Section 4
East County

OVERVIEW OF KEY FINDINGS – EAST COUNTY

Existing and 2035 future conditions analysis was conducted for the transportation system in the East County. Key findings from this analysis are summarized below. The full analysis of the existing conditions and future base conditions follows.

Existing Conditions:

Transportation Disadvantaged Populations

- The most transportation disadvantaged populations live primarily along OR 224, north of US 26, and outside Estacada in areas that are low density.

Roadways

- Two of the six study intersections are operating at volume-to-capacity ratios that do not meet performance standards:
  - OR 212/SE 282nd Avenue
  - OR 224/OR 211
- Roadways segments are generally uncongested during the weekday evening peak period.

Sidewalks/Pedestrian Walkways

- Based on rural roadway standards, there are no deficiencies in the pedestrian system except in the Rural Centers of Boring, Welches, Zigzag, and Wildwood/Timberline.
- Sidewalks are a required standard on all roadways in the County's urban areas; however the Essential Pedestrian Network in the County's comprehensive plan (see Appendix 5) provides guidance on which local roadways are critical parts of the pedestrian network. It also includes all collectors and arterials in the subarea.
- Existing gaps in the pedestrian network include all roadways identified on the Essential Pedestrian Network that do not have an existing sidewalk facility.
- The County's Pedestrian Master Plan identifies priorities for filling in the pedestrian network gaps which will be reviewed using the TSP Vision and Goals evaluation criteria.

Bicycle Lanes

- There are shoulder lanes on portions of the state highway system, but not on the county roadway system.
- Existing gaps in the network include all roadways identified on the Planned Bicycle Network (nearly all collectors and arterials) that do not have an existing bicycle facility.
- The County's Bike Master Plan identifies priorities for filling in the bicycle network gaps which will be reviewed using the TSP Vision and Goals evaluation criteria.

Safety Corridors

- The following candidate safety corridors (listed below in no particular order) were identified based on the crash data review and analysis:
    - SE 282nd Avenue from US 26 to SE Richey Road
    - OR 211 from OR 224 to eastbound US 26
    - US 26 from SE Kelso Road to Duncan Road
    - US 26 from Duncan Road to SE Langensand Road
    - US 26 from SE Firwood Road to E Sleepy Hollow Drive
    - US 26 from Rhododendron to Highway 35
    - SE Eagle Creek Road from SE Firwood Road to NE 6th Avenue
    - OR 211 from OR 224 to S Hillcockburn Road
    - OR 224 from SE 232nd to OR 211
    - OR 224 from Fish Creek Road to National Forest Road 46

Transit

- Transit service consists of fixed-route bus service and dial-a-ride service.
- Service Frequency: A majority of the services provided currently operate at LOS F throughout the day with respect to frequency. TriMet's Line 30 and SAM's Sandy Local/Gresham Express, however, operate at LOS C during peak time periods.
- Hours of Service: A majority of the services provided currently operate at LOS C or below throughout the day with respect to hours of service.
- Service Coverage: Although the current population and employment densities are not sufficient to complete the level-of-service analysis for service coverage, the nature of services currently provided is appropriate for the more rural area.
    - The number of transit supportive areas is not expected to increase significantly by 2035.

2035 Future Base Conditions:

- Three of the six study intersections operate at volume-to-capacity ratios in excess of performance standards under both Low Build and Full Build:
    - OR 212/SE 282nd Avenue
    - OR 224/SE 232nd Avenue
    - OR 224/OR 211
- Of the three study intersections that did not meet performance standards under the Low Build future scenario, one is modified by a Full Build Project (e.g., a turn lane or other physical change made to the intersection). However, it continues to not meet standards under the Full Build Scenario:

  - OR 224/SE 232nd Avenue

- The majority of Full Build capacity projects planned for East County reconstruct and widen rural roadways to meet standards.
- Demand for travel is highest along US 26, OR 224, and OR 211, particularly as the roadways approach the urban areas of Sandy, Estacada, and Damascus, under both the Low Build and Full Build future scenarios.
- The large majority of the major roadways in East County are projected to be uncongested during the weekday evening peak hour under both the Low Build and Full Build future scenarios.
- Three roadway segments operate at volume-to-capacity ratios over 0.80 and are thus considered to be nearing congestion or have some level of congestion under both the low build and full build future conditions:
  - OR 224 (S Bakers Ferry Road to Amisigger Road)
  - US 26 (through Sandy)
  - OR 212 (SE 272nd Avenue to SE 282nd Avenue)
- Overall, low to moderate growth is forecast for the roadways in East County. Little growth is forecast for state facilities, with more significant increases in traffic volumes on County facilities (such as SE 282nd Avenue and SE 232nd Avenue).

EXISTING CONDITIONS – EAST COUNTY

INTRODUCTION

The East County geographic sub area extends east and south from the eastern edge of Damascus to the County boundary. It is located outside the County's urban growth boundary (UGB). The sub area includes large sections of US 26 and OR 224. The unincorporated communities of Boring, the Villages at Mt. Hood, and Government Camp are located in the East County Sub Area. The incorporated areas of Estacada and Sandy are included as well. East County is the largest geographic sub area and includes large areas of undeveloped land. The extent of the East County area is illustrated in Figure E 1.

LAND USE AND POPULATION

This section provides a general overview of existing land uses and population patterns in East County. It identifies the activity centers, current land uses zoning designation, population density, and transportation disadvantaged populations.

Activity Centers

East County includes the incorporated areas of Estacada and Sandy as well as a number of unincorporated communities. The County's TSP update focuses on the communities, activities, and transportation system within the unincorporated areas of the County. These communities include Boring and the Villages at Mt Hood. Figure E 2 illustrates the locations of these communities and various activity centers within and surrounding the communities such as libraries, schools and parks.

Boring is located slightly less than 10 miles south of Gresham off of OR 212. Historically, Boring was established and grew as a community supported from a timber-based economy. Today, residents reflect a mixture of commuting workers traveling to/from larger incorporated areas to the north, west and south as well as working for the increasing number of local employers.

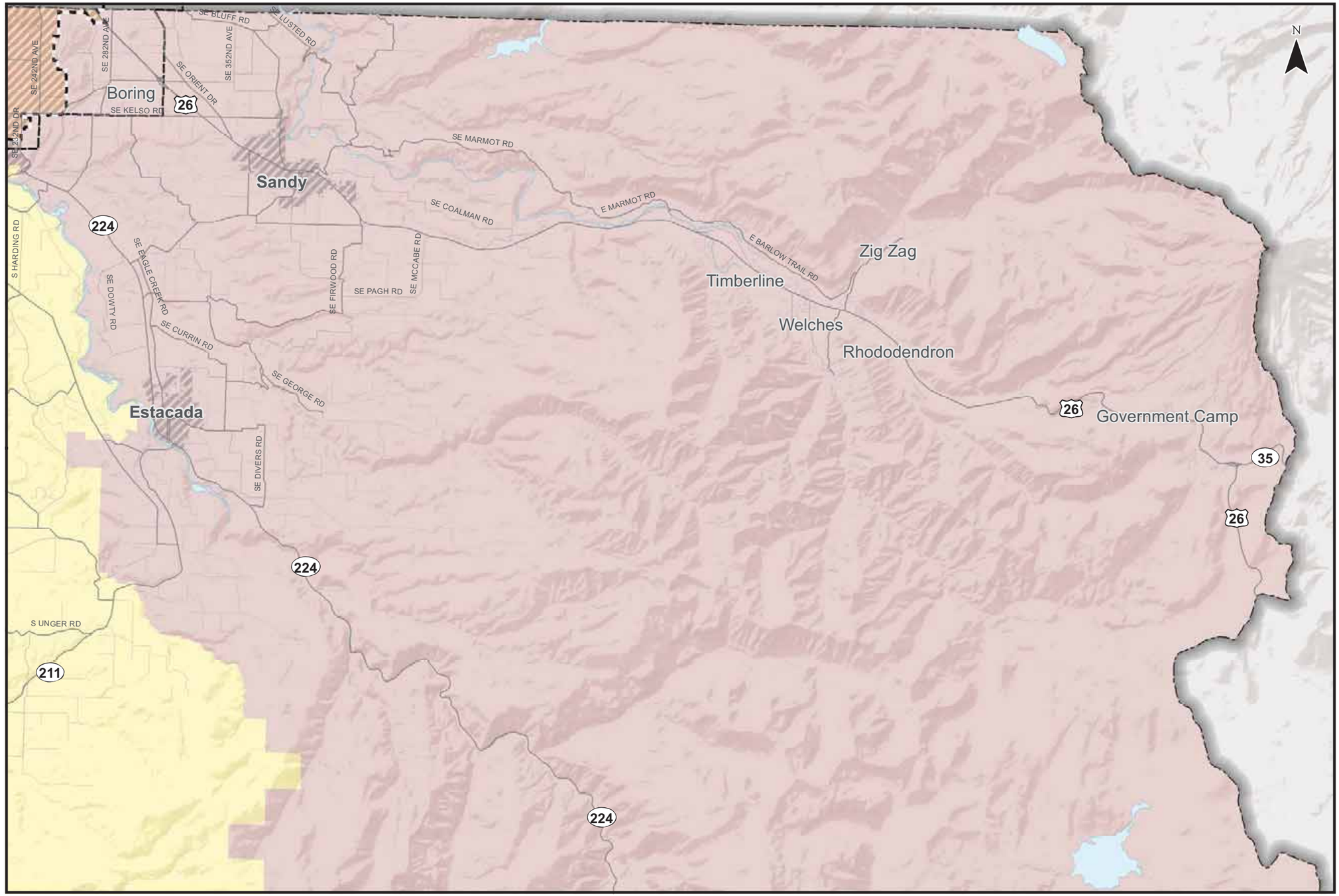
The Villages at Mount Hood include the communities of Brightwood, Welches, Wemme, Zig Zag, and Rhododendron. These communities provide a variety of services that support recreational activities along the Mt Hood corridor, such as restaurants, outdoor supply shops, and overnight accommodations. They are also home to approximately 3,500 people with local businesses, schools and other similar community amenities.

Several recreational areas, including ski resorts and popular hiking and equestrian trails, are also located along US 26 in the eastern area of the County. Three of the five ski areas near Mount Hood are located in Clackamas County near Government Camp. Mt. Hood National Forest provides a range of year-round recreational opportunities and scenic vistas that attract both local residents and visitors from outside the County. The Mt. Hood National Forest also provides important economic value with timber logging. Furthermore, the area around Sandy is home to some of the largest nursery growers in the state and Sandy's industrial base includes several major retailers.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*

Geographic Analysis Sub Areas

- East County
- Southwest County
- Greater McLoughlin Area
- Greater Clackamas Regional Center/ Industrial Area
- Northwest County
- Incorporated Areas
- County Boundary
- UGB
- Metro Area



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

East County - Northern Portion
Geographic Analysis Sub Areas

Figure
EN 1

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CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

Geographic Analysis Sub Areas

- East County
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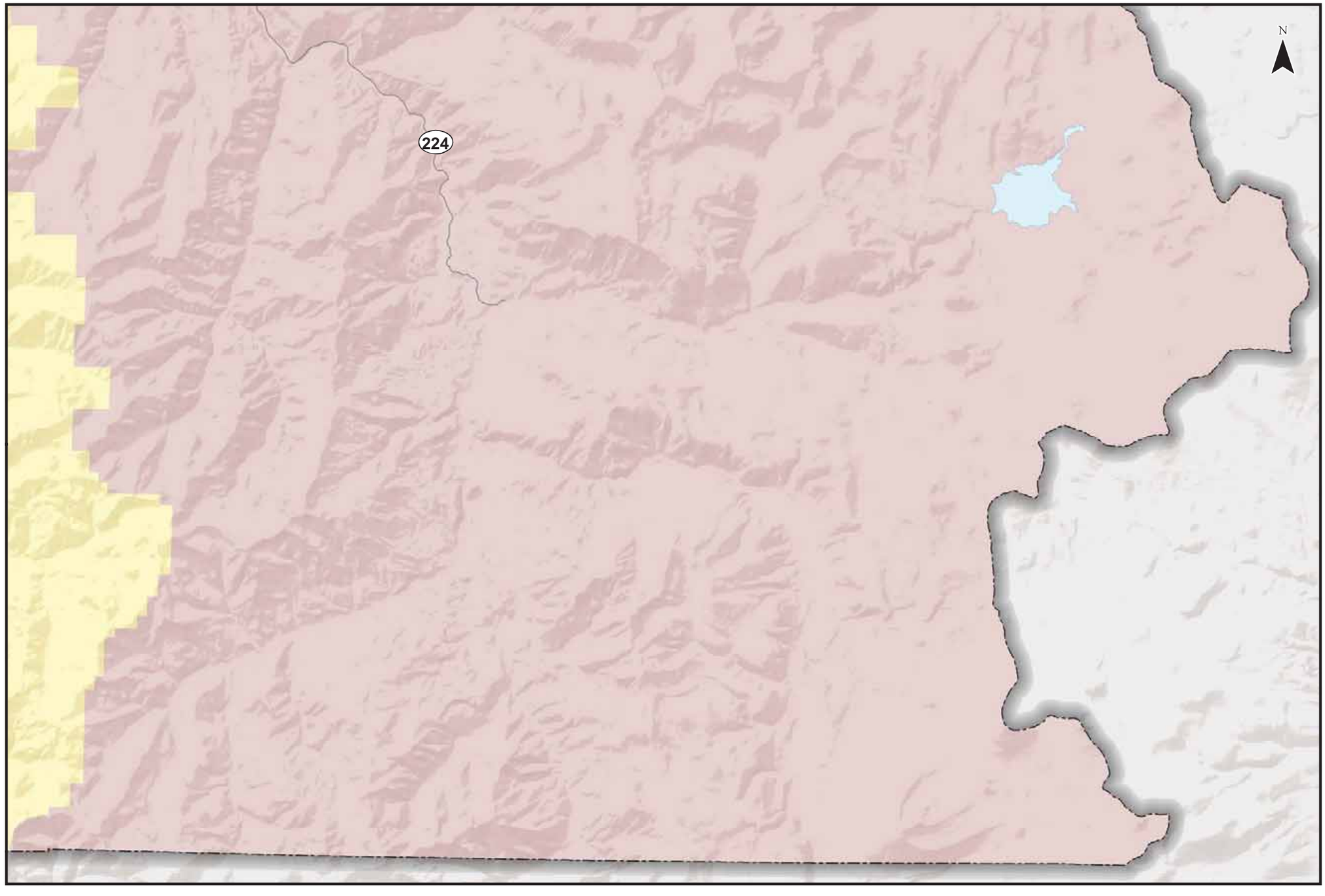
- Metro Area



0 1 2 3 4 Miles

Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

East County - Southern Portion
Geographic Analysis Sub Areas

Figure
ES 1

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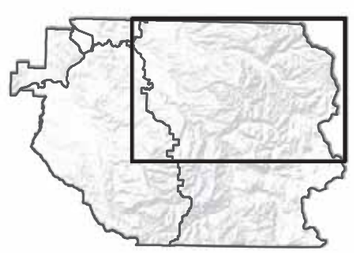
CLACKAMAS COUNTY Transportation System Plan *Update*

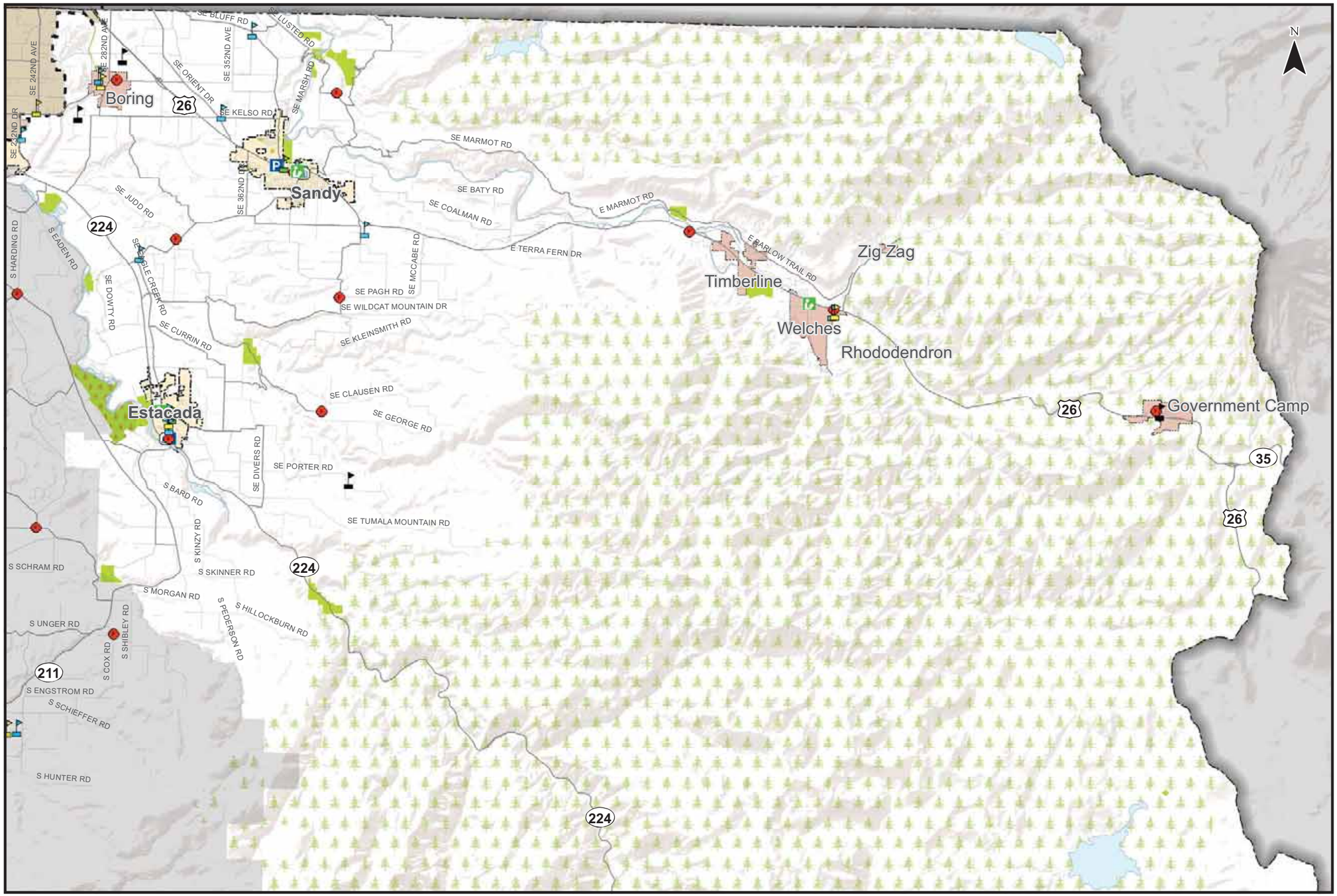


- Fire Stations
- Museum
- City Hall
- Libraries
- Park & Ride
- Light Rail

Schools

- Public Elementary
- Public Middle School
- Public High School
- Private K-12
- College or University

- Parks
- State Parks
- Mt. Hood National Forest
- Urban Activity Centers
- Incorporated Areas
- Rural Centers
- County Boundary
- UGB



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Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

Activity Centers
East County - Northern Portion

Figure
EN 2

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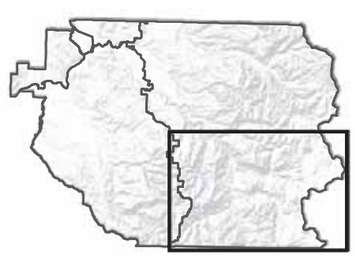
CLACKAMAS COUNTY Transportation System Plan *Update*



- Fire Stations
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Schools

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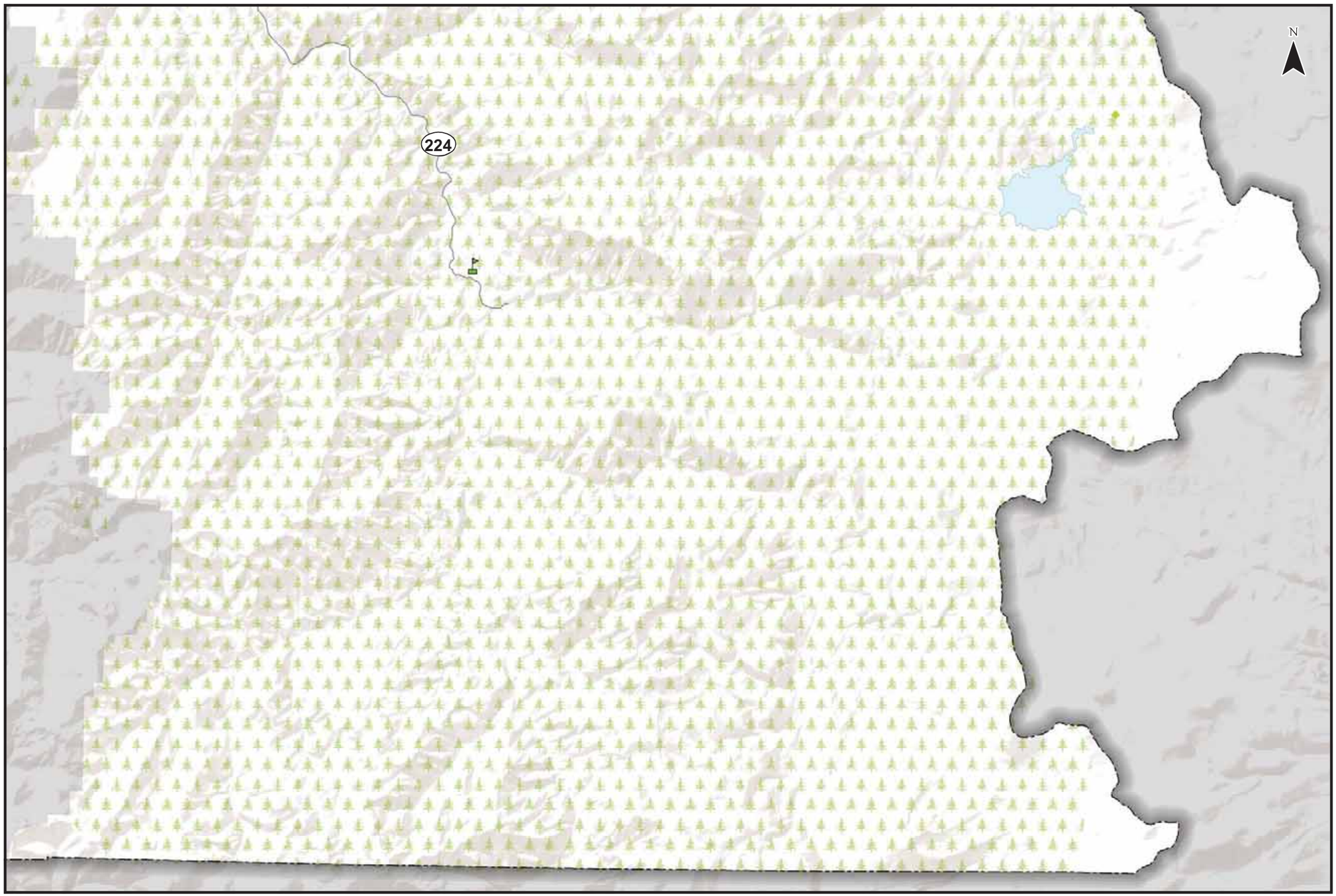

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Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

Activity Centers
East County - Southern Portion

Figure
ES 2

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Government Camp is also located in the East County area along US 26. The Government Camp Village urban renewal area, encompassing approximately 8,960 acres on the slopes of Mt. Hood, was created in 1989 to encourage private developments, such as resorts, restaurants, recreational facilities, and residential units.

Finally, another important planning activity occurring in this area along US 26 is the Mt Hood Multimodal Plan. ODOT, in partnership with the Forest Service-Mt. Hood National Forest, Clackamas County, Hood River County, and in cooperation with FHWA-Western Federal Lands Highway Division, is developing a transportation plan for the Mt. Hood Highway/US 26-OR 35 corridor to and through the northern portion of the Mt. Hood National Forest. This planning effort will strive for affordable and achievable solutions by focusing on: 1) improving highway safety for all users and; 2) expanding travel options year-round to enhance mobility and access to recreation and rural communities. This project is scheduled to start in July 2012 and last approximately 16 months. The location of these activity centers, as well as concentrations of commercial, employment, and residential uses, will be considered when making recommendations for enhancing access for multiple transportation modes.

Land Use and Zoning

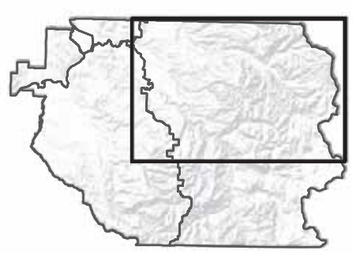
Figure E 3 illustrates the current basic land use zoning designations throughout East County. Each land use's purpose, area of application, uses, and regulations are described in the *Clackamas County Zoning and Development Ordinance.* As seen in the figure, the majority of East County is zoned "Timber District," intended to conserve and protect environmental resources and recreational opportunities. Other significant portions of the East County area are zoned for Exclusive Farm Use or as Agricultural/Forest District. The areas around the Villages at Mt. Hood and Government Camp are zoned for residential and commercial development.

Population Inventory

Figure E 4 illustrates the population density by census tract. From this figure, it is evident that the highest population density is in Sandy. Mt. Hood Village and Estacada also have higher population densities. The population density is low (less than 1 person per acre) in the rest of the area. Figures E 5 through E 8 illustrate demographic information about the households within East County. Respectively, these figures show the elderly (age 65 and older) population, youth (age 17 and younger) population, low-income population, and vehicle ownership. The data within each of these figures were combined and used to identify the transportation disadvantaged populations within Clackamas County.

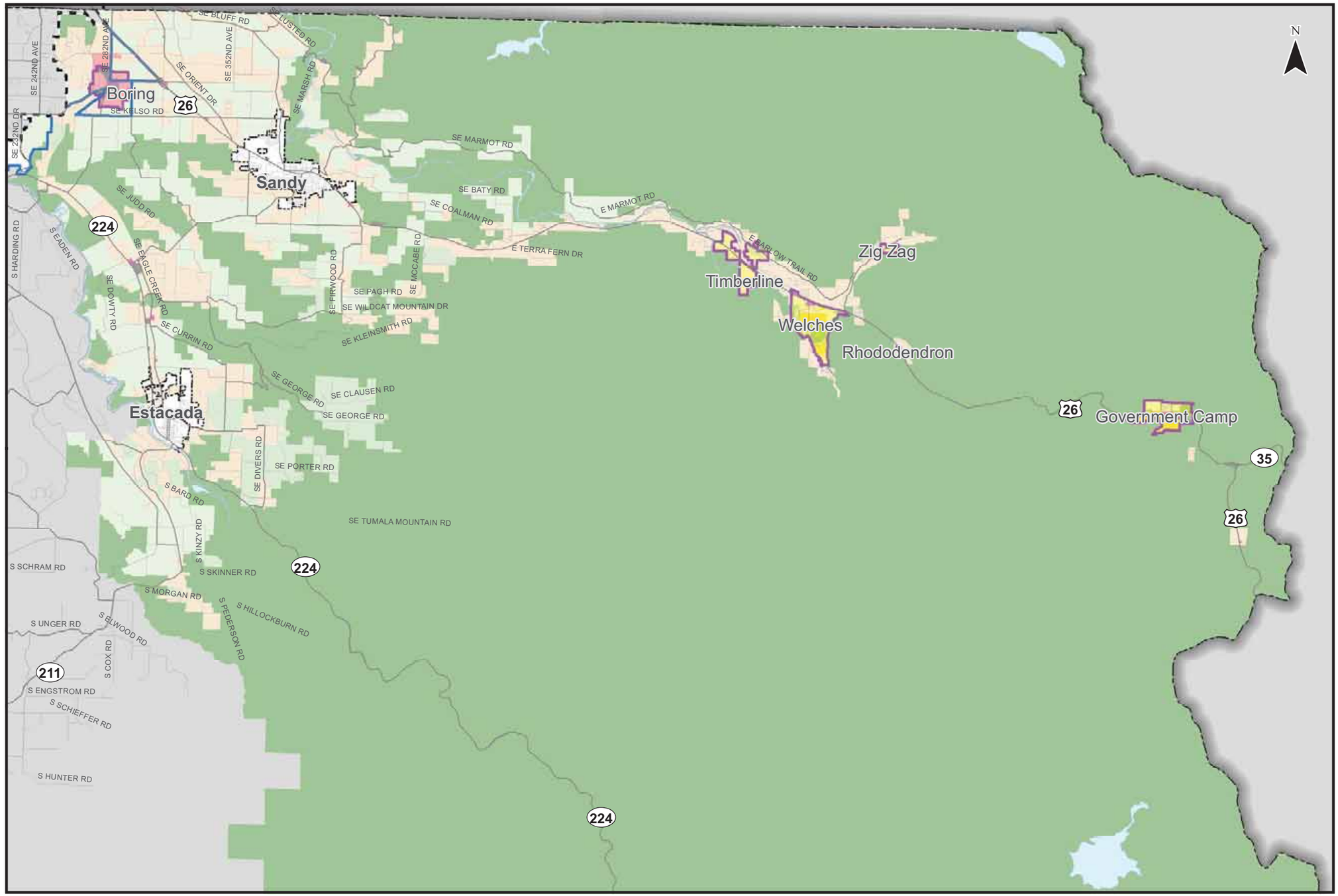
Figure E 9 illustrates the location of Transportation Disadvantaged Populations in East County. Transportation disadvantaged populations are defined as populations who have historically had significant unmet transportation needs or have experienced disproportionate negative impacts from the transportation system. Transportation disadvantaged populations were mapped by census block and calculated by considering the location of elderly populations, youth populations, low-income populations, non-white and non-Hispanic populations, households with 0-1 vehicles, households where no adult speaks English well, and residential areas within 500 feet of a freeway or highway. The transportation disadvantaged populations in the East County area are primarily along OR 224, north of US 26, and outside Estacada. The purpose of mapping this information is to be aware of where the population is living while considering their needs to access different destinations. Population density and the location of disadvantaged populations will both be considered when identifying transportation projects to include in the TSP Update.

CLACKAMAS COUNTY Transportation System Plan *Update*



Zoning Designations

- Exclusive Farm Use
- Ag. / Forest District
- Timber District
- Rural Center
- Rural Residential, Future Urban
- Urban Low Density Residential
- Village Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Planned Mixed Use
- Village Community Service
- Open Space Management
- Urban Reserves
- Rural Centers
- Incorporated Areas
- County Boundary
- UGB



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Data Source:
Clackamas County, Metro Data Resouce Center

Land Use Zoning Designations
East County - Northern Portion

Figure
EN 3

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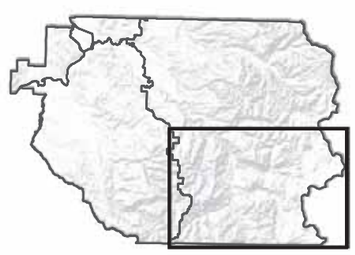
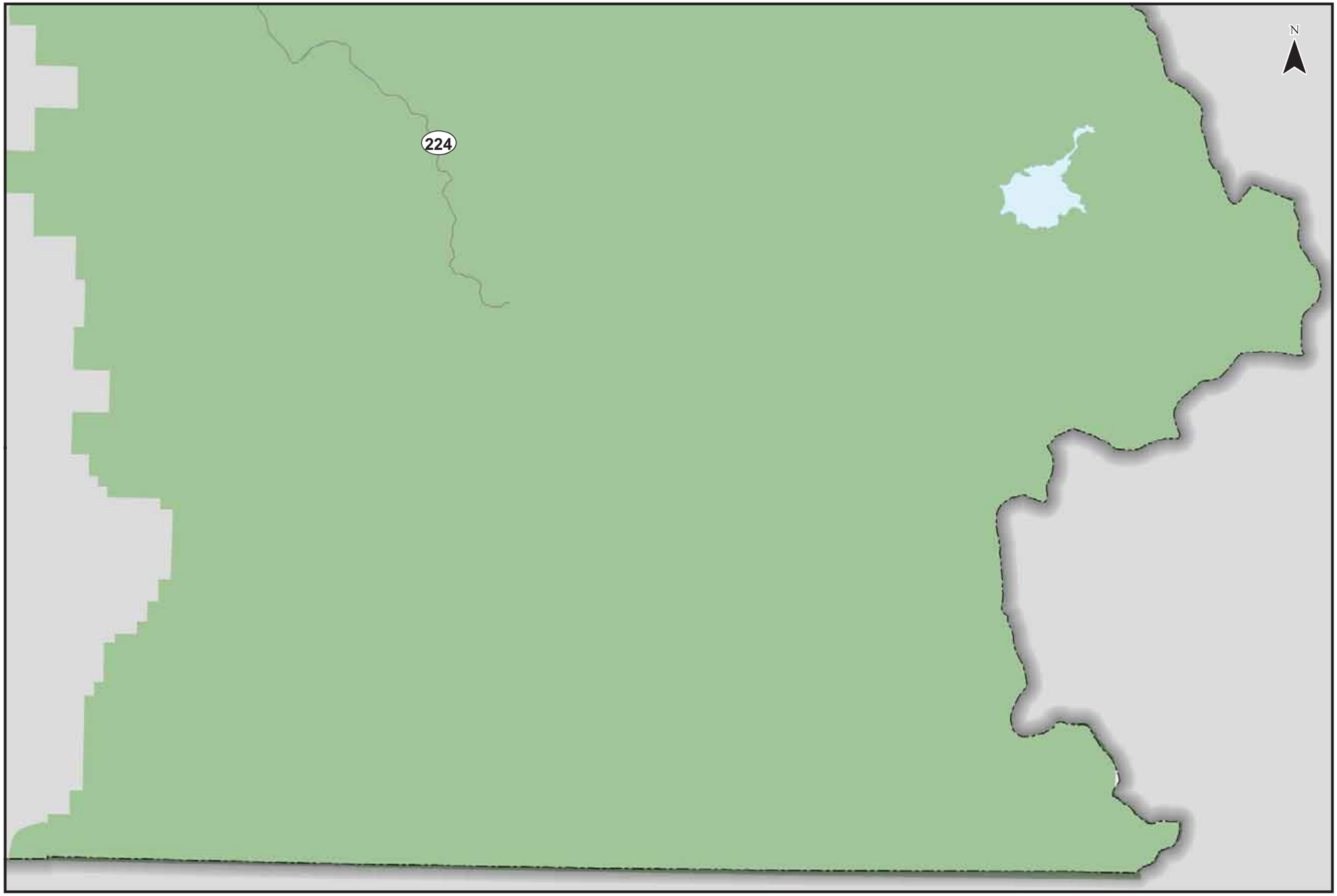
CLACKAMAS COUNTY Transportation System Plan *Update*



Zoning Designations

- Exclusive Farm Use
- Ag. / Forest District
- Timber District
- Rural Center
- Rural Residential, Future Urban
- Urban Low Density Residential
- Village Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Planned Mixed Use
- Village Community Service
- Open Space Management
- Urban Reserves
- Rural Centers
- Incorporated Areas
- County Boundary
- UGB



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Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

Land Use Zoning Designations
East County - Southern Portion

Figure
ES 3

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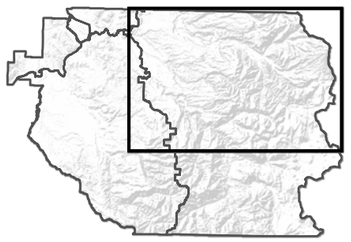
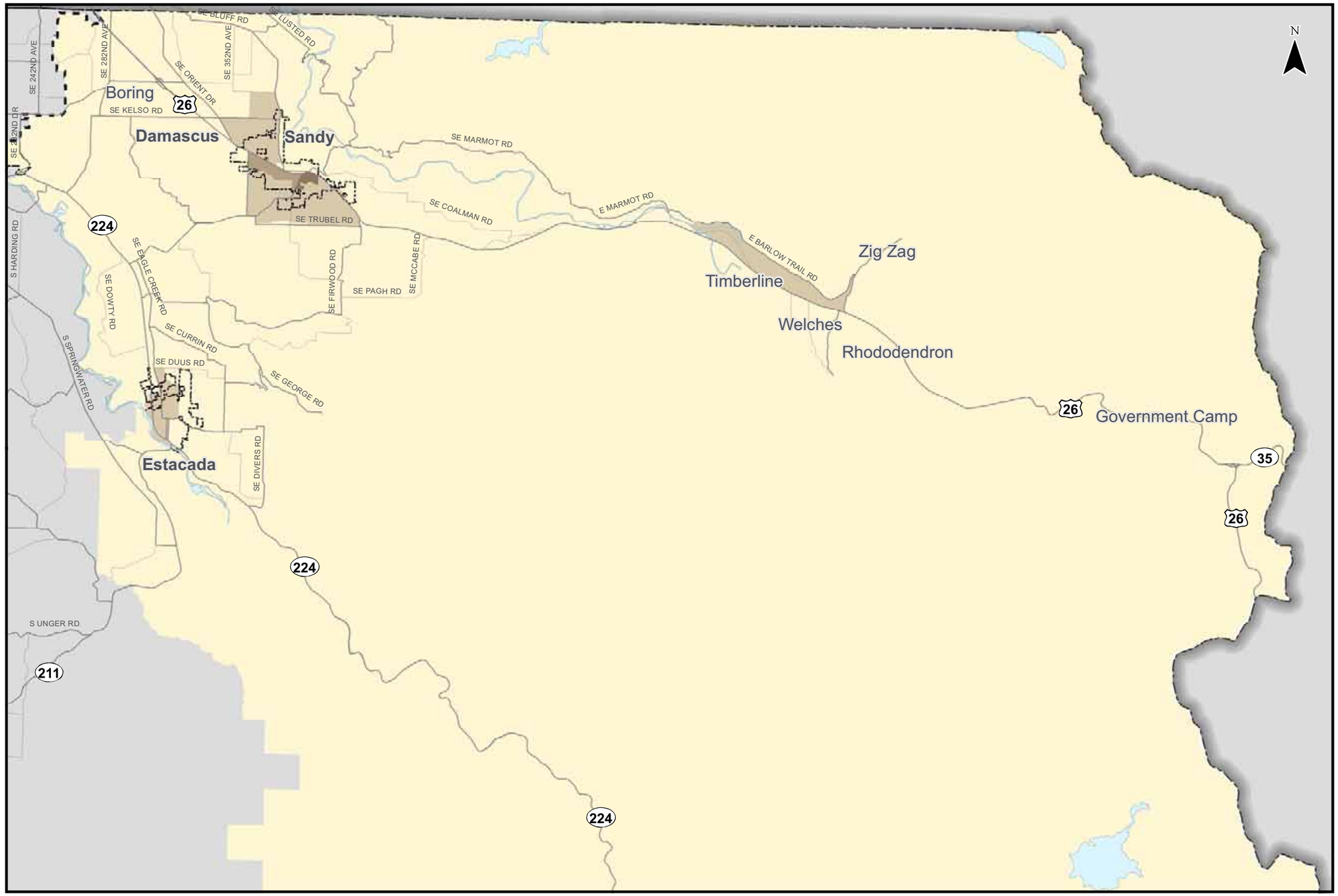
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



People Per Acre

- <1
- 1 - 5
- 6 - 8
- 9 - 12
- 13 - 17

- Incorporated Areas
- County Boundary
- UGB



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Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

Population Density by Census Tract
East County - Northern Portion

Figure
EN 4

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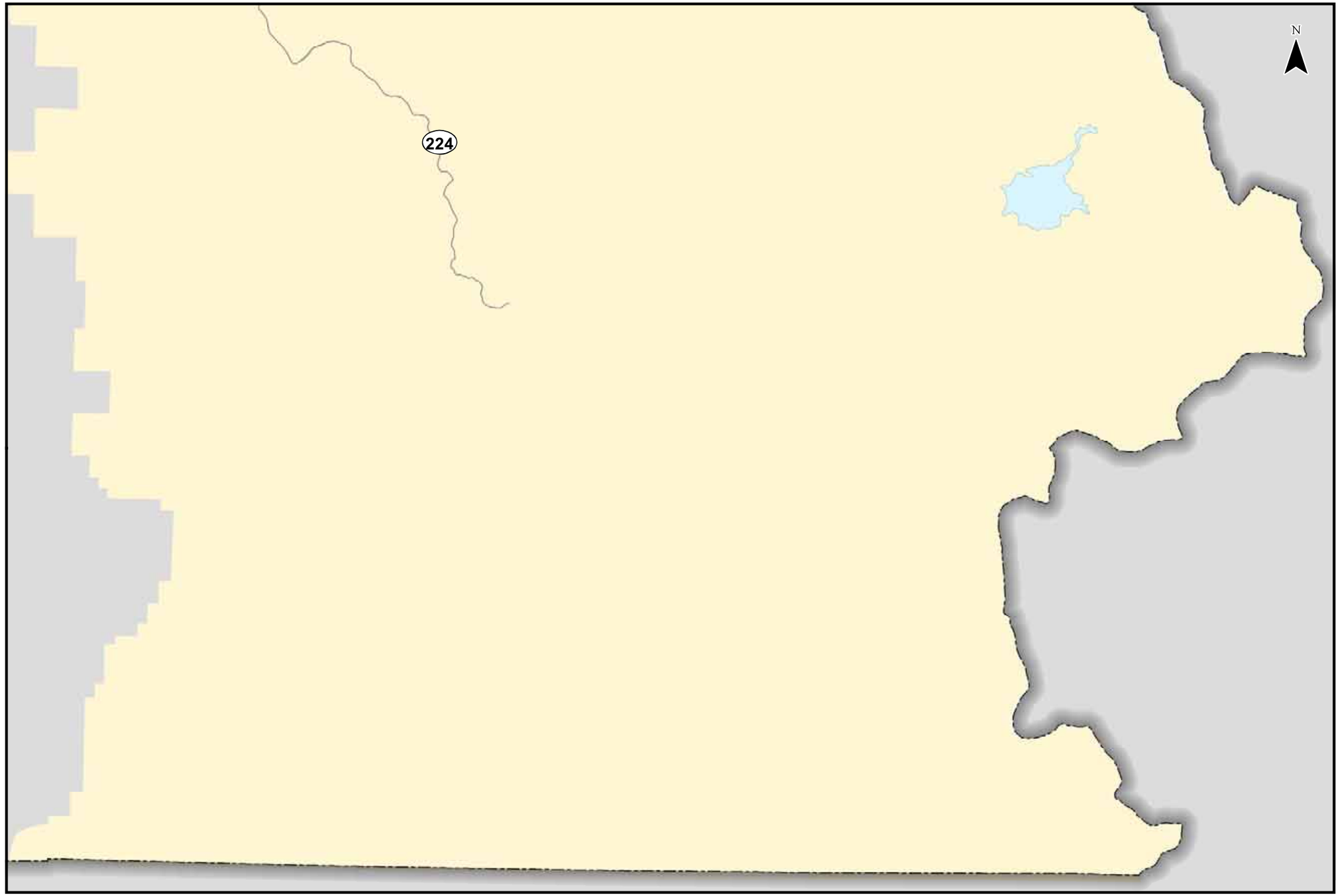
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



People Per Acre

- <1
- 1 - 5
- 6 - 8
- 9 - 12
- 13 - 17
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Population Density by Census Tract
East County - Southern Portion

