PLANNING COMMISSION AGENDA
November 14, 2013
7 p.m. Regular Meeting
Newberg Public Safety Building
401 E. Third Street

I. CALL MEETING TO ORDER

II. ROLL CALL

III. PUBLIC COMMENTS (5 minute maximum per person)
1. For items not listed on the agenda

IV. CONSENT CALENDAR (items are considered routine and are not discussed unless requested by the commissioners)
1. Approval of October 10, 2013 Planning Commission Meeting Minutes

V. WORKSHOP: NEWBERG TRANSPORTATION SYSTEM PLAN UPDATE
Newberg's existing Transportation System Plan (TSP) was adopted in 2005. This project will result in a new, updated plan for the city, along with implementing land use ordinances and a funding plan. The purpose of the workshop is to brief the Planning Commission on the TSP update. It is not expected that the Planning Commission will take public comments.

VI. NEW BUSINESS: TRAFFIC CALMING PLAN: Review the Traffic Safety Commission's proposed traffic calming plan

VII. ITEMS FROM STAFF
1. Update on Council items
2. Other reports, letters, or correspondence
3. Planning Commission Holiday Dinner: December 4, 2013
3. Next Planning Commission Meeting: December 12, 2013

VIII. ITEMS FROM COMMISSIONERS

IX. ADJOURN

FOR QUESTIONS PLEASE STOP BY, OR CALL 503-537-1240, PLANNING & BUILDING DEPT. - P.O. BOX 970 - 414 E. FIRST STREET

ACCOMMODATION OF PHYSICAL IMPAIRMENTS:
In order to accommodate persons with physical impairments, please notify the City Recorder's office of any special physical accommodations you may need as far in advance of the meeting as possible and no later than 48 hours prior to the meeting. To request these arrangements, please contact the city recorder at (503) 537-1283. For TTY services please dial 711.

PLANNING COMMISSION MINUTES
October 10, 2013
7:00 p.m. Regular Meeting
Newberg Public Safety Building
401 E. Third Street

I. CALL MEETING TO ORDER

Chair Cathy Stuhr called the meeting to order at 7:00 PM.

II. ROLL CALL

Members Present:	Cathy Stuhr, Chair	Art Smith, Vice Chair	Jason Dale
	Allyn Edwards	Matt Fortner	Gary Bliss
	Philip Smith	Sulamita Barbiyeru, student pc	

Staff Present: Barton Brierley, Planning & Building Director
Steve Olson, Associate Planner DawnKaren Bevill, Minutes Recorder

Others Present: Andy Becker

III. PUBLIC COMMENTS

Chair Stuhr opened and closed the public comments as no one chose to comment.

IV. CONSENT CALENDAR

Approval of September 12, 2013, Planning Commission Meeting Minutes.

MOTION: Philip Smith/Matthew Fortner to approve the Consent Calendar including the planning commission minutes for September 12, 2013. Motion carried (7 Yes/ 0 No)

V. LEGISLATIVE PUBLIC HEARING

1. **APPLICANT:** City of Newberg
REQUEST: Consider a Development Code amendment to allow large Original Art Murals
FILE NO.: DCA-13-002 **RESOLUTION NO.:** 2013-302

Chair Stuhr opened the Legislative Hearing and called for abstentions, bias, ex-parte contact, or objections to jurisdiction. Commissioner Philip Smith stated during a luncheon, this matter was brought up in conversation by a friend. Commissioner Smith was not aware of this hearing at the time and stated the conversation will not affect his decision.

Mr. Steve Olson presented the staff report accompanied by a PowerPoint presentation (see official meeting packet for full report). A mural is a type of sign and the Oregon constitution requires sign codes to be content-neutral (cannot discriminate against commercial speech). The purpose of the proposed code amendment is to allow original murals on a content-neutral basis if they meet certain objective standards. Staff recommended adoption of Resolution 2013-302 as proposed.

Chair Stuhr opened public testimony at 7:41 PM.

Mr. Andy Becker of Climax Portable Machinery & Welding, thanked staff for working with the company regarding the code regarding the mural celebrating their 50th anniversary and supports the resolution.

Commissioner Fortner asked if Mr. Becker has a sketch of the mural. Mr. Becker had two in his possession and shared them with the commissioners.

Chair Stuhr closed the public testimony at 7:47 PM.

MOTION: Art Smith/Matthew Fortner to adopt planning commission Resolution No. 2013-302 as recommended. No vote.

The commissioner's discussed their concerns regarding control of content on murals. Chair Stuhr stated code could be changed in the future if murals become derogatory. She does not want to prohibit them as it would prevent people from showing their artistic talent. The commissioners also discussed pros and cons of allowing murals along the Newberg-Dundee bypass.

MOTION: To adopt planning commission Resolution No. 2013-302 with friendly amendments, amending the five-year period to a three-year period, restrict murals from facing Hancock Street and First Street within the C-3 zone only, to delete "G" on page 13 regarding landscaping, and to prohibit murals on the bypass until January 1, 2017. Motion carried (7 Yes/ 0 No)

Chair Stuhr called for a five-minute recess.

VI. WORKSHOP: Subdivision submittal requirements

TIME – 8:17 PM

Mr. Brierley, planning & building director, presented a subdivision review process summary accompanied by a PowerPoint presentation (see official meeting packet for details). He explained the objectives of the workshop are to familiarize the planning commission with the complete process for subdivision review, to look at the current submittal requirements for subdivision tentative plats and discuss whether there could be improvements to the submittal requirements, and to familiarize the planning commission with the process for agency review of subdivisions. Staff welcomed input from the planning commission.

Commissioner Bliss stated it has been his experience if something in writing is given prior to the application it is more likely to cover things that will not come up during the verbal process. The planning commission should not be approving or reviewing a tentative plat map that will be changed. The information is either there at the time of review or it is incomplete.

The commissioners discussed the need for clear and objective language throughout the code. Commissioner Philip Smith suggested a workshop to examine and identify vague language in the code. Chair Stuhr stated she would like to view traffic study reports showing cumulative impacts.

VII. ITEMS FROM STAFF

TIME – 8:54 PM

1. Update on Council items

Barton Brierley reported the city council created a temporary sign committee to look at portable and temporary sign regulations and will appoint committee members to make recommendations on changes. Mr. Brierley said one member of the planning commission should be a member of that committee. The Terra Subdivision appeal hearing will be held on November 18, 2013 at the City Council.

2. Other reports, letters, or correspondence

Mr. Brierley stated planning commission terms expire at the end of this year for Commissioners Edwards, Fortner, and Art Smith. Each can reapply by November 4, 2013, by 4:30 PM.

It was the consensus of the planning commission to hold their holiday social dinner on December 5, 2013, with details to follow.

3. The next planning commission meeting is scheduled for Thursday, November 14, 2013 to discuss the Transportation System Plan (TSP) update. The traffic safety commission will be invited to attend.

VIII. ITEMS FROM COMMISSIONERS

No items were brought forward.

IX. ADJOURN

Chair Stuhr adjourned the meeting at 9:02 PM.

Approved by the Planning Commission on this 14th day of November, 2013.

AYES: **NO:** **ABSENT:** **ABSTAIN:**

_____ _____

Planning Recording Secretary *Planning Commission Chair*

Planning and Building Department
P.O. Box 970 ▪ 414 E First Street ▪ Newberg, Oregon 97132
503-537-1240 ▪ Fax 503-537-1272 ▪ www.newbergoregon.gov

PLANNING COMMISSION STAFF REPORT
WORKSHOP: TRANSPORTATION SYSTEM PLAN

MEETING DATE: November 14, 2013

FILE NO: CPTA4-11-001

TOPIC: Transportation System Plan Update

ATTACHMENTS:

1. Existing Conditions Memo
2. Future Conditions Memo

At your November 14, 2013 meeting, you will hold a workshop on the Transportation System Plan update. We have invited the Traffic Safety Commission representative also to attend.

DKS Associates is the consultant who is drafting the plan. They will have representatives at the meeting to make the presentation. We will be discussing two items:

1. Existing Conditions
2. Future Needs

Attached are memos on each of these items.

What Makes Newberg Different?

The City of Newberg is located in the Willamette Valley, between Portland and the Oregon Coast. As shown in Figure 1, Newberg is a junction for three of Oregon's highways: Highway 99W, OR 240, and OR 219. Newberg is unique in that it maintains a smaller town feel, but is still conveniently close enough for an easy trip into Oregon's biggest metropolitan area. The City of Newberg borders the Willamette River on the south side and is abutted by farms, vineyards and rural forests on the edges of the city. Newberg is located in the heart of the Willamette Valley, a renowned wine making region, and is situated just a few miles east of Dundee. This setting has proved attractive to new residents, with the population growing from 18,064 in the 2000 census to 22,068 in 2010.

Tractor from a nearby farm traveling through the residential neighborhoods in Newberg

Figure 1: Newberg Vicinity Map

Newberg provides many attractions for visitors. The city is home of the Chehalem Cultural Center, Roger's Landing, and George Fox University among many other attractions. George Fox University had an enrollment of just over 3,500 students for the 2011-2012 school year. The campus encompasses about 108 acres on the northeast side of downtown Newberg. The university hosts cultural and athletic events all year long on the campus which draws visitors to the city.

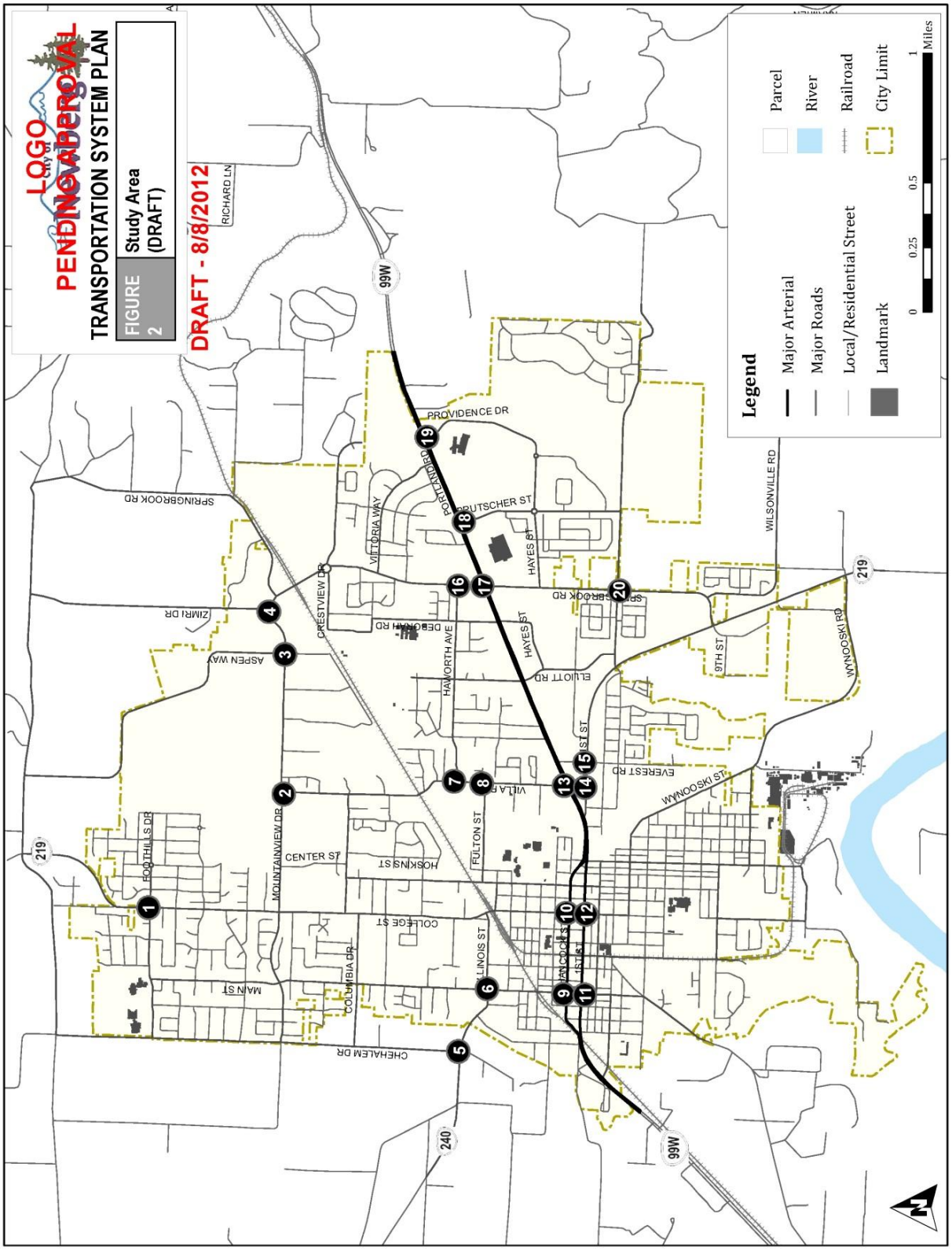
The location of Newberg provides the opportunity for many recreational activities. Near the city there are 11 parks and within the city there is a skateboarding and BMX park. The city is also within an hour drive to the Oregon Coast and adjacent to the Willamette River.

Newberg's first postmaster named the city in 1869 and by 1887 the population was around 200 people. The city became incorporated as a town in 1889 and as a city in 1893. Newberg's location on key freight corridors has always been part of its identity. Early on, Newberg was a key shipping hub along the Willamette River, and later gained interurban rail service when the Red Electric line opened between Portland and Eugene. The automobile age saw the opening of the Capitol Highway through the center of Newberg, which in 1930 was assigned the US Route number 99W. The role of 99W as a key route between the Portland region, the Oregon coast, and attractions is as important to the character of Newberg today as it was when the highway first opened.

The City of Newberg is continuing to make the city an attractive location to visit and live. The city is currently working on the Newberg Cultural District Master Plan which is a plan to further enhance the downtown of the city with the primary focus on the areas surrounding the Chehalem Cultural Center and Newberg Public Library. The focus area and buildings of this plan are planning to be set up so that outdoor events, farmer's markets, beer and wine tasting events, and much more can be held in the downtown area.

Also, the City has worked closely with state and regional partners to plan and design a 99W bypass route that will alleviate some of the traffic issues through the downtown core of Newberg. The planning efforts associated with this Transportation System Plan (TSP) update will address some of the concepts associated with the bypass plans but will primarily focus on ways to enhance the City as a whole. The City of Newberg identified key intersections that will be evaluated as part of this TSP. These intersections are shown in **Error! Reference source not found.**, as well as major roadways and intersections that were reviewed for motor vehicle, pedestrian, and freight activity.

Figure 2: Newberg Roadways and Study Intersections



Where Do People Want to Go?

Planning for a transportation system that meets the City's needs requires an understanding of key travel destinations throughout Newberg – locations that create demand for travel because they are where people go to work, to school, or to take care of other daily needs. These key destinations can be thought of as activity generators, or trip attractors.

Activity generators may be destinations that residents use for their daily needs, or they may be attractions that draw travelers from around the region. The most common categories of activity generators in Newberg include:

- Recreational (e.g., parks, trails)
- Schools (e.g., Newberg High School, George Fox University)
- Places of employment (e.g., business and industrial locations)
- Shopping (e.g., grocery stores, restaurants)
- Public transportation (e.g., bus stops)
- Tourist Locations (e.g., Rogers Landing, Chehalem Cultural Center)

All of these activity generator types represent important starting and ending points for travel in Newberg, and they provide a basis for assessing important travel routes.

How Do People Get There?

Planning for an effective transportation system also means understanding how Newberg residents, workers, and students choose to travel to and from destinations, whether by foot, bicycle, public transportation, motor vehicle, or other mode. Understanding mode choice includes assessing existing travel patterns and activity levels, and looking at the underlying factors particular to Newberg that inform mode choice.

The Commute to Work

Travel occurs for many reasons, including school, shopping, and recreation. The trip type that people most often associate with traffic problems, though, is their work trip, which often occurs in peak traffic conditions. 74% of working Newberg residents commute to work by driving alone (single occupant motor vehicle or SOV), 13% carpool to work, and 6% walk to work. Public transportation (1 %) and bicycling (<1 %) are not common modes for the journey to work, and 5% work at home.

Table 1 compares Newberg residents' mode choice for commute to Yamhill County and to Oregon statewide. The proportions of Newberg residents driving alone and carpooling to work were both slightly higher than the statewide average, and the percentage commuting by transit and biking is lower in Newberg than it is statewide. However, the proportions of residents walking are slightly higher than the statewide average. Overall, the comparisons are similar between Newberg and Yamhill County as a whole.

Table 1: Percent of Commuters Using Modes

Transportation Mode	Newberg	Yamhill Co.	Oregon
Motor Vehicle – Single Occupant	74%	75%	72%
Motor vehicle - Carpool	13%	12%	11%
Walked	6%	5%	4%
Biked/Other	<1%	2%	3%
Public Transportation	1%	1%	4%
Worked from Home	5%	5%	6%

Source: 2006-2010 American Community Survey

While data on commute-to-work mode choice is important in understanding major travel patterns, it is important not to confuse this with overall levels of activity for different travel modes. Work trips for Newberg residents cover long distances in many cases, with 51% of work trip destinations being outside of Yamhill County. Non-motor vehicle modes tend to be more likely for shorter non-work trips to and from other activity generators like schools, recreation, and shopping.

Existing Activity Levels

Pedestrian, bicycle, and motor vehicle activity at intersections throughout Newberg was reviewed for the p.m. peak period (4:00 p.m. to 6:00 p.m.) on a typical weekday in April.[1] The counts were taken at a time when school was still in session and when the weather was adequate for higher levels of pedestrians and bicycles. However, in summer months, activity levels are generally higher due to an increase in the number of visitors and vacationers traveling through. Also, weekend activity levels were not measured, but because of the higher level of shopping and recreational travel on weekends, pedestrian and bicycle activity would be expected to be higher.

Pedestrians crossing at 1th Street and 99W

Pedestrian Volumes

Of all the intersections reviewed, one location on Highway 99W had notably higher levels of pedestrian crossing activity than the other study intersections. The highest pedestrian volume was where 1st Street (Highway 99W) intersects with College Street, which is near both the George Fox University Campus and the Newberg Public Library. The HAWK signal located on OR 219, just west of Everest Road and the intersection of Springbrook Road and Haworth Avenue, also had notably high pedestrian volumes. Both of these locations are outside of the downtown core area but are in commercial areas that provide adequate sidewalks

[1] Based on counts conducted April 19, 2012 and April 24, 2012

and crossings that lead into residential areas just outside of the Highway 99W corridor. As can be seen in Figure 3, the intersections of Mountainview Drive/Zimri Drive and Providence Drive/Highway 99W had no pedestrians during the p.m. peak hour. Both of these intersections are on the edge of the City where there is very little commercial or residential development.

