdictions and agencies to locate traditional and non-traditional sources of revenue to funding public transit improvements. This is a critical component of the plan that affects the City's ability to meet Transit Goals, Objectives and Policies.

Potential Transit Improvements

A number of recommended transit system improvements were recently collected from public input by the Milwaukie staff represented Clackamas Transportation Coordinating Committee (CTCC). This list was submitted to Tri-Met this Fall (1995) as part of Tri-Met's annual service needs identification process. The following is the first priority list of identified service need improvements that affect Milwaukie and its future growth area (UGBMA):

First Priority

New Line - ORE 224/Clackamas Town Center: Serving downtown Milwaukie, Milwaukie Marketplace, Oregon Institute of Technology, Clackamas Community College and Promenade, and destinations further east.

New Line - Johnson Creek Boulevard/82nd Avenue: Serving downtown Portland to Clackamas Town Center via the Sellwood Bridge, Johnson Creek Boulevard. Serves industrial area from 45th Avenue to Bell Avenue.

Line Revision - Bus #71 - 92nd Street: Extend to Clackamas Town Center via 92nd Avenue, Otty Road or Johnson Creek Boulevard and 82nd Avenue.

New Line - 82nd/I-205: Serving Clackamas Town Center, 82nd Drive, Johnson Creek Boulevard, Interchange, I-205 to Gateway Center.

New Line - River Road/Thiessen Road: Serving downtown Milwaukie to Clackamas Town Center via River Road, Thiessen Road and 82nd Drive.

New Line - Oregon City/Jennings Avenue: Serving Oregon City to Clackamas Town Center via McLoughlin Boulevard, Jennings Avenue, Webster Road, ORE 224, 82nd Avenue and Sunnybrook.

As stated in a previous section, coordination of planning and design and future bus transit services related to the South-North HCT is an additional first priority.

Second through fourth priority lists can be found in Chapter 5 of the TSP.

AUTOMOBILES

Forecasts of 2015 traffic volumes were developed using Metro's travel demand forecast model. The forecasts assessed automobile needs and priorities based on future population growth and the capacity of the transportation system to support the additional traffic. These data were reviewed and refined to produce detailed traffic forecasts at intersections. When automobile trips are assigned to the roadway network, the level of traffic growth is expected to create the need for improvements at several locations. Table 6.11 lists potential projects which should improve 2015 travel conditions where congestion exists along roadways and at intersections.

In addition, the Roads Working Group evaluated various elements of the street system and then ranked them in terms of priorities for improvements. Each group member was given a certain number of points that he or she could allocate to each category according to his or her vision of priorities for the City. This was a small sample and should be considered as initial public opinion on street-related priorities. The ranking of the different improvement priorities follows, from most important to least important:

- Street Maintenance
- Multimodal Improvements
- Neighborhood Traffic Management
- Circulation Enhancements
- Capacity Improvements
- Safety Improvements
- Improve Roadways to City Standards

The Proposed Automobile Master Plan is shown in Figure 6.10. It represents road and intersection improvements and studies that need to occur in the next twenty years to ensure that vehicular traffic can travel to local and regional destinations without experiencing significant delays. The City, through its Capital Improvement Program (CIP), joint funding with other agencies (County, Metro) and development approval process would implement the projects listed in Table 6.11. The proposed Automobile Action Plan is shown in Figure 6.11. It depicts the priority road projects that the City should pursue based on technical data and citizen participation.

STREET PROJECTS

A series of traffic improvements were identified which are needed to meet future circulation needs of the year 2015. Most of these projects will require resources beyond the City's available revenue funds. Some of these projects will be addressed through the Clackamas County Capital Improvement Program and the ODOT Transportation Improvement Program. Others will be built by adjacent development. It is important for the City of Milwaukie to pursue initial planning studies of specific projects noted in Table 6.11 to provide the basis for future regional and local transportation improvement and funding programs.

OTHER STREET SYSTEM PROGRAMS

Street Maintenance/Operations, Neighborhood Traffic Management (NTM), Transportation Demand Management (TDM), Access Management, and Regional Center Parking are automobile (street) related programs which may require City funds to be allocated to improve transportation conditions in Milwaukie. Each of these is discussed in the following sections.

STREET MAINTENANCE/OPERATIONS

In 1994, the City hired Pavement Management Systems, Inc. (PMSI) to inventory the existing pavement condition of roadways in the City and to determine the cost of improving paved roadways identified in poor condition over the next ten years using different funding scenarios. Preliminary results of the PMSI work suggests that 30 lane-miles of pavement, or 20 percent of paved roadways, in the City are currently in poor condition and in need of rehabilitation. It is estimated that an average of over seven lane miles per year will be in need of rehabilitation between 1996 and 2004. This means an additional 66 lane-miles in the City that will need pavement improvements.

The present condition of Milwaukie's streets requires the City to go beyond current maintenance levels to achieve having all paved roadways in good to excellent surface condition. If nothing is done to improve pavement surface condition, the City's ability to maintain its streets will fall far behind its possible resources as the number of paved roads in good condition diminish and the amount of lane miles in need of rehabilitation increase. PMSI estimates that up to 80% of the paved lane miles in the City will be in poor condition. This would border on a situation in twenty years where nearly all streets would require reconstruction. The PMSI study developed two strategies for Milwaukie to rectify this situation.

A "need based" strategy seeks to address current and future needs as they arise, so that all roads are maintained in good pavement condition. Because 30 lane-miles have been identified for pavement rehabilitation in 1996, an estimated $2,010,000 will have been needed in the first year to make the necessary roadway improvements to these 30 miles of roads. In addition, an average annual appropriation of $223,000 above the existing street maintenance budget of $1.27 million, would need to be allocated to address lane mile needs on an annual basis through 2004. The total cost for the "need based" scenario is preliminarily estimated at $4,280,000 above current maintenance expenditures.

A "balanced" approach addressing pavement management needs in Milwaukie would spread estimated expenditures over the next ten years. Approximately between $310,000 and $400,000 per year above the existing street maintenance budget would be required to address identified roadway needs in each of the next ten years. The total cost for this "balanced" approach is estimated at $3,550,000 million.

NEIGHBORHOOD TRAFFIC MANAGEMENT

Neighborhood Traffic Management (NTM) is a term that has been used to describe traffic control devices typically used in residential neighborhoods to slow traffic. A number of streets in Milwaukie have been identified as Neighborhood streets. These streets are typically longer than the average Local street and would be appropriate locations for potential of NTM applications. A wide range of traffic control devices are being tested throughout the region, including such devices as chokers, medians,

speed awareness (using the "speed wagon") traffic circles and speed humps. The City of Milwaukie has established standards for NTM and has installed speed humps as a test project on 34th Avenue. NTM traffic control devices are being tested within the confines of Milwaukie to assess their applicability. A critical aspect of NTM projects is building consensus for appropriate application. NTM measures should be applied only where a majority of neighborhood residents agree that it would be effective (i.e. via petition).

Strategies for NTM seek to reduce traffic speeds on neighborhood streets, thereby improving livability in Milwaukie. The role of the TSP as a long range plan should not be to identify the type of improvements that are required to address specific neighborhood traffic needs but rather to address what type of streets are appropriate to be considered for NTM. The proposed functional classification system includes a new category (Neighborhood Routes), which defines potential streets for application of NTM. City staff should be directed to finalize the details of the NTM program including process and alternatives for improvement of the NTM program. The details should be included in the Roadway Design Manual.

The strategy for citywide implementation of NTM could be based on one of the following levels of implementation:

- **Aggressive:** The City would fund a NTM program which allows most requests for NTM measures on Neighborhood routes to be installed.
- **Reactive:** The City allocates a certain amount of money per year to install selected NTM projects. The number of projects would be limited. The City could also encourage implementation of NTM projects by private development and neighborhood associations.
- **Do Nothing:** The City would not allocate money toward NTM projects, although it could still provide guidelines if private development or neighborhood associations wanted to install NTM projects.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. The following are examples of TDM measures:

- Work with employers to install bicycle racks
- Work with property owners to place parking stalls for carpoolers near building entrances
- Provide incentives to take transit and use other modes (i.e. free transit pass)
- Provide information regarding commute options to larger employers (e.g. carpools, vanpools)
- Encourage linkage of housing, retail and employment centers (including having local home builders and employers provide incentives to live and work in or near Milwaukie)
- Encourage flexible working hours
- Encourage telecommuting
- Schedule deliveries outside of peak hours
- Provide City staff support to Milwaukie TDM coordination

The Oregon Department of Environmental Quality (DEQ) has established Employee Commute Options (ECO) goals for trip reductions and has been developing a program for the region along with Metro. A specific subcommittee of Metro's Joint Policy Advisory Committee on Transportation (JPACT)

addresses TDM issues regionally. The City of Milwaukie can take a leadership role within the community to work with employers on meaningful demand reduction. While many of the programs noted above are passive, with City staff and committee participation, these programs can produce short term benefits. This would require funding staff time for this purpose.

TDM should be a priority of the City. It can be employed as an interim measure to implement the 2040 Growth Concept and can assist the City in meeting the ten percent vehicle miles traveled (VMT) reduction and parking spaces reduction required by the Transportation Planning Rule. Potential strategies for implementation of TDM are listed below.

- **Aggressive:** The City would fund a staff position to implement a TDM program in Milwaukie. The City could take specific actions (i.e., ordinances) which would encourage employer TDM programs.
- **Moderately Aggressive:** The City would fund a part-time staff position to begin implementation of a TDM program.
- **Reactive:** The City would wait for DEQ's ECO (Employee Commute Options) rules and respond to those requirements appropriately.
- **Do Nothing:** The City could opt to not implement TDM in Milwaukie at a citywide level.

The City should also consider being a role model for local businesses through implementation of its own TDM measure for City employees.

ACCESS MANAGEMENT PLAN

Access management is important, particularly on high volume roadways, for maintaining traffic flow and mobility. Where neighborhood and local streets function to provide access, arterial and collector streets serve greater traffic volume. Numerous driveways, or street intersections, increase the number of conflicts and potential for accidents and decrease mobility and traffic flow. There is extensive research indicating the negative safety and capacity impacts of multiple or close access points on high volume streets. [1] Milwaukie, as with every city, needs a balance of streets which provide access with streets and serve mobility. While limits on access do not need to apply to every street, if key arterials and collectors do not have access control, traffic will intrude into neighborhoods causing significant impacts. Table 6.13 summarizes a set of proposed access management guidelines for Milwaukie. This system has been adapted from ODOT's Access Management Manual.

The City needs to develop specific access management plans for arterial and collector streets similar to the recently completed Lake Road Multimodal Connection Study.

The City should act on the following strategies to implement access management in Milwaukie:

- Examine roadways with potential to remove access points. Certain streets should be studied to determine if and where access control measures should be implemented. Examples of potential studies are the ORE 224 corridor through Milwaukie, ORE 99E to the north of downtown.

[1] *Access Management Manual*, Oregon Department of Transportation, Planning Section, August 1991.

- New driveway placement should be in accordance with Table 6.13 and should be included in the City's Zoning Ordinance and Roadway Design Manual when developed. Access requirements should be evaluated at the site plan review stage and shared access should be considered where feasible.

REGIONAL CENTER PARKING

As stated previously, Milwaukie is designated as a Regional Center in Metro's 2040 Growth Concept Plan. Milwaukie's Regional Center is intended to become the focus of compact higher density and intensity mixed use development and redevelopment with enhanced transit and highway improvements. Its location encompasses the downtown area and east to the ORE 224 area. Because of this designation, parking needs in Milwaukie may be different from its current demands and requirements. Parking standards should be reviewed in light of this designation as part of implementing the City's Regional Center Master Plan. This could include developing specific maximum parking ratios for the Expanded City Center. In areas near the proposed Light Rail Transit stations, lower parking ratios are possible near the station. Planning in these station areas should consider variable (reduced) off-street parking ratios as an element toward meeting Transportation Planning Rule requirements.

The following strategies should be addressed by Milwaukie:

- Parking needs should be reviewed for individual developments at the site plan review stage. Parking provisions should be compared to demand, as identified by the Institute of Traffic Engineers (ITE) or the State DEQ, with the goal of a ten percent reduction in parking supply.
- Consolidation of parking (i.e., parking structures or shared parking) should be encouraged to avoid excessive use of land for surface parking lots
- The City should seek joint use of Light Rail Station area parking resources for Milwaukie's Regional Center to encourage highest density development (to meet 2040 goals).

RAIL AND TRUCK FREIGHT

Currently, there are two active major railroad lines that traverse Milwaukie, connecting the Portland area to the greater region and State. Commercial rail transportation uses both of these lines, the Southern Pacific (SP) Main line and a Branch line. Rail freight traffic is active through Milwaukie with a minimum of six inbound and six outbound trains per day. The primary need for rail transportation is to have the rail infrastructure including crossings exist and operate in good to excellent condition. It is also important to minimize conflicts between rail transportation and other modes of travel where they intersect. In the City's broader view of transportation system planning, the City needs to ensure that rail transportation is safely and efficiently conducted, but also that other modes of transportation are not negatively impacted in their safety and function.

The movement of goods and services by trucks to and from Milwaukie and through the region has different needs than rail freight. The safe and efficient movement of goods is a common goal, but trucks utilize different infrastructure, have different land use implications and must be integrated with other modes in the broader transportation system. Truck freight have specific travel needs such as adequate lane widths, adequate turning radii at intersections, and adequately designed loading and unloading areas. Truck services also need to have roadways operating at an adequate level of service so that goods

and services can move efficiently through the City, region and state. The Roads Working Group identified many of these needs and also recommended that a local truck route be established for trucks making deliveries in Milwaukie. Residents would like to minimize truck traffic through residential areas as well as potential safety, noise and roadway construction impacts.

A number of strategies for implementing a rail and truck freight plan were developed by City staff, consistent with the related goals and policies. These priority strategies are listed below:

- Improve railroad crossings for pedestrian and other travel modes
- Improve railroad crossings for the efficient movement of commercial and passenger trains
- Improve local business accessibility to railroad services
- Improve truck route roadways and intersections to adequately serve trucks
- Consider minor truck routes in the delivery of local goods and services

One outcome of the previously listed strategies is that a revised "Truck Freight Routes Map" was developed (see Figure 7.1). This map highlights proposed freight truck routes in Milwaukie. If these routes are adopted as part of the TSP, the City should notify freight truck companies who serve Milwaukie residents and businesses of the preferred corridors for truck travel in the City. The City should also consider street signing related to truck routes.

FINANCING

Funding Sources and Opportunities

There are several potential funding sources for transportation system improvements. These are funding options which have been used in the past by agencies in Oregon. In most cases, these funding sources can be sufficient to fund transportation improvements for local communities. Due to the complexity of today's transportation projects and rising levels of need, it is necessary to seek several avenues of funding. Many of Milwaukie's transportation needs are regional in nature (for example, ORE 99E or ORE 224). At a regional level, Metro has identified $4.5 billion of transportation projects in the preferred 2015 Regional Transportation Plan (RTP). The region has identified less than one billion dollars of funding for the 2015 RTP. Because of this situation, joint funding of projects and hybrid funding will be needed working together at regional and local levels. Unique or hybrid project funding generally will include the funding sources discussed below, combined in a new package. Table 9.1 summarizes several funding options available for transportation improvements.

The City of Milwaukie's motor vehicle fees, which are dedicated to transportation, amount to about $900,000 per year. These are State gas tax monies that are passed through to the cities based upon population. Over 75 to 90 percent of these funds are used for maintenance and preservation activities on roadways. This source of funds has generally been used for system maintenance in the past with a small allocation for capital projects (which in most cases includes rebuilding streets to newer standards). Because of limited revenues from the motor vehicle fees, many transportation projects are funded through other sources.

Within the Portland region, funding for major transportation projects is typically brought to a vote of the public for approval. Specific projects are outlined for use of public funds, such as the Major Streets Transportation Improvement Program (MSTIP) in Washington County or the Westside Light Rail

Project. Because of the need to gain public approval for transportation funding, it is important to develop a consensus in the community for supporting needed transportation improvements. The Transportation System Plan (TSP) can be valuable for this purpose. In most communities, where time is taken to build a consensus regarding a transportation plan, existing funding sources (similar to those noted) can be packaged together to address funding needs.

Several groups of projects were identified in the TSP. They include:

- Walkway Improvements
- Bikeway Improvements
- Street Improvements
- Street Maintenance
- Transit Improvements

Table 9.2 identifies which existing funding sources might be used to implement elements of the plan. Tax increment financing has not been used in Milwaukie and other fees were not identified in this initial funding summary beyond those associated with motor vehicle fees. Historically, the funding sources have been developed to support roadways for automobiles. Few funding sources have been allocated to other travel modes. Other travel modes were generally implemented as an element of a roadway project. Now motor vehicle fees and exactions are specifically allocated to roadway, bikeway and walkway improvements. Unfortunately, most of the current funding structure to support roadway development will require either supplementary funding or reallocation of funding to address other modes in a balanced fashion.

Table 9.1
Potential Transportation Revenue Sources

Type	Description
System Development Charges (SDC)	SDCs or traffic impact fees have been used in Oregon and throughout the United States. The cornerstone to development of SDCs in meeting the rational nexus test, which involves two principals: 1) there must be a reasonable connection between growth generated by development and the facilities constructed to serve that growth; and 2) there must be a connection between the fees collected from the project which are constructed. Charges are typically developed based on a measurement of the demand that new development places on the transportation system and the capital costs required to meet that demand. Recent legislation (SB 1156) requires that SDC credits of at least 30% are required for transit oriented development within 1/4 mile of a LRT station.
Gas Tax	The State, cities and counties provide their basic roadway funding through a tax placed on gasoline. State gas tax is approved legislatively while local gas taxes are approved by voters. State funds are dedicated to roadway construction and maintenance. This tax does not fall under the Measure 5 limits, because it is a pay-as-you-go user tax. While Multnomah and Washington Counties have separate gas tax to support roadways within their counties, Clackamas County does not. Only one percent of these funds are generally used for bicycle and pedestrian- related improvements.
Street Utility Fees	Certain cities have used street utility fees for maintenance. The fees are collected monthly with water or sewer bills. These funds are not for capacity improvements, but for supporting local roadway maintenance based upon land use type and trip generation. This frees other revenue sources for capacity needs. Utility fees can be vulnerable to Measure 5 limitations, unless they include provisions for property owners to reduce or eliminate charges based on actual use.
Exactions	Frontage improvements are common examples of exaction costs passed onto developers. Developers of sites adjacent to unimproved roadway frontage are responsible to provide those roadway improvements. Developers of sites adjacent to improvements identified as SDC projects can be credited the value of their frontage work, which is included in the SDC project cost estimate.
Local Improvement Districts (LID)	LIDs provide a means for funding specific improvements that benefit a specific group of property owners. LIDs require owner/voter approval and a specific project definition. Assessments are placed against benefiting properties to pay for improvements. LIDs can be matched against other funds where a project has system wide benefit, beyond benefiting the adjacent properties. Fees are paid through special assessment billings.
Tax Increment Financing	In designated Urban Renewal Districts, tax increment funds can be used for any capital improvements). These funds currently fall under Measure 5 limitations. The recent rejection of Measure 1 severely limits the use of this funding source in the future. There are presently no Urban Renewal Districts in the City of Milwaukie.
Special Assessments	A variety of special assessments are available in Oregon to defray costs of sidewalks, curbs, gutters, street lighting, parking and CBD or commercial zone transportation improvements. These assessments would likely fall within the Measure 5 limitations. Jurisdictions in the Portland region (such as Washington County) have passed local levies to fund local road maintenance to supplement gas tax revenues.
Fees	Gresham collects a Public Street Charge and a Driveway Approach Permit Fee. These fees are project specific and vary year to year based upon development permits.
Other Vehicle Fees	The State collects truck weight mile taxes, vehicle registration fees, and license fees. These funds are pooled together with the gas tax in distributing state motor vehicle fees to local agencies. Local agencies do not have the authority to impose local registration fees (a 1990 ballot measure for this purpose was defeated).
Oregon Special Public Works Fund	The Special Public Works Fund (SPWF) Program was created by the legislature in 1985 as an economic development element of the Oregon Lottery. The program provides grants and loan assistance to eligible municipalities. There has been little use of these funds on urban Arterials.

To accommodate a more balanced funding program, the City will need to specifically seek funding for programs such as walkway improvements. One approach would be for the City to initiate a walkway grants program where an allocation of funds (for example, $50,000 per year) is set aside for neighborhoods to match with local funds (at a level determined by Council - for example, 10%, 25%, 50% or 75%) through special assessments or LIDs. This hybridization of funding, where local support is matched with other funding sources can become a significant element of transportation funding in the future with constrained overall funds. Additionally, should new gas tax funds be developed statewide or regionally, the City can incorporate more diverse travel mode projects, using the TSP as a guide.

Table 9.2
Fundable Projects by Source

Source	Bicyclist	Pedestrian	Streets	Maintenance	Transit
System Development Charges (SDC)	•	•	✓		
Gas Tax/Motor Vehicle Fees	✓*	✓*	✓	✓	
Street Utility Fees				✓	
Exactions	•	✓	✓		
Local Improvement Districts (LID)	•	•	✓		
Tax Increment Financing					
Special Assessments	•	•	✓	✓	✓
Fees					
Other Vehicle Fees					
Oregon Special Public Works Fund			✓		✓
Employee Tax					✓

• Typically as part of roadway project where other modes are incorporated
✓ Used as a primary source of funding
* These improvements must be within the right-of-way.

COSTS

Order of magnitude cost estimates were developed for the projects identified in the automobile, bicycling and walking elements. Since many of the projects have more than one modal facility need, the costs were developed at a project level incorporating all modes, as appropriate. It may be desirable to break project travel mode elements out separately, however, in most cases, there are greater cost efficiencies of undertaking a combined, overall project. Each of these project costs will need further refinement to detail, such as right-of-way requirements and costs associated with special design details as projects are pursued. Table 9.3 summarizes the elements of the plan which were not project specific and how costs will be addressed for these elements.

Table 9.3
Other Street Program Costs

Mode	Issues
Parking	The TSP does not define specific projects. Off-street parking will be provided by private property owners as land develops. Downtown area parking issues will need to be addressed based upon needs, using packaged funding including local and private sources.
Neighborhood Traffic Management	Specific NTM projects are not defined. These project will be subject to neighborhood consensus, based upon City of Milwaukie design criteria. Humps/undulations can cost $2,000 to $4,000 each and traffic circle can cost $3,000 to $8,000 each. Based upon this, a limited program could cost $10,000 to $40,000 per year, depending upon neighborhood needs. If this cost were entirely funded through the City, implementation may lag behind neighborhood needs. If private cost sharing (or matching funds) is established as a criteria for the neighborhoods, the program could become more comprehensive. Consideration of neighborhood value provided by NTM should be consider by the City in determining whether to pursue non-public funds. It is important that any new development incorporate elements of NTM as part of its on-site design.
Public Transportation	Tri-Met will continue to develop costs and funding sources for implementing transit related improvements. The City can supplement this by incorporating transit features through development exactions and roadway project design. Funding for future LRT will be through special assessment (previously passed in November 1994).
Trucks/Freight	Roadway funding will address these needs. Roadway overcrossings of railroads can use special PUC funds set aside for safety improvements to railroad crossings.
Rail	Cost to be addressed and funded by private railroad companies and the State.
Air, Water, Pipeline	Not required by City.
Transportation Demand Management	City support may include staff involvement in TDM program, helping initiate or coordinate activities. Costs could range from $20,000 to $75,000 per year. DEQ will be establishing regional guidelines. Private business will need to support employee trip reduction programs. Requirements of TDM can be exacted as conditions of development.

Many of the project costs have been developed by Clackamas County or previous work by the City. Where the TSP identified the comparable needs, these project costs have been utilized. Table 9.4 summarizes the key project in the TSP by agency. Table 9.5 provides a rough break out of project costs by mode, based on assumptions related to modal benefit and pavement width required for each mode.

Table 9.4
Action Plan Project Costs

PROJECT	AGENCY	INITIAL PROJECT ESTIMATE
MULTIMODAL PROJECTS		
1. 32nd/JCB Signal	City	$105,000
2. 42nd/JCB Signal	City	$119,000
3. ORE 99E/Harrison Intersection	ODOT/City	$1,500,000
4a. 42nd/Harrison Signal	City	$140,000
4b. 43rd/King Signal	City	$140,000
4c. Harrison/42nd/King Alignment	County/City	$1,340,000
5a. Stanley/King Signal	City	$150,000
5b. Stanley Realignment	City/County	$970,000
6. Linwood/Railroad/Harmony/ Lake Widening	City/County/Tri-Met	$6,860,000
7. Lake/Oatfield Turn Lane	City	$55,000
8. ORE 224 Access Control	ODOT	$50,000,000
9. ORE 224/ORE 99E/Lake Study	City/County	$75,000
10. ORE 99E Access Control	ODOT	$5,000,000
11. ORE 99E/River Road	City/County/ODOT	$450,000
12. Downtown ORE 99E	ODOT/City	$3,800,000
13. JCB Multimodal (32nd-45th)	Portland/City	$2,594,000
14. JCB Multimodal (45th-82nd)	Regional/County/City	$5,210,000
BIKEWAY/WALKWAY PROJECTS		
15. 17th Avenue Ped	Regional/City	200,000
16. Linwood Avenue Bike/Ped	Regional/City/County	$260,000
17. Harrison Street ORE 99E-King Bike	City/County	$2,600,000
18. Railroad Ave Bike/Ped	Regional/City	$1,000,000
19. 37th Avenue (ORE 224-Harrison) Bike/Ped	TBD	TBD
20. Stanley Avenue (Willow to Johnson Creek Blvd) Ped	TBD	TBD
21. 42nd/43rd Avenues Bike/Ped	TBD	TBD
TOTAL OF ALL PROJECTS		**84,088,000***

**Includes $1,520,000 for Lake Road Multimodal improvements not specifically listed as a separate project in Table 6.11.*

Table 9.5
Action Plan Project Costs by Mode

Project	Total Project Cost	Automobile Element	Bicycling Element	Walking Element
32nd/JCB Signal	105,000	89,250	5,250	10,500
42nd/JCB Signal	119,000	101,150	5,950	11,900
ORE 99E/Harrison Intersection	1,500,000	666,500	555,500	278,000
42nd/Harrison Signal	140,000	119,000	7,000	14,000
43rd/King Signal	140,000	119,000	7,000	14,000
Harrison/42nd/King Alignment	1,340,000	1,206,000	67,000	67,000
Stanley/King Signal	150,000	127,500	7,500	15,000
Stanley Realignment	970,000	873,000	48,500	48,500
Linwood/RR/Harmony/Lake	6,860,000	4,007,685	2,003,850	848,465
Lake/Oatfield	55,000	44,000	0	11,000
ORE 224 Access Control	50,000,000	45,000,000	2,500,000	2,500,000
ORE 224/ORE 99E/Lake	75,000	63,750	5,625	5,625
ORE 99E Access Control	5,000,000	4,500,000	250,000	250,000
ORE 99E/River Road	450,000	405,000	22,500	22,500
ORE 99E Downtown	3,800,000	2,843,300	554,700	402,000
JCB Multimodal (32nd-45th)	2,594,000	1,297,000	589,545	707,455
JCB Multimodal (45th-82nd)	5,210,000	3,043,740	1,521,870	644,390
17th Avenue ~~Bike/~~Ped	200,000	0	0	200,000
Linwood Avenue Bike/Ped	260,000	0	170,000	90,000
Harrison Street ORE 99E-King	2,600,000	1,950,000	390,000	260,000
Railroad Avenue Bike/Ped	1,000,000	750,000	150,000	100,000
37th Avenue Bike/Ped	TBD	0	TBD	TBD
Stanley Avenue Ped	TBD	0	0	TBD
42nd/43rd Avenues Bike/Ped	TBD	0	TBD	TBD
Total	**84,088,000***	**68,093,875**	**9,305,790**	**6,688,335**

**Includes $1,520,000 for Lake Road Multimodal improvements not specifically listed as a separate project in Table 6.11 (as do individual element totals include their portions of same).*
Note: Maintenance and operating costs are not included in this table.

