

APPENDIX D3: CENTRAL WEBER COUNTY

Safety Summary

Tech Memo #1 Safety Analysis

Case Study Project Information Sheets

Case Study Project Location Map

Equity Index Map

CENTRAL WEBER COUNTY SAFETY SUMMARY

CSAP OVERVIEW

“A plan to provide local governments the means to make strategic roadway safety improvements”

Wasatch Front Regional Council (WFRC) is preparing a regional Comprehensive Safety Action Plan (CSAP). The CSAP will present a **holistic, well-defined strategy to reduce roadway fatalities and serious injuries** in the Wasatch Front region.

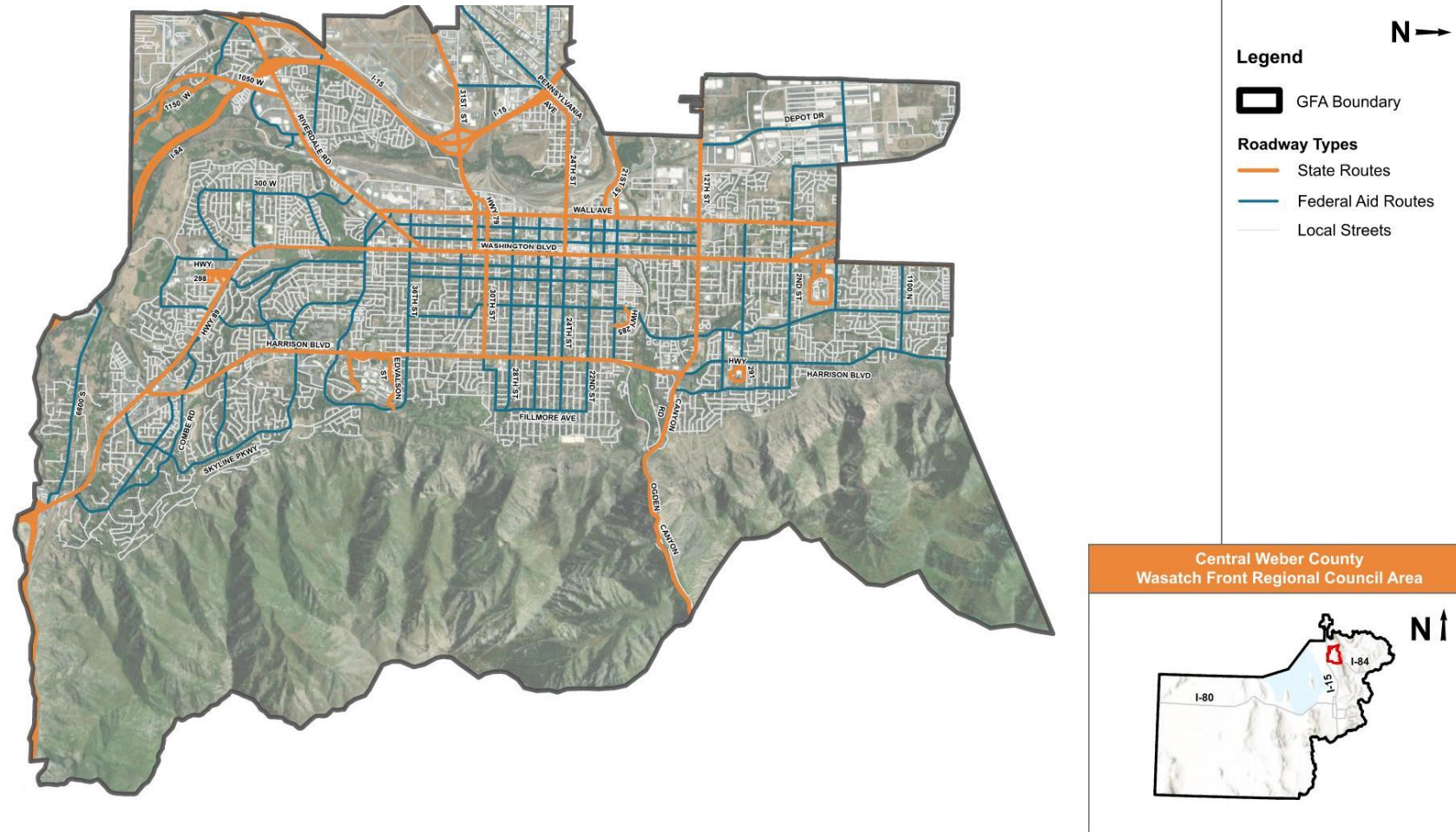
The CSAP will **analyze** safety needs, **identify** high-risk locations and factors contributing to crashes, and **prioritize** strategies to address them.

The CSAP will meet eligibility requirements that allow local jurisdictions to apply for **Implementation Grants** from the United States Department of Transportation (USDOT) Safe Streets and Roads for All (SS4A) discretionary grant program. The grant program was established by the Bipartisan Infrastructure Law (BIL) with \$5 billion in appropriated funds, 2022-2026. A Safety Action Plan must include the following elements, as specified by FHWA to satisfy eligibility requirements to apply for an implementation grant:

State Route: Roadways owned, operated, and maintained by UDOT

Federal-Aid Route: Non-UDOT roadways eligible for federal funding – typically minor arterials and collectors

Local Streets: Other non-UDOT / non-Federal Aid roadways, primarily collectors, and residential streets



Self-Certification Checklist

Plan must include the following:

Safety Analysis

- Existing conditions and historical trends
- Crashes by location, severity, and contributing factor
- Systemic and specific safety needs
- Geospatial identification of higher risk locations

Identification of comprehensive set of projects and strategies

...And must complete 4 of the 6 elements to the right:

- | | |
|---|--|
| <p>1. Leadership Commitment</p> <ul style="list-style-type: none"> <input type="checkbox"/> Governing body publicly commit to a zero fatalities and serious injury goal | <p>4. Equity</p> <ul style="list-style-type: none"> <input type="checkbox"/> Data-driven, inclusive, and representative processes |
| <p>2. Plan Development</p> <ul style="list-style-type: none"> <input type="checkbox"/> Committee charged with plan development, implementation, and monitoring | <p>5. Policies, Plans, Guidelines, and/or Standards</p> <ul style="list-style-type: none"> <input type="checkbox"/> Assessment policies, plans, guidelines, and/or standards |
| <p>3. Development Activities</p> <ul style="list-style-type: none"> <input type="checkbox"/> Engagement with public and relevant stakeholders | <p>6. Progress</p> <ul style="list-style-type: none"> <input type="checkbox"/> Description on how progress will be measured over time |

Safe System Approach

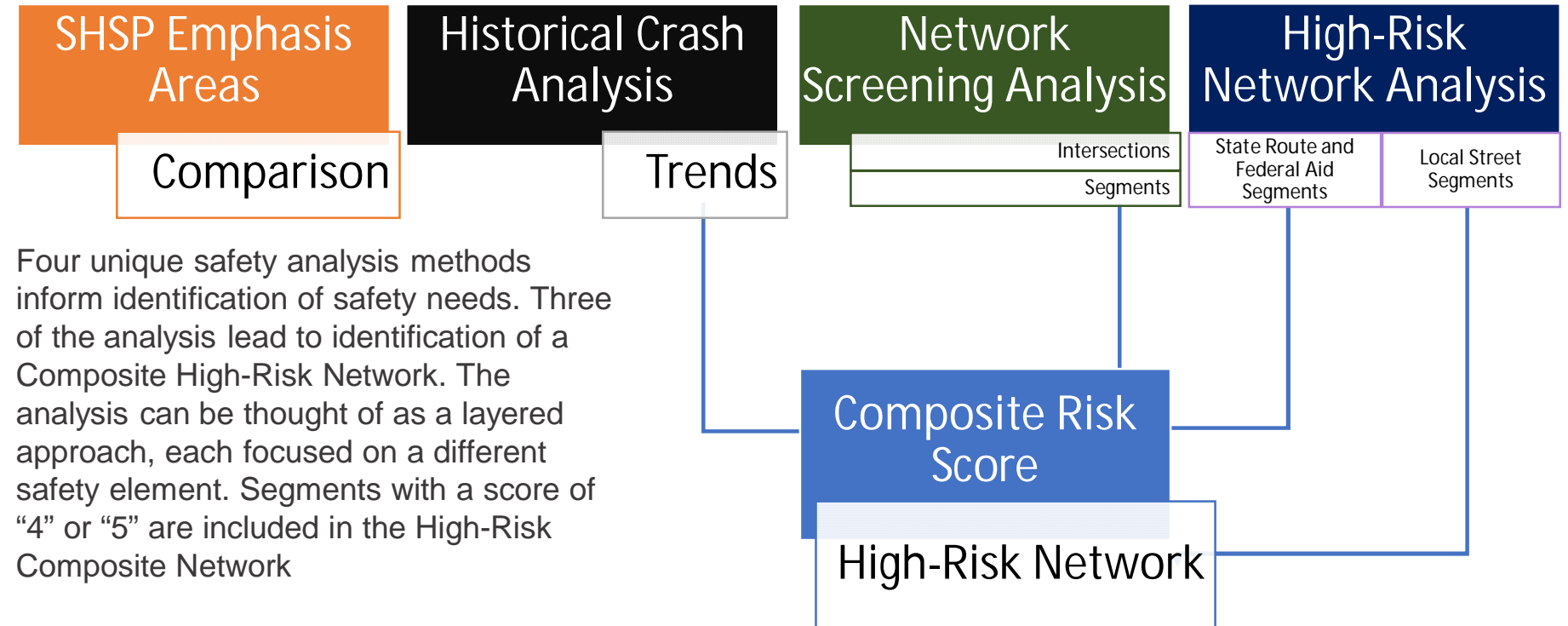
Implementing a Safe System Approach requires moving away from traditional safety paradigms.

- ❑ The Safe System approach seeks to prevent death and serious injuries.
- ❑ The Safe System approach designs for human mistakes and limitations.
- ❑ The Safe System approach focuses on speed management and strategies to reduce system kinetic energy.
- ❑ The Safe System approach aims to share responsibility among system users, managers, and others.
- ❑ The Safe System approach proactively identifies and addresses risks



Traditional Approach to Safety	Safe System Approach Paradigm
Prevent crashes	Prevent death and serious injury
Improve human behavior	Design for human mistakes/limitations
Control speeding	Reduce system kinetic energy
Individuals are responsible	Share responsibility
React based on crash history	Proactively identify and address risks

Safety Analysis Methodology



Four unique safety analysis methods inform identification of safety needs. Three of the analysis lead to identification of a Composite High-Risk Network. The analysis can be thought of as a layered approach, each focused on a different safety element. Segments with a score of "4" or "5" are included in the High-Risk Composite Network

Analysis	Composite High Risk Score Element	Value
Historical Crash Analysis	Segment 5-Year Crash Totals \geq 3 Crashes	1
Network Screening Analysis	Positive Local CCR Differential	1
High Risk Network Analysis	Crash Profile Risk Score \geq 20	1
	usRAP Vehicle Star Rating = 1-2 Stars	1
	usRAP Pedestrian Star Rating = 1-2 Stars	0.5
	usRAP Bicycle Star Rating = 1-2 Stars	0.5
Total Possible Composite Risk Score		5

Strategic Highway Safety Plan (SHSP) Emphasis Area Comparison

Based on a comparison of fatal and serious injuries for each Utah SHSP Emphasis area, the following emphasis areas should be considered when developing safety improvement projects specific to the **Central Weber County GFA**.

- Intersections
- Pedestrian
- Speed-Related
- Older Driver
- Roadway Departure

Intersection, Roadway Departure, and Speed-Related emphasis areas rank highest in terms of number of fatal and serious injuries at the Statewide and WFRC Levels.

In addition to Intersection, Roadway Departure, and Speed-Related emphasis areas within the **Central Weber County GFA**, Pedestrian and Older Driver are also identified as top emphasis areas.

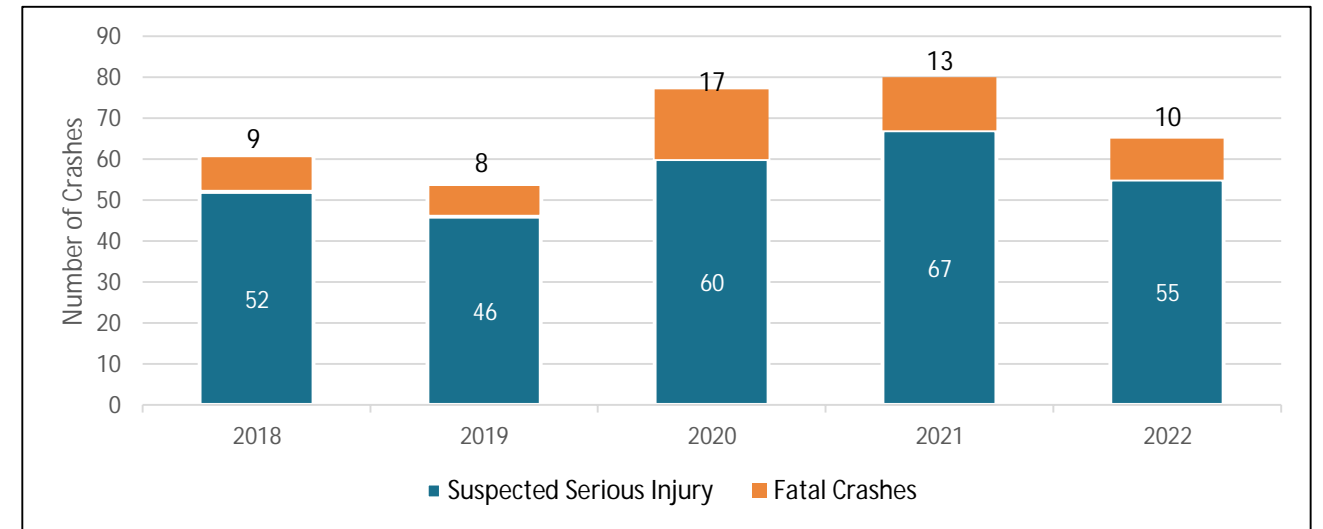
Strategic Highway Safety Plan Emphasis Area Comparison

Category	Utah SHSP Safety Emphasis Area	Statewide Totals		WFRC Totals		Central Weber County GFA Totals		
		Fatal and Serious Injury	Rank	Fatal and Serious Injury	Rank	Fatal and Serious Injury	Rank	Change in Rank From WFRC
Driver	Teen Driver	1,640	4	751	4	56	7	-3
	Older Driver	1,508	6	700	6	73	4	2
	Speed-Related	2,133	3	936	3	76	3	0
	Aggressive Driving	555	11	297	10	31	10	0
	Distracted Driving	718	10	286	11	23	11	0
	Impaired Driving	1,184	8	623	8	48	9	-1
	No Safety Restraints	1,542	5	599	9	52	8	1
Roadway	Intersection	3,567	1	2,163	1	194	1	0
	Roadway Departure	2,931	2	1,014	2	69	5	-3
Special Users	Motorcycle	1,457	7	750	5	68	6	-1
	Pedestrian	912	9	636	7	78	2	5
	Bicycle*	280	12	167	12	11	12	0

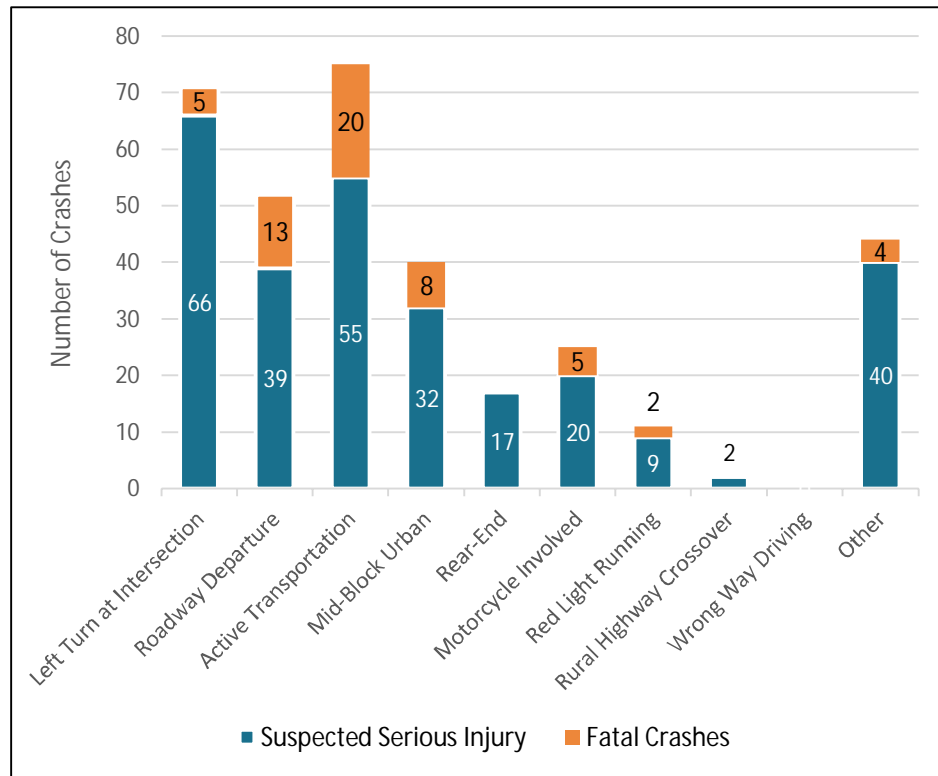
*While Bicycles are not one of the eleven Utah SHSP emphasis areas, they are included as part of the CSAP safety analysis.

5-Year Historical Crash Trends in Central Weber County GFA

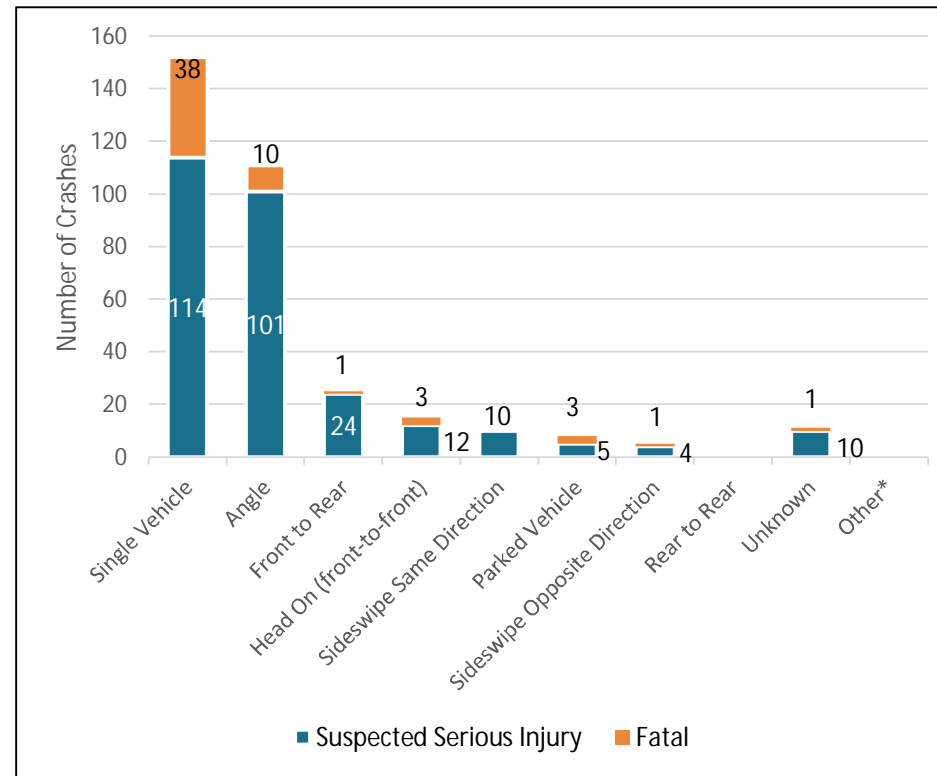
Route Type	State Route		Federal Aid Route		Local Street		Overall Total		% of WFRC
Crash Severity	Crashes		Crashes		Crashes		Crashes		%
	#	%	#	%	#	%	#	%	
Fatal	37	1%	13	1%	7	1%	57	0.5%	< 0.1%
Suspected Serious Injury	180	2%	73	3%	27	2%	280	2.5%	0.2%
Suspected Minor Injury	983	13%	373	14%	136	10%	1,492	13.3%	0.8%
Possible Injury	1,298	18%	448	17%	167	12%	1,913	17.1%	1.1%
No Injury / Property Damage Only	4,790	66%	1,667	65%	1,014	75%	7,471	66.6%	4.1%
Route Total	7,288	100%	2,574	100%	1,351	100%	11,213	100%	6.2%



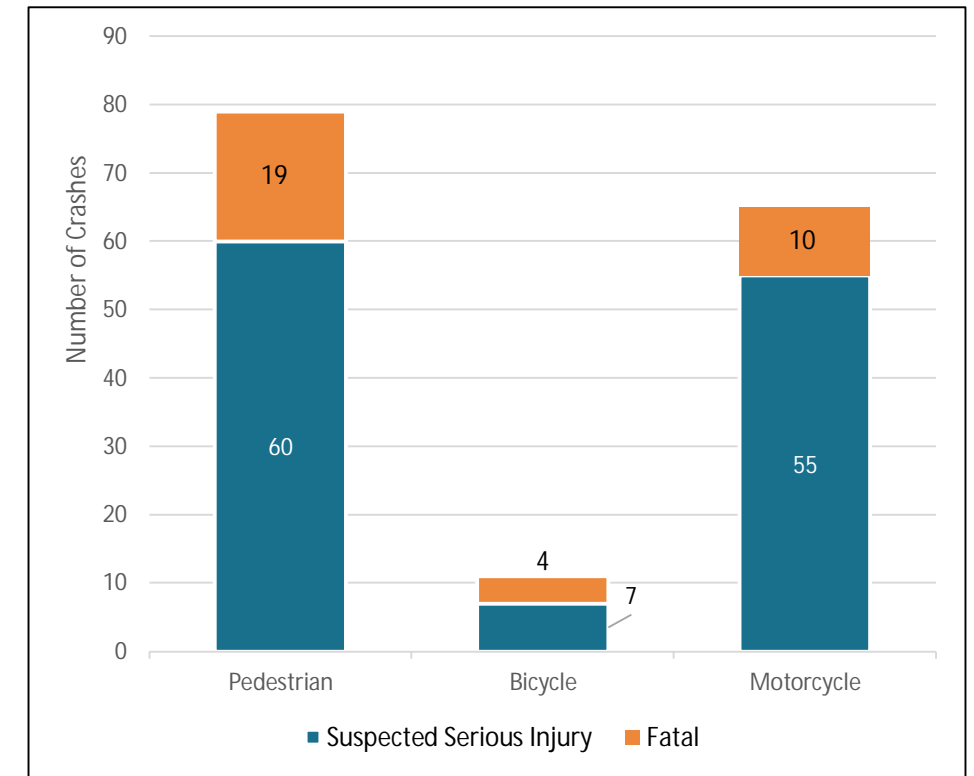
Annual Fatal and Serious Injury Crashes (2018-2022)



Crash Type



Manner of Collision



Active Transportation

Historical Crash Analysis
Trends

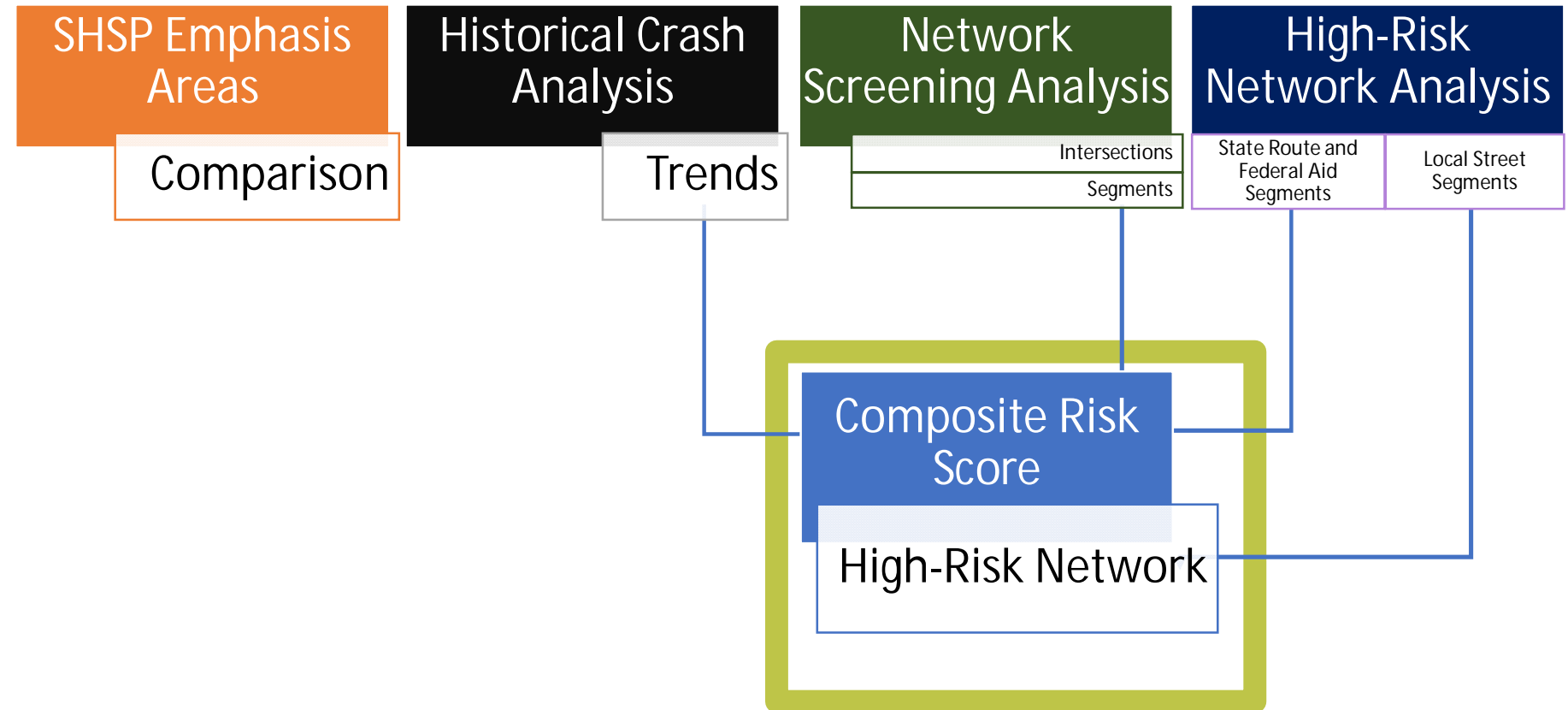
Composite High-Risk Roadway Network

Each of the completed safety analysis methodologies identified segments or intersections that may be **candidates for safety improvements** to reduce fatalities and serious injury crashes.

To provide focused information for jurisdictional decisions regarding **prioritization of safety improvements**, an analysis was performed to identify overlapping segments from each of the analysis methodologies. A **composite score**, from zero to five, was assigned to each State Highway or Federal Aid Route segment in the region. State Route or Federal Aid Route segments with a score of “4” or higher are included in the High-Risk Network. These represent the top 10% of State Route and Federal Aid Route segments for the entire WFRC area.

State Route and Federal Aid segments in the **Central Weber County GFA** that scored “4” or higher, and included in the Composite High-Risk Network, are listed in the table on page 6 and 7. The table also lists streets identified through a separate Local Street Risk Assessment.

The Composite High Risk Network map on page 8 includes State Route and Federal Aid Route segments with a score of “4” or higher. The map also shows local streets identified through a separate Local Street Risk Assessment.



Analysis	Composite High Risk Score Element	Value
Historical Crash Analysis	Segment 5-Year Crash Totals ≥ 3 Crashes	1
Network Screening Analysis	Positive Local CCR Differential	1
High Risk Network Analysis	Crash Profile Risk Score ≥ 20	1
	usRAP Vehicle Star Rating = 1-2 Stars	1
	usRAP Pedestrian Star Rating = 1-2 Stars	0.5
	usRAP Bicycle Star Rating = 1-2 Stars	0.5
Total Possible Composite Risk Score		5

Composite Risk Score

High-Risk Network

Composite High-Risk Network (State Route/Federal Aid) and Local Street Risk Network

Facility	Limits	Functional Classification	City	RISK TYPE						
				usRAP- Pedestrian Star Rating	usRAP - Bicycle Star Rating	usRAP- Vehicle Star Rating	Crash Profile Risk Score	CCR Differential Analysis	Significant Crashes	Local Streets Risk Assessment
State Route										
Harrisville Road	400 North to Washington Blvd	Other Principal Arterial	Ogden	X	X	X	X		X	
Washington Blvd	400 North to Harrison Blvd	Other Principal Arterial	Ogden, South Ogden	X	X	X	X	X		
1200 South	1200 West to Harrison Blvd	Other Principal Arterial	Ogden	X	X	X	X		X	
Ogden Canyon Road	Valley Drive to East GFA extent	Minor Arterial	Ogden	X	X	X	X	X	X	
Harrison Blvd	1200 S to Washington Blvd	Other Principal Arterial	Ogden, South Ogden	X	X	X	X		X	
Wall Avenue	400 North to Riverdale Road	Other Principal Arterial	Ogden, South Ogden	X	X	X	X	X	X	
31st St	I-15 to Wall Avenue	Other Principal Arterial	Ogden	X	X		X	X	X	
South Weber Drive	Riverdale Road to South GFA extents	Major Collector	Riverdale	X	X	X	X	X	X	
Riverdale Road	West GFA extents to Washington Blvd	Other Principal Arterial	Riverdale	X	X	X	X		X	
US-89	2250 East to I-84	Other Principal Arterial	Uintah	X	X	X	X		X	

State Route segments in the **Central Weber GFA** Composite High-Risk Network are listed at left. Each of these segments received a composite risk score of "4" or higher. These segments provide a focus for local jurisdictions to collaborate with UDOT. Each of these segments are shown on the map on page 8.

Composite Risk Score

High-Risk Network



Composite High-Risk Network (State Route/Federal Aid) and Local Street Risk Network, Cont'd

Facility	Limits	Functional Classification	City	RISK TYPE						
				usRAP- Pedestrian Star Rating	usRAP - Bicycle Star Rating	usRAP- Vehicle Star Rating	Crash Profile Risk Score	CCR Differential Analysis	Significant Crashes	Local Streets Risk Assessment
Federal Aid Routes										
Midland Drive	I-15 to 1900 West	Minor Arterial	Ogden	X	X	X	X		X	
2nd St	Washington Blvd to Eccles Ave	Major Collector	Ogden	X	X		X	X	X	
Local Streets										
				Local Street Risk Assessment						
Monroe Street	12th Street to 6th Street	Minor Arterial	Ogden	The Local Street Risk Assessment considered factors such as locations of crashes, proximity to schools, and hard-braking.						X
36th Street	US-89 to Lincoln Avenue	Minor Arterial	South Ogden							X
40th Street	Orchard to SR-26	Minor Arterial	Riverdale							X
29th Street	Adams Avenue to Lincoln Avenue	Local	Ogden							X
7th Street	US-89 to Downs Drive	Local	Ogden							X
28th Street	Grant Avenue to Union Avenue	Minor Collector	Ogden							X
27th Street	Lincoln Avenue to US-89	Local	Ogden							X
Monroe Street	12th Street to 22nd Street	Minor Arterial	Ogden							X
2nd Street	Century Drive to SR-235	Major Collector	Ogden							X
20th Street	SR-204 to Quincy Avenue	Minor Arterial	Ogden							X

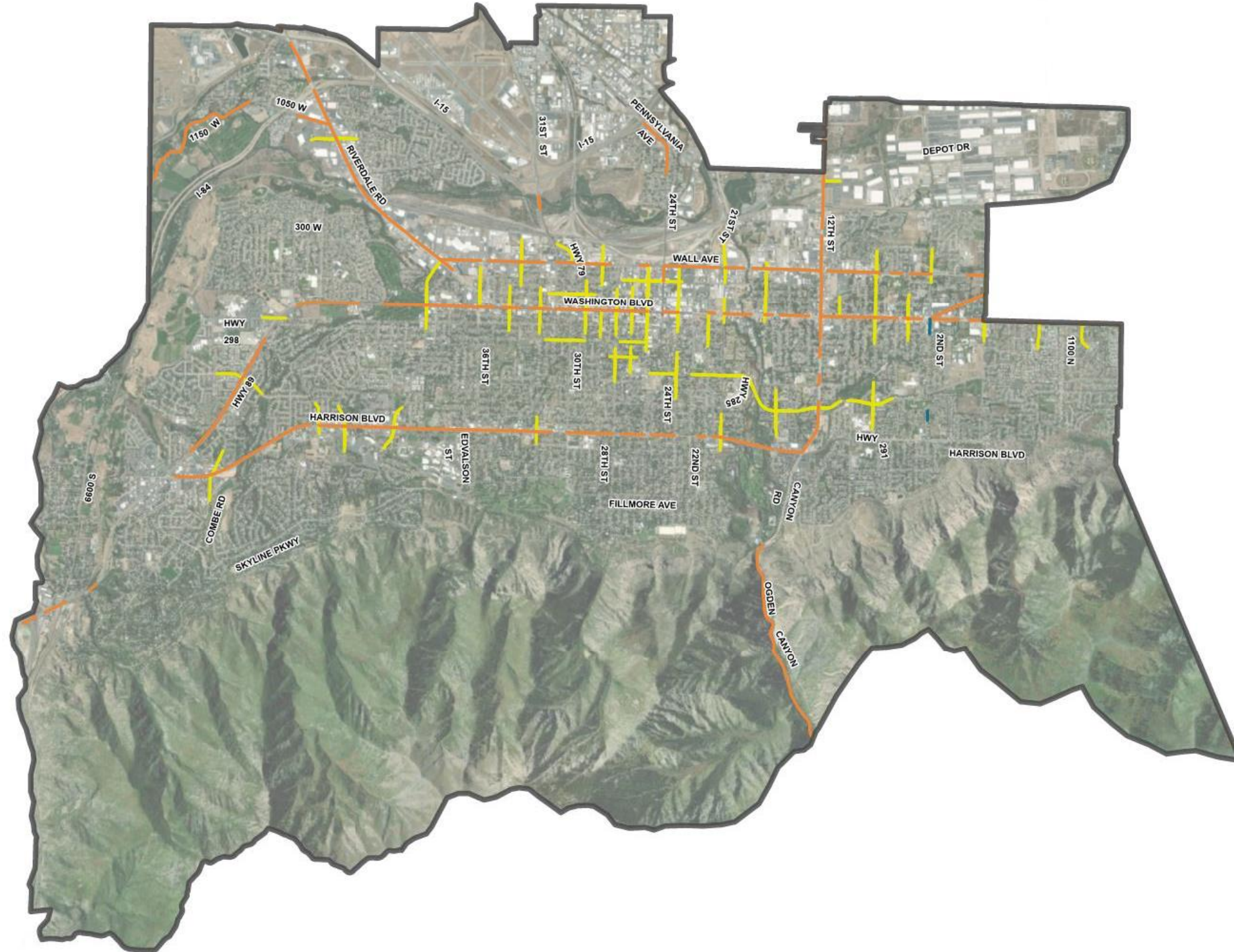
Federal Aid segments in the **Central Weber GFA** Composite High-Risk Network are listed at left. Listed segments received a composite risk score of "4" or higher. The segment is shown on the map on page 8.

