



TECHNICAL MEMORANDUM #3

Date: June 18, 2015

Project #:
18018.0

To: Mike Kuntz, Jackson County

CC: John McDonald, Oregon Department of Transportation, Region 3

From: Matthew Bell and Susan Wright, P.E. Kittelson & Associates, Inc.

Project: Jackson County Transportation System Plan (TSP) Update

Subject: Draft Technical Memorandum #3: Current Transportation System Operations

This memorandum provides an overview of the current transportation system operations and deficiencies within Jackson County. This memorandum includes an analysis of existing traffic operations and safety at the study intersections and along several major roadways throughout Jackson County. The information included in this memorandum will be used to determine the existing transportation system needs for the Jackson County Transportation System Plan (TSP) update. The information was developed based the existing transportation system inventory presented in Tech Memo #2 as well as information and direction provided by Jackson County and the Oregon Department of Transportation (ODOT) Transportation Planning Analysis Unit (TPAU). *Additional information on the key assumptions and methodologies associated with this analysis is provided in Attachment "A".*

CURRENT TRANSPORTATION SYSTEM OPERATIONS ANALYSIS

The current transportation system operations analysis identifies how the study area's transportation system operates today. This analysis includes an evaluation of traffic operations at the study intersections, including non-motorized (pedestrian and bicycle) operations. The results of this analysis will be used to identify existing transportation system needs at the study intersections for motorized and non-motorized travel modes. Figure 1 illustrates the study area for the Jackson County TSP update and the location of the study intersections.

Kittelison & Associates, Inc. (KAI) staff visited and inventoried the study area in March 2015. At that time, KAI collected information on existing transportation system conditions along county roadways and at the study intersections. Figure 2 illustrates the lane configurations and traffic control devices at the study intersections. *Additional information on the site visit it provided in Attachment "B".*

Traffic Counts

Traffic counts were conducted at the study intersections in June and July 2014. All of the counts were conducted on a typical mid-week day over a 24-hour, 16-hour, or 3-hour time period. All of the counts include the total number of pedestrians, bicyclists, and motor vehicles that entered the study intersections in 15-minute intervals during the morning (6:00 to 9:00 a.m.) and/or evening (3:00 to 6:00 p.m.) peak time periods and on 60-minute intervals during all other times of the day. The traffic counts conducted during the morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak periods were reviewed to determine individual intersection and system peak hours for the operational analysis. The counts were also seasonally adjusted to reflect 30th highest hour traffic volumes and balanced consistent with the methodology provided in the ODOT Analysis Procedures Manual (APM). Figures 3 and 4 summarize the traffic counts at the study intersections during the weekday a.m. and weekday p.m. peak hours, respectively. *The traffic count worksheets are included in Attachment "C".*

Analysis Methodology and Operational Standards

The intersection operations analysis was conducted using Synchro 8 software, which implements the methodologies outlined in the Highway Capacity Manual (HCM). Based on direction provided by TPAU, the HCM 2000 methodology was used to analyze traffic operations at the signalized intersections while the HCM 2010 methodology was used to analyze traffic operations at the unsignalized intersections.

The intersection operations analysis results were compared to operational standards and targets used by the County and ODOT to assess performance and potential areas for improvement. Both the County and ODOT use volume/capacity (v/c) ratios, which compare the volume of traffic entering an intersection to the theoretical capacity of the intersection to accommodate traffic. A v/c ratio of 1.0 indicates that an intersection is operating at capacity while a v/c ratio over 1.0 indicates that the intersection's capacity is exceeded. The County and ODOT v/c standards are summarized below.

- The County's current TSP sets a maximum v/c ratio of 0.85 for all signalized and unsignalized intersections located outside an MPO boundary and a v/c ratio of 0.95 for all signalized and unsignalized located inside an MPO boundary.
- Table 6 of the *Oregon Highway Plan (OHP)* provides maximum v/c ratios for all signalized and unsignalized intersections outside the Metro area. The ODOT controlled intersections within the study area are located along OR62, OR66, OR99, OR140, OR230, OR234, OR238, and at the I-5/Siskiyou Highway interchange.

Intersection Operations

The traffic volumes shown in Figures 3 and 4 were used to analyze traffic operations at the study intersections. Figures 3 and 4 and Tables 1 and 2 summarize the results of the traffic operations analysis at the study intersections for the weekday a.m. and weekday p.m. peak hours, respectively. Note: traffic operations were evaluated at 19 of the study intersections during both the morning and evening peak time periods and at 11 of the study intersections during the evening peak period only.

Table 1: Existing Intersection Operations – Weekday AM Peak Hour

Map ID	Intersection	Level of Service (LOS)	Delay (Sec)	Volume/Capacity (V/C)	Agency	Standard	Met?
1	Hamrick Road/E Pine Street-Biddle Road	A	9.8	0.64	County	0.95	Yes
2	Table Rock Road/Biddle Road	C	25.1	0.65	County	0.95	Yes
3	Table Rock Road/Vilas Road	C	24.3	0.66	County	0.95	Yes
4	Table Rock Road/Antelope Road	B	16.3	0.47	County	0.95	Yes
5	Table Rock Road/Wilson Road	B	11.8	0.15	County	0.95	Yes
6	Table Rock Road/Gregory Road	D	25.2	0.16	County	0.95	Yes
7	Kershaw Road/OR140	C	16.8	0.40	ODOT	0.85	Yes
8	OR62/OR140-Leigh Way	C	34.4	0.85	ODOT	0.85	Yes
9	OR62/OR234-Del Isle Way	C	16.6	0.01	ODOT	0.70	Yes
10	OR62/OR230	A	8.9	0.01	ODOT	0.70	Yes
11	OR62/Vilas Road	C	34.0	0.79	ODOT	0.85	Yes
12	I-5 SB Ramp /Siskiyou Highway	A	8.5	0.02	ODOT	0.75	Yes
13	I-5NB Ramp/Siskiyou Highway	A	8.9	0.00	ODOT	0.75	Yes
14	OR62/Tiller Trail Highway (OR 227)	A	9.5	0.06	ODOT	0.70	Yes
15	OR62/Mill Creek/1 st Street	A	9.7	0.02	ODOT	0.70	Yes
16	OR62/Butte Falls Highway	C	21.3	0.21	ODOT	0.70	Yes
17	OR66/Siskiyou Highway (OR273)	A	9.2	0.03	ODOT	0.75	Yes
18	Rogue River Highway/OR234	A	9.2	0.05	ODOT	0.75	Yes
19	OR238/Upper Applegate Road	A	9.1	0.13	ODOT	0.75	Yes

Table 2: Existing Intersection Operations – Weekday PM Peak Hour

Map ID	Intersection	Level of Service (LOS)	Delay (Sec)	Volume/Capacity (V/C)	Agency	Standard	Met?
1	Hamrick Road/E Pine Street-Biddle Road	C	26.3	0.87	County	0.95	Yes
2	Table Rock Road/Biddle Road	C	28.9	0.67	County	0.95	Yes
3	Table Rock Road/Vilas Road	C	34.3	0.81	County	0.95	Yes
4	Table Rock Road/Antelope Road	C	28.5	0.75	County	0.95	Yes
5	Table Rock Road/Wilson Road	C	16.9	0.17	County	0.95	Yes
6	Table Rock Road/Gregory Road	F	>50	0.46	County	0.95	Yes
7	Kershaw Road/OR140	C	19.4	0.49	ODOT	0.85	Yes
8	OR62/OR140-Leigh Way	C	31.6	0.84	ODOT	0.85	Yes
9	OR62/OR234-Del Isle Way	D	31.4	0.53	ODOT	0.70	Yes
10	OR62/OR230	A	9.1	0.04	ODOT	0.70	Yes
11	OR62/Vilas Road	D	44.9	0.90	ODOT	0.85	No
12	I-5 SB Ramp /Siskiyou Highway	A	8.5	0.02	ODOT	0.75	Yes
13	I-5NB Ramp/Siskiyou Highway	A	9.0	0.03	ODOT	0.75	Yes
14	OR62/Tiller Trail Highway (OR 227)	B	11.5	0.11	ODOT	0.70	Yes
15	OR62/Mill Creek/1 st Street	A	9.7	0.03	ODOT	0.70	Yes
16	OR62/Butte Falls Highway	B	13.1	0.15	ODOT	0.70	Yes
17	OR66/Siskiyou Highway (OR273)	A	9.4	0.01	ODOT	0.75	Yes
18	Rogue River Highway/OR234	A	9.7	0.05	ODOT	0.75	Yes
19	OR238/Upper Applegate Road	A	9.2	0.16	ODOT	0.75	Yes

20	Foothill-Phoenix Road/Hillcrest Road	C	20.4	0.56	County	0.95	Yes
21	Foothill Road/McAndrew Road WB Ramp	E	38.9	0.32	County	0.95	Yes
22	Foothill Road/McAndrew Road EB Ramp	C	19.9	0.45	County	0.95	Yes
23	Foothill Road/Lone Pine Road	C	21.4	0.04	County	0.95	Yes
24	Foothill Road/Coker Butte Road	B	11.3	0.08	County	0.95	Yes
25	Hanley Road/Beall Lane	B	10.2	0.34	County	0.95	Yes
26	E Evans Creek Road at Minthorne Road	A	8.7	0.02	County	0.85	Yes
27	Columbus Road/South Stage Road	C	15.7	0.64	County	0.95	Yes
28	Atlantic Avenue/Antelope Road	B	11.0	0.02	County	0.95	Yes
29	OR66/Old Hyatt Prairie Road	-	0.0	0.00	ODOT	0.75	Yes
30	Antelope Road/Kirtland Road	B	13.1	0.16	County	0.95	Yes

As shown in Figure 3 and 4 and Tables 1 and 2, all of the study intersections currently operate acceptably according to their respective mobility standards with the exception of the OR62/Vilas Road intersection. The following summarizes the deficiencies at the study intersection under existing traffic conditions. *The worksheets used to evaluation traffic operations at the study intersections are included in Attachment “D”.*

- #11 – OR62/Vilas Road – The OR62/Vilas Road intersection currently operates below capacity, but above its mobility target ($v/c=0.85$) during the weekday p.m. peak hour. This is primarily due to the high volume of eastbound left and southbound through movements that occur at the intersection during the weekday p.m. peak hour.
 - There are currently separate left turn lanes at the northbound and southbound approaches with protected phasing
 - There are separate left-turn lanes at the eastbound and westbound approaches with permitted phasing.
 - There are separate right turn lanes at each approach with overlap at the eastbound and westbound approaches.
 - Signal timing and phasing modification opportunities are limited; however, they could improve operations at the intersection as will the addition of a second separate eastbound left-turn lane.

Intersection Queues

A queuing analysis was conducted at the seven signalized study intersections using Synchro 8 software. Table 3 summarizes the 95th percentile queues during the weekday a.m. and p.m. peak hours. The storage lengths reflect the striped storage for each movement at the intersections.

Table 3: Existing 95th Percentile Queues – Weekday AM and PM Peak Hours

Map ID	Intersection	Movement	Weekday AM Queue (Feet)	Weekday PM Queue (feet)	Storage (feet)	Adequate?
1	Hamrick Road/E Pine Street-Biddle Road	EBL	141	352	380	Yes
		WBL	3	10	305	Yes
		NBR	0	0	150	Yes
2	Table Rock Road/Biddle Road	EBL	178	112	450	Yes
		EBR	31	34	225	Yes
		WBL	9	72	75	Yes
		WBR	39	60	200	Yes
		NBL	34	86	100	Yes
		SBL	134	135	100	No
3	Table Rock Road/Vilas Road	EBL	87	95	85	No
		WBL	101	178	115	No
		NBL	37	66	90	Yes
		NBR	53	65	215	Yes
		SBL	92	102	90	No
4	Table Rock Road/Antelope Road	EBR	0	9	150	Yes
		WBL	79	222	275	Yes
		NBL	23	25	100	Yes
		SBL	35	48	270	Yes
8	OR62/OR140-Leigh Way	NBL	70	147	130	No
		NBR	48	166	60	No
		SBL	52	114	200	Yes
11	OR62/Vilas Road	EBL	228	#367	150	No
		EBR	41	51	200	Yes
		WBL	68	89	50	No
		NBL	173	#356	250	No
		NBR	16	38	90	Yes
		SBL	96	128	200	Yes
		SBR	265	241	90	No
20	Foothill-Phoenix Road/Hillcrest Road	175	NA	123	175	Yes
		100	NA	41	100	Yes
		15	NA	99	175	Yes
		150	NA	27	150	Yes

As shown in Table 3, five of the seven signalized study intersections currently have one or more movements where the 95th percentile queues exceed the available striped storage for that movement. In most cases the queues can be accommodated within a center two-way left-turn lane that extends beyond the striped storage, with the exception of the northbound right-turn at the #8 - OR62/OR140-Leigh Way intersection and the southbound right-turn at the #11 - OR62/Vilas Road intersection. These queues have the potential to extend into the adjacent through lane and block traffic. *The worksheets used to evaluation queuing at the signalized study intersections are included in Attachment "E".*

Non-Motorized Operations

As indicated previously, the traffic counts include the total number of pedestrians and bicyclists that entered the study intersections in 15-minute intervals during the morning (6:00 to 9:00 a.m.) and/or evening (3:00 to 6:00 p.m.) peak time periods and on 60-minute intervals during all other times of the day. Tables 4 and 5 summarize the peak hour pedestrian and bicycle volumes by crossing location and direction of travel. The intersections shown in grey are located along urban facilities.

Table 4: Existing Peak Hour Pedestrian Volumes by Crossing Location

Map ID	Intersection	North Leg (am/pm)	East Leg (am/pm)	South Leg (am/pm)	West Leg (am/pm)	Total (am/pm)
1	Hamrick Road/E Pine Street-Biddle Road	1/2		1/1		2/3
2	Table Rock Road/Biddle Road		1/1			1/1
3	Table Rock Road/Vilas Road				0/1	0/1
4	Table Rock Road/Antelope Road	1/0				1/0
5	Table Rock Road/Wilson Road					0/0
6	Table Rock Road/Gregory Road		1/0	1/0		2/0
7	Kershaw Road/OR140	1/0				1/0
8	OR62/OR140-Leigh Way	1/2	1/0		0/2	2/4
9	OR62/OR234-Del Isle Way					0/0
10	OR62/OR230					0/0
11	OR62/Vilas Road		1/0			1/0
12	I-5 SB Ramp /Siskiyou Highway					N/A
13	I-5NB Ramp/Siskiyou Highway					0/0
14	OR62/Tiller Trail Highway (OR 227)	0/1				0/1
15	OR62/Mill Creek/1 st Street		0/1		0/1	0/2
16	OR62/Butte Falls Highway					0/0
17	OR66/Siskiyou Highway (OR273)					0/0
18	Rogue River Highway/OR234				1/0	1/0
19	OR238/Upper Applegate Road					0/0
20	Foothill-Phoenix Road/Hillcrest Road					NA/0
21	Foothill Road/McAndrew Road WB Ramp					NA/0
22	Foothill Road/McAndrew Road EB Ramp					NA/0
23	Foothill Road/Lone Pine Road					NA/0
24	Foothill Road/Coker Butte Road					NA/0
25	Hanley Road/Beall Lane	NA/5				NA/5
26	E Evans Creek Road at Minthorne Road					NA/0
27	Columbus Road/South Stage Road					NA/0
28	Atlantic Avenue/Antelope Road	NA/1				NA/1
29	OR66/Old Hyatt Prairie Road	NA/6	NA/2			NA/8
30	Antelope Road/Kirtland Road					NA/0

The peak hour pedestrian volumes shown in Table 4 indicate that there is a low level of pedestrian activity at a majority of the study intersections. The intersections with the highest level of pedestrian activity are located along urban facilities and within predominantly urban areas as summarized below.

- #1 – Hamrick Road/E Pine Street-Biddle Road – a total of two pedestrians were observed at the intersection during the morning and three pedestrians were observed during the evening peak hours. The intersection is located along an urban minor collector (E Pine Street-Biddle Road) and therefore, should provide sidewalks at the eastbound and westbound approaches at a minimum.
 - The intersection is currently signalized with pedestrian pushbuttons, countdown signal heads, and marked crosswalks at each leg.
 - There are sidewalks in all four corners of the intersection and along the south side of Biddle Road and the east side of Hamrick Road – south of the intersection.
- #8 – OR62/OR140-Leigh Way – a total of two pedestrians were observed at the intersection during the morning and four pedestrians were observed during the evening peak hours. The intersection is located at the intersection of two ODOT facilities in a predominantly urban environment.
 - The intersection is currently signalized with pedestrian pushbuttons, countdown signal heads, and marked crosswalks at the north, east and west legs.
 - There are sidewalks in the northeast, northwest, and southwest corners of the intersection and along both sides of OR62 north of the intersection and both sides of Leigh Way west of the intersection.
- #25 - Hanley Road/Beall Lane – a total of five pedestrians were observed at the intersection during the evening peak hour. The intersection is located at the intersection of an urban minor arterial (Hanley Road north of the intersection), and urban major collector (Beall Lane east of the intersection), a rural minor arterial, and an rural major collector and therefore, should provide sidewalks on the north and east legs at a minimum; however, the intersection is also located in a predominantly residential area adjacent to a neighborhood retail store.
 - The intersection is currently all-way stop-controlled (AWSC) with overhead beacons to alert motorists of the intersection.
 - There are no signed or striped crosswalks at the intersection and no sidewalks along Hanley Road and Beall Road north and east of the intersection.
 - There are 4 to 6-foot shoulders along both sides of Hanley Road and Beall Road south and west of the intersection.
- #29 - OR66/Old Hyatt Prairie Road – a total of eight pedestrians were observed at the intersection during the evening peak hour. The intersection is located at the intersection of an ODOT facility (OR66) with a Bureau of Land Management (BLM) facility (Old Hyatt Prairie Road) in a predominantly rural area adjacent to the Pacific Crest trail system.
 - The intersection is currently two-way stop-controlled (TWSC).
 - There are no signed or striped crosswalks at the intersection and now sidewalks.

Opportunities to improve the pedestrian environment at these intersections, such as wider shoulders in the rural areas, sidewalks in the urban areas, and appropriate crossing treatments, will be evaluated as part of the alternatives analysis and considered as part of the TSP update.