PRIORITIZING OPTIONS

Transportation funding resources are limited within the City. Alone, Milwaukie would have few resources to address all of its transportation needs. Many transportation projects require the City to work together with its regional partners (Clackamas County, Metro, Tri-Met, ODOT, and adjacent cities) to forward significant transportation projects. Projects which are multimodal (addressing walking, transit, bicycling, autos, and trucks) increase the productivity and efficiency of the existing arterial and collector system to serve growth (particularly in light of the regional 2040 proposals in Milwaukie); and projects that provide local improvements within and between neighborhoods have the greatest potential to move forward, working together with other agencies.

One way to prioritize the projects identified with high need in Milwaukie requires decision-makers to use a weighted ranking methodology such as that shown in Table 9.6. Here, five guiding principles of the TSP are used to guide decisions. These guiding principles have been developed through statewide requirements, regional planning, citizen input, and technical evaluation.

Table 9.6
Summary of Guiding Principles

Criteria	Basis	Weight
1. Does this project address more than one mode of transportation?	The City Vision Statement and Transportation Planning Rule section 660-12-035(4) which mandates reduction in vehicle miles traveled VMT and avoiding principal reliance on any one mode of travel	
2. Does this project address both regional and local needs?	Region 2040 calls for cities to look beyond only their local needs in decision making.	
3. Does this project provide connectivity locally?	The City Vision Statement	
4. Does this project serve to reduce neighborhood disruption, while accommodating existing and planned land use?	The City Vision Statement and Citizen Working Groups	
5. Does the project make the best use of existing transportation facilities?	Citizen Working Groups	

A combination of technical rating and weighting of criteria should be used in prioritizing the City's TSP improvement priorities. Staff can prepare technical ratings of the Action Plan elements of highest need. These ratings could be merged with decision-maker's weighting using the guiding principles suggested above. The outcome will be a rating of the transportation plan projects for further development by staff and the regional agencies. These projects would form the priority TSP Action Plan list that will be updated periodically as projects are completed and new priorities are determined.

Milwaukie's existing transportation system and Comprehensive Plan Transportation Element are for the most part automobile oriented. The intent of the TSP has been to optimize each of the travel modes discussed to develop a safe, efficient, balanced and diverse transportation system. Modal priorities have been defined that benefit modal network plans. The final Action Plan list will most likely be a combination of different modal projects that optimize the individual modal plans and the overall system. The TSP provides the framework for understanding long-range citywide transportation system needs and priorities, while also identifying short-range multimodal priorities that address the most immediate deficiencies in the transportation system.

APPENDICES

APPENDIX 1:
TSP Citizen Working Groups

MILWAUKIE TRANSPORTATION SYSTEM PLAN
CITIZEN WORKING GROUP PARTICIPANTS

PEDESTRIAN/BICYCLIST WORKING GROUP

Dick Baker
Bud Boyer
Kay Cormier
Gloria Flink
Kathy Goss
Sherrie Hensen
JoAnn Herrigel
Gerrie Sue Lent
Caroline Locher
Michelle Greeley Roberts
Julie Wisner
Patty Wisner
Jim Young
Katie Young

ROADS WORKING GROUP

Dick Baker
Dwight Dillon
Mark Fields
Terry Flink
Rob Kappa
Tina Krause-Marshall
Jeff Marshall
Matt O'Brien
Dorothy Pengraph
Dick Port
Ed Salmons
Susan Stone
Norm Unrein
Fred Wilson
Julie Wisner
Patty Wisner

TRANSIT WORKING GROUP

Don Adams
Edwin Belles
Dave Church
Dana Day
Randy Day
Dwight Dillon
Mark Ellington
Don Graf
Ray Guimary
John Hartsock
Ed Heimel
Mart Hughes
Eleanor Johnson
Michael Kay
Karen O'Dowd
Joanna Pienovi
Dick Port
Ralph Rigdon
Christie Schaeffer
Lucy Schreiber
Karen Williams

APPENDIX 2:
Natural Resources Property List

Please reference

City of Milwaukie
Comprehensive Plan

for latest version of

Appendix 2
Natural Resources
Property List
& Site Map

APPENDIX 3:
Historic Resources Property List

Please reference

City of Milwaukie
Comprehensive Plan

for latest version of

Appendix 3
Historic Resources
Property List
& Site Map

APPENDIX 4:
Summary of Transportation Related Goals, Objectives, and Policies from Comprehensive Plan

Milwaukie Comprehensive Plan

Transportation-Related Goals, Objectives, and Policies

TRANSPORTATION ELEMENT	
ITEM	**COMMENTS**
GOAL: To provide and encourage a safe, convenient and economic transportation system by providing easy access within the City and to the major transportation networks connecting with the City. In order to lessen the dependence of Milwaukie residents on the automobile as the prime means of travel, the improvement, further development, and utilization of alternative travel modes is stressed.	A multimodal transportation system should be stressed up front in the goal. As part of the Transportation System Plan (TSP), each mode element will have its own goal(s). This goal is too lengthy and should be revised into specific mode goals or eliminated, as new goals are created.
OBJECTIVE #1: Roadways Classification To classify all roadways by purpose they serve.	With the multimodal perspective, roadways or accessways have more than one purpose. Objective needs to be updated to reflect the multiple travel mode functions of accessways. Objective does not specifically address goal.
POLICIES: 1. Definition of roadways. 2. Coordination with relevant jurisdictions on road system maintenance. 3. Develop and refine street design standards as necessary, especially for local streets.	1. See comments above for Objective #1. 2. Basic intergovernmental coordination policy that is appropriate. 3. Transportation Planning Rule (TPR)design standards have been adopted in the Zoning and Subdivision Ordinances and allow for some variation in design. This policy may be outdated. SUMMARY: The function classification of accessways in Milwaukie is being updated based on communitywide, multimodal travel and the TPR.
OBJECTIVE #2: Regional Traffic To rely on freeways/expressways and major arterials for regional traffic movement.	Seems appropriate. Objective partially relates to goal, in terms of major transportation networks.
POLICIES: 1. Coordinate with responsible agencies on regional traffic routes. 2. Participate on METRO's JPACT to identify improvements to Hwy. 99E. 3. Provide local employment and commercial opportunities to avoid local trips on the regional system. 4. Improve main east/west connections. 5. Limit curb cuts and access drives along Hwy. 99E.	1. Basic intergovernmental coordination policy that still is appropriate. 2. This is an appropriate policy and relates to a regionally significant highway. 3. This is an appropriate policy to reduce local trips using regional highways. 4. This is an appropriate policy based on the 1989 METRO Southeast Corridor Study. It attempts to improve the local traffic circulation system, thereby reducing local trips on the regional system. 5. This is an appropriate policy for the Comprehensive Plan. SUMMARY: The policies meet the objective by improving and encouraging through traffic on the regional system, and by discouraging local trips from using the regional system.

TRANSPORTATION ELEMENT ..... continued	
ITEM	**COMMENTS**
OBJECTIVE #3: Roadway Construction & Improvements To improve access, circulation, and safety of roadways.	Language should be expanded to apply to all mode users of a roadway. This objective addresses goal in terms of access and safety with circulation being correlated with transportation network connectivity.
POLICIES: 1. The Roadway and Traffic Safety Management Plan (1978) adopted as part of Transportation Element. 2. Allocate money for roadway improvements by priority: maintenance, safety, vehicle and transit capacity, livability, cost, and new roads. 3. Encourage State to improve Hwy. 99E by riverfront with amenities, and encourage State to relocate Hwy. 99E downtown. 4. Roadway projects guided by Public Facilities Plan. 5. Transportation improvements should be provided as properties develop. Improvements consistent with Plan and roadway classifications. 6. Utilize Public Facilities Ordinance for transportation improvements, as development occurs. 7. Investigate improvements to Harrison St. and decreasing Washington St. as primary access to Hwy. 224.	1. This policy is outdated since the 1978 Plan is outdated. It will be replaced by new data, analyses, and recommendations of TSP. 2. This policy will be updated during TSP to reflect more current prioritization for the funding of accessway improvements. 3. Most of policy still appropriate except relocation of Hwy. 99E downtown. Improvements would implement objective. 4. This policy will be replaced as the Public Facilities Plan was never officially adopted by City. The transportation section of the Plan will be replaced by new data, analyses, and recommendations of the TSP. 5. "Should" should be replaced by "shall." Otherwise, policy is appropriate and serves objective. 6. This policy is appropriate and serves objective. 7. May be an outdated policy since some improvements have been made to Harrison Street. Policy will be further reviewed as part of TSP development for appropriateness. SUMMARY: All of the appropriate policies relate to the objective. New policies may be generated in the TSP to reflect current access, circulation, and safety improvement needs.
OBJECTIVE #4: Freight Movement & Business Operation To ensure that industries and businesses have adequate access to local and regional markets.	Basic objective seems appropriate. However, the objective does not directly address goal.
POLICIES: 1. Participate in regional transportation planning to ensure that adequate transportation facilities for industries and businesses are provided. 2. Encourage railway companies to provide service to industries and businesses. 3. Limit movement of goods and business-oriented truck operations to freeways/expressways and arterials, where possible.	1. Basic intergovernmental coordination policy that seems appropriate and serves objective. 2. Basic policy that seems appropriate and serves objective. 3. This policy may be revised and expanded in the TSP to reflect appropriate, designated truck routes for regional and local truck traffic affecting Milwaukie. SUMMARY: These will be expanded into two separate sections in the TSP, for truck and rail modes. Additional objectives and policies are likely to be developed to better reflect current and future projected truck and rail needs and considerations.

TRANSPORTATION ELEMENT ..... continued	
ITEM	**COMMENTS**
OBJECTIVE #5: Regional Transit Opportunities To encourage improved transit service for trips through and leaving the city.	This is a basic objective that does not directly address goal.
POLICIES:	
1. Continue to participate in the JPACT program to reduce congestion along Hwy. 99E.	1. This is an appropriate policy since congestion still exists along Hwy. 99E, and the highway is a regional transit corridor.
2. Aggressively promote Hwy. 99E Corridor for light rail transit.	2. This policy may be outdated as light rail transit planning has recognized part of Hwy. 99E in its future South/ North line. However, the City may wish to promote a future extension along Hwy. 99E from downtown Milwaukie to Oregon City.
3. Coordinate with responsible agencies along Hwy. 99E Corridor to promote light rail.	3. Policy may be outdated and should be revised to encourage continued coordination throughout the planning and development of the South/North light rail line.
4. Incorporate transit-related facilities in downtown and greenway improvement plans.	4. This is an appropriate policy that serves objective.
5. Encourage affordable housing close to regional transit facilities.	5. This is an appropriate policy that serves objective.
6. Improved transit service between downtown and the Clackamas Town Center is encouraged.	6. This is an appropriate policy given the 2040 Regional designations of both areas as Regional Centers.
7. Improve timed-transfer facility on Main Street, evaluate future location as redevelopment occurs.	7. This policy seems appropriate and serves objective.
8. Strongly encourage the financing and development of the McLoughlin light rail line. A general alignment is shown on Map 8.	8. This policy and associated map need to be revised based on past, current, and near-future activities and decisions with the South/North light rail line and its narrowing of alignment options through Milwaukie.
	SUMMARY: The policies meet the objective. This section will become part of the TSP's Transit Plan Element and will be further developed based on current and future identified needs and considerations.
OBJECTIVE #6: Local Transit Opportunities To encourage improved transit service for trips within Milwaukie.	Basic objective seems appropriate. Objective does not directly address goal.
POLICIES:	
1. Work with appropriate agencies to locate existing and new transit service and facilities; preference given to minor arterials and collectors.	1. Basic intergovernmental coordination policy. Emphasis on minor arterials and collectors will be reviewed for appropriateness as part of TSP development.
2. Frequent service to Island Station neighborhood is encouraged.	2. This policy is outdated. Elderly and moderate income housing exists elsewhere in the City. A generic policy to serve these target groups is more appropriate.
3. Consider transit facility needs during road improvements on suitable transit routes.	3. This is an appropriate policy for local and regional transit opportunities.
4. Pedestrian facilities linking neighborhoods to transit have high priority.	4. This is an appropriate policy that will be reviewed for its continued emphasis as part of TSP document.
5. Concentrate employment and commercial activities near transit.	5. Appropriate policy for local and regional transit opportunities.
6. Work to ensure transit opportunities for employees in industrial area.	6. This is an appropriate policy and serves local and regional transit opportunities.

TRANSPORTATION ELEMENT ..... continued	
ITEM	**COMMENTS**
7. Continue to support programs to assist the transportation disadvantaged.	7. This is an appropriate policy and serves local and regional transit opportunities. SUMMARY: The policies implement the objective. This section will become part of the TSP's Transit Plan Element. The objective and policies will be further developed as appropriate, based on current and future identified needs and considerations.
OBJECTIVE #7: Rail To improve the safety and convenient operation of railroad crossings.	Basic objective, though it does not address goal.
POLICIES: 1. Continue to cooperate with the railroads to ensure minimal traffic disruption. 2. Incorporate railroad crossing projects from the Roadway and Traffic Safety Management Plan in Transportation Element.	1. This is an appropriate policy that serves objective. It should be expanded to deal with other safety issues and coordination between the City and railroad entities. 2. The Roadway and Traffic Safety Management Plan is outdated. The TSP will incorporate new data collection and analyses, new railroad-related projects may be recommended as part of the TSP. SUMMARY: This section will become part of the TSP's Freight, Truck, and Rail Plan Element. The objective and policies will be further developed as appropriate, based on current and future identified needs and considerations.
OBJECTIVE #8: Pedestrian/Bikeway To develop a pedestrian/bikeway system which connects local activity centers.	This objective needs to be expanded by travel modes. The objective does not directly address goal, indirectly mentioned as alternative travel modes.
POLICIES: 1. Implement bikeway plans as shown in Map 8 2. Encourage connections from private developments to bikeway network. All new developments must provide pedestrian facilities. 3. Encourage and assist local areas to provide improvement districts for pedestrian facilities. 4. High priority is given to pedestrian facilities along or to transit corridors. 5. Support proposed 40-mile loop bicycle/pedestrian trail.	1. Bikeway Plan Map is outdated and will be revised as part of TSP development. 2. Basic concepts appropriate; needs to be made into two separate policies and expanded to address bicycle and pedestrian facility needs further. 3. This is an appropriate policy that may or may not directly serve the objective. 4. This is an appropriate policy that may or may not directly serve the objective. 5. This is an appropriate policy, but may need to be made more current. SUMMARY: This section will become the Pedestrian Plan and Bicycle Plan Elements of the TSP. The existing policies and objective are incomplete to address current and future identified needs and considerations for bicyclist and pedestrian travel. Issues such as engineering, education, enforcement, encouragement, and funding need to be further addressed.

TRANSPORTATION ELEMENT ..... continued	
ITEM	**COMMENTS**
OBJECTIVE #9: Transportation Planning Rule (TPR) No objective.	Needs an objective.
POLICIES: 1. Conduct development reviews for new and altered development to implement local, State, and regional transportation plans. 2. The review process for public projects shall be coordinated and consolidated when possible. 3. Coordinate development reviews with appropriate agencies. 4. Prepare corridor design plans as part of next periodic review. 5. Consider adopting Tri-Met's model standards regulations. 6. Sidewalks set back from curbs are preferred in residential areas. Sidewalks with curbs and on-street parking are preferred in commercial areas.	1. This is an appropriate policy and implements the TPR. 2. This is an appropriate policy and implements the TPR. 3. This is an appropriate policy and implements the TPR. 4. This is an appropriate policy and implements the TPR. 5. Tri-Met has not yet adopted model standards and regulations. The wording of this policy may be amended based on what Tri-Met ends up adopting. 6. This is a design consideration based on land uses adjacent to roadway. This policy should be reviewed as part of TSP development to see if still appropriate. SUMMARY: Objective #9 and its associated policies have recently been added to the Comprehensive Plan based on the TPR. It is appropriate to be included in the TSP, with minor modifications as needed.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES	
ITEM	**COMMENTS**
OPEN SPACES, SCENIC AREAS, AND NATURAL RESOURCES ELEMENT **OBJECTIVE #3: Scenic Areas** **Policy 2**	
Work with ODOT to ensure that future improvements to Hwy. 99E do not obstruct the visual relationship between the downtown and riverfront area, and encourage that the large trees north of downtown be retained where possible.	Appropriate policy for Comprehensive Plan.
AIR, WATER AND LAND RESOURCES QUALITY ELEMENT **OBJECTIVE #1: Regional Air Quality** **Policy 2**	
Continue to support and participate in regional public transportation planning efforts aimed at controlling air pollution	Appropriate policy for Comprehensive Plan.
AIR, WATER AND LAND RESOURCES QUALITY ELEMENT **OBJECTIVE #2: Local Air Quality** **Policy 2**	
Encourage the reduction of vehicle emissions by improving local flow and seeking ways to increase transit ridership.	Appropriate policy for Comprehensive Plan with minor clarifications such as adding the word "traffic" after "local" and by adding "bicycling and walking to get to local destinations" at the end of the policy.
AIR, WATER AND LAND RESOURCES QUALITY ELEMENT **OBJECTIVE #3: Noise** **Policy 5**	
Work with ODOT to implement traffic management measures designed to improve traffic flow on Hwy. 224, Hwy. 99E, and major arterials.	Appropriate policy for Comprehensive Plan.
RESIDENTIAL LAND USE AND HOUSING ELEMENT **OBJECTIVE #2: Residential Land Use: Density and Location** **Policy 2.c.**	
Areas may be designated low density residential . . . if transportation routes are limited primarily to collector and local streets.	Appropriate policy that may be revised based on related changes to functional classification in the TSP.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES..... continued	
ITEM	**COMMENTS**
RESIDENTIAL LAND USE AND HOUSING ELEMENT **OBJECTIVE #2: Residential Land Use: Density and Location** **Policy 4.b. & c.**	
Areas may be designated medium density residential . . . with access primarily to major and minor arterials. Siting should not increase traffic through low density residential areas. Medium density areas near or adjacent to . . . transit stops.	Appropriate policy that may be revised based on related changes to functional classification in the TSP.
RESIDENTIAL LAND USE AND HOUSING ELEMENT **OBJECTIVE #2: Residential Land Use: Density and Location** **Policy 5.c.**	
Areas may be designated high density residential . . . based on access . . . should primarily be by major and minor arterials. Siting should not cause traffic to move through adjacent lower density designated areas.	Appropriate policy that may be revised based on any related changes to functional classification in the TSP.
RESIDENTIAL LAND USE AND HOUSING ELEMENT **OBJECTIVE #3: Residential Land Use: Design** **Policy 1**	
Access driveways to less than four residential units will not be allowed onto arterials unless it can be shown that no other alternative is possible.	Appropriate policy for Comprehensive Plan.
RESIDENTIAL LAND USE AND HOUSING ELEMENT **OBJECTIVE #3: Residential Land Use: Design** **Policy 2.a.**	
Multifamily developments . . . within 100 feet of low and moderate density areas will provide one or more of the following . . . roadways separating projects.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #1: Economic Development** **Policy 8**	
City will lobby for roadway and other improvements outside of the city that bear heavily on the community's industrial complex	Appropriate policy for Comprehensive Plan.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES..... continued	
ITEM	**COMMENTS**
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #4: Industrial Land Use** **Policy 2**	
Properties adjacent to the three major industrial areas and annexed properties not zoned industrial will be evaluated on the following when considering an industrial designation: (a) historical commitment to industrial use; (b) access to regional transportation network . . ; (c) significant traffic increase shall not result on streets of collector or less status	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #6: Commercial Land Use** **Policy 2**	
Expansion or creation of commercial designated areas will be evaluated against the following criteria: (a) historical commitment to commercial use; (b) access to a transportation network appropriate for the scale of proposed development; (c) significant traffic increase shall not result on streets of collector or less status serving low density residential areas	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #10: Commercial Land Use: Convenience Centers** **Policy 2**	
Local convenience centers will be designed as complementary to district centers. Traffic movement to and from site will be the primary consideration.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #11: Commercial Land Use: Highway Oriented Center** **Policy 2**	
Access to highway oriented centers may not be by way of collector or less streets serving residential areas.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #11: Commercial Land Use: Highway Oriented Center** **Policy 4**	
Highway oriented commercial centers should locate at freeway interchanges or major arterial intersections instead of strip development patterns.	Appropriate policy for Comprehensive Plan.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES..... continued	
ITEM	**COMMENTS**
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #12: Downtown Office Center** **Policy 5**	
Focus redevelopment efforts on the waterfront. Develop an improvement and management program for the downtown and waterfront area. Various methods . . . will be explored for improvements . . . such as parking, street lighting, landscaping, street furniture, paving, and traffic management.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #12: Downtown Office Center** **Policy 7**	
Establish locations for major public transit stations or interchange facilities . . . work with METRO and Tri-Met.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #13: McLoughlin Boulevard** **Policy 1**	
City will work with ODOT and METRO during their transportation planning programs to identify appropriate land uses and access arrangements along McLoughlin Blvd. City will integrate its own downtown improvement plans and waterfront plans with regional transportation planning programs.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #13: McLoughlin Blvd.** **Policy 2**	
The opportunity will be taken during any improvement of the McLoughlin Corridor to create new or more efficient vehicular access to the riverfront, as well as pedestrian access not in conflict with motorized transportation.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #13: McLoughlin Blvd.** **Policy 3**	
Improved pedestrian and bicycle connections will be provided between downtown and the riverfront	Appropriate policy for Comprehensive Plan.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES..... continued	
ITEM	**COMMENTS**
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #13: McLoughlin Blvd.** **Policy 5**	
Visual and pedestrian amenities will be required along the downtown portion of McLoughlin Blvd. . . . street trees, landscaped medians, turn bays rather than continuous turn lanes and pedestrian-supportive features on the right-of-way.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #13: McLoughlin Blvd.** **Policy 6**	
City will encourage ODOT to provide a long-term solution to McLoughlin Blvd. problems in Milwaukie. This could include the relocation of McLoughlin Blvd. to the east, resulting in a better integration of the downtown area with proposed riverfront improvements.	The first part of policy is still appropriate for the Comprehensive Plan. The second part of policy related to relocation of McLoughlin Blvd. to the east is no longer a desirable option and should be deleted.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #14: Milwaukie Expressway** **Policy 1**	
City will work with ODOT and County to ensure that highway service uses are not allowed direct access to the Milwaukie Expressway.	Appropriate policy for Comprehensive Plan.
ECONOMIC BASE AND INDUSTRIAL/COMMERCIAL LAND USE ELEMENT **OBJECTIVE #14: Milwaukie Expressway** **Policy 2**	
Urge ODOT and Clackamas County to continue to provide adequate access for industrial and commercial areas adjacent to Highway 224.	Appropriate policy for Comprehensive Plan.
RECREATIONAL NEEDS ELEMENT **OBJECTIVE #5: Neighborhood and Community Parks**	
A neighborhood park will be provided in a convenient location for the residents of each neighborhood, preferably on collector or minor arterial streets.	Appropriate policy for Comprehensive Plan.
WILLAMETTE GREENWAY ELEMENT **OBJECTIVE #7: Central Riverfront** **Policy 1**	
City will prepare a Central Riverfront Master Plan . . . focusing specifically on the riverfront west of McLoughlin Blvd. . . . and address the following issues: public access, safe pedestrian access across McLoughlin Blvd., . . . visual access, transportation	Appropriate policy for Comprehensive Plan.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES..... continued	
ITEM	**COMMENTS**
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Policy 5**	
To implement traffic safety management improvements proposed in the Roadway and Traffic Safety Management Plan, 1978, and the Public Facilities Plan, 1988.	This policy is no longer appropriate because the TSP will recommend traffic safety management improvements. This policy should be deleted.
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Policy 6**	
To improve neighborhood traffic circulation in order to reduce congestion.	This policy is appropriate in content, but should be reworded to read like a policy rather than an objective.
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Policy 7**	
To more adequately maintain existing City streets, and to solve the problem of surface flooding and ponding.	This policy is appropriate in content, but should be reworded to read like a policy rather than an objective.
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Neighborhood Area 1** **Guideline #2: Multifamily Housing**	
Projects should have close proximity to major streets and public transit, and should not cause through traffic in the neighborhood. . . . Projects should have adequate off-street parking.	Appropriate guideline for Comprehensive Plan.
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Neighborhood Area 1** **Guideline #7: Traffic Safety**	
To implement improvements proposed to improve railroad crossings.	Appropriate guideline for Comprehensive Plan.
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Neighborhood Area 2** **Guidelines #5 and 6**	
5. Improve public transit service to residents. 6. Provide safe pedestrian walkways separated from roadways, without necessarily constructing sidewalks	Guidelines are appropriate for Comprehensive Plan. Guideline #6, as off-road paths only, may be difficult to implement. A combination of off-road paths and sidewalks would be more effective.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES..... continued	
ITEM	**COMMENTS**
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Neighborhood Area 3** **Guideline #2: Multifamily Housing**	
Projects should have direct access to arterials and collectors.	Appropriate guideline for Comprehensive Plan.
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Neighborhood Area 4** **Guidelines #1, 2, 4, and 5**	
1. Locate higher density housing near arterials and in support of public transit. 2. A systems development charge should be considered for . . . streets . . . . 4. Adequate walkways are provided and maintained. 5. Reconstruct neighborhood streets to appropriate standards.	Appropriate guidelines for Comprehensive Plan.
NEIGHBORHOOD ELEMENT **OBJECTIVE #2: Neighborhood Needs** **Neighborhood Area 5** **Guidelines #1, 2, 3, 6, and 7**	
1. High density apartments near commercial areas while allowing other housing along arterials and transit. 2. A systems development charge should be considered for . . . streets . . . . 3. Review development proposals for compatibility of street layout and design. 6. Control and enforce speed restrictions on neighborhood streets. 7. Reconstruct neighborhood streets to appropriate standards and provide walkways.	Appropriate guidelines for Comprehensive Plan.
PUBLIC FACILITIES AND SERVICES ELEMENT **OBJECTIVE #6: Drainage and Streets** **Policy 2**	
Promote construction of street, curb, and sidewalk/bikepath improvements coordinated with the construction of the storm drainage system, with highest priority for arterials, collectors, bikeway streets, or streets serving public transit.	Overall, appropriate policy for Comprehensive Plan. However, language needs to be updated for "sidewalk/ bikepath."
PUBLIC FACILITIES AND SERVICES ELEMENT **OBJECTIVE #8: Police and Fire Services** **Policy 5**	
Ensure streets are of high structural quality, sufficient width, and well-maintained	Appropriate policy for Comprehensive Plan.