Local Street segments identified through a separate analysis that considered factors such as crash location, proximity to schools, and hard braking are also listed at left. The segments are shown on the map on page 8.

Composite Risk Score

High-Risk Network

Composite High-Risk Roadway Network



Legend

GFA Boundary

Composite High-Risk Network

- State Routes
- Federal Aid Routes
- Local Streets

Central Weber County
Wasatch Front Regional Council Area



Composite Risk Score

High-Risk Network

Network Screening - Intersections

Network Screening is one of the inputs to the Composite High Risk Roadway Network. Network screening is based on Critical Crash Rate Differential analysis as documented in the Highway Safety Manual. This analysis identified intersections where historical crash rates exceed those which can be expected for similar facilities.

A list of the top 10 intersections on State Routes, Federal Aid Routes, and Local (Non-Federal Aid) Streets in the **Central Weber County** GFA are listed at right, along with their associated number of crashes.

For each intersection, the Critical Crash Rate (CCR) Differential and Equivalent Property Damage Only (EDPO) value is listed. These intersections represent those with the highest potential for safety improvements and can be considered as project candidate locations.

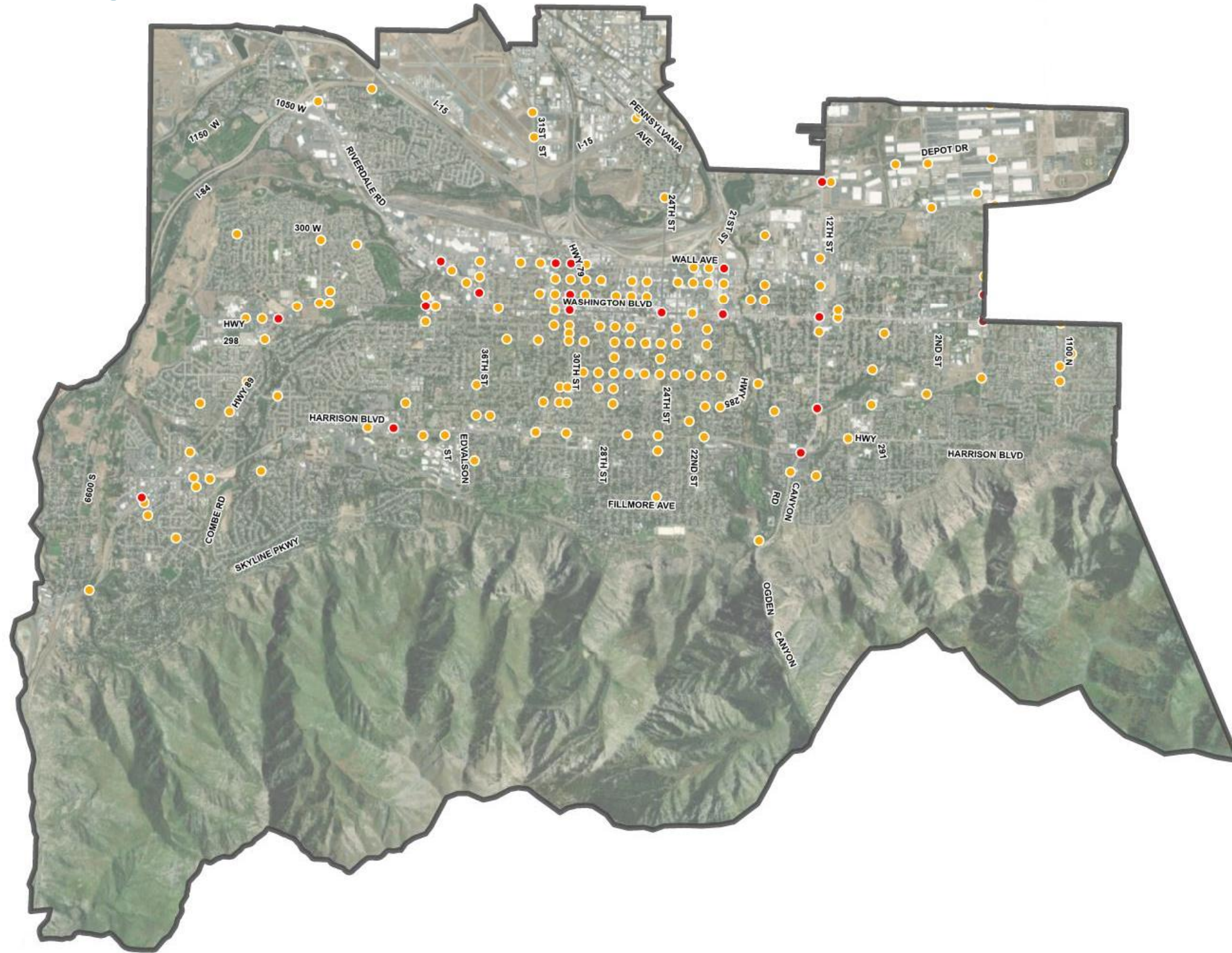
Signalized and unsignalized intersections in the **Central Weber County** GFA with a positive Critical Crash Rate Differential (rate exceeds expected rate) are mapped on page 10.

Intersection	City	Crashes	Critical Crash Rate Differential	EPDO ¹	Fatal	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	No Injury/PDO	Angle	Front to Rear	Head On	Parked Vehicle	Single Vehicle	Rear to Rear	Rear to Side	Sideswipe (Same Direction)	Sideswipe (Opposite Direction)	Other/Unknown	Pedestrian	Bicycle	Motorcycle
Signalized Intersections																						
Washington Blvd & 40Th St	South Ogden	102	0.5	1895	1	1	28	21	51	62	26	3	4	0	0	0	3	2	2	1	1	2
Harrisville Rd & 400 N	Ogden	29	0.4	486	0	3	5	7	14	14	7	2	3	0	0	0	0	1	2	2	0	0
Washington Blvd & 24Th St	Ogden	54	0.4	304	0	0	3	18	33	24	12	4	8	1	0	0	1	4	0	3	2	0
Wall Ave & 20Th St	Ogden	68	0.4	743	0	4	7	15	42	43	18	1	3	0	0	0	0	1	2	2	1	1
Washington Blvd & 12Th St	Ogden	107	0.4	884	0	1	20	25	61	36	45	4	16	0	0	0	0	5	1	10	4	0
Adams Ave & Hwy 89	South Ogden	51	0.4	449	0	1	9	11	30	25	14	6	3	0	0	0	1	1	1	0	0	1
Monroe Blvd & 12Th St	Ogden	57	0.3	1583	1	2	14	15	25	43	6	2	4	0	0	0	0	1	1	2	1	2
Washington Blvd & North St	Harrisville	48	0.2	497	0	1	7	20	20	24	11	3	8	1	0	0	0	1	0	2	4	2
Wall Ave & 31St St	Ogden	64	0.2	831	0	2	22	11	29	29	20	1	9	1	0	0	0	2	2	3	7	1
Harrison Blvd & Canyon Rd	Ogden	53	0.2	803	0	4	11	14	24	27	17	3	2	0	0	0	3	0	1	0	0	3
Unsignalized Intersections																						
Jefferson Ave & Canyon View Dr	Ogden	3	4.0	3	0	0	0	0	3	2	0	0	1	0	0	0	0	0	0	0	0	0
Monroe Blvd & 27Th St	Ogden	21	3.0	250	0	1	3	7	10	20	0	0	1	0	0	0	0	0	0	0	0	0
Lincoln Ave & 17Th St	Ogden	26	2.8	329	0	1	5	10	10	26	0	0	0	0	0	0	0	0	0	0	0	1
Van Buren Ave & 35Th St	Ogden	4	2.7	68	0	0	3	0	1	3	0	0	1	0	0	0	0	0	0	0	1	0
Jefferson Ave & 34Th St	Ogden	5	2.4	26	0	0	0	2	3	0	0	0	2	2	0	0	0	1	0	0	0	0
Adams Ave & 27Th St	Ogden	7	2.2	49	0	0	1	2	4	4	0	0	1	0	0	0	1	1	0	0	0	1
Kiesel Ave & 10Th St	Ogden	3	2.1	24	0	0	1	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0
Wasatch Dr & Eastwood Blvd	South Ogden	11	2.1	21	0	0	0	1	10	9	2	0	0	0	0	0	0	0	0	0	0	0
Jackson Ave & 27Th St	Ogden	3	2.0	13	0	0	0	1	2	2	0	0	1	0	0	0	0	0	0	0	0	0
Jefferson Ave & 23Rd St	Ogden	5	2.0	108	0	1	0	1	3	4	0	0	0	0	0	0	0	1	0	0	0	0

1. Equivalent Property Damage Only Crashes

	= 90 - 100% probability that crash type is over-represented
	= 80 - 90% probability that crash type is over-represented
	= 70 - 80% probability that crash type is over-represented

Network Screening - Intersections



Legend

GFA Boundary

Critical Crash Rate Differential (> 1.0)

- Signalized
- Unsignalized

Central Weber County Wasatch Front Regional Council Area



Network
Screening Analysis

Intersections
Segments

Supporting Information



High-Risk Roadway Segments (Federal Aid Routes)

Facility	Limits	City	RISK TYPE						
			usRAP- Pedestrian Star Rating	usRAP - Bicycle Star Rating	usRAP- Vehicle Star Rating	Crash Profile Risk Score	CCR Differential Analysis	Significant Crashes	Local Streets Risk Assessment
Federal Aid Routes									
Monroe Blvd	Kylee Lane to Melody Lane	Ogden	X		X				
Monroe Blvd	Melody Lane to 1500 North	Ogden	X						
21st Street	Lincoln Avenue to Washington Blvd	Ogden	X		X				
Mountain Road	900 North to North GFA Extents	Ogden	X	X					
2nd Street	Stewart Drive to Harrison Boulevard	Ogden	X	X					
Harrison Blvd	Canyon Road to 2nd Street	Ogden	X	X					
Harrison Blvd	2nd Street to North GFA Extents	Ogden	X						
4400 South	250 West to 300 East	Washington Terrace	X	X					
300 East	4400 South to Washington Blvd	Washington Terrace	X	X					
40th Street	Palmer Drive to Gramercy Ave	South Ogden	X						
36th Street	Lincoln Avenue to Brinker Avenue	Ogden	X						
36th Street	Tyler Avenue to Ogden Drive	Ogden	X						
530 West	2nd Street to North GFA Extents	Ogden	X						
Federal Park Drive	5600 South to Riverdale Road	Roy	X						
2550 South	1900 West to Pennsylvania Avenue	Ogden				X			
Pennsylvania Avenue	3300 South to 2550 South	Ogden				X			
Midland Drive	1900 West to 2550 South	Ogden				X			
Mountain Road	900 North to North GFA Extents	Ogden				X			

A list of Federal Aid segments in the **Central Weber GFA** identified from each of the safety analysis methods is listed in the table at left. The table lists the top-10 segments from each analysis. An “x” is placed to identify the analysis that flagged the segment:

- **usRAP** Star Ratings (Vehicle, Bicycle, Pedestrian)
- **Crash Profile** Risk Score
- **Network Screening**, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period)

The maps on page 15 through 19 depict each of these segments identified by the respective analysis.

Composite Risk Score

High-Risk Network

High-Risk Roadway Segments (Federal Aid Routes), Cont'd

Facility	Limits	City	RISK TYPE						
			usRAP- Pedestrian Star Rating	usRAP - Bicycle Star Rating	usRAP- Vehicle Star Rating	Crash Profile Risk Score	CCR Differential Analysis	Significant Crashes	Local Streets Risk Assessment
Federal Aid Routes									
530 West	2nd Street to 400 North	Ogden				X			
2nd Street	530 West to Harrison Boulevard	Ogden				X			
Harrison Boulevard	Canyon Road to 2nd Street	Ogden				X			
36th Street	Wall Avenue to Harrison Boulevard	Ogden				X			
Chime View Drive	Wall Avenue to 40th Street	Ogden				X			
4400 South / 300 East	Washington Terrace Road to Washington Blvd	South Ogden				X			
2nd Street	530 West to Wetgate Lane	Ogden				X			
Combre Road	Harrison Boulevard to Eastwood Drive	Uintah				X			
Sheridan Drive	Harrison Boulevard to Polk Avenue	Ogden				X			
9th Street	Monroe Boulevard to Polk Avenue	Ogden				X			
6600 S	2275 S to Bell Ln	Uintah					X	X	
North St	630 E to 660 E	Ogden					X	X	
400 N	Harrisville Rd to 325 E	Harrisville					X	X	
Skyline Dr	Hwy 89 to Fashion Point Dr	South Ogden					X	X	
26th St	Iowa Ave to Harrison Blvd	Ogden					X	X	
400 N	Burbridge Ave to Depot Dr	Ogden					X	X	
4600 S	Fillmore Ave to 1575 E	Ogden					X	X	
Jefferson Ave	22nd St to 23rd St	Ogden					X	X	
Grant Ave	13th St to 12th St	Ogden					X	X	
Monroe Blvd	30th St to Darling Street	Ogden					X	X	

Composite Risk Score
High-Risk Network

Network Screening – Segments (Local Streets)

Facility	Limits	City	RISK TYPE						
			usRAP- Pedestrian Star Rating	usRAP - Bicycle Star Rating	usRAP- Vehicle Star Rating	Crash Profile Risk Score	CCR Differential Analysis	Significant Crashes	Local Streets Risk Assessment
Local Streets			Local Street Risk Assessment						
1475 N	435 E to 485 E	Ogden							X
34th St	Washington Blvd to Grant Ave	Ogden							X
35th St	Brinker Ave to Harrison Blvd	Ogden							X
25th St	Wall Ave to Lincoln Ave	Ogden							X
38th St	Grant Ave to Kiesel Ave	South Ogden							X
Healy St	Grant Ave to Washington Blvd	Ogden							X
Sylvia Dr	Chimes View Dr to 39th St	South Ogden							X
25th St	Kiesel Ave to Grant Ave	Ogden							X
475 N	Washington Blvd to	Harrisville							X
Chambers St	Holroyd Dr to Glasmann Way	South Ogden							X

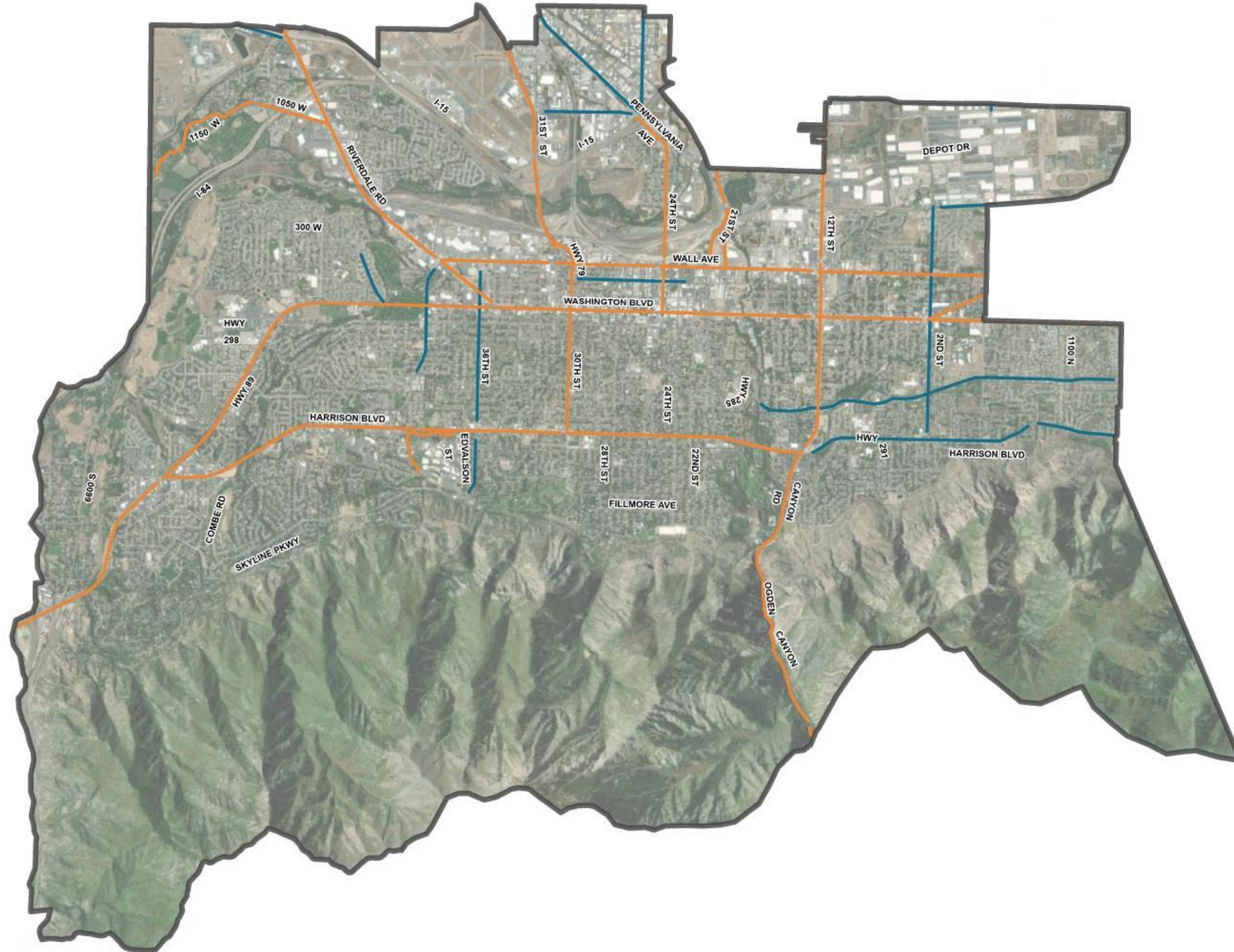
A list of Local Street segments in the **Central Weber GFA** identified from Network Screening, applying Critical Crash Rate (CCR) and Significant Crashes (three or more crashes over 5-year period), is shown at left.

Composite Risk Score

High-Risk Network



usRAP Pedestrian Star Rating - Segments



Legend

GFA Boundary

Pedestrian Star Rating (1-2)

State Routes

Federal Aid Routes

Central Weber County
Wasatch Front Regional Council Area

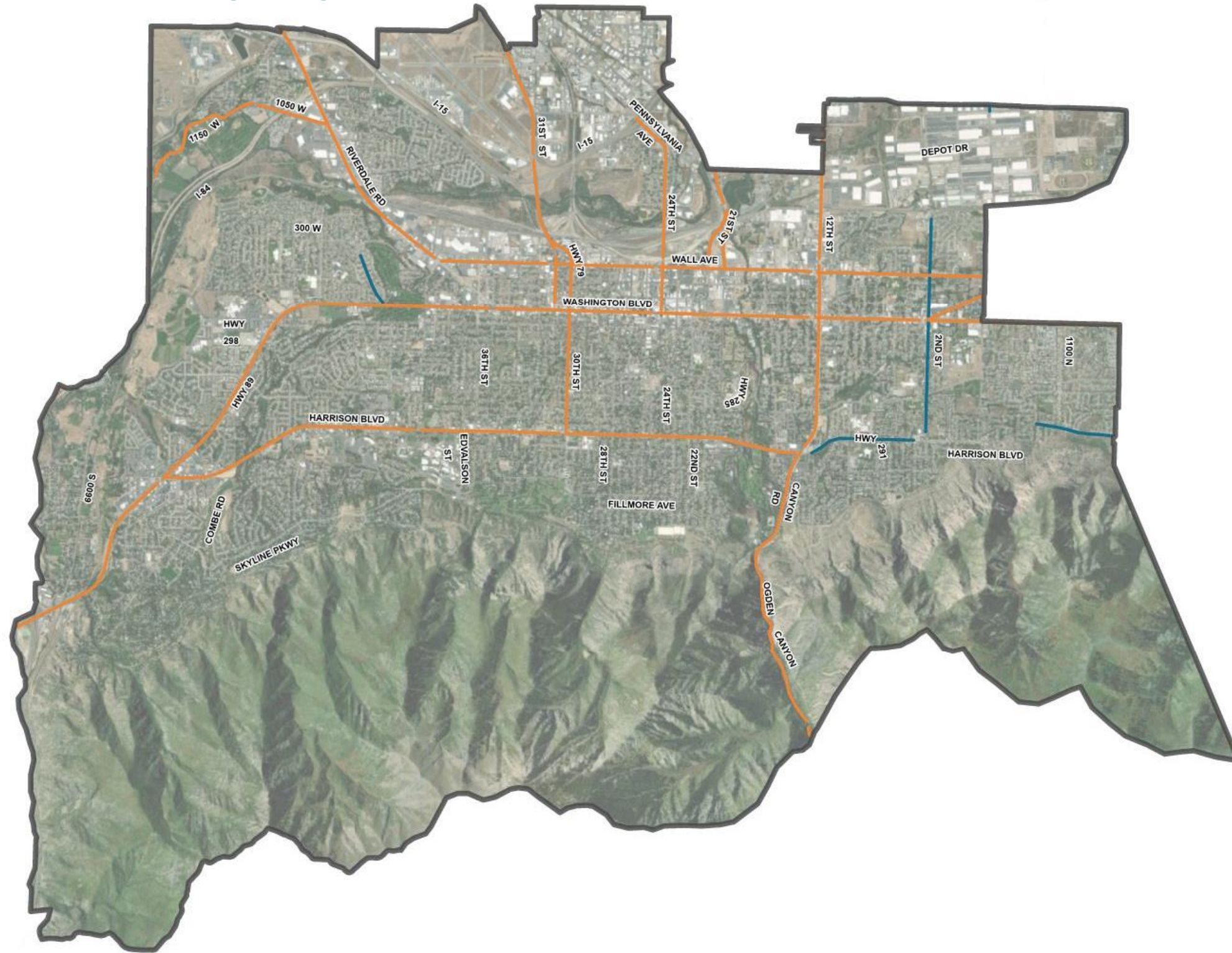


High-Risk
Network Analysis

State Route and
Federal Aid
Segments

Local Street
Segments

usRAP Bicycle Star Rating - Segments



Legend

GFA Boundary

Bicycle Star Rating (1-2)

State Routes

Federal Aid Routes

Central Weber County
Wasatch Front Regional Council Area

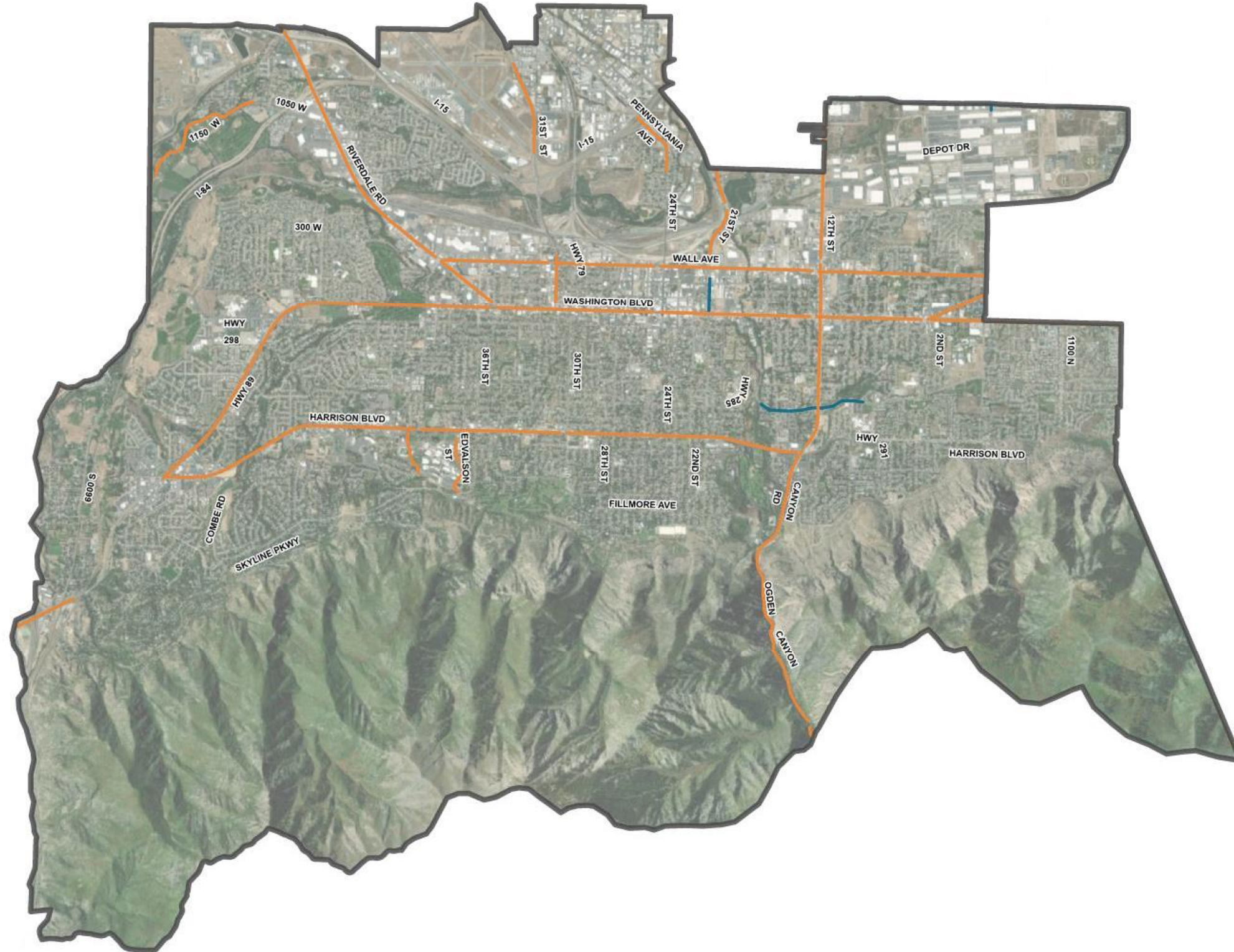


High-Risk
Network Analysis

State Route and
Federal Aid
Segments

Local Street
Segments

usRAP Vehicle Star Rating - Segments



Legend

GFA Boundary

Vehicle Star Rating (1-2)

State Routes

Federal Aid Routes

Central Weber County Wasatch Front Regional Council Area

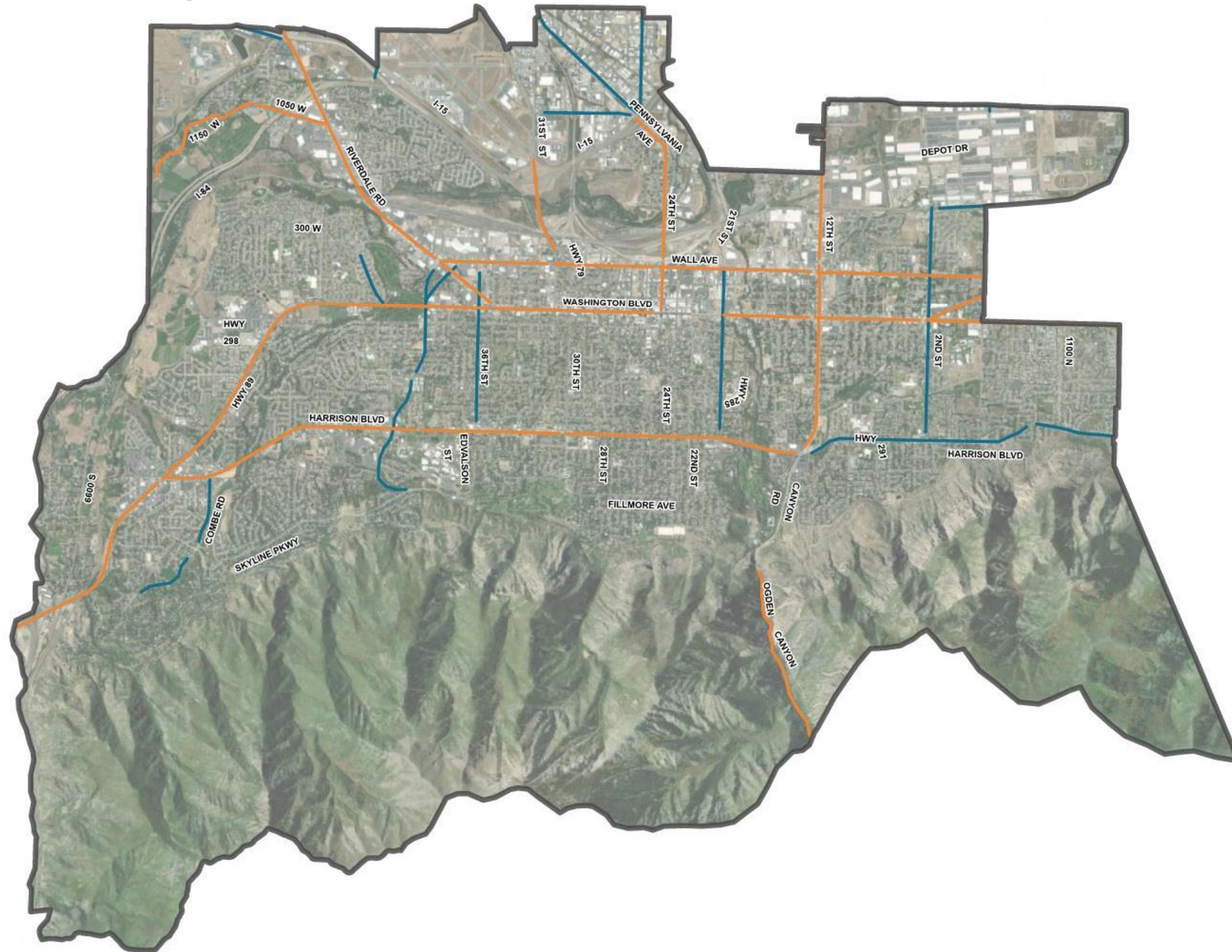


High-Risk Network Analysis

State Route and
Federal Aid
Segments

Local Street
Segments

Crash Profile Risk - Segments



Legend

GFA Boundary

Crash Profile Risk (> 20)

State Routes

Federal Aid Routes

Central Weber County
Wasatch Front Regional Council Area

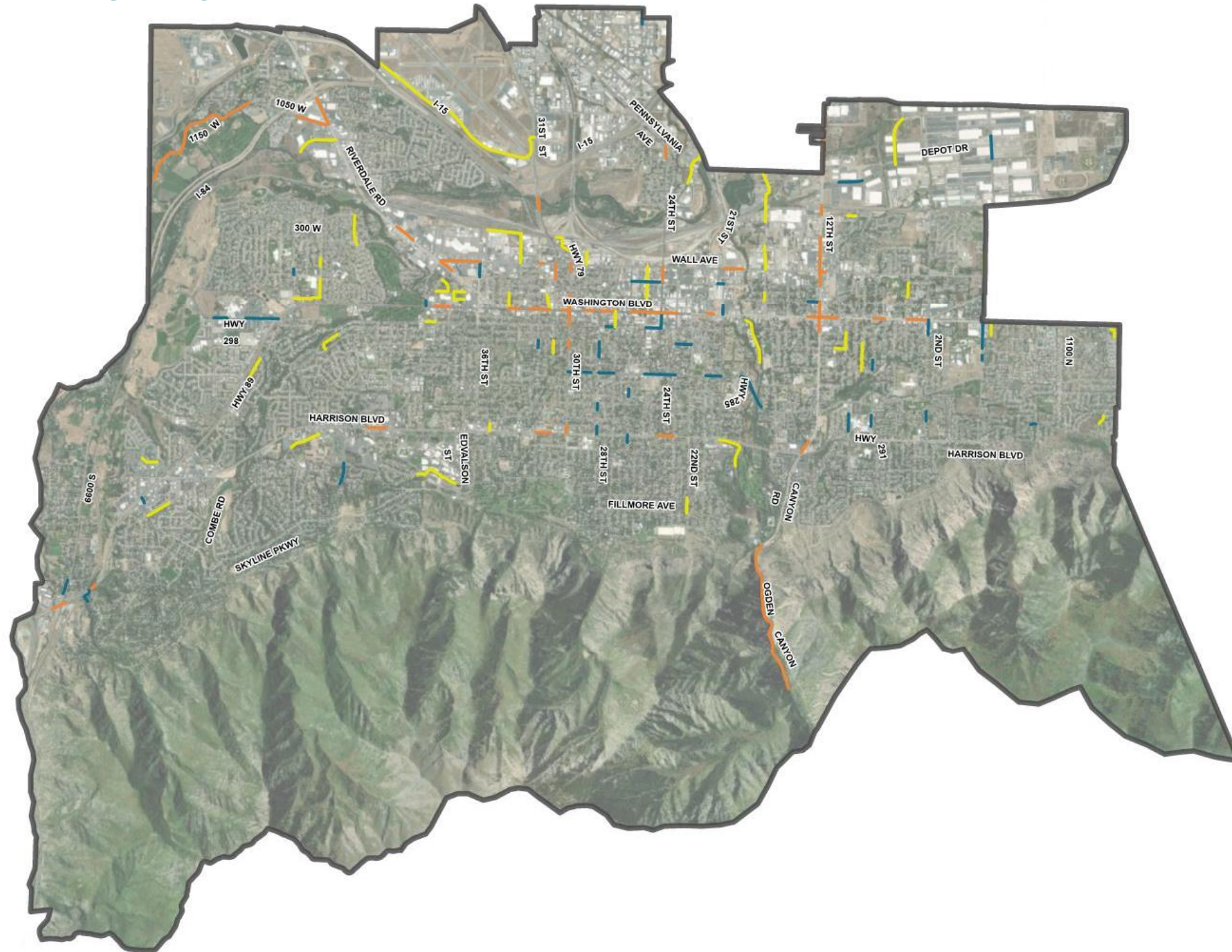


High-Risk
Network Analysis

State Route and
Federal Aid
Segments

Local Street
Segments

Network Screening - Segments



Legend

GFA Boundary

Critical Crash Rate Differential (> 0.0)