Bicycle Volumes

During the weekday p.m. peak period, bicycle volumes are low (four bikes or less per intersection during the p.m. peak hour) through Newberg. The intersections that had the highest bicycle volumes were along OR 219 at 1st Street, Highway 99W, and Fulton Street with a total of four bicycles during the p.m. peak hour. These intersections are generally close to George Fox University and provide adequate bicycle paths that would encourage bicycle traffic. The majority of the study intersections had no bicycle activity during the p.m. peak hour. Bicycle use tends to vary seasonally, as warmer, dryer weather and longer daylight hours make it a more attractive travel mode so it is expected that bicycle volumes would be higher in the summer months. Bicycle activity is shown for only the 20 study intersections for the one-hour p.m. peak period is shown in Figure 3.

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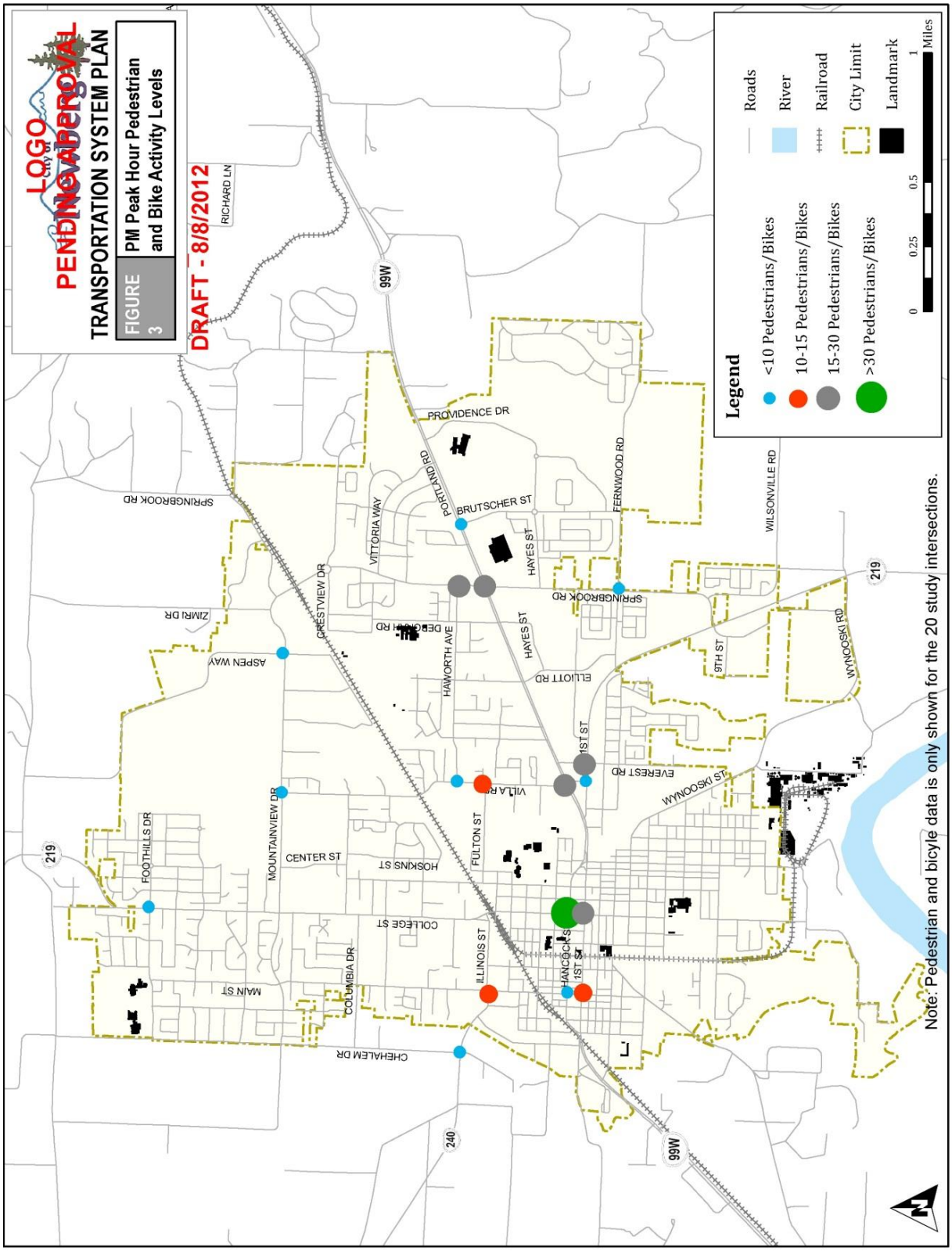
Figure 3: Pedestrian and Bicycle Activity



Motor Vehicle Volumes

Review of traffic count data showed that weekday traffic volumes were highest for roadways in Newberg between 4:30 p.m. and 5:30 p.m. Motor vehicle activity varies depending on time of year, however, as the level of tourism increases during summer months. Warmer weather brings an influx of visitors to Newberg and other Yamhill County destinations, and it also brings an increase in vacation travel to the Oregon Coast via 99W. Because of these important seasonal variations, traffic count data was adjusted to represent two separate conditions: p.m. peak hour traffic conditions during (1) the 30th highest annual hour, and (2) the average weekday. ODOT uses the analysis from the 30th highest annual hour to base their design recommendations. Figure 4 show the typical volumes on 99W for a typical summer weekend and an average weekday[2]. Peak summer volumes on Hwy 99W have a higher PM peak than the average weekday volumes. The summer peaks for both the a.m. and p.m. hour also occur later than the typical average weekday (commuter) trend.

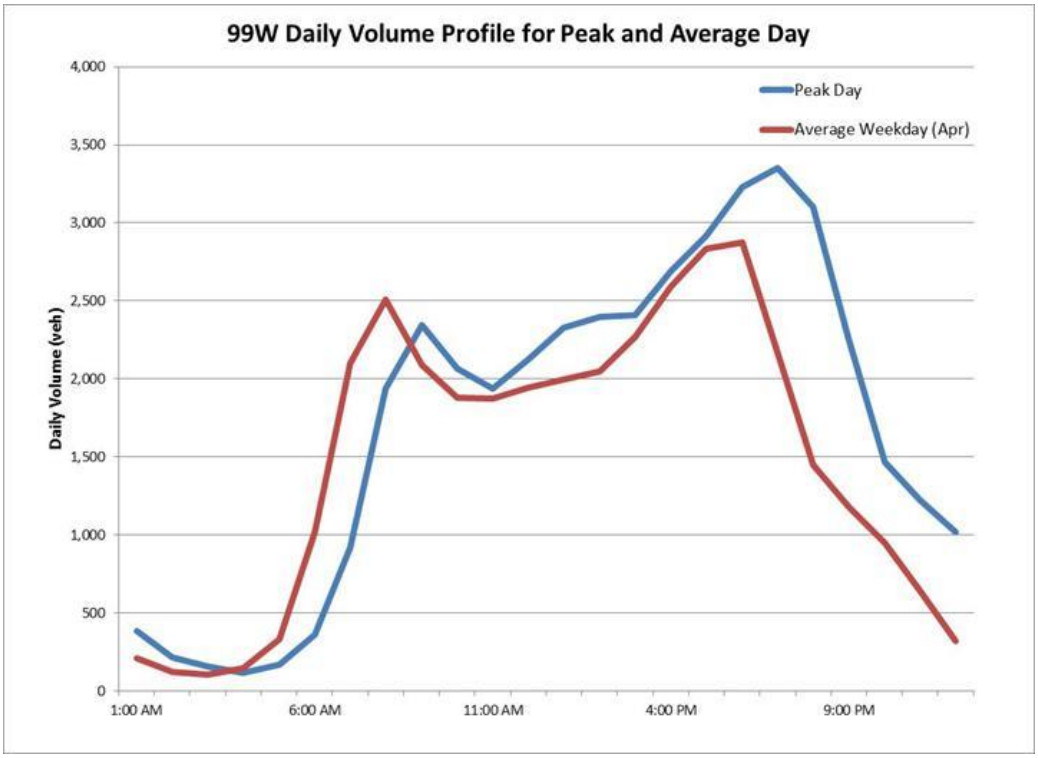


Figure 4: Hourly Traffic Volume Profile on 99W

Figure 5 shows historical growth on Highway 99W (as measured at ATR 36-004 located on the eastern edge of the city). Average daily traffic (ADT) volumes have remained relatively constant around 40,000 vehicles per day between year 2000 and 2009.and also shows the annual growths along 99W[3]. During this time ADT has ranged from 39,000 (in 2004) to 42,000 (in 2007).

[2] Data collected from ATR 36-004 in 2009.
[3] ODOT Traffic Volume Tables, http://cms.oregon.gov/odot/td/tdata/pages/tsm/tvt.aspx

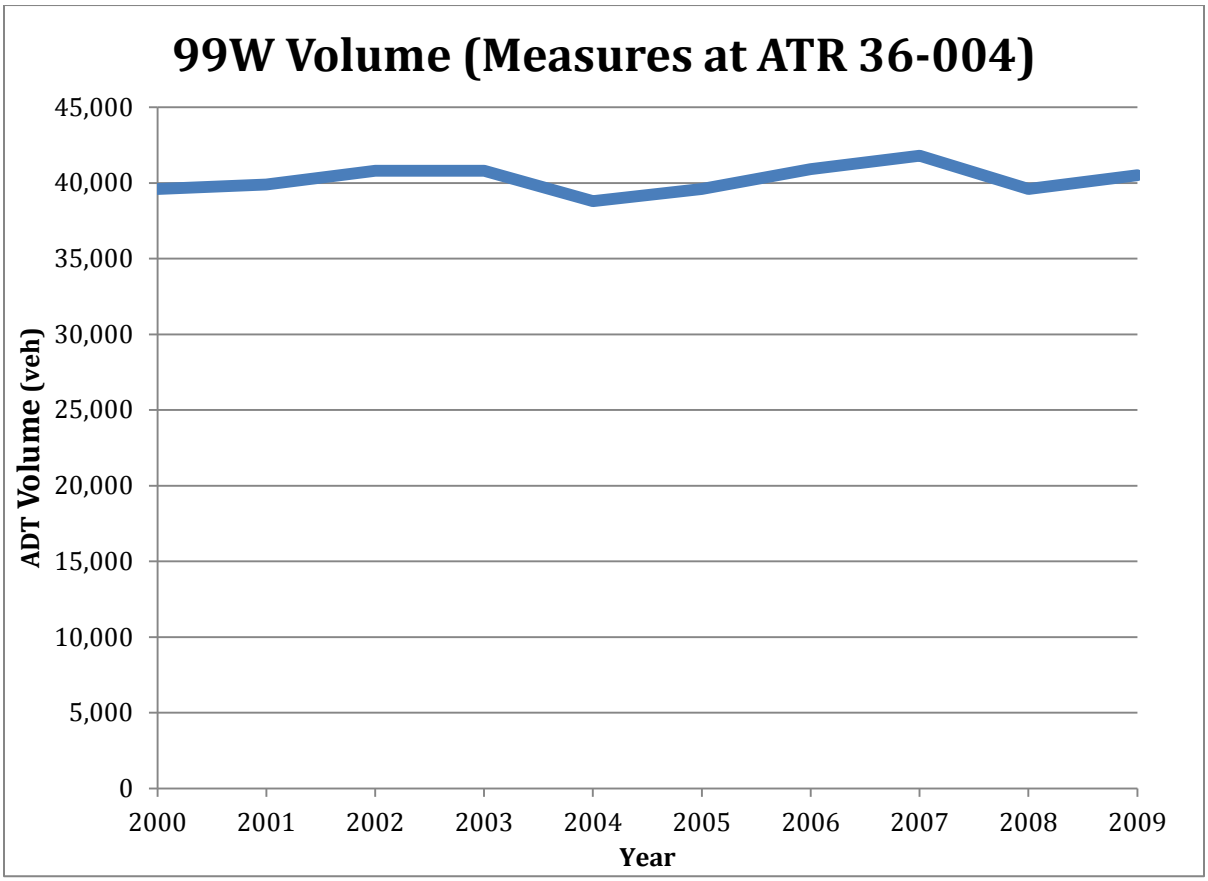


Figure 5: Historical Traffic Growth on 99W

Intersection traffic count data was collected in Newberg in the month of April, and required adjustment in order to represent average weekday and peak seasonal conditions using methodology from the Oregon Department of Transportation (ODOT) Analysis Procedures Manual.[4] The final p.m. peak 30th highest annual hour and average weekday traffic volumes developed for the study intersections are provided in the Appendix.

Generally, volumes in the p.m. peak hour on 99W are higher at the east end of Newberg, between Villa Road and Providence Drive. The total traffic volumes are relatively high along 99W west of Villa Road through the downtown area. However, the roadway is split into a couplet with the westbound portion carrying about 60% of the 99W traffic and the eastbound portion carrying about 40% of the traffic. The volumes in general along 99W are higher in the westbound direction during the p.m. peak hour, suggesting that much of the volume is most likely commuter traffic from the Portland metro area.

[4] The Appendix contains additional information on seasonal factoring. To a obtain traffic volumes that would reflect the 30th highest design hour, a factor of 1.06 was applied to the existing field collected traffic volumes. As a result the traffic volume data was divided by 1.03 to develop the average weekday traffic volume values.

Mode Choice Factors

The choice of how to get to a destination involves a variety of factors, including which modes are available and what one's habits are. When considering whether a trip will be taken by motor vehicle, walking, bicycle, or transit, the underlying factors affecting choice are typically ease and convenience of travel, travel cost, and travel time. These factors in turn depend on the particular destination, barriers to travel, and demographic characteristics such as age and income.

Destination

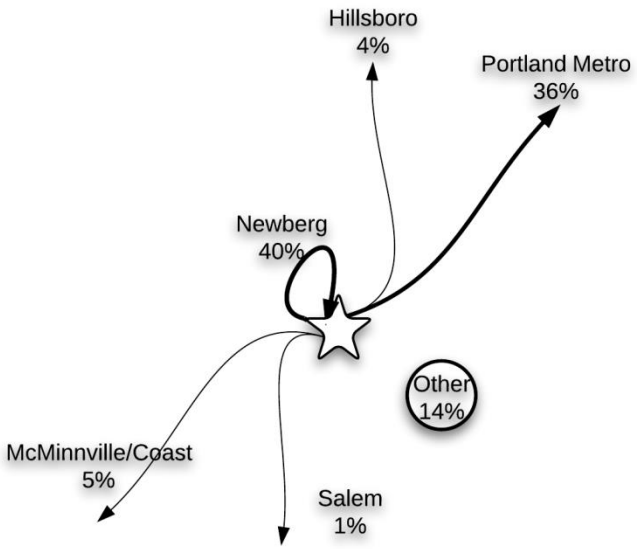
Newberg residents use the transportation system to make many types of trips, including work, school, shopping, and recreation. The type of trip strongly influences the mode of transportation chosen. If the trip destination is a park or an elementary school, then there is a higher likelihood that one will walk or bike because these destinations often exist in one's neighborhood. Conversely, if the trip destination is work or shopping, a motor vehicle is probably more convenient.

Table 2: Commute Time to Work

Commute Length	Newberg	Yamhill Co.	Oregon
Less than 15 minutes	38%	37%	34%
15 to 30 minutes	24%	28%	37%
30 to 45 minutes	22%	17%	17%
45 minutes or more	17%	18%	11%
Average commute time	**24 min.**	**24 min.**	**22 min.**

Source: U.S. Census Bureau, 2008-2010 American Community Survey

Newberg residents who work outside of the City are likely to commute by motor vehicle due to this mode's time and comfort advantages over non-motorized travel and its convenience advantage over bus service. Table 2 shows the range of travel times that Newberg residents experience when commuting, and compares these to statewide figures. The Census data confirms that a significantly higher percentage of workers in Newberg have long commutes (30 minutes and higher) than is the case for typical Oregon workers. This underlines the importance of vehicular travel, whether by SOV, carpool, or transit, to the residents of Newberg.



Newberg Commute to Work

Census data also reveals the commute destinations of Newberg's workers. As shown in Table 3, a majority (60%) of Newberg's workers commute to jobs outside of the City, with 36% of workers bound for the Portland metropolitan area. Other workplace destinations for Newberg residents include the areas of Hillsboro (4%), McMinnville and Coast (5%), and other parts of Oregon.

Table 3: Commute to Work

Workplace Destination	Total Workers	Percentage of Total Workers
Newberg	3575	40%
Portland	3219	36%
Other Oregon	1168	13%
McMinnville & Coast	410	5%
Hillsboro	390	4%
Salem Area	124	1%
Out of State	63	1%
Dundee	35	-
Total	**8984**	**100%**

Source: 2000 Census Transportation Planning Package (CTPP)

Barriers to Travel

Because Newberg is a smaller city, many of the destinations within the City are within reasonable walking range of many of the neighborhoods. Most of the arterials within the city provide adequate walking paths from the neighborhoods to the commercial areas either via sidewalks or shoulders (which are not optimal). Additionally, there are many crosswalks and curb ramps throughout the city. However, there is still room for improvement in some of the areas that have not been developed or re-developed within the last five years. Locations with sidewalk gaps and faded crosswalk paint provides for a less safe walking atmosphere which is more likely to discourage pedestrians travel.