OTHER COMPREHENSIVE PLAN ELEMENTS, OBJECTIVES, AND/OR POLICIES..... continued	
ITEM	**COMMENTS**
PUBLIC FACILITIES AND SERVICES ELEMENT **OBJECTIVE #9: School Coordinator**	
Ensure sidewalks and bikeways are provided to promote safe routes to schools	Appropriate policy that may be strengthened as a priority in TSP.
ENERGY CONSERVATION ELEMENT **OBJECTIVE #2: Transportation System**	
To encourage an energy-efficient transportation system.	Appropriate objective for Energy Conservation Element.
ENERGY CONSERVATION ELEMENT **OBJECTIVE #2: Transportation System** **Policy 1**	
Through Transportation Element, encourage: efficiency improvements to major highways and arterials, improvements to public transit, improvements to pedestrian and bicycle system.	Appropriate policy that implements above objective.
ENERGY CONSERVATION ELEMENT **OBJECTIVE #4: Site and Building Design** **Policy 2**	
Encourage street and site design which maximizes solar energy potential of structures.	Appropriate policy for Comprehensive Plan.
CITY GROWTH ELEMENT **OBJECTIVE #7: Extension of Services** **Policy 1**	
City cooperate with County and affected service districts in planning and providing for . . . transportation.	Appropriate policy for Comprehensive Plan.

APPENDIX 5:
Locally Relevant Oregon Transportation Plan Policies

OREGON TRANSPORTATION PLAN (1992) POLICIES THAT RELATE TO MILWAUKIE

Policy 2A - Land Use: It is the policy of the State of Oregon to develop transportation plans and policies that implement Oregon's Statewide Planning Goals, as adopted by the Land Conservation and Development Commission.

Action Steps under this policy call for support of local land use planning with systems planning to provide needed level of mobility; State, regional and local system plans reflect accommodation of planned development within jurisdictions; coordinate State transportation planning with regional and local land use plans; and provide technical assistance to local governments for implementation of the Transportation Planning Rule.

Policy 2B - Urban Accessibility: It is the policy of the State of Oregon to define minimum levels of service and assure balanced, multimodal accessibility to existing and new development within urban areas to achieve the state goal of compact, highly urbanized areas.

Action steps under this policy are to cooperate with local governments and metropolitan planning organizations to develop integrated transportation plans; support infill projects; and increase the availability and use of transit, walking, bicycling and ridesharing.

Policy 2C - Relationship of Interurban and Urban Mobility: It is the policy of the State of Oregon to provide interurban mobility through and near urban areas in a manner which minimizes adverse effects on land use and urban travel patterns.

Action steps under this policy are to encourage regional and local transportation system plans and land use plans to avoid dependence on the state highway system for direct access to development adjacent to the state highway; and promote the development of bus and passenger rail to improve urban accessibility and achieve land use goals.

Policy 2D - It is the policy of the State of Oregon to promote safe, comfortable travel for pedestrians and bicyclists along travel corridors and within existing communities and new developments.

The action step for this policy is to make walkways, pedestrian shelters and bikeways an integral part of the circulation pattern between and within communities.

Policy 4K - Local Government Responsibilities - It is the policy of the State of Oregon that local governments shall define a transportation system of local significance adequate to meet identified need for the movement of people and goods to local destinations within their jurisdictions; and local government transportation plans shall be consistent with regional transportation plans and adopted elements of the state transportation system plan.

The action steps for this policy is to have cities and counties adopt regional and local transportation plans as part of their comprehensive plans; and local governments shall carry out their responsibilities for transportation planning and development as described in the Transportation Planning Rule.

APPENDIX 6:
Functional Classification by Jurisdiction

Roadway Functional Classification According to Jurisdiction

Roadway	Jurisdiction				
	ODOT	Metro	Cof Port	Clack Co	Milwaukie
ORE 99E (AOH)*	Statewide	Maj Art	Reg Traffic	Maj Art	Maj Art
ORE 224 (AOH)*	Statewide	Princ Art		Free/Exp	Free/Exp
SE 17th Avenue			Neigh Coll	Min Art	Min Art
SE JCB		Min Art	Neigh Coll	Min Art	Min Art
SE Harrison St				Min Art	Min Art
SE King Rd				Min Art	Min Art
SE Monroe St				Min Art/Coll	Min Art/Coll
SE 37th Ave				Min Art	Min Art
SE Linwood Ave		Min Art		Min Art	Min Art
SE Lake Rd		Min Art		Min Art	Min Art
SE Harmony Rd		Min Art		Maj Art	Min Art
SE 22nd Ave				Min Art	Min Art
SE River Rd				Min Art	Min Art
SE Oatfield Rd		Min Art		Min Art	Min Art
SE Railroad Ave				Min Art	Min Art
SE Main St					Collect
SE 32nd Ave				Collect	Collect
SE 42nd Ave				Collect	Collect
SE 43rd Ave				Collect	Collect
SE Jackson St					Collect
SE Jefferson St					Collect
SE 21st Ave					Collect
SE Washington St				Collect	Collect
SE 34th Ave				Collect	Collect
SE Oak St					Collect
SE Home Ave				Collect	Collect
SE Stanley Ave				Collect	Collect
SE Bell Ave				Collect	Collect

* AOH - Access Oregon Highway

Legend: Maj Art = Major Arterial
Princ Art = Principal Arterial
Min Art = Minor Arterial
Reg Traff = Regional Trafficway
Neigh Coll = Neighborhood Collector
Free/Exp = Freeway/Expressway
Coll/Collect = Collector

APPENDIX 7:
Levels of Service Descriptions

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, but by itself indicates neither the ability of the street network to carry additional traffic nor the quality of service afforded by the street facilities. For this, the concept of *level of service* has been developed to subjectively describe traffic performance. Level of service can be measured at intersections and along key roadway segments.

Level of service categories are similar to report card ratings for traffic performance. Intersections are typically the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is generally diminished in their vicinities. Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Level of service D and E are progressively worse peak hour operating conditions and F conditions represent where demand exceeds the capacity of an intersection. Most urban communities set level of service D as the minimum acceptable level of service for peak hour operation and plan for level of service C or better for all other times of the day. The *Highway Capacity Manual* provides level of service calculation methodology for both intersections and arterials.[20] The following sections provide interpretations of the analysis approaches.

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[20] *1994 Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1994, Chapters 9, 10, 11.

SIGNALIZED INTERSECTIONS

For signalized intersections, level of service is evaluated based upon average vehicle delay experienced by vehicles entering an intersection. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to the variation in traffic control. The *1985 Highway Capacity Manual*[21] provides the basis for these calculations.

Level of Service Definitions Signalized Intersections

Level of Service	Vehicle Delay (secs.)	Volume to Capacity Ratio	Description
A	≤5.00	0.00-0.59	**Free Flow/Insignificant Delays:** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.
B	5.1-15.0	0.60-0.69	**Stable Operation/Minimal Delays:** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles.
C	15.1-25.0	0.70-0.79	**Stable Operation/Acceptable Delays:** Major approach phases fully utilized. Most drivers feel somewhat restricted.
D	25.1-40.0	0.80-0.89	**Approaching Unstable/Tolerable Delays:** Drivers may have to wait through more than one red signal indication. Queues may develop but dissipate rapidly, without excessive delays.
E	40.1-60.0	0.90-0.99	**Unstable Operation/Significant Delays:** Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection.
F	≥60.0	N/A	**Forced Flow/Excessive Delays:** Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report No.209, Washington D.C., 1985; and *Circular 212*, Transportation Research Board, 1980.

[21] *1985 Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1985, Chapter 9.

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The *1985 Highway Capacity Manual*[22] describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

Unsignalized intersection levels of service are described in the following table. Note that unsignalized intersections are generally reported with two levels of service (i.e. A/E) indicating the major street approach and minor street approach (usually left turn movements), respectively.

Level of Service Definitions
Unsignalized Intersections

Level of Service	Expected Delay	Reserve Capacity (Vehicles/Hour)
A	Little or no delay	≥400
B	Short traffic delay	300-399
C	Average traffic delays	200-299
D	Long traffic delays	100-199
E	Very long traffic delays	0-99
F	Extreme delays potentially affecting other traffic movements in the intersection	≤ 0

Source: *Highway Capacity Manual*, Special Report 209, Transportation Research Board Washington, D.C., 1985.

[22] *1985 Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1985, Chapter 10.

ALL-WAY STOP CONTROLLED INTERSECTIONS

Unsignalized intersections and all-way stop controlled intersections are each subject to a separate capacity analysis methodology. All-way stop controlled intersection operations are reported by leg of the intersection. This method was developed by Dr. Michael Kyte of the University of Idaho.[23]

This method calculates a delay value for each approach to the intersection. The following table describes the amount of delay associated with each level of service.

Delay (Seconds)	Level of Service
≤ 5	A
6 - 10	B
11 - 20	C
21 - 30	D
31 - 45	E
> 45	F

* All-way stop controlled intersections use a different methodology than unsignalized intersections with one or more approaches uncontrolled. Level of services for all-way stop controlled intersections are reported for each approach (northbound, southbound, eastbound, westbound) in this document. Note that asterisks (**) appear where no approach exists.

[23] *Transportation Research Circular #373*, Transportation Research Board.

ARTERIAL LEVEL OF SERVICE

Arterial level of service is based on the average travel speed for the segment, section, or entire arterial under consideration. The average travel speed is computed from the running time on the arterial segment(s) and the intersection approach delay. It is strongly influenced by the number of signals per mile and the average intersection delay. On a given facility, factors such as inappropriate signal timing, poor progression, and increasing traffic flow can substantially degrade the arterial LOS.[24]

Arterial levels of service are summarized in the following table.

Arterial Levels of Service

Arterial Class	**I**	**II**	**III**
Range of Free Flow Speeds (mph)	45 to 35	35 to 30	35 to 25
Typical Free Flow Speed (mph)	40 mph	33 mph	27 mph
Level of Service	**Average Travel Speed (mph)**		
A	≥ 35	≥ 30	≥ 25
B	≥ 28	≥ 24	≥ 19
C	≥ 22	≥ 18	≥ 13
D	≥ 17	≥ 14	≥ 9
E	≥ 13	≥ 10	≥ 7
F	< 13	< 10	< 7

[24] *1985 Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1985, Chapter 11.

APPENDIX 8:
Travel Time Runs Methodology

TRAVEL TIME RUNS METHODOLOGY

Travel time runs were conducted on several key routes in Milwaukie. These travel time runs measured the length of time it took to travel from one end to the other of each key route during the PM peak period (4:00 PM to 6:00 PM) during the week. Three key north-south routes and four key east-west routes were surveyed. The north-south routes are as follows:

- McLoughlin Boulevard from Tacoma Street to Park Avenue
- 32nd Avenue/Oak Street/Oatfield Road from Tacoma Street to Park Avenue
- Linwood Avenue from Johnson Creek Boulevard to Harmony Road

The east-west routes are as follows:

- Tacoma Street/Johnson Creek Boulevard from McLoughlin Boulevard to I-205
- ORE 224/Milwaukie Expressway from McLoughlin Boulevard to Webster Road
- Lake Road/Harmony Road from Harrison Street to Clackamas Town Center
- Harrison Street/King Road from McLoughlin Boulevard to 82nd Avenue

The time periods observed were weekday evening peak and any other time when the route exhibited free flow traffic conditions. Three to four runs were performed on each route.

APPENDIX 9:
Level of Service Calculations

Existing

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 13 32nd Ave/JCB	E	34.6	1.041	E	34.6	1.041	+ 0.000 V/C
# 20 42nd Ave/JCB	C	12.2	0.732	C	12.2	0.732	+ 0.000 V/C
# 35 ORE 99E/Harrison Street	E	45.3	1.024	E	45.3	1.024	+ 0.000 D/V
# 36 ORE 99E/Jackson Street	A	xxxxx	0.000	A	xxxxx	0.000	+ 0.000 V/C
# 37 ORE 99E/Monroe St	D	xxxxx	0.000	D	xxxxx	0.000	+ 0.000 V/C
# 42 17th Avenue/ORE 224	C	22.6	0.858	C	22.6	0.858	+ 0.000 D/V
# 46 ORE 224/Harrison Street	C	22.2	0.868	C	22.2	0.868	+ 0.000 D/V
# 54 ORE 224/Monroe	B	8.4	0.719	B	8.4	0.719	+ 0.000 D/V
# 55 ORE 99E/Jefferson St	B	6.8	0.789	B	6.8	0.789	+ 0.000 D/V
# 56 ORE 99E/Washington St	D	xxxxx	0.000	D	xxxxx	0.000	+ 0.000 V/C
# 85 32nd Ave/Harrison	B	14.6	0.380	B	14.6	0.380	+ 0.000 D/V
#100 42nd Ave/Harrison	C	16.5	0.886	C	16.5	0.886	+ 0.000 V/C
#104 42nd Ave/King Rd	B	9.1	0.627	B	9.1	0.627	+ 0.000 V/C
#112 43rd Ave/King Rd	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
#121 Stanley/King Rd (West Leg)	D	xxxxx	0.000	D	xxxxx	0.000	+ 0.000 V/C
#128 Stanley/JCB	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
#135 Linwood/JCB	F	xxxxx	0.000	F	xxxxx	0.000	+ 0.000 V/C
#139 Stanley/King Rd (East Leg)	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C
#141 Linwood/King Rd	C	20.1	0.658	C	20.1	0.658	+ 0.000 D/V
#180 37th Ave/Monroe	B	7.2	0.613	B	7.2	0.613	+ 0.000 V/C
#194 Oak St/Railroad Ave	B	xxxxx	0.000	B	xxxxx	0.000	+ 0.000 V/C
#199 Oak Street/Campbell Street	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C
#205 Oak Street/ORE 224	C	18.3	0.834	C	18.3	0.834	+ 0.000 D/V

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#238 Linwood/RR Ave/Harmony	D	31.1	0.922	D	31.1	0.922	+ 0.000 D/V
#272 37th Avenue/ORE 224	B	11.4	0.786	B	11.4	0.786	+ 0.000 D/V
#319 Oatfield Rd/Lake Rd	D	31.9	0.902	D	31.9	0.902	+ 0.000 D/V
#338 Oak/Washington	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C
#363 37th Ave/Railroad Avenue	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #13 32nd Ave/JCB

Cycle (sec):	1	Critical Vol./Cap. (X):	1.041
Loss Time (sec):	0	Average Delay (sec/veh):	34.6
Optimal Cycle:	0	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign Include			Stop Sign Include			Stop Sign Include			Stop Sign Include		
Rights:												
Lanes:	0	0	1! 0	0	0	0	0	0	1	0	0	0
Volume Module:												
Base Vol:	91	0	87	0	0	0	0	597	241	89	232	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	91	0	87	0	0	0	0	597	241	89	232	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	91	0	87	0	0	0	0	597	241	89	232	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	91	0	87	0	0	0	0	597	241	89	232	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	91	0	87	0	0	0	0	597	241	89	232	0
Saturation Flow Module:												
Sat/Lane:	372	372	372	0	0	0	805	805	805	830	830	830
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.51	0.00	0.49	0.00	0.00	0.00	0.00	0.71	0.29	0.28	0.72	0.00
Final Sat.:	190	0	182	0	0	0	0	573	232	230	600	0
Capacity Analysis Module:												
Vol/Sat:	0.48	0.00	0.48	0.00	0.00	0.00	0.00	1.04	1.04	0.39	0.39	0.00
Crit Moves:	****					****			****	****		
Level Of Service Module:												
Delay/Veh:	6.2	1.0	6.2	1.0	1.0	1.0	1.0	52.2	52.2	4.3	4.3	1.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	6.2	1.0	6.2	1.0	1.0	1.0	1.0	52.2	52.2	4.3	4.3	1.0
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #20 42nd Ave/JCB

Cycle (sec):	1	Critical Vol./Cap. (X):	0.732
Loss Time (sec):	0	Average Delay (sec/veh):	12.2
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign Include			Stop Sign Include			Stop Sign Include			Stop Sign Include		
Rights:												
Lanes:	1	0	0	0	1	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	37	0	150	0	0	0	0	601	81	198	402	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	37	0	150	0	0	0	0	601	81	198	402	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	37	0	150	0	0	0	0	601	81	198	402	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	37	0	150	0	0	0	0	601	81	198	402	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	37	0	150	0	0	0	0	601	81	198	402	0
Saturation Flow Module:												
Sat/Lane:	250	250	250	0	0	0	932	932	932	1038	1038	1038
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.88	0.12	0.33	0.67	0.00
Final Sat.:	250	0	250	0	0	0	0	821	111	343	695	0
Capacity Analysis Module:												
Vol/Sat:	0.15	0.00	0.60	0.00	0.00	0.00	0.00	0.73	0.73	0.58	0.58	0.00
Crit Moves:			****			****		****			****	
Level Of Service Module:												
Delay/Veh:	1.8	1.0	9.8	1.0	1.0	1.0	1.0	16.1	16.1	9.0	9.0	1.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	1.8	1.0	9.8	1.0	1.0	1.0	1.0	16.1	16.1	9.0	9.0	1.0
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #35 ORE 99E/Harrison Street

Cycle (sec): 120 Critical Vol./Cap. (X): 1.024
Loss Time (sec): 16 Average Delay (sec/veh): 45.3
Optimal Cycle: 180 Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Ovl			Include		
Min. Green:	6	15	15	6	15	15	15	15	15	15	15	15
Lanes:	1 0	1	1 0	1 0	1	1 0	0 1	0	0 1	1 0	1!	0 0
Volume Module:												
Base Vol:	257	743	156	145	1320	2	8	107	565	149	91	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	257	743	156	145	1320	2	8	107	565	149	91	45
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	257	743	156	145	1320	2	8	107	565	149	91	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	257	743	156	145	1320	2	8	107	565	149	91	45
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.00	1.05	1.05	1.00	1.00	1.00	1.05	1.00	1.00
Final Vol.:	257	780	164	145	1386	2	8	107	565	156	91	45
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.96	0.96	0.94	0.99	0.99	0.99	0.99	0.85	0.94	0.94	0.94
Lanes:	1.00	1.65	0.35	1.00	1.99	0.01	0.07	0.93	1.00	1.36	0.43	0.21
Final Sat.:	1693	2856	601	1693	3559	5	125	1666	1522	2300	717	354
Capacity Analysis Module:												
Vol/Sat:	0.15	0.27	0.27	0.09	0.39	0.39	0.06	0.06	0.37	0.07	0.13	0.13
Crit Moves:	****				****				****		****	
Green/Cycle:	0.15	0.40	0.40	0.13	0.38	0.38	0.21	0.21	0.36	0.13	0.13	0.13
Volume/Cap:	1.03	0.68	0.68	0.68	1.03	1.03	0.30	0.30	1.03	0.54	1.02	1.02
Level Of Service Module:												
Delay/Veh:	90.4	23.4	23.4	43.8	53.9	53.9	30.3	30.3	65.9	38.3	85.3	85.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	90.4	19.9	19.9	43.8	45.8	45.8	25.7	25.7	56.0	32.6	72.5	72.5
Queue:	13	26	26	5	59	59	3	3	26	9	16	16

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #36 ORE 99E/Jackson Street

Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	1	1 0	0 0	2	0 0	0 0	0	0 0	0 0	0	0 1
Volume Module:												
Base Vol:	0	1201	38	0	2180	0	0	0	0	0	0	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1201	38	0	2180	0	0	0	0	0	0	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1201	38	0	2180	0	0	0	0	0	0	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1201	38	0	2180	0	0	0	0	0	0	20
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1201	38	0	2180	0	0	0	0	0	0	22
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx	7.0	6.5	5.5	7.0	6.5	5.5
Capacity Module:												
Cnflict Vol:	2180	xxxx	xxxxx	1239	xxxx	xxxxx	3439	3419	1090	3400	3400	619
Potent Cap.:	130	xxxx	xxxxx	239	xxxx	xxxxx	65	82	290	65	82	538
% Used Cap.:	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	4.1
Impedance:	1.00	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.98
Actual Cap.:	130	xxxx	xxxxx	239	xxxx	xxxxx	63	82	290	65	82	538
Level Of Service Module:												
Unused Cap.:	130	xxxx	xxxxx	239	xxxx	xxxxx	63	82	290	65	82	516
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	A
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #37 ORE 99E/Monroe St

Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1	1 0	1 0	1	1 0	0 0	0	0 0	0 0	0	0 1
Volume Module:												
Base Vol:	0	1143	41	70	2241	7	0	0	0	0	0	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1143	41	70	2241	7	0	0	0	0	0	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1143	41	70	2241	7	0	0	0	0	0	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1143	41	70	2241	7	0	0	0	0	0	60
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1143	41	77	2241	7	0	0	0	0	0	66
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 45 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.8	xxxx	xxxxx	5.8	xxxx	xxxxx	7.9	7.4	6.1	7.9	7.4	6.1
Capacity Module:												
Cnflict Vol:	2248	xxxx	xxxxx	1184	xxxx	xxxxx	3558	3499	1124	3482	3482	592
Potent Cap.:	105	xxxx	xxxxx	206	xxxx	xxxxx	40	50	228	40	50	481
% Used Cap.:	0.0	xxxx	xxxxx	37.3	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	13.7
Impedance:	1.00	xxxx	xxxxx	0.71	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.91
Actual Cap.:	105	xxxx	xxxxx	206	xxxx	xxxxx	26	35	228	28	35	481
Level Of Service Module:												
Unused Cap.:	105	xxxx	xxxxx	129	xxxx	xxxxx	26	35	228	28	35	415
LOS by Move:	*	*	*	D	*	*	*	*	*	*	*	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #42 17th Avenue/ORE 224

Cycle (sec):	100	Critical Vol./Cap. (X):	0.858
Loss Time (sec):	12	Average Delay (sec/veh):	22.6
Optimal Cycle:	93	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	1 0	1 0	1	0 1	0 0	0	0 0	1 0	0	0 1
Volume Module:												
Base Vol:	0	258	49	691	672	0	0	0	0	49	0	361
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	258	49	691	672	0	0	0	0	49	0	361
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	258	49	691	672	0	0	0	0	49	0	361
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	258	49	691	672	0	0	0	0	49	0	361
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	258	49	691	672	0	0	0	0	49	0	361
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	0.86	0.86	1.09	0.99	1.00	1.00	1.00	1.00	0.94	1.00	0.98
Lanes:	0.00	0.84	0.16	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Final Sat.:	0	1305	248	1957	1791	0	0	0	0	1693	0	1772
Capacity Analysis Module:												
Vol/Sat:	0.00	0.20	0.20	0.35	0.38	0.00	0.00	0.00	0.00	0.03	0.00	0.20
Crit Moves:			****	****			****					****
Green/Cycle:	0.00	0.23	0.23	0.41	0.64	0.00	0.00	0.00	0.00	0.24	0.00	0.24
Volume/Cap:	0.00	0.86	0.86	0.86	0.58	0.00	0.00	0.00	0.00	0.12	0.00	0.86
Level Of Service Module:												
Delay/Veh:	0.0	40.7	40.7	26.8	8.3	0.0	0.0	0.0	0.0	22.8	0.0	38.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	0.0	34.6	34.6	26.8	7.1	0.0	0.0	0.0	0.0	22.8	0.0	33.0
Queue:	0	10	10	19	11	0	0	0	0	1	0	11