State Routes

Federal Aid Routes

Local Streets

Central Weber County
Wasatch Front Regional Council Area



High-Risk
Network Analysis

State Route and
Federal Aid
Segments

Local Street
Segments

CENTRAL WEBER COUNTY TECH MEMO #1

SAFETY ANALYSIS

TECHNICAL MEMORANDUM #1

APPENDIX A3 - CENTRAL WEBER COUNTY GEOGRAPHIC FOCUS AREA ANALYSIS

September 2023

Statutory Notice

23 U.S.C. § 409: US Code - Section 409: Discovery and admission as evidence of certain reports and surveys

Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway- highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

File name: Appendix A3 - Central Weber County GFA - Safety Analysis.docx

Table of Contents

1. Introduction.....	5
1.1. Safety Analysis	5
1.2. Appendix Organization.....	5
2. Study Area.....	6
3. SHSP Emphasis Area Analysis.....	9
4. Historical Crash Analysis.....	10
4.1. Overall Crashes	10
4.2. Fatal and Serious Injury Crashes by Year.....	10
4.3. Fatal and Serious Injury Crashes by Crash Type	16
4.4. Fatal and Serious Injury Vulnerable User Crashes.....	18
4.5. Fatal and Serious Injury Crashes by Manner of Collision	20
4.6. Fatal and Serious Injury Intersection Crashes.....	22
4.7. Fatal and Serious Injury Crashes by Functional Class	24
4.8. Fatal and Serious Injury Crash Trees Diagrams.....	26
5. Crash and Network Screening Analysis.....	30
6. Roadway Characteristic Risk Analysis	38
6.1. Crash Profile Risk Assessment	38
6.2. usRAP Risk Assessment	41
6.3. Local Street Risk Assessment.....	48
7. Safety Analysis Summary	50
7.1. Common Risk Characteristics	50
7.2. Composite High-Risk Roadway Network.....	50

List of Figures

Figure 2.1 – Central Weber County GFA Study Area	7
Figure 2.2 – Central Weber County GFA Roadway Network.....	8
Figure 4.1 – Fatal and Serious Injury Crashes by Year	11
Figure 4.2 – Fatal Crashes by Year	11
Figure 4.3 – Annual Fatal Crashes by Roadway Ownership	12
Figure 4.4 – Serious Injury Crashes by Year.....	12
Figure 4.5 – Annual Serious Injury Crashes by Roadway Ownership.....	13
Figure 4.6 – Fatal and Serious Injury Crashes	14
Figure 4.7 – Fatal and Serious Injury Crash Density	15
Figure 4.8 – Fatal and Serious Injury Crashes by Crash Type	16
Figure 4.9 – Fatal Crashes by Crash Type and Roadway Ownership	17
Figure 4.10 – Serious Injury Crashes by Crash Type and Roadway Ownership.....	17
Figure 4.11 – Fatal and Serious Injury Crashes by Vulnerable User	18
Figure 4.12 – Fatal Crashes by Vulnerable User and Roadway Ownership	19
Figure 4.13 – Serious Injury Crashes by Vulnerable User and Roadway Ownership	19
Figure 4.14 – Fatal and Serious Injury Crashes by Manner of Collision	20
Figure 4.15 – Fatal Crashes by Manner of Collision and Roadway Ownership	20
Figure 4.16 – Serious Injury Crashes by Manner of Collision and Roadway Ownership.....	21
Figure 4.17 – Fatal and Serious Injury Crashes by Intersection	22
Figure 4.18 – Fatal Crashes by Intersection and Roadway Ownership	23
Figure 4.19 – Serious Injury Crashes by Intersection and Roadway Ownership.....	23
Figure 4.20 – Fatal and Serious Injury Crashes by Functional Class	24
Figure 4.21 – Fatal Injury Crashes by Functional Class and Roadway Ownership.....	24
Figure 4.22 – Serious Injury Crashes by Functional Class and Roadway Ownership.....	25
Figure 4.23 – Fatal and Serious Injury Crash Tree Diagram (Crash Type).....	27
Figure 4.24 – Fatal and Serious Injury Crash Tree Diagram (Manner of Collision).....	28
Figure 4.25 – Fatal and Serious Injury Crash Tree Diagram (Active Transportation).....	29
Figure 5.1 – CCR Differential – Segments (State Routes).....	31
Figure 5.2 – CCR Differential – Segments (Federal Aid Routes).....	32
Figure 5.3 – CCR Differential – Segments (Local Routes)	33
Figure 5.4 – CCR Differential – Intersections (Signalized)	35

Figure 5.5 – CCR Differential – Intersections (Unsignalized)..... 36

Figure 6.1 – WFRC Risk Assessment Results (State Routes) 39

Figure 6.2 – WFRC Risk Assessment Results (Federal Aid Routes)..... 40

Figure 6.3 – Vehicle Star Rating (State Routes)..... 42

Figure 6.4 – Vehicle Star Rating (Federal Aid Routes)..... 43

Figure 6.5 – Pedestrian Star Rating (State Routes) 44

Figure 6.6 – Pedestrian Star Rating (Federal Aid Routes)..... 45

Figure 6.7 – Bicycle Star Rating (State Routes)..... 46

Figure 6.8 – Bicycle Star Rating (Federal Aid Routes) 47

Figure 6.9 – Local Street Risk Assessment Results..... 49

Figure 7.1 – Central Weber County High-Risk Roadway Network (State Routes)..... 52

Figure 7.2 – Central Weber County High-Risk Roadway Network (Federal Aid Routes) 53

List of Tables

Table 3.1 – SHSP Emphasis Areas Analysis 9

Table 4.1 – Crashes by Severity by Roadway Ownership..... 10

Table 5.1 – Crash and Network Screening Analysis Results - Segments..... 34

Table 5.2 – Crash and Network Screening Analysis Results - Intersections..... 37

Table 6.1 – WFRC Risk Segments (Federal Aid Routes)..... 38

Table 6.2 – usRAP Risk Segments (Federal Aid Route) 41

Table 6.3 – Local Street High Priority Segments..... 48

Table 7.1 – Composite High-Risk Roadway..... 51

Table 7.2 – Central Weber County High-Risk Roadway Network (Federal Aid Routes) 51

1. Introduction

Appendix A3 summarizes the safety analysis performed for the Central Weber County Geographic Focus Area (GFA) for the Wasatch Front Area Comprehensive Safety Action Plan (CSAP).

The analysis of available safety related data informs identification of a potential project locations that may be further considered in the development of safety related projects and project types.

1.1. Safety Analysis

The following safety analysis methodologies were completed for the Central Weber County GFA:

- Strategic Highway Safety Plan (SHSP) Emphasis Area Analysis
- Historical Crash Analysis
- Crash and Network Screening Analysis
- Roadway Characteristic Risk Analysis
 - Crash Profile Risk Assessment
 - usRAP Risk Factors Analysis
 - Local Street Risk Assessment

An overview on the methodologies used to perform these safety analyses are described in Technical Memorandum #1: Safety Analysis Results Summary. **Appendix A3** summarizes the results of the analyses for the Central Weber County GFA.

1.2. Appendix Organization

This Appendix is organized into the following sections:

- **Section 1** - Introduction
- **Section 2** - Central Weber County GFA Study Area and Roadway Network.
- **Section 3** - Strategic Highway Safety Plan (SHSP) Emphasis Area Analysis.
- **Section 4** - Historical Crash Analysis
- **Section 5** - Crash and Network Screening Analysis based on Highway Safety Manual (HSM).
- **Section 6** - Roadway Characteristic Risk Analysis
- **Section 7** - Common Risk Characteristics and Composite High-Risk Roadway Network

2. Study Area

The CSAP study area includes each jurisdiction within the WFRC area. To organize the large number of jurisdictions within the WFRC area into manageable analysis areas, jurisdictions are organized into Geographic Focus Areas (GFA). The Central Weber County GFA (**Figure 2.1**) is located entirely within Weber County and includes the following agencies and jurisdictions:

- Ogden
- Riverdale
- South Ogden
- Uintah
- Washington Terrace

The safety analyses presented in this Technical Memorandum are specific to the Central Weber County GFA.

Figure 2.2 highlights the roadway network within the Central Weber County GFA study area. Roadways within the study area are divided into the following three categories:

- State Routes: UDOT-maintained roads
- Federal Aid Routes: Jurisdiction-maintained roads eligible for federal funding
- Local Streets: Local Jurisdiction-maintained roads that are not Federal Aid routes.

NOTE ON CRASH DATA ANALYSIS: All crash data presented in this Technical Memorandum are specific to Central Weber County GFA, for the years 2018-2022. Crash data was obtained from the Utah Department of Transportation.

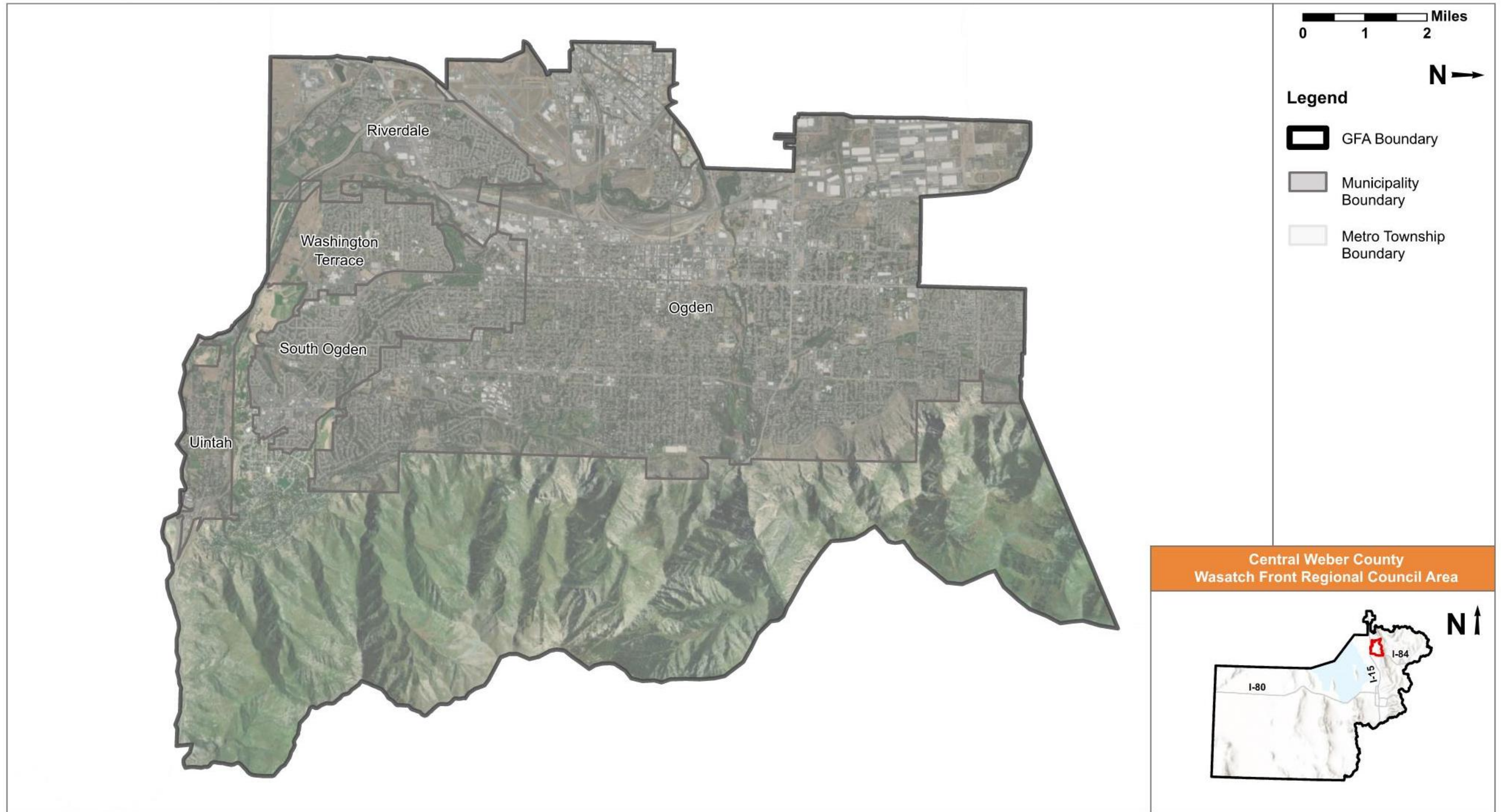


Figure 2.1 – Central Weber County GFA Study Area

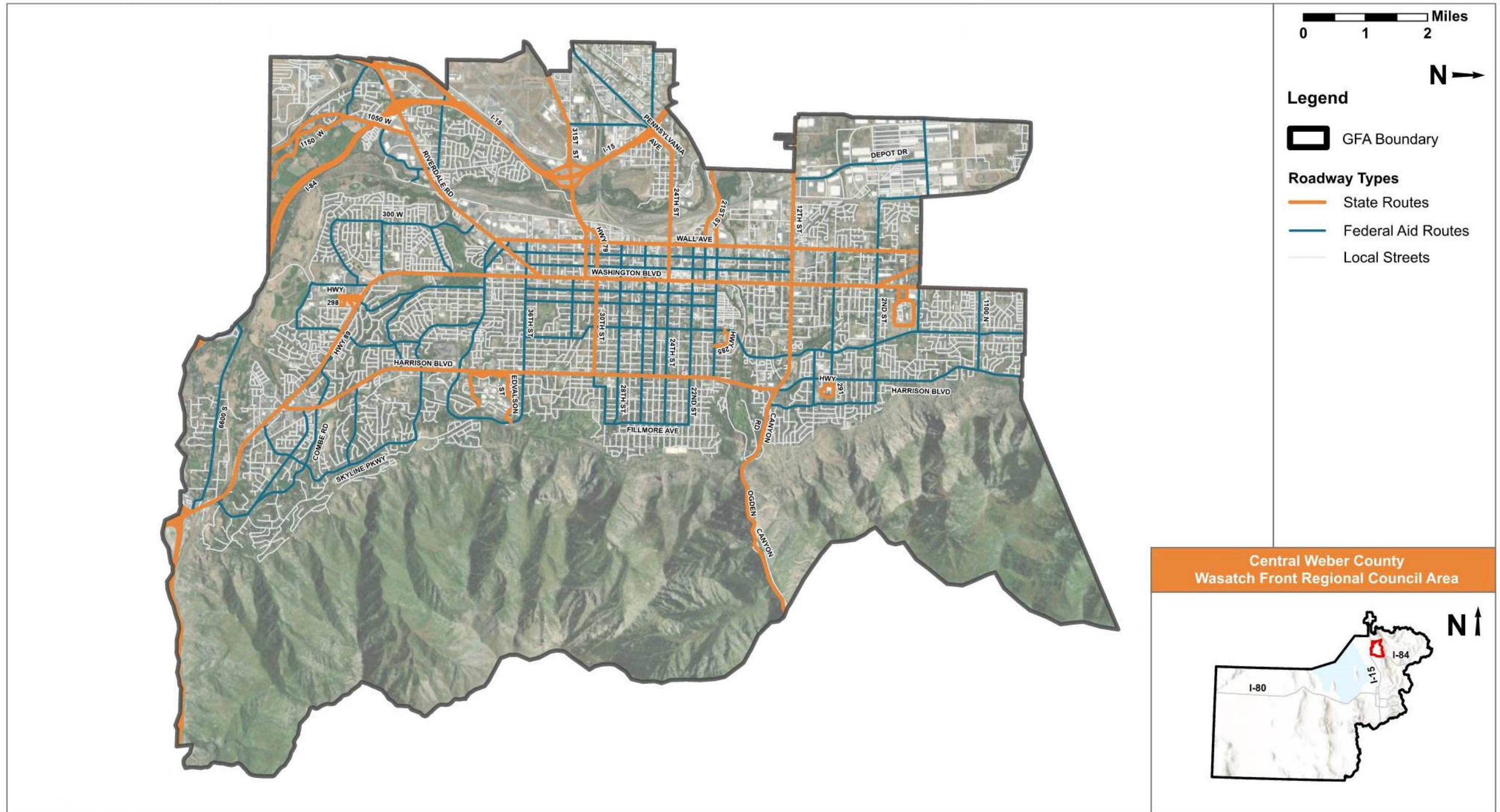


Figure 2.2 – Central Weber County GFA Roadway Network

3. SHSP Emphasis Area Analysis

The SHSP emphasis area analysis ranks the frequency of fatal and serious injury crashes in the Central Weber County GFA for each of the eleven Utah SHSP emphasis areas. The rankings of the emphasis areas are compared for the Central Weber County GFA, statewide (all public roads statewide), and the WFRC study area totals. Each reported crash can have more than one emphasis area identified. The results of the SHSP emphasis area analysis are displayed in **Table 3.1**. The top five ranked emphasis areas are highlighted in the table with the top five for the Central Weber County GFA listed below:

- Intersections
- Pedestrian
- Speed-Related
- Older Driver
- Roadway Departure

Table 3.1 – SHSP Emphasis Areas Analysis

Category	Utah SHSP Safety Emphasis Area	Statewide Totals		WFRC Totals		Central Weber County Totals		
		Fatal and Serious Injury	Rank	Fatal and Serious Injury	Rank	Fatal and Serious Injury	Rank	Change in Rank From WFRC
Driver	Teen Driver	1,640	4	751	4	56	7	-3
	Older Driver	1,508	6	700	6	73	4	2
	Speed-Related	2,133	3	936	3	76	3	0
	Aggressive Driving	555	11	297	10	31	10	0
	Distracted Driving	718	10	286	11	23	11	0
	Impaired Driving	1,184	8	623	8	48	9	-1
	No Safety Restraints	1,542	5	599	9	52	8	1
Roadway	Intersection	3,567	1	2,163	1	194	1	0
	Roadway Departure	2,931	2	1,014	2	69	5	-3
Special Users	Motorcycle	1,457	7	750	5	68	6	-1
	Pedestrian	912	9	636	7	78	2	5
	Bicycle*	280	12	167	12	11	12	0

*Bicyclists aren't one of the eleven Utah SHSP emphasis areas but was included as part of the CSAP safety analysis.

4. Historical Crash Analysis

A historical crash data analysis was conducted for the most recent complete 5-year period from 2018 to 2022. This historical crash analysis is primarily focused on fatal and serious injury crashes. Overall Crashes.

4.1. Overall Crashes

Table 4.1 provides an overview of overall crashes by severity and roadway ownership within the Central Weber County GFA. The data shows the following:

- State Routes recorded 65% of the total crashes in this GFA
- Federal Aid routes recorded 23% of fatal and serious injury crashes in this GFA
- Local Streets (non-Federal Aid) recorded 12% of fatal and serious injury crashes in this GFA

Table 4.1 – Crashes by Severity by Roadway Ownership

Route Type	State Route		Federal Aid Route		Local Street		Overall Total		% of WFRC
Crash Severity	Crashes		Crashes		Crashes		Crashes		%
	#	%	#	%	#	%	#	%	
Fatal	37	1%	13	1%	7	1%	57	0.5%	< 0.1%
Suspected Serious Injury	180	2%	73	3%	27	2%	280	2.5%	0.2%
Suspected Minor Injury	983	13%	373	14%	136	10%	1,492	13.3%	0.8%
Possible Injury	1,298	18%	448	17%	167	12%	1,913	17.1%	1.1%
No Injury / Property Damage Only	4,790	66%	1,667	65%	1,014	75%	7,471	66.6%	4.1%
Route Total	7,288	100%	2,574	100%	1,351	100%	11,213	100%	6.2%

4.2. Fatal and Serious Injury Crashes by Year

Figure 4.1 through **Figure 4.5** provide an overview of fatal and serious injury crashes by year and roadway ownership for the Central Weber County GFA. The data shows the following:

- Fatal crashes increased in 2020 and 2021, and decreased in 2022 (10 fatal crashes) to near 2018 levels (9 fatal crashes)
- Serious injury crashes have followed a similar pattern
- Year 2022 and recorded highest number of serious crashes during the 5-year period (2018 – 2022)
- Most of the fatal and serious injury crashes occurred on State Routes.

4.3. Fatal and Serious Injury Crashes by Location

Error! Reference source not found. shows the locations of the fatal and serious injury crashes within the Central Weber County GFA GFA.

Error! Reference source not found. is a density map of fatal and serious injury crashes within the Central Weber County GFA GFA.