Table 5: Existing Peak Hour Bicycle Volumes by Movement

Map ID	Intersection	Northbound	Eastbound	Southbound	Westbound	Total
1	Hamrick Road/E Pine Street-Biddle Road	0/1	1/1	2/2	2/0	5/4
2	Table Rock Road/Biddle Road	0/2		0/2		0/4
3	Table Rock Road/Vilas Road	0/1		0/1	0/2	0/4
4	Table Rock Road/Antelope Road	1/0		0/1	2/4	3/5
5	Table Rock Road/Wilson Road	0/1	0/2	0/2		0/5
6	Table Rock Road/Gregory Road	0/1		0/1		0/2
7	Kershaw Road/OR140				1/0	1/0
8	OR62/OR140-Leigh Way	1/3	0/1	5/2	1/0	7/6
9	OR62/OR234-Del Isle Way	0/0				0/0
10	OR62/OR230					0/0
11	OR62/Vilas Road	4/1		2/5		6/6
12	I-5 SB Ramp /Siskiyou Highway					N/A
13	I-5NB Ramp/Siskiyou Highway				1/0	1/0
14	OR62/Tiller Trail Highway (OR 227)		0/1			0/1
15	OR62/Mill Creek/1 st Street					0/0
16	OR62/Butte Falls Highway					0/0
17	OR66/Siskiyou Highway (OR273)					0/0
18	Rogue River Highway/OR234				0/1	0/1
19	OR238/Upper Applegate Road					0/0
20	Foothill-Phoenix Road/Hillcrest Road	2	4			6
21	Foothill Road/McAndrew Road WB Ramp					0
22	Foothill Road/McAndrew Road EB Ramp					0
23	Foothill Road/Lone Pine Road					0
24	Foothill Road/Coker Butte Road					0
25	Hanley Road/Beall Lane		1		1	2
26	E Evans Creek Road at Minthorne Road					0
27	Columbus Road/South Stage Road			2	5	7
28	Atlantic Avenue/Antelope Road					0
29	OR66/Old Hyatt Prairie Road					0
30	Antelope Road/Kirtland Road		1			1

The peak hour bicycle volumes shown in Table 5 indicate that there is a moderate level of bicycle activity at several of the study intersections. The locations with the highest level of bicycle activity are summarized below.

- #1 - Hamrick Road/E Pine Road-Biddle Street – a total of five bicyclists were observed at the intersection during the morning peak hour and four bicyclists were observed during the

evening peak hour. The intersection is located along an urban minor collector (E Pine Street-Biddle Road) and therefore, should provide east-west on-street bike lanes at a minimum.

- There are striped bicycle lanes along both sides of E Pine Street west of the intersection and both sides of Biddle road east of to the intersection – the bicycle lanes along Biddle Road terminate east of Table Rock Road.
 - There are striped bicycle lanes on both sides of Hamrick Road north of the intersections and a wide shoulder (>6-feet) along the west side of Hamrick Road south of the intersection.
 - The bicycle lane at the southbound approach is located between the through and the separate right-turn lane.
- #4 – Table Rock Road/Antelope Road – a total of three bicyclists were observed at the intersection during the morning peak hour and five bicyclists were observed during the evening peak hour. The intersection is located along an urban major arterial (Table Rock Road and Antelope Road east of the intersections) and an urban industrial collector (Antelope Road west of the intersection) and therefore, should provide north-south and east-west bike lanes at a minimum.
- There are striped bicycle lanes along both sides of Antelope Road east of the intersection.
 - The bicycle lane at the westbound approach is located between the through and the separate right-turn lane.
 - There are wide shoulders (4 to 6-feet) along both sides of Table Rock Road north and south of the intersection and Antelope Road west of the intersections.
 - If on-street bicycle lanes are installed along Table Rock Road and Antelope Road, the bicycle lanes at the northbound and eastbound approaches should be between the through and separate right turn lanes.
- #8 - OR62/OR140-Leigh Way – a total of seven bicyclists were observed at the intersection during the morning peak hour and six bicyclists were observed during the evening peak hour. The intersection is located at the intersection of two ODOT facilities in a predominantly retail/commercial area.
- There are striped bicycle lanes along both sides of OR 62 north and south of the intersection.
 - The bicycle lane at the northbound approach is located between the through and the separate right-turn lane.
 - There are striped bicycle lanes on both sides of Leigh Way west of the intersection and a wide shoulder (4 to 6-feet) on the south side of OR140 east of the intersection.

- #11 - OR62/Vilas Road - a total of six bicyclists were observed at the intersection during the morning peak hour and six bicyclists were observed during the evening peak hour. The intersection is located at the intersection of an ODOT facility with an urban minor arterial (Vilas Road west of the intersection) and a rural major collector (Vilas Road east of the intersection), and therefore should provide bike lanes west of the intersection and shoulders east of the intersection at a minimum.
 - There are striped bicycle lanes along OR62 north and south of the intersection.
 - The bike lanes at the northbound and southbound approaches are located between the through and the separate right-turn lanes.
 - There are striped bike lanes along Vilas Road west of the intersection and eastbound approach has striped bicycle lanes and the westbound approach has no shoulders.

Opportunities to improve the bicycle environment at these intersections, such as wider shoulders in the rural areas, striped bike lanes in the urban areas, and appropriate crossing treatments, will be evaluated as part of the alternatives analysis and considered as part of the TSP update.

BICYCLE LEVEL OF TRAFFIC STRESS

The bicycle facilities located along select County roadways were evaluated under existing traffic conditions in an effort to identify any potential issues that could be addressed as part of the TSP update. The APM provides a methodology for evaluating bicycle facilities within urban and rural environments that is known as Bicycle Level of Traffic Stress (LTS). As applied by ODOT, this methodology classifies four levels of traffic stress that a cyclist can experience on the roadway, ranging from LTS 1 (little traffic stress) to LTS 4 (high traffic stress).

A road segment with a LTS 1 generally has low traffic speeds and low volumes and is suitable for all cyclists, including children. A road segment with a LTS 4 generally has high speeds, high volumes and is perceived as unsafe by most adults. LTS 2 is considered appealing to a majority of the bike-riding population and is the desired target on most roadways. Figure 5 illustrates the results of the LTS analysis for Jackson County.

There results of the analysis indicate that there are eight segments with LTS 2, 21 segments with LTS 3, and six segments with LTS 4. It is important to note that while some segments with LTS 3 or 4 have shorter segments with lower LTS scores, the LTS of the whole segment is based on the worst LTS.

Opportunities to improve the bicycle environment along the segments with an LTS 3 or higher, such as wider shoulders in the rural areas and striped bike lanes in the urban areas, will be evaluated as part of the alternatives analysis and considered as part of the TSP update.

The following summarizes the segments with LTS 3:

- W Pine Street from Highway 99 to Hanley Road
- Hanley Road from W Pine Street to Rossanley Drive

- Ross Lane from Hanley Road to Old Stage Road
- S Stage Road from Highway 99 to Jacksonville
- N Phoenix Road from Phoenix city limits to Barnett Road
- Foothill Road from Hillcrest Road to Corey Road
- Bigham-Brown Road from Antelope Road to Alta Vista Road
- E Pine Street from I-5 northbound ramps to 500' east of Table Rock Road
- Table Rock Road from south touchdown of I-5 overcrossing to OR234
- East Vilas Road from OR62 to Foothill Road
- Antelope Road from Kirtland Road to Bigham-Brown Road
- Eagle Mill Road from S Valley View Road to Oak Street
- Colver Road from OR99 to Phoenix city limit
- Pioneer Road from Colver Road to Griffin Creek Road
- Coleman Creek Road from Pioneer Road to Carpenter Hill Road
- Carpenter Hill Road from Coleman Creek Road to Voorhies Road
- Voorhies Road from Carpenter Hill Road to S Stage Road
- Stewart Avenue from Oak Grove Road to Hull Road
- Hull Road from Stewart Avenue to S Stage Road
- Bellinger Lane from Hull Road to S Stage Road
- E Evans Creek Road from Rogue River city limit to Meadows Road

A majority of the segments with LTS 3 have 0 to 2 feet wide shoulders with traffic volumes between 1,500 and 7,000 vehicles per day (VPD) or 4 to 6 feet wide shoulders with traffic volumes that exceed 1,500 VPD. In order for these segments to be rated LTS 2, the shoulders would need to be widened to a minimum of 6 feet; however, if traffic volumes exceed 7,000 VPD, a separated multi-use path is needed to be rated LTS 2.

The following summarizes the segments with LTS 4:

- Old Stage Road from Jacksonville city limits to I-5 Exit 40
- W Main Street from Renault Avenue to Hanley Road
- Fern Valley Road from N. Phoenix to Payne Road
- Dark Hollow Road from Pioneer Road to Pioneer Road
- Griffin Creek Road from S Stage Road to Pioneer Road
- E Main Street (Ashland) from Walker Road to OR66

All of the segments with LTS 4 have a posted speed limit of less than 40 miles per hour (mph), and therefore have a different set of criteria than the rural, high speed segments. In order for these segments to be rated LTS 2, the shoulders or bike lanes would need to be widened to a minimum of 5.5 feet at 30 mph or below, 7-feet at 35 mph, and a separated multi-use path would be needed at 40 mph. A reduction in the posted speed limit is another alternative that could be considered along these segments. *Additional information on the Bicycle LTS analysis results are included in Attachment "F".*

CRASH ANALYSIS

A crash analysis was conducted at the study intersections and along select County facilities in an effort to identify any potential safety issues that could be addressed as part of the TSP update. The crash analysis includes a review and summary of data obtained from ODOT for the five-year period from January 1, 2009 through December 31, 2013. The data includes the location, type, and severity of all crashes that occurred along County and ODOT facilities within Jackson County, as well as detailed information on the crashes (year, month, day, time, weather, number, age, and gender of drivers/passengers, direction, actions, errors, causes, etc.). The crash data was obtained in GIS format and therefore, is not available as an attachment.

Intersection Crash Analysis

Figure 6 illustrate the location and severity of crashes along all County and ODOT facilities. The crash data at the study intersections was compiled and analyzed for crash patterns, potential causes, and potential countermeasures. Table 6 summarizes the location, type, severity, and number of crashes that occurred at the study intersections over the 5-year period.

Table 6: Intersection Crash Summary (2009-2013)

Map ID	Intersection	Collision Type								Severity			Total	Crash Rate	Met?
		Angle	Turning	Side-swipe	Rear End	Head On	Fixed Object	Ped/Bike	Other	PDO	Injury	Fatal			
1	Hamrick Road/E Pine Street-Biddle Road	3	24	2	5	0	0	0	0	19	15	0	34	0.82	No
2	Table Rock Road/Biddle Road	4	16	0	14	0	0	0	0	13	21	0	34	0.79	No
3	Table Rock Road/Vilas Road	7	21	3	20	0	1	0	3	26	29	0	55	1.20	No
4	Table Rock Road/Antelope Road	0	6	0	1	0	1	0	0	3	5	0	8	0.31	Yes
5	Table Rock Road/Wilson Road	0	7	1	2	0	1	0	0	6	5	0	11	0.43	Yes
6	Table Rock Road/Gregory Road	0	3	1	14	0	2	2	0	7	14	1	22	1.00	Yes
7	Kershaw Road/OR140	13	1	0	3	0	0	0	0	5	12	0	17	1.16	No
8	OR62/OR140	1	10	2	33	0	0	1	1	19	28	1	48	0.86	No
9	OR62/OR234-Del Isle Way	0	6	0	2	0	1	0	0	3	6	0	9	0.54	Yes
10	OR62/OR230	0	0	0	0	1	0	0	0	1	0	0	1	0.42	Yes
11	OR62/Vilas Road	3	20	6	31	0	0	1	1	28	34	0	62	0.92	No
12	I-5 SB Ramp /Siskiyou Highway	0	0	1	0	0	0	0	0	1	0	0	1	1.00	No
13	I-5NB Ramp/Siskiyou Highway	0	0	0	0	0	0	0	0	0	0	0	0	0.00	Yes
14	OR62/Tiller Trail Highway (OR 227)	0	0	0	1	0	0	0	0	0	1	0	1	0.12	Yes
15	OR62/Mill Creek/1 st Street	0	1	0	0	0	0	0	0	1	0	0	1	0.33	Yes
16	OR62/Butte Falls Highway	0	2	0	0	0	1	0	0	3	0	0	3	0.28	Yes
17	Siskiyou Highway/OR66	0	0	0	0	0	0	0	2	2	0	0	2	0.68	No
18	Rogue River Highway/OR234	0	2	0	1	0	1	0	0	2	2	0	4	0.95	No
19	OR238/Upper Applegate Road	0	0	0	0	0	1	0	3	4	0	0	4	0.89	No
20	Foothill-Phoenix Road/Hillcrest Road	1	0	0	1	0	2	0	1	3	1	1	5	0.18	Yes
21	Foothill Road/McAndrew Road WB Ramp	0	1	0	1	0	1	0	0	1	2	0	3	0.14	Yes
22	Foothill Road/McAndrew Road EB Ramp	0	4	0	0	0	1	0	0	5	0	0	5	0.23	Yes
23	Foothill Road/Lone Pine Road	0	1	1	0	0	1	0	0	2	1	0	3	0.15	Yes
24	Foothill Road/Cocker Butte Road	0	0	0	6	1	4	0	1	5	6	1	12	1.01	No
25	Hanley Road/Beall Lane	1	0	0	0	0	0	0	0	1	0	0	1	0.08	Yes
26	E Evans Creek Road at Minthorne Road	0	2	0	0	0	1	0	0	2	1	0	3	0.74	No
27	Columbus Road/Stage Road	1	1	0	1	0	1	0	0	3	1	0	4	0.33	Yes
28	Atlantic Avenue/Antelope Road	0	0	0	0	0	1	0	0	1	0	0	1	0.19	Yes

29	OR66/Old Hyatt Prairie Road	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
30	Antelope Road/Kirtland Road	0	0	0	1	0	1	0	1	1	2	0	3	0.30	

PDO = Property Damage Only
 MEV = Million Entering Vehicles

Table 6 also includes a calculated crash rate for each study intersection per million entering vehicles (MEV). This rate was compared to the 90th percentile rates for similar facilities included in Table 4-1 of the APM to identify intersections for further review. As shown in Table 6, a total of 12 intersections currently exceed the 95th percentile crash rates for similar intersections. Of the 12 intersections, seven were identified for further evaluation.

- #1 - Hamrick Road/E Pine Street-Biddle Road – A total of 34 crashes were reported at the intersection over the 5 year period. Of the 34 crashes, 15 resulted in an injury, and 19 resulted in property damage only. A majority of the crashes were reported as turning movement crashes, which is typical of signalized intersections with permitted and protected-permitted phasing.
 - The intersection currently has separate left turn lanes at the eastbound and westbound approaches with protected-permitted phasing (the signal at the westbound approach is a dog-house).
 - The northbound and southbound approaches have shared through-left turn lanes with permitted phasing and a negative off-set.
- #2 - Table Rock Road/Biddle Road - A total of 34 crashes were reported at the intersection over the 5 year period. Of the 34 crashes, 21 resulted in an injury, and 13 resulted in property damage only. A majority of the crashes were reported as turning movement and rear-end crashes, which is typical of signalized intersections with protected-permitted phasing.
 - The intersection currently has separate left turn lanes at each approach with protected-permitted phasing.
 - The eastbound, westbound, and southbound approaches have separate right-turn lanes. The southbound right-turn lane has overlap.
- #3 - Table Rock Road/Vilas Road - A total of 55 crashes were reported at the intersection over the 5 year period. Of the 55 crashes, 29 resulted in an injury, and 26 resulted in property damage only. A majority of the crashes were reported as turning movement and rear-end crashes, which is typical of signalized intersections with protected-permitted phasing.
 - The intersection currently has separate left turn lanes at the north, south, east, and westbound approaches with protected-permitted phasing.
 - The northbound approach has a separate channelized right-turn lane with yield control.
- #7 - Kershaw Road/OR140 - A total of 17 crashes were reported at the intersection over the 5 year period. Of the 17 crashes, 12 resulted in an injury, and 5 resulted in property damage only. A majority of the crashes were reported as angle crashes, which is typical of a two-way stop controlled intersection.

- The intersection currently has separate left and right-turn lanes at the eastbound and westbound approaches and a flared right-turn lane at the northbound approach.
 - The northbound and southbound approaches are stop controlled.
 - Beacons are provided overhead to alert motorist of the intersection and there appears to be sufficient sight-distance at the northbound and southbound approaches.
- #8 - OR 62/OR140 – A total of 48 crashes were reported at the intersection over the 5 year period. Of the 48 crashes, 28 resulted in an injury, 19 resulted in property damage only, and 1 resulted in a fatality. A majority of the crashes were reported as rear-end and turning crashes, which is typical of a signalized intersection with permitted phasing.
 - The intersection currently has separate left-turn lanes at the northbound and southbound approaches with protected phasing.
 - The eastbound and westbound approaches have shared through/left-turn lanes with permitted phasing.
 - The eastbound, westbound, and northbound approaches have separate right-turn lanes.
 - #11 - OR 62/Vilas Road – A total of 62 crashes were reported at the intersection over the 5 year period. Of the 62 crashes, 34 resulted in an injury and 28 resulted in property damage only. The majority of the crashes were reported as rear-end and turning crashes, which is typical of a signalized intersection with permitted phasing.
 - The intersection currently has separate left-turn lanes at the northbound and southbound approaches with protected phasing.
 - The eastbound and westbound approaches have separated left-turn lanes with permitted phasing.
 - The northbound, southbound, and eastbound approach have separated right-turn lanes.
 - #24 - Foothill Road/Coker Butte Road – A total of 12 crashes were reported at the intersection over the 5 year period. Of the 12 crashes, 6 resulted in an injury, 5 resulted in property damage only, and 1 resulted in a fatality. The majority of the crashes were rear end crashes and fixed object crashes, which is typical of two-way stop controlled intersections.
 - There is currently no separate left or right turn lanes at the northbound and southbound approaches to separate slowed or stopped vehicles from high-speed through vehicles.
 - The eastbound approach has a flared right-turn lane.

- The eastbound and westbound approaches are stop controlled.

No trends or patterns were identified at the remaining study intersections that require further evaluation as part of the TSP update.

Opportunities to improve traffic operations and safety at these intersections, such as signing and striping, separate left- and right-turn lanes, signal timing and phasing, will be evaluated as part of the alternatives analysis and considered as part of the TSP update.

Segment Crash Analysis

Segment crash rates were calculated and compared with official published crash rates from ODOT *Crash Tables – Table II*, which provides 90th percentile crash rates by functional classification. Ten segments were analyzed for crash rates. Table 7 reports the crash rate analysis findings. Cells that are highlighted represent crash rates that are higher than the 90th percentile crash rate for that type of facility.

