

City of Ukiah

Transportation System Plan

Final Report

June 2001

Prepared by:

**David Evans and Associates, Inc. and
Umatilla County in cooperation with
Oregon Department of Transportation**

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CHAPTER 1: INTRODUCTION

The City of Ukiah Transportation System Plan (TSP) guides the management of existing transportation facilities and the design and implementation of future facilities for the next 20 years. This Transportation System Plan constitutes the transportation element of the City's Comprehensive Plan and satisfies the requirements of the Oregon Transportation Planning Rule established by the Department of Land Conservation and Development. It identifies and prioritizes transportation projects for inclusion in the Oregon Department of Transportation's (ODOT's) Statewide Transportation Improvement Program (STIP).

PLANNING AREA

The City of Ukiah Transportation System Plan planning area covers the entire area within the Ukiah Urban Growth Boundary (UGB). The planning area is shown on Figure 1-1. Roadways included in the Transportation System Plan fall under three jurisdictions: The City of Ukiah, Umatilla County, and the state of Oregon.

Ukiah is located in the southwestern portion of Umatilla County in the northeastern corner of Oregon. It is a small agricultural community with a population of approximately 280 people. The City is laid out in a grid pattern centered north-south around OR 244 and east-west around County Road No. 1475 (Soap Hill Road).

The majority of local city streets, which are under the City's jurisdiction, are unpaved gravel roadways. There are three county roads that penetrate the Ukiah UGB: (1) Soap Hill Road (No. 1475) extends south from OR 244, (2) Albee Road (No. 1447) extends north from OR 244, and (3) County Road No. 1446 (known locally as Waid Street). Only Soap Hill road is paved. The OR 244 (Ukiah-Hilgard Highway) connects Ukiah with I-84 in the town of Hilgard just west of La Grande.

Agriculture, food processing, wood products, tourism, manufacturing, and recreation serve as the principal industries within Umatilla County. Employment in agriculture and wood products is subject to seasonal variations, which tend to parallel growing and construction seasons.

PLANNING PROCESS

The Ukiah Transportation System Plan was prepared as part of an overall effort in Umatilla County to prepare TSPs for Umatilla County and eight small municipalities: the cities of Adams, Athena, Echo, Helix, Pilot Rock, Stanfield, Ukiah, and Weston. Each plan was developed through a series of technical analyses combined with systematic input and review by the county, the cities, the management team, the Transportation Advisory Committee (TAC), ODOT, and the public. The TAC consisted of staff, elected and appointed officials, residents, and business people from Umatilla County, and the eight cities. Key elements of the process include:

- Involving the Ukiah community (Chapter 1)
- Defining goals and objectives (Chapter 2)
- Reviewing existing plans and transportation conditions (Chapters 3, 4, and Appendices A and B)
- Developing population, employment, and travel forecasts (Chapter 5, and Appendices C and D)
- Developing and evaluating potential transportation system improvements (Chapter 6)
- Developing the Transportation System Plan and a capital improvement plan (Chapter 7)

- Evaluate funding options and develop financial plan (Chapter 8)
- Developing recommended policies and ordinances (Chapter 9)

Community Involvement

Community involvement is an integral component in the development of a TSP for the City of Ukiah, Umatilla County and each of the other seven cities covered under the Umatilla County TSP process. Since the communities faced many similar transportation and land use issues, a public involvement program involving all the jurisdictions was used. This process allowed for individual attention when needed, and general problem solving for all jurisdictions as appropriate. Several different techniques were utilized to involve each local jurisdiction, ODOT, and the general public.

A combined management team and transportation advisory committee (TAC) provided guidance on technical issues and direction regarding policy issues to the consultant team. Staff members from each local jurisdiction, from ODOT, and a local resident from each community served on the TAC. This group met several times during the course of the project.

The second part of the community involvement effort consisted of community meetings within Umatilla County. The first public meeting was held in June 1998. The Ukiah general public was invited to learn about the TSP planning process and provide input on transportation issues and concerns. A second public meeting was held in July 1998. The third and final public meeting was held in September 1998. The public was notified of the public meetings through public announcements in the local newspapers and on the local radio station.

Goals and Objectives

Based on input from the community, the county, and the management team/TAC, a set of goals and objectives were defined for the TSP. These goals and objectives were used to make decisions about various potential improvement projects. They are described in Chapter 2.

Review and Inventory of Existing Plans, Policies, and Public Facilities

To begin the planning process, all applicable Ukiah and Umatilla County transportation and land use plans and policies were reviewed and an inventory of public facilities was conducted. The purpose of these efforts was to understand the history of transportation planning in the Ukiah area, including the street system improvements planned and implemented in the past, and how the City is currently managing its ongoing development. Existing plans and policies are described in Appendix A of this report.

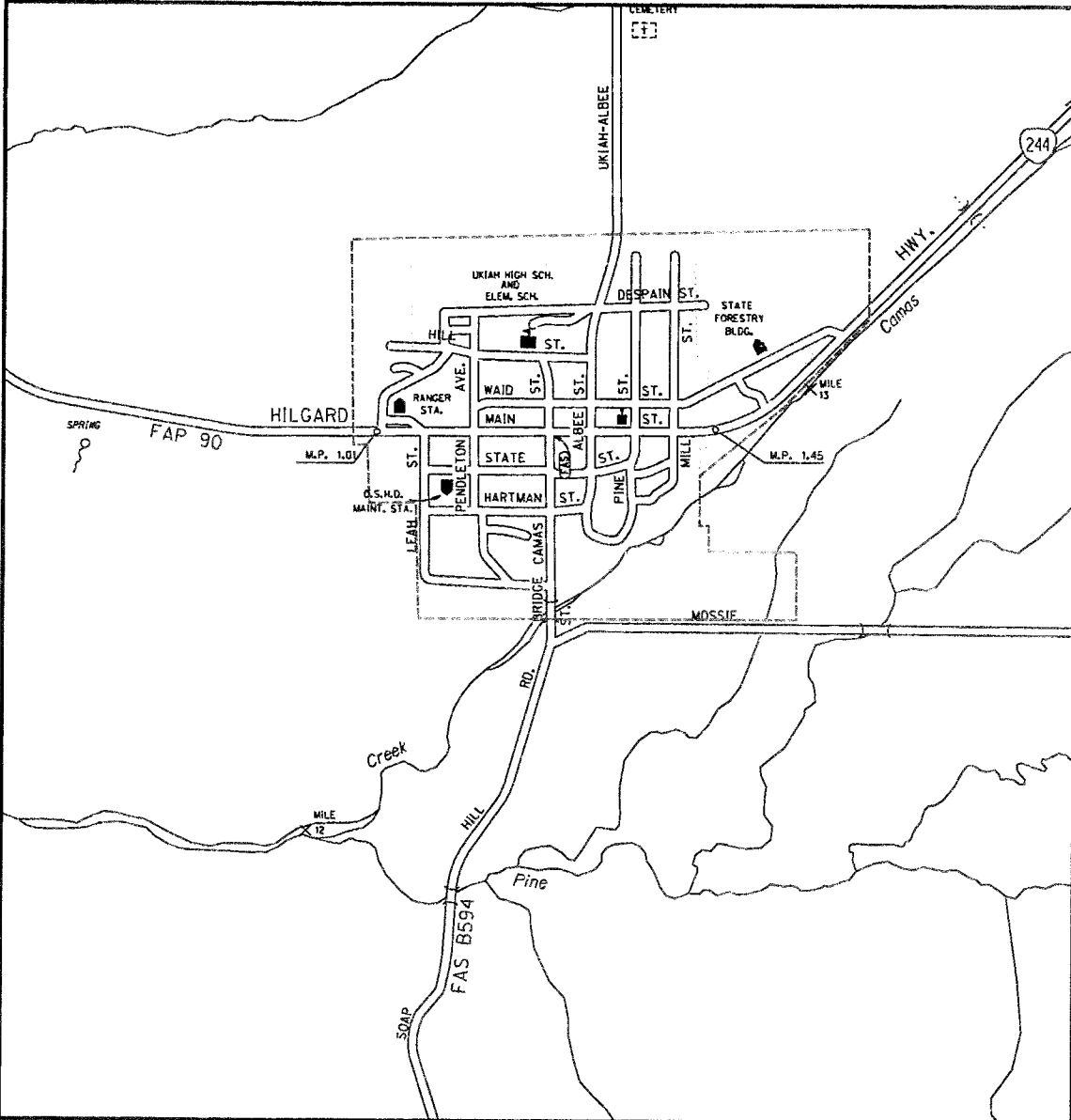
The inventory of existing facilities catalogs the current transportation system. The results of the inventory are described in Chapter 3, while Chapter 4 describes how the system operates. Appendix B summarizes the inventory of the existing arterial and collector street system.

Future Transportation System Demands

The Transportation Planning Rule requires the Transportation System Plan to address a 20-year forecasting period. Future traffic volumes for the existing and committed transportation systems were projected using

LEGEND:

----- URBAN GROWTH BOUNDARY
 CITY LIMITS



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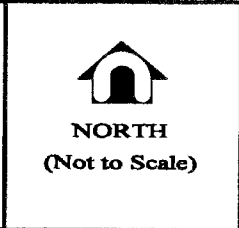


FIGURE 1-1
Planning Area
-Ukiah

City of Ukiah TSP

ODOT's *Level 1- Trending Analysis* methodology. The overall travel demand forecasting process is described in Chapter 5.

Transportation System Potential Improvements

Once the travel forecasts were developed, it was possible to evaluate a series of potential transportation system improvements. The evaluation of potential transportation improvements was based on a qualitative review of safety, environmental, socioeconomic, and land use impacts, as well as estimated cost. These improvements were developed with the help of the local working group, and they attempt to address the concerns specified in the goals and objectives (Chapter 2). After evaluating the results of the potential improvements analysis, a series of transportation system improvements were selected. These recommended improvements are described in Chapter 6.

Transportation System Plan

The Transportation System Plan addresses each mode of transportation and provides an overall implementation program. The street system plan was developed from the forecasting and potential improvement evaluations described above. The bicycle and pedestrian plans were developed based on current usage, land use patterns, and the requirements set forth by the Transportation Planning Rule. The public transportation, air, water, rail, and pipeline plans were developed based on discussions with the owners and operators of those facilities. Chapter 7 details the plan elements for each mode.

Funding Options

The City of Ukiah will need to work with Umatilla County and ODOT to finance new transportation projects over the 20-year planning period. An overview of funding and financing options that might be available to the community are described in Chapter 8.

Recommended Policies and Ordinances

Suggested Comprehensive Plan policies and implementing zoning and subdivision ordinances are included in Chapter 9. These policies and ordinances are intended to support the TSP and satisfy the requirements of the Transportation Planning Rule (TPR).

RELATED DOCUMENTS

The City of Ukiah TSP addresses the regional and rural transportation needs in the City. There are several other documents that address specific transportation elements or areas in Umatilla County that may directly or indirectly impact transportation elements in and around Ukiah.

Other Transportation System Plans Prepared Concurrently with the Ukiah TSP

In addition to the Ukiah TSP, seven small city TSPs were prepared in conjunction with the Umatilla County TSP project. These documents include:

- City of Adams TSP
- City of Athena TSP
- City of Echo TSP
- City of Helix TSP
- City of Pilot Rock TSP
- City of Stanfield TSP
- City of Weston TSP

Other In-Process or Completed Plans

The following references were reviewed for relevance to the City of Ukiah TSP process to ensure compliance with existing applicable plans.

Ukiah Comprehensive Plan

No date of adoption is written for the Ukiah Comprehensive Plan. The Plan does contain an overall Transportation Goal:

To provide and encourage a safe, convenient, and economic transportation system.

Four transportation policies to enact the goal were listed: (1) to encourage Umatilla County to pave County Roads Numbered 275 and 448 within the city limits and maintain the bridge over Camas Creek; (2) to encourage the state of Oregon to repave OR 244 within the city limits; (3) to prioritize the sequence for paving of city streets; and (4) to contract with Umatilla County or the state of Oregon to pave streets within the City when they are doing work in the area.

The Public Facilities element of the Plan also contains a policy that affects transportation system planning in the City. Public facilities and services Policy 3 is:

To develop, maintain, update, and expand police and fire service, streets and sidewalks, water and sewer systems, and storm drains as necessary to provide adequate facilities and services to the community.

Subdivision Ordinance

The Subdivision and Partition Ordinance for the City of Ukiah was revised in 1994 in connection with an update of the Comprehensive Plan. The purpose of this ordinance is to accomplish the orderly development of land, facilitate creation and sales of lots and parcels and insure that needed access, public services and facilities are, or can be, made available to areas proposed for development.

Section 1, General Provisions, contains development and design standards for easements, lots, subdivisions and streets and addresses other improvements and requirements such as water systems, stormwater runoff, sewage systems, open space, street signs, and amendments.

The design standards for streets are primarily found in paragraph (2) of Subsection 1.9 and include regulations for road surfaces, intersection design, design speed, block lengths, crosswalks, street connectivity, and right-of-way widths.

Zoning Ordinance

Some of the many purposes of this ordinance are to: encourage the most appropriate use of property within the City, to stabilize and protect the value of property, lessen traffic congestion, and implement the Comprehensive Plan by facilitating adequate and economical provision for public improvements.

The ordinance contains provisions for use zones, development permits, zoning of annexed areas, conditional uses, variances, mobile home parks, off-street parking and loading, signs, and enforcement. The main features pertaining to transportation are contained in Article 9, Off-Street Parking and Loading. In addition, transportation facilities may be modified or conditioned as part of a conditional use permit.

Umatilla County Comprehensive Plan

The Umatilla County Comprehensive Plan was written in 1983 to meet the statewide requirements for planning. It was last amended in 1987. The plan is broken into three sections: the Introduction; Plan Elements – Findings, Recommended Policies; and the Plan Map. The Plan Elements section is broken into sections dealing with the fourteen goals. This includes a Transportation Element with findings and recommended policies.

Umatilla County Development Code

- The Umatilla County Development Ordinance was adopted in 1983, and last amended in November of 1991. In 1997 this ordinance was recodified and retitled as Chapter 1528 Development Code. The portions of the code most relevant to the Transportation System Plan include sections on off-street parking requirements, driveways, and road standards. Amendments to the development code include road standards for county roads.

Corridor Strategies

Corridor strategies have been prepared for both US 395.

The US 395 corridor is covered in two studies: *the US 395 North (Umatilla-Stanfield) Draft Corridor Strategy* and the *US 395 South (Pendleton-California Border) Corridor Strategy*. The Corridor Strategies were developed to identify projects for the Oregon STIP. Generally, the Corridor Strategies translate the policies of the Oregon Transportation Plan (OTP) into specific actions; describe the functions of each transportation mode, consider tradeoffs, and show how they will be managed; identify and prioritize improvements for all modes of travel; indicate where improvements should be made; resolve any conflicts with local land use ordinances and plans; and establish guidelines for how transportation plans will be implemented.

The US 395 Corridor Strategies contain a corridor overview, which includes population and employment forecasts, highway data such as traffic volumes and pavement conditions and descriptions of other modes of travel (air, rail, bicycle, etc.). The overall corridor strategy is to, “accommodate efficient movement of

through travel, while maintaining environmental integrity, enhancing travel safety and supporting economic development.” The reports set forth objectives that are intended to embody this overall strategy for the corridor, and to set direction and provide guidance for corridor-wide transportation plans and improvements.

Airport Master Plans

The *1986 Hermiston Municipal Airport Master Plan Update* provides a comprehensive analysis of the Hermiston Airport including an inventory of facilities, a discussion of use for a twenty year planning period (ending in 2006), and recommendations for facility improvements. The introduction of the plan also provides a good overview of all the major transportation facilities serving Hermiston and Northeast Oregon.

The primary objective of the *Master Plan Update for Eastern Oregon Regional Airport at Pendleton* was to re-evaluate the recommendations of previous airport planning studies, to determine the long-range requirements for airport development, to identify and assess development alternatives, and to produce an airport development/improvement plan that will yield a safe, efficient, economical, and environmentally acceptable public facility with capacity for future air transport needs of the Eastern Oregon area. When approved by the various local, regional, state, and federal agencies, the Airport Master Plan represents the long-term intentions of all agencies regarding the location and extent of airport improvements. This permits long-range programming and budgeting, reduces lengthy review periods for each project, and provides for orderly and timely development.

Other State Plans

In addition to the ODOT corridor strategy, coordination with the following state plans is required:

- Oregon Transportation Plan (1992)
- Oregon Highway Plan (1991)
- Oregon Bicycle and Pedestrian Plan (1995)
- Oregon Public Transportation Plan (1996)
- Oregon Rail Freight Plan (1994)
- Oregon Rail Passenger Policy and Plan (1992)
- Oregon Traffic Safety Action Plan (1995)
- Oregon Aviation System Plan (in development).

CHAPTER 2: GOALS AND OBJECTIVES

The purpose of the TSP is to provide a guide for Ukiah to meet its transportation goals and objectives. The following goals and objectives were developed from information contained in the City's Comprehensive Plan and reflect public concerns as expressed during public meetings. An overall goal was drawn from the plan, along with more specific goals and objectives. Throughout the planning process, each element of the plan was evaluated against these parameters.

OVERALL TRANSPORTATION GOAL

To provide and encourage a safe, convenient, and economic transportation system.

Goal 1

Preserve the function, capacity, level of service, and safety of the nearby highways.

Objectives

- A. Develop access management standards.
- B. Develop alternative, parallel routes where practical.
- C. Promote alternative modes of transportation.
- D. Promote transportation demand management programs.
- E. Promote transportation system management.
- F. Develop procedures to minimize impacts to and protect transportation facilities, corridors, or sites during the development review process.
- G. Encourage the state of Oregon to repave OR 244 within the city limits.

Goal 2

Ensure that the road system within the City is adequate to meet public needs, including those of the transportation disadvantaged.

Objectives

- A. Meet identified maintenance level of service standards on the county and state highway systems.
- B. Pave city streets, when possible. Provide at minimum graveled streets.
- C. Develop and adhere to a five-year road program for maintenance and improvement of the existing city road system. This includes a prioritization of the sequence of paving city streets.
- D. Review and revise, if necessary, street cross section standards for local, collector, and arterial streets to enhance safety and mobility.

- E Develop access management strategies where needed.
- F Evaluate the need for traffic control devices.
- G Evaluate the safety of the street system and develop plans to mitigate any safety hazards.

Goal 3

Improve coordination among Ukiah and nearby cities, the Oregon Department of Transportation (ODOT), the US Forest Service (USFS), the Federal Highway Administration (FHWA), and the county.

Objectives

- A. Contract with Umatilla County or the state of Oregon to pave streets within the City when they are doing work in the area. Coordinate roadway maintenance and improvements with the state and county, as well.
- B. Cooperate with ODOT in the implementation of the Statewide Transportation Improvement Program (STIP).
- C. Work with county in establishing right-of-way needed for new roads identified in the transportation system plans.
- D. Take advantage of federal and state highway funding programs.
- E. Encourage Umatilla County to pave County Road Nos. 1447 and 1446 within the city limits.
- F. Consider pooling resources with other cities and the county to provide services that benefit areas both in and outside the City.

Goal 4

Increase the use of alternative modes of transportation (walking, bicycling, and public transportation) through improved access, safety, and service.

Objectives

- A. Cooperate with other cities and the county to pursue an inter-city transit service.
- B. Provide sidewalks or shoulders and safe crossings on collectors and arterials.
- C. Explore opportunities for bicycle facilities and coordinate with the county bicycle plan.
- D. Seek Transportation and Growth Management (TGM) and other funding for projects evaluating and improving the environment for alternative modes of transportation.

CHAPTER 3: TRANSPORTATION SYSTEM INVENTORY

As part of the planning process, David Evans and Associates, Inc., conducted an inventory of the existing transportation system in Ukiah. This inventory covered the street system as well as the pedestrian, bikeway, public transportation, rail, air, water, and pipeline systems.

STREET SYSTEM

The most common understanding of transportation is of roadways carrying cars and trucks. Most transportation dollars are devoted to building, maintaining, or planning roads to carry automobiles and trucks. The mobility provided by the personal automobile has resulted in a great reliance on this form of transportation. Likewise, the ability of trucks to carry freight to nearly any destination has greatly increased their use.

Encouraging the use of cars and trucks must be balanced against costs, livability factors, the ability to accommodate other modes of transportation, and negative impacts on adjacent land uses; however, the basis of transportation in nearly all American cities is the roadway system. This trend is clearly seen in the existing Ukiah transportation system, which consists almost entirely of roadway facilities for cars and trucks. Because of the rural nature of the area, the street system will most likely continue to be the basis of the transportation system for at least the 20-year planning period; therefore, the emphasis of this plan is on improving the existing street system for all users.

The existing street system inventory was conducted for all highways, arterial roadways, and collector roadways within Ukiah, as well as those in Umatilla County that are included in the TSP planning area. Inventory elements include:

- Street classification and jurisdiction
- Street width
- Number of travel lanes
- Presence of on-street parking, sidewalks, or bikeways
- Speed limits
- General pavement conditions

Street Classification

The current Comprehensive Plan for the City of Ukiah does not provide functional classifications for the streets within the City. Typically, streets are classified as arterials, collectors or local streets. Based on conditions observed during the field reconnaissance (traffic volumes, street widths, etc.), DEA classified all streets within the City. The classification system includes city, county, and state roadways.

Arterials

Arterials form the primary roadway network within and through a region. They provide a continuous road system, which distributes traffic between cities, neighborhoods and districts. Generally, arterials are high capacity roadways, which high traffic volumes entering or leaving the City.

In Ukiah, there is one street which functions as an arterial: Main Street (OR 244, also called Ukiah - Hilgard Highway). This roadway serves as the focus for most of the commercial development in the City.

Collectors

Collectors serve traffic within the commercial, industrial and residential neighborhood areas. They connect local neighborhoods or districts to the arterial network. Collectors help form part of the grid system; however, they are not intended to function as alternate routes to the arterial system.

Two streets in Ukiah are identified as collectors: Camas Street and Albee Street.

Local Streets

Local streets provide access to all parcels of land and serve travel over relatively short distances. They are designed to carry the very low traffic volumes associated with the local uses that abut them. Through traffic movements are discouraged on local streets.

The local streets in Ukiah are comprised of all streets not classified as either arterials or collectors. Local streets in Ukiah also form part of the grid system.

Street Layout

The majority of the Ukiah streets are positioned in a loose grid pattern. Block sizes vary but are typically 300 feet square. The grid system loses its rigidity on the fringes of the urbanized area. Figure 3-1 shows the roadway functional classification and jurisdiction.

State Highways

Discussion of the Ukiah street system must include the state highways that traverse the planning area. Although Ukiah has no direct control over the state highways, adjacent development and local traffic patterns are heavily influenced by the highways. Ukiah is served by one state highway: OR 244 (Ukiah - Hilgard Highway). This highway serves as the major route through town with commercial and industrial development focused along its corridor.

The 1999 *Oregon Highway Plan* (OHP) classifies the state highway system into four categories (LOI): Interstate, Statewide, Regional, District, and Local Interest. ODOT has established primary and secondary functions for each type of highway and objectives for managing the operations for each one.

Oregon 244 through Ukiah is designated as a highway of district importance. According to the OHP, the primary function of a district highway is to "serve local traffic and land access." For highways of district significance, emphasis is placed on preserving safe and efficient higher speed through travel in rural areas, and moderate- to low-speed operations in urban or urbanizing areas with a moderate to high level of interruptions to flow.

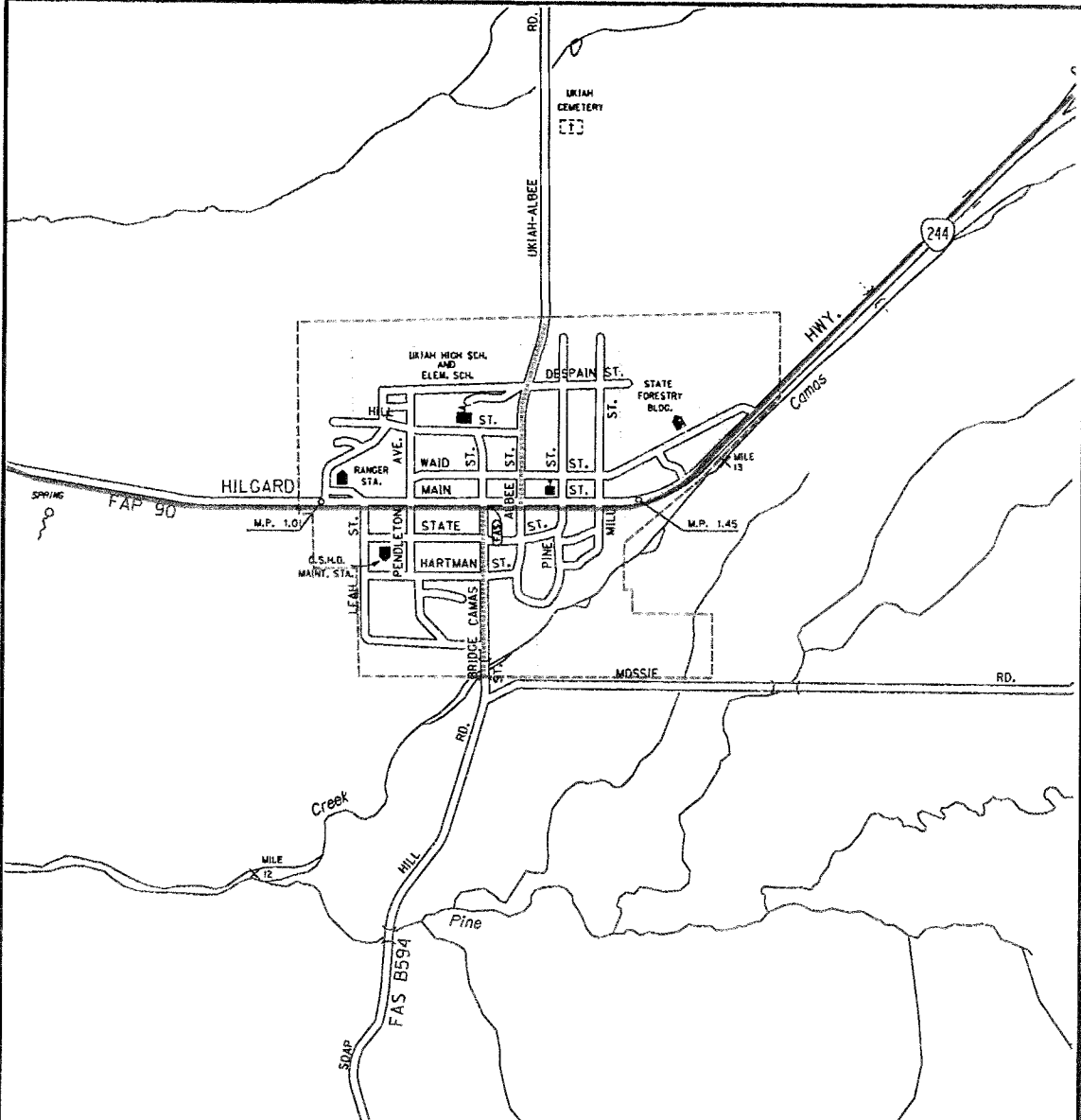
Oregon 244

Oregon 244 (Ukiah - Hilgard Highway) is a highway of district-wide significance, which connects Ukiah with I-84 in Union County. Just west of Ukiah, OR 244 connects with US 395. It is a two-lane roadway with a speed limit of 35 mph within the City of Ukiah. Through the center of Ukiah, the highway extends east-west

LEGEND:

- ARTERIAL
- COLLECTOR

- ==== LOCAL STREET
- - - - URBAN GROWTH BOUNDARY
- CITY LIMITS



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FIGURE 3-1
Roadway Functional Classification -Ukiah

City of Ukiah TSP

along Main Street, and is part of the city's street grid system. Outside Ukiah, the highway is a rural, two-lane highway with a speed limit of 55 mph.