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #46 ORE 224/Harrison Street

Cycle (sec): 110 Critical Vol./Cap. (X): 0.868
Loss Time (sec): 12 Average Delay (sec/veh): 22.2
Optimal Cycle: 101 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 2	0 1	1	0 2	0 1	0	1 0	1 0	0	1 0	1 0
Volume Module:												
Base Vol:	83	897	52	186	1600	28	9	399	151	49	275	118
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	83	897	52	186	1600	28	9	399	151	49	275	118
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	83	897	52	186	1600	28	9	399	151	49	275	118
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	83	897	52	186	1600	28	9	399	151	49	275	118
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.00	1.00	1.05	1.00	1.05	1.05	1.05	1.05	1.05	1.05
Final Vol.:	83	942	52	186	1680	28	9	419	159	51	289	124
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.93	0.98	0.83	0.94	0.98	0.84	0.65	0.65	0.65	0.53	0.53	0.53
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.03	1.43	0.54	0.22	1.25	0.53
Final Sat.:	1676	3528	1499	1684	3546	1507	36	1677	636	210	1187	509
Capacity Analysis Module:												
Vol/Sat:	0.05	0.27	0.03	0.11	0.47	0.02	0.25	0.25	0.25	0.24	0.24	0.24
Crit Moves:	****				****			****				
Green/Cycle:	0.06	0.43	0.43	0.18	0.55	0.55	0.29	0.29	0.29	0.29	0.29	0.29
Volume/Cap:	0.87	0.63	0.08	0.63	0.87	0.03	0.87	0.87	0.87	0.85	0.85	0.85
Level Of Service Module:												
Delay/Veh:	74.4	19.3	14.2	34.8	19.6	8.8	36.4	36.4	36.4	36.1	36.1	36.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	74.4	16.4	12.1	34.8	16.7	7.5	31.0	31.0	31.0	30.7	30.7	30.7
Queue:	4	23	1	6	47	0	19	19	19	15	15	15

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #54 ORE 224/Monroe

Cycle (sec): 100 Critical Vol./Cap. (X): 0.719
Loss Time (sec): 12 Average Delay (sec/veh): 8.4
Optimal Cycle: 62 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 1	1 0	1	0 1	1 0	0	0 1!	0 0	0	0 1!	0 0
Volume Module:												
Base Vol:	40	830	10	10	1680	20	15	40	110	20	20	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	830	10	10	1680	20	15	40	110	20	20	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	830	10	10	1680	20	15	40	110	20	20	20
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	40	830	10	10	1680	20	15	40	110	20	20	20
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.00	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	40	871	11	10	1764	21	15	40	110	20	20	20
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.95	1.00	1.00	0.95	1.00	1.00	0.81	0.81	0.81	0.70	0.70	0.70
Lanes:	1.00	1.98	0.02	1.00	1.98	0.02	0.09	0.24	0.67	0.34	0.33	0.33
Final Sat.:	1710	3555	45	1710	3558	42	133	353	972	418	418	418
Capacity Analysis Module:												
Vol/Sat:	0.02	0.25	0.24	0.01	0.50	0.50	0.11	0.11	0.11	0.05	0.05	0.05
Crit Moves:	****				****			****				
Green/Cycle:	0.03	0.71	0.71	0.02	0.69	0.69	0.16	0.16	0.16	0.16	0.16	0.16
Volume/Cap:	0.72	0.35	0.35	0.35	0.72	0.72	0.72	0.72	0.72	0.30	0.30	0.30
Level Of Service Module:												
Delay/Veh:	59.0	4.4	4.4	39.7	8.0	8.0	37.4	37.4	37.4	28.6	28.6	28.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	59.0	3.7	3.7	39.7	6.8	6.8	31.8	31.8	31.8	24.3	24.3	24.3
Queue:	2	10	10	0	31	31	5	5	5	1	1	1

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #55 ORE 99E/Jefferson St

Cycle (sec): 110 Critical Vol./Cap. (X): 0.789
Loss Time (sec): 8 Average Delay (sec/veh): 6.8
Optimal Cycle: 64 Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	15	15	15	0	15	15	0	0	0	15	15	15
Lanes:	1	0 1	1 0	0	1 0	1 0	0	0 1!	0 0	1	0 1!	0 0
Volume Module:												
Base Vol:	6	1126	26	3	2052	8	8	12	14	249	16	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	1126	26	3	2052	8	8	12	14	249	16	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	6	1126	26	3	2052	8	8	12	14	249	16	23
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	1126	26	3	2052	8	8	12	14	249	16	23
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.05	1.05	1.05	1.00	1.00	1.00	1.05	1.00	1.00
Final Vol.:	6	1182	27	3	2155	8	8	12	14	261	16	23
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.05	1.00	1.00	0.95	0.95	0.95	0.84	0.84	0.84	0.96	0.96	0.96
Lanes:	1.00	1.96	0.04	0.01	1.98	0.01	0.24	0.35	0.41	1.77	0.09	0.14
Final Sat.:	90	3520	80	5	3403	13	356	534	623	3059	163	235
Capacity Analysis Module:												
Vol/Sat:	0.07	0.34	0.34	0.63	0.63	0.63	0.02	0.02	0.02	0.09	0.10	0.10
Crit Moves:					****						****	
Green/Cycle:	0.79	0.79	0.79	0.79	0.79	0.79	0.14	0.14	0.14	0.14	0.14	0.14
Volume/Cap:	0.08	0.42	0.42	0.80	0.80	0.80	0.16	0.16	0.16	0.63	0.72	0.72
Level Of Service Module:												
Delay/Veh:	2.0	2.8	2.8	6.3	6.3	6.3	31.9	31.9	31.9	35.9	38.6	38.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	2.0	2.4	2.4	5.3	5.3	5.3	27.1	27.1	27.1	30.5	32.8	32.8
Queue:	0	12	12	39	39	39	1	1	1	9	9	9

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #56 ORE 99E/Washington St

Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1 1	0	1 0	1 1	0	0 0	0 0	0	0 0	0 0	1
Volume Module:												
Base Vol:	0	1045	131	81	2335	2	0	0	0	0	0	62
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1045	131	81	2335	2	0	0	0	0	0	62
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1045	131	81	2335	2	0	0	0	0	0	62
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1045	131	81	2335	2	0	0	0	0	0	62
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1045	131	89	2335	2	0	0	0	0	0	68
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 45 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.8	xxxx	xxxxx	5.8	xxxx	xxxxx	7.9	7.4	6.1	7.9	7.4	6.1
Capacity Module:												
Cnflict Vol:	2337	xxxx	xxxxx	1176	xxxx	xxxxx	3655	3593	1168	3529	3529	588
Potent Cap.:	105	xxxx	xxxxx	210	xxxx	xxxxx	40	50	213	40	50	483
% Used Cap.:	0.0	xxxx	xxxxx	42.5	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	14.1
Impedance:	1.00	xxxx	xxxxx	0.65	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.91
Actual Cap.:	105	xxxx	xxxxx	210	xxxx	xxxxx	24	33	213	26	33	483
Level Of Service Module:												
Unused Cap.:	105	xxxx	xxxxx	121	xxxx	xxxxx	24	33	213	26	33	415
LOS by Move:	*	*	*	D	*	*	*	*	*	*	*	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #85 32nd Ave/Harrison

Cycle (sec):	100	Critical Vol./Cap. (X):	0.380
Loss Time (sec):	12	Average Delay (sec/veh):	14.6
Optimal Cycle:	34	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Ovl			Ovl			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	1 0	0 1	0	1 0	0 1	1	0 0	1 0	1	0 0	1 0
Volume Module:												
Base Vol:	17	135	13	23	130	186	166	315	1	16	203	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	135	13	23	130	186	166	315	1	16	203	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	17	135	13	23	130	186	166	315	1	16	203	23
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	17	135	13	23	130	186	166	315	1	16	203	23
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	17	135	13	23	130	186	166	315	1	16	203	23
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.79	0.79	0.84	0.94	0.94	0.84	0.94	0.99	0.99	0.93	0.97	0.97
Lanes:	0.11	0.89	1.00	0.15	0.85	1.00	1.00	0.99	0.01	1.00	0.90	0.10
Final Sat.:	159	1266	1515	253	1431	1507	1693	1776	6	1676	1569	178
Capacity Analysis Module:												
Vol/Sat:	0.11	0.11	0.01	0.09	0.09	0.12	0.10	0.18	0.18	0.01	0.13	0.13
Crit Moves:		****					****				****	
Green/Cycle:	0.28	0.28	0.31	0.28	0.28	0.54	0.26	0.57	0.57	0.03	0.34	0.34
Volume/Cap:	0.38	0.38	0.03	0.32	0.32	0.23	0.38	0.31	0.31	0.31	0.38	0.38
Level Of Service Module:												
Delay/Veh:	22.3	22.3	18.2	21.8	21.8	9.2	23.5	8.7	8.7	37.2	19.2	19.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	19.0	19.0	15.4	18.5	18.5	7.8	23.5	7.4	7.4	37.2	16.3	16.3
Queue:	3	3	0	3	3	3	4	5	5	0	5	5

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Milwaukie TSP
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Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #100 42nd Ave/Harrison

Cycle (sec):	1	Critical Vol./Cap. (X):	0.886
Loss Time (sec):	0	Average Delay (sec/veh):	16.5
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	1 0	1 0	0	1 0	1 0	0	1 0	0 1	0	1 0	0 1
Volume Module:												
Base Vol:	19	52	225	7	33	28	54	260	49	163	160	12
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	19	52	225	7	33	28	54	260	49	163	160	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	19	52	225	7	33	28	54	260	49	163	160	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	19	52	225	7	33	28	54	260	49	163	160	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	19	52	225	7	33	28	54	260	49	163	160	12
Saturation Flow Module:												
Sat/Lane:	254	254	254	262	262	262	405	405	405	462	462	462
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.27	0.73	1.00	0.21	0.97	0.82	0.17	0.83	1.00	0.50	0.50	1.00
Final Sat.:	68	186	254	54	254	216	70	335	405	233	229	462
Capacity Analysis Module:												
Vol/Sat:	0.28	0.28	0.89	0.13	0.13	0.13	0.78	0.78	0.12	0.70	0.70	0.03
Crit Moves:			****		****		****				****	
Level Of Service Module:												
Delay/Veh:	2.9	2.9	29.0	1.6	1.6	1.6	19.0	19.0	1.6	14.2	14.2	1.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	2.9	2.9	29.0	1.6	1.6	1.6	19.0	19.0	1.6	14.2	14.2	1.1
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #104 42nd Ave/King Rd

Cycle (sec):	1	Critical Vol./Cap. (X):	0.627
Loss Time (sec):	0	Average Delay (sec/veh):	9.1
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	128	0	30	45	380	0	0	254	74
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	128	0	30	45	380	0	0	254	74
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	128	0	30	45	380	0	0	254	74
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	128	0	30	45	380	0	0	254	74
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	128	0	30	45	380	0	0	254	74
Saturation Flow Module:												
Sat/Lane:	0	0	0	385	385	385	678	678	678	569	569	569
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.81	0.00	0.19	0.11	0.89	0.00	0.00	0.77	0.23
Final Sat.:	0	0	0	312	0	73	72	606	0	0	441	128
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.41	0.00	0.41	0.63	0.63	0.00	0.00	0.58	0.58
Crit Moves:			****	****			****				****	
Level Of Service Module:												
Delay/Veh:	1.0	1.0	1.0	4.8	1.0	4.8	10.8	10.8	1.0	1.0	8.9	8.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	1.0	1.0	1.0	4.8	1.0	4.8	10.8	10.8	1.0	1.0	8.9	8.9
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #112 43rd Ave/King Rd

Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1!	0 0	0 1	0	0 1	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	4	15	28	59	10	67	84	454	2	31	314	69
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	4	15	28	59	10	67	84	454	2	31	314	69
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	4	15	28	59	10	67	84	454	2	31	314	69
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	4	15	28	59	10	67	84	454	2	31	314	69
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	4	16	31	65	11	74	92	454	2	34	314	69
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1030	953	455	963	920	349	383	xxxx	xxxxx	456	xxxx	xxxxx
Potent Cap.:	181	249	662	201	262	741	714	xxxx	xxxxx	661	xxxx	xxxxx
% Used Cap.:	2.4	6.6	4.7	32.2	4.2	9.9	12.9	xxxx	xxxxx	5.2	xxxx	xxxxx
Impedance:	xxxx	0.96	0.97	xxxx	0.97	0.94	0.92	xxxx	xxxxx	0.97	xxxx	xxxxx
Actual Cap.:	147	221	662	167	233	741	714	xxxx	xxxxx	661	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	143	205	631	102	222	668	621	xxxx	xxxxx	627	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	A	A	*	*	A	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	343	xxxxx	174	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	291	xxxxx	98	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	C	*	E	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #121 Stanley/King Rd (West Leg)

Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	60	2	32	42	532	0	0	399	51
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	60	2	32	42	532	0	0	399	51
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	60	2	32	42	532	0	0	399	51
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	60	2	32	42	532	0	0	399	51
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	0	0	66	2	35	46	532	0	0	399	51
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1058	1024	532	999	999	425	450	xxxx	xxxxx	532	xxxx	xxxxx
Potent Cap.:	173	228	601	190	235	683	665	xxxx	xxxxx	601	xxxx	xxxxx
% Used Cap.:	0.0	0.0	0.0	34.7	0.9	5.2	6.9	xxxx	xxxxx	0.0	xxxx	xxxxx
Impedance:	xxxx	1.00	1.00	xxxx	1.00	0.97	0.96	xxxx	xxxxx	1.00	xxxx	xxxxx
Actual Cap.:	160	218	601	183	226	683	665	xxxx	xxxxx	601	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	160	218	601	117	223	648	619	xxxx	xxxxx	601	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	244	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	141	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	D	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #128 Stanley/JCB

Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	0	0 1	0 0	1!	0 0	0 0	1!	0 0	1 0	0	1 0
Volume Module:												
Base Vol:	25	0	74	6	0	2	1	822	55	98	456	3
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	0	74	6	0	2	1	822	55	98	456	3
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	0	74	6	0	2	1	822	55	98	456	3
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	25	0	74	6	0	2	1	822	55	98	456	3
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	28	0	81	7	0	2	1	822	55	108	456	3
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1409	1407	850	1507	1433	457	459	xxxx	xxxxx	877	xxxx	xxxxx
Potent Cap.:	124	158	400	113	153	660	742	xxxx	xxxxx	459	xxxx	xxxxx
% Used Cap.:	22.2	0.0	20.3	5.8	0.0	0.3	0.1	xxxx	xxxxx	23.5	xxxx	xxxxx
Impedance:	xxxx	1.00	0.86	xxxx	1.00	1.00	1.00	xxxx	xxxxx	0.83	xxxx	xxxxx
Actual Cap.:	103	132	400	81	128	660	742	xxxx	xxxxx	459	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	76	132	319	74	128	658	741	xxxx	xxxxx	351	xxxx	xxxxx
LOS by Move:	E	*	B	*	*	*	A	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	104	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	95	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	E	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #135 Linwood/JCB

Level Of Service: F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	1 0	0 0	1!	0 0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	25	75	95	20	65	20	20	730	180	135	600	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	75	95	20	65	20	20	730	180	135	600	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	75	95	20	65	20	20	730	180	135	600	50
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	25	75	95	20	65	20	20	730	180	135	600	50
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	28	83	105	22	72	22	22	730	180	149	600	50
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1710	1625	820	1860	1690	625	650	xxxx	xxxxx	910	xxxx	xxxxx
Potent Cap.:	65	93	418	65	83	535	520	xxxx	xxxxx	366	xxxx	xxxxx
% Used Cap.:	42.3	88.7	25.0	33.8	85.9	4.1	4.2	xxxx	xxxxx	40.6	xxxx	xxxxx
Impedance:	xxxx	0.16	0.82	xxxx	0.20	0.98	0.97	xxxx	xxxxx	0.68	xxxx	xxxxx
Actual Cap.:	8	62	418	5	55	535	520	xxxx	xxxxx	366	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	-19	-21	314	-17	-16	513	498	xxxx	xxxxx	217	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	C	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	24	xxxx	118	xxxx	22	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	-86	xxxx	-69	xxxx	-94	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	F	*	F	*	F	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #139 Stanley/King Rd (East Leg)

Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1!	0 0	0 0	0	0 0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	11	0	9	0	0	0	0	569	23	13	439	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	11	0	9	0	0	0	0	569	23	13	439	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	11	0	9	0	0	0	0	569	23	13	439	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	11	0	9	0	0	0	0	569	23	13	439	0
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	12	0	10	0	0	0	0	569	23	14	439	0
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1032	1032	581	1053	1044	439	439	xxxx	xxxxx	592	xxxx	xxxxx
Potent Cap.:	180	225	564	174	222	673	673	xxxx	xxxxx	556	xxxx	xxxxx
% Used Cap.:	6.7	0.0	1.8	0.0	0.0	0.0	0.0	xxxx	xxxxx	2.6	xxxx	xxxxx
Impedance:	xxxx	1.00	0.99	xxxx	1.00	1.00	1.00	xxxx	xxxxx	0.98	xxxx	xxxxx
Actual Cap.:	177	222	564	170	218	673	673	xxxx	xxxxx	556	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	165	222	554	170	218	673	673	xxxx	xxxxx	541	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	257	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	235	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	C	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #141 Linwood/King Rd

Cycle (sec):	100	Critical Vol./Cap. (X):	0.658
Loss Time (sec):	12	Average Delay (sec/veh):	20.1
Optimal Cycle:	54	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1	0	1	0 0 1	0	1	0 0 1	0	1	0 0 1 0
Volume Module:												
Base Vol:	81	151	95	26	287	58	58	428	73	75	329	16
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	81	151	95	26	287	58	58	428	73	75	329	16
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	81	151	95	26	287	58	58	428	73	75	329	16
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	81	151	95	26	287	58	58	428	73	75	329	16
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	81	151	95	26	287	58	58	428	73	75	329	16
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.93	0.93	0.95	0.97	0.97	0.94	0.97	0.97	0.94	0.98	0.98
Lanes:	1.00	0.61	0.39	1.00	0.83	0.17	1.00	0.85	0.15	1.00	0.95	0.05
Final Sat.:	1693	1028	647	1701	1445	292	1684	1484	253	1693	1682	82
Capacity Analysis Module:												
Vol/Sat:	0.05	0.15	0.15	0.02	0.20	0.20	0.03	0.29	0.29	0.04	0.20	0.20
Crit Moves:	****				****			****		****		
Green/Cycle:	0.07	0.34	0.34	0.04	0.30	0.30	0.08	0.44	0.44	0.07	0.43	0.43
Volume/Cap:	0.66	0.43	0.43	0.43	0.66	0.66	0.45	0.66	0.66	0.66	0.45	0.45
Level Of Service Module:												
Delay/Veh:	42.4	19.8	19.8	39.0	25.2	25.2	35.4	18.3	18.3	43.2	15.7	15.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	42.4	16.8	16.8	39.0	21.4	21.4	35.4	15.6	15.6	43.2	13.3	13.3
Queue:	3	5	5	1	9	9	2	11	11	2	7	7

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #180 37th Ave/Monroe

Cycle (sec):	1	Critical Vol./Cap. (X):	0.613
Loss Time (sec):	0	Average Delay (sec/veh):	7.2
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	0 1 0	0	0	1! 0 0	0	1	0 0 0
Volume Module:												
Base Vol:	94	73	109	0	47	19	14	243	109	65	147	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	94	73	109	0	47	19	14	243	109	65	147	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	94	73	109	0	47	19	14	243	109	65	147	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	94	73	109	0	47	19	14	243	109	65	147	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	94	73	109	0	47	19	14	243	109	65	147	0
Saturation Flow Module:												
Sat/Lane:	523	523	523	374	374	374	597	597	597	687	687	687
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.34	0.26	0.40	0.00	0.71	0.29	0.04	0.66	0.30	0.31	0.69	0.00
Final Sat.:	178	138	207	0	266	108	23	396	178	211	476	0
Capacity Analysis Module:												
Vol/Sat:	0.53	0.53	0.53	0.00	0.18	0.18	0.61	0.61	0.61	0.31	0.31	0.00
Crit Moves:	****					****	****			****		
Level Of Service Module:												
Delay/Veh:	7.4	7.4	7.4	1.0	2.0	2.0	10.3	10.3	10.3	3.2	3.2	1.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	7.4	7.4	7.4	1.0	2.0	2.0	10.3	10.3	10.3	3.2	3.2	1.0
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #194 Oak St/Railroad Ave

Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	0 0	0	0 0	0 1	0	0 1	0 0	0
Volume Module:												
Base Vol:	95	0	122	0	0	0	0	150	64	150	224	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	95	0	122	0	0	0	0	150	64	150	224	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	95	0	122	0	0	0	0	150	64	150	224	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	95	0	122	0	0	0	0	150	64	150	224	0
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	105	0	134	0	0	0	0	150	64	165	224	0
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	556	556	182	710	588	224	224	xxxx	xxxxx	214	xxxx	xxxxx
Potent Cap.:	451	506	908	354	483	866	961	xxxx	xxxxx	969	xxxx	xxxxx
% Used Cap.:	23.2	0.0	14.8	0.0	0.0	0.0	0.0	xxxx	xxxxx	17.0	xxxx	xxxxx
Impedance:	xxxx	1.00	0.90	xxxx	1.00	1.00	1.00	xxxx	xxxxx	0.88	xxxx	xxxxx
Actual Cap.:	399	447	908	282	427	866	961	xxxx	xxxxx	969	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	294	447	774	282	427	866	961	xxxx	xxxxx	804	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	583	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	344	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #199 Oak Street/Campbell Street

Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 0	0	0 0	0 1	0	0 0	1! 0	0	0 0	0 0	0
Volume Module:												
Base Vol:	49	339	0	0	340	26	59	0	27	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	339	0	0	340	26	59	0	27	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	49	339	0	0	340	26	59	0	27	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	49	339	0	0	340	26	59	0	27	0	0	0
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	54	339	0	0	340	26	65	0	30	0	0	0
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	366	xxxx	xxxxx	339	xxxx	xxxxx	741	741	353	781	754	339
Potent Cap.:	831	xxxx	xxxxx	855	xxxx	xxxxx	335	390	738	318	383	750
% Used Cap.:	6.5	xxxx	xxxxx	0.0	xxxx	xxxxx	19.4	0.0	4.0	0.0	0.0	0.0
Impedance:	0.96	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	0.98	xxxx	1.00	1.00
Actual Cap.:	831	xxxx	xxxxx	855	xxxx	xxxxx	322	375	738	298	368	750
Level Of Service Module:												
Unused Cap.:	777	xxxx	xxxxx	855	xxxx	xxxxx	257	375	708	298	368	750
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	392	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	297	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	C	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #205 Oak Street/ORE 224

Cycle (sec):	100	Critical Vol./Cap. (X):	0.834
Loss Time (sec):	12	Average Delay (sec/veh):	18.3
Optimal Cycle:	86	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	1	1 0	1	0	1 0	1	0	2 0	1	0	2 0
Volume Module:												
Base Vol:	18	262	109	117	268	138	179	1552	48	121	858	160
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	18	262	109	117	268	138	179	1552	48	121	858	160
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	18	262	109	117	268	138	179	1552	48	121	858	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	18	262	109	117	268	138	179	1552	48	121	858	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.05	1.05	1.00	1.05	1.05	1.05	1.00	1.05	1.00	1.00	1.05	1.00
Final Vol.:	19	275	109	123	281	145	179	1630	48	121	901	160
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.82	0.82	0.85	0.75	0.75	0.75	0.94	0.98	0.84	0.93	0.98	0.83
Lanes:	0.13	1.87	1.00	0.45	1.02	0.53	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	190	2747	1522	609	1390	717	1684	3546	1507	1676	3528	1499
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.07	0.20	0.20	0.20	0.11	0.46	0.03	0.07	0.26	0.11
Crit Moves:					****			****		****		
Green/Cycle:	0.24	0.24	0.24	0.24	0.24	0.24	0.19	0.55	0.55	0.09	0.45	0.45
Volume/Cap:	0.41	0.41	0.30	0.83	0.83	0.83	0.57	0.83	0.06	0.83	0.57	0.24
Level Of Service Module:												
Delay/Veh:	24.5	24.5	23.6	33.7	33.7	33.7	29.9	16.5	7.9	55.8	15.8	12.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	20.8	20.8	20.1	28.6	28.6	28.6	29.9	14.0	6.7	55.8	13.4	11.0
Queue:	7	7	2	16	16	16	5	39	1	4	19	3

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #238 Linwood/RR Ave/Harmony

Cycle (sec):	90	Critical Vol./Cap. (X):	0.922
Loss Time (sec):	16	Average Delay (sec/veh):	31.1
Optimal Cycle:	117	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	1	0 0	1	0	1 0	1	0	1 0	1	0	1 0
Volume Module:												
Base Vol:	62	283	556	90	259	23	47	254	63	421	344	78
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	62	283	556	90	259	23	47	254	63	421	344	78
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	62	283	556	90	259	23	47	254	63	421	344	78
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	62	283	556	90	259	23	47	254	63	421	344	78
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	62	283	556	90	259	23	47	254	63	421	344	78
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.99	0.99	0.85	0.94	0.98	0.98	0.95	0.97	0.97	1.06	0.97	0.97
Lanes:	0.18	0.82	1.00	1.00	0.92	0.08	1.00	0.80	0.20	1.00	0.82	0.18
Final Sat.:	319	1454	1522	1693	1620	144	1701	1392	345	1906	1416	321
Capacity Analysis Module:												
Vol/Sat:	0.19	0.19	0.37	0.05	0.16	0.16	0.03	0.18	0.18	0.22	0.24	0.24
Crit Moves:	****				****			****		****		
Green/Cycle:	0.21	0.21	0.45	0.17	0.17	0.17	0.04	0.20	0.20	0.24	0.39	0.39
Volume/Cap:	0.92	0.92	0.81	0.31	0.92	0.92	0.62	0.92	0.92	0.92	0.62	0.62
Level Of Service Module:												
Delay/Veh:	46.3	46.3	21.3	24.9	50.6	50.6	41.6	47.9	47.9	42.7	17.9	17.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	39.3	39.3	18.1	24.9	43.0	43.0	41.6	40.7	40.7	42.7	15.2	15.2
Queue:	11	11	13	2	9	9	1	10	10	13	9	9