Table 7: Segment Crash Summary (2009-2013)

Roadway	Segment	Number of Crashes	Segment Length	ADT	Crash Rate	90 th Percentile Crash Rate
Foothill Rd	Hillcrest to Lone Pine	21	0.26	4,879	9.01	1.36
	Lone Pine Road to Coker Butte	41	2.06	6,228	1.75	1.36
	Coker Butte to Corey	52	2.88	6,228	1.59	1.36
Old Stage Rd	Jacksonville City Limits to Tami Lane	2	1.08	2,269	0.45	1.36
	Tami Lane to Ross Lane	4	0.90	2,283	1.06	1.36
	Ross Lane to Beall Lane	6	1.27	1,503	1.72	1.36
	Beall Lane to Taylor Road	11	0.85	2,110	3.37	1.36
	Taylor Road to Scenic Ave	2	1.38	2,227	0.36	1.36
	Scenic Ave to I-5 exit	27	4.77	2,562	1.21	1.36
Table Rock Road	Morningside to Biddle Road	82	1.28	17,283	2.03	1.15
	Biddle Road to E Villas Road	78	0.76	17,283	3.27	1.15
	E Villas Road to Wilson	17	0.50	18,266	1.02	1.15
	Wilson to West Gregory	38	0.99	16,933	1.24	1.15
	West Gregory to Antelope Road	33	1.14	14,545	1.09	1.15
	Antelope Road to Kirtland Rd	10	0.54	8,434	1.19	1.15
	Kirtland Road to Modoc/Bybee Ferry Road	9	1.24	7,291	0.54	1.15
	Modoc/Bybee Ferry Road to Highway 234	31	4.55	2,703	1.38	1.36
Antelope	Kirtland to Table Rock Road	11	1.20	3,040	1.65	1.36
	Kirtland to Agate Road	21	1.52	13,550	0.56	0.76
	Agate Road to Hwy 62	30	0.33	8,703	5.80	1.15
	Hwy 62 to Division Road	13	0.15	10,799	4.27	1.15
	Division Road to Hale Way	7	0.46	7,452	1.12	1.15

	Hale Way to Atlantic Ave	9	0.97	4,999	1.01	1.15
	Atlantic Ave to Bighma-Brown	2	0.83	2,367	0.56	1.36
Meadows Rd	E Evans Creek to Beagle Road	9	5.23	549	1.72	1.36
	Beagle Road to Highway 234	4	2.75	723	1.10	1.36
E Evans Creek Rd	Rogue River city limit to Forest Hills Road	30	3.56	4,715	0.98	1.36
	Forest Hills Road to Minthorne Road	7	1.61	2,968	0.80	1.36
	Minthorne Road to Pleasant Creek Road	9	1.40	2,503	1.41	1.36
	Pleasant Creek to Covered Bridge Road	0	0.56	1,284	0.00	1.36
	Covered Bridge Road to East of Sykes Road	1	1.58	1,040	0.33	1.36
	East of Sykes Road to Meadows Road	9	12.51	570	0.69	1.36
Pioneer Rd	Colver Road to Coleman Creek Road	5	1.24	1,630	1.36	1.96
	Coleman Creek Road to Dark Hollow Road	2	0.66	1,237	1.34	1.96
	Dark Hollow Road to Carpenter Hill Road	6	2.21	747	1.99	1.96
	Carpenter Hill Road to Dark Hollow Road	8	0.47	1,106	8.47	1.96
	Dark Hollow Road to Griffin Creek Road	3	0.79	1,367	1.52	1.96
S Stage Rd	Highway 99 to Voorhies Road	5	0.25	6,561	1.70	1.15
	Voorhies Road to Kings Highway	15	1.68	5,723	0.86	1.15
	Kings Highway to Columbus Avenue	6	0.57	5,537	1.05	1.15
	Columbus Avenue to Orchard Home	6	0.43	4,438	1.72	1.15
	Orchard Home to Hull Road	9	1.04	3,868	1.23	1.15
	Hull Road to Arnold Lane	11	1.09	4,091	1.35	1.15
	Arnold Lane to Bellinger Lane	2	0.97	3,236	0.35	1.15
Bellinger Lane to Jacksonville	2	0.56	5,151	0.38	1.15	
Hanley Road	W Pine to Ross Lane	7	1.58	4,848	0.50	1.15
	Ross Lane to Rossanley	4	0.32	5,997	1.15	1.36
	Rossanley to Jacksonville City Limits	61	2.15	5,920	2.62	1.36
N Phoenix Rd	Phoenix city limits to Barnett	23	2.30	7,610	0.72	1.15

As shown in Table 7, a total of 21 segments currently exceed the 90th percentile crash rates for the similar facilities. Of the 21 segments, 17 were identified for further evaluation – based on the APM, segments that are less than a mile long tend to show an over-estimated segment crash rate and are impacted more significantly by intersection crashes than longer segments. Six of the segments shorter than a mile that were found to exceed the 90th percentile crash rates were analyzed based on engineering judgement. The following segments were analyzed.

- Foothill Road – Hillcrest to Lone Pine – Of the 21 crashes along the segment, 7 were reported as fixed object, which was the most common type of crash on the segment. The majority, 15 crashes, were property damage only crashes and 6 crashes resulted in injury. No fatalities were reported.
- Foothill Road – Lone Pine Road to Coker Butte – Rear-end crashes were the most common type of crash on this segment with 18 of the 41 crashes. Fixed object crashes were the second most common type of crash with 14 crashes. Injuries were reported in 25 of the crashes recorded.
- Foothill Road – Coker Butte to Corey Road – Fixed object and rear-end crashes account for 37 of the 52 reported crashes on the segment, with 23 and 14 crashes, respectively. Almost half, 23 crashes, reported excessive speeds as a factor in the crashes. This segment experienced two fatal crashes. The fatalities were the result of a head-on collision in both cases. Neither case involved alcohol but in both occurrences the road surface had precipitation and speed too fast for conditions was the attributing cause from the reports.
- Old Stage Road – Ross Lane to Beall Lane – This study section reported six crashes. Fixed object and turning movement were the two crash types reported on the segment with 2 and 4 crashes, respectively. No crash patterns were observed.
- Old Stage Road – Beall Lane to Taylor Road – A total of 11 crashes were reported on the segment. Fixed object crashes accounted for the majority of the crashes on the corridor with seven reported. Of the 11 crashes, 8 resulted in an injury, while the other 3 were property damage only.
- Table Rock Road – Biddle Road to E Villas Road – Of the 78 crashes reported on the segment, the two most common types were turning movement and rear-end with 32 and 28 crashes, respectively. Forty-six crashes resulted in an injury and 32 crashes were reported as property damage only.
- Table Rock Road – Wilson to West Gregory Road – Rear-end crashes account for 21 of the 38 crashes reported on the segment. Of the 38 crashes, 24 resulted in an injury while the other 14 were property damage only. One of the reported crashes involved a pedestrian and resulted in an injury. The crash report cited the cause of the collision to be from the pedestrian being illegally in the roadway.
- Table Rock Road – Modoc/Bybee Ferry Road to OR234 – Of the 31 crashes along the segment, 11 were reported as fixed object, the most common type. Turning movement crashes followed with 8 crashes. Two-thirds of the crashes reported injuries and just under half of the crashes occurred under lighting other than day light. No street lights are present on this section of roadway which may be a contributing factor.
- Antelope Road – Kirtland Road to Table Rock Road – A total of 11 crashes were reported on the segment over the 5 year period. Turning movement crashes accounted for the majority

of the crashes on the corridor with seven reported. Of the 11 crashes, 7 resulted in an injury, while the other 4 were property damage only.

- Antelope Road – Agate Road to OR62 – A total of 30 crashes were recorded on the segment, 17 of which were rear-end crashes. Sixteen of the crashes resulted in injuries while the other 14 were property damage only.
- Meadows Road – E Evans Creek to Beagle Road – Fixed object crashes were the most common on this segment of Meadows Road with five of the nine recorded crashes. There were no fatalities but seven crashes reported injuries.
- E Evans Creek Road – Minthorne Road to Pleasant Creek Road – Fixed object and turning movement crashes each accounted for the three crashes on the segment. Of the nine crashes, three reported injuries while the other six were property damage only.
- Pioneer Road – Dark Hollow Road (south) to Carpenter Hill Road – A total of six crashes were recorded on this segment, of which four were fixed object collisions. The severity of the six crashes was evenly split between injury and property damage only. Two crashes occurred when there was ice on the roadway surface; both of these crashes were fixed object and speed too fast for conditions was cited as the cause.
- Pioneer Road – Carpenter Hill Road to Dark Hollow Road – A total of eight crashes were reported on the segment. Turning movement crashes accounted for half (4) of the crashes recorded and fixed object crashes accounted for 3 crashes. Of the crashes reported, three resulted in an injury and the other five were property damage only.
- S Stage Road – Orchard Home Road to Hull Road – Of the nine crashes recorded on the segment, five were turning movement crashes. Four of the crashes resulted in injuries while the other five were property damage only. No fatality crashes were reported.
- S Stage Road – Hull Road to Arnold Lane – Fixed object and turning movement crashes each accounted for the four of the 11 crashes on the segment. Six of the crashes resulted in injuries while the other five were property damage only. No fatality crashes were reported.
- Hanley Road – Rossanley to Jacksonville City Limits – A total of 61 crashes were recorded during the five year period. Of the 61 crashes, the two most common types were turning movement and fixed object with 29 and 20 crashes, respectively. An injury resulted in 37 crashes, 23 crashes were property damage only, and one crash resulted in a fatality. The fatal crash was a fixed object crash. Alcohol was not reported as a factor; driving in excess of posted speed was cited as a cause.

For all segments with crash rates higher than the 90th percentile crash rate, the three most common collision types are fixed object, rear-end, and turning movement. A majority of the rear-end and turning movement crashes occur at intersections along the segments, while the fixed object crashes occur between the intersections.

Opportunities to improve traffic operations and safety along these roadway segments, such as signing and striping, separate left- and right-turn lanes will be evaluated as part of the alternatives analysis and considered as part of the TSP update.

Statewide Safety Priority Index System

The ODOT Statewide Priority Index System (SPIS) identifies sites along state highways where safety issues warrant further investigation. The SPIS is a method developed by ODOT for identifying hazardous locations on state highways through consideration of crash frequency, crash rate, and crash severity. Sites identified within the top 5 percent are investigated by ODOT staff and reported to the Federal Highway Administration (FHWA). The following segments have been identified within the top five percent over the last five-year period:

- OR62 from mile point 0.05 to 17.33 (multiple segments)
- OR99 from mile point 3.60 to 19.14 (multiple segments)
- OR140 from mile point 2.20 to 2.38
- OR234 from mile point 10.57 to 12.68
- OR238 from mile point 28.40 to 38.15

Additional information related to ODOT's investigation and potential improvements will be provided in subsequent versions of this memo.

FREIGHT ANALYSIS

The Motor Carrier Transportation Division (MCTD) routes within Jackson County were reviewed along with the intersections of the routes to identify any potential issues with freight truck movements. These routes and intersections experience the highest percentage of heavy vehicle traffic within the County, and therefore should accommodate efficient freight truck movements.

- #10 - OR62/OR230 – There are currently separate right turn lanes at the northbound and westbound approaches to the intersection that appear to be capable of accommodating freight truck movements.
- #8 - OR62/OR140-LeighWay – There are currently separate right-turn lanes at the eastbound and westbound approaches to the intersection that appear to be capable of accommodating freight truck movements.
 - This intersection is identified above as exceeding the 95th percentile crash rates for similar facilities.
- OR62/OR99/OR238 – There are currently separate right-turn lanes at the northbound, southbound, and westbound approaches to the intersection that appear to be capable of accommodating freight truck movements.

- #17 - OR66/Siskiyou Highway (OR273) – There are currently no separate right-turn lanes at the intersection; however, the intersection appears to be capable of accommodating freight movements.
- OR99/OR234 – There are currently no separate right-turn lanes at the intersection and while the intersection appears to be capable of accommodating freight truck movements, the narrow travel lanes may make turning movements a challenging for some drivers.
- OR62/OR234 – There is a separate right-turn lane at the southbound approach and a flared right-turn lane at the eastbound approach that appear to be capable of accommodating freight truck movements.

In 2012, The Rogue Valley Metropolitan Planning Organization (RVMPO) released the *Freight Study Report*. The report provides a comprehensive review of existing freight conditions within the RVMPO service area of Jackson County. Based on the report, the primary deficiencies of the Jackson County roadway network include a lack of viable alternative routes when regular routes are blocked during construction, daily out-of-direction travel to avoid bottlenecks and congestion, and restrictions that prevent the movement of oversized freight at certain times.

- Alternative Routes – Due to congestion, many carriers use alternate routes to avoid the North Medford Interchange and Highway 62. Heading to I-5 from White City and/or Highway 62, they use Vilas Road and Table Rock Road. Those heading north often connect with I-5 at the Seven Oaks Interchange via Kirtland Road.
- Out-of-direction travel – Manufacturers are taking circuitous routes to reach their warehouses. Shippers are using alternative routes to OR99, OR62, and particularly the northbound OR62/I-5 interchange. This is placing significant burdens on the Central Point Interchange, Hamrick Road, Table Rock Road, Vilas Road, and Kirtland Road. These routes are de facto freight routes in the area.
 - Table Rock Road which travels north-south through Medford connects to OR234. The road is heavily used by trucks. Expanding the road into a four-lane highway with turning lanes would improve freight movement along this roadway.
 - Many freight truck drivers currently use the Central Point interchange to avoid the North Medford Interchange and Highway 62 during heavy congestion. A common occurrence is when drivers exit I-5 at the Central Point interchange, head east on Pine Street and then north on Hamrick Road. Further evaluation of potential restrictions of Hamrick Road is provided below.
- Regulatory Issues - Truckers are most disturbed about the state and federal regulations that restrict freight movements on certain roadways and during certain times of the day.
 - Oversize freight loads face several key limitations. For example, a curfew exists on oversize loads from 7:00 to 9:00 a.m., 11:00 a.m. to 1:00 p.m., and 4:00 to 6:00 p.m. on the viaduct and within city limits. There is also a statewide regulation that

prevents oversized loads from using state highways on weekends from Memorial Day through Labor Day. These restrictions severely limit the operational capacity of freight movement.

If freight truck movements were restricted on Hamrick Road, drivers would likely continue to use the Central Point interchange to avoid the North Medford Interchange and Highway 62 during heavy congestion. However, rather than using Hamrick Road drivers would continue east to Table Rock Road where heavy vehicles volumes would increase by approximately 200 percent. Based on the current transportation system operations analysis described above, the Table Rock Road/Biddle Road intersection can accommodate the increase in heavy vehicle volumes. In addition, the intersection currently has separate right-turn lanes at the eastbound, westbound, and southbound approaches that appear to be capable of accommodating freight truck movements.

EXISTING DEFICIENCIES

The following provides a summary of existing deficiencies in the County related to freight movement, pedestrian and bicycle facilities within the urban areas, and pavement conditions.

Intersection Deficiencies

Table 8 summarizes the intersection deficiencies identified under existing traffic conditions.

Table 8: Intersection Deficiencies

Map ID	Intersection	Deficiency
11	OR62/Vilas Road	Currently operates above mobility target (v/c=0.85)

Bicycle Deficiencies

Table 9 summarizes the bicycle LTS deficiencies identified under existing traffic conditions.

Table 9: Bicycle LTS Deficiencies

Road	From/To	Deficiency
W Pine Street	Highway 99 to Hanley Road	Currently operates at LTS3
Hanley Road	W Pine Street to Rossanley Drive	Currently operates at LTS3
Ross Lane	Hanley Road to Old Stage Road	Currently operates at LTS3
S Stage Road	Highway 99 to Jacksonville	Currently operates at LTS3
N Phoenix Road	Phoenix city limits to Barnett Road	Currently operates at LTS3
Foothill Road	Hillcrest Road to Corey Road	Currently operates at LTS3
Bigham-Brown Road	Antelope Road to Alta Vista Road	Currently operates at LTS3
E Pine Street	I-5 northbound ramps to 500' east of Table Rock Road	Currently operates at LTS3
Table Rock Road	south touchdown of I-5 overcrossing to OR234	Currently operates at LTS3
East Vilas Road	OR62 to Foothill Road	Currently operates at LTS3
Antelope Road	Kirtland Road to Bigham-Brown Road	Currently operates at LTS3

Eagle Mill Road	S Valley View Road to Oak Street	Currently operates at LTS3
Colver Road	OR99 to Phoenix city limit	Currently operates at LTS3
Pioneer Road	Colver Road to Griffin Creek Road	Currently operates at LTS3
Coleman Creek Road	Pioneer Road to Carpenter Hill Road	Currently operates at LTS3
Carpenter Hill Road	Coleman Creek Road to Voorhies Road	Currently operates at LTS3
Voorhies Road	Carpenter Hill Road to S Stage Road	Currently operates at LTS3
Stewart Avenue	Oak Grove Road to Hull Road	Currently operates at LTS3
Hull Road	Stewart Avenue to S Stage Road	Currently operates at LTS3
Bellinger Lane	Hull Road to S Stage Road	Currently operates at LTS3
E Evans Creek Road	Rogue River city limit to Meadows Road	Currently operates at LTS3
Old Stage Road from	Jacksonville city limits to I-5 Exit 40	Currently operates at LTS4
W Main Street	Renault Avenue to Hanley Road	Currently operates at LTS4
Fern Valley Road	N. Phoenix to Payne Road	Currently operates at LTS4
Dark Hollow Road	Pioneer Road to Pioneer Road	Currently operates at LTS4
Griffin Creek Road	S Stage Road to Pioneer Road	Currently operates at LTS4
E Main Street	Walker Road to OR66	Currently operates at LTS4

In addition to the above LTS deficiencies, the majority of the County’s rural roadways lack standard width shoulders to accommodate cyclists outside of the vehicle travel lane. Attachment “G” contains a comprehensive list of County facilities and a summary of the pedestrian and bicycle system needs within the rural areas.

Safety Deficiencies

Tables 10 and 11 summarize the safety deficiencies identified at the study intersections and roadway segments under existing traffic conditions.

