

# **TANGENT TRANSPORTATION SYSTEM PLAN**

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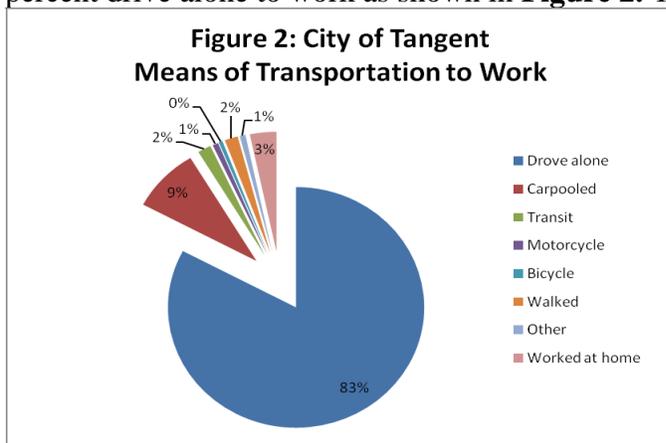
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**EXISTING CONDITIONS  
AND DEFICIENCIES**

## 1.0 Introduction

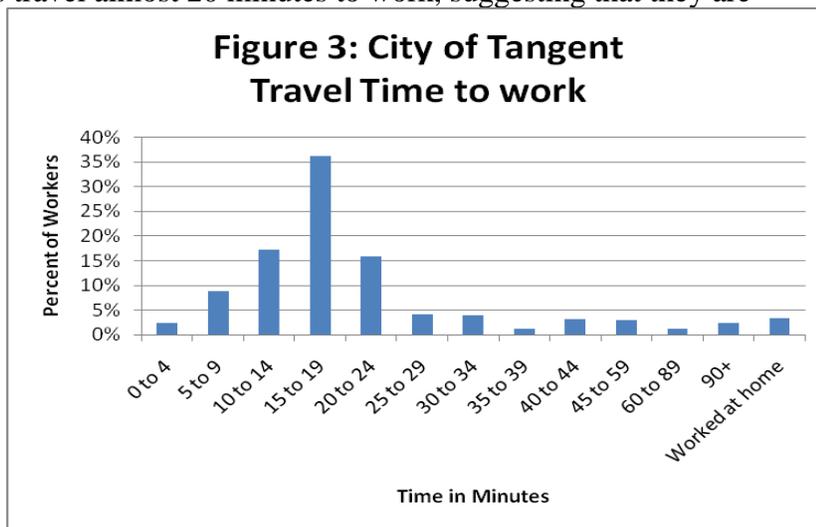
The City of Tangent is located at the junction of Highway 34 and Highway 99E in Linn County's **Figure 1** shows the location of Tangent, which is roughly half way between Salem and Eugene. Because of its location, and proximity to Interstate-5, Corvallis, and Albany, Tangent is experiencing rapid increases in industrial development. Much of the existing development is agriculturally or construction related. Housing has also grown in response to job growth in Tangent and nearby communities. As a result, roughly 12,000 vehicles travel Highway 34 per day. At the same time, nearly 7,000 vehicles use Highway 99E as it passes through town. With the growth in traffic, truck activity has also significantly increased.

Like most people in the U.S., residents of Tangent generally choose to drive alone rather than car pool, use public transportation, bicycle, or walk. The 2000 census results indicate that 83% percent drive alone to work as shown in **Figure 2**. Tangent's drive-alone rate is



higher than the national average of 76%

percent for work trips. This may be because many workers in Tangent actually work outside of the City, either in Albany or other nearby Cities. Travel time to work data (Figure 3) suggests that the majority of employees travel almost 20 minutes to work, suggesting that they are



employed outside of Tangent.

This Transportation System Plan (TSP) is intended to meet the need for long range planning and replace the transportation element of the Comprehensive Plan. Other factors have also influenced the need for a TSP.

In 1991, the Oregon Land Conservation and Development Commission (LCDC) adopted the Transportation Planning Rule (TPR). The rule is intended to implement statewide Planning Goal 12 and, in so doing, provide for a carefully planned transportation system designed to reduce reliance on the automobile and increase walking, bicycling, and the use of transit. Recommendations contained in this TSP are in harmony with the applicable requirements of the TPR.

Also in 1991 and again in 1998, Congress passed transportation legislation which made transportation funding to cities more flexible, but reaffirmed that jurisdictions need to prepare transportation plans. These state and federal requirements and the general need by the City for a comprehensive transportation plan have prompted the City to prepare a TSP. The purpose of this TSP is to address existing and twenty year transportation needs within the City of Tangent. The TSP addresses the needs of transportation in Tangent, which include roadway, bicycle, pedestrian, transit, rail, water, air, and pipeline facilities.

## **2.0 Review of Existing Plans and Policies**

As an initial step in preparing the TSP, existing plans and policies were reviewed to establish the history of planning in Tangent, planned street system improvements, and other county and state planned transportation improvements. The review also served to evaluate consistency between local plans/policies and other county, state, and federal plan provisions affecting transportation.

The review included the following documents:

- City of Tangent Comprehensive Plan
- City of Tangent Planning and Zoning Ordinance
- City of Tangent Public Works Design Standards
- City of Tangent Capital Improvement Program
- Linn County Transportation Plan
- Oregon Transportation Plan
- Oregon Highway Plan
- Oregon Transportation Planning Rule
- ODOT Economic Development Analysis of Highway Corridors
- OTDOT Overview of Statewide Corridors
- Oregon Highway 34 Transportation Corridor Plan
- ODOT Accident Rate Tables
- ODOT Traffic Volume Tables
- Oregon Rail Freight Plan

- Oregon High Speed Rail Capacity Analysis
- Governor’s Transportation Initiative

### **3.0 TSP Goals and Policies**

As part of the TSP, community goals and policies were prepared to guide the development and implementation of the plan. Goals and policies were based on input obtained during public meetings and citizen advisory committee meetings held throughout the project.

#### **3.1 State Goal 12 – Transportation**

The Tangent Comprehensive Plan was revised and adopted by the voters in November 2007. Statewide Planning Goal 12, Transportation, is “to provide and encourage a safe, convenient and economic transportation system.” (OAR 660-015-0000(12)). As part of the Comprehensive Plan revision process, the City of Tangent conducted the Tangent Visioning project, which resulted in a Vision Statement incorporated into the Comprehensive Plan. The transportation element of the Vision Statement states that:

“Tangent has safe, efficient and economical transportation routes. There are orderly and sufficient outlets, inlets, with railroad crossings, walkways and bike paths designed to minimize congestion and speed. Neighborhoods give input on road and pathway design. Tangent neighborhoods are connected through a series of bike and walking paths. Every street is lined with trees and has gained the reputation of a “Tree City”. Tangent has open green space, walkways, and public parks that serve the entire community with public access with connected walkways to existing areas of the community. Streets, highways and pathways meet the needs of the transportation disadvantaged. Streets and highways facilitate the flow of goods and services throughout the community.”

City Goal #1: To provide and encourage a safe, convenient, and economical transportation system within the City.

City Goal #2: To protect the ability of Highway 34 and 99E to move regional traffic through Tangent in a safe manner.

City Goal #3: To lessen the adverse effects of the rapid and frequent movement of trains through the City.

City Goal #4: To encourage the use of alternatives to the private automobile.

Policy 1:

The City will establish street and sidewalk standards with respect to:

1. Right-of-way.
2. Paved width.
3. Surface cover and composition.

4. Base composition and compaction.
5. Curbs and gutters.
6. Street function.
7. Cul-de-sac length and radius.
8. Curb cuts for driveways.
9. Sidewalks and bikeway standards.
10. Wheelchair ramps.
11. Maximum curve.
12. Speed limits.

Policy 2:

The City will participate in any decision to locate or modify transportation facilities within the City limits and the Urban Growth Boundary.

Policy 3:

The City will participate in all decisions involving transportation facilities which affect the City.

Policy 4:

A workable drainage plan, depicting drainage through the roadbed, how ponding will be prevented, and the effects of flooding upon streets, parking areas, and hard-surfaced pedestrian ways shall be approved by the City prior to any street, parking lot, or pedestrian/bikeway construction.

Policy 5:

New and resurfaced roadways and parking areas will not cause or augment ponding or increase damage due to flooding.

Policy 6:

The City of Tangent shall require all streets and pedestrian ways in new subdivisions, major partitions, mobile home parks, mobile home subdivisions, industrial parks and commercial centers to be the financial responsibility of principals behind the proposed use and designed to City standards. All street development shall be completed or bonded for completion prior to construction of the first structure of the proposed development.

Policy 7:

The Planning Commission shall review development proposals for proper street lighting and shall explore methods of lighting existing areas of Tangent, with lights that use low energy, provide proper lighting levels, and are not a nuisance to surrounding neighbors.

Policy 8:

The City of Tangent shall cooperate with the State Department of Transportation and the Linn County Road Department in the identification and removal of hazards, and regulate traffic at intersections, with special regard to the intersections of Highway 34 , Old Highway 34 and Highway 99E. The City shall cooperate with appropriate agencies to limit access points to the above highways.

Policy 9:

The City shall set standards by which it will accept responsibility for streets and roads, and will encourage the County to meet those standards on existing County roads within the City and Urban Growth Boundary.

Policy 10:

A street plan for the entire City, which shows the location of collector roads, bike routes, pedestrian walkways, railroad-crossing safeguards, overpasses, and all public transportation facilities shall be developed. Developers will be required to conform to the plan when building in the City.

Policy 11:

The City shall establish setback requirements from the right-of-way line of Highway 34 and 99E to reduce the effects of noise, pollution, vibration, and accidents to properties adjacent to these arterials and to reduce the negative effects of access from the property onto the arterials.

Policy 12:

1. Prior to each review of the Comprehensive Plan, the Planning Commission will identify traffic problem areas, review and suggest strategies for their solution, and recommend these strategies be included in the Comprehensive Plan.

Policy 13:

Roadways, pedestrian and bicycle ways will be designed to maximize safety and to provide a linkage between systems (i.e. schools, parks, neighborhoods, commercial and industrial areas).

Policy 14:

The City of Tangent shall consider a flexible interpretation of adopted street standards when a strict interpretation of street standards would jeopardize or remove an existing structure, a historic structure, site or object, a community landmark, or when the unique physical characteristics of the land will not permit a strict interpretation of street standards without greatly increasing the cost of the project. A flexible interpretation of street standards shall not reduce the function of a street. If, through a flexible interpretation of standards, a street function would be reduced, then the City shall:

1. Consider the cost of moving the structure, site, object, or landmark at the road builders' expense.
2. Reconsider the function of the street and, if possible, reestablish the street function, but only if the street function can be reestablished without transferring the problem to another part of the City.
3. Apply flexibility to a specific street through modification of on-street parking areas.

### **3.2 Access Management**

**Policy 15:**

The City of Tangent shall require all new commercial or industrial uses and major residential uses which will utilize Old Highway 34 or Highway 99E as primary access, to submit to the City a transportation plan which shows:

1. Location of access points.
2. Estimates of the amount of traffic which will utilize the above access points.
3. Effect on traffic movement of both vehicles and pedestrians that the proposed development will have on Old Highway 34 and 99E.
4. The identification of all improvements that will be required to maintain adequate traffic flow.
5. Permit approval by the Oregon State Highway Division.

**Policy 16:**

Land uses adjacent to Old Highway 34, Highway 34 and Highway 99E shall not reduce the ability of these highways to carry through traffic.

**Policy 17:**

The negative impact of strip development paralleling all State highways will be minimized through access controls, land use review procedures, and zoning.

**Policy 18:**

Subdivisions will provide roadways according to the City street plan.

**Policy 19:**

Direct access to all State highways will be provided only where adequate access to another street is not feasible. Frontage roads and access collection points shall be implemented wherever feasible.

**Policy 20:**

Access control techniques will be used to coordinate traffic and land use patterns, and to help minimize the negative impacts of growth.