Figure
ES 4

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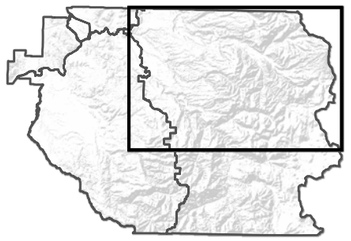
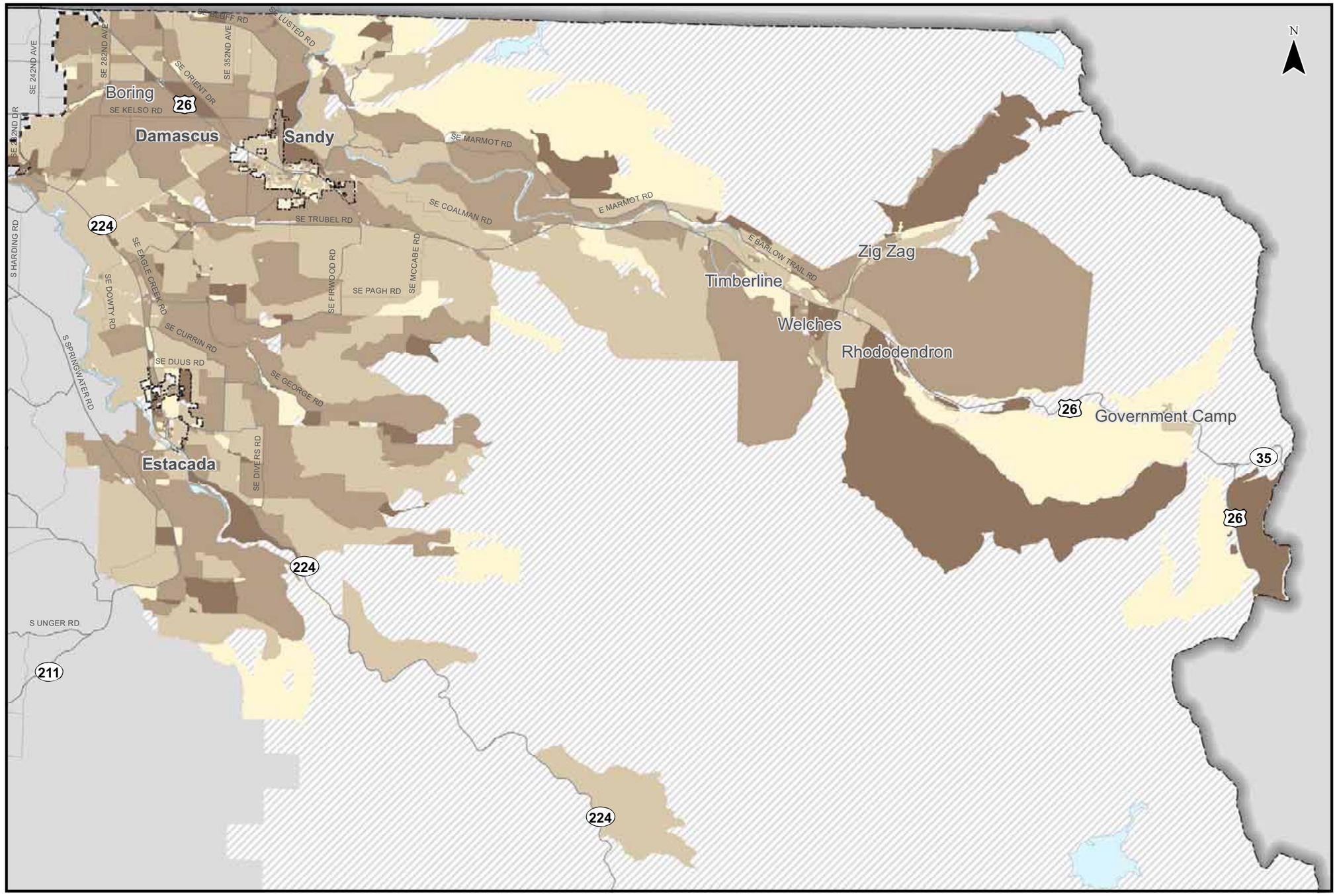
CLACKAMAS COUNTY Transportation System Plan Update



Population Age 65 and Older

- 0% - 6%
- 6% - 15%
- 15% - 30%
- 30% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
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Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

Elderly Population by Census Block
East County - Northern Portion

Figure
EN 5

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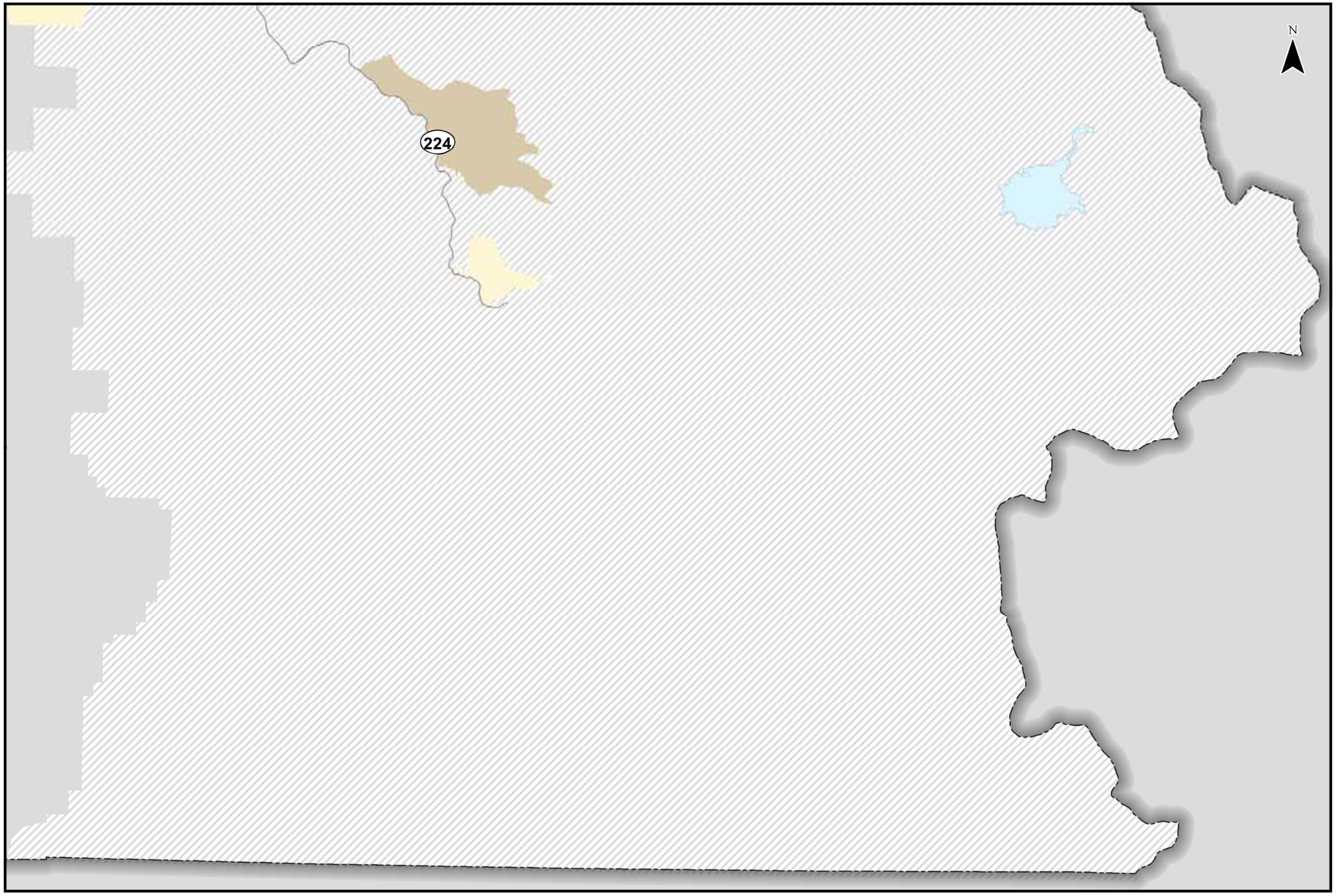
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Population Age 65 and Older

- 0% - 6%
- 6% - 15%
- 15% - 30%
- 30% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

Elderly Population by Census Block
East County - Southern Portion

Figure
ES 5

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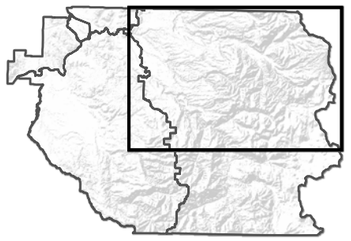
CLACKAMAS COUNTY Transportation System Plan Update



Population Under Age 18

- 0% - 10%
- 10% - 25%
- 25% - 33%
- 33% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

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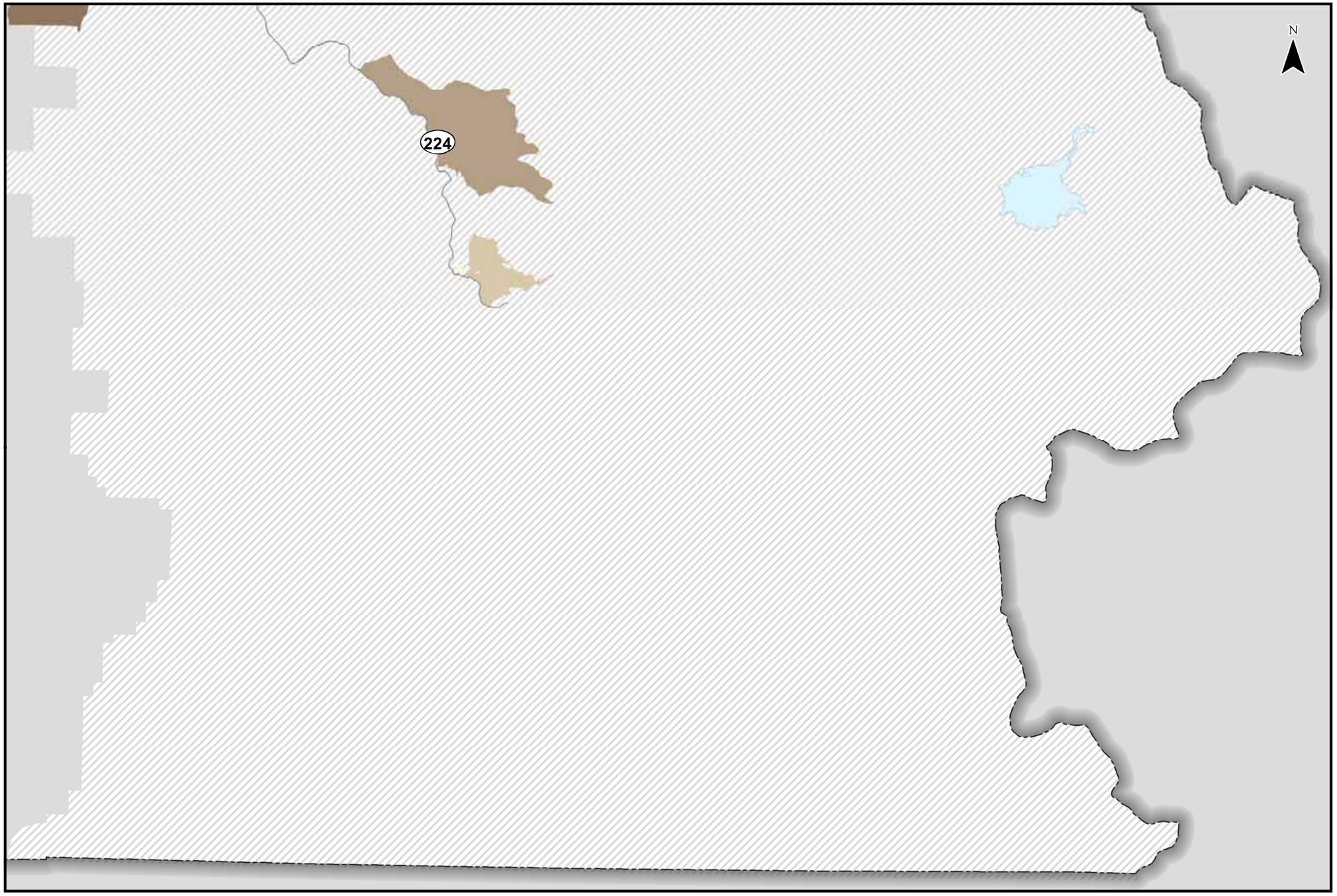
Youth Population by Census Block
East County - Northern Portion

Figure
EN 6

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Population Under Age 18

- 0% - 10%
- 10% - 25%
- 25% - 33%
- 33% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

Youth Population by Census Block
East County - Southern Portion

Figure
ES 6

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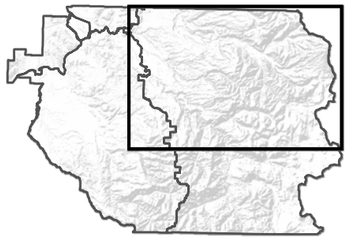
CLACKAMAS COUNTY Transportation System Plan Update



Population Under 200% Poverty

- 0% - 10%
- 10% - 20%
- 20% - 33%
- 33% - 100%
- No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
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Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

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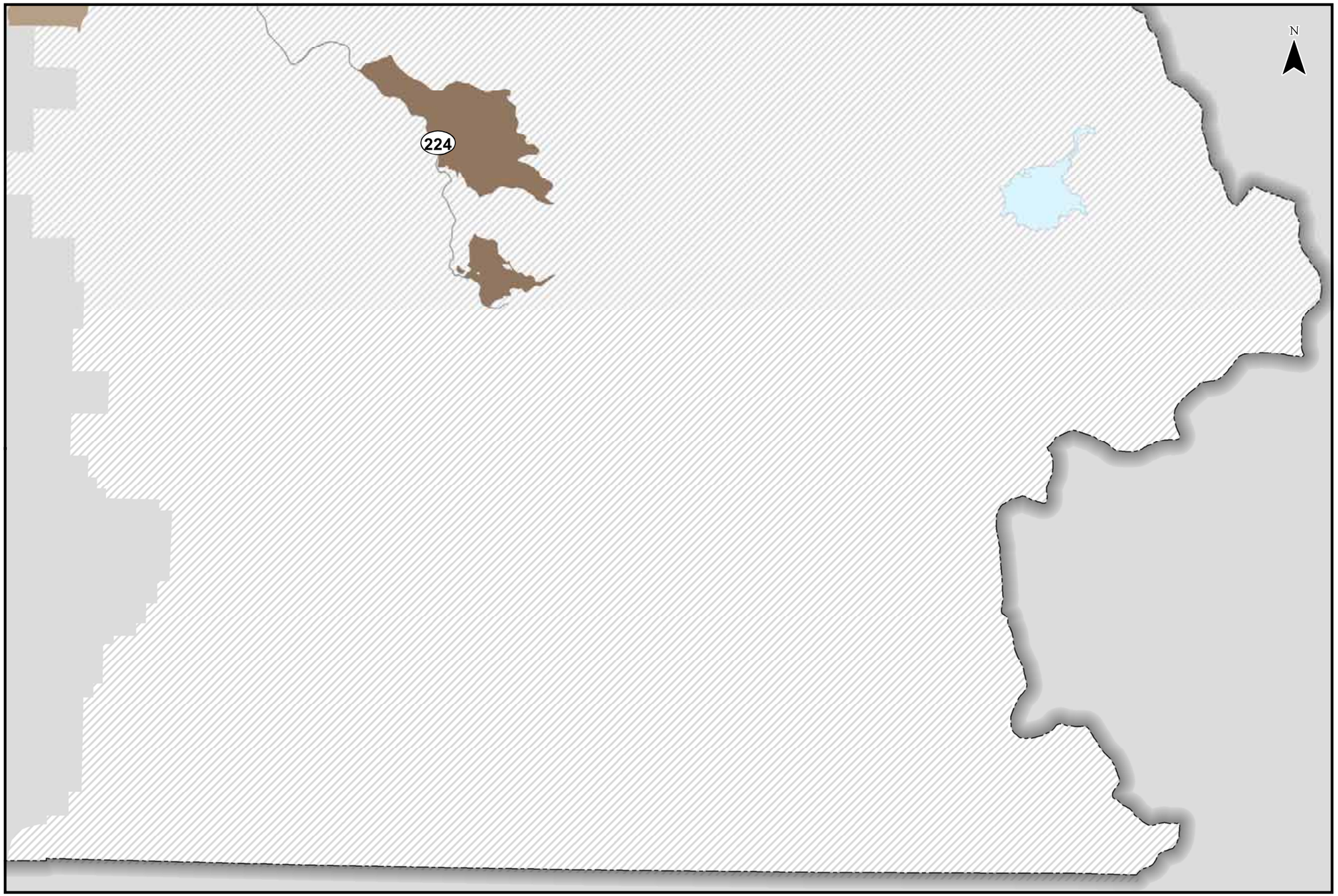
Low Income Population by Census Block East County - Northern Portion

Figure
EN 7

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Population Under 200% Poverty

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Low Income Population by Census Block
East County - Southern Portion

Figure
ES 7

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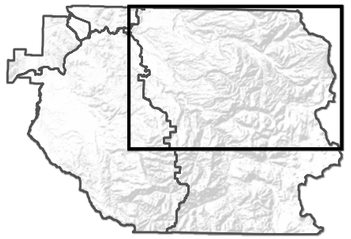
CLACKAMAS COUNTY Transportation System Plan Update



Households with Less Than Two Vehicles

- 0% - 10%
- 10% - 15%
- 15% - 25%
- 25% - 100%
- No Population/No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

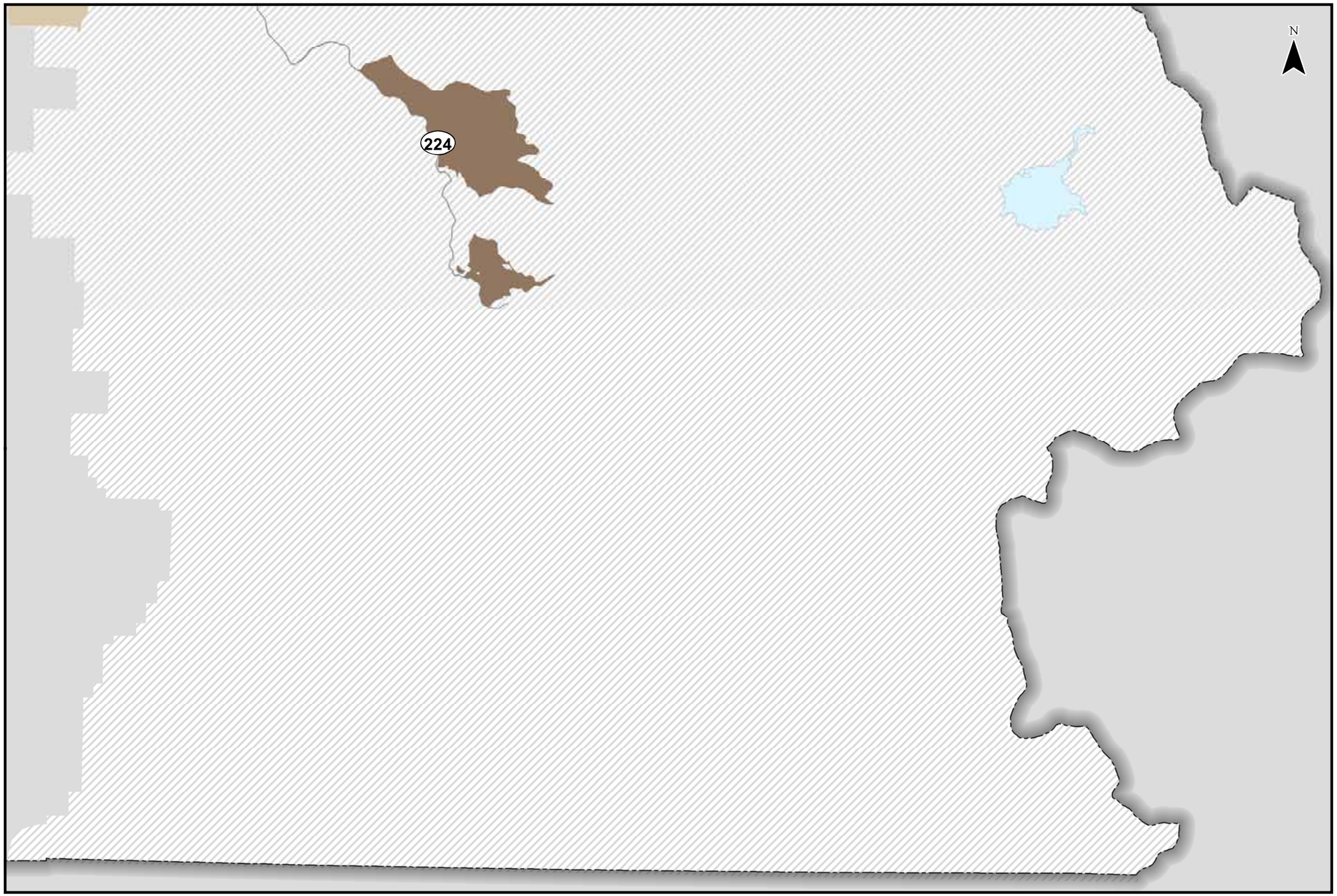
Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\08 Vehicle Ownership by Census Block.mxd

Vehicle Ownership by Census Block
East County - Northern Portion

Figure
EN 8

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Households with Less Than Two Vehicles

- 0% - 10%
- 10% - 15%
- 15% - 25%
- 25% - 100%
- No Population/No Data
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

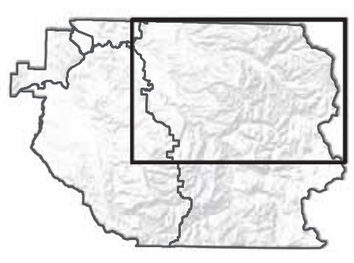
Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute Clackamas County, Metro Data Resouce Center

Vehicle Ownership by Census Block
East County - Southern Portion

Figure
ES 8

H:\proj\lie\11732 - Clackamas County TSP\gis\11x17 Maps\08 Vehicle Ownership by Census Block.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Transportation Disadvantaged

- No Data
- Least Disadvantaged
- Somewhat Disadvantaged
- Disadvantaged
- Most Disadvantaged
- Incorporated Areas
- County Boundary
- UGB

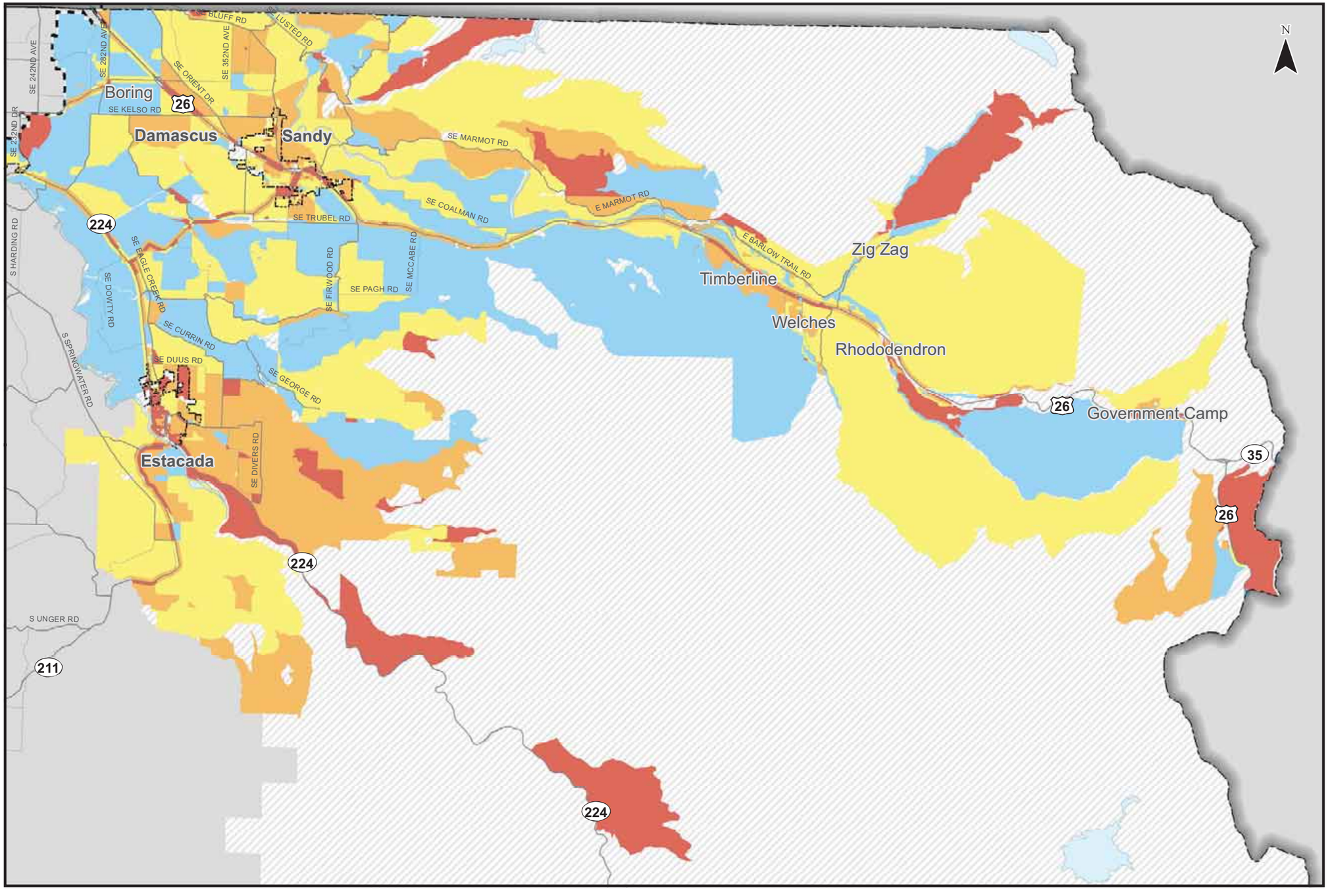
The Transportation Disadvantaged Index takes into account a number of demographic characteristics including age, income, ethnicity, vehicle ownership, ability to speak English, and proximity of freeway or highways to a household. The higher the index number the more disadvantaged the population is with respect to transportation.

More specifically the index is calculated at the census block level as the sum of people 65 and older, 17 and younger, under 200% of the poverty line, non-white and non-Hispanic, living in households with 0-1 vehicles, and living in households where no adult speaks English well. That sum is divided by total block population; twenty-five is added for areas within 500 feet of a freeway or highway. People fitting into multiple vulnerability categories are counted multiple times. Data at the household level is multiplied by 2.56 to convert it to a person unit. The number 2.56 is the average household size for Clackamas County. Data only available by tract is distributed among blocks based on the distribution of tract population.

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute, Clackamas County, Metro Data Resouce Center

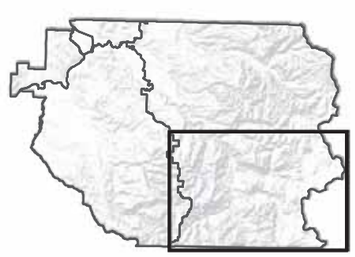


Transportation Disadvantaged Populations by Census Block
East County - Northern Portion

Figure
EN 9

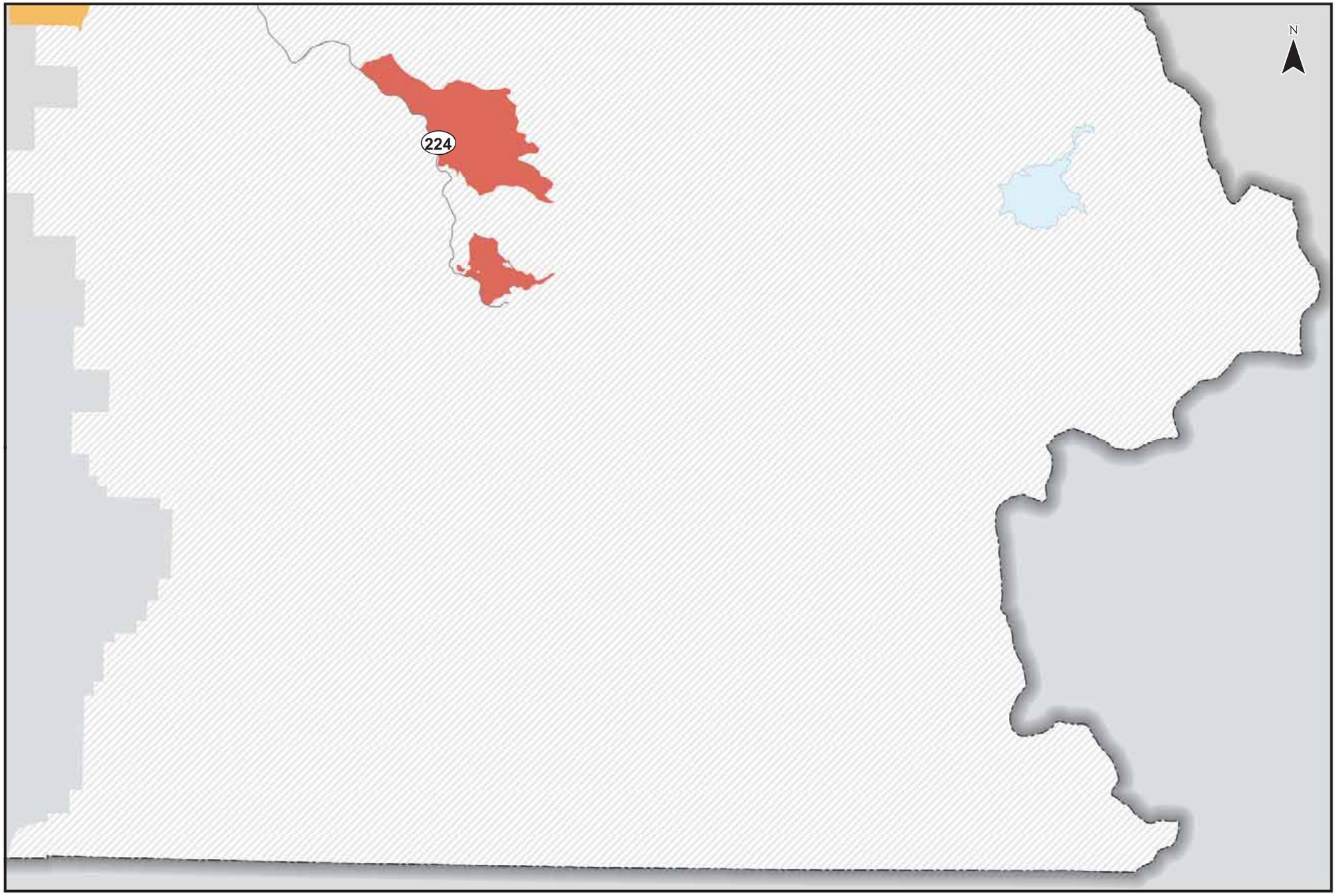
H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\09 Transportation Disadvantaged Populations by Census Block.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Transportation Disadvantaged

- No Data
- Least Disadvantaged
- Somewhat Disadvantaged
- Disadvantaged
- Most Disadvantaged
- Incorporated Areas
- County Boundary
- UGB



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0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

Data Source: US Census Bureau (2010 SF1, 5-year ACS estimates, Tiger/Line Shapefiles) Map and analysis by Liz Paterson, April 2012, Oregon Public Health Institute, Clackamas County, Metro Data Resouce Center

Transportation Disadvantaged Populations by Census Block
East County - Southern Portion

Figure
ES 9

H:\proffile\11732 - Clackamas County TSP\gis\11x17 Maps\09 Transportation Disadvantaged Populations by Census Block.mxd

TRANSPORTATION SYSTEM OPERATIONS ANALYSIS

This section summarizes the existing transportation system operations within the East County area. It includes a review of the roadway and intersection operations with a focus on vehicular travel, as well as the pedestrian and bicycle system, public transportation system, and crash data from the area. A discussion of the methodology and approach for this analysis is provided in *Section 3 Assumptions and Methods* of this report. While this report attempts to accurately reflect the existing conditions of the transportation system, it is not meant to serve as an all-encompassing and comprehensive final assessment. Rather, it is meant to serve as a starting point for discussion by the broader community about the current condition of the transportation system in Clackamas County. This information will be used to help inform the development of the Clackamas County TSP.

Figure E 10 illustrates the functional classification designations of the roadway facilities and identifies which facilities are maintained by the County. A roadway's functional classification reflects its role in the transportation system and defines desired operational and design characteristics for all modes of transportation. Clackamas County has six functional street classifications:

- Freeway and Expressway,
- Major Arterial,
- Minor Arterial,
- Collector,
- Connector, and
- Local Street.

These classifications and the role they play in defining a street's design and character are further described in Section 3 of this report. As seen in Figure E 10, the County does not maintain most facilities in Sandy or Estacada. There are also several state highways maintained by ODOT, including US 26, OR 211, and OR 224.

Figure E 11 illustrates the existing signal locations. As shown, most signalized intersections are in Sandy.

Figure E 12 maps at-grade railroad crossing locations. There are no railroad lines in East County, and therefore no crossing locations.

Intersection and Road System Operations Analysis

This section summarizes the analysis and findings related to existing traffic operations with a focus on auto transportation modes. Operations were analyzed at key study intersections and roadway segments.

Study Intersection Traffic Operations Analysis

TSP study intersections were selected based on input from ODOT, city, and County staff. Figure E 13 shows the location of each study intersection in East County and notes whether intersections fall under the County's jurisdiction or the Oregon Department of Transportation's (ODOT) jurisdiction. All six study intersections in the East area are on ODOT facilities. Figure E 14 shows the existing lane configurations and

traffic control devices at each location. With the exception of the intersection of OR 212/SE 282nd Avenue, all study intersections are unsignalized.

Traffic Operations Analysis Results for Study Intersections

Existing traffic operations at the study intersections were assessed based on seasonally adjusted year 2012 turning movement counts, which reflect weekday p.m. peak hour traffic conditions. The operations at each intersection were compared to the respective performance standards. The process used to evaluate the traffic operations is more extensively described in *Section 3 Assumptions and Methods* of this report. The results are shown in **Error! Reference source not found.** and **Error! Reference source not found.**, with intersections that are operating below performance standards noted.

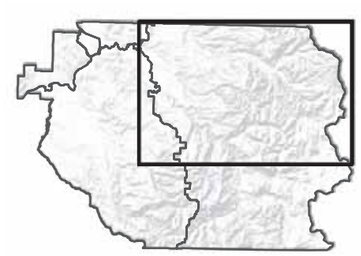
Table E 1 Traffic Operations Analysis Results at Study Intersections in East County

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard?
501	OR 212 /SE 282nd Ave	ODOT	v/c = 0.7	No (v/c=0.85)
502	OR 224 /SE 232nd Ave	ODOT	v/c = 0.7	Yes
503	OR 224/OR 211	ODOT	v/c = 0.75	No (v/c=1.38)
504	US 26/Salmon River Rd	ODOT	v/c = 0.7	Yes
505	US 26/Government Camp West	ODOT	v/c = 0.7	Yes
506	US 26/Government Camp East	ODOT	v/c = 0.7	Yes

As shown, the intersections of OR 212/SE 282nd Avenue (501) and OR 224 /OR 211 (503) do not meet standards. All other intersections operate well below the volume-to-capacity ratio standards. *Appendix 8* contains detailed traffic operations analysis results.

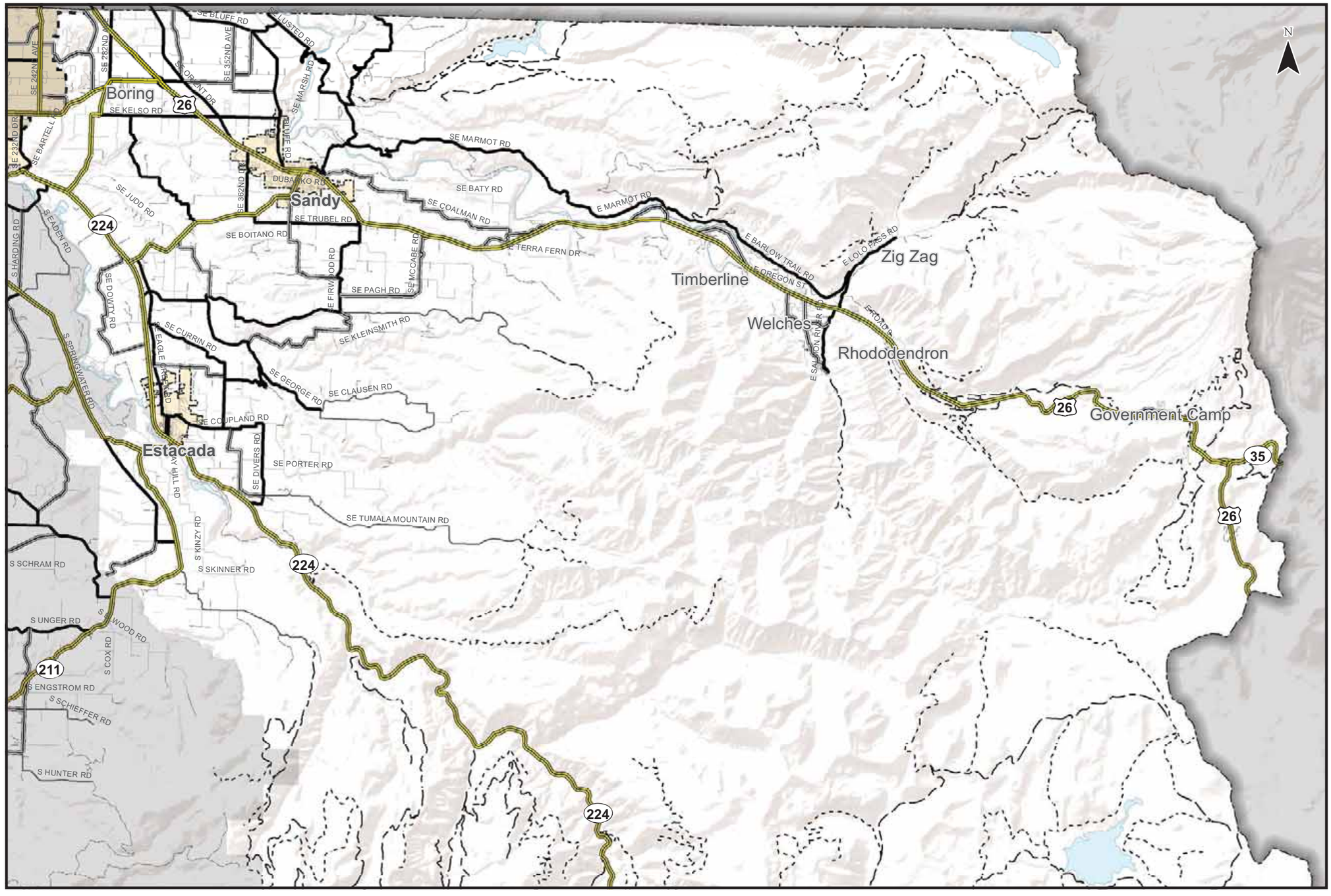
Additional analysis was performed at the two study intersections on US 26 in Government Camp as part of the Mt. Hood Highway EIS Capacity Study. This analysis suggests that the intersection at US 26/Government Camp West is operating slightly over its operational performance standard (at a v/c of 0.81) under existing PM peak hour traffic conditions, while the intersection at US 26/Government Camp East is meeting performance standards. The EIS analysis was based on seasonally adjusted peak season weekend counts taken in January, whereas the TSP Update analysis was performed with seasonally adjusted counts conducted during a weekday p.m. peak hour in February. Weekday p.m. peak hour and weekend peak hour conditions are notably different at Government Camp.

CLACKAMAS COUNTY Transportation System Plan Update



Functional Classifications

- Freeway
- Expressway
- Major Arterial
- Minor Arterial
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroad
- Ferry
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Roadway Functional Classifications
East County - Northern Portion

Figure
EN 10

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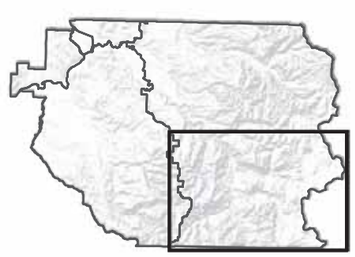
CLACKAMAS COUNTY Transportation System Plan Update



Functional Classifications

- Freeway
- Expressway
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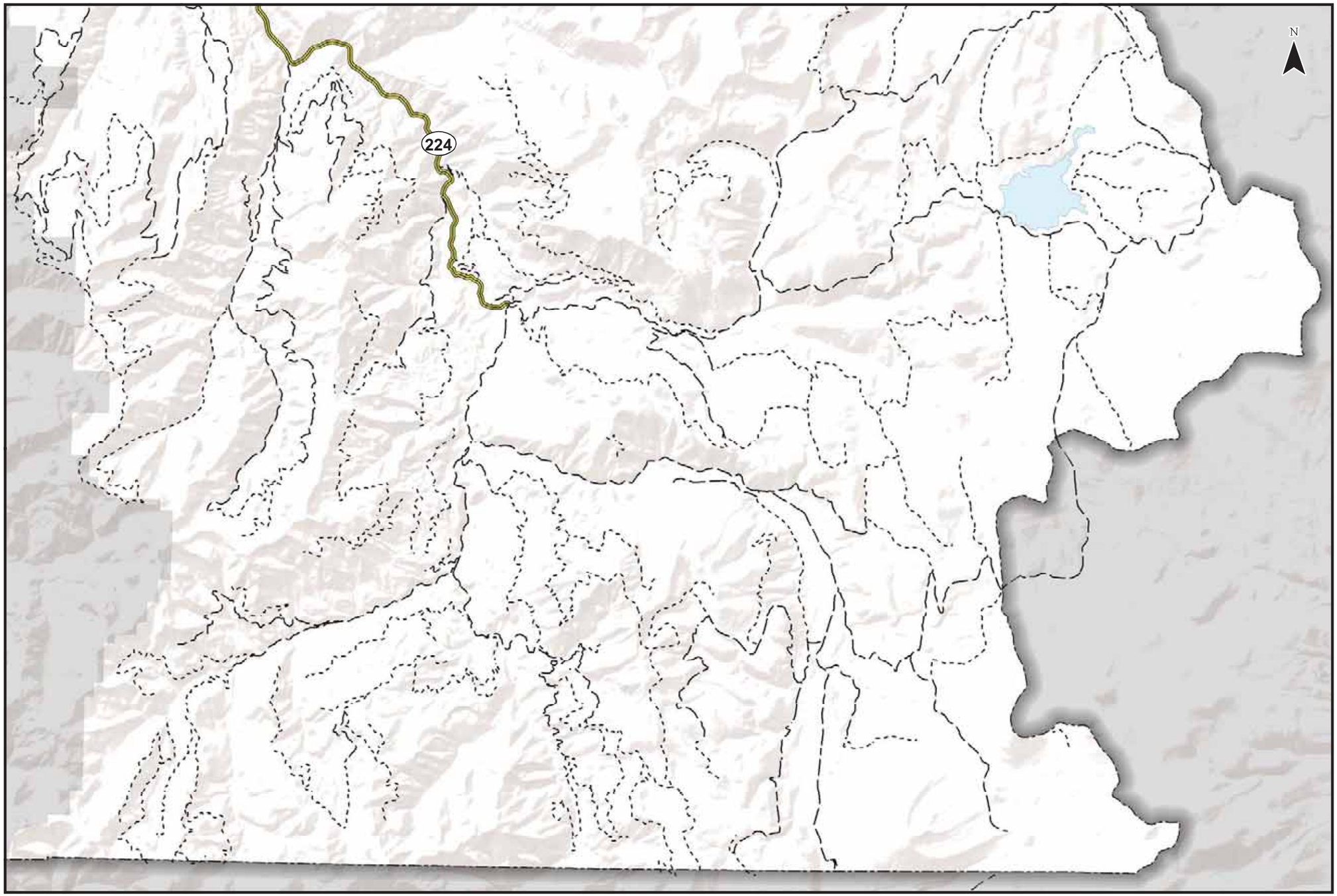
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroad
- Ferry
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Roadway Functional Classifications
East County - Southern Portion

Figure
ES 10

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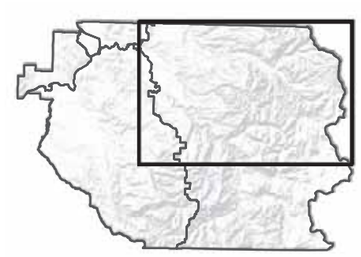
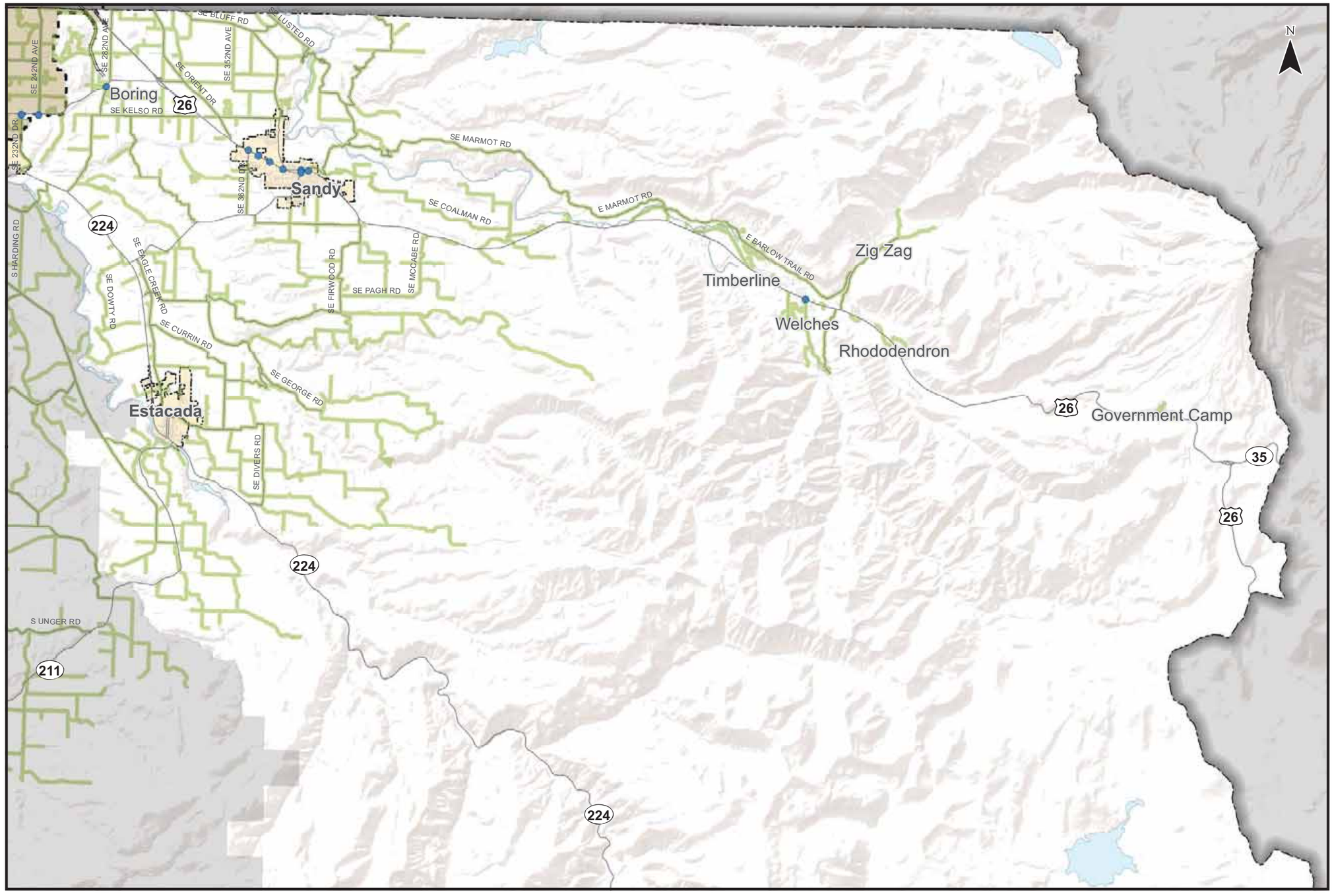
CLACKAMAS COUNTY Transportation System Plan *Update*