GENERAL PAVEMENT CONDITIONS

City Streets

The ODOT Pavements Unit published a 1994 report entitled, *Pavement Rating Workshop, Non-National Highway System*. This report thoroughly defines the characteristics that pavements must display to be categorized as Very Good and so on. The report also provides color photographs of roadways that display these characteristics, which aids in field investigation and rating of pavement condition. These established guidelines were employed by DEA in conducting a subjective evaluation of pavement condition for all collectors within the City of Ukiah.

An inventory of the City's collectors, conducted by DEA in November 1997, indicated that pavement on Camas Street is in fair condition.

State Highways

The Oregon Department of Transportation's (ODOT's) Pavement Unit surveys the State Highway System on an annual basis. Observed severity levels of certain distress types are used to determine a pavement condition rating score. These scores are used to stratify pavement segments into five condition categories: (1) Very Good, (2) Good, (3) Fair, (4) Poor, and (5) Very Poor. The *Umatilla County Transportation System Plan* briefly defines these condition categories.

According to the 1997 ODOT Pavement Condition Report, the section of OR 244 extending through Ukiah is in good condition.

BRIDGES

The Oregon Department of Transportation maintains an up to date inventory and appraisal of Oregon bridges. Part of this inventory involves the evaluation of three mutually exclusive elements of bridges. One element identifies which bridges are structurally deficient. This is determined based on the condition rating for the deck, superstructure, substructure, or culvert and retaining walls. It may also be based on the appraisal rating of the structural condition or waterway adequacy. Another element identifies which bridges are functionally obsolete. This element is determined based on the appraisal rating for the deck geometry, under clearances, approach roadway alignment, structural condition, or waterway adequacy. The third element summarizes the sufficiency ratings for all bridges. The sufficiency rating is a complex formula which takes into account four separate factors to obtain a numeric value rating the ability of a bridge to service demand. The scale ranges from 0 to 100 with higher ratings indicating optimal conditions and lower ratings indicating insufficiency. Bridges with ratings under 55 may be nearing a structurally deficient condition.

There is one county owned and maintained bridge (bridge #59C646147500027) within the City of Ukiah's city limits on Soap Hill Road at the south end of the city was built in 1984. ODOT's bridge information system indicates that it is structurally sound.

PEDESTRIAN SYSTEM

The most basic transportation option is walking. Walking is the most popular form of exercise in the United States and can be performed by people of all ages and all income levels. However, it is not often considered as a means of travel. Because pedestrian facilities are generally an afterthought, they are not planned as an essential component of the transportation system.

The relatively small size of Ukiah indicates that walking could be employed regularly, weather permitting, to reach a variety of destinations. Encouraging pedestrian activities may not only decrease the use of the personal automobile but may also provide benefits for retail businesses. Where people find it safe, convenient, and pleasant to walk, they may linger and take notice of shops overlooked before. They may also feel inclined to return to renew the pleasant experience time and again.

There are no sidewalks or separate pedestrian paths in the City of Ukiah. The only pedestrian facilities in the City are the painted crosswalks at the intersections of Main Street and Albee Street and at Albee Street and Despain Street.

BIKEWAY SYSTEM

Like pedestrians, bicyclists are often overlooked when considering transportation facilities. Bicycles are not often considered as a serious mode of transportation. However, cycling is a very efficient mode of travel. Bicycles take up little space on the road or parked, do not contribute to air or noise pollution, and offer relatively higher speeds than walking. Because of the small size of Ukiah, a cyclist can travel to any destination in town within a matter of minutes.

Bicycling should be encouraged for short trips in order to reduce some of the negative aspects of urban growth and automobile use. Noise, air pollution, and traffic congestion could be mitigated if more short trips were taken by bicycle or on foot. Typically, a short trip that would be taken by bicycle is around two miles; on foot, the distance commonly walked is around one half mile.

Ukiah currently has no sanctioned bikeways; bicyclists must share the roadways with motorized vehicles. On low volume roadways, such as many of the local streets, bicyclists and automobiles can both safely and easily use the roadway. On higher volume roadways, particularly Main Street, safety for the bicyclists is an important issue.

An impediment to bicycle use is the lack of parking and storage facilities for bikes throughout the City of Ukiah.

PUBLIC TRANSPORTATION

The only intercity bus service in Umatilla County is provided by Greyhound bus lines which provides service along I-84, US 395, and OR 11 within Umatilla County. Greyhound has terminals located in Hermiston and Pendleton that connect these cities to each other and major population centers outside of the county. The Hermiston terminal has two departures heading southeast (with stops in Pendleton, La Grande, Boise, and Salt Lake City); three buses running west to Portland; and two buses heading north on US 395 to Pasco and Spokane daily. The Pendleton terminal has three departures southeast (with stops in La Grande, Boise and Salt Lake City); three departures west to Portland; and two departures north to Seattle via Walla Walla, Pasco, and Spokane daily. The line to Seattle could serve Milton-Freewater as it runs through the City along OR 11.

Pendleton, Hermiston, Pilot Rock, and the Umatilla Indian Reservation have dial-a-ride type transit service available for the transportation disadvantaged. Dial-a-ride service is defined as door-to-door service initiated by a user's request for transportation service from their origins to specific locations on an immediate or advance reservation basis. These services are provided by the Pendleton Senior Center in Pendleton, the Confederated Tribes of the Umatilla Indian Reservation on the Umatilla Indian Reservation, the Hermiston Senior Center in Hermiston, and the Pilot Rock Lions Club in Pilot Rock. A similar kind of service could be appropriate for Ukiah.

Ukiah has no local fixed-route transit service at this time. The small size and low traffic volumes on city streets indicate that mass transit is not necessary or economically feasible at this time. The Transportation Planning Rule exempts cities with a population of less than 25,000 from developing a transit system plan or a transit feasibility study as part of their Transportation System Plans.

RAIL SERVICE

Ukiah has no passenger or freight rail service. Until recently, AMTRAK service was available in Hermiston and Pendleton along the rail line that follows the I-84 corridor from Portland to Boise, Idaho and points east. Amtrak is currently experiencing a funding crisis. As a result, passenger service between Portland and Denver, including service to cities within Umatilla County, was discontinued in May 1997. This line serves only freight traffic now.

The nearest freight line to Ukiah is the Union Pacific main line which runs through Pendleton. There is also a major freight line owned and operated by Union Pacific Railroad, a Class I line-haul freight railroad, which stops in Hermiston. In addition, there is a switch line out of Pendleton which hauls freight from Pilot Rock two to three days per week, and a line between Milton-Freewater and Weston on the Blue Mountain Railroad consisting of one freight train per day (maximum) or some local switching.

AIR SERVICE

The City of Ukiah is served by Eastern Oregon Regional Airport in Pendleton, which is approximately 50 miles north of Ukiah and by Hermiston Municipal Airport, which is approximately 70 miles north-northwest of Ukiah.

Eastern Oregon Regional Airport in Pendleton is a tower-controlled airport with 40,600 annual operations. Passenger service includes 16 scheduled flights per day by Horizon Airlines, with flights to Portland and Seattle. The airfield is also home to 60 locally owned fixed-wing aircraft, four rotor, and eight CH-47 Chinook helicopters with the Oregon Army Air Guard.

The City of Hermiston owns and operates a municipal airport. No commercial flights are available at the present time, but there is charter service available. The Hermiston Municipal Airport is located 1.5 miles from downtown Hermiston and had 12,380 annual operations in 1995. The airport is at an elevation of 641 feet above Mean Sea Level and has one runway which is 4,500 feet long and positioned in a northeast-southwest direction. The airport is often used by businesses such as Simplot, Gilroy Foods, Les Schwab Tires, UPS, and other large organizations such as PGE, Bonneville Power, and the Army Corps of Engineers. There is an agricultural spray operation based at the airport, and local residents also use the airport for recreational purposes.

WATER TRANSPORTATION

Ukiah has no water transportation services. The nearest commercial port is the Port of Umatilla located in the northwest corner of the county along the Columbia River.

CHAPTER 4: CURRENT TRANSPORTATION CONDITIONS

As part of the planning process, the current operating conditions for the transportation system were evaluated. This evaluation focused primarily on street system operating conditions since the automobile is by far the dominant mode of transportation in Ukiah. Census data were examined to determine travel mode distributions. Traffic counts were used to determine how well traffic is currently flowing.

TRAFFIC VOLUMES

Historic traffic volume counts, documented in the *ODOT Traffic Volume Tables*, exist for OR 244 in Ukiah.

Average Daily Traffic

The Average Daily Traffic (ADT) on OR 244 in Ukiah is shown in Figure 4-1. Traffic volumes are highest on OR 244 in the center of town and drop off dramatically east of the urbanized area. Traffic volumes on OR 82 range from 900 vehicles per day (vpd) in the center of town and drop to 440 vpd at the east edge of town. Traffic volumes have been growing at a rate of 5 percent per year since 1990.

The traffic volumes shown on Figure 4-1 and other volume figures are average volumes for the year. Summer is the season when volumes are highest. ODOT data on Highway 395 west of Pilot Rock (the location of the nearest ODOT permanent traffic recorder) indicate that during the summer season, volumes are about 25 percent higher than average volumes.

No other daily or hourly traffic data were available for the city streets in Ukiah, nor were any counts taken. Because the daily volumes on OR 244 in the city were so low (fewer than 1,000 vpd), traffic volumes on the other city streets were expected to be very low, and capacity deficiencies on city streets do not appear to be an issue in Ukiah.

Street Capacity

Transportation engineers have established various standards for measuring traffic capacity of roadways or intersections. Each standard is associated with a particular level of service (LOS). The LOS concept requires consideration of factors that include travel speed, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort and convenience, and operating cost. In the 1991 OHP, levels of service were defined by a letter grade from A-F, with each grade representing a range of volume to capacity (v/c) ratios. A volume to capacity ratio (v/c) is the peak hour traffic volume on a highway divided by the maximum volume that the highway can handle. If traffic volume entering a highway section exceeds the section's capacity, then disruptions in traffic flow will occur, reducing the level of service. LOS A represents relatively free-flowing traffic and LOS F represents conditions where the street system is totally saturated with traffic and movement is very difficult. The 1999 OHP maintains a similar concept for measuring highway performance, but represents LOS by specific v/c ratios to improve clarity and ease of implementation. Table 4-1 presents the level of service criteria and associated range of v/c ratio for arterial and collector roadways.

**TABLE 4-1
LEVEL OF SERVICE CRITERIA FOR ARTERIAL AND COLLECTOR STREETS**

Service Level ⁽¹⁾ (v/c Ratio) ⁽²⁾	Typical Traffic Flow Conditions
A (0.00-0.48)	Relatively free flow of traffic with some stops at signalized or stop sign controlled intersections. Average speeds would be at least 30 miles per hour.
B (0.49-0.59)	Stable traffic flow with slight delays at signalized or stop sign controlled intersections. Average speed would vary between 25 and 30 miles per hour.
C (0.60-0.69)	Stable traffic flow with delays at signalized or stop sign controlled intersections. Delays are greater than at level B but still acceptable to the motorist. The average speeds would vary between 20 and 25 miles per hour.
C-D (0.70-0.73)	
D (0.74-0.83)	Traffic flow would approach unstable operating conditions. Delays at signalized or stop sign controlled intersections would be tolerable and could include waiting through several signal cycles for some motorists. The average speed would vary between 15 and 20 miles per hour.
D-E (0.84-0.87)	
E (0.84-0.97)	Traffic flow would be unstable with congestion and intolerable delays to motorists. The average speed would be approximately 10 to 15 miles per hour.
E-F (0.98-0.99)	
F (\geq 1.00)	Traffic flow would be forced and jammed with stop and go operating conditions and intolerable delays. The average speed would be less than 10 miles per hour.

Source: (1)Transportation Research Board, *1985 Highway Capacity Manual*, Special Report 209. National Research Council.
(2) ODOT, *SIGCAP Users Manual*. ODOT, 1994.

The 1999 *Oregon Highway Plan* (OHP) establishes mobility standards for the state highway system¹. Regional Highways, such as OR 244 should operate at a v/c ratio of 0.80 where the speed limit is less than 45 mph.

The traffic operation was determined at a representative intersection (Camas Street) along OR 244 using the 1985 Highway Capacity Software for unsignalized intersections. This software is based on the 1985 Highway Capacity Manual, Special Report 209, published by the Transportation Research Board. Since all intersecting streets and driveways are controlled by stop signs in the City, the analysis was performed for an unsignalized intersection. The peak hour traffic on the highway was assumed to be 10 percent of the 24-hour ADT volume and the directional split was assumed to be 60/40. Because side street traffic volumes were unavailable, an assumed volume of 30 vph was used and unsignalized intersection level-of-service calculations were made for the intersection. The peak hour operations at the intersection are shown in Table 4-2.


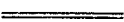




**TABLE 4-2
SUMMARY OF OPERATIONS AT MAIN STREET AND CAMAS STREET**

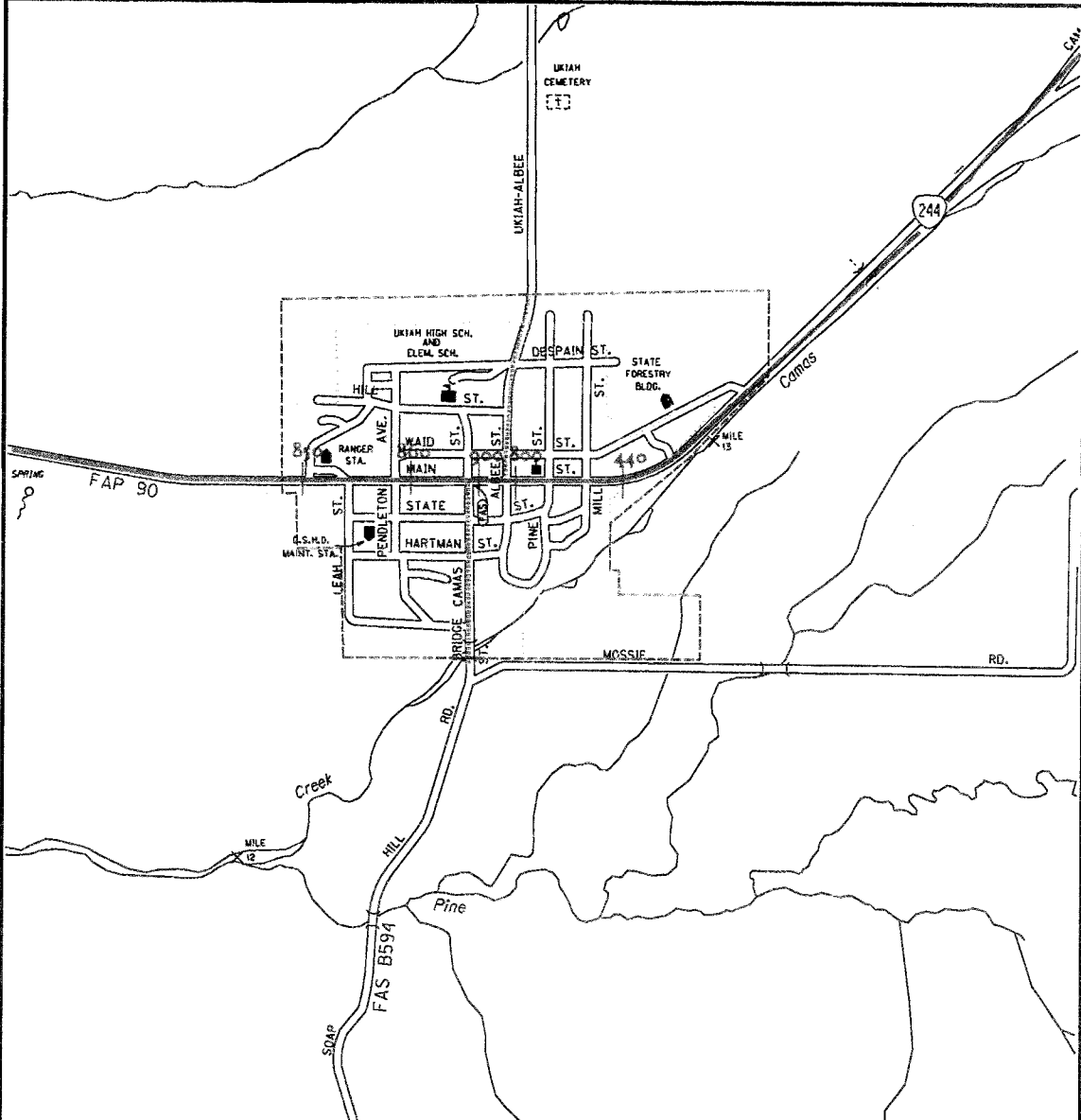
Location	Movement	1996 LOS (v/c)
Main Street and Camas Street	Eastbound; Left	A(<0.48)
	Westbound; Left	A(<0.48)
	Northbound Left, Through, Right	A(<0.48)
	Southbound; Left, Through, Right	A(<0.48)

Note: The level of service is shown for all evaluated movements of the unsignalized intersection.

¹1999 *Oregon Highway Plan*, Table 6. MAXIMUM VOLUME TO CAPACITY RATIOS OUTSIDE METRO.

LEGEND:

	ARTERIAL		LOCAL STREET
	MAJOR COLLECTOR		URBAN GROWTH BOUNDARY
			CITY LIMITS
			1000 AVERAGE DAILY TRAFFIC



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 NORTH
 (Not to Scale)

FIGURE 4-1
1996 Average Daily Two-Way Traffic Volumes -Ukiah
 City of Ukiah TSP

In general, the intersection currently operates very well. Traffic on the highway flows smoothly and the left turn movements to Camas Street operate at LOS A. The northbound and southbound left, through and right turns from Camas Street to OR 244 also operate at LOS A. These left turn movement levels of service correlate to maximum v/c ratios of less than 0.48.

TRANSPORTATION DEMAND MANAGEMENT MEASURES

In addition to inventorying the transportation facilities in Ukiah, an inventory was performed of any Transportation Demand Management (TDM) strategies that may currently be in place. TDM strategies are designed to relieve congestion on the street system by spreading peak hour traffic over a longer period of time, encouraging the use of alternative modes of transportation (i.e. sidewalks, bike lanes, public transit), and encouraging the single car driver to ride with others through local carpool programs. Other than the sidewalk and bicycle facilities that exist in Ukiah, no formal TDM strategies exist in the City.

This following sections briefly describe two elements that may impact future transportation demand management decisions in the City: 1) distribution of departure time to work, and 2) distribution of travel modes.

Alternative Work Schedules

One way to maximize the use of the existing transportation system is to spread peak traffic demand over several hours instead of a single hour. Statistics from the 1990 Census show the spread of departure to work times over a 24-hour period (see Table 4-3). Approximately 47 percent of the total employees (those not working at home) depart for work between 6:00 and 7:00 a.m. Another 32 percent depart in the hour after the peak. Therefore, approximately 80 percent of all morning commute trips occur between 6:00 a.m. and 8:00 a.m.

**TABLE 4-3
DEPARTURE TO WORK DISTRIBUTION**

Departure Time	1990 Census	
	Trips	Percent
12:00 a.m. to 4:59 a.m.	6	6.8%
5:00 a.m. to 5:59 a.m.	7	7.9%
6:00 a.m. to 6:59 a.m.	42	47.2%
7:00 a.m. to 7:59 a.m.	28	31.5%
8:00 a.m. to 8:59 a.m.	2	2.2%
9:00 a.m. to 9:59 a.m.	0	0%
10:00 a.m. to 10:59 a.m.	2	2.2%
11:00 a.m. to 11:59 a.m.	0	0%
12:00 p.m. to 3:59 p.m.	2	2.2%
4:00 p.m. to 11:59 p.m.	0	0%
Total	89	100.0%

Source: US Bureau of Census.

Assuming an average nine-hour workday, the corresponding afternoon peak can be determined for work trips. Using this methodology, the peak work travel hour would occur between 3:00 and 4:00 p.m., which corresponds with the peak hour of activity measured for traffic volumes.

Travel Mode Distribution

Although the automobile is the primary mode of travel for most residents in the Ukiah area, some other modes are used as well. Modal split data is not available for all types of trips. The 1990 Census statistics that were reported for journey to work trips are shown in Table 4-4 and reflect the predominant use of the automobile in this area.

In 1990, 66.3 percent of all trips to work were in a private vehicle (auto, van, or truck). Trips in single-occupancy vehicles made-up 49.2 percent of these trips, and carpooling accounted for 50.8 percent. The number of carpoolers is extremely high compared to the statewide average of 12 percent.

The 1990 census data indicated that bicycles were not utilized for transportation. Since the census data do not include trips to school or other non-work activities, overall bicycle usage may be greater. None of the City of Ukiah's roadways include dedicated bicycle lanes. Dedicated bicycle lanes can encourage bicycle commuting, as can other facilities such as bicycle parking, showers, and locker facilities.

Pedestrian activity was extremely high accounting for 27.4 percent of trips to work in 1990. (Statewide, 4.2 percent of trips to work were on foot.) The high amount of walking is probably due to the fact that most of the City is within a few minutes walk of the city center. However, pedestrian facilities are very limited in Ukiah. There are no sidewalks and many streets are gravel. The census data indicated that approximately 60 percent of the travel time to work was less than 10 minutes. Again, the census data only report trips to work; trips to school or other non-work activities are not included.

TABLE 4-4
JOURNEY TO WORK TRIPS

Trip Type	1990 Census	
	Trips	Percent
Private Vehicle	63	66.3%
<i>Drove Alone</i>	31	49.2%
<i>Carpooled</i>	32	50.8%
Public Transportation	0	0%
Motorcycle	0	0%
Bicycle	0	0%
Walk	26	27.4%
Other	0	0%
Work at Home	6	6.3%
Total	95	100.0%

Source: US Bureau of Census.

ACCIDENT ANALYSIS

The Oregon Department of Transportation (ODOT) collects detailed accident information on an annual basis along OR 244 within Umatilla County. However, no accident rate information exists for the Ukiah urban

area (MP 1.01 to MP 1.45) for the three-year period analyzed from January 1, 1994 to December 31, 1996; nor does it exist as far back as 1988.

Historic

There were no ODOT coded accidents within the Ukiah city limits during the three-year period analyzed.

CHAPTER 5: TRAVEL FORECASTS

The traffic volume forecasts for Umatilla County and its municipalities are based on historic growth of the state highway system taking into account historic and projected population growth. Forecasts were only prepared for the state highway system in the county, since the volumes on these roadways are much higher than on any of the county roads.

LAND USE

Land use and population growth plays an important part in projecting future traffic volumes. Population forecasts were developed to help determine future transportation needs since the amount of growth and where it occurs will affect traffic and transportation facilities in the study area. The population analysis presented here is not intended to provide a complete economic forecast or housing analysis, and it should not be used for any purpose other than that for which it was designed.

The population projections for Umatilla County are based on historic growth rates, the original population and employment forecasts made by the State of Oregon Office of Economic Analysis (OEA), and a recent study¹ identifying new economically-driven factors that will result in a higher population total than what was initially projected in the DEA forecast.

Historic and projected population estimates for Umatilla County, Ukiah, and seven other cities in the county are summarized in Table 5-1. Factors that will affect the future growth rates of the county and incorporated cities include employment opportunities, available land area for development, and community efforts to manage growth.

**TABLE 5-1
UMATILLA COUNTY POPULATION TRENDS**

	1970 ¹	1980 ¹	1990 ¹	1996 ¹ Estimate	2017 ² Projected
Umatilla County	44,923	58,855	59,249	65,500	80,073
Incorporated Cities					
Ukiah	NA	249	250	280	340
Adams	219	240	223	260	310
Athena	872	965	997	1,105	1,360
Echo	479	624	499	530	660
Helix	152	155	150	185	230
Pilot Rock	1,612	1,630	1,478	1,570	1,650
Stanfield	891	1,568	1,568	1,755	2,490
Weston	660	719	606	680	730

Sources:

- 1) Portland State University Center for Population Research and Census.
- 2) The population forecast shown for the county has been officially adopted, however there is no official breakdown in population for the incorporated cities in the county. The projected population numbers shown for the eight cities are based on the initial OEA forecast, solely for the purpose of producing travel forecasts for these cities.

¹ *Umatilla County Population Analysis*, December 16, 1998, produced by David Evans and Associates, Inc.

Umatilla County recently worked with the OEA to increase the official population projections for the county. Even though higher estimates have been adopted for the county than were used for the forecasting in this document, the new estimates will not impact travel projections for the TSP. This is because travel forecasts are based primarily on historic traffic levels taking into account population and land use. The difference between the original estimates and new official estimates is not great enough to impact travel projections.

A detailed description of existing and future land use projections, including the methodology and data sources used, is contained in the Umatilla County Population Analysis located in Appendix C. This appendix contains both the original estimates of the OEA and the new official estimates for the county.

As mentioned, Umatilla County has adopted new population estimates for the county as a whole. The new estimates have been disaggregated to determine how much growth is likely to occur in each *city*.

Historic and Projected Growth

The population of Umatilla County has grown since the 1970s, with significantly slower growth in the 1980s, reflecting a general slowdown in the state's economy. Ukiah's population remained the same between 1980 and 1990 (Ukiah was incorporated after 1970, so there is no Census data available before 1980).