Table 10: Safety Deficiencies - Intersections

Map ID	Intersection	Deficiency
1	Hamrick Road/E Pine Street-Biddle Road	Currently exceeds 95 th percentile crash rate for similar facilities
2	Table Rock Road/Biddle Road	Currently exceeds 95 th percentile crash rate for similar facilities
3	Table Rock Road/Vilas Road	Currently exceeds 95 th percentile crash rate for similar facilities
7	Kershaw Road/OR140	Currently exceeds 95 th percentile crash rate for similar facilities
8	OR 62/OR140	Currently exceeds 95 th percentile crash rate for similar facilities
11	OR 62/Vilas Road	Currently exceeds 95 th percentile crash rate for similar facilities
24	Foothill Road/Coker Butte Road	Currently exceeds 95 th percentile crash rate for similar facilities

Table 11: Safety Deficiencies - Segments

Road	From/To	Deficiency
Foothill Road	Hillcrest to Lone Pine Road	Currently exceeds 90 th percentile crash rate for similar facilities
Foothill Road	Lone Pine Road to Coker Butte	Currently exceeds 90 th percentile crash rate for similar facilities
Foothill Road	Coker Butte to Corey Road	Currently exceeds 90 th percentile crash rate for similar facilities

Old Stage Road	Ross Lane to Beall Lane	Currently exceeds 90 th percentile crash rate for similar facilities
Old Stage Road	Beall Lane to Taylor Road	Currently exceeds 90 th percentile crash rate for similar facilities
Table Rock Road	Biddle Road to E Villas Road	Currently exceeds 90 th percentile crash rate for similar facilities
Table Rock Road	Wilson to West Gregory Road	Currently exceeds 90 th percentile crash rate for similar facilities
Table Rock Road	Modoc/Bybee Ferry Road to OR234	Currently exceeds 90 th percentile crash rate for similar facilities
Antelope Road	Kirtland Road to Table Rock Road	Currently exceeds 90 th percentile crash rate for similar facilities
Antelope Road	Agate Road to OR62	Currently exceeds 90 th percentile crash rate for similar facilities
Meadows Road	E Evans Creek to Beagle Road	Currently exceeds 90 th percentile crash rate for similar facilities
E Evans Creek Road	Minthorne Road to Pleasant Creek Road	Currently exceeds 90 th percentile crash rate for similar facilities
Pioneer Road	Dark Hollow Road to Carpenter Hill Road	Currently exceeds 90 th percentile crash rate for similar facilities
Pioneer Road	Carpenter Hill Road to Dark Hollow Road	Currently exceeds 90 th percentile crash rate for similar facilities
S Stage Road	Orchard Home Road to Hull Road	Currently exceeds 90 th percentile crash rate for similar facilities
S Stage Road	Hull Road to Arnold Lane	Currently exceeds 90 th percentile crash rate for similar facilities
Hanley Road	Rossanley to Jacksonville City Limits	Currently exceeds 90 th percentile crash rate for similar facilities

Freight Deficiencies

Table 12 summarizes the intersection deficiencies identified under existing traffic conditions.

Table 12: Intersection Deficiencies

Deficiency
Alternative Routes
Out-of-Direction Travel
Regulatory Restrictions

Pedestrian and Bicycle Deficiencies within UGBs

Jackson County currently has jurisdiction over approximately 30 miles of roads located with the boundaries of incorporated cities and approximately 40 miles of roads within the Urban Growth Boundaries (UGB). Attachment “A” contains a comprehensive list of County facilities and a summary of the pedestrian and bicycle system needs within the UGBs of the incorporated Cities.

Pavement Deficiencies

The following summarizes pavement condition deficiencies for County and State facilities.

County Roads

Jackson County collects an extensive amount of pavement condition data and compiles a pavement condition index (PCI). The County classifies each roadway link as follows:

- 70-100 PCI: Very Good
- 50-70 PCI: Good
- 25-50 PCI: Poor

- 0-25 PCI: Very Poor

The Oregon Department of Transportation goal is to have 78 percent of all their highway road mileage in fair (equivalent to the County's Good) or better (equivalent to the County's Very Good) condition. The pavement management system data shows that of the 767 miles of County roadways, approximately 74% are in "Very Good" condition, 20% are in "Good" condition, 5% miles are in "Poor" condition and 0.1% are in "Very Poor" condition. For the remaining 0.9% of roads under County jurisdiction, the data were missing or incomplete. Hence, the County maintains 94 percent of its roadways in fair or better condition.

State Roads

The Oregon Department of Transportation conducts pavement condition surveys biennially. It employs two separate and distinct pavement rating procedures. The National Highway System (NHS), consisting of the most important highways, is surveyed using the Objective Rating Method, which provides detailed data on pavement surface distress types, severity, and quantities. The methodology is time- and labor-intensive. NHS highways in Jackson County are I-5, Highway 140, and Highway 62 between I-5 and Highway 140. For non-NHS highways, the subjective Good-Fair-Poor (GFP) Rating Method is used, which relies on visual inspection of pavement surface and is rated from 1.0 to 5.0 based on the ride quality and surface distresses. The indexes resulting from both methodologies are then categorized into five conditions: "Very Good", "Good", "Fair", "Poor" and "Very Poor."

Based on the most recent survey data, most of the pavement on the State Highways is in fair, good, or very good condition. Poor pavement condition is reported at the following locations in Jackson County:

- Highway 99 between Central Point and Medford;
- Highway 62 through Shady Cove and east of the junction with Highway 230; and
- Sections of Highway 66 east of I-5.

A section of Highway 99 just above the Oregon-California border is reported as having very poor pavement condition and is the only reported location with very poor conditions in the county.

Title VI Deficiencies

The following populations and geographic areas have been identified within Jackson County for conducting outreach and data analysis. Special consideration should be taken for public outreach and County transportation facility analysis near areas known to have protected populations to minimize adverse impacts and maximize positive impacts. Areas and populations identified through American Community Survey is not exhaustive of protected populations within Jackson County. It's possible additional areas of protected populations may be identified.

In general, areas in and around White City and portions of the I-5 corridor between the cities of Talent and Ashland contain protected populations that should be considered. Other notable areas are generally distributed in or near cities within the county. More information can be found below.

Non-white Population

Overall, Jackson County's non-white population is below state averages for comparable years, except for populations identifying as two or more races. The largest minority population identifies as Hispanic or Latino (11.1%), followed by two or more races (3.2%). Two census block groups whose non-white population is higher than state averages are located within White City and in SW Medford.

Population Over 65

Jackson County's population over the age of 65 is higher than the state average, 18.3% compared to 14.5%. Census block groups within the County where the population exceeds state averages are generally distributed around the county. Census block groups that have the highest percentages, over 41%, are concentrated along the I-5 corridor between the cities of Medford, Phoenix, and Talent.

Households in Poverty

Approximately 16% of households within Jackson County are below poverty level. Compared to the state average, Jackson County has a slightly higher rate of poverty. Areas with the highest rates of poverty are generally located along the I-5 corridor near or within the city limits of Rogue River, Medford, Talent. Other areas with high rates of poverty outside of the I-5 corridor can be found near White City, Jacksonville, and Shady Cove. The census block group outside of White City to the west has the highest concentration of households in poverty within the county, ranging between 34-46%.

FINDINGS AND NEXT STEPS

The information provided in this memorandum indicates that, there are a number of issues that could be addressed as part of the TSP update. The following provides a summary of issues for further consideration:

- All study intersections currently meet their respective mobility standards with the exception of OR 62/Vilas Road. There are several movements at the signalized intersections that currently exceed the striped storage for the movement.
- There are several gaps in the shoulder facilities along rural county roadways that impact pedestrian and bicycle connectivity.
- There are several gaps in the pedestrian and bicycle facilities (sidewalks and bike lanes) along urban county roadways that impact pedestrian and bicycle connectivity.
- The gaps in shoulders and bicycle facilities limit the potential to attract new riders or encourage existing rider to commute or complete other trips by bike.
- There are several intersections that currently exceed the 95th percentile crash rates.
- There are several roadway segments that currently exceed the 90th percentile crash rates.

- While all of the major intersections located along the MVTD designated freight routes appear to be capable of accommodating freight truck turning movements, many of the routes themselves lack shoulders in the rural areas and sidewalks and bike lanes in the urban areas.
- Based on the RVMPO freight study, there is also a lack of alternative routes, out-of-direction travel, and regulatory restrictions that impact freight movement in the county.
- There are areas in the County with above average concentrations of non-white population, people over 65, and households in poverty where special consideration should be taken for public outreach and to minimize adverse impacts and maximize positive impacts.

The information provided in this memorandum will be used to determine existing transportation system needs for the Jackson County TSP update. The information will be reviewed by the Project Management Team (PMT), Technical Advisory Committee (TAC), Citizens Advisory Committee (CAC), and general public for confirmation of the needs prior to the development of the alternatives analysis and TSP update.

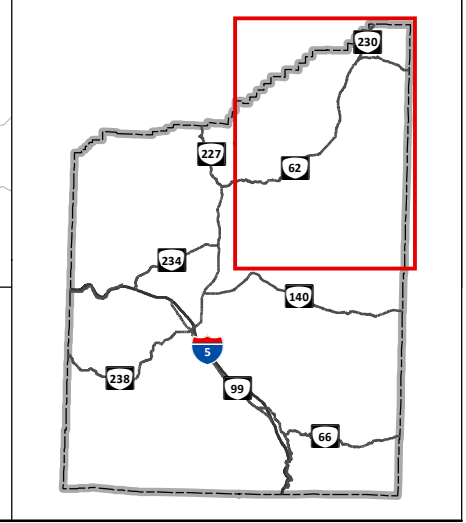
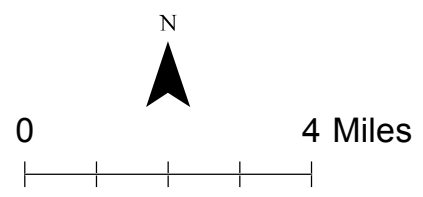
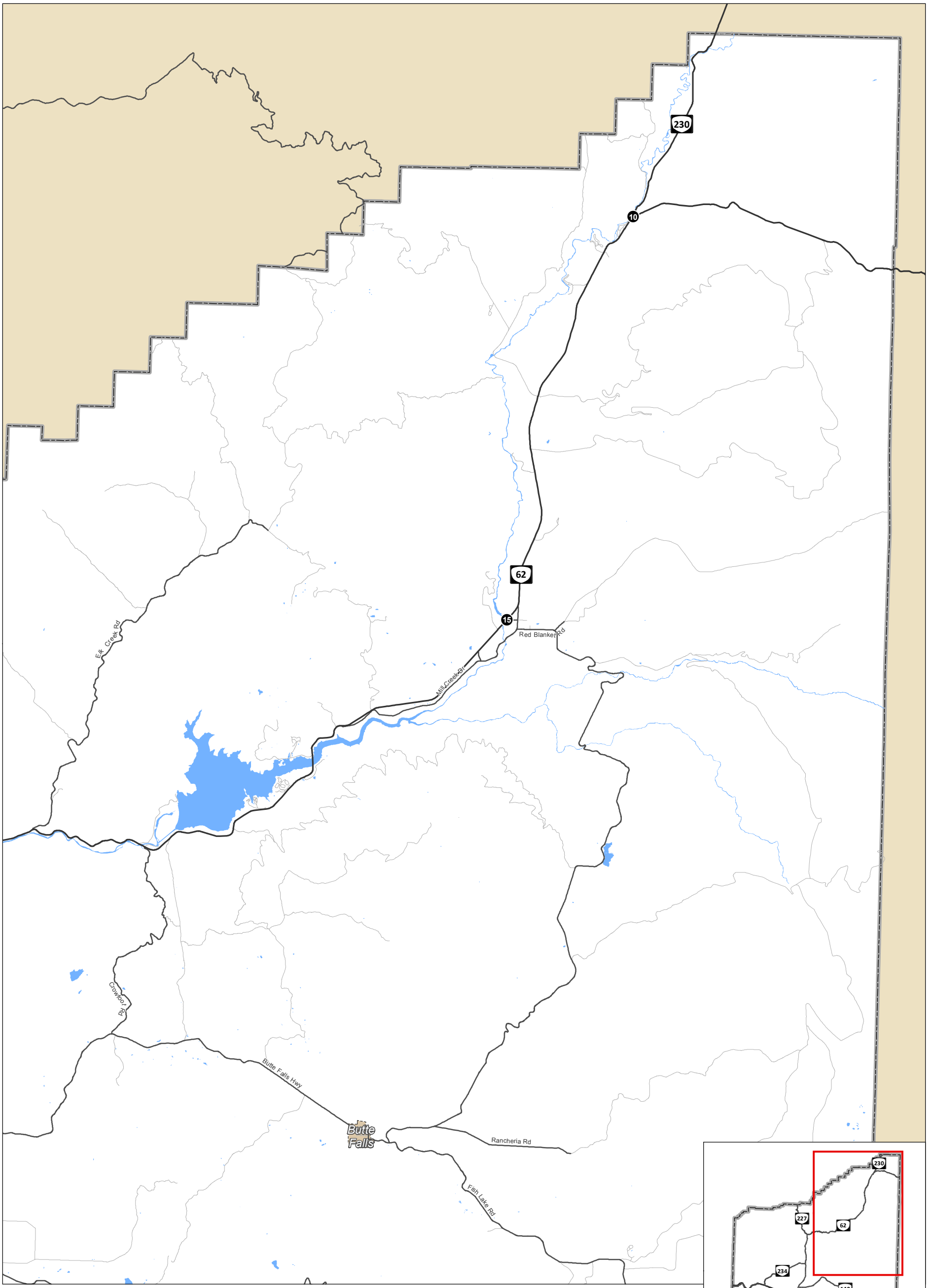
MAP ATLAS

1. Study Area
2. Lane Configurations and Traffic Control Devices
3. Existing Traffic Conditions, Weekday AM Peak Hour
4. Existing Traffic Conditions, Weekday PM Peak Hour
5. Bicycle Level of Traffic Stress (LTS)
6. Crash Sites (2009-2013)

ATTACHMENTS

- A. Methodology Memo
- B. Site Visit Memo
- C. Traffic Counts
- D. Existing Traffic Conditions Worksheets
- E. Queuing Worksheets
- F. Bicycle Level of Traffic Stress Summary
- G. Pedestrian and Bicycle Needs Summary – Rural Areas
- H. Pedestrian and Bicycle Needs Summary - UGBs

Map Atlas

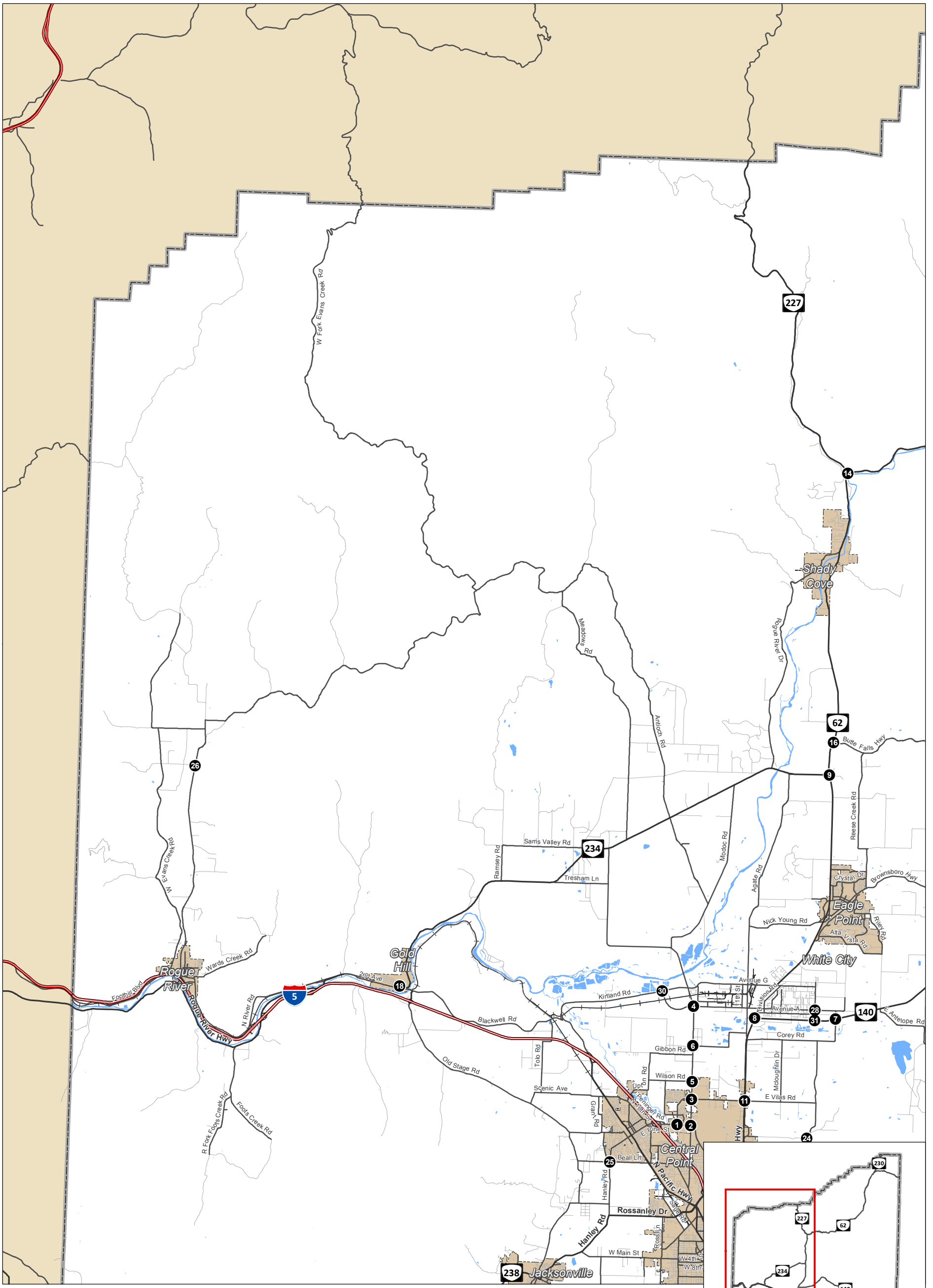


- Study Intersections
- City Boundaries
- County Boundary

**Study Intersections
Jackson County, OR**

**Figure
1A**

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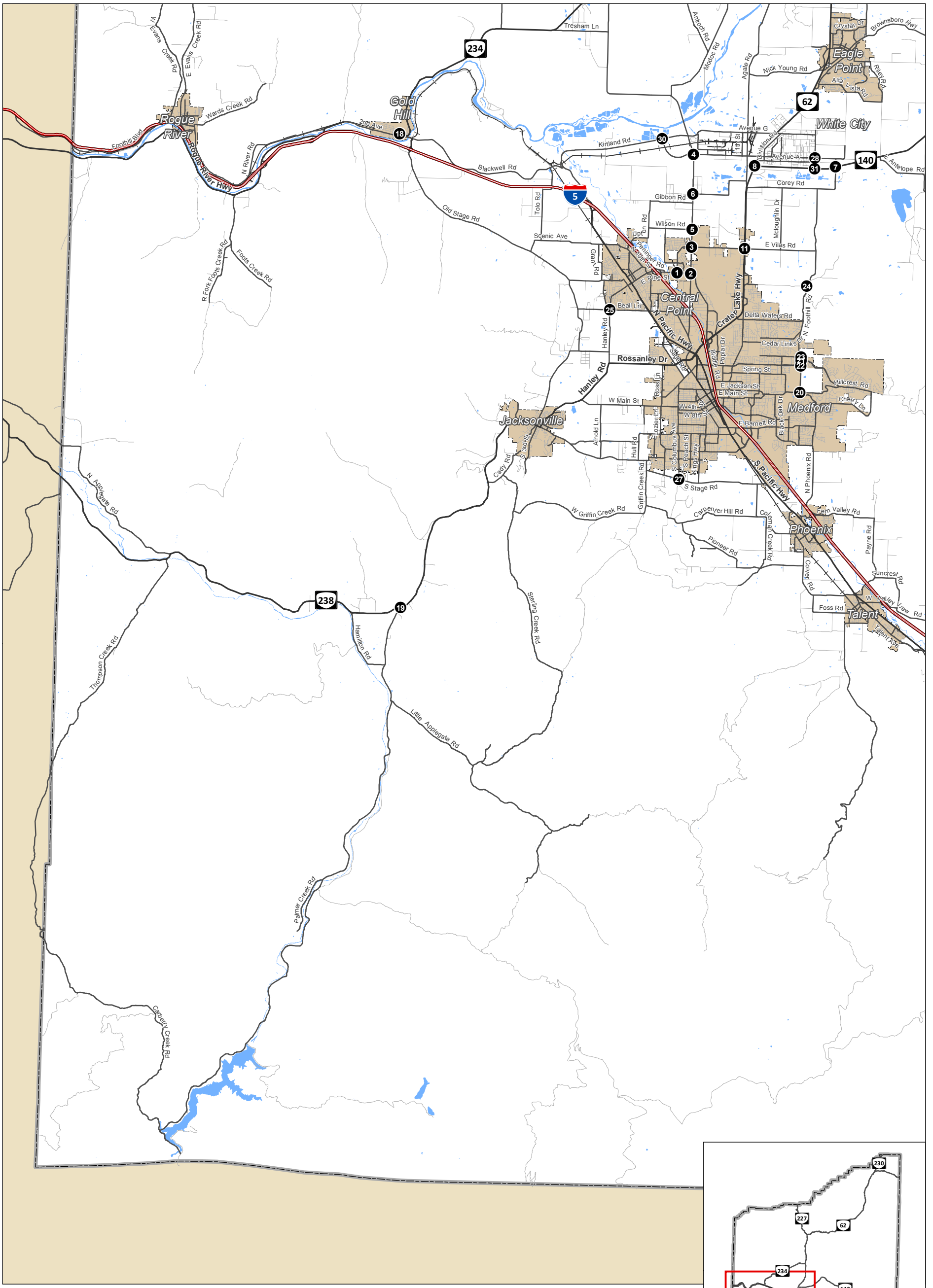