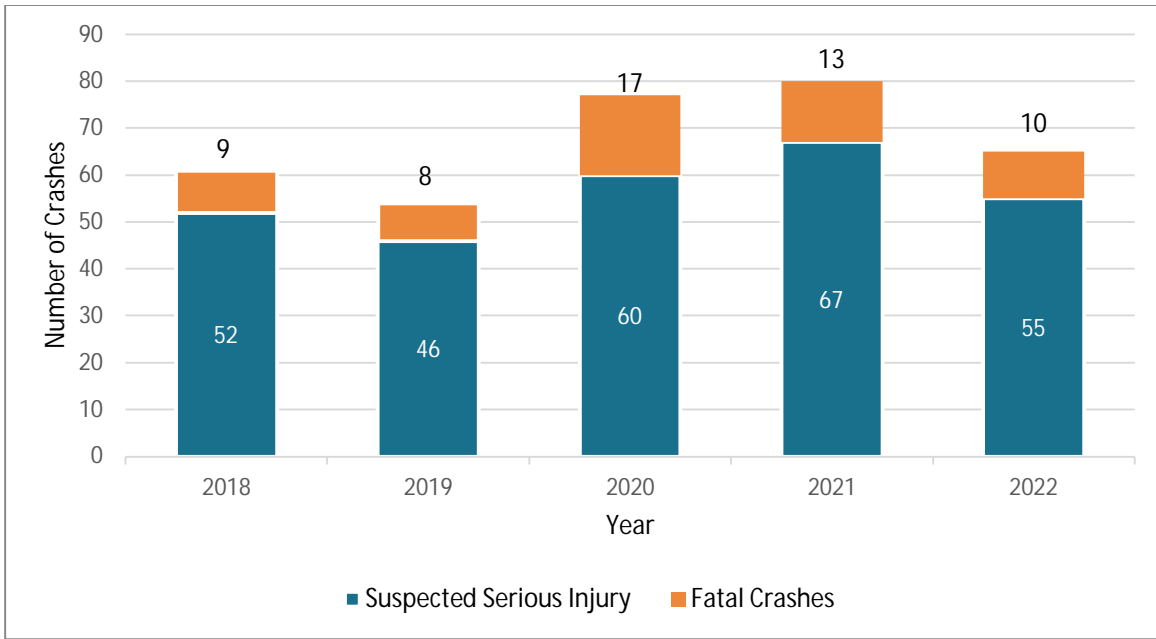


Figure 4.1 – Fatal and Serious Injury Crashes by Year

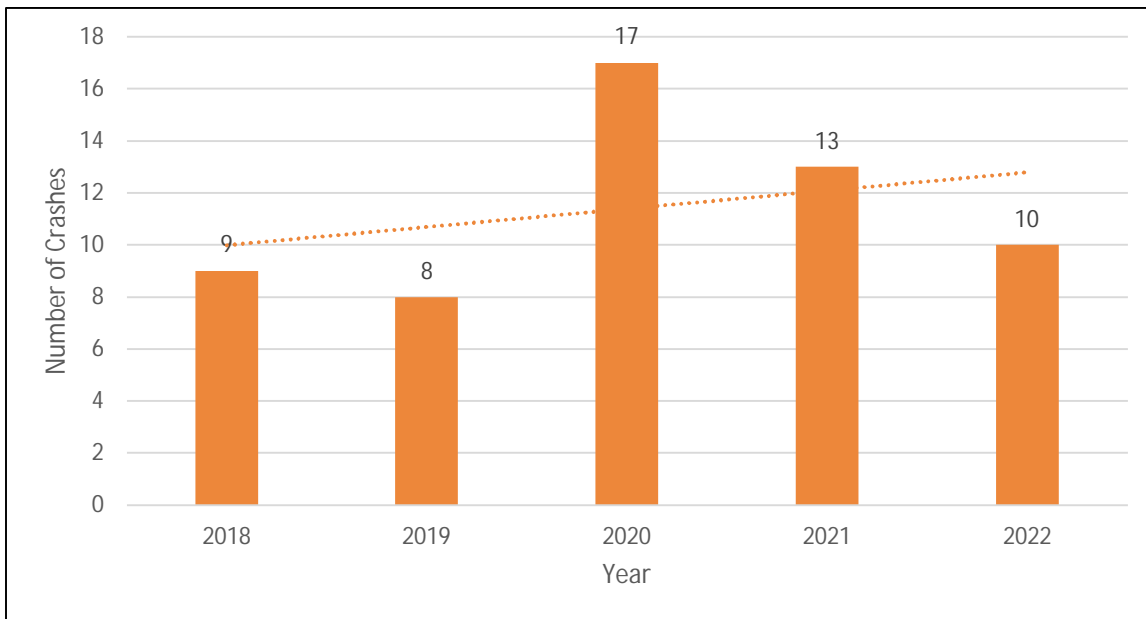


Figure 4.2 – Fatal Crashes by Year

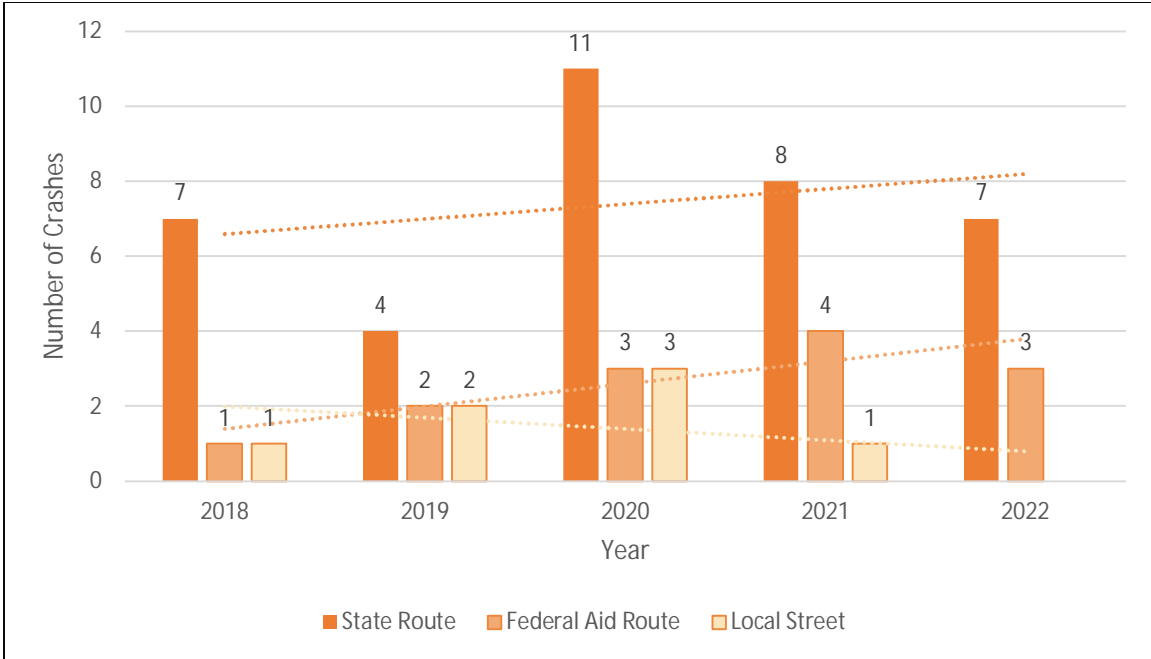


Figure 4.3 – Annual Fatal Crashes by Roadway Ownership

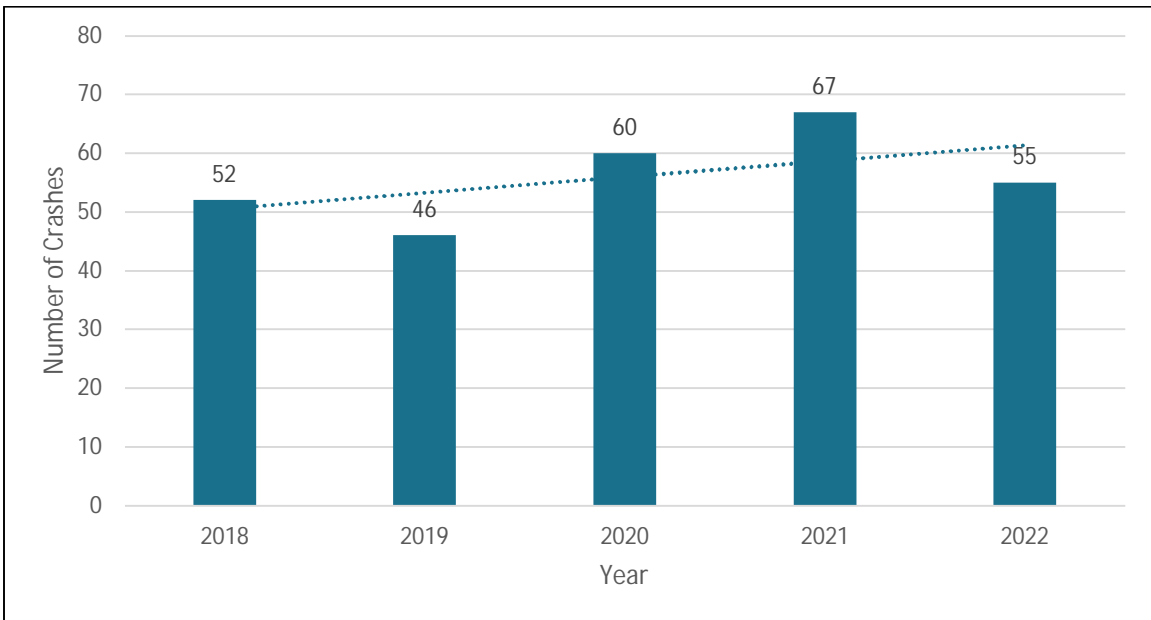


Figure 4.4 – Serious Injury Crashes by Year

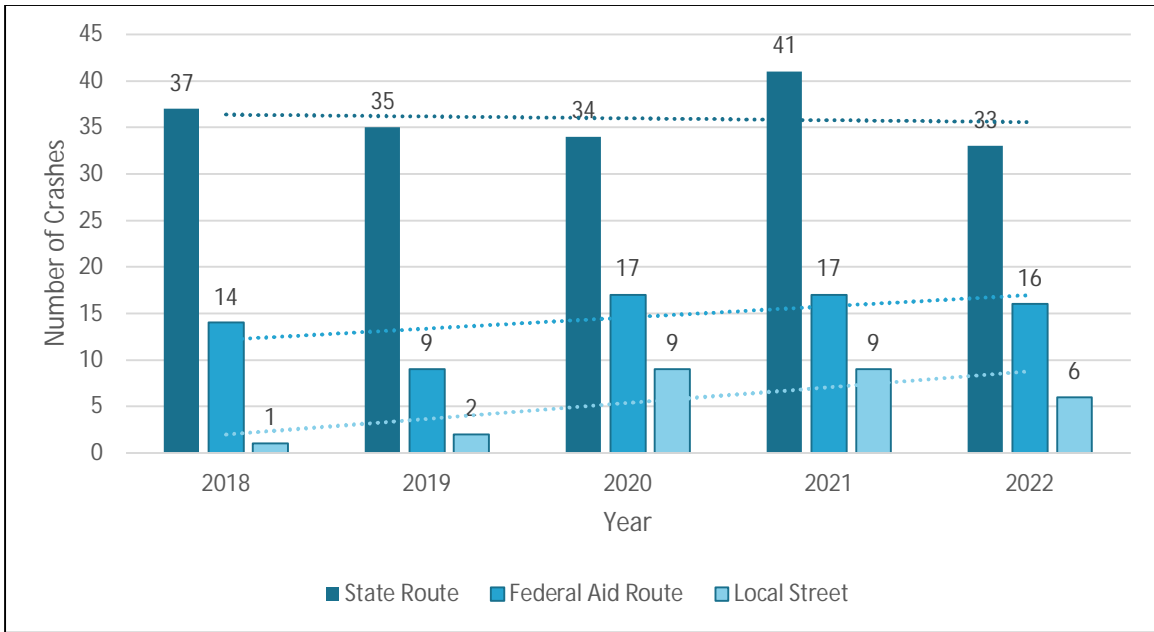


Figure 4.5 – Annual Serious Injury Crashes by Roadway Ownership

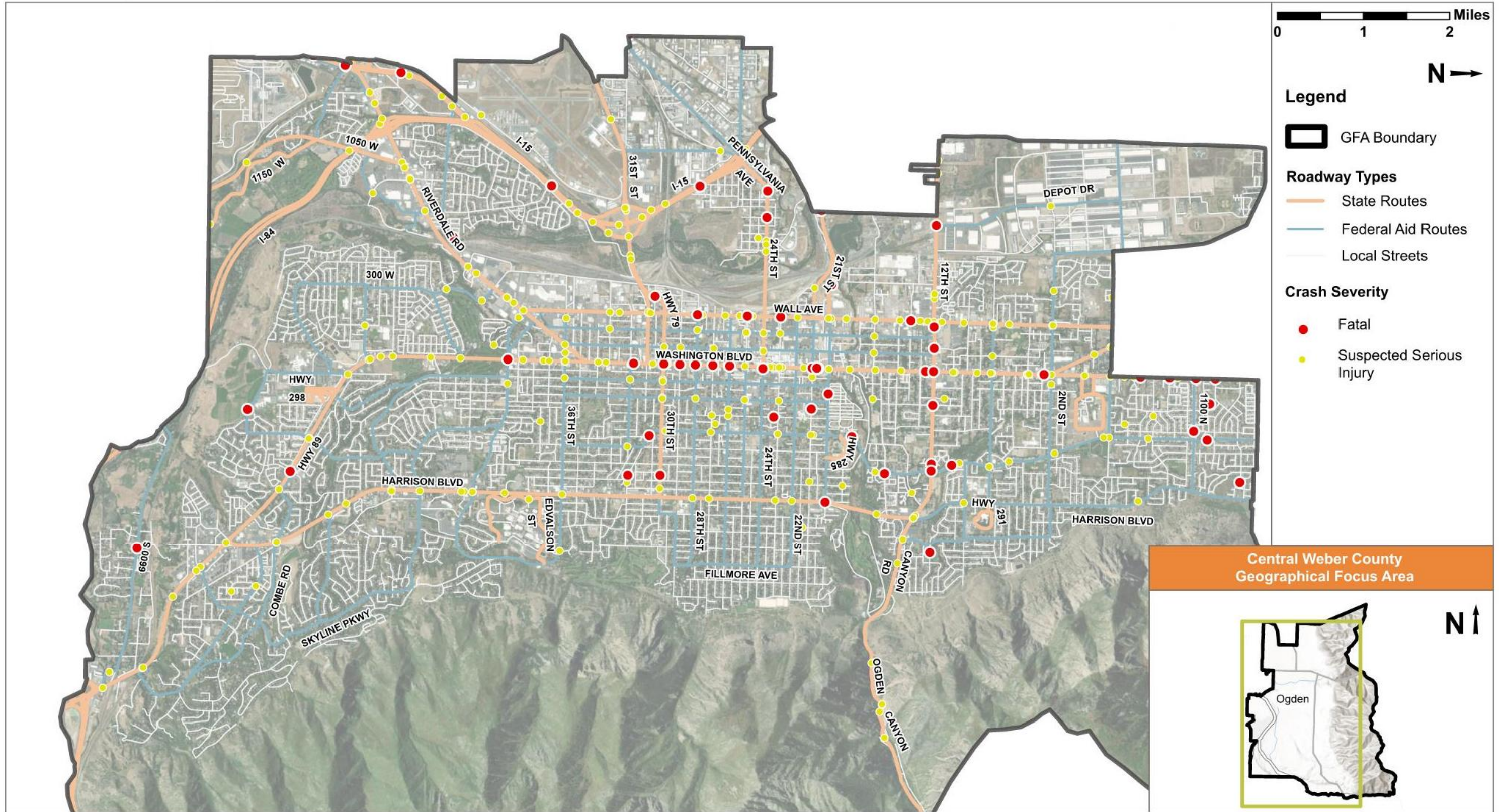


Figure 4.6 – Fatal and Serious Injury Crashes

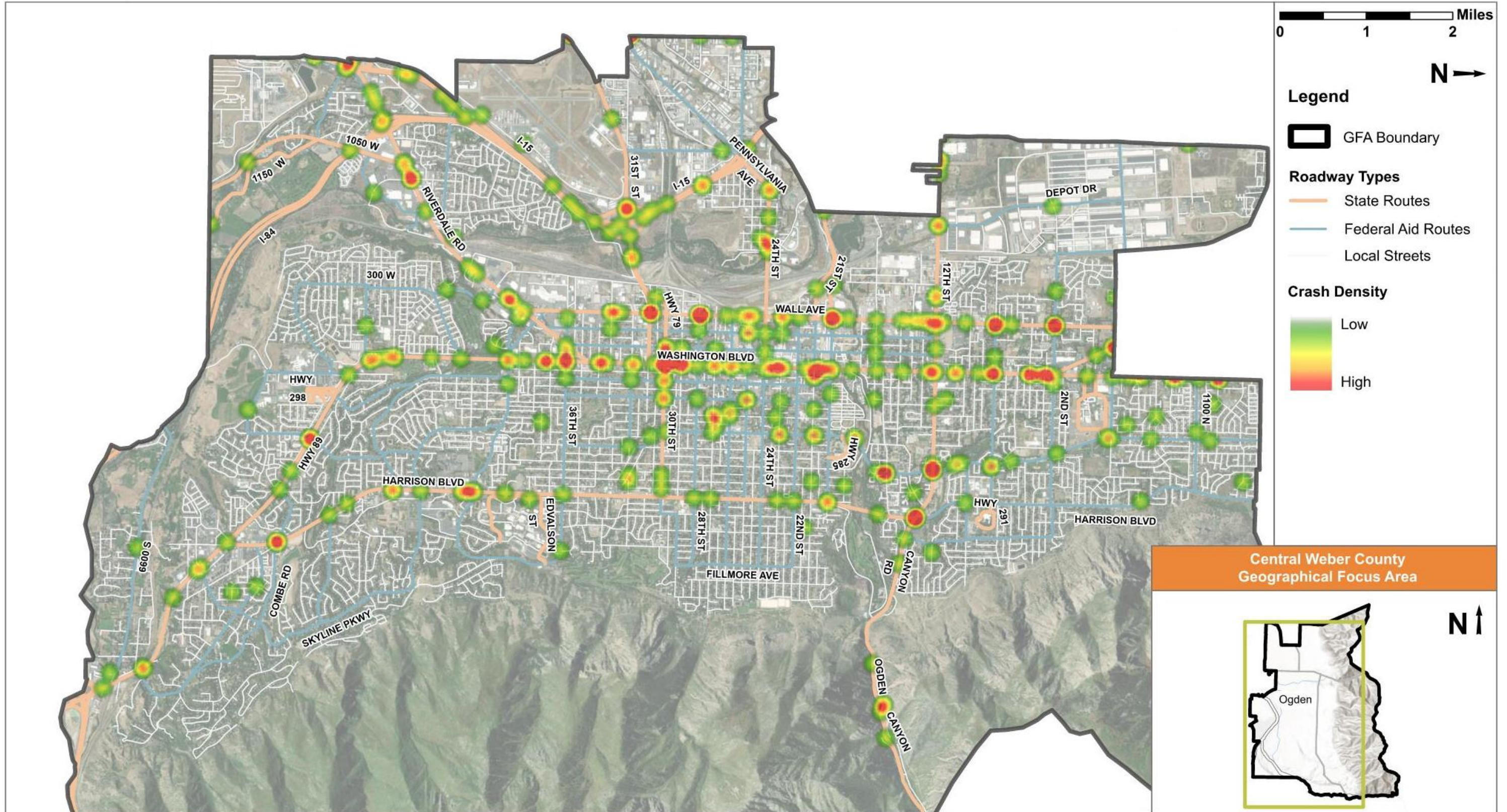


Figure 4.7 – Fatal and Serious Injury Crash Density

4.4. Fatal and Serious Injury Crashes by Crash Type

Figure 4.8 through Figure 4.10 provide an overview of fatal and serious injury crashes by crash type and roadway ownership for the Central Weber County GFA. The data shows the following:

- The Active Transportation crash type has the highest number of total fatal and serious injuries with 75 crashes. Most occurred on State Routes, but Federal Aid and Local Streets also experienced fatal Active Transportation crashes.

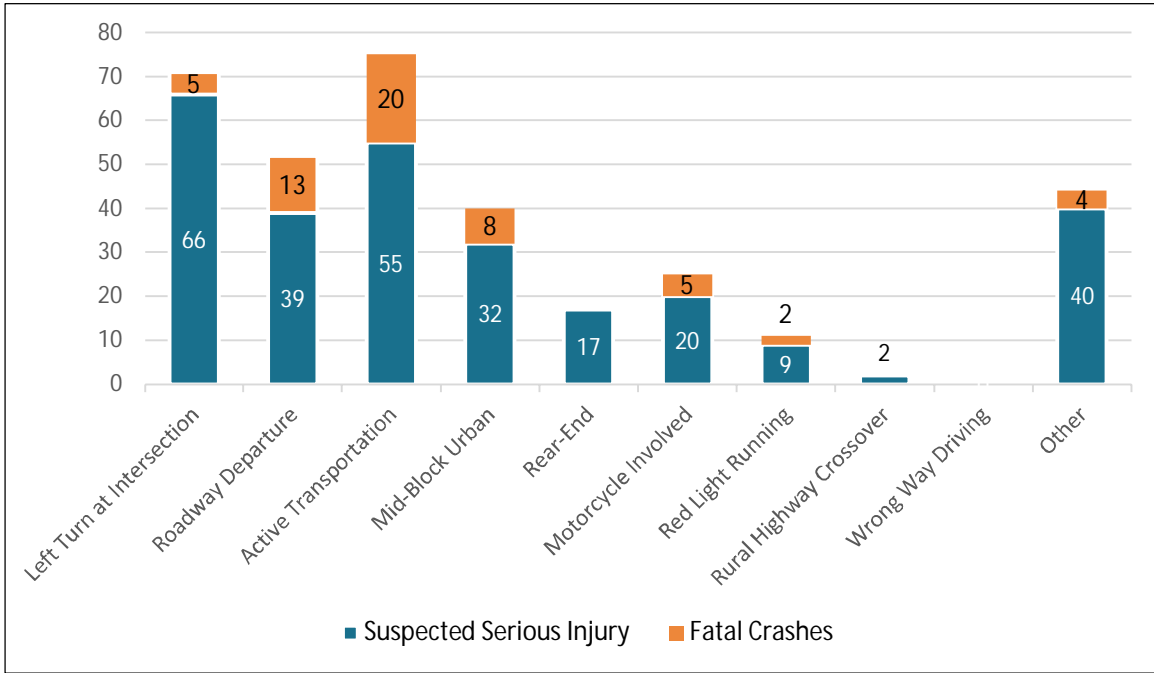


Figure 4.8 – Fatal and Serious Injury Crashes by Crash Type

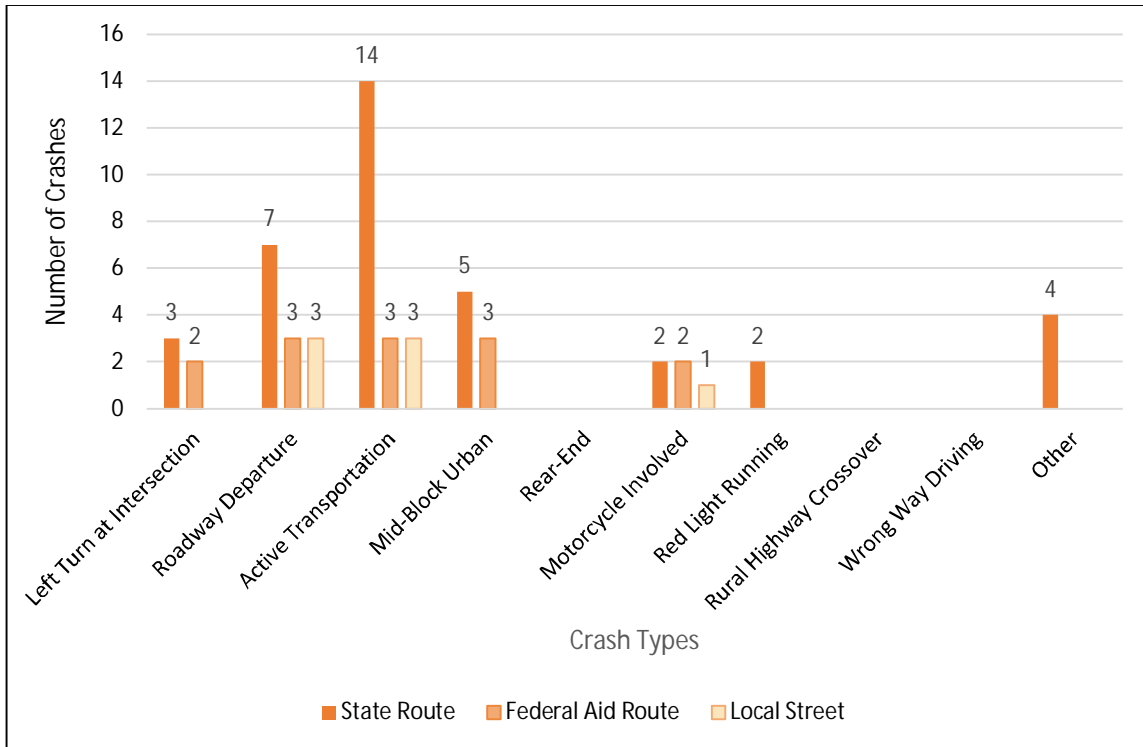


Figure 4.9 – Fatal Crashes by Crash Type and Roadway Ownership

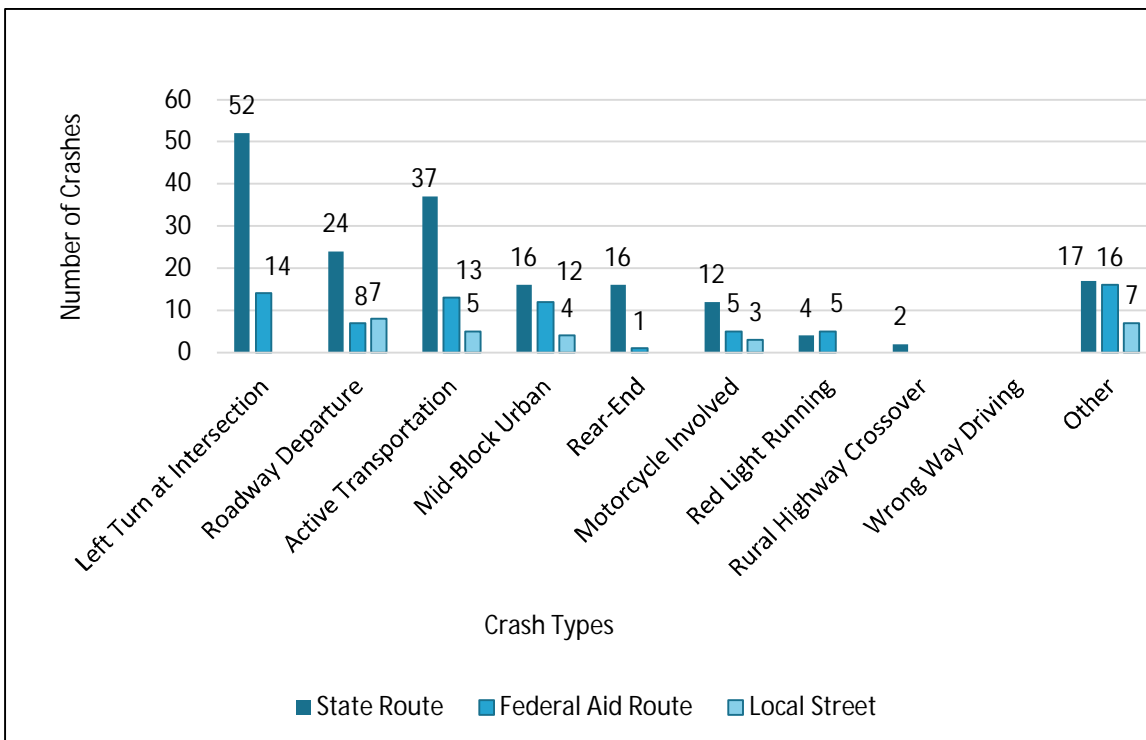


Figure 4.10 – Serious Injury Crashes by Crash Type and Roadway Ownership

4.5. Fatal and Serious Injury Vulnerable User Crashes

Figure 4.11 through Figure 4.13 provide an overview of fatal and serious injury crashes by vulnerable road user and roadway ownership for the Central Weber County GFA. The data shows the following:

- There were 79 pedestrian fatal and serious injury crashes, as compared to 11 bicycle fatal and serious injury crashes in this GFA
- 12 of 19 pedestrian fatal crashes occurred on State Routes; four occurred on Federal Aid routes, and three occurred on Local Streets
- There were 65 motorcycle-involved fatal and serious injury crashes in this GFA

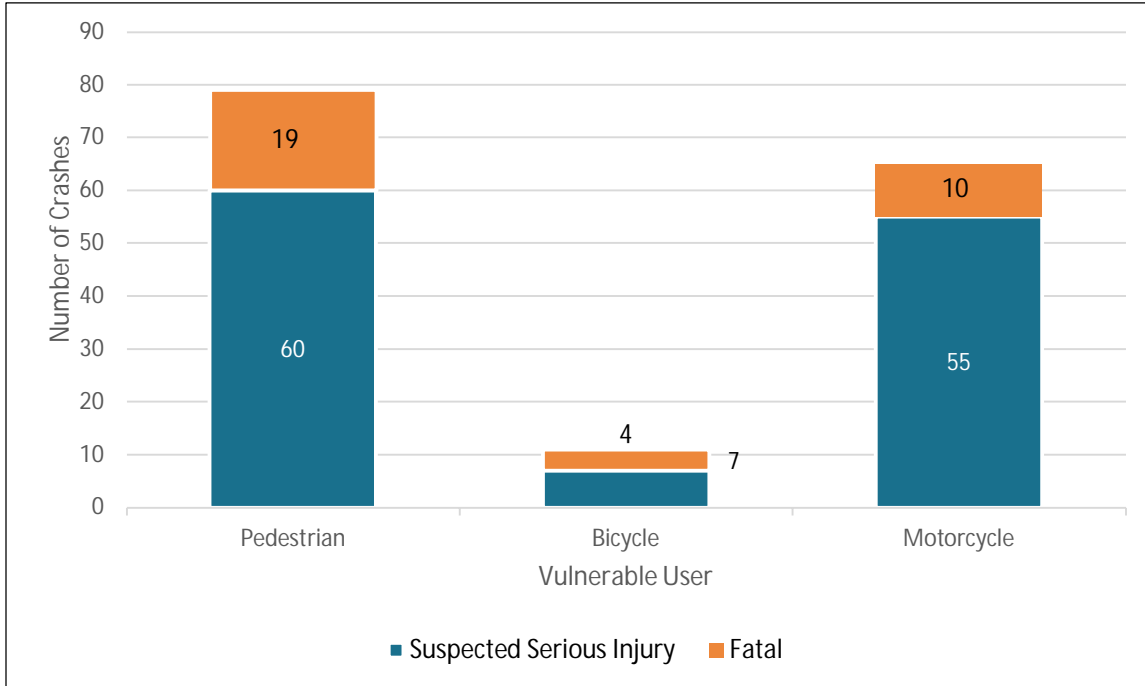


Figure 4.11 – Fatal and Serious Injury Crashes by Vulnerable User

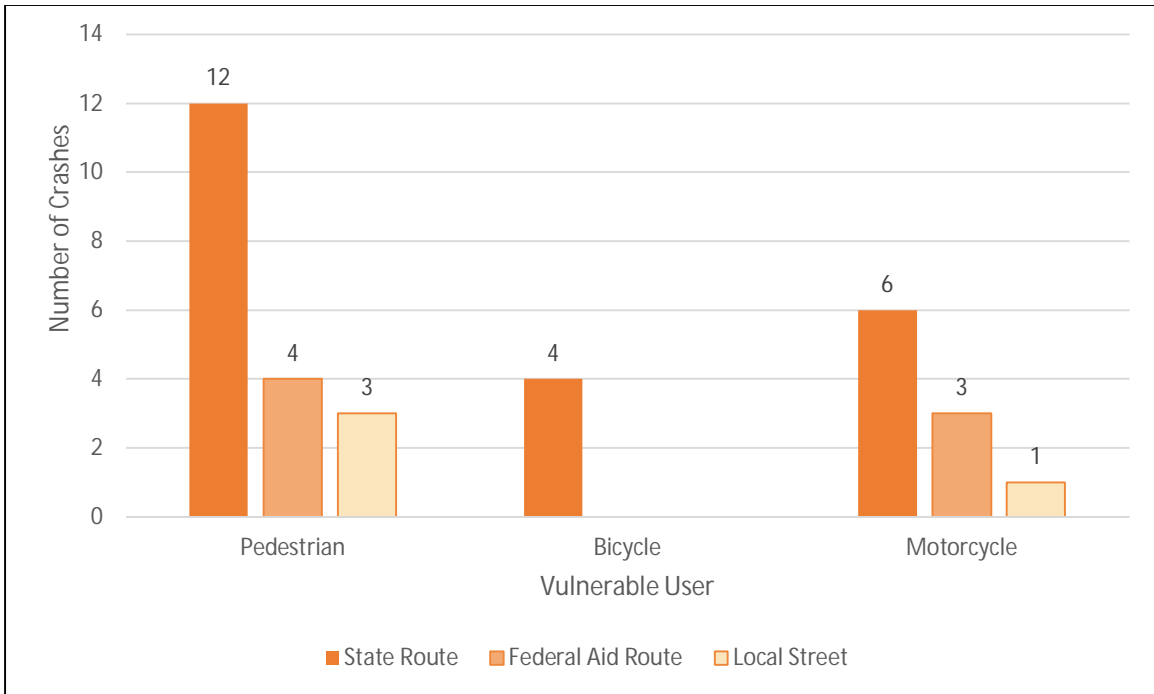


Figure 4.12 – Fatal Crashes by Vulnerable User and Roadway Ownership

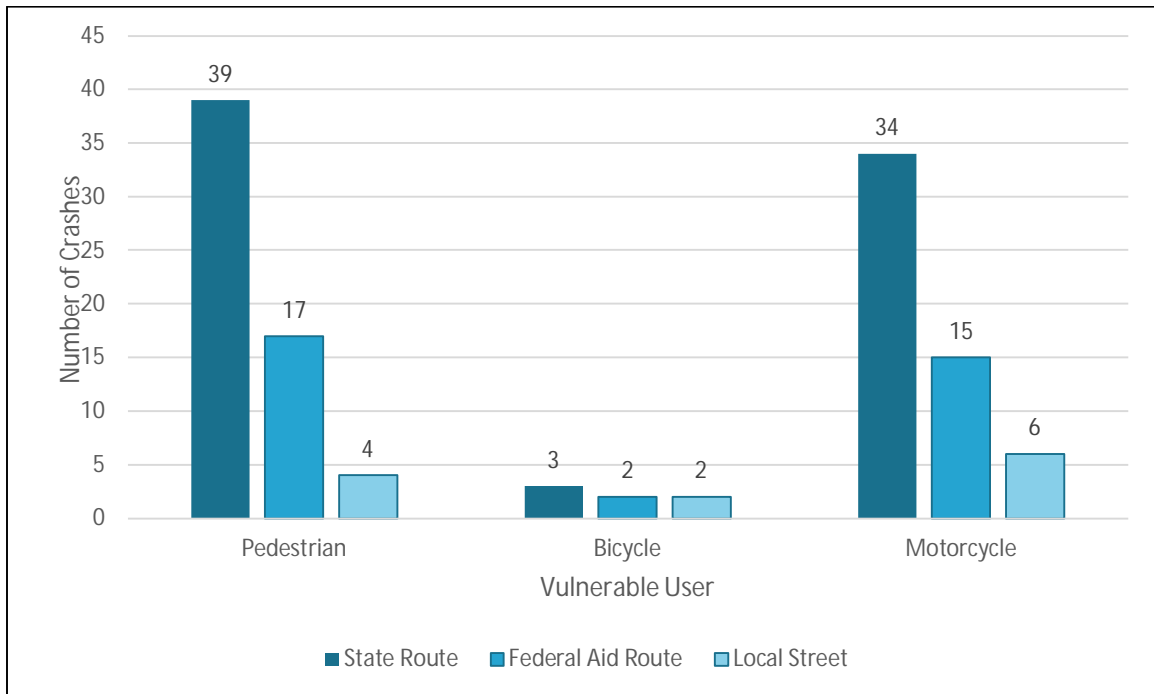


Figure 4.13 – Serious Injury Crashes by Vulnerable User and Roadway Ownership

4.6. Fatal and Serious Injury Crashes by Manner of Collision

Figure 4.14 through Figure 4.16 provide an overview of fatal and serious injury crashes by manner of collision and roadway ownership for the Central Weber County GFA. The data shows the following:

- Single vehicle and angle crash types resulted in the largest number of fatal and serious injury crashes in this GFA.

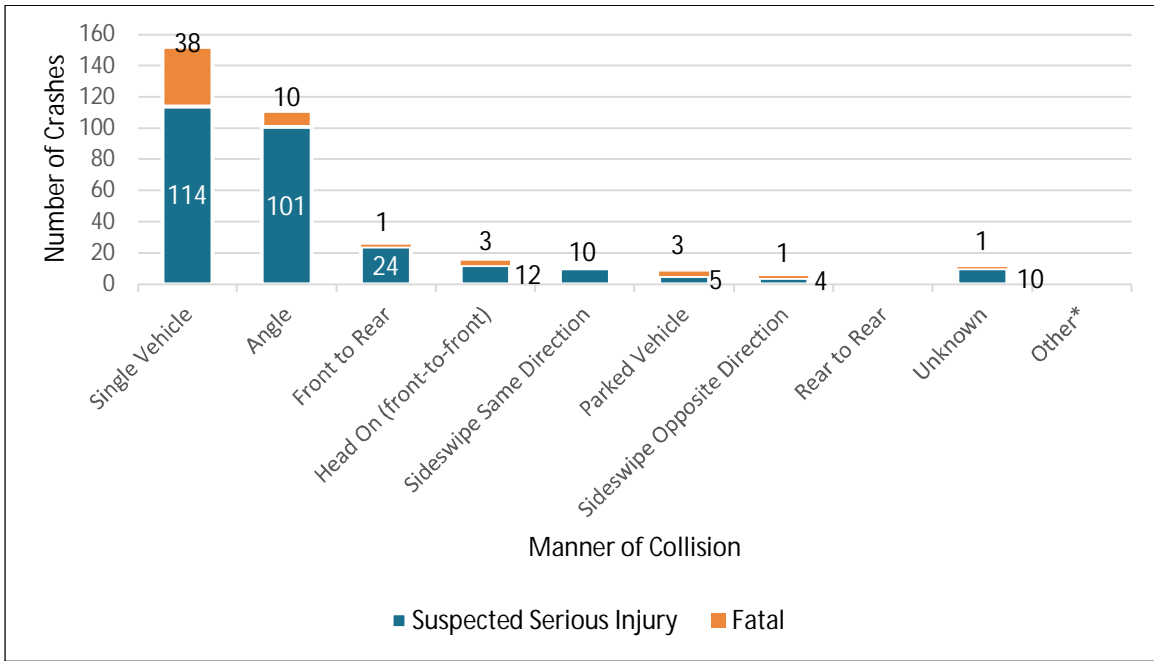


Figure 4.14 – Fatal and Serious Injury Crashes by Manner of Collision

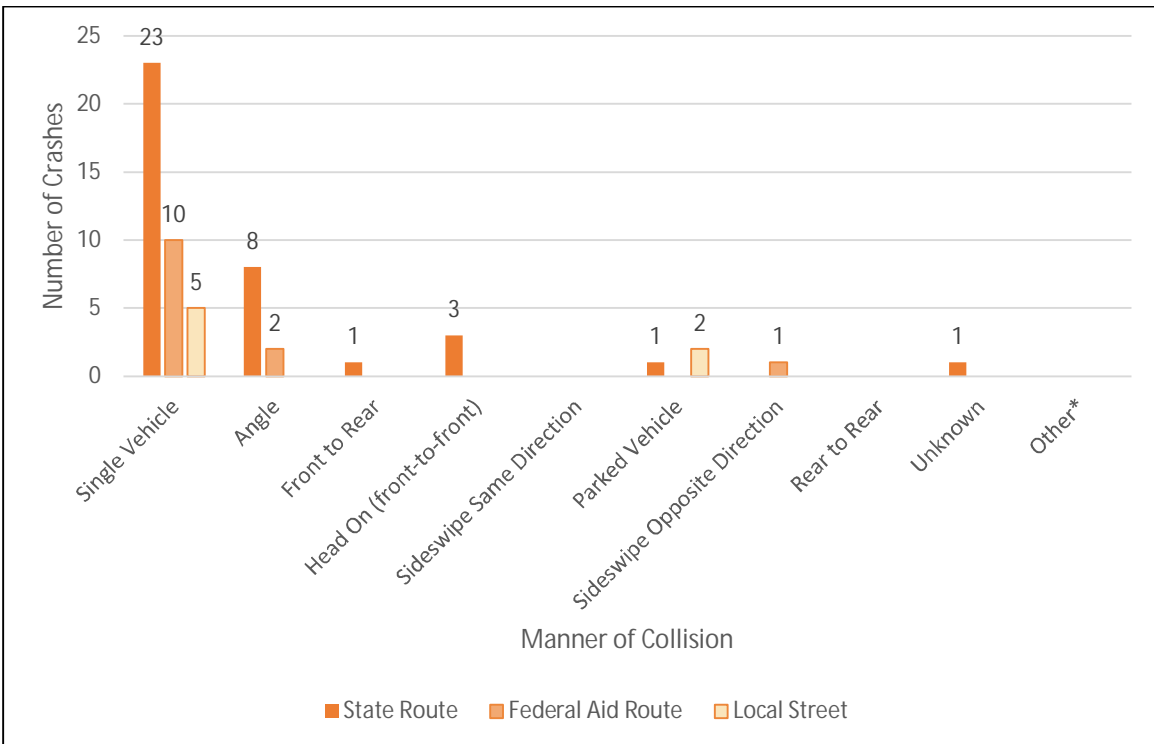


Figure 4.15 – Fatal Crashes by Manner of Collision and Roadway Ownership

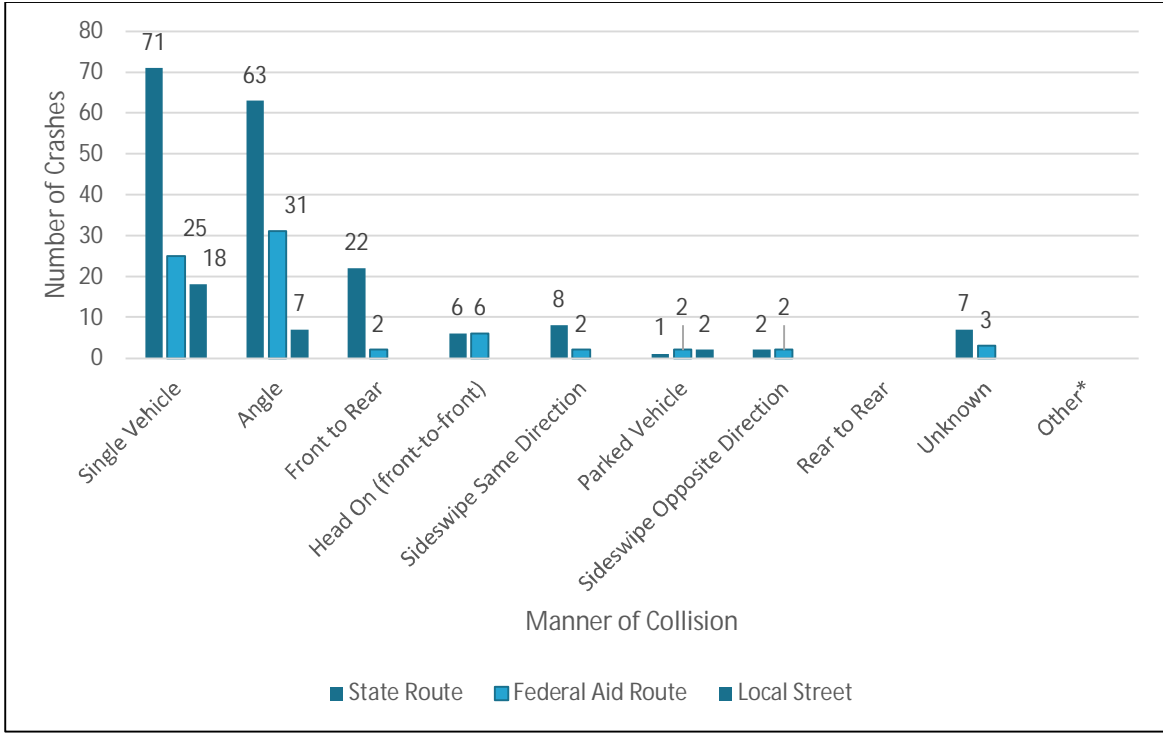


Figure 4.16 – Serious Injury Crashes by Manner of Collision and Roadway Ownership



4.7. Fatal and Serious Injury Intersection Crashes

Figure 4.17 through Figure 4.19 provide an overview of fatal and serious injury crashes by intersection and roadway ownership for the Central Weber County GFA. The data shows the following:

- Intersection involved fatal and serious injury crashes are slightly higher than not intersection involved, but not intersection involved has a higher number of fatal crashes
- State Routes have similar numbers of not intersection involved and intersection involved