**Policy 21:**

The City of Tangent and the Union Pacific Railroad shall cooperate in the siting and issuing of railroad siding permits.

**Policy 22:**

The City of Tangent shall coordinate in all City street improvements, extensions and closures with the State Public Utility Commission when the Union Pacific Railroad is involved.

**Policy 23:**

The City shall cooperate with the Union Pacific Railroad to minimize safety hazards at railroad crossings.

Policy 24:  
Industrially zoned land will have railroad access, wherever possible.

Policy 25:  
Development on land adjacent to the railroad shall be either adequately screened, buffered and constructed, or be activities least affected by noise and vibration.

Policy 26:  
Residential development within 400 feet of the railroad shall be buffered from the noise and vibration of the railroad. The developer shall supply the buffer.

Policy 27  
Consideration of traffic changes due to rail changes will be a major concern for Tangent. None of the current proposals relating to Highway 34 and the Tangent Business Park are capable of supporting public traffic. Addressing this impact should be the subject of extended public discussion over the next transportation planning period.

### **3.3 Public Transportation**

Policy 28  
The City of Tangent shall support the Linn County Senior Bus Service, the Linn-Benton Loop, and any other public or private bus system as both a form of public transportation and an alternative mode of transportation.

Policy 29  
The Bus systems shall be encouraged to stop at the Corner of Birdfoot and Highway 99E. Bus stops should be convenient to citizens of Tangent and the bus systems.

Policy 30:  
The City of Tangent shall identify a commuter transfer point that is:

1. Usable as an off-street parking lot.
2. Convenient to the citizens of Tangent.
3. Useable as bus stops by all transit systems.
4. Useable as collecting points for car and van pools.

Policy 31:  
The City of Tangent shall participate on any committee established to review and develop a regional transportation system.

Policy 32:  
The City of Tangent shall actively pursue improved transportation systems to surrounding cities where major educational, employment, commercial and residential centers are located, as an alternative to private automobiles.

### **3.4 Pedestrian and Bikeways**

Policy 33:

The Planning Commission of the City of Tangent shall consider pedestrian and bikeways when reviewing all development proposals and street improvements.

Policy 34:

The City of Tangent shall combine efforts with local citizens, Greater Albany Public Schools (GAPS), the Linn County Road Department, and the State of Oregon Department of Transportation to identify and eliminate hazards to pedestrians and non-motorized traffic.

Policy 35:

The City of Tangent shall encourage greater use of bicycles by developing, designating and posting bikeways throughout the City and coordinating with local business establishments to provide covered bicycle parking.

Policy 36:

The City shall formulate a bicycle and pedestrian way plan, and incorporate its recommendations into the City Ordinances and Resolutions. The plan shall cover the City and Urban Growth Boundary and tie into other cities and counties plans where feasible.

Policy 37:

Safe bike and pedestrian ways, which are separated from the roadway, shall be encouraged along Old Highways 34 and 99E.

Policy 38:

All new development located in areas with proposed bike/pedestrian ways as identified on the official bike/pedestrian plan map to be developed under Policy 43 36 shall be responsible for the development of the bike/pedestrian way through their property.

## **4.0 Existing Land Use**

At the time the City of Tangent was incorporated in 1973, city limits were established. Later, when the Urban Growth Boundary (UGB) was being located, the state determined that the UGB should be considerably smaller than the original city limits, concluding that the City could not justify the need for such a large land area. **Figure 4** shows the city limits and the UGB. In harmony with the requirements of the TPR, the Tangent TSP addresses the transportation needs within the UGB and not the greater city limits.

According to the 2000 census, Tangent had a population of 933, with 339 households, and 262 families. The City of Tangent had a projected population in 2008 of 985<sup>1</sup>, which is a 5.6 percent increase since the 2000 census, and at 0.7 percent annually. Tangent is split by the east-west Corvallis-Lebanon Highway (Highway 34). The City of Tangent is further divided by the Albany-Junction City Highway (Highway 99E), which runs north and south. As shown in **Figure 5**, Southern Tangent consists of a mix of residential and commercial uses. The commercial uses

are located adjacent to Highway 99E while the residential lands are predominately further from the highway.

Commercial, residential and industrial land uses are also located north of Highway 34. The commercial and industrial properties are within easy access of the junction of the two state highways.

Most of the community destinations such as the Post Office, City Hall, parks, schools, and some shopping are easily accessible by walking or biking in the southern parts of Tangent. Land uses in the northern part of Tangent are more auto-oriented and are not as readily accessible by walking or cycling.

## **5.0 The Existing Roadway System**

### **5.1 Functional Classification**

Functional classification is intended to group streets and highways according to the function they are intended to provide, whether it is cross-town travel or access to a business or residence.

#### **5.1.1 Tangent Classification**

The City of Tangent Comprehensive Plan classifies streets as either arterial, collector, or local streets. Because of the location of Tangent with respect to Highway 99E and Highway 34, much of the street system is made up of arterial streets. Few collector and local streets exist. A review of the existing functional classification was made to determine deficiencies in the street functional classification. These classifications are shown on **Figure 7** and are described as follows:

**Arterial Streets:** The City of Tangent has two arterial street designations: major and minor arterial. Major arterial streets, such as highways and freeways, generally bring traffic to and from other cities and geographic areas. Minor arterials provide a similar function but typically serve vehicle trips across town, rather than between cities. They may also provide connections between major traffic generators as well as important rural routes. The length of the typical trip on the arterial system normally exceeds one mile. Arterial streets often have a considerable amount of commercial and industrial development facing them. Access controls are often necessary to protect carrying capacity and safe access and egress. Generally, residential development is discouraged from having direct access and is served by side streets.

**Collector Streets:** Collector streets accommodate internal traffic movements between different areas such as residential neighborhoods, shopping center, and employment centers. Collectors do not handle long through-trips and are not necessarily continuous for long lengths. Collectors provide connections between the arterial street system and the local street system.

**Local Street:** Local streets primarily serve traffic to and from residential neighborhoods and provide direct access to abutting land uses. These streets directly serve residential neighborhoods and have low traffic volumes. Those streets not designated as either arterials or collectors are considered local streets.

## **5.1. 2 ODOT Classifications**

The state highway classification system divides state highways into five categories based on function:

1. Interstate
2. Statewide
3. Regional
4. District
5. Local Interest Roads

Supplementing the five classifications are four special purpose classifications:

1. Land Use
2. Statewide Freight Routes
3. Scenic Byways
4. Lifeline Routes

These four special purpose classifications address the expectations and demands placed on portions of the highway system by land uses, the movement of trucks, the Scenic Byway designation, and significance as a lifeline or emergency response route.

According to the 1999 Oregon Highway Plan, Highway 34 is classified as a Statewide Highway and as a designated state freight route. In the year 2000 Highway 34 was designated by the Oregon Highway Division as an “Expressway”. Highway 34 is also listed as part of the National Highway system. Highway 99E is classified as a Regional Highway.

### **Statewide Highways:**

Statewide Highways, like Highway 34, typically provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and recreational areas not served by the Interstate Highway system. ODOT’s management objective for this type of roadway is to provide safe and efficient, high-speed, continuous-flow operation. In constrained and urban areas, interruptions to traffic flow are intended to be minimal.

### **Regional Highways:**

Regional Highways, like Highway 99E, typically provide connections and links to regional centers, Statewide and Interstate Highways, or economic or activity centers of regional significance. ODOT’s management objective for Regional Highways is to provide safe and efficient, high-speed, continuous-flow operation in rural areas and moderate to high-speed operation in urban and urbanizing areas. A secondary function is to serve land uses in the vicinity of these highways.

## **5.2 Lane Widths**

Roads within the City of Tangent Urban Growth Boundary vary from two to five lanes in width. Highway 34 and Highway 99E are the only roadways with five-lane sections in Tangent.

Highway 99E narrows to two lanes as the highway enters the southern portion of the City of Tangent. The remaining road sections within Tangent are two-lane sections

### **5.3 Pavement Condition**

Pavement conditions in the City of Tangent were reviewed. The pavement conditions were rated according to such characteristics as age, deterioration, side spalling, cracking, and appearance. Nearly all of the pavement is in fair condition or better. The recently constructed “Meadow Lark Loop” and housing subdivision and part of Lake Creek Drive have pavement in excellent condition. Rolland Drive and Garden Lane are rated excellent, as they were both given a new surface in 1999. Queen Anne’s Lace Drive has poor pavement conditions. Other streets with poor conditions are Old Mill Road, Blackberry Lane between Birdfoot and Old Oak Drive and Oak Lane (a small road that completes Old Mill Road to Hwy 99E). Streets with excellent pavement conditions, which are in recently constructed subdivisions, are Sequoia Street, Meadow Wood Street, Camas Street, Arrowhead Way, and Wildrose Drive.

### **5.4 Jurisdictional Responsibility**

Jurisdictional responsibility is divided between the City, ODOT, and Linn County. The County currently maintains two city-owned streets, Birdfoot Drive and Old Oak Drive (a portion.) Below is a jurisdictional responsibility for the streets.

#### **City of Tangent**

- 
- Blackberry Lane
- Birdfoot Drive
- Old Mill Road
- Rolland Drive
- Queen Anne’s Lace Drive
- Garden Lane
- Old Oak Drive (One block between Old Church Road and Blackberry Lane)

#### **ODOT**

- Highway 34
- Highway 99E
- Old Highway 34

#### **Linn County**

- Looney Lane
- McFarland Road
- North Lake Creek Drive
- Tangent Drive
- Old Oak Drive
- Glass Drive

### **Privately owned**

- Quail Run
- Meadow Lark Loop
- Camas Lane
- Meadow Wood Street
- Sequoia Street
- Eagle Road (except for the portion under OR 34)
- Hooska Avenue
- Mallard Avenue
- Thelma Street (as shown on some maps but not used as a road)
- Conser Place
- Arrowhead Way
- Wildrose Drive
- Brush Lane (as shown on some maps – a driveway without current address)

### **5.5 Traffic Signals**

There currently are three traffic signals located within the UGB. Two of the signals are at the intersection of the Highway 34 ramps and Highway 99E. The signals provide protected left turns to the highway ramps as well as turns into the businesses with driveways opposite the ramps. The third and newest signal is located at the intersection of Old Hwy 34 and Hwy 99E. The signals are traffic actuated.

### **5.6 Speed Limits**

Highway 34 is posted at 55 miles per hour. Highway 99E is also 55 miles per hour, except between the northern city limits and south of Glass Drive where it is posted at 45 miles per hour within the City of Tangent. The speed limit on Old Highway 34 is 45 mph at the westerly end. McFarland Road is 25 mph, along with the local roads east of OR 99E and south of Tangent Drive, and Queen Anne's Lace Drive west of OR 99E. Tangent Drive has a speed limit of 40 mph through the city. North Lake Creek Drive is posted at 35 mph, and Meadowlark Loop west of 99E is 15 mph.

Speeding has been a problem along Highway 34 and as a result the highway is a designed safety corridor. Special signing and enforcement are present to increase safety and maintain speeds at or below the posted levels. Speeding is also an issue along Highway 99E. and Tangent Drive.

### **5.7 Traffic Volumes**

A total of nine study intersections, all under Oregon Department of Transportation (ODOT) jurisdiction, were analyzed. These nine intersections are:

1. OR 99E at McFarland Road
2. OR 99E at Old OR 34
3. OR 99E at OR 34 Westbound (WB) Ramps
4. OR 99E at OR 34 Eastbound (EB) Ramps
5. OR 99E at Lake Creek Drive
6. OR 99E at Tangent Drive

7. OR 99E Birdfoot Drive
8. OR 34 at McFarland Road/Looney Lane
9. Old OR 34 at Industrial Parkway

Sixteen-hour, full vehicle classification, turning movement counts were collected at the intersections of OR 99E at OR 34 westbound ramps, OR 99E at OR 34 eastbound ramps, and OR 34 at McFarland Road/Looney Lane. Based on the volume counts for all intersections within the study area, a system wide peak hour of 4:30-5:30 p.m. was established and used for all nine study intersections.