Gaps in Sidewalks on Arterial Roadway

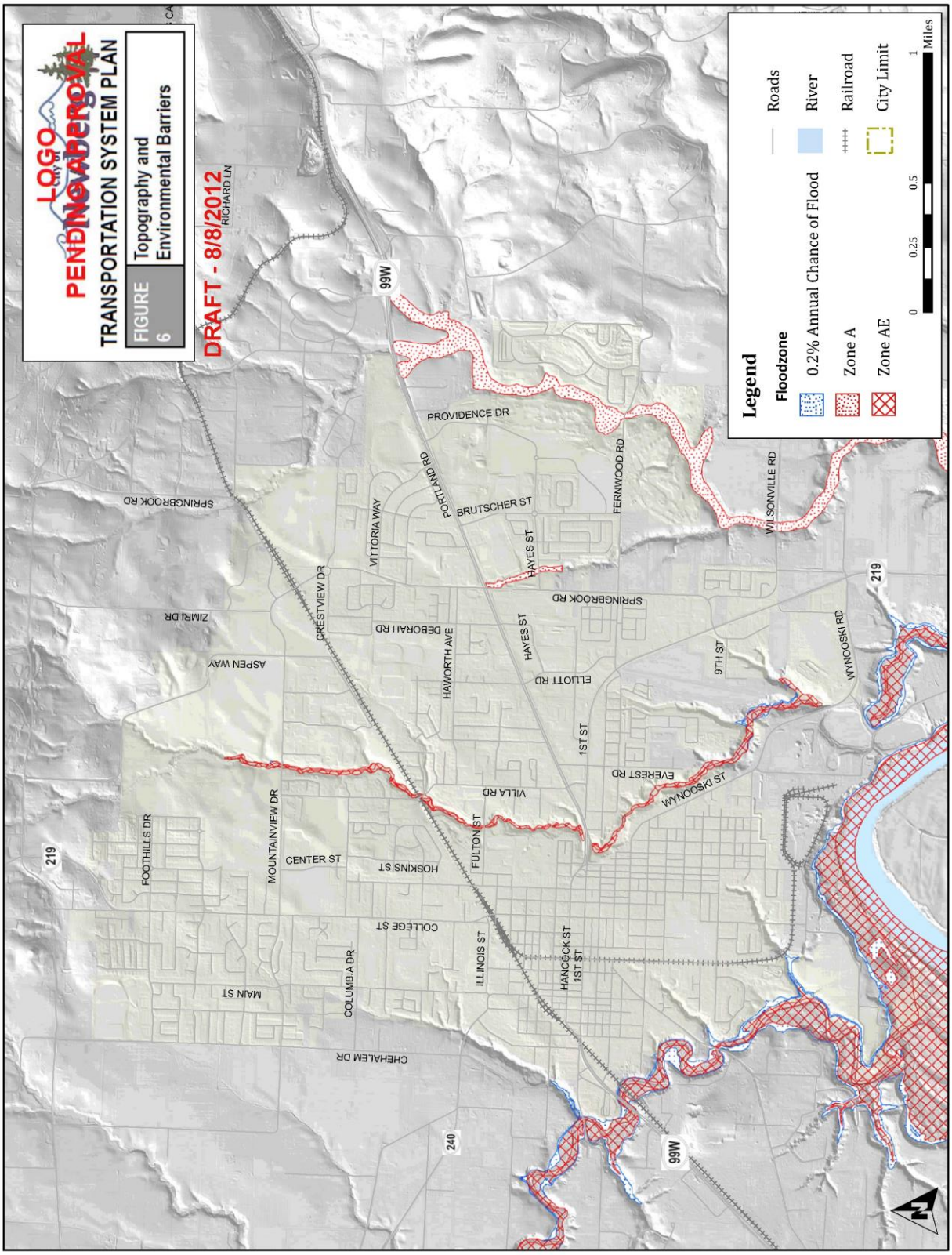
Much like the pedestrian network the bicycle network provides adequate bike paths and shared lanes between some of the neighborhoods and commercial areas. However, the bike paths and shared bike lanes are even less available than sidewalks and have more gaps reducing the likelihood that people will use bikes as a method of transportation within the city.

Weather conditions can be a significant factor in whether a person chooses non-motorized travel. Rain, snow, and uncomfortable temperatures may reduce the likelihood of someone walking or biking for leisure, or cause someone to use a car for a trip that in better weather they might make by foot or bicycle.

The topography and physical barriers such as waterways and hills or mountains may also provide natural barriers to choosing different modes of travel and may also limit development potential in certain areas. Figure shows the topography and other potential physical constraints within Newberg. The city is generally flat with hills to the north and east and some small elevation loss closer to the Willamette River. While this setting (between the hills and Willamette River) somewhat limits regional connectivity, regional connections are provided in each direction via 99W and OR 219. Most of Newberg is out of flood zones which results in few limitations in improving the transportation network. However, two primary barriers exist:

- The Willamette & Pacific Railroad (WPRR) operates a rail line that runs parallel to 99W through Newberg, about halfway between 99W and Mountain View Drive.
- Hess Creek runs north-south through the middle of the city, near Villa Road (north of 99W) and Wynooski Road (south of 99W)

Figure 6: Physical constraints



Age and Income

Demographic characteristics like age and income typically play a role in determining how you will get to a destination. Because vehicle ownership has such a strong impact on mode choice, and because residents with lower incomes are less likely to own one or more vehicles, lower income residents often account for more trips via walking, biking, and public transportation. Age is a key factor as well, as the youngest residents cannot drive, and the oldest residents are less likely to drive. Table 4 shows that Newberg has a slightly higher proportion of school age children than Yamhill County or the state of Oregon, with 21% of the population being under 15 years old according to the 2010 Census. Conversely, Newberg has a slightly lower proportion of people who are retirement age or older than is seen in the County or the State.

Table 4: Newberg Residents Age Comparison

Age	Newberg	Yamhill Co.	Oregon
Under 5 years old	7%	6%	6%
5-14 years old	14%	14%	13%
15-64 years old	67%	66%	67%
65 years old and over	12%	13%	14%
Median age	**33**	**37**	**38**

Source: 2010 US Census

Household income can be a major determinant of travel mode as well. Table 5 shows that the household income distribution of Newberg is comparable to that of Yamhill County and Oregon State, with a slightly lower percentage of Newberg households earning less than $25,000 a year and a slightly higher percentage of Newberg households earning in the $50,000 - $75,000 a year range, compared to the state of Oregon. Median household income in Newberg is marginally higher than in the County or State, indicating possible higher levels of vehicle ownership and use.

Table 5: Newberg Residents Income Comparison

Income	Newberg	Yamhill Co.	Oregon
Under $25,000	19%	21%	24%
$25,000-$49,999	27%	27%	27%
$50,000-$74,999	24%	21%	20%
$75,000-$149,999	27%	27%	24%
$150,000 and over	4%	5%	6%
Median Household Income	**$54,000**	**$52,000**	**$49,000**

Source: 2006-2010 American Community Survey

What Transportation Infrastructure is Available?

Newberg residents rely on the City's existing transportation infrastructure to travel to work, school, recreational, and other destinations every day. The infrastructure includes sidewalks, off-street paths, bike lanes, roadways, and transit.

Pedestrian and Bicycle Facilities

People who choose to walk or bike to their destination in Newberg may use sidewalks, shared paths, bike lanes, or shoulders. Pedestrian and bicycle facilities provided in the City also include crosswalks and curb ramps.

Sidewalks in Springbrook Neighborhood

Sidewalks and Crosswalks

Sidewalks on arterial and collector streets are generally available near commercial areas but decrease with distance from the core central area of town. Sidewalks are present along most of 99W as it transitions from Portland Road through the downtown area as the Hancock Street and 1st Street couplet. Newer commercial and residential areas such as the Springbrook neighborhood have sidewalk. The newer commercial and residential developments usually abut older areas that do not have sidewalks, leaving gaps in the pedestrian network. All new sidewalks have ADA-compliant curb ramps at intersections and at driveways.

The majority of crosswalks throughout the city are at intersections. The crosswalks generally provide ADA-compliant curb ramps and are in acceptable condition, with some crosswalk locations throughout the city needing new striping. The crosswalks generally provide adequate advance signing and one location in the city has a pedestrian hybrid beacon (HAWK), which is just west of the intersection of 1st Street (OR 219)/Everest Road.

ADA Compliant Curb Ramp with No Connections

Downtown Newberg has a fairly complete pedestrian network with sidewalks, ADA-compliant curb ramps, pedestrian way finding signage, and amenities such as benches and street . Crosswalks are striped for a majority of the intersection movements downtown and traffic speeds are low, which makes walking easy and attractive. While crosswalks are provided with ADA-compliant ramps at most locations, some of the crosswalks are in poor condition.

Faded Crosswalk in Downtown Newberg

Providing safe pedestrian and bicycle access to school is important in promoting physical fitness for school-age children and creating healthy travel habits that will carry into adulthood. Newberg's pedestrian and bicycle infrastructure does not provide optimal connections for children and families traveling to and from school from nearby residential neighborhoods.

Off-Street Paths

Shared use paths and trails are currently limited within the City of Newberg. However, the Chehalem Park and Recreation District has plans to develop a 70-mile plus system between Dundee and Newberg that will link parks, historical sites, schools, libraries, Willamette River, and regional trails.

Bike Lanes

Bike lanes are portions of the roadway designed specifically for bicycle travel with a striped lane and stenciling indicating bicycle use. ODOT standard width for a bike lane is six feet. The minimum width of a bicycle lane against a curb or adjacent to on-street parking is five feet. A bicycle lane as narrow as four feet is allowed, but only in very constrained conditions. Newberg adopted the

Bike Lanes near HAWK signal on OR 219

Newberg Bicycle/Pedestrian Plan, which incorporates ODOT, AASHTO and MUTCD to guide bikeway improvements. A bike lane width of five feet is used for most public streets, with six feet recommended for arterials.

The bicycle network in Newberg includes several bike lanes on city streets. The most continuous bike path is along 99W. Much like with sidewalks in the city, there are bike lanes near the newer commercial and residential areas with fewer bike lanes in the more established areas of town.

Several other streets in the city have bike lanes for short segments, such as Springbrook Road from Middlebrook Drive to Mountainview Drive and Mountainview Drive from Springbrook Road to Aspen Way. At these locations the bike lane transitions into a shoulder that can be used by bicyclists, which is typical for most locations within the city. However, the changes are not always clearly signed and may catch new cyclists by surprise.

Shared Roadway

Shared roadways occur where bicycles and motor vehicles share the same travel lane. The most appropriate roadways for this type of shared use are those with low speeds (25 m.p.h. or less) and low traffic volumes (3,000 vehicles per day or fewer)[5]. Signed shared roadways are where facilities are designated and signed as bicycle routes and serve to provide continuity to other bicycle facilities (e.g., bicycle lanes) or to designate a preferred route through a community. Such a route is typically has warning signs and often have shared roadway pavement markings.

All local streets in Newberg are low speed, low volume roadways that could be classified as shared roadways. There are a few signed shared roadways in the neighborhood just south of Downtown Newberg. These roadways allow cyclists to avoid using 99W in favor of quieter, more comfortable streets.

Downtown Parking Signs

Bike Parking

Where you store your bike when you get to your destination is an important part of bicycle infrastructure. If there is nowhere safe and secure to park your bike, then you are less likely to ride even if your trip distance and the roadway facilities are right for cycling. On-street bike parking is not evident in Newberg.

Downtown Parking

Parallel parking in the downtown area of Newberg is provided along the majority of Hancock Street, 1st Street, and the majority of the cross streets. Parking in many locations downtown is limited to two hours or less

[5] The Federal Highway Administration's *Manual on Uniform Traffic Control Devices* guidance states that shared lane markings should not be placed on roadways with a speed limit above 35 m.p.h. http://mutcd.fhwa.dot.gov/

between 8 a.m. and 6 p.m.. In some locations parking is not allowed between 12 a.m. and 7 a.m.. All of the parking restrictions for the downtown area are signed clearly next to the road.

Transit Service

Transit service is provided in Newberg by Yamhill County Transit Area (YCTA), which provides bus routes connecting Newberg to destinations along the 99W corridor, including McMinnville, Newberg, Sherwood, and Tigard. YCTA provides two transit lines that provide transit to and from various locations within the city. YCTA also provides an Americans with Disabilities Act (ADA) dial-a-ride service. Transit routes in Newberg are shown in Figure 7.

Transit Service for People with Disabilities

YCTA provides demand response (dial-a-ride) service for people with disabilities who are unable to use regular fixed route buses, and also for people whose origins and/or destinations are not within close proximity (generally ¾ mile) of YCTA's fixed route services. This curb-to-curb service, provided by smaller buses equipped with wheelchair lifts, is available Monday through Friday between 8:00 a.m. and 4:30 p.m.

Curb-to-curb service is provided by Yamhill County Transit Area

Bus Service on the 99W Corridor

YCTA Route 44, also known as the 99W Link, runs from downtown McMinnville to Tigard Transit Center with three stops in Newberg northbound near Springbrook Road, near Villa Road, and near Main Street. Key destinations along this route include the central business districts in McMinnville, Dundee, and Tigard. These destinations include activity generators like Linfield College, George Fox University, and the Tigard Transit Center, which provides connections throughout the Portland metro area.

Route 44 provides service at one-hour frequencies in the a.m. and p.m. peak hours, and two-hour frequencies in mid-day, between 6:00 a.m. and 7:00 p.m. YCTA Route 46S provides service on the same route on Saturdays, with four trips each way between 8:00 a.m. and 7:00 p.m.

YCTA Route 45X is an express service between McMinnville and the Tigard Transit Center. This service is offered once during the a.m. for the northeast direction and once during the p.m. for the southwest direction.

Bus Service within Newberg

YCTA also operates Route 5 and Route 7, which provide service within Newberg. Both services begin and end near Main Street. Route 5 travels along Foothills Drive providing service to attractions such as George Fox University and the Senior Center. Route 7 travels along 99W

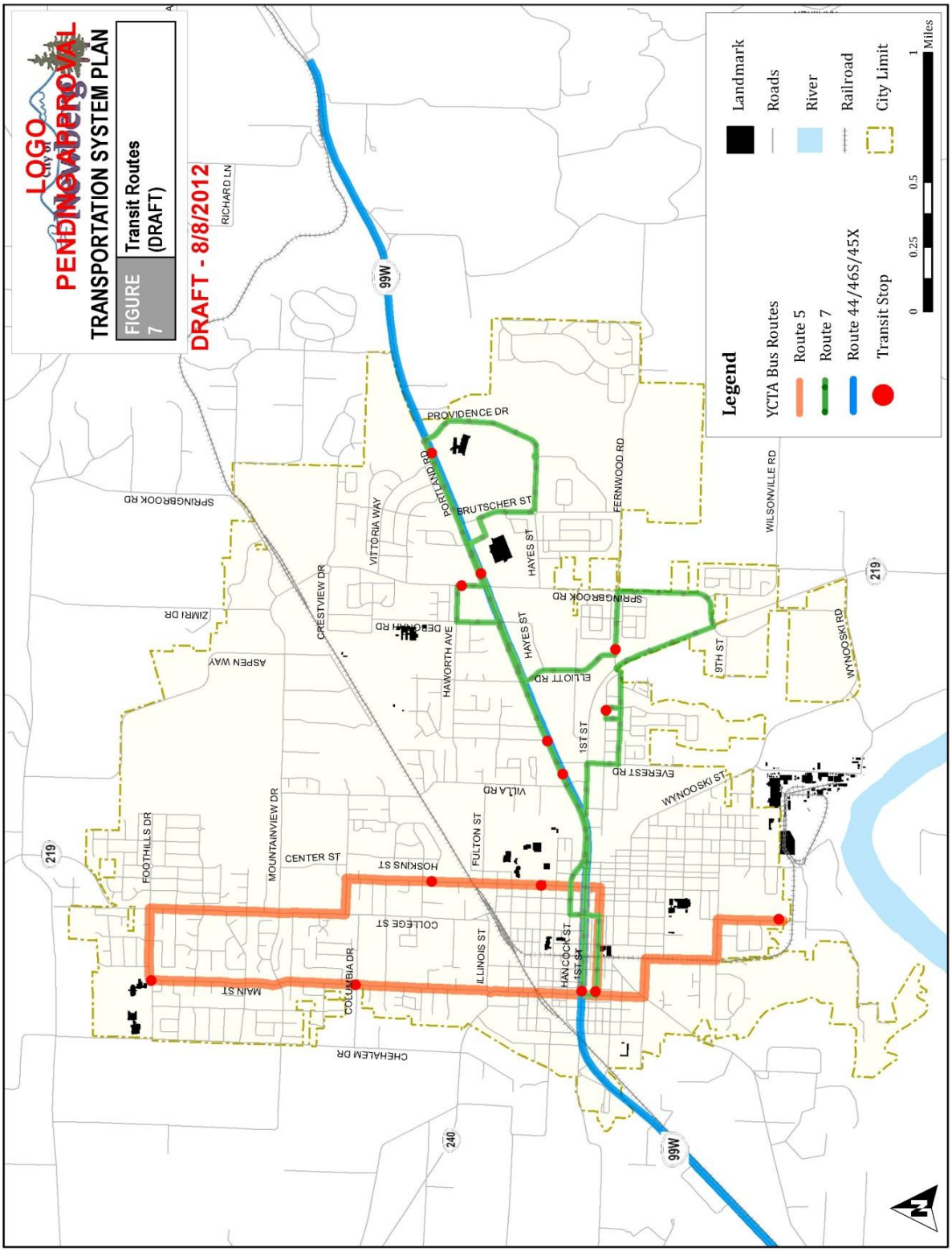
providing service to the Providence Hospital. Route 5 and Route 7 provide service at one-hour frequencies between 7:00 a.m. and 6:30 p.m. Monday through Friday.

Transit Access and Amenities

One of Newberg's primary transit stops is on 99W near the southern end of the City. The eastbound stop near Main Street is accessible via sidewalks and provides a shelter and bench for travelers waiting for buses bound for Newberg and the Portland metro area. Some other stops also include shelters, however the majority of all other stops throughout the City are neither covered nor provide benches, but do provide a sign and generally easily sidewalk and bicycle accessible.

Bus Shelter on 99W near Main Street

Figure 7: Existing transit routes



Roadways

Within Newberg, roadways are under the jurisdiction of the City, Yamhill County and ODOT. Roadways are organized by **functional classifications**, which provide a hierarchy of intended purposes (as shown in Figure 8). Roadways with a higher intended usage generally have a classification and related standards that promote more efficient vehicle movement through the City, while roadways with lower intended usage are classified to provide greater access to local destinations such as businesses or residences.