Existing Traffic Signals

- County Owned
- ODOT Owned
- Ped Crossing Flasher
- County Maintained Roads
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Existing Signal Locations
East County - Northern Portion

Figure
EN 11

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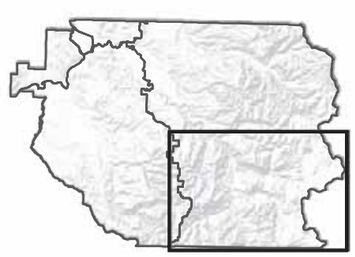
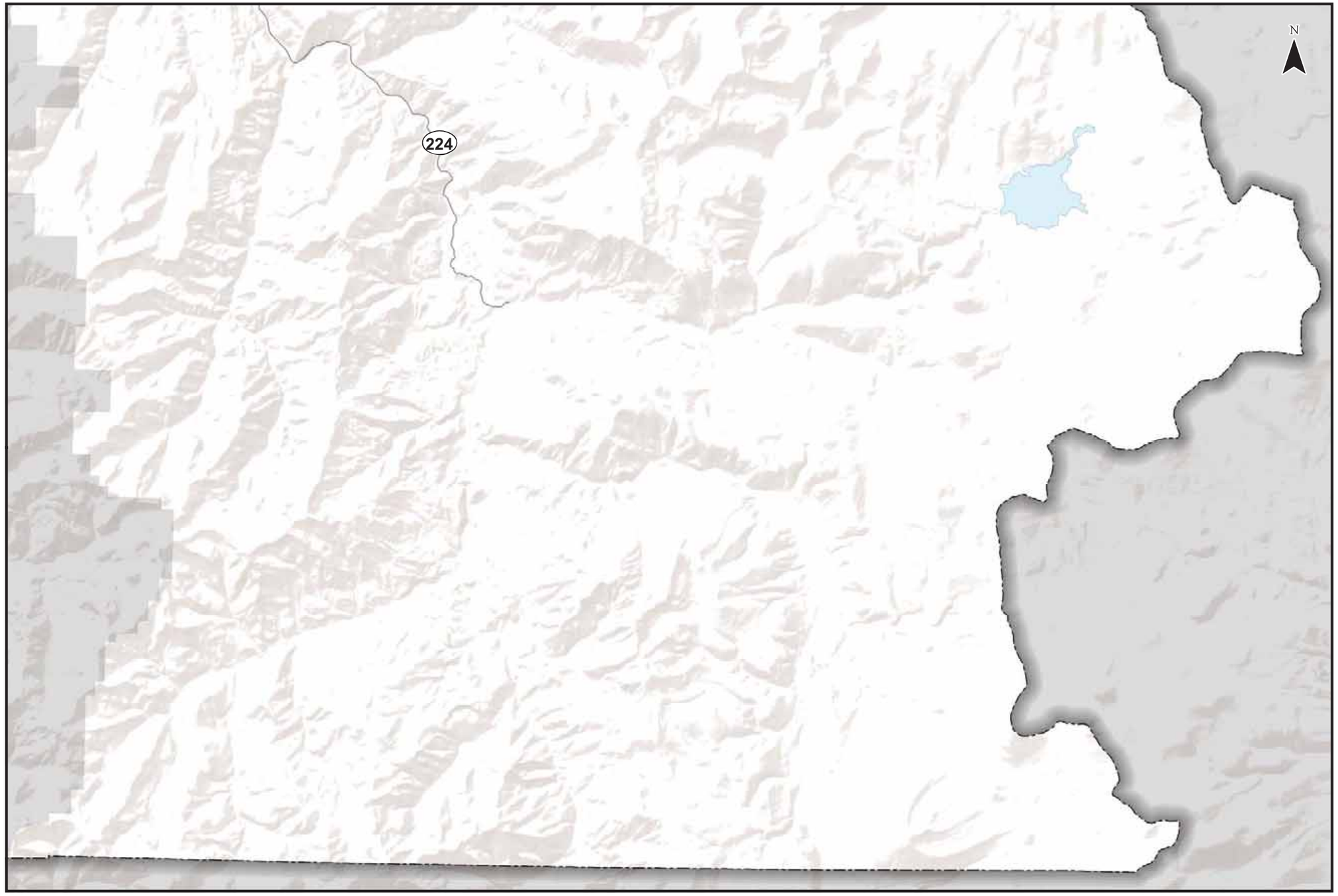
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Existing Traffic Signals

- County Owned
- ODOT Owned
- Ped Crossing Flasher
- County Maintained Roads
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Existing Signal Locations
East County - Southern Portion

Figure
ES 11

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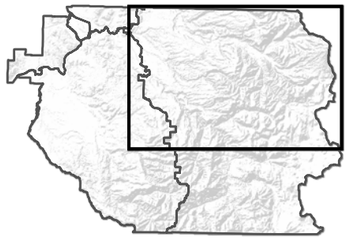
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



- At-Grade Rail Crossings
- Railroads
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

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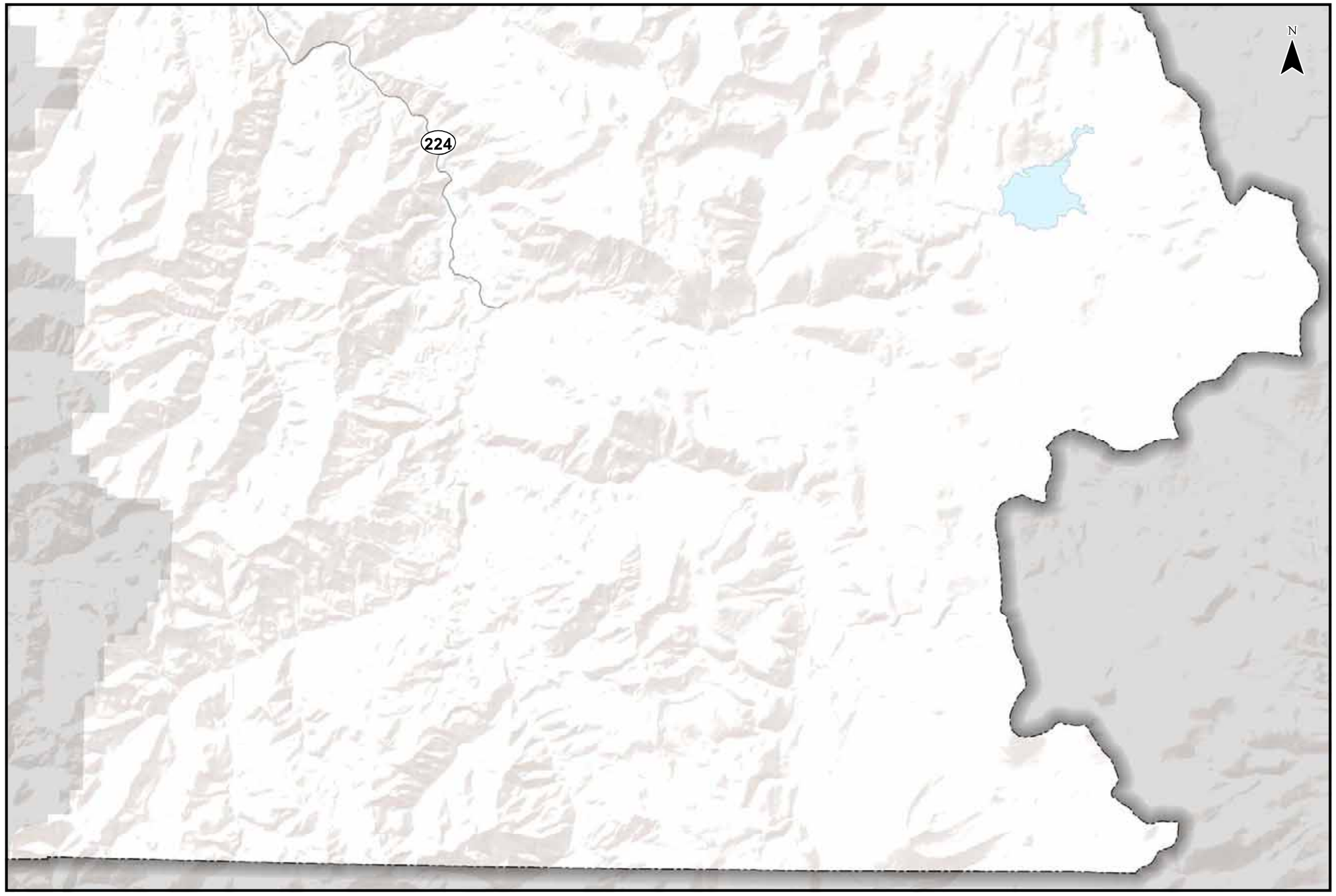
At-Grade Railroad Crossing Locations
East County - Northern Portion

Figure
EN 12

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



- At-Grade Rail Crossings
- Railroads
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

At-Grade Railroad Crossing Locations
East County - Southern Portion

Figure
ES 12

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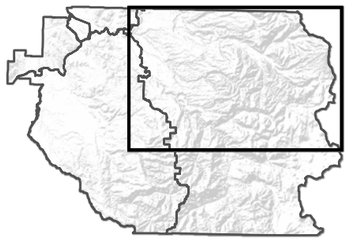
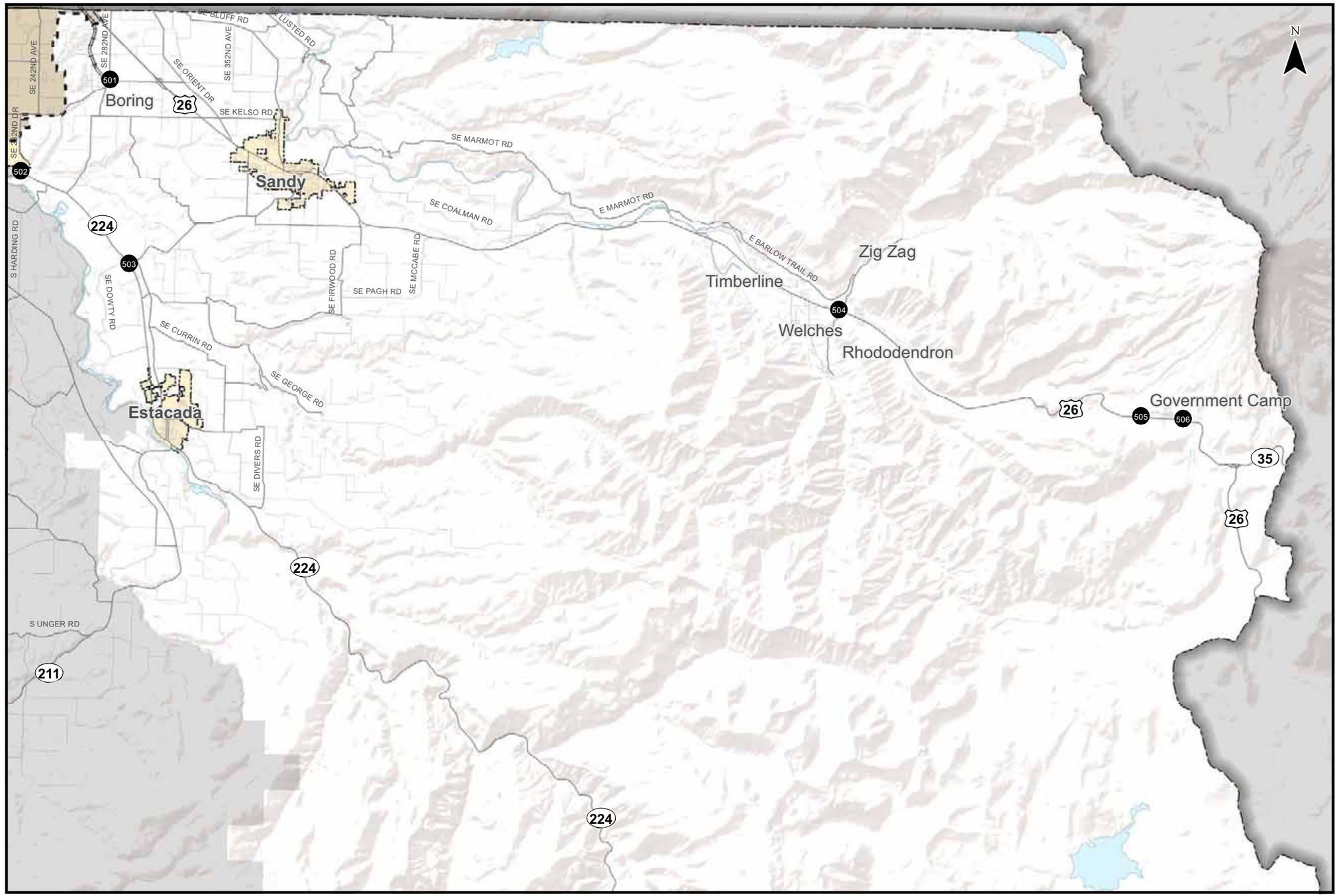
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Study Intersection Jurisdiction

- ### ODOT
- ### Clackamas County
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Transportation System Plan Study Intersections
East County - Northern Portion

Figure
EN 13

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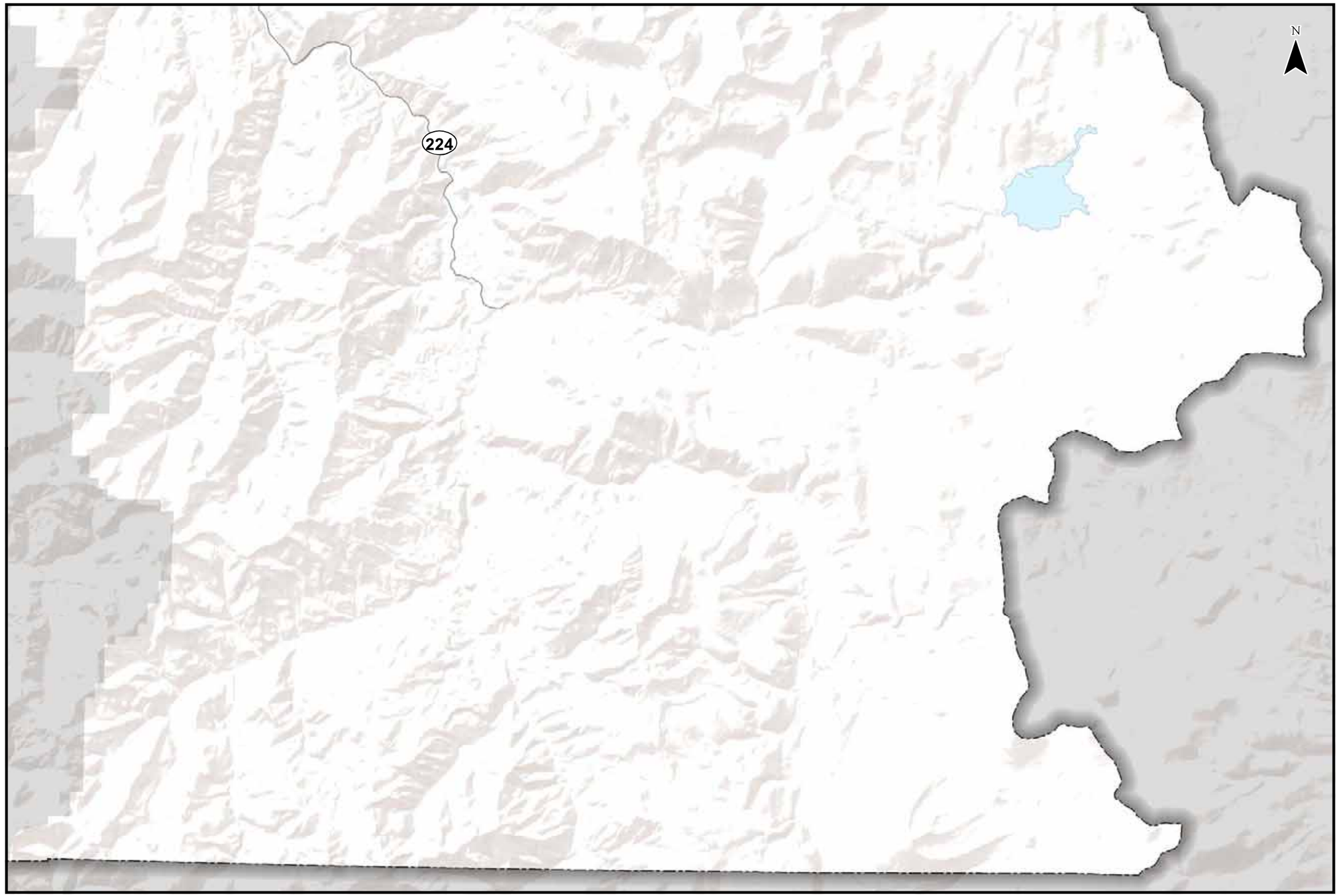
CLACKAMAS COUNTY Transportation System Plan Update

Study Intersection Jurisdiction

- ODOT
- Clackamas County
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Transportation System Plan Study Intersections
East County - Southern Portion

Figure
ES 13

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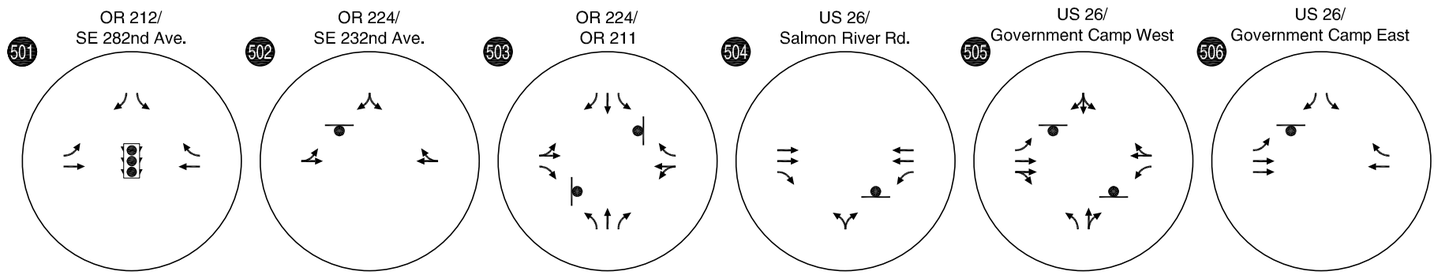
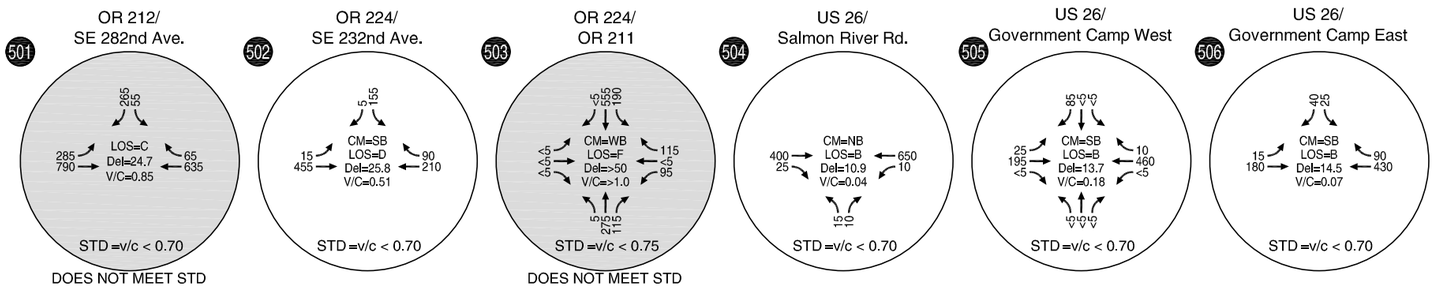


(##) - ODOT STUDY INTERSECTION
(##) - COUNTY STUDY INTERSECTION
- STOP SIGN
- TRAFFIC SIGNAL
- ROUNDABOUT

Existing Lane Configuration and Traffic Control Devices East County

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN

Figure E 14



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
STD = OPERATIONAL STANDARD

Existing Intersection Operations
PM Peak Hour
East County

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN

Figure
E 15

Roadway Segment Operations Analysis

The roadway segment operations analysis consists of considering the roadway segment volumes and approximate level of congestion based on a comparison of the volume to the segment capacity. *Section 3 Assumptions and Methods* provides additional details on the scope and approach to the analysis below.

Roadway Segment Volumes

The roadway segment volumes provide a sense of the demand for travel on the roadways. Figure E 16 illustrates the roadway link volumes from the weekday evening peak hour. The roadway segment volumes are from Metro's Beta Forecast travel demand model; therefore, the roadway segment links approximate the actual roadway geometry. The roadway segment links in the model do not reflect roadway curvature. Also, the roadway segment link volumes from the model are provided for roadways of generally a major collector designation or higher, so traffic volume on local roads are not reflected.

As is evident from Figure E 16, under the existing roadway system demand for travel is highest along US 26, OR 224, and OR 211 particularly as the roadways approach the urban areas of Sandy, Estacada, and Damascus. This reflects the commuting trend of outbound vehicle traffic dissipating further from city centers as commuters return home from work.

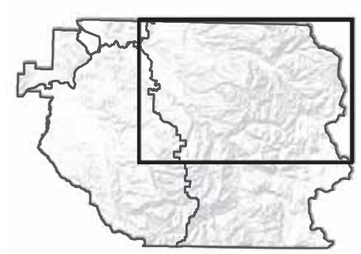
Approximate Level of Congestion

The level of congestion experienced on roadway segments was estimated using the roadway segment volumes from the Metro Beta Forecast base model and the roadway segment capacity. The volume was compared to the capacity to calculate a volume-to-capacity ratio that is used to estimate level of congestion. **Error! Reference source not found.** summarizes the level of congestion that corresponds to different volume-to-capacity ratios.

Table E 2 Volume-to-Capacity Ranges for Roadway Segment Congestion Estimates

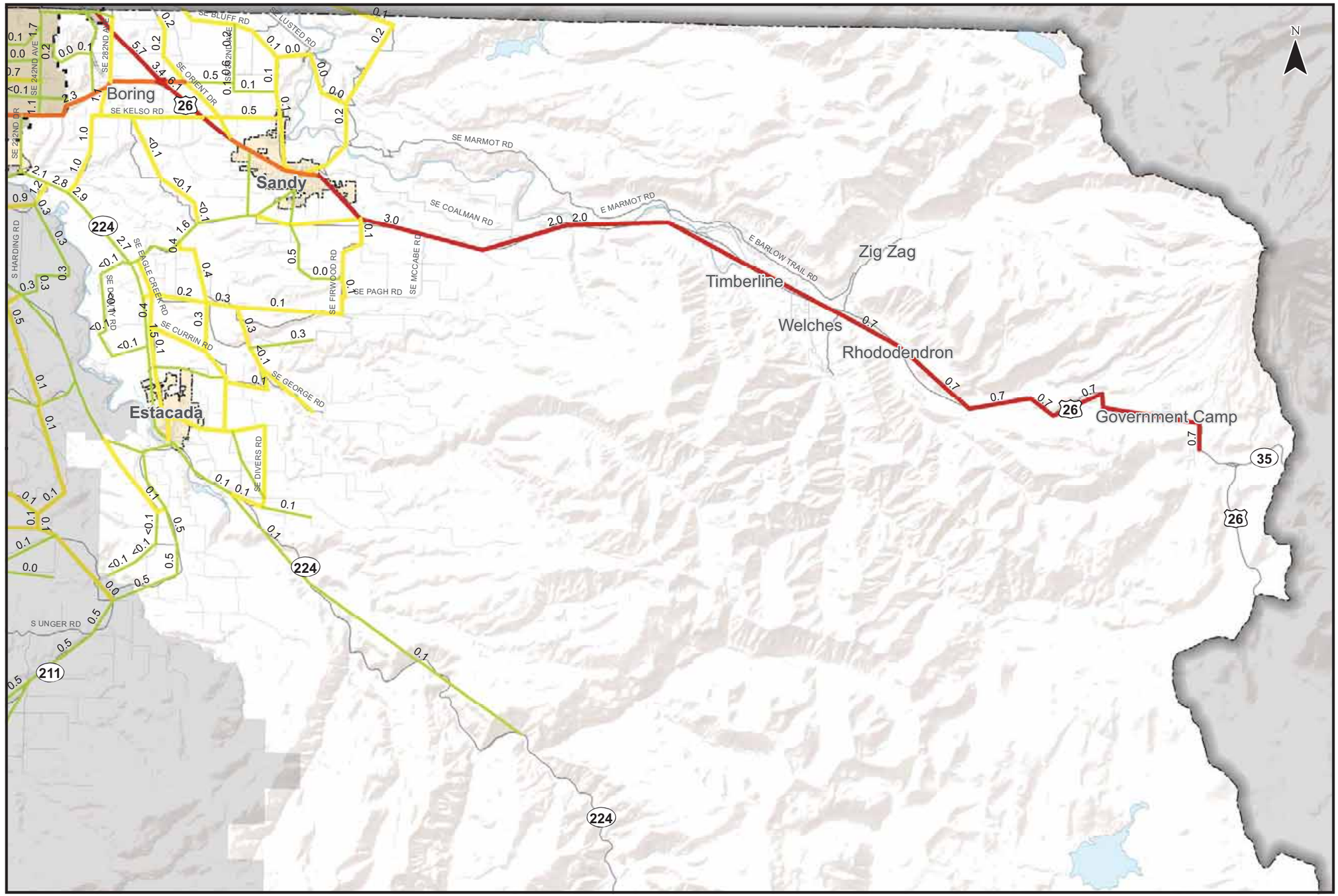
Congestion Level	Volume to Capacity Range
Very Congested	1.1 or greater
Congested	1.0 to 1.1
Some Congestion	0.9 to 1.0
Nearing Congestion	0.8 to 0.90
Less Congested	0.0 to 0.80

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



2010 Base Volumes

- Freeway
- Principal / Major Arterial
- Minor Arterial
- Lower Order Facility
- #.# PM Weekday Traffic Volume in Thousands
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center

Evening Weekday Peak Hour Link Volumes 2010 Base Year
East County - Northern Portion

Figure
EN 16

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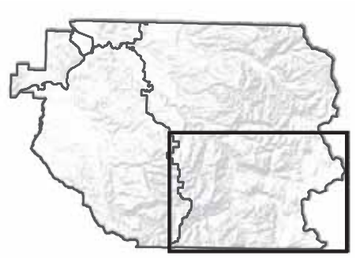
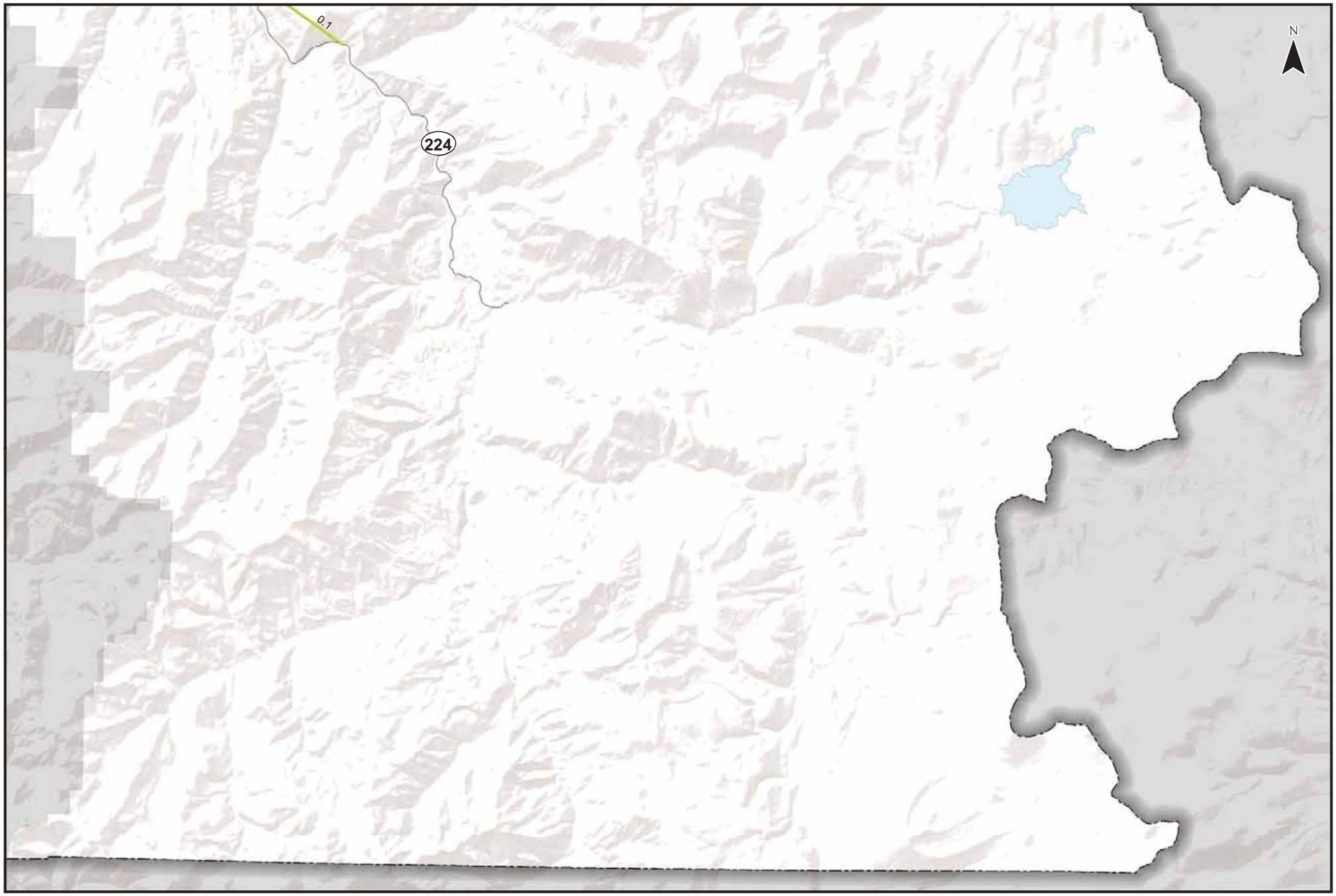
CLACKAMAS COUNTY Transportation System Plan Update



2010 Base Volumes

- Freeway
- Principal / Major Arterial
- Minor Arterial
- Lower Order Facility
- #.# PM Weekday Traffic Volume in Thousands
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center

Evening Weekday Peak Hour Link Volumes 2010 Base Year
East County - Southern Portion

Figure
ES 16

H:\proffile\11732 - Clackamas County TSP\gis\11x17 Maps\16 Evening Weekday Peak Hour Link Volumes 2010 Base Year.mxd

Figure E 17 illustrates the relative congestion during the weekday evening peak hours on roadways based on the estimated roadway segment volumes and capacity. It is possible for the study intersection analysis results to indicate there are intersections experiencing relatively high amounts of delay on roadway segments that are shown as experiencing relatively minimal congestion. The roadway segment analysis considers only the capacity of the lanes on the segment and the volumes on the segment. It is an idealized assessment of volume to capacity (e.g., if all vehicles were traveling in the same direction along a roadway, how many vehicles could the roadway carry). In actuality, motorists experience congestion on roadway segments due to intersection operations. The purpose of the roadway segment analysis is to help identify if the delay being experienced (or anticipated to be experienced in the future) is primarily related to the intersection or the roadway segment.

As can be seen in Figure E 17, under the 2010 Base Year, the roadway segments experience lower congestion during the weekday evening peak hour. There are no segments with volume-to-capacity ratios over 0.8. A similar analysis was conducted for two future year scenarios; the results of that analysis are discussed further below in the section presenting Future Conditions for East County.

Pedestrian and Bicycle System

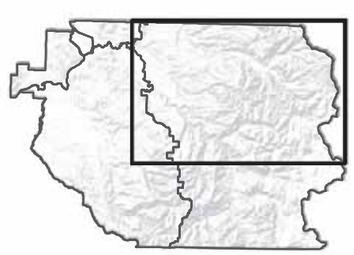
Figure E 18 illustrates the location of sidewalks, multi-use paths, and crosswalk signals. Figure E 19 illustrates the location of bike lanes, multi-use paths and shoulder bikeways on roadways in the County. The information is based on inventory data obtained from the County, TriMet, and ODOT.

As shown in Figure E 18, there are no sidewalks in the East County subarea except within the cities of Sandy and Estacada (note that the data shown within cities and unincorporated communities is not complete and primarily includes state and county facilities). Sidewalks are only required in "unincorporated communities," which are identified as Rural Centers in the pedestrian maps. They include Rural Communities, Rural Service Centers, Resort Communities and Urban Unincorporated Communities as defined by the County's Comprehensive Plan. Within "unincorporated communities", sidewalks or walkways are to be provided adjacent to or within areas of development, such as schools, businesses, or employment centers near or along highways. Gaps in the rural area pedestrian network include all facilities within Rural Centers that do not have a sidewalk or walkway adjacent to or within such areas of development. Based on rural roadway standards, there are no deficiencies in the pedestrian system except in the Rural Centers of Boring, Welches, Zigzag, and Wildwood/Timberline.

As shown in Figure E 19, the bicycle network in East County consists primarily of shoulder bikeways (at least 4 feet wide) along the state highway system. The Springwater Trail ends near Boring and an additional multi-use trail is located south of Estacada. The majority of the state highway system has shoulder bikeways throughout the East County area (except OR 224 inside the National Forest and a section of OR 211); however, the county roadway system has no shoulders wide enough to be designated as shoulder bikeways.

Bicycle facilities should be provided on all roadways designated as Collectors or higher (i.e. Major Arterials, Minor Arterials, Connectors, and Collectors). Based on the County's current design standards, in urban areas the facility should be a bike lane and in rural areas it should be a 6-foot shoulder. The County's current Comprehensive Plan identifies all collector and arterial roadways in East County as part of the Planned Bikeway Network (*see Appendix 5 for the County's essential pedestrian and planned bikeway network maps*). Existing gaps in the network include all roadways identified on the Planned Bikeway Network that do not have an existing bicycle facility (nearly all County collectors and arterials).

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



Very Congested >1.10
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Congested 1.0 - 1.1
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

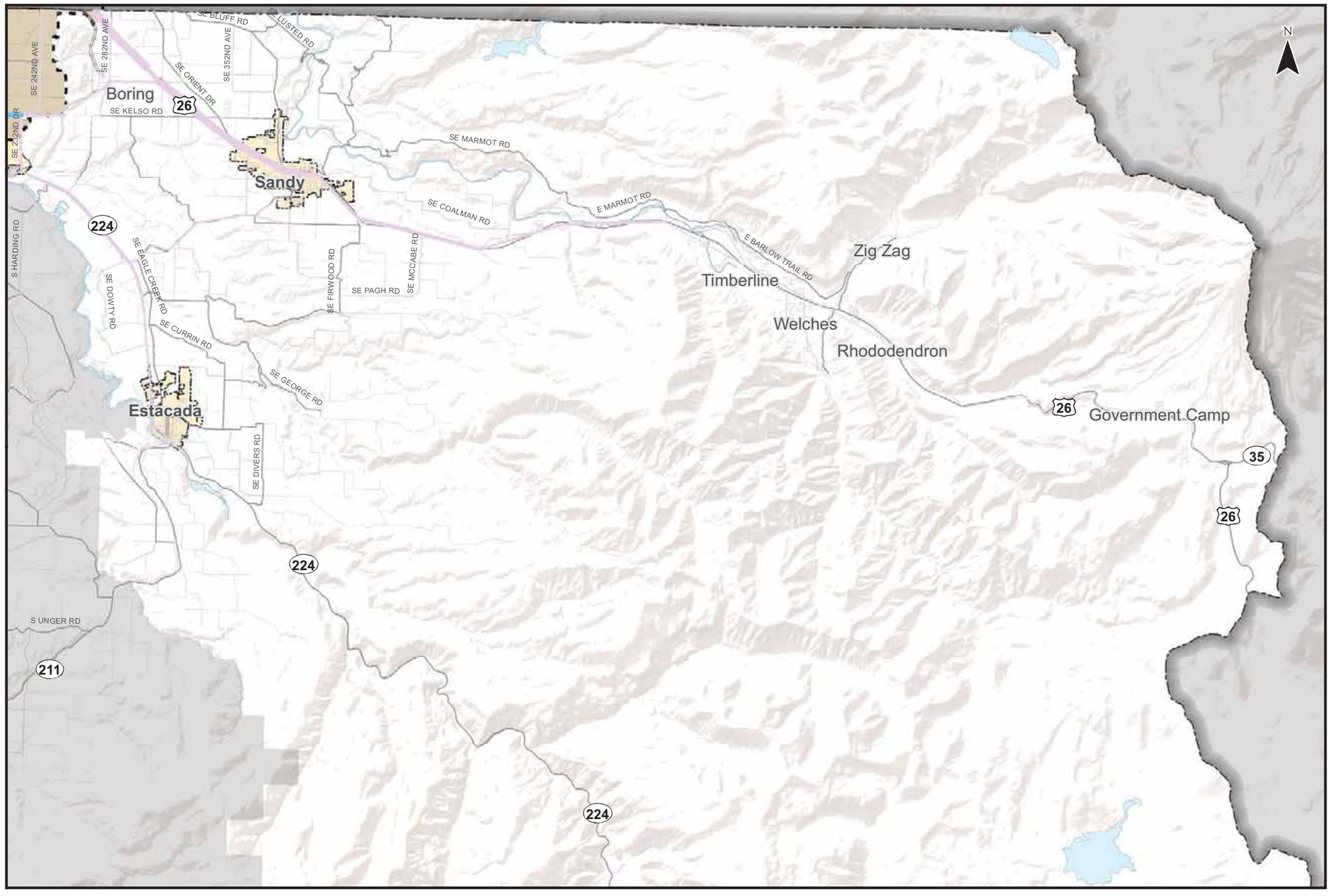
Some Congestion 0.9 - 1.0
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Nearing Congestion 0.8 to 0.9
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Less Congested <0.8
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center

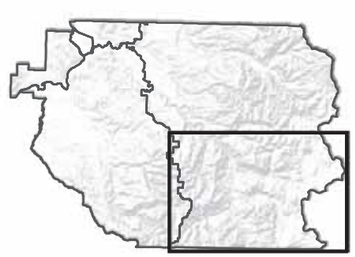


Evening Weekday Peak Hour Roadway Segment Congestion 2010 Base Year
East County - Northern Portion

Figure
EN 17

H:\proflile\11732 - Clackamas County TSP\gis\11x17 Maps\17 Evening Weekday Peak Hour Roadway Segment Congestion 2010 Base Year.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



Very Congested >1.10
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Congested 1.0 - 1.1
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

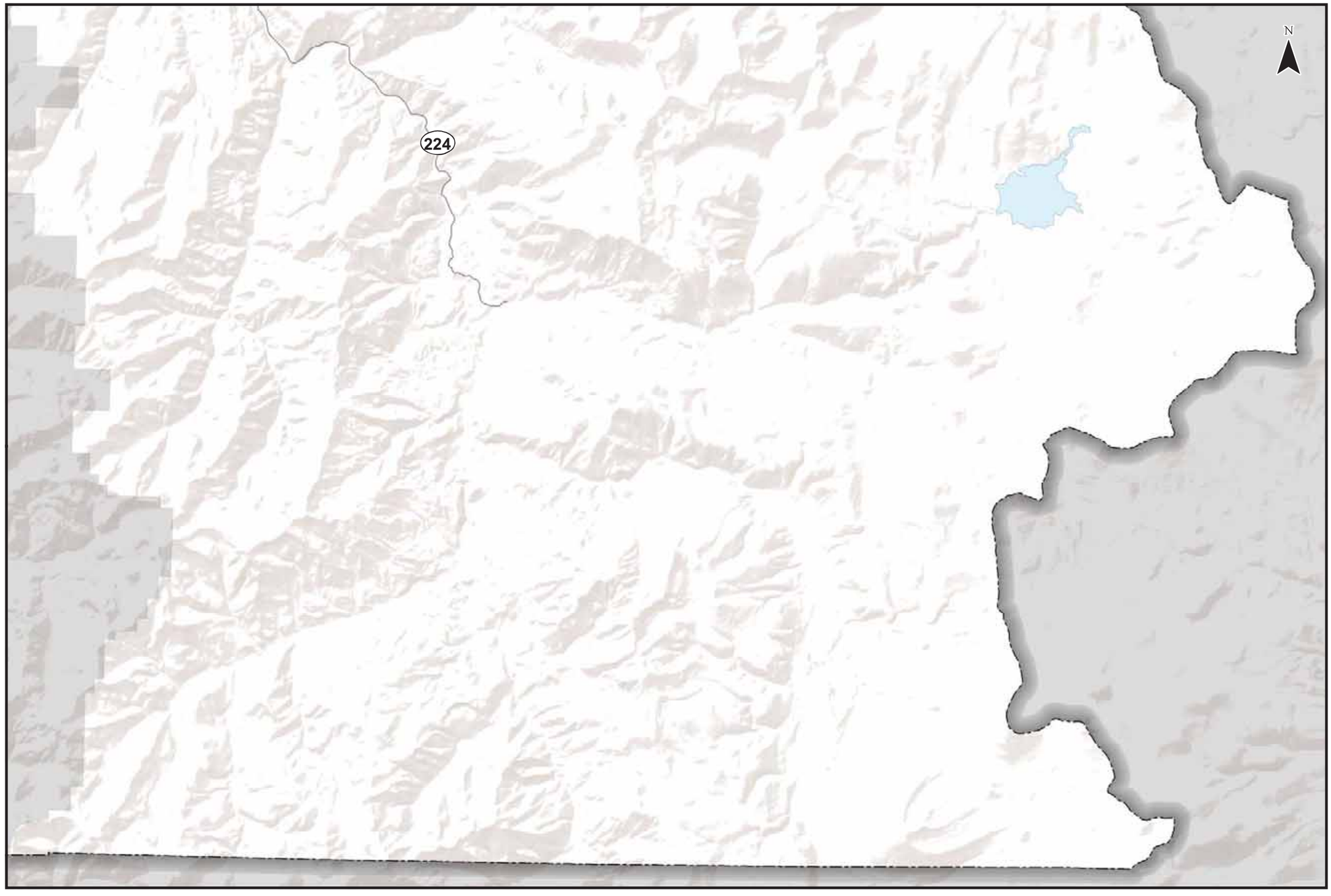
Some Congestion 0.9 - 1.0
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Nearing Congestion 0.8 - 0.9
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Less Congested <0.8
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

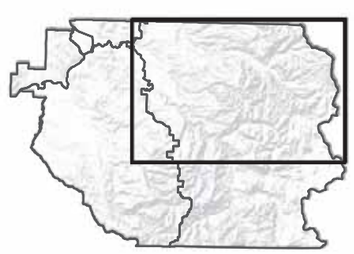
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center



Evening Weekday Peak Hour Roadway Segment Congestion 2010 Base Year
East County - Southern Portion