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #272 37th Avenue/ORE 224

Cycle (sec):	100	Critical Vol./Cap. (X):	0.786
Loss Time (sec):	12	Average Delay (sec/veh):	11.4
Optimal Cycle:	74	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	0	1 0	0 1	1	0 2	0 1	1	0 2	0 1
Volume Module:												
Base Vol:	3	61	11	137	96	135	79	1806	11	21	991	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	3	61	11	137	96	135	79	1806	11	21	991	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	3	61	11	137	96	135	79	1806	11	21	991	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	3	61	11	137	96	135	79	1806	11	21	991	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00
Final Vol.:	3	61	11	137	96	135	79	1896	11	21	1041	140
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.81	0.81	0.81	0.90	0.90	0.85	0.94	0.98	0.84	0.94	0.98	0.84
Lanes:	0.04	0.81	0.15	0.59	0.41	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	59	1192	215	948	664	1522	1684	3546	1507	1684	3546	1507
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.05	0.14	0.14	0.09	0.05	0.53	0.01	0.01	0.29	0.09
Crit Moves:					****			****		****		
Green/Cycle:	0.18	0.18	0.18	0.18	0.18	0.18	0.10	0.68	0.68	0.02	0.60	0.60
Volume/Cap:	0.28	0.28	0.28	0.79	0.79	0.48	0.49	0.79	0.01	0.79	0.49	0.15
Level Of Service Module:												
Delay/Veh:	26.8	26.8	26.8	38.5	38.5	28.8	34.5	9.6	3.9	91.2	8.7	6.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	22.8	22.8	22.8	32.7	32.7	24.5	34.5	8.2	3.3	91.2	7.4	5.7
Queue:	2	2	2	7	7	3	2	37	0	1	16	2

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #319 Oatfield Rd/Lake Rd

Cycle (sec):	90	Critical Vol./Cap. (X):	0.902
Loss Time (sec):	16	Average Delay (sec/veh):	31.9
Optimal Cycle:	110	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0 1	0	1	0 0	1 0	1	0 0	1 0	1	0 0	1 0
Volume Module:												
Base Vol:	50	117	313	19	137	14	10	186	139	451	141	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	50	117	313	19	137	14	10	186	139	451	141	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	50	117	313	19	137	14	10	186	139	451	141	23
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	50	117	313	19	137	14	10	186	139	451	141	23
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	50	117	313	19	137	14	10	186	139	451	141	23
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.88	0.88	0.95	0.99	0.99	0.94	0.93	0.93	0.95	0.98	0.98
Lanes:	1.00	0.27	0.73	1.00	0.91	0.09	1.00	0.57	0.43	1.00	0.86	0.14
Final Sat.:	1693	432	1154	1701	1609	164	1693	959	716	1701	1509	246
Capacity Analysis Module:												
Vol/Sat:	0.03	0.27	0.27	0.01	0.09	0.09	0.01	0.19	0.19	0.27	0.09	0.09
Crit Moves:		****		****				****		****		
Green/Cycle:	0.08	0.30	0.30	0.01	0.23	0.23	0.03	0.22	0.22	0.29	0.48	0.48
Volume/Cap:	0.37	0.90	0.90	0.90	0.37	0.37	0.20	0.90	0.90	0.90	0.20	0.20
Level Of Service Module:												
Delay/Veh:	30.6	37.2	37.2	137	22.3	22.3	32.6	43.7	43.7	37.0	10.3	10.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	30.6	31.6	31.6	137	18.9	18.9	32.6	37.1	37.1	37.0	8.7	8.7
Queue:	1	13	13	1	3	3	0	10	10	13	2	2

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #338 Oak/Washington

Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	1 0	0	0 1	0 1	0	0 0	0 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	170	0	240	220	40	0	0	30	120
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	170	0	240	220	40	0	0	30	120
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	170	0	240	220	40	0	0	30	120
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	170	0	240	220	40	0	0	30	120
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	0	0	187	0	240	242	44	0	0	33	132
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	240	xxxx	xxxxx	0	xxxx	xxxxx	320	170	0	210	410	0
Potent Cap.:	948	xxxx	xxxxx	1000	xxxx	xxxxx	617	824	1000	710	612	1000
% Used Cap.:	0.0	xxxx	xxxxx	18.7	xxxx	xxxxx	39.2	5.3	0.0	0.0	5.4	13.2
Impedance:	1.00	xxxx	xxxxx	0.87	xxxx	xxxxx	xxxx	0.97	1.00	xxxx	0.97	0.91
Actual Cap.:	948	xxxx	xxxxx	1000	xxxx	xxxxx	476	717	1000	599	533	1000
Level Of Service Module:												
Unused Cap.:	948	xxxx	xxxxx	813	xxxx	xxxxx	234	673	1000	599	500	868
LOS by Move:	*	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	502	xxxx	xxxxx	xxxx	xxxx	851
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	216	xxxx	xxxxx	xxxx	xxxx	686
Shared LOS:	*	*	*	*	*	*	C	*	*	*	*	A

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Milwaukie TSP
PM Peak Hour
Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #363 37th Ave/Railroad Avenue

Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	1 0	0	1	0	0 0	0	0 0	1	0	1
Volume Module:												
Base Vol:	0	195	127	124	131	0	0	0	0	121	0	73
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	195	127	124	131	0	0	0	0	121	0	73
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	195	127	124	131	0	0	0	0	121	0	73
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	195	127	124	131	0	0	0	0	121	0	73
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	195	127	136	131	0	0	0	0	133	0	80
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	131	xxxx	xxxxx	322	xxxx	xxxxx	650	577	131	514	514	258
Potent Cap.:	1000	xxxx	xxxxx	870	xxxx	xxxxx	390	491	963	481	539	831
% Used Cap.:	0.0	xxxx	xxxxx	15.7	xxxx	xxxxx	0.0	0.0	0.0	27.7	0.0	9.7
Impedance:	1.00	xxxx	xxxxx	0.90	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.94
Actual Cap.:	1000	xxxx	xxxxx	870	xxxx	xxxxx	331	442	963	432	485	831
Level Of Service Module:												
Unused Cap.:	1000	xxxx	xxxxx	734	xxxx	xxxxx	331	442	963	299	485	750
LOS by Move:	*	*	*	A	*	*	*	*	*	C	*	A
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Future (2015)

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 13 32nd Ave/JCB	F	685.4	1.805	F	685.4	1.805	+ 0.000 V/C
# 20 42nd Ave/JCB	E	38.3	1.085	E	38.3	1.085	+ 0.000 V/C
# 35 ORE 99E/Harrison Street	F	67.3	1.119	F	67.3	1.119	+ 0.000 D/V
# 36 ORE 99E/Jackson Street	A	xxxxx	0.000	A	xxxxx	0.000	+ 0.000 V/C
# 37 ORE 99E/Monroe St	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
# 42 17th Avenue/ORE 224	C	24.6	0.890	C	24.6	0.890	+ 0.000 D/V
# 46 ORE 224/Harrison Street	F	77.7	1.171	F	77.7	1.171	+ 0.000 D/V
# 54 ORE 224/Monroe	D	31.3	1.052	D	31.3	1.052	+ 0.000 D/V
# 55 ORE 99E/Jefferson St	B	12.7	0.952	B	12.7	0.952	+ 0.000 D/V
# 56 ORE 99E/Washington St	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
# 85 32nd Ave/Harrison	B	14.2	0.449	B	14.2	0.449	+ 0.000 D/V
#100 42nd Ave/Harrison	E	34.5	1.082	E	34.5	1.082	+ 0.000 V/C
#104 42nd Ave/King Rd	C	19.4	0.853	C	19.4	0.853	+ 0.000 V/C
#112 43rd Ave/King Rd	F	xxxxx	0.000	F	xxxxx	0.000	+ 0.000 V/C
#121 Stanley/King Rd (West Leg)	F	xxxxx	0.000	F	xxxxx	0.000	+ 0.000 V/C
#128 Stanley/JCB	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
#135 Linwood/JCB	F	xxxxx	0.000	F	xxxxx	0.000	+ 0.000 V/C
#139 Stanley/King Rd (East Leg)	D	xxxxx	0.000	D	xxxxx	0.000	+ 0.000 V/C
#141 Linwood/King Rd	D	29.7	0.917	D	29.7	0.917	+ 0.000 D/V
#180 37th Ave/Monroe	C	15.9	0.859	C	15.9	0.859	+ 0.000 V/C
#194 Oak St/Railroad Ave	D	xxxxx	0.000	D	xxxxx	0.000	+ 0.000 V/C
#199 Oak Street/Campbell Street	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C
#205 Oak Street/ORE 224	F	73.8	1.190	F	73.8	1.190	+ 0.000 D/V

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#238 Linwood/RR Ave/Harmony	F	102.6	1.188	F	102.6	1.188	+ 0.000 D/V
#272 37th Avenue/ORE 224	E	40.3	1.094	E	40.3	1.094	+ 0.000 D/V
#319 Oatfield Rd/Lake Rd	E	52.8	1.037	E	52.8	1.037	+ 0.000 D/V
#338 Oak/Washington	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
#363 37th Ave/Railroad Avenue	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #13 32nd Ave/JCB

Cycle (sec):	1	Critical Vol./Cap. (X):	1.805
Loss Time (sec):	0	Average Delay (sec/veh):	685.4
Optimal Cycle:	0	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	0 0	0	0 0	0 1	0	0 1	0 0	0
Volume Module:												
Base Vol:	107	0	85	0	0	0	0	905	640	86	329	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	107	0	85	0	0	0	0	905	640	86	329	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	107	0	85	0	0	0	0	905	640	86	329	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	107	0	85	0	0	0	0	905	640	86	329	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	107	0	85	0	0	0	0	905	640	86	329	0
Saturation Flow Module:												
Sat/Lane:	374	374	374	0	0	0	856	856	856	844	844	844
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.56	0.00	0.44	0.00	0.00	0.00	0.00	0.59	0.41	0.21	0.79	0.00
Final Sat.:	208	0	166	0	0	0	0	501	355	175	669	0
Capacity Analysis Module:												
Vol/Sat:	0.51	0.00	0.51	0.00	0.00	0.00	0.00	1.80	1.80	0.49	0.49	0.00
Crit Moves:			****			****		****			****	
Level Of Service Module:												
Delay/Veh:	7.0	1.0	7.0	1.0	1.0	1.0	1.0	952	952.1	6.5	6.5	1.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	7.0	1.0	7.0	1.0	1.0	1.0	1.0	952	952.1	6.5	6.5	1.0
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #20 42nd Ave/JCB

Cycle (sec):	1	Critical Vol./Cap. (X):	1.085
Loss Time (sec):	0	Average Delay (sec/veh):	38.3
Optimal Cycle:	0	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	0 0	1	0 0	0 0	0	0 0	0 1	0	0 1	0 0	0
Volume Module:												
Base Vol:	61	0	149	0	0	0	0	832	162	203	474	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	61	0	149	0	0	0	0	832	162	203	474	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	61	0	149	0	0	0	0	832	162	203	474	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	61	0	149	0	0	0	0	832	162	203	474	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	61	0	149	0	0	0	0	832	162	203	474	0
Saturation Flow Module:												
Sat/Lane:	252	252	252	0	0	0	916	916	916	988	988	988
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.84	0.16	0.30	0.70	0.00
Final Sat.:	252	0	252	0	0	0	0	767	149	296	692	0
Capacity Analysis Module:												
Vol/Sat:	0.24	0.00	0.59	0.00	0.00	0.00	0.00	1.09	1.09	0.69	0.69	0.00
Crit Moves:			****			****			****	****		
Level Of Service Module:												
Delay/Veh:	2.5	1.0	9.5	1.0	1.0	1.0	1.0	61.8	61.8	13.5	13.5	1.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	2.5	1.0	9.5	1.0	1.0	1.0	1.0	61.8	61.8	13.5	13.5	1.0
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

****

Intersection #35 ORE 99E/Harrison Street

****

Cycle (sec): 120 Critical Vol./Cap. (X): 1.119
Loss Time (sec): 16 Average Delay (sec/veh): 67.3
Optimal Cycle: 180 Level Of Service: F

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase			Split Phase		
Rights:	Include			Include			Ovl			Include		
Min. Green:	6	15	15	6	15	15	15	15	15	15	15	15
Lanes:	1 0	1	1 0	1 0	1	1 0	0 1	0	0 1	1 0	1!	0 0
Volume Module:												
Base Vol:	302	804	164	150	1689	0	10	109	511	181	91	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	302	804	164	150	1689	0	10	109	511	181	91	45
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	302	804	164	150	1689	0	10	109	511	181	91	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	302	804	164	150	1689	0	10	109	511	181	91	45
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.00	1.05	1.05	1.00	1.00	1.00	1.05	1.00	1.00
Final Vol.:	302	844	172	150	1773	0	10	109	511	190	91	45
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.96	0.96	0.94	0.99	1.00	0.99	0.99	0.85	0.94	0.94	0.94
Lanes:	1.00	1.66	0.34	1.00	2.00	0.00	0.08	0.92	1.00	1.42	0.39	0.19
Final Sat.:	1693	2872	585	1693	3564	0	151	1640	1522	2379	664	328
Capacity Analysis Module:												
Vol/Sat:	0.18	0.29	0.29	0.09	0.50	0.00	0.07	0.07	0.34	0.08	0.14	0.14
Crit Moves:	****				****				****		****	
Green/Cycle:	0.16	0.46	0.46	0.14	0.44	0.00	0.14	0.14	0.30	0.13	0.13	0.13
Volume/Cap:	1.12	0.64	0.64	0.64	1.12	0.00	0.47	0.47	1.12	0.64	1.10	1.10
Level Of Service Module:												
Delay/Veh:	129	19.3	19.3	40.9	90.7	0.0	37.2	37.2	111.7	39.8	115	114.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	129	16.4	16.4	40.9	77.1	0.0	31.6	31.6	95.0	33.9	97.6	97.6
Queue:	19	26	26	5	101	0	4	4	31	11	21	21

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

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Intersection #36 ORE 99E/Jackson Street

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Level Of Service: A

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Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	1	1 0	0 0	2	0 0	0 0	0	0 0	0 0	0	1
Volume Module:												
Base Vol:	0	1298	52	0	2527	0	0	0	0	0	0	37
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1298	52	0	2527	0	0	0	0	0	0	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1298	52	0	2527	0	0	0	0	0	0	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1298	52	0	2527	0	0	0	0	0	0	37
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1298	52	0	2527	0	0	0	0	0	0	41
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx	7.0	6.5	5.5	7.0	6.5	5.5
Capacity Module:												
Cnflict Vol:	2527	xxxx	xxxxx	1350	xxxx	xxxxx	3914	3877	1263	3851	3851	675
Potent Cap.:	130	xxxx	xxxxx	205	xxxx	xxxxx	65	82	232	65	82	503
% Used Cap.:	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	8.1
Impedance:	1.00	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.95
Actual Cap.:	130	xxxx	xxxxx	205	xxxx	xxxxx	62	82	232	65	82	503
Level Of Service Module:												
Unused Cap.:	130	xxxx	xxxxx	205	xxxx	xxxxx	62	82	232	65	82	462
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	A
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #37 ORE 99E/Monroe St

Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1 1	0	1 0	1 1	0	0 0	0 0	0	0 0	0 0	1
Volume Module:												
Base Vol:	0	1254	35	83	2576	20	0	0	0	0	0	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1254	35	83	2576	20	0	0	0	0	0	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1254	35	83	2576	20	0	0	0	0	0	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1254	35	83	2576	20	0	0	0	0	0	60
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1254	35	91	2576	20	0	0	0	0	0	66
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 45 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.8	xxxx	xxxxx	5.8	xxxx	xxxxx	7.9	7.4	6.1	7.9	7.4	6.1
Capacity Module:												
Cnflict Vol:	2596	xxxx	xxxxx	1289	xxxx	xxxxx	4018	3958	1298	3950	3950	645
Potent Cap.:	105	xxxx	xxxxx	177	xxxx	xxxxx	40	50	175	40	50	448
% Used Cap.:	0.0	xxxx	xxxxx	51.5	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	14.7
Impedance:	1.00	xxxx	xxxxx	0.56	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.90
Actual Cap.:	105	xxxx	xxxxx	177	xxxx	xxxxx	20	28	175	23	28	448
Level Of Service Module:												
Unused Cap.:	105	xxxx	xxxxx	86	xxxx	xxxxx	20	28	175	23	28	382
LOS by Move:	*	*	*	E	*	*	*	*	*	*	*	B
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #42 17th Avenue/ORE 224

Cycle (sec):	100	Critical Vol./Cap. (X):	0.890
Loss Time (sec):	12	Average Delay (sec/veh):	24.6
Optimal Cycle:	105	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0 1	0	1 0	1 0	0	0 0	0 0	0	1 0	0 0	1
Volume Module:												
Base Vol:	0	302	49	691	672	0	0	0	0	50	0	361
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	302	49	691	672	0	0	0	0	50	0	361
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	302	49	691	672	0	0	0	0	50	0	361
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	302	49	691	672	0	0	0	0	50	0	361
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	302	49	691	672	0	0	0	0	50	0	361
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	0.86	0.86	1.09	0.99	1.00	1.00	1.00	1.00	0.94	1.00	0.98
Lanes:	0.00	0.86	0.14	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Final Sat.:	0	1336	217	1957	1791	0	0	0	0	1693	0	1772
Capacity Analysis Module:												
Vol/Sat:	0.00	0.23	0.23	0.35	0.38	0.00	0.00	0.00	0.00	0.03	0.00	0.20
Crit Moves:			****	****			****					****
Green/Cycle:	0.00	0.25	0.25	0.40	0.65	0.00	0.00	0.00	0.00	0.23	0.00	0.23
Volume/Cap:	0.00	0.89	0.89	0.89	0.58	0.00	0.00	0.00	0.00	0.13	0.00	0.89
Level Of Service Module:												
Delay/Veh:	0.0	42.3	42.3	30.2	7.9	0.0	0.0	0.0	0.0	23.3	0.0	43.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	0.0	36.0	36.0	30.2	6.7	0.0	0.0	0.0	0.0	23.3	0.0	36.6
Queue:	0	12	12	20	11	0	0	0	0	1	0	12

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #46 ORE 224/Harrison Street

Cycle (sec):	110	Critical Vol./Cap. (X):	1.171
Loss Time (sec):	12	Average Delay (sec/veh):	77.7
Optimal Cycle:	180	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 2	0 1	1	0 2	0 1	0	1 0	1 0	0	1 0	1 0
Volume Module:												
Base Vol:	108	1123	48	328	2243	45	18	427	192	177	363	106
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	108	1123	48	328	2243	45	18	427	192	177	363	106
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	108	1123	48	328	2243	45	18	427	192	177	363	106
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	108	1123	48	328	2243	45	18	427	192	177	363	106
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.00	1.00	1.05	1.00	1.05	1.05	1.05	1.05	1.05	1.05
Final Vol.:	108	1179	48	328	2355	45	19	448	202	186	381	111
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.93	0.98	0.83	0.94	0.98	0.84	0.61	0.61	0.61	0.60	0.60	0.60
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	0.06	1.34	0.60	0.55	1.12	0.33
Final Sat.:	1676	3528	1499	1684	3546	1507	63	1482	668	591	1211	353
Capacity Analysis Module:												
Vol/Sat:	0.06	0.33	0.03	0.19	0.66	0.03	0.30	0.30	0.30	0.31	0.31	0.31
Crit Moves:	****				****						****	
Green/Cycle:	0.06	0.39	0.39	0.23	0.57	0.57	0.27	0.27	0.27	0.27	0.27	0.27
Volume/Cap:	1.17	0.85	0.08	0.85	1.17	0.05	1.13	1.13	1.13	1.17	1.17	1.17
Level Of Service Module:												
Delay/Veh:	195	26.8	15.9	42.1	110	8.1	106	106	106.4	132	132	132.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	195	22.8	13.5	42.1	93.9	6.9	90.4	90.4	90.4	112	112	112.3
Queue:	8	35	1	11	156	1	37	37	37	43	43	43

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PM Peak Hour
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Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #54 ORE 224/Monroe

Cycle (sec):	100	Critical Vol./Cap. (X):	1.052
Loss Time (sec):	12	Average Delay (sec/veh):	31.3
Optimal Cycle:	180	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 1	1 0	1	0 1	1 0	0	0 1!	0 0	0	0 0	1 0
Volume Module:												
Base Vol:	65	1054	0	41	2498	20	10	84	132	0	45	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	65	1054	0	41	2498	20	10	84	132	0	45	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	65	1054	0	41	2498	20	10	84	132	0	45	56
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	65	1054	0	41	2498	20	10	84	132	0	45	56
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.00	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	65	1107	0	41	2623	21	10	84	132	0	45	56
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.95	1.00	1.00	0.95	1.00	1.00	0.82	0.82	0.82	1.00	0.83	0.83
Lanes:	1.00	2.00	0.00	1.00	1.98	0.02	0.04	0.37	0.59	0.00	0.45	0.55
Final Sat.:	1710	3600	0	1710	3571	29	65	549	862	0	666	828
Capacity Analysis Module:												
Vol/Sat:	0.04	0.31	0.00	0.02	0.73	0.73	0.15	0.15	0.15	0.00	0.07	0.07
Crit Moves:	****				****			****				
Green/Cycle:	0.04	0.68	0.00	0.05	0.70	0.70	0.15	0.15	0.15	0.00	0.15	0.15
Volume/Cap:	1.05	0.45	0.00	0.45	1.05	1.05	1.05	1.05	1.05	0.00	0.46	0.46
Level Of Service Module:												
Delay/Veh:	147	5.7	0.0	37.3	41.5	41.5	97.1	97.1	97.1	0.0	30.9	30.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	147	4.8	0.0	37.3	35.2	35.2	82.6	82.6	82.6	0.0	26.3	26.3
Queue:	4	14	0	1	109	109	11	11	11	0	3	3

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PM Peak Hour
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Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

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Intersection #55 ORE 99E/Jefferson St

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Cycle (sec):	110			Critical Vol./Cap. (X):			0.952						
Loss Time (sec):	8			Average Delay (sec/veh):			12.7						
Optimal Cycle:	146			Level Of Service:			B						

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Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	15	15	15	0	15	15	0	0	0	15	15	15
Lanes:	1	0 1	1 0	0	1 0	1 0	0	0 1!	0 0	1	0 1!	0 0
Volume Module:												
Base Vol:	10	1197	46	10	2387	10	10	20	10	289	18	58
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	1197	46	10	2387	10	10	20	10	289	18	58
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	1197	46	10	2387	10	10	20	10	289	18	58
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	1197	46	10	2387	10	10	20	10	289	18	58
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.05	1.05	1.05	1.00	1.00	1.00	1.05	1.00	1.00
Final Vol.:	10	1257	48	11	2506	11	10	20	10	303	18	58
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.05	0.99	0.99	0.94	0.94	0.94	0.87	0.87	0.87	0.93	0.94	0.94
Lanes:	1.00	1.93	0.07	0.01	1.98	0.01	0.25	0.50	0.25	1.67	0.08	0.25
Final Sat.:	90	3433	131	15	3355	15	392	783	392	2796	133	429
Capacity Analysis Module:												
Vol/Sat:	0.11	0.37	0.37	0.75	0.75	0.75	0.03	0.03	0.03	0.11	0.14	0.14
Crit Moves:					****						****	
Green/Cycle:	0.79	0.79	0.79	0.79	0.79	0.79	0.14	0.14	0.14	0.14	0.14	0.14
Volume/Cap:	0.14	0.47	0.47	0.95	0.95	0.95	0.18	0.18	0.18	0.76	0.95	0.95
Level Of Service Module:												
Delay/Veh:	2.2	3.1	3.1	14.1	14.1	14.1	31.6	31.6	31.6	39.2	59.5	59.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	2.2	2.7	2.7	12.0	12.0	12.0	26.9	26.9	26.9	33.3	50.6	50.6
Queue:	0	14	14	72	72	72	1	1	1	12	15	15

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

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Intersection #56 ORE 99E/Washington St

****

Level Of Service: E

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1 1	0	1 0	1 1	0	0 0	0 0	0	0 0	0 0	1
Volume Module:												
Base Vol:	0	1119	227	81	2851	10	0	0	0	0	0	81
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1119	227	81	2851	10	0	0	0	0	0	81
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1119	227	81	2851	10	0	0	0	0	0	81
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1119	227	81	2851	10	0	0	0	0	0	81
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1119	227	89	2851	10	0	0	0	0	0	89

Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 45 MPH <<

RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.8	xxxx	xxxxx	5.8	xxxx	xxxxx	7.9	7.4	6.1	7.9	7.4	6.1
Capacity Module:												
Cnflict Vol:	2861	xxxx	xxxxx	1346	xxxx	xxxxx	4364	4283	1431	4175	4175	673
Potent Cap.:	105	xxxx	xxxxx	168	xxxx	xxxxx	40	50	154	40	50	431
% Used Cap.:	0.0	xxxx	xxxxx	53.1	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	20.7
Impedance:	1.00	xxxx	xxxxx	0.55	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.86
Actual Cap.:	105	xxxx	xxxxx	168	xxxx	xxxxx	19	27	154	22	27	431
Level Of Service Module:												
Unused Cap.:	105	xxxx	xxxxx	79	xxxx	xxxxx	19	27	154	22	27	342
LOS by Move:	*	*	*	E	*	*	*	*	*	*	*	B
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #85 32nd Ave/Harrison

Cycle (sec):	100	Critical Vol./Cap. (X):	0.449
Loss Time (sec):	12	Average Delay (sec/veh):	14.2
Optimal Cycle:	38	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Ovl			Ovl			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 1	0 0	1	0 1	0 0	1	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	17	135	13	58	130	370	199	449	10	16	224	29
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	135	13	58	130	370	199	449	10	16	224	29
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	17	135	13	58	130	370	199	449	10	16	224	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	17	135	13	58	130	370	199	449	10	16	224	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	17	135	13	58	130	370	199	449	10	16	224	29
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.78	0.78	0.84	0.88	0.88	0.84	0.94	0.99	0.99	0.93	0.96	0.96
Lanes:	0.11	0.89	1.00	0.31	0.69	1.00	1.00	0.98	0.02	1.00	0.89	0.11
Final Sat.:	157	1250	1515	487	1091	1507	1693	1743	39	1676	1531	198
Capacity Analysis Module:												
Vol/Sat:	0.11	0.11	0.01	0.12	0.12	0.25	0.12	0.26	0.26	0.01	0.15	0.15
Crit Moves:						****		****		****		
Green/Cycle:	0.29	0.29	0.31	0.29	0.29	0.55	0.27	0.57	0.57	0.02	0.33	0.33
Volume/Cap:	0.38	0.38	0.03	0.42	0.42	0.45	0.44	0.45	0.45	0.45	0.44	0.44
Level Of Service Module:												
Delay/Veh:	22.1	22.1	18.4	22.4	22.4	10.5	23.7	9.5	9.5	42.3	20.4	20.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	18.8	18.8	15.7	19.1	19.1	8.9	23.7	8.1	8.1	42.3	17.3	17.3
Queue:	3	3	0	4	4	6	5	7	7	1	6	6