Figure 11 depicts the road system peak hour counts in the city area.

A light/medium/heavy vehicle split was collected at OR 99E intersections with McFarland Road, Old Hwy 34, Lake Creek Drive, Tangent Drive, Birdfoot Drive, and the intersection of Old Highway 34 at Industrial Pkwy.

Appended to this TSP is a technical memorandum (July 6, 2009) that describes and analyzes the existing transportation conditions. Included are traffic count data and analysis results, and the methods and assumptions used for the analysis and approved by ODOT.

All nine study intersections meet ODOT mobility standards. Queue lengths at intersections are within standards.

### 5.8 Level of Service

Results from the operational analysis results indicate that all of the nine study intersections currently meet jurisdictional mobility standards, as measured by the volume to capacity (V/C) ratio. *Table 1* shows the results of the existing conditions intersection operational analysis.

**TABLE 1**  
Tangent Integrated Land Use and Transportation Plan Update: Intersection Mobility Standards

ID	Intersecting Roadway (OHP Highway Classification)		Control Type	Existing Mobility Standard				Forecas t V/C Ratio	
				0.75 <sup>1</sup>	0.90 <sup>2</sup>	0.27	0.08		
1	OR 99E (Regional TR)	McFarland Road (Local Road)	1-Way Stop	0.75 <sup>1</sup>	0.90 <sup>2</sup>	0.27	0.08		
2	OR 99E (Regional TR)	Old OR 34 (Local Road)	Signal	0.75		0.42			
3	OR 99E (Regional TR)	OR 34 WB Ramps (Statewide FR, TR, EXPR, NHS)	Signal	0.75		0.46			
4	OR 99E (Regional TR)	OR 34 EB Ramps (Statewide FR, TR, EXPR, NHS)	Signal	0.75		0.46			
5	OR 99E (Regional TR)	Lake Creek Drive (Local Road)	2-Way Stop	0.75	0.90	0.17	0.14		

TABLE 1

Tangent Integrated Land Use and Transportation Plan Update: Intersection Mobility Standards

ID	Intersecting Roadway (OHP Highway Classification)	Control Type	Forecast				
			Existing Mobility Standard		t V/C Ratio		
6	OR 99E (Regional TR)	Tangent Drive (Local Road)	2-Way Stop	0.75	0.85	0.17	0.07
7	OR 99E (Regional TR)	Birdfoot Drive (Local Road)	2-Way Stop	0.75	0.90	0.15	0.07
8	OR 34 (Statewide FR, TR, EXPR, NHS)	McFarland Road/Looney Lane (Local Road)	2-Way Stop	0.70	0.80	0.40	0.44
9	Old OR 34 (Local Road)	Industrial Parkway (Local Road)	1-Way Stop	0.80	0.90	0.06	0.07

## Notes:

<sup>1</sup> Indicates OHP Mobility Standard V/C ratio for uncontrolled roadway approach<sup>2</sup> Indicates OHP Mobility Standard V/C ratio for stop controlled roadway approach

Signal: Signalized Intersection

TR – Federally Designated Truck Route

FR – State Freight Route

EXPR – Designated Expressway

NHS – Part of the National Highway System

## 5.9 Safety Analysis

Vehicle crash data for study area intersections and major corridors were analyzed for the years 2003 through 2007. The crash data were analyzed to identify crash patterns that may describe safety deficiencies within the study area.

### Segment Crash Rates

Crash rates, expressed in “crashes per million vehicle-miles (MVM) traveled,” are used to compare the crash experience of one roadway segment to another. This rate expresses how many crashes might be expected of vehicles traveling through a particular section of roadway for a cumulative total of one million miles. Three crash segments were analyzed for this study based on separating them by the study area boundaries.

- 1.24 mile segment on OR 99E
  - from MP 6.71 (northern UGB)
  - to MP 7.95 (.05 miles south of OR 99E at OR 34 EB Ramps)
- 1.37 mile segment on OR 99E
  - from MP 7.95 (.05 miles south of OR 99E at OR 34 EB Ramps)
  - to MP 9.32 (southern Tangent City Limits)
- 2.07 mile segment on OR 34
  - from MP 6.53 (western Tangent City Limits)
  - to MP 8.60 (eastern Tangent City Limits)

**Table 2** provides a summary of the segment crash analysis results.

**TABLE 2**

Tangent Integrated Land Use and Transportation Plan Update: Segment Crash Rate Results

No.	Roadway	Milepost		Length (miles)	2003- 2007 Average AADT	Number of Crashes	Crash Rate	
		From	To				5-year Segment Average	5-year State Average
1	OR 99E (Highway No. 58)	6.71	7.95	1.24	12430	25	0.89	2.61 <sup>1</sup>
2	OR 99E (Highway No. 58)	7.95	9.32	1.37	4880	20	1.64	2.61 <sup>1</sup>
3	OR 34 (Highway No. 210)	6.53	8.60	2.07	23,630	16	0.18	1.19 <sup>2</sup>

Notes:

<sup>1</sup> Based on Urban Cities, Minor Arterial, 2007 Rate

<sup>2</sup> Based on Rural Cities, Other Principal Arterial, 2007 Rate

## General Intersection Safety Observations

During a traffic field visit, conducted May 28, 2009, observations were made in relation to study intersection safety. At the intersection of OR 99E and Birdfoot Drive, the guardrail surrounding the creek appears to have been damaged during previous crashes but not repaired. In its current state, it may not protect vehicles from entering the creek and could puncture those vehicles that collide with it.

The 16-hr counts conducted at OR 34 at McFarland Road/Looney Lane indicated undesirable and illegal maneuvers occurring at this location. Between 6 AM and 10 PM, five vehicles completed eastbound left turns from OR 34 to Looney Lane. This movement is signed as illegal at the intersection. The counts also indicate 11 northbound left turns were completed from McFarland Road to OR 34. While not signed as an illegal movement, it raises safety concerns and is unclear whether it is permitted. Currently, there is a small median separating eastbound and westbound traffic on OR 34 at the intersection. It is located so that it allows vehicles to complete northbound left turns, but prevents vehicles from dwelling in the center two-way left turn lane and completing the turn in two parts. The median location also allows vehicles to cross the highway from McFarland Road to Looney Lane despite a Do Not Enter sign.

## Safety Priority Index System (SPIS)

In addition to crash rates, ODOT also assesses roadway safety via the Safety Priority Index System (SPIS) for state routes. The SPIS takes into account crash frequency, crash rate, and

crash severity. SPIS scores are computed for sections starting at one tenth of a mile. The scores for different roadway segments can be compared to determine where safety improvement funds might best be spent. Typically, ODOT places the highest priority locations where SPIS scores fall within the top 10 percent in the entire state or region. The 2008 top 10% SPIS data for Region 2 was analyzed for this report. There are no SPIS sites located within the project study area.

## **6.0 The Existing Bicycle System**

A bikeway is a facility designed to accommodate bicyclists and can exist as a shared roadway, shoulder bikeway, bike lane, or off-street path. The majority of the bikeways in the City are shared roadways, where motorists and cyclists share the same travel lanes. Most of the other bicycle facilities are shoulder bikeways where the paved shoulder of the roadway is at least six feet wide. Some bike lanes are present where the street has curb and gutter.

There are shoulder bikeways along both sides of the Highway 34 within the Urban Growth Boundary. Shoulder bikeways are also located on Highway 99E, starting from about the Post Office near mile post 9.0, and extending to the north through the remainder of the City. Near the northern part of the City, the shoulder bikeway transitions to a bike lane. Looney Lane also has a shoulder bikeway while part of North Lake Creek Drive has a bike lane. There are no off-street paths in the City of Tangent.

The current design of drainage catch basins has the street grate in the pavement, which can pose a hazard to cyclists. Some cities use a different design that has the drainage inlet in the curb face. This design completely eliminates the drainage grate in the pavement and is safer for bicyclists.

Overall, the City of Tangent lacks a complete pedestrian and bicycle transportation system. While the Oregon Bicycle and Pedestrian Plan supports bike lanes on collector and arterial streets, the plan does not recommend exclusive bike lanes for local streets. On local streets, the appropriate facilities for bicycles are shared roadways because of the lower traffic speeds and traffic volumes.

## **7.0 The Existing Pedestrian System**

Sidewalks serve as an integral part of a larger transportation system designed to safely move people, goods, and services. To encourage walking as an alternative mode of transportation, sidewalks should not only functionally serve as a pedestrian corridor but should also be regarded by the pedestrian as a safe haven from vehicular traffic.

In general, few streets in the City have curbs and gutters, and fewer have sidewalks. The lack of sidewalks forces pedestrians to walk in the street or use some other mode of transportation to reach their destination. It may not be possible or desirable to construct sidewalks on all streets; however, sidewalks are needed on corridors that lead to major activity centers in the City, such as:

- Schools
- Post Office
- City Hall
- Commercial Businesses

Most sidewalks appear to have been constructed concurrent with new developments or due to roadway improvements. There is a continuous sidewalk along both sides of Highway 99E starting from the intersection of Highway 34 and continuing to the north to the City of Albany.

Currently (2010) there are sidewalks along both sides of OR 99E only from the intersection with Old Highway 34 to the North City Limits of Tangent. Newly developed businesses on OR 99E have sidewalks adjacent to the roadway, such as with Barenbrug, ProBuild, and Linn Benton Tractor. Other businesses have condition of approval requirements to add sidewalks when both neighbors add sidewalks and improvements are made to OR 99E. There also are sidewalks on both sides of North Lake Creek Drive, along with a striped shoulder wide enough for bicycles. As lots in the Meadow Wood Estates subdivision are developed, sidewalks are being constructed for each lot and block. There is a sidewalk on one side (east) of Old Church Road adjacent to a subdivision. Elsewhere in the old part of Tangent, sidewalks do not exist.

According to the TPR, sidewalks are required along arterials, collectors and most local streets in urban areas, except that sidewalks are not required along controlled access roadways. In some instances, the UGB is adjacent to one side of the roadway such as along McFarland Road. In these situations, sidewalks may not be needed if development or other walking destinations are not expected on either side of the street.

The City has modified its development standards to provide flexibility in the placement of property line sidewalks for all street standards. This is based in part upon input from Tangent citizens, the consultant and ODOT that pedestrians typically feel safer when using property line sidewalks but already feel safe on many of Tangent's low volume roads that have no sidewalks or shoulders. Property line sidewalks allow street trees to be placed closer to the street, thus encouraging driver to drive slower.

A property line sidewalk setback of 4 feet, is too narrow to support street trees. Four feet is adequate for juvenile trees but will not sustain full grown street trees without damaging the tree and/or the sidewalk. At least five feet is needed for small street tree varieties, while at least eight feet is needed for large street trees.

## **8.0 The Existing Transit System**

The Linn-Benton Loop is run by the Albany Transit System, and operates weekday and Saturday service. It connects Albany and Corvallis via the Linn Benton Community College. Passengers can request a stop at Fisher Implement/Highway 99 in Tangent on an on-call basis.

The Loop operates transit service between Albany and Corvallis with a frequency of roughly every hour. The bus travels along Highway 34 and Highway 99E, and provides service to stops

including Oregon State University and Hewlett Packard in Corvallis, and Linn-Benton Community College and the AMTRAK rail station in Albany.

The Linn Shuttle (which primarily serves elderly and disable persons) also passes through the northern part of Tangent five times per day, and provides connections to Sweet Home, Lebanon, Albany and Millersburg. Shuttle buses are wheelchair equipped. Call (541) 367-4775 for information.

During public meetings, several residents expressed a desire to have improved transit service. Density has a strong influence on the use of transit. Transit requires a relatively high land use density at one or both ends of the trip, or along the travel corridor. Cities generally need a population density of at least three to four persons per acre to support bus service. Tangent currently has a population density less than one person per acre within the UGB.