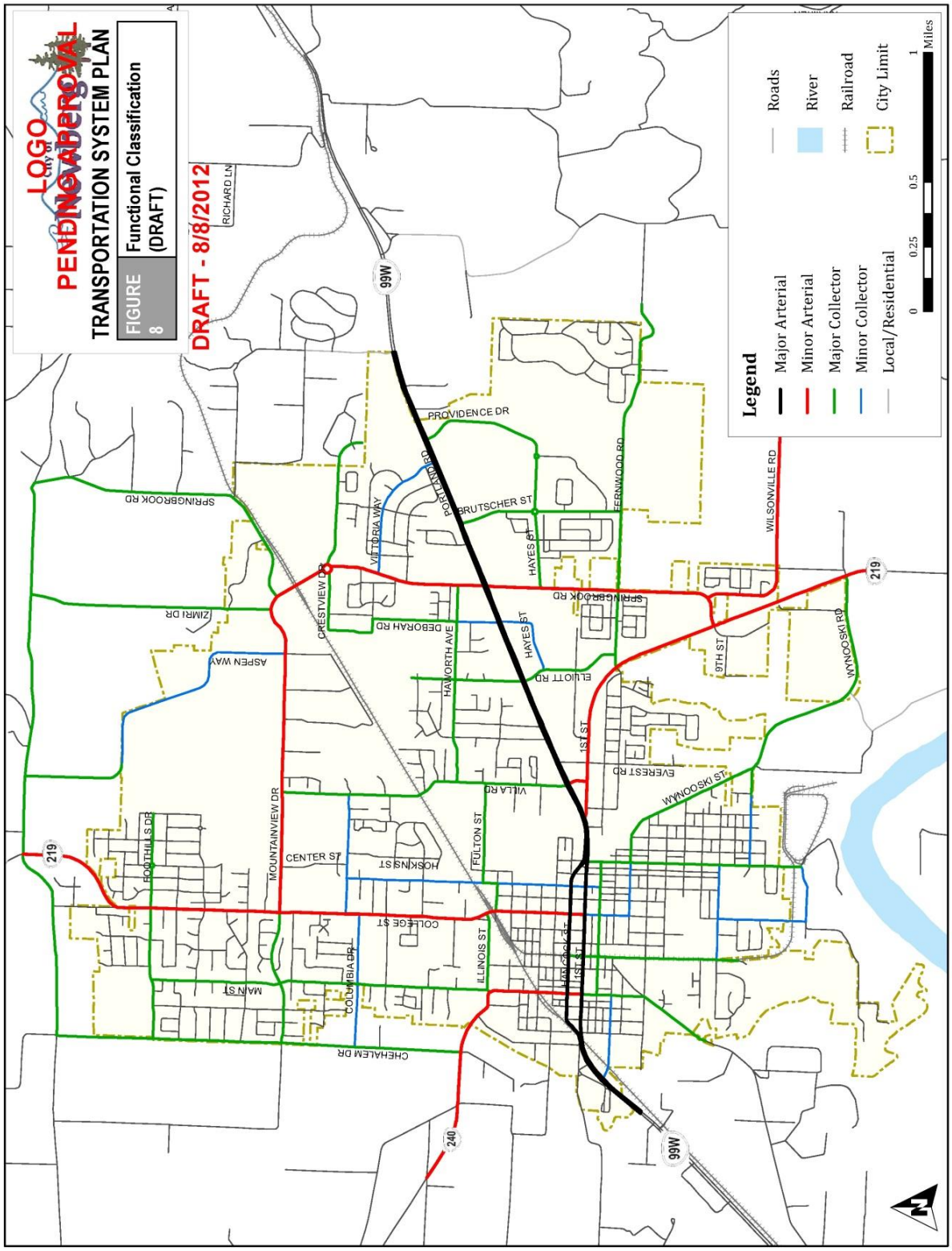
The City of Newberg has two classifications for arterials: Major Arterials and Minor Arterials. The only Major Arterial in the city is Highway 99W. Highway 99W has by far the highest traffic volumes in Newberg. Some of the Minor Arterials in Newberg are OR 219, Springbrook Drive, Mountainview Drive, and OR 240. These Minor Arterials also carry some of the higher volumes of any roadway in the city and are used by residents to connect to locations outside the city, as well as provide major connections within the city. The posted speed limits on along arterials in Newberg vary from 55 miles per hour as you enter to the city to as low as 25 miles per hour through the downtown core.

Traffic on 99W During the PM Peak

Roadways that connect neighborhoods and major activity generators to arterials are generally classified as collectors. They provide greater accessibility to neighborhoods than arterials and provide moderately efficient through movement for local traffic. The City of Newberg has two classifications for collectors: Major Collectors and Minor Collectors. Villa Road and Haworth Avenue are examples of Major Collector streets that provide connections between the commercial areas of town and the neighborhoods. Collectors have a posted speed of 25 miles per hour within Newberg.

Roadways that provide more direct access to residences are typically classified as local streets. This classification is typically a low volume street, often lined with residences. All local City streets are posted at 25 miles per hour.

Figure 8: Functional class



Freight

ODOT classifies Highway 99W as a freight route through the City of Newberg. Truck freight movements in Newberg involve shipments both to and from locations in the City, and shipments that pass through the City. OR 219 and OR 240 also provide routes for trucks traveling to and through the City of Newberg. Congestion on 99W currently slows freight movement to and through Newberg. Freight volumes on 99W at OR 219 are greater than 100 trucks during the evening peak hour. However, these trucks account for less than five percent of traffic at this intersection during the p.m. peak (4:00 p.m. to 6:00 p.m.).

Rail

The Willamette & Pacific Railroad (WPRR) operates a rail line that runs parallel to 99W through Newberg (Figure 5). Rail freight originating in the western Willamette Valley is carried on WPRR tracks through Newberg, and on Portland & Western Railroad (PNWR) tracks the rest of the way into Portland. The rail crosses 99W in Newberg at-grade on the west end of the downtown couplet.

The Federal Railroad Administration designates six classes for rail tracks to set maximum speeds for the trains based on the conditions of the tracks. The tracks within Newberg are designated as Class 2, which limits freight speeds to 25 miles per hour. The tracks within the City of Newberg are currently used for freight movement, and have one train operating daily in each direction with up to two additional smaller trains operating periodically. There are no passenger rail services near the study area, with the nearest Amtrak stations located in Portland, Oregon City, and Salem.

In 2008, Yamhill County completed a feasibility study for development of an improved rail system for passengers and freight.[6] Objectives were to evaluate infrastructure and develop a ridership estimate for a Yamhill County commuter rail service. One recommendation of this study was to take actions to preserve the integrity of existing rights-of-way to retain and enhance passenger and freight transportation options in the future.

Newberg-Dundee Bypass

The City of Newberg has been working with the state and regional partners to plan and design a 99W bypass route. The goal of this project is to improve regional and local transportation along Highway 99W. This project will help relieve congestion and hopefully improve safety through the downtown Newberg corridor. The project is currently in final design and is planned to be moving into construction once funding has been fully acquired.[7]

[6] *Feasibility Study for Development of an Improved Yamhill County Rail System for Passengers and Freight, Final Report.* Yamhill County, 2008.
[7] http://oregonjta.org/region2/?p=highway99w

Air

Within Newberg there is one airport that is privately owned but available for public use. The Sportsman Airpark in the southeast corner of the city has one paved 2,800-foot runway and averages 14,000 operations (takeoffs or landings) per year. Approximately 55 aircraft are based at the airport. The Sportsman Airpark provides general flight instruction and airplane rental and maintenance services, as well as private helicopter and recreational hot-air ballooning services.

A larger general aviation airport is located approximately 20 miles north of Newberg, in Hillsboro. The Hillsboro Airport serves approximately 200,000 operations annually. It is owned by the Port of Portland and has two paved runways (6,600 feet and 4,000 feet). There are three fixed-base operators at the airport, and the airport provides all the facilities to support jet- and propeller-driven aircraft and helicopters.

The nearest airport with scheduled passenger service is the Portland International Airport, located approximately 34 miles northeast of Newberg. This airport is also owned by the Port of Portland and has three runways (7,000 feet, 8,000 feet, and 11,000 feet). The Portland International Airport serves more than 13.7 million passengers and 270,000 tons of cargo annually.

Waterway

The Willamette River is located south of Newberg and provides potential opportunities for recreational boating. Rogers Landing County Park, operated by the Yamhill County Parks and Recreation, takes access to the river at the end of Rogers Landing south of Downtown Newberg. Rogers Landing provides a three-lane boat launch.

Pipeline

Northwest Natural currently runs a 6" high-pressure (400 psi) natural gas transmission line through Newberg south of HWY 99W that feeds the distribution systems within the city. The distributions systems operate at 60 psi or lower and range in size from 1'-4". Additionally there is 12" High Pressure line (720 psi) that runs south of HWY 99W and serves the SP Newsprint Papermill. This 12" High Pressure also supplies the 6" High Pressure line that serves the west side of town. Currently there are district regulators connected to both the 12" and 6" High Pressure lines to reduce pressures as necessary to serve Newberg. Residents of Newberg who live on a street where a natural gas distribution line already exists can be easily connected to that distribution line.

How is System Performance Measured?

Maintaining an acceptable level of performance for Newberg's transportation infrastructure requires a variety of analytical tools and assessment types. The measures used to monitor the transportation system are shown below.

Collisions

The safety of the roadways and intersections in Newberg were monitored through collision data as part of the TSP Update. The data was reviewed to identify potential patterns for motor vehicle, pedestrian, and bicyclist collisions.

Pedestrian, Bicycle, and Transit Facilities

The facilities of alternative modes to motor vehicle were reviewed as part of this TSP Update to identify facility deficits or potential connectivity or access improvement opportunities.

Roadway Jurisdiction

The standards and maintenance responsibilities of the various roadways depend on the roadway's jurisdiction. In Newberg, roadways are typically[8] under the jurisdiction of either the City, Yamhill County, or ODOT. Each responsible jurisdiction sets standards for the roadways to maintain their intended functional classification, which vary depending on the design speed, connectivity and the priority for access to fronting properties. Higher speed, regional facilities are used primarily for longer trips, while lower speed local city streets are used primarily to access homes, shops, schools and jobs.

Mobility Targets

Mobility is an important consideration because it measures how freely vehicle traffic can move along to its intended destination. In general, roadway systems have their highest degree of conflicts and associated congestion at intersections, and so the performance of a system is often defined by how well the intersections function.

There are two methods used to gauge these conditions – one is numeric, and one is a letter grade. ODOT prefers the numeric volume-to-capacity (v/c) ratio method (see Table 6 and Table 7), while Yamhill County and the City use a letter grade derived from the Level of Service (LOS) method.

All intersections in Newberg must operate at or below the adopted targets or mitigation would be necessary to approve future growth. All intersections under State jurisdiction must comply with the v/c ratios in the 1999 Oregon Highway Plan (OHP), while intersections under Newberg and Yamhill County jurisdiction must meet those respective agencies' LOS standards. The adopted intersection performance targets vary by jurisdiction of the roadways. For Newberg and Yamhill County, the target is Level of Service D. For ODOT, the target for OR 99W, OR

[8] A few local streets are private.

219, and OR 240 have varying volume-to-capacity ratios depending on the location of the intersection as speeds and roadway classifications vary along these corridors.

Table 6: Mobility Targets by Jurisdiction

Jurisdiction	Performance Method	Mobility Target
ODOT	**Volume-to-capacity (v/c) ratio** is a decimal representation (between 0.00 and 1.00) of the proportion of capacity that is being used (i.e., the saturation) at a turn movement, approach leg, or an intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually experience excessive queues and long delays.	The OHP v/c threshold varies by intersection based on classification and speed. See Table 7.
City of Newberg	**Level of service (LOS):** A "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.	Level of Service D[9] or better
Yamhill County	Same as Newberg	Same as Newberg

[9] City of Newberg Design Standard and Details and Specifications Manual (2010), http://www.newbergoregon.gov/sites/default/files/2010_DS_Final.pdf

Table 7: Mobility Targets for ODOT Intersections

Intersection	Speed Limit	v/c Target[10]
Hancock Street (99W)/Main Street	25 mph	0.85
1st Street (99W)/Main Street	25 mph	0.85
Hancock Street (99W)/College Street	25 mph	0.85
1st Street (99W)/College Street	25 mph	0.85
Portland Rd (99W)/Villa Rd (OR 219)	35 mph	0.85
Portland Rd (99W)/Providence Drive	45 mph	0.80
Portland Rd (99W)/Springbrook Rd	40 mph	0.80
Portland Rd (99W)/Brutscher Street	40 mph	0.80
1st Street/Villa Rd (OR 219)	35 mph	0.95
Foothills Drive/Hillsboro-Silverton Highway (OR 219)	35 mph	0.95
Yamhill-Newberg Highway (OR 240)/Chehalem Drive	25 mph	0.95
1st Street (OR 219)/Everest Rd	35 mph	0.95

Revenue

Newberg funds needed improvements to the transportation system from a number of revenue sources as listed in Table 8. These limited funds are allocated to expenditures including capital projects, maintenance, engineering design, and administration. On average, the City has approximately $597,300 per year[11] to fund system improvements, which would total approximately $13.7 million over a through year 2035 if current funding levels are maintained.

Table 8: Newberg Transportation Funding (2011 Dollars)

Revenue Source	Average Annual Amount
Permits	$7,000
Gas Taxes	$901,000
Bikeway Taxes	$11,000
System Development Fees	$306,000
Federal Exchange Grant	$300,000
Other	$139,000
Total Revenues (5-year average)	**$1,664,000**
Expenditures	**Average Annual Amount**
Street Maintenance	$692,000
Street Engineering Design	$152,000
Street Administration	$222,000
Total Expenditures (5-year average)	**$1,066,000**
Difference (Revenue Available for Capital Improvements)	**$598,000**

Source: City of Newberg, 2012

[10] *Oregon Highway Plan 1F Revisions*: Adopted December 21, 2011
[11] The City has spent approximately $645,000 per year on capital projects (including overlays) during the last five years.

Access Spacing

Access spacing is a broad set of techniques to balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual destinations. Typically, more driveways and intersections along a roadway results in more conflict points and less efficient operations. Proper implementation of access management techniques will promote reduced congestion, reduced collision rates, less need for additional highway capacity, conservation of energy, and reduced air pollution. ODOT, Yamhill County, and the City of Newberg have adopted access spacing standards (see Table 9). Table 4 from the Oregon Administrative Rules 734-51 was used to determine spacing standards as all highways through Newberg have an average annual daily traffic greater than 5,000.

Table 9: Spacing Standards for Newberg Streets

Facility	Spacing Standard
ODOT Statewide Highway Speeds 30 & 35 (Urban)	500 feet
ODOT Statewide Highway Speeds 40 & 45 (Urban)	800 feet
City of Newberg Major Arterial (Urban)	600 feet
City of Newberg Major Arterial (CBD)	200 feet
City of Newberg Minor Arterial (Urban)	300 feet
City of Newberg Minor Arterial (CBD)	100 feet
City of Newberg Major Collector (All)	200 feet
City of Newberg Minor Collector (All)	150 feet
City of Newberg Local Streets (All)	100 feet
Yamhill County public roads	500 feet

http://www.oregon.gov/ODOT/HWY/ACCESSMGT/docs/pdf/734-051.pdf
Newberg Development Code, Section 15.505.200, Vehicular Access Standards
Yamhill County TSP, Access Management Policy 8

Freight Routes

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement, while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. ODOT has identified Highway 99W as a Freight Route and Truck Route through Newberg.

What Conditions Do Transportation System Users Face?

This section uses the measures discussed above to evaluate performance of the existing transportation infrastructure.

Collision Evaluation

Collision data from the most recent three years of available data (2008 to 2010) for all roadways in Newberg was obtained from ODOT and reviewed. Over the past three years, 492 collisions occurred in Newberg Figure 8 shows the distribution of crash types in Newberg for the three year period.

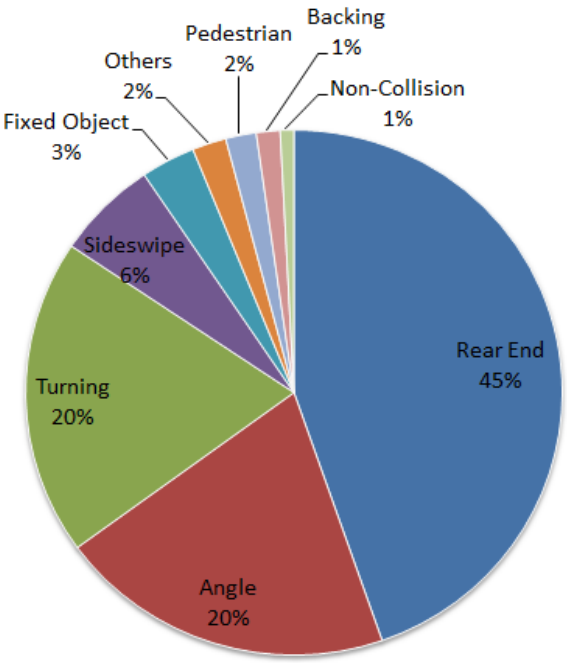


Figure 6: Newberg Collisions by Type, 2008-2010

The severity of the collisions in Newberg over the past three years is illustrated in Figure 7. 87% of all crashes involved either minor injuries or were PDO only, indicating overall low severity of collisions. Two fatalities were reported over the three-year period. Out of the 492 collisions, 9 involved pedestrians and 12 collisions involved bicyclists.

Intersection Collisions

The total number of crashes experienced at an intersection is typically proportional to the number of vehicles entering it. Therefore, a crash rate describing the frequency of crashes per million entering vehicles (MEV) is used to determine if the number of crashes should be considered high. Using this technique, a collision rate close to or greater than 1.0 MEV is commonly used to identify when collision occurrences are higher than average and should be further evaluated. Further, a threshold value (critical crash rate) that allows for a relative comparison among intersections with similar characteristics is computed for each intersection. The sites that have a higher observed collision rate than the critical crash rate are flagged for further review.

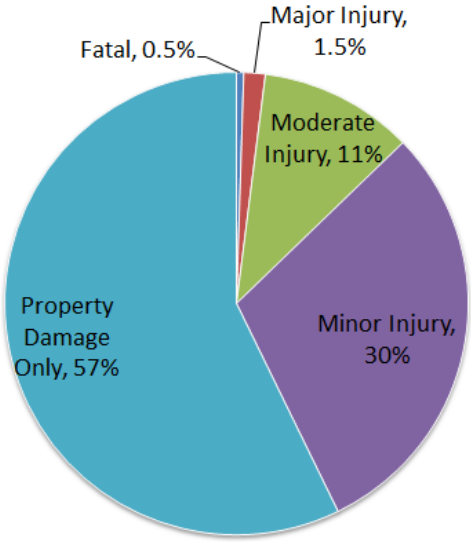


Figure 7: Newberg Collisions by Severity

As shown in Table 10, intersection crash rates and critical crash rates were calculated (based on the past three years of collision data) for each of the 20 study intersections reviewed in Newberg. The crash rate at one intersection is close to the 1.0 per million entering vehicles (MEV) threshold, generally indicating that the frequency of collisions is high for the volume of traffic served. The collisions were further evaluated at this intersection to see if any trends exist.

Table 10: Intersection Collision Evaluation

Intersection	PM Peak Hour Total Entering Volume	Collision Rate	Critical Crash Rate
State Route, Signalized Intersections			
Hancock Street (99W)/Main Street	2379	0.25	0.67
1st Street (99W)/Main Street	1629	0.54	0.72
Hancock Street (99W)/College Street	2473	0.36	0.67
1st Street (99W)/College Street	1782	0.66	0.71
Portland Rd (99W)/Villa Rd (OR 219)	3836	0.46	0.62
Portland Rd (99W)/Providence Drive	3062	0.13	0.64
Portland Rd (99W)/Springbrook Rd*	3929	**0.80**	**0.62**
Portland Rd (99W)/Brutscher Street	3272	0.30	0.63
State Route, Unsignalized Intersections			
1st Street/Villa Rd (OR 219)	1358	0.14	0.33
Foothills Drive/Hillsboro-Silverton Highway (OR 219)	656	0.00	0.44
Yamhill-Newberg Highway (OR 240)/Chehalem Drive	825	0.00	0.40
1st Street (OR 219)/Everest Rd	1409	0.28	0.33
Non State Route, Unsignalized Intersections			
Mountainview Drive/Villa Rd	799	0.00	0.49
Mountainview Drive/Zimri Drive	895	0.00	0.47
Illinois Street/Main Street	1117	0.09	0.44
Fulton Street/Villa Rd	638	0.00	0.53
Haworth Avenue/Villa Rd	704	0.14	0.51
Mountainview Drive/Aspen Way	772	0.13	0.50
Fernwood Rd/Springbrook Rd	892	0.11	0.47
Haworth Avenue/Springbrook Rd+	1417	**0.69**	**0.40**

Source: ODOT Crash Data System

* Intersection collision rate exceeds 2010 Highway Safety Manual critical crash rate of 0.62 per MEV for signalized state route intersections

+ Intersection collision rate exceeds 2010 Highway Safety Manual critical crash rate of 0.40 per MEV for un-signalized non state route intersections

The highest collision rate occurs at the intersection of Portland Road (99W) and Springbrook Road. This intersection is signalized, with 32 reported crashes in the three-year period analyzed,

14 involved injuries and the rest were property damage only (PDO). A majority of the crashes (27) were of the rear-end variety, caused mostly by vehicles following too closely. There were 4 reported crashes of the turning movement variety caused by drivers disregarding the traffic signal, driving to the left of the centerline, or not yielding right-of-way.