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #100 42nd Ave/Harrison

Cycle (sec):	1	Critical Vol./Cap. (X):	1.082
Loss Time (sec):	0	Average Delay (sec/veh):	34.5
Optimal Cycle:	0	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 1	0	0 1	0 1	0	0 1	0 0	1	0 1	0 0	1
Volume Module:												
Base Vol:	20	61	225	8	49	37	54	394	49	199	182	12
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	61	225	8	49	37	54	394	49	199	182	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	61	225	8	49	37	54	394	49	199	182	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	61	225	8	49	37	54	394	49	199	182	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	20	61	225	8	49	37	54	394	49	199	182	12
Saturation Flow Module:												
Sat/Lane:	238	238	238	251	251	251	414	414	414	468	468	468
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.25	0.75	1.00	0.17	1.04	0.79	0.12	0.88	1.00	0.52	0.48	1.00
Final Sat.:	59	179	238	43	262	198	50	364	414	244	224	468
Capacity Analysis Module:												
Vol/Sat:	0.34	0.34	0.95	0.19	0.19	0.19	1.08	1.08	0.12	0.81	0.81	0.03
Crit Moves:			****		****			****			****	
Level Of Service Module:												
Delay/Veh:	3.6	3.6	36.3	2.0	2.0	2.0	61.1	61.1	1.6	22.1	22.1	1.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	3.6	3.6	36.3	2.0	2.0	2.0	61.1	61.1	1.6	22.1	22.1	1.1
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #104 42nd Ave/King Rd

Cycle (sec): 1 Critical Vol./Cap. (X): 0.853
Loss Time (sec): 0 Average Delay (sec/veh): 19.4
Optimal Cycle: 0 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	1!	0 0
Volume Module:												
Base Vol:	0	0	0	137	0	32	45	510	0	57	311	77
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	137	0	32	45	510	0	57	311	77
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	137	0	32	45	510	0	57	311	77
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	137	0	32	45	510	0	57	311	77
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	137	0	32	45	510	0	57	311	77
Saturation Flow Module:												
Sat/Lane:	0	0	0	337	337	337	651	651	651	602	602	602
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.81	0.00	0.19	0.08	0.92	0.00	0.13	0.70	0.17
Final Sat.:	0	0	0	273	0	64	53	598	0	77	421	104
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.50	0.00	0.50	0.85	0.85	0.00	0.74	0.74	0.74
Crit Moves:			****			****	****			****		
Level Of Service Module:												
Delay/Veh:	1.0	1.0	1.0	6.7	1.0	6.7	25.5	25.5	1.0	16.6	16.6	16.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	1.0	1.0	1.0	6.7	1.0	6.7	25.5	25.5	1.0	16.6	16.6	16.6
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #112 43rd Ave/King Rd

Level Of Service: F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1!	0 0	0	1	0 0	1	0	0 1	1	0	0 1
Volume Module:												
Base Vol:	10	15	28	118	10	110	91	586	10	31	329	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	15	28	118	10	110	91	586	10	31	329	71
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	15	28	118	10	110	91	586	10	31	329	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	10	15	28	118	10	110	91	586	10	31	329	71
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	11	16	31	130	11	121	100	586	10	34	329	71
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1233	1113	591	1126	1083	365	400	xxxx	xxxxx	596	xxxx	xxxxx
Potent Cap.:	135	195	556	157	207	728	700	xxxx	xxxxx	553	xxxx	xxxxx
% Used Cap.:	8.1	8.5	5.5	82.4	5.3	16.6	14.3	xxxx	xxxxx	6.2	xxxx	xxxxx
Impedance:	xxxx	0.95	0.97	xxxx	0.97	0.89	0.91	xxxx	xxxxx	0.96	xxxx	xxxxx
Actual Cap.:	101	170	556	126	181	728	700	xxxx	xxxxx	553	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	90	153	526	-3	170	607	600	xxxx	xxxxx	519	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	A	A	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	223	xxxxx	129	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	165	xxxxx	-11	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	D	*	F	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #121 Stanley/King Rd (West Leg)

Level Of Service: F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	150	10	42	49	730	0	0	414	74
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	150	10	42	49	730	0	0	414	74
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	150	10	42	49	730	0	0	414	74
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	150	10	42	49	730	0	0	414	74
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	0	0	165	11	46	54	730	0	0	414	74
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1319	1267	730	1230	1230	451	488	xxxx	xxxxx	730	xxxx	xxxxx
Potent Cap.:	120	153	464	136	161	664	638	xxxx	xxxxx	464	xxxx	xxxxx
% Used Cap.:	0.0	0.0	0.0	121	6.8	7.0	8.4	xxxx	xxxxx	0.0	xxxx	xxxxx
Impedance:	xxxx	1.00	1.00	xxxx	0.96	0.96	0.95	xxxx	xxxxx	1.00	xxxx	xxxxx
Actual Cap.:	105	146	464	129	153	664	638	xxxx	xxxxx	464	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	105	146	464	-36	142	618	585	xxxx	xxxxx	464	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	157	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	-66	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	*	*	*	*	*	*

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PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #128 Stanley/JCB

Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	0	0 1	0 0	1!	0 0	0 0	1!	0 0	1 0	0	1 0
Volume Module:												
Base Vol:	27	0	110	10	0	10	10	1099	50	130	507	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	27	0	110	10	0	10	10	1099	50	130	507	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	27	0	110	10	0	10	10	1099	50	130	507	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	27	0	110	10	0	10	10	1099	50	130	507	10
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	30	0	121	11	0	11	11	1099	50	143	507	10
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1791	1781	1124	1911	1801	512	517	xxxx	xxxxx	1149	xxxx	xxxxx
Potent Cap.:	82	105	278	82	105	619	691	xxxx	xxxxx	330	xxxx	xxxxx
% Used Cap.:	36.2	0.0	43.6	13.4	0.0	1.8	1.6	xxxx	xxxxx	43.3	xxxx	xxxxx
Impedance:	xxxx	1.00	0.64	xxxx	1.00	0.99	0.99	xxxx	xxxxx	0.65	xxxx	xxxxx
Actual Cap.:	52	67	278	34	67	619	691	xxxx	xxxxx	330	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	22	67	157	23	67	608	680	xxxx	xxxxx	187	xxxx	xxxxx
LOS by Move:	E	*	D	*	*	*	A	*	*	D	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	64	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	42	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	E	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #135 Linwood/JCB

Level Of Service: F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 1	0	0 0	1! 0	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	52	93	105	20	121	40	27	987	273	140	653	54
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	52	93	105	20	121	40	27	987	273	140	653	54
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	52	93	105	20	121	40	27	987	273	140	653	54
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	52	93	105	20	121	40	27	987	273	140	653	54
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	57	102	116	22	133	44	30	987	273	154	653	54
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	2159	1997	1123	2305	2107	680	707	xxxx	xxxxx	1260	xxxx	xxxxx
Potent Cap.:	65	82	278	65	82	499	480	xxxx	xxxxx	233	xxxx	xxxxx
% Used Cap.:	88.0	125	41.6	33.8	162	8.8	6.2	xxxx	xxxxx	66.1	xxxx	xxxxx
Impedance:	xxxx	0.00	0.66	xxxx	0.00	0.95	0.96	xxxx	xxxxx	0.42	xxxx	xxxxx
Actual Cap.:	0	33	278	0	33	499	480	xxxx	xxxxx	233	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	-57	-69	162	-22	-100	455	450	xxxx	xxxxx	79	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	E	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	0	xxxx	62	xxxx	0	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	-159	xxxx	-156	xxxx	-199	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	F	*	F	*	F	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #139 Stanley/King Rd (East Leg)

Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	0 0	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	16	0	49	0	0	0	0	829	50	77	471	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	0	49	0	0	0	0	829	50	77	471	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	0	49	0	0	0	0	829	50	77	471	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	16	0	49	0	0	0	0	829	50	77	471	0
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	18	0	54	0	0	0	0	829	50	85	471	0
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1402	1402	854	1476	1427	471	471	xxxx	xxxxx	879	xxxx	xxxxx
Potent Cap.:	100	125	398	88	122	650	650	xxxx	xxxxx	383	xxxx	xxxxx
% Used Cap.:	17.7	0.0	13.6	0.0	0.0	0.0	0.0	xxxx	xxxxx	22.1	xxxx	xxxxx
Impedance:	xxxx	1.00	0.91	xxxx	1.00	1.00	1.00	xxxx	xxxxx	0.84	xxxx	xxxxx
Actual Cap.:	84	105	398	68	103	650	650	xxxx	xxxxx	383	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	66	105	344	68	103	650	650	xxxx	xxxxx	298	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	C	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	207	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	136	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	D	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #141 Linwood/King Rd

Cycle (sec):	100	Critical Vol./Cap. (X):	0.917
Loss Time (sec):	12	Average Delay (sec/veh):	29.7
Optimal Cycle:	118	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1	0	1	0	0 1	0	1	0	0 1	0
Volume Module:												
Base Vol:	87	170	83	87	364	61	71	695	91	103	418	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	87	170	83	87	364	61	71	695	91	103	418	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	87	170	83	87	364	61	71	695	91	103	418	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	87	170	83	87	364	61	71	695	91	103	418	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	87	170	83	87	364	61	71	695	91	103	418	30
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.94	0.94	0.95	0.98	0.98	0.94	0.97	0.97	0.94	0.98	0.98
Lanes:	1.00	0.67	0.33	1.00	0.86	0.14	1.00	0.88	0.12	1.00	0.93	0.07
Final Sat.:	1693	1138	555	1701	1503	252	1684	1536	201	1693	1646	118
Capacity Analysis Module:												
Vol/Sat:	0.05	0.15	0.15	0.05	0.24	0.24	0.04	0.45	0.45	0.06	0.25	0.25
Crit Moves:	****				****			****		****		
Green/Cycle:	0.06	0.24	0.24	0.08	0.26	0.26	0.08	0.49	0.49	0.07	0.48	0.48
Volume/Cap:	0.92	0.63	0.63	0.63	0.92	0.92	0.53	0.92	0.92	0.92	0.53	0.53
Level Of Service Module:												
Delay/Veh:	82.0	28.1	28.1	39.7	43.6	43.6	36.6	28.2	28.2	77.1	14.3	14.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	82.0	23.9	23.9	39.7	37.1	37.1	36.6	24.0	24.0	77.1	12.1	12.1
Queue:	4	7	7	3	14	14	2	23	23	5	9	9

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #180 37th Ave/Monroe

Cycle (sec):	1	Critical Vol./Cap. (X):	0.859
Loss Time (sec):	0	Average Delay (sec/veh):	15.9
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0	0	0	1! 0	0	0	1! 0	0	1	0 0 0
Volume Module:												
Base Vol:	111	78	117	5	92	26	17	363	121	123	195	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	78	117	5	92	26	17	363	121	123	195	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	111	78	117	5	92	26	17	363	121	123	195	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	111	78	117	5	92	26	17	363	121	123	195	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	111	78	117	5	92	26	17	363	121	123	195	0
Saturation Flow Module:												
Sat/Lane:	437	437	437	331	331	331	583	583	583	693	693	693
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.36	0.25	0.39	0.04	0.75	0.21	0.03	0.73	0.24	0.39	0.61	0.00
Final Sat.:	159	111	167	13	248	70	20	422	141	268	425	0
Capacity Analysis Module:												
Vol/Sat:	0.70	0.70	0.70	0.37	0.37	0.37	0.86	0.86	0.86	0.46	0.46	0.00
Crit Moves:	****					****		****			****	
Level Of Service Module:												
Delay/Veh:	14.3	14.3	14.3	4.1	4.1	4.1	26.2	26.2	26.2	5.7	5.7	1.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	14.3	14.3	14.3	4.1	4.1	4.1	26.2	26.2	26.2	5.7	5.7	1.0
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #194 Oak St/Railroad Ave

****

Level Of Service: D

****

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	0	0	0		0	0	0	1	0		0	1	0	0	0	
Volume Module:																								
Base Vol:	132	0	159				0	0	0				0	190	95				172	323	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	132	0	159				0	0	0				0	190	95				172	323	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	132	0	159				0	0	0				0	190	95				172	323	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	132	0	159				0	0	0				0	190	95				172	323	0			
Adjusted Volume Module:																								
Grade:	0%						0%						0%						0%					
% Cycle/Cars:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
% Truck/Comb:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
PCE Adj:	1.10	1.10	1.10				1.10	1.10	1.10				1.10	1.00	1.00				1.10	1.00	1.00			
Cycl/Car PCE:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
Trck/Cmb PCE:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
Adj Vol.:	145	0	175				0	0	0				0	190	95				189	323	0			
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<																								
RT Rad/Ang:	20.0 ft/90.0 deg						20.0 ft/90.0 deg						20.0 ft/90.0 deg						20.0 ft/90.0 deg					
Critical Gp:	6.5	6.0	5.5				6.5	6.0	5.5				5.0	xxxx	xxxxx				5.0	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	733	733	238				939	780	323				323	xxxx	xxxxx				285	xxxx	xxxxx			
Potent Cap.:	341	396	852				254	373	764				869	xxxx	xxxxx				905	xxxx	xxxxx			
% Used Cap.:	42.6	0.0	20.5				0.0	0.0	0.0				0.0	xxxx	xxxxx				20.9	xxxx	xxxxx			
Impedance:	xxxx	1.00	0.86				xxxx	1.00	1.00				1.00	xxxx	xxxxx				0.86	xxxx	xxxxx			
Actual Cap.:	293	340	852				188	321	764				869	xxxx	xxxxx				905	xxxx	xxxxx			
Level Of Service Module:																								
Unused Cap.:	148	340	678				188	321	764				869	xxxx	xxxxx				716	xxxx	xxxxx			
LOS by Move:	*	*	*				*	*	*				*	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	457	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
Unused Cap.:	xxxx	137	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx			
Shared LOS:	*	D	*				*	*	*				*	*	*				*	*	*			

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #199 Oak Street/Campbell Street

****

Level Of Service: C

****

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	0	1	0	0	0		0	0	0	1	0		0	0	1!	0	0		0	0	0	0	0	
Volume Module:																								
Base Vol:	49	339	0				0	340	26				59	0	27				0	0	0			
Growth Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
Initial Bse:	49	339	0				0	340	26				59	0	27				0	0	0			
User Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00				1.00	1.00	1.00			
PHF Volume:	49	339	0				0	340	26				59	0	27				0	0	0			
Reduct Vol:	0	0	0				0	0	0				0	0	0				0	0	0			
Final Vol.:	49	339	0				0	340	26				59	0	27				0	0	0			
Adjusted Volume Module:																								
Grade:	0%						0%						0%						0%					
% Cycle/Cars:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
% Truck/Comb:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
PCE Adj:	1.10	1.00	1.00				1.10	1.00	1.00				1.10	1.10	1.10				1.10	1.10	1.10			
Cycl/Car PCE:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
Trck/Cmb PCE:	xxxx	xxxx					xxxx	xxxx					xxxx	xxxx					xxxx	xxxx				
Adj Vol.:	54	339	0				0	340	26				65	0	30				0	0	0			
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<																								
RT Rad/Ang:	20.0 ft/90.0 deg						20.0 ft/90.0 deg						20.0 ft/90.0 deg						20.0 ft/90.0 deg					
Critical Gp:	5.0	xxxx	xxxxx				5.0	xxxx	xxxxx				6.5	6.0	5.5				6.5	6.0	5.5			
Capacity Module:																								
Cnflict Vol:	366	xxxx	xxxxx				339	xxxx	xxxxx				741	741	353				781	754	339			
Potent Cap.:	831	xxxx	xxxxx				855	xxxx	xxxxx				335	390	738				318	383	750			
% Used Cap.:	6.5	xxxx	xxxxx				0.0	xxxx	xxxxx				19.4	0.0	4.0				0.0	0.0	0.0			
Impedance:	0.96	xxxx	xxxxx				1.00	xxxx	xxxxx				xxxx	1.00	0.98				xxxx	1.00	1.00			
Actual Cap.:	831	xxxx	xxxxx				855	xxxx	xxxxx				322	375	738				298	368	750			
Level Of Service Module:																								
Unused Cap.:	777	xxxx	xxxxx				855	xxxx	xxxxx				257	375	708				298	368	750			
LOS by Move:	A	*	*				*	*	*				*	*	*				*	*	*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	392	xxxxx				xxxx	xxxx	xxxxx			
Unused Cap.:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	297	xxxxx				xxxx	xxxx	xxxxx			
Shared LOS:	*	*	*				*	*	*				*	C	*				*	*	*			

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #205 Oak Street/ORE 224

Cycle (sec):	100	Critical Vol./Cap. (X):	1.190
Loss Time (sec):	12	Average Delay (sec/veh):	73.8
Optimal Cycle:	180	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	1	1 0	1	0	1 0	1	0	2 0 1	1	0	2 0 1
Volume Module:												
Base Vol:	25	348	128	169	289	177	246	2277	91	162	1058	212
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	348	128	169	289	177	246	2277	91	162	1058	212
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	348	128	169	289	177	246	2277	91	162	1058	212
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	348	128	169	289	177	246	2277	91	162	1058	212
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.05	1.05	1.00	1.05	1.05	1.05	1.00	1.05	1.00	1.00	1.05	1.00
Final Vol.:	26	365	128	177	303	186	246	2391	91	162	1111	212
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.64	0.64	0.85	0.67	0.67	0.67	0.94	0.98	0.84	0.93	0.98	0.83
Lanes:	0.13	1.87	1.00	0.53	0.91	0.56	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	152	2140	1522	640	1095	672	1684	3546	1507	1676	3528	1499
Capacity Analysis Module:												
Vol/Sat:	0.17	0.17	0.08	0.28	0.28	0.28	0.15	0.67	0.06	0.10	0.31	0.14
Crit Moves:					****			****		****		
Green/Cycle:	0.23	0.23	0.23	0.23	0.23	0.23	0.21	0.57	0.57	0.08	0.44	0.44
Volume/Cap:	0.73	0.73	0.36	1.19	1.19	1.19	0.71	1.19	0.11	1.19	0.71	0.32
Level Of Service Module:												
Delay/Veh:	30.6	30.6	24.7	143	143	142.7	32.7	121	7.6	185	18.3	13.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	26.0	26.0	21.0	121	121	121.3	32.7	103	6.5	185	15.6	11.8
Queue:	11	11	3	42	42	42	7	160	1	12	26	4

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #238 Linwood/RR Ave/Harmony

Cycle (sec):	90	Critical Vol./Cap. (X):	1.188
Loss Time (sec):	16	Average Delay (sec/veh):	102.6
Optimal Cycle:	180	Level Of Service:	F

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	1	0 0 1	1	0	0 1 0	1	0	0 1 0	1	0	0 1 0
Volume Module:												
Base Vol:	93	330	815	84	346	26	50	258	122	579	361	93
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	93	330	815	84	346	26	50	258	122	579	361	93
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	93	330	815	84	346	26	50	258	122	579	361	93
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	93	330	815	84	346	26	50	258	122	579	361	93
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	93	330	815	84	346	26	50	258	122	579	361	93
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.99	0.99	0.85	0.94	0.98	0.98	0.95	0.95	0.95	1.06	0.97	0.97
Lanes:	0.22	0.78	1.00	1.00	0.93	0.07	1.00	0.68	0.32	1.00	0.80	0.20
Final Sat.:	390	1383	1522	1693	1641	123	1701	1155	546	1906	1381	356
Capacity Analysis Module:												
Vol/Sat:	0.24	0.24	0.54	0.05	0.21	0.21	0.03	0.22	0.22	0.30	0.26	0.26
Crit Moves:		****			****			****		****		
Green/Cycle:	0.20	0.20	0.46	0.18	0.18	0.18	0.04	0.19	0.19	0.26	0.40	0.40
Volume/Cap:	1.19	1.19	1.17	0.28	1.19	1.19	0.66	1.19	1.19	1.19	0.66	0.66
Level Of Service Module:												
Delay/Veh:	147	147	119.3	24.5	151	150.7	44.1	150	149.9	140	18.3	18.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	125	125	101.4	24.5	128	128.1	44.1	127	127.5	140	15.6	15.6
Queue:	26	26	48	2	23	23	2	24	24	35	10	10

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #272 37th Avenue/ORE 224

Cycle (sec):	100	Critical Vol./Cap. (X):	1.094
Loss Time (sec):	12	Average Delay (sec/veh):	40.3
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1	0	2	0 1	1	0	2 0 1
Volume Module:												
Base Vol:	10	75	11	137	147	151	120	2562	11	47	1267	146
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	75	11	137	147	151	120	2562	11	47	1267	146
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
PHF Volume:	10	75	11	137	147	151	120	2562	11	47	1267	146
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	75	11	137	147	151	120	2562	11	47	1267	146
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00	1.05	1.00
Final Vol.:	10	75	11	137	147	151	120	2690	11	47	1330	146
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.68	0.68	0.68	0.90	0.90	0.85	0.94	0.98	0.84	0.94	0.98	0.84
Lanes:	0.10	0.79	0.11	0.48	0.52	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	128	959	141	778	834	1522	1684	3546	1507	1684	3546	1507
Capacity Analysis Module:												
Vol/Sat:	0.08	0.08	0.08	0.18	0.18	0.10	0.07	0.76	0.01	0.03	0.38	0.10
Crit Moves:					****			****		****		
Green/Cycle:	0.16	0.16	0.16	0.16	0.16	0.16	0.11	0.69	0.69	0.03	0.60	0.60
Volume/Cap:	0.49	0.49	0.49	1.09	1.09	0.62	0.62	1.09	0.01	1.09	0.62	0.16
Level Of Service Module:												
Delay/Veh:	30.5	30.5	30.5	109	109	32.9	36.2	60.4	3.6	190	9.9	6.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	25.9	25.9	25.9	92.7	92.7	28.0	36.2	51.3	3.1	190	8.4	5.6
Queue:	3	3	3	15	15	4	3	135	0	4	24	2

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #319 Oatfield Rd/Lake Rd

Cycle (sec):	90	Critical Vol./Cap. (X):	1.037
Loss Time (sec):	16	Average Delay (sec/veh):	52.8
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1 0	1	0	0 1 0	1	0	0 1 0	1	0	0 1 0
Volume Module:												
Base Vol:	52	103	343	27	229	19	16	272	180	481	149	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	52	103	343	27	229	19	16	272	180	481	149	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	1.00	1.00	1.00	1.00	1.00
PHF Volume:	52	103	343	27	229	19	16	272	180	481	149	23
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	52	103	343	27	229	19	16	272	180	481	149	23
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	52	103	343	27	229	19	16	272	180	481	149	23
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.87	0.87	0.95	0.99	0.99	0.94	0.93	0.93	0.95	0.98	0.98
Lanes:	1.00	0.23	0.77	1.00	0.92	0.08	1.00	0.60	0.40	1.00	0.87	0.13
Final Sat.:	1693	362	1206	1701	1637	136	1693	1008	667	1701	1520	235
Capacity Analysis Module:												
Vol/Sat:	0.03	0.28	0.28	0.02	0.14	0.14	0.01	0.27	0.27	0.28	0.10	0.10
Crit Moves:		****		****				****		****		
Green/Cycle:	0.05	0.27	0.27	0.02	0.24	0.24	0.05	0.26	0.26	0.27	0.49	0.49
Volume/Cap:	0.59	1.04	1.04	1.04	0.59	0.59	0.20	1.04	1.04	1.04	0.20	0.20
Level Of Service Module:												
Delay/Veh:	38.6	69.3	69.3	189	24.7	24.7	31.5	69.5	69.5	68.0	10.0	10.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	38.6	58.9	58.9	189	21.0	21.0	31.5	59.1	59.1	68.0	8.5	8.5
Queue:	1	18	18	2	6	6	0	18	18	19	2	2

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #338 Oak/Washington

****

Level Of Service: E

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	1 0	0	0 1	0 1	0	0 0	0 0	0	1 0
Volume Module:												
Base Vol:	0	0	0	223	0	292	341	54	0	0	31	111
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	223	0	292	341	54	0	0	31	111
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	223	0	292	341	54	0	0	31	111
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	223	0	292	341	54	0	0	31	111
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	0	0	245	0	292	375	59	0	0	34	122
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	292	xxxx	xxxxx	0	xxxx	xxxxx	365	223	0	277	515	0
Potent Cap.:	898	xxxx	xxxxx	1000	xxxx	xxxxx	579	777	1000	651	538	1000
% Used Cap.:	0.0	xxxx	xxxxx	24.5	xxxx	xxxxx	64.7	7.6	0.0	0.0	6.3	12.2
Impedance:	1.00	xxxx	xxxxx	0.82	xxxx	xxxxx	xxxx	0.95	1.00	xxxx	0.96	0.92
Actual Cap.:	898	xxxx	xxxxx	1000	xxxx	xxxxx	424	640	1000	512	443	1000
Level Of Service Module:												
Unused Cap.:	898	xxxx	xxxxx	755	xxxx	xxxxx	48	581	1000	512	409	878
LOS by Move:	*	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	444	xxxx	xxxxx	xxxx	xxxx	785
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	10	xxxx	xxxxx	xxxx	xxxx	629
Shared LOS:	*	*	*	*	*	*	E	*	*	*	*	A

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Milwaukie TSP
PM Peak Hour
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Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

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Intersection #363 37th Ave/Railroad Avenue