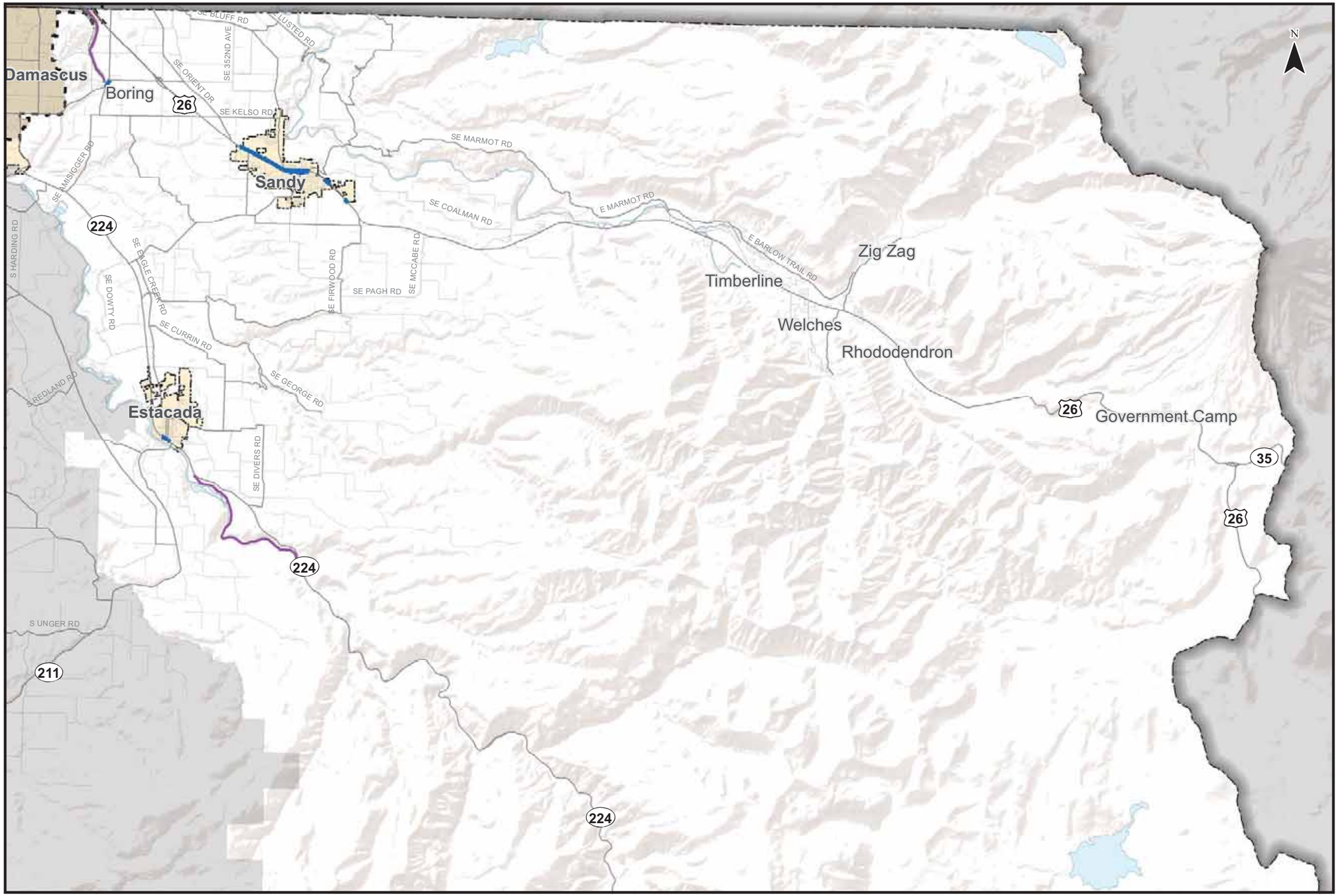
Figure
ES 17

CLACKAMAS COUNTY Transportation System Plan Update



Pedestrian Network

- Sidewalks
- 76% to 99% Complete
- 51% to 75% Complete
- 26% to 50% Complete
- 1% to 25% Complete
- No Sidewalks
- Multi-Use Path
- Ped Crossing Flasher
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Pedestrian Network
East County - Northern Portion

Figure
EN 18

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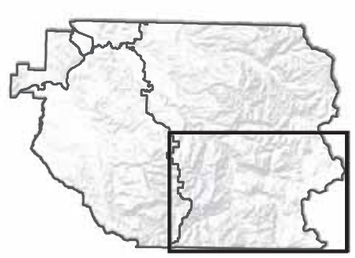
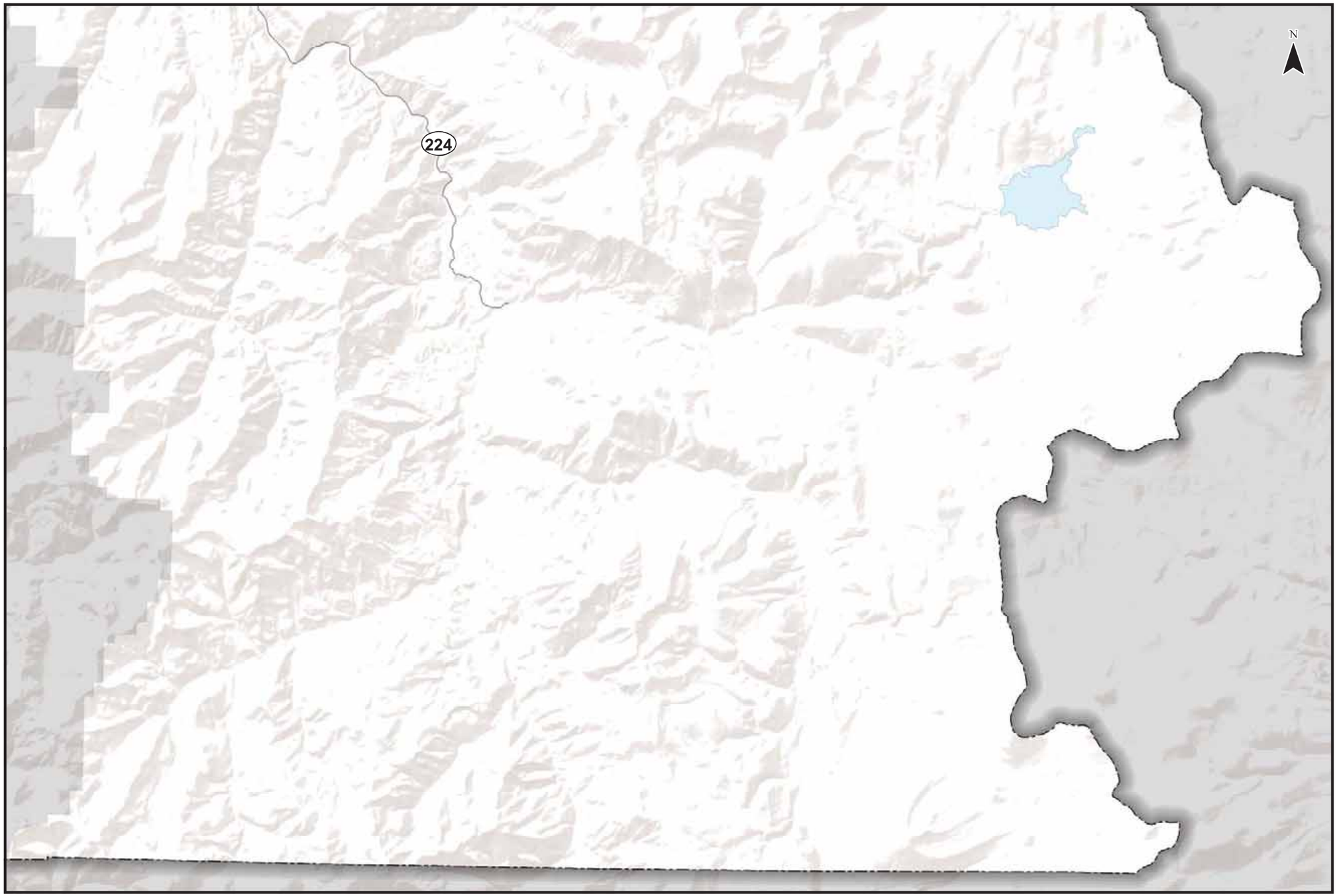
CLACKAMAS COUNTY Transportation System Plan Update



Pedestrian Network

- Sidewalks
- 76% to 99% Complete
- 51% to 75% Complete
- 26% to 50% Complete
- 1% to 25% Complete
- No Sidewalks
- Multi-Use Path
- Ped Crossing Flasher
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Pedestrian Network
East County - Southern Portion

Figure
ES 18

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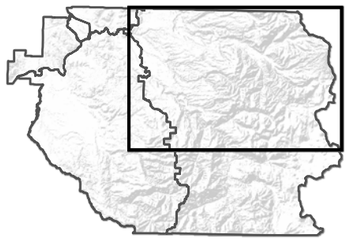
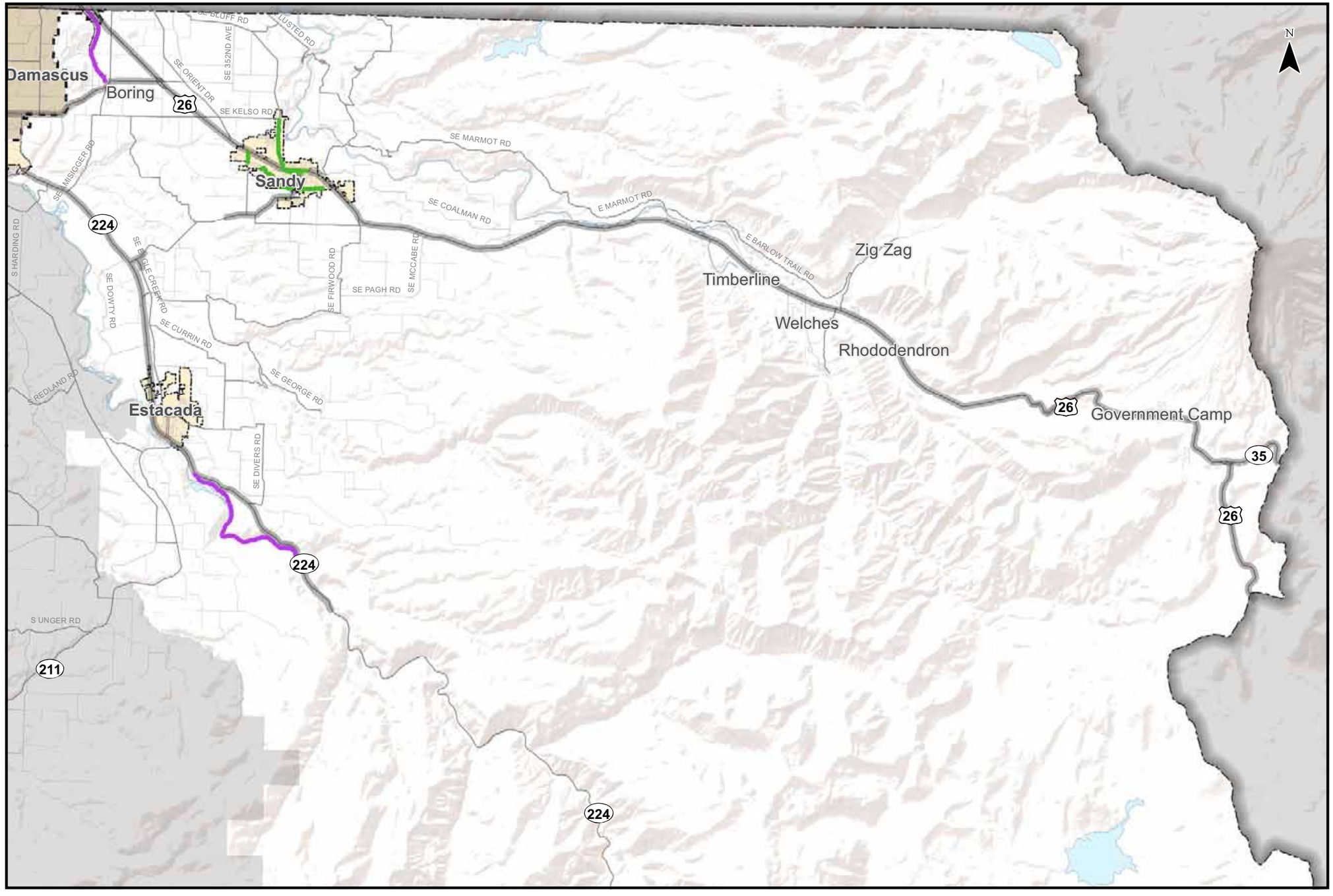
CLACKAMAS COUNTY Transportation System Plan Update



Bike Facilities

- Bike Lane
- Multi-Use Path
- Shoulders (At Least 4ft Wide)
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Bicycle Network
East County - Northern Portion

Figure
EN 19

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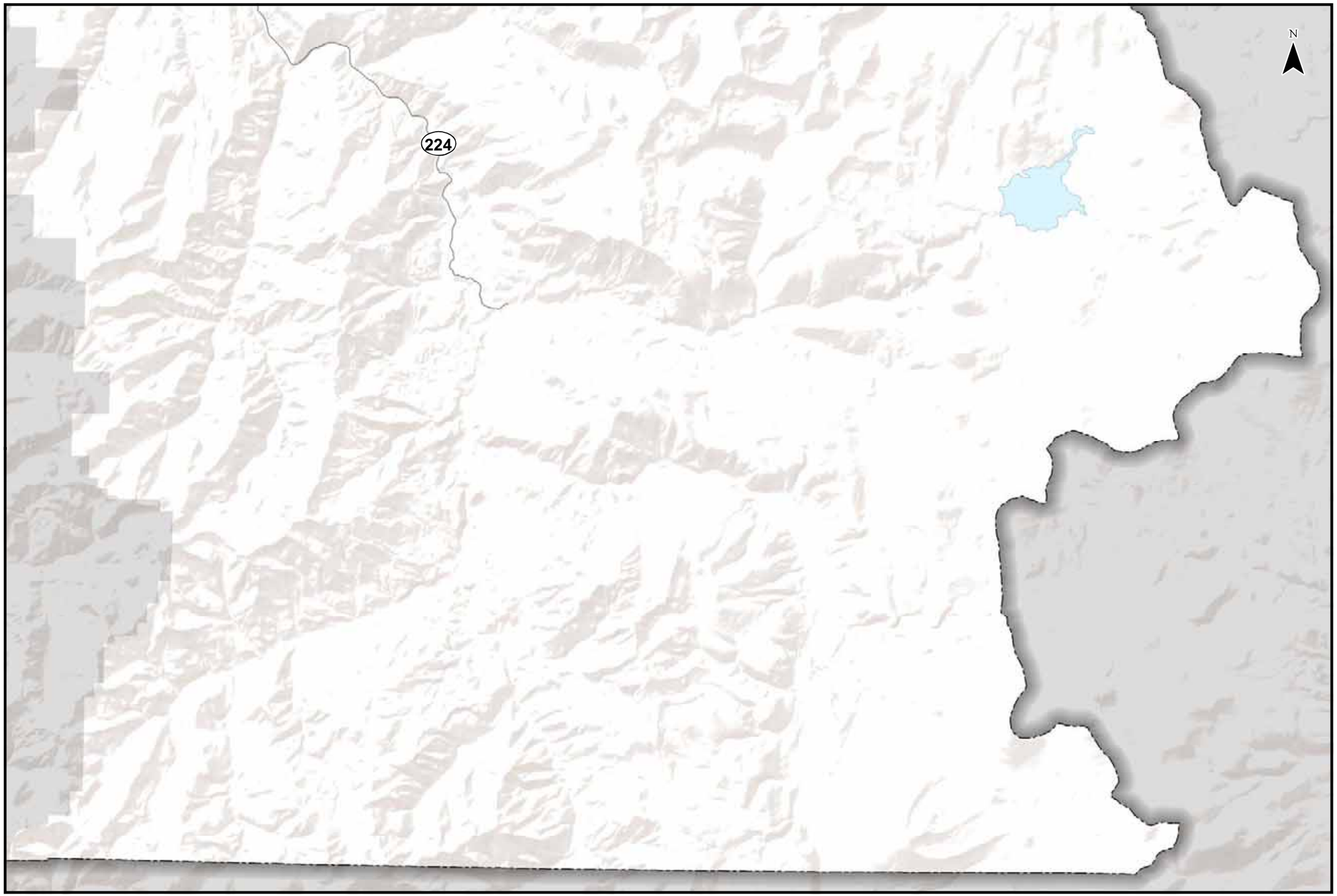
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

Bike Facilities

- Bike Lane
- Multi-Use Path
- Shoulders (At Least 4ft Wide)
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Bicycle Network
East County - Southern Portion

Figure
ES 19

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The County's Bike Master Plan identifies priorities for filling in the bicycle network gaps. Table E 3 below identifies the priority bicycle projects from the Bike Master Plan in East County. The priority for these projects will be reviewed applying the evaluation criteria of the TSP Vision and Goals..

Table E 3 Bicycle Master Plan Projects in East County

Bike Master Plan Project Number	Street Name	Section Description	Project Elements
RB 403	282ND	OR 212 to County Line	Widen / Shoulder Bikeways
RB 411	COMPTON	US 26 to 352nd Ave	Widen / Shoulder Bikeways
RB 412	EAGLE CREEK	OR 211 to River Mill Rd	Widen / Shoulder Bikeways
RB 414	GRAYS HILL	Green Mountain Road to OR 211	Widen / Shoulder Bikeways
RB 420	KELSO	Amisigger Rd to Sandy City Limits	Widen / Shoulder Bikeways
RB 427	RICHEY	Kelso Rd to 282nd Rd	Widen / Shoulder Bikeways
RB 429	SALMON RIVER	US 26 to Welches Rd	Widen / Shoulder Bikeways
RB 436	TEN EYCK	Lusted Rd to Sandy City Limits	Widen / Shoulder Bikeways
RB 439	WELCHES	US 26 to Salmon River Rd	Widen / Shoulder Bikeways
906	CAZADERO MULTI USE TRAIL		Multi-Use Trail from County Line through Boring to Estacada

RB = Rural Bikeway, SRB = State Rural Bikeway

Public Transportation System

The public transportation system consists of fixed-route and dial-a-ride services as well as regional transit centers and park/rides. Frequent morning and evening peak hour service provides residents with the ability to use public transit for daily commuting, while less frequent mid-day, as well as Saturday and Sunday, service provides residents with the ability to access retail, commercial, institutional, and other land uses throughout Clackamas County.

Providers within East Clackamas County

Three transit agencies currently provide service within East Clackamas County, including TriMet, Sandy Area Metro (SAM), and Mountain Express Transit (MXT). Figure E 20 displays the fixed-route services provided by each agency within East Clackamas County. These services are discussed in greater detail below.

Fixed-Route Service

TriMet

TriMet operates two fixed-route bus lines within East Clackamas County, including Lines 30 and 84.

- Line 30 provides weekday service between the Clackamas Town Center and the Estacada City Center via SE 82nd Avenue, OR 212, OR 224, and Eagle Creek Road from 6:00 a.m. to 8:25 p.m. on 30-60 minute headways (i.e., buses arrive every 30 to 60 minutes). During peak time periods, line 30 travels through Milwaukie as Line 31 to provide service to the Portland City Center. *Line 30 connects to SAM's Sandy Estacada Line in Estacada.*

- Line 84 provides weekday rush-hour service between the Gresham Central Transit Center and the Kelso City Center via SE Hood Road, SE Powell Valley Road, SE Bluff Road, and SE Kelso Road three times per day. Line 84 also provides weekday rush-hour service between the Gresham Central Transit Center and the Boring City Center via SE Hood Road, SE Powell Valley Road, and SE Boring Road/SE 282nd Avenue three times a day. *Line 84 connects with SAM's Sandy Local/Gresham Express Line at the Gresham Central Transit Center*.

On December 14, 2011, TriMet Board of Directors voted to remove TriMet service from the unincorporated area of Boring, granting the Boring Community Planning Organization's petition (requesting TriMet service be removed) filed in September 2011. This change is scheduled to take effect during the 2012 calendar year.

Sandy Area Metro (SAM)

Sandy Area Metro (SAM) operates two fixed-route bus lines within East Clackamas County, including the Sandy Local/Gresham Express and the Sandy Estacada.

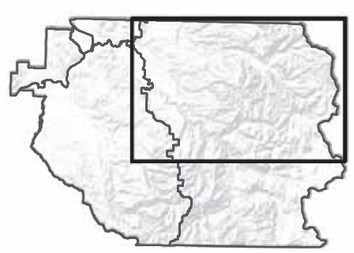
- The Sandy Local/Gresham Express provides weekday service between the Sandy City Center and the Gresham Central Transit Center via US 26 from 5:25 a.m. to 8:28 p.m. on approximately 30 minute headways. *The Sandy Local/Gresham Express connects to eight TriMet bus lines at the Gresham Central Transit Center as well as TriMet's Blue Light Rail Line*.
- The Sandy Estacada provides weekday rush-hour service between the Sandy City Center and the Estacada City Center via US 26 and SE 362nd Avenue five times a day. *The Sandy Estacada connects to TriMet Line 30 in Estacada.*

Both the Sandy Local/Gresham Express and the Sandy Estacada connect to MXT at the Sandy area park/rides.

Mountain Express Transit (MXT)

Mountain Express Transit (MXT) operates one fixed-route bus line within East Clackamas County that provides weekday service between the Sandy City Center and Rhododendron via US 26 from 5:47 a.m. to 7:08 p.m. during peak time periods. *Mountain Express Transit connects to SAM's Local Sandy/Gresham Express and Sandy Estacada lines at the Sandy area park/rides*.

CLACKAMAS COUNTY Transportation System Plan Update



- Bus Stops
- Route Number
- Park & Ridge

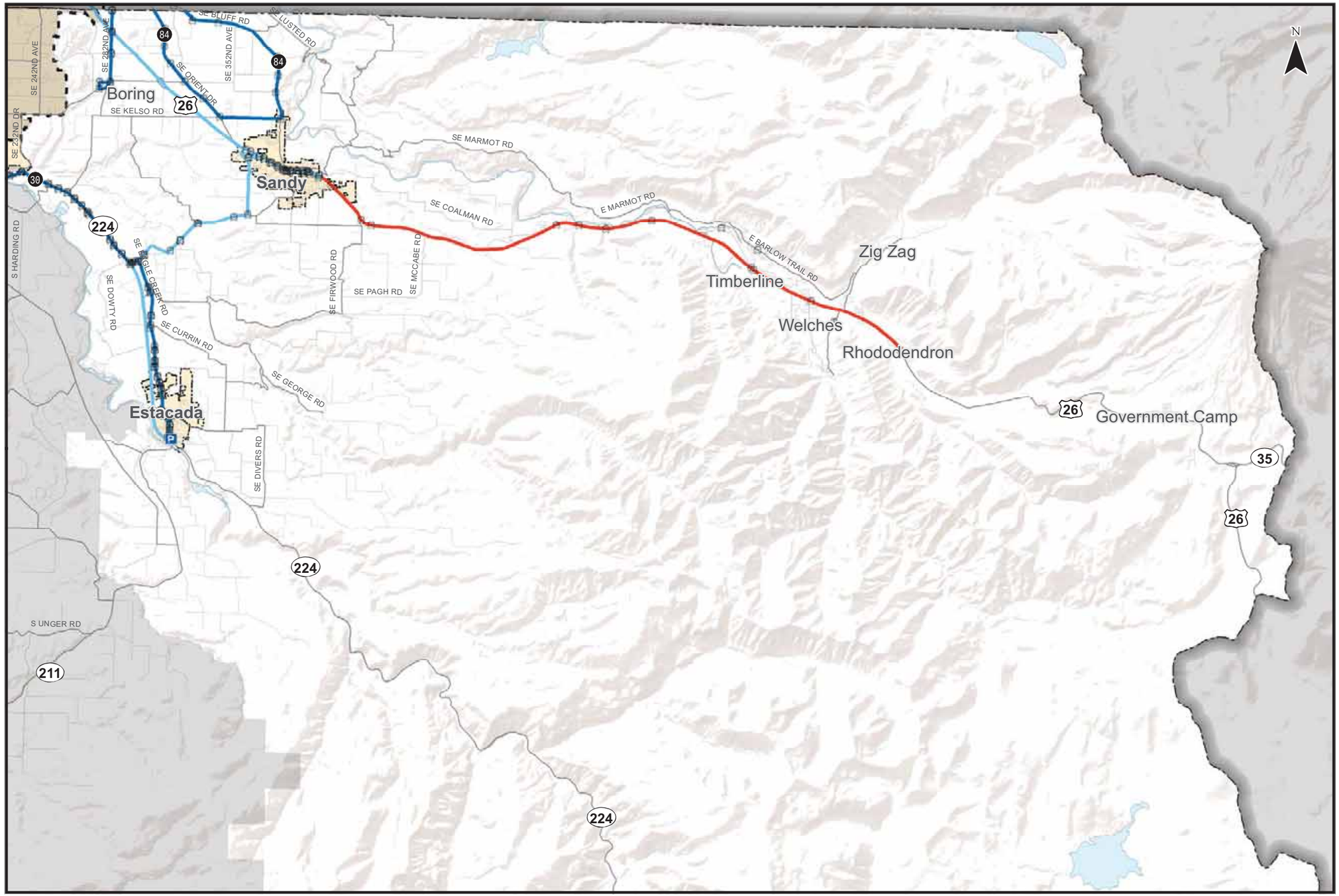
Bus Transit Providers

- Tri-Met
- SAM
- SCTD
- CAT
- MXT
- SMART

Tri-Met Rails

- MAX
- WES

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Transit Service
East County - Northern Portion

Figure
EN 20

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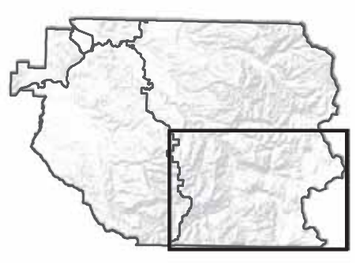
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



- Bus Stops
- Route Number
- Park & Ride

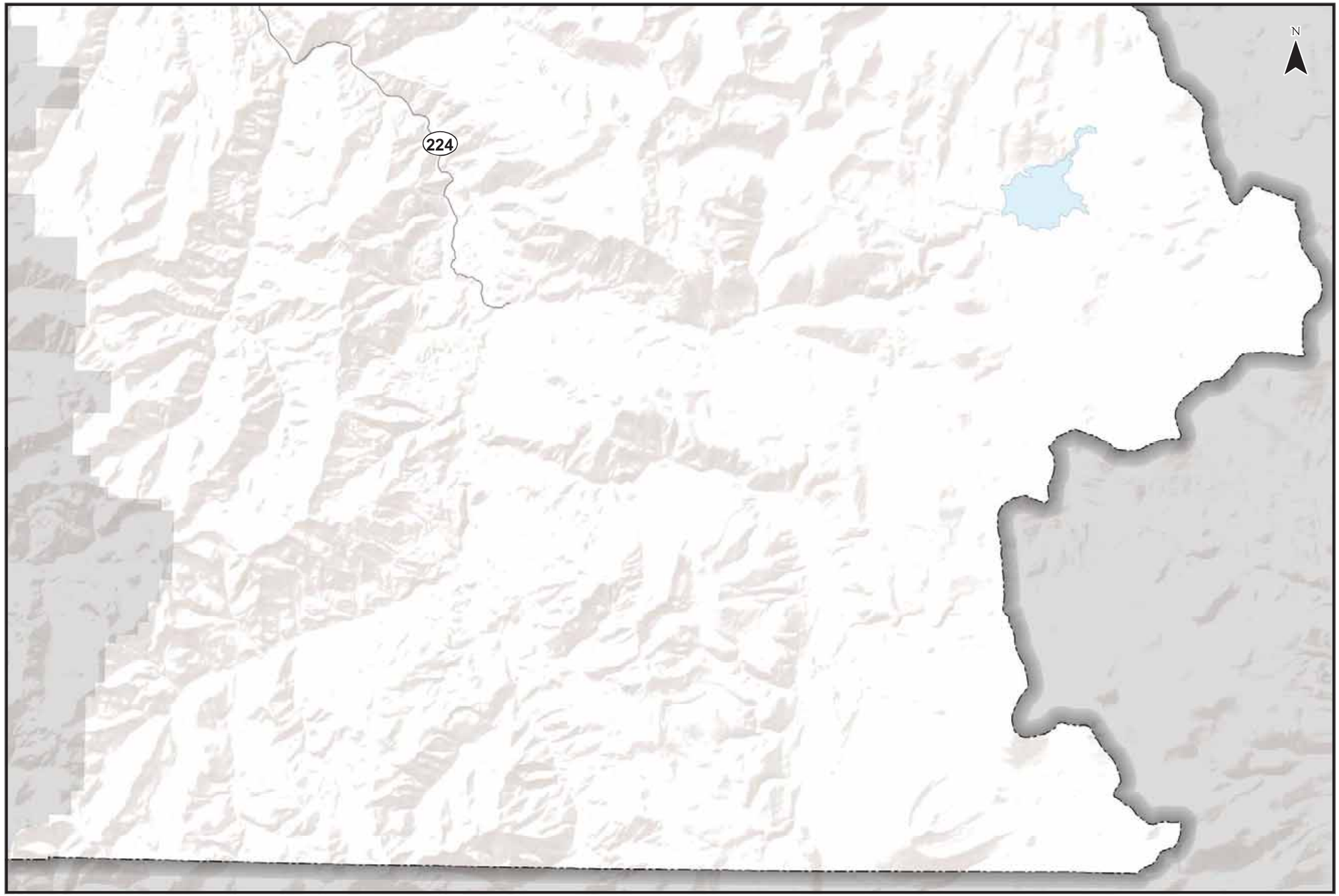
Bus Transit Providers

- Tri-Met
- SAM
- SCTD
- CAT
- MXT
- SMART

Tri-Met Rails

- MAX
- WES

- Incorporated Areas
- County Boundary
- UGB



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Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

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Transit Service
East County - Southern Portion

Figure
ES 20

Dial-a-Ride

TriMet provides dial-a-ride service to residents who are unable to use regular fixed-route services due to disabilities or disabling health conditions. The service is offered within three-fourths of a mile beyond the outermost portions of TriMet's bus and light-rail lines. Service is not offered outside TriMet's service district. This service is available 4:30 a.m. to 2:30 a.m. seven days a week.

The Sandy Transit Area Rides (STAR) dial-a-ride service operates within the Sandy area (plus a five-mile radius upon availability), Monday through Friday from 5:30 a.m. to 9:00 p.m. and Saturdays from 10:15 a.m. to 4:30 p.m. Service is not provided on Sundays. STAR is available to the general public and provides ADA complimentary paratransit services to ADA eligible individual. Reservations are made upon availability and on a first come first serve basis.

Park/Ride

There are currently four park/rides in East Clackamas County that provide people from outlying areas with a place to park their cars and ride transit. Three of the four facilities are in Sandy, while the other is in Estacada.

- Within Sandy, the Sandy Transit Operations Facility, located at 16610 Champion Way, has space for 35 vehicles and is served by SAM's Sandy Estacada Line. The two other facilities are located toward the east end of Sandy; one at Langensand and McCormick with space for 5 disabled vehicles, and the other at the Assembly of God Church on McCormick with space for more than 20 vehicles. Both facilities are served by SAM's Sandy Local/Gresham Express and Sandy Estacada Lines as well as MXT's Mountain Express Line.
- Within Estacada, the City of Estacada Park/Ride, located at 590 SE Short Street, has space for 20 vehicles and is served by the SAM's Sandy Estacada Line as well as TriMet's Line 30.

Transit level-of-Service

The transit level-of-service analysis provided below is based on the methodology described in *TCRP Report 100: Transit Capacity and Quality of Service Manual*. Refer to the Methodology/Approach section for additional information about the level-of-service measures included in the analysis.

Service Frequency

Service frequencies differ by service provider and by route. Table E 4 summarizes the transit level-of-service analysis results for service frequency. As shown, a majority of existing services currently operate at LOS F throughout the day.

Table E 4 Service Frequency Level-of-Service Analysis

Provider	Routes	Service Frequency (Min)	LOS
TriMet	Line 30	30-60-minutes[1]	D-F
TriMet	Line 84	>60-minutes[2]	F
SAM	Sandy Local/Gresham Express	30-minutes[1]	C
SAM	Sandy Estacada	>60-minutes[2]	F
MXT	Mountain Express	>60-minutes[1]	F

1. Service is less frequent on Saturday or Sunday.
2. No service is provided on Saturday or Sunday.

Hours of Service

The total number of hours transit service is provided differs by service provider and by route. Table E 5 summarizes the transit level-of-service analysis results for hours of service. As shown, a majority of existing services currently operate at LOS C or below.

Table E 5 Hours of Service Level-of-Service Analysis

Provider	Routes	Hours of Service	LOS
TriMet	Line 30	14-hours[1]	C
TriMet	Line 84	2-hours[2]	F
SAM	Sandy Local/Gresham Express	15-Hours[1]	C
SAM	Sandy Estacada	4-hours[2]	E
MXT	Mountain Express	8-hours[1]	E

1. Service is less frequent on Saturday or Sunday.
2. No service is provided on Saturday or Sunday.

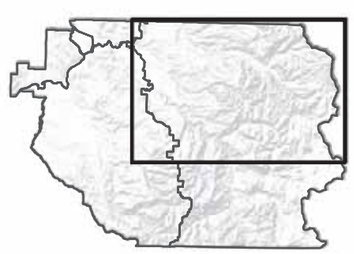
Service Coverage

0 displays the transit level-of-service analysis results for service coverage within East Clackamas County. The results indicate that there are currently no transit supportive areas within East Clackamas County in terms of household or employment density. This does not suggest that the existing transit services currently provided are not warranted; rather the combination of park/rides in the more populated areas with express routes to major transit centers is the most appropriate level-of-service coverage for this type of area. In addition, many of the areas that currently have transit service are shown in Figure E 9 as containing a large portion of the transportation disadvantaged population within East Clackamas County. Transit service to these areas is an important part of the community.

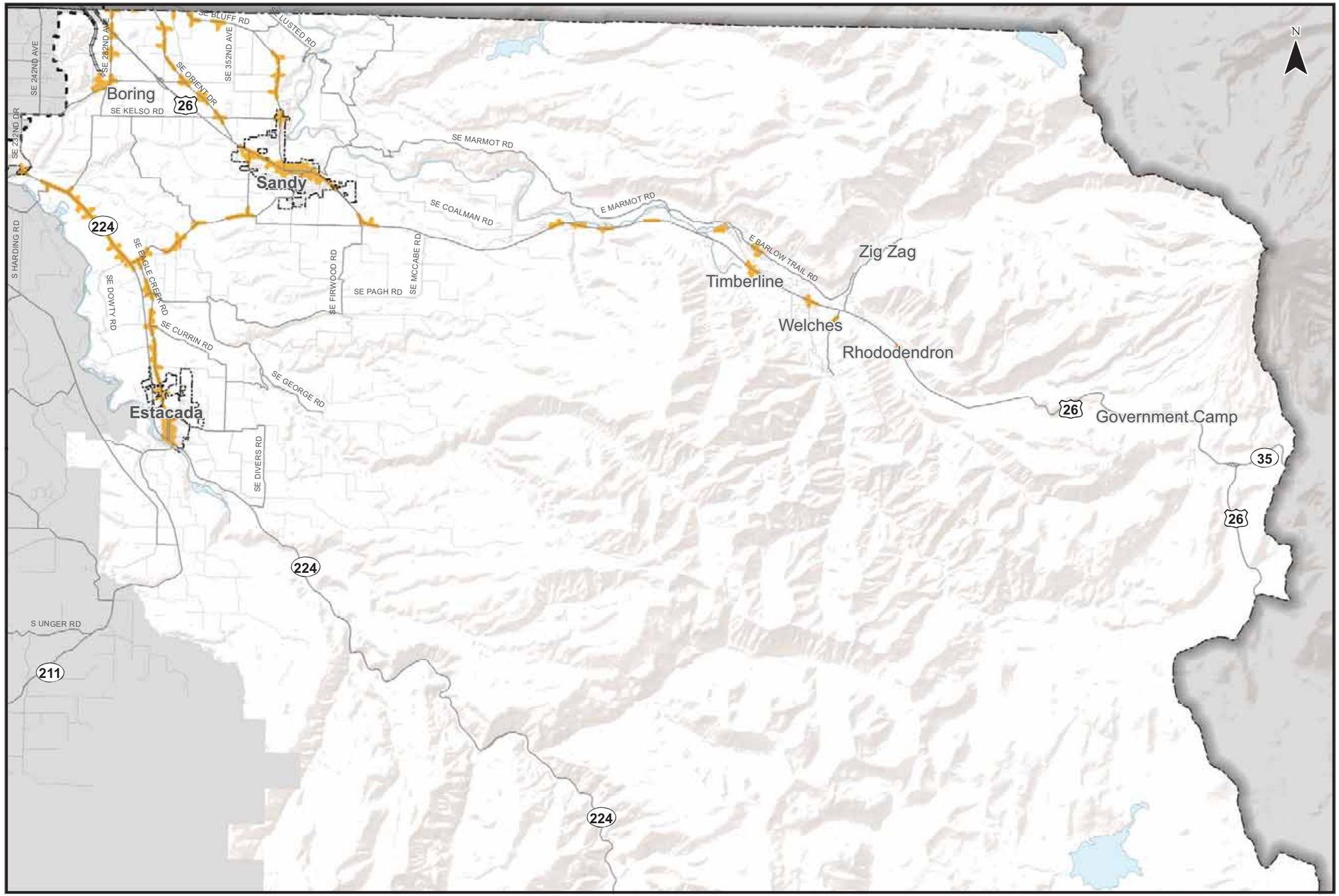
Future Transit Service Coverage

The future transit level-of-service analysis assumes that existing service frequencies, service hours, and service coverage are the same in the future. The only difference is the population and employment growth assumptions included in the regional traffic model and the resulting transit supportive areas and transit supportive areas served. Figure E 22 displays the transit level-of-service analysis results for service coverage. The results indicate that there are no transit supportive areas expected within East Clackamas County in 2035 and that service focused on park/rides will continue to be the appropriate service strategy in the future.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



- Transit Supportive Areas Served
- Transit Supportive Areas
- Transit Service Areas
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Existing Transit Supportive Areas
East County - Northern Portion

Figure
EN 21

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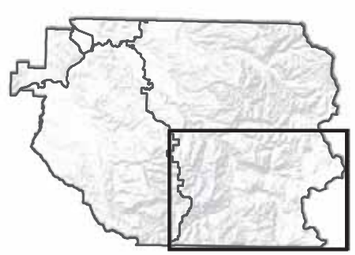
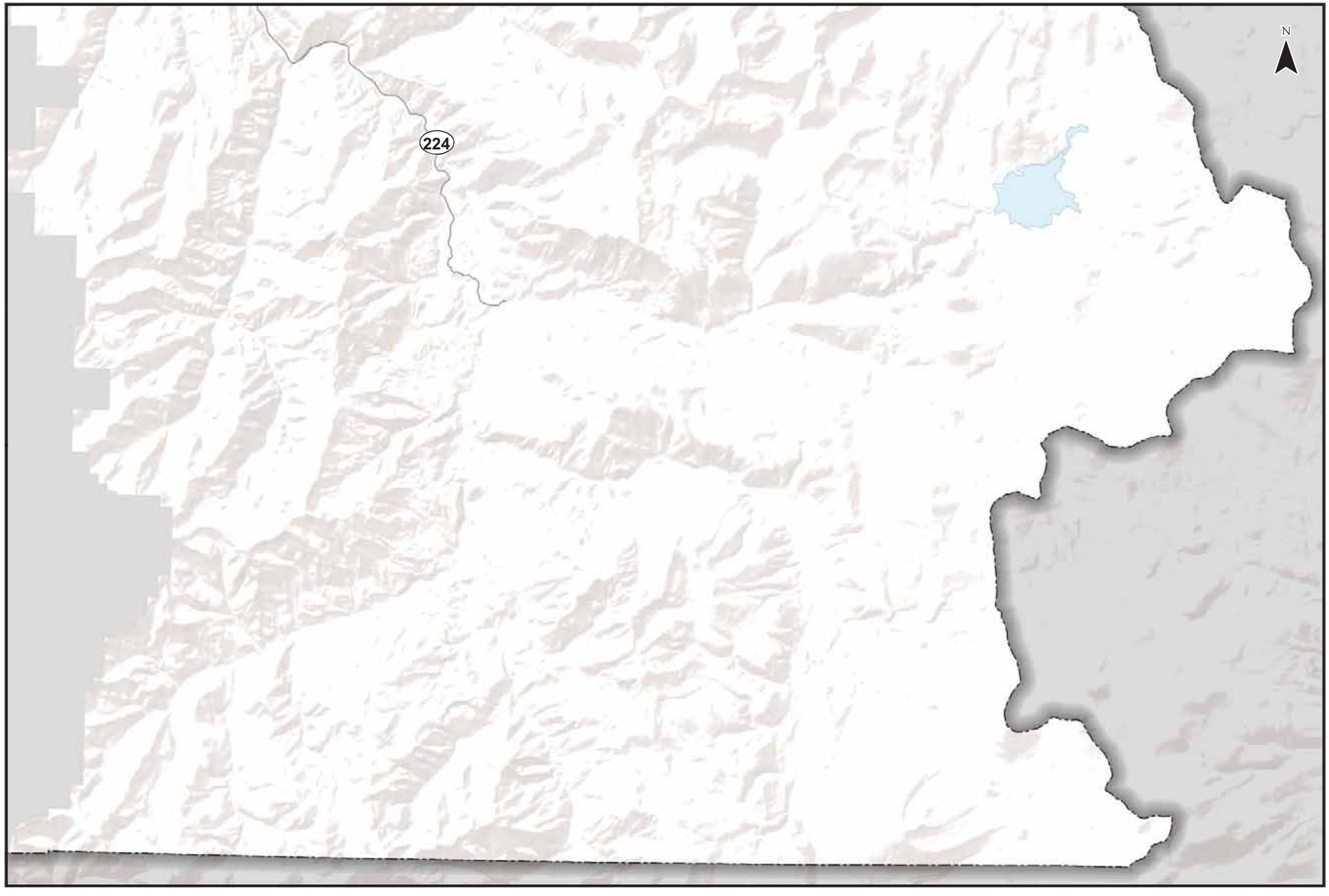
CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN Update



- Transit Supportive Areas Served
- Transit Supportive Areas
- Transit Service Areas
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center

Existing Transit Supportive Areas
East County - Southern Portion

Figure
ES 21

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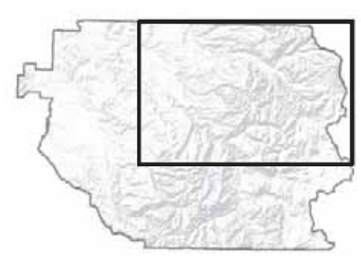
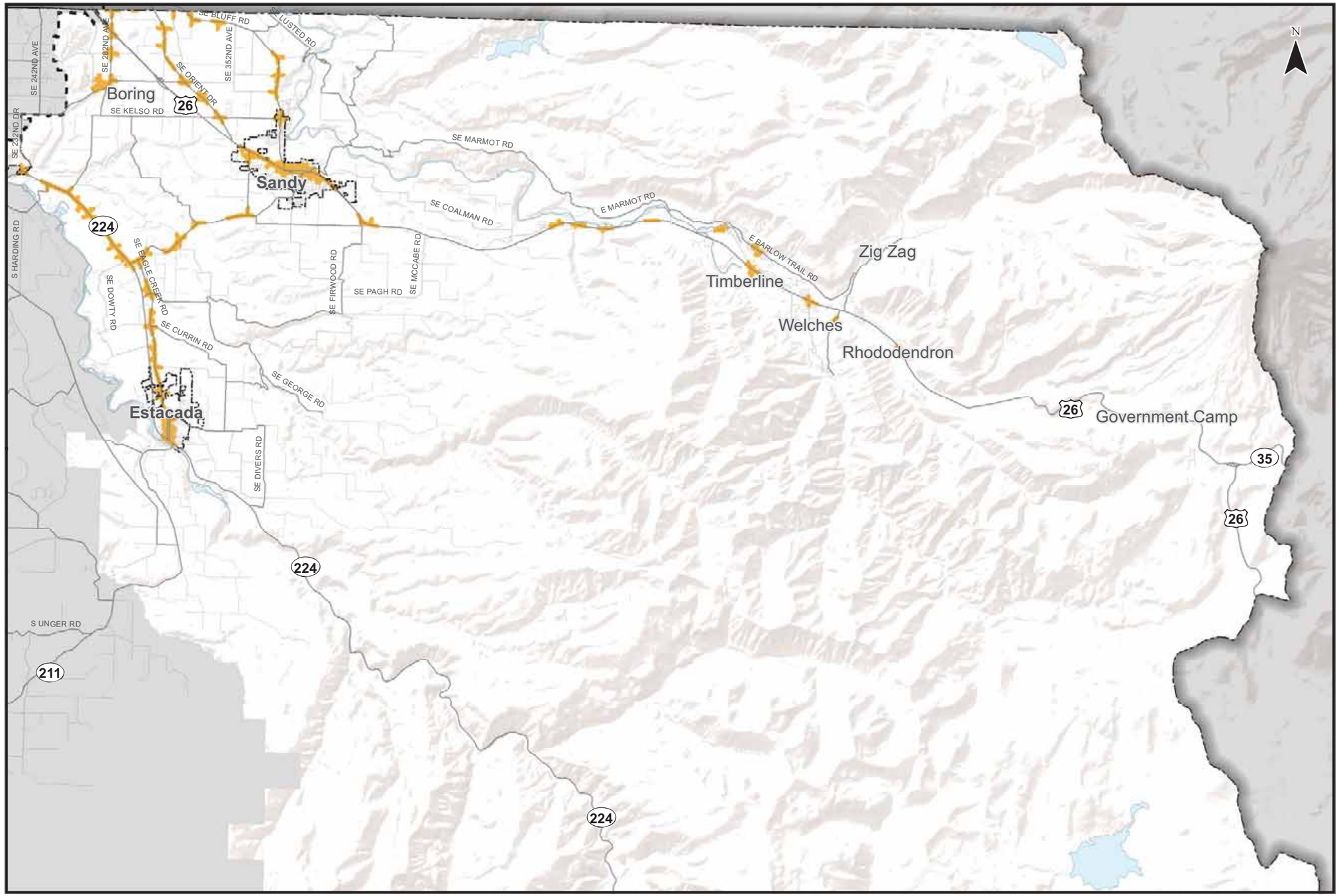
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



- Transit Supportive Areas Served
- Transit Supportive Areas
- Transit Service Areas
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

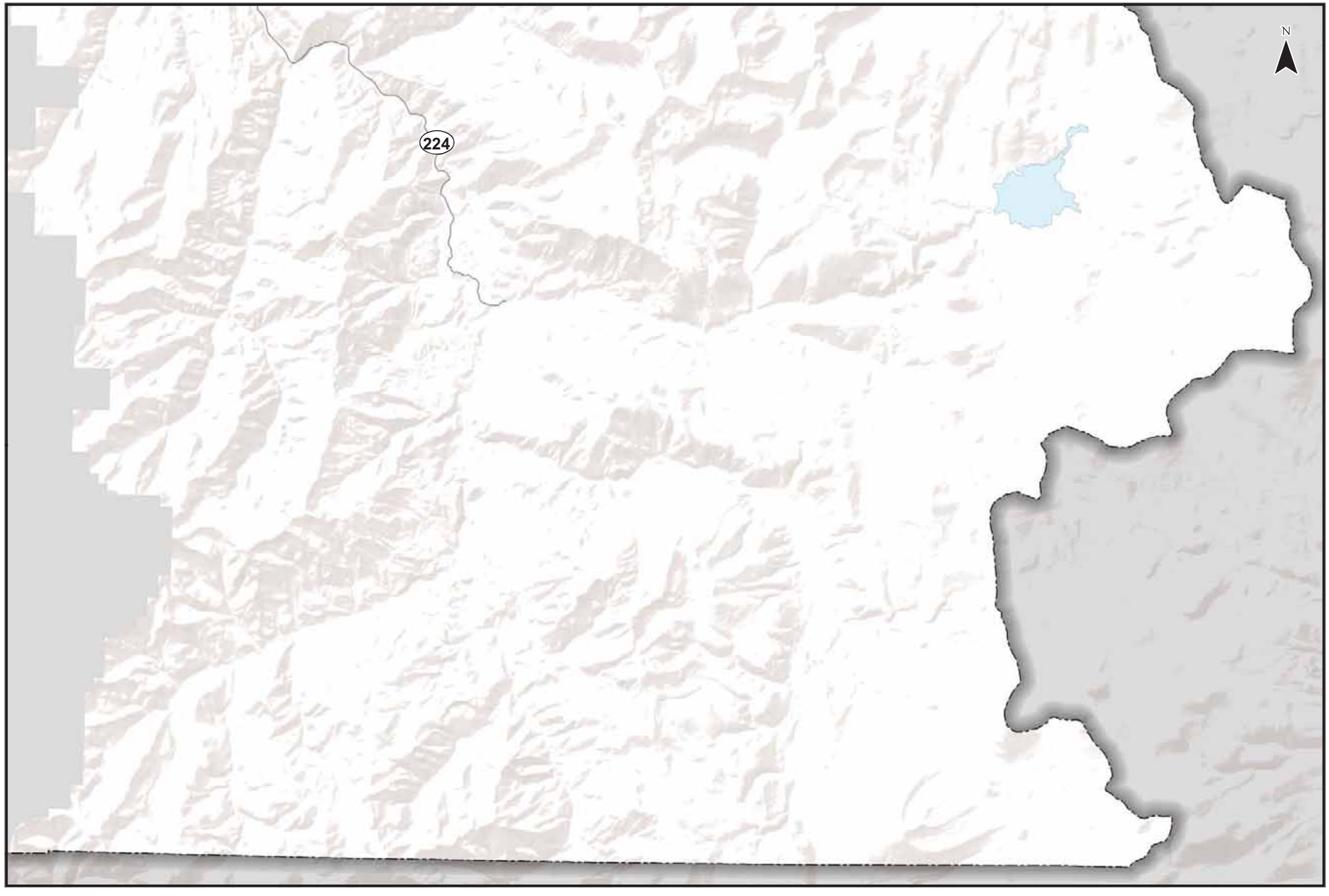
Future Transit Supportive Areas
East County - Northern Portion

Figure
EN 22

H:\proffile\11732 - Clackamas County TSP\gis\11x17 Maps\22 Future Transit Supportive Areas.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

- Transit Supportive Areas Served
- Transit Supportive Areas
- Transit Service Areas
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Future Transit Supportive Areas
East County - Southern Portion

Figure
ES 22

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\22 Future Transit Supportive Areas.mxd

CRASH ANALYSIS

The existing conditions crash analysis considered:

1) Locations within the County identified as safety priorities by the Oregon Department of Transportation;
2) Primary crash types contributing to the majority of serious injury and fatal crashes in the County; and
3) Specific safety focus intersections identified by County staff.