In the non-state route category, the intersection of Haworth Avenue and Springbrook Road had a collision rate higher than the critical crash rate. This is an un-signalized four-way stop controlled intersection with a total of 10 reported crashes at this site with 2 rear-end crashes being caused by drivers following too closely, 4 crashes of the angle variety and the turning movement variety caused by drivers either running the stop sign or not yielding right-of-way.

Roadway Segment Collisions

How does collision frequency on Highway 99W in Newberg compare to other state highways in Oregon? Crash rates identifying the number of crashes per million vehicle-miles traveled for 99W, as well as statewide average crash rates for similar facilities, were obtained from ODOT's 2010 State Highway Crash Rate Tables.[12] For comparison against statewide averages, Highway 99W was classified as a non-freeway principal arterial through an urban city. The reported crash rates are shown in Table 11.

Table 11: State Highway Collision Rate Comparison

	Crashes per Million Vehicle Miles				
Facility	2010	2009	2008	2007	2006
Highway 99W through Newberg (2.77 mi)*	**2.50**	**2.80**	**2.53**	2.03	**2.62**
OR 219 through Newberg (2.97 mi)**	**2.88**	**2.45**	**2.53**	**3.11**	2.33
Similar ODOT facilities	2.49	2.36	2.37	2.38	2.37

Source: ODOT 2010 State Highway Crash Rate Tables
BOLD values indicate crash rate exceeds statewide average
* Highway 99W mile points 21.36 to 24.13
** OR 219 mile points 18.45 to 21.42

The 99W segment, and the OR 219 segment through Newberg are both about three miles long and have greater crash rates than similar ODOT facilities all but one of the last five years. The crash rate for the OR 240 segment that is less than a half a mile long through Newberg is too short to accurately calculate the crash rate.

[12] *2010 State Highway Crash Rate Tables.* Retrieved March 2012 from ODOT website: http://www.oregon.gov/ODOT/TD/TDATA/car/CAR_Publications.shtml

ODOT High Collision Locations

Highway 99W through Newberg contains four sites that rank among the top ten percent for state highways in Oregon according to the Safety Priority Index System (SPIS) for 2011.[13] The four sites are:

- Pacific Highway West (99W) between mile points 21.71 and 21.89 has been identified as a top 5% SPIS location. This segment includes the Brutscher Street intersection. A total of 19 crashes were reported at this location in the three year period from 2008 to 2010 (12 Injury and 7 PDO only)
- Pacific Highway West (99W) between mile points 21.96 and 22.14 has been identified as a top 5% SPIS location. This segment includes the Springbrook Street intersection. 42 crashes were reported at this location in the three year period (20 Injury and 22 PDO only)
- Pacific Highway West (99W) between mile points 22.80 and 22.98 has been identified as a top 5% SPIS location. This segment includes the Everest Road and Villa Road intersections. 25 crashes were reported at this location (13 Injury and 12 PDO only)
- Hillsboro-Silverton (OR-219) between mile points 21.11 and 21.29 has been identified as a top 5% SPIS location. A total of 21 crashes were reported at this location, all of which occurred at the intersection of OR-219 and 2nd Street. 11 crashes involved injuries and 10 were PDO only. It is interesting to note that there are a high number of crashes (40%) at this location that are of the turning variety.

[13] 2011 ODOT Safety Priority Index System (SPIS), http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/spis.shtml. SPIS ranks locations based on a combination of crash frequency, rate, and severity.

Motor Vehicle Conditions

The motor vehicle conditions in Newberg vary based on the time of year. Operations at the 20 study intersections, shown in Table 12, were evaluated during the p.m. peak hour of the peak seasonal period (30th highest annual hour) and the average weekday as described in the Motor Vehicle Volumes section of this document. While the average weekday v/c and LOS is provided, the peak seasonal values are what ODOT bases it's targets on.

Table 12: Intersection Operations (2012 p.m. peak)

Intersection	Mobility Target	Peak Seasonal		Average Weekday	
		V/C Ratio	LOS	V/C Ratio	LOS
Foothills Drive/Hillsboro-Silverton Highway (OR 219)	0.95	0.39	A	0.36	A
Mountainview Drive/Villa Rd	D	0.28	C	0.28	C
Mountainview Drive/Aspen Way	D	0.11	B	0.11	B
Mountainview Drive/Zimri Drive	D	0.28	C	0.28	C
Yamhill-Newberg Highway (OR 240)/Chehalem Drive	0.95	0.24	C	0.19	C
Illinois Street/Main Street (OR 240)	0.95	0.74	E	0.61	D
Haworth Avenue/Villa Rd	D	0.39	C	0.37	C
Fulton Street/Villa Rd	D	0.25	B	0.23	B
Hancock Street (99W)/Main Street	0.85	0.70	B	0.64	B
Hancock Street (99W)/College Street	0.85	0.76	B	0.70	B
1st Street (99W)/Main Street	0.85	0.57	B	0.52	B
1st Street (99W)/College Street	0.85	0.58	B	0.53	B
Portland Rd (99W)/Villa Rd (OR 219)	0.85	0.84	D	0.77	C
1st Street/Villa Rd (OR 219)	0.95	0.29	C	0.25	C
1st Street (OR 219)/Everest Rd	0.90	**0.96**	**F**	0.70	F
Haworth Avenue/Springbrook Rd	D	**0.89**	**E**	**0.82**	**E**
Portland Rd (99W)/Springbrook Rd*	0.80	0.77	C	0.71	C
Portland Rd (99W)/Brutscher Street	0.80	0.80	C	0.73	C
Portland Rd (99W)/Providence Drive	0.80	0.72	A	0.66	A
Fernwood Rd/Springbrook Rd	D	0.54	B	0.52	B

Notes:V/C ratio and LOS reported for the worst minor street approach for unsignalized intersections

Capacity analysis indicates that the majority of the intersections are meeting mobility targets/standards. The intersection of Haworth Avenue/Springbrook Road exceeds the Newberg mobility standards during the average weekday and the seasonal peak with the southbound approach having the most delay. The intersection of 1st Street (OR 219)/Everest Road and Illinois Street/Main Street meet mobility standards during the average weekday but not during the seasonal peak with the stop controlled approaches operating with significant delay.

Access Spacing

An access inventory was conducted along Highway 99W within Newberg, comparing the number of existing approaches (driveways and public streets) to the applicable ODOT spacing standard. Table 13 shows the number of existing approaches for each segment of 99W and compares it to the approximate number of driveway or public street approaches that would be allowed under full compliance with the spacing standards. As shown, the segments of 99W through the downtown and close to the downtown area have more driveway and public street approaches than recommended under the standard. The couplet portion of 99W is particularly access dense with more than double the recommended driveways on the stretch from Elliot Road to Villa Road. It is expected that, as properties along 99W are redeveloped, accesses will be removed or consolidated in order to move towards the standard.

Table 13: Highway 99W Access Spacing Inventory

Highway 99W Roadway Segment	Segment Length	Recommended Approaches*	Southwest Side	Northeast Side
Providence Drive to Brutscher Street	1,850	2	**3**	1
Brutscher Street to Springbrook Road	1,350	2	2	**3**
Springbrook Road to Elliot Road	2,100	4	**7**	**9**
Elliot Road to Villa Road	2,250	5	**12**	**12**
Villa Road to College Street**	2,800	6	**10**	**9**
College Street to Main Street**	1,650	3	1	**10**

* Segment length divided by 500-foot or 800-foot access spacing standard, minus existing local street approach
**Due to typical roadway to couplet configuration within segment being measured, access on only one side of the couplet was counted.

Summary of Issues

The review of existing conditions identified the following key issues:

- Two primary barriers exist that restrict system connectivity – Hess Creek and the WPRR rail line
- Additional amenities are needed that support multimodal travel in Newberg
    - Sidewalks should be added along all collectors and arterials when possible.
    - Crosswalks should be re-striped at locations where paint has faded.
    - Bike lanes should be added along all collectors and arterials when possible.
    - Bike parking structures should be added throughout the city near major traffic generators.
- Transit stop amenities (benches and shelters) are limited in the City
- Roadway segments with high crash frequencies exist:
    - Three locations on Highway 99W in Newberg are listed as on ODOT's Safety Priority Index System (SPIS) for 2011 and the crash rates along 99W through Newberg have been greater than the state averages for four of the last five years. It is expected that safety will be improved through the City of Newberg with the construction of the Newberg-Dundee Bypass.
    - OR 219 also has crash rate above the state average through the City of Newberg. Additionally two intersections along OR 219 operate above mobility standards. These intersections should be evaluated to determine what operational and/or geometric improvements can improve operations and safety.
- The majority of intersections analyzed meet City and ODOT mobility standards for delay or capacity. However, several locations do not meet standards. These intersections should be evaluated to determine what operational and/or geometric improvements will improve operations and safety.
    - The intersection of Haworth Avenue/Springbrook Road exceeds the Newberg mobility standards during the average weekday and the seasonal peak. Additionally, this intersection has a crash rate that exceeds standards.
    - The intersection of 1st St (OR 219)/Everest Rd does not meet ODOT standards during the seasonal peak.
- The amount of driveways on Hwy 99W exceed the recommended number of approaches based on ODOT standards. Most street segments between public intersections include between two to four times the recommended amount of driveways. While the high number of driveways improves access, it also reduces mobility for the highway through the corridor.

DRAFT TECHNICAL MEMORANDUM #6

DATE: November 1, 2013

TO: Newberg TSP Update Project Management Team

FROM: Carl Springer, P.E., DKS Associates
Garth Appanaitis, P.E., DKS Associates
Julie Sosnovske, P.E., DKS Associates

SUBJECT: **Newberg Transportation System Plan Update**
Future Needs Analysis

This memorandum describes transportation conditions in Newberg in year 2035 if no new investments, other than those already funded[1], are made to the transportation system. The following items are addressed:

- How do we determine future transportation system demand?
- What will Newberg look like in 2035?
- Where transportation solutions are needed?
- What if the future is different than we thought?

The next phase in the TSP update process (to be documented in Technical Memorandum #8: Alternatives Evaluation) will include developing and evaluating alternatives that address these needs.

How Do We Determine Future Transportation System Demand?

To determine future transportation system needs in Newberg requires the ability to accurately forecast travel demand from estimates of future population and employment, and forecast travel patterns based on decisions and preferences demonstrated by existing residents and travelers through the region. Travel demand models help forecast future commuter, school, and other travel patterns, including estimates of the length and time of day a trip will be made. Comparing model outputs with counts and patterns observed on the existing system helps to refine model forecasts. This refinement step is completed before any evaluation of system performance is made. Once the traffic forecasting process is complete, the 2035 traffic volumes are analyzed to determine the areas of the street network that are expected to be congested and that may need future investments to accommodate growth.

[1] Phase 1 of the Newberg-Dundee Bypass (Dundee to Springbrook Road) is funded and included in the analysis.

Estimating Future Travel

The Oregon Department of Transportation (ODOT) maintains a travel demand model that estimates daily and PM peak hour demand for the existing year and future year transportation system in the Newberg-Dundee area based on existing and forecast land uses, as well as other data and assumptions.[2] The forecasting process for the Newberg TSP Update uses base year (2000) and future year (2035) models to estimate future traffic volumes. As part of the TSP update, the future model was updated from its previous 2025 horizon year to include projected 2035 land use consistent with Yamhill County's coordinated population projections. These models include two key elements that help estimate future traffic:

- **Transportation Analysis Zones (TAZs).** The Newberg-Dundee model area is split into 131 TAZs. Each TAZ is described by the number of households and the number and type of employees within the zone. The type and intensity of the land uses determines the scale and directionality of trips generated by the zone.
- **Transportation Network.** The model includes a network of links that generally represent the major transportation system (City and County collector and arterial roads and the state highway facilities) in the model area. Each link is coded with attributes (e.g., speed and capacity) that approximate the function of existing roadways and programmed roadway improvements (for the future year). Each TAZ is connected to links in the model at points that approximate where vehicles are expected to enter the network.

The following sections provide an overview of transportation growth, impacts, and needs in Newberg through year 2035. The majority of this assessment is based on a "2035 Base Scenario" – which assumes that the bypass will be limited to the currently funded Phase 1 and that Newberg will not develop beyond the urban reserve area (URA) adopted in 1995. Additional scenarios (including a full bypass construction and further urban growth boundary (UGB)/URA expansion) are explored in later sections.

What will Newberg look like in 2035?

In 2000, Newberg had about 6,650 households and around 7,100 jobs. Between now and 2035, both population (households) and employment are expected to grow significantly. By 2035, Newberg is expected to have about 13,700 households and 14,500 jobs, an increase of approximately 105% from year 2000. With more people and more jobs in Newberg, the transportation network will face increased local demand through 2035.

The forecasting process accounts for the existing network as well as any programmed future improvements. The most significant programmed network change is the Phase 1 Newberg-Dundee Bypass, which provides a major alternate route for through traffic on OR 99W. In addition, several roadway connections in Newberg were assumed to be constructed as development occurs.

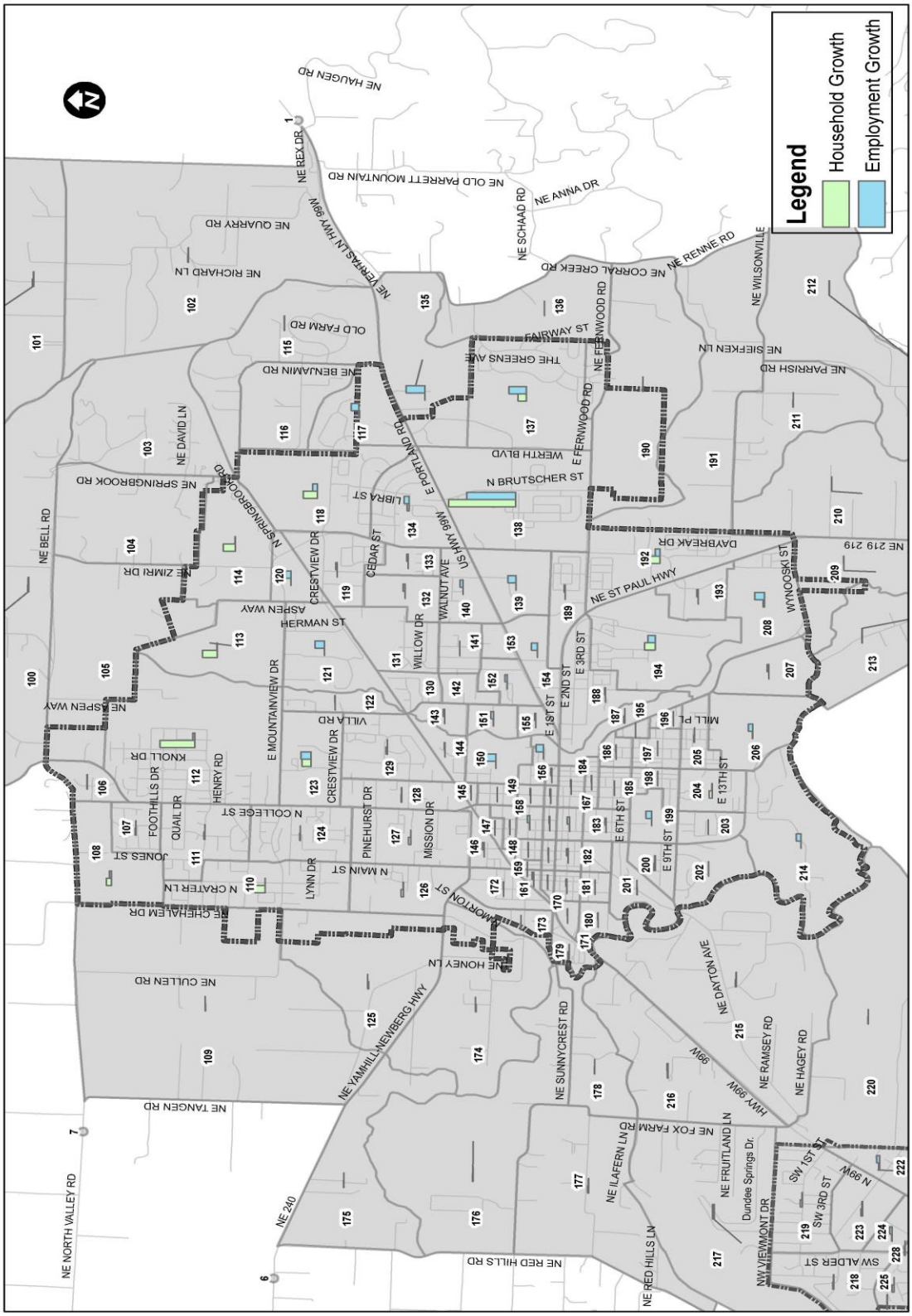
[2] For more detail on the forecasting process, see this project's Technical Memorandum #5, Future Forecasting.

- Phase 1 Newberg-Dundee Bypass (Dundee to OR 219) – 1 lane in each direction
- Foothills Drive (Aldersgate Drive to Villa Road) – Major Collector
- Villa Road (Aspen Way to Mountainview Drive) – Major Collector
- OR 219/2nd Street Reconfiguration

Growing Population and Employment

Figure 1 provides an overview of land use growth, by zone, that is anticipated through year 2035. Much of the household growth is expected to occur outside of the downtown core, primarily in the north and southeast parts of town. While some employment growth is expected in the downtown core, significant growth is expected in the southeast of OR 99W and Springbrook Road.

Figure 1: Relative Growth and Employment in Newberg TAZs



Change in Travel Patterns

With the forecasted increase in population and employment in Newberg, the transportation infrastructure needed to support growth is significant. The programmed Phase 1 Newberg-Dundee Bypass is a key improvement that will generally serve traffic passing through the Newberg-Dundee area, alleviating some pressure on the local transportation system.

The increase in households and employees through year 2035 mean an increase in the overall number of trips generated. Table 1 shows the change in PM peak hour trip ends estimated by the Newberg-Dundee model within Newberg, and within the entire model area. The table shows that trips are expected to grow at a slower rate in Newberg than in the rest of the model area between 2000 and 2035 if the land develops according to the model's land use assumptions.