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Level Of Service: C

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Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	1 0	0	1	0 0	0 0	0	0 0	1	0	0 1
Volume Module:												
Base Vol:	0	208	129	157	193	0	0	0	0	123	0	84
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	208	129	157	193	0	0	0	0	123	0	84
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	208	129	157	193	0	0	0	0	123	0	84
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	208	129	157	193	0	0	0	0	123	0	84
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	208	129	173	193	0	0	0	0	135	0	92
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	193	xxxx	xxxxx	337	xxxx	xxxxx	771	687	193	623	623	272
Potent Cap.:	983	xxxx	xxxxx	857	xxxx	xxxxx	322	423	897	409	461	815
% Used Cap.:	0.0	xxxx	xxxxx	20.2	xxxx	xxxxx	0.0	0.0	0.0	33.1	0.0	11.3
Impedance:	1.00	xxxx	xxxxx	0.86	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.93
Actual Cap.:	983	xxxx	xxxxx	857	xxxx	xxxxx	257	364	897	352	397	815
Level Of Service Module:												
Unused Cap.:	983	xxxx	xxxxx	684	xxxx	xxxxx	257	364	897	217	397	723
LOS by Move:	*	*	*	A	*	*	*	*	*	C	*	A
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Future (2015) Mitigated

Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 13 32nd Ave/JCB	B	11.7	0.785	B	11.7	0.785	+ 0.000 D/V
# 20 42nd Ave/JCB	B	8.1	0.796	B	8.1	0.796	+ 0.000 D/V
# 35 ORE 99E/Harrison Street	D	34.9	0.981	D	34.9	0.981	+ 0.000 D/V
# 36 ORE 99E/Jackson Street	A	xxxxx	0.000	A	xxxxx	0.000	+ 0.000 V/C
# 37 ORE 99E/Monroe St	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
# 42 17th Avenue/ORE 224	C	24.6	0.890	C	24.6	0.890	+ 0.000 D/V
# 46 ORE 224/Harrison Street	E	58.3	1.108	E	58.3	1.108	+ 0.000 D/V
# 54 ORE 224/Monroe	B	13.8	0.933	B	13.8	0.933	+ 0.000 D/V
# 55 ORE 99E/Jefferson St	B	14.7	0.947	B	14.7	0.947	+ 0.000 D/V
# 56 ORE 99E/Washington St	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
# 85 32nd Ave/Harrison	B	14.2	0.449	B	14.2	0.449	+ 0.000 D/V
#100 42nd Ave/Harrison	B	9.6	0.555	B	9.6	0.555	+ 0.000 D/V
#104 42nd Ave/King Rd	C	19.4	0.853	C	19.4	0.853	+ 0.000 V/C
#112 43rd Ave/King Rd	B	6.8	0.447	B	6.8	0.447	+ 0.000 D/V
#121 Stanley/King Rd (West Leg)	B	7.0	0.547	B	7.0	0.547	+ 0.000 D/V
#128 Stanley/JCB	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
#135 Linwood/JCB	C	17.5	0.833	C	17.5	0.833	+ 0.000 D/V
#139 Stanley/King Rd (East Leg)	D	xxxxx	0.000	D	xxxxx	0.000	+ 0.000 V/C
#141 Linwood/King Rd	D	35.3	0.931	D	35.3	0.931	+ 0.000 D/V
#180 37th Ave/Monroe	C	15.9	0.859	C	15.9	0.859	+ 0.000 V/C
#194 Oak St/Railroad Ave	D	xxxxx	0.000	D	xxxxx	0.000	+ 0.000 V/C
#199 Oak Street/Campbell Street	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C
#205 Oak Street/ORE 224	E	43.2	1.069	E	43.2	1.069	+ 0.000 D/V

Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#238 Linwood/RR Ave/Harmony	D	32.7	0.875	D	32.7	0.875	+ 0.000 D/V
#272 37th Avenue/ORE 224	D	30.5	1.042	D	30.5	1.042	+ 0.000 D/V
#319 Oatfield Rd/Lake Rd	D	32.3	0.849	D	32.3	0.849	+ 0.000 D/V
#338 Oak/Washington	E	xxxxx	0.000	E	xxxxx	0.000	+ 0.000 V/C
#363 37th Ave/Railroad Avenue	C	xxxxx	0.000	C	xxxxx	0.000	+ 0.000 V/C

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #13 32nd Ave/JCB

Cycle (sec):	90	Critical Vol./Cap. (X):	0.785
Loss Time (sec):	12	Average Delay (sec/veh):	11.7
Optimal Cycle:	71	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	0	0	1	0 1	1	0	1 0 0
Volume Module:												
Base Vol:	107	0	85	0	0	0	0	905	640	86	329	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	107	0	85	0	0	0	0	905	640	86	329	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	107	0	85	0	0	0	0	905	640	86	329	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	107	0	85	0	0	0	0	905	640	86	329	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	107	0	85	0	0	0	0	905	640	86	329	0
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.84	1.00	0.84	1.00	1.00	1.00	1.00	1.00	0.85	0.95	1.00	1.00
Lanes:	0.56	0.00	0.44	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Final Sat.:	843	0	669	0	0	0	0	1800	1530	1710	1800	0
Capacity Analysis Module:												
Vol/Sat:	0.13	0.00	0.13	0.00	0.00	0.00	0.00	0.50	0.42	0.05	0.18	0.00
Crit Moves:	****							****		****		
Green/Cycle:	0.16	0.00	0.16	0.00	0.00	0.00	0.00	0.64	0.64	0.06	0.70	0.00
Volume/Cap:	0.78	0.00	0.78	0.00	0.00	0.00	0.00	0.78	0.65	0.78	0.26	0.00
Level Of Service Module:												
Delay/Veh:	37.9	0.0	37.9	0.0	0.0	0.0	0.0	11.4	8.7	51.3	3.7	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	32.2	0.0	32.2	0.0	0.0	0.0	0.0	9.7	7.4	51.3	3.1	0.0
Queue:	6	0	6	0	0	0	0	17	10	3	3	0

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #20 42nd Ave/JCB

Cycle (sec):	90	Critical Vol./Cap. (X):	0.796
Loss Time (sec):	8	Average Delay (sec/veh):	8.1
Optimal Cycle:	63	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 0 1	0	0	0 0 0	0	0	0 1 0	1	0	1 0 0
Volume Module:												
Base Vol:	61	0	149	0	0	0	0	832	162	203	474	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	61	0	149	0	0	0	0	832	162	203	474	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	61	0	149	0	0	0	0	832	162	203	474	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	61	0	149	0	0	0	0	832	162	203	474	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	61	0	149	0	0	0	0	832	162	203	474	0
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.88	0.88	0.21	1.00	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.84	0.16	1.00	1.00	0.00
Final Sat.:	1800	0	1530	0	0	0	0	1326	258	378	1800	0
Capacity Analysis Module:												
Vol/Sat:	0.03	0.00	0.10	0.00	0.00	0.00	0.00	0.63	0.63	0.54	0.26	0.00
Crit Moves:			****					****				
Green/Cycle:	0.12	0.00	0.12	0.00	0.00	0.00	0.00	0.79	0.79	0.79	0.79	0.00
Volume/Cap:	0.28	0.00	0.80	0.00	0.00	0.00	0.00	0.80	0.80	0.68	0.33	0.00
Level Of Service Module:												
Delay/Veh:	27.4	0.0	43.1	0.0	0.0	0.0	0.0	6.7	6.7	7.5	2.1	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	27.4	0.0	36.6	0.0	0.0	0.0	0.0	5.7	5.7	7.5	1.8	0.0
Queue:	1	0	5	0	0	0	0	15	15	3	3	0

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #35 ORE 99E/Harrison Street

Cycle (sec): 120 Critical Vol./Cap. (X): 0.981
Loss Time (sec): 16 Average Delay (sec/veh): 34.9
Optimal Cycle: 180 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Split Phase Ovl			Split Phase		
Rights:	Include			Include						Include		
Min. Green:	6	15	15	6	15	15	10	10	10	10	10	10
Lanes:	1 0	1	1 0	1 0	1	1 0	0 1	0	0 2	1 0	0	1 0
Volume Module:												
Base Vol:	302	804	164	150	1689	0	10	109	565	181	91	45
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	302	804	164	150	1689	0	10	109	565	181	91	45
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	302	804	164	150	1689	0	10	109	565	181	91	45
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	302	804	164	150	1689	0	10	109	565	181	91	45
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.00	1.05	1.05	1.00	1.00	1.05	1.00	1.00	1.00
Final Vol.:	302	844	172	150	1773	0	10	109	593	181	91	45
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.96	0.96	0.94	0.99	1.00	0.99	0.99	0.75	0.94	0.94	0.94
Lanes:	1.00	1.66	0.34	1.00	2.00	0.00	0.08	0.92	2.00	1.00	0.67	0.33
Final Sat.:	1693	2872	585	1693	3564	0	151	1640	2686	1684	1127	557
Capacity Analysis Module:												
Vol/Sat:	0.18	0.29	0.29	0.09	0.50	0.00	0.07	0.07	0.22	0.11	0.08	0.08
Crit Moves:	****				****		****			****		
Green/Cycle:	0.18	0.52	0.52	0.16	0.50	0.00	0.08	0.08	0.26	0.11	0.11	0.11
Volume/Cap:	1.00	0.57	0.57	0.57	1.00	0.00	0.80	0.80	0.84	1.00	0.75	0.75
Level Of Service Module:												
Delay/Veh:	77.3	15.2	15.2	37.7	39.3	0.0	57.9	57.9	38.4	92.1	50.2	50.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	77.3	13.0	13.0	37.7	33.4	0.0	49.2	49.2	32.6	92.1	42.7	42.7
Queue:	14	23	23	5	70	0	5	5	20	9	5	5

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #36 ORE 99E/Jackson Street

Level Of Service: A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include						Include		
Lanes:	1 0	1	1 0	0 0	2	0 0	0 0	0	0 0	0 0	0	0 1
Volume Module:												
Base Vol:	0	1298	52	0	2527	0	0	0	0	0	0	37
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1298	52	0	2527	0	0	0	0	0	0	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1298	52	0	2527	0	0	0	0	0	0	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1298	52	0	2527	0	0	0	0	0	0	37
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1298	52	0	2527	0	0	0	0	0	0	41
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx	7.0	6.5	5.5	7.0	6.5	5.5
Capacity Module:												
Cnflict Vol:	2527	xxxx	xxxxx	1350	xxxx	xxxxx	3914	3877	1263	3851	3851	675
Potent Cap.:	130	xxxx	xxxxx	205	xxxx	xxxxx	65	82	232	65	82	503
% Used Cap.:	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	8.1
Impedance:	1.00	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.95
Actual Cap.:	130	xxxx	xxxxx	205	xxxx	xxxxx	62	82	232	65	82	503
Level Of Service Module:												
Unused Cap.:	130	xxxx	xxxxx	205	xxxx	xxxxx	62	82	232	65	82	462
LOS by Move:	*	*	*	*	*	*	*	*	*	*	*	A
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #37 ORE 99E/Monroe St

****

Level Of Service: E

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1	1	0	1 0 1	1	0	0 0 0	0	0	0 0 0	0	1
Volume Module:												
Base Vol:	0	1254	35	83	2576	10	0	0	0	0	0	60
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1254	35	83	2576	10	0	0	0	0	0	60
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1254	35	83	2576	10	0	0	0	0	0	60
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1254	35	83	2576	10	0	0	0	0	0	60
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1254	35	91	2576	10	0	0	0	0	0	66

Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 45 MPH <<

RT Rad/Ang:	20.0	ft/90.0	deg	20.0	ft/90.0	deg	20.0	ft/90.0	deg	20.0	ft/90.0	deg
Critical Gp:	5.8	xxxx	xxxxx	5.8	xxxx	xxxxx	7.9	7.4	6.1	7.9	7.4	6.1
Capacity Module:												
Cnflict Vol:	2586	xxxx	xxxxx	1289	xxxx	xxxxx	4013	3953	1293	3941	3941	645
Potent Cap.:	105	xxxx	xxxxx	177	xxxx	xxxxx	40	50	176	40	50	448
% Used Cap.:	0.0	xxxx	xxxxx	51.5	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	14.7
Impedance:	1.00	xxxx	xxxxx	0.56	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.90
Actual Cap.:	105	xxxx	xxxxx	177	xxxx	xxxxx	20	28	176	23	28	448
Level Of Service Module:												
Unused Cap.:	105	xxxx	xxxxx	86	xxxx	xxxxx	20	28	176	23	28	382
LOS by Move:	*	*	*	E	*	*	*	*	*	*	*	B
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

Traffix System Version 6.7 (c) 1994 DA Licensed to DKS Associates, Po

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

****

Intersection #42 17th Avenue/ORE 224

****

Cycle (sec):	100	Critical Vol./Cap. (X):	0.890
Loss Time (sec):	12	Average Delay (sec/veh):	24.6
Optimal Cycle:	105	Level Of Service:	C

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Protected			Protected			Protected		
Rights:	Include			Include			Include			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	1 0	1	0 1	0 0	0	0 0	0 0	1	0 0	0 1
Volume Module:												
Base Vol:	0	302	49	691	672	0	0	0	0	50	0	361
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	302	49	691	672	0	0	0	0	50	0	361
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	302	49	691	672	0	0	0	0	50	0	361
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	302	49	691	672	0	0	0	0	50	0	361
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	302	49	691	672	0	0	0	0	50	0	361
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	0.86	0.86	1.09	0.99	1.00	1.00	1.00	1.00	0.94	1.00	0.98
Lanes:	0.00	0.86	0.14	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Final Sat.:	0	1336	217	1957	1791	0	0	0	0	1693	0	1772
Capacity Analysis Module:												
Vol/Sat:	0.00	0.23	0.23	0.35	0.38	0.00	0.00	0.00	0.00	0.03	0.00	0.20
Crit Moves:			****	****			****					****
Green/Cycle:	0.00	0.25	0.25	0.40	0.65	0.00	0.00	0.00	0.00	0.23	0.00	0.23
Volume/Cap:	0.00	0.89	0.89	0.89	0.58	0.00	0.00	0.00	0.00	0.13	0.00	0.89
Level Of Service Module:												
Delay/Veh:	0.0	42.3	42.3	30.2	7.9	0.0	0.0	0.0	0.0	23.3	0.0	43.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	0.0	36.0	36.0	30.2	6.7	0.0	0.0	0.0	0.0	23.3	0.0	36.6
Queue:	0	12	12	20	11	0	0	0	0	1	0	12

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #46 ORE 224/Harrison Street

Cycle (sec):	120	Critical Vol./Cap. (X):	1.108
Loss Time (sec):	16	Average Delay (sec/veh):	58.3
Optimal Cycle:	180	Level Of Service:	E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Prot+Permit			Prot+Permit		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 2	0 1	1	0 2	0 1	1	0 2	0 1	1	0 1	1 0
Volume Module:												
Base Vol:	108	1123	48	328	2243	45	18	427	192	177	363	106
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	108	1123	48	328	2243	45	18	427	192	177	363	106
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	108	1123	48	328	2243	45	18	427	192	177	363	106
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	108	1123	48	328	2243	45	18	427	192	177	363	106
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.00	1.00	1.05	1.00	1.00	1.05	1.00	1.00	1.05	1.05
Final Vol.:	108	1179	48	328	2355	45	18	448	192	177	381	111
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.93	0.98	0.83	0.94	0.98	0.84	0.94	0.98	0.84	0.94	0.96	0.96
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	1.55	0.45
Final Sat.:	1676	3528	1499	1684	3546	1507	1684	3546	1507	1684	2664	776
Capacity Analysis Module:												
Vol/Sat:	0.06	0.33	0.03	0.19	0.66	0.03	0.01	0.13	0.13	0.11	0.14	0.14
Crit Moves:	****				****			****		****		
Green/Cycle:	0.06	0.42	0.42	0.24	0.60	0.60	0.01	0.11	0.11	0.09	0.19	0.19
Volume/Cap:	1.11	0.80	0.08	0.80	1.11	0.05	0.74	1.11	1.12	1.11	0.74	0.74
Level Of Service Module:												
Delay/Veh:	159	25.8	16.1	40.2	74.6	7.5	83.9	114	140.3	139	37.5	37.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	159	21.9	13.7	40.2	63.4	6.4	83.9	96.7	119.3	139	31.9	31.9
Queue:	8	36	1	11	134	1	1	26	13	12	16	16

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #54 ORE 224/Monroe

Cycle (sec):	120	Critical Vol./Cap. (X):	0.933
Loss Time (sec):	12	Average Delay (sec/veh):	13.8
Optimal Cycle:	143	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Permitted		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 1	1 0	1	0 1	1 0	0	1 0	0 1	0	0 0	1 0
Volume Module:												
Base Vol:	65	1054	0	41	2498	20	10	84	132	0	45	56
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	65	1054	0	41	2498	20	10	84	132	0	45	56
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	65	1054	0	41	2498	20	10	84	132	0	45	56
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	65	1054	0	41	2498	20	10	84	132	0	45	56
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.00	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	65	1107	0	41	2623	21	10	84	132	0	45	56
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.85	1.00	0.83	0.83
Lanes:	1.00	2.00	0.00	1.00	1.98	0.02	0.11	0.89	1.00	0.00	0.45	0.55
Final Sat.:	1710	3600	0	1710	3571	29	191	1609	1530	0	666	828
Capacity Analysis Module:												
Vol/Sat:	0.04	0.31	0.00	0.02	0.73	0.73	0.05	0.05	0.09	0.00	0.07	0.07
Crit Moves:	****				****						****	
Green/Cycle:	0.04	0.77	0.00	0.06	0.79	0.79	0.07	0.07	0.11	0.00	0.07	0.07
Volume/Cap:	0.93	0.40	0.00	0.40	0.93	0.93	0.72	0.72	0.76	0.00	0.93	0.93
Level Of Service Module:												
Delay/Veh:	104	3.6	0.0	42.7	12.6	12.6	53.0	53.0	51.2	0.0	88.9	88.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	104	3.1	0.0	42.7	10.7	10.7	45.0	45.0	43.5	0.0	75.6	75.6
Queue:	4	12	0	1	76	76	4	4	5	0	5	5

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #55 ORE 99E/Jefferson St

Cycle (sec):	120	Critical Vol./Cap. (X):	0.947
Loss Time (sec):	8	Average Delay (sec/veh):	14.7
Optimal Cycle:	148	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	15	15	15	0	15	15	0	0	0	15	15	15
Lanes:	1	0 1	1 0	0	0 1	1 0	0	0 1!	0 0	1	0 0	1 0
Volume Module:												
Base Vol:	10	1197	46	0	2387	10	10	20	10	289	18	58
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	1197	46	0	2387	10	10	20	10	289	18	58
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	1197	46	0	2387	10	10	20	10	289	18	58
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	1197	46	0	2387	10	10	20	10	289	18	58
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.05	1.00	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	10	1257	48	0	2506	11	10	20	10	289	18	58
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.05	0.99	0.99	1.00	1.00	1.00	0.85	0.85	0.85	0.87	0.89	0.89
Lanes:	1.00	1.93	0.07	0.00	1.99	0.01	0.25	0.50	0.25	1.00	0.24	0.76
Final Sat.:	90	3433	131	0	3584	16	384	767	384	1566	379	1223
Capacity Analysis Module:												
Vol/Sat:	0.11	0.37	0.37	0.00	0.70	0.70	0.03	0.03	0.03	0.18	0.05	0.05
Crit Moves:					****					****		
Green/Cycle:	0.74	0.74	0.74	0.00	0.74	0.74	0.19	0.19	0.19	0.19	0.19	0.19
Volume/Cap:	0.15	0.50	0.50	0.00	0.95	0.95	0.13	0.13	0.13	0.95	0.24	0.24
Level Of Service Module:												
Delay/Veh:	3.6	5.0	5.0	0.0	16.4	16.4	30.4	30.4	30.4	63.5	31.1	31.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	3.6	4.3	4.3	0.0	14.0	14.0	25.8	25.8	25.8	63.5	26.4	26.4
Queue:	0	18	18	0	79	79	1	1	1	13	2	2

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #56 ORE 99E/Washington St

Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1 1	0	1 0	1 1	0	0 0	0 0	0	0 0	0 0	1
Volume Module:												
Base Vol:	0	1119	227	81	2851	10	0	0	0	0	0	81
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1119	227	81	2851	10	0	0	0	0	0	81
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1119	227	81	2851	10	0	0	0	0	0	81
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1119	227	81	2851	10	0	0	0	0	0	81
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	1119	227	89	2851	10	0	0	0	0	0	89
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 45 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.8	xxxx	xxxxx	5.8	xxxx	xxxxx	7.9	7.4	6.1	7.9	7.4	6.1
Capacity Module:												
Cnflict Vol:	2861	xxxx	xxxxx	1346	xxxx	xxxxx	4364	4283	1431	4175	4175	673
Potent Cap.:	105	xxxx	xxxxx	168	xxxx	xxxxx	40	50	154	40	50	431
% Used Cap.:	0.0	xxxx	xxxxx	53.1	xxxx	xxxxx	0.0	0.0	0.0	0.0	0.0	20.7
Impedance:	1.00	xxxx	xxxxx	0.55	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.86
Actual Cap.:	105	xxxx	xxxxx	168	xxxx	xxxxx	19	27	154	22	27	431
Level Of Service Module:												
Unused Cap.:	105	xxxx	xxxxx	79	xxxx	xxxxx	19	27	154	22	27	342
LOS by Move:	*	*	*	E	*	*	*	*	*	*	*	B
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #85 32nd Ave/Harrison

Cycle (sec):	100	Critical Vol./Cap. (X):	0.449
Loss Time (sec):	12	Average Delay (sec/veh):	14.2
Optimal Cycle:	38	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Ovl			Ovl			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 1	0	0 1	0 1	0	0 1	1	0	0 1	1	0	0 1
Volume Module:												
Base Vol:	17	135	13	58	130	370	199	449	10	16	224	29
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	17	135	13	58	130	370	199	449	10	16	224	29
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	17	135	13	58	130	370	199	449	10	16	224	29
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	17	135	13	58	130	370	199	449	10	16	224	29
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	17	135	13	58	130	370	199	449	10	16	224	29
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.78	0.78	0.84	0.88	0.88	0.84	0.94	0.99	0.99	0.93	0.96	0.96
Lanes:	0.11	0.89	1.00	0.31	0.69	1.00	1.00	0.98	0.02	1.00	0.89	0.11
Final Sat.:	157	1250	1515	487	1091	1507	1693	1743	39	1676	1531	198
Capacity Analysis Module:												
Vol/Sat:	0.11	0.11	0.01	0.12	0.12	0.25	0.12	0.26	0.26	0.01	0.15	0.15
Crit Moves:						****		****		****		
Green/Cycle:	0.29	0.29	0.31	0.29	0.29	0.55	0.27	0.57	0.57	0.02	0.33	0.33
Volume/Cap:	0.38	0.38	0.03	0.42	0.42	0.45	0.44	0.45	0.45	0.45	0.44	0.44
Level Of Service Module:												
Delay/Veh:	22.1	22.1	18.4	22.4	22.4	10.5	23.7	9.5	9.5	42.3	20.4	20.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	18.8	18.8	15.7	19.1	19.1	8.9	23.7	8.1	8.1	42.3	17.3	17.3
Queue:	3	3	0	4	4	6	5	7	7	1	6	6

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #100 42nd Ave/Harrison

Cycle (sec):	90	Critical Vol./Cap. (X):	0.555
Loss Time (sec):	8	Average Delay (sec/veh):	9.6
Optimal Cycle:	35	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 1	0	1 0	0 1	0	1 0	0 1	0	1 0	0 1	0	0 1
Volume Module:												
Base Vol:	20	61	225	8	49	37	54	394	49	199	182	12
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	20	61	225	8	49	37	54	394	49	199	182	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	20	61	225	8	49	37	54	394	49	199	182	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	20	61	225	8	49	37	54	394	49	199	182	12
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.05	1.05	1.05	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	20	61	225	8	51	39	54	394	49	199	182	12
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	1.00	1.00	0.85	0.79	0.79	0.79	0.87	0.87	0.85	0.59	0.59	0.85
Lanes:	0.25	0.75	1.00	0.16	1.04	0.80	0.12	0.88	1.00	0.52	0.48	1.00
Final Sat.:	444	1356	1530	232	1479	1131	189	1377	1530	555	507	1530
Capacity Analysis Module:												
Vol/Sat:	0.04	0.05	0.15	0.03	0.03	0.03	0.29	0.29	0.03	0.36	0.36	0.01
Crit Moves:			****								****	
Green/Cycle:	0.26	0.26	0.26	0.26	0.26	0.26	0.65	0.65	0.65	0.65	0.65	0.65
Volume/Cap:	0.17	0.17	0.56	0.13	0.13	0.13	0.44	0.44	0.05	0.56	0.56	0.01
Level Of Service Module:												
Delay/Veh:	19.4	19.4	22.6	19.1	19.1	19.1	6.2	6.2	4.4	7.4	7.4	4.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
AdjDel/Veh:	16.5	16.5	19.2	16.3	16.3	16.3	5.3	5.3	3.8	6.3	6.3	3.7
Queue:	6	6	7	2	2	2	6	6	0	5	5	0

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #104 42nd Ave/King Rd

Cycle (sec):	1	Critical Vol./Cap. (X):	0.853
Loss Time (sec):	0	Average Delay (sec/veh):	19.4
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	1!	0 0
Volume Module:												
Base Vol:	0	0	0	137	0	32	45	510	0	57	311	77
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	137	0	32	45	510	0	57	311	77
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	137	0	32	45	510	0	57	311	77
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	137	0	32	45	510	0	57	311	77
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	*0*	*0*	*0*	137	*0*	32	45	510	*0*	57	311	77
Saturation Flow Module:												
Sat/Lane:	0	0	0	337	337	337	651	651	651	602	602	602
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.81	0.00	0.19	0.08	0.92	0.00	0.13	0.70	0.17
Final Sat.:	0	0	0	273	0	64	53	598	0	77	421	104
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.50	0.00	0.50	0.85	0.85	0.00	0.74	0.74	0.74
Crit Moves:			****			****	****			****		
Level Of Service Module:												
Delay/Veh:	1.0	1.0	1.0	6.7	1.0	6.7	25.5	25.5	1.0	16.6	16.6	16.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	1.0	1.0	1.0	6.7	1.0	6.7	25.5	25.5	1.0	16.6	16.6	16.6
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #112 43rd Ave/King Rd