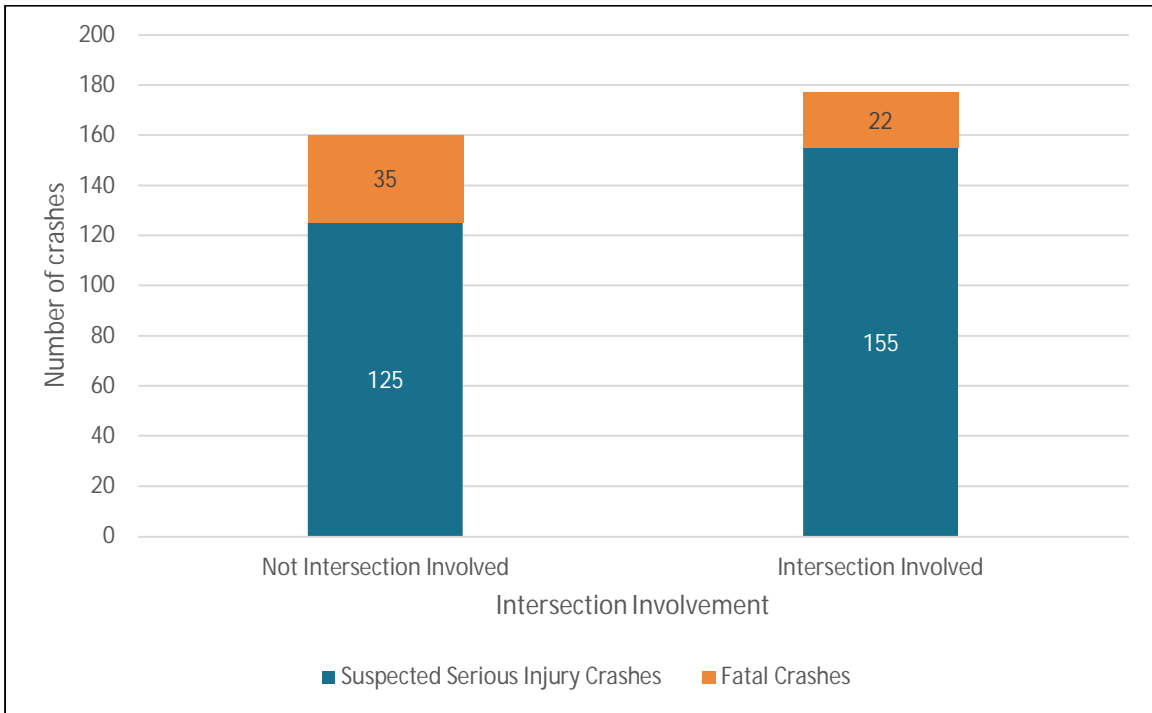


Figure 4.17 – Fatal and Serious Injury Crashes by Intersection

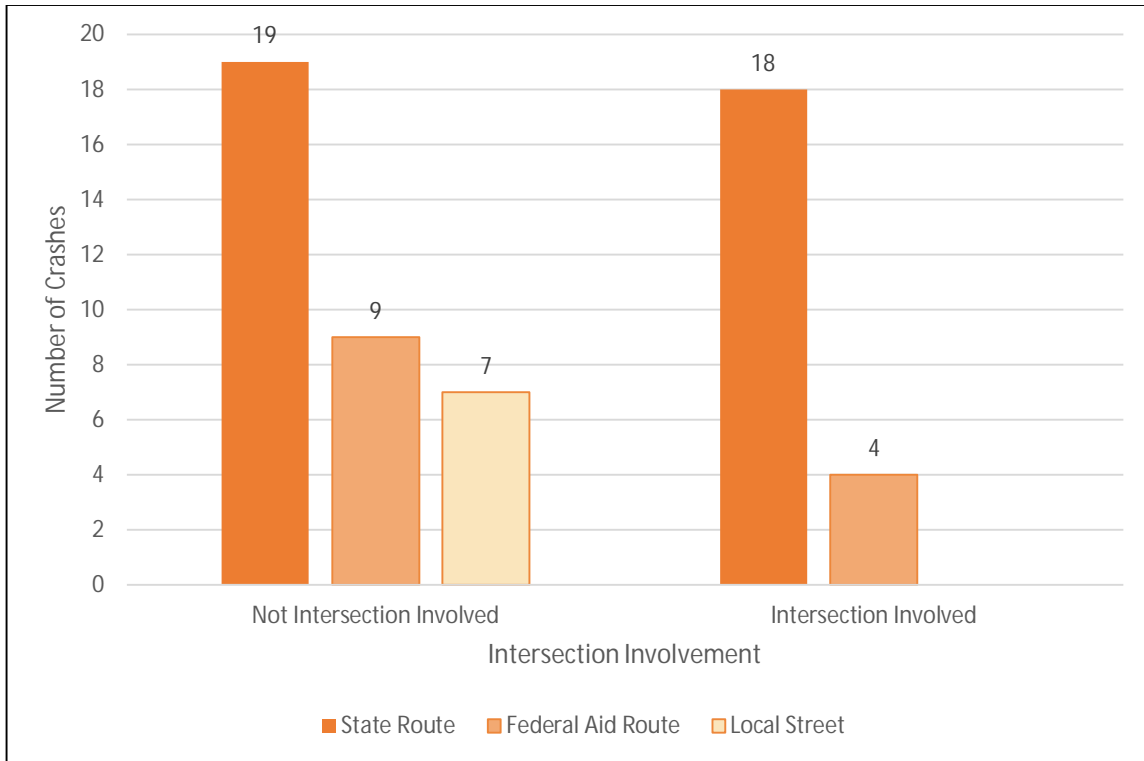


Figure 4.18 – Fatal Crashes by Intersection and Roadway Ownership

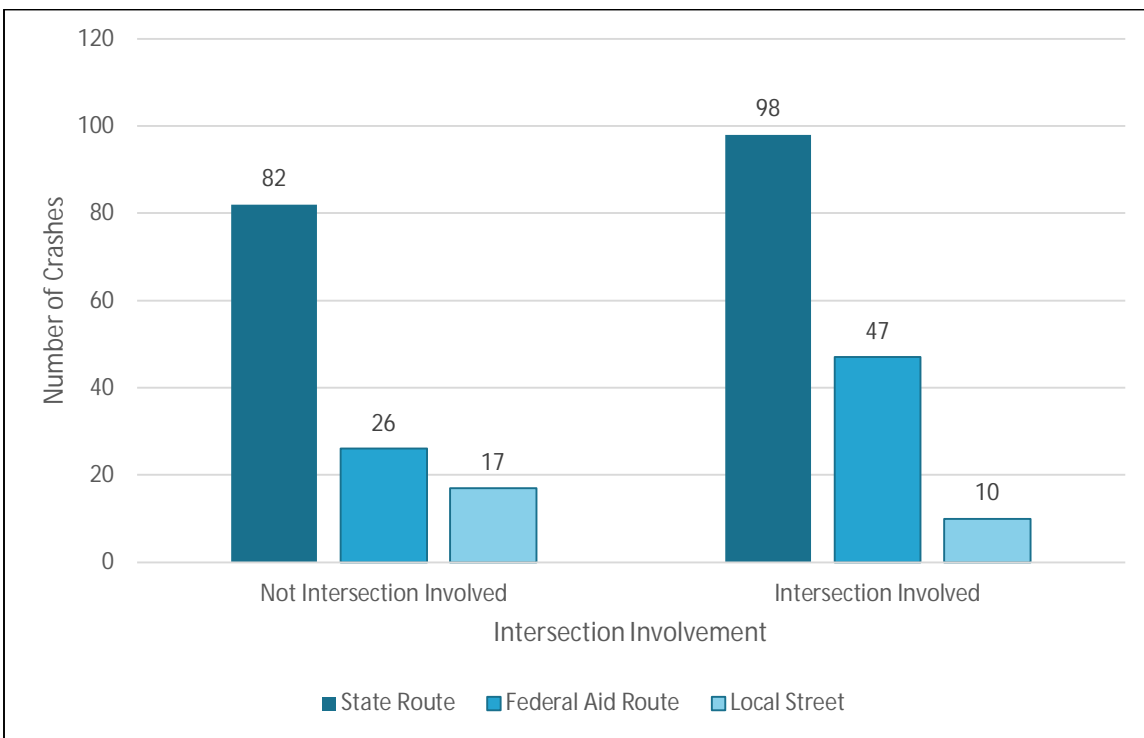


Figure 4.19 – Serious Injury Crashes by Intersection and Roadway Ownership

4.8. Fatal and Serious Injury Crashes by Functional Class

Figure 4.20 through Figure 4.22 provide an overview of fatal and serious injury crashes by functional class and roadway ownership for the Central Weber County GFA. The data shows the following:

- Principal Arterial recorded the highest total number of fatal and serious injury crashes, more than three times any other functional classification

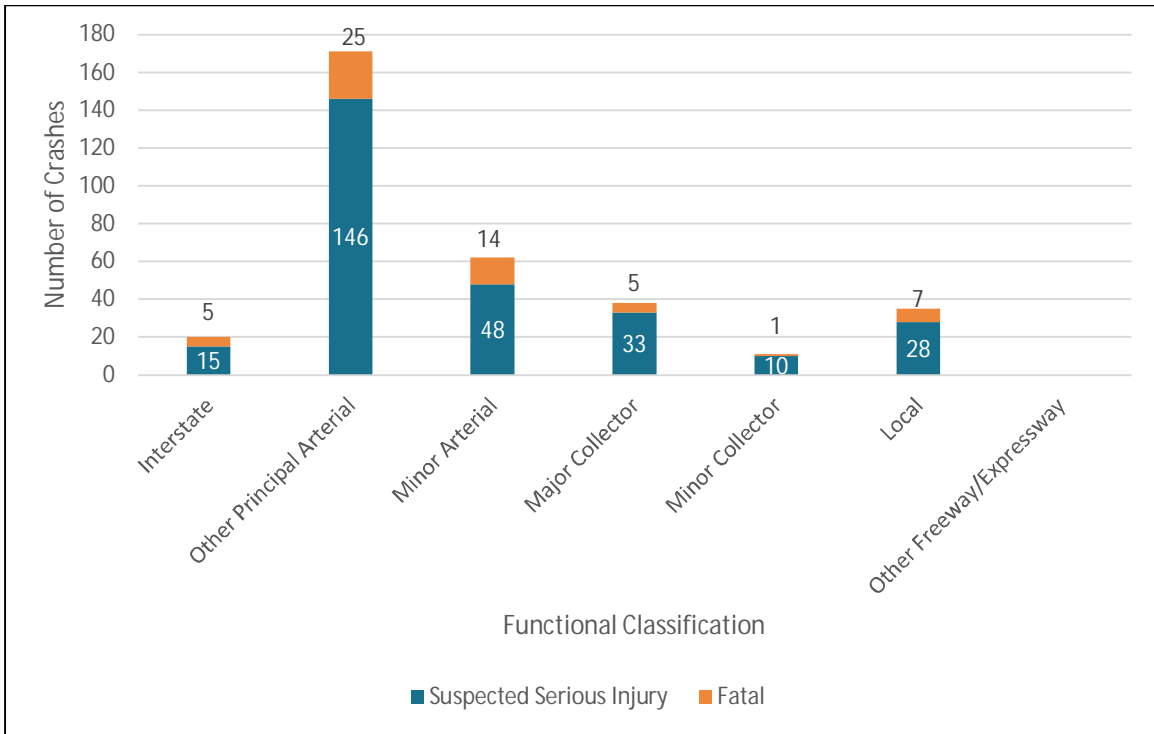


Figure 4.20 – Fatal and Serious Injury Crashes by Functional Class

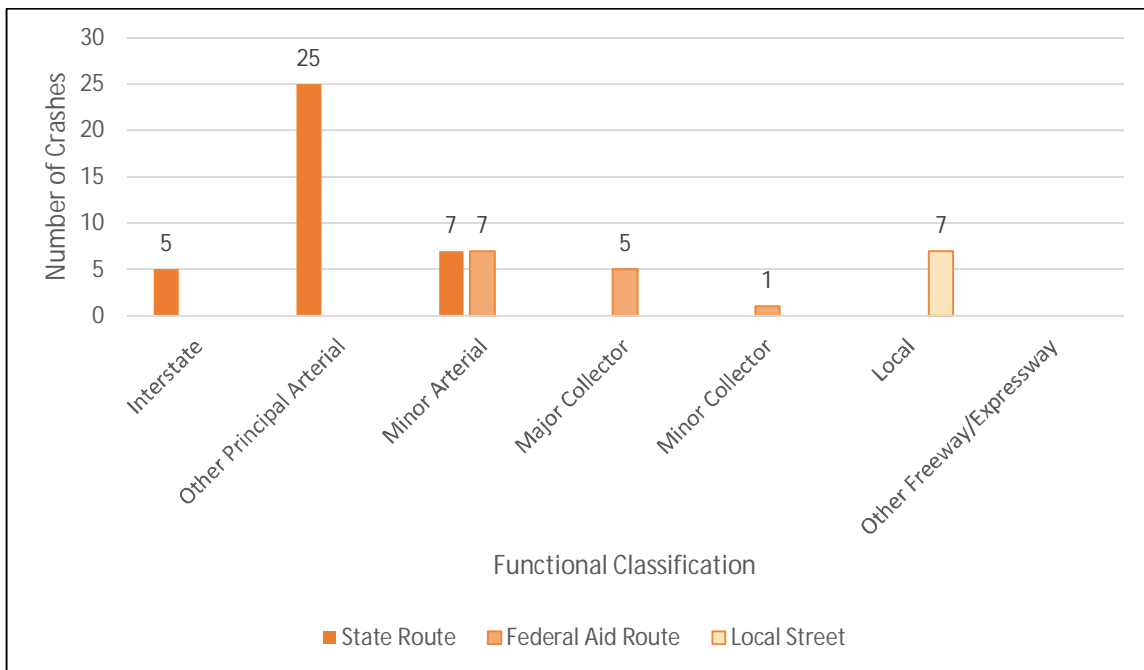


Figure 4.21 – Fatal Injury Crashes by Functional Class and Roadway Ownership

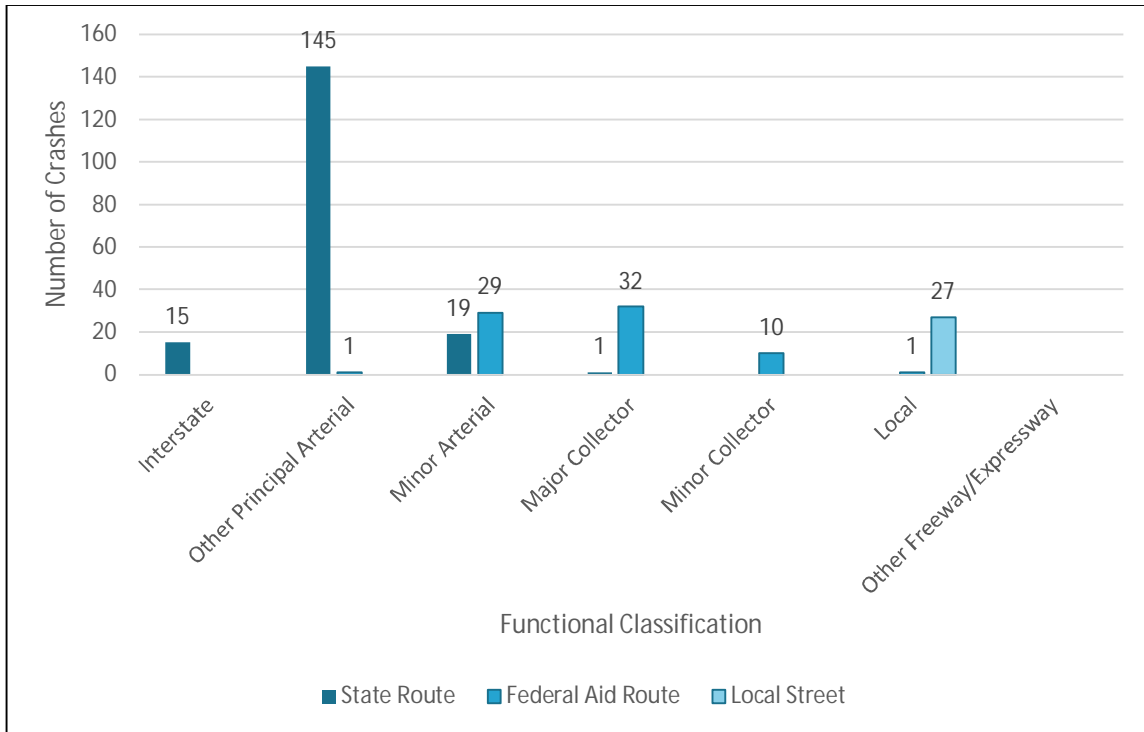


Figure 4.22 – Serious Injury Crashes by Functional Class and Roadway Ownership

4.9. Fatal and Serious Injury Crash Trees Diagrams

Fatal and serious injury crash tree diagrams were generated for the Central Weber County GFA. These crash tree diagrams are presented in **Figure 4.25** through **Figure 4.24**.

The crash trees are limited to the top 3 categories for crash type and manner of collision. Each crash tree diagram displays the total fatal and serious injury crashes (T), fatal crashes (K), and serious injury crashes (A). The data shows the following:

- State Routes recorded the highest number of crashes
- The urban area had more crashes recorded than the rural areas
- Urban areas recorded a higher number of crashes than rural area
- State Routes has a higher number of intersection-related crashes
- Of the non-intersection involved crashes, roadway departure crashes, active transportation and left—turn at intersection all had similar numbers of fatal crashes

CRASH TYPE

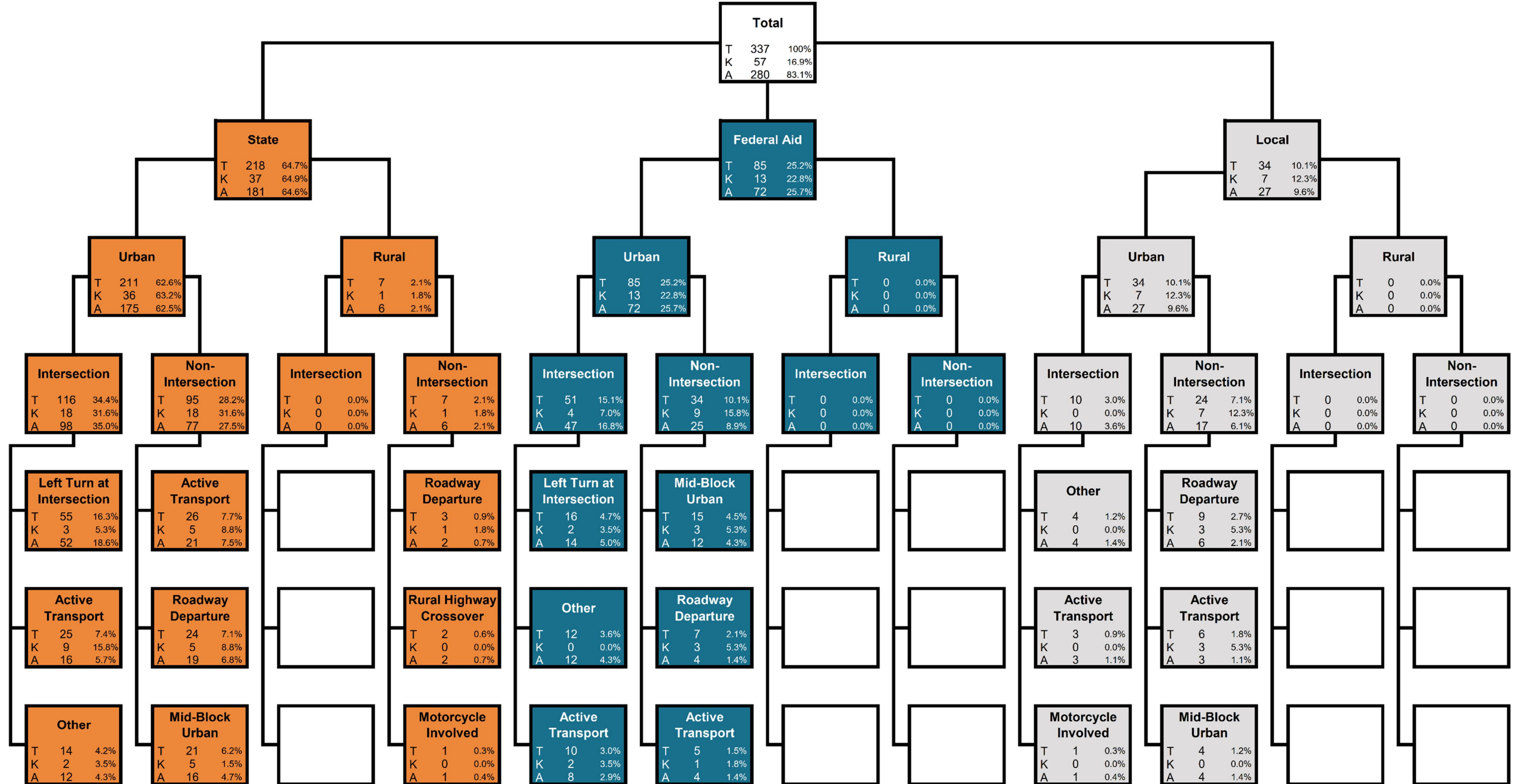


Figure 4.23 – Fatal and Serious Injury Crash Tree Diagram (Crash Type)

MANNER OF COLLISION

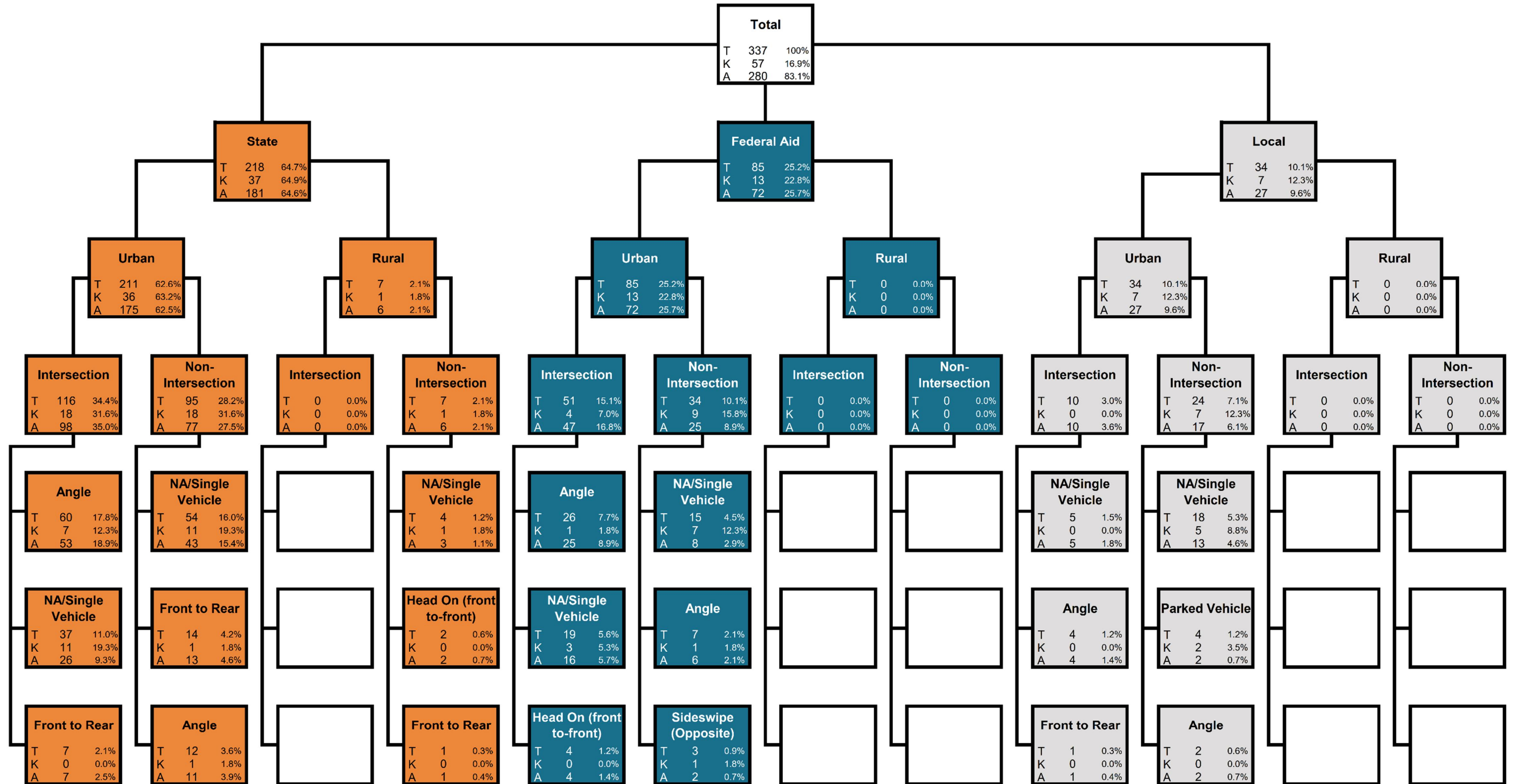


Figure 4.24 – Fatal and Serious Injury Crash Tree Diagram (Manner of Collision)

ACTIVE TRANSPORTATION

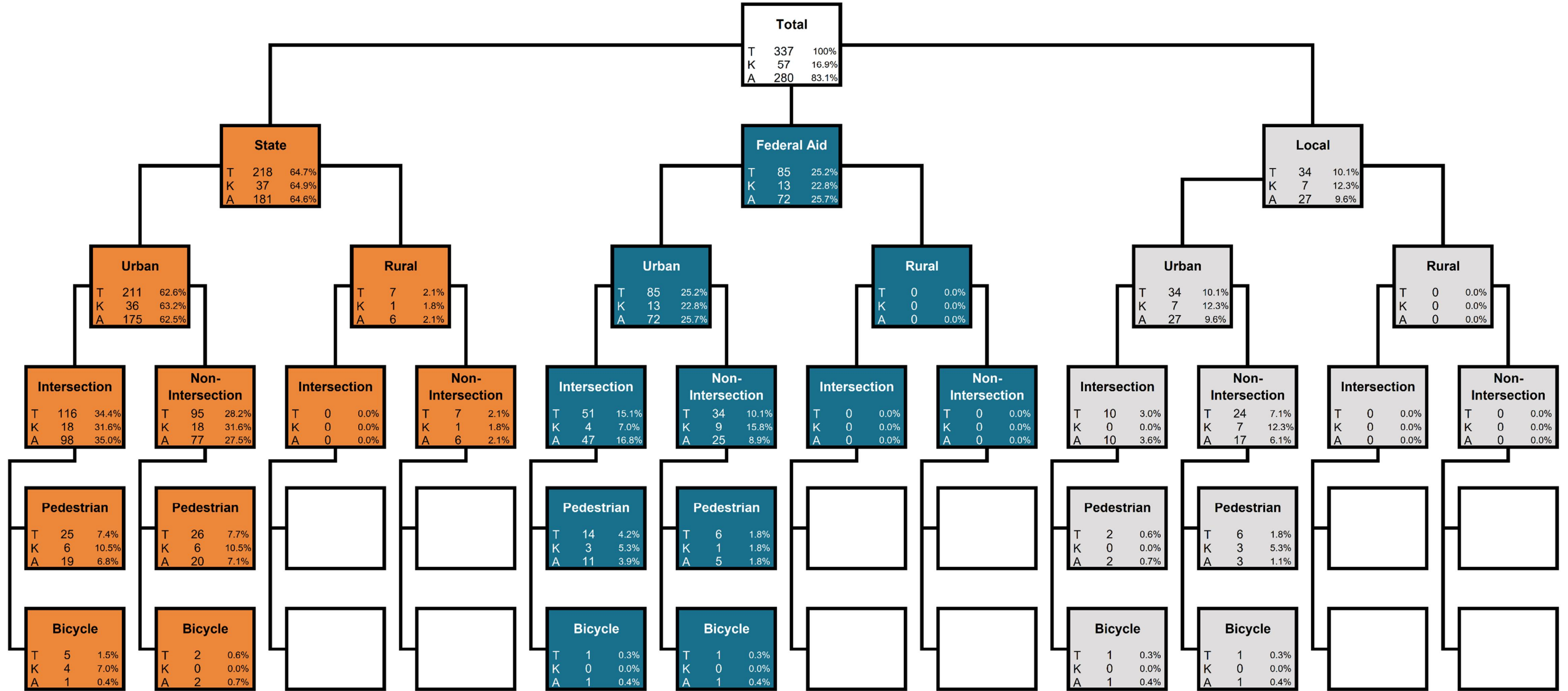


Figure 4.25 – Fatal and Serious Injury Crash Tree Diagram (Active Transportation)

5. Crash and Network Screening Analysis

A crash and network screening analysis was prepared for the Central Weber County GFA informed by four sub-analyses:

- Number of Crashes
- Critical Crash Rate (CCR)
- Probability of a Specific Crash Type Exceeding Threshold Proportion
- Equivalent Property Damage Only (EPDO)

CCR Differential by roadway ownership are mapped in the following figures:

- **Figure 5.1** – CCR Differential – Segments (State Routes)
- **Figure 5.2** – CCR Differential – Segments (Federal Aid Routes)
- **Figure 5.3** – CCR Differential – Segments (Local Routes)
- **Figure 5.4** – CCR Differential – Intersections (Signalized)
- **Figure 5.5** – CCR Differential – Intersections (Unsignalized)

A positive Local CCR Differential is an indication of a location with a potential for safety improvement (PSI).

A list of the top 10 CCR Differential segments and intersections for the Central Weber County GFA are located in **Table 5.1** and **Table 5.2** along with their associated number of crashes, probability of a specific crash type exceeding threshold proportion, and EPDO analysis results.

These locations represent those with the highest potential for safety improvements and can be considered as project candidate locations.

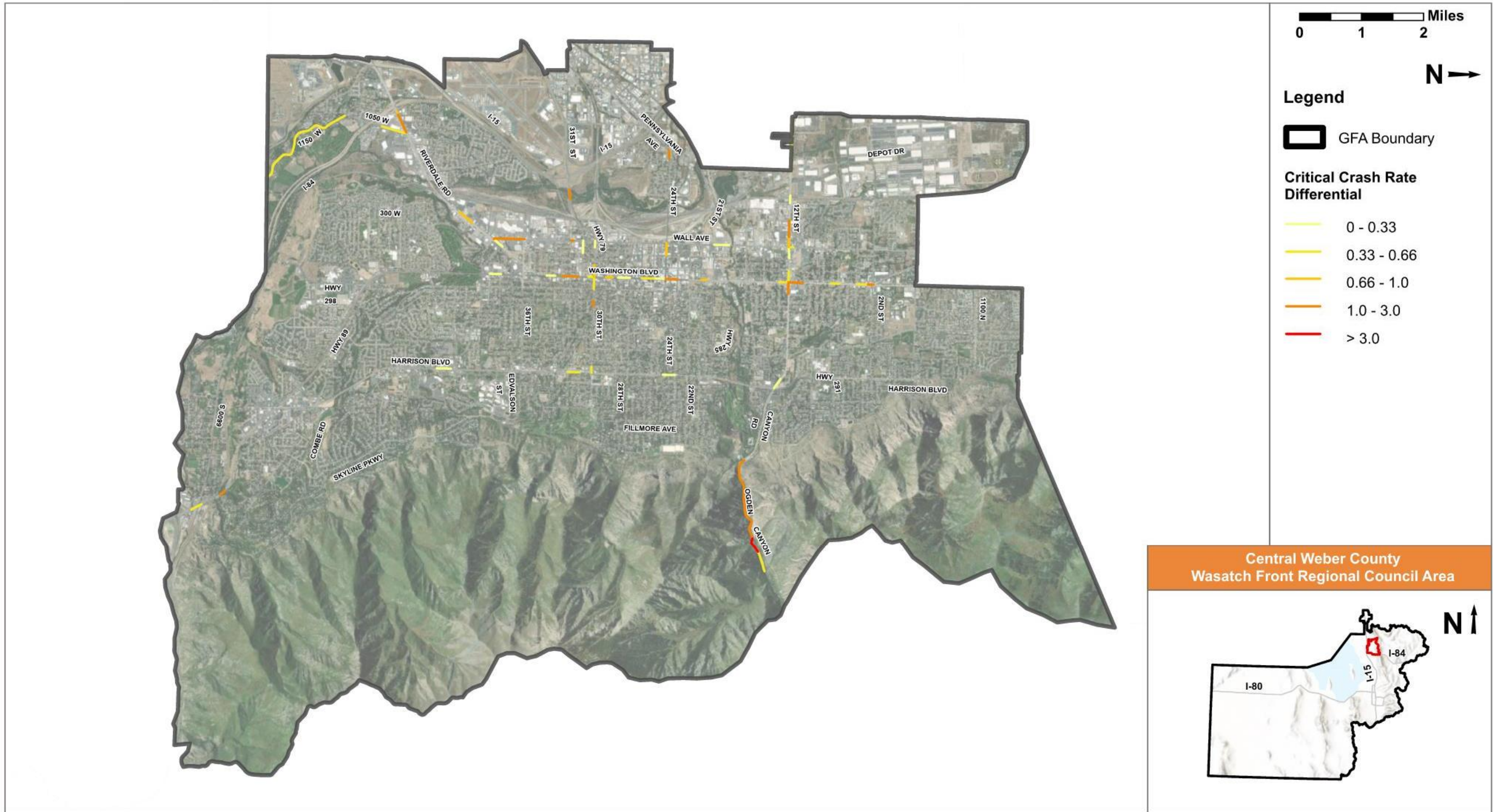


Figure 5.1 – CCR Differential – Segments (State Routes)

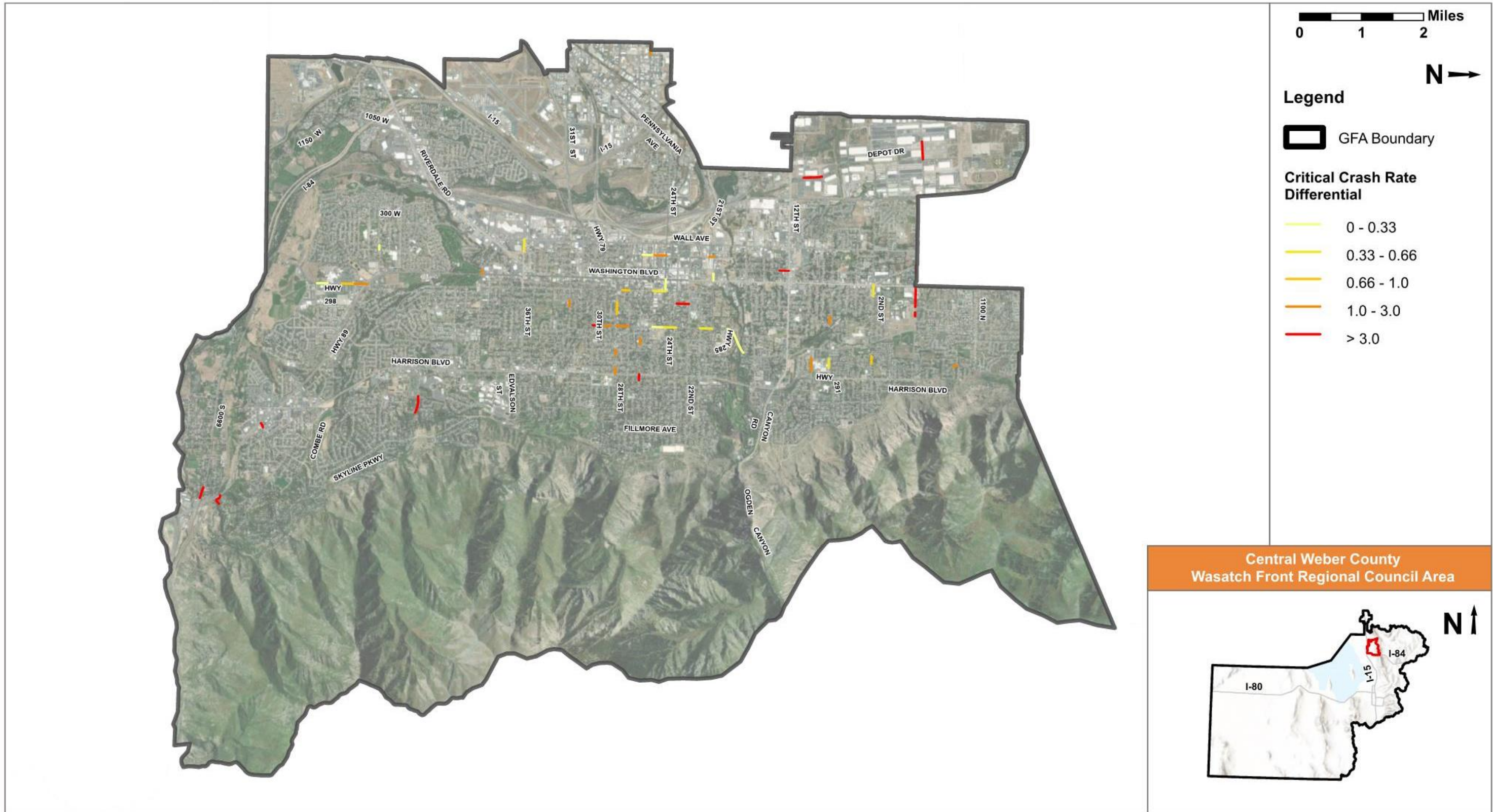


Figure 5.2 – CCR Differential – Segments (Federal Aid Routes)