Estimated at 65,500 in 1997, the population of Umatilla County has grown relatively rapidly since the 1990 Census, with an average annual growth rate of 1.44 percent. Most of the jurisdictions in Umatilla County have grown at a healthy rate, comparable to the annual growth rate of 1.44 percent for the county overall. Ukiah saw little growth between 1980 and 1990; only one person was added in that 10 year period. But since 1990, Ukiah has grown at a slightly faster rate than the county as a whole, with an average growth rate of 1.9 percent per year since 1990. This growth trend is expected to continue in Ukiah, although at a slower rate that is similar to the County's projected average annual growth rate. Ukiah is projected to grow at an average growth rate of 1.0 percent, which will increase its population to 340 people by 2017, an increase of 60 people from 1996.

Factors Affecting Population Growth in Umatilla County

Umatilla County is expected to experience population gains for the next 20 years. Like much of rural Oregon, the economy of Umatilla County remains largely seasonal, with nearly one-quarter of all employment agriculture-based. Therefore, population increases are difficult to predict, and are not likely to be as stable as the forecasts appear to imply.

The State Office of Economic Analysis prepared long-term population projections by county. Based on these projections, preliminary population forecasts for the jurisdictions of Adams, Athena, Echo, Helix, Pilot Rock, Stanfield, Ukiah, and Weston were developed in five-year increments. (See Umatilla County Population Discussion – Appendix C.)

An *ad hoc* HUES (Hermiston, Umatilla, Echo, and Stanfield) Impact Planning Group was formed in early 1997 to lead cooperative efforts to address growth concerns in western Umatilla County arising from four major employers locating or expanding in the region. The HUES Growth Impact Study, conducted by the Benkendorf Associates Corporation, Hobson Johnson & Associates, and Martin Davis Consulting, quantifies the impact of the construction and operation of these four facilities. Employment impacts are translated into household and population impacts, and desegregated across the four HUES communities, Pendleton, and rural Umatilla County.

Of these four employers (the Two Rivers Correctional Institution, the Umatilla Chemical Agent Disposal Facility, the Union Pacific Railroad Hinkle Locomotive Shop, and the Wal-Mart Distribution Center and Truck Maintenance Facility), only one (the Wal-Mart Distribution Center) had been announced and incorporated in the long-range population and employment forecast prepared by the Office of Economic Analysis. Because the Umatilla County site was selected as the location for the Wal-Mart Distribution Center in 1994, its impacts were already incorporated in the Office of Economic Analysis long-term population and employment forecast. Applying the HUES methodology, DEA subtracted out the impact of the Wal-Mart Distribution Center, in order to identify the population impacts resulting from the three “big four” employers otherwise not accounted for in the OEA forecast. These estimated impacts were then applied to the original population forecasts for Echo and Stanfield.

As mentioned earlier, Umatilla County has concluded work with the OEA to revise the state’s official population estimates for the county to account for the impact of the major employers. The new projections would be higher than those initially estimated by the OEA, but are not different enough to require any revisions to travel projections.

Population forecasts for the jurisdictions of Adams, Athena, Echo, Helix, Pilot Rock, Stanfield, Ukiah, and Weston were developed in five-year increments, based on the initial OEA population forecast. This was done only for the purpose of producing the future traffic forecast and should not be used for anything other than the intended purpose.

Overall, Umatilla County is expected to experience healthy rates of population growth, averaging nearly 1 percent annually over the planning horizon. The western portion of Umatilla County is expected to grow faster than the rest of Umatilla County, fueled by the four major employers.

TRAFFIC VOLUMES

Traffic volume projections for the year 2018 are based on historic growth trends of highway volumes taking into account current and future land use projections.

Historic

Before projecting future traffic growth, it is important to examine past growth trends on the Ukiah roadway system. Historic data are only available for the state highway system in Ukiah; however, these roadways carry far more traffic than any other roads in the City. The Oregon Department of Transportation (ODOT) collects traffic count data on the state highways (rural and urban sections) every year at the same locations. These counts have been conducted at five locations on OR 244 (Ukiah-Hilgard Highway) in Ukiah.

Historical growth trends on OR 244 in and around Ukiah were established using the average annual daily traffic (AADT) volume information presented in the ODOT Traffic Volume Tables for the years 1976 through 1996. The AADT volumes were obtained for each of these years at selected locations along the highway. Using a linear regression analysis of the average AADT volumes between 1976 and 1996, an average annual growth rate was determined. Table 5-2 summarizes the historic average growth rate on each of these sections.

**TABLE 5-2
HISTORIC TRAFFIC GROWTH RATES ON STATE HIGHWAYS**

Highway Section	Average Annual Growth Rate 1976-1996	Total Growth 1976-1996
OR 244 (Ukiah-Hilgard Highway)		
Rural section- US 395 to Ukiah	1.32%	30.0%
Ukiah- 0.01 miles east of Pendleton Street	1.26%	28.3%
Ukiah- 0.01 miles east of Camas Street	1.41%	32.4%
Ukiah- 0.01 miles east of Albee Street	1.71%	40.4%
Rural section- Ukiah to Union County line	1.48%	34.0%

Source: ODOT 1976-1996 Transportation Volume Tables; information compiled by DEA.

Based on volumes from ODOT's annual count locations over the 20-year period from 1976 to 1996, the average annual growth rate on US 395 in Ukiah has ranged from approximately 1.3 to 1.7 percent per year. On the rural section of the highway west of Ukiah, traffic has been growing at a rate of approximately 1.3 percent per year. East of Ukiah to the county line, traffic has been growing at a rate of nearly 1.5 percent per year. The increase in the number of trips over the 20-year period considered is highest in Ukiah and lowest east of Ukiah. The higher growth rate east of Ukiah is somewhat misleading since this location experienced the smallest net increase in the number of trips; however, this location has experienced low traffic volumes so the small increase in trips resulted in a higher percentage of the location's base year trips.

Traffic growth on OR 244 in Ukiah averaged 1.71 percent per year over the last 20 years. Population growth during the same period averaged 0.74 percent per year. Ukiah experienced a growth spurt between 1990 and 1996 where population growth averaged 1.9 percent per year (the result of an increase of 30 residents over the six years). Traffic volumes on the highway grew at 3.0 percent per year during that period.

Future Traffic Volumes

Based on the official OEA estimates for the county, the population in Ukiah is forecast to grow at a rate of 1 percent per year over the next 20 years. It was decided that the most appropriate growth rate to project future traffic is that rate which was calculated from the historic traffic growth and not those rates that were calculated from the historic and future population forecasts. Using the same linear regression analysis used to calculate the historic growth rate of traffic, forecasts were made for the years 1996 through 2018. Traffic volumes are expected to grow at a rate of 1.71 percent per year (45 percent by the year 2018) to 1,250 vpd on the highway east of Pendleton Street. This estimate is consistent with the traffic forecasts in the *Corridor Strategy of US 395 South (Pendleton-California Border)*.

It is important to note that using the historical growth trends assumes that future traffic patterns will remain consistent with historical patterns, without consideration of future planned developments. The forecast future traffic volumes and total growth from 1996 to 2018 are shown in Table 5-3.

**TABLE 5-3
FORECAST TRAFFIC VOLUMES AND TOTAL GROWTH ON STATE HIGHWAYS**

Location	1996 ADT (vehicles/day)	2018 ADT (vehicles/day)	Total Growth 1996-2018
OR 244			
Ukiah- 0.01 miles east of Pendleton Street	860	1,250	45.3%
Ukiah- 0.01 miles east of Camas Street	900	1,305	45.0%
Ukiah- 0.01 miles east of Albee Street	800	1,160	45.0%

Source: ODOT 1976-1996 Transportation Volume Tables; information compiled by DEA.

HIGHWAY SYSTEM CAPACITY

For the year 2018, unsignalized intersection analyses were performed using the overall growth (45 percent) expected on OR 244 at the same intersection in Ukiah for which the existing conditions were analyzed. The analyses indicated that all three intersections are expected to exceed ODOT level of service standards over the 20-year forecast period. The results of the unsignalized intersection analyses are shown in Table 5-4. Traffic operations were determined at the intersection using the 1985 Highway Capacity Software for unsignalized intersections. This software is based on the 1985 *Highway Capacity Manual*, Special Report 209, published by the Transportation Research Board.

Analysis Results

Traffic movement volumes at the intersection of Main Street and Camas Street are forecast to increase by 45 percent over the 20-year forecast period. However, all traffic movements at the intersection are expected to continue to operate at LOS A throughout the 20-year forecast period.

**TABLE 5-4
SUMMARY OF OPERATIONS AT MAIN STREET AND CAMAS STREET**

Location	Movement	1996 LOS	2018 LOS
Main Street and Camas Street	Eastbound; Left	A	A
	Westbound; Left	A	A
	Northbound Left, Through, Right	A	A
	Southbound; Left, Through, Right	A	A

Note: The level of service is shown for all evaluated movements of the unsignalized intersection.

CHAPTER 6: IMPROVEMENT OPTIONS ANALYSIS

As required by the Oregon Transportation Planning Rule (TPR), transportation alternatives were formulated and evaluated for the Ukiah Transportation System Plan (TSP). These potential improvements were developed with input from the TAC, Management Team and city officials, and the public. Each of the transportation system improvement options was developed to address specific deficiencies, access, or safety concerns and attempt to address the concerns specified in the goals and objectives (Chapter 2).

The following list includes all of the potential transportation system improvements considered. Improvement options two and three are illustrated in Figure 6-1.

1. Revise zoning code to allow and encourage mixed-use development and redevelopment.
2. Extend Mill Street north for planned residential development.
3. Implement speed control measures along OR 244 (Main Street).
4. Implement transportation demand management strategies.

The proposed transportation system improvements evaluated for the Ukiah TSP include state highway, county, and local road projects. **It should be noted that not all of the transportation improvement options recommended along the county and state systems have identified funding. Therefore, recommended transportation improvements cannot be considered as committed projects, but are subject to the County's and ODOT's abilities to meet these current and future needs financially.**

EVALUATION CRITERIA

The evaluation of the potential transportation improvements in the City of Ukiah was based on a qualitative review of four factors: 1) safety; 2) access; 3) environmental factors, such as air quality, noise, and water quality; and 4) socioeconomic and land use impacts, such as community livability, right-of-way requirements and impacts on adjacent lands.

A fifth factor in the evaluation of the potential transportation improvements was cost. Costs were estimated in 1998 dollars based on preliminary alignments for each potential transportation system improvement.

IMPROVEMENT OPTIONS EVALUATION

Through the transportation analysis and input provided from the public involvement program, multiple improvement projects were identified.

Option 1. Revise Zoning Code To Allow And Encourage Mixed-Use Development And Redevelopment

One of the goals of the Oregon TPR is to reduce the reliance on the automobile. One way city jurisdictions can do this is through amendments in zoning and development codes to permit mixed-use developments and increases in density in certain areas. Mixed-use refers to development that contains more than one type of land-use, e.g., residential and commercial. Specific amendments would allow small-scale commercial uses within residential zones or residential uses within commercial zones. Such code amendments can encourage residents to walk and bicycle throughout the community by providing shorter travel distances between land uses.

These code revisions are more effective in medium to large sized cities with populations of 25,000 and over, and in cities such as Ukiah, they may not be appropriate. Because of Ukiah's size, the decision of what mode of transportation to use when making a trip inside the City is not influenced by distance. The longest distance between city limit boundaries in Ukiah is around 1/2 mile, a distance short enough to walk, ride a bike, or drive. Distances between different land uses, such as residential and commercial, are even shorter.

Increasing density may have some effect on development in Ukiah. Population is projected to increase by 21 percent (60 additional residents) in the next 20 years.

No direct costs are associated with making the zoning code amendments.

Revisions to zoning and development codes to allow for increased density are recommended.

Option 2. Extend Mill Street North For Planned Residential Development

This project involves extending Mill Street 100 feet north to provide access to a planned four-lot residential development. The roadway will be 36 feet in width to provide two lanes of travel and on-street parking on both sides of the road. At this time, the City does not have the funding to extend Mill Street using an asphalt overlay. Therefore, it will be gravel based, similar to the existing section of Mill Street.

The area of the residential development is within the Urban Growth Boundary but not within the city limits. Therefore, in order for Mill Street to be extended as a city road, the City will need to incorporate this area into the city limits. The City will need to work with the county.

The estimated cost for this project is around \$2,250. This assumes a unit cost of \$22.50 per linear foot to construct a 36 foot wide gravel road with a 6 inches of base aggregate. This does not include the costs associated with annexing property into the city limits.

This option is recommended.

Option 3. Implement Speed Control Measures Along OR 244 (Main Street)

A problem with vehicles speeding along OR 244 (Main Street) through town has been identified by residents in Ukiah. They believe measures should be used to ensure that cars and trucks obey the posted speed limit of 35 mph within the Urban Growth Boundary.

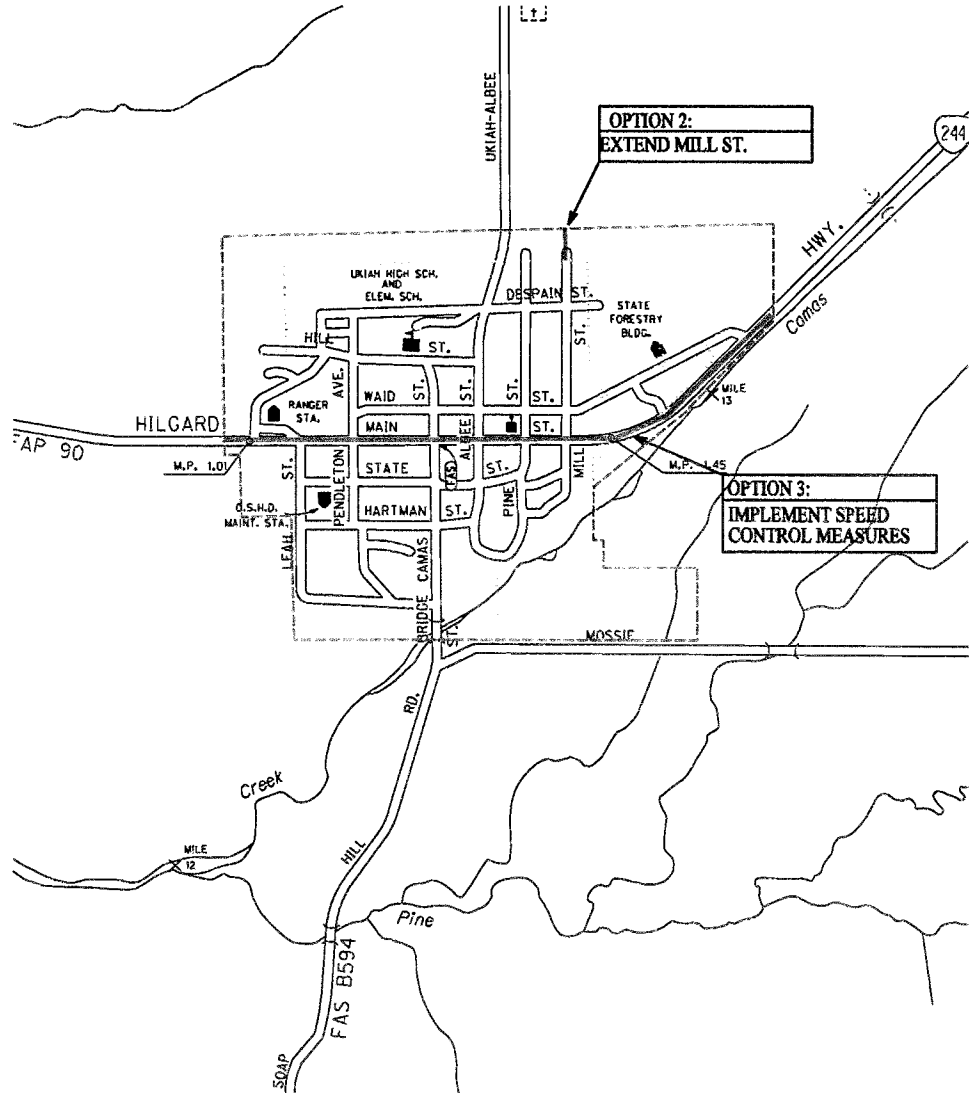
Research has been done by David Evans and Associates, Inc., to identify and assess different methods of speed control along rural highways such as OR 244. A technical memorandum is located in Appendix D which identifies and describes different speed control measures in detail. A number of these measures may be useful in Ukiah. The use of a speed detector trailer with a traffic-activated sign may be effective. By using radar, a message sign can indicate when drivers are traveling too fast and also indicate to the driver to slow down. The use of a speed detector trailer was recommended in the Grant County TSP for various cities in the county. The City of Ukiah may look into the purchase and shared usage of one of these trailers with those cities in Grant County who also have a common interest. The total cost for a traffic activated sign, radar, and trailer is estimated to be \$10,000 to \$11,000.

Other speed control measures include enforcement through the local authorities, the addition of vertical elements along the roadway such as trees and landscaping, and the use of pavement markings to provide narrower lane widths or to stripe for bike lanes.

LEGEND:

----- POTENTIAL IMPROVEMENT

----- URBAN GROWTH BOUNDARY
 - - - - - CITY LIMITS



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FIGURE 6-1

Potential Transportation System Improvements -Ukiah

City of Ukiah TSP

The City should consider the speed control measures described here and look into the use of other measures outlined in the technical memorandum.

This option is recommended.

Option 4. Implement Transportation Demand Management Strategies

Transportation demand management (TDM) strategies change the demand on the transportation system by providing facilities for modes of transportation other than single occupant passenger vehicles, implementing carpooling programs, altering work shift schedules, and applying other transportation measures within the community. The TPR recommends that cities evaluate TDM measures as part of their TSP.

TDM strategies are most effective in large, urban cities; however, some strategies can still be useful in small cities such as Ukiah. For example, staggering work shift schedules at local businesses may not be appropriate in Ukiah since there are no large employers in the area. However, provisions for alternative modes of transportation, such as sidewalks and bike lanes, and implementing a county-wide carpooling program can be beneficial for residents of the City.

Ukiah can implement TDM strategies by requiring all future street improvement projects to include the addition of some sort of pedestrian facility, such as new sidewalks or walkways, which will effectively separate pedestrians from motorized traffic. All new street improvement projects should also consider bicycle lanes as well.

Implementing a local carpool program that only serves Ukiah would not be effective due to the City's geographical size and people living and working in different locations. However, a county-wide carpool program is feasible. Residents who live in Ukiah and residents who live in other cities and rural areas should be encouraged to carpool with a fellow coworker or someone who works in the same area.

Although the primary goal of these measures is to reduce the number of vehicle trips made within the City, especially during peak periods, street capacity for automobiles and trucks is generally not an issue in Ukiah. At the same time, providing adequate facilities for pedestrians and bicyclists increases the livability of a city, and improves traffic and pedestrian safety. With more emphasis on walking or biking in the City, conditions such as air quality and noise levels would be improved as well. Therefore, this option is recommended.

Costs associated with implementing TDM strategies were not determined.

SUMMARY

Table 6-1 summarizes the recommendations of the street system modal plan based on the evaluation process described in this chapter. Chapter 7 discusses how these improvement options fit into the modal plans for the Ukiah area.

**TABLE 6-1
TRANSPORTATION IMPROVEMENT OPTIONS: RECOMMENDATION SUMMARY**

Option	Recommendation
1. Revise zoning code to allow and encourage mixed-use development and redevelopment	• Implement
2. Extend Mill Street north for planned residential development	• Implement
3. Implement speed control measures along OR 244 (Main Street)	• Implement
4. Implement transportation demand management strategies	• Implement

CHAPTER 7: TRANSPORTATION SYSTEM PLAN

The purpose of this chapter is to provide detailed operational plans for each of the transportation systems within the community. The Ukiah Transportation System Plan (TSP) covers all the transportation modes that exist and are interconnected throughout the urban area. Components of the TSP include street classification standards, access management recommendations, transportation demand management measures, modal plans, and a system plan implementation program.

STREET DESIGN STANDARDS

Street design standards ensure the design of a roadway supports its intended function. The function is determined by operational characteristics such as traffic volume, operating speed, safety, and capacity. Street standards institute design parameters necessary to provide a community with roadways that are relatively safe, aesthetic, and easy to administer when new roadways are planned or constructed. They are based on experience, and policies and publications of the profession.

Existing Street Standards

Existing roadway development standards for the City of Ukiah include requirements for minimum right-of-way and minimum pavement widths for arterial, collector, local streets, and alleys. However, the required widths vary according to two types of areas; residential and business-industrial. Table 7-1 presents the existing street standards.

**TABLE 7-1
EXISTING STREET DESIGN STANDARDS**

	Minimum Right-of-Way Width (in feet)	Minimum Pavement Width (in feet)
RESIDENTIAL		
Arterial	80	44
Collector	60	40
Local Street	50	28
Alleys	20	none given
BUSINESS-INDUSTRIAL		
Arterial	80	52
Collector	80	48
Local Street	60	40
Alleys	20	none given

Current standards for cul-de-sac streets include a maximum street length of 400 feet with a turnaround. Minimum street width is not specified.

There are no designated bikeway or pedestrian requirements.

The City has no existing street classification linking the above street design standards to existing roadways.

Recommended Street Standards

The development of the Ukiah TSP provides the City with an opportunity to review and revise street design standards to more closely fit with the functional street classification, and the goals and objectives of the TSP. The recommended street standards for all types of functional street classifications system are shown graphically in Figure 7-1 through Figure 7-4. The recommended street design standards shall apply to all new roadway construction and to the existing roadways identified in the functional street classification map in Chapter 3 (Figure 3-1).

Since the Ukiah TSP includes all land within the Urban Growth Boundary (UGB), the recommended street standards should be applied in the outlying areas outside the city limits and within the UGB as well. Although these outlying areas may presently have a rural appearance, these lands will ultimately be part of the urban area. Retrofitting rural streets in these areas as well as all rural streets within the city limits to urban standards in the future is expensive and controversial; it is more efficient to build them to an acceptable urban standard.

**TABLE 7-2
RECOMMENDED STREET DESIGN STANDARDS**

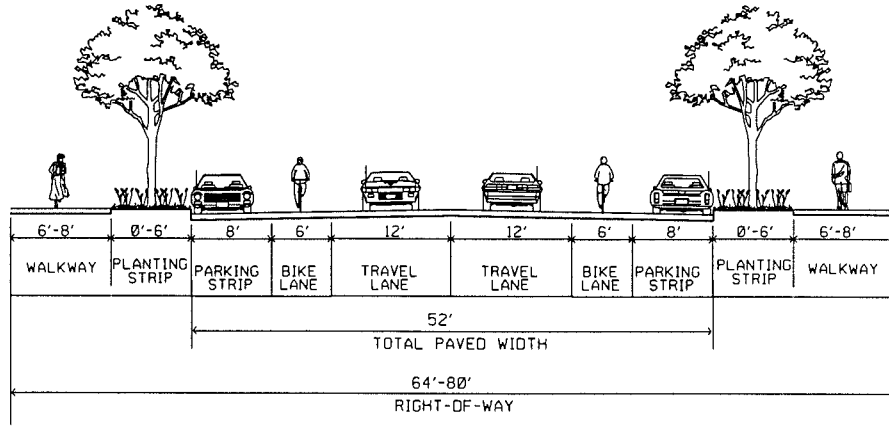
Classification	Pavement Width	Right-of-Way Width	Min. Posted Speed
Local – Option 1	20 ft.	44-50 ft.*	15-25 mph
Local – Option 2	23-24 ft.	47-50 ft.*	15-25 mph
Local – Option 3	28 ft.	38-50 ft.*	15-25 mph
Alley	10-12 ft.	16-20 ft.	15 mph
Collector	36 ft.	46-60 ft.	25-35 mph
Arterial	52 ft.	64-80 ft.	25-45 mph

* without planting strip or walk Right-of-Way width shall be 40–50 ft.

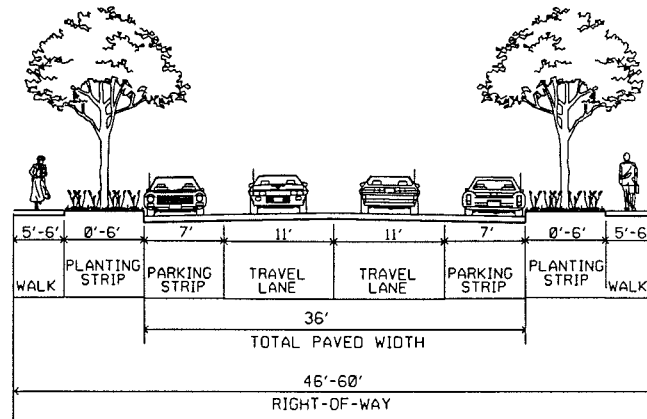
Sidewalks shall be provided on arterial streets and should be included on all urban streets as an important component of the pedestrian system, unless the cost of sidewalks are excessively disproportionate to the need or probable use. Ideally, sidewalks should be buffered from the street by a planting strip to eliminate obstructions in the walkway, provide a more pleasing design, and provide a buffer from traffic. When sidewalks are located directly adjacent to the curb, they can include such impediments as mailboxes, street light, and sign poles, which reduce the effective width of the walk. To maintain a safe and convenient walkway for at least two adults, a 5 foot sidewalk should be used in residential areas.

Residential Streets

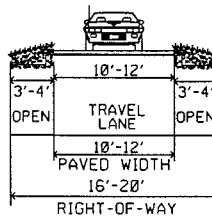
The design of a residential street affects its traffic operation, safety, and livability. The residential street should be designed to enhance the livability of the neighborhood while accommodating less than 1,200 vehicles per day. Design speeds should be 15 to 25 mph. When traffic volumes exceed approximately 1,000 to 1,200 vehicles per day, the residents on that street will perceive the traffic as a noise and safety problem. To maintain neighborhoods, local residential streets should be designed to encourage low speed travel and to discourage through traffic. Narrower streets discourage speeding and through traffic as well as improve neighborhood aesthetics. They also reduce right-of-way needs, construction costs, stormwater run-off, and the need to clear vegetation.