Cycle (sec):	90	Critical Vol./Cap. (X):	0.447
Loss Time (sec):	8	Average Delay (sec/veh):	6.8
Optimal Cycle:	29	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1!	0 0	0 1	0	0 1	1 0	0	1 0	1 0	0	0
Volume Module:												
Base Vol:	10	15	28	118	10	110	91	586	10	31	329	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	15	28	118	10	110	91	586	10	31	329	71
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	15	28	118	10	110	91	586	10	31	329	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	15	28	118	10	110	91	586	10	31	329	71
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	10	15	28	118	10	110	91	586	10	31	329	71
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.56	0.56	0.56	0.93	0.93	0.85	0.56	1.00	1.00	0.43	0.97	0.97
Lanes:	0.19	0.28	0.53	0.92	0.08	1.00	1.00	0.98	0.02	1.00	0.82	0.18
Final Sat.:	192	288	537	1543	131	1530	1008	1770	30	774	1436	310
Capacity Analysis Module:												
Vol/Sat:	0.05	0.05	0.05	0.08	0.08	0.07	0.09	0.33	0.33	0.04	0.23	0.23
Crit Moves:					****			****				
Green/Cycle:	0.17	0.17	0.17	0.17	0.17	0.17	0.74	0.74	0.74	0.74	0.74	0.74
Volume/Cap:	0.31	0.31	0.31	0.45	0.45	0.42	0.12	0.45	0.45	0.05	0.31	0.31
Level Of Service Module:												
Delay/Veh:	25.1	25.1	25.1	26.2	26.2	26.0	2.5	3.6	3.6	2.4	3.0	3.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	21.4	21.4	21.4	22.3	22.3	22.1	2.5	3.1	3.1	2.4	2.6	2.6
Queue:	1	1	1	3	3	3	1	6	6	0	3	3

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #121 Stanley/King Rd (West Leg)

Cycle (sec):	90	Critical Vol./Cap. (X):	0.547
Loss Time (sec):	8	Average Delay (sec/veh):	7.0
Optimal Cycle:	34	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	1 0	0 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	16	0	49	150	10	42	49	730	0	0	414	74
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	0	49	150	10	42	49	730	0	0	414	74
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	0	49	150	10	42	49	730	0	0	414	74
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	16	0	49	150	10	42	49	730	0	0	414	74
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	16	0	49	150	10	42	49	730	0	0	414	74
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.80	1.00	0.80	0.90	0.88	0.88	0.50	1.00	1.00	1.00	0.98	0.98
Lanes:	0.25	0.00	0.75	1.00	0.19	0.81	1.00	1.00	0.00	1.00	0.85	0.15
Final Sat.:	354	0	1086	1620	305	1279	900	1800	0	1800	1497	267
Capacity Analysis Module:												
Vol/Sat:	0.05	0.00	0.05	0.09	0.03	0.03	0.05	0.41	0.00	0.00	0.28	0.28
Crit Moves:				****				****				
Green/Cycle:	0.17	0.00	0.17	0.17	0.17	0.17	0.74	0.74	0.00	0.00	0.74	0.74
Volume/Cap:	0.27	0.00	0.27	0.55	0.19	0.19	0.07	0.55	0.00	0.00	0.37	0.37
Level Of Service Module:												
Delay/Veh:	24.9	0.0	24.9	27.8	24.4	24.4	2.4	4.2	0.0	0.0	3.2	3.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	21.1	0.0	21.1	27.8	20.8	20.8	2.4	3.6	0.0	0.0	2.8	2.8
Queue:	1	0	1	4	1	1	0	8	0	0	4	4

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #128 Stanley/JCB

Level Of Service: E

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	0 0	1	0 0	1! 0	0	0 0	1! 0	0	1 0	0 1	0
Volume Module:												
Base Vol:	27	0	110	10	0	10	10	1099	50	130	507	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	27	0	110	10	0	10	10	1099	50	130	507	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	27	0	110	10	0	10	10	1099	50	130	507	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	27	0	110	10	0	10	10	1099	50	130	507	10
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	30	0	121	11	0	11	11	1099	50	143	507	10
Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1791	1781	1124	1911	1801	512	517	xxxx	xxxxx	1149	xxxx	xxxxx
Potent Cap.:	82	105	278	82	105	619	691	xxxx	xxxxx	330	xxxx	xxxxx
% Used Cap.:	36.2	0.0	43.6	13.4	0.0	1.8	1.6	xxxx	xxxxx	43.3	xxxx	xxxxx
Impedance:	xxxx	1.00	0.64	xxxx	1.00	0.99	0.99	xxxx	xxxxx	0.65	xxxx	xxxxx
Actual Cap.:	52	67	278	34	67	619	691	xxxx	xxxxx	330	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	22	67	157	23	67	608	680	xxxx	xxxxx	187	xxxx	xxxxx
LOS by Move:	E	*	D	*	*	*	A	*	*	D	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	64	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	42	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	E	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #135 Linwood/JCB

Cycle (sec): 120 Critical Vol./Cap. (X): 0.833
Loss Time (sec): 12 Average Delay (sec/veh): 17.5
Optimal Cycle: 91 Level Of Service: C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1 0	1	0	0 1 0	1	0	1 0 1	1	0	0 1 0
Volume Module:												
Base Vol:	52	93	105	20	121	40	27	987	273	140	653	54
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	52	93	105	20	121	40	27	987	273	140	653	54
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	52	93	105	20	121	40	27	987	273	140	653	54
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	52	93	105	20	121	40	27	987	273	140	653	54
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	52	93	105	20	121	40	27	987	273	140	653	54
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.52	0.92	0.92	0.41	0.96	0.96	0.95	1.00	0.85	0.95	0.99	0.99
Lanes:	1.00	0.47	0.53	1.00	0.75	0.25	1.00	1.00	1.00	1.00	0.92	0.08
Final Sat.:	936	778	878	738	1299	429	1710	1800	1530	1710	1646	136
Capacity Analysis Module:												
Vol/Sat:	0.06	0.12	0.12	0.03	0.09	0.09	0.02	0.55	0.18	0.08	0.40	0.40
Crit Moves:		****						****		****		
Green/Cycle:	0.14	0.14	0.14	0.14	0.14	0.14	0.03	0.66	0.66	0.10	0.73	0.73
Volume/Cap:	0.39	0.83	0.83	0.19	0.65	0.65	0.55	0.83	0.27	0.83	0.55	0.55
Level Of Service Module:												
Delay/Veh:	36.4	52.7	52.7	34.5	40.9	40.9	52.1	15.5	6.5	59.6	6.0	6.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	36.4	44.8	44.8	34.5	34.8	34.8	52.1	13.2	5.5	59.6	5.1	5.1
Queue:	2	8	8	1	5	5	1	26	4	6	11	11

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

Intersection #139 Stanley/King Rd (East Leg)

Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	0 0 0	1	0	0 1 0	1	0	0 1 0
Volume Module:												
Base Vol:	16	0	49	0	0	0	0	829	50	77	471	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	0	49	0	0	0	0	829	50	77	471	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	0	49	0	0	0	0	829	50	77	471	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	16	0	49	0	0	0	0	829	50	77	471	0
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	18	0	54	0	0	0	0	829	50	85	471	0

Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<

RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1402	1402	854	1476	1427	471	471	xxxx	xxxxx	879	xxxx	xxxxx
Potent Cap.:	100	125	398	88	122	650	650	xxxx	xxxxx	383	xxxx	xxxxx
% Used Cap.:	17.7	0.0	13.6	0.0	0.0	0.0	0.0	xxxx	xxxxx	22.1	xxxx	xxxxx
Impedance:	xxxx	1.00	0.91	xxxx	1.00	1.00	1.00	xxxx	xxxxx	0.84	xxxx	xxxxx
Actual Cap.:	84	105	398	68	103	650	650	xxxx	xxxxx	383	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	66	105	344	68	103	650	650	xxxx	xxxxx	298	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	C	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	207	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	136	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	D	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #141 Linwood/King Rd

Cycle (sec):	120	Critical Vol./Cap. (X):	0.931
Loss Time (sec):	16	Average Delay (sec/veh):	35.3
Optimal Cycle:	147	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1	0	1	0	0 1	0	1	0	0 1	0
Volume Module:												
Base Vol:	87	170	83	87	364	61	71	695	91	103	418	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	87	170	83	87	364	61	71	695	91	103	418	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	87	170	83	87	364	61	71	695	91	103	418	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	87	170	83	87	364	61	71	695	91	103	418	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	87	170	83	87	364	61	71	695	91	103	418	30
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.94	0.94	0.95	0.98	0.98	0.94	0.97	0.97	0.94	0.98	0.98
Lanes:	1.00	0.67	0.33	1.00	0.86	0.14	1.00	0.88	0.12	1.00	0.93	0.07
Final Sat.:	1693	1138	555	1701	1503	252	1684	1536	201	1693	1646	118
Capacity Analysis Module:												
Vol/Sat:	0.05	0.15	0.15	0.05	0.24	0.24	0.04	0.45	0.45	0.06	0.25	0.25
Crit Moves:	****				****			****		****		
Green/Cycle:	0.06	0.23	0.23	0.08	0.26	0.26	0.08	0.49	0.49	0.07	0.47	0.47
Volume/Cap:	0.93	0.64	0.64	0.64	0.93	0.93	0.54	0.93	0.93	0.93	0.54	0.54
Level Of Service Module:												
Delay/Veh:	93.3	33.7	33.7	47.0	51.6	51.6	43.7	34.1	34.1	88.0	17.5	17.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	93.3	28.7	28.7	47.0	43.8	43.8	43.7	29.0	29.0	88.0	14.9	14.9
Queue:	5	8	8	3	17	17	2	28	28	5	11	11

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
4-Way Stop Method
Base Volume Alternative

Intersection #180 37th Ave/Monroe

Cycle (sec):	1	Critical Vol./Cap. (X):	0.859
Loss Time (sec):	0	Average Delay (sec/veh):	15.9
Optimal Cycle:	0	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	1	0 0 0
Volume Module:												
Base Vol:	111	78	117	5	92	26	17	363	121	123	195	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	111	78	117	5	92	26	17	363	121	123	195	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	111	78	117	5	92	26	17	363	121	123	195	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	111	78	117	5	92	26	17	363	121	123	195	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	111	78	117	5	92	26	17	363	121	123	195	0
Saturation Flow Module:												
Sat/Lane:	437	437	437	331	331	331	583	583	583	693	693	693
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.36	0.25	0.39	0.04	0.75	0.21	0.03	0.73	0.24	0.39	0.61	0.00
Final Sat.:	159	111	167	13	248	70	20	422	141	268	425	0
Capacity Analysis Module:												
Vol/Sat:	0.70	0.70	0.70	0.37	0.37	0.37	0.86	0.86	0.86	0.46	0.46	0.00
Crit Moves:	****					****		****			****	
Level Of Service Module:												
Delay/Veh:	14.3	14.3	14.3	4.1	4.1	4.1	26.2	26.2	26.2	5.7	5.7	1.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	14.3	14.3	14.3	4.1	4.1	4.1	26.2	26.2	26.2	5.7	5.7	1.0
Queue:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #194 Oak St/Railroad Ave

****

Level Of Service: D

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	0 0	0	0 0	0 1	0	0 1	0 0	0
Volume Module:												
Base Vol:	132	0	159	0	0	0	0	190	95	172	323	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	132	0	159	0	0	0	0	190	95	172	323	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	132	0	159	0	0	0	0	190	95	172	323	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	132	0	159	0	0	0	0	190	95	172	323	0
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.00	1.00	1.10	1.00	1.00
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	145	0	175	0	0	0	0	190	95	189	323	0

Critical Gap Module: >> Population: 0 << >> Run Speed(E/W): 30 MPH <<

RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	733	733	238	939	780	323	323	xxxx	xxxxx	285	xxxx	xxxxx
Potent Cap.:	341	396	852	254	373	764	869	xxxx	xxxxx	905	xxxx	xxxxx
% Used Cap.:	42.6	0.0	20.5	0.0	0.0	0.0	0.0	xxxx	xxxxx	20.9	xxxx	xxxxx
Impedance:	xxxx	1.00	0.86	xxxx	1.00	1.00	1.00	xxxx	xxxxx	0.86	xxxx	xxxxx
Actual Cap.:	293	340	852	188	321	764	869	xxxx	xxxxx	905	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	148	340	678	188	321	764	869	xxxx	xxxxx	716	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	457	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	137	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	D	*	*	*	*	*	*	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #199 Oak Street/Campbell Street

****

Level Of Service: C

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0 0	0	0 0	0 1	0	0 0	1! 0	0	0 0	0 0	0
Volume Module:												
Base Vol:	49	339	0	0	340	26	59	0	27	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	339	0	0	340	26	59	0	27	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	49	339	0	0	340	26	59	0	27	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	49	339	0	0	340	26	59	0	27	0	0	0
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	54	339	0	0	340	26	65	0	30	0	0	0

Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<

RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	366	xxxx	xxxxx	339	xxxx	xxxxx	741	741	353	781	754	339
Potent Cap.:	831	xxxx	xxxxx	855	xxxx	xxxxx	335	390	738	318	383	750
% Used Cap.:	6.5	xxxx	xxxxx	0.0	xxxx	xxxxx	19.4	0.0	4.0	0.0	0.0	0.0
Impedance:	0.96	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	0.98	xxxx	1.00	1.00
Actual Cap.:	831	xxxx	xxxxx	855	xxxx	xxxxx	322	375	738	298	368	750
Level Of Service Module:												
Unused Cap.:	777	xxxx	xxxxx	855	xxxx	xxxxx	257	375	708	298	368	750
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	392	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	297	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	C	*	*	*	*

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

****

Intersection #205 Oak Street/ORE 224

****

Cycle (sec): 120 Critical Vol./Cap. (X): 1.069
Loss Time (sec): 16 Average Delay (sec/veh): 43.2
Optimal Cycle: 180 Level Of Service: E

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Ovl			Ovl			Ovl			Ovl		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0 2	0 1	2	0 2	0 1	1	0 2	0 1	1	0 2	0 1
Volume Module:												
Base Vol:	25	348	128	169	289	177	246	2277	91	162	1058	212
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	25	348	128	169	289	177	246	2277	91	162	1058	212
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	25	348	128	169	289	177	246	2277	91	162	1058	212
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	25	348	128	169	289	177	246	2277	91	162	1058	212
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.05	1.00	1.05	1.05	1.00	1.00	1.05	1.00	1.00	1.05	1.00
Final Vol.:	25	365	128	177	303	177	246	2391	91	162	1111	212
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.95	0.99	0.85	0.92	0.99	0.85	0.94	0.98	0.84	0.93	0.98	0.83
Lanes:	1.00	2.00	1.00	2.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1701	3582	1522	3295	3582	1522	1684	3546	1507	1676	3528	1499
Capacity Analysis Module:												
Vol/Sat:	0.01	0.10	0.08	0.05	0.08	0.12	0.15	0.67	0.06	0.10	0.31	0.14
Crit Moves:		****		****				****		****		
Green/Cycle:	0.02	0.10	0.19	0.05	0.13	0.36	0.23	0.63	0.65	0.09	0.49	0.54
Volume/Cap:	0.90	1.07	0.45	1.07	0.65	0.33	0.64	1.07	0.09	1.07	0.64	0.26
Level Of Service Module:												
Delay/Veh:	133	102	33.8	122	40.1	21.4	34.3	54.8	6.0	123	17.7	11.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	133	86.3	28.7	122	34.1	18.2	34.3	46.6	5.1	123	15.0	9.5
Queue:	2	20	4	11	10	4	8	119	1	10	28	4

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

****

Intersection #238 Linwood/RR Ave/Harmony

****

Cycle (sec): 120 Critical Vol./Cap. (X): 0.875
Loss Time (sec): 16 Average Delay (sec/veh): 32.7
Optimal Cycle: 117 Level Of Service: D

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Protected			Protected		
Rights:	Ovl			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	1 0	0 2	1	0 0	1 0	1	0 1	0 1	2	0 0	1 0
Volume Module:												
Base Vol:	93	330	815	84	346	26	50	258	122	579	361	93
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	93	330	815	84	346	26	50	258	122	579	361	93
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	93	330	815	84	346	26	50	258	122	579	361	93
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	93	330	815	84	346	26	50	258	122	579	361	93
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.05	1.00	1.00
Final Vol.:	93	330	856	84	346	26	50	258	122	608	361	93
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.99	0.99	0.75	0.94	0.98	0.98	0.95	0.99	0.85	1.03	0.97	0.97
Lanes:	0.22	0.78	2.00	1.00	0.93	0.07	1.00	1.00	1.00	2.00	0.80	0.20
Final Sat.:	390	1383	2686	1693	1641	123	1701	1791	1522	3691	1381	356
Capacity Analysis Module:												
Vol/Sat:	0.24	0.24	0.32	0.05	0.21	0.21	0.03	0.14	0.08	0.16	0.26	0.26
Crit Moves:		****			****			****		****		
Green/Cycle:	0.27	0.27	0.46	0.24	0.24	0.24	0.04	0.16	0.44	0.19	0.32	0.32
Volume/Cap:	0.87	0.87	0.69	0.21	0.87	0.87	0.82	0.87	0.18	0.87	0.82	0.82
Level Of Service Module:												
Delay/Veh:	43.1	43.1	20.6	27.7	45.9	45.9	81.5	53.9	15.7	44.5	35.6	35.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	36.6	36.6	17.5	27.7	39.0	39.0	81.5	45.8	13.4	44.5	30.3	30.3
Queue:	15	15	23	2	14	14	2	10	2	22	15	15

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #272 37th Avenue/ORE 224

Cycle (sec): 120 Critical Vol./Cap. (X): 1.042
Loss Time (sec): 12 Average Delay (sec/veh): 30.5
Optimal Cycle: 180 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0	0	1! 0	0	0	1	0	1	0	2	0	1
Volume Module:												
Base Vol:	10	75	11	137	147	151	120	2562	11	47	1267	146
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	75	11	137	147	151	120	2562	11	47	1267	146
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	75	11	137	147	151	120	2562	11	47	1267	146
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	75	11	137	147	151	120	2562	11	47	1267	146
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.05	1.05	1.05	1.00	1.05	1.00	1.00	1.05	1.00
Final Vol.:	10	75	11	144	154	159	120	2690	11	47	1330	146
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.70	0.70	0.70	0.84	0.84	0.84	0.94	0.98	0.84	0.94	0.98	0.84
Lanes:	0.10	0.79	0.11	0.63	0.67	0.70	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	131	984	144	954	1021	1054	1684	3546	1507	1684	3546	1507
Capacity Analysis Module:												
Vol/Sat:	0.08	0.08	0.08	0.15	0.15	0.15	0.07	0.76	0.01	0.03	0.38	0.10
Crit Moves:					****			****		****		
Green/Cycle:	0.14	0.14	0.14	0.14	0.14	0.14	0.12	0.73	0.73	0.03	0.63	0.63
Volume/Cap:	0.53	0.53	0.53	1.04	1.04	1.04	0.59	1.04	0.01	1.04	0.59	0.15
Level Of Service Module:												
Delay/Veh:	38.3	38.3	38.3	84.5	84.5	84.5	41.2	38.7	3.4	167	10.1	6.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	0.85	0.85	0.85	0.85	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	32.6	32.6	32.6	71.8	71.8	71.8	41.2	32.9	2.9	167	8.5	5.7
Queue:	3	3	3	23	23	23	4	124	0	4	26	2

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Operations Method
Base Volume Alternative

Intersection #319 Oatfield Rd/Lake Rd

Cycle (sec): 120 Critical Vol./Cap. (X): 0.849
Loss Time (sec): 16 Average Delay (sec/veh): 32.3
Optimal Cycle: 107 Level Of Service: D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1	0	1	0	0	1	0	1	0	1
Volume Module:												
Base Vol:	52	103	343	27	229	19	16	272	180	481	149	23
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	52	103	343	27	229	19	16	272	180	481	149	23
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	52	103	343	27	229	19	16	272	180	481	149	23
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	52	103	343	27	229	19	16	272	180	481	149	23
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	52	103	343	27	229	19	16	272	180	481	149	23
Saturation Flow Module:												
Sat/Lane:	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Adjustment:	0.94	0.87	0.87	0.95	0.99	0.99	0.94	0.99	0.84	0.95	0.98	0.98
Lanes:	1.00	0.23	0.77	1.00	0.92	0.08	1.00	1.00	1.00	1.00	0.87	0.13
Final Sat.:	1693	362	1206	1701	1637	136	1693	1782	1515	1701	1520	235
Capacity Analysis Module:												
Vol/Sat:	0.03	0.28	0.28	0.02	0.14	0.14	0.01	0.15	0.12	0.28	0.10	0.10
Crit Moves:		****		****				****		****		
Green/Cycle:	0.06	0.34	0.34	0.02	0.29	0.29	0.05	0.18	0.24	0.33	0.47	0.47
Volume/Cap:	0.48	0.85	0.85	0.85	0.48	0.48	0.21	0.85	0.49	0.85	0.21	0.21
Level Of Service Module:												
Delay/Veh:	43.9	36.8	36.8	109	27.3	27.3	42.2	49.2	30.4	36.4	14.3	14.3
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ProgAdjFctr:	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85	1.00	0.85	0.85
AdjDel/Veh:	43.9	31.3	31.3	109	23.2	23.2	42.2	41.8	25.9	36.4	12.2	12.2
Queue:	2	15	15	2	7	7	1	10	5	17	3	3

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #338 Oak/Washington

****

Level Of Service: E

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	1	0	0 0 1	0	1	0 0 0	0	0	0 1 0
Volume Module:												
Base Vol:	0	0	0	223	0	292	341	54	0	0	31	111
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	223	0	292	341	54	0	0	31	111
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	223	0	292	341	54	0	0	31	111
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	223	0	292	341	54	0	0	31	111
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	0	0	245	0	292	375	59	0	0	34	122
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	292	xxxx	xxxxx	0	xxxx	xxxxx	365	223	0	277	515	0
Potent Cap.:	898	xxxx	xxxxx	1000	xxxx	xxxxx	579	777	1000	651	538	1000
% Used Cap.:	0.0	xxxx	xxxxx	24.5	xxxx	xxxxx	64.7	7.6	0.0	0.0	6.3	12.2
Impedance:	1.00	xxxx	xxxxx	0.82	xxxx	xxxxx	xxxx	0.95	1.00	xxxx	0.96	0.92
Actual Cap.:	898	xxxx	xxxxx	1000	xxxx	xxxxx	424	640	1000	512	443	1000
Level Of Service Module:												
Unused Cap.:	898	xxxx	xxxxx	755	xxxx	xxxxx	48	581	1000	512	409	878
LOS by Move:	*	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	444	xxxx	xxxxx	xxxx	xxxx	785
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	10	xxxx	xxxxx	xxxx	xxxx	629
Shared LOS:	*	*	*	*	*	*	E	*	*	*	*	A

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Milwaukie TSP
PM Peak Hour
Future (Year 2015) Volumes (Mitigated)

Level Of Service Computation Report
1985 HCM Unsignalized Method
Base Volume Alternative

****

Intersection #363 37th Ave/Railroad Avenue

****

Level Of Service: C

****

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	1 0	0	1	0 0 0	0	0	0 0 0	1	0	0 0 1
Volume Module:												
Base Vol:	0	208	129	157	193	0	0	0	0	123	0	84
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	208	129	157	193	0	0	0	0	123	0	84
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	208	129	157	193	0	0	0	0	123	0	84
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	208	129	157	193	0	0	0	0	123	0	84
Adjusted Volume Module:												
Grade:	0%			0%			0%			0%		
% Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
% Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
PCE Adj:	1.10	1.00	1.00	1.10	1.00	1.00	1.10	1.10	1.10	1.10	1.10	1.10
Cycl/Car PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Trck/Cmb PCE:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adj Vol.:	0	208	129	173	193	0	0	0	0	135	0	92
Critical Gap Module: >> Population: 0 << >> Run Speed(N/S): 30 MPH <<												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	193	xxxx	xxxxx	337	xxxx	xxxxx	771	687	193	623	623	272
Potent Cap.:	983	xxxx	xxxxx	857	xxxx	xxxxx	322	423	897	409	461	815
% Used Cap.:	0.0	xxxx	xxxxx	20.2	xxxx	xxxxx	0.0	0.0	0.0	33.1	0.0	11.3
Impedance:	1.00	xxxx	xxxxx	0.86	xxxx	xxxxx	xxxx	1.00	1.00	xxxx	1.00	0.93
Actual Cap.:	983	xxxx	xxxxx	857	xxxx	xxxxx	257	364	897	352	397	815
Level Of Service Module:												
Unused Cap.:	983	xxxx	xxxxx	684	xxxx	xxxxx	257	364	897	217	397	723
LOS by Move:	*	*	*	A	*	*	*	*	*	C	*	A
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*

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APPENDIX 10:
Transit Needs Questionnaire

MILWAUKIE'S TRANSPORTATION SYSTEM PLAN
TRANSIT ELEMENT WORKSESSION QUESTIONNAIRE

1. How often do you use public transportation?

   Daily____ Weekly____ Occasionally____ Rarely____ Never_____

2. What destinations and where do you use public transportation to reach? Examples are downtown Portland, medical facilities at Sunnyside, work location, and OIT. _____
   _____

3. What bus routes do you take to get to these destinations? _____

4. If you use public transportation, how do you travel to the bus stop?

   Walk ____ Bicycle _____ Car _____ Not Applicable (Service comes to me)_____

5. Where would you suggest additional public transit service, along what roads and connecting to what other bus routes or destinations? _____
   _____
   _____

6. If you occasionally, rarely, or never use public transportation, what are the most important things that can be done to make it more likely for you to use public transportation?_____
   _____
   _____

7. What improvements to the existing public transportation service would you like to see happen to improve your service and experience on public transit? _____
   _____
   _____

8. What improvements would you like to see happen to improve your service and experience at the downtown Milwaukie transit transfer center? _____
   _____
   _____

9. Other comments related to public transportation service and use in the Milwaukie area?
   _____
   _____
   _____
   _____
   _____