Table 1: Vehicle Trip Generation (PM Peak Hour Trip Ends*)

	Year 2000	Year 2035	% Increase
Newberg-Dundee Model Area	25,418	44,672	76%
Newberg TAZs Only	16,025	26,664	66%

Source: Newberg-Dundee Travel Demand Model
Note: *A trip end represents the beginning or ending point of a trip. Each trip has two trip ends.

How Will Changes Affect Traffic Congestion in Newberg?

The analysis of existing conditions indicated that the majority of intersections in Newberg are currently meeting mobility targets/standards. Significant traffic congestion and vehicle queuing exist in only a few areas in Newberg today. While the Newberg-Dundee bypass is expected to divert much of the through traffic away from OR 99W, traffic is expected to increase in the Newberg area over the planning horizon, resulting in traffic volumes significantly higher than today at many locations. Traffic volume growth (relative to present conditions) at select locations includes:

- OR 219 (south of Foothills Drive): 110%
- OR 240 (west of Chehalem Drive): 70%
- Springbrook Road (north of Haworth Avenue): 60%
- OR 99W (east of Providence Drive): 45%
- Mountainview Drive (west of Villa Road): 40%
- OR 99W (west of couplet): 20%
- OR 99W (east of Villa Road): 10%
- OR 99W (both directions) west of College Street: -5%

Three relative levels of growth conditions are present, as indicated by the sample of locations above:

- Higher Growth Areas – Many of the collector and arterial facilities outside the downtown area will have higher growth due to a combination of lower existing traffic levels and more opportunities for adjacent land use development.

- Moderate Growth Areas – Areas along OR 99W outside the couplet will have higher overall traffic volume increases, but relative to existing traffic, growth is more moderate.
- Lower Growth Areas – Some areas, particularly those near the couplet, will have low future growth due to the traffic that will be diverted onto the Bypass. These areas will experience a reduction in traffic following the completion of the bypass, with traffic returning nearer to present day levels through year 2035.

Forecast year 2035 PM peak hour volumes representing the 30th highest hour (or design hour) and the average weekday are shown in Figure 2 (attached).

Motor Vehicle Operations

Intersections in Newberg are evaluated according to mobility targets, helping to identify and maintain a minimum level of efficiency for motor vehicle travel.[3] Two methods to gauge intersection operations include volume-to-capacity (v/c) ratios and level of service (LOS).

Volume-to-capacity (V/C) ratio: A decimal representation (with 1.00 representing saturated condition) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays. ODOT mobility targets for intersections along OR 99W are based on v/c ratios.

Level of service (LOS): A "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and traffic is highly congested. LOS is used to designate minimum performance standards for intersections under City of Newberg and Yamhill County jurisdictions.

The motor vehicle conditions in Newberg vary based on the time of year. Operations at the 20 study intersections, shown in Table 2, were evaluated for the PM peak hour using the 2035 volume forecasts for both the peak seasonal period and average weekday. Mobility targets for each intersection are shown as well.

[3] For more information on mobility targets and operational analysis, see this project's Technical Memorandum #4, Existing Conditions.

Table 2: Intersection Operations (2035 PM Peak Hour)

Intersection	Mobility Target	Peak Seasonal		Average Weekday	
		V/C Ratio	LOS	V/C Ratio	LOS
Foothills Drive/Hillsboro-Silverton Highway (OR 219)	0.95	>1.0	F	>1.0	F
Mountainview Drive/Villa Rd	D	>1.0	F	>1.0	F
Mountainview Drive/Aspen Way	D	0.83	F	0.83	F
Mountainview Drive/Zimri Drive	D	>1.0	F	>1.0	F
Yamhill-Newberg Highway (OR 240)/Chehalem Drive	0.95	0.64	F	0.47	E
Illinois Street/Main Street (OR 240)	0.95	>1.0	F	>1.0	F
Haworth Avenue/Villa Rd	D	>1.0	F	>1.0	F
Fulton Street/Villa Rd	D	>1.0	F	>1.0	F
Hancock Street (99W)/Main Street	0.85	>1.0	F	0.87	C
Hancock Street (99W)/College Street	0.85	0.91	C	0.91	C
1st Street (99W)/Main Street	0.85	0.67	B	0.66	B
1st Street (99W)/College Street	0.85	0.63	B	0.63	B
Portland Rd (99W)/Villa Rd (OR 219)	0.85	>1.0	F	>1.0	F
1st Street/Villa Rd (OR 219)	0.95	0.93	F	0.86	F
1st Street (OR 219)/Everest Rd	0.90	**>1.0**	**F**	>1.0	F
Haworth Avenue/Springbrook Rd	D	>1.0	F	0.73	F
Portland Rd (99W)/Springbrook Rd	0.80	>1.0	F	>1.0	F
Portland Rd (99W)/Brutscher Street	0.80	>1.0	F	>1.0	F
Portland Rd (99W)/Providence Drive	0.80	>1.0	F	>1.0	F
Fernwood Rd/Springbrook Rd	D	>1.0	F	>1.0	F

Notes:V/C ratio and LOS reported for the worst minor street approach for unsignalized intersections
Intersections not meeting the mobility standard are shaded in black.

Where Are Transportation Solutions Needed?

This section describes where transportation system deficiencies have been identified through future analysis as well the previous existing conditions work. Areas addressed include motor vehicle, walking, biking, transit, and other potential areas of transportation deficiency.

Motor Vehicle Capacity Needs

Operational analysis (Table 2) shows that most study intersections (16 of 20 locations) would fail to meet the ODOT and/or City of Newberg mobility target in the future under both peak seasonal and average weekday conditions. In addition, two other locations would meet mobility targets but would have high average delay or would be nearing capacity. These locations and conditions fall into several general groups:

- **OR 99W (East of Downtown) –** Major intersections along OR 99W east of downtown would degrade due to additional traffic along the corridor. These locations would not be relieved by the bypass and may serve higher turning volumes for trips to and from the bypass.
- **OR 99W (Through Downtown) –** Most of the study intersections through downtown would meet targets due to the relief provided by the Newberg-Dundee Bypass. However, Hancock at Main Street and Hancock at College Street would both fail to meet mobility targets due to the high vehicle crossing volumes. Targets would be exceeded during both peak seasonal and average weekday conditions, however targets during average conditions come relatively close (v/c difference of 0.06 or less) to being met.
- **Stop-Controlled Approaches along Major Corridors –** Growth along major corridors will increase delay for vehicles turning from side streets. These locations may be candidates for intersection improvements (lane channelization or intersection control) or improvements to parallel corridors to provide other routes that can relieve these corridors. These locations include:
    - Mountainview Drive at Villa, Aspen, and Zimri
    - Highway 240 at Illinois/Main and Chehalem
    - Villa Road at Haworth and Fulton
    - Springbrook Road at Haworth
- **Other Spot Locations** – Other study intersection locations that are not identified in the preceding groups also have capacity needs:
    - 1st Street / Everest Road – Traffic volumes along 1st Street (OR 219) will continue to grow due to additional growth in the southeast area. In addition, traffic volumes on Everest will grow due to circulation changes with the planned reconfiguration of the OR 219 / 2nd Street intersection (restricted side street movements to right-in-right-out). Considerations for intersection control and lane channelization at this location will need to account for the adjacent intersections and traffic flow along OR 219.
    - Fernwood Road / Springbrook Road – The western leg at this intersection will have limited traffic growth due to the reconfiguration of OR 219/2nd Street. However, the other approaches will experience increased traffic volume due to growth in the southeast area as well as traffic traveling to and from the bypass. This intersection is a candidate for intersection improvements such as lane channelization or intersection control.

Alternative Mobility Targets

Mobility targets are typically based on 30th highest hour traffic volumes, in this case represented in the peak seasonal analysis shown in Table 2. ODOT also provides avenues for exploring alternative mobility targets, which are typically less difficult to meet. One approach to alternative targets is to analyze operations under traffic conditions that are less intense than the 30th highest hour, such as the average weekday PM peak hour.

While future traffic analysis shows somewhat better operations under average weekday conditions, the difference is not significant enough to allow any intersections to meet the mobility targets under average weekday conditions. However, some locations (such as Hancock Street/ Main Street and Hancock Street/ College Street) may be able to achieve the mobility targets during the average weekday when combined with additional improvements. Therefore, using average weekday operations to inform potential alternative mobility targets may be beneficial and could be further considered through the alternative development process.

Connectivity Needs

The ability to travel between different areas of the city conveniently and efficiently (a direct route) is an important part of system planning. The following connectivity issues have been identified for Newberg:

- The extensions of Villa Road to the north and Foothills Drive to the east are planned into the currently undeveloped area in the northeast area of Newberg. It will be important to provide these collectors through the development process, which are spaced to minimize traffic impacts on local residential streets as well as to provide access into downtown Newberg and to key routes out of town such as OR 99W and OR 219.
- Springbrook Road provides the only through access between OR 99W and Wilsonville Road. Developments to the east of Springbrook Road have limited access to OR 99W and Wilsonville Road, which are key routes into and out of Newberg.
- Additional connectivity is needed north of OR 99W between Springbrook Road and Benjamin Road in both the north-south and east-west directions.
- Currently, OR 99W and OR 219 are the only regional roads that serve trips between Newberg and locations to the south. Additional major connections are constrained by the Willamette River. However, there may be options for creating additional connections, particularly for non-motorized travel.

Safety Needs

As noted in the existing conditions analysis, OR 99W through Newberg (mile points 21.36 to 24.13) and OR 219 through Newberg (mile points 18.45 to 21.42) both have higher collision rates than the statewide average for similar facilities. Specific locations along these facilities were identified through ODOTs Safety Priority Index System (SPIS). While the construction of the Newberg-Dundee Bypass is expected to relieve some congestion, planned housing and employment growth is expected to replace much of the traffic volume diverted to the bypass. Four locations were identified as top 5% SPIS locations and will be reviewed for solutions to address needs:

- OR 99W (M 21.71 to 21.89 - including the Brutscher Street intersection)
- OR 99W (mile points 21.96 to 22.14 - including the Springbrook Road intersection)
- OR 99W (mile points 22.80 to 22.98 - including the Everest Road and Villa Road intersections)
- OR 219 (mile points 21.11 to 21.29 - including the 2nd street intersection)

Walking Needs

Figure 3A shows the presence of sidewalks along collector and arterial facilities in Newberg. Sidewalks on arterial and collector streets are generally available near commercial areas but decrease with distance from the core central area of town. Sidewalks are present along most of OR 99W as it transitions from Portland Road through the downtown area as the Hancock Street and 1st Street couplet. Newer commercial and residential areas have sidewalks. The newer commercial and residential developments usually abut older areas that do not have sidewalks, leaving gaps in the pedestrian network. All new sidewalks have ADA-compliant curb ramps at intersections and at driveways.

Downtown Newberg has a fairly complete pedestrian network with sidewalks, ADA-compliant curb ramps, pedestrian way finding signage, and amenities such as benches. Crosswalks are striped for a majority of the intersections downtown and traffic speeds are low, which makes walking easy and attractive. While crosswalks are provided with ADA-compliant ramps at most locations, some of the crosswalks are in poor condition.

Providing safe pedestrian and bicycle access to school is important in promoting physical fitness for school-age children and creating healthy travel habits that will carry into adulthood. Pedestrian and bicycle infrastructure should be a priority in Newberg to provide good connections for children and families traveling to and from school from nearby residential neighborhoods.

By 2035, pedestrian activity is likely to increase significantly as population and employment grows, and some non-local traffic is diverted to the Bypass. This means that correcting deficiencies in the pedestrian network becomes even more important.

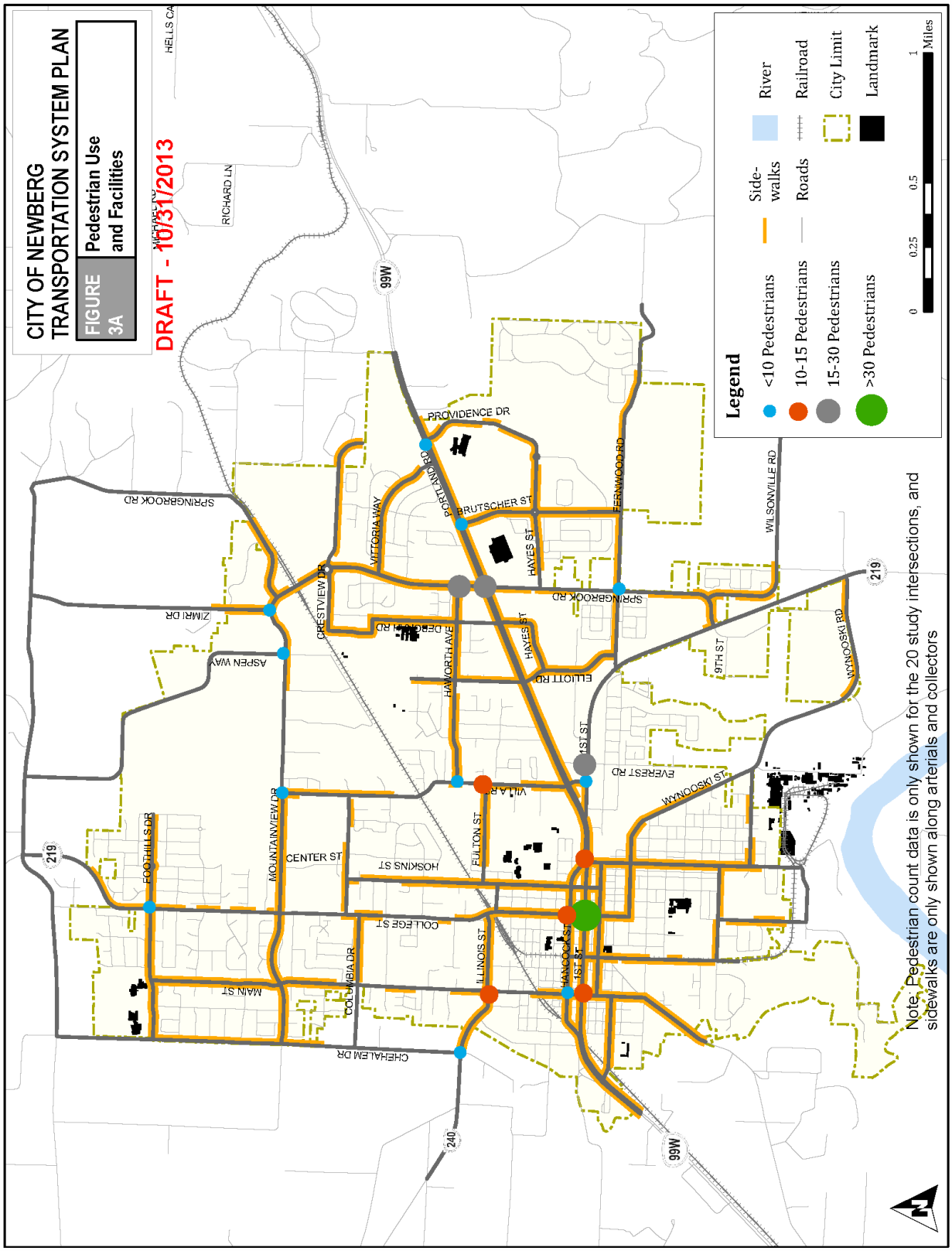
- Sidewalks should be added along all collectors and arterials when possible.
- Key gaps in the arterial and collector system exist on the following routes:

- 1st Street/OR 219 south of Fernwood Road
- 4th Street/Wynooski Street
- Fernwood Road (south side) east of Springbrook Road
- Springbrook Road
- Villa Road (established areas and undeveloped areas)
- Elliott Road north of OR 99W (which provides access to the Newberg High School)
- OR 219 and Main Street adjacent to established neighborhoods
- Mountainview Drive between Villa Road and Aspen Way
- Sidewalks on Aspen Way, Zimri Drive and Springbrook Road will become important as more development occurs in northeast Newberg
- 9th Street (Blaine Street to River Street)
- Blaine Street (Sherman Street to Ewing Young Park)
- Dayton Avenue (5th Street to the UGB)
- Illinois Street (Main Street to College Street)
- Haworth Avenue
- Meridian Street (First Street to Crestview Drive)
- River Street (Sheridan Street to 14th Street)

- The Chehalem Heritage Trail system being planned by the Chehalem Park and Recreation District (CPRD) should be considered when prioritizing pedestrian improvements in Newberg.[4] This trail system has facilities planned throughout the CPRD area (including both Newberg and Dundee) and includes existing and new or improved facilities for both pedestrians and bicyclists.

[4] See the *Chehalem Heritage Trail Strategic Plan,* Chehalem Park and Recreation District, 2010.

(INSERT FULL PAGE) - Figure 3A: Pedestrian Use and Facilities



Biking Needs

There are a limited number of routes with designated bike lanes in Newberg, with the most continuous being along OR 99W. Similar to sidewalks, there are bike lanes near the newer commercial and residential areas with fewer bike lanes in the more established areas of town. Currently 40 percent of Newberg residents with jobs work in Newberg. As both population and employment increase in the Newberg area, more Newberg residents are anticipated to live closer to work. This may spur an increase in the number of commuters biking and walking to work.