Arterial Roads



Collector Roads



Alley

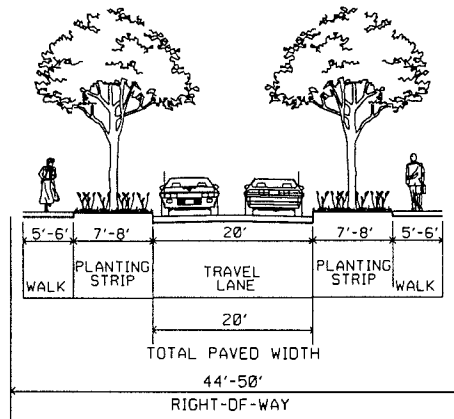
FIGURE 7-1

Street Standards Arterial, Collector and Alley Roadways

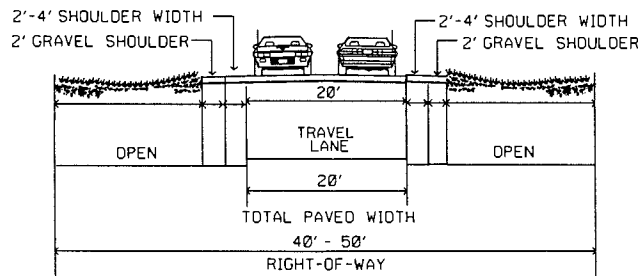
City of Ukiah TSP

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(Not to Scale)



Local Option 1



Local Option 1 (without planting strip and walk)

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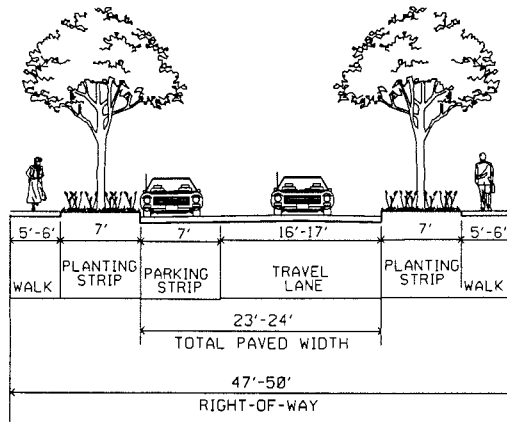


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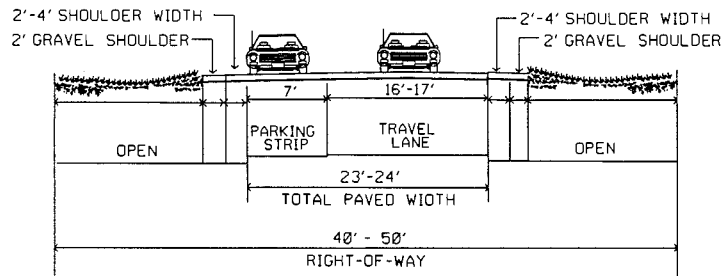
FIGURE 7-2

Street Standards
 Local Option 1 Roadways

City of Ukiah TSP



Local Option 2



Local Option 2 (without planting strip and walk)

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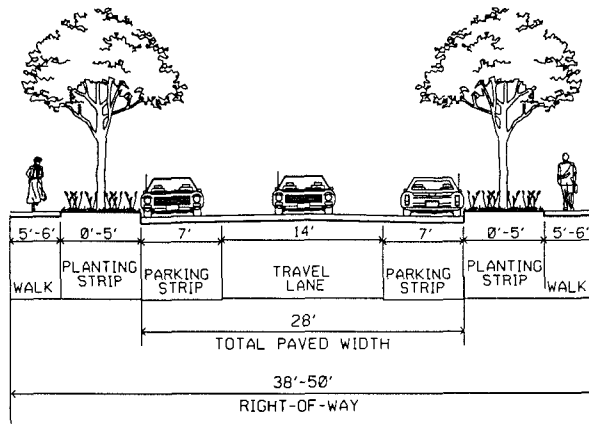


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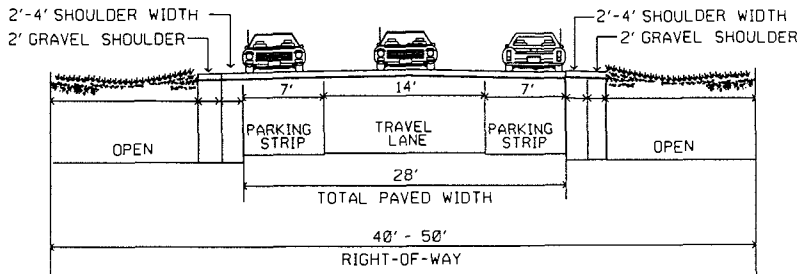
FIGURE 7-3

Street Standards
 Local Option 2 Roadways

City of Ukiah TSP



Local Option 3



Local Option 3 (without planting strip and walk)

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(Not to Scale)

FIGURE 7-4

Street Standards
 Local Option 3 Roadways

City of Ukiah TSP

Local Street

Three recommended street standard options are provided for residential streets, as shown in Figures 7-2, 7-3, and 7-4. Each option provides a minimum of 20 feet of pavement or gravel surface and provides varying degrees of on-street parking. The City should choose one of these options for each residential street based on the existing right-of-way and neighborhood character.

Option 1

This first option for a local street is a 20 foot paved roadway surface within a 44 to 50 foot right-of-way. This standard will accommodate passage of one lane of moving traffic in each direction. Five to six foot sidewalks and seven to eight foot planting strips should be provided on each side of the roadway. The planting strips may be graded to accommodate parking in appropriate locations. Local Option 1 without planting strips or sidewalks provides a 20-foot paved or gravel roadway surface within a 50-foot right-of-way.

Option 2

This option provides a 23 to 24 foot paved roadway surface within a 47 to 50 foot right-of-way. This standard will accommodate passage of one lane of moving traffic, with a seven foot paved parking strip on one side. Five to six foot sidewalks and seven foot planting strips should be provided on each side of the roadway. Local Option 2 without planting strips or sidewalks provides a 23 to 24 foot paved or gravel roadway surface within a 50-foot right-of-way.

Option 3

A third option for a local street provides a 28 foot paved roadway within a 38 to 50 foot right-of-way. This standard will accommodate passage of one lane of moving traffic, with paved parking present along both sides of the road. Five to six-foot sidewalks should be provided on both sides of the roadway and an optional planting strip is also included. Local Option 3 without planting strips or sidewalks provides a 28-foot paved or gravel roadway surface within a 50-foot right-of-way.

Alleys

Alleys can be a useful way to diminish street width by providing rear access and parking to residential, commercial, and industrial areas. Including alleys in a residential subdivision allows homes to be placed closer to the street and eliminates the need for garages to be the dominant architectural feature. This pattern, once common, has been recently revived as a way to build better neighborhoods. In addition, alleys can be useful in commercial and industrial areas, allowing access by delivery trucks off the main streets. Alleys should be encouraged in the urban area of Ukiah. Alleys should be 10 to 12 feet wide, with a 16 to 20 foot right-of-way (see Figure 7-1).

Cul-de-Sac Streets

Cul-de-sac, or "dead-end" residential streets are intended to serve only the adjacent land in residential neighborhoods. These streets should be short (less than 400 feet long) and serve a maximum of 20 single-family houses. Because the streets are short and the traffic volumes relatively low, the street width can be narrower than a standard residential street, allowing for the passage of two lanes of traffic when no vehicles are parked at the curb and one lane of traffic when vehicles are parked at the curb.

Because cul-de-sac streets limit street and neighborhood connectivity, they should only be used where topographical or other environmental constraints prevent street connections. Where cul-de-sacs must be used, pedestrian and bicycle connections to adjacent cul-de-sacs or through-streets should be included.

Collector Streets

Collectors are intended to carry between 1,200 and 10,000 vehicles per day, including limited through-traffic, at a design speed of 25 to 35 mph. A collector can serve residential, commercial, industrial, or mixed land uses. Collectors are primarily intended to serve local access needs of residential neighborhoods by connecting local streets to arterials. Bike lanes are typically not needed in smaller cities like Ukiah due to slower traffic speeds and low traffic volumes. The recommended street standard provided for collectors, is shown in Figure 7-1. This recommended standard provides one lane of moving traffic in each direction plus parking on both sides and can also be striped to provide two travel lanes plus left-turn lanes at intersections or driveways by removing parking for short distances. Five to six-foot sidewalks should be provided on each side of the roadway. A planting strip has been included with a width of zero to seven feet.

Arterial Streets

Arterial streets form the primary roadway network within and through a region. They provide a continuous roadway system that distributes traffic between different neighborhoods and districts. Generally, arterial streets are high capacity roadways that carry high traffic volumes with minimal localized activity. Design speeds should be between 25 and 45 mph (see Figure 7-1). The recommended design standard for arterial streets provides a 52-foot paved surface within an 64 to 80-foot right-of-way to allow for two 12-foot travel lanes, two six-foot bike lanes, and two eight-foot parking lanes. The bike lanes should be striped between the parking lane and the travel lane. Six to eight-foot walkways and zero to six-foot planting strips are also included.

Bike Lanes

In cases where a bikeway is proposed within the street right-of-way, 5 to 6 feet of roadway pavement should be striped on each side of the street and reserved for bike lanes. The striping should be done in conformance with the *State Bicycle and Pedestrian Plan* (1995). In cases where curb parking will exist with a bike lane, the bike lane will be located between the parking and travel lanes. In some situations, curb parking may have to be removed to permit a bike lane.

Bikeways should be added when a new street is built or improvements are made to existing streets.

On arterial and collector streets that are not scheduled to be improved as part of the street system plan, bike lanes may be added to the existing roadway to encourage cycling, or when forecast traffic volumes exceed 2,500 to 3,000 vehicles per day. The striping of bike lanes on streets that lead directly to schools should be high priority.

Sidewalks

A complete pedestrian system should be implemented in the urban portion of Ukiah. Every urban street should have sidewalks on both sides of the roadway as shown on the cross sections in Figure 7-1 through Figure 7-4. Sidewalks on residential streets should be at least 5 feet wide. In addition, pedestrian and bicycle connections should be provided between any cul-de-sac or other dead-end streets.

Another essential component of the sidewalk system is street crossings. Intersections must be designed to provide safe and comfortable crossing opportunities. Tools to accomplish this include crosswalks, signal timing (to ensure adequate crossing time) when traffic signals are present, and other enhancements such as curb extensions, which are used to decrease pedestrian crossing distance and act as traffic calming measures.

Curb Parking Restrictions

Curb parking should be prohibited at least 25 feet from the end of an intersection curb return to provide adequate sight distance at street crossings.

Street Connectivity

Street connectivity is important because a well-connected street system provides more capacity and better traffic circulation than a disconnected one. Developing a grid system of relatively short blocks can minimize excessive volumes of motor vehicles along roads by providing a series of equally attractive or restrictive travel options. Short block sizes also benefit pedestrians and bicyclists by shortening travel distances and making travel more convenient. The average block size within the City's grid system is between 275 and 525 feet square, which is an ideal block size. To ensure that this pattern of development continues into the future, a maximum block perimeter of 1,250 feet is recommended, as stated in the City's existing Comprehensive Plan. This feature is critical to Ukiah's continued livability.

ACCESS MANAGEMENT

Access management is an important tool for maintaining a transportation system. Too many access points along arterial streets lead to an increased number of potential conflict points between vehicles entering and exiting driveways and through vehicles on the arterial streets. This leads to not only increased vehicle delay and deterioration in the level of service on the arterial, but also a reduction in safety. Research has shown a direct correlation between the number of access points and collision rates. Experience throughout the United States has also shown that a well-developed access plan for a street system can minimize local cost for additional capacity and/or access improvements along unmanaged roadways. Therefore, it is essential that all levels of government maintain the efficiency of existing arterial streets through better access management.

The TPR defines access management as measures regulating access to streets, roads and highways from public roads and private driveways and requires that new connections to arterials and state highways be consistent with designated access management categories. As the city of Ukiah continues to develop, the arterial/collector/local street system will become more heavily used and relied upon for a variety of travel needs. As such, it will become increasingly important to manage access on the existing and future arterial/collector street system as new development occurs.

One objective of the Ukiah TSP is to develop an access management policy that maintains and enhances the integrity (capacity, safety, and level-of-service) of the city's streets. Too many access points along a street can contribute to a deterioration of its safety, and on some streets, can interfere with efficient traffic flow.

Access Management Techniques

The number of access points to an arterial can be restricted through the following techniques:

- Restrictions on spacing between access points (driveways) based on the type of development and the speed along the arterial.
- Sharing of access points between adjacent properties.
- Providing access via collector or local streets where possible.
- Constructing frontage roads to separate local traffic from through-traffic.
- Providing service drives to prevent spill-over of vehicle queues onto the adjoining roadways.
- Providing acceleration, deceleration, and right-turn only lanes.
- Offsetting driveways to produce T-intersections to minimize the number of conflict points between traffic using the driveways and through traffic.
- Installing median barriers to control conflicts associated with left-turn movements.
- Installing barriers to the property along the arterial to restrict access width to a minimum.

Recommended Access Management Standards

Access management is hierarchical, ranging from complete access control on freeways to increasing use of streets for access purposes to including parking and loading at the local and minor collector level. Table 7-3 describes recommended general access management guidelines by roadway functional classification.

**TABLE 7-3
RECOMMENDED ACCESS MANAGEMENT STANDARDS**

Functional Classification	Intersections			
	Public Road		Private Drive ⁽²⁾	
	Type ⁽¹⁾	Spacing	Type	Spacing
Arterial				
Ukiah-Hilgard Highway (OR 244) ⁽³⁾	See Access Management Spacing Standards,			
Other Arterial Streets Within the UGB	Appendix C of the 1999 Oregon Highway Plan			
Collector ⁽⁴⁾				
Albee Street (County Road No. 1447)	At-grade	250 ft.	L/R Turns	100 ft.
Camas Street (County Road No. 1475)				
Residential Street	At-grade	250 ft.	L/R Turns	Access to Each Lot
Alley (Urban)	At-grade	100 ft.	L/R Turns	Access to Each Lot

Notes:

- (1) For most roadways, at-grade crossings are appropriate.
- (2) Allowed moves and spacing requirements may be more restrictive than those shown to optimize capacity and safety. Also see the section below on "Access Control Rights" along state highways.
- (3) See section on Special Transportation Area below.
- (4) Some sections of these roads are designated as residential streets, where the residential access management standard applies.

Application

The access management standards above apply mainly to new development accesses. They are not intended to eliminate existing intersections or driveways. It is important to note, however, that existing developments and legal accesses on the transportation network will not be affected by the recommended access management techniques until either a land use action is proposed, a safety or capacity deficiency is identified that requires specific mitigation, a specific access management strategy/plan is developed, existing properties along the highway are redeveloped, or a major construction project is initiated on the street.

To summarize, access management strategies consist of managing the number of access points and providing traffic and facility improvements. The solution is a balanced, comprehensive system that provides reasonable access while maintaining the safety and efficiency of traffic movement.

State Highways

Access management is important to promoting safe and efficient travel for both local and long distance users along the Ukiah-Hilgard Highway in Ukiah. The *1999 Oregon Highway Plan* (OHP) specifies access management spacing standards and policies for state facilities. The OHP establishes guidelines to be applied when making access management decisions. Future developments on state highways (zone changes, Comprehensive Plan amendments, redevelopment, and/or new development) will be required to meet the 1999 OHP.

Although Ukiah may designate state highways as arterial roadways within their transportation system, the access management categories for these facilities should generally follow the guidelines of the *1999 Oregon Highway Plan*. This section of the TSP describes the state highway access categories and specific roadway segments where special access areas may apply.

The Ukiah-Hilgard Highway through Ukiah is categorized in the 1999 Oregon Highway Plan as a District Highway. Access management to district highways is to provide for safe and efficient medium speed and medium to high volume traffic movements.

Additional property frontage along the state highway does not guarantee that additional approach roads will be allowed. Proposed land use actions that do not comply with the designated access spacing policy will be required to apply for an access variance from the City of Ukiah and/or ODOT. In addition, according to the 1991 OHP, the impact in traffic generation from a proposed change in land use or new development must allow for a level of service (LOS) "D" to be maintained within the development's influence area along the highway. The influence area is defined as the area in which the average daily traffic is increased by 10 percent or more by a single development, or 500 feet in each direction from the property-line of the development, whichever is greater.

A conditional access permit may be issued by ODOT and the City of Ukiah for a single connection to a property that cannot be accessed in a manner that is consistent with the spacing standards. These conditions typically apply to properties that either have no reasonable access or cannot obtain reasonable alternative access to the public road system. The permit should carry a condition that the access may be closed at such time that reasonable access becomes available to a local public street. In addition, approval of a conditional permit might require ODOT-approved turning movement design standards to ensure safety and managed access. Under special circumstances, ODOT may be required to purchase property in order to prevent safety conflicts.

ACCESS CONTROL RIGHTS

Historically, owners of property abutting public roadways have enjoyed a common law abutter's right of access to the roadway. However, in order to provide for a transportation system that would accommodate changing public needs, legislation has been passed to modify the rights of access. Oregon Revised Statutes specify among other property rights, the right of access can be purchased or condemned as deemed necessary for rights-of-way. ODOT has purchased access control rights from many properties along state highways.

Once the state has acquired the access rights to a property, road approach permits can only be issued at locations on the property where the right of access has been reserved. These "reservations of access" give the property owner the common law right of access to the state highway only at specific locations and they are clearly identified in the deed where the property owner sold the right of way to the state. If the owner wants to gain additional access rights to the highway, they must apply for a "grant" of access.

There may be local street connections shown in this Transportation System Plan that will require modifying the existing access rights or gaining additional access rights to the state highway system. Review of this TSP by ODOT does not imply tacit approval to modify or grant additional access rights. This must be accomplished by applying to ODOT for such modification or grant.

An "indenture of access" is used to modify existing access rights such as moving or widening the reservation or lifting other restrictions that may have been placed on it. A "grant of access" is required to gain an additional access point to the highway and, depending on the circumstances, may require payment to the state for the market value of the grant. Application for both the indenture and grant of access is made to local ODOT district office.

Special Transportation Area

The Ukiah-Hilgard Highway is categorized as a District Highway in the Oregon Highway Plan. The primary function of District Highways is to provide connections and links to inter-community movements. They also serve local access and traffic. In urban areas the access management objective is to provide the highest and safest performance operation consistent with the identified function of the roadway. Access management for district urban highways recognizes the balanced demands of traffic movement and access needs.

To assist in implementing state access management standards and policies, the 1999 Oregon Highway Plan also recognizes that state highways serve as main streets of many communities, such as downtown Ukiah. Shorter block lengths and a well-developed grid system are important to a downtown area, along with convenient and safe pedestrian facilities. In general, downtown commercial arterial streets typically have blocks 200 to 400 feet long, driveway access sometimes as close as 100-foot intervals and occasionally, signals may be spaced as close as every 400 feet. The streets in downtown areas must have sidewalks and crosswalks, along with on-street parking. The need to maintain these typical downtown characteristics must be carefully considered along with the need to maintain the safe and efficient movement of through traffic. The Oregon Highway Plan recognizes the main street function through the designation of Special Transportation Areas (STAs). Special Transportation Area

A Special Transportation Area (STA) is a designation that may be applied to a state highway, when a downtown, business district or community center straddles the state highway within a community's urban growth boundary. The primary objective of an STA is to provide access to community activities, businesses and residences, and to accommodate pedestrian, and bicycle movements along and across the highway in a compact central business district. An STA designation will allow reduced mobility standards, accommodate existing public street spacing and compact development patterns, and enhance opportunities to provide improvements for pedestrians and bicyclists in the downtown area.

Access management in STAs corresponds to the existing city block for public road connections and discourages private driveways. However, where driveways are allowed and land use patterns permit, the minimum spacing for driveways is 175 feet or mid-block if the current city block spacing is less than 350 feet. In addition, the need for local access outweighs the consideration of maintaining highway mobility within a STA. The maximum volume to capacity ratio for state highways increases in a STA.

In Ukiah, the area along Main Street between Leah Street and Mill Street exemplifies the design features of a historic downtown. Within this five-block segment, buildings are spaced close together, parking is on street, and the posted speed limit is 35 m.p.h. The compact development pattern qualifies this area for a STA highway segment designation.

Upon adoption of the TSP by the Ukiah City Council and a finding of compliance with the Oregon Highway Plan, the City of Ukiah and ODOT Region 5 may jointly designate this segment of OR 244 as an STA through a Memorandum of Understanding (MOU). The MOU will incorporate by reference the TSP and the following STA Management Plan provisions.

Special Transportation Area Management Plan

The Ukiah STA is located on the portion of Ukiah-Hilgard Highway No. 341 routed on Main Street between the intersections of Leah Street (milepoint 1.07) and Mill Street (milepoint 1.40), which is located completely within the urban growth boundary and city limits of the City of Ukiah.

The primary objective of the Ukiah STA is to provide access to community activities, businesses and residences, and to accommodate pedestrian, and bicycle movements along and across the highway in the city's central business district.

The designation of a STA in Ukiah is intended to accommodate the existing public street spacing and compact development pattern. Specific access management conditions for the Ukiah STA on OR 244 include:

- a) Minimum spacing for public road connections at the current city block spacing of 300 feet.
- b) Public road connections are preferred over private driveways. Private driveways are discouraged in an STA.
- c) Where land use patterns permit, ODOT will work with the City and property owners to identify appropriate access to adjacent property owners within the STA.
- d) Where a right to access exists, access will be allowed to property at less than the designated spacing standard only if the property does not have reasonable alternative. If possible, other options should be considered, such as joint access.
- e) Where a right to access exists, the number of driveways to a single property shall be limited to one. ODOT will work with the City and property owners if additional driveways are necessary to accommodate and service the traffic to the property, and will not interfere with driver expectancy and the safety of through traffic on the highway.
- f) Driveways shall be located where they do not create undue interference or hazard to the free movement of normal highway or pedestrian traffic. Locations in areas of restricted sight distance or at points that interfere with the placement and proper functioning of traffic control signs, lighting or other devices that affect traffic operation will not be permitted.
- g) If a property is landlocked (no reasonable alternative exists) because a driveway cannot be safely constructed and operated and all other alternatives have been explored and rejected, ODOT might be required to purchase the property. However, if a hardship is self-inflicted, such as by partitioning or subdividing a property, ODOT has no responsibility for purchasing the property.

Today, traffic on the state highway operates at LOS A, which correlates to maximum volume to capacity ratio of 0.48. Increase in traffic volumes over the 20 year projection period will not impact the level-of-service (LOS) or meet the maximum volume to capacity ratio of 0.80 for OR 244 within the city's urban growth boundary.

To maintain highway mobility through a STA in Ukiah, land use development decisions (within the urban growth boundary) shall not cause traffic flow to exceed a volume to capacity ratio of 0.80. The posted speed limit in the STA is currently and will remain at 35 miles per hour as allowed by state statute in a business district. Parallel parking is permitted in the STA, provided minimum sight distance requirements are met for all public road connections and private driveways. Parking in this area is adequate at this time. No signals or traffic control devices currently exist in this area. No changes are contemplated.

The designation of a STA in Ukiah further identifies the need to accommodate pedestrian, and bicycle movements along and across the highway in the compact central business district. The recommended urban arterial standard within the STA consists of a 64 to 80-foot right-of-way with a paved width of 52 feet that includes two 12-foot travel lanes with a 6-foot bike lane and an 8-foot parking strip on each side of the road.

The standard includes a 6–8 foot walkway on each side of the road and a planting strip of 0-6 feet depending on the width of the walkway. To accommodate pedestrian movements along the highway, sidewalks should be installed within the STA and extended to Pendleton and Pine Streets, as recommended in the TSP.

Another essential component to accommodate pedestrians in a STA is street crossings. There are no specific crosswalk enhancements or safety improvements recommended within the STA at this time. Future improvements and modifications to the highway within the STA and within the curb line, or if no regular established curb, to the r/w utilized for highway purposes will be made in accordance with the Oregon Highway Design Manual and with ODOT approval.

Existing maintenance and operational strategies along OR 244 will be employed within the STA, consistent with Oregon Revised Statute 373.020, as follows:

ODOT shall be responsible for the ongoing maintenance of: a) the roadway surface between curbs, or if no regular established curb, to that portion of right-of-way utilized for highway purposes b) painting centerline stripe, c) designated school crosswalk delineation, directional and regulatory signs except those signs described as the City's responsibility and d) plowing snow one blade-width of centerline stripe provided there are no conflicts with utilities.

City shall be responsible for the on going maintenance of: a) storm sewer system, b) sidewalks, c) landscaping, d) luminaries, e) U-turn signs, parking signs, and street name signs, f) painting parking-stripes and other pavement delineation not described as ODOT's responsibility, and g) snow removal from parking strip.

Future improvements and modifications to the highway within the STA will include maintenance and operational strategies with ODOT and City approval.

MODAL PLANS

The Ukiah modal plans have been formulated using information collected and analyzed through a physical inventory, forecasts, goals and objectives, and input from area residents. The plans consider transportation system needs for Ukiah during the next 20 years assuming the growth projections discussed in Chapter 5. The timing for individual improvements will be guided by the changes in land use patterns, growth of the population in future years, and available funds. Specific projects and improvement schedules may need to be adjusted depending on when and where growth occurs in Ukiah.

Street System Plan

The street system plan recommends any changes necessary to the current street classification system and outlines a series of improvements that are recommended for construction within the City of Ukiah during the next 20 years. These options have been discussed in Chapter 6 (Improvement Options Analysis). Projects that make up the proposed street system plan are summarized in Table 7-4.

Street System Functional Classification

Street system functional classifications relate the design of a roadway to its function. The function is determined by operational characteristics such as travel demand, street capacity, and the operating speed of

the roadway. DEA classified all streets within the Urban Growth Boundary as either arterial, collector, or local streets. A review of the existing street system inventory, the recommended street design standards, and all new projects recommended in the street system plan indicates no changes are necessary at this time to the existing roadway functional classification. Therefore, the existing street classification will be maintained as shown in Figure 3-1 and described as follows:

- Ukiah-Hilgard Highway (Main Street) – classified as an arterial roadway, as it is a District Highway, it carries the highest traffic volumes through the City, and it is the primary route to other cities in the county and state.
- Camas Street (Main Street to south UGB) – classified as a collector street, as its function is to connect local neighborhoods with the Ukiah-Hilgard Highway.
- Albee Street (Main Street to north UGB) – classified as a collector street, as its function is to connect local neighborhoods with the Ukiah-Hilgard Highway.
- All other roads – classified as local streets.

Street Improvement Projects

Table 7-4 presents street improvement projects within the urban area that compose the street system plan. Prioritization of these projects is at the discretion of the City and/or county, depending upon jurisdiction over the project. The county roadway project along Ukiah Road was not included in the project list since this project falls outside the city limits and Urban Growth Boundary and outside the jurisdiction of the City.