See *Section 3 Assumptions and Methods* for a description of the crash analysis methodology.

Figure E 23 below illustrates the reported crashes in the East County area from 2007 through 2010. The following sub-sections take a closer look at the reported crash data to identify the historic trends and patterns that have contributed to the majority of fatal and serious injury crashes.

Statewide Safety Priority Locations

ODOT identifies top safety priority locations annually using a Statewide Priority Index System (SPIS). The locations in the top 5% and 10% are those that have historically experienced a higher number and/or higher severity of crashes. These locations are referred to as SPIS locations or SPIS sites. Clackamas County applies the same methodology as ODOT to County roadways to identify the top 20 to 25 locations on which to focus safety reviews and improvements.

Figure E 24 identifies the ODOT and Clackamas County SPIS locations within East County. There are several SPIS locations, including portions of US 26 through Sandy and northwest of Sandy as well as OR 224 around the intersection of SE Ammisigger Road. Forthcoming TSP update reports will explore potential projects, studies, programs and/or policies to reduce crashes at these locations.

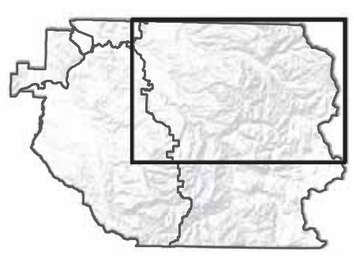
Primary Crash Types Contributing to Serious Injury and Fatal Crashes

The following sub-sections and figures display the locations of the crash types that historically have led to the majority of serious injury and fatal crashes. As discussed in *Section 3 Assumptions and Methods*, these crash types are:

- Roadway Departure Crashes;
- Crashes Involving Young Drivers (ages 15 through 25 years old); and
- Crashes Involving Aggressive Driving (driving too fast, following too close).

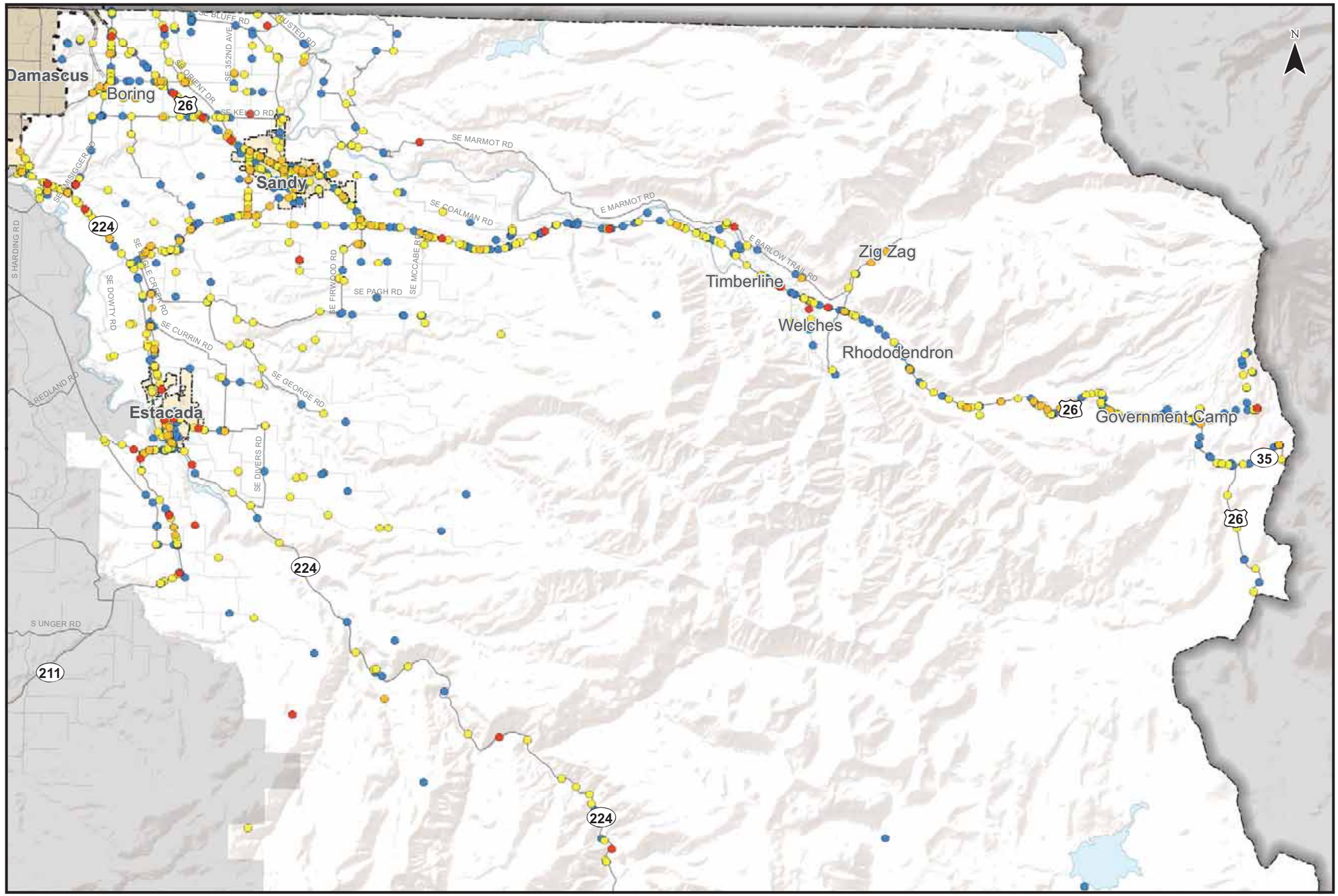
In addition to the three crash types above, crashes involving pedestrian and bicyclists are also considered. While the overall occurrence of crashes involving pedestrians and bicyclists may not be as high as other crash types, when those crashes do occur they often result in serious injuries or fatalities because pedestrians and bicyclists are more vulnerable than people traveling in motorized vehicles.

CLACKAMAS COUNTY Transportation System Plan Update



Reported Crashes
2007 Through 2010

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Reported Crashes 2007-2010
East County - Northern Portion

Figure
EN 23

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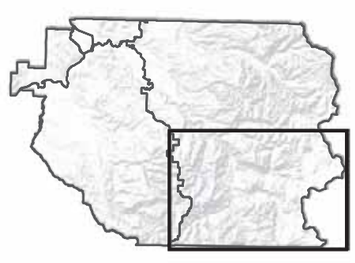
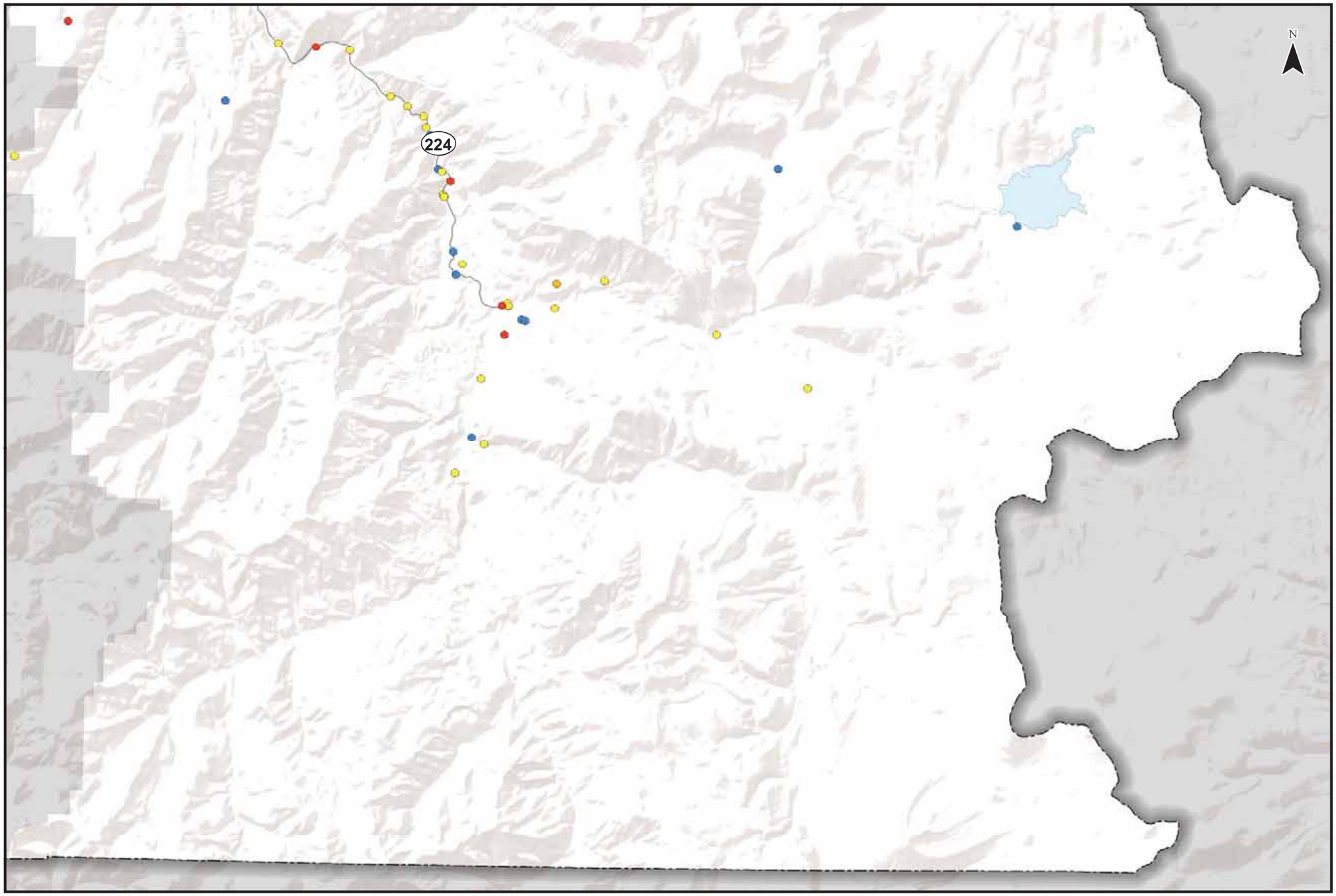
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Reported Crashes
2007 Through 2010

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Reported Crashes 2007-2010
East County - Southern Portion

Figure
ES 23

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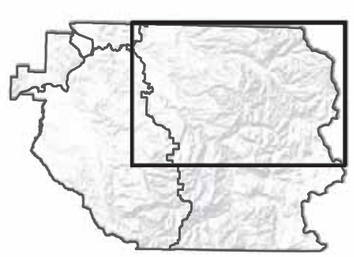
CLACKAMAS COUNTY Transportation System Plan Update



County SPIS Sites

ODOT SPIS Sites

- 5% Site
- 10% Site

Functional Classifications

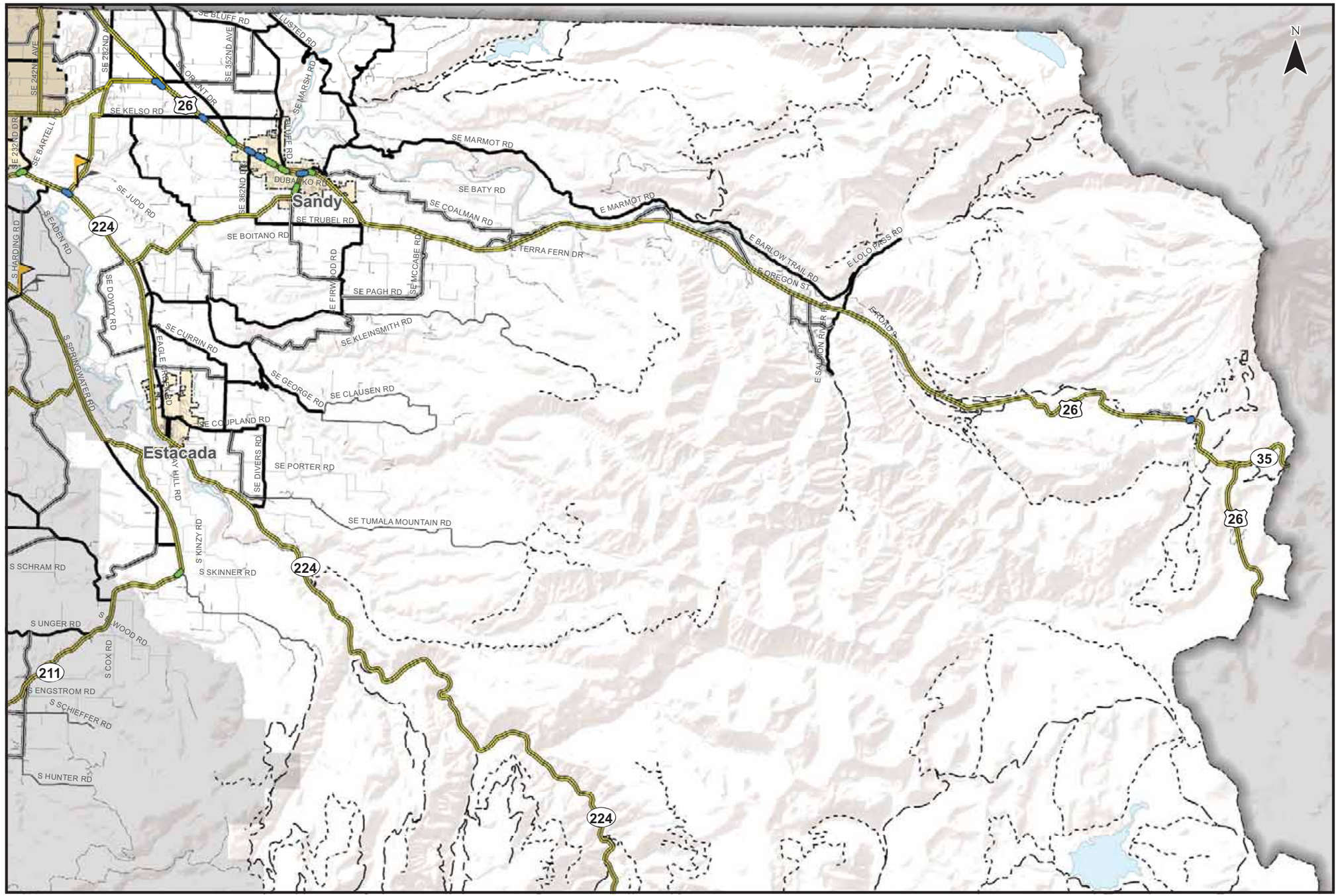
- Freeway
- Expressway
- Major Arterial
- Minor Arterial
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroad

- Incorporated Areas
- County Boundary
- UGB

On an annual basis, the Oregon Department of Transportation identifies safety priority locations through their Statewide Priority Index System (SPIS). The SPIS process identifies locations for review and potential improvements based on their crash history. SPIS locations listed in the top 5% and top 10% represent locations that have historically experienced a higher number and/or higher severity of crashes than other locations in the state.

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center



Statewide Priority Index System Locations
East County - Northern Portion

Figure
EN 24

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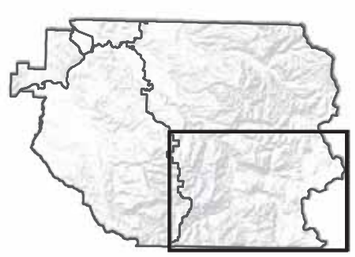
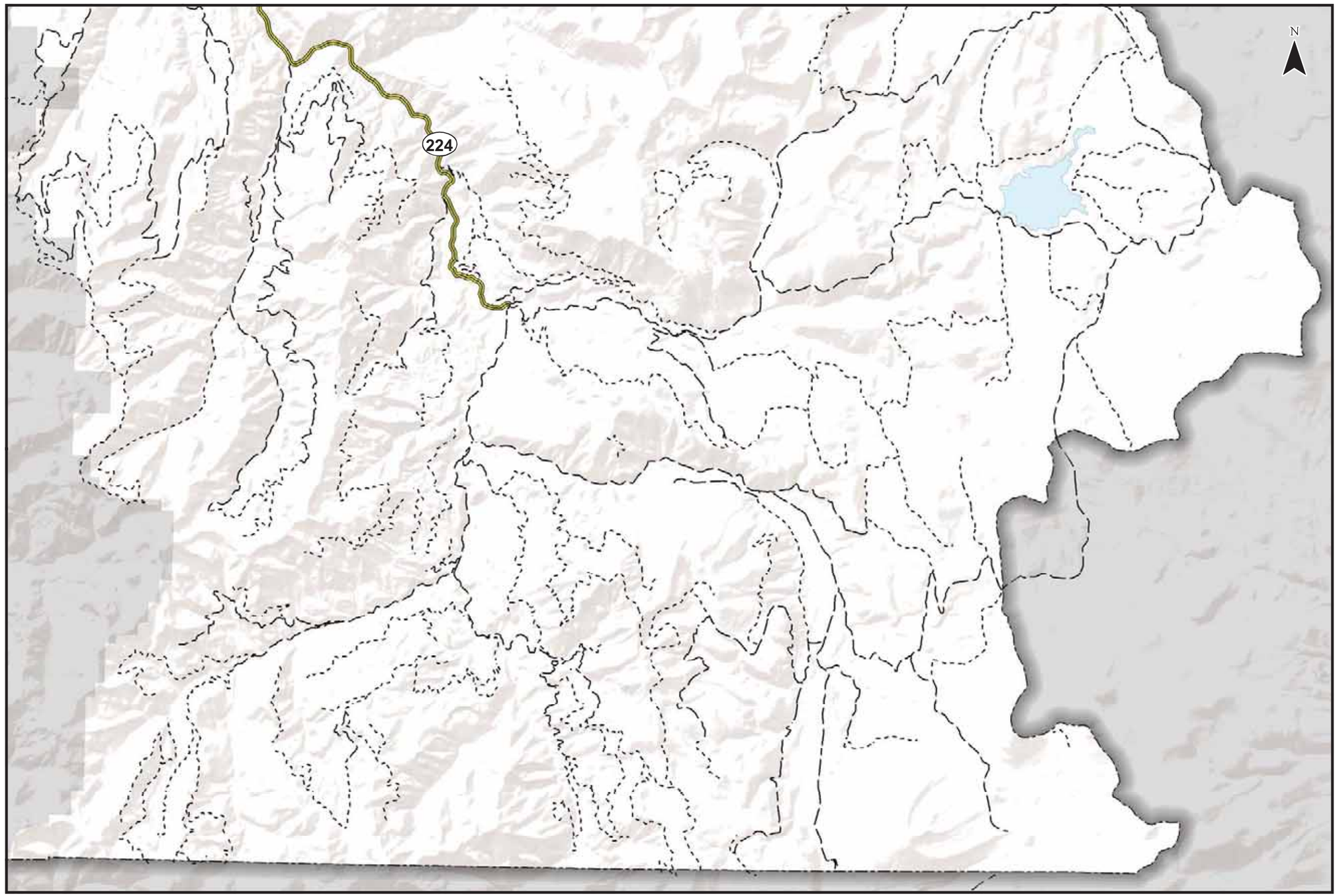
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update





County SPIS Sites

ODOT SPIS Sites

- 5% Site
- 10% Site

Functional Classifications

- Freeway
- Expressway
- Major Arterial
- Minor Arterial
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroad
- Incorporated Areas
- County Boundary
- UGB

On an annual basis, the Oregon Department of Transportation identifies safety priority locations through their Statewide Priority Index System (SPIS). The SPIS process identifies locations for review and potential improvements based on their crash history. SPIS locations listed in the top 5% and top 10% represent locations that have historically experienced a higher number and/or higher severity of crashes than other locations in the state.

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Statewide Priority Index System Locations
East County - Southern Portion

Figure
ES 24

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The purpose of this assessment is to identify candidate safety corridors for the County to study and evaluate in greater detail. A candidate safety corridor is a series of roadway segments and intersections that have experienced higher frequencies of roadway departure crashes, crashes involving young drivers, and crashes involving aggressive driving. From the analysis presented below, the following corridors (listed in no particular order) in the East County Area emerged as candidate safety corridors:

1. SE 282nd Avenue from US 26 to SE Richey Road
2. OR 211 (Eagle Creek-Sandy Highway) from OR 224 to eastbound US 26
3. US 26 from SE Kelso Road to Duncan Road
4. US 26 from Duncan Road to SE Langensand Road
5. US 26 from SE Firwood Road to E Sleepy Hollow Drive
6. US 26 from Rhododendron, OR to Highway 35
7. SE Eagle Creek Road from SE Firwood Road to NE 6th Avenue
8. OR 211 (Woodburn-Estacada Highway) from OR 224 to S Hillcockburn Road
9. OR 224 from SE 232nd to OR 211 (Eagle Creek – Sandy Highway)
10. OR 224 from Fish Creek Road to National Forest Road 46

A few of the corridors identified above extend into incorporated areas; collaboration with partner agencies may be needed to study those corridors. Potential corridors completely within an incorporated area are not identified here because they are considered the responsibility of the corresponding city.

Figure E 25 illustrates the location of these corridors.

Roadway Departure Crashes, Crashes Involving Young Drivers, and Crashes Involving Aggressive Driving

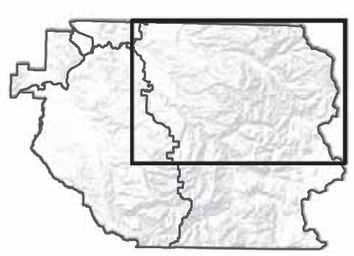
Roadway departure crashes, crashes involving young drivers and crashes involving aggressive driving were mapped in two ways. First, each crash type was mapped and assessed separately to identify corridors where each crash type has occurred. Second, the serious injury and fatal crashes for each of those crash types were also mapped together to consider where the crash types over lap and focus attention on serious injury and fatal crashes. The results of both mapping exercises informed the candidate safety corridors listed above.

Figure E 26 illustrates the roadway departure crashes in East County.

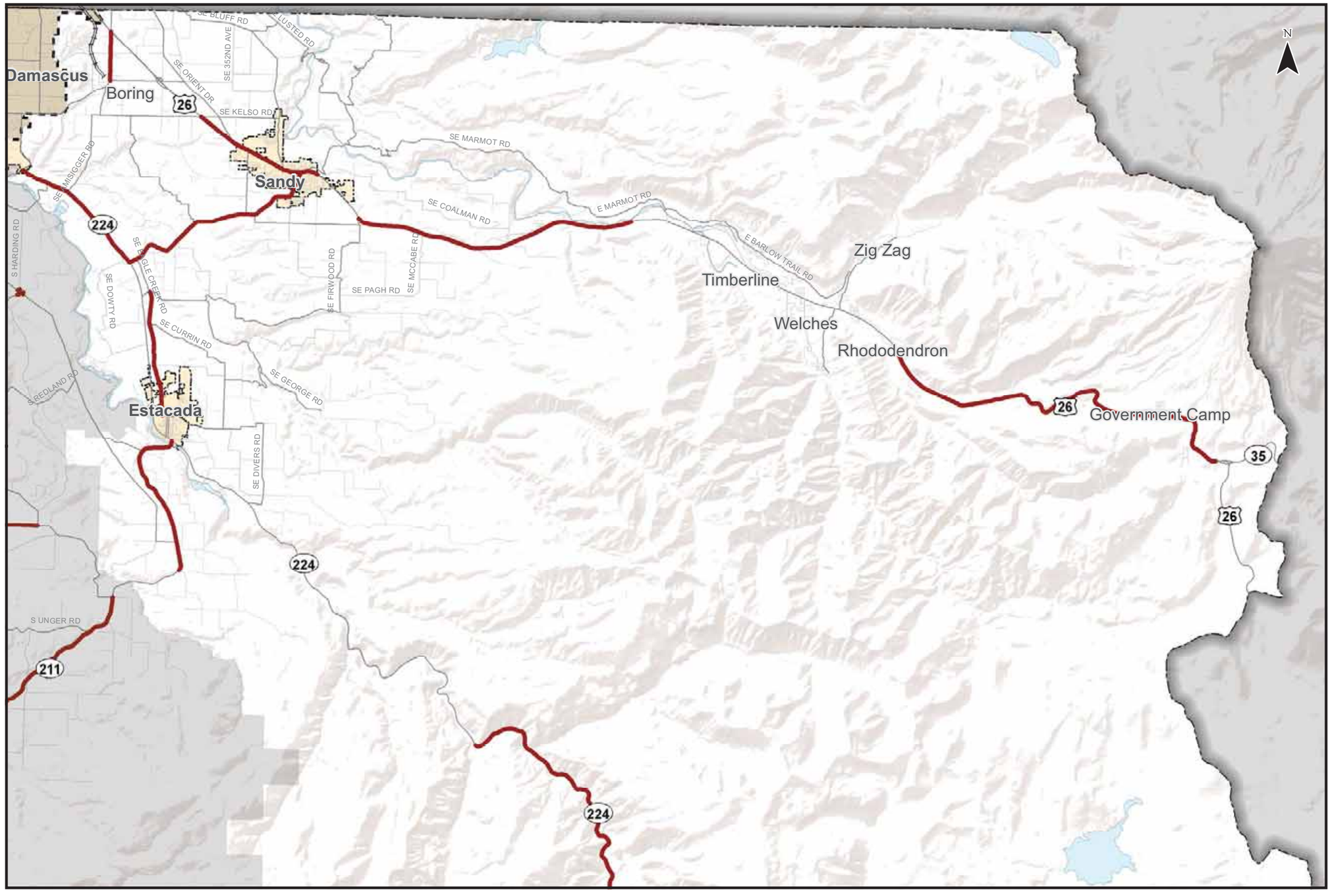
The roadway departure crashes have occurred on OR 224, OR 211, US 26, and SE 282nd. The portions of these facilities with a higher frequency of serious injury and fatal crashes are included in the candidate safety corridors listed above.

Figure E 27 illustrates the crashes involving young drivers in East County. Young drivers are defined as drivers age 15 through 25 years old.

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN



- Candidate Safety Corridors
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Candidate Safety Corridors
East County - Northern Portion

Figure
EN 25

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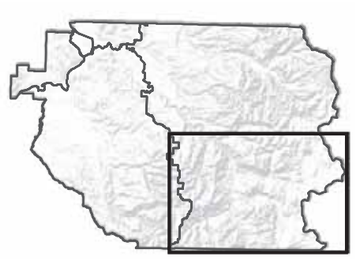
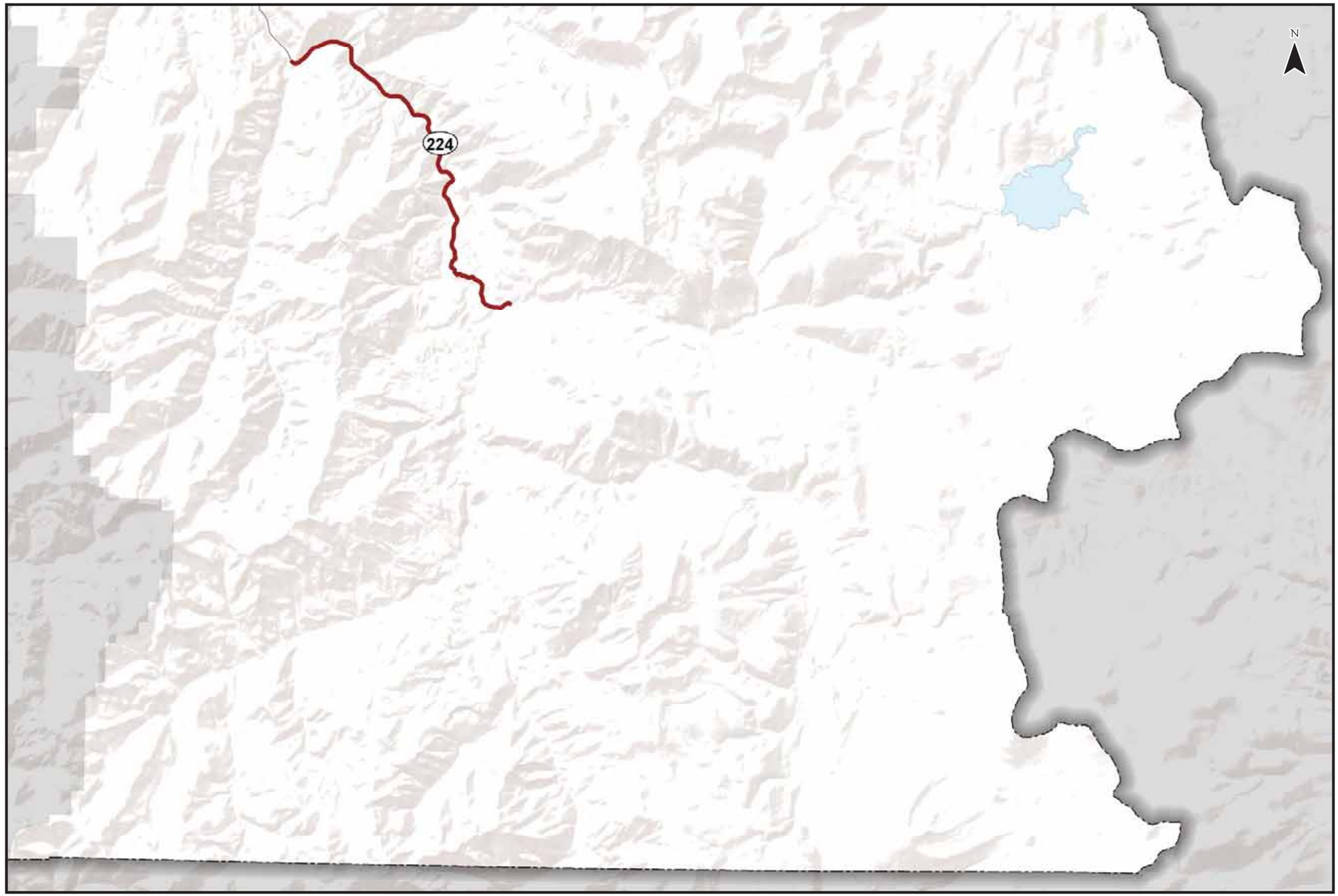
CLACKAMAS COUNTY Transportation System Plan Update





- Candidate Safety Corridors
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Candidate Safety Corridors
East County - Southern Portion

Figure
ES 25

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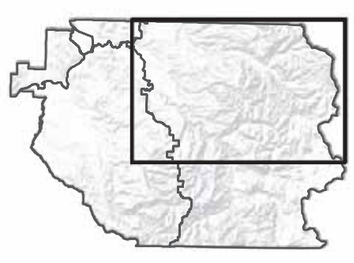
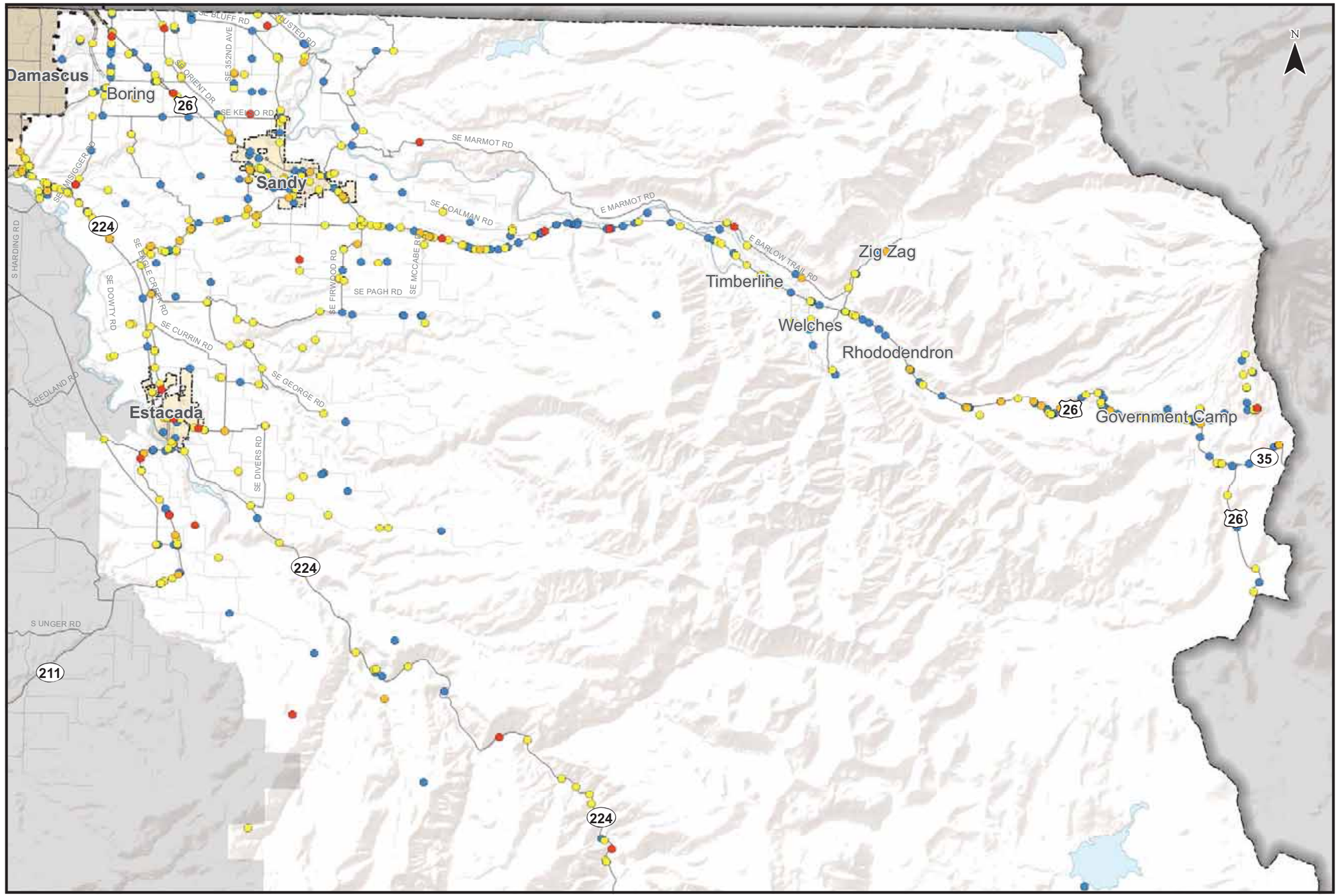
CLACKAMAS COUNTY Transportation System Plan Update



Roadway Departure Crashes

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Roadway Departure Crashes 2007-2010
East County - Northern Portion

Figure
EN 26

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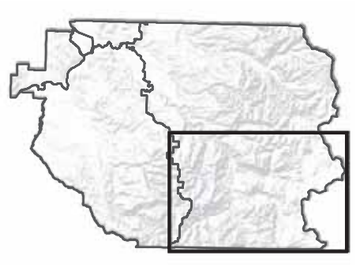
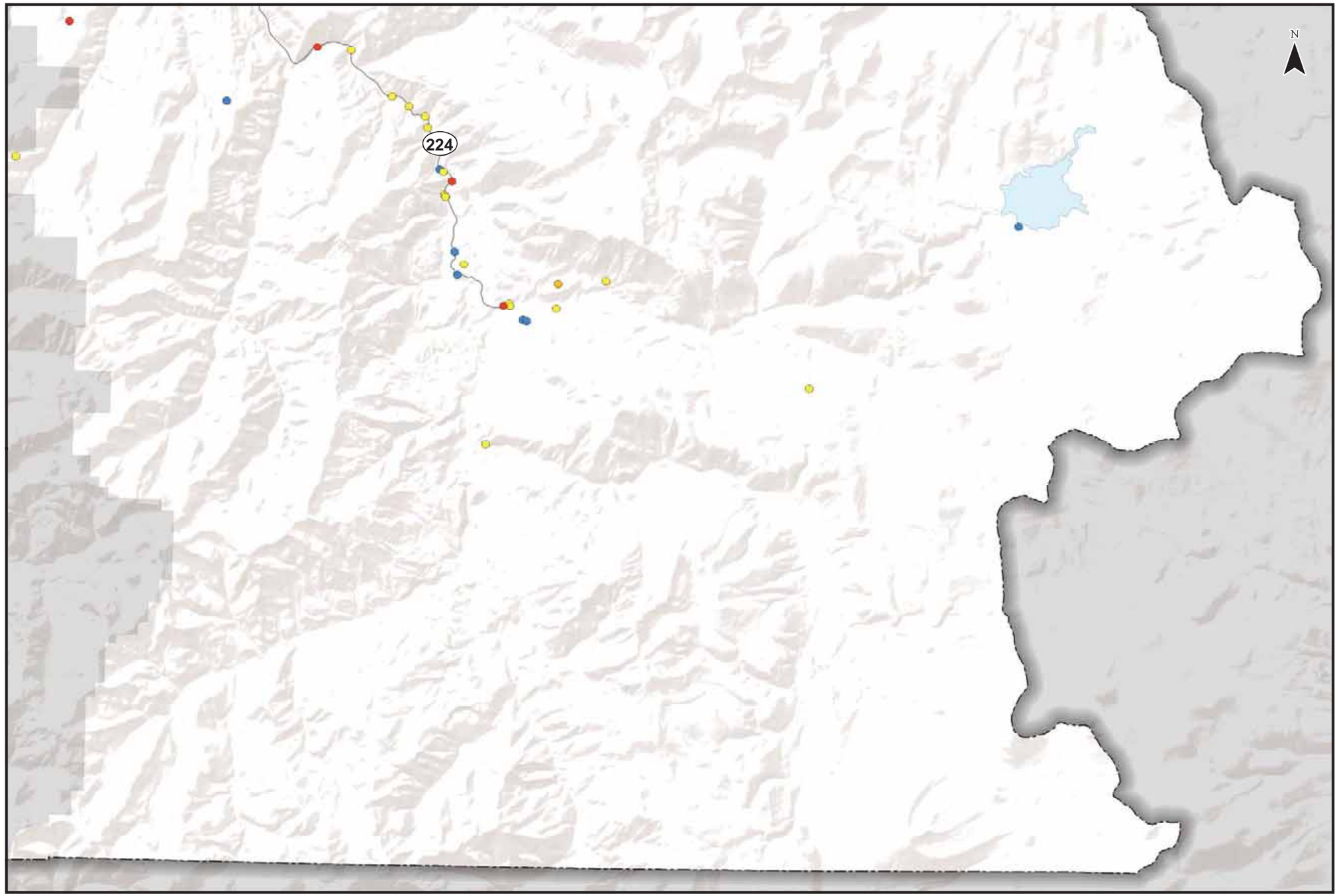
CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN Update



Roadway Departure Crashes

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Roadway Departure Crashes 2007-2010
East County - Southern Portion

Figure
ES 26

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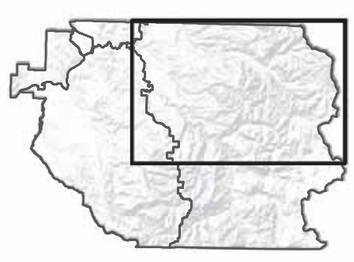
CLACKAMAS COUNTY Transportation System Plan Update



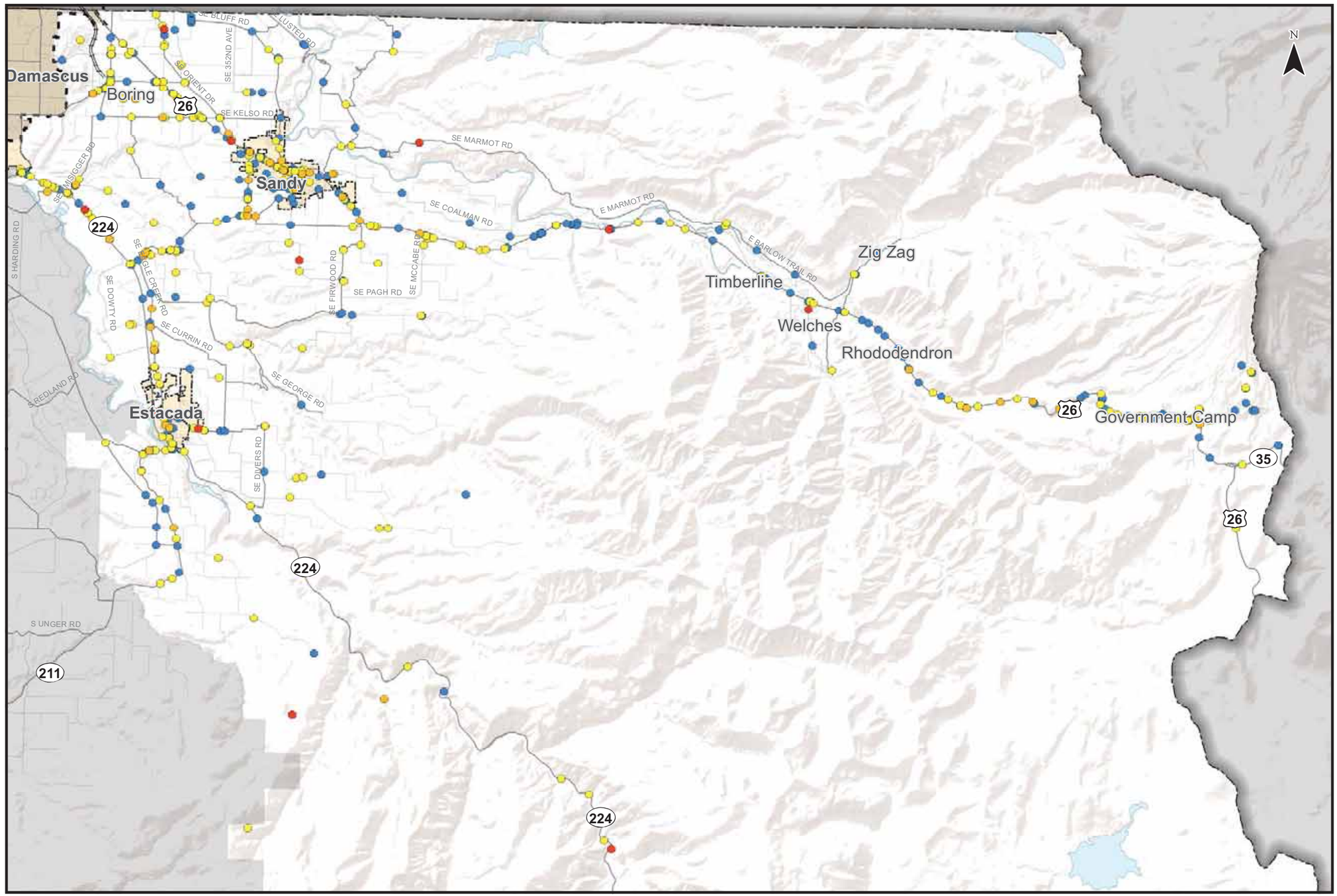
Crashes Involving Young Drivers (15-25 Years Old)

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash

Incorporated Areas

County Boundary

UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Young Drivers (15-25 Years Old) 2007-2010
East County - Northern Portion

Figure
EN 27

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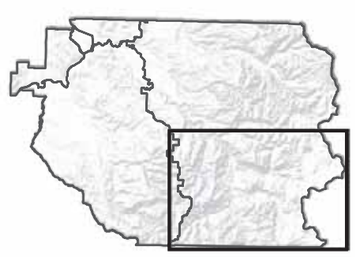
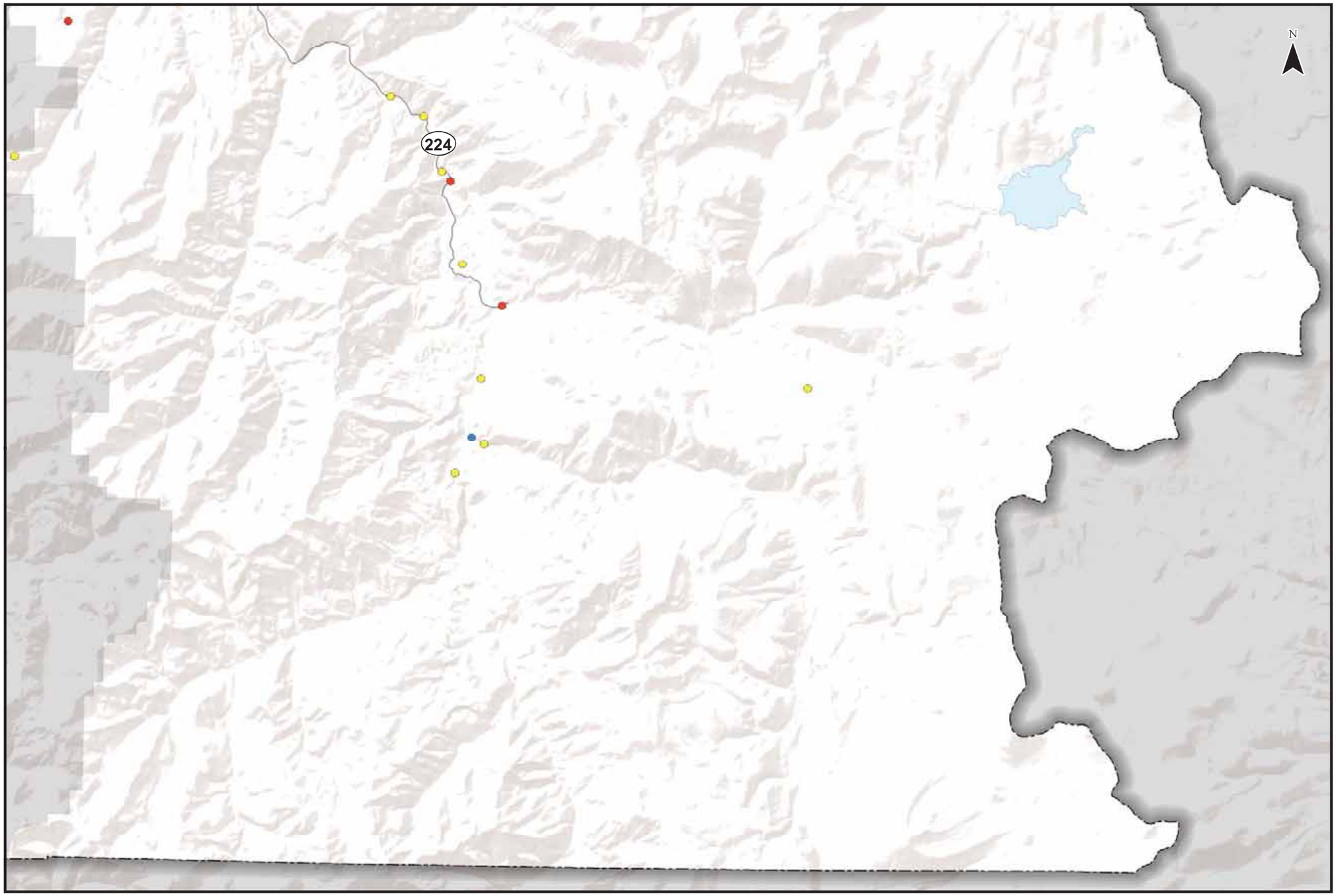
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Young Drivers (15-25 Years Old)

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Young Drivers (15-25 Years Old) 2007-2010
East County - Southern Portion

Figure
ES 27

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\27 Crashes Involving Young Drivers (15-25 Years Old).mxd

The location of these crashes reinforces the candidate safety corridors listed above. The three areas that are most noticeable with regards to crashes involving younger drivers are in Estacada, Sandy, and US 26 extending from approximately Rhododendron to the Government Camp area.