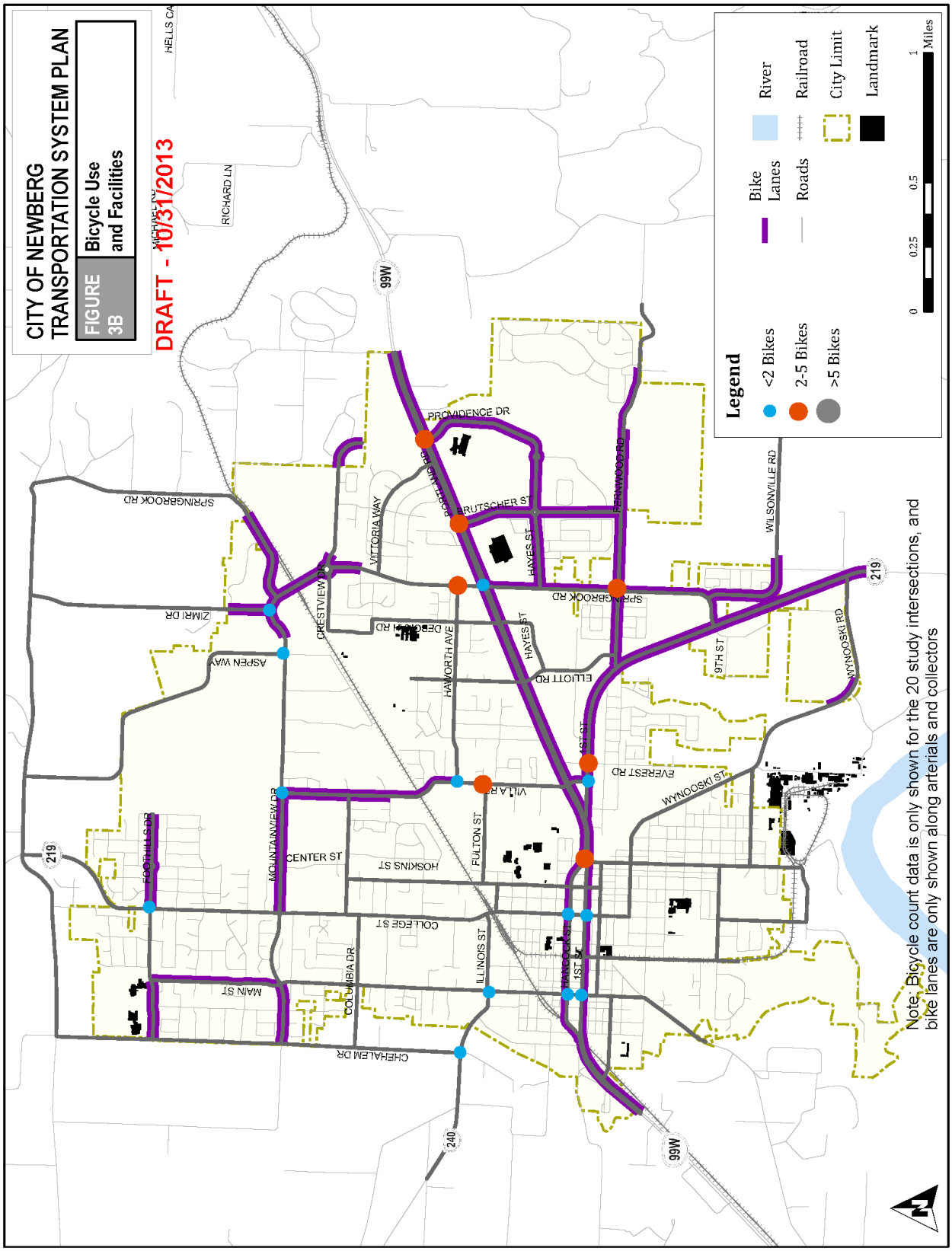
This means that Newberg has excellent potential to increase the number of people who travel by bike. It also highlights the importance of identifying and improving key bike connections to the city. Figure 3B identifies the presence of bicycle facilities along collectors and arterials in Newberg.

- OR 99W provides the most continuous bike route in Newberg with shoulders and/or striped bike lanes through town. The bike lanes are generally at least 5-6 feet wide.
- Newberg's local street system (away from OR 99W) generally features low volumes of motor vehicle traffic, and is suitable for shared use by cyclists, but is not marked or signed as such. Designated bike routes on the local system can provide continuity to other bicycle facilities such as roads with bike lanes and shared use paths. Including wayfinding signs will direct cyclists to key destinations such as shopping, employment centers, and schools. Wayfinding signs can also provide directions and distances to key connections to the bike network such as any trails developed as part of the proposed Chehalem Heritage Trail Strategic Plan.[5]
- Bike lanes should be considered on all collector and arterial roadways with a priority for higher volume routes (those in excess of about 3,000 vehicles daily) to provide access from outlying areas to commercial and employment centers in town. Arterials and high volume collector routes lacking bike lanes include the following:
    - OR 219 (north of OR 99W)
    - Mountainview Drive (between Villa Road and Zimri Drive)
    - Springbrook Road (south of OR 99W – west side and north of OR 99W between Haworth Avenue and Middlebrook Drive)
    - Wilsonville Road east of Daybreak Drive
    - OR 240
    - Villa Road
    - Haworth Avenue and Fulton Street between OR 219 and Springbrook Road (currently marked with sharrows)
    - Main Street/OR 240 between OR 99W and UGB
    - Main Street between Illinois Street and Mountainview Drive
    - Dayton Avenue between OR 99W and City Limits
    - Blaine Street (1st Street to Ninth Street)
    - Dayton Avenue (5th Street to UGB)
    - Elliot Road (OR 99W to Newberg High School)

[5] See the *Chehalem Heritage Trail Strategic Plan,* Chehalem Park and Recreation District, 2010.

  - Illinois Street (College Street to Main Street)
  - River Street (OR 99W to Rogers Landing)
  - Wynooski Streeet (Willamette Street to OR 219)
- Bicycle facilities identified in the Chehalem Heritage Trails Master Plan, within Newberg, should be considered for potential bicycle treatments (i.e. bike lanes, shared use paths, etc.).
- Bike parking should be considered at key destinations such as the commercial area on OR 99W in downtown Newberg, and in future development areas.

(INSERT FULL PAGE) - Figure 3B: Bicycle Use and Facilities



Transit Needs

Transit service is currently provided in Newberg by Yamhill County Transit Area (YCTA), which provides two fixed bus routes connecting Newberg to destinations along the OR 99W corridor, including McMinnville, Newberg, Sherwood, and Tigard (routes 44/46S/45X). YCTA also provides Americans with Disabilities Act (ADA) dial-a-ride service and two routes within Newberg (routes 5 and 7). The following are future considerations as Newberg grows:

- Route 44/46S/45X, a commuter service with limited stops along OR 99W between McMinnville and Tigard, stops at three locations in Newberg (Safeway, J's Restaurant and Naps Thriftway). Improvements to provide comfortable pedestrian crossings and amenities should be considered in coordination with YCTA.
- Bus stops should be clearly identifiable, with amenities provided, such as shelters and information, where appropriate. Prominent stops help increase local awareness of transit options, and can enhance the street environment.
- Routes 5 and 7 provide local service within Newberg. Expansion of the transit network, and potentially these routes in particular, should be considered for new urban growth areas, particularly in the northeast and southeast parts of town. Connections to transit will be vitally important in southeast Newberg area where both households and employment are expected to grow significantly.
- All current routes provide infrequent service with one to two-hour headways between 6:00 AM. and 7:00 PM Monday through Friday. Route 44 also makes four trips between 8:00 AM and 7:00 PM Saturday.

Freight Needs

ODOT classifies OR 99W as a freight route through the City of Newberg. Currently, truck freight movements in Newberg involve shipments both to and from locations in the City, and shipments that pass through the City, mainly on OR 99W, and also on OR 219 and OR 240. Heavy vehicles typically represent three percent or less of the PM peak traffic in Newberg. With the construction of the Newberg-Dundee bypass, many of the through truck trips will likely be diverted onto the bypass rather than using OR 99W. However, the southeast Newberg area is expected to attract commercial and industrial development, so local truck traffic may increase in Newberg through 2035.

Development in the southeast Newberg area should be designed to accommodate significant freight traffic. Turning radii and pavement design will be important along any future freight routes. Access points into this area should be evaluated for their appropriateness for freight, particularly turning movements, and designed and/or upgraded to accommodate truck traffic.

Transportation System Management and Operations Needs

Access Management

An existing access inventory was conducted along OR 99W. Almost all segments of OR 99W have more driveway and public street approaches than allowed under the applicable ODOT spacing

standard. The stretch from Elliott Road to College Street is particularly dense with driveways. As properties along OR 99W are redeveloped and streetscape improvements are made, accesses should be removed or consolidated in order to move toward the standard.

Demand Management

Currently, 74 percent of Newberg's residents commute to work in single occupancy vehicles despite the various travel options available. One option for encouraging other travel options, such as bicycling or transit, is to market the amenities available to commuters heading to McMinnville or the Portland Metro Area. Wayfinding signage and pavement markings along future routes, including times and distances to key destinations can help promote nonmotorized travel. As new employers open for business in the southeast Newberg area, there may be opportunities to market transit, walking, and biking as travel options to and from the area.

Air, Rail, Pipeline and Water Needs

No system needs have been identified for Newberg's waterway or pipeline systems through 2035. Upgrades to Sportsman Airpark, including extending the runway, have been identified as air needs.

The Willamette & Pacific Railroad (WPRR) operates a rail line that runs parallel to OR 99W through Newberg. The line is currently used for freight movement, and has one train operating daily in each direction with up to two smaller trains operating periodically. A spur from this line is located along Blaine Street and crosses the OR 99W couplet. There are no passenger rail services on this line currently, but the integrity of existing rights-of-way should be preserved in order to retain and enhance passenger and freight transportation options in the future.

What if the Future is Different than we Thought?

The needs identified in this report are tied to assumptions about the future of Newberg (such as level of growth and development of the transportation network) using the 2035 Base Scenario. Solutions and future projects to address the needs identified in this report will be primarily based on these forecasted conditions.

A sensitivity analysis was performed to determine the general areas and magnitude of impact that future changes could bring. This section highlights the general impacts under three different scenarios. While these scenarios are not analyzed in the same detail as the year 2035 Base Scenario, they will be considered as future transportation improvements are considered and prioritized

The following combinations of scenarios were considered:

- Full Bypass (Extend the bypass east of Springbrook Road to connect to OR 99W)
- UGB/URA Expansion (Development of land in 2007 proposed URA boundary)
- Full Bypass and UGB/URA Expansion (combination of previous scenarios)

The following sections summarize the general impacts of these scenarios relative to the 2035 Base Scenario.

Full Bypass

The full Newberg-Dundee Bypass would extend from the Phase 1 terminus at Springbrook Road eastward to connect to OR 99W near Corral Creek Road. West of Newberg, the bypass would add an interchange to provide access near Fox Farm Road on the north side of Dundee. The bypass would also be extended beyond the Phase 1 southern/western terminus on the south side of Dundee to reach Dayton. The full bypass would include two lanes in each direction, which is wider than the Phase 1 width of 1 lane in each direction. Figure 4 shows the general trends that could result from this scenario:

- Overall the bypass would become a more attractive route. The bypass (with increased length and capacity) would serve additional traffic.
- The largest magnitude of change would occur east of Springbrook Road. The extended bypass alignment would serve both trips added to the bypass trips as well as remove Phase 1 bypass trips from the adjacent street network (OR 99W and roadways connecting to the Phase 1 terminus at Springbrook Road)
- West of Springbrook Road, the original (Phase 1) portion of the bypass would also serve additional traffic due to the increased attractiveness of the full bypass route. The parallel OR 99W route through the couplet would have less traffic.
- Study intersections impacted by this scenario include two general groups: those along OR 99W (less traffic) and those located north of OR 99W (less traffic).

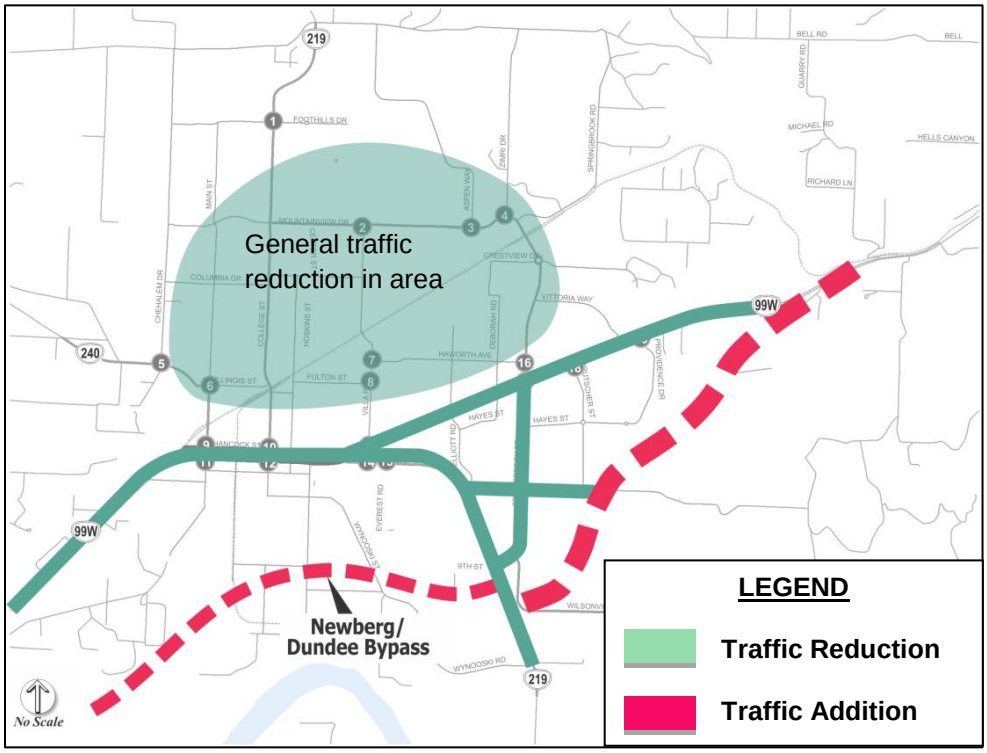


Figure 4: General Impacts of Full Bypass Extension

UGB/URA Expansion

An expansion of the URA was proposed in 2007 that identified potential growth areas that could someday provide future locations for development. These areas were not adopted in 2007 but were explored as a potential future scenario to determine high level impacts to the transportation system. The scenario included approximately 350 additional houses and 1,700 additional jobs above the 2035 Base Scenario, generally located around the eastern edge of Newberg. Figure 5 shows the potential trends that could occur with such development:

- The magnitude of traffic shifts and growth due to this scenario are not as large as the Full Bypass Extension that was explored in the previous scenario.
- Traffic growth would be greatest in the southeast area of the city, adjacent to growth areas.
- Due to shifting trip-making associated with different options, the additional growth in the URA may attract some trips that would otherwise be associated with areas in northern Newberg. Therefore, traffic growth may have minor decreases in areas north of OR 99W.
- Additional traffic in the southeast area could deter through traffic from travelling between OR 99W east of Newberg and the bypass without additional enhancements to mobility through the area (or the full bypass). Wthout additional enhancements, bypass volumes may slightly reduce while traffic traveling through the downtown core on the existing OR 99W alignment may increase.

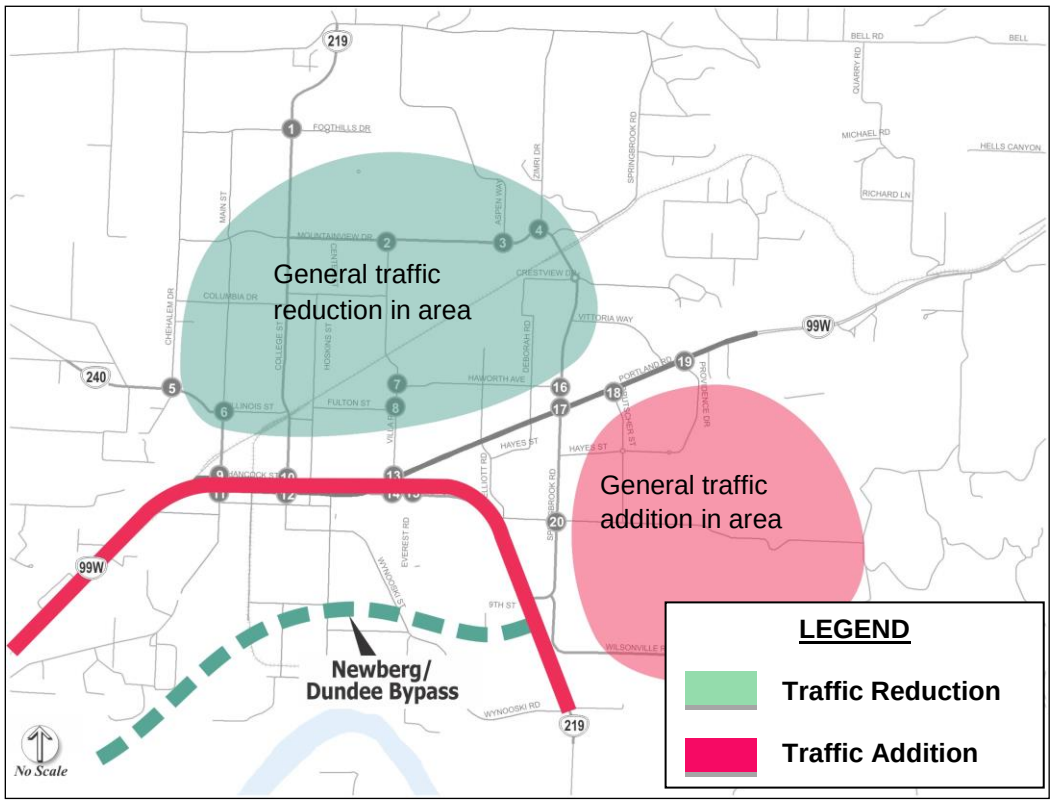


Figure 5: General Impacts of UGB/URA Expansion

Full Bypass and UGB/URA Expansion

The combination of the previous two scenarios (full Newberg-Dundee Bypass and UGB/URA expansion) was explored as a third scenario. Due to the relative impacts of the previous two scenarios (as noted, the Full Bypass scenario would shift a greater magnitude of traffic), the combined scenario would look very similar to the Full Bypass scenario. That is, the addition of the UGB/URA growth areas would not significantly change the general trends that were identified in the Full Bypass scenario. The same general trends (shown in Figure 6) would be identified in this scenario:

- The bypass would become a more attractive route.
- The largest magnitude of change would occur on the bypass east of Springbrook Road.
- West of Springbrook Road, the original (Phase 1) portion of the bypass would also serve additional traffic.
- Study intersections would generally experience a reduction in overall traffic demand.