It should be noted that the inclusion of a project in the TSP does not constitute a commitment by ODOT or the county that either agency will participate in the funding of the project. ODOT’s participation will be determined via the biennial updates of the multi-year STIP process, and the construction of any project is contingent upon the availability of future revenues. The county’s participation will be according to project prioritization as indicated in the Capital Improvement Plan, and contingent upon available funding.

**TABLE 7-4
RECOMMENDED STREET SYSTEM PROJECTS**

Project Number	Location/Description	Cost
1.	Extend Mill Street north for planned residential development	\$2,250
2.	Implement speed control measures along OR 244 (Main Street) – Radar detector trailer	\$10,000
Total		\$12,250

Pedestrian System Plan

A complete, interconnected pedestrian system should be implemented in the City when feasible. A sidewalk inventory revealed that there are no existing sidewalks in the City. Every paved street should have sidewalks on both sides of the roadway, to meet the recommended street standards, except in extenuating circumstances. Continuous pedestrian access on walkways should be provided between businesses, parks, and adjacent neighborhoods. (Ordinances specifying these requirements are included in Chapter 9.)

Because of the small size of Ukiah and the limited public resources available for transportation system improvements, sidewalk construction on a large scale may not be feasible. However, the City should require sidewalks to be constructed as part of any major roadway improvements, or as adjacent land is developed.

The primary goal of establishing a pedestrian system is to improve pedestrian safety; however, an effective sidewalk system has several qualitative benefits as well. Providing adequate pedestrian facilities increases the livability of a city. When pedestrians can walk on a sidewalk, separated from vehicular street traffic, it makes the walking experience more enjoyable and may encourage walking, rather than driving, for short trips. Sidewalks enliven a downtown and encourage leisurely strolling and window shopping in commercial areas. This "main street" effect improves business for downtown merchants and provides opportunities for friendly interaction among residents. It may also have an appeal to tourists as an inviting place to stop and walk around.

The cost to construct a concrete sidewalk facility is approximately \$30 per linear foot. This assumes a sidewalk width of 5 feet with curbing. The cost estimate also assumes the sidewalks are composed of 4 inches of concrete and 6 inches of aggregate. As an alternative, asphalt walkways could be provided instead of a concrete sidewalk at a lower initial cost. Construction costs for this type of facility are typically about 40 percent of the costs for concrete sidewalks; however, maintenance, such as sealing and resurfacing the asphalt, must occur more frequently.

All new sidewalk construction in the City should include curb cuts for wheelchairs at every street corner to comply with the Americans with Disabilities Act (ADA). The addition of crosswalks should also be considered at all major intersections. As improvements are made to the existing street system, projects involving the construction of new sidewalks may require implementation of on-street parking in place of parking on grass or gravel shoulders.

The following is a list of specific pedestrian improvements that may be needed over the next 20-years. The implementation program identifies an approximate schedule for these improvements. (See Figure 7-5).

- Phase 1 - City Park (Main Street) Provide a sidewalk on both sides of the road between Camas and Albee Street along Main Street and between Main Street and State Street along Camas Street and Albee Street adjacent to the City Park. This is a high priority project (for the next 0-5 years) and, at an approximate length of 1200 feet, is expected to cost \$80,000.
- Phase 2 - Dorm to School (Pendleton Avenue and Hill Street) and Albee Street Provide a sidewalk between the School Dormitory on Pendleton Avenue (south of State Street) and the Ukiah School on Hill Street. Provide a sidewalk along Alba Street between Main Street and Dispain Street. This a medium priority project (for the next 5-10 years) and, at a approximate length of 2,400 feet, is expected to cost \$ 160,000.
- Phase 3 - Main Street (Highway 244) Provide a sidewalk on both sides of Main Street from Pendleton Street to Pine Street. The newly constructed sidewalk would be at least 5 feet wide and approximately 1,800 feet in length (doubled to include both sides of the road). This project will cost around \$320,000 including storm drain improvements and roadway surface restoration. This is a medium priority project (for the next 5-20 years).

Bicycle System Plan

On the collector and local streets in Ukiah, bicyclists share normal vehicle lanes with motorists. Due to low travel speeds and traffic volumes observed in the City, shared usage of the roadway between bicyclists and automobiles is appropriate.

At the present time, conditions along the Ukiah-Hilgard Highway and where the highway becomes Main Street through town, allow bicyclists to safely share the roadway with auto traffic. The posted speed limit along the highway is 35 mph within the city limits and traffic volumes are low at around 440 to 900 vehicles per day (vpd). With traffic volumes expected to reach a maximum of 1,305 vpd by the year 2018, an exclusive bikeway facility along the highway is not critical.

Bicycle parking is lacking in Ukiah. Bike racks should be installed in front of downtown businesses and all public facilities (schools, post office, library, city hall, and parks). Typical rack designs cost about \$50 per bike plus installation. An annual budget of approximately \$1,500 to \$2,000 should be established so that Ukiah can begin to place racks where needs are identified and to respond to requests for racks at specific locations. Bicycle parking requirements are further addressed in Chapter 9 (Policies and Ordinances).

Transportation Demand Management Plan

Through transportation demand management (TDM), peak travel demands can be reduced or spread over time to more efficiently use the existing transportation system, rather than building new or wider roadways. Techniques that have been successful and could be initiated to help alleviate some traffic congestion include carpooling and vanpooling, alternative work schedules, bicycle and pedestrian facilities, and programs focused on high density employment areas.

In Ukiah, because traffic volumes are low, capacity of the local street system is not an issue. Therefore, implementing TDM strategies may not be practical in most cases. However, the sidewalk and bicycle improvements recommended earlier in this chapter are also considered TDM strategies. By providing these facilities, the City of Ukiah is encouraging people to travel by modes other than the automobile.

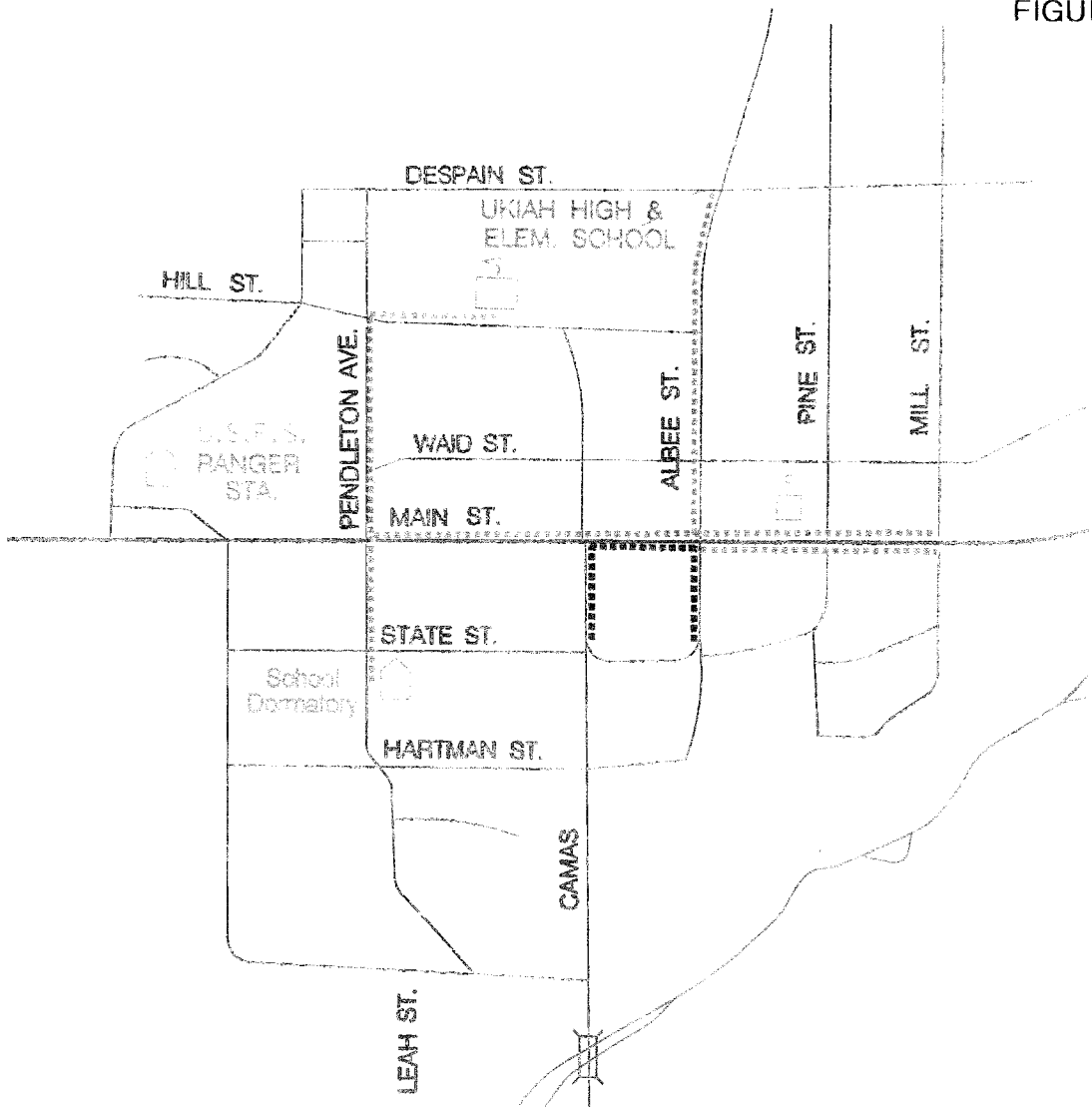
Because intercity commuting is a factor in Umatilla County, residents who live in Ukiah and work in other cities should be encouraged to carpool with a coworker or someone who works in the same area. Implementing a local carpool program in Ukiah alone is not practical because of the City's small size; however, a county-wide carpool program is feasible. The City of Ukiah should support state and county carpooling and vanpooling programs that could further boost carpooling ridership.

No costs have been estimated for the TDM plan. Grants may be available to set up programs; other aspects of transportation demand management can be encouraged through ordinances and policy.

Public Transportation Plan

As described in Chapter 3, the only intercity bus service in Umatilla County is provided by Greyhound bus lines which provides service along I-84, US 395, and OR 11 within Umatilla County. Greyhound has terminals located in Hermiston and Pendleton which connect these cities to each other and major population centers outside of the county. The Hermiston terminal has two departures heading southeast (with stops in Pendleton, La Grande, Boise, and Salt Lake City); three buses running west to Portland; and two buses heading north on US 395 to Pasco and Spokane daily. The Pendleton terminal has three departures

FIGURE 7-5



Sidewalk Improvement Projects (proposed funding source)

Phase 1 - City Park (Umatilla County Bike-Ped Funds)

Phase 2 - Dorm to School, Albee St (ODOT Bike-Ped Funds)

Phase 3 - Main Street (Funding not Identified)



Proposed Sidewalk Improvement Projects

City of Ukiah

**Oregon Dept. of Transportation, REGION 5
SEPTEMBER 12, 2001**

southeast (with stops in La Grande, Boise and Salt Lake City); three departures west to Portland; and two departures north to Seattle via Walla Walla, Pasco, and Spokane daily.

Because of the small size of Ukiah, ridership demand is not high enough for Greyhound bus lines to feasibly provide service to the City. Bus service may be provided in the future to the City of Milton-Freewater, but Ukiah is located almost equidistant to Milton-Freewater as it is to the City of Pendleton, where service is already provided.

Although Pendleton, Hermiston, Pilot Rock, and the Umatilla Indian Reservation have dial-a-ride type service available for the transportation disadvantaged, it is not available in Ukiah at this time. Dial-a-ride service is defined as door-to-door service initiated by a user's request for transportation service from his/her origin to specific locations on an immediate or advance reservation basis. These services are provided by the Pendleton Senior Center in Pendleton, the Confederated Tribes of the Umatilla Indian Reservation on the Umatilla Indian Reservation, the Hermiston Senior Center in Hermiston, and the Pilot Rock Lions Club in Pilot Rock. A similar kind of service could be appropriate for Ukiah.

Ukiah has no local fixed-route transit service at this time. The small size and low traffic volumes on city streets indicate that mass transit is not necessary or economically feasible at this time. The Transportation Planning Rule exempts cities with a population of less than 25,000 from developing a transit system plan or a transit feasibility study as part of their TSPs,

Rail Service Plan

Ukiah has no passenger or freight rail service. Until recently, Amtrak service was available in Hermiston and Pendleton along the rail line that follows the I-84 corridor from Portland to Boise, Idaho and points east. Amtrak is currently experiencing a funding crisis. As a result, passenger service between Portland and Denver, including service to cities within Umatilla County, was discontinued in May 1997. This line now serves only freight traffic.

The nearest freight line to Ukiah is the Union Pacific main line which runs through Pendleton. There is also a major freight line owned and operated by Union Pacific Railroad, a Class I line-haul freight railroad, which stops in Hermiston. In addition, there is a switch line out of Pendleton which hauls freight from Pilot Rock two to three days per week, and a line between Milton-Freewater and Weston on the Blue Mountain Railroad consisting of one freight train per day (maximum) or some local switching.

Air Service Plan

Ukiah does not have its own air service within the City; however, there are other airport facilities in the county. Eastern Oregon Regional Airport is located in Pendleton, approximately 50 miles north of Ukiah, and provides commercial air service. Hermiston Municipal Airport is located in Hermiston, approximately 70 miles north of Ukiah, and provides chartered flights. Other small nearby airports in the county include: Barrett Field northwest of Athena, the Pea Growers' Field south of Athena, and Curtis Airfield northwest of Pendleton. These airports are small, private, uncontrolled airstrips mainly used for crop dusting operations.

Pipeline Service

There are currently no pipelines serving Ukiah.

Water Transportation

Ukiah has no water transportation services.

TRANSPORTATION SYSTEM PLAN IMPLEMENTATION PROGRAM

Implementation of the Ukiah TSP will require changes both to the City Comprehensive Plan and the Zoning Code and preparation of a 20-year Capital Improvement Plan (CIP). These actions will enable Ukiah to address both existing and emerging transportation issues throughout the urban area in a timely and cost effective manner.

One part of the implementation program is the formulation of a 20-year CIP. The purpose of the CIP is to detail what transportation system improvements will be needed as Ukiah grows and provide a process to fund and schedule the identified transportation system improvements. It is expected that the Transportation System Plan Capital Improvement Plan can be integrated into the existing city and county CIP and the ODOT STIP. This integration is important since the TSP proposes that city, county, and state governmental agencies fund all or some of the transportation improvement projects.

Model policy and ordinance language that conforms with the requirements of the Transportation Planning Rule is included in Chapter 9. The proposed ordinance amendments will require approval by the Ukiah City Council and those that affect the unincorporated urban area will also require approval by the Umatilla Board of County Commissioners.

20-Year Capital Improvement Program

Table 7-4 summarizes the CIP and provides cost information. The cost estimates for all the projects listed in the CIP were prepared on the basis of 1998 dollars. These costs include design, construction, and some contingency costs. They are preliminary estimates and generally do not include right-of-way acquisition, water or sewer facilities, or adding or relocating public utilities. The following schedule is not a prioritized list and scheduled implementation of these projects is at the discretion of the City and/or county, depending upon jurisdiction over the project.

Ukiah has identified a total of two street projects in its CIP with a cost of \$12,250 and three sidewalk projects in its CIP with a cost of \$560,000.

TABLE 7-5
CAPITAL IMPROVEMENT PROGRAM (1998 DOLLARS)

Project No.	Location/Description	Costs (\$ x 1,000)				Total
		City	County ²	State	Private ¹	
1.	Extend Mill Street north for planned residential development	\$2.25				\$2.25
2.	Implement speed control measures along OR 244 (Main Street) – Radar detector trailer	\$2.0			\$8.0	\$10.0
3.	Phase 1 Sidewalks - City Park	\$30.0	\$40.0	\$10.0		\$80.0
4.	Phase 2 Sidewalks - Dorm to School, Albee Street			\$160.0		\$160.0
5.	Phase 3 - Main Street (OR 244)	\$20.0	\$40.0	\$260.0		\$320.0
Total		\$54.25	\$80.0	\$430.0	\$8.0	\$572.25

Note:

(1) Partial cost for a radar detector trailer may be provided by several cities in Grant County.

(2) Umatilla County Bicycle and Pedestrian funds (50% In-Kind Match identified as City responsibility).

CHAPTER 8: FUNDING OPTIONS AND FINANCIAL PLAN

The Transportation Planning Rule requires Transportation System Plans to evaluate the funding environment for recommended improvements. This evaluation must include a listing of all recommended improvements, estimated costs to implement those improvements, a review of potential funding mechanisms, and an analysis of existing sources' ability to fund proposed transportation improvement projects. Ukiah's TSP identifies two recommended projects costing \$12,500 over the next 20 years. This section of the TSP provides an overview of Ukiah's revenue outlook and a review of some funding and financing options that may be available to the City of Ukiah to fund the improvements.

Pressures from increasing growth throughout much of Oregon have created an environment of estimated improvements that remain unfunded. Ukiah will need to work with Umatilla County and ODOT to finance the potential new transportation projects over the 20-year planning horizon. The actual timing of these projects will be determined by the rate of population and employment growth actually experienced by the community. This TSP assumes Ukiah will grow at a rate comparable to past growth, consistent with the county-wide growth forecast. If population growth exceeds this rate, the improvements may need to be accelerated. Slower than expected growth will relax the improvement schedule.

HISTORICAL STREET IMPROVEMENT FUNDING SOURCES

In Oregon, state, county, and city jurisdictions work together to coordinate transportation improvements. Table 8-1 shows the distribution of road revenues for the different levels of government within the state by jurisdiction level. Although these numbers were collected and tallied in 1991, ODOT estimates that these figures accurately represent the current revenue structure for transportation-related needs.

TABLE 8-1
SOURCES OF ROAD REVENUES BY JURISDICTION LEVEL

Revenue Source	Jurisdiction Level			All Funds
	State	County	City	
State Road Trust	58%	38%	41%	48%
Local	0%	22%	55%	17%
Federal Road	34%	40%	4%	30%
Other	9%	0%	0%	4%
Total	100%	100%	100%	100%

Source: ODOT 1993 Oregon Road Finance Study.

At the state level, nearly half (48 percent in Fiscal Year 1991) of all road-related revenues are attributable to the state highway fund, whose sources of revenue include fuel taxes, weight-mile taxes on trucks, and vehicle registration fees. As shown in the table, the state road trust is a considerable source of revenue for all levels of government. Federal sources (generally the federal highway trust account and federal forest revenues) comprise another 30 percent of all road-related revenue. The remaining sources of road-related revenues are generated locally, including property taxes, Local Improvement Districts (LIDs), bonds, traffic impact fees, road user taxes, general fund transfers, receipts from other local governments, and other sources.

As a state, Oregon generates 94 percent of its highway revenues from user fees, compared to an average of 78 percent among all states. This fee system, including fuel taxes, weight distance charges, and registration fees, is regarded as equitable because it places the greatest financial burden upon those who create the greatest need for road maintenance and improvements. Unlike many states that have indexed user fees to

inflation, Oregon has static road-revenue sources. For example, rather than assessing fuel taxes as a *percentage* of price per gallon, Oregon's fuel tax is a fixed amount (currently 24 cents) per gallon.

Transportation Funding in Umatilla County

Historically, sources of road revenues for Umatilla County have included federal grants, state revenues, intergovernmental transfers, interest from the working fund balance, and other sources. Transportation revenues and expenditures for Umatilla County are shown in Table 8-2 and Table 8-3.

TABLE 8-2
UMATILLA COUNTY TRANSPORTATION-RELATED REVENUES

	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998
	Actual	Actual	Actual	Actual	Budget	Budget
Beginning Balance	\$1,187,957	\$992,044	\$903,997	\$1,762,230	\$1,600,000	\$1,300,000
DMV License & Gas Tax Fees	\$2,956,777	\$3,145,649	\$3,258,762	\$3,356,616	\$3,400,000	\$3,400,000
Misc. State Receipts			\$635,655	\$222,990	\$209,000	\$219,000
National Forest Rental	\$1,061,341	\$589,248	\$534,150	\$189,902	\$180,000	\$180,000
Mineral Leasing 75%				\$125		
Misc. Federal Receipts	\$1,968	\$1,670	\$1,208	\$77,681		
Interest on Invested Funds	\$72,834	\$38,672	\$77,885	\$92,220	\$75,000	\$75,000
Refunds & Reimbursements		\$75		\$338		
Sale of Public Lands	\$20,144	\$14,363	\$5,443	\$102	\$15,000	\$5,000
Rentals/Sale of Supplies	\$15,318	\$16,565	\$51,748	\$74,498	\$45,000	\$27,000
BLM Maintenance Agreement		\$2,000				
Misc. Receipts-Local	\$26,662	\$102,916	\$143,691	\$48,997		
Service Center	\$46,996	\$55,961	\$53,361	\$61,189	\$58,500	\$64,000
Rural Address fund					\$30,000	
	\$5,389,996	\$4,959,163	\$5,665,900	\$5,886,887	\$5,612,500	\$5,270,000

Source: Umatilla County.

As shown in Table 8-2, revenues remained relatively stable (between a low of just under \$5 million in 1993-1994 to a high of nearly \$5.9 million in 1995-1996). Approximately \$3 million of the annual revenues come from the state highway fund, rising slightly from \$3 million in 1992-1993 to an estimated \$3.4 million in 1996-1997. A declining amount has come from federal apportionment (mostly federal forest receipts). Twenty-five percent of federal forest revenue (the 25-percent fund) is returned to the counties based on their share of the total acreage of federal forests. Westside national forests in Oregon and Washington are subject to the Spotted Owl Guarantee, which limits the decline of revenues from these forests to 3 percent annually. Oregon forests under the Owl Guarantee include the Deschutes, Mount Hood, Rogue River, Siskiyou, Siuslaw, Umpqua, and Willamette national forests. Forest revenues distributed to Umatilla County are from the Umatilla and Whitman forests and not subject to the Owl Guarantee and, therefore, are more difficult to predict. With a healthy working capital balance, the county has also been able to generate between \$40,000 and \$90,000 annually in interest on its invested funds.

**TABLE 8-3
UMATILLA COUNTY TRANSPORTATION-RELATED EXPENDITURES**

	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998
	Actual	Actual	Actual	Actual	Budget	Budget
Personal Services	\$1,908,211	\$1,878,969	\$1,956,968	\$2,077,603	\$2,260,676	\$2,304,704
Materials and Services	\$1,897,273	\$1,961,106	\$1,564,591	\$1,735,853	\$2,131,925	\$1,972,800
Capital Outlay	\$601,846	\$225,074	\$385,176	\$404,357	\$400,000	\$400,000
Contingency					\$568,840	\$334,224
Transfer to Road Improvement Fund					\$11,555	
Transfer to General Fund						\$58,272
	4,407,330	\$4,065,149	\$3,906,735	\$4,217,813	\$5,372,996	\$5,070,000

Source: Umatilla County.

As shown in Table 8-3, Umatilla County has spent between \$225,000 and \$600,000 annually in capital improvements. The county also transfers money to a road improvement fund for larger-scale capital improvements. The bulk of expenditures in the road fund are for personal services and materials and services relating to maintenance.

In addition to the road department fund, Umatilla County has a separate bicycle path fund. Its revenues and expenditure history are shown below in Table 8-4. Like the road fund, the bicycle path fund is developing a healthy working capital balance, supporting additional interest income, thereby reducing its dependence on the gas taxes collected through the state highway fund.

**TABLE 8-4
UMATILLA COUNTY BICYCLE PATH FUND REVENUES AND EXPENDITURES**

	1994-1995	1995-1996	1996-1997	1997-1998
	Actual	Actual	Budget	Budget
Beginning Fund Balance	\$230,059	\$260,652	\$299,775	\$349,775
Resources				
DMV License & Gas Tax Fees	\$32,917	\$32,946	\$34,000	\$34,000
Interest	\$13,073	\$16,251	\$16,000	\$18,000
	\$45,989	\$49,197	\$50,000	\$52,000
Expenditures				
Materials & Services	\$15,396		\$150,000	\$100,000
Capital Outlay				
	\$15,396	\$-	\$150,000	\$100,000

Source: Umatilla County.

Revenues and Expenditures in the City of Ukiah

Like most jurisdictions in Oregon, the City of Ukiah funds street operations, maintenance, and improvements through revenue from the state highway funds, interest from its working capital balance, and grants for specific projects. Generally, the state highway fund provides a large proportion of the revenues available for local jurisdiction's roadway moneys. Spending is typically disaggregated in the following categories: personal services, materials and equipment, and capital improvements, with the bulk of the expenditures used for maintenance and operations.

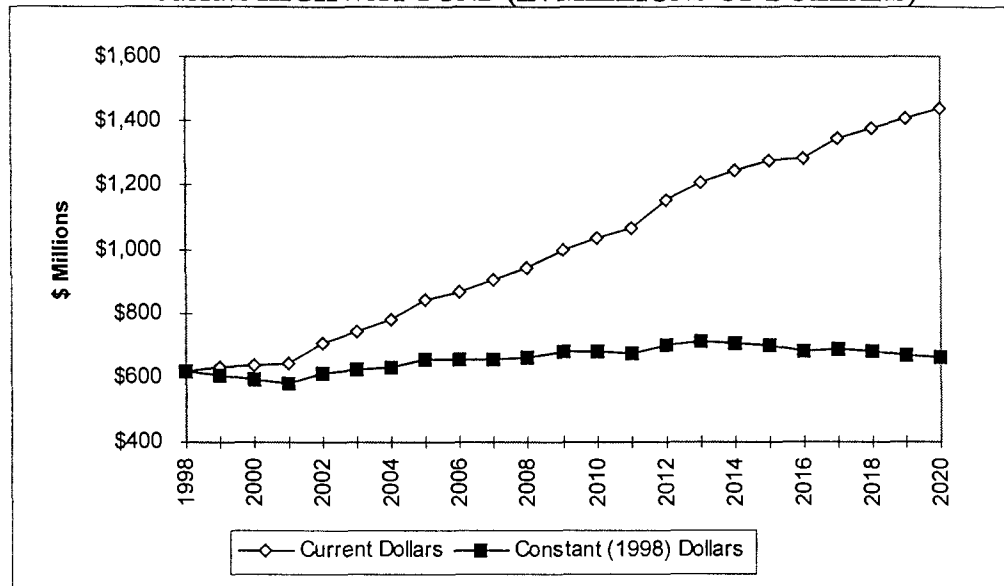
Transportation Revenue Outlook in the City of Ukiah

ODOT's policy section recommends certain assumptions in the preparation of transportation plans. In its *Financial Assumptions* document prepared in May 1998, ODOT projected the revenue of the state highway fund through year 2020. The estimates are based on not only the political climate, but also the economic structure and conditions, population and demographics, and patterns of land use. The latter is particularly important for state-imposed fees because of the goals in place under Oregon's Transportation Planning Rule (TPR) requiring a 10-percent reduction in per-capita vehicle miles of travel (VMT) in Metropolitan Planning Organization (MPO) areas by year 2015, and a 20-percent reduction by year 2025. This requirement will affect the 20-year revenue forecast from the fuel tax. ODOT recommends the following assumptions:

- Fuel tax increases of one cent per gallon per year (beginning in year 2002), with an additional one cent per gallon every fourth year.
- Vehicle registration fees would be increased by \$10 per year in 2002, and by \$15 per year in year 2012.
- Revenues will fall halfway between the revenue-level generated without TPR and the revenue level if TPR goals were fully met.
- Revenues will be shared among the state, counties, and cities on a "50-30-20 percent" basis rather than the previous "60.05-24.38-15.17 percent" basis.
- Inflation occurs at an average annual rate of 3.6 percent (as assumed by ODOT).