Other factors, including population and proximity to a larger city, affect whether bus service can be supported. Most cities in Oregon do not have fixed-route local bus service because their relatively small size does not generate enough tax base to support the service. In order to provide efficient transit service, Tangent's land use density, population or tax base would need to increase.

## **9.0 The Existing Rail System**

Roughly 20 trains pass through Tangent daily. Sixteen are freight trains and six are passenger trains. Amtrak has two northbound and two southbound Cascades commuter-style trains between Eugene and Portland daily. The other two Amtrak trains are the Coast Starlight sleeper-style trains running daily each way through Tangent, serving points between Seattle and Los Angeles.

Union Pacific owns the rail line through the City and operates freight rail service. Amtrak operates its passenger trains on the Union Pacific tracks.

Tangent has at-grade rail crossings at Old Highway 34, Tangent Drive, and Birdfoot Drive. Based on recent accident data, conversations with ODOT, and field observations, all crossings are functioning well and are safe; however, ODOT would like to close some of the rail crossings and replace them with a grade separated facility. ODOT's desire to remove crossings is intended to eliminate the "potential" for conflicts between trains and vehicles. The location of the new crossing or the locations of the crossings to be closed have not been evaluated or identified. No other improvements are planned for the existing rail crossings in Tangent, unless there is an expansion of service.

Stormwater flows during high precipitation events currently backs-up at the culvert on the north side of Tangent Drive, which carries North Lake Creek under the tracks. The culvert apparently is undersized. Flooding of Tangent Drive can result, and the track bed and crossing could be compromised.

Residents wanting to use the passenger rail system typically use the station in Albany. The Linn-Benton Loop currently provides transit service to the rail station, but does not have a schedule that coincides with existing train schedules.

## **10.0 The Existing Water, Air, and Pipeline Systems**

There are no airport facilities located within the City of Tangent; however, there are general aviation and commercial airports nearby. Albany has a general aviation airport within 10 miles of Tangent and Corvallis has a general aviation airport within 15 miles. The nearest commercial airport is located in Eugene which is approximately 35 miles away. Portland International airport is the largest commercial airport in Oregon and is located roughly 90 miles from Tangent.

There are no water routes which could be used for transportation within the City of Tangent. There are also no pipeline facilities within the City of Tangent.

## **FUTURE CONDITIONS AND DEFICIENCIES**

## 11.0 Future Land Use and Traffic Growth Assumptions

### 11.1 Land Use Growth

Future land use growth information was updated during the 2009-2010 Tangent Integrated Land Use and Transportation Plan Update. The associated Buildable Lands Inventory identified the location of land parcels that are currently vacant, partially vacant, or redevelopable in the future. Database information also indicated how much of each land use type (i.e. industrial, commercial, residential, etc.) is available to be developed within the City's Urban Growth Boundary (UGB).

Based on data provided by the City, the population of Tangent is expected to grow to 1481 residents within the next 20 years. The estimate is based on the adopted annual growth rate (2.17 percent) in the Comprehensive Plan, assuming 3 years of no growth due to the current economic recession.

According to the 2000 census, Tangent had a population of 933, with 339 households, and 262 families. Tangent's population in 2008 was estimated to be 985, according to the Portland State University Population Research Center, *2008 Oregon Population Report*. This is a 5.6 percent increase since the 2000 census and 0.7 percent annually.

An inventory of buildable lands (Figure 16) was used to determine land supply by zoning, excluding constrained lands due to flood hazard, wetlands, or water quality issues. Results were as follows:

#### Housing land needs:

- The housing needs for the projected population were analyzed, recognizing how households will change over the next 20 years.
- An additional 161 housing units will be needed by 2030 to accommodate projected residential needs.
- There is enough residential land for the housing needs in 2030 within the existing urban growth boundary (UGB), although some available land (approximately 4 acres) may need to be rezoned to residential multi-family.
- 

#### Employment land needs:

- Employment was considered relative to the City's vision and goals statements, and was based on local, regional, and national trends.
- An estimated 810 employees will work in Tangent in 2030, requiring 14.72 acres of industrial/commercial land.
- There are ample industrial and commercial lands available to accommodate projected employment land needs to 2030.

*Figure 16* illustrates the general location of future land use growth within the City of Tangent. As seen in *Figure 16*, industrial development is expected in the northeast parts of Tangent. Highway Commercial/Industrial growth is expected along Old Highway 34 between Looney Lane and Highway 99E. Community Commercial land use growth is planned south of Highway 34, along Highway 99E. Residential growth will predominantly occur in eastern central Tangent,

and in the UGB area north of Highway 34. Parcels that are fully developed within the shaded areas in the figure were not assumed to be available for future growth.

## **11.2 Land Use Densities**

Densities of development were calculated based on information provided by the City’s land use planner. Below are the assumptions used to estimate the density of future development:

<u>Land Use Type</u>	<u>Density Assumption</u>
Industrial -	11.2 jobs per acre
Commercial/Service -	23.5 jobs per acre
Institutional/Government -	20 jobs per acre
Other/Uncovered-	6 jobs per acre
Average jobs density-	15 jobs per acre
Residential -	Approximately 4 units per acre.

## **11.3 Vehicular Trip Generation**

Over the next 20 years, trips will be generated by land use growth within the City of Tangent. Using the ODOT Analysis Procedures Manual, two growth factors were assumed to represent the trips associated with the growth in land use. The OR 99E growth factor (1.85, based on an average annual growth rate of 4.05 percent) was applied uniformly to each of the existing 2009 30th highest hour intersection turn movements to obtain 2030 Future No-Build and Build 30th highest hour intersection volumes, except at the intersection of OR 34 at McFarland Road/Looney Lane, which was adjusted using the OR 34 growth factor (1.44, based on an average annual growth rate of 2.10 percent). Traffic volume would increase in Tangent due to the growth in employment and residents, but the existing street network can accommodate the projected growth.

## **11.4 Background Traffic Growth**

The growth factor discussed in section 11.3 was used for both the background-related and city-related traffic volume growth.

## **11.5 Trip Distribution and Assignment**

For the future No-Build and Build scenarios, trips were distributed based on existing traffic patterns. Figure 19A indicates the future assignment and increase in trip volume for the No-Build condition from the existing condition. With the closure of the OR 34 at McFarland Road/ SW Looney Lane in the future Build condition, trips that accessed OR 34 from McFarland Road or SW Looney Lane will instead access OR 34 from the OR 99E at OR 34 eastbound (EB) ramps or OR 99E at OR 34 westbound (WB) ramps.

## 12.0 The Future Roadway System

### 12.1 Functional Classification

New land uses proposed within the UGB will require new streets to allow connectivity within each development. Future residential and industrial land development will likely require new local streets; however, additional collector and arterial streets are not expected to be needed during the 20-year planning horizon. The areas that will contain the majority of new residential development will be located in the north UGB area of Tangent. Another area that will experience residential growth will be located north of Tangent Drive in the eastern pocket of Tangent’s UGB.

### 12.2 Level of Service

One set of future No-Build and Build traffic volumes were developed that assume no zoning changes from existing land use. A growth factor of 1.85, or 4.05 percent annual, was applied to existing traffic volumes to account for the historical rate of growth in the area to reach future condition traffic volumes.

Results from the operational analysis results show that one of the nine study intersections does not meet ODOT mobility standards for the 2030 Future No-Build scenario. The intersection that does not meet ODOT mobility standards is OR 99E at OR 34 EB Ramps. The heavy flow of vehicles going to and from OR 34 eastbound causes congestion at this intersection: especially on the eastbound approach where vehicles are leaving the highway.

Table 4 shows the results of the 2030 Future No-Build intersection operational analysis. Figure 19B shows the volumes, channelization, and analysis results for all of the study area intersections.

**TABLE 4**

Tangent Integrated Land Use and Transportation Plan Update: No Build Intersection Mobility Standards and Operations

ID	Intersecting Roadway (OHP Highway Classification)		Control Type	Future No-Build			
				Mobility Standard		Forecast V/C Ratio	
1	OR 99E (Regional TR)	McFarland Road (Local Road)	1-Way Stop	0.75 <sup>1</sup>	0.90 <sup>2</sup>	0.50	0.21
2	OR 99E (Regional TR)	Old OR 34 (Local Road)	Signal	0.75		0.70	
3	OR 99E (Regional TR)	OR 34 WB Ramps (Statewide FR, TR, EXPR, NHS)	Signal	0.75		0.73	
4	OR 99E (Regional TR)	OR 34 EB Ramps (Statewide FR, TR, EXPR, NHS)	Signal	0.75		0.94	
5	OR 99E (Regional TR)	Lake Creek Drive (Local Road)	2-Way Stop	0.75	0.90	0.29	0.41
6	OR 99E (Regional TR)	Tangent Drive (Local Road)	2-Way Stop	0.75	0.85	0.32	0.16
7	OR 99E (Regional TR)	Birdfoot Drive (Local Road)	2-Way Stop	0.75	0.90	0.26	0.15
8	OR 34 (Statewide FR, TR, EXPR, NHS)	McFarland Road/Looney Lane (Local Road)	2-Way Stop	0.70	0.80	0.62	0.65

**TABLE 4**

Tangent Integrated Land Use and Transportation Plan Update: No Build Intersection Mobility Standards and Operations

ID	Intersecting Roadway (OHP Highway Classification)		Control Type	Future No-Build			
				Mobility Standard		Forecast V/C Ratio	
9	Old OR 34 (Local Road)	Industrial Parkway (Local Road)	1-Way Stop	0.80	0.90	0.11	0.14

Notes:

<sup>1</sup> Indicates OHP Mobility Standard V/C ratio for uncontrolled roadway approach

<sup>2</sup> Indicates OHP Mobility Standard V/C ratio for stop controlled roadway approach

Signal: Signalized Intersection

TR – Federally Designated Truck Route

FR – State Freight Route

EXPR – Designated Expressway

The future Build condition assumes two network changes, the closure of the OR 34 at McFarland Road/SW Looney Lane and an additional EB left turn lane at the intersection of OR 99 at OR 34 EB Ramps. Vehicles that previously used McFarland Road and SW Looney Lane to access OR 34 will now use the signalized intersections of OR 99 and OR 34 EB and WB Ramps. Results from the operational analysis results show that two of the nine study intersections just barely do not meet ODOT mobility standards for the 2030 Future Build scenario. The intersections of OR 99E at OR 34 EB Ramps and OR 99E at OR 34 WB Ramps both have a V/C ratio (Volume to Capacity) just above standard at 0.77 and 0.76 respectively. Should the Looney Lane access to OR 34 remain as at present, the mobility standard would be met. Future Build operations at these ramps are expected to be acceptable to ODOT.

Table 5 shows the results of the 2030 Future Build intersection operational analysis. Figure 19C shows the volumes, channelization, and analysis results for all of the study area intersections.

**TABLE 5**

Tangent Integrated Land Use and Transportation Plan Update: Build Intersection Mobility Standards and Operations

ID	Intersecting Roadway (OHP Highway Classification)		Control Type	Future Build			
				Mobility Standard		Forecast V/C Ratio	
1	OR 99E (Regional TR)	McFarland Road (Local Road)	1-Way Stop	0.75 <sup>1</sup>	0.80 <sup>2</sup>	0.50	0.21
2	OR 99E (Regional TR)	Old OR 34 (Local Road)	Signal	0.75		0.75	
3	OR 99E (Regional TR)	OR 34 WB Ramps (Statewide FR, TR, EXPR, NHS)	Signal	0.75		0.76	
4	OR 99E (Regional TR)	OR 34 EB Ramps (Statewide FR, TR, EXPR, NHS)	Signal	0.75		0.77	
5	OR 99E (Regional TR)	Lake Creek Drive (Local Road)	2-Way Stop	0.75	0.80	0.29	0.45
6	OR 99E (Regional TR)	Tangent Drive (Local Road)	2-Way Stop	0.75	0.80	0.32	0.16
7	OR 99E (Regional TR)	Birdfoot Drive (Local Road)	2-Way Stop	0.75	0.80	0.26	0.15

TABLE 5

Tangent Integrated Land Use and Transportation Plan Update: Build Intersection Mobility Standards and Operations

ID	Intersecting Roadway (OHP Highway Classification)	Control Type	Future Build Mobility Standard		Forecast V/C Ratio		
8	OR 34 (Statewide FR, TR, EXPR, NHS)	McFarland Road/Looney Lane (Local Road)	N/A	N/A	N/A	N/A	N/A
9	Old OR 34 (Local Road)	Industrial Parkway (Local Road)	1-Way Stop	0.75	0.80	0.11	0.14

**Notes:**

<sup>1</sup> Indicates OHP Mobility Standard V/C ratio for uncontrolled roadway approach

<sup>2</sup> Indicates OHP Mobility Standard V/C ratio for stop controlled roadway approach

Signal: Signalized Intersection

TR – Federally Designated Truck Route

FR – State Freight Route

EXPR – Designated Expressway

NHS – Part of the National Highway System

The capacity that exists in the present city street and county road transportation system (Figure 7) would be adequate to handle forecast traffic volumes under the future No-Build and Build scenarios, given the projected growth for Tangent by 2030, which is approximately another 500 persons.