Figure E 28 illustrates crashes involving aggressive driving. Aggressive driving includes vehicles traveling too fast for conditions, exceeding the posted speed, and following too closely. The locations of crashes involving aggressive driving reinforce the candidate safety corridors noted above particularly the corridor east of Sandy and west of the Villages at Mt. Hood.

Figure E 29 illustrates serious injury and fatal crashes that were roadway departure crashes, involved young drivers, and/or involved aggressive driving.

The purpose of these figures is to help focus on the corridors where serious injury and fatal crashes have occurred. The previous figures reinforced the corridor selection based on the overall frequency of crashes. These figures help confirm the candidate safety corridors are incorporating areas with a history of serious injury or fatal crashes.

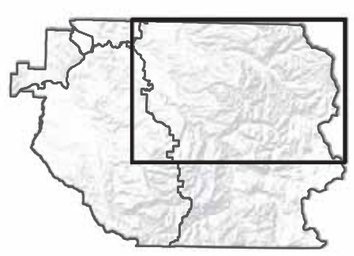
Crashes Involving Pedestrians or Bicyclists

In rural areas, crashes involving in pedestrians and bicyclists are a small proportion of total reported crashes because of the lower volumes of pedestrians and bicyclists using the roadway. These two crash types are considered here to confirm that the candidate safety corridors incorporate areas where pedestrian and bicycle crashes have occurred and the potential for specific pedestrian and bicycle safety focus areas.

Figure E 30 and Figure E 31 illustrate crashes involving pedestrians and bicyclists.

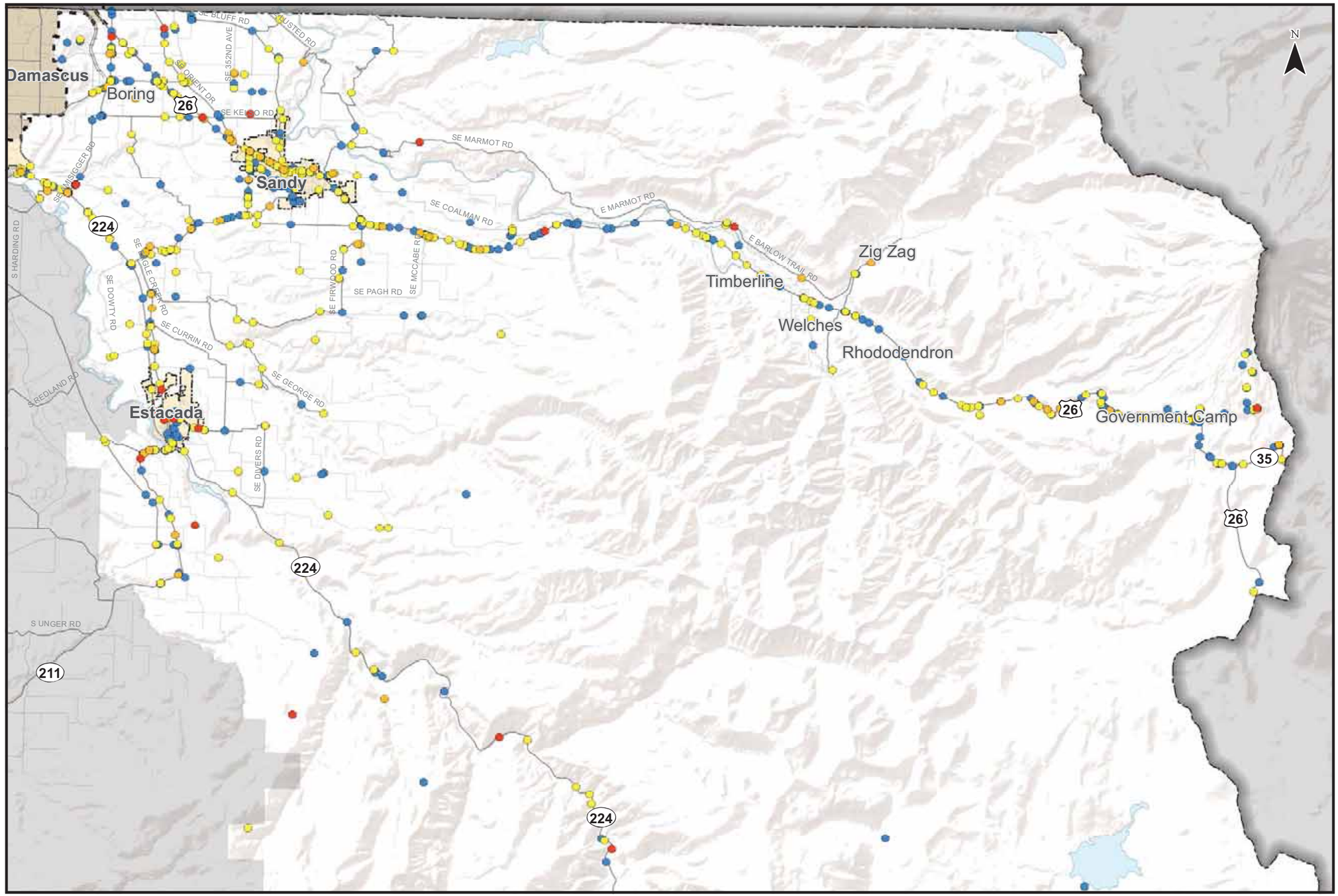
The pedestrian and bicycle crashes within East County from 2007 through 2010 have predominately occurred in the more urbanized areas of Sandy and Estacada. This is consistent with what is expected given pedestrian and bicycle activity is higher in urban areas. The primary roadways within Sandy and Estacada are included in the candidate safety corridors above.

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Aggressive Driving

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Aggressive Driving 2007-2010
East County - Northern Portion

Figure
EN 28

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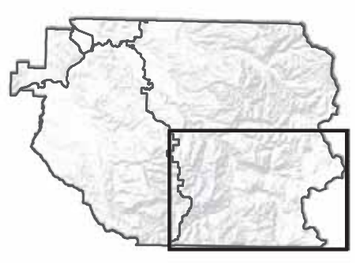
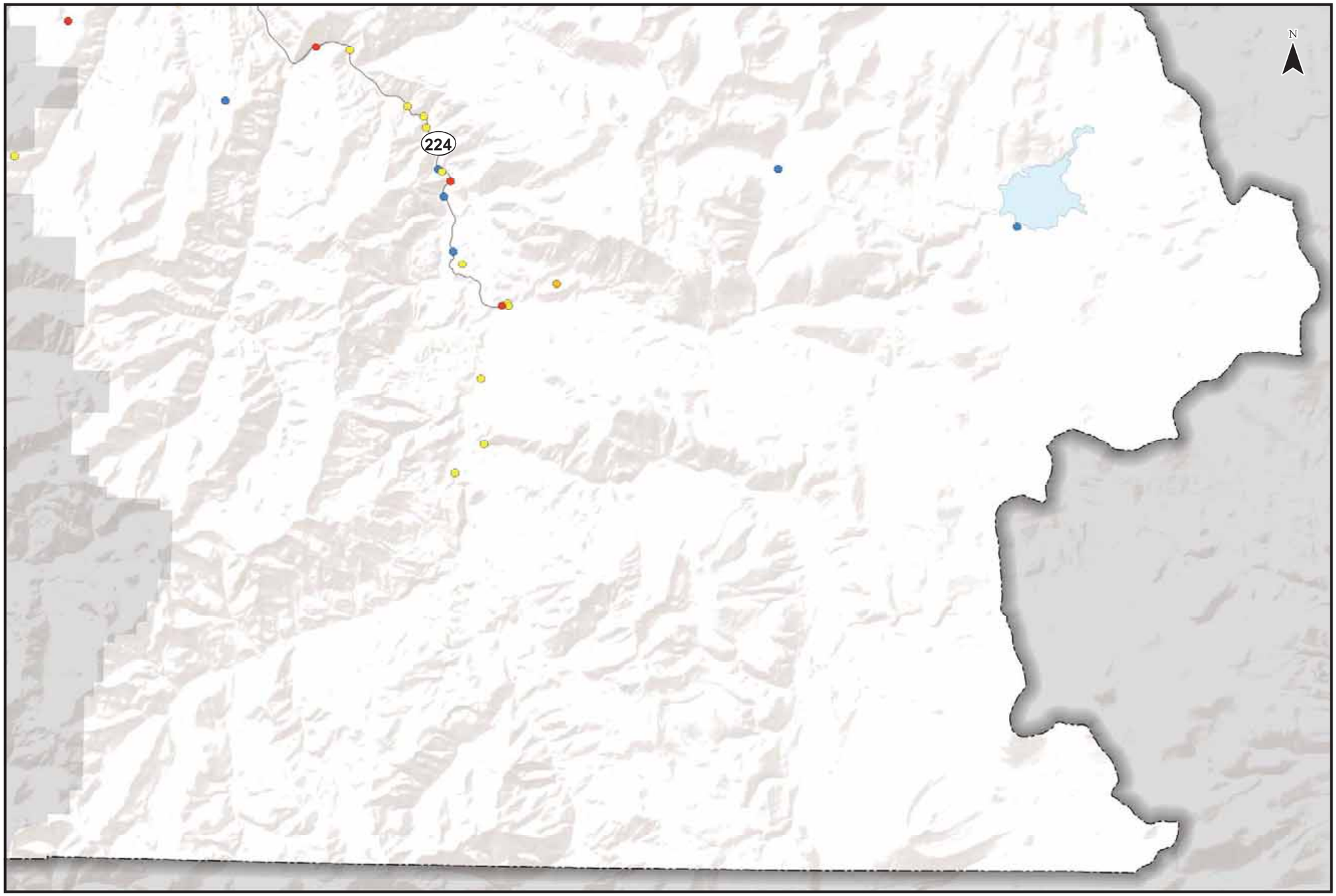
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Aggressive Driving

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
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Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Aggressive Driving 2007-2010
East County - Southern Portion

Figure
ES 28

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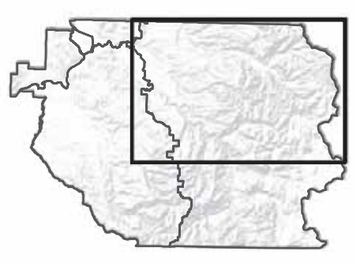
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Roadway Departure Crashes

- Fatal Crash
- Serious Injury Crash

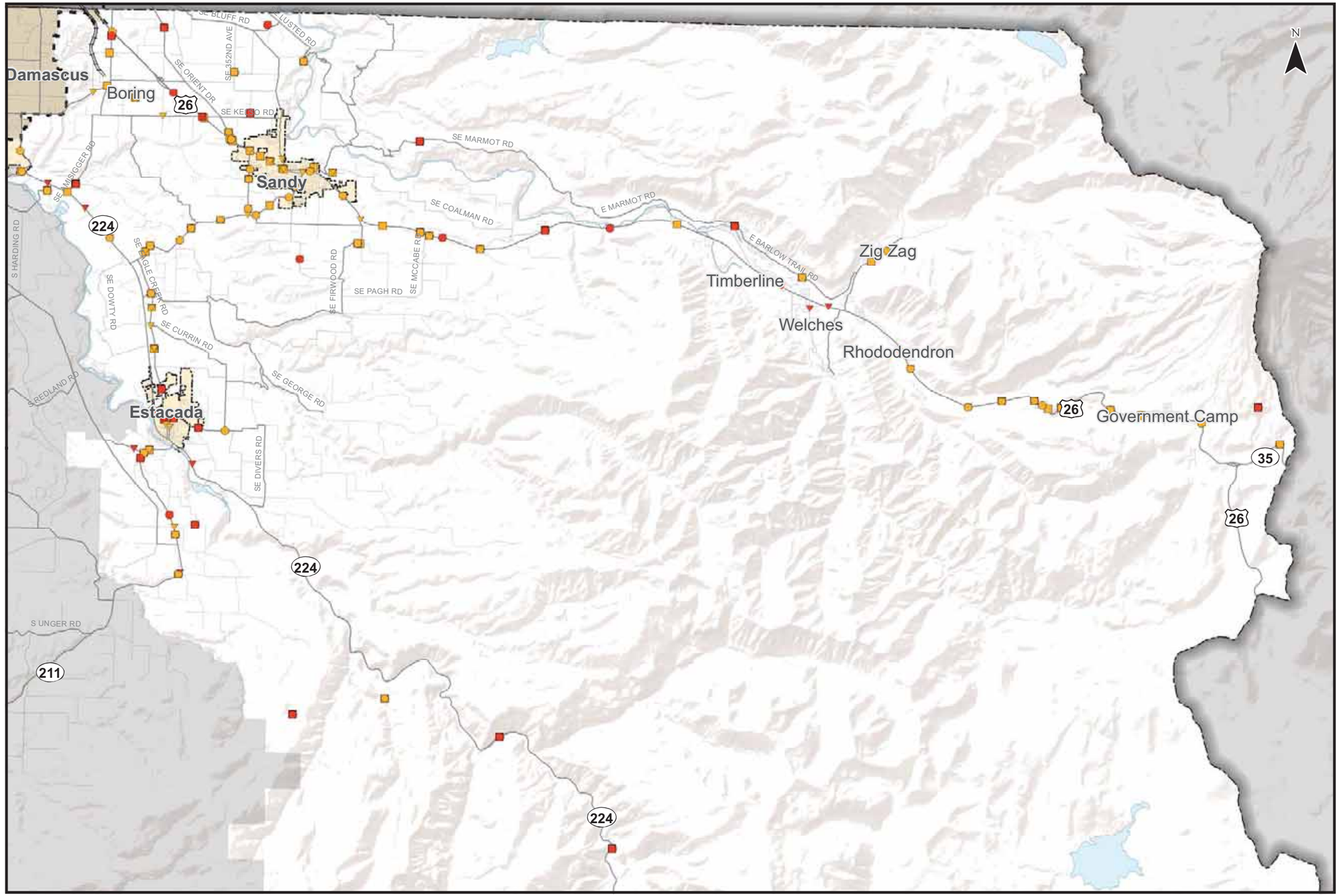
Crashes Involving Young Drivers (15-25 Years Old)

- Fatal crash
- Serious Injury Crash

Aggressive Driving Crahses

- Fatal Crash
- Severe Injury Crash

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

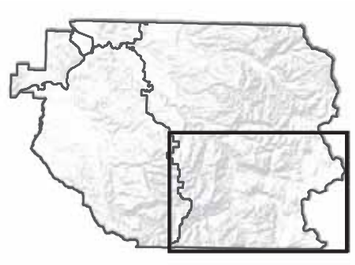
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Fatal & Serious Injury, Roadway Departure, Young Driver & Aggressive Driving Crashes East County - Northern Portion

Figure
EN 29

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\29 Fatal & Serious Injury, Roadway Departure, Young Driver & Aggressive Driving Crashes.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Roadway Departure Crashes

- Fatal Crash
- Serious Injury Crash

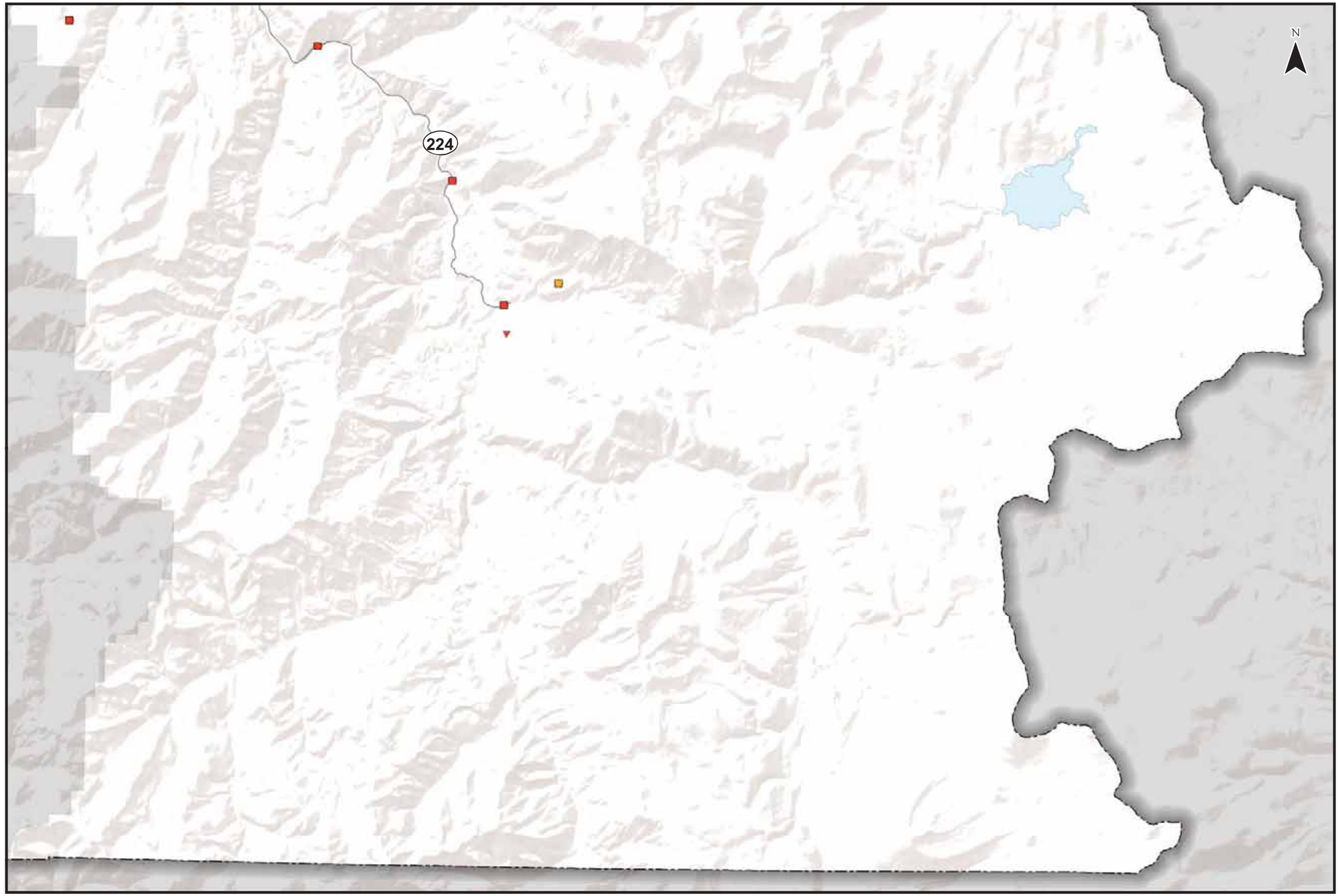
Crashes Involving Young Drivers (15-25 Years Old)

- Fatal crash
- Serious Injury Crash

Aggressive Driving Crahses

- Fatal Crash
- Severe Injury Crash

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Fatal & Serious Injury, Roadway Departure, Young Driver & Aggressive Driving Crashes East County - Southern Portion

Figure
ES 29

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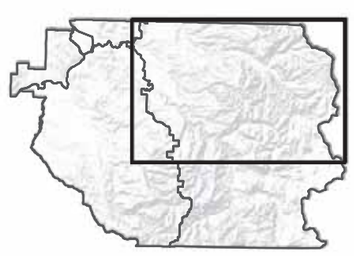
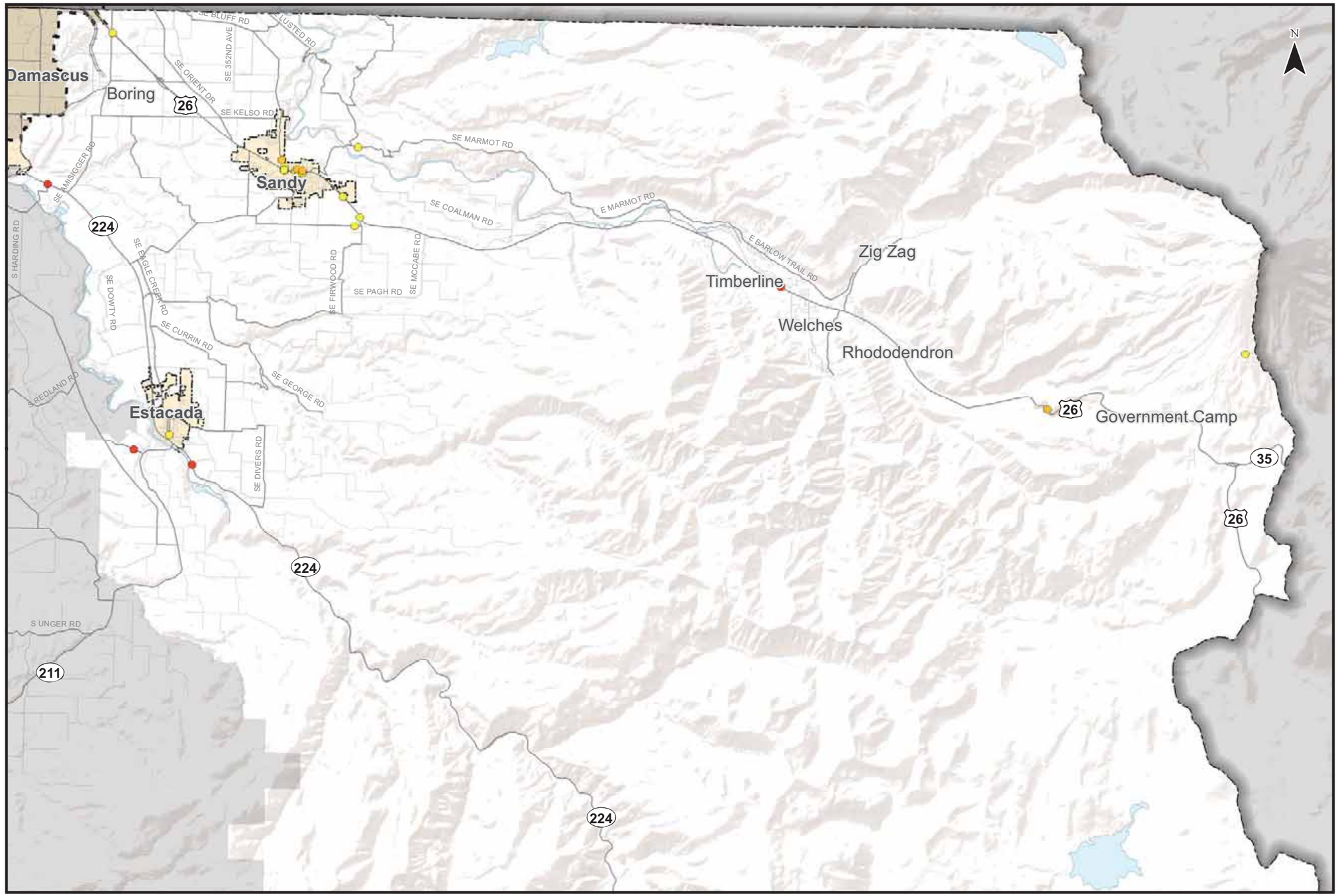
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Pedestrians

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Pedestrians 2007-2010
East County - Northern Portion

Figure
EN 30

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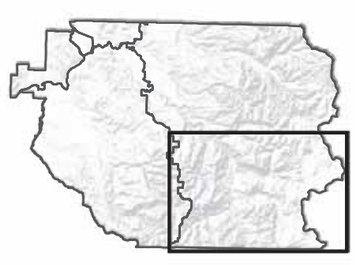
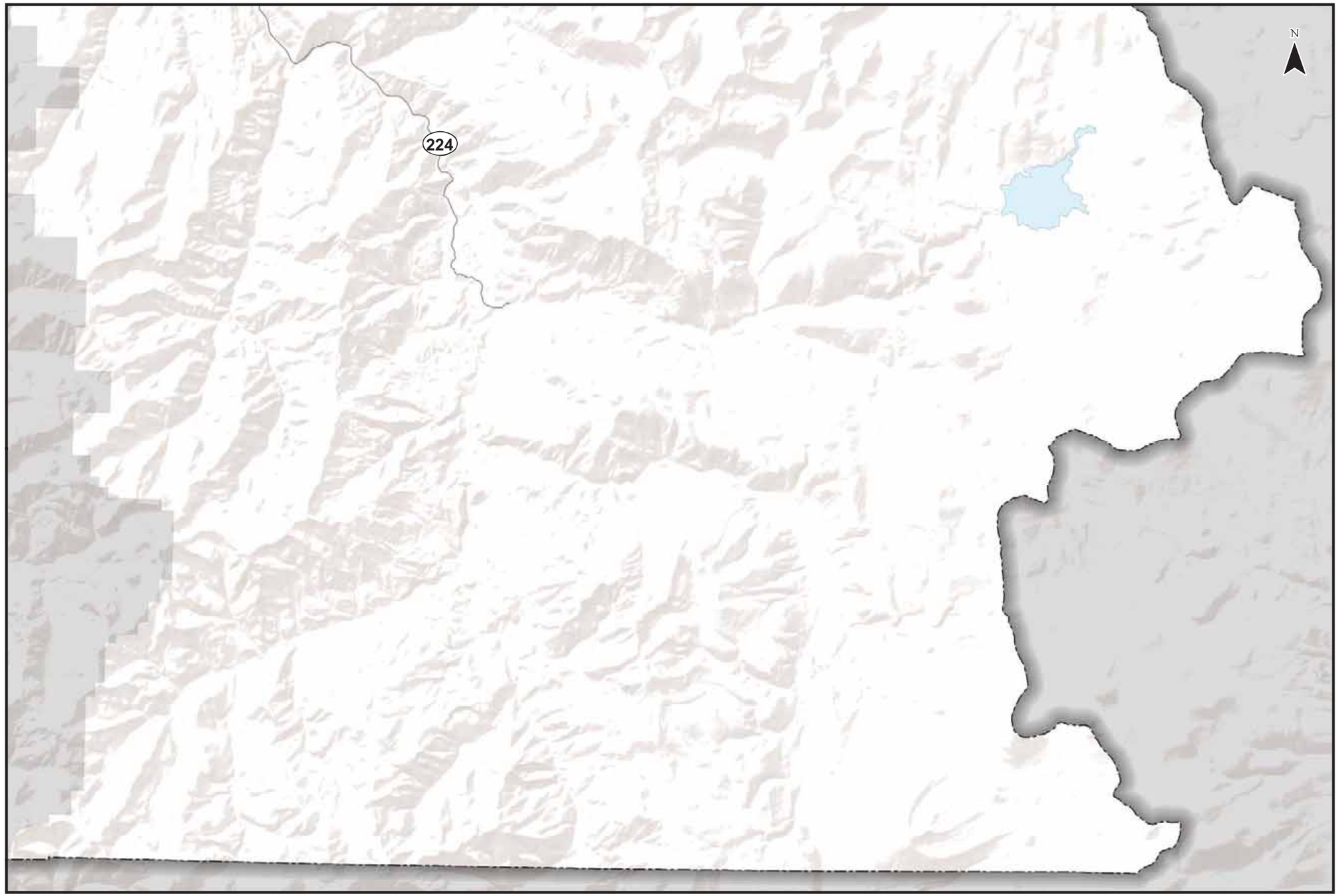
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Pedestrians

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Pedestrians 2007-2010
East County - Southern Portion

Figure
ES 30

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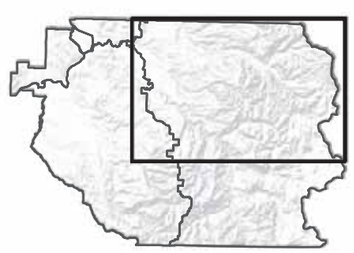
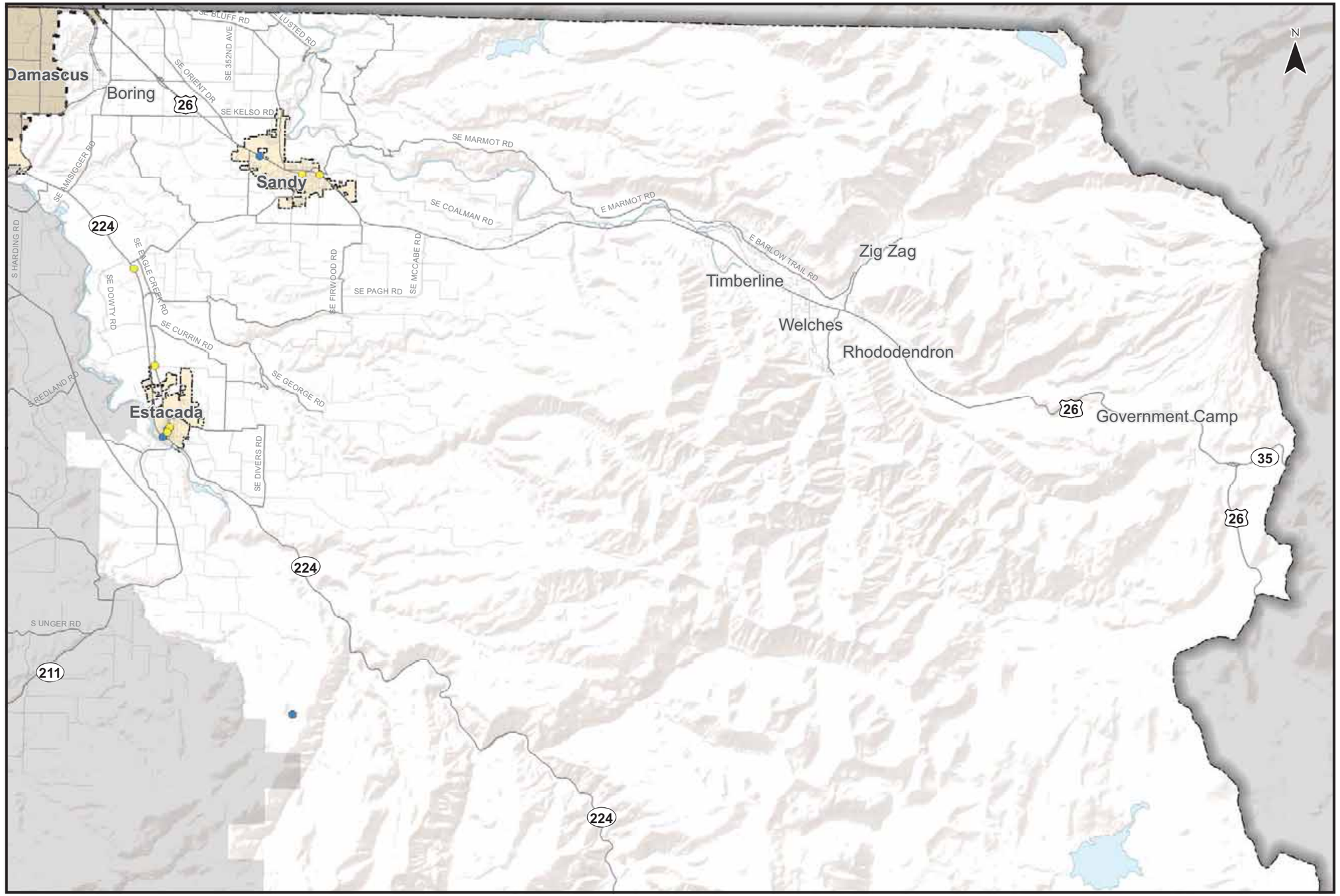
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Bicycles

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

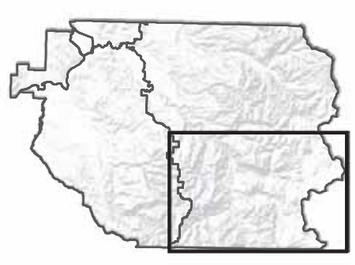
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Bicycles 2007-2010
East County - Northern Portion

Figure
EN 31

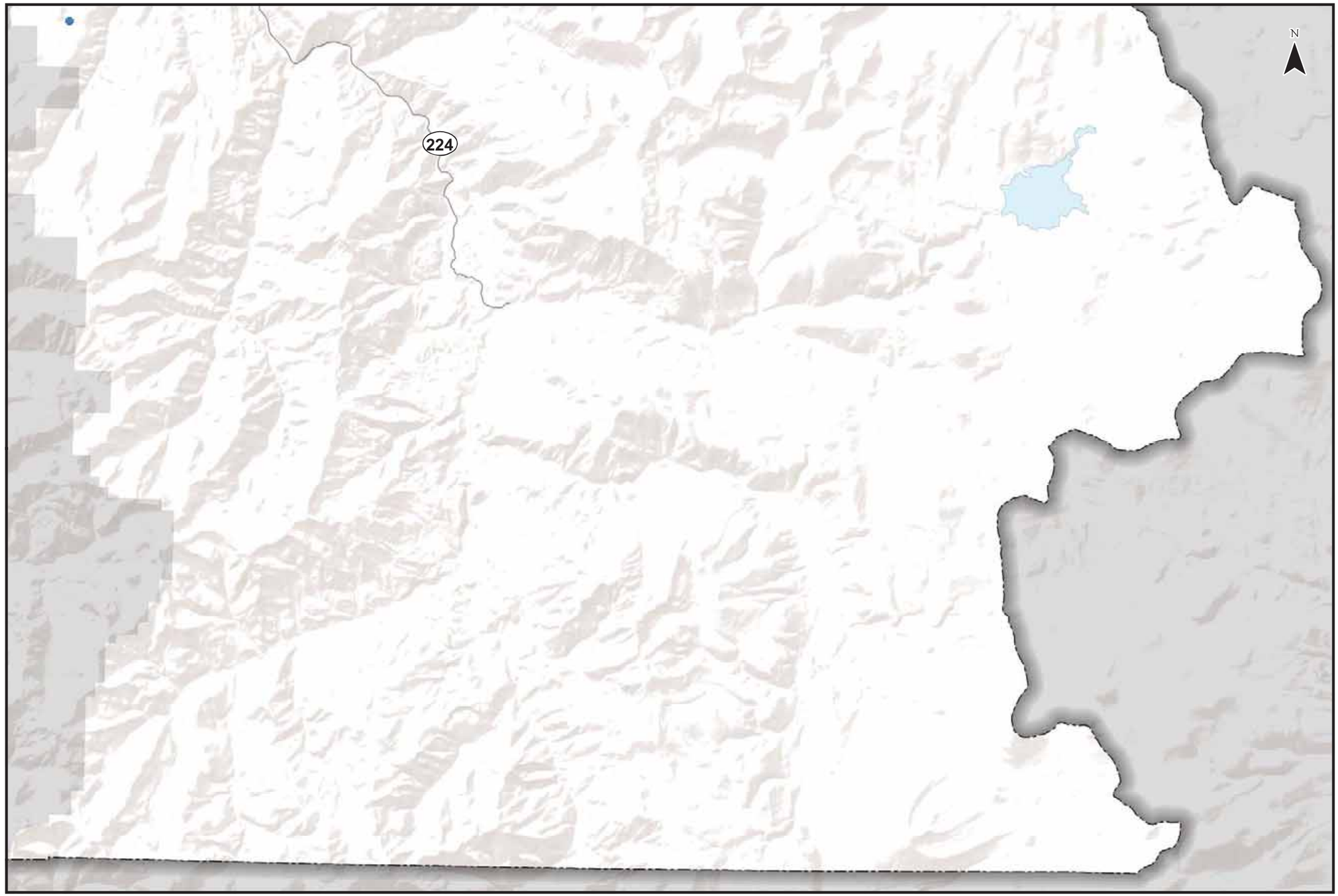
H:\proffile\11732 - Clackamas County TSP\gis\11x17 Maps\31 Crashes Involving Bicyclists.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Crashes Involving Bicycles

- Fatal Crash
- Serious Injury Crash
- Minor Injury Crash
- PDO Crash
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center,
Oregon Department of Transportation

Crashes Involving Bicycles 2007-2010
East County - Southern Portion

Figure
ES 31

H:\proffile\11732 - Clackamas County TSP\gis\11x17 Maps\31 Crashes Involving Bicyclists.mxd

Specific Safety Focus Intersections

County staff identified a number of safety focus intersections for one or more of the following reasons:

- Approaching roads are offset;
- Sight distance is limited on approach to or at the intersection;
- Intersecting roads are skewed (do not intersect at 90-degrees);
- Geometry of approaching roads is challenging for motorists; and/or
- Intersection geometry or lane configuration is unconventional.

The purpose of identifying these types of intersections is to proactively consider potential improvements in advance of the intersections appearing on the County's priority location list discussed above. The basic characteristics noted above are some geometric features that may make the driving task more difficult and therefore increase the risk of crashes occurring. For example, the American Association of State Highway and Transportation Officials' (AASHTO's) *Highway Safety Manual* notes skewed stop controlled intersections tend to experience more crashes than intersections intersecting at 90-degrees.[1]

Figure E 32 illustrates the location of these intersections. Table E 7 summarizes the locations.

Table E 6 Safety Focus Intersections in East County

Major Road	Minor Road	Reason Identified	County Safety Priority Location?	Located on an Candidate Safety Corridor?
282nd	Haley	Sight Distance	-	Yes
352nd	Hauglum	Offset Intersection and Sight Distance	-	-
362nd	Deming	Sight Distance	-	-
362nd	Skogan	Sight Distance and Intersection Skew	-	-
Amisigger	Judd	Sight Distance and Intersection Skew	Yes	-
Bakers Ferry	Eaden to OR 224	Intersection Geometry - Quadrant Radii	-	-
Bornstedt	Firwood	Approach Geometry and Sight Distance	-	-
Bornstedt	Trubel	Sight Distance	-	-
Cherryville	Baty	Intersection Skew	-	-
Compton	352nd	Sight Distance	-	-
Currin	Coupland	Intersection Crash History	-	Yes
E Salmon River	E Welches	Intersection Skew and Sight Distance	-	-
E Welches	E Elk Park	Intersection Skew, Unconventional Geometry and Approach Geometry	-	-
Eagle Creek	Currin/Folsom	Offset Intersection	-	-
Eagle Fern	Wildcat Mountain	Intersection Skew, Unconventional Geometry, and Sight Distance	-	-
East Barlow Trail	Brightwood	Intersection Skew	-	-
East Barlow Trail	E McIntyre	Intersection Skew and Sight Distance	-	-
Kelso	Orient Dr	Intersection Skew	-	-

[1] AASHTO. *1st Edition of the Highway Safety Manual*. 2010. (See Volume 3, Part D, page 14-16).

Major Road	Minor Road	Reason Identified	County Safety Priority Location?	Located on an Candidate Safety Corridor?
Lusted	Dodge Park	Sight Distance	-	-
Marmot	Shipley	Intersection Skew, Sight Distance, and Unconventional Geometry	-	-
McCabe	US 26 to Dowling	Approach Geometry	-	-
Orient	Revenue	Intersection Skew	-	-
Orient	Compton	Intersection Skew and Sight Distance	-	-
Richey Road	Kelso	Intersection Crash History	-	-
Springwater	Hayden	Intersection Skew	-	-
Springwater	Holman	Unconventional Geometry	-	-
Ten Eyck	Shipley	Sight Distance and Intersection Skew	-	-
Ten Eyck	Marmot	Intersection Skew and Approach Geometry	-	-
Ten Eyck	Kubitz	Sight distance and Approach Geometry	-	-
Ten Eyck	Coalman	Intersection Skew	-	-
Trubel	Firwood	Intersection Skew, Offset Intersection and Approach Geometry (Vertical Grade)	-	-
Wildcat Mountain	Dowling	Intersection Crash History	-	-
Wildcat Mountain	Firwood	Unconventional Geometry	-	-

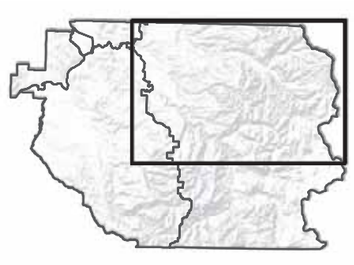
The list of safety focus intersections shown in Table E 7 supplements the County's Safety Priority Locations and the Candidate Safety Corridors discussed above. There is some overlap between the safety focus intersections and the previous safety locations presented.