Figure 8-1 shows the forecast in both current-dollar and inflation-deflated constant (1998) dollars. As highlighted by the constant-dollar data, the highway fund is expected to grow slower than inflation early in the planning horizon until fuel-tax and vehicle-registration fee increases occur in year 2002, increasing to a rate somewhat faster than inflation through year 2015, continuing a slight decline through the remainder of the planning horizon.

**FIGURE 8-1
STATE HIGHWAY FUND (IN MILLIONS OF DOLLARS)**



Source: ODOT Financial Assumptions.

As the state highway fund is expected to be a significant source of funding for Ukiah, the City is highly susceptible to changes in the state highway fund. In order to analyze the City’s ability to fund the recommended improvements from current sources, DEA applied the following assumptions:

- ODOT state highway fund assumptions as outlined above.
- The state highway fund will account for the majority of the City’s street fund.
- Interest and other local sources continue to provide stable revenue streams.
- The proportion of revenues available for capital expenditures for street improvements is estimated to have averaged \$1,000 annually.

Communities of similar size to Ukiah tend to have between \$1,000 and \$5,000 available annually to fund capital improvements from existing sources. To be conservative, this analysis will assume that the City of Ukiah has had approximately \$1,000 annually from existing sources to fund capital improvements. Applying this and the assumptions about the state highway fund as recommended by ODOT yields total resources between \$900 and \$1,200 as shown in Table 8-5.

TABLE 8-5
ESTIMATED RESOURCES AVAILABLE TO CITY OF UKIAH
FROM STATE HIGHWAY FUND, 1998 DOLLARS

Year	Estimated Funds Available for Capital Outlay
1999	\$1,000
2000	\$1,000
2001	\$1,000
2002	\$900
2003	\$1,000
2004	\$1,000
2005	\$1,000
2006	\$1,100
2007	\$1,100
2008	\$1,100
2009	\$1,100
2010	\$1,100
2011	\$1,100
2012	\$1,100
2013	\$1,100
2014	\$1,200
2015	\$1,100
2016	\$1,100
2017	\$1,100
2018	\$1,100
2019	\$1,100
2020	\$1,100

The amount actually received from the state highway fund will depend on a number of factors, including the actual revenue generated by state gasoline taxes, vehicle registration fees, and other sources, and the population growth in Ukiah (since the distribution of state highway funds is based on an allocation formula which includes population).

REVENUE SOURCES

In order to finance the recommended transportation system improvements requiring expenditure of capital resources, it will be important to consider a range of funding sources. Although the property tax has traditionally served as the primary revenue source for local governments, property tax revenue goes into general fund operations, and is typically not available for road improvements or maintenance. Despite this limitation, the use of alternative revenue funding has been a trend throughout Oregon as the full implementation of Measures 5 and 47 have significantly reduced property tax revenues (see below). The alternative revenue sources described in this section may not all be appropriate in Ukiah; however, this overview is being provided to illustrate the range of options currently available to finance transportation improvements during the next 20 years.

Property Taxes

Property taxes have historically been the primary revenue source for local governments. However, property tax revenue goes into general fund operations, and is not typically available for road improvements or maintenance. The dependence of local governments on this revenue source is due, in large part, to the fact that property taxes

are easy to implement and enforce. Property taxes are based on real property (i.e., land and buildings) which has a predictable value and appreciation to base taxes upon. This is as opposed to income or sales taxes, which can fluctuate with economic trends or unforeseen events.

Property taxes can be levied through: 1) tax base levies, 2) serial levies, and 3) bond levies. The most common method uses tax base levies, which do not expire and are allowed to increase by 6 percent per annum. Serial levies are limited by the amounts and times they can be imposed. Bond levies are for specific projects and are limited by time based on the debt load of the local government or the project.

The historic dependence on property taxes is changing with the passage of Ballot Measure 5 in the early 1990s. Ballot Measure 5 limits the property tax rate for purposes other than payment of certain voter-approved general obligation indebtedness. Under full implementation, the tax rate for all local taxing authorities is limited to \$15 per \$1,000 of assessed valuation. As a group, all non-school taxing authorities are limited to \$10 per \$1,000 of assessed valuation. All tax base, serial, and special levies are subject to the tax rate limitation. Ballot Measure 5 requires that all non-school taxing districts' property tax rate be reduced if together they exceed \$10 per \$1,000 per assessed valuation by the county. If the non-debt tax rate exceeds the constitutional limit of \$10 per \$1,000 of assessed valuation, then all of the taxing districts' tax rates are reduced on a proportional basis. The proportional reduction in the tax rate is commonly referred to as compression of the tax rate.

Measure 47, an initiative petition, was passed by Oregon voters in November 1996. It is a constitutional amendment that reduces and limits property taxes and limits local revenues and replacement fees. The measure limits 1997-98 property taxes to the lesser of the 1995-96 tax minus 10 percent, or the 1994-95 tax. It limits future annual property tax increases to 3 percent, with exceptions. Local governments' lost revenue may be replaced only with state income tax, unless voters approve replacement fees or charges. Tax levy approvals in certain elections require 50 percent voter participation.

The state legislature created Measure 50, which retains the tax relief of Measure 47 but clarifies some legal issues. This revised tax measure was approved by voters in May 1997.

The League of Oregon Cities (LOC) estimated that direct revenue losses to local governments, including school districts, will total \$467 million in fiscal year 1998, \$553 million in 1999, and increase thereafter. The actual revenue losses to local governments will depend on actions of the Oregon Legislature. LOC also estimates that the state will have revenue gains of \$23 million in 1998, \$27 million in 1999, and increase thereafter because of increased personal and corporate tax receipts due to lower property tax deduction.

Measure 50 adds another layer of restrictions to those which govern the adoption of tax bases and levies outside the tax base, as well as Measure 5's tax rate limits for schools and non-schools and tax rate exceptions for voter approved debt. Each new levy and the imposition of a property tax must be tested against a longer series of criteria before the collectible tax amount on a parcel of property can be determined.

System Development Charges

System Development Charges (SDCs) are becoming increasingly popular in funding public works infrastructure needed for new local development. Generally, the objective of systems development charges is to allocate portions of the costs associated with capital improvements upon the developments, which increase demand on transportation, sewer or other infrastructure systems.

Local governments have the legal authority to charge property owners and/or developer fees for improving the local public works infrastructure based on projected demand resulting from their development. The charges are

most often targeted towards improving community water, sewer, or transportation systems. Cities and counties must have specific infrastructure plans in place which comply with state guidelines in order to collect SDCs.

SDCs are collected when new building permits are issued. Transportation SDCs are based on trip generation of the proposed development. Residential calculations would be based on the assumption that a typical household will generate a given number of vehicle trips per day. Nonresidential use calculations are based on employee ratios for the type of business or industrial uses. The SDC revenues would help fund the construction of transportation facilities necessitated by new development.

State Highway Fund

Gas tax revenues received from the state of Oregon are used by all counties and cities to fund roads, and road construction and maintenance. In Oregon, the state collects gas taxes, vehicle registration fees, overweight/overheight fines and weight/mile taxes and returns a portion of the revenues to cities and counties through an allocation formula. Like other Oregon cities, the City of Ukiah uses its state gas tax allocation to fund street construction and maintenance.

Local Gas Taxes

The Oregon Constitution permits counties and incorporated cities to levy additional local gas taxes with the stipulation that the moneys generated from the taxes will be dedicated to road-related improvements and maintenance within the jurisdiction. At present, only a few local governments (including the cities of Woodburn and The Dalles and Multnomah and Washington counties) levy a local gas tax. The City of Ukiah may consider raising its local gas tax as a way to generate additional road improvement funds. However, with relatively few jurisdictions exercising this tax, an increase in the cost differential between gas purchased in Ukiah and gas purchased in neighboring communities may encourage drivers to seek less expensive fuel elsewhere. Any action will need to be supported by careful analysis to minimize the unintended consequences of such an action.

Vehicle Registration Fees

The Oregon vehicle registration fee is allocated to the state, counties and cities for road funding. Oregon counties are granted authority to impose a vehicle registration fee covering the entire county. The Oregon Revised Statutes would allow Umatilla County to impose a biannual registration fee for all passenger cars licensed within the county. Although both counties and special districts have this legal authority, vehicle registration fees have not been imposed by local jurisdictions. In order for a local vehicle registration fee program to be viable in Umatilla County, all the incorporated cities and the county would need to formulate an agreement which would detail how the fees would be spent on future road construction and maintenance.

Local Improvement Districts

The Oregon Revised Statutes allow local governments to form Local Improvement Districts (LIDs) to construct public improvements. LIDs are most often used by cities to construct localized projects such as streets, sidewalks or bikeways. The statutes allow formation of a district by either the city government or property owners. Cities that use LIDs are required to have a local LID ordinance that provides a process for district formation and payback provisions. Through the LID process, the cost of local improvements is generally spread out among a group of property owners within a specified area. The cost can be allocated based on

property frontage or other methods such as traffic trip generation. The types of allocation methods are only limited by the Local Improvement Ordinance. The cost of LID participation is considered an assessment against the property which is a lien equivalent to a tax lien. Individual property owners typically have the option of paying the assessment in cash or applying for assessment financing through the City. Since the passage of Ballot Measure 5, cities have most often funded local improvement districts through the sale of special assessment bonds.

GRANTS AND LOANS

There are a variety of grant and loan programs available, most with specific requirements relating to economic development or specific transportation issues, rather than for the general construction of new streets. Many programs require a match from the local jurisdiction as a condition of approval. Because grant and loan programs are subject to change and statewide competition, they should not be considered a secure long-term funding source. Most of the programs available for transportation projects are funded and administered through ODOT and/or the Oregon Economic Development Department (OEDD). Some programs that may be appropriate for the City of Ukiah are described below. The primary contact for information on the following programs is ODOT Region 5, which can be reached at (541) 963-3177.

Bike-Pedestrian Grants

By law (ORS 366.514), all road, street or highway construction or reconstruction projects must include facilities for pedestrians and bicyclists, with some exceptions. ODOT's Bike and Pedestrian Program assists in the development of walking and bicycling improvements. Cities and counties with projects on local streets are eligible for local grant funds. Eligible projects include curb extensions, pedestrian crossings and intersection improvements, shoulder widening and restriping for bike lanes. Projects on urban state highways with little or no right of way taking and few environmental impacts are eligible for funds. The Bike and Pedestrian Program is limited to projects costing up to \$200,000. Projects that cost more than \$200,000, require the acquisition of ROW, or have environmental impacts should be submitted to ODOT for inclusion in the STIP.

Access Management

The Access Management Program sets aside approximately \$500,000 a year to address access management issues. One primary component of this program is an evaluation of existing approach roads to state highways. These funds are not committed to specific projects, and priorities and projects are established by an evaluation process.

Enhancement Program

This federally funded program earmarks \$8 million annually for projects in Oregon. Projects must demonstrate a link to the intermodal transportation system, compatibility with approved plans, and local financial support. A 10.27 percent local match is required for eligibility. Each proposed project is evaluated against all other proposed projects in its region. Within the five Oregon regions, the funds are distributed on a formula based on population, vehicle miles traveled, number of vehicles registered and other transportation-related criteria. The solicitation for applications was mailed to cities and counties the last week of October 1998. Local jurisdictions have until January 1999 to complete and file their applications for funding available during the 2000-2003 fiscal years that begin October 1999.

Highway Bridge Rehabilitation or Replacement Program

The Highway Bridge Rehabilitation or Replacement Program (HBRR) provides federal funding for the replacement and rehabilitation of bridges of all functional classifications. A portion of the HBRR funding is allocated for the improvement of bridges under local jurisdiction. A quantitative ranking system is applied to the proposed projects based on sufficiency rating, cost factor, and load capacity. They are ranked against other projects statewide, and require state and local matches of 10 percent each. It includes the Local Bridge Inspection Program and the Bridge Load Rating Program.

Transportation Safety Grant Program

Managed by ODOT's Transportation Safety Section (TSS), this program's objective is to reduce the number of transportation-related accidents and fatalities by coordination a number of statewide programs. These funds are intended to be used as seed money, funding a program for three years. Eligible programs include programs in impaired driving, occupant protection, youth, pedestrian, speed, enforcement, bicycle and motorcycle safety. Every year, TSS produces a Highway Safety Plan that identifies the major safety programs, suggests countermeasures to existing safety problems, and lists successful projects selected for funding, rather than granting funds through an application process.

Federal Transit Administration (FTA) Section 5311-Non-urbanized Area Formula Program

Section 5311 is a federally sponsored program for general public transit services in small urban and rural areas. It supports both capital and operation needs. The ODOT Public Transit Division distributes these funds. In FY00, the cities of Pendleton and Milton-Freewater received these funds to support transportation programs for the general public. The City of Ukiah would be eligible for these funds if it implemented intercity service or intracity services open to the general public. The recipient of these funds must provide matching funds of up to 50 percent for operating uses and up to 20 percent for capital expenses.

Section 5311(f) – Part of 5311 funds is allocated to intercity services. Intercity transit services connect communities to rail, bus and air hubs. These funds can be used for both capital and operating expenses. Local revenues must match these funds. Match requirements are the same as those for 5311 funds.

Surface Transportation Program (STP) Funds

TEA-21, the Federal Transportation Efficiency Act for the 21st Century, that funds programs for highways and transit, permits surface transportation program funding flexibility between modes. This gives the state more latitude in selecting the modal alternatives that would best address local congestion problems. STP funds are generally limited to capital projects with a few exceptions. In non-urbanized areas ODOT has the responsibility of allocating these funds. In Ukiah, ODOT Region 5 makes funding decisions with public input.

Department of Labor Welfare-to-Work Program

The US Department of Labor provides grants to communities to give transitional assistance to move welfare recipients into unsubsidized employment. One of the areas applicants are encouraged to consider is the development of responsive transportation systems to move people to work or to career training. These grants must serve at least 100 welfare recipients. The Department of Labor expects the grants to range from one million to five million dollars over a period of three years. Applications must be a coordinated effort between

transportation providers and Oregon Adult and Family Services. The funding can be used for capital and operating expenses and will cover up to 50 percent of the cost of a program.

ODOT has submitted a grant application for funding for Oregon programs. ODOT identified the Bend/Redmond area as the first demonstration program. Other areas of the state may be eligible after that. To be eligible for this funding, it is essential that communities bring together local ODOT staff, transit providers and AFS staff to begin the coordination process.

FTA Section 5310 Discretionary Grants

This program funds vehicles and other capital projects for programs that serve elderly and disabled people. In FY99 the City of Pendleton received \$36,000 to purchase a new vehicle.

Special Transportation Fund

The Special Transportation Fund (STF) awards funds to maintain, develop, and improve transportation services for people with disabilities and people over 60 years of age. Financed by a two-cent tax on each pack of cigarettes sold in the state, the annual distribution is approximately \$5 million. Three-quarters of these funds are distributed on a per-capita formula to mass transit districts, transportation districts, where such districts do not exist, and counties. The remaining funds are distributed on a discretionary basis.

County Allotment Program

The County Allotment Program distributes funds to counties on an annual basis; the funds distributed in this program are in addition to the regular disbursement of state highway fund resources. The program determines the amount of total revenue available for roads in each county and the number of road miles (but not lane miles) of collectors and arterials under each county's jurisdiction. Using these two benchmarks, a "resource-per-equivalent" ratio is calculated for each county. Resources from the \$750,000 program are provided to the county with the lowest resource-per-equivalent road-mile ratio until they are funded to the level of the next-lowest county. The next-lowest county is then provided resources until they are funded to the level of the third-lowest county, and so on, until the fund is exhausted.

Immediate Opportunity Grant Program

The Oregon Economic Development Department (OEDD) and ODOT collaborate to administer a grant program designed to assist local and regional economic development efforts. The program is funded to a level of approximately \$7 million per year through state gas tax revenues. The following are primary factors in determining eligible projects:

- Improvement of public roads.
- Inclusion of an economic development-related project of regional significance.
- Creation or retention of primary employment.
- Ability to provide local funds (50/50) to match grant.

- Improvement to the quality of the community.

The maximum amount of any grant under the program is \$500,000. Local governments that have received grants under the program include Washington County, Multnomah County, Douglas County, the City of Hermiston, port of St. Helens, and the City of Newport.

Oregon Special Public Works Fund

The Special Public Works Fund (SPWF) program was created by the 1995 State Legislature as one of several programs for the distribution of funds from the Oregon Lottery to economic development projects in communities throughout the state. The program provides grant and loan assistance to eligible municipalities primarily for the construction of public infrastructure which support commercial and industrial development that result in permanent job creation or job retention. To be awarded funds, each infrastructure project must support businesses wishing to locate, expand, or remain in Oregon. SPWF awards can be used for improvement, expansion, and new construction of public sewage treatment plants, water supply works, public roads, and transportation facilities.

While SPWF program assistance is provided in the form of both loans and grants, the program emphasizes loans in order to assure that funds will return to the state over time for reinvestment in local economic development infrastructure projects. Jurisdictions that have received SPWF funding for projects that include some type of transportation-related improvement include the cities of Baker City, Bend, Cornelius, Forest Grove, Madras, Portland, Redmond, Reedsport, Toledo, Wilsonville, Woodburn, and Douglas County.

Oregon Transportation Infrastructure Bank

The Oregon Transportation Infrastructure Bank (OTIB) program is a revolving loan fund administered by ODOT to provide loans to local jurisdictions (including cities, counties, special districts, transit districts, tribal governments, ports, and state agencies). Eligible projects include construction of federal-aid highways, bridges, roads, streets, bikeways, pedestrian accesses, and right of way costs. Capital outlays such as buses, light-rail cars and lines, maintenance yards and passenger facilities are also eligible.

ODOT FUNDING OPTIONS

The state of Oregon provides funding for all highway related transportation projects through the Statewide Transportation Improvement Program (STIP) administered by the Oregon Department of Transportation. The STIP outlines the schedule for ODOT projects throughout the state. The STIP, which identifies projects for a three-year funding cycle, is updated on an annual basis. In developing this funding program, ODOT must verify that the identified projects comply with the Oregon Transportation Plan (OTP), ODOT Modal Plans, Corridor Plans, local Comprehensive Plans, and federal planning requirements. The STIP must fulfill federal planning requirements for a staged, multi-year, statewide, intermodal program of transportation projects. Specific transportation projects are prioritized based on a review of the TEA-21 planning requirements and the different state plans. ODOT consults with local jurisdictions before highway related projects are added to the STIP.

The highway-related projects identified in Ukiah's TSP will be considered for future inclusion on the STIP. The timing of including specific projects will be determined by ODOT based on an analysis of all the project needs within Region 5. The City of Ukiah, Umatilla County, and ODOT will need to communicate on an annual basis to review the status of the STIP and the prioritization of individual projects within the

project area. Ongoing communication will be important for the city, county, and ODOT to coordinate the construction of both local and state transportation projects.

ODOT also has the option of making some highway improvements as part of their ongoing highway maintenance program. Types of road construction projects that can be included within the ODOT maintenance programs are intersection realignments, additional turn lanes, and striping for bike lanes. Maintenance related construction projects are usually done by ODOT field crews using state equipment. The maintenance crews do not have the staff or specialized road equipment needed for large construction projects.

An ODOT funding technique that will likely have future application to Ukiah's TSP is the use of state and federal transportation dollars for off-system improvements. Until the passage and implementation of ISTEA, state and federal funds were limited to transportation improvements within highway corridors. ODOT now has the authority and ability to fund transportation projects that are located outside the boundaries of the highway corridors. The criteria for determining what off-system improvements can be funded has not yet been clearly established. It is expected that this new funding technique will be used to finance local system improvements that reduce traffic on state highways or reduce the number of access points for future development along state highways.

FINANCING TOOLS

In addition to funding options, the recommended improvements listed in this plan may benefit from a variety of financing options. Although often used interchangeably, the words financing and funding are not the same. Funding is the actual generation of revenue by which a jurisdiction pays for improvements, some examples include the sources discussed above: property taxes, SDCs, fuel taxes, vehicle registration fees, LIDs, and various grant programs. In contrast, financing refers to the collecting of funds through debt obligations.

There are a number of debt financing options available to the City of Ukiah. The use of debt to finance capital improvements must be balanced with the ability to make future debt service payments and to deal with the impact on its overall debt capacity and underlying credit rating. Again, debt financing should be viewed not as a source of funding, but as a time shifting of funds. The use of debt to finance these transportation-system improvements is appropriate since the benefits from the transportation improvements will extend over the period of years. If such improvements were to be tax financed immediately, a large short-term increase in the tax rate would be required. By utilizing debt financing, local governments are essentially spreading the burden of the costs of these improvements to more of the people who are likely to benefit from the improvements and lowering immediate payments.

General Obligation Bonds

General obligation (GO) bonds are voter-approved bond issues, which represent the least expensive borrowing mechanism available to municipalities. GO bonds are typically supported by a separate property tax levy specifically approved for the purposes of retiring debt. The levy does not terminate until all debt is paid off. The property tax levy is distributed equally throughout the taxing jurisdiction according to assessed value of property. GO debts typically used to make public improvement projects that will benefit the entire community.

State statutes require that the GO indebtedness of a city not exceed 3 percent of the real market value of all taxable property in the city. Since GO bonds would be issued subsequent to voter approval, they would not

be restricted to the limitations set forth in Ballot Measures 5, 47, and 50. Although new bonds must be specifically voter approved, Measure 47 and 50 provisions are not applicable to outstanding bonds, unissued voter-approved bonds, or refunding bonds.

Limited Tax Bonds

Limited tax general obligation (LTGO) bonds are similar to GO bonds in that they represent an obligation of the municipality. However, a municipality’s obligation is limited to its current revenue sources and is not secured by the public entity’s ability to raise taxes. As a result, LTGO bonds do not require voter approval. However, since the LTGO bonds are not secured by the full taxing power of the issuer, the limited tax bond represents a higher borrowing cost than GO bonds. The municipality must pledge to levy the maximum amount under constitutional and statutory limits, but not the unlimited taxing authority pledged with GO bonds. Because LTGO bonds are not voter approved, they are subject to the limitations of Ballot Measures 5, 47, and 50.

Bancroft Bonds

Under Oregon Statute, municipalities are allowed to issue Bancroft bonds which pledge the City’s full faith and credit to assessment bonds. As a result, the bonds become general obligations of the City but are paid with assessments. Historically, these bonds provided a city with the ability to pledge its full faith and credit in order to obtain a lower borrowing cost without requiring voter approval. However, since Bancroft bonds are not voter approved, taxes levied to pay debt service on them are subject to the limitations of Ballot Measures 5, 47, and 50. As a result, since 1991, Bancroft bonds have not been used by municipalities that were required to compress their tax rates.

FUNDING REQUIREMENTS

Ukiah’s TSP identifies both capital improvements and strategic efforts recommended during the next 20 years to address safety and access problems and to expand the transportation system to support a growing population and economy. The TSP identifies 5 projects estimated to cost over \$572,250 over the 20-year planning horizon. These projects will require funding from the City, although speed control measures may receive financial support from private sources and sidewalk projects may receive financial support from Umatilla County with a 50% In-Kind match provided by the City and ODOT. Estimated costs by project are shown in Table 8-6.

**TABLE 8-6
RECOMMENDED PROJECTS AND FINANCIAL RESPONSIBILITY**

Project No.	Location/Description	Costs (\$ x 1,000)				Total
		City	County	State	Private	
1.	Extend Mill Street north for planned residential development	\$2.25				\$2.25

Project No.	Location/Description	Costs (\$ x 1,000)				Total
		City	County	State	Private ¹	
2.	Implement speed control measures along OR 244 (Main Street) — Radar detector trailer	\$2.0			\$8.0	\$10.0
3.	Phase 1 Sidewalks - City Park	\$30.0	\$40.0	\$10.0		\$80.0
4.	Phase 2 - Dorm to School, Albee Street			\$160.0		\$160.0
5.	Phase 3 - Main St. (Hwy 244)	\$20.0	\$40.0	\$260.0		\$320.0
Total		\$54.25	\$80.0	\$430.0	\$8.0	\$572.25

Based on current revenue sources for the City of Ukiah as estimated in Table 8-5 and the improvements identified in this Transportation System Plan, the City is expected to experience a small budget surplus, as shown in Table 8-7. In order for the City to actually implement the recommended projects and to realize this surplus, the City will need to contain the costs of regular operations and maintenance, and to ensure a small, but stable, amount of resources is set aside each year for these capital improvements.

TABLE 8-7
ESTIMATED CAPITAL FUNDING BALANCE

	Amount
Capital Available from Existing Revenue Sources	\$22,500
Capital Needed to Fund Projects Identified as City-Funded Projects	\$54,250
Surplus (Deficit)	(\$31,750)

This Transportation System Plan recommends five projects, estimated to cost a total of \$572,250 for the Ukiah area. Based on estimates of existing funding sources, and the estimates of capital outlay required to implement the recommended projects, the City of Ukiah is expected to be able to address the capital requirements, with assistance from county, state and federal programs. The City of Ukiah will need to continue to work with Umatilla County and ODOT in order to fully implement this TSP.

CHAPTER 9: RECOMMENDED POLICIES AND ORDINANCES

In 1991, the Oregon Transportation Planning Rule was adopted to implement State Planning Goal 12 Transportation (amended in May and September 1995). The Transportation Planning Rule requires counties and cities to complete a Transportation System Plan (TSP) that includes policies and ordinances to implement that plan. The City of Ukiah's Comprehensive Plan was revised in 1994. Based on content, the Transportation discussion in the Comprehensive Plan has not been significantly updated since the implementation of the Transportation Planning Rule. The City's Zoning and Subdivision Ordinances were also updated in 1994 and are in need of updating to meet the requirements of the Transportation Planning Rule and this TSP, as well.