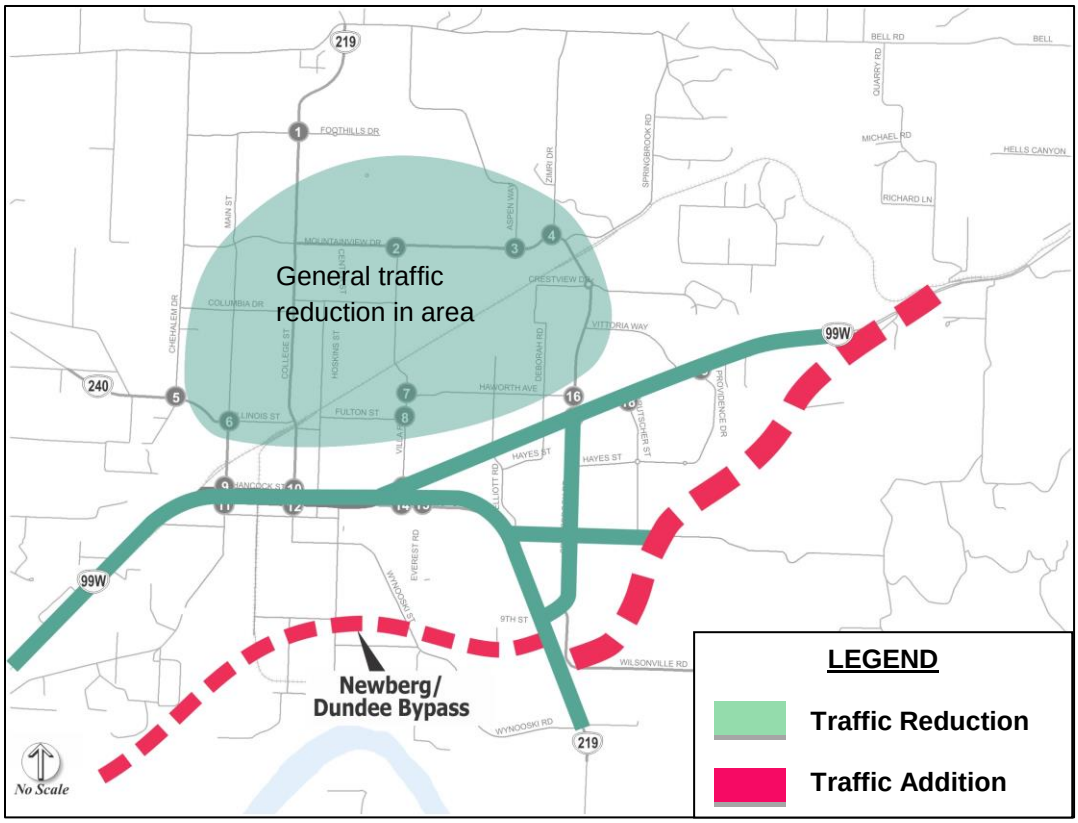
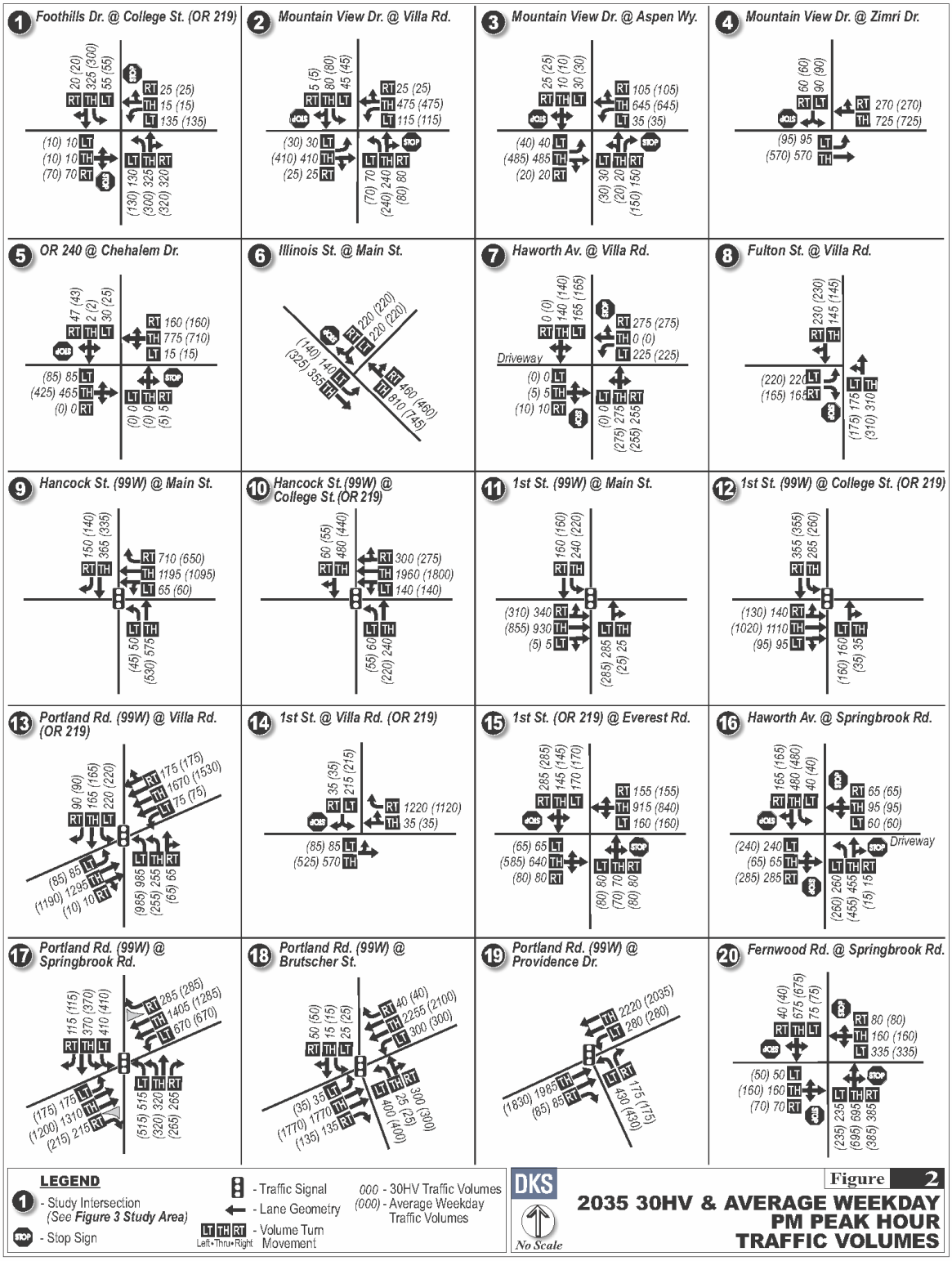


Figure 6: General Impacts of Combined Full Bypass Extension and UGB/URA Expansion

ATTACHMENTS

Figure 2 – Traffic Volumes



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PLANNING COMMISSION STAFF REPORT
TRAFFIC CALMING PLAN

MEETING DATE: November 14, 2013

FILE NO: G-13-006

APPLICANT: Initiated by Newberg Traffic Safety Commission

REQUEST: Endorse the use of the Traffic Calming Plan

ATTACHMENTS:

Resolution 2013-303 with
Exhibit "A": Traffic Calming Plan

A. SUMMARY: The proposal would endorse the Newberg Traffic Safety Commission's proposed traffic calming plan. The plan considers a number of potential traffic calming measures and gives guidance on when and where they would be appropriate for use. The plan would be used by the Traffic Safety Commission in making decisions about traffic calming measures.

B. BACKGROUND: The Newberg Traffic Safety Commission has developed a draft Traffic Calming Plan. The Planning Commission discussed this plan at their joint meeting with the Traffic Safety Commission on April 11, 2013. The Traffic Safety Commission would like the Planning Commission input and endorsement on the plan.

PLANNING COMMISSION RESOLUTION 2013-303

A RESOLUTION ENDORSING THE USE OF THE TRAFFIC CALMING PLAN

RECITALS

1. The Newberg Traffic Safety Commission has developed a Traffic Calming Plan to establish a set of consistent standard to respond to traffic calming requests.

2. The Planning Commission and Traffic Safety Commission met in April 2013 to discuss this plan.

3. The traffic calming plan presents an consistent and sound approach to implementing various traffic calming techniques.

The Newberg Planning Commission resolves as follows:

1. The Commission recommends that the Newberg Traffic Safety Commission and Newberg City Council implement the Neighborhood Traffic Calming Plan as shown in Exhibit "A". Exhibit "A" is hereby adopted and by this reference incorporated.

Adopted by the Newberg Planning Commission this 14th day of November, 2014.

ATTEST:

Planning Commission Chair	Planning Commission Secretary

List of Exhibits:
Exhibit "A": Neighborhood Traffic Calming Plan

Neighborhood Traffic Calming Plan

Engineering Services Department & Newberg-Dundee Police Department

1. INTRODUCTION AND PURPOSE

The purpose of this Neighborhood Traffic Calming Plan (NTCP) is to establish a set of consistent standards offering the City of Newberg's approach to potential traffic calming requests by the public, City staff, Newberg Traffic Safety Commission, and others.

Local residential streets in the City are designed and constructed to serve neighborhood traffic. As collector or arterial streets experience congestion, local residential streets report an increase in cut through traffic. This increase can be attributed to population growth in the City which averages around three percent each year over the last decade. Other growth related traffic issues are higher traffic volumes that reduce roadway capacity and excessive speed beyond the posted limits. These traffic problems have been brought to the attention of Newberg Traffic Safety Commission for consideration in accordance with the Municipal Code §2.15.070 through §2.15.220.

The City of Newberg recognizes the benefits of reasonable traffic calming measures (TCM) that may restore livability and enhance traffic and pedestrian safety. TCM, on the other hand, may adversely affect emergency response time for fire and rescue if they are not properly applied. This NTCP is created to provide a unified response in addressing speed, volume, and cut through traffic problems that are often expressed by local residents. Upon adoption by Newberg Traffic Safety Commission and the Newberg City Council, NTCP will provide guidance to the public and staff on traffic calming implementation.

2. EVALUATION PROCESS

Although requests for TCM are often initiated by local residents, the City can also request it proactively. Careful consideration must be given to the applicability, location and design of TCM based upon a set of established traffic engineering principles.

The *Manual on Uniform Traffic Control Devices* (MUTCD), 2009 Edition or the latest as revised, offers authoritative principles on certain TCM. *U.S. Traffic Calming Manual*, published by APA Planners Press and American Society of Civil Engineers, 2009, provides practical guidance only on when and how to implement TCM and not all listed TCM are acceptable to the City of Newberg. See Section 5 for acceptable TCM on city streets.

2.1 Involving the Community

Getting community support and adequate funding is crucial for the success of TCM. Input from all stakeholders including decision makers is essential in building support for a sustainable TCM. Newberg-Dundee Police Department and Newberg Engineering Services Department offer staff support in the TCM process. Approval from Newberg Fire Department is also required.

2.2 Understanding the Problems

Listening to citizens' complaints is essential for each traffic issue. By listening, root problems or causes may be isolated from perceptions.

2.3 Visiting Problem Areas and Collecting Data

Visits to problematic areas may identify certain site issues such as lack of visibility due to vegetative growth that may be easily corrected. Often, traffic data such as speed and volume has to be collected and crash information from Newberg-Dundee Police Department records evaluated for a traffic study. Details of crash information are now available through the City's Geographic Information System.

2.4 Developing and Analyzing Options

Data that is collected for a TCM consideration would typically be reviewed by City staff within 30 days of its collection. Recommendations that meet Federal Highway Administration Rules as set forth in the current MUTCD edition and the Oregon Supplement to MUTCD may follow.

Newberg Fire Department has identified the following routes as primary to their fire and paramedic responses:

> Main Street, College Street, Meridian Street, Villa Road, Springbrook Road, Blaine Street, River Street, Wynooski Road, Haworth Avenue, Mountainview Drive, Vittoria Way, Brutscher Street, Hayes Street/Providence Drive, and Fernwood Road.

Consequently, traffic calming on these routes requires special review and must demonstrate no loss in emergency response time. Horizontal deflection devices such as roundabouts may be the only calming measure approvable in these circumstances. Joint approvals from Police, Fire and Engineering Services Departments will be required prior to implementation of any TCM projects.

City streets of *local* or *minor collector* classifications with a posted speed limit of 25 MPH or less per current edition of *Newberg Transportation System Plan* (other than the above emergency routes) may receive full consideration for TCM.

The Average Daily Traffic (ADT) is defined as the total traffic volume on a street during a given time period (in whole days), greater than 1 day and less than 1 year, divided by the number of days in that time period. The 85th percentile speed is the speed under which 85 percent of traffic is traveling in a free flowing condition. This should be a good indicator for the posted speed. TCM solutions are best used when the 85th percentile speed is more than 5 mph higher than the posted speed limit and the ADT exceeds 1,000 vehicles. Speeds are best controlled by law enforcement actions when these criteria are not met.

A post-implementation evaluation will be performed by City staff following each TCM project. This should identify all impacts to the citywide transportation system. Although TCM may address a speeding or volume issue on a single street or at a single intersection, only an analysis will determine if the real issue has been fully mitigated and not simply shifted to the neighboring streets. TCM must not be installed if they generate other traffic hazards.

3. FUNDING

Normally community neighborhoods will fund 100% of TCM projects. The City may participate in funding when TCM for certain streets is deemed critical from the City's perspective. Funding options must be reviewed and determined before planning for design and construction occurs. Cost of the design, construction permits, etc. of any TCM projects must be developed and sources of funding determined prior to implementation.

3.1 Determining Eligibility for Funding

Each street or intersection will be given a score to determine eligibility for City funding according to the point system in the following table. Proposed TCM project would be eligible for partial City funding when street scoring reaches at least 50 points, with full City funding at 100 points.

Table A: Street Scoring for Subsidy

Category	Points	Basis for Point Assignment
85th Percentile Speed	Max 40	10 points for every mph greater than 5 mph over the posted speed limit.
Average Daily Traffic Volume	Max 20	2 points for every 100 vehicles.
Sidewalks	Max 20	10 points for missing sidewalk on one side; 20 points for no sidewalks at all.
Pedestrian Generators	Max 20	10 points for each school, church, library, community center, park or playground.
Total Scoring	Max 100	

3.2 Setting Funding Level

The City intends to subsidize TCM projects based on budget allowance for design and construction according to the following levels of participation:

Table B: Funding from the City

Points	Subsidy Level
49 or less	None
50	50% of total cost up to a maximum of $5,000
60	60% of total cost up to a maximum of $6,000
70	70% of total cost up to a maximum of $7,000
80	80% of total cost up to a maximum of $8,000
90	90% of total cost up to a maximum of $9,000
100	100% of total cost up to a maximum of $10,000

The City's contribution is limited and will be based on budgetary constraints and available funding for requests that meet NTCP criteria.

3.3 Exploring Funding Options

The City may explore grant opportunities or in-kind donations for implementing TCM on city streets. When neighborhood funding is able to support 100% of the construction cost, the City will offer a TCM construction plan at no cost to the neighbors, provided at least 60% of households in the calming area support the cause.

The neighbors can also petition for the formation of a local improvement district per Newberg Municipal Code Chapter 3.15.

4. DESIGN AND CONSTRUCTION

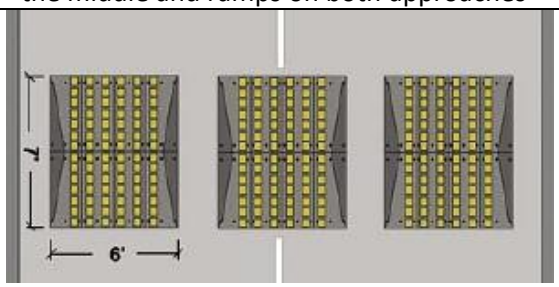
Construction plans require review by all affected City Departments prior to construction and must comply with Federal and State regulations and requirements. The City will install TCM per the approved plan.

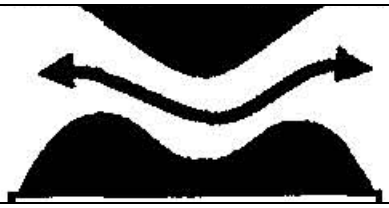
5. TRAFFIC CALMING MEASURES

This section identifies TCM that are in use by the City of Newberg. Some are listed for information and not allowed for use at this time.

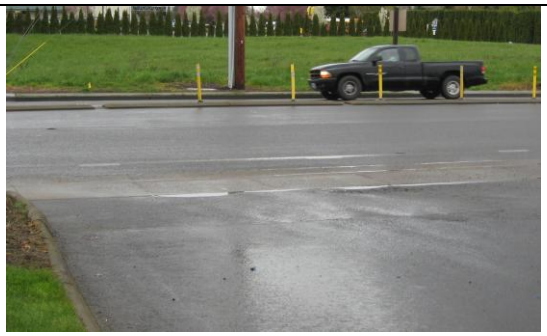
Table C: Legend for key words in the "Comments" column of Traffic Calming Measures:

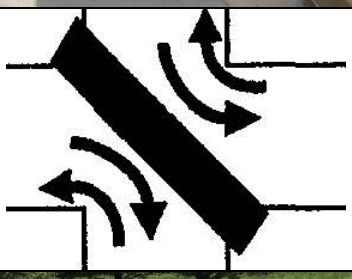
Key Words	Meaning
Allowed	The described device is permitted. Use when designed in accordance with generally accepted engineering principles and practices.
Cautioned	The described device may be allowed under certain conditions. Use when approved and designed in accordance with generally accepted engineering principles and practices.
Restricted	The described device is restricted due to *side effect* and is therefore not likely approved for use.
Not Allowed	The described device is not permitted.
Not Recommended	The described device reduces flexibility in traffic flow and is therefore discouraged for use.

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Vertical Deflection Techniques	Speed Hump	Cautioned	
	Speed Table	Cautioned	"A long raised speed hump with a flat section in the middle and ramps on both approaches"
	Speed Cushion	Allowed	 Designed as several small speed humps installed across the width of the street with spaces between them for the wider axle of emergency vehicles such as fire engines and ambulances to straddle them without slowing down or increasing the response time
	Raised Crosswalk	Cautioned (at bus shelters or on critical pedestrian routes but not always – Must be engineered to the posted speed)	Same as "speed table" but with crosswalk marking
	Textured Crosswalk	Cautioned (on critical pedestrian routes but not always)	
	Rumble Strips	Restricted (due to noise creation)	"Raised parallel strips of material placed on pavement that transmits an audible rumbling through the wheels when travel on"
	Raised Intersection	Restricted	"A flat raised area covering an entire intersection, with ramps on all approaches"

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Horizontal Deflection Techniques	Curb Extension	Allowed	
	Crosswalk Bulb Out	Allowed	
	Traffic Circle (controlled by stop signs)	Allowed (but must accommodate fire/ garbage trucks and school buses)	" A raised island, placed in an intersection, around which traffic circulates"
	Roundabout (with yield control)	Allowed	
	Raised Median Island	Cautioned	
	Chicane	Not recommended	
	Choker	Not recommended	"A curb extension on both sides of the street"

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Horizontal Deflection Techniques	On-street Parking	Allowed (per code)	

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Obstruction Techniques	Right-in/Right-out	Restricted (use only when warranted)	
	Raised Median Through Intersection	Allowed (but must accommodate fire/ garbage trucks and school buses)	
	Intersection Channelization	Cautioned	

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Obstruction Techniques	Bike Lane Channelization	Cautioned	
	Diverter	Not recommended	
	Full Closure	Not recommended	

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Signage (for traffic calming purposes)	Traffic Calming Neighborhood	Cautioned	
	Playground (not truly a traffic calming signage)	Allowed (per code) but not typically effective	

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Signage (for traffic calming purposes)	Local Traffic Only (cannot be enforced on public streets)	Cautioned	
	One Way Street	Not recommended	
	Speed Limit	Allowed (per code)	
	Right Turn Only	Restricted (no left turn)	
	Yield	Allowed (per code)	
	Stop	Not recommended (for traffic calming as problems shift to other areas)	

Traffic Calming Measures			
Devices		**Comments** See Table C	**Photos and/or Descriptions**
Other Techniques	Speed Radar	Cautioned http://www.trafficlogix.com	
	Crossing Flags	Not allowed http://pedflags.com/ http://www.seattle.gov	

6. REFERENCES

For additional information on traffic calming, see the following websites:

- http://www.trafficcalming.org, Traffic Calming by Fehr & Peers Transportation Consultants.
- http://www.ite.org, Institute of Transportation Engineers.
- http://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm, U.S. Department of Transportation, Federal Highway Administration.