- One of the safety focus intersections identified by the County is also part of their County Safety Priority Locations presented and discussed above.
- Two of the safety focus intersections are located on a candidate safety corridor discussed above.

The remaining intersections listed are either skewed intersection and/or have limited sight distance. These are candidate intersections for proactive improvements to help reduce the likelihood of crashes.

In a forthcoming TSP Update Alternative Analysis, potential projects, programs, studies and/or policies to improve these locations will be discussed.

CLACKAMAS COUNTY Transportation System Plan Update



Safety Focus Intersections

Functional Classifications

- Freeway
- Expressway
- Major Arterial
- Minor Arterial
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroad
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

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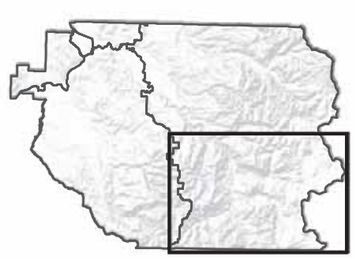
Safety Focus Intersections
East County - Northern Portion

Figure
EN 32

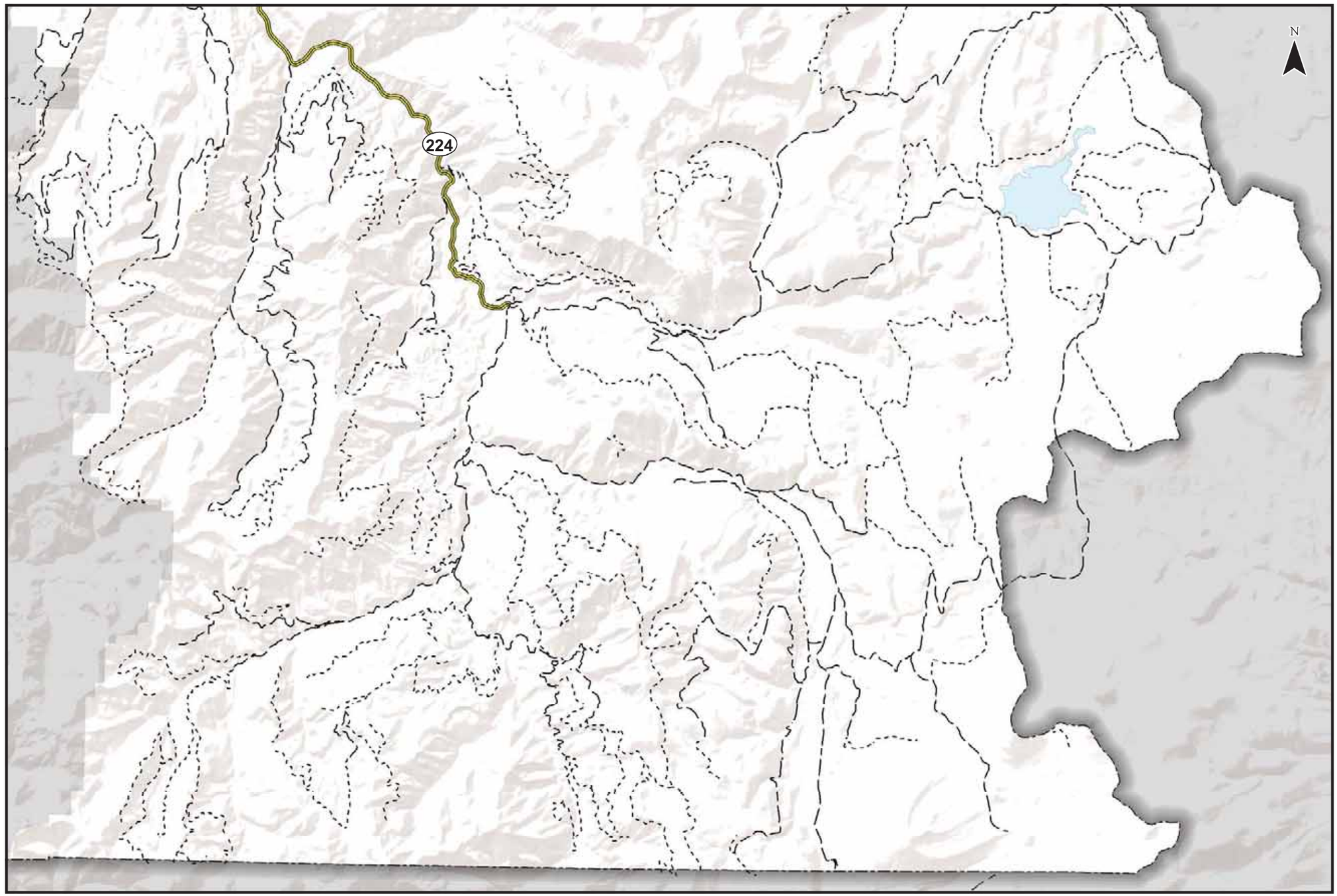
CLACKAMAS COUNTY Transportation System Plan Update



Safety Focus Intersections

Functional Classifications

- Freeway
- Expressway
- Major Arterial
- Minor Arterial
- Collector
- Connector
- Local
- Forest Service Paved
- Forest Aggregate Road
- General dirt, road or trail
- Other
- Railroad
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

Safety Focus Intersections
East County - Southern Portion

Figure
ES 32

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FUTURE BASE CONDITIONS – EAST COUNTY

INTRODUCTION

This section summarizes the results of the projected future traffic conditions and analysis for the East County. It evaluates study intersections performance in the year 2035 assuming growth and development occurs and some planned modifications are made to the transportation system. Two future base scenarios were analyzed:

1. **Low Build:** Assumes that only planned transportation projects with funding currently allotted are completed.
2. **Full Build:** Assumes that all transportation projects identified in the existing TSP that are planned before the year 2035 are completed.

The approach and methodology to the Future Base Conditions analysis is further described in *Section 3 Assumptions and Methods*. This section focuses on the results of the analysis in terms of intersection and roadway operations.

2035 LOW BUILD SCENARIO

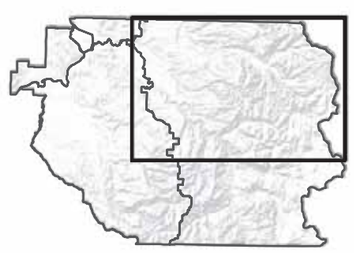
The low-build scenario assumes the completion of transportation projects identified in the existing Clackamas County TSP and Metro Regional Transportation Plan (RTP) with funding currently allotted. The purpose of the low build scenario is to identify intersections and roadways that will not meet standards in 2035 if only the currently funded transportation projects are completed. The analysis will also indicate which projects in the low build scenario help bring the operations on intersections and roadways up to standards.

The forecast traffic volumes, roadway cross-sections, and intersection configurations were adjusted to reflect this scenario, based on the low build capacity projects and mapped in Figure E 33. The capacity projects planned and funded are listed and described in Table E 7.

Table E 7 Low Build Projects in the East County

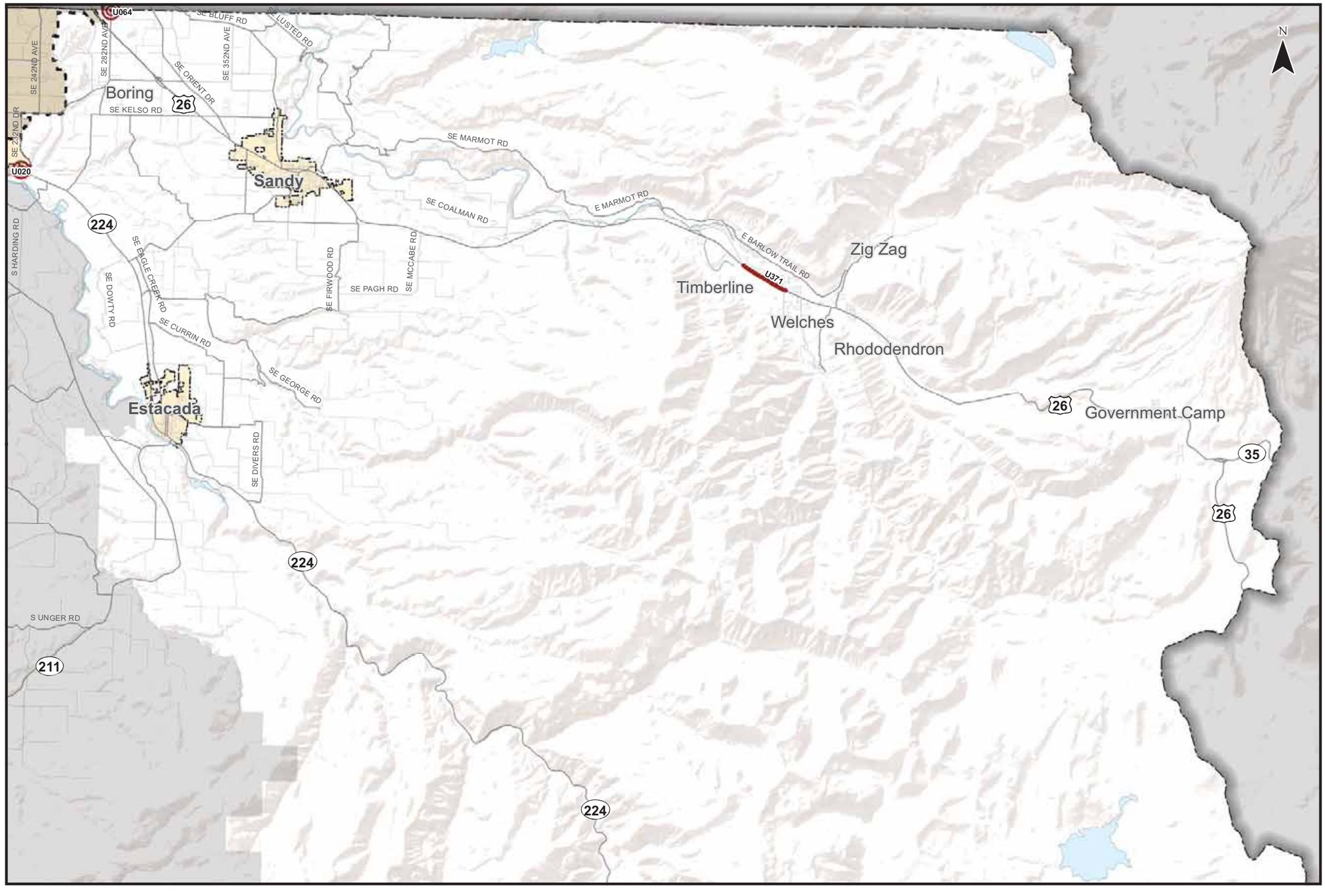
Project	ID	Location	Description
US 26	U371	East Wildwood Ave/ US 26 intersection	Install continuous two-way center turn lane from milepost 38.75 to 40.01
OR 224	U020	SE 232nd Dr/OR 224 intersection (ID 502)	Install eastbound left-turn lane and westbound right-turn lane

CLACKAMAS COUNTY Transportation System Plan Update



2035 Low Build Projects

- Intersection Projects
- Roadway Projects
- Incorporated Areas
- County Boundary
- UGB



This figure displays the projects included in the 2035 Low Build Scenario. The 2035 Low Build Scenario assumes the transportation projects in the existing Clackamas County TSP and Metro Regional Transportation Plan (RTP) with funding currently allotted are completed by 2035. The purpose of the 2035 Low Build Scenario is to identify intersections and roadways that will not meet standards in 2035 if only the currently funded transportation projects are implemented.

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

2035 Low Build Projects
East County - Northern Portion

Figure
EN 33

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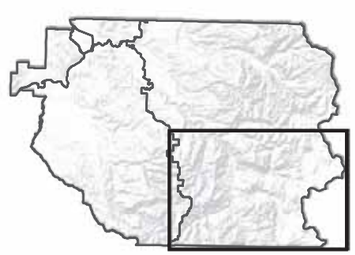
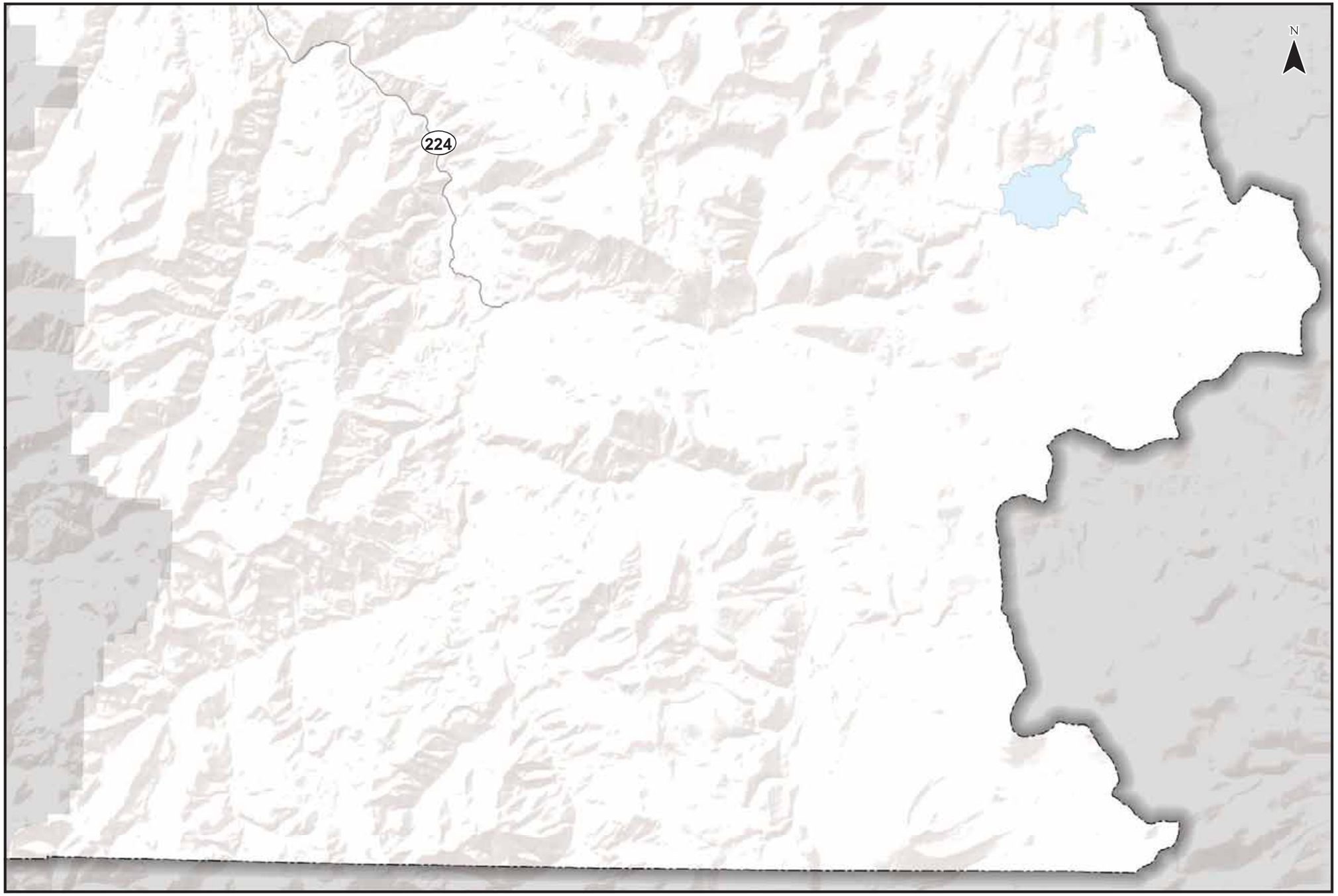
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



2035 Low Build Projects

- Intersection Projects
- Roadway Projects
- Incorporated Areas
- County Boundary
- UGB



This figure displays the projects included in the 2035 Low Build Scenario. The 2035 Low Build Scenario assumes the transportation projects in the existing Clackamas County TSP and Metro Regional Transportation Plan (RTP) with funding currently allotted are completed by 2035. The purpose of the 2035 Low Build Scenario is to identify intersections and roadways that will not meet standards in 2035 if only the currently funded transportation projects are implemented.

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

2035 Low Build Projects
East County - Southern Portion

Figure
ES 33

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\33 2035 Low Build Projects.mxd

Study Intersection Analysis

Any uncompleted low-build projects that affect lane configurations or traffic control at study intersections were accounted for and are noted in Figure E 34. The operations at the study intersections were analyzed based on the traffic volumes forecast under the low-build scenario and are illustrated in Table E 8 and Figure E 35. Intersections that do not meet standards are noted.

Table E 8 2035 Low Build Traffic Operations Analysis Results at Study Intersections in East County

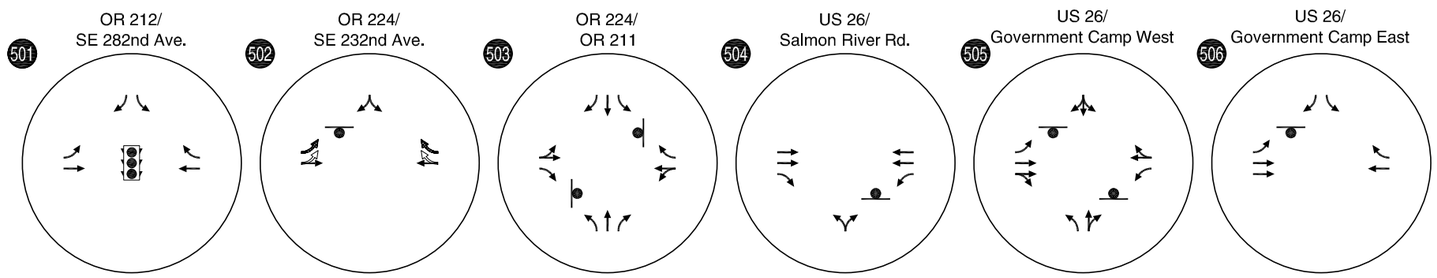
ID	Intersection	Jurisdiction	Performance Standard	Meets Standard?	Low Build Project?	Meets Standard in Low Build?
501	OR 212 / SE 282nd Ave	ODOT	v/c = 0.7	No	No	No (v/c=1.40)
502	OR 224 /SE 232nd Ave	ODOT	v/c = 0.7	Yes	Yes (U020)	No (v/c=2.50)
503	OR 224/OR 211	ODOT	v/c = 0.75	No	No	No (v/c= 2.78)
504	US 26/Salmon River Rd	ODOT	v/c = 0.7	Yes	No	Yes
505	US 26/Government Camp West	ODOT	v/c = 0.7	Yes	No	Yes
506	US 26/Government Camp East	ODOT	v/c = 0.7	Yes	No	Yes

As shown in the table, three intersections do not meet standards in the low-build scenario.

- The intersection of OR 224/SE 232nd Avenue (502) does not meet standards, although it is operating acceptably under existing conditions. There is a project planned at this intersection, which includes adding an eastbound left-turn only lane and westbound right-turn only lane. This project was accounted for in the operations analysis. However, the southbound approach of SE 232nd Avenue still operates at a level-of-service F and volume-to-capacity ratio well over 1.0.
- The OR 212/SE 282nd Avenue (501) and OR 224/R 211 (503) intersections do not meet standards currently and continue to operate at volume-to-capacity standards well over 1.0. There are no capacity projects planned and financed at these locations in the low build scenario.
- The three intersections on US 26 continue to meet standards in the low build scenario.

As noted in the existing conditions analysis, additional analysis was performed at the two study intersections on US 26 in Government Camp as part of the Mt. Hood Highway EIS Capacity Study. This analysis suggests that the intersection at US 26/Government Camp West is operating well over its operational performance standard (at a v/c of >1.0) under 2032 weekend peak hour traffic conditions while the intersection at US 26/Government Camp East is projected to still operate acceptably. The difference in the EIS and the TSP analyses are due to the different study periods of a weekend peak hour and weekday p.m. peak hour, respectively.

Appendix 8 contains detailed traffic operations analysis results.

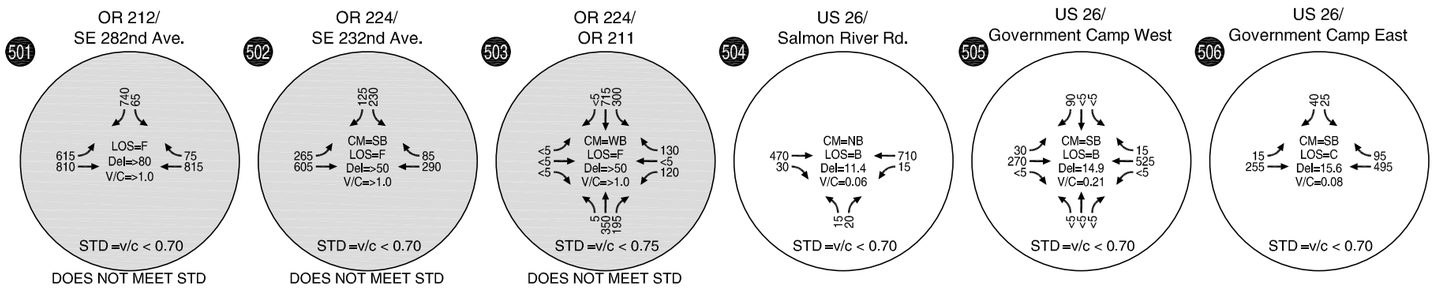


- ## - ODOT STUDY INTERSECTION
- (##) - COUNTY STUDY INTERSECTION
- - STOP SIGN
- - TRAFFIC SIGNAL
- - ROUNDABOUT
- - LANE REMOVED
- - LANE ADDED

Low Build Lane Configuration and Traffic Control Devices East County

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN

Figure E 34



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
STD = OPERATIONAL STANDARD

Low Build Intersection Operations
PM Peak Hour
East County

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN

Figure
E 35

Roadway Segment Analysis

The roadway segment operations analysis considers the roadway segment volumes and approximate level of congestion based on a comparison of the volume to the segment capacity. *Section 3 Assumptions and Methods* provides additional details on the scope and approach to the analysis below.

Roadway Segment Volumes

The roadway segment volumes provide a sense of the demand for travel on the roadways. Figure E 36 illustrates the roadway link volumes from the weekday evening peak hour for the 2035 Low Build Scenario.

As is evident from Figure E 36, under the 2035 Low Build Scenario demand for travel is highest along US 26, OR 224, and OR 211 particularly as the roadways approach the urban areas of Sandy, Estacada, and Damascus. This reflects the commuting trend of outbound vehicle traffic dissipating further from city centers as commuters return home from work. These trends are consistent with the existing conditions.

Approximate Level of Congestion

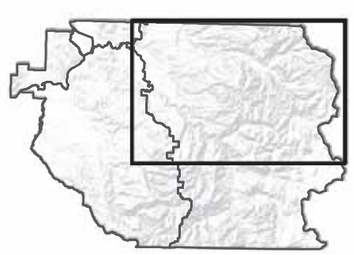
The level of congestion experienced on roadway segments was estimated using the roadway segment volumes from the Metro base model and the roadway segment capacity. The volume was compared to the capacity to calculate a volume-to-capacity ratio that is used to estimate level of congestion.

Figure E 37 illustrates the relative congestion during the 2035 Low Build weekday evening peak hour on roadways based on the estimated roadway segment volumes and capacity. As can be seen in Figure E 37, under the 2035 Low Build Scenario a few segments are estimated to begin experiencing varying levels of congestion. The segment of US 26 through Sandy is shown to be nearing capacity, segments of OR 224 north of Estacada are shown to be nearing or reaching congestion, and portions of OR 212 south of Damascus are also shown as experiencing some congestion. The large majority of the major roadways continue to be shown as uncongested during the weekday evening peak hour. Table E 9 lists the roadway segments that have volume-to-capacity ratios over 0.8 and describes the level of congestion as nearing congestion, some congestion, congested, or very congested.

Table E 9 2035 Low Build Roadway Segment Congestion in East County

Roadway	Segment	Level of Congestion
OR 224	S Bakers Ferry Rd to SE Ameisigger Rd	Nearing Congestion to Congested
US 26	Through Sandy	Nearing Congestion
OR 212	SE 272nd Ave to SE 282nd Ave	Some Congestion to Congested

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update

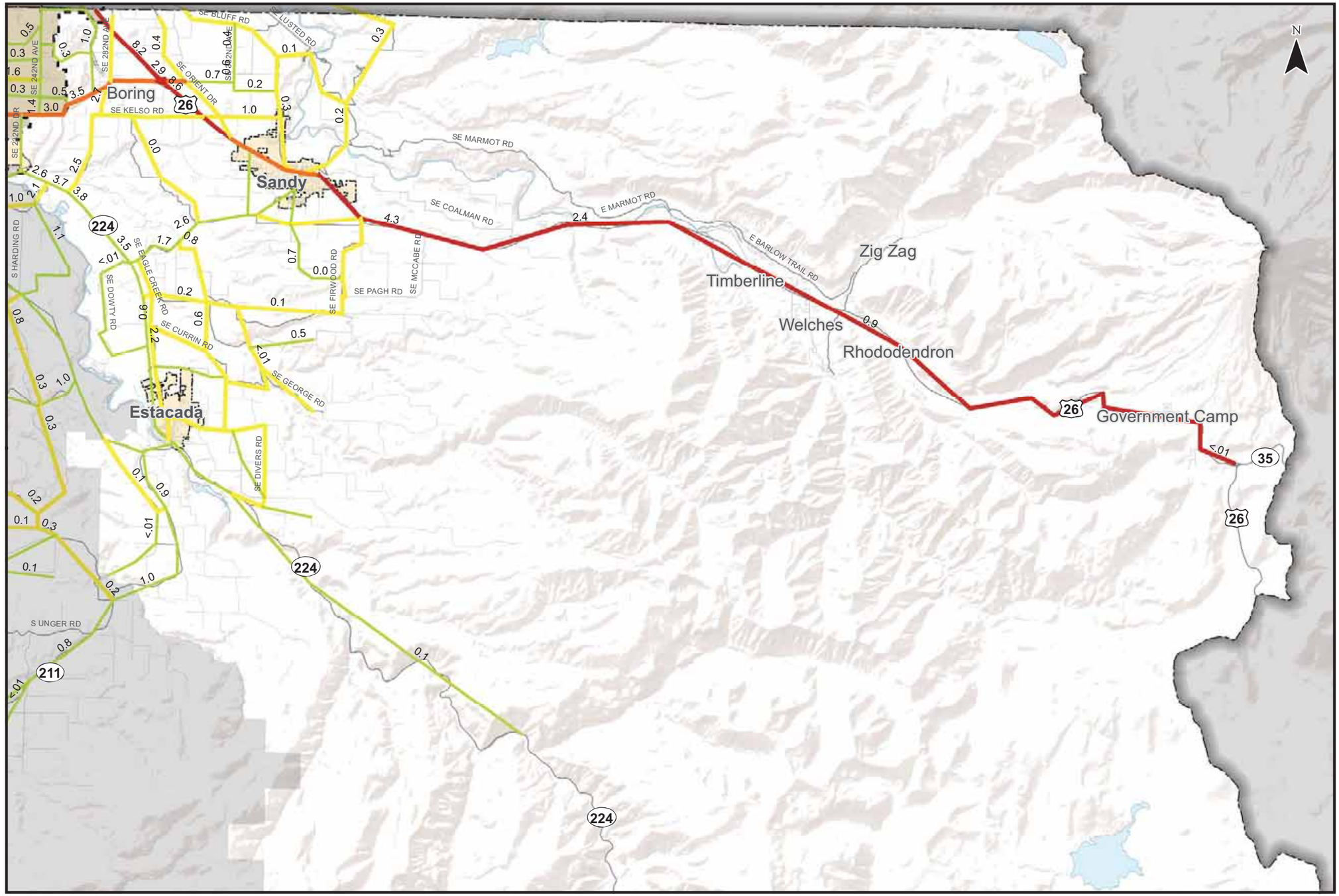


2035 Low Build Volumes

- Freeway
- Principal / Major Arterial
- Minor Arterial
- Other

#.# PM Weekday Traffic Volume in Thousands

- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resouce Center

Evening Weekday Peak Hour Link Volumes 2035 Low Build Scenario
East County - Northern Portion

Figure
EN 36

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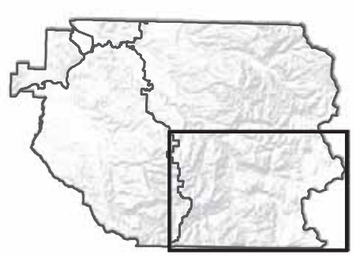
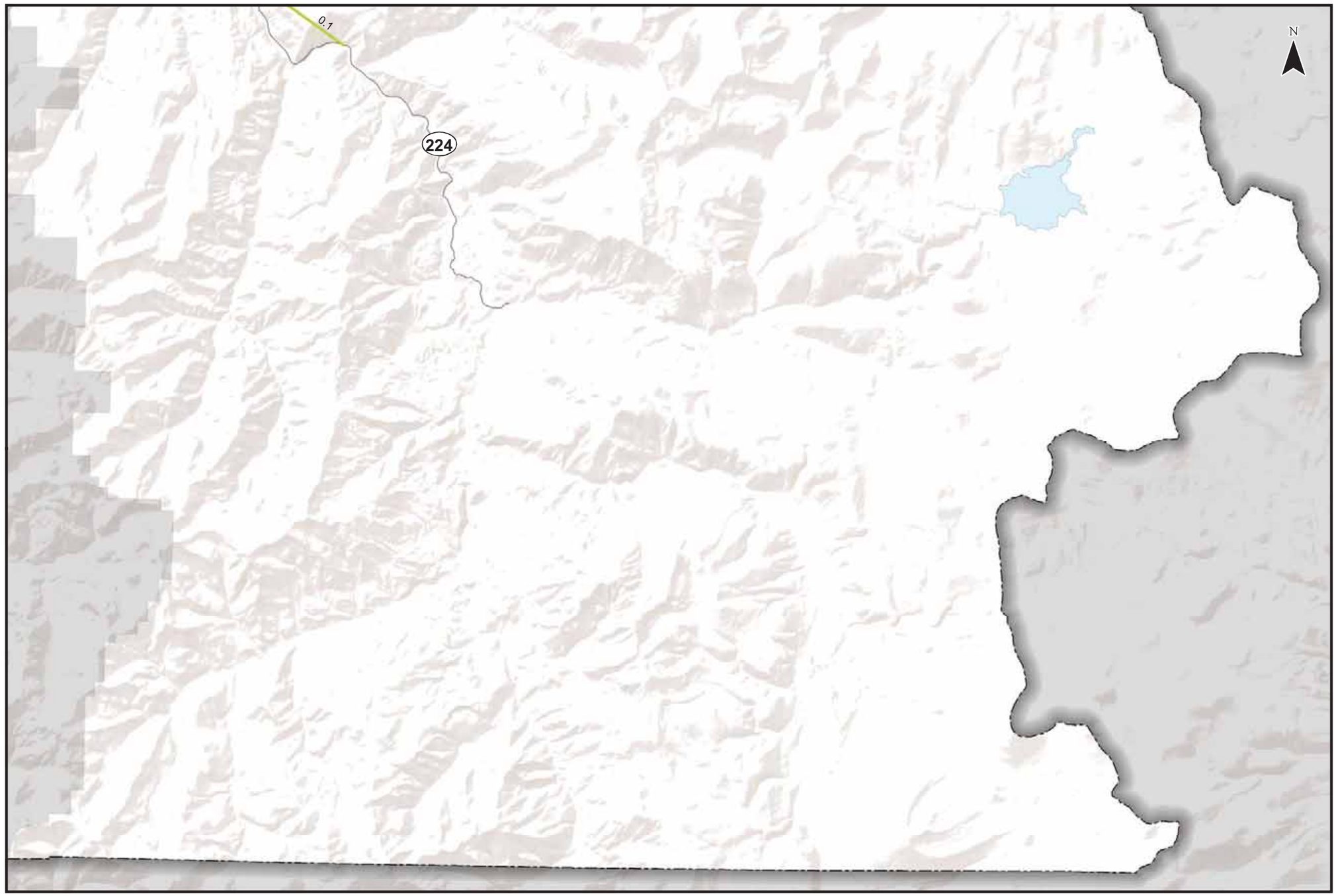
CLACKAMAS COUNTY Transportation System Plan Update



2035 Low Build Volumes

- Freeway
- Principal / Major Arterial
- Minor Arterial
- Other
- #.# PM Weekday Traffic Volume in Thousands
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

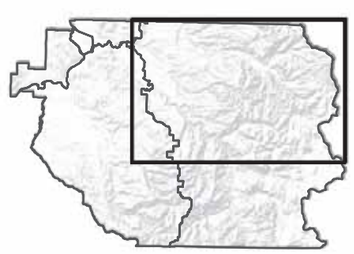
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resouce Center

Evening Weekday Peak Hour Link Volumes 2035 Low Build Scenario
East County - Southern Portion

Figure
ES 36

H:\proj\file\11732 - Clackamas County TSP\gis\11x17 Maps\36 Evening Weekday Peak Hour Link Volumes 2035 Low Build Scenario.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



Very Congested >1.10
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Congested 1.0 - 1.1
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

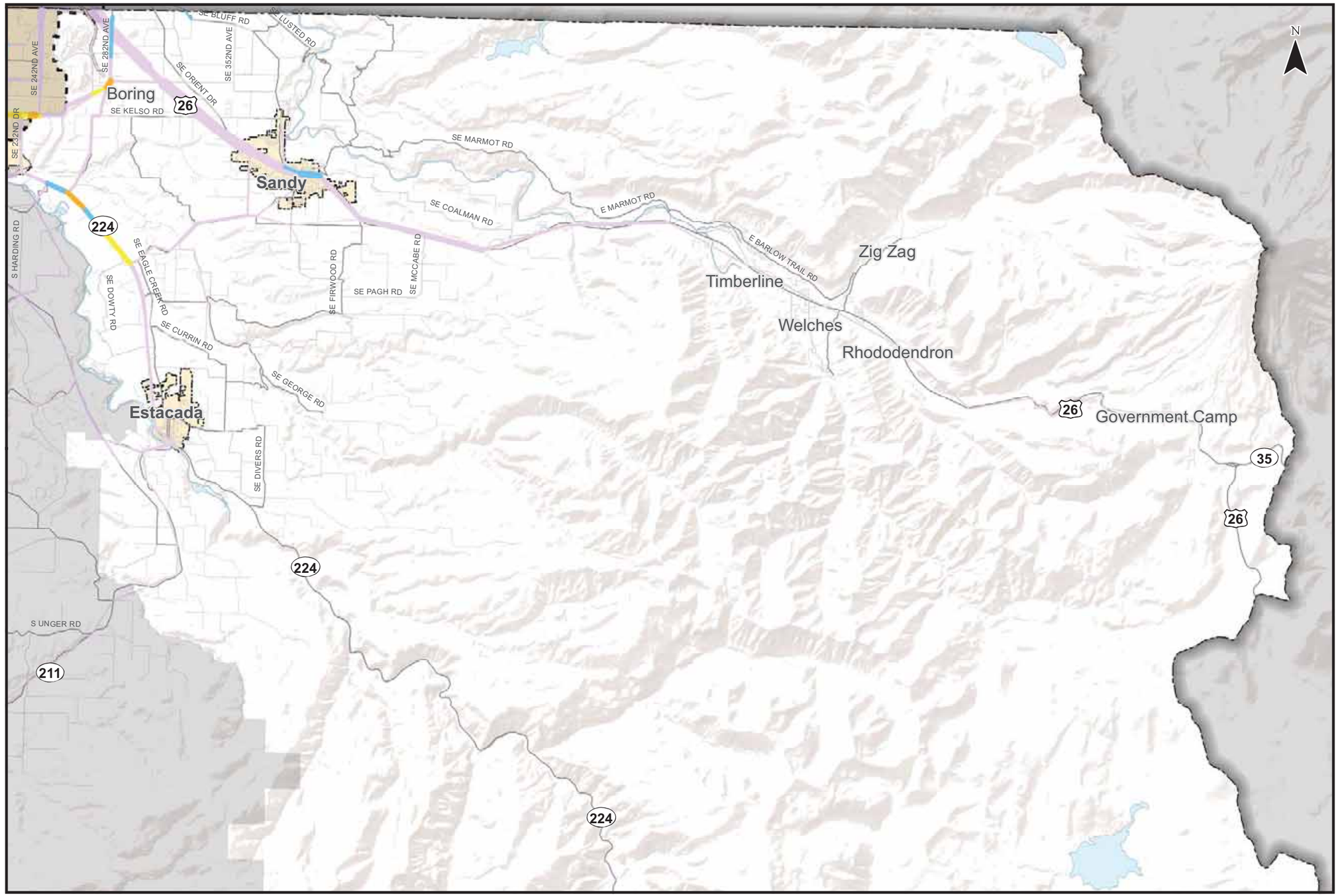
Some Congestion 0.9 - 1.0
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Nearing Congesion 0.8 - 0.9
- 1,000 Vehicles
- 5,000 Vehicles
- 10,000 Vehicles

Less Congested <0.8
- 100 Vehicles
- 1,000 Vehicles
- 10,000 Vehicles
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center



Evening Weekday Peak Hour Roadway Segment Congestion 2035 Low Build Scenario
East County - Northern Portion

Figure
EN 37

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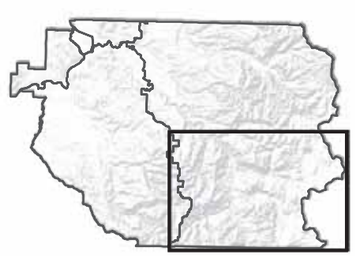
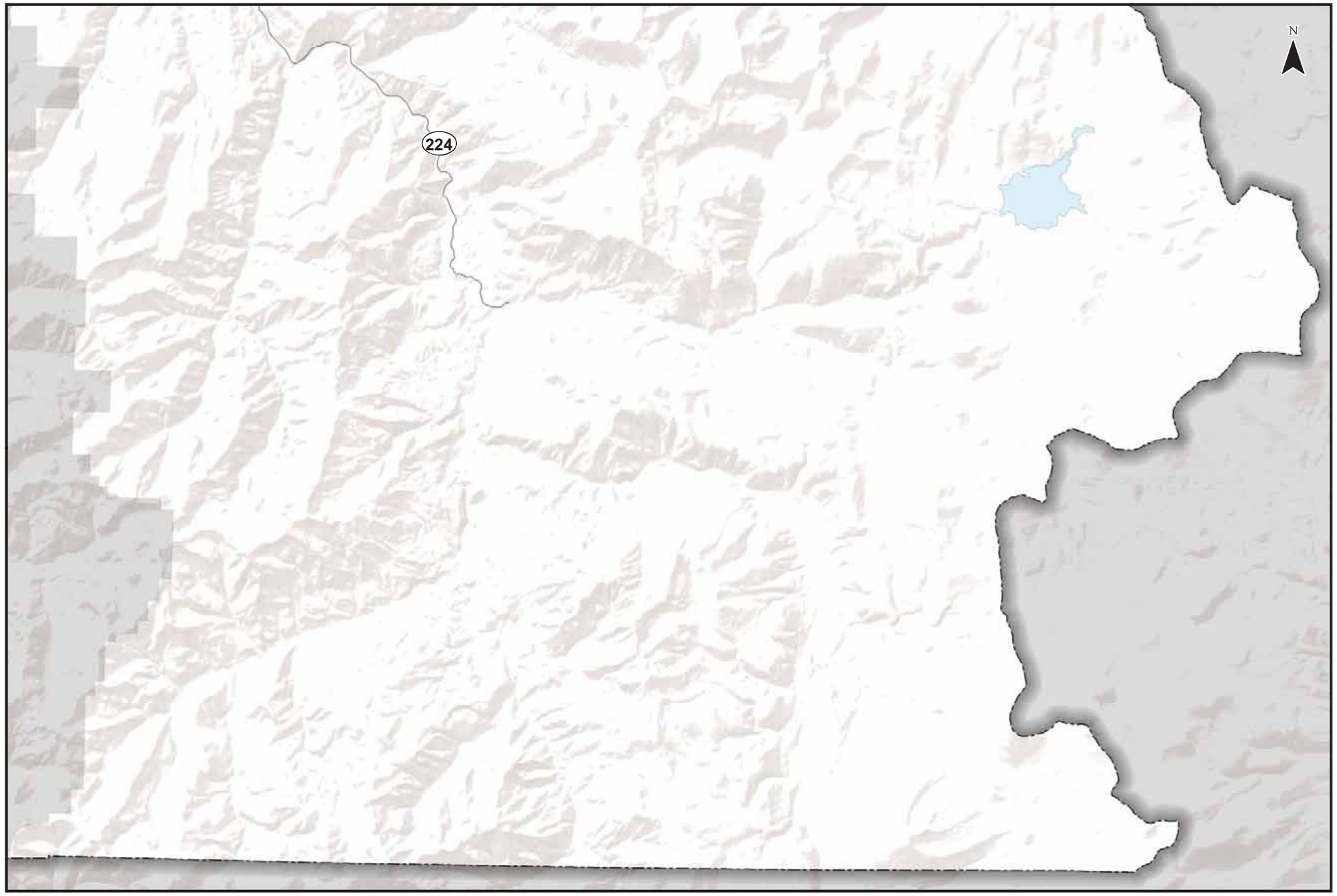
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*





Very Congested >1.10
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- 5,000 Vehicles
- 10,000 Vehicles

Congested 1.0 - 1.1
- 1,000 Vehicles
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Nearing Congesion 0.8 - 0.9
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- 100 Vehicles
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- 10,000 Vehicles
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center

Evening Weekday Peak Hour Roadway Segment Congestion 2035 Low Build Scenario
East County - Southern Portion

Figure
ES 37

H:\profile\11732 - Clackamas County TSP\gis\11x17 Maps\37 Evening Weekday Peak Hour Roadway Segment Congestion 2035 Low Build Scenario.mxd

2035 FULL BUILD SCENARIO

The full build scenario includes all of the existing planned projects in the County's current TSP and the Metro RTP. The purpose of analyzing the full build scenario is to determine how all transportation projects that are currently planned will improve future traffic operations. This will help identify which projects are necessary to address roadway and intersection operations that are below standard and which projects are located on facilities that are forecast to perform above standards. In addition, the full build analysis will identify intersections and roadways that do not meet standards even with planned transportation projects.

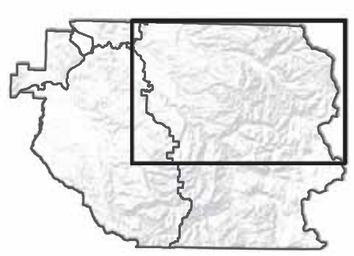
The forecast traffic volumes, roadway cross-sections, and intersection configurations were adjusted based on projects in the full build scenario that affect roadway or intersection capacity, such as the addition of turn lanes or roadway widening. The capacity full build projects are mapped in Figure E 38 and listed and described in Table E 10. There are several planned intersection and roadway projects. The majority of roadway projects involve reconstructing and widening rural roadways to three lanes to meet standards.