### 12.3 Lane Widths

No changes to lane widths on OR 99E are needed since the recent improvements to the highway through Tangent. However, as was recently constructed at Tangent Drive, a left turn lane for OR 99E southbound traffic at Birdfoot Drive would better serve future traffic from development in the older, southern part of town. Key existing community facilities in this area include a restaurant, fire station, school, city hall, and developing residential area. There is adequate right-of-way at Birdfoot Drive, at least 80 feet according to current tax assessor's maps, for adding a left-turn lane. Should future residential and commercial development substantially increase traffic turning left onto Birdfoot Drive, a turn lane should be considered.

### 12.4 Pavement Conditions

The road network was evaluated for future pavement conditions based upon existing conditions and anticipated traffic flow demands. If maintenance is continued as it has in the past, most roads will remain in fair or better condition. In order to keep streets in fair or better condition, chip seal, overlay, or reconstruction maintenance will be needed on the following streets:

- Blackberry Lane (south of Birdfoot Drive)
- Garden Lane
- Old Mill Road
- Old Oak Drive
- Queen Anne's Lace Drive

## 12.5 Traffic Signals

Signal warrant analyses were conducted in 2000 (using 2018 traffic) for the unsignalized intersections listed below.

- Highway 99E & North Lake Creek Drive (meets warrant #11 in 2000)
- Highway 99E & Tangent Drive (meets warrant #11 in 2006)
- Highway 99E & Birdfoot Drive (meets warrant #11 in 2012)

Results of the analysis showed that the unsignalized intersections meet at least one signal warrant by the year 2018. The intersections met Peak Hour Volume Warrant – Warrant #11 based upon the PM traffic volumes. Presumably, other warrants, including #1 and #2 would also be met by the year 2018. Although the three intersections met a peak hour warrant, it is unlikely that more than one could be signalized due to inadequate spacing between intersections. The most likely locations for future traffic signals are at and at Highway 99E & Tangent Drive. The Tangent Drive traffic signal would provide pedestrian and vehicular crossing benefits at the intersection, and serves to interrupt traffic on Highway 99E, thus making it easier for traffic on North Lake Creek Drive and Birdfoot Drive to enter and exit the highway. Traffic signals were evaluated at these locations with results as shown in **Table 6**.

**Table 6 – PM Levels of Service at Potential Signalized Intersections**

	Year 2018 Total Traffic	
Location	Overall V/C	Overall Lost
Hwy 99E & Tangent Drive.	0.75	D

A signal was recently installed at the intersection of Old Highway 34 which was forecast to be slightly over ODOT’s volume/capacity threshold by the year 2018. Recent analysis (2009) does not show unacceptable intersection operations at the remaining two intersections. Signalization has provided some safety benefit to pedestrians crossing OR99E. Based on expected traffic growth, the signal will exceed the threshold in the year 2016.

As an alternative, a traffic signal could be placed at the Highway 99E and North Lake Creek Drive in lieu of a traffic signal at Highway 99E and Tangent Drive, but it would not provide the same interruption of traffic for the Tangent Drive and Birdfoot Drive intersections. Pedestrians would find it more difficult to cross Highway 99E if the signal is located at North Lake Creek, instead of Tangent Drive.

## 12.6 Speed Limits

As noted previously, speeding has been a problem along Highway 34 and as a result the roadway is a designated safety corridor. As traffic volumes increase, speeding frequency may decrease due to congestion. Development along Highway 99E and roadway improvements will also provide visual queues to drivers that they need to slow down inside the City. Tangent Drive has been identified by the citizens in the city as a problem with speeders.

## **12.7 Crashes**

As the City of Tangent develops, and traffic growth arises, intersections or areas with frequent accidents will likely experience increased accidents if mitigation is not implemented. Future accident potential at the five highest accident locations is discussed below:

### **Highway 99E and Highway 34 WB Ramps:**

This intersection became signalized and had the traffic signal turned on September 11, 1997. Many of the accidents that have occurred here are a result of turning vehicles being hit by oncoming traffic prior to the signal being activated. Many of these accidents are now being prevented due to the traffic signal protecting vehicles that are making turns. Increased traffic levels at the intersection are not expected to cause the accident frequency to significantly increase.

### **Highway 99E and Highway 34 EB Ramps:**

Many accidents taking place at this location have involved turning vehicles and oncoming traffic, prior to installation of the traffic signal. Many of these accidents are now being prevented due to a traffic signal protecting vehicles that are making turns. Increased traffic levels at the intersection are not expected to cause the accident frequency to significantly increase.

### **Highway 34 and Looney Lane:**

Accidents occur at this location when westbound vehicles, traveling too close or driving too fast, rear-end vehicles slowing to exit Highway 34. As growth occurs more vehicles will exit here to access the adjacent commercial and industrial areas which may increase the number of accidents.

### **Highway 99E and Birdfoot Drive:**

As growth occurs in Tangent, traffic volumes will increase. Without mitigation at this intersection, vehicle conflicts will continue to occur here. All recent accidents that have occurred here have been a result of vehicles turning onto or off of Birdfoot Drive and being hit by vehicles traveling through on Highway 99E. Widening Highway 99E to three lanes would provide a left turn lane refuge and will eliminate many of the conflicts.

## **12.8 Committed Projects**

One project is being planned in the vicinity of Tangent.

ODOT and Linn County are working on a project to eliminate the existing at-grade intersection of Columbus Street and New Highway 34. The intersection could be replaced by an overpass for Columbus traffic and provide right-in and right-out access to the highway. The improvements would also facilitate a potential roadway link to the Tangent Industrial Park and Linn County's EFU zoned lands east of the City. The City should continue to coordinate with the County and ODOT to provide this alternative connection into Tangent. However, the existing private access on the south side of OR 34, approximately 2,100 feet east of the Hwy 99E overcrossing, will not be allowed connection to the industrial park street network, according to ODOT, and would likely be closed with the project's construction. ODOT also will be preparing an OR 34 Corvallis – Lebanon Facility Plan. This facility plan would specify such access controls and changes

along the highway, including any changes to the McFarland Road/Looney Lane intersection in Tangent, and improvements to the interchange with OR 99E.

### 13.0 The Future Bicycle System

As noted previously, not all collector and arterial streets in Tangent have bikeways. **Figure 20** shows the locations that currently need or will need bikeways in the future. **Table 7** lists the bikeway needs based on year 2018 traffic volumes. Bikeway needs are consistent with requirements of the Transportation Planning Rule (TPR) and the guidelines of the Oregon Bikeway and Pedestrian Plan which state that arterial and collector streets should have shoulder or on-street bike lanes. Shared lanes are permitted on collector streets if traffic volumes are less than 3,000 vehicles per day and speeds are low. Bike lanes are generally not needed on local streets; however, a shared bikeway is recommended on Blackberry Drive to encourage north/south bicycle travel without having to use Highway 99E. Figure 32A shows the design and structure of a bike/ped (shared-use) path.

Because Tangent Drive, near the residential neighborhood of Meadow Wood Street, has a narrow or non-existent shoulder for bicycle and pedestrian travel, a bike/ped path ~~also~~ is recommended between Tangent Drive and Garden Lane, as shown on Figure 20. This bike path and pedestrian trail would provide safer travel for school children and residents to the southern part of the city. An upgrade of Tangent Drive (A County-owned road) to collector standards, a proposed and costly road improvement, would lessen the safety need for this lower-cost project.

Old Church Road is currently wide enough to accommodate bike lanes in each direction. These bike lanes are a recommended improvement that would tie-in to the proposed bike path in the street’s presently unimproved right-of-way connection to Tangent Drive, as shown in Figure 20. The bike path could be part of a linear park developed by the City in this block along North Lake Creek.

To the west of the city, North Lake Drive with standard shoulders and Tangent Drive with narrow shoulders lead to the larger city of Corvallis via several County roads. Although shoulders are often minimal through this rural area, the route is popular for bicycle recreation and travel, and warrants designation as a bikeway.

**Table 7 – Bikeway needs**

<b>Street</b>	<b>From</b>	<b>To</b>	<b>Bikeway Type Needed</b>
McFarland Road	Hwy 99E	Old Hwy 34	McFarland Road is classified as a collector street. The posted speed is 25 mph and future traffic volumes will be less than 3,000 vehicles per day. Given the classification, speed, and volume on the roadway, a shared bike lane is appropriate.
Blackberry Drive	Birdfoot Drive	Tangent Drive	Blackberry Drive is classified as a local street. The posted speed is 25 mph and future traffic volumes will be less than 3,000 vehicles per day. Given the classification, speed, and volume on the roadway, a shared bike lane is appropriate.

McFarland Road	Hwy 34	N. Lake Creek Dr.	McFarland Road is classified as a minor arterial street. The speed limit is unposted and drivers commonly drive in excess of 40 mph. Future traffic volumes will be less than 3,000 vehicles per day. Much of the roadway is outside of the UGB. Given the classification, speed, volume, and location of the roadway, a shoulder bike lane is appropriate.
Old Hwy. 34	Looney Lane	Hwy 99E	Old Highway 34 is classified as a local street but should be classified as a minor arterial street (see Roadway Section). The posted speed is 45 mph and future traffic volumes will be greater than 3,000 vehicles per day. Given the classification, speed, and volume on the roadway, a shoulder or on-street bike lane is appropriate.
Tangent Drive	Hwy 99E	City Limits	Tangent Drive is classified as a minor arterial street. The posted speed is 40 mph. Future traffic volumes will be more than 3,000 vehicles per day. Some of the roadway is outside of the UGB. Given the classification, speed, volume, and location of the roadway, a shoulder or on-street bike lane is appropriate.
Birdfoot Drive	Hwy 99E	Old Church Rd.	Birdfoot Drive is classified as a collector. The posted speed is 25 mph and future traffic volumes will be less than 3,000 vehicles per day. Given the classification, speed, and volume of the roadway, a shared bikeway is permitted; however, an on-street bike lane may be more appropriate because the street is also a route to the local elementary school. An on-street bike lane would provide greater safety for young riders traveling to and from school.
Old Church Rd.	Birdfoot Drive	Old Oak Drive	Old Church Road is classified as a collector. The posted speed is 25 mph and future traffic volumes will be less than 3,000 vehicles per day. Given the classification, speed, and volume of the roadway, a shared bikeway is permitted; however, an on-street bike lane may be more appropriate because the street is also a route to the local elementary school. An on-street bike lane would provide greater safety for young riders traveling to and from school.
Old Oak Drive	Old Church Rd.	City Limits	Old Oak Drive is classified as a minor arterial street but should be classified as a

			collector. The posted speed is 25 mph and future traffic volumes will be less than 3,000 vehicles per day. Given the classification, speed and volume of the roadway, a shared bikeway is permitted; however, an on-street bike lane may be more appropriate because the street is also a route to the elementary school. An on-street bike lane would provide greater safety for young riders traveling to school
Hwy 99E	S. of Hwy 34	Post Office	Highway 99E is classified as a principal arterial street. The speed limit is 45 mph. Future traffic volumes are greater than 3,000 vehicles per day. Given the classification, speed, and volume of the roadway, a shoulder or on-street bike lane is appropriate.