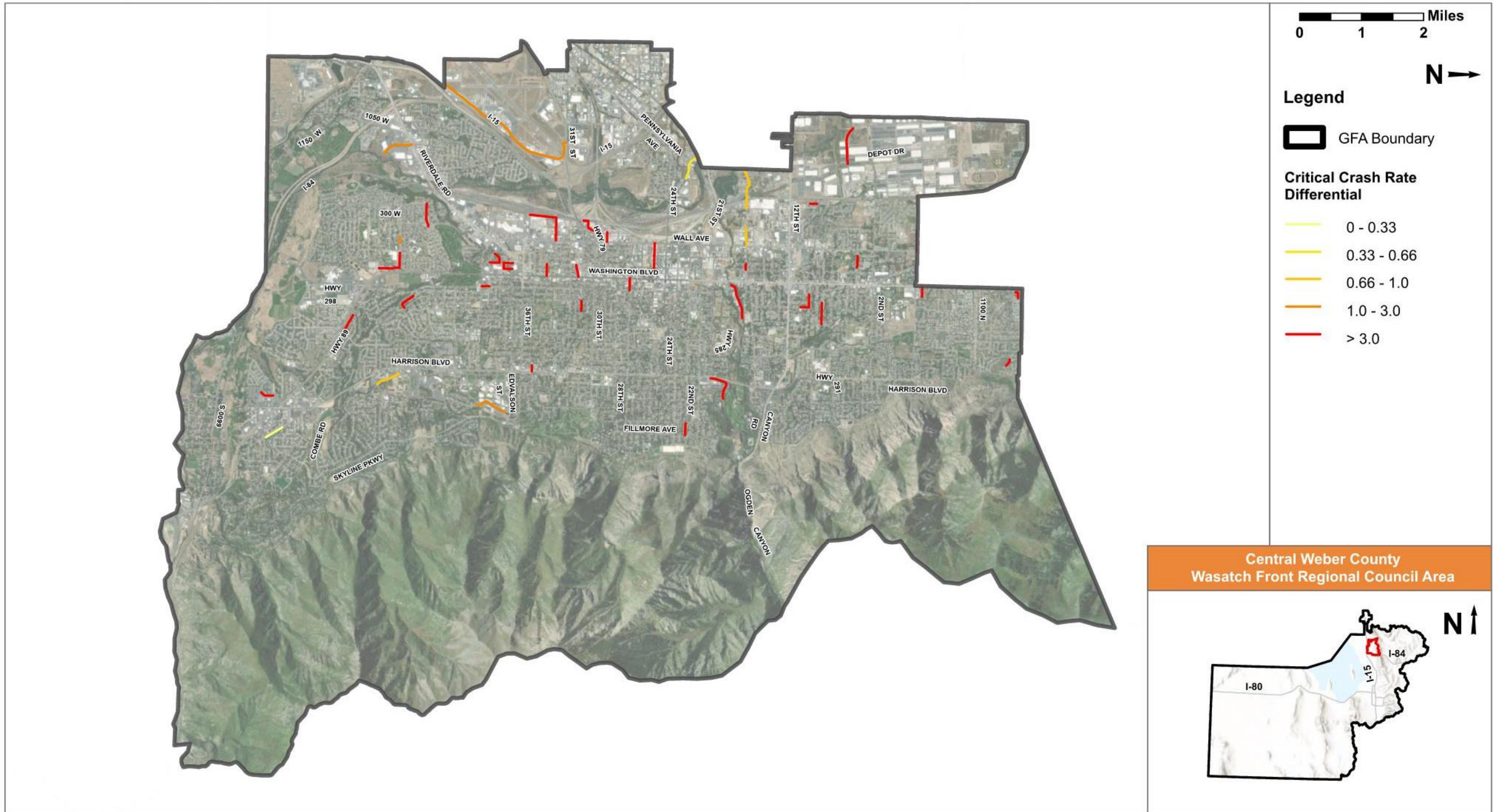


Figure 5.3 – CCR Differential – Segments (Local Routes)

Table 5.1 – Crash and Network Screening Analysis Results - Segments

Facility	Limits	Functional Classification	City	Crashes	Critical Crash Rate Differential	EPDO ¹	Fatal	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	No Injury/PDO	Angle	Front to Rear	Head On	Single Vehicle	Parked Vehicle	Rear to Rear	Rear to Side	Sideswipe (Same Direction)	Sideswipe (opposite Direction)	Other/Unknown	Pedestrian	Bicycle	Motorcycle	
State Routes																									
Ogden Canyon Rd (SR-39)	Access Road Cyn to Warm Water Canyo	Minor Arterial		20	4.2	205	0	1	4	1	14	0	1	3	10	1	0	0	4	1	0	0	0	2	
Washington Blvd (US-89)	US-39 to 11th St	Other Principal Arterial	Ogden	29	2.4	1043	1	0	4	4	20	14	8	0	3	1	0	0	0	3	0	0	0	3	
31st St (SR-39)	I-15 NB Off Ramp to Parker Dr	Other Principal Arterial	Ogden	25	2.4	66	0	0	0	4	21	1	20	0	1	0	0	0	0	3	0	0	0	0	
12th St (SR-39)	I St to Gibson Ave	Other Principal Arterial	Ogden	53	2.3	500	0	2	5	15	31	37	9	1	5	0	0	0	0	1	0	2	0	0	
Washington Blvd (US-89)	3rd St to 2nd St	Other Principal Arterial	Ogden	17	2.2	999	1	0	3	3	10	0	10	0	3	1	0	0	1	2	0	2	0	0	
Washington Blvd (US-89)	23rd St to 24th St	Other Principal Arterial	Ogden	18	2.0	266	0	2	1	4	11	2	10	0	3	1	0	0	0	1	1	1	0	0	
Washington Blvd (US-89)	11th St to 10th St	Other Principal Arterial	Ogden	15	1.8	46	0	0	0	3	12	7	1	1	2	0	0	0	1	3	0	0	2	0	
Wall Ave (SR-204)	Riverdale Rd to Chimes View Dr	Other Principal Arterial	South Ogden	17	1.7	69	0	0	1	3	13	7	7	1	0	0	0	0	0	1	1	0	0	0	
24th St (SR-53)	Pennsylvania Ave to G Ave	Minor Arterial	Ogden	14	1.6	1025	1	1	0	3	9	0	4	0	7	0	0	0	1	1	1	1	0	0	
12th St (SR-39)	Adams Ave to US-89	Other Principal Arterial	Ogden	21	1.6	95	0	0	2	3	16	9	8	1	0	0	0	0	0	2	1	0	0	1	
Federal Aid Routes																									
6600 S	2275 S to Bell Ln	Major Collector	Uintah	3	82.9	24	0	0	1	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0
North St	630 E to 660 E	Major Collector	Ogden	3	20.5	24	0	0	1	0	2	1	0	0	1	1	0	0	0	0	0	0	0	0	0
400 N	Harrisville Rd to 325 E	Major Collector	Harrisville	17	18.3	237	0	1	5	2	9	10	3	0	3	0	0	0	0	1	0	0	0	1	0
Skyline Dr	Hwy 89 to Fashion Point Dr	Minor Collector	South Ogden	3	16.2	3	0	0	0	0	3	1	0	0	1	0	0	0	0	1	0	0	0	0	0
26th St	Iowa Ave to Harrison Blvd	Minor Collector	Ogden	3	13.2	3	0	0	0	0	3	0	1	0	0	1	0	0	0	1	0	0	0	0	0
400 N	Burbridge Ave to Depot Dr	Major Collector	Ogden	5	6.6	37	0	0	1	1	3	3	0	0	2	0	0	0	0	0	0	0	0	0	0
4600 S	Fillmore Ave to 1575 E	Major Collector	Ogden	3	5.8	3	0	0	0	0	3	0	1	0	1	0	0	0	0	0	1	0	0	0	0
Jefferson Ave	22nd St to 23rd St	Local	Ogden	4	5.4	25	0	0	1	0	3	1	0	0	0	3	0	0	0	0	0	0	0	0	0
Grant Ave	13th St to 12th St	Major Collector	Ogden	5	5.4	48	0	0	2	0	3	1	0	1	3	0	0	0	0	0	0	1	0	0	0
Monroe Blvd	30th St to Darling Street	Minor Arterial	Ogden	4	5.2	107	0	1	0	1	2	3	0	0	0	1	0	0	0	0	0	1	0	0	0
Local Streets																									
1475 N	435 E to 485 E	Local	Ogden	3	125.7	13	0	0	0	1	2	0	0	2	1	0	0	0	0	0	0	0	0	0	0
34th St	Washington Blvd to Grant Ave	Local	Ogden	3	81.4	24	0	0	1	0	2	0	0	0	1	2	0	0	0	0	0	0	0	0	0
35th St	Brinker Ave to Harrison Blvd	Local	Ogden	3	66.4	13	0	0	0	1	2	0	2	0	0	1	0	0	0	0	0	0	0	0	0
25th St	Wall Ave to Lincoln Ave	Local	Ogden	10	66.1	10	0	0	0	0	10	3	0	0	2	3	0	2	0	0	0	0	0	0	0
38th St	Grant Ave to Kiesel Ave	Local	South Ogden	4	47.7	25	0	0	1	0	3	2	0	0	1	1	0	0	0	0	0	1	0	0	0
Healy St	Grant Ave to Washington Blvd	Local	Ogden	3	46.8	3	0	0	0	0	3	0	0	0	1	2	0	0	0	0	0	0	0	0	0
Sylvia Dr	Chimes View Dr to 39th St	Local	South Ogden	3	46.5	3	0	0	0	0	3	1	0	0	0	1	0	0	0	1	0	0	0	0	0
25th St	Kiesel Ave to Grant Ave	Local	Ogden	4	45.3	4	0	0	0	0	4	2	0	0	0	2	0	0	0	0	0	0	0	0	0
475 N	Washington Blvd to	Local	Harrisville	3	42.4	24	0	0	1	0	2	0	0	0	2	1	0	0	0	0	0	1	0	0	0
Chambers St	Holroyd Dr to Glasmann Way	Local	South Ogden	3	39.1	3	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0

1. Equivalent Property Damage Only Crashes

	= Local CCR Differential > 3.0		= 90 - 100% probability that crash type is over-represented
	= Local CCR Differential 1.0 - 3.0		= 80 - 90% probability that crash type is over-represented
	= Local CCR Differential 0.66 - 1.0		= 70 - 80% probability that crash type is over-represented
	= Local CCR Differential 0.33 - 0.66		
	= Local CCR Differential 0.0 - 0.33		

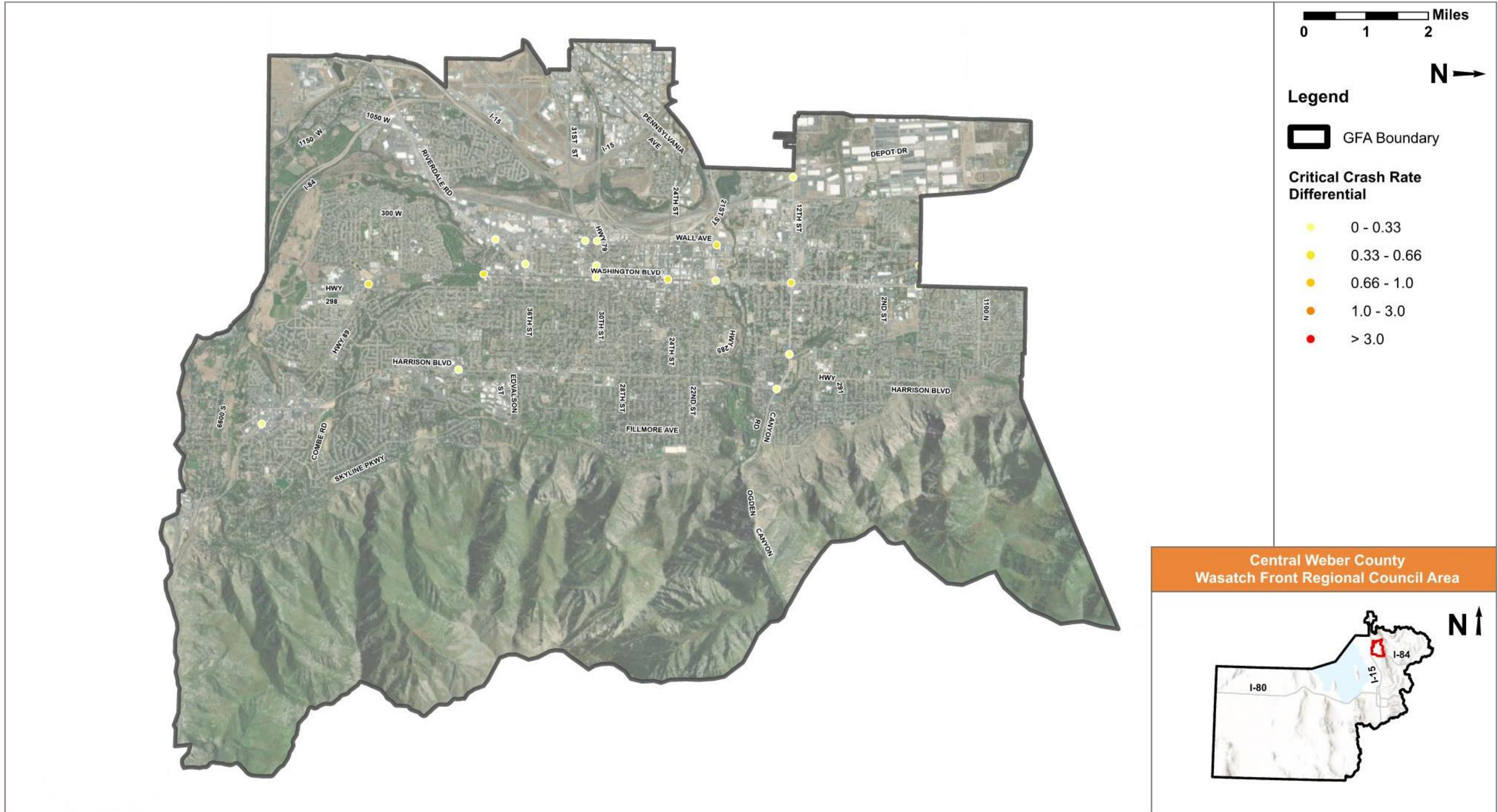


Figure 5.4 – CCR Differential – Intersections (Signalized)

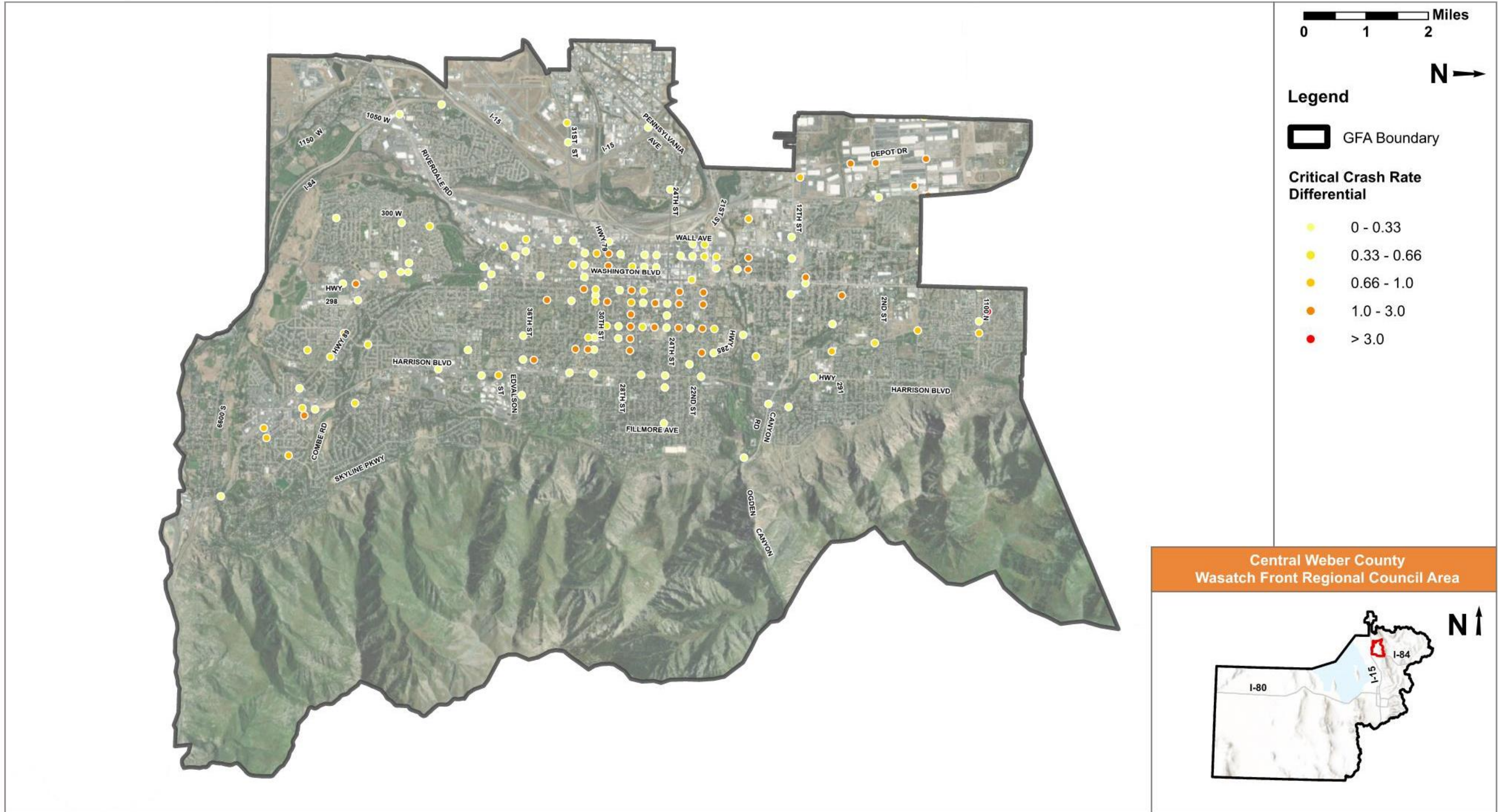


Figure 5.5 – CCR Differential – Intersections (Unsignalized)

Table 5.2 – Crash and Network Screening Analysis Results - Intersections

Intersection	City	Crashes	Critical Crash Rate Differential	EPDO ¹	Fatal	Suspected Serious Injury	Suspected Minor Injury	Possible Injury	No Injury/PDO	Angle	Front to Rear	Head On	Parked Vehicle	Single Vehicle	Rear to Rear	Rear to Side	Sideswipe (Same Direction)	Sideswipe (opposite Direction)	Other/Unknown	Pedestrian	Bicycle	Motorcycle
Signalized Intersections																						
Washington Blvd & 40Th St	South Ogden	102	0.5	1895	1	1	28	21	51	62	26	3	4	0	0	0	3	2	2	1	1	2
Harrisville Rd & 400 N	Ogden	29	0.4	486	0	3	5	7	14	14	7	2	3	0	0	0	0	1	2	2	0	0
Washington Blvd & 24Th St	Ogden	54	0.4	304	0	0	3	18	33	24	12	4	8	1	0	0	1	4	0	3	2	0
Wall Ave & 20Th St	Ogden	68	0.4	743	0	4	7	15	42	43	18	1	3	0	0	0	0	1	2	2	1	1
Washington Blvd & 12Th St	Ogden	107	0.4	884	0	1	20	25	61	36	45	4	16	0	0	0	0	5	1	10	4	0
Adams Ave & Hwy 89	South Ogden	51	0.4	449	0	1	9	11	30	25	14	6	3	0	0	0	1	1	1	0	0	1
Monroe Blvd & 12Th St	Ogden	57	0.3	1583	1	2	14	15	25	43	6	2	4	0	0	0	0	1	1	2	1	2
Washington Blvd & North St	Harrisville	48	0.2	497	0	1	7	20	20	24	11	3	8	1	0	0	0	1	0	2	4	2
Wall Ave & 31St St	Ogden	64	0.2	831	0	2	22	11	29	29	20	1	9	1	0	0	0	2	2	3	7	1
Harrison Blvd & Canyon Rd	Ogden	53	0.2	803	0	4	11	14	24	27	17	3	2	0	0	0	3	0	1	0	0	3
Unsignalized Intersections																						
Jefferson Ave & Canyon View Dr	Ogden	3	4.0	3	0	0	0	0	3	2	0	0	1	0	0	0	0	0	0	0	0	0
Monroe Blvd & 27Th St	Ogden	21	3.0	250	0	1	3	7	10	20	0	0	1	0	0	0	0	0	0	0	0	0
Lincoln Ave & 17Th St	Ogden	26	2.8	329	0	1	5	10	10	26	0	0	0	0	0	0	0	0	0	0	0	1
Van Buren Ave & 35Th St	Ogden	4	2.7	68	0	0	3	0	1	3	0	0	1	0	0	0	0	0	0	0	1	0
Jefferson Ave & 34Th St	Ogden	5	2.4	26	0	0	0	2	3	0	0	0	2	2	0	0	0	1	0	0	0	0
Adams Ave & 27Th St	Ogden	7	2.2	49	0	0	1	2	4	4	0	0	1	0	0	0	1	1	0	0	0	1
Kiesel Ave & 10Th St	Ogden	3	2.1	24	0	0	1	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0
Wasatch Dr & Eastwood Blvd	South Ogden	11	2.1	21	0	0	0	1	10	9	2	0	0	0	0	0	0	0	0	0	0	0
Jackson Ave & 27Th St	Ogden	3	2.0	13	0	0	0	1	2	2	0	0	1	0	0	0	0	0	0	0	0	0
Jefferson Ave & 23Rd St	Ogden	5	2.0	108	0	1	0	1	3	4	0	0	0	0	0	0	0	1	0	0	0	0

1. Equivalent Property Damage Only Crashes

	= Local CCR Differential > 3.0		= 90 - 100% probability that crash type is over-represented
	= Local CCR Differential 1.0 - 3.0		= 80 - 90% probability that crash type is over-represented
	= Local CCR Differential 0.66 - 1.0		= 70 - 80% probability that crash type is over-represented
	= Local CCR Differential 0.33 - 0.66		
	= Local CCR Differential 0.0 - 0.33		

6. Roadway Characteristic Risk Analysis

A roadway characteristic risk analysis was performed using the following three sub-analysis:

- Crash Profile Risk Assessment
- usRAP Risk Assessment
- Local Street Risk Assessment

6.1. Crash Profile Risk Assessment

This risk assessment sub-analysis identifies common roadway characteristics for fatal and serious injury crashes that occurred within the WFRC study area. Based on the scoring of the various roadway characteristic risks identified from analysis of crash reports, a risk score was assigned to all state and federal aid routes within the Central Weber County GFA. GFA consistent with the methodology described in Tech Memo #1 Section 3.4. The results of the Crash Profile Risk Assessment are mapped in the following figures:

- **Figure 6.1** – Crash Profile Risk Assessment Results (State Routes)
- **Figure 6.2** – Crash Profile Risk Assessment Results (Federal Aid Routes)

Table 6.1 provides an overview of urban and rural segments with the highest risk scoring. Up to ten urban and rural segments are listed if the segment received at least 67% of the overall total risk score.

Table 6.1 – WFRC Risk Segments (Federal Aid Routes)

Area Type	Road Segment	Extents	Risk Score
Urban	2550 South	1900 West to Pennsylvania Avenue	25.7
Urban	Pennsylvania Avenue	3300 South to 2550 South	24.8
Urban	Midland Drive	1900 West to 2550 South	24.1
Urban	Mountain Road	900 North to North GFA Extents	24
Urban	530 West	2nd Street to 400 North	22
Urban	2nd Street	530 West to Harrison Boulevard	22
Urban	Harrison Boulevard	Canyon Road to 2nd Street	22
Urban	36th Street	Wall Avenue to Harrison Boulevard	22
Urban	Chime View Drive	Wall Avenue to 40th Street	21.9
Urban	4400 South / 300 East	Washington Terrace Road to Washington Boulevard	21
Rural	2nd Street	530 West to Wetgate Lane	22
Rural	Combre Road	Harrison Boulevard to Eastwood Drive	21.5
Rural	Sheridan Drive	Harrison Boulevard to Polk Avenue	20
Rural	9th Street	Monroe Boulevard to Polk Avenue	20

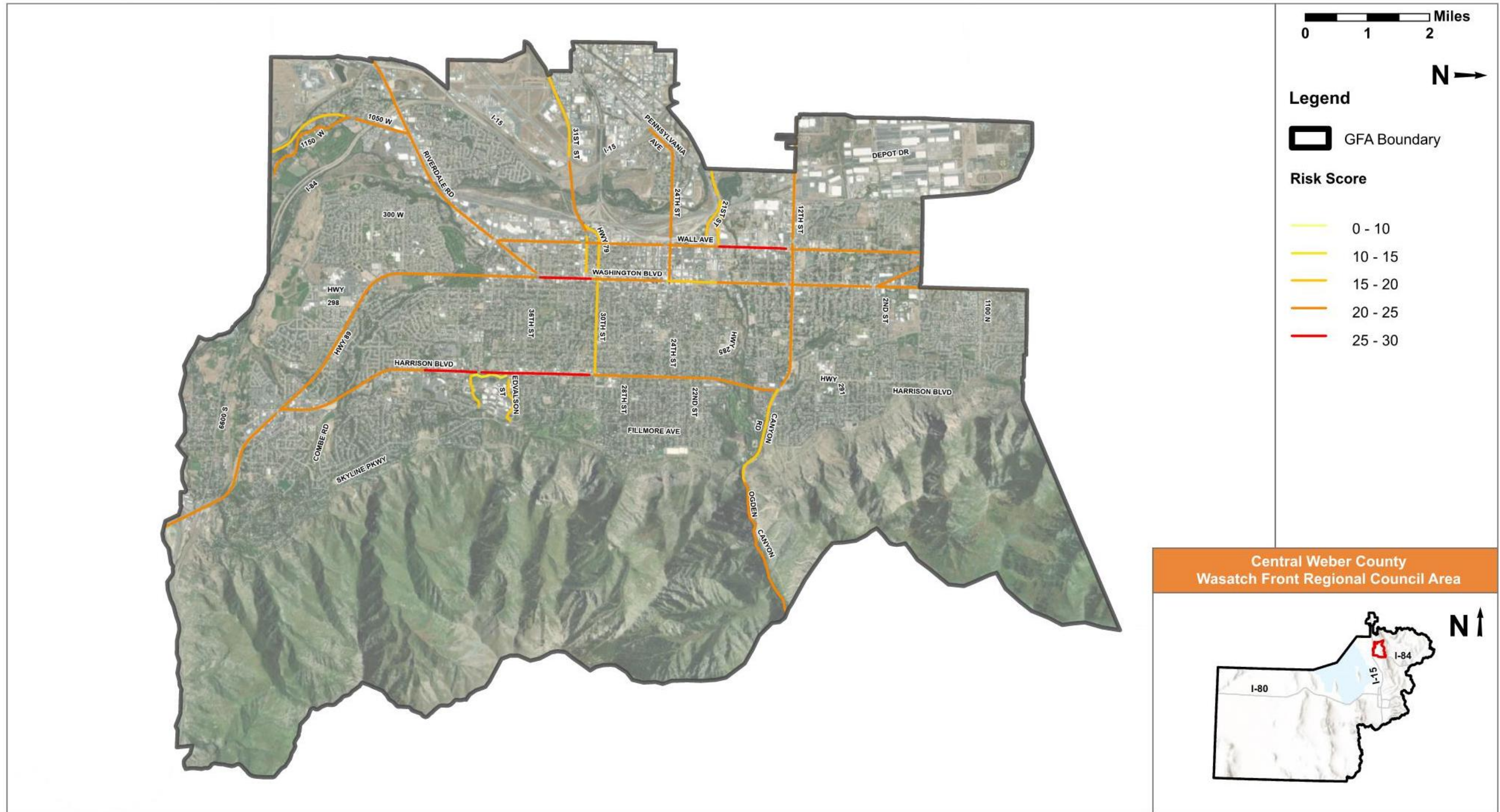


Figure 6.1 – Crash Profile Risk Assessment Results (State Routes)

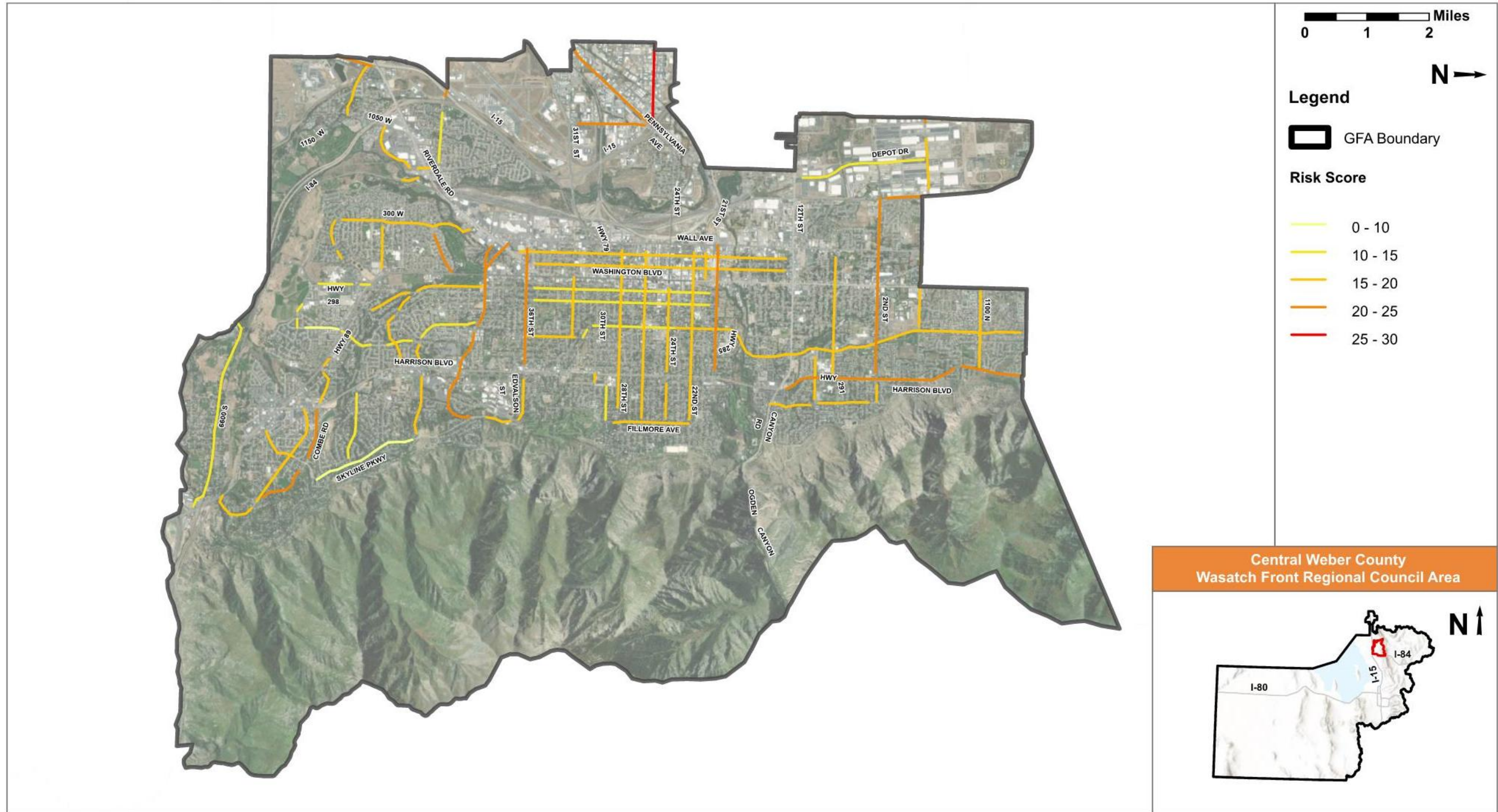


Figure 6.2 – Crash Profile Risk Assessment Results (Federal Aid Routes)

6.2. usRAP Risk Assessment

A roadway characteristic risk assessment was performed using roadway feature data collected for Utah state and federal aid routes. The risk assessment was performed using the usRAP tool. The output of the usRAP tool is a star rating or risk rating for vehicle, pedestrian, and bicyclist features. The results of the usRAP risk assessment by star rating are mapped in the following figures:

- **Figure 6.3** – Vehicle Star Rating (State Routes)
- **Figure 6.4** – Vehicle Star Rating (Federal Aid Routes)
- **Figure 6.5** – Pedestrian Star Rating (State Routes)
- **Figure 6.6** – Pedestrian Star Rating (Federal Aid Routes)
- **Figure 6.7** – Bicycle Star Rating (State Routes)
- **Figure 6.8** – Bicycle Star Rating (Federal Aid Routes)

A summary of the highest risk segments (1-2 Stars) for federal aid routes in the Central Weber County GFA are located in **Table 6.2**.