- Study Intersections
- City Boundaries
- County Boundary

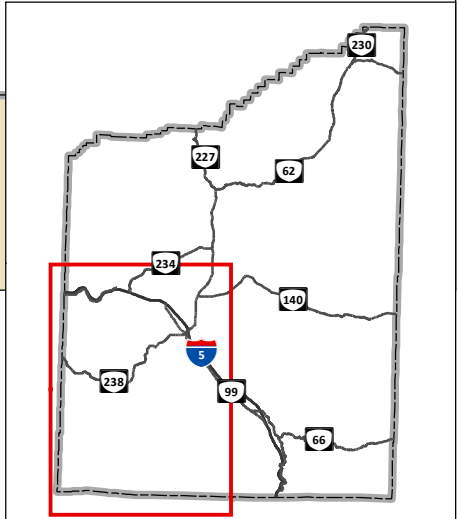
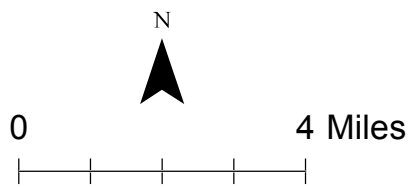
Study Intersections
Jackson County, OR

Figure
1B

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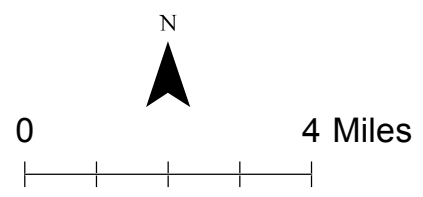
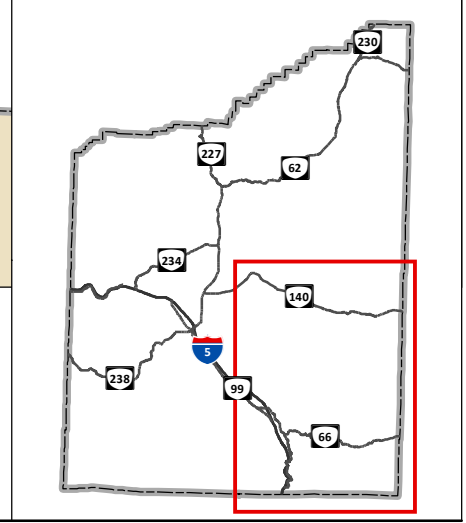
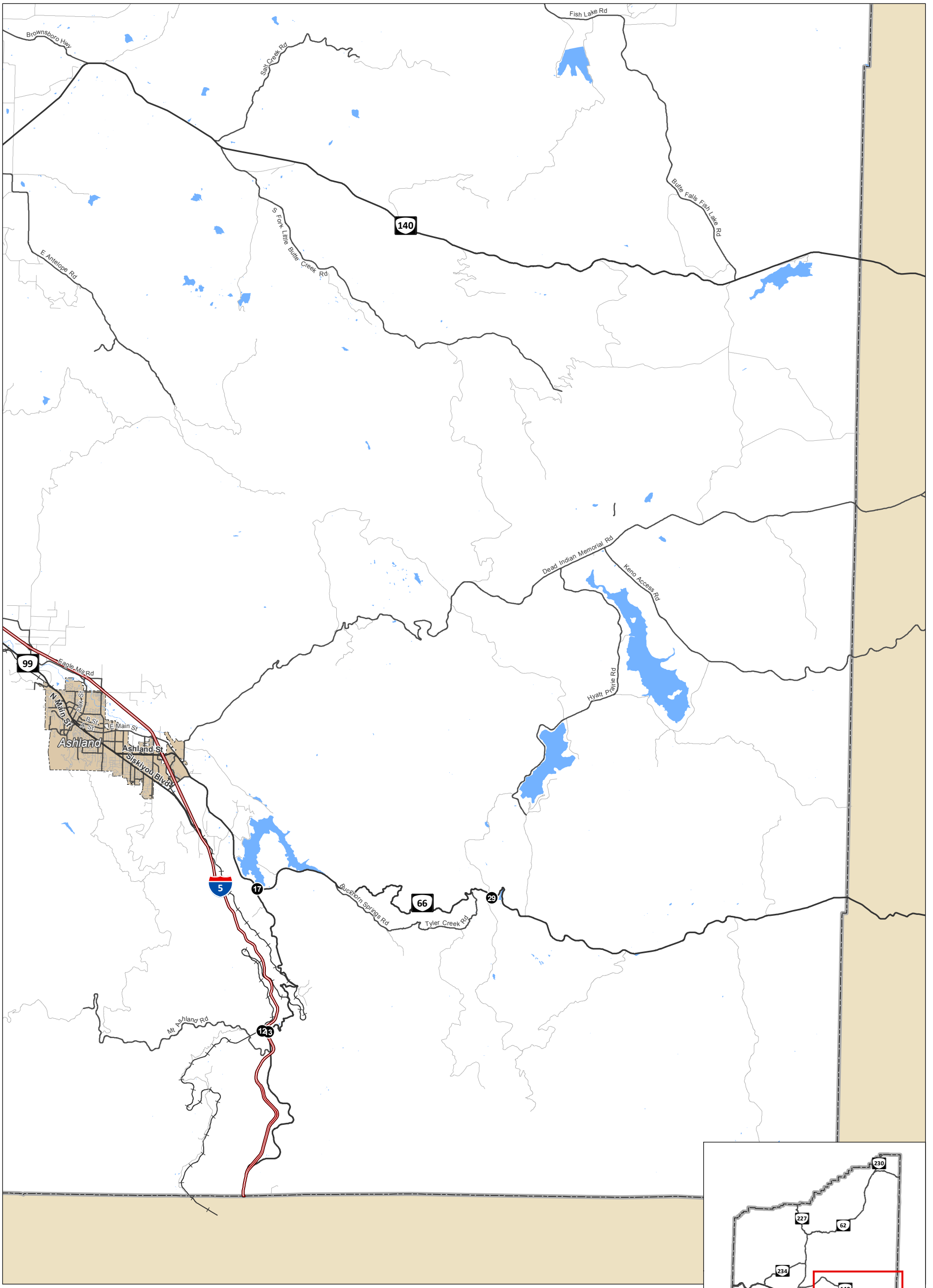


- Study Intersections
- City Boundaries
- County Boundary



Study Intersections
Jackson County, OR

Figure
1C

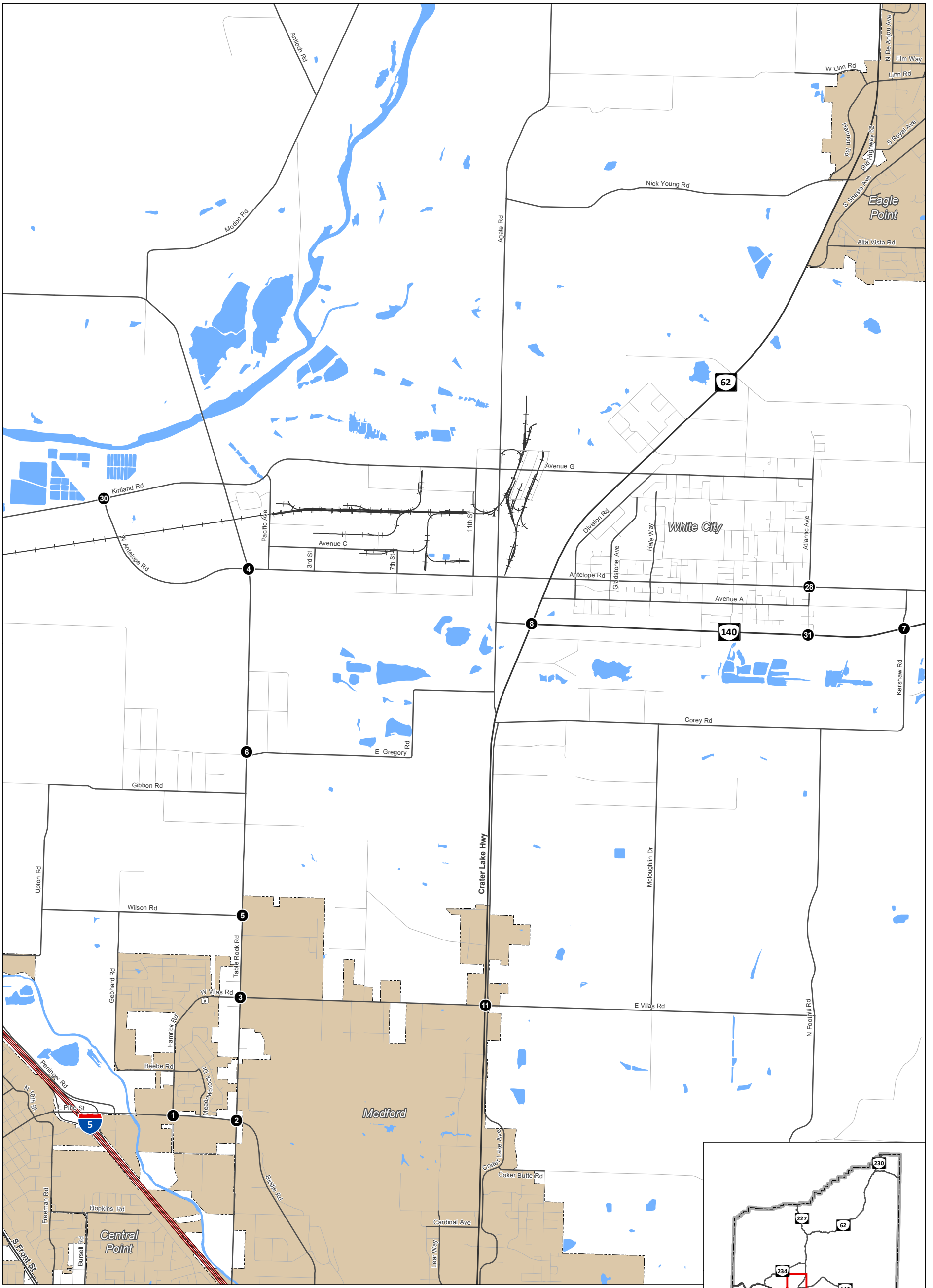


- Study Intersections
- City Boundaries
- ⊕ County Boundary

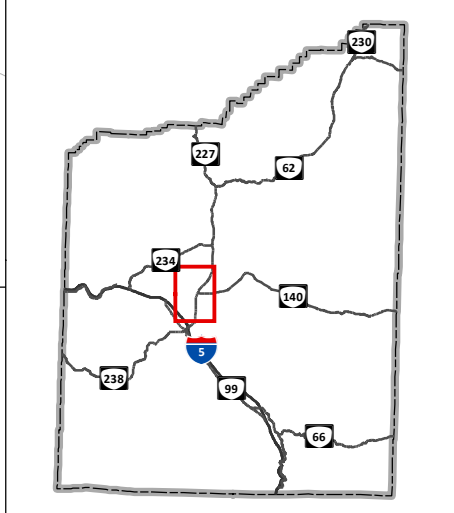
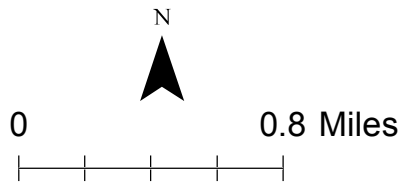
Study Intersections Jackson County, OR

Figure 1D

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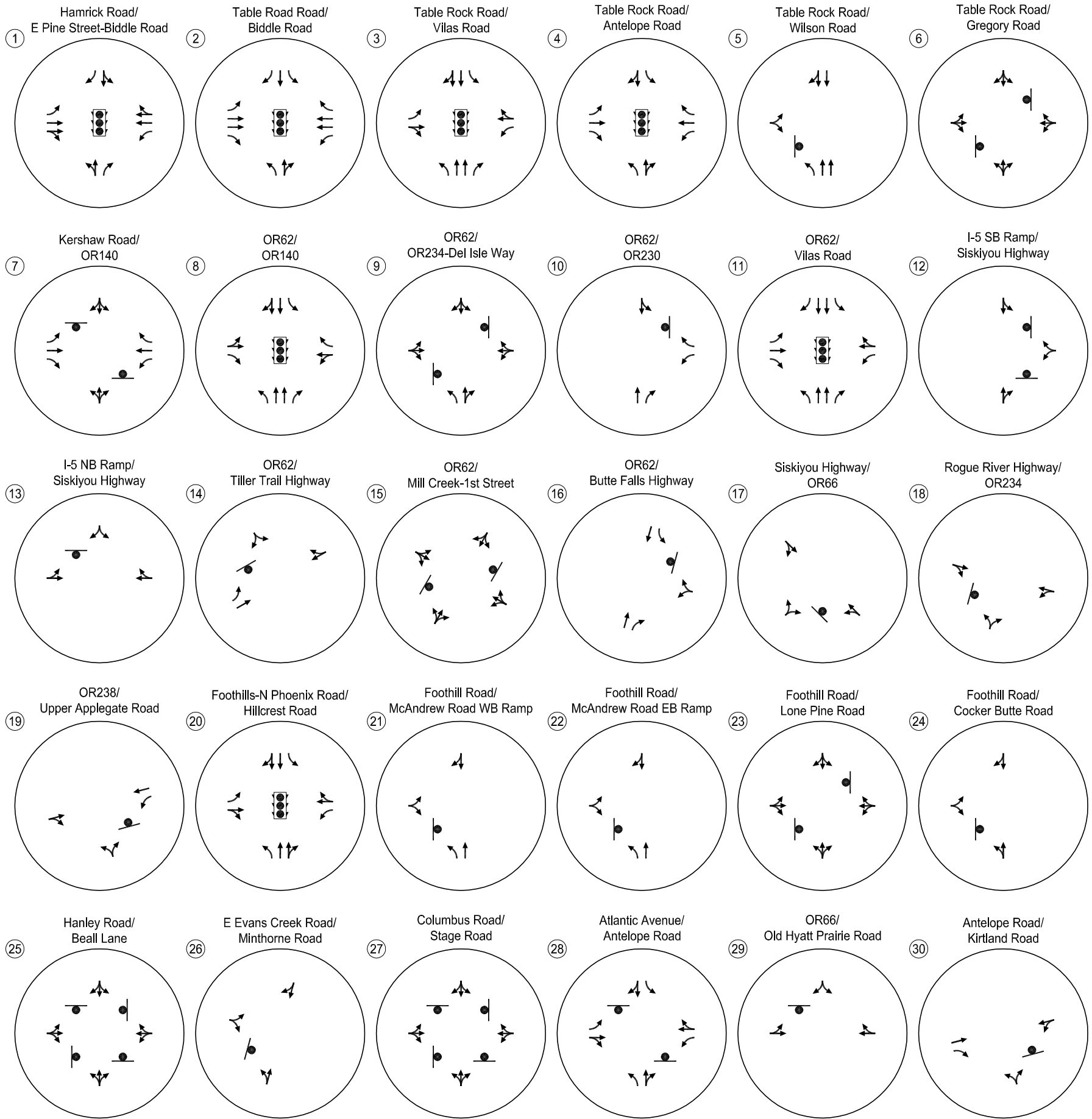
- Study Intersections
- City Boundaries
- County Boundary