ELEMENTS REQUIRED BY THE TRANSPORTATION PLANNING RULE

The applicable portion of the Transportation Planning Rule is found in Section 660-12-045: Implementation of the Transportation System Plan. In summary, the Transportation Planning Rule requires that local governments revise their land use regulations to implement the Transportation System Plan in the following manner:

- Amend land use regulations to reflect and implement the Transportation System Plan.
- Clearly identify which transportation facilities, services, and improvements are allowed outright, and which will be conditionally permitted or permitted through other procedures.
- Adopt land use or subdivision ordinance measures, consistent with applicable federal and state requirements, to protect transportation facilities, corridors and sites for their identified functions, that include the following topics:
 - ⇒ access management and control;
 - ⇒ protection of public use airports;
 - ⇒ coordinated review of land use decisions potentially affecting transportation facilities;
 - ⇒ conditions to minimize development impacts to transportation facilities;
 - ⇒ regulations to provide notice to public agencies providing transportation facilities and services of land use applications that potentially affect transportation facilities; and
 - ⇒ regulations assuring that amendments to land use applications, densities, and design standards are consistent with the Transportation System Plan.
- Adopt land use or subdivision regulations for urban areas and rural communities to provide safe and convenient pedestrian and bicycle circulation and bicycle parking, and to ensure that new development provides on-site streets and accessways that provide reasonably direct routes for pedestrian and bicycle travel.
- Establish street standards that minimize pavement width and total right-of-way.

APPROVAL PROCESSES FOR TRANSPORTATION FACILITIES

Section 660-12-045(1) of the Transportation Planning Rule requires that cities and counties amend their land use regulations to conform with the jurisdiction's adopted Transportation System Plan. This section of the Transportation Planning Rule is intended to clarify the approval process for transportation-related projects.

Recommended Policies for Approval Process

Policies should clarify the approval process for different types of projects. The following policies are recommended to be adopted in the Ukiah Comprehensive Plan:

- *The Transportation System Plan is an element of the City of Ukiah Comprehensive Plan Comprehensive Plan. It identifies the general location of transportation improvements. Changes in the specific alignment of proposed public road and highway projects that shall be permitted without plan amendment if the new alignment falls within a transportation corridor identified in the Transportation System Plan.*
- *Operation, maintenance, repair, and preservation of existing transportation facilities shall be allowed without land use review, except where specifically regulated.*
- *Dedication of right-of-way, authorization of construction, and the construction of facilities and improvements for projects authorized in the Transportation System Plan, the classification of the roadway and approved road standards shall be allowed without land use review.*
- *For state projects that require an Environmental Impact Statement (EIS) or Environmental Assessment (EA), the draft EIS or EA shall serve as the documentation for local land use review, if local review is required.*

Recommended Ordinances for Approval Process

Projects that are specifically identified in the Transportation System Plan and for which the jurisdiction has made all the required land use and goal compliance findings are permitted outright, subject only to the standards established by the Plan.

However, a city may not allow outright an improvement that is included in the Transportation System Plan but for which no site-specific decisions have been made. Therefore, it is recommended that small jurisdictions review these transportation projects as regulated land use actions, using the conditional use process. This process is recommended for inclusion in a revised version of Section 1.8 of the Subdivision Ordinance or as new section within the development code.

PROTECTING EXISTING AND FUTURE OPERATION OF FACILITIES

Section 60-12-045(2) of the Transportation Planning Rule requires that jurisdictions protect future operation of transportation corridors. For example, an important arterial for through-traffic should be protected in

order to meet the community's identified needs. In addition, the proposed function of a future roadway must be protected from incompatible land uses.

Other future transportation facilities that the City of Ukiah may wish to protect include the space and building orientation necessary to support future transit, and right-of-ways or other easements for accessways, paths, and trails. Policies are suggested below that will demonstrate the desire of the community to protect these transportation facilities.

Protection of existing and planned transportation systems can be provided by ongoing coordination with other relevant agencies, adhering to the road standards, and to the access management policies and ordinances suggested below.

Recommended Policies for Protection of Transportation Facilities

- *The City of Ukiah shall protect the function of existing and planned roadways as identified in the Transportation System Plan.*
- *The City of Ukiah shall include a consideration of a proposal's impact on existing or planned transportation facilities in all land use decisions.*
- *The City of Ukiah shall protect the function of existing or planned roadways or roadway corridors through the application of appropriate land use regulations.*
- *The City of Ukiah shall consider the potential to establish or maintain accessways, paths, or trails prior to the vacation of any public easement or right-of-way.*
- *The City of Ukiah shall preserve right-of-way for planned transportation facilities through exactions, voluntary dedication, or setbacks.*

Recommended Access Control Ordinances

- a) Appropriate portions of the following provisions should be adopted as a new section in the Subdivision or Zoning Ordinance to provide access management. Section 1.9 and 1.10 of the Subdivision Ordinance should be amended for consistency with the new section.

COORDINATED REVIEW OF LAND USE DECISIONS

A lack of coordination between state and local decision processes can result in costly delays and changes in public road and highway projects, as well as some maintenance and operation activities. Section 660-12-045(2)(d) of the Transportation Planning Rule requires that jurisdictions develop a process for the coordinated review of land use decisions affecting transportation facilities. The following recommended policies would establish coordinated review.

Recommended Policies for Coordinated Review

- *The City of Ukiah shall coordinate with the Oregon Department of Transportation (ODOT) to implement the highway improvements listed in the Statewide Transportation Improvement Program (STIP) that are consistent with the Transportation System Plan and county Comprehensive Plan.*
- *The City of Ukiah shall provide notice to ODOT of land use applications and development permits for properties that have frontage or access onto Highway 244 (Ukiah-Hilgard Highway).*
- *The City of Ukiah shall consider the findings of ODOT's draft Environmental Impact Statements and Environmental Assessments as integral parts of the land use decision-making procedures. Other actions required, such as a goal exception or plan amendment, will be combined with review of the draft EA or EIS and land use approval process.*

Recommended Process for Applying Conditions to Development Proposals

Section 660-12-045(2)(e) of the Transportation Planning Rule requires that jurisdictions develop a process to apply conditions to development proposals in order to minimize impacts on transportation facilities.

The site plan review process is a useful tool for a small jurisdiction. The City of Ukiah may want to implement a site plan review process that includes a requirement to provide data on the potential traffic impacts of a project through a traffic impact study or, at least an estimation of the number of trips expected to be generated. Recommended language to be included under site plan criteria is as follows:

- *The proposed use shall not impose an undue burden on the public transportation system. For developments that are likely to generate more than 400 average daily motor vehicle trips (ADTs), the applicant shall provide adequate information, such as a traffic impact study or traffic counts, to demonstrate the level of impact to the surrounding street system. The developer shall be required to mitigate impacts attributable to the project.*
- *The determination of impact or effect and the scope of the impact study should be coordinated with the provider of the affected transportation facility.*

If the City of Ukiah decides to implement a Site Plan review process, conditions such as the following may be included in the ordinance, to be applied in the event that a proposed project is demonstrated to have potentially adverse effects on the transportation system. These are additional to the conditions imposed by the recommended Access Management Ordinance included previously.

- *Dedication of land for streets, transit facilities, sidewalks, bikeways, paths, or accessways shall be required where the existing transportation system will be impacted by or is inadequate to handle the additional burden caused by the proposed use.*
- *Improvements such as paving, curbing, installation or contribution to traffic signals, construction of sidewalks, bikeways, accessways, paths, or streets that serve the proposed use where the existing transportation system may be burdened by the proposed use.*

Recommended Regulations to Provide Notice to Public Agencies

Review of land use actions is typically initiated by a notice. This process is usually defined by a procedures ordinance or noticing policy. This ordinance or policy should be amended to provide for notice to ODOT regarding any land use action on or adjacent to OR 244 . Similarly, all actions by the City potentially affecting a county road should provide notice to Umatilla County.

Information that should be conveyed to reviewers includes:

- *Project location.*
- *Proposed land use action.*
- *Location of project access point(s).*

Additional information to be supplied upon request (provided the information is available) includes a site plan showing the following:

- *Distances to neighboring constructed access points, median openings, traffic signals, intersections, and other transportation features on both sides of the property;*
- *Number and direction of lanes to be constructed on the driveway, plus striping plans;*
- *All planned transportation features (lanes, signals, bikeways, walkways, crosswalks, etc.);*
- *Trip generation data or appropriate traffic studies;*
- *Parking and internal circulation plans for vehicles and pedestrians;*
- *Plat map showing property lines, right-of-way, and ownership of abutting properties;*
- *A detailed description of any requested variance; and*
- *If airport-related, proximity to nearest runway.*

Recommended Regulations to Assure that Amendments are Consistent with the Transportation System Plan

Section 660-12-045(2)(g) of the Transportation Planning Rule requires that jurisdictions develop regulations to assure that all development proposals, plan amendments, or zone changes conform to the Transportation System Plan. This requirement can be addressed by adding a policy to the Comprehensive Plan, as follows:

- *All development proposals, plan amendments, or zone changes shall conform to the adopted Transportation System Plan.*

Within the zoning ordinance, development proposals can be addressed through site plan review, discussed above. Zone changes and plan amendments can be partially addressed by the following language:

- *The applicant must show that the proposed change conforms to the Comprehensive Plan.*

The following statements should be added to the local ordinance and policy language governing zone changes and plan amendments:

- A. *A plan or land use regulation amendment significantly affects a transportation facility if it:*
 1. *Changes the functional classification of an existing or planned transportation facility;*
 2. *Changes standards implementing a functional classification system;*
 3. *Allows types or levels of land use that would result in levels of travel or access that are inconsistent with the functional classification of a transportation facility; or*
 4. *Would reduce the level of service of the facility below the minimum acceptable level identified in the Transportation System Plan.*

- B. *Amendments to the Comprehensive Plan and land use regulations, which significantly affect a transportation facility, shall assure that allowed land uses are consistent with the function, capacity, and level of service of the facility identified in the Transportation System Plan. This shall be accomplished by one of the following:*
 1. *Limiting allowed land uses to be consistent with the planned function of the transportation facility;*
 2. *Amending the Transportation System Plan to ensure that existing, improved, or new transportation facilities are adequate to support the proposed land uses consistent with the requirement of the Transportation Planning Rule; or*
 3. *Altering land use designations, densities, or design requirements to reduce demand for automobile travel and meet travel needs through other modes.*

SAFE AND CONVENIENT PEDESTRIAN AND BICYCLE CIRCULATION

Bicycling and walking are often the most appropriate mode for short trips. Especially in small cities where the downtown area is compact, walking and bicycling can replace short auto trips, reducing the need for construction and maintenance of new roads. However, the lack of safe and convenient bikeways and walkways can be a strong discouragement to use these mode choices. The Transportation Planning Rule (660-12-045(3)) requires that urban areas and rural communities plan for bicycling and walking as part of the overall transportation system.

Recommended Ordinances for Bicycle Parking

The lack of safe and convenient bicycle parking can waste resources and further discourage bicycling as a transportation mode. The following are recommended ordinances:

- *A minimum of 2 bicycle parking spaces per use (one sheltered and one unsheltered) shall be required.*
- *The following Special Minimum Standards shall be considered as supplemental requirements for the number of required bicycle parking spaces.*
 - *Multi-Family Residences. Every residential use of four (4) or more dwelling units shall provide at least one sheltered bicycle parking space for each unit. Sheltered bicycle parking spaces may be located*

within a garage, storage shed, basement, utility room or similar area. In those instances in which the residential complex has no garage or other easily accessible storage unit, the required bicycle parking spaces shall be sheltered under an eave, overhang, an independent structure, or similar cover.

- *Parking Lots.* *All public and commercial parking lots and parking structures shall provide a minimum of one bicycle parking space for every 10 motor vehicle parking spaces.*
 - *Schools.* *Elementary and middle schools, both private and public, shall provide one bicycle parking space for every 10 students and employees. High schools shall provide one bicycle parking space for every 5 students and employees. All spaces shall be sheltered under an eave, overhang, independent structure, or similar cover.*
 - *Colleges.* *Colleges, universities, and trade schools shall provide one bicycle parking space for every 10 motor vehicle spaces plus one space for every dormitory unit. Fifty percent of the bicycle parking spaces shall be sheltered under an eave, overhang, independent structure, or similar cover.*
 - *Downtown Areas.* *In downtown areas with on-street parking, bicycle parking for customers shall be provided along the street at a rate of at least one space per use. Spaces may be clustered to serve up to six (6) bicycles; at least one cluster per block shall be provided. Bicycle parking spaces shall be located in front of the stores along the street, either on the sidewalks in specially constructed areas such as pedestrian curb extensions. Inverted "U" style racks are recommended. Bicycle parking shall not interfere with pedestrian passage, leaving a clear area of at least 5 feet. Customer spaces are not required to be sheltered. Sheltered parking (within a building, or under an eave, overhang, or similar structure) shall be provided at a rate of one space per 10 employees, with a minimum of one space per store.*
 - *Rural Schools, Service Centers, and Industrial Parks.* *Where a school, service center, or industrial park is located 5 or more miles from the closest urban area or rural residential subdivision with a density of more than one dwelling unit per 20 acres, a minimum of two bicycle parking spaces per use shall be required.*
- *The following formulas for Calculating the Number of Required Bicycle Parking Spaces are recommended.*
- *Fractional numbers of spaces shall be rounded up to the next whole space.*
 - *For facilities with multiple uses (such as a commercial center), the bicycle parking requirements shall be calculated by using the total number of motor vehicle parking spaces required for the entire development.*

Recommended Ordinances for Bicycle and Pedestrian Circulation and Access

Sections 660-12-045(3)(b), (c), and (d) of the Transportation Planning Rule deals with providing facilities for safe and convenient pedestrian and bicycle circulation and access, both within new residential and commercial development, and on public streets. In order for walking and bicycling to be viable forms of transportation, especially in smaller cities where they can constitute a significant portion of local trips, the proper facilities must be supplied. In addition, certain development design patterns, such as orienting commercial uses to the street and placing parking behind the building, make a commercial district more accessible to non-motorized transportation and to existing or future transit.

The Transportation Planning Rule specifies that, at a minimum, sidewalks and bikeways be provided along arterials and collectors in urban areas. Separate bicycle and pedestrian facilities should be provided where they would safely minimize trip distances by providing a "short cut." Small cities should enhance existing ordinances by including the following recommended additions and recommendations. The recommendations should be placed within the appropriate Section 1.2 of the subdivision ordinance:

Definitions:

- A. *Accessway. A walkway that provides pedestrian and bicycle passage either between streets or from a street to a building or other destination such as a school, park, or transit stop. Accessways generally include a walkway and additional land on either side of the walkway, often in the form of an easement or right-of-way, to provide clearance and separation between the walkway and adjacent uses. Accessways through parking lots are generally physically separated from adjacent vehicle parking or parallel vehicle traffic by curbs or similar devices and include landscaping, trees, and lighting. Where accessways cross driveways, they are generally raised, paved, or marked in a manner that provides convenient access for pedestrians.*
- B. *Bicycle. A vehicle designed to operate on the ground on wheels, propelled solely by human power, upon which any person or persons may ride, and with two tandem wheels at least 14 inches in diameter. An adult tricycle is considered a bicycle.*
- C. *Bicycle Facilities. A general term denoting improvements and provisions made to accommodate or encourage bicycling, including parking facilities and all bikeways.*
- D. *Bikeway. Any road, path, or way that is some manner specifically open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are shared with other transportation modes. (These are further defined in the Ukiah Bicycle and Pedestrian Plan).*
- E. *Pedestrian Facilities (also Walkway). A general term denoting improvements and provisions made to accommodate or encourage walking, including sidewalks, accessways, crosswalks, ramps, paths, and trails.*
- F. *Neighborhood Activity Center. An attractor or destination for residents of surrounding residential areas. Includes, but is not limited to existing or planned schools, parks, shopping areas, transit stops, employment areas.*
- G. *Reasonably direct. A route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.*
- H. *Safe and convenient. Bicycle and pedestrian routes that are:*
 - 1. *Reasonably free from hazards, and*
 - 2. *Provides a reasonably direct route of travel between destinations, considering that the optimum travel distance is one-half mile for pedestrians and three miles for bicyclists.*
- I. *Walkway. A hard-surfaced area intended and suitable for pedestrians, including sidewalks and the surfaced portions of accessways.*

If the City of Ukiah decides to implement a site plan review process, it should include a requirement to show the design and location of bicycle parking and bicycle and pedestrian circulation elements such as

accessways and walkways. It is recommended that the following language be added to the land use regulations:

- A. *Bicycle Parking. The development shall include the number and type of bicycle parking facilities required in the bicycle Parking section of this title. The location and design of bicycle parking facilities shall be indicated on the site plan.*
- B. *Pedestrian Access and Circulation.*
 1. *Internal pedestrian circulation shall be provided in new commercial, office, and multi-family residential developments through the clustering of buildings, construction of hard surface walkways, landscaping, accessways, or similar techniques.*
- C. *Commercial Development Standards.*
 1. *New commercial buildings, particularly retail shopping and offices, shall be oriented to the street, near or at the setback line. A main entrance shall be oriented to the street. For lots with more than two front yards, the building(s) shall be oriented to the two busiest streets.*
 2. *Off-street motor vehicle parking for new commercial developments shall be located at the side or behind the building(s).*
- D. *All site plans (industrial and commercial) shall clearly show how the site's internal pedestrian and bicycle facilities connect with external existing or planned facilities or systems.*

The City Subdivision Ordinances should reflect the intent of the Transportation Planning Rule by adding the following provision to development requirements.

- *Approval of Subdivision Tentative Plans and Final Plats. Information required shall include the location and design of all proposed pedestrian and bicycle facilities, including accessways.*
- A. *Cul-de-Sacs and Accessways.*
 1. *Cul-de-sacs or permanent dead-end streets may be used as part of a development plan; however, through-streets are encouraged except where topographical, environmental, or existing adjacent land use constraints make connecting streets unfeasible. Cul-de-sac lengths in excess of 300 feet are prohibited. Where cul-de-sacs are planned, accessways shall be provided connecting the ends of cul-de-sacs to each other, to other streets, or to neighborhood activity centers.*
 2. *Accessways for pedestrians and bicyclists shall be 10 feet wide and located within a 20 foot-wide right-of-way or easement. If the streets within the subdivision are lighted, the accessways shall also be lighted. Stairs or switchback paths may be used where grades are steep.*
 3. *Accessways for pedestrians and bicyclists shall be provided at mid-block where the block is longer than 600 feet.*
 4. *The Hearings Body may determine, based upon evidence in the record, that an accessway is impracticable. Such evidence may include but is not limited to:*

- a) *Physical or topographic conditions make an accessway connection impractical. Such conditions include but are not limited to extremely steep slopes, wetlands, or other bodies of water where a connection cannot reasonable be provided.*
- b) *Buildings or other existing development on adjacent lands physically preclude a connection now or in the future.*
- c) *Where accessways would violate provisions of leases, easements, covenants, restrictions, or other agreements existing as of as of the date of adoption that preclude a required accessway connection.*

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APPENDIX A

Ukiah Plans

UKIAH PLANS

Ukiah Comprehensive Plan

No date of adoption is written for the Ukiah Comprehensive Plan.

The Plan does contain an overall Transportation Goal:

To provide and encourage a safe, convenient, and economic transportation system.

Four transportation policies to enact the goal were listed: to encourage Umatilla County to pave County Roads Numbered 275 and 448 within the city limits and maintain the bridge over Camas Creek; to encourage the state of Oregon to repave State Highway No. 244 within the city limits; to prioritize the sequence for paving of city streets; to contract with Umatilla County or the State of Oregon to pave streets within the city when they are doing work in the area.

The Public Facilities element of the Plan also contains a policy which affects transportation system planning in the city. Public facilities and services Policy 3 is,

To develop, maintain, update, and expand police and fire service, streets and sidewalks, water and sewer systems, and storm drains as necessary to provide adequate facilities and services to the community.

NEED PLAN TECHNICAL REPORT

Subdivision Ordinance

The Subdivision and Partition Ordinance for the City of Ukiah was revised in 1994 in connection with an update of the Comprehensive Plan.

The purpose of this ordinance is to accomplish the orderly development of land, facilitate creation and sales of lots and parcels and insure that needed access, public services and facilities are, or can be, made available to areas proposed for development.

Section 1, General Provisions, contains development and design standards for easements, lots, subdivisions and streets and addresses other improvements and requirements such as water systems, stormwater runoff, sewage systems, open space, street signs, and amendments.

The design standards for streets are primarily found in paragraph (2) of Subsection 1.9 and include regulations for road surfaces, intersection design, design speed, block lengths, crosswalks, street connectivity, and right-of-way widths.

Zoning Ordinance

The purpose of this ordinance is to promote the public health, safety, and welfare, to encourage the most appropriate use of property within the city, to stabilize and protect the value of property, to provide adequate light and air, to prevent overcrowding, to lessen traffic congestion, to implement the Comprehensive Plan by facilitating adequate and economical provision for public improvements, to provide a method of administration and penalties for infringement.

The ordinance contains provisions for use zones, development permits, zoning of annexed areas, conditional uses, variances, mobile home parks, off-street parking and loading, signs, and enforcement. The main features pertaining to transportation are contained in Article 9, Off-Street Parking and Loading. In addition, transportation facilities may be modified or conditioned as part of a conditional use permit.

Pipeline Service

Although not often considered as transportation facilities, pipelines carry liquids and gases very efficiently. The use of pipelines can greatly reduce the number of trucks and rail cars carrying fluids such as natural gas, oil, and gasoline. There are currently no pipelines serving Ukiah. Furthermore, there are no nearby pipelines that could be easily extended to serve the town.

APPENDIX B

Major Street Inventories

1997 MAJOR STREETS INVENTORY

Ukiah Transportation System Plan

Roadway Segment Location	Jurisdiction	Level of Importance	Speed	Street	No. of	Passing	Shoulders			On-Street	Curbs	Sidewalks	Bikeway	1997
			Limit (mph)	Width (feet)	Travel Lanes	Lanes (direction)	Width (feet)	Side	Paving	Parking				Pavement Condition*
Arterials														
OR Hwy 244 (Ukiah-Hilgard Highway)														
West UGB Limits to MP 1.04 (Ranger Station)	State	District	55	28	2	No	4 - 6	Both	Partial	No	No	No	No	Good
MP 1.04 to MP 1.38 (Mill Street)	State	District	35	28	2	No	> 6	Both	Paved	Both sides	No	No	No	Good
MP 1.38 to East UGB Limits	State	District	55	28	2	No	4 - 6	Both	Partial	No	No	No	No	Good
Collectors														
County Road No. 1447 - Albee Street														
Main Street to N UGB Limits	County	NA	25	20	2	No	No	NA	NA	No	No	No	No	Fair
County Road No. 1475 - Bridge Camas Street														
South UGB Limits to Main Street	County	NA	25	28	2	No	No	NA	NA	No	No	No	No	Fair
* Pavement condition information for arterials is from the 1997 ODOT Pavement Condition Report. Condition information for collectors is based on field survey conducted by DEA in November 1997.														

APPENDIX C

Umatilla County Population Discussion

Umatilla County Population Discussion

METHODOLOGY AND DATA SOURCES

Population estimates and projections were developed from historical data, official annual estimates, official long-range forecasts, and an impact analysis of four major employers entering or expanding in western Umatilla County. Historical data are compiled as reported by the Census Bureau. Portland State University's Center for Population Research and Census developed annual population estimates for cities and counties for the purpose of allocating certain state tax revenues to cities and counties. The State of Oregon Office of Economic Analysis (OEA) provided long-term (through year 2040) state population forecasts, disaggregated by county, for state planning purposes.

The Office of Economic Analysis used business-cycle trends (as reflected by the Employment Department's employment forecasts) as the primary driver of population and employment for the short term. For the long term, the forecasts shift to a population-driven model, which emphasizes demographics of the resident population, including age and gender of the population, with assumptions regarding life expectancy, fertility rate, and immigration. DEA used a methodology based on OEA's county-distribution methodology in developing population and employment forecasts for each of the cities in Umatilla County. DEA calculated a weighted average growth rate for each jurisdiction (weighting recent growth more heavily than past growth) and combined this average growth rate with the projected county-wide growth rate. This methodology assumes convergence of growth rates because of the physical constraints of any area to sustain growth rates beyond the state or county average for long periods of time. These constraints include availability of land and housing, congestion, and other infrastructure limitations.

These preliminary forecasts were used as a basis for discussion with individuals who have local knowledge and expertise. The projections were then revised based on local input and analysis. One element that had a significant impact on the population analysis was the HUES (Hermiston, Umatilla, Echo, and Stanfield) Growth Impact Study, conducted by the Benkendorf Associates Corporation, Hobson Johnson & Associates, and Martin Davis Consulting, which quantifies the impact of the construction and operation of four major employers.

As required by state policy, this forecast is consistent with the State of Oregon Office of Economic Analysis forecast at the end of the 20-year planning period. Because of the impact of the four large employers, however, the growth of Umatilla County will occur faster in the beginning of the planning horizon, slowing to compensate near the end of the planning period.

These population and employment forecasts were developed to determine future transportation needs. The amount of growth, and where it occurs, will affect traffic and transportation facilities in the study area. This report is not intended to provide a

complete economic forecast or housing analysis, and it should not be used for any purpose other than that for which it was designed.

CURRENT POPULATION AND EMPLOYMENT LEVEL

Estimated at 65,500 in 1997, the population of Umatilla County has grown relatively rapidly since the 1990 Census, with an average annual growth rate of over one-and-one-half percent. The following table shows the estimated change in population for Umatilla County and the jurisdictions of Adams, Athena, Echo, Helix, Pilot Rock, Stanfield, Ukiah, and Weston for 1990 and 1996.

Umatilla County Population Level 1990 and 1996

	1990	1997	1990-1997 Change	
			Number	CAARG*
Umatilla County	59,249	65,500	6,251	1.4%
Adams	223	265	42	2.5%
Athena	997	1,120	123	1.7%
Echo	499	585	86	2.3%
Helix	150	190	40	3.4%
Pilot Rock	1,478	1,585	107	1.0%
Stanfield	1,568	1,770	202	1.7%
Ukiah	250	240	-10	-0.6%
Weston	606	680	74	1.6%

* *Compound Average Annual Rate of Growth*

Source: Portland State University Center for Population Research and Census.