Table 6.2 – usRAP Risk Segments (Federal Aid Route)

Road Segment	Extents	Vehicle Risk	Pedestrian Risk	Bicycle Risk
Monroe Blvd	Kylee Lane to Melody Lane	X	X	
Monroe Blvd	Melody Lane to 1500 North		X	
21st Street	Lincoln Avenue to Washington Blvd	X	X	
Mountain Road	900 North to North GFA Extents		X	X
2nd Street	Stewart Drive to Harrison Boulevard		X	X
Harrison Blvd	Canyon Road to 2nd Street		X	X
Harrison Blvd	2nd Street to North GFA Extents		X	
4400 South	250 West to 300 East		X	X
300 East	4400 South to Washington Blvd		X	X
40th Street	Palmer Drive to Gramercy Ave		X	
36th Street	Lincoln Avenue to Brinker Avenue		X	
36th Street	Tyler Avenue to Ogden Drive		X	
530 West	2nd Street to North GFA Extents		X	
Federal Park Drive	5600 South to Riverdale Road		X	

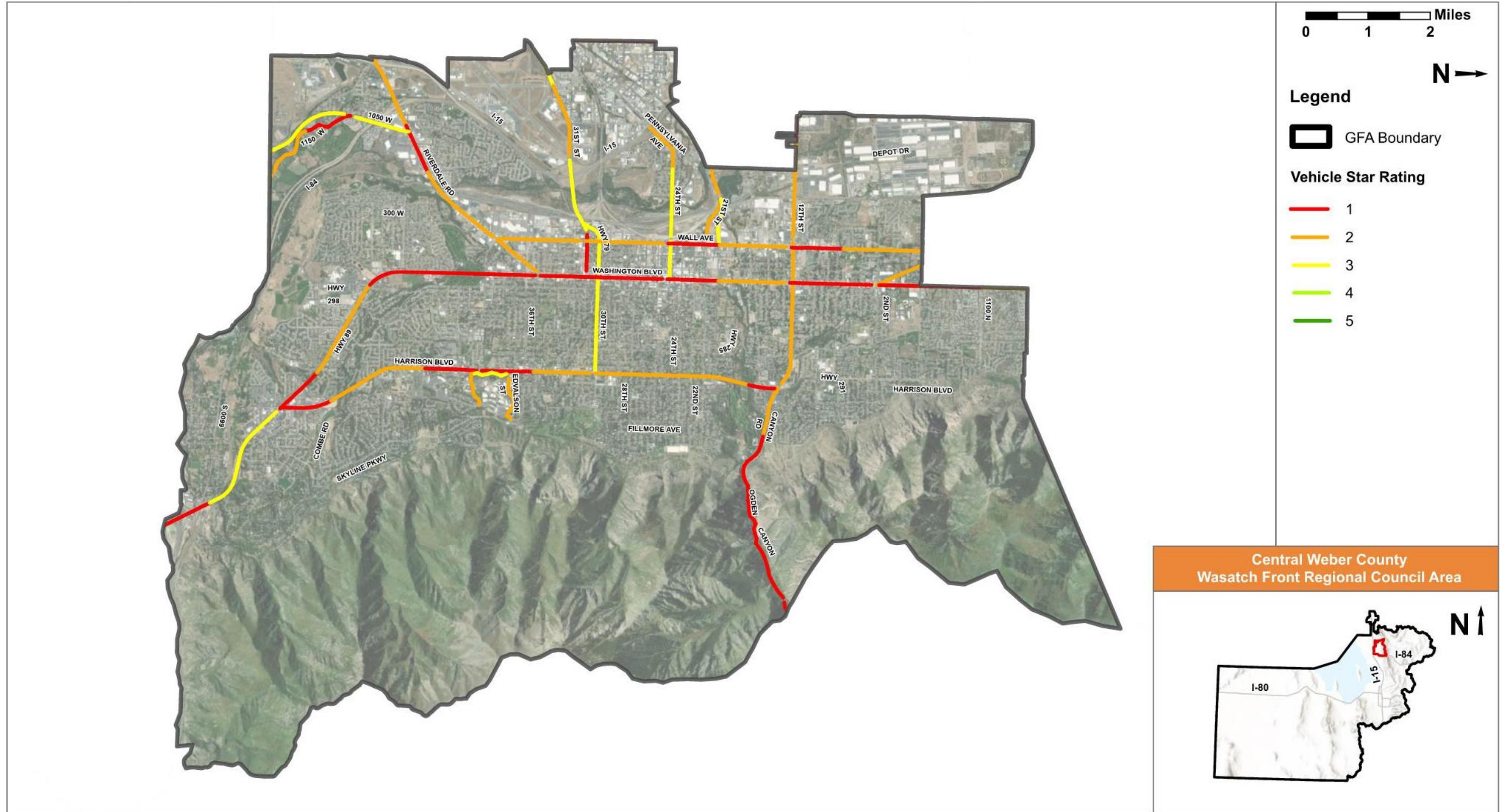


Figure 6.3 – Vehicle Star Rating (State Routes)

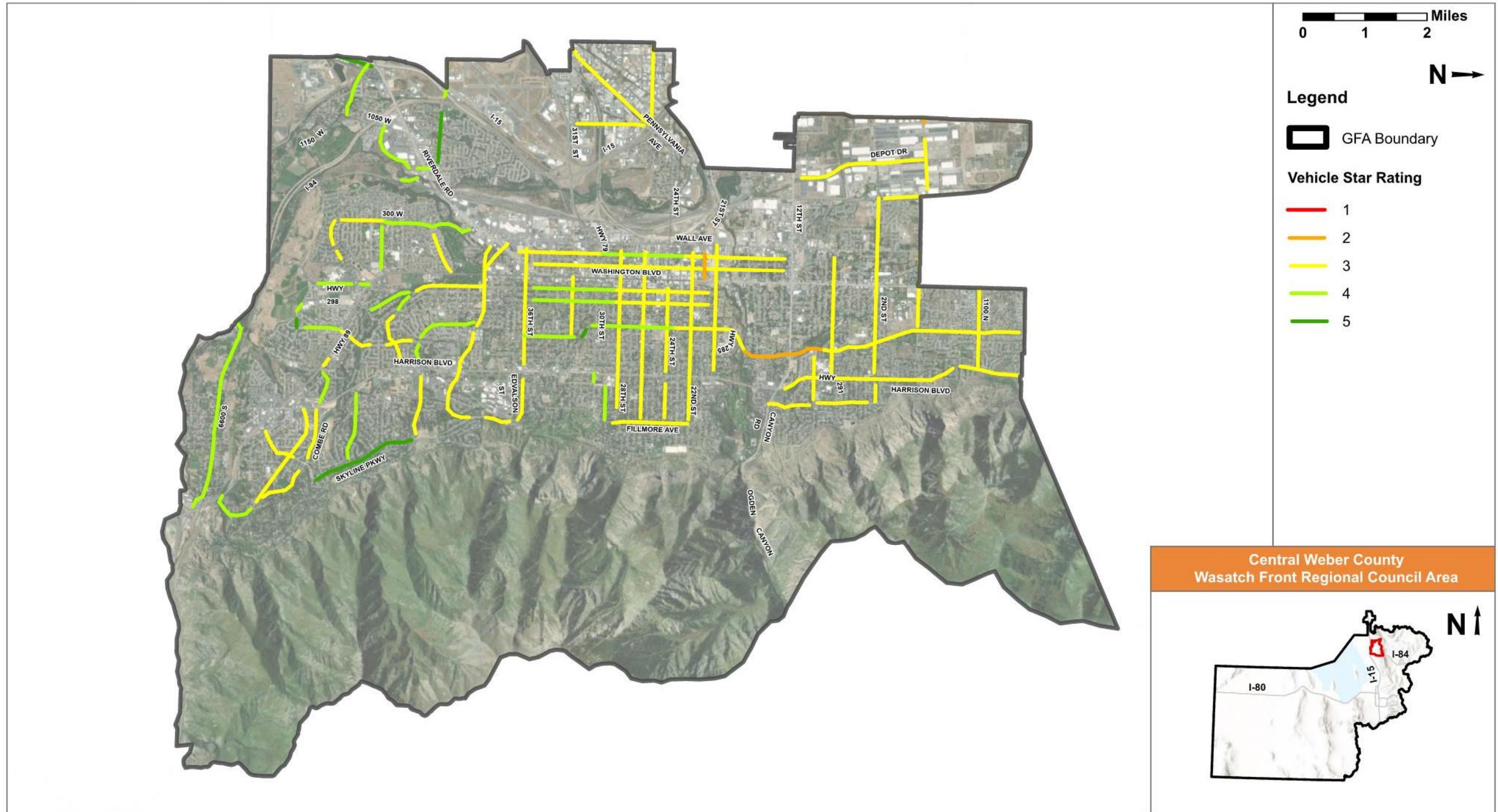


Figure 6.4 – Vehicle Star Rating (Federal Aid Routes)

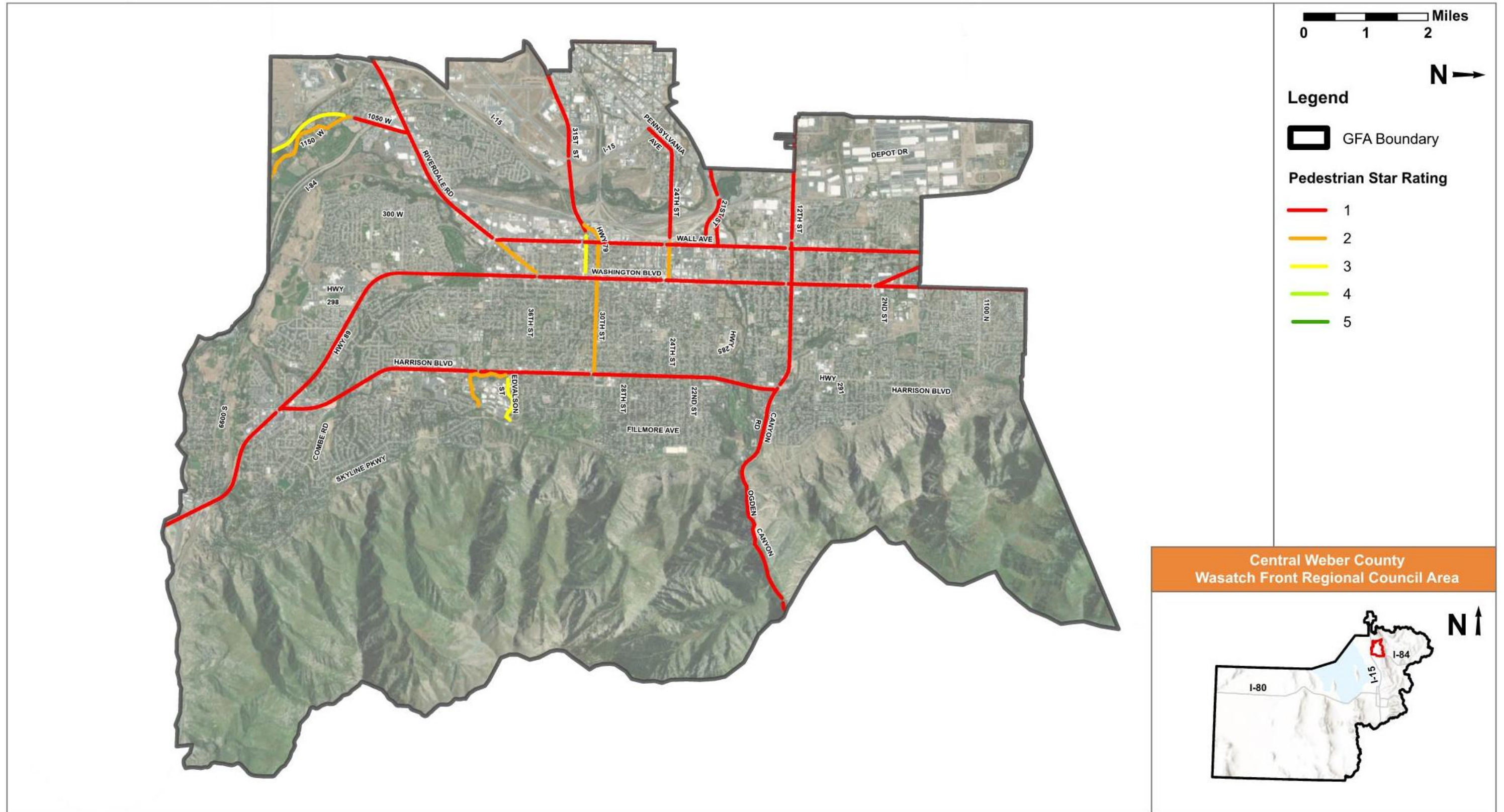


Figure 6.5 – Pedestrian Star Rating (State Routes)

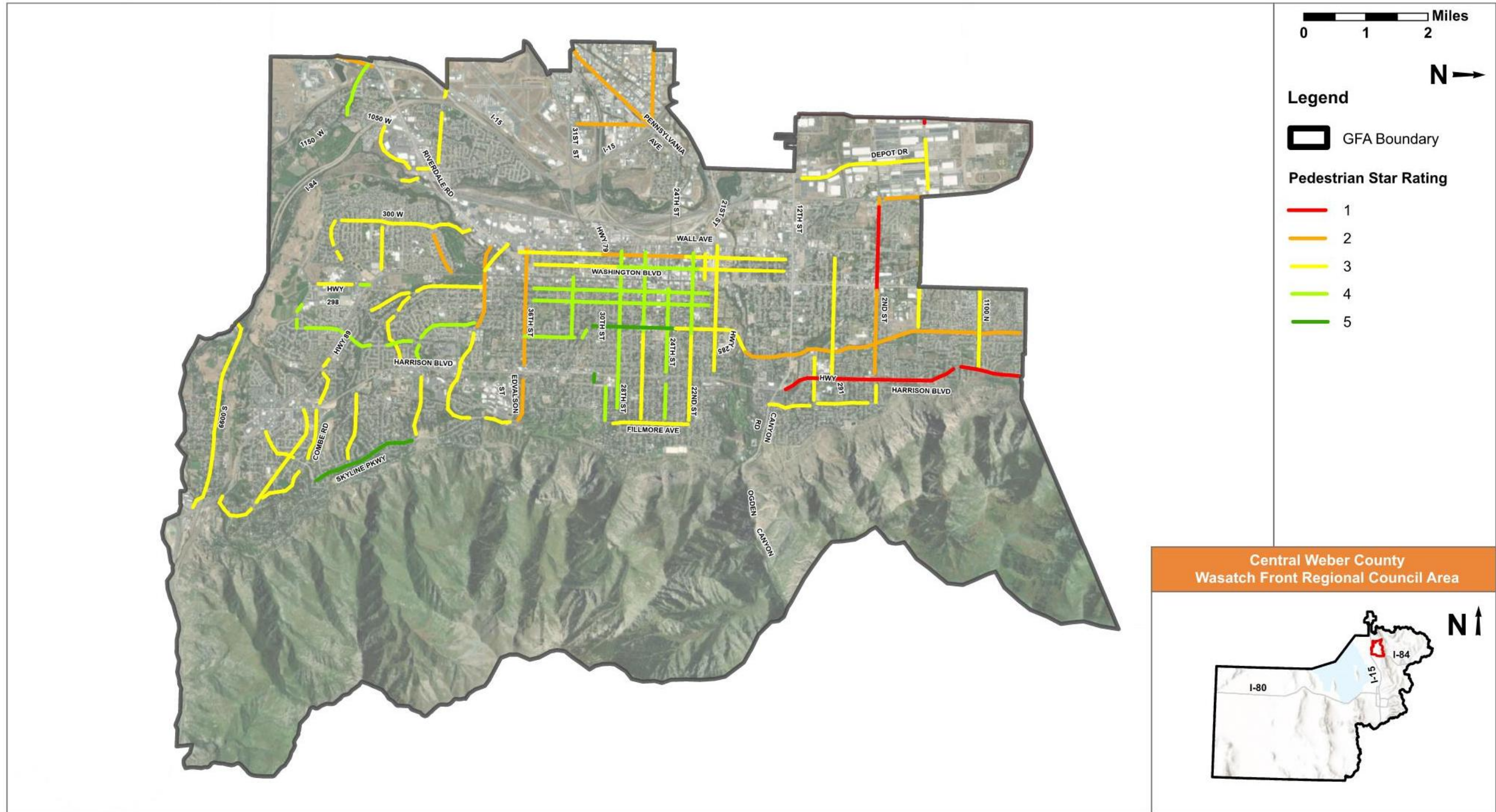


Figure 6.6 – Pedestrian Star Rating (Federal Aid Routes)

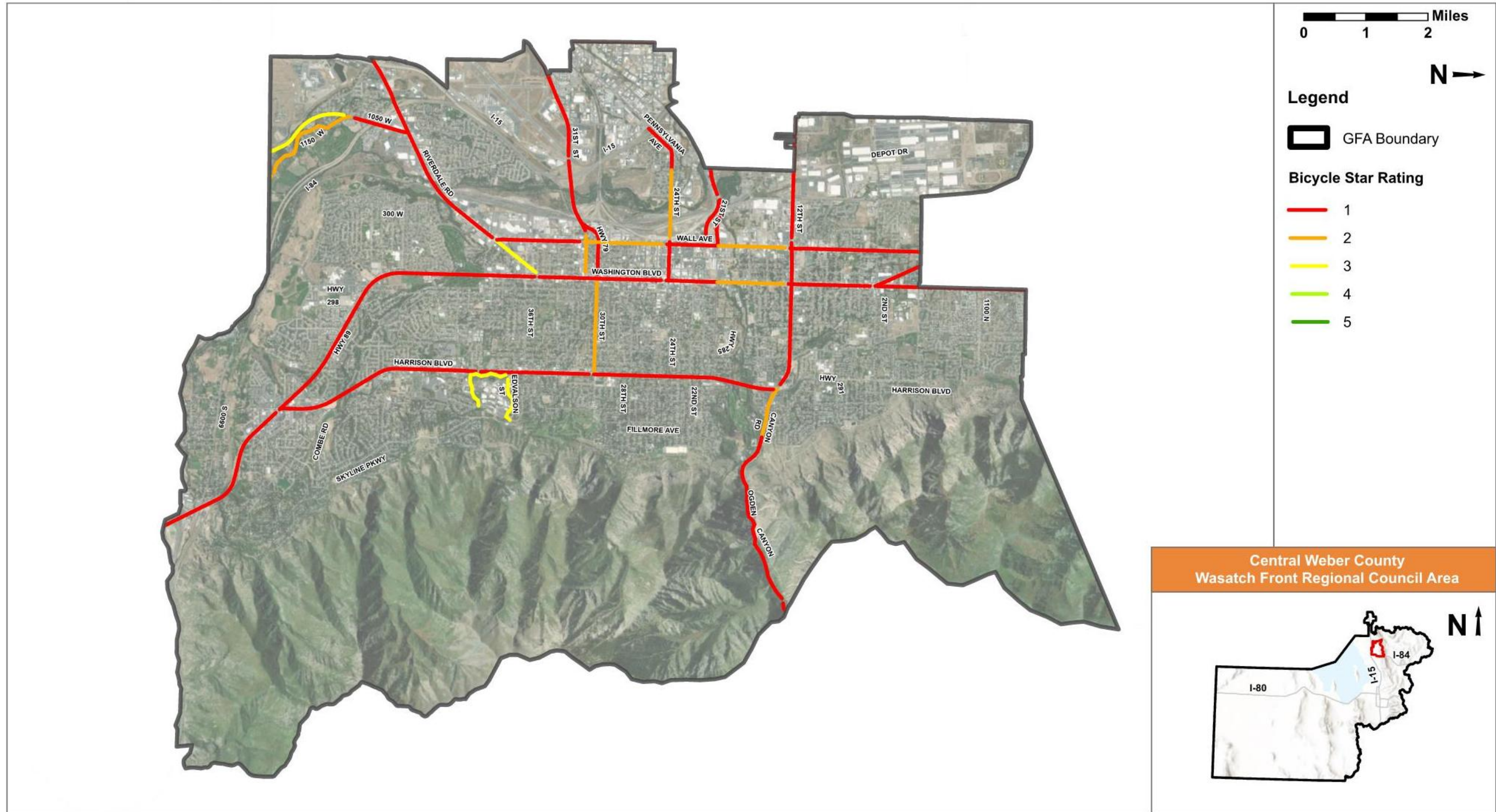


Figure 6.7 – Bicycle Star Rating (State Routes)

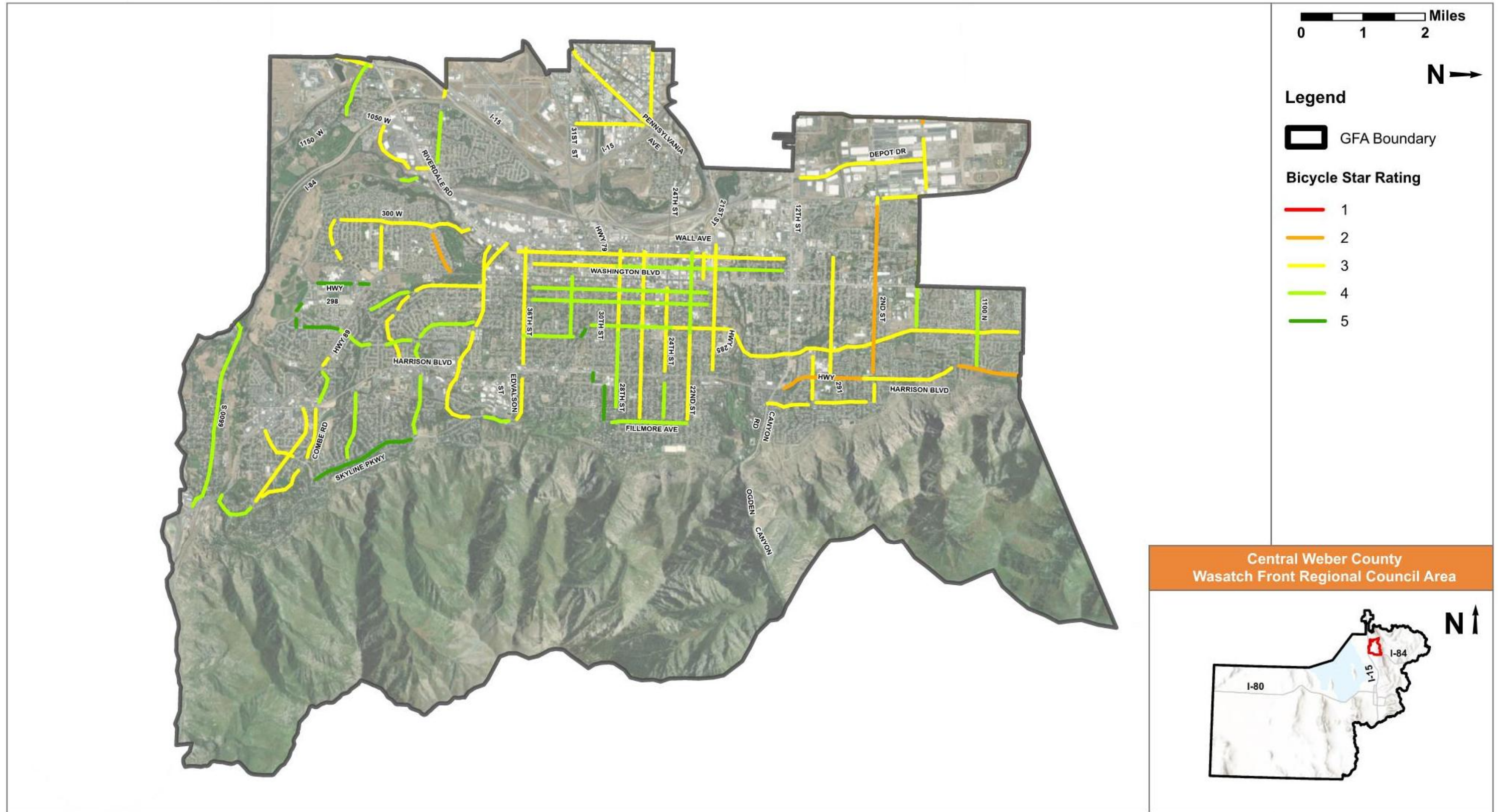


Figure 6.8 – Bicycle Star Rating (Federal Aid Routes)

6.3. Local Street Risk Assessment

A local street risk assessment was performed for all local roads within WFRC that are not included in the usRAP network. The results of the local street risk assessment are summarized in **Table 6.3** and **Figure 6.9**. Mapped segments include the top 5% risk segments within the WFRC study area and the top 10 segments or high priority segments within the Central Weber County GFA.

Table 6.3 – Local Street High Priority Segments

Road Segment	Extents
Monroe Street:	12th Street – 6th Street
36 th Street:	US-89 – Lincoln Avenue
40 th Street:	Orchard – SR-26
29 th Street:	Adams Avenue – Lincoln Avenue
7 th Street:	US-89 – Downs Drive
28 th Street:	Grant Avenue – Union Avenue
27 th Street:	Lincoln Avenue – US-89
Monroe Street:	12 th Street – 22 nd Street
2 nd Street:	Century Drive – SR-235
20 th Street:	SR-204 – Quincy Avenue

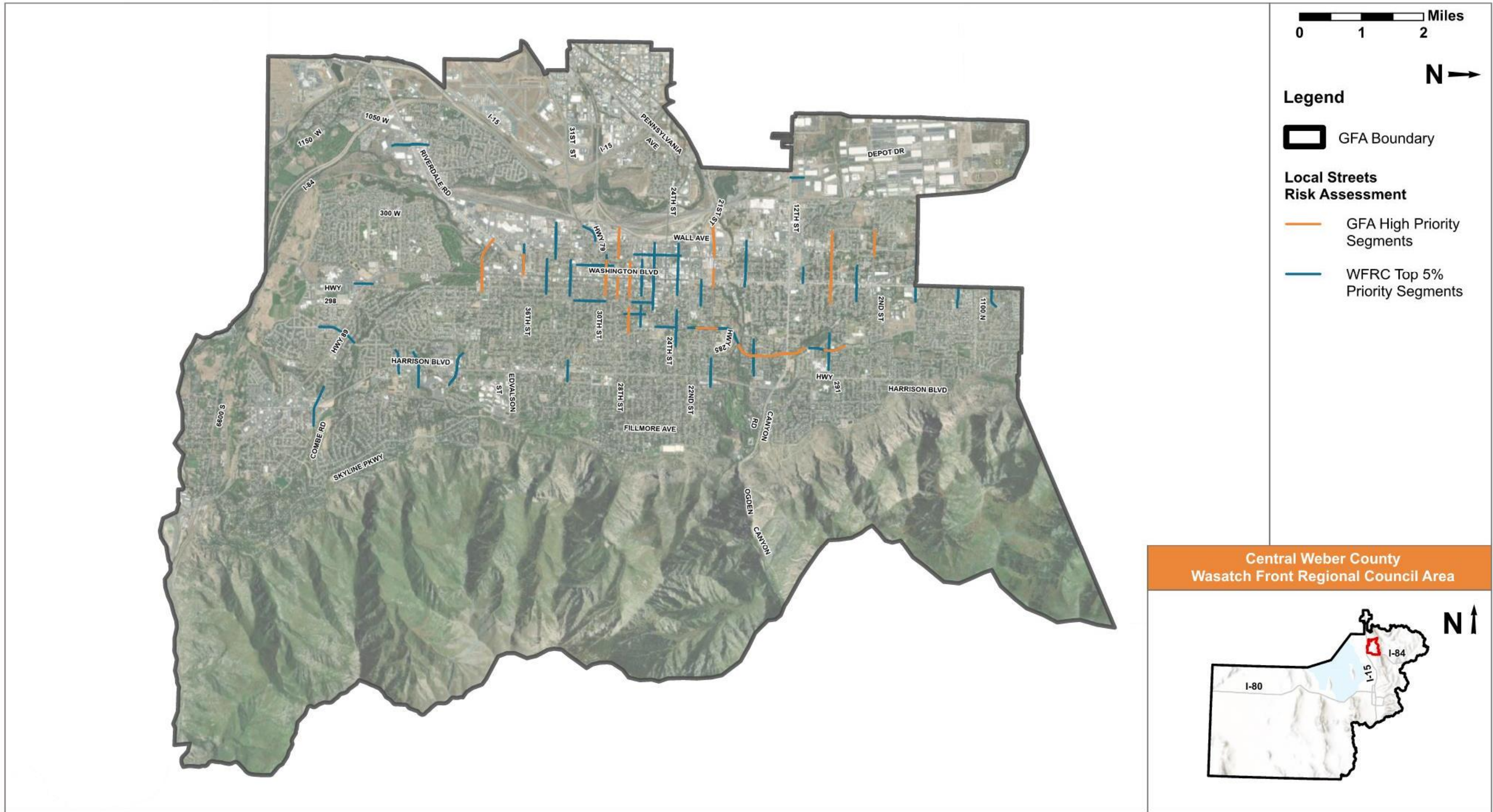


Figure 6.9 – Local Street Risk Assessment Results

7. Safety Analysis Summary

This section summarizes the safety analysis performed for the Central Weber County GFA by identifying common risk characteristics and a composite high-risk roadway network.

7.1. Common Risk Characteristics

Based on the SHSP Emphasis Area Analysis and the Historical Crash Analysis summarized above, the following are common risk characteristics that should be considered when developing safety improvement projects specific to the Central Weber County GFA:

- Intersections
 - 52.2% of all fatal and serious injuries
- Pedestrian
 - 21.0% of all fatal and serious injuries
- Speed-Related Transportation
 - 20.4% of all fatal and serious injuries
- Older Driver
 - 19.6% of all fatal and serious injuries
- Roadway Departure
 - 18.5% of all fatal and serious injuries
 - 15.4% of all fatal and serious injury crashes
- Active Transportation
 - 22.3% of all fatal and serious injury crashes
- Left Turn at Intersection
 - 21.1% of all fatal and serious injury crashes

7.2. Composite High-Risk Roadway Network

Each of the safety analysis methodologies completed identified segments that can be improved to reduce fatalities and serious injuries.

To identify an overall high-risk roadway network and provide focused information for jurisdictional decisions regarding prioritization of safety improvements, an analysis was performed to identify overlapping segments from each of the analysis methodologies. A composite score, from zero to five, was determined using the approach in **Table 7.1**. The high-risk roadway network is a composite of the various risks as presented in **Section 4** through **Section 6** of Tech Memo #1. The top 10% of roadway segments for the entire WFRC area are included in the Composite High-Risk Network. These segments have a composite risk value of four or higher.

The Central Weber County GFA Composite High-Risk Network for Federal Aid routes is summarized in **Table 7.2**.

The results are also mapped in **Figure 7.1** (State Routes) and **Figure 7.2** (Federal Aid Routes).

Table 7.1 – Composite High-Risk Roadway

Analysis	Risk Type	Approach	Value
Historical Crash Analysis	Historical Crash Risk	5-Year Crash Totals ≥ 3 Crashes	1
Crash and Network Screening Analysis	Systemic Crash Risk	Positive Local CCR Differential	1
WFRC Risk Assessment	Roadway Risk	Risk Score ≥ 20	1
usRAP Risk Assessment	Vehicle Risk	Vehicle Star Rating = 1-2 Stars	1
usRAP Risk Assessment	Pedestrian Risk	Pedestrian Star Rating = 1-2 Stars	0.5
usRAP Risk Assessment	Bicycle Risk	Bicycle Star Rating = 1-2 Stars	0.5
Total Possible Composite Risk Score			5

The greater the overlap the higher the likelihood that the segment has risk factors that should be addressed to reduce and/or eliminate fatal and serious injury crashes at that location. The top 10% of roadway segments for the entire WFRC area are considered high-risk segments. These segments have a composite risk value of four or higher. A summary of the composite high-risk roadway network for federal aid routes is summarized in **Table 7.2**. The results are also mapped in **Figure 7.1** and **Figure 7.2**.

Table 7.2 – Central Weber County High-Risk Roadway Network (Federal Aid Routes)

Facility	Limits	Functional Classification	City	Composite Risk Score	Length (miles)	usRAP- Pedestrian Star Rating	usRAP - Bicycle Star Rating	usRAP- Vehicle Star Rating	Crash Profile Risk Score	CCR Differential Analysis	Significant Crashes
Federal Aid Routes											
2nd St	Washington Blvd to Eccles Ave	Major Collector	Ogden	4	1.0	X	X		X	X	X

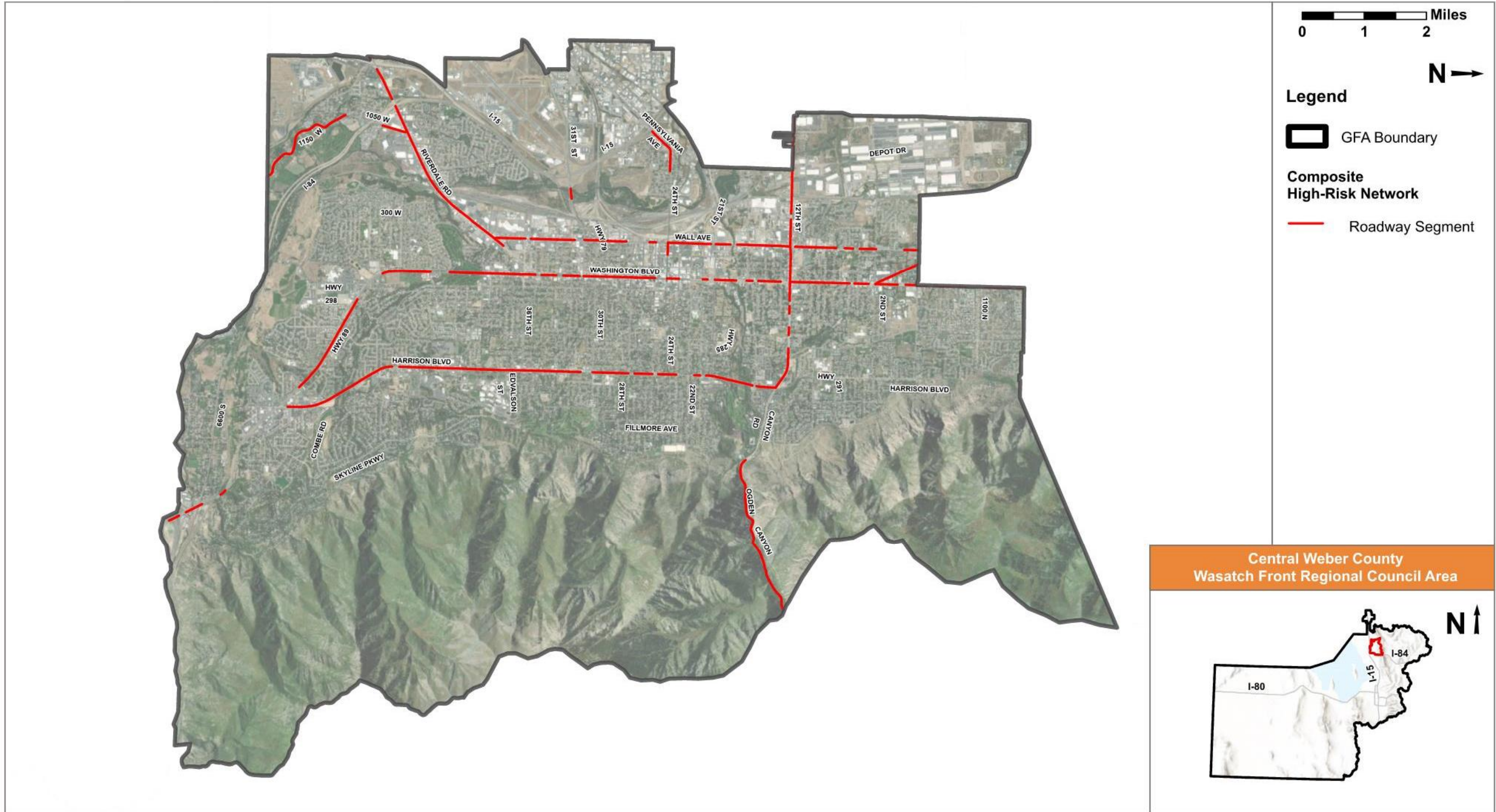


Figure 7.1 – Central Weber County High-Risk Roadway Network (State Routes)

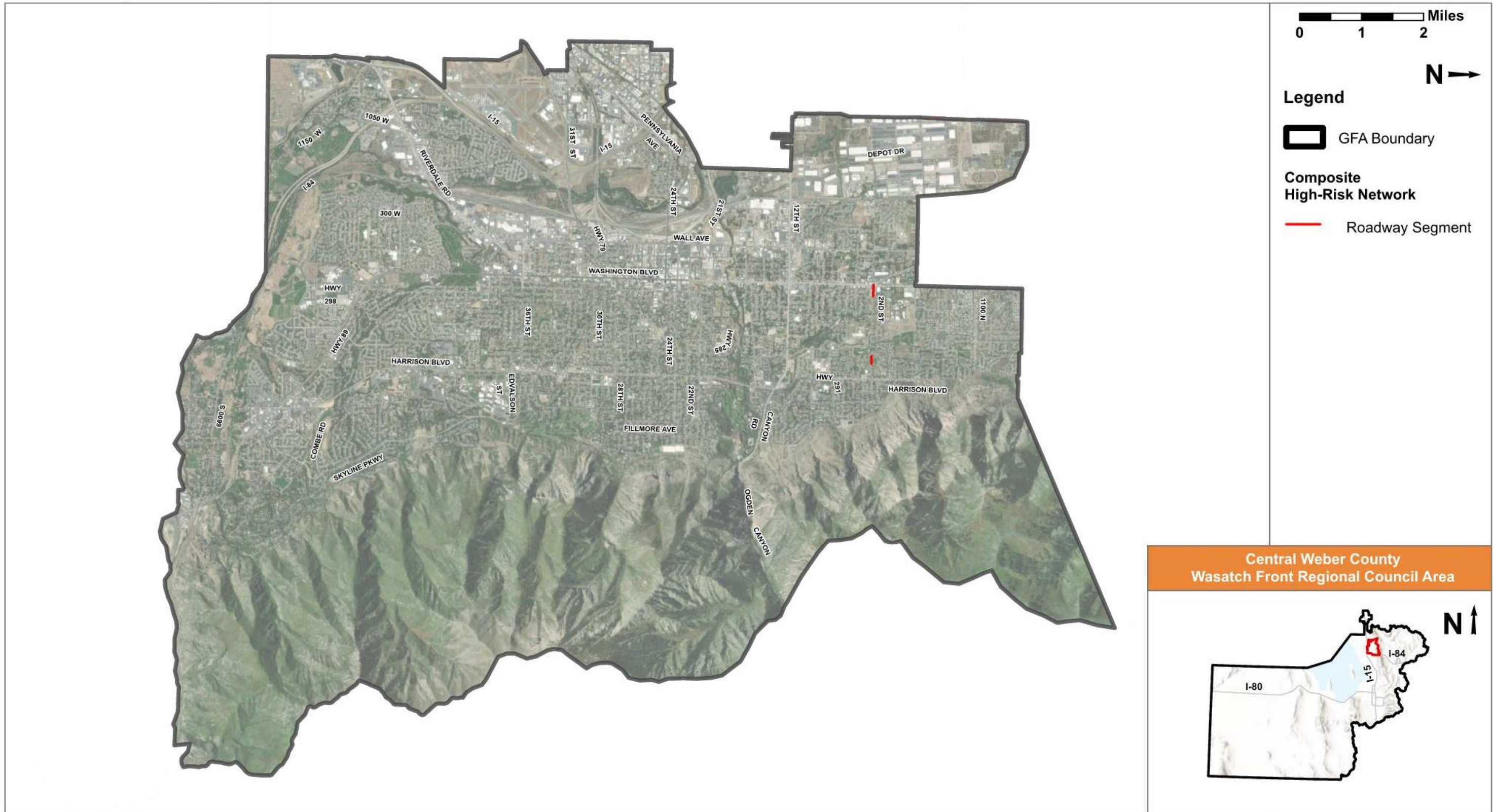


Figure 7.2 – Central Weber County High-Risk Roadway Network (Federal Aid Routes)



CENTRAL WEBER COUNTY CASE STUDY PROJECT INFORMATION SHEETS

Project Description/How is safety improved?