**Study Intersections
Jackson County, OR**

**Figure
1E**

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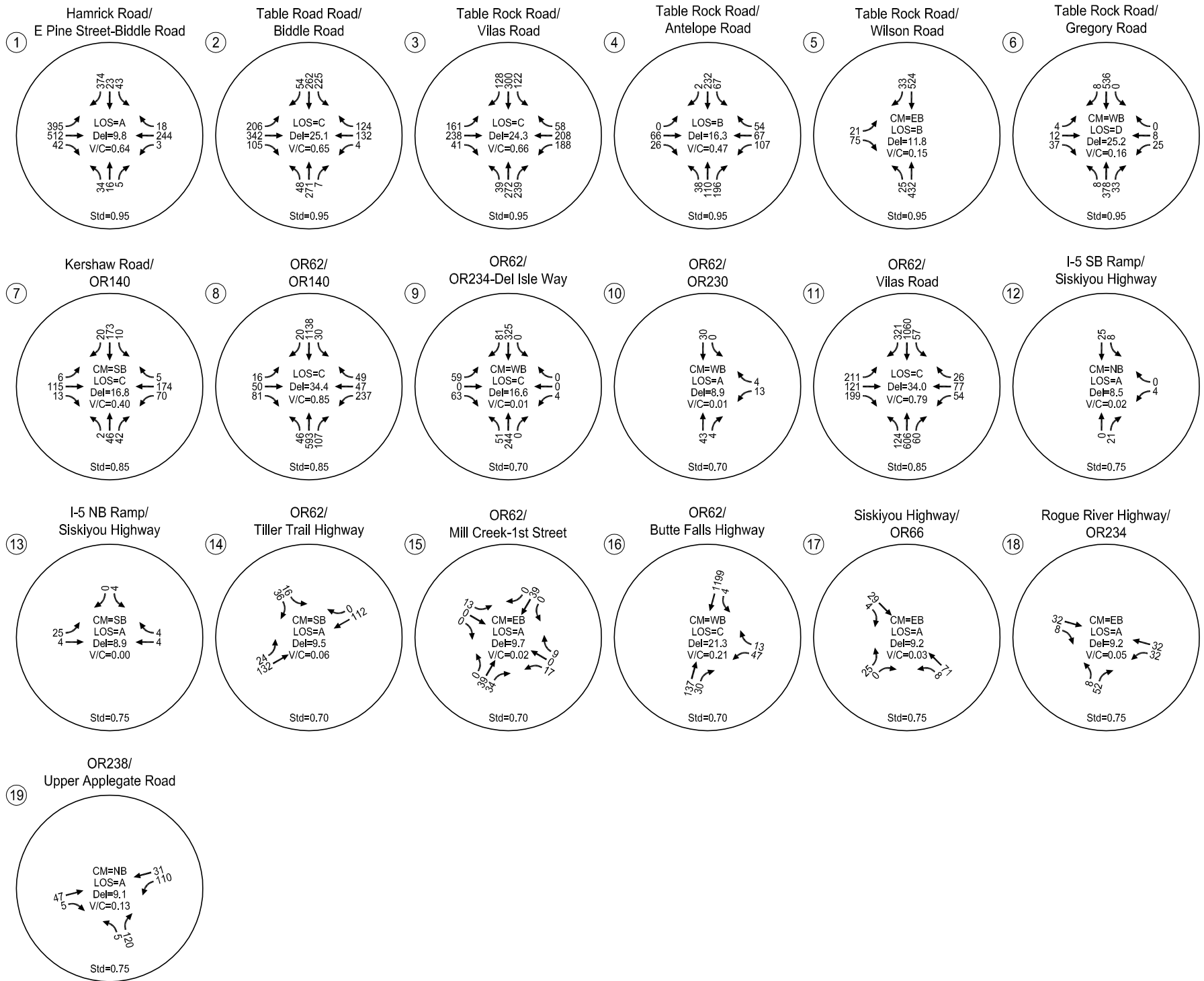


 - STOP SIGN
 - TRAFFIC SIGNAL

Existing Land Configurations & Traffic Control Devices
Jackson County, OR

Figure 2

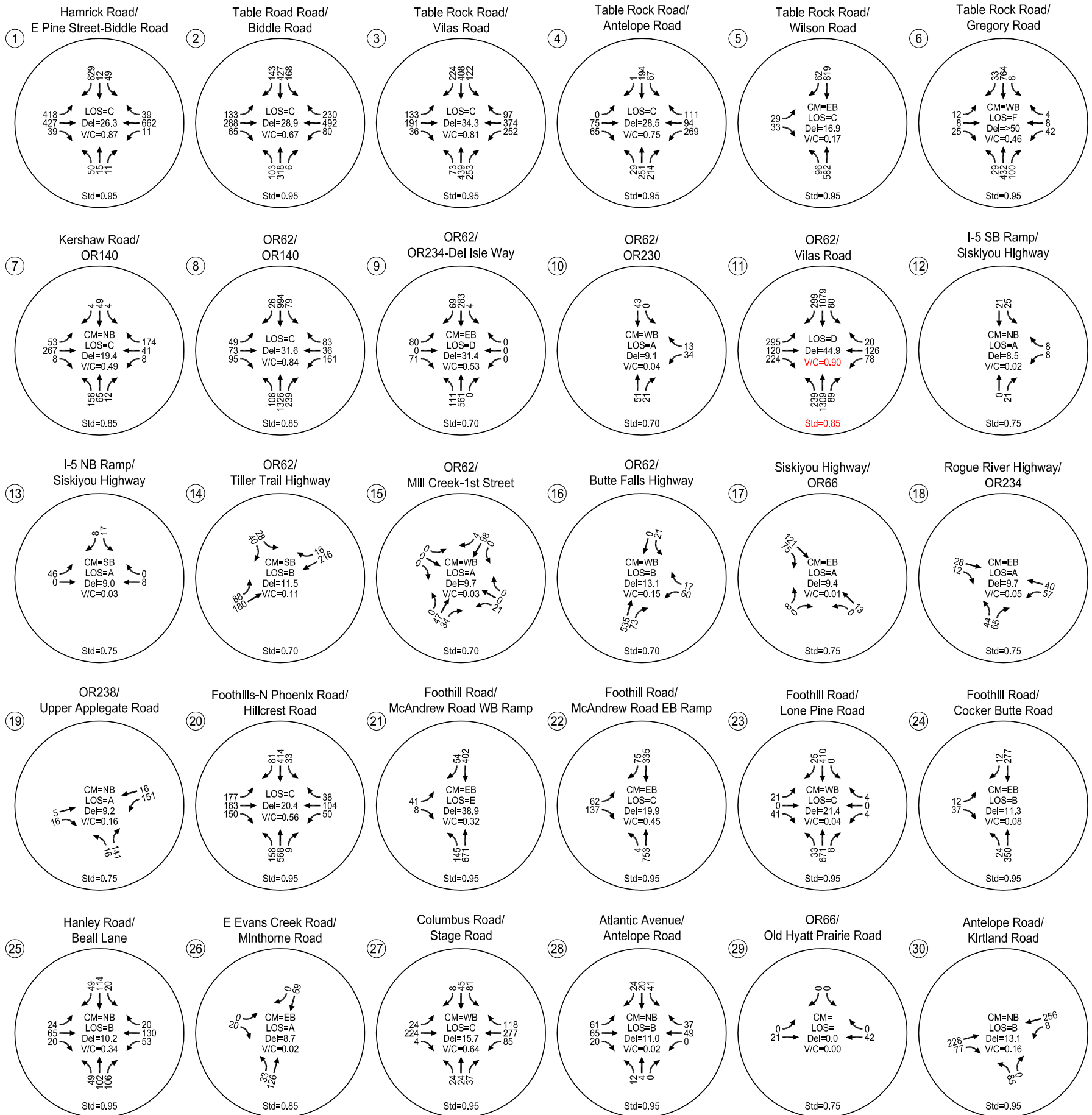
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CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWC = TWO-WAY STOP CONTROL
 AWSC = ALL-WAY STOP CONTROL

Existing Traffic Conditions
 Weekday AM Peak Hour
 Jackson County, OR

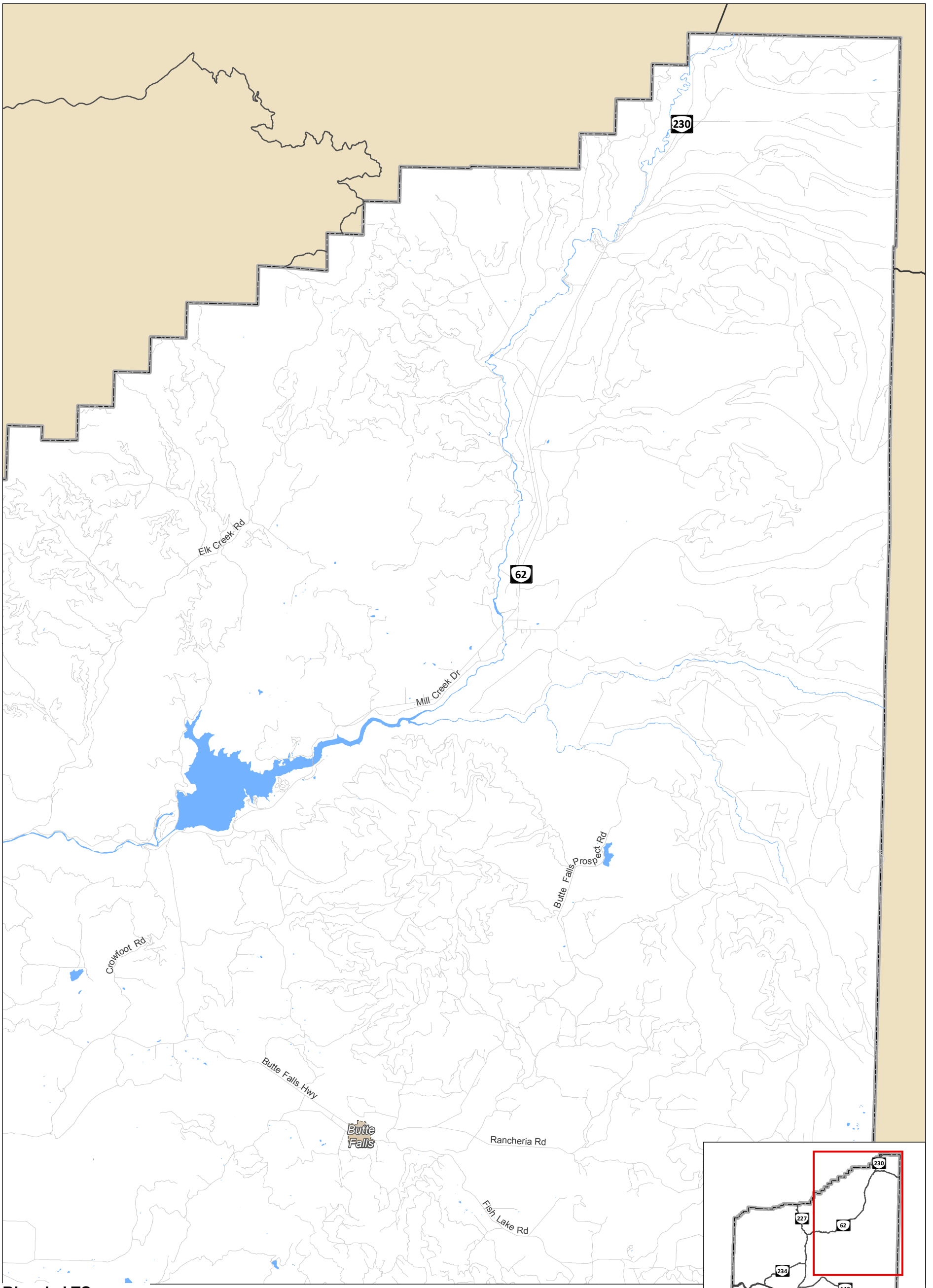
Figure
 3



CM = CRITICAL MOVEMENT (TWSC)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED/AWSC) / CRITICAL MOVEMENT LEVEL OF SERVICE (TWSC)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED/AWSC) / CRITICAL MOVEMENT CONTROL DELAY (TWSC)
 V/C = CRITICAL VOLUME-TO-CAPACITY RATIO
 TWC = TWO-WAY STOP CONTROL
 AWSC = ALL-WAY STOP CONTROL

Existing Traffic Conditions
 Weekday PM Peak Hour
 Jackson County, OR

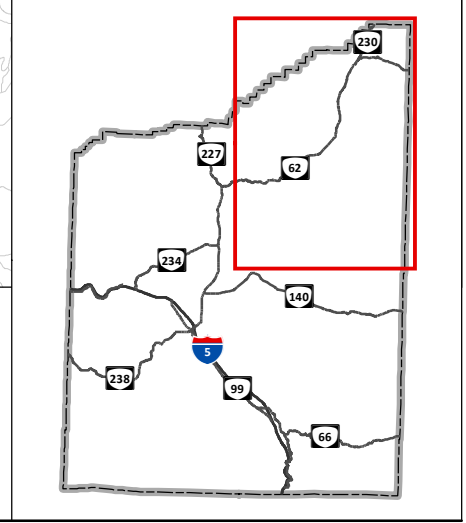
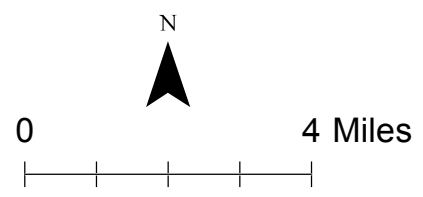
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Bicycle LTS

- LTS 1
- LTS 2
- LTS 3
- LTS 4

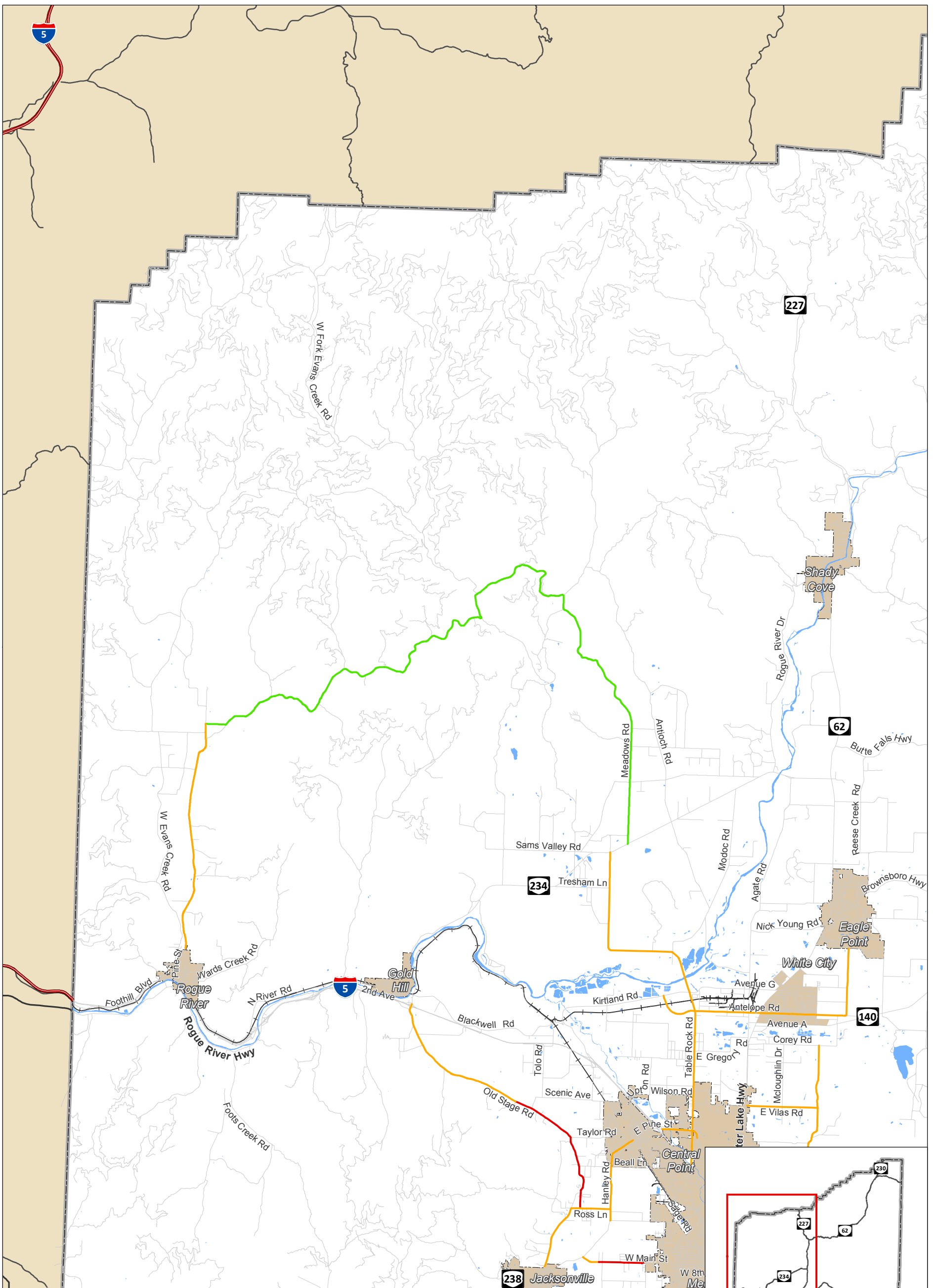
- City Boundaries
- County Boundary



**Bicycle Level of Traffic Stress (LTS)
Jackson County, OR**

**Figure
5A**

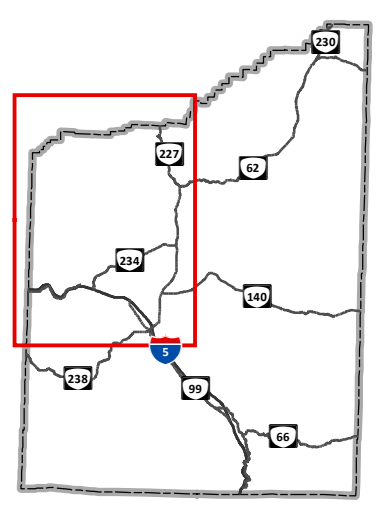
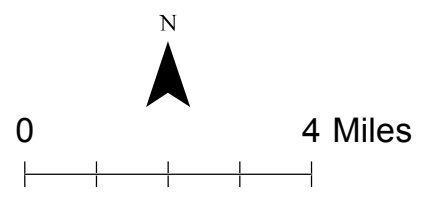
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Bicycle LTS