### 14.0 The Future Pedestrian System

New sidewalks will be needed as new arterial streets are constructed or brought up to standards. Sidewalks are one way to provide necessary connections between residential areas and major activity centers within the City. Low traffic volume streets and graveled or paved street shoulders also can provide acceptable pedestrian connections within Tangent’s residential core **Figure 21** shows locations with existing and proposed sidewalks. Sidewalk locations are in harmony with Tangent’s Vision Statement requirements of the Transportation Planning Rule (TPR) and the guidelines of the Oregon Bikeway and Pedestrian Plan.

A recommended location for a cross walk with raised median and pedestrian refuge (particularly for school children) is approximately opposite Queen Anne’s Lace Drive, where the highway has now been widened with a painted median and, to the north, a turn lane onto Tangent Drive.

### 15.0 The Future Transit System

As discussed in **Section 6.0**, there is currently no transit service in Tangent. The Linn-Benton Loop and the Linn County Shuttle transit routes pass through northern Tangent along Highway 99E, but they do not have scheduled stops within the city limits.

By the year 2030. Tangent’s population may reach 1,481 persons; however, population density is not expected to exceed three or four persons per acre within the UGB by then, which is the threshold typically needed to support fixed-route bus service.

Although the future City population and density will not be sufficient for new bus service, modifications to existing service may be feasible. The Linn County Shuttle, which currently passes through Tangent, is evaluating the feasibility of bus service to Tangent. The Shuttle could provide connections to the City of Albany and other transit systems including Albany Transit

Service and the Linn-Benton Loop. If service is provided, the Shuttle may need to purchase another bus and hire additional staff.

## **16.0 The Future Rail System**

As discussed previously, roughly 20 trains pass through Tangent daily. Sixteen are freight trains and 4 are passenger trains. ODOT expects that the number of freight trains will increase to as many as 20 trains per day during the TSP planning horizon. Passenger service is also expected to increase to as many as 10 trains per day.

The ODOT Rail division has informed the City that the Union Pacific Railroad has plans to expand the track through the City of Tangent to a double track, and would increase the number and speed of freight trains through the City. Amtrak has plans to add two more Cascades train trips (one northbound, one southbound) each day in lieu of present thru-way bus service between Portland and Eugene. Additionally, the State is looking at adding high speed rail passenger service between Portland and Eugene at speeds of 90-110 miles per hour, though no alignment has been chosen at this point. With this potential expansion, the ODOT Rail division will discourage any new at grade crossings, and would prefer construction of a grade separation (overcrossing) if funding were available and an alignment feasible. Other alternatives likely would be closing of one or two of the three existing at-grade crossings, with widening and improvements to the remaining crossing(s), or a completely new crossing with closure of all three existing crossings. Because only approximately 400 feet separates the rail line and the highway, an overcrossing at Tangent Drive, or other street, would also have to cross OR 99E for an acceptable vertical grade of 5 percent to be possible on the structure. Such a long and tall structure--approximately 800 feet on each side of the UPRR tracks with a vertical clearance of 23.5 feet over the tracks and 17.5 feet over OR 99E--would raise issues of cost-effectiveness for a low-volume road as well as compatibility with the community's Vision Statement.

Regardless of any railroad crossing improvements in the future at Tangent Drive, the culvert on the north side of Tangent Drive that carries North Lake Creek under the tracks needs to be enlarged to provide increased conveyance of stormwater.

## **17.0 The Future Water, Air, and Pipeline Systems**

No future plans or needs are expected for air, water, or pipeline transportation systems within the City of Tangent.

# **TRANSPORTATION SYSTEM PLAN**

## 18.0 General

As a result of existing deficiencies and failure of the existing street network to accommodate future transportation demands, build alternatives were developed and evaluated. The alternatives were developed to mitigate the deficiencies while satisfying the goals and policies outlined in the TSP, as well as other statewide requirements, including the Transportation Planning Rule. The following are the recommended improvements necessary to satisfy the existing and future transportation needs of the City of Tangent. Future improvements are based on the assumed build out of parcels at densities and intensities discussed in **Section 11.2**. Projects regarding ODOT roadways are consistent with the 1999 Highway Plan and standards. ODOT planning staff were involved in the development of the alternatives and final recommendations.

Improvements identified in **Sections 19.0** through **Section 25.0** represent the recommended “build alternatives” evaluated as part of the TSP. The Implementation Plan in **Section 26** lists the probable costs associated with each recommended build alternative. No-build alternatives are not included in the section since their implementation costs are considered to be zero.

## 19.0 Land Use Recommendations

Tangent’s vision for future land use includes remaining a rural community distinct and separate from nearby cities, maintain and encourage existing agricultural activities outside the urban growth boundary (UGB) but within the City limits, preserve the residential area of Tangent by directing commercial and industrial land uses to the northern part of the City, and maintaining a green belt around the residential core.

The *Downtown Tangent Development Plan* (2002) recommends that Birdfoot Drive, along with OR 99E between Birdfoot Drive and Tangent Drive be developed as the Main Street Core Area for the community. Transition zones should be developed to the North and South of this area to aid in traffic calming and cue motorists that they are entering the downtown core. The use of a planted median strip along OR 99E, with turn pockets, will allow for good traffic circulation while helping reinforce the notion of this corridor as a pedestrian friendly area. OR 99E is more suited for the development of businesses that are dependent on through traffic and visibility such as restaurants and grocery stores. There are infill development opportunities on both east and west sides of OR 99E between Birdfoot Drive and North Lake Creek Drive. North Lake Creek Drive and OR 99E would be a good location for a grocery store with parking located behind the building. There are development possibilities on the east side of OR 99E between Tangent Drive and Birdfoot Drive, as well as several buildings along the highway.

The PD (Planned Development) Overlay District should be considered for areas within the Community Commercial District and the Highway Commercial/Industrial District. Perhaps combined with a design review board, a PD Overlay can be used to apply new development standards under an approved plan and program that is professionally prepared. A PD Overlay can encourage new techniques and new technology to community development to achieve economies in land development and maintenance while providing building groupings, open spaces and circulation systems that enhance the working or living environment of the inhabitants. Access management and parking also can be addressed effectively with a PD Overlay in a manner to

protect the function of the state highway, maximize development of available land, and promote the Vision for the community.

Changes in land use, in general, should consider techniques to reduce stormwater run-off, such as with Low Impact Development, and to enhance safety for all modes of travel within the city.

## **20.0 The Proposed Roadway System**

Based on the land use assumptions of the TSP, several roadway system improvements will be needed to support existing and future growth. They include the following:

- Street Functional Classification Modifications
- Transportation System Management
- Pavement Preservation and Maintenance
- Transportation Demand Management
- Capacity Expansion

### **20.1 Street Functional Classification**

The street functional classifications for Tangent are as shown in Figure 7. City plans must be consistent with county and regional plans and with the State plan. For instance, classifying a street as a collector, when Linn County has it listed as a local access road, will not make it eligible for federal funds.

### **20.2 Transportation System Management**

Transportation System Management (TSM) is part of the planning process aimed at improving the efficiency of the existing transportation system. Alternatives discussed below are developed to maximize the operation of existing facilities. TSM type projects include:

- Traffic Signal Adjustment or Installation
- Traffic Lane Modifications
- Truck Route Delineation
- Access Management

The TSM projects are generally low-cost, capital improvements that can be implemented more quickly than larger projects that expand system capacity.

#### **20.2.1 Traffic Lane Modifications**

Traffic growth on OR 99E could make it difficult for minor street traffic to enter and exit the highway as residential areas develop in Tangent. A left turn lane for OR 99E southbound traffic at Birdfoot Drive, as was recently constructed at Tangent Drive, would more safely serve traffic, including buses and carpools carrying students, destined for the school. Also, zoned future development of multi-family housing on Old Oak Drive, and commercial property fronting the highway with probable access from Birdfoot Drive, would increase traffic at this intersection. Should such development occur, addition of a left-turn lane from OR 99E onto Birdfoot Drive is recommended.

## 20.2.2 Truck Routes

A review of the Comprehensive Plan Designations for commercial and industrial areas and review of the levels of commercial truck activity between geographical areas indicates where truck routes are appropriate and where they should be limited. **Figure 26** illustrates the recommended truck routes within the City. Streets not identified as truck routes should restrict through truck travel.

Restricting truck traffic to designated facilities helps eliminate the problem of heavy trucks disrupting residential areas and damaging street pavements not designed for heavy loads. Although through trucks will be prohibited on some streets, local truck traffic, such as farm equipment, trash pick-up and local deliveries, will be permitted. As shown in the figure, trucks should not be permitted on North Lake Creek Drive and Tangent Drive, nor on local streets. The City should work with the Linn County Roads Department to implement the prohibition.

## 20.2.3 Access Management

In order to maintain acceptable operational conditions and help extend the functional life span of major streets, it is proposed that Tangent adopt and enforce access management standards. The standards would apply to all new development and redevelopment of land adjacent to collectors and arterial streets. State standards would apply to Highway 99E under the jurisdiction of ODOT. Access management standards contained in the 1999 Highway Plan are listed in **Table 9 8**. Minor deviation from these standards may be permitted in some cases, but in all cases access must be consistent with the provisions of Oregon Administrative Rule (OAR) 734-051.

**Table 8 –Access Management Standards**

Location	Intersection Spacing
Highway 99E North City Limits to North Lake Creek Drive	990 feet
Highway 99E North Lake Creek Drive to South City Limits	750 feet
Highway 34 East City Limits to West City Limits	1,320 feet

According to the Highway Plan, "...where a right of access exists, access will be allowed to a property at less than the designated spacing standard only if that property does not have reasonable access and the designated spacing cannot be accomplished. If possible, other options should be considered such as joint access."

The Highway Plan further notes that, "...approach roads shall be located where they do not create undue interference or hazard to the free movement of normal highway or pedestrian traffic. Locations on sharp curves, steep grades, areas of restricted sight distance or at points

which interfere with the placement and proper functioning of traffic control signs, signals, lighting or other devices that affect traffic operation will not be permitted.”

The number of approaches per properties along City and Linn County roads should be limited to one. More than one access can be considered if the City determines that additional access is necessary to accommodate and service traffic to the property.

Highway 99E has been widened to provide a center turn lane for approximately a half-mile south of the OR 34 eastbound ramp. At the time of design, a raised median at various locations was considered to limit access, but none were selected for construction. A raised center median can serve a secondary benefit by providing a refuge area for pedestrians crossing the busy highway. Perhaps a more appropriate location for a raised center median and pedestrian crossing refuge (particularly school children), which might not have been considered earlier, is approximately opposite Queen Anne’s Lace Drive, south of where the highway has now been widened with a turn lane onto Tangent Drive.

McFarland Road is a County-owned local road with little traffic past the mobile home park near the intersection with North Lake Creek Drive. However, the 16-hr counts conducted at OR 34 at McFarland Road/Looney Lane indicated undesirable and illegal maneuvers at this intersection. The location of the existing raised median on OR 34 allows vehicles to complete northbound left turns, but prevents vehicles from dwelling in the center two-way left turn lane and completing the turn in two parts. The existing raised median allows vehicles to cross the highway from McFarland Road to Looney Lane despite a Do Not Enter sign. There is no acceleration lane onto OR 34 from Looney Lane, which is a County-owned local road restricted to a right-in/right-out movement for OR 34 westbound traffic. In the near term, the existing raised median should be extended to prevent illegal left-turn maneuvers and crossing the highway entirely from McFarland Road to Looney Lane. Regardless, the south connection of McFarland Road to OR 34 provides no practical benefit to present or future travelers compared to using the OR 34/OR 99E interchange, and should be closed for safety reasons as soon as possible. The distance between McFarland Road and the eastbound OR 34 offramp is only approximately 1,650 feet, which is considerably less than the minimum spacing standard of 1 mile for a rural expressway (OHP Table 18). A cul-de-sac is proposed at the connection, with an off-road bike path continuing approximately 1,000 feet to the Seventh-Day Adventist School property. (Alternatively, McFarland Road could be extended to a private drive, providing vehicular access to the school instead of from OR 34.) For the same reasons, the northern connection of Looney Lane to OR 34 should be closed. Less effective, but with no out-of-direction travel impact for Looney Lane southbound traffic ultimately headed west, would be to restrict the movement to right-out only and provide an acceleration lane. The existing and alternate route connects Looney Lane with Old Hwy 34 and OR 99E to the interchange.