Most of the jurisdictions in Umatilla County have grown at a healthy rate, comparable to the annual growth rate of 1.4 percent for the county overall. The smaller jurisdictions of Adams and Helix have grown at a slightly faster rate, starting from the smaller population bases of 223 (Adams) and 150 (Helix) in 1990.

Populations with Specific Transportation Needs

Certain populations have been identified as having more intensive transportation needs than the general population. These populations include people under the legal driving age, those under the poverty level, and those with mobility limitations.

As stated above, Portland State University's Center for Population and Census estimates the Umatilla County's population as 65,500 in 1997. The Center further estimates that 18,623 of these people, or about 28 percent of the population, is under the age of 18 and that 5,505 are under age 5. Because the purpose of this analysis is to determine the number of people with specific transportation needs, DEA used PSU's age disaggregation to estimate that 16,617 people are under 16, the legal driving age in Umatilla County.

According to the 1990 Census, 16.5 percent of the 57,046 persons living in Umatilla County (for whom poverty status is determined) were below poverty level. Poverty statistics are based on a threshold of nutritionally-adequate food plans by the Department of Agriculture for the specific size of the family unit in question. The distribution of the population below poverty level shows that a larger proportion of younger persons than older populations are affected by this indicator, as shown in the following table.

**Poverty Status
Umatilla County--1990 Census**

	Below Poverty Level			Total* Population	Percent of Total Population Below Poverty
	Male	Female	Total Below Poverty Level		
11 and under	1,408	1,175	2,583	10,929	23.6%
12 to 17	481	517	998	5,223	19.1%
18 and over	2,300	3,538	5,838	40,894	14.3%
Total	4,189	5,230	9,419	57,046	16.5%

* For whom poverty status is determined.

Source: U.S. Census Bureau.

The Census Bureau reports that 3.3 percent of the population 16 and older had a mobility limitation in 1990. Persons were identified as having a mobility limitation if they had a health condition (physical and/or mental) that lasted for six or more months and which made it difficult to go outside the home alone. A temporary health problem, such as a broken bone that was expected to heal normally, was not considered a health condition.

Using the proportion of the population with mobility limitations and below the poverty level¹ in 1990, DEA estimated the number of people with specific transportation needs in 1996. The following table shows that an estimated 34.8 percent of the population may have specific transportation needs. (There is likely to be some overlap between the 3.3 percent of the population with mobility limitations and the 14.5 percent below the poverty level; therefore, the sum of the figures may overstate the proportion of the population with specific transportation needs.)

**Estimated Population with Specific Transportation Needs
1996, Umatilla County**

	Percent of Total Population	Estimated Number
Persons between the ages of 5 and 15	17.0%	11,115
Persons 16 and older under Poverty Level	14.5%	9,480
Persons 16 and older with Mobility Limitation	3.3%	2,130
Total Specific Transportation Needs Population	34.8%	22,725

¹ DEA used the Census Bureau's age disaggregation to estimate that 10.7 percent of the population over the age of 16 was under the poverty level in 1990.

Source: U.S. Census Bureau.

Planning for the overall transportation system will need to consider the special needs of these populations.

HISTORICAL GROWTH

The population of Umatilla County has grown since the 1970s, with significantly slower growth in the 1980s, reflecting a general slowdown in the state's economy. Helix, Pilot Rock, and Weston actually experienced a net population loss between 1970 and 1990. The following table shows the population trend for Adams, Athena, Echo, Helix, Pilot Rock, Stanfield, Ukiah, and Weston, and Umatilla County as a whole.

Umatilla County Historical Population Trend

	1970	1980	1985	1990	1995	1997	1970-1990 Change	
							Number	CAARG*
Umatilla County	44,923	58,855	60,000	59,249	65,200	65,500	14,326	1.4%
Adams	219	240	245	223	260	265	4	0.1%
Athena	872	965	955	997	1,080	1,120	125	0.7%
Echo	479	624	605	499	530	585	20	0.2%
Helix	152	155	155	150	170	190	(2)	(0.1%)
Pilot Rock	1,612	1,630	1,630	1,478	1,560	1,585	(134)	(0.4%)
Stanfield	891	1,568	1,660	1,568	1,700	1,770	677	2.9%
Ukiah	N.A.	249	230	250	270	240	N/A	N/A
Weston	660	719	730	606	655	680	(54)	(0.4%)

* Compound Average Annual Rate of Growth

Ukiah was incorporated in July 1972.

Source: Portland State University Center for Population Research and Census.

The number of people residing in Stanfield nearly doubled between 1970 and 1980. This population growth may have been fueled by some significant housing developments and the location of several food processing plants in Stanfield during this time.

POPULATION AND EMPLOYMENT FORECASTS

Umatilla County is expected to experience population gains for the next 20 years. Like much of rural Oregon, the economy of Umatilla County remains largely seasonal, with nearly one-quarter of all employment agriculture-based. Therefore, population increases are difficult to predict, and are not likely to be as stable as the forecasts appear to imply.

The State Office of Economic Analysis prepared long-term population projections by county. Based on these projections and the methodology described above, preliminary population forecasts for the jurisdictions of Adams, Athena, Echo, Helix, Pilot Rock, Stanfield, Ukiah, and Weston were developed in five-year increments.

An ad-hoc HUES (Hermiston, Umatilla, Echo, and Stanfield) Impact Planning Group was formed in early 1997 to lead cooperative efforts to address growth concerns in western Umatilla County arising from four major employers locating or expanding in the region. The HUES Growth Impact Study, conducted by the Benkendorf Associates Corporation, Hobson Johnson & Associates, and Martin Davis Consulting, quantifies the impact of the construction and operation of these four facilities. Employment impacts are translated into household and population impacts, and disaggregated across the four HUES communities, Pendleton, and rural Umatilla County.

Of these four employers (the Two Rivers Correctional Institution, the Umatilla Chemical Agent Disposal Facility, the Union Pacific Railroad Hinkle Locomotive Shop, and the Wal-Mart Distribution Center and Truck Maintenance Facility), only one (the Wal-Mart Distribution Center) had been announced and incorporated in the long-range population and employment forecast prepared by the Office of Economic Analysis. Because the Umatilla County site was selected as the location for the Wal-Mart Distribution Center in 1994, its impacts were already incorporated in the Office of Economic Analysis long-term population and employment forecast. Applying the HUES methodology, DEA, Inc. subtracted out the impact of the Wal-Mart Distribution Center, in order to identify the population impacts resulting from the three "big four" employers otherwise not accounted for in the OEA forecast.

HUES Population Impacts by Community
HUES Study "Scenario One" Less Wal-Mart Distribution Center

	Base Population	Population Impact		
	1996	2000	2005	2007
Hermiston	11,050	1,681	2,354	1,412
Umatilla	3,310	503	705	423
Echo*	530	81	113	68
Stanfield	1,755	267	374	224
HUES communities subtotal		2,531	3,545	2,128
Pendleton		223	313	188
Rural Umatilla County		223	313	188
Total Population Impact		2,978	4,171	2,503

* The HUES study estimates Echo's base population using utility hook-up data and a 2.5 average household size. However, this methodology yields a base-year estimate inconsistent with the "official" state estimate. As required by state policy, the Transportation System Plan uses the official state estimate as the base population. As appropriate, the TSP uses utility hook-up data as the base number of households.

Source: HUES Growth Impact Study and David Evans and Associates, Inc.

These estimated impacts were then applied to the original population forecast for Echo and Stanfield by the mathematical model. The resulting population forecast is shown in five-year increments in the table below.

Umatilla County Population Forecast

	1995						1995-2000	1995-2017
		2000	2005	2010	2015	2017	CAARG	CAARG
Umatilla County	65,200	72,800	77,000	78,300	79,500	80,073	2.2%	0.9%
Adams	260	270	280	290	300	310	0.7%	0.8%
Athena	1,080	1,160	1,210	1,270	1,330	1,360	1.4%	1.1%
Echo	530	610	640	650	660	660	2.9%	1.0%
Helix	170	190	210	220	230	230	2.7%	1.4%
Pilot Rock	1,560	1,580	1,600	1,610	1,640	1,650	0.3%	0.3%
Stanfield	1,700	2,020	2,130	2,290	2,430	2,490	3.5%	1.8%
Ukiah	270	290	310	320	340	340	1.6%	1.1%
Weston	655	690	700	710	720	730	1.0%	0.5%

Source: 1995 estimates developed by Portland State University Center for Population Research and Census; long-term County forecasts developed by State of Oregon Office of Economic Analysis; and Jurisdiction forecasts and intermediate County forecasts developed by David Evans and Associates, Inc.

Overall, Umatilla County is expected to experience healthy rates of population growth, averaging nearly one percent annually over the planning horizon. As shown in the table, the western portion of Umatilla County is expected to grow faster than the rest of Umatilla County, fueled by the four major employers. Of all jurisdictions included in this analysis, Stanfield is expected to grow the fastest, at an annual average of 3.5 percent at the beginning of the planning horizon, slowing somewhat, but still achieving a very rapid average annual rate of 1.8 percent for the 20-year planning period.

APPENDIX D

Speed Control Measures

TECHNICAL MEMORANDUM

SPEED CONTROL MEASURES

Numerous studies have been carried out to determine the influence of particular roadway features on traffic speed. Some of the most significant characteristics of roadway features are curvature, grades, length of grade, number of lanes, surface condition, sight distance, lateral clearance, number of intersections, and built-up areas near the roadways. Some of the main reasons drivers give for speeding include being in a hurry, to avoid a potential danger, to keep up with other traffic, and to maintain a speed with which the driver feels comfortable.

This technical memorandum describes a variety of speed control measures to address public concern over high-speed traffic through the downtown areas of many of the cities in Grant County. Speed control measures consist of physical controls, passive controls, and psycho-perception controls. Specific speed control techniques for each of these three categories are summarized in the following pages and listed in Table 1 located at the end of this memorandum.

Physical Controls

Physical speed controls are those measures which are physically constructed to restrict or affect vehicle operation or performance. Speed control techniques that can be designed or built into transportation systems include the use of road markings, texturing, medians, street narrowing, and other physical features. They often result in other "traffic calming" benefits such as reduced traffic volumes and noise levels in congested areas. High construction costs somewhat limit extensive use of these types of speed control measures.

Speed Bumps

Speed bumps are short bumps in a roadway used in parking lots, on private roads, and around universities. Their effectiveness at reducing speed is somewhat inconsistent, as drivers tend to slow down to reduce vehicle rocking while traveling over the bumps but will then increase their speeds between the bumps to make up for lost time. They increase the likelihood of vehicle damage and loss of control even when driving over them at low speeds. Speed bumps can be effective in lowering traffic volumes; however, they cause an increase in noise. They also cause problems for snowplows. Speed bumps have moderately high construction costs and little to no maintenance costs once constructed.

Road Humps

Road humps are typically 12 feet long and three to four inches high and can be safely crossed at speeds of 30 mph. Extensive testing has indicated that road humps are effective in reducing speeds on residential streets; that in the 85th percentile, speeds closely match the 25 mph speed limit used on most residential streets. Road humps are less likely than speed bumps to cause loss of control or vehicle damage caused by vehicles bottoming-out. Tests also showed a reduction in injury accidents and no statistically significant change in accidents on surrounding streets that could have been used as alternate routes. Speed bumps tend to reduce traffic volumes by discouraging through traffic on local neighborhood streets. Noise levels go down by slowing down traffic. Speed humps have moderately high construction costs and little to no maintenance costs once constructed.

Rumble Strips

Like road humps, rumble strips have been found to be effective in reducing average travel speeds and are less likely than speed bumps to cause loss of control or vehicle damage. Rumble strips typically consist of rows of raised metallic saucer-like elements affixed to the roadway which cause a mild rumbling under the vehicle and a significant amount of noise when driven over. The effect is to make motorists more aware of their speed and their surroundings with the intent of causing drivers to slow down. This in turn improves safety. Rumble strips have moderate construction costs and low maintenance costs once installed.

A significant disadvantage to this control measure is that it is difficult to construct a rumble surface that would not generate too much noise for adjacent residents. Raised metallic rumble strips also cause maintenance problems for snowplows and can be a hazard if dislodged.

Rumble strips can also be constructed by scoring the roadway pavement, which may be more desirable as they would create less noise. They would not result in a raised profile which would interfere with snowplows and there would be nothing that could become dislodged.

Median Barrier

The primary function of medians is to restrict conflicting turning movements by not allowing left turns from a travel lane into a driveway. Wide medians can also allow for turning pockets at intersections, provide pedestrian refuge, and reduce pavement width. Medians can be as narrow as two to four feet wide within a limited right-of-way.

Medians often slow traffic by giving the appearance of a parkway setting and narrow lanes. They improve safety and may increase the capacity of high-volume streets by limiting conflicting mid-block movements and channelizing traffic at complex intersections. They may improve safety at certain locations by making side street driveways right turn in and out only. Medians also increase pedestrian

safety and ability to cross wider streets by providing mid-street pedestrian refuge. Construction costs for medians are high; however, they have low maintenance costs once constructed.

Traffic Circle

Traffic circles are primarily used to reduce delay at intersections and improve safety. Traffic circles have advantages over traffic signals because they improve intersection operations, tend to have lower accident rates, less severe accidents, and cost less. Entry into traffic circles is continuous and controlled by yield signs. In many situations the capacity is similar to other intersection traffic control.

Traffic circles may reduce delays at intersections and can improve local street access as well as decrease speed depending on design. Traffic circles reduce the number of conflict points and the number and severity of crashes at some locations. Safety may be an issue in areas where drivers are not used to and are unclear about how to use them. Other disadvantages are that they may reduce the opportunity for pedestrians to cross roads and they can be intimidating to bicyclists. Traffic circles also have high construction costs.

Chokers and Road Narrowing

Lateral clearance on a roadway has been proven to have an effect on travel speeds, albeit a minor effect. The narrower a road is, the more slowly drivers tend to travel.

Where on-street parking exists, constructing sidewalks with curb extensions, or bulbs at intersections such that the sidewalk is extended to the end of the parking lane is an effective way to narrow a road. Narrower streets mean shorter crosswalk lengths, thus improving pedestrian safety by reducing the amount of time pedestrians are in the street. Narrow streets also shorten the pedestrian phase at signalized intersections, thus allowing a redistribution of green time to the traffic movements which need it most. They can also slow traffic in these areas.

Road narrowing usually does not result in reduced traffic volumes nor in reduced noise. This measure may cause problems for cyclists if the curb extension conflicts with a bike lane.

This improvement option can be made at a moderate to high construction cost. The cost of a single curb extension is about \$2,000. For all four corners of an intersection, the total cost would be about \$8,000. Once constructed, there is little to no maintenance required for this option.

Passive Controls

Passive speed control measures do not physically alter vehicle operation or speed. They typically consist of regulatory signs or signals and rely on driver compliance to be effective. This inherently makes them

less effective at controlling speeds than physical controls. Their relatively low construction costs, however, may make them more practical to implement on a large-scale basis.

Stop Signs

Experience in the United States over the years indicates that stop signs installed on local streets have little effect on speed except in the immediate vicinity of the signs. Tests found that motorists start to slow down 200 feet before the intersection and return to near normal speed about 100 feet past the stop point. Studies also showed that speeds between intersections are not significantly changed but tend to increase slightly after the installation of stop signs. In addition, some tests found that stop signs installed to control speed were disobeyed on a wide scale. When not forced to stop by a priority vehicle, few drivers came to a complete stop and many did not stop at all. The Manual on Uniform Traffic Control Devices requires that stop signs not be used for speed control.

Speed Limit Signs

Speed limit laws often specify general limits for residential streets, business districts, school zones, or rural areas. The laws usually recognize that safe speed varies from road to road and permit highway agencies to raise or lower speed limits on the basis of an engineering or traffic survey. The basic intent of speed zoning is to identify a safe and reasonable limit for a given road section or zone. The most widely accepted method of setting speed limits is the 85th percentile speed. This is the speed that 85 percent of traffic is moving at or below and reflects the safe speed for the given roadway conditions as determined by a large majority of drivers. The 85th percentile speed is in the speed range where the accident involvement rate is lowest.

Numerous studies have been carried out on the effects of speed limits. Studies on urban and rural roads indicate that speed limits have little or no effect on traffic speed and that drivers respond to changing roadway conditions more so than posted speed limits. A survey of drivers indicated that over three-fourths of the motorists indicated they drive at a speed that traffic and road condition will permit regardless of the posted speed limit. Although the motorists tended to think of speeding as one of the primary causes of accidents, they did not feel that going ten mph over the legal limit was very wrong. One speed study indicated that when the speed limit was raised to match the 85th percentile speed, there was essentially no change in speed. Where the speed limit was lowered, the spread in speeds increased and compliance dropped from 89 percent to 24 percent.

In summary, changing the posted speed limit can be done at a low construction cost with little to no maintenance problems or cost; however, lowering posted speed limits rarely results in actual reductions in speed. Speed zones need to be constantly enforced to be effective. Lowering the posted speed limit rarely results in improved safety because any safety benefits realized by slower speeds is negated by an increase in speed variance. Speed limits can also give pedestrians a false sense of security by expecting drivers to obey signs. Changes to the posted speed limit are not likely to result in any changes in traffic volumes or noise either.

Traffic Activated Signs

Radar can be used to activate variable message signs when vehicles are traveling faster than the speed limit. These signs display the speed indication and the message SLOW DOWN or TOO FAST with flashing beacons to drivers exceeding the posted speed limit. Speed limit signs without beacons produced no significant reductions in speed. Some tests indicated that there was an increase in the speed variance with the speed violation sign. This is an unfavorable effect since it has been shown to increase the likelihood of accidents. Other tests indicated that speeds became more uniform. It is unlikely that a traffic activated sign would have any effect on traffic volumes or noise. These signs have moderately high construction costs and low maintenance costs.

Psycho-Perception Controls

Psycho-perception controls are those speed control measures that rely on drivers' attitudes, perceptions, and reactions to their surroundings. These include knowledge about speed enforcement, perceived safe traveling speed, and reaction to changes in the surrounding environment. They rely less on physically slowing vehicles or driver compliance with the law and more on the human psyche. Nonetheless, their benefits can be quantified and they make an important contribution to speed control.

Enforcement

In the presence of police enforcement, motorists tend to slow down. The magnitude of the speed decrease depends on the relative level of the speed limit and the perceived severity of the threat and enforcement. A marked police vehicle parked with lights flashing and simulating an arrest produces the largest reduction in speed. Stationary enforcement is more effective than moving enforcement in controlling speed. In most cases, the decrease in speed is less than three mph but reductions up to ten mph have been observed. As would be expected, the greater the number of enforcement measures present in a given area or the greater the frequency of presence, the greater the impact on the speed of traffic in that area.

The distance that the speed suppression effect extends from the enforcement measure depends on the frequency or strategy of patrol, the patrol method, the traffic situation, and other factors. In most cases, this distance is less than three miles either side of the measure, but there have been reports of an effect up to four miles upstream and ten miles downstream of the enforcement.

Enforcement also appears to have a carryover effect. That is, the speed suppression effect remains for some period of time after the enforcement unit is removed. The duration of this effect and the factors which can alter it are not well defined, but are associated with driver communication and frequency of exposure.

Speed enforcement not only reduces speed but also has the tendency to reduce accident severity as well. Studies have shown that the variance of speed distribution is reduced by enforcement. The effect of enforcement on speed variance is of interest since it is related to accident involvement. Other studies have shown that the effect of enforcement is to shift the entire speed distribution in the direction of lower speeds without actually altering speed distribution.

Economic and manpower constraints usually prohibit widespread or long-term employment of speed enforcement measures.

Transverse Markings

Transverse markings consist of a series of pavement markings placed across the road. Pavement marking materials consist of paint, thermoplastic, or pre-cut adhesive backed lines. The spacing between the markings gradually decreases as the area of speed control is approached. The marking pattern is intended to give the illusion of high speed and cause drivers to slow down. Tests have shown transverse markings to be successful in producing speed reductions, especially for speeders, and to reduce speed-related accidents, as well as all accidents. The technique may not affect those who are familiar with the area.

Transverse markings do not result in a decrease in traffic volumes nor a decrease in noise. They can create a hazard to pedestrians and bicyclists because some markings are slicker than the normal pavement when wet. Providing painted markings can be accomplished at a low construction cost and do not require much maintenance beyond routine painting.

Crosswalks

Providing marked crosswalks is primarily to improve pedestrian safety. Sometimes crosswalks are effective in causing drivers to slow down when approaching intersections with marked crosswalks. Raised or textured crosswalks are more effective than painted crosswalks at producing this effect, as they act as speed humps; however, they could result in an increase in noise and are not recommended for streets with high traffic volumes. They could also create a safety hazard for bicyclists.

Marked crosswalks indicate to drivers that they are approaching an area of high pedestrian volumes and that they are expected to yield the right-of-way to pedestrians. Crosswalks make crossing streets more pleasant because they delineate and reinforce pedestrian crossing. Area businesses may consider this option a plus.

A danger associated with this improvement option is that marked crosswalks could give pedestrians a false sense of security, especially at unsignalized intersections.

Providing painted crosswalks can be accomplished at a low construction cost (approximately \$3 per linear foot) and do not require much maintenance beyond routine painting. Raised or textured crosswalks have higher construction costs and little to no maintenance costs.

Odd Speed Limit Signs

Differentiated speed limits and advisory speed limits can be considered “odd” speed limits. Differentiated speed limits can consist of different speed limits for day and night or different speed limits for cars and trucks. Advisory speed limits are often used to aid drivers in selecting safe speeds for hazardous locations such as curves, roadwork sites, intersections, and road sections with lower design speeds.

When different speed limits are used for day and night, the night speed limits are generally set at five to ten mph lower than day speed limits. There are no reports available on the effectiveness of these limits, although speeds are generally lower and accident risk has been found to be greater at night.

Different speed limits for cars and trucks have also been used. One study of differentiated speed limits indicated that the actual difference in car and truck speeds was less than the posted ten mph differential except on steep upgrades where trucks could not maintain speed. At most sites studied the actual difference between car and truck speeds was less than six mph.

Studies have indicated that drivers exceeded advisory speeds of 15 to 35 miles per hour but did not exceed 45 and 50 mph speed advisories. Advisory and regulatory 35 mph speed limit signs were shown to have little if any effect on speed compared to the standard curve sign. In general, drivers were not influenced by raising or lowering advisory speeds, but they were influenced by the sharpness of the curve. Additionally, drivers using a highway repeatedly, quickly learn the speed that curvature and road conditions will allow and advisory speeds can be expected to have little effect on them.

As with typical speed limit signs, odd speed limit signs can be installed at a low construction cost with little to no maintenance problems or cost; however, they rarely result in actual reductions in speed. These signs also have a tendency to be ignored, and are more subject to vandalism.

Vertical Elements Along Roadway

This option consists of adding a vertical architectural element to the sides of a two-lane highway within an urban area to give the appearance of narrowness. This technique, sometimes called “Gateway Treatment,” also gives drivers a sense of “place,” i.e., the feeling that they have entered an urban area with lower speed limits, on-street parking, conflicting pedestrian and bicycle movements, and increased highway access.

This treatment may improve pedestrian safety because it causes drivers to be more alert; however, it could also distract motorists’ attention.

The most common and most aesthetically pleasing way of accomplishing this is with the use of trees in a landscaped strip along the highway's edge. Trees provide shade and improve the landscape. The subliminal effect of getting drivers to slow down when driving a stretch of highway treated in this way is best achieved when the trees consist of mature shade trees which provide a canopy over the road somewhat limiting peripheral vision; however, it takes many years for newly-planted trees to reach the maturity level needed to provide the desired effect. The disadvantages of using trees are that trees may conflict with utility lines and outdoor advertising, they may obscure traffic signs and limit sight distance, and trees with heavy leaves or fruit can create slippery conditions. Issues of maintenance including irrigation and drainage must be determined. Appropriate species must be selected so that roots do not disturb sidewalks.

Other vertical elements which could be used in place of trees are period street lamps, signs or even moving building lines closer to the highway edge to provide the illusion of a more narrow right-of-way. Care should be taken so as not to block drivers' sight distance.

This option is a popular improvement because of its aesthetic value, and because it does not compromise safety nor create negative noise impacts. This improvement option is estimated to have moderate to high construction costs; however, there is little to no maintenance required after construction.

Narrowing Lane Widths

Narrowing lane widths may slow traffic through the perceived higher risk of collision in narrower lanes. One study indicated no reduction in roadway capacity when changed from 12-foot-wide to 11-foot-wide lanes. This study noted a decrease in accidents; however, the reduction could not clearly be attributed to the lane modification. Another study of arterials and collectors suggests that for speeds of 30 mph, a 20-foot width is sufficient for a two-lane, two-way road.

Narrowing lane widths marginally shortens crossing distance and may increase pedestrian safety. This technique also has the effect of widening pedestrian space.

Significant narrowing is not feasible where through traffic volumes are close to road capacity. Lanes narrower than 11 feet on through, high volume streets may have higher accident rates. In addition, this technique may limit some truck movements depending on how narrow the streets are. There may also be a decrease in bicycle safety depending on how narrow the lanes are. Motorists may not wait, but attempt to move around a bicyclist even in narrow lanes. The presence of bike lanes might help although motorists might drive in bike lanes.

Narrowing lanes with the use of pavement markings can be accomplished at a low construction cost and little to no maintenance cost.

Bicycle Lanes

Bicycles should be accommodated on virtually all roadways. For most local streets, the traffic volume and speeds are low enough that bicycles and autos can safely share the same roadway. On collector streets and arterials, both the volume and speed of the automobile traffic is high enough that a designated space is needed for bicyclists. In urban areas where there are curbs, a six-foot bike lane is recommended for bicycles, and special care taken to secure safe bicycle passage through intersections. In rural areas without curbs and sidewalks, the typical recommended facility is a shoulder bikeway, where a six-foot standard paved shoulder is provided for bicycles. According to the Oregon Bicycle and Pedestrian Plan, the guideline for rural arterials with a design hour volume of less than 200 vpd is for a paved shoulder which is four feet wide.

Bicycle lanes also improve bicyclist safety and encourage more bicycle trips by improving the cycling experience by taking bike trips out of the general flow traffic lanes. Depending on the existing pavement width, bike lanes can be provided at a low construction cost simply by restriping an existing road (approximately \$0.40 per linear foot). If a roadway has to be widened to provide a bike lane or a paved shoulder, it can be done at a relatively high construction cost (approximately \$45 per linear foot for a facility five feet wide on both sides of the road, built to highway standards, with curbs and striping). After construction, little to no maintenance is required except for routine painting of pavement markings.

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