- LTS 1
- LTS 2
- LTS 3
- LTS 4

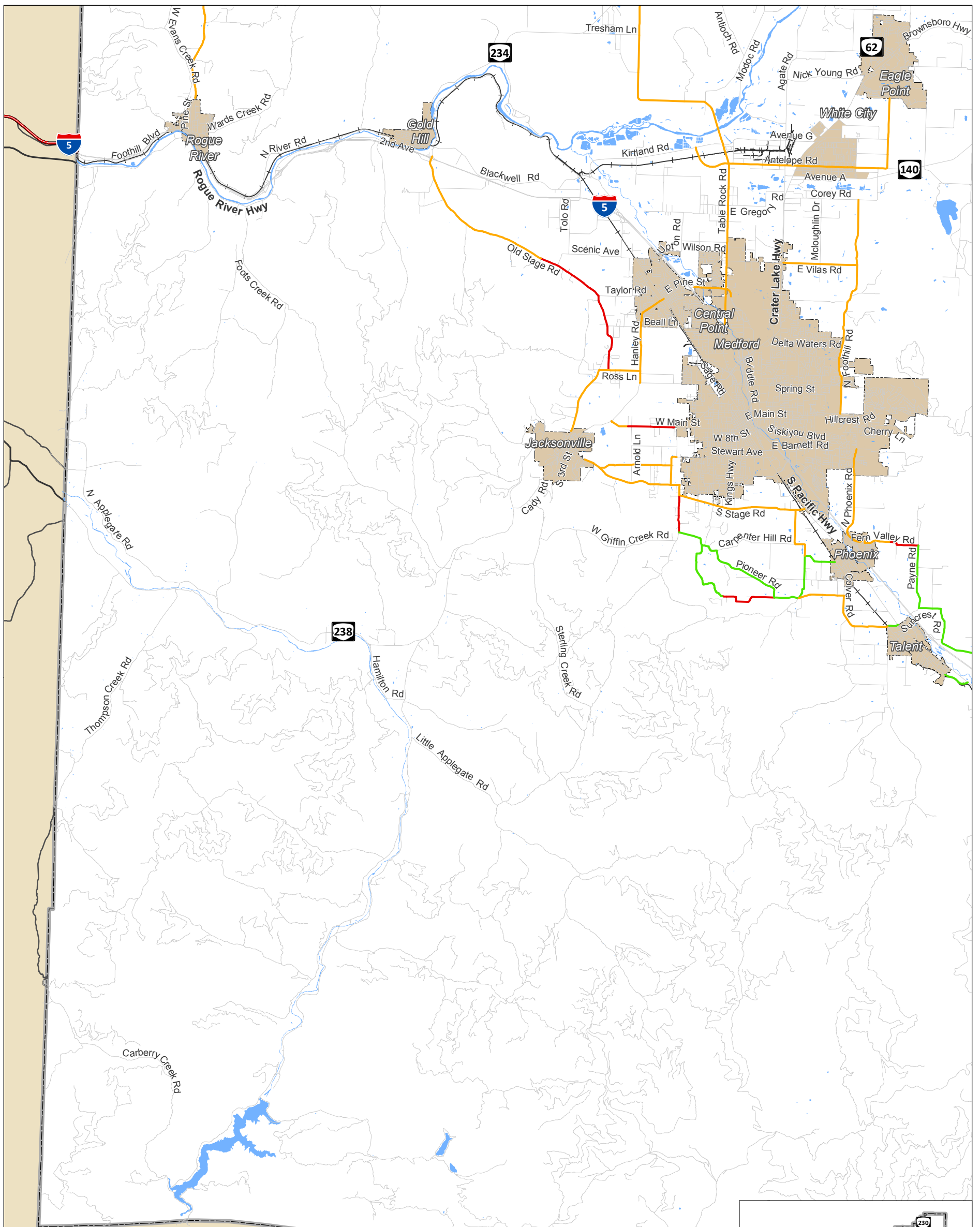
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- County Boundary



**Bicycle Level of Traffic Stress (LTS)
Jackson County, OR**

**Figure
5B**

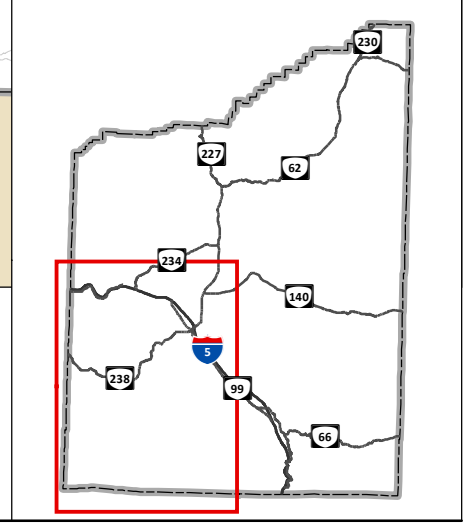
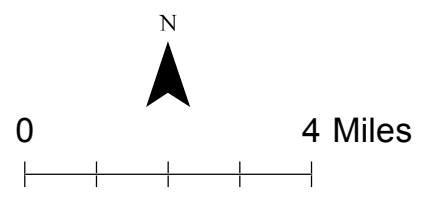
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Bicycle LTS

- LTS 1
- LTS 2
- LTS 3
- LTS 4

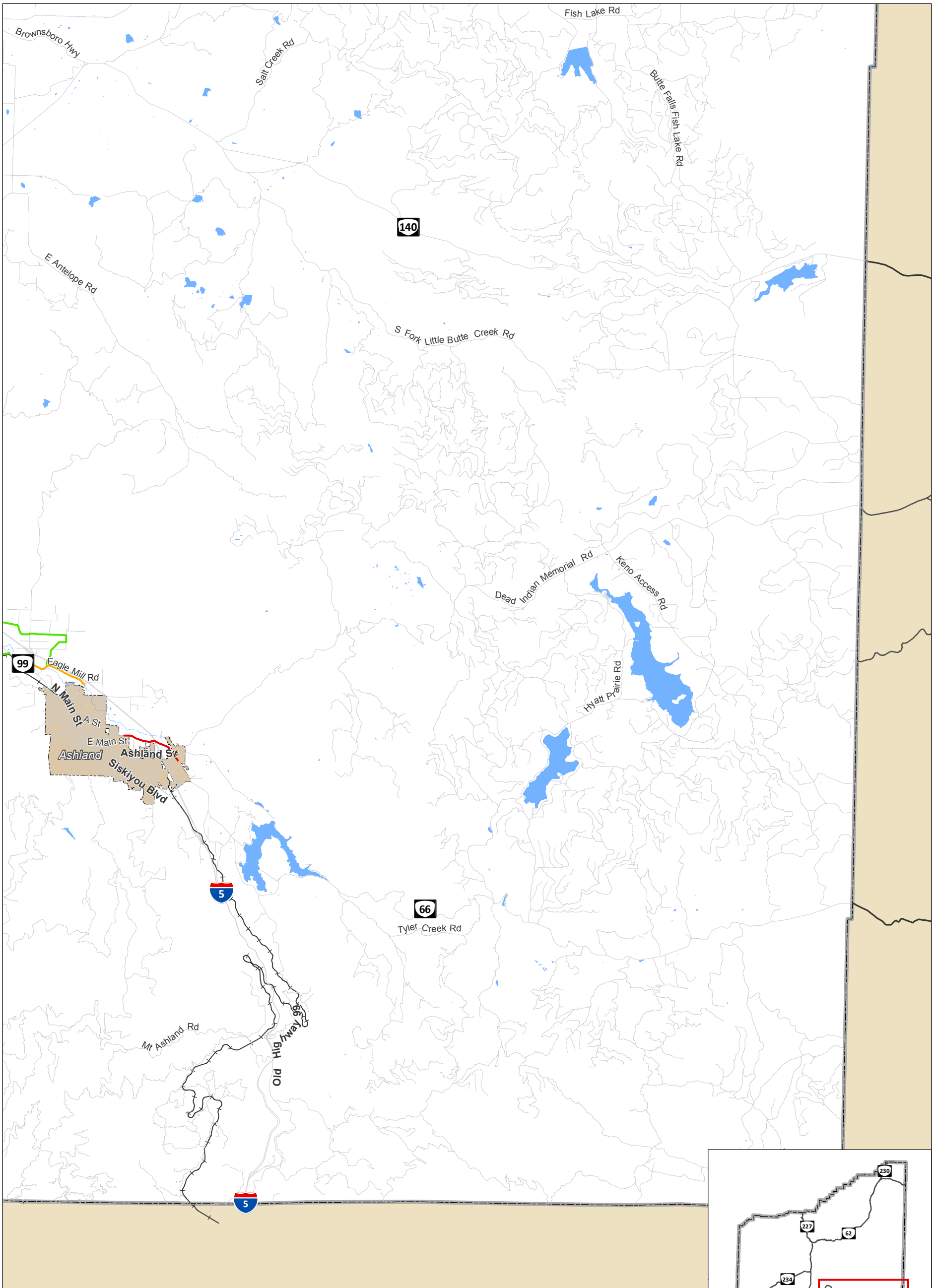
- City Boundaries
- County Boundary



**Bicycle Level of Traffic Stress (LTS)
Jackson County, OR**

**Figure
5C**

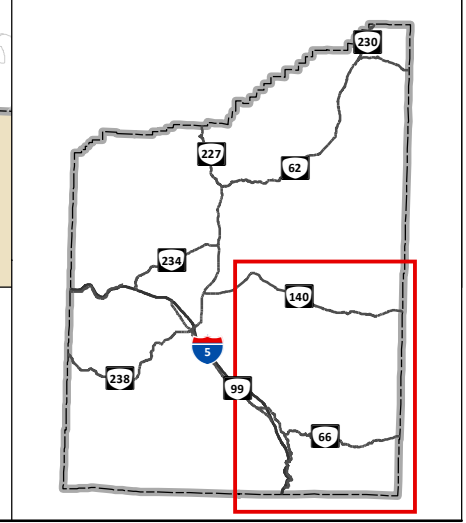
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Bicycle LTS

- LTS 1
- LTS 2
- LTS 3
- LTS 4

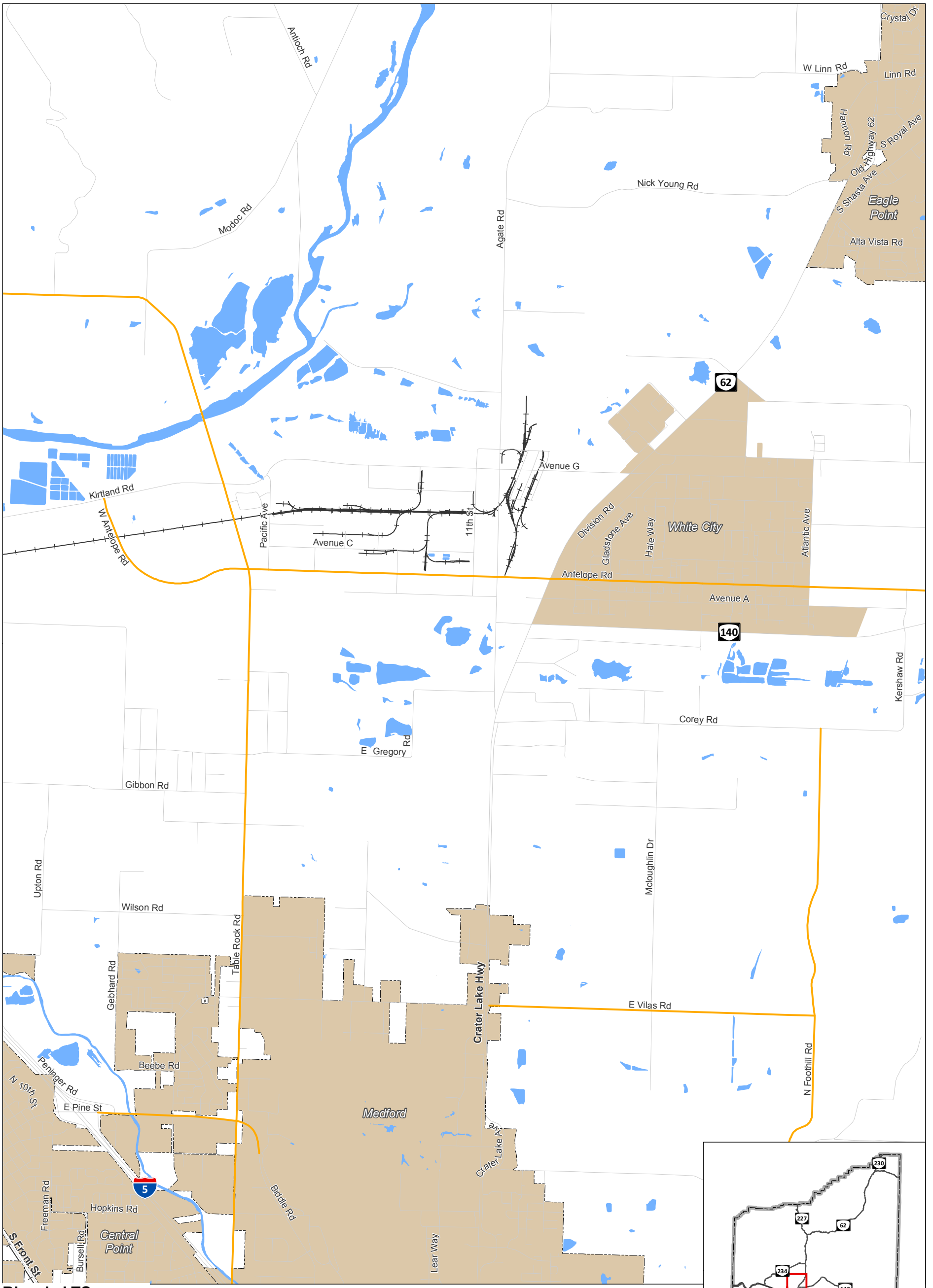
- City Boundaries
- County Boundary



**Bicycle Level of Traffic Stress (LTS)
Jackson County, OR**

**Figure
5D**

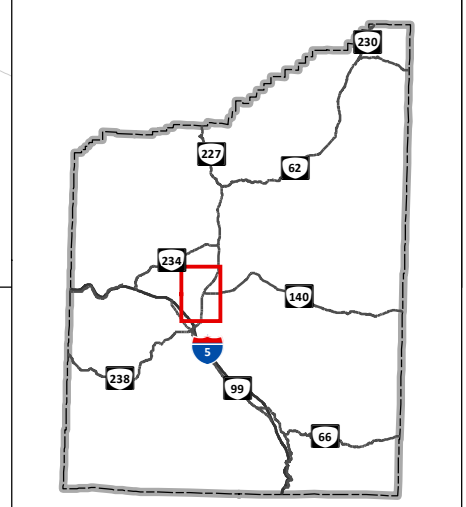
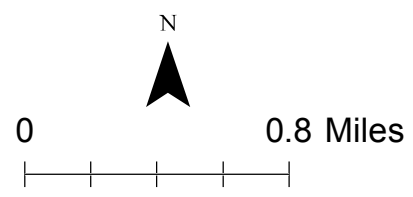
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Bicycle LTS

- LTS 1
- LTS 2
- LTS 3
- LTS 4

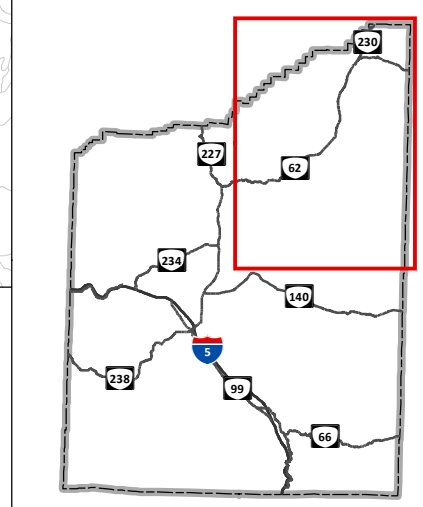
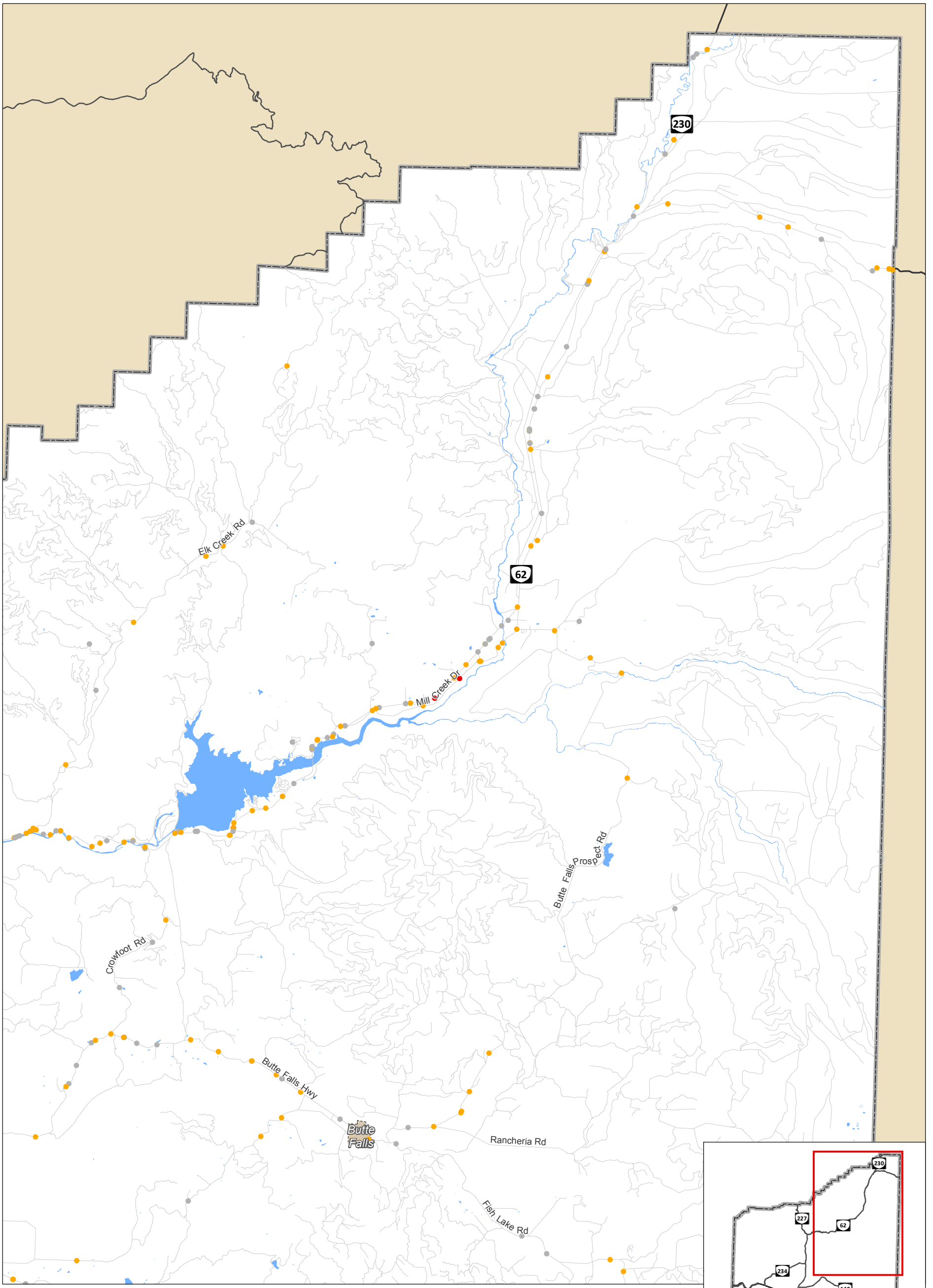
- City Boundaries
- County Boundary