According to the 1999 Oregon Highway Plan, OR 34 is a Statewide Highway and a designated state freight route. In 2000, OR 34 was designated by the Oregon Highway Division as an expressway. OR 34 is listed as part of the National Highway system. OR 99E is classified as a Regional Highway. Any future improvements should address opportunities to meet access spacing standards for OR 99E, OR 34, and county roadways. There are 63 driveway approaches on OR 99E, some of which are unrestricted, open frontages for businesses and residences. In the

southern end of the study area, most approaches are residents and small businesses, towards the north of the study area, the approaches are mainly to access the industrial and warehouse businesses.

All new commercial or industrial uses, multi-family residential uses, subdivisions, and manufactured dwelling parks, including expansion of existing uses, that propose to use an ODOT facility (Old Hwy 34 or new OR 34 or OR 99E) as access is required to submit a Traffic Assessment, which shall include the following: location of access points, estimates of the amount of traffic that will utilize the above access points, effect of the proposed development on traffic movement of both vehicles and pedestrians on OR 34 and/or OR 99E, identification of all improvements required to maintain adequate traffic flow, and approval by the Oregon Department of Transportation.

Consistent with the Oregon Highway Plan, where a right of access exists, access to a property at less than the designated spacing standard shall be in accordance with the Oregon Highway Plan. Access to a property at less than the designated spacing standard access shall be allowed only if it does not have any other reasonable access and the required spacing cannot be met. If possible, other options should be considered, including joint access. Only one approach per property is allowed to a street owned by either the City of Tangent or Linn County. Access to OR 99E and OR 34 is provided only where adequate access to another street or driveway is not feasible in accordance with the relevant policies and statutes.

Should the Community Commercial district be developed between Birdfoot Drive and Tangent Drive, and OR 99E and the UPRR tracks (as identified in the Tangent Downtown Concept Plan, 2002), new access to businesses would be restricted from OR 99E according to access spacing standards of 750 feet (45 mph) for a regional highway. Alternatively, vehicular access for the development's parking would be provided from Birdfoot Drive and Tangent Drive. Pedestrian access would be provided on-site and from off-site, using the proposed pedestrian crossing with raised median refuge south of Tangent Drive. A Planned Development Overlay zone applied to block development in the Community Commercial district should address access management and parking issues. Development in the Highway Commercial/Industrial district also must meet access spacing standards.

#### **20.2.4 Speed Reduction**

As discussed previously, speeding on Highway 99E is a concern of residents in Tangent. In this case, speeding is primarily a result of a street design that inadequately conveys to the driver the appropriate velocity. Drivers generally travel at a speed which they believe to be safe, based on visual information such as traffic volumes, street width, alignment, grades, and roadside obstacles. Thus, because Highway 99E has a rural appearance and is relatively uncongested, it is often driven at a greater speed than if it were an urban type street. Increased police enforcement is an option; however, it would be difficult to manage the problem for a sustained period of time given existing and future police staffing levels. The better solution is to alter the geometric design of the street, so as to self-enforce the desired level of speed.

A traffic light was added at the intersection of OR 99E and Old Highway 34 between 2002 and 2009. The speed limit on OR 99E was reduced between the northern city limits and North Lake Creek Drive from 55 to 45 mph.

Installation of a raised median north of the intersection N. Lake Creek and Highway 99E. and/or between Queen Anne's Lace Drive and Birdfoot Drive on Highway 99E would be expected to encourage speed reduction by drivers to 45 mph or below. In addition, there are still segments of Highway 99E that could be upgraded to urban standards including sidewalks, curbs, gutters, and street trees when adjacent properties are developed.

Until the day when Tangent Drive, posted at 40 mph, is upgraded to minor collector design standards with shoulders and sidewalks, the road through residential areas should be posted with caution signs warning drivers of pedestrians and bicycles on the roadway.

Each of these projects will significantly alter the design appearance of the highway through Tangent and would be expected to reduce traffic speeds to 45 mph or below. Each of these projects are consistent with the policies and goals of ODOT.

### **20.3 Pavement Preservation and Maintenance**

Most streets in the City are currently maintained at a level of fair or better condition. Keeping pavement surfaces in this condition is the most economical method of maintenance. If street conditions are permitted to deteriorate to a poor status, the costs for maintenance increase dramatically. Over the next 20 years, continued maintenance should occur to preserve or improve the condition of Tangent streets. However, funding is inadequate to ensure regular maintenance.

The following streets should be reconstructed and/or paved to provide an all-weather surface:

- Old Mill Road
- Queen Anne's Lace Drive

In addition, the following streets should be resurfaced with an overlay or chip seal during the next 20 years:

- Blackberry Lane (south of Birdfoot Drive)
- Old Oak Lane

Depending on traffic levels and weather conditions, other street sections may need to be overlaid or chip sealed. In addition, it is possible that other public streets in the City will need to be slurry sealed sometime during the 20 year planning period. Periodic inspections of the pavement condition will be necessary to determine if and when other streets need maintenance.

### **20.4 Transportation Demand Management**

Travel Demand Management (TDM) is one alternative in reducing traffic and thus improving the operation of both intersections and roadway links. Travel Demand Management programs are designed to maximize the people-moving capability of the transportation system by increasing the number of persons in a vehicle or by influencing the time of, or need to, travel. Successful TDM strategies help offset some of the negative impacts of future growth on the roadway system or delay the impacts for several years.

TDM strategies include encouraging the use of alternatives to single occupant vehicles (such as car pooling, van pooling, public and private transit, bicycling and walking), and influencing when travel occurs during the day, and how often travel occurs during the week (through compressed work weeks, flexible work schedules, and telecommuting).

Tangent should pursue the following TDM strategies:

- Improved bicycle and pedestrian facilities (see **Section 21.0** and **Section 22.0**).
- Increased transit service (see **Section 23.0**).
- Coordination with major employers to promote transit use, car pools, van pools, and alternative modes of transportations.

Major employers should be encouraged to reduce the number of vehicles at the workplace by implementation of one or more of the following:

- Welcome letter for new employees that includes information about commute options.
- Provide information about bus schedules, bicycle routes, carpools and vanpools.
- Publish information about alternative modes of transportation in the company newsletter.
- Provide a guaranteed ride home for employees who use alternatives to driving alone.
- Allow employees to dress casually on days they use alternative transportation.
- Provide free or discounted transit passes.
- Permit employees to telecommute when appropriate.

The nature of TDM programs are such that the positive impacts on the operation of specific intersections and links are difficult to quantify. TDM programs, however, can be effective and should be implemented as a method to reduce traffic demand in Tangent.

## **20.5 Capacity Expansion**

Results of the traffic study indicate that no significant expansion in capacities of existing streets is needed to support future growth in Tangent. Essentially all of the operational needs can be addressed through other measures such as signalization and minor intersection improvements. The recent widening and addition of turn lanes to Highway 99E has improved traffic safety and turn movements at the intersections.

The Future 2030 No-Build conditions analysis shows the eastbound (EB) approach of OR 99E and OR 34 EB ramps with a LOS F (Level of Service) and a V/C of 1.16 (failing), and an intersection V/C of 0.94. By adding a left turn lane to the EB approach with 100-feet of storage, adding a protected permitted left turn phase and lagging the protected left turn phase, the approach LOS can be brought down to LOS E and the V/C to 0.97; however, the intersection operates at a V/C of 0.82, which does not meet the standard of 0.75 V/C. By adding a left turn movement to the existing through-right lane and keeping the protected left lane separated while operating the east-west approaches split-phased, improved the intersection C/C to 0.72. This V/C meets the ODOT Standard.

The Future 2030 Build conditions analysis shows one intersection will not meet mobility standards. The intersection of OR 99E and OR 34 WB ramps operates at LOS B and V/C of 0.76. By adding right turn pocket of 150 feet, the intersection would operate at LOS B and V/C of 0.71. The necessity of this pocket should be determined in the future.

## **20.6 New Streets**

Figures 29A and 29C show the approximate locations for future street connections in the Tangent UGB and city limits that would be expected as part of future development. New streets would have the functional classification of local streets. Additional connections or extensions would be possible depending upon development plans and city approval. Development of properties in the Community Commercial and Highway Commercial/Industrial districts would have to address access management to the state highway that could potentially involve new private streets.

## **20.7 Street Design Standards**

Roadway design standards are based on the functional classification and operational characteristics of the street. The intent is to provide a street design that can safely and efficiently accommodate traffic demand by autos, buses, bicycles, pedestrians, and emergency vehicles. Street design also influences the development of adjacent land parcels.

In Tangent, the existing street network predominantly consists of local streets with one minor and one rural collector and two arterial streets, according to ODOT's functional classification (Figure 7). As the City develops, new collector and arterial street connection is not expected. Highway 99E was recently upgraded with turn lanes and to improve traffic operations and reduce accidents. The Transportation Planning Rule requires cities to review their roadway standards and reduce excessively wide pavements. As a result, street design standards for local streets were evaluated and found to be overly wide. The City has recently adopted standards for narrower local streets, which also are already common in the older residential parts of Tangent.

Typical pavement widths of existing residential streets in Tangent are 36 feet or less. Generally, local streets have traffic volumes with less than 1,000 vehicles per day, whereas a 36 foot wide street can easily handle 10,000 vehicles per day. Narrower streets also are appropriate for reducing construction costs, stormwater runoff, and resulting in a greater harmony with small neighborhoods. Figures 31C illustrates recommended "skinny" street design standards for Tangent's local streets. Figure 31D shows a cul-de-sac variation. The Tangent Public Works Design Standards include dimensions for arterials, collectors and local streets; these include a local street standard of 28 feet with options from 34 feet to 16 feet in width, ~~curb to curb~~ pavement edge to pavement edge., depending on on-street parking and travel lane queuing provisions. Such narrow streets also are consistent with Low Impact Development (LID) measures to reduce and naturally treat stormwater run-off.

## **21.0 The Proposed Bicycle System**

**Table 9** lists proposed bikeway improvements. For shoulder bikeways, these improvements would include shoulder widening or creation as roads were upgraded. Improvements could be painted marking with "sharrows" or a striped lane on the streets in the case of a shared bikeway or an on-street bike lane. Bike /ped paths would be graveled off-street facilities of 8 to 10 feet in width, which ultimately could be paved. The unimproved right-of-way of Old Church Road

between Birdfoot Drive and Tangent Drive is proposed for a bike path (shared-use), perhaps part of a linear city park, rather than improvement as a street connection. **Figure 32A** depicts the three type of bikeways recommended for use in the City. **Figure 33** illustrates the proposed bicycle system. Bikeway installations are consistent with requirements of the Transportation Planning Rule (TPR) and the guidelines of the **Oregon Bikeway and Pedestrian Plan**. Figure 32A shows the design and structure of a shared-use path for bicycles and pedestrians.