Table E 10 Full Build Projects in the East County

Project	ID	Location	Description
US 26*	U371	East Wildwood Ave/ US 26 intersection	Install continuous two-way center turn lane from milepost 38.75 to 40.01
OR 224*	U020	SE 232nd Dr/OR 224 intersection	Install EB left-turn lane and WB right-turn lane
SE 232nd Avenue	U228	OR 212 to OR 224	Reconstruct and widen (rural) (3 lanes)
Richey Road	U229	Kelso Road to OR 212	Reconstruct and widen (rural) (3 lanes), add turn lanes
Amisigger Road	U231	OR 224 to Kelso/Richey Road	Reconstruct and widen (rural) (3 lanes), smooth curves
Kelso Road	U232	Richey Road to Orient Drive	Reconstruct and widen (rural) (3 lanes)
Ten Eyck Road	U237	Lusted Road to US 26	Reconstruct and widen (rural) (3 lanes)
Multopor Overpass	U246	US 26/Multopor Drive intersection	Add eastbound right-turn lane
Bakers Ferry Road	U247	Springwater Road to OR 224	Reconstruct and widen (rural) (3 lanes)
Springwater Road	U253	Springwater/Hayden Road intersection	Install southbound left-turn lane
Hayden Road	U254	Springwater Road to OR 211	Reconstruct and widen (rural) (3 lanes), intersection improvements
Eagle Creek Road	U256	Keegan Road to Currin Road	Perform additional safety analysis at Wildcat Mountain Drive, widen lanes (3 lanes) and shoulders to County standards
Eagle Creek Road	U257	Currin Road to Duus Road	Remove or decrease horizontal curve along Eagle Creek Road, relocate intersection, widen lanes (3 lanes) and shoulders to County standards, investigate speed zone south of Currin Road
Coupland Road	U258	Eagle Creek Road to Divers Road	Reconstruct and widen (rural) (3 lanes)
Bull Run Road	U495	Ten Eyck Road to Multnomah County Line	Reconstruct and widen (rural) (3 lanes)
Firwood Road	U502	Wildcat Mountain Drive to US 26	Reconstruct and widen (rural) (3 lanes)

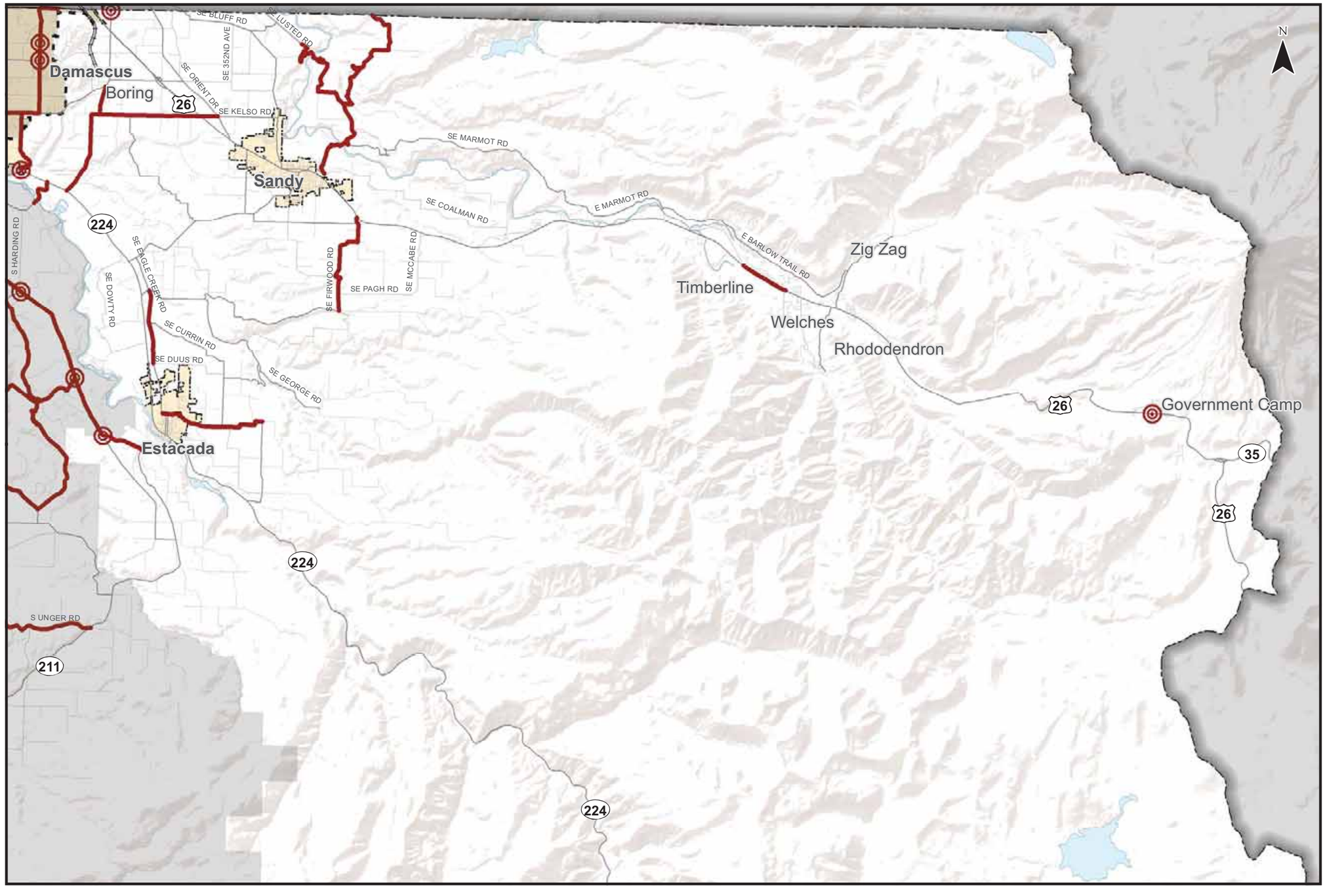
* Project also included in low build scenario

CLACKAMAS COUNTY Transportation System Plan Update



Full Build Projects

- Intersection Projects
- Roadway Projects
- Incorporated Areas
- County Boundary
- UGB



This figure displays the projects included in the 2035 Full Build Scenario. The 2035 Full Build Scenario includes the existing planned projects in the County's current TSP and the Metro RTP. The purpose of analyzing the Full Build Scenario is to determine how transportation projects that are currently planned will improve future traffic operations. This will help identify which projects are necessary to address roadway and intersection operations that are below standard and which projects are located on facilities that are forecasted to perform above standards.

0 1 2 3 4 5 Miles

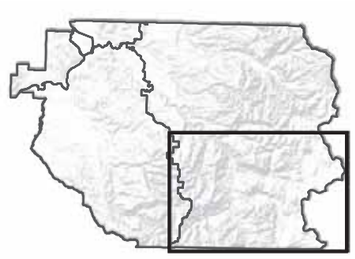
Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

2035 Full Build Projects
East County - Northern Portion

Figure
EN 38

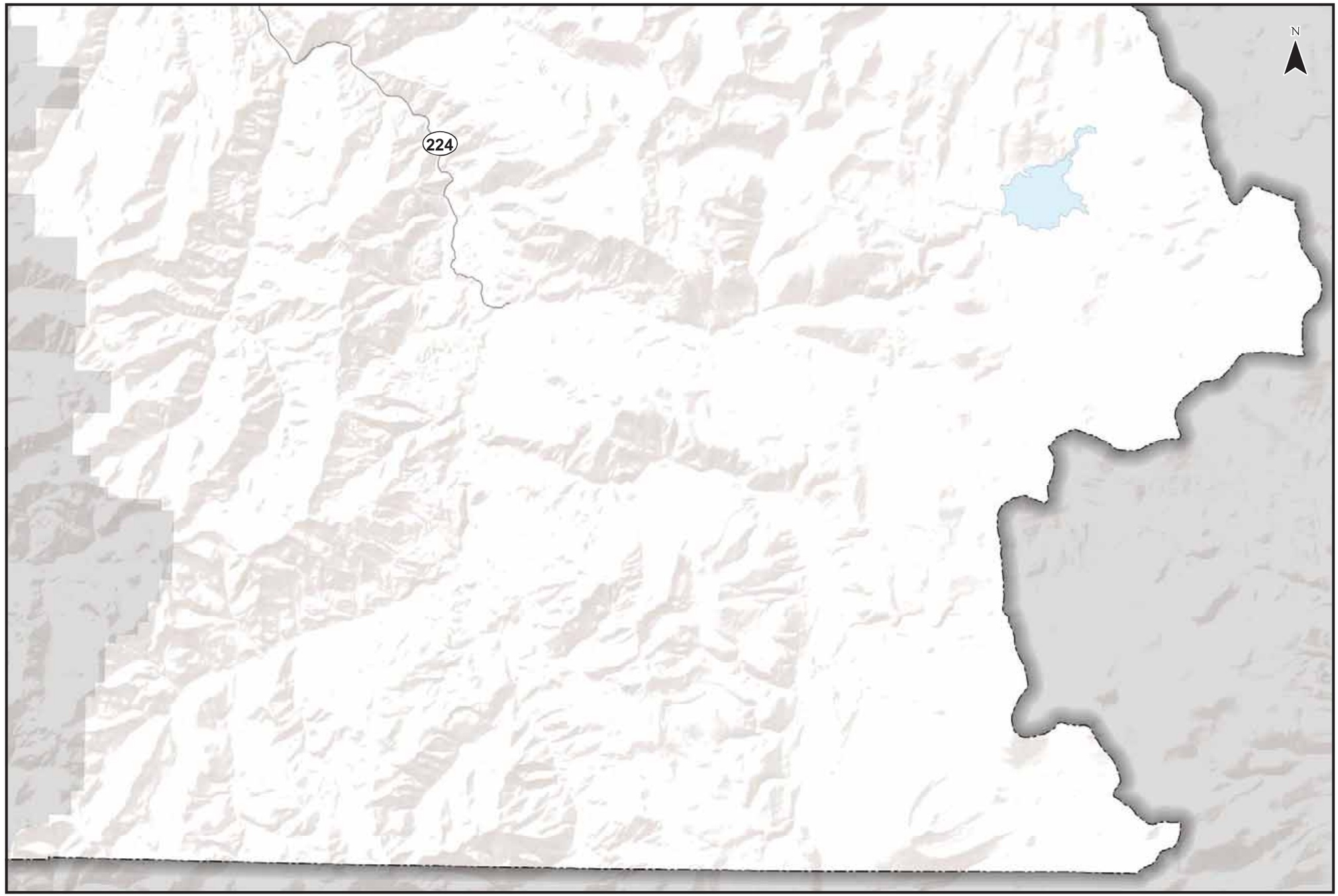
H:\proflile\11732 - Clackamas County TSP\gis\11x17 Maps\38 2035 Full Build Projects.mxd

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Full Build Projects

- Intersection Projects
- Roadway Projects
- Incorporated Areas
- County Boundary
- UGB



This figure displays the projects included in the 2035 Full Build Scenario. The 2035 Full Build Scenario includes the existing planned projects in the County's current TSP and the Metro RTP. The purpose of analyzing the Full Build Scenario is to determine how transportation projects that are currently planned will improve future traffic operations. This will help identify which projects are necessary to address roadway and intersection operations that are below standard and which projects are located on facilities that are forecasted to perform above standards.

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Clackamas County, Metro Data Resouce Center

2035 Full Build Projects
East County - Southern Portion

Figure
ES 38

H:\proffile\11732 - Clackamas County TSP\gis\11x17 Maps\38 2035 Full Build Projects.mxd

Study Intersection Analysis

The operations at the study intersections that do not meet standards under the low build scenario were analyzed under the full build scenario using traffic volumes projected under the full build scenario. 0 illustrates the lane configurations and traffic control devices at the study intersections. The intersections that meet standards under the low build analysis were not analyzed under the full build scenario.

The intersection operation results are shown in Table E 11 and Figure E 40, with intersections that do not meet standards noted. Any full build projects that affect lane configurations at study intersections were accounted for and are noted in the figure and table as well. Signal timings were adjusted as appropriate to account for changes in the forecast traffic volumes.

Table E 11 2035 Low Build Traffic Operations Analysis Results at Study Intersections in East County

ID	Intersection	Jurisdiction	Performance Standard	Meets Standard in 2035 Low Build?	Full Build Project?	Meets Standard in 2035 Full Build?
501	OR 212/SE 282nd Ave	ODOT	v/c = 0.7	No	No	No (v/c=1.43)
502	OR 224/ SE 232nd Ave	ODOT	v/c = 0.7	No	Yes (U020, U228)	No (v/c=3.22)
503	OR 224/OR 211	ODOT	v/c = 0.75	No	No	No (5.36)

The three intersections that do not meet standards under the low build scenario continue to not meet standards under the full build scenario.

- The intersection of OR 224/SE 232nd Avenue is affected by the widening project on SE 232nd Avenue included in the full build scenario. However, the southbound approach of SE 232nd Avenue operates at level-of-service F and volume-to-capacity ratio over 1.0.
- The intersections of OR 212/SE 232nd Avenue and OR 224/OR 211 are not impacted by full build capacity projects and continue to operate at volume-to-capacity ratios over 1.0.

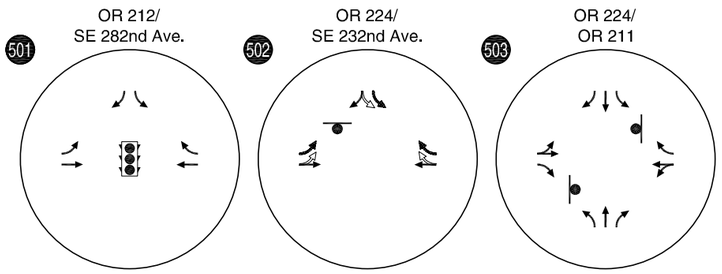
Appendix 8 contains detailed traffic operations analysis.

Roadway Segment Analysis

The following sub-sections present the roadway segment volumes and approximate congestion for the 2035 Full Build Scenario. *Section 3 Assumptions & Methods* provides additional details on the scope and approach to the analysis below.

Roadway Segment Volumes

The roadway segment volumes provide a sense of the demand for travel on the roadways. Figure E 41 illustrates the roadway link volumes from the weekday evening peak hour for the 2035 Full Build Scenario.



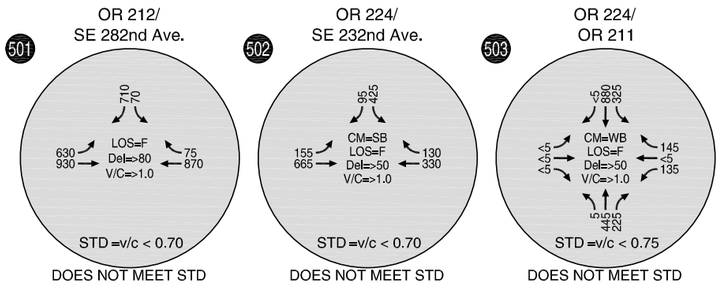
NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

- ## - ODOT STUDY INTERSECTION
- ## - COUNTY STUDY INTERSECTION
- - STOP SIGN
- - TRAFFIC SIGNAL
- - ROUNDABOUT
- ⇨ - LANE REMOVED
- → - LANE ADDED

Full Build Lane Configuration and Traffic Control Devices East County

CLACKAMAS COUNTY Transportation System Plan Update

Figure E 39



NOTE: THE FULL BUILD ANALYSIS WAS ONLY CONDUCTED ON THE INTERSECTIONS THAT DID NOT MEET STANDARDS IN THE LOW BUILD ANALYSIS

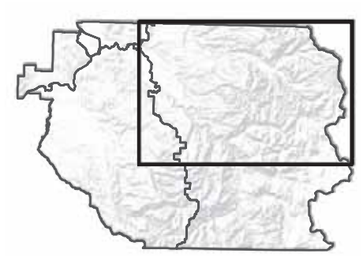
CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
STD = OPERATIONAL STANDARD

Full Build Intersection Operations
PM Peak Hour
East County

CLACKAMAS COUNTY Update
TRANSPORTATION SYSTEM PLAN

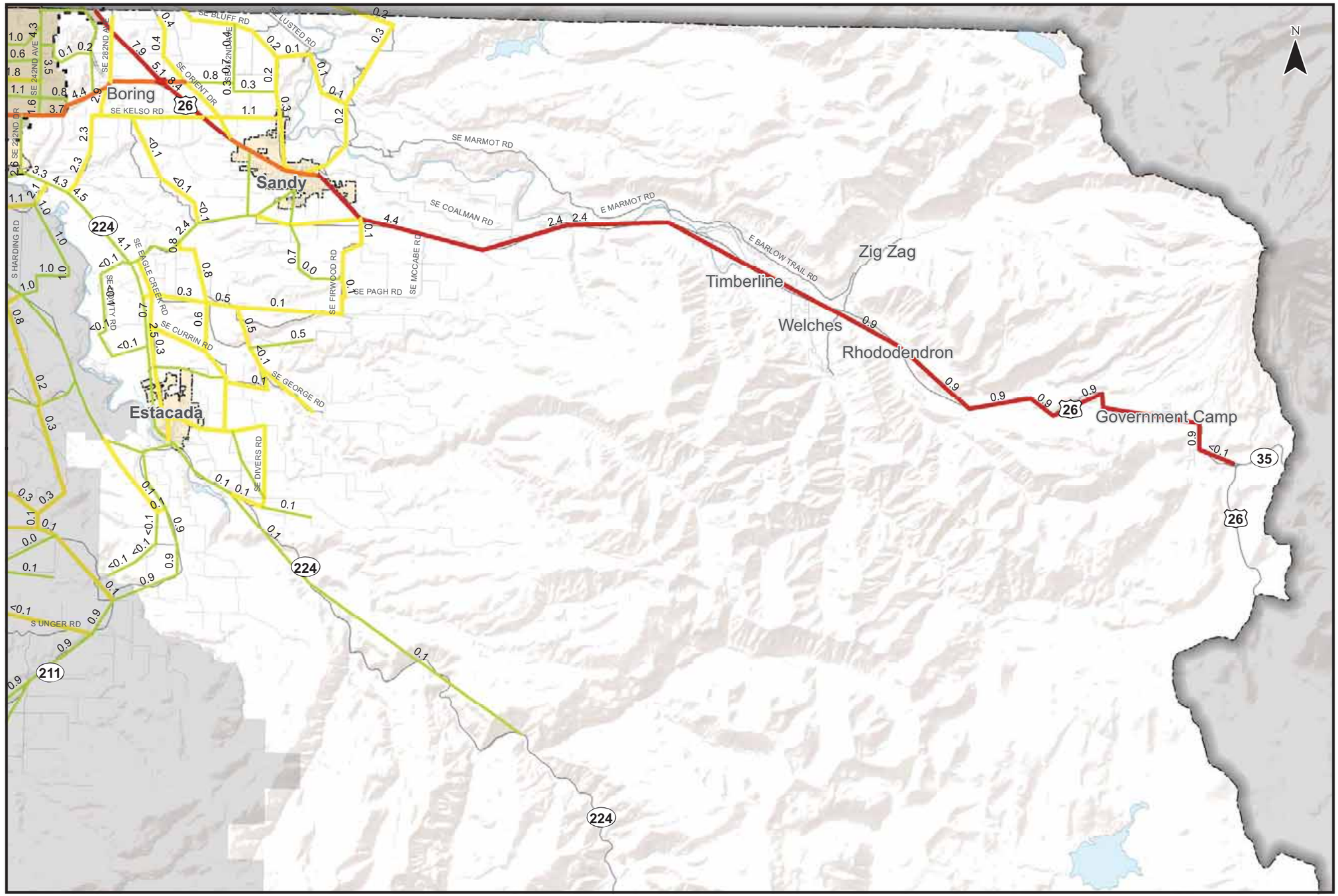
Figure E 40

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



2035 Full Build Volumes

- Freeway
- Principal / Major Arterial
- Minor Arterial
- Oher
- #.# PM Weekday Traffic Volume in Thousands
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resouce Center

Evening Weekday Peak Hour Roadway Segment Volumes 2035 Full Build
East County - Northern Portion

Figure
EN 41

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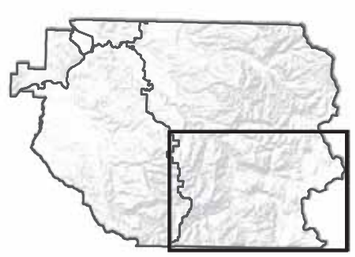
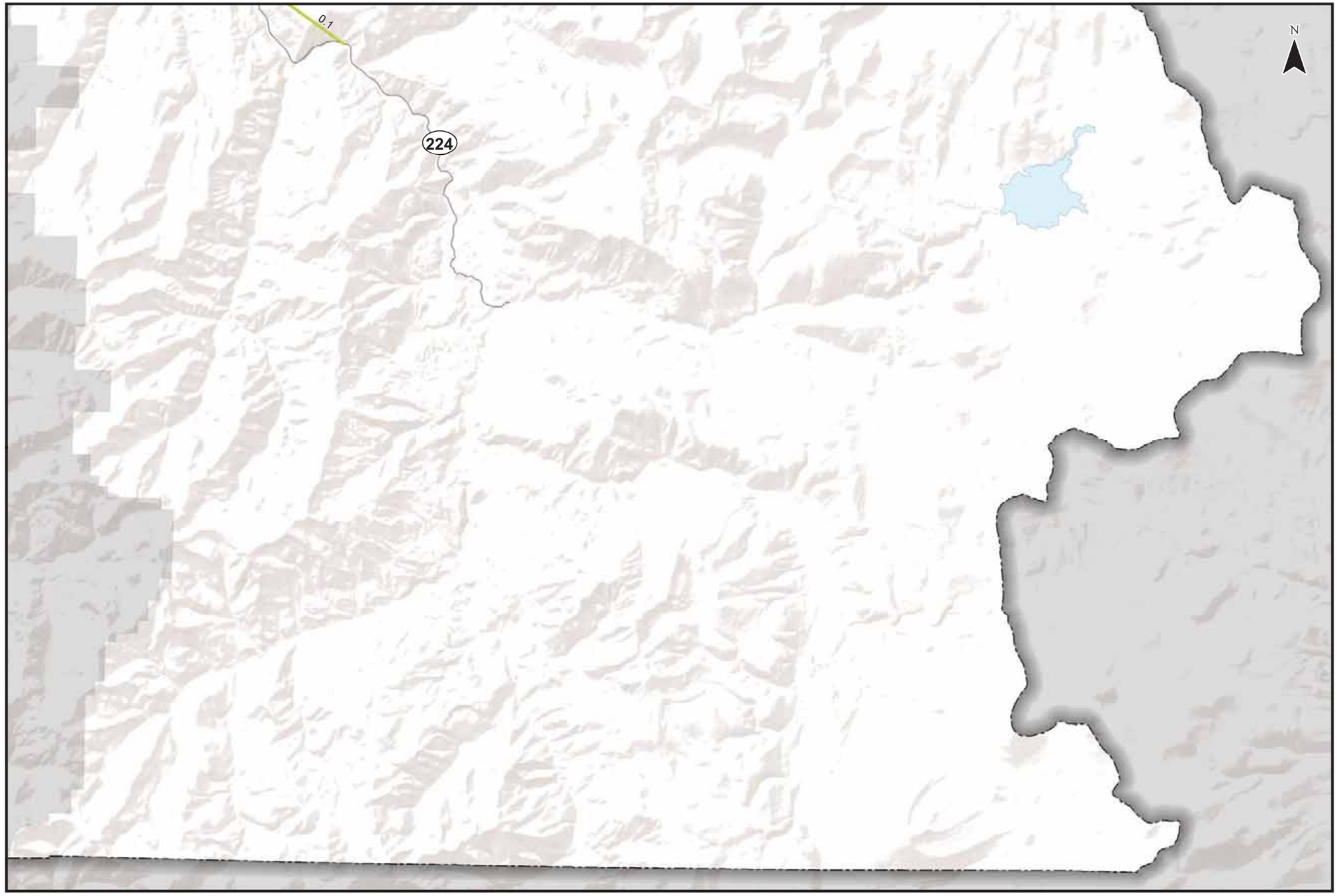
CLACKAMAS COUNTY Transportation System Plan Update



2035 Full Build Volumes

- Freeway
- Principal / Major Arterial
- Minor Arterial
- Oher
- #.# PM Weekday Traffic Volume in Thousands
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resouce Center

Evening Weekday Peak Hour Roadway Segment Volumes 2035 Full Build
East County - Southern Portion

Figure
ES 41

H:\proflle\11732 - Clackamas County TSP\gis\11x17 Maps\41 Evening Weekday Peak Hour Link Volumes 2035 Full Build Scenario.mxd

As is evident from Figure E 41, under the 2035 Full Build Scenario demand for travel continues to be highest along US 26, OR 224, and OR 211 particularly as the roadways approach the urban areas of Sandy, Estacada, and Damascus. This reflects the commuting trend of outbound vehicle traffic dissipating further from city centers as commuters return home from work. These trends are consistent with the existing and 2035 Low Build scenarios.

Approximate Level of Congestion

The level of congestion experienced on roadway segments was estimated using the roadway segment volumes from the Metro base model and the roadway segment capacity. The volume was compared to the capacity to calculate a volume-to-capacity ratio that is used to estimate level of congestion.

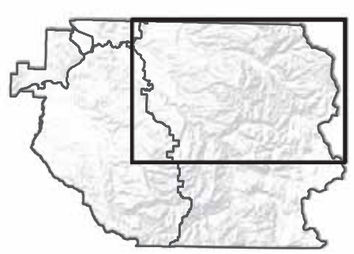
Figure E 42 illustrates the relative congestion during the 2035 Full Build weekday evening peak hour on roadways based on the estimated roadway segment volumes and capacity.

As can be seen in Figure E 42, under the 2035 Full Build Scenario many of the same segments experiencing congestion in the 2035 Low Build Scenario continue to experience congestion in the 2035 Full Build Scenario. The primary difference is a lower degree of congestion on portions of OR 212 south of Damascus. The large majority of the major roadways in East County continue to be shown as uncongested during the weekday evening peak hour. Table E 12 summarizes the level of congestion on roadway segments nearing congestion to very congested.

Table E 12 2035 Full Build Roadway Segment Congestion in East County

Roadway	Segment	Level of Congestion
OR 224	S Bakers Ferry Rd to SE Amisigger Rd	Nearing Congestion to Some Congestion
US 26	Through Sandy SE Firwood Rd to E Cherryville Dr	Nearing Congestion
OR 212	SE 272nd Ave to SE 282nd Ave	Very Congested

CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN *Update*



Very Congested >1.10
- 1,000 Vehicles
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- 10,000 Vehicles

Congested 1.0 - 1.1
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- 5,000 Vehicles
- 10,000 Vehicles

Some Congestion 0.9 - 1.0
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- 5,000 Vehicles
- 10,000 Vehicles

Nearing Congestion 0.8 - 0.9
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- 5,000 Vehicles
- 10,000 Vehicles

Less Congested <0.8
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- 10,000 Vehicles
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 5 Miles

Coordinate System:
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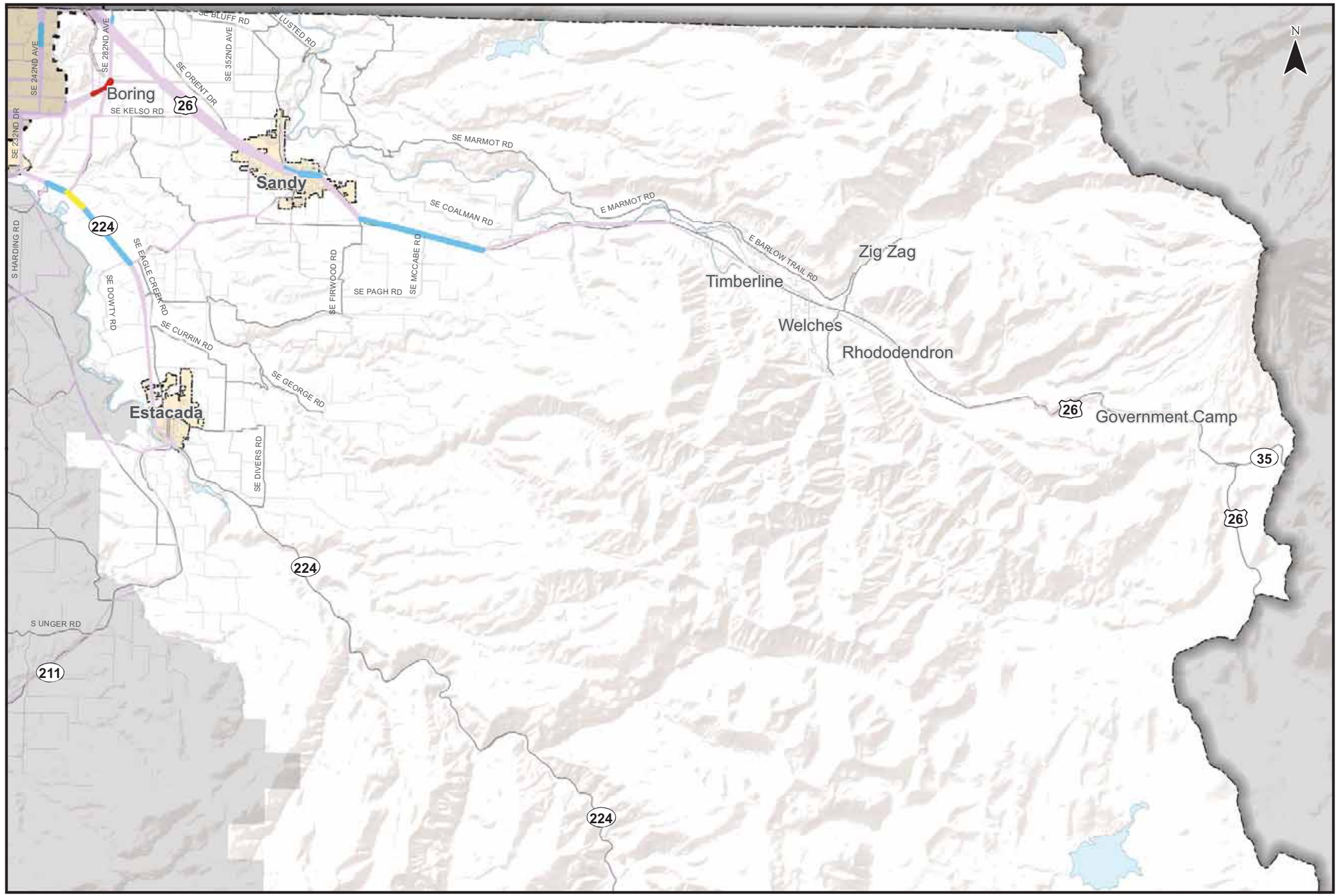

Evening Weekday Peak Hour Roadway Segment Congestion 2035 Full Build
East County - Northern Portion

Figure
EN 42

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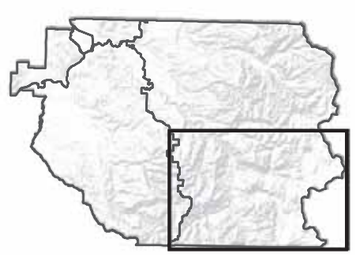
CLACKAMAS COUNTY
TRANSPORTATION SYSTEM PLAN *Update*



Very Congested >1.10
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- 5,000 Vehicles
- 10,000 Vehicles

Congested 1.0 - 1.1
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- 5,000 Vehicles
- 10,000 Vehicles

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- 5,000 Vehicles
- 10,000 Vehicles

Less Congested <0.8
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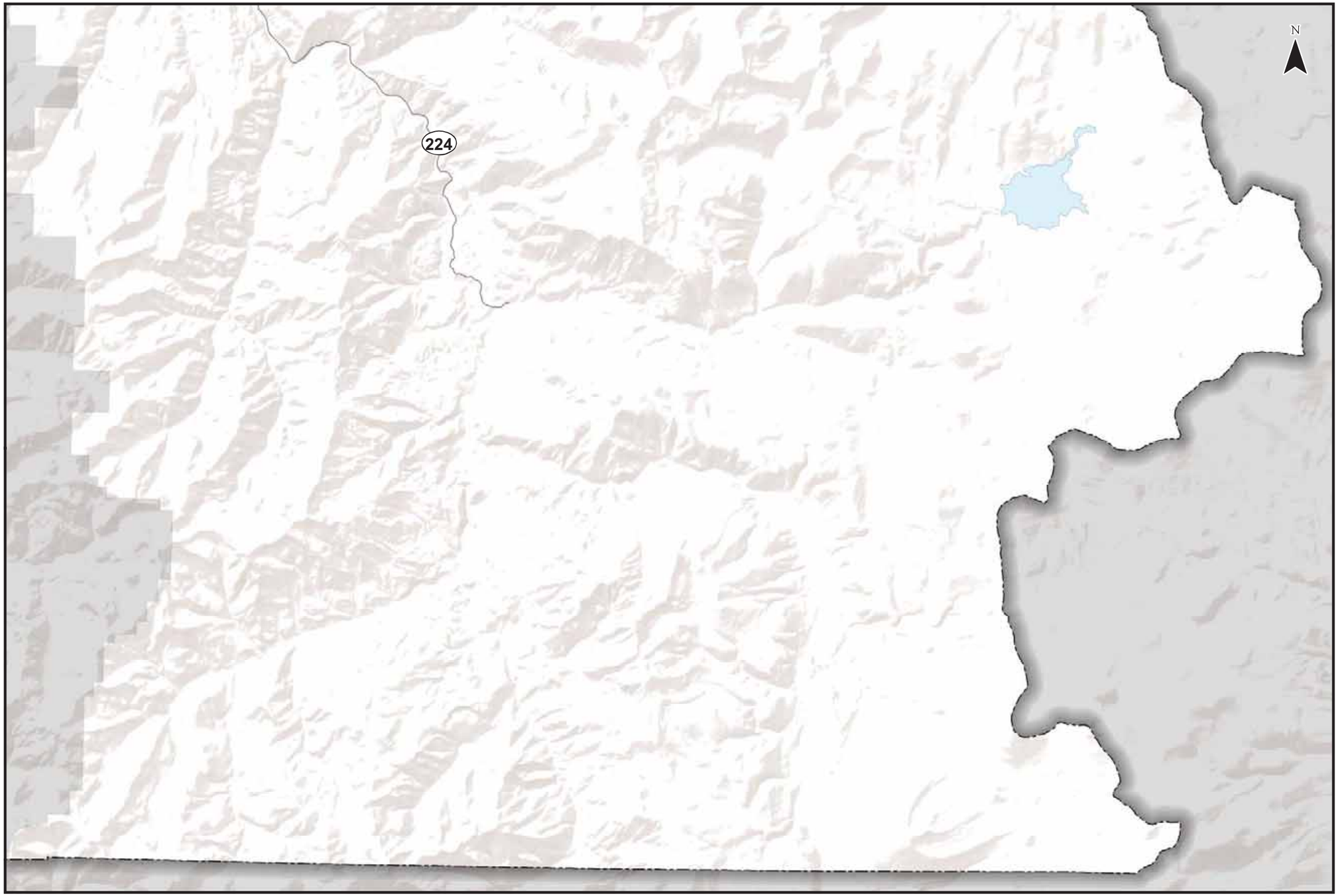
- 5,000 Vehicles
- 10,000 Vehicles
- Incorporated Areas
- County Boundary
- UGB

0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Cambridge Systematics, Clackamas County, Metro Data Resouce Center



Evening Weekday Peak Hour Roadway Segment Congestion 2035 Full Build
East County - Southern Portion

Figure
ES 42

H:\proffile\11732 - Clackamas County TSP\gis\11x17 Maps\42 Evening Weekday Peak Hour Roadway Segment Congestion 2035 Full Build Scenario.mxd

COMPARISON OF EXISTING, 2035 LOW BUILD, AND 2035 FULL BUILD ANALYSIS RESULTS

Traffic volumes are forecast to increase slightly in East County. The increase in traffic volumes is more significant on SE 282nd Avenue and SE 232nd Avenue than on state facilities. There are very few transportation projects planned and financed under the low build scenario. The full build scenario includes several roadway projects, mainly reconstructing and widening rural roadways.

Intersection Operations Analysis

Table E 13 compares the intersection operation results for the existing, 2035 low build, and 2035 full build scenarios. The table also notes intersections that are impacted by low build and full build projects. As seen in the table, the intersection of OR 212/SE 282nd Avenue and OR 224/OR 211 do not meet standards under any of the scenarios and are not affected by any planned transportation projects. Although the intersection of OR 224/SE 232nd Avenue is impacted by two full build projects (addition of turn lanes and roadway widening), its volume-to-capacity ratio continues to exceed performance standards.

Table E 13 Comparison of Traffic Operations Analysis Results at Study Intersections in East County

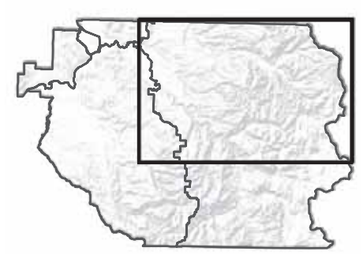
ID	Intersection	Jurisdiction	Performance Standard	Currently Meets Standard?	Low Build Project?	Meets Standard in 2035 Low Build?	Full Build Project?	Meets Standard in 2035 Full Build?
501	OR 212 /SE 282nd Ave	ODOT	v/c = 0.7	No	No	No	No	No
502	OR 224 /SE 232nd Ave	ODOT	v/c = 0.7	Yes	No	No	Yes	No
503	OR 224/OR 211	ODOT	v/c = 0.75	No	No	No	No	No
504	US 26/ Salmon River Rd	ODOT	v/c = 0.7	Yes	No	-	No	-
505	US 26/ Government Camp West	ODOT	v/c = 0.7	Yes	No	-	No	-
506	US 26/ Government Camp East	ODOT	v/c = 0.7	Yes	No	-	No	-

Roadway Segment Operations Comparison

Figure E 43 compares the approximate change in congestion between the 2035 Low Build Scenario and 2035 Full Build Scenario.

As shown in Figure E 43, implementing the full build projects decreases congestion (relative to low build scenario) on five relatively short segments of OR 224, OR 212, SE 282nd and SE Bluff Road. In two instances, the full build projects increase congestion relative to the low build scenario. The level of congestion on the vast majority of roadways does not change between the 2035 Low Build and 2035 Full Build scenarios.

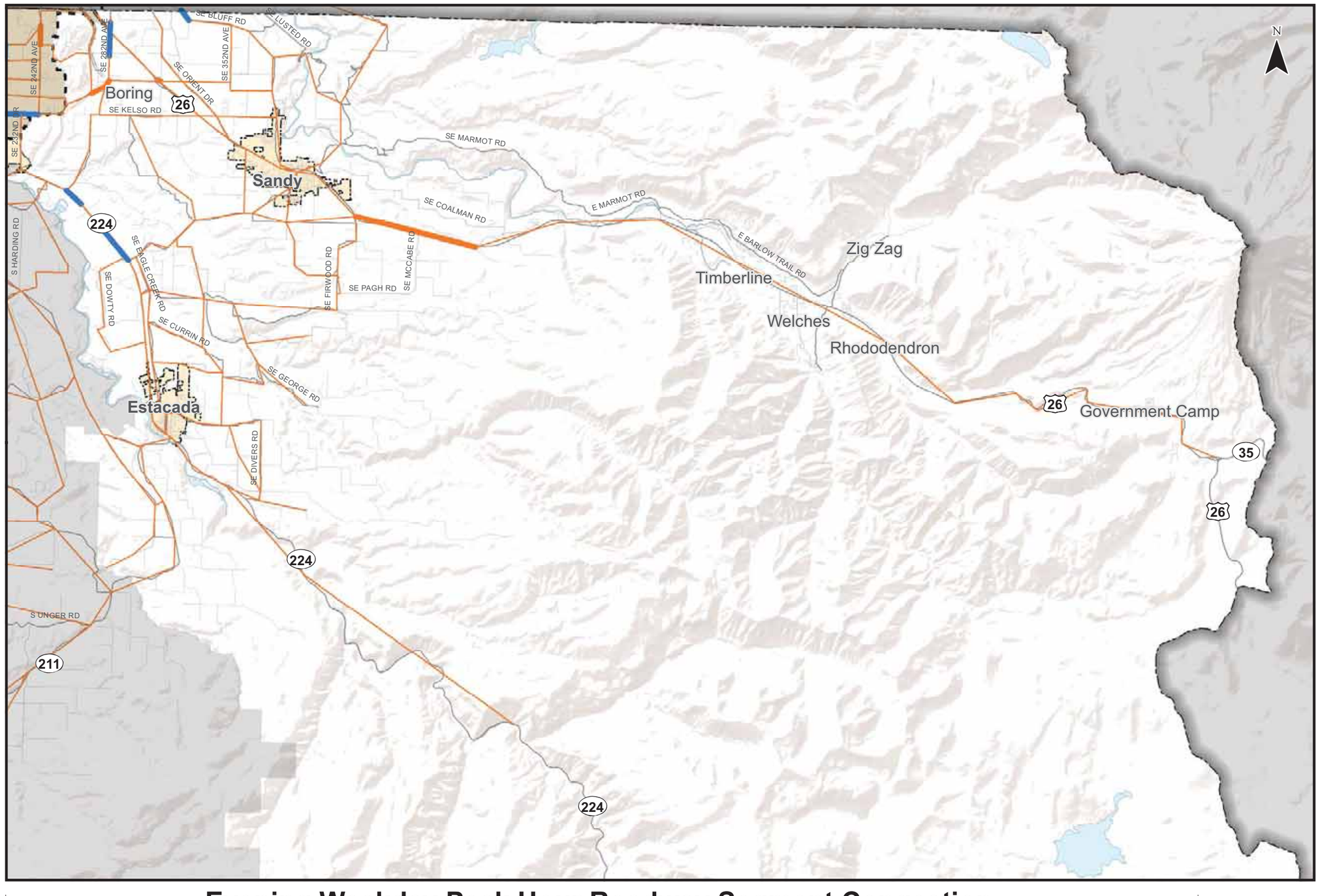
CLACKAMAS COUNTY Transportation System Plan Update



Change in Congestion

Low to Full Build

- Congestion Increases
- Minimal Change
- Congestion Decreases
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 5 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resouce Center

Evening Weekday Peak Hour Roadway Segment Congestion Comparison of 2035 Low Build vs. 2035 Full Build East County - Northern Portion

Figure
EN 43

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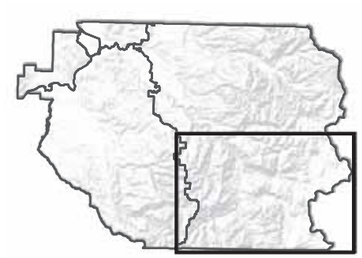
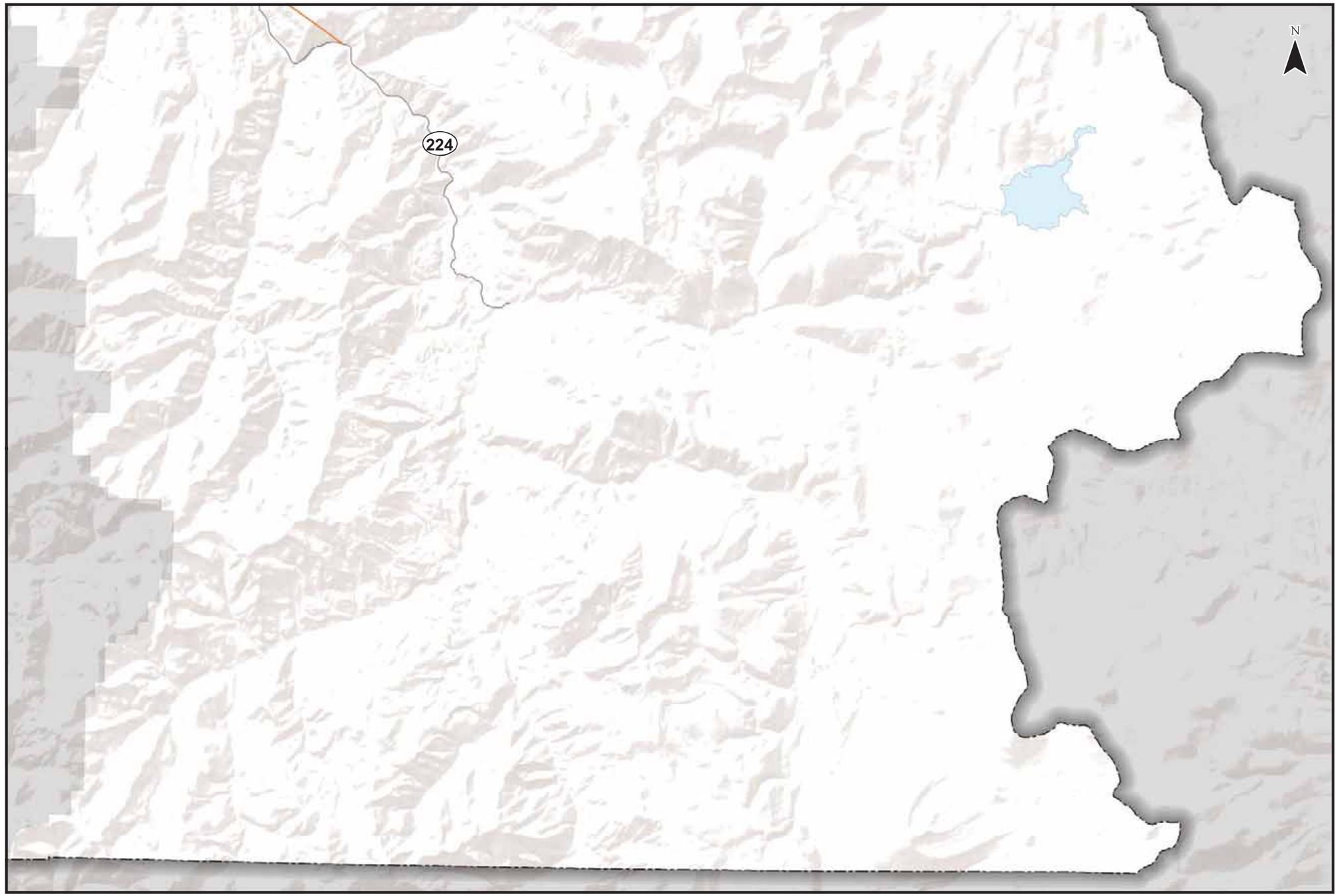
CLACKAMAS COUNTY TRANSPORTATION SYSTEM PLAN Update



Change in Congestion

Low to Full Build

- Congestion Increases
- Minimal Change
- Congestion Decreases
- Incorporated Areas
- County Boundary
- UGB



0 1 2 3 4 Miles

Coordinate System:
NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source:
Cambridge Systematics, Clackamas County,
Metro Data Resouce Center

Evening Weekday Peak Hour Roadway Segment Congestion Comparison of 2035 Low Build vs. 2035 Full Build East County - Southern Portion

Figure
ES 43

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