**Bicycle Level of Traffic Stress (LTS)
Jackson County, OR**

**Figure
5E**

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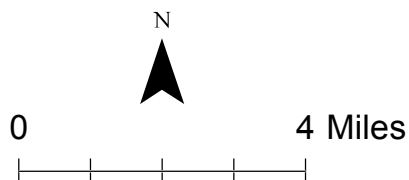
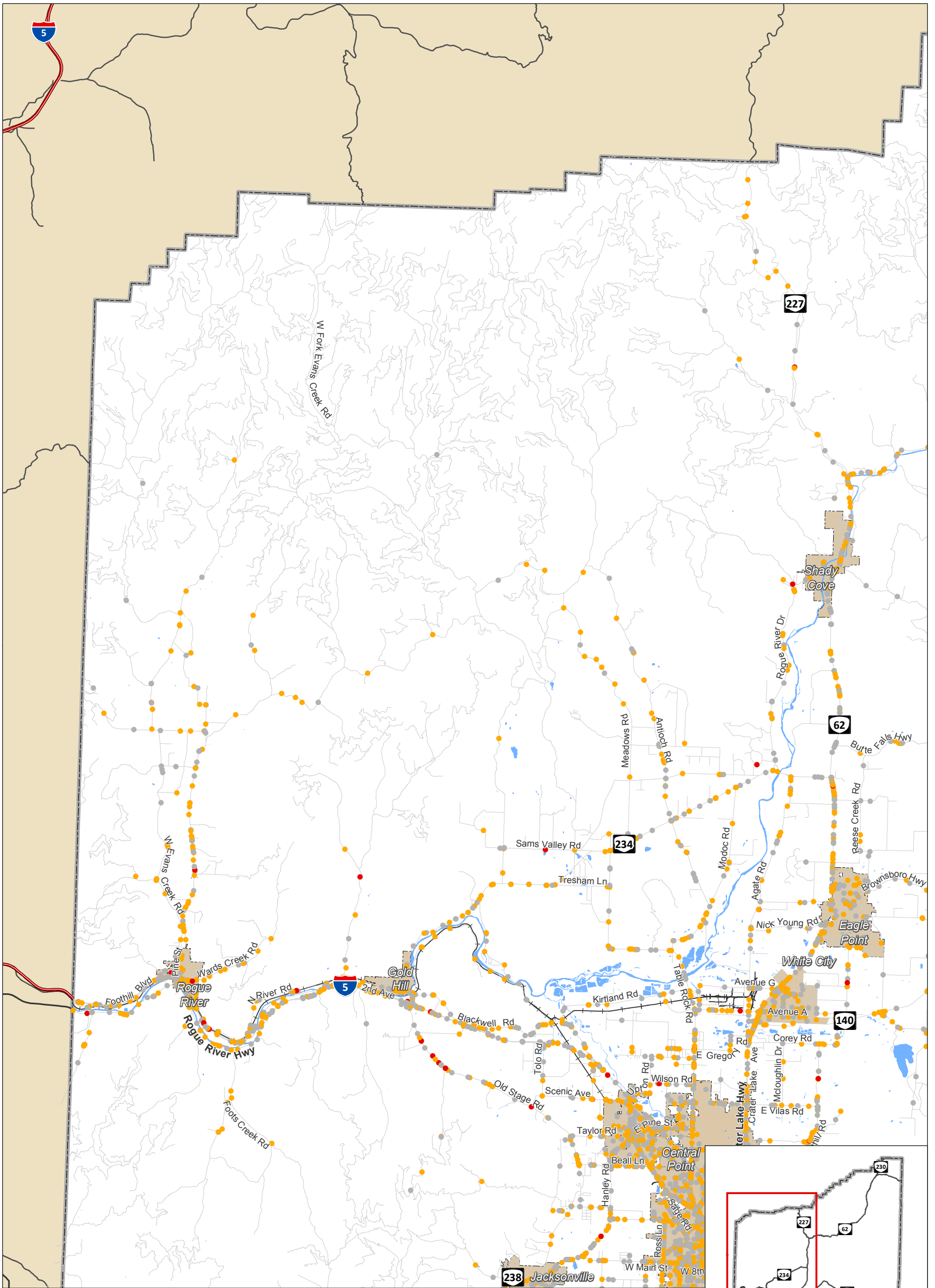




-  City Boundaries
-  County Boundary

**Crash Sites (2009-2013)
Jackson County, OR**

**Figure
5A**

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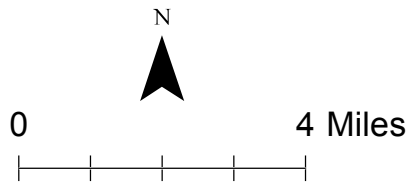
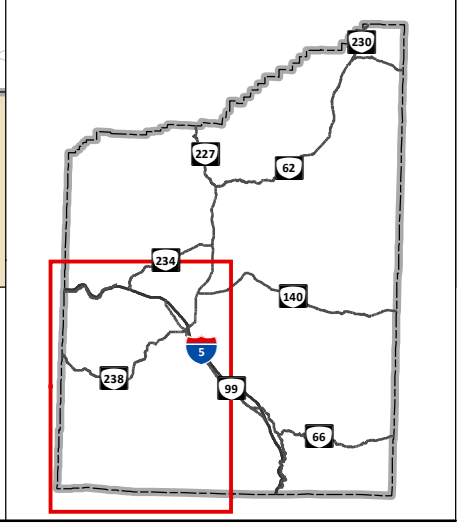
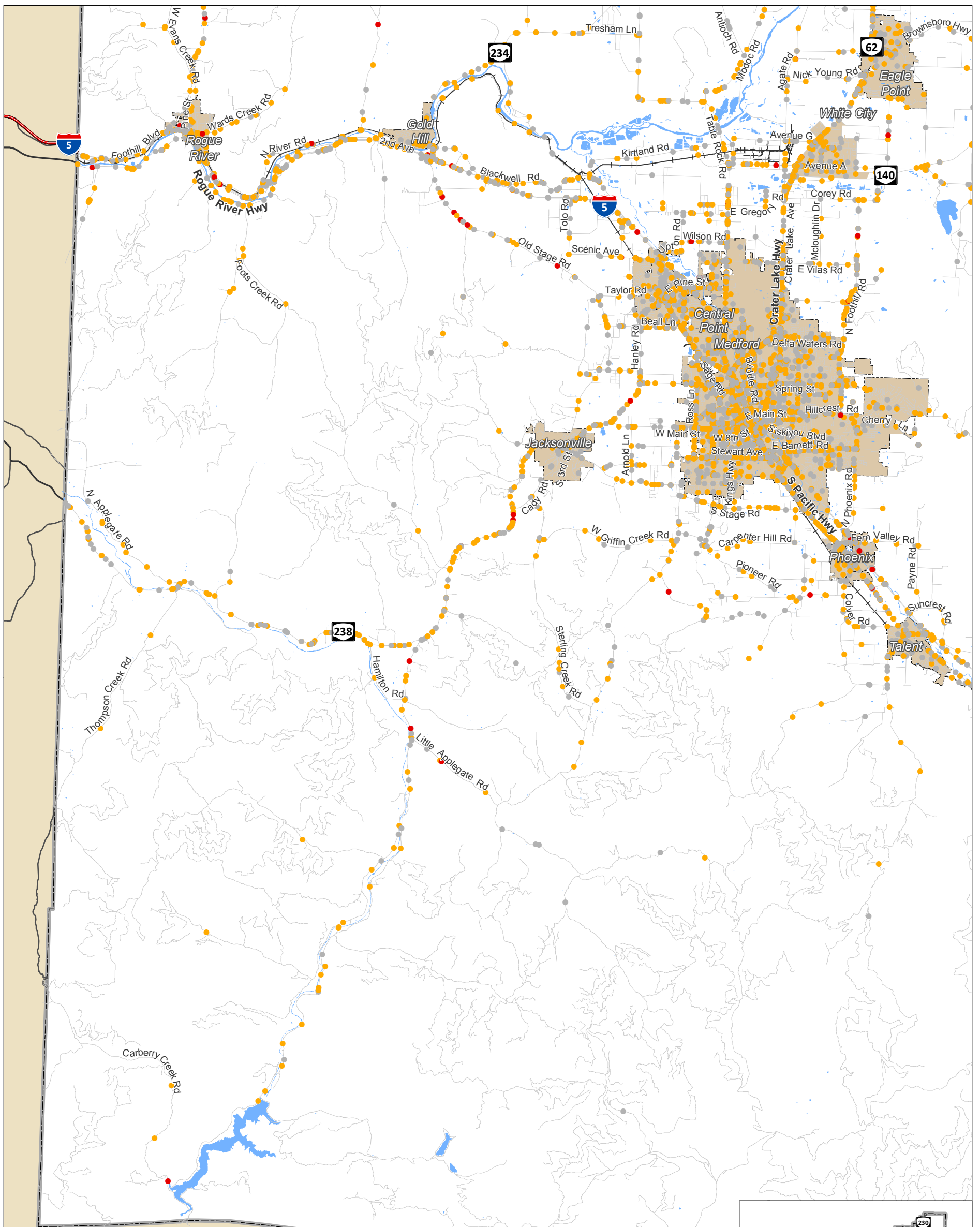




-  City Boundaries
-  County Boundary

**Crash Sites (2009-2013)
Jackson County, OR**

**Figure
5B**

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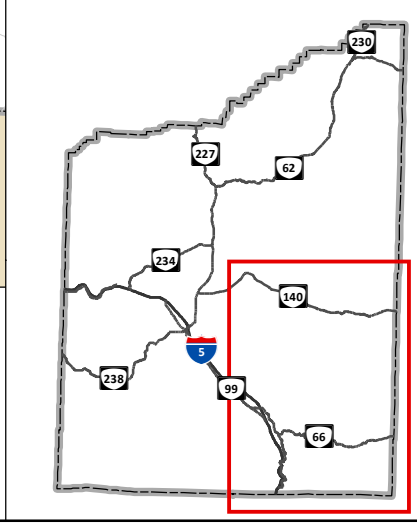
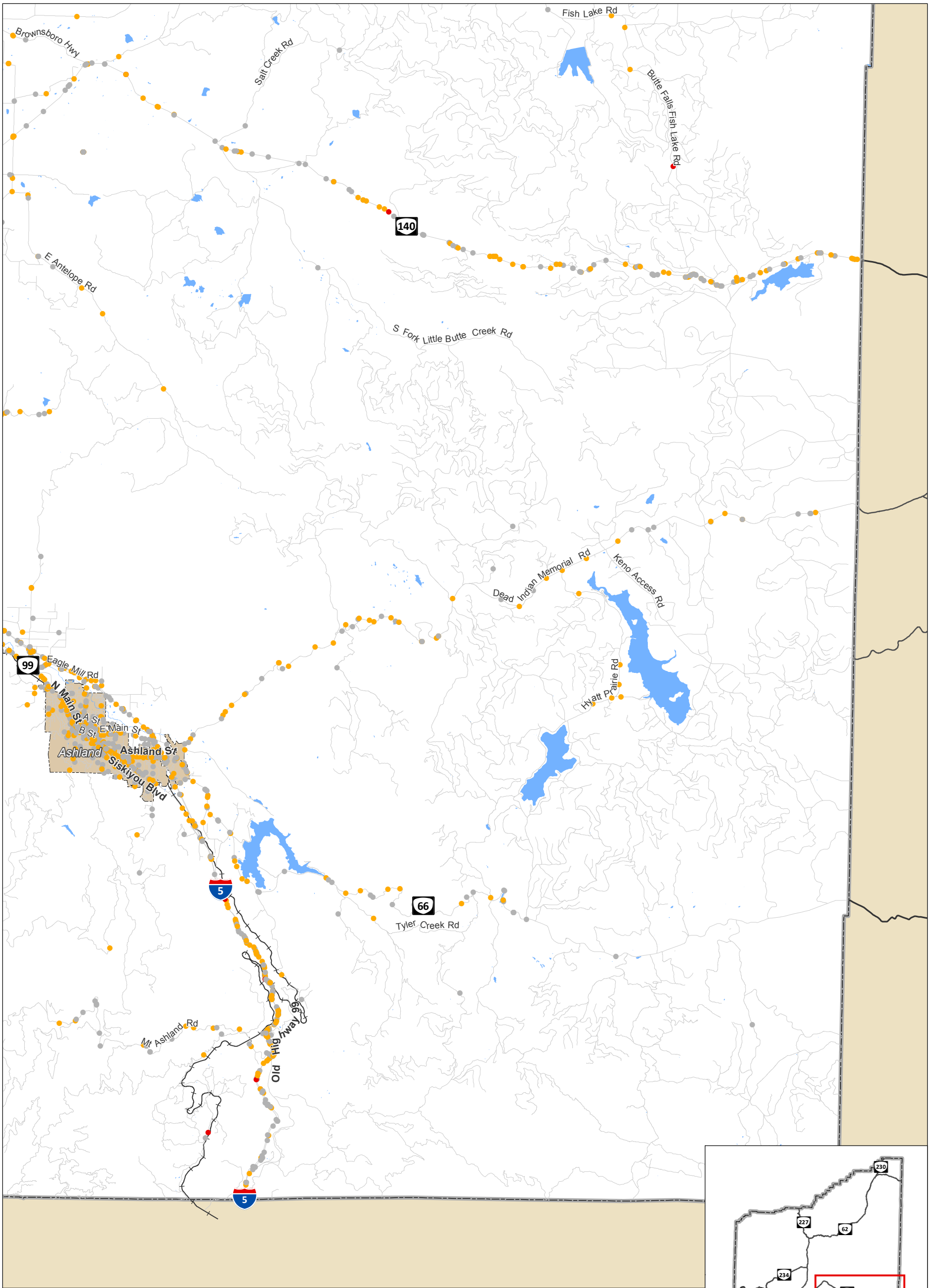




 City Boundaries
 County Boundary

**Crash Sites (2009-2013)
Jackson County, OR**

**Figure
5C**

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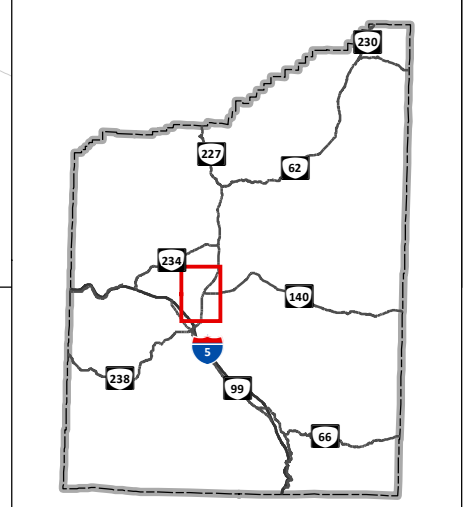
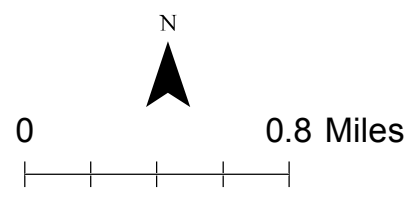
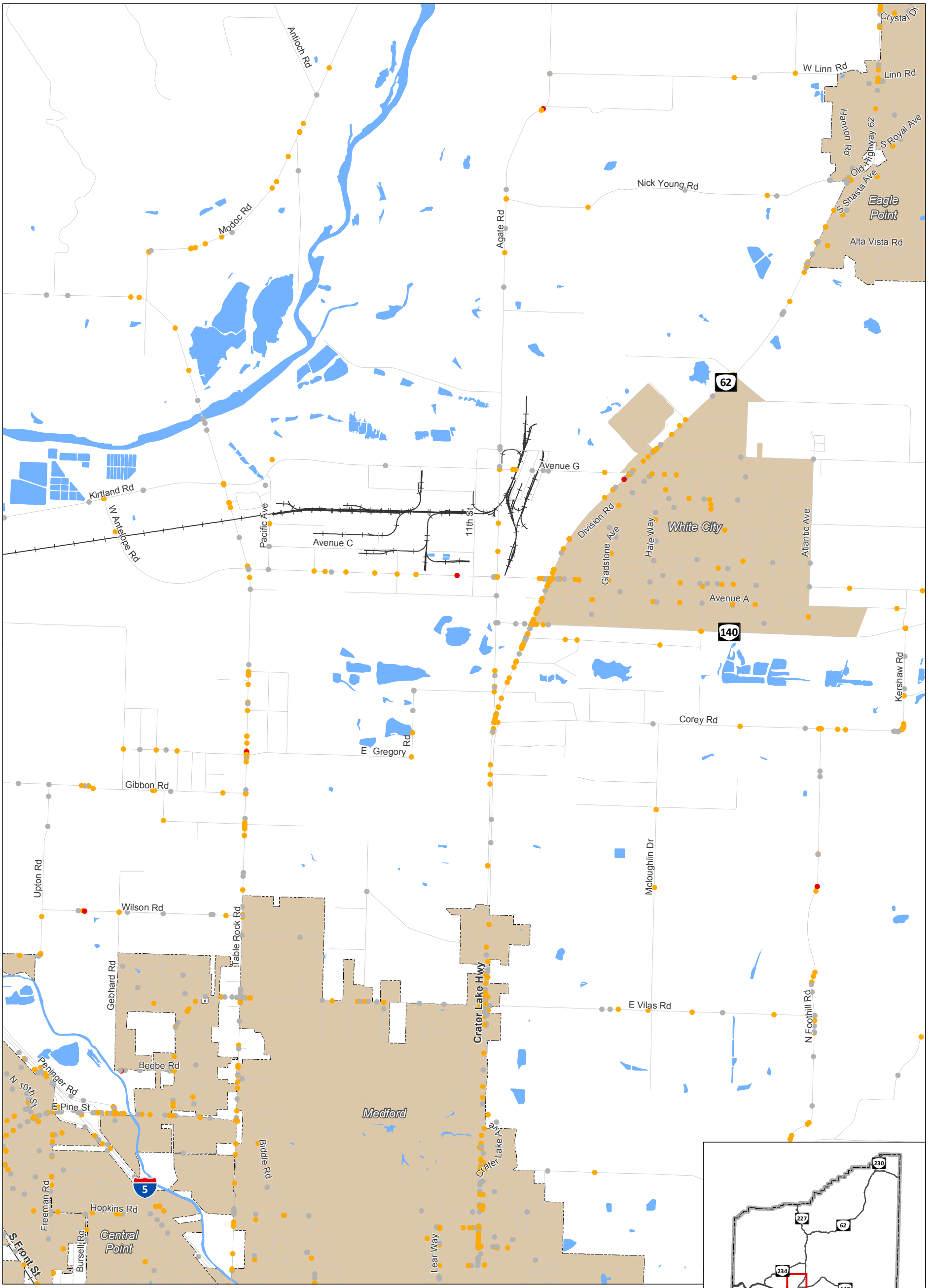




-  City Boundaries
-  County Boundary

**Crash Sites (2009-2013)
Jackson County, OR**

**Figure
5D**

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-  City Boundaries
-  County Boundary

**Crash Sites (2009-2013)
Jackson County, OR**

**Figure
5E**

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