**Table 9 – Recommended Bikeways**

Street	From	To	Recommended Bikeway Type
McFarland Road	OR 34	7th Day Adventist School	Bike Path
McFarland Road	North Lake Drive	OR 34	Shoulder/Shared Bikeway
McFarland Road	Old Hwy 34	OR 99E (north)	Shoulder/Shared Bikeway
Old Hwy 34	McFarland Road	Tangent Industrial Park	Shoulder Bikeway
North Lake Creek Drive	OR 99E	Tangent Drive	Shoulder Bikeway
Tangent Drive	East City Limits	East UGB	Shared Bikeway
Tangent Drive	East UGB	OR 99E	Shoulder Bikeway
Tangent Loop	South City Limits	South UGB	Shared Bikeway
Tangent Loop	South UGB	Old Oak Drive	Shoulder Bikeway
Old Oak Drive	Tangent Loop	Old Church Drive	Shoulder Bikeway
Old Church Road	Old Oak Drive	Birdfoot Drive	Bike Lane
Old Church Road R/W	Birdfoot Drive	Tangent Drive	Bike Path
Shared-use Path	Tangent Drive	Garden Lane	Bike Path
Shared-use Path	Sequoia Lane	Eagle Drive	Bike Path/Emergency Lane
Birdfoot Drive	OR 99E	Garden Lane	Shared Bikeway
Blackberry Lane	Birdfoot Drive	Old Oak Drive	Shared Bikeway
Garden Lane	Tangent Drive	Blackberry Lane	Shared Bikeway

## 22.0 The Proposed Pedestrian System

**Figure 34** shows locations where sidewalks should be completed in the City. In some instances, the UGB is adjacent to one side of the roadway such as along McFarland Road. In these situations, sidewalks are not recommended if development or other walking destinations are not expected on that side of the street. The most important locations for sidewalks are along streets that lead to major activity centers such as the elementary school, post office, City Hall, park and commercial businesses. Sidewalk priorities are based on areas of greatest pedestrian demand and priority areas identified during public meetings on the TSP.

Sidewalks should be at least 5 feet wide and have ramps at the intersections that meet current requirements of the Americans with Disabilities Act.

A recommended location for a raised median and pedestrian crossing refuge (particularly for school children) is approximately opposite Queen Anne’s Lace Drive, south of where the highway has now been widened with a turn lane onto Tangent Drive. The pedestrian system also would be complemented by four proposed bike paths that would function with shared-use.

OR 99E currently acts as a barrier to pedestrian traffic, dividing residential areas from schools and government services. Tangent will need to work with ODOT to design and create pedestrian

crossings on OR 99E to promote safe pedestrian circulation. Pedestrian crossings need to be developed to connect the residential areas along the west side of OR 99E with the civic/downtown areas along the east side of the highway. The elementary school needs a safe, complete connection via sidewalks the length of the west side of OR 99E. Crosswalks, using a textured or colored concrete to cue drivers of the pedestrian area should be considered as part of the streetscape upgrades at Birdfoot Drive and OR 99E.

### **23.0 The Proposed Public Transportation System**

Although the future City population and density will not be sufficient to support new bus service, the City should coordinate with the Linn County Shuttle to modify their existing service to create stops in Tangent. The Shuttle could provide connections to the City of Albany and other systems including Albany Transit Service and the Linn-Benton Loop. If the Shuttle service is modified, the bus should come into the northern and southern parts of Tangent via Highway 99E to allow the greatest number of residents access to the system.

Persons that do not have access to a car or are unable to drive would be those who would benefit the greatest by the proposed service.

### **24.0 The Proposed Rail System**

As discussed previously, ODOT has identified a desire to close some of the existing at-grade rail crossings in Tangent. This need is a low priority issue for ODOT until high speed passenger rail activity increases. If one or more crossings are closed, they would be replaced with a grade separated facility. The location of a new crossing and the actual crossings to be closed have not been identified or evaluated by ODOT.

Although the state would like to remove crossings, the City should retain the crossing if possible. Having multiple crossings helps provide secondary routes for emergency vehicles serving the area and creates more opportunities for street connectivity, especially benefiting bicyclists and pedestrians.

As an alternative, the City should work with the state to install more advanced rail crossing systems if needed to further reduce the potential for crossing conflicts and accidents.

The culvert under the tracks at Tangent Drive should be replaced with one with a larger flow capacity to prevent flooding and potential track bed damage.

### **25.0 The Proposed Water, Air, and Pipeline Systems**

There are not airport facilities, no navigable water routes, nor are pipelines within the City of Tangent, thus no improvements needed or recommended.

# IMPLEMENTATION PLAN

## 26.0 Implementation Plan

Previous sections of this report have identified the 20 year transportation needs with the City of Tangent. The City faces a major challenge to obtain adequate funding to complete the proposed improvement projects. This section presents the recommended implementation plan for these improvements. Projects identified for implementation within zero to five years should receive a priority status to solve more immediate transportation issues.

### 26.1 Project Cost Estimates

Estimates of probable cost were calculated for each improvement project recommended in the TSP. Estimates included design and construction costs and contingencies but not right of way costs. The estimated costs are in 2010 dollars and were determined by examining costs for recent improvement projects in the City of Tangent and other Oregon localities. **Table 11** lists recommended improvement projects, probable costs, and implementation schedule. It should be noted that some project implementation may occur sooner than identified in **Table 11**, depending on when nearby properties develop.

Improvement Type	Location	Description	Estimated Cost (2010 dollars)	Timing
<b>Pedestrian crossing</b>	<b>OR 99E and Queen Annes Lace</b>	<b>Construct raised median for pedestrian refuge and install actuated beacon</b>	<b>\$150,000</b>	<b>0-5 years</b>
<b>Bike/Ped Path</b>	<b>McFarland Road</b>	<b>Construct shared-use path from end of road to school property</b>	<b>\$33,000</b>	<b>10-20 years</b>
<b>Bike/Ped Path</b>	<b>South of Tangent Drive (across from Sequoia)</b>	<b>Construct shared-use path from Tangent Drive to Garden Lane</b>	<b>\$49,000</b>	<b>5-10 years</b>
<b>Bike/Ped Path</b>	<b>Old Church Road</b>	<b>Construct shared-use path from Birdfoot Drive to Tangent Drive</b>	<b>\$37,000</b>	<b>5-10 years</b>
<b>Bikeway</b>	<b>Tangent Drive</b>	<b>Construct shoulder bikeway from OR 99E to east UGB</b>	<b>\$200,000</b>	<b>5-10 years</b>
<b>Curb, Gutter, Sidewalk</b>	<b>Old Oak Drive</b>	<b>Construct curb, gutter, sidewalk (at least one side) between Old Church Road and south UGB</b>	<b>\$550,000</b>	<b>10-20 years</b>
<b>Curb, Gutter, Sidewalk</b>	<b>Birdfoot Drive</b>	<b>Construct curb, gutter, drainage, and sidewalk (at least one side) between OR 99E and Old Church Road</b>	<b>\$195,000</b>	<b>10-20 years</b>
<b>Curb, Gutter,</b>	<b>Tangent Drive</b>	<b>Construct curb,</b>	<b>\$650,000</b>	<b>10-20 years</b>

Sidewalk		gutter, drainage, and sidewalk (at least one side) between OR 99E and east UGB		
Curb, Gutter, Sidewalk	Queen Anne's Lace Drive	Reconstruction, including curb, gutter, drainage and sidewalks	\$134,882	0-5 years
Curb, Gutter, Sidewalk	Old Mill Road	Reconstruction, including curb, gutter, drainage and sidewalks	\$186,000	0-5 years
Curb, Gutter, Sidewalk	Blackberry Lane	Reconstruction, including curb, gutter, drainage and sidewalks\$	\$299,000	0-5 years
Pavement Preservation	Old Oak Lane	Overlay or chip seal pavement	\$75,000	0-5 years
Ramp Widening	OR 34 EB Ramps	Construct additional left-turn lane	\$182,000	15-20 years

**Table 10 – Estimate of Probable Costs and Recommended Implementation Schedule**

**NOTE:** The provided estimates for bike paths include design and construction engineering, 40% contingency, gravel surfacing on all paths and associated construction items. The estimates do not include costs for required right-of-way.

Total costs for the TSP recommended projects are approximately \$2.74 million dollars. Funding for the projects is expected to come from public and private sources. Implementation of the largest cost project, improvements to Old Oak Drive, would depend upon multi-family housing development in the area, and costs could be assigned to the developers. Routine pavement preservation costs for overlay or chip seal are estimated to continue at historic levels. Other identified improvements that are outside of the UGB would be undertaken after projects inside the UGB are completed, which could defer implementation to beyond the 20-year timeframe unless additional funding sources are available.

In addition to the costs noted in the table above, additional storm drainage costs may be applicable based on the actual location and nature of the proposed project. The Tangent Drainage and Stormwater Management Plan should be consulted, Table 6-1 in particular, to verify the scope and estimated costs of major drainage projects that may affect the proposed construction.

## **26.2 Transportation Funding Sources**

The City of Tangent transportation receives funding from federal, state, and local sources.

### **26.2.1 Federal Funding Sources**

Federal transportation funding is obtained primarily from the federal fuel tax, which Tangent residents pay when purchasing gasoline and diesel fuels. However, Tangent is too small to receive federal funds for transportation projects directly from the federal government. Linn County receives funding for areas outside MPOs and smaller than 5,000 persons, and such funds can be spent on County roads in the City, as well as for transit, pedestrian, and bicycle system improvements.

### **26.2.2 State Funding Sources**

The State of Oregon obtains transportation funding from a variety of taxes and fees. These include the state fuel tax, weight-mile fees for heavy trucks, vehicle registration fees, state fines and assessments, and the state cigarette tax. State revenues are used to fund projects on state facilities and are distributed from the State Highway Trust Fund to cities based on population.

### **26.2.3 Local Funding Sources**

The local funding sources identified for transportation projects are described below:

#### **General Obligation (G.O.) Bonds**

The City of Tangent has the authority to sell bonds to pay for street projects that address a current deficiency and should be funded by the community. These bonds are backed by the general taxing authority of the bonds. General obligation bonds must be approved by voters.

#### **System Development Charges**

System Development Charges (SDCs) are fees paid by developers to help meet growth-driven needs. A transportation SDC can be used to fund projects that mitigate the impacts of additional traffic on the existing transportation system.

#### **Transportation System Utility Fees**

Properties can be charged monthly fees for use of the transportation system, similar to other utilities. A transportation system utility fee is an option for the City of Tangent to use for funding street maintenance improvements. The fees would be calculated based on the estimated number of vehicle trips generated by each land use. Cities such as Medford, Ashland, and La Grande currently have transportation system utility fees.

#### **Developer Agreements**

Significant development is expected to occur within the City of Tangent during the 20-year planning period. The costs of constructing new roadways to serve developing land are expected to be paid by developers. Developers would be required to invest in the transportation infrastructure as part of the permit process.

#### **Other Local Funding Sources**

Other possible local funding mechanisms may be available to help fund the TSP. These funding mechanisms include a local gasoline tax, local weight-mile fees, local vehicle registration fees, special assessments, and payroll taxes.

## **27. Public Involvement**

As part of the development of the TSP, a Technical Advisory Committee was formed consisting of community representatives, ODOT, and City Staff. The committee met several times to initiate the study, discuss alternatives, and make recommendations for inclusion in the TSP. Public meetings were also held to assess community support for the options and plan recommendations.

Minutes from Each meeting were recorded by the City of Tangent and are included in the Appendix.

## **Appendix**

### **Plan and Policy Review**

Existing plans and policies were reviewed to establish the history of planning in Tangent, planned street system improvements, and other county and state planned transportation improvements. The review also served to evaluate consistency between local plans/policies and other county, state, and federal plan provisions affecting transportation.

The review included the following documents:

- City of Tangent Comprehensive Plan
- City of Tangent Planning and Zoning Ordinance
- City of Tangent Public Works Design Standards
- City of Tangent Capital Improvement Program
- Linn County Transportation Plan
- Oregon Transportation Plan
- Oregon Highway Plan
- Oregon Transportation Planning Rule
- ODOT Economic Development Analysis of Highway Corridors
- ODOT Overview of Statewide Corridors
- Oregon Highway 34 Transportation Corridor Plan
- ODOT Accident Rate Tables
- ODOT Traffic Volume Tables
- Oregon Rail Freight Plan
- Oregon High Speed Rail Capacity Analysis