This project recommends site distance, advance warning and general striping improvements along Monroe Blvd at 27th St, 23rd St, 21st St and 16th St to address an overrepresentation of angle collisions at these intersections. Additionally, this project recommends the following spot improvements along the corridor:

- Driveway consolidation along Monroe Blvd at the intersection with 24th St
 - Intersection control evaluations at all key intersections identified for this corridor, to assess the potential for implementation of roundabouts
 - Unless a signal is identified for 16th St/Monroe Blvd under the intersection control evaluation, implement a HAWK signal at the north leg of this intersection.
 - Construction of left turn lanes on the east and west approaches to the Monroe Blvd/22nd St intersection and Flashing Yellow Arrow protected permitted left turns on the north and south approaches.
 - At the intersection of 12th St/Monroe Blvd, implementation of an Flashing Yellow Arrow protected permitted left turn phase on the NB left-turn and replacement of the
- This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.*

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Corridor Access Management



Dedicated Left and Right-Turn Lanes at Intersections



Pedestrian Hybrid Beacons



Roundabouts

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Corridor Access Management-Driveway Consolidation (Urban)	0.69 - 0.75	Fatal & Injury	2.00	DRIVEW	\$ 7,000	\$ 14,000
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	4.00	INT	\$ 19,000	\$ 76,000
Perform an Intersection Control Evaluation and Implement	NA	All Crashes	6.00	INT	\$ 225,000	\$ 1,350,000
Install Pedestrian Hybrid Beacons (PHB) or HAWK	0.453	Pedestrian	1.00	EACH	\$ 200,000	\$ 200,000
Change a permissive only to Flashing Yellow Arrow	0.5 - 0.6	Left-Turn	3.00	INT	\$ 8,000	\$ 24,000
Change a 5-section "Doghouse" to Flashing Yellow Arrow	0.75 - 0.93	Left-Turn	1.00	INT	\$ 8,000	\$ 8,000
Convert Existing Intersection to Modern Roundabout	0.18 - 0.59	All Crashes	6.00	INT	\$ 2,500,000	\$ 15,000,000
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$ 16,672,000
Mobilization: (% +/-)* 10%	\$ 75,000
Traffic Control: (% +/-) 5%	\$ 833,600
Items Not Estimated / Contingency: (% +/-) 30%	\$ 5,001,600
Estimated Construction Cost:	\$ 22,582,200

Local Match[†]: 20% \$ 5,736,000

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 2,709,864
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 3,387,330
Estimated Project Total:		\$ 28,680,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000
**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Information Sheet

GFA(s): Central Weber County, South Box Elder & North Weber County
Project Name: US 89 from SR 134 to I-84
Jurisdiction(s): Ogden, Harrisville, Pleasant View, Uintah, South Ogden
Emphasis Areas: Roadway Departures, Intersections, Impaired Driving
Equity Priority: High, Medium

Date Prepared: 3/7/2024
Prepared By: JSF
Checked By: EJS

Location Description

Roadway:	US 89	Key Intersection Locations:	Skyline Drive	5000 South	31st Street	20th Street
From:	SR 134		1475 East	4700 South	30th Street	12th Street
To:	I-84		Sunset Drive	40th Street	24th Street	North Street
Length:	13.84 miles		Adams Avenue	Riverdale Road	22nd Street	Independence Boulevard

Project Location Map

Map ID: 4.15.2.1



Segment Information and Safety Analysis Areas Summary

Roadway Characteristics	Value
Length (miles)	13.84
Average Daily Traffic (vehicles per day)	27,959
Functional Classification	Other Principal Arterial
Roadway Ownership	State
Urban/Rural Designation	Urban
Number of Key Intersections	25

Why Was This Location Identified?	
Composite Safety Score	✓
Historic Crashes	✓
Critical Crash Rate Differential	✓
Crash Profile Risk Score	✓
usRAP - Star Rating (Veh, Ped, Bike)	✓
Local Street Assessment	

Segment Crash History

Crash History (2018 - 2022)	# of crashes
Fatal Crashes (K)	8
Suspected Serious Injury Crashes (A)	25
Suspected Minor Injury Crashes (B)	86
Possible Injury Crashes (C)	108
No Injury/PDO Crashes (O)	454
Total Crashes	681
Total EPDO Crashes	13,047

What Crash Types are Over-Represented?		
Fatal	✓	Head On (HO)
Serious Injury	✓	Parked Vehicle (PV)
Pedestrian (Ped)	✓	Single Vehicle
Bicycle (Bike)		Rear to Rear (RR)
Motorcycle	✓	Rear to Side (RS)
Angle	✓	Sideswipe (SS)
Front to Rear (FR)	✓	Other/Unknown

Intersection Crash History

Intersections	Signal	K	A	B	C	O	Total	EPDO	What Crash Types are Over-Represented?								
									K/A	Ped/Bike	Angle	FR	HO	PV	RR/RS	SS	
Skyline Drive & US 89	✓	0	1	9	40	19	69	768				✓					✓
1475 East & US 89	✓	0	0	8	9	8	25	288				✓					
Sunset Drive & US 89	✓	0	0	2	16	8	26	234				✓					
Adams Avenue & US 89	✓	0	1	11	30	25	67	705					✓				
5000 South & US 89	✓	0	2	2	8	6	18	329	✓						✓		✓
4700 South & US 89	✓	0	0	1	12	8	21	167							✓		
40th Street & US 89	✓	1	1	21	51	62	136	2,091			✓						✓
Riverdale Road & US 89	✓	0	0	2	13	3	18	195				✓					✓
31st Street & US 89	✓	0	0	5	18	10	33	326		✓		✓					
30th Street & US 89	✓	1	3	13	26	34	77	1,789	✓	✓	✓						
24th Street & US 89	✓	0	0	18	33	24	75	800		✓				✓		✓	✓
22nd Street & US 89	✓	0	0	6	19	8	33	358				✓					✓
20th Street & US 89	✓	0	2	13	20	31	66	735		✓	✓		✓		✓		
12th Street & US 89	✓	0	1	25	61	36	123	1,380		✓		✓		✓	✓		
North Street & US 89	✓	0	3	7	14	14	38	610	✓						✓		
Independence Boulevard & US 89	✓	0	0	4	15	11	30	271				✓					✓

Project Description/How is safety improved?

This project improves safety through the systemic installation of raised medians along the entire length of the corridor. Other improvements include lane narrowing through Ogden to allow for the installation of a bicycle lane from 22nd St. to 2nd St. An evaluation should be performed to see if lane reduction along this segment is feasible to accommodate a buffered bicycle lane and other pedestrian improvements such as bulbouts or mid-block crossings. Re-timing for existing signals along the corridor to implement leading pedestrian intervals due to the high pedestrian and bicycle crash representation is also included.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Median Barriers



Corridor Access Management



Bicycle Lanes



Leading Pedestrian Interval

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Install Raised Medians on Roadways with Existing TWLTL	0.29	All Crashes	13.84	MILE	\$ 928,000	\$ 12,843,520
Traffic Calming - Lane Narrowing	0.68	All Crashes	2.23	MILE	\$ 39,000	\$ 86,970
Install Bicycle Lane	0.51 - 0.694	Bicycle	2.23	MILE	\$ 21,000	\$ 46,830
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	3.00	INT	\$ 19,000	\$ 57,000
Install Pedestrian Hybrid Beacons (PHB) or HAWK	0.453	Pedestrian	1.00	EACH	\$ 200,000	\$ 200,000
Include a Leading Pedestrian Interval (LPI)	0.87	Pedestrian	14.00	INT	\$ 3,000	\$ 42,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$ 13,276,320
Mobilization: (% +/-)*	10% \$ 75,000
Traffic Control: (% +/-)	5% \$ 663,816
Items Not Estimated / Contingency: (% +/-)	30% \$ 3,982,896
Estimated Construction Cost:	\$ 17,998,032

Local Match[†]: 20% \$ 4,571,600

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 2,159,764
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 2,699,705
Estimated Project Total:		\$ 22,858,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Evaluate if traffic volumes warrant lane reductions from 22nd St to 2nd St instead of lane narrowing
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Wall Avenue (SR 204) from Harrisville Road (US 89) to Riverdale Road (SR 26)

Project Information Sheet

GFA(s): Central Weber County
 Project Name: Wall Avenue (SR 204) from Harrisville Road (US 89) to Riverdale Road (SR 26)
 Jurisdiction(s): Ogden
 Emphasis Areas: Intersections, Roadway Departures, Impaired Driving
 Equity Priority: High, Medium

Date Prepared: 3/7/2024
 Prepared By: JSF
 Checked By: EJS

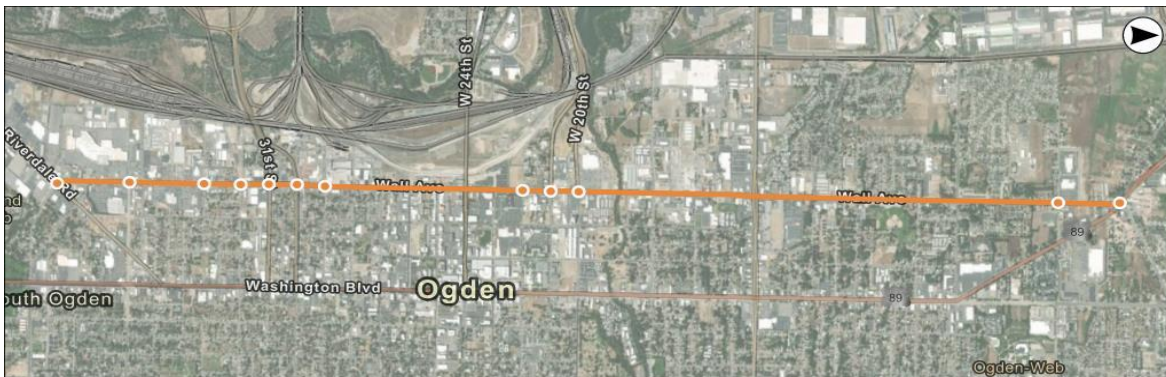
Location Description

Roadway: Wall Avenue (SR 204)
 From: Harrisville Road (US 89)
 To: Riverdale Road (SR 26)
 Length: 5.44 miles

Key Intersection Locations:
 Harrisville Road (US 89) 33rd Street SR 79 21st Street
 Riverdale Road 32nd Street 29th Street 20th Street
 36th Street 31st Street 22nd Street North Street

Project Location Map

Map ID: 4.15.3



Segment Information and Safety Analysis Areas Summary

Roadway Characteristics	Value
Length (miles)	5.44
Average Daily Traffic (vehicles per day)	27,037
Functional Classification	Other Principal Arterial
Roadway Ownership	State
Urban/Rural Designation	Urban
Number of Key Intersections	12

Why Was This Location Identified?	
Composite Safety Score	✓
Historic Crashes	✓
Critical Crash Rate Differential	✓
Crash Profile Risk Score	✓
usRAP - Star Rating (Veh, Ped, Bike)	✓
Local Street Assessment	

Segment Crash History

Crash History (2018 - 2022)	# of crashes
Fatal Crashes (K)	0
Suspected Serious Injury Crashes (A)	17
Suspected Minor Injury Crashes (B)	44
Possible Injury Crashes (C)	47
No Injury/PDO Crashes (O)	184
Total Crashes	292
Total EPDO Crashes	3,291

What Crash Types are Over-Represented?			
Fatal		Head On (HO)	✓
Serious Injury	✓	Parked Vehicle (PV)	✓
Pedestrian (Ped)	✓	Single Vehicle	✓
Bicycle (Bike)	✓	Rear to Rear (RR)	
Motorcycle	✓	Rear to Side (RS)	
Angle	✓	Sideswipe (SS)	✓
Front to Rear (FR)	✓	Other/Unknown	

Intersection Crash History

Intersections	Signal	K	A	B	C	O	Total	EPDO	What Crash Types are Over-Represented?								
									K/A	Ped/Bike	Angle	FR	HO	PV	RR/RS	SS	
Harrisville Road (US 89) & Wall Avenue	✓	0	1	10	49	35	95	908			✓						
Riverdale Road & Wall Avenue	✓	0	1	10	15	40	66	527							✓	✓	
36th Street & Wall Avenue	✓	0	0	6	21	28	55	400			✓		✓				
33rd Street & Wall Avenue	✓	0	2	6	10	4	22	439	✓	✓		✓		✓		✓	
32nd Street & Wall Avenue		0	0	6	15	8	29	312				✓					
31st Street & Wall Avenue	✓	0	2	11	29	29	71	791		✓				✓	✓		
SR 79 & Wall Avenue	✓	0	0	13	24	22	59	584									✓
29th Street & Wall Avenue	✓	0	0	5	10	7	22	232					✓				
22nd Street & Wall Avenue		0	1	4	7	9	21	271	✓	✓		✓					✓
21st Street & Wall Avenue	✓	0	0	8	26	18	52	492				✓	✓			✓	
20th Street & Wall Avenue	✓	0	4	15	42	43	104	1,229	✓		✓						
North Street & Wall Avenue	✓	0	0	0	13	10	23	158			✓	✓					

Wall Avenue (SR 204) from Harrisville Road (US 89) to Riverdale Road (SR 26)

Project Description/How is safety improved?

This project includes median installation, evaluating locations for 3/4 access intersections or traffic signals at current stop-controlled location, lane narrowing, shoulder widening, and installation of a bicycle lane. Lane narrowing is intended to calm traffic and to provide width for the bicycle lane. This project converts existing 5-section "doghouse" type signal heads to flashing yellow arrow type signal heads at the following intersections with Wall Avenue: 29th, 31st, and 36th Streets. Permissive only left-turns at signalized intersections should also be converted to flashing yellow arrow type signal heads at the following intersections with Wall Avenue (this may require adding signal heads to the intersection): 25th, 23rd, 20th, 17th, 700 South, and North Street.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Bicycle Lanes



Corridor Access Management



Reduced Left-Turn Conflict Intersections



Walkways

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Install Raised Medians on Roadways with Existing TWLTL	0.29	All Crashes	5.23	MILE	\$ 928,000	\$ 4,854,987
Traffic Calming - Lane Narrowing	0.68	All Crashes	5.23	MILE	\$ 39,000	\$ 204,035
Install Bicycle Lane	0.51 - 0.694	Bicycle	5.23	MILE	\$ 21,000	\$ 109,865
Install Sidewalk or Walkways	NA	Pedestrian	1.22	MILE	\$ 634,000	\$ 773,480
Shoulder Widening on Rural Roads	0.771	All Crashes	0.83	MILE	\$ 32,000	\$ 26,560
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Change a 5-section "Doghouse" to Flashing Yellow Arrow	0.75 - 0.93	Left-Turn	3.00	INT	\$ 8,000	\$ 24,000
Adequate Number/Visibility of Signal Heads	0.85	All Crashes	7.00	INT	\$ 24,000	\$ 168,000
Change a permissive only to Flashing Yellow Arrow	0.5 - 0.6	Left-Turn	6.00	INT	\$ 8,000	\$ 48,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$ 6,208,927
Mobilization: (% +/-)* 10%	\$ 75,000
Traffic Control: (% +/-) 5%	\$ 310,446
Items Not Estimated / Contingency: (% +/-) 30%	\$ 1,862,678
Estimated Construction Cost:	\$ 8,457,051

Local Match[†]: 20% \$ 2,148,200

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 1,014,846
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 1,268,558
Estimated Project Total:		\$ 10,741,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Evaluate signalization at warranted intersections
- Additional Improvements #3: Evaluate feasibility of 3/4 access intersection at unsignalized location with median installation
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project improves safety and active transportation mobility on the Harrison Boulevard corridor. Safety improvements include bicycle lanes and raised medians in the existing two-way left-turn lane. Other improvements at intersections include changing permissive only left-turn phasing or doghouse signal heads to flashing yellow arrows (24th Street, 26th Street, 30th Street, 4400 South, 5700 South, 22nd Street, 28th Street, and 4800 South) and making improvements to unsignalized intersections (21st Street, 27th Street).

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Bicycle Lanes



Corridor Access Management



Stop-Controlled Intersection Systemic Countermeasures

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Install Bicycle Lane	0.51 - 0.694	Bicycle	6.03	MILE	\$ 21,000	\$ 126,630
Install Raised Medians on Roadways with Existing TWLTL	0.29	All Crashes	4.87	MILE	\$ 928,000	\$ 4,519,360
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Adequate Number/Visibility of Signal Heads	0.85	All Crashes	7.00	INT	\$ 24,000	\$ 168,000
Change a 5-section "Doghouse" to Flashing Yellow Arrow	0.75 - 0.93	Left-Turn	1.00	INT	\$ 8,000	\$ 8,000
Change a permissive only to Flashing Yellow Arrow	0.5 - 0.6	Left-Turn	7.00	INT	\$ 8,000	\$ 56,000
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	2.00	INT	\$ 19,000	\$ 38,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$	4,915,990
Mobilization: (% +/-)*	10%	\$ 75,000
Traffic Control: (% +/-)	5%	\$ 245,800
Items Not Estimated / Contingency: (% +/-)	30%	\$ 1,474,797
Estimated Construction Cost:	\$	6,711,587

Local Match[†]: 20% \$ 1,704,800

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 805,390
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 1,006,738
Estimated Project Total:		\$ 8,524,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Evaluate signalization at warranted intersections
- Additional Improvements #3: Evaluate signalization at warranted intersections
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project applies countermeasures targeted at improving safety on a typical rural two lane roadway. The systemic countermeasures include shoulder widening, edge line rumble strips, driver feedback and upgraded signage on curves, and edge line pavement markings.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Enhanced Delineation for Horizontal Curves



Longitudinal Rumble Strips and Stripes on Two-Lane Roads



SafetyEdge™



Wider Edge Lines

Opinion of Probable Construction Cost

Segment Improvements						
Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Install Driver Feedback Speed Limit Signs	NA	All Crashes	4.00	EACH	\$ 10,000	\$ 40,000
Provide 2-Ft Paved Shoulder on Rural 2-Lane Roadways	0.66 - 0.89	All Crashes	3.24	MILE	\$ 298,000	\$ 965,520
Install Safety Edge with Repaving Projects	0.79 - 0.892	All Crashes	3.24	MILE	\$ 121,000	\$ 392,040
Shoulder Widening on Rural Roads	0.771	All Crashes	3.24	MILE	\$ 32,000	\$ 103,680
Install Edge line Rumble Strips	0.49 - 0.87	Fatal & Injury	3.24	MILE	\$ 9,000	\$ 29,160
Install 6" Edge line (Both Sides of Road)	0.64 - 0.88	All Crashes	3.24	MILE	\$ 7,000	\$ 22,680
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements						
Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$	1,553,080
Mobilization: (% +/-)*	10%	\$ 75,000
Traffic Control: (% +/-)	5%	\$ 77,654
Items Not Estimated / Contingency: (% +/-)	30%	\$ 465,924
Estimated Construction Cost:	\$	2,171,658

Local Match[†]: 20% \$ 551,800

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 260,599
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 325,749
Estimated Project Total:		\$ 2,759,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the Countermeasure Toolbox for a complete list of safety countermeasures.

- Additional Improvements #1: Improve Roadside Design on Curves
- Additional Improvements #2: Re-Evaluate Speed Based on Roadway Context, Built Environment, and Existing Road Users
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project is focused on improving safety and active transportation mobility on the Harrison Boulevard corridor. Safety and mobility improvements include installing bicycle lanes and raised medians in the roadway in the existing two-way left-turn lane. Other improvements at intersections are listed including changing permissive only left-turn phasing or doghouse signal heads to flashing yellow arrows (24th Street, 26th Street, 30th Street, 4400 South, 5700 South, 22nd Street, 28th Street, and 4800 South) and making improvements to unsignalized intersections (21st Street, 27th Street).

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Bicycle Lanes



Corridor Access Management



Stop-Controlled Intersection Systemic Countermeasures

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Install Bicycle Lane	0.51 - 0.694	Bicycle	6.03	MILE	\$ 21,000	\$ 126,630
Install Raised Medians on Roadways with Existing TWLTL	0.29	All Crashes	4.87	MILE	\$ 928,000	\$ 4,519,360
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Adequate Number/Visibility of Signal Heads	0.85	All Crashes	7.00	INT	\$ 24,000	\$ 168,000
Change a 5-section "Doghouse" to Flashing Yellow Arrow	0.75 - 0.93	Left-Turn	1.00	INT	\$ 8,000	\$ 8,000
Change a permissive only to Flashing Yellow Arrow	0.5 - 0.6	Left-Turn	7.00	INT	\$ 8,000	\$ 56,000
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	2.00	INT	\$ 19,000	\$ 38,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$ 4,915,990
Mobilization: (% +/-)* 10%	\$ 75,000
Traffic Control: (% +/-) 5%	\$ 245,800
Items Not Estimated / Contingency: (% +/-) 30%	\$ 1,474,797
Estimated Construction Cost:	\$ 6,711,587

Local Match[†]: 20% \$ 1,704,800

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 805,390
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 1,006,738
Estimated Project Total:		\$ 8,524,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Evaluate signalization at warranted intersections
- Additional Improvements #3: Evaluate signalization at warranted intersections
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Information Sheet

GFA(s): Central Weber County, South Box Elder & North Weber County
Project Name: US 89 from SR 134 to I-84
Jurisdiction(s): South Ogden, Ogden, Harrisville, Pleasant View, Uintah
Emphasis Areas: Roadway Departures, Intersections, Impaired Driving
Equity Priority: High, Medium

Date Prepared: 3/7/2024
Prepared By: JSF
Checked By: EJS

Location Description

Roadway:	US 89	Key Intersection Locations:	Skyline Drive	5000 South	30th Street	12th Street
From:	SR 134		1475 East	4700 South	24th Street	North Street
To:	I-84		Sunset Drive	40th Street	22nd Street	Independence Boulevard
Length:	13.84 miles		Adams Avenue	31st Street	20th Street	2700 North

Project Location Map

Map ID: 4.17.2.1



Segment Information and Safety Analysis Areas Summary

Roadway Characteristics	Value
Length (miles)	13.84
Average Daily Traffic (vehicles per day)	27,959
Functional Classification	Other Principal Arterial
Roadway Ownership	State
Urban/Rural Designation	Urban
Number of Key Intersections	25

Why Was This Location Identified?	
Composite Safety Score	✓
Historic Crashes	✓
Critical Crash Rate Differential	✓
Crash Profile Risk Score	✓
usRAP - Star Rating (Veh, Ped, Bike)	✓
Local Street Assessment	

Segment Crash History

Crash History (2018 - 2022)	# of crashes
Fatal Crashes (K)	8
Suspected Serious Injury Crashes (A)	25
Suspected Minor Injury Crashes (B)	86
Possible Injury Crashes (C)	108
No Injury/PDO Crashes (O)	454
Total Crashes	681
Total EPDO Crashes	13,047

What Crash Types are Over-Represented?		
Fatal	✓	Head On (HO)
Serious Injury	✓	Parked Vehicle (PV)
Pedestrian (Ped)	✓	Single Vehicle
Bicycle (Bike)		Rear to Rear (RR)
Motorcycle	✓	Rear to Side (RS)
Angle	✓	Sideswipe (SS)
Front to Rear (FR)	✓	Other/Unknown

Intersection Crash History

Intersections	Signal	K	A	B	C	O	Total	EPDO	What Crash Types are Over-Represented?								
									K/A	Ped/Bike	Angle	FR	HO	PV	RR/RS	SS	
Skyline Drive & US 89	✓	0	1	9	40	19	69	768				✓					✓
1475 East & US 89	✓	0	0	8	9	8	25	288				✓					
Sunset Drive & US 89	✓	0	0	2	16	8	26	234				✓					
Adams Avenue & US 89	✓	0	1	11	30	25	67	705					✓				
5000 South & US 89	✓	0	2	2	8	6	18	329	✓						✓		✓
4700 South & US 89	✓	0	0	1	12	8	21	167							✓		
40th Street & US 89	✓	1	1	21	51	62	136	2,091			✓						✓
31st Street & US 89	✓	0	0	5	18	10	33	326		✓		✓					
30th Street & US 89	✓	1	3	13	26	34	77	1,789	✓	✓	✓						
24th Street & US 89	✓	0	0	18	33	24	75	800		✓			✓		✓	✓	✓
22nd Street & US 89	✓	0	0	6	19	8	33	358				✓				✓	
20th Street & US 89	✓	0	2	13	20	31	66	735		✓	✓		✓		✓		
12th Street & US 89	✓	0	1	25	61	36	123	1,380		✓		✓			✓		
North Street & US 89	✓	0	3	7	14	14	38	610	✓						✓		
Independence Boulevard & US 89	✓	0	0	4	15	11	30	271				✓				✓	
2700 North & US 89	✓	0	1	14	66	38	119	1,194				✓				✓	✓

Project Description/How is safety improved?

This project is focused on improving safety through the systemic installation of raised medians along the entire length of the corridor. Other improvements include lane narrowing through Ogden to allow for the installation of a bicycle lane from 22nd St. to 2nd St. An evaluation should be performed to see if lane reduction along this segment is possible to allow for a buffered bicycle lane and other pedestrian improvements like bulbouts or mid-block crossings. Re-timing for existing signals along the corridor to implement leading pedestrian intervals due to the high pedestrian and bicycle crash representation is also included.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Median Barriers



Corridor Access Management



Bicycle Lanes



Leading Pedestrian Interval

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Install Raised Medians on Roadways with Existing TWLTL	0.29	All Crashes	13.84	MILE	\$ 928,000	\$ 12,843,520
Traffic Calming - Lane Narrowing	0.68	All Crashes	2.23	MILE	\$ 39,000	\$ 86,970
Install Bicycle Lane	0.51 - 0.694	Bicycle	2.23	MILE	\$ 21,000	\$ 46,830
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	3.00	INT	\$ 19,000	\$ 57,000
Install Pedestrian Hybrid Beacons (PHB) or HAWK	0.453	Pedestrian	1.00	EACH	\$ 200,000	\$ 200,000
Include a Leading Pedestrian Interval (LPI)	0.87	Pedestrian	14.00	INT	\$ 3,000	\$ 42,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$ 13,276,320
Mobilization: (% +/-)*	10% \$ 75,000
Traffic Control: (% +/-)	5% \$ 663,816
Items Not Estimated / Contingency: (% +/-)	30% \$ 3,982,896
Estimated Construction Cost:	\$ 17,998,032

Local Match[†]: 20% \$ 4,571,600

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 2,159,764
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 2,699,705
Estimated Project Total:		\$ 22,858,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Evaluate if traffic volumes warrant lane reductions from 22nd St to 2nd St instead of lane narrowing
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project recommends corridor-level access management, including driveway consolidation where feasible. Additionally, speed feedback signs are proposed to assist with compliance with 30 mph speed limit, and striping of parking areas between Riverdale Rd and Washington Blvd to delineate and narrow the travelled way to calm traffic on the one-way segment of 40th Street. This addresses the over representation of angle crashes along this corridor. The following intersection improvements are recommended, consistent with addressing angle, rear-end and/or sideswipe crashes at each respective location:

- Driveway consolidation where feasible within 100 ft of each of the intersections of 40th St with Riverdale Rd, Washington Blvd, Adams Ave, and Harrison Blvd
- Implementation of protected left-turn phasing for the north and south approaches of 40th St/Washington Blvd and 40th St/Harrison Blvd intersections, in addition to dynamic advance warning signage for the north leg of 40th St/Harrison Blvd and the south leg of 40th St/Washington Blvd

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Corridor Access Management



Wider Edge Lines



Bicycle Lanes

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Traffic Calming - Wider Lane Lines	0.68	All Crashes	0.33	MILE	\$ 21,000	\$ 6,930
Corridor Access Management-Driveway Consolidation (Urban)	0.69 - 0.75	Fatal & Injury	6.00	DRIVEW	\$ 7,000	\$ 42,000
Traffic Calming - Lane Narrowing	0.68	All Crashes	1.70	MILE	\$ 39,000	\$ 66,300
Install Bicycle Lane	0.51 - 0.69	Bicycle	1.70	MILE	\$ 21,000	\$ 35,700
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Corridor Access Management-Driveway Consolidation (Urban)	0.69 - 0.75	Fatal & Injury	8.00	DRIVEW	\$ 7,000	\$ 56,000
Right-in-Right-out Access Treatment	0.55	All Crashes	2.00	DRIVEW	\$ 50,000	\$ 100,000
Change Permissive Left-Turn to Protected or Protected/Permissive	0.79 - 0.95	Left-Turn	4.00	INT	\$ 8,000	\$ 32,000
Change a permissive only to Flashing Yellow Arrow	0.5 - 0.6	Left-Turn	4.00	INT	\$ 8,000	\$ 32,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$	370,930
Mobilization: (% +/-)*	10%	\$ 37,100
Traffic Control: (% +/-)	5%	\$ 18,547
Items Not Estimated / Contingency: (% +/-)	30%	\$ 111,279
Estimated Construction Cost:	\$	537,856

Local Match[†]: 20% \$ 136,800

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 64,543
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 80,678
Estimated Project Total:		\$ 684,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: _____
- Additional Improvements #3: _____
- Additional Improvements #4: Conversion from one-way to two-way (Riverdale Rd to Hwy 89)?
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Information Sheet

GFA(s): Central Weber County, South Box Elder & North Weber County
Project Name: US 89 from SR 134 to I-84
Jurisdiction(s): Uintah, South Ogden, Ogden, Harrisville, Pleasant View
Emphasis Areas: Roadway Departures, Intersections, Impaired Driving
Equity Priority: High, Medium

Date Prepared: 3/7/2024
Prepared By: JSF
Checked By: EJS

Location Description

Roadway:	US 89	Key Intersection Locations:	Skyline Drive	5000 South	31st Street	20th Street
From:	SR 134		1475 East	4700 South	30th Street	12th Street
To:	I-84		Sunset Drive	40th Street	24th Street	North Street
Length:	13.84 miles		Adams Avenue	Riverdale Road	22nd Street	Independence Boulevard

Project Location Map

Map ID: 4.18.1.1



Segment Information and Safety Analysis Areas Summary

Roadway Characteristics	Value
Length (miles)	13.84
Average Daily Traffic (vehicles per day)	27,959
Functional Classification	Other Principal Arterial
Roadway Ownership	State
Urban/Rural Designation	Urban
Number of Key Intersections	25

Why Was This Location Identified?	
Composite Safety Score	✓
Historic Crashes	✓
Critical Crash Rate Differential	✓
Crash Profile Risk Score	✓
usRAP - Star Rating (Veh, Ped, Bike)	✓
Local Street Assessment	

Segment Crash History

Crash History (2018 - 2022)	# of crashes
Fatal Crashes (K)	8
Suspected Serious Injury Crashes (A)	25
Suspected Minor Injury Crashes (B)	86
Possible Injury Crashes (C)	108
No Injury/PDO Crashes (O)	454
Total Crashes	681
Total EPDO Crashes	13,047

What Crash Types are Over-Represented?		
Fatal	✓	Head On (HO)
Serious Injury	✓	Parked Vehicle (PV)
Pedestrian (Ped)	✓	Single Vehicle
Bicycle (Bike)		Rear to Rear (RR)
Motorcycle	✓	Rear to Side (RS)
Angle	✓	Sideswipe (SS)
Front to Rear (FR)	✓	Other/Unknown

Intersection Crash History

Intersections	Signal	K	A	B	C	O	Total	EPDO	What Crash Types are Over-Represented?								
									K/A	Ped/Bike	Angle	FR	HO	PV	RR/RS	SS	
Skyline Drive & US 89	✓	0	1	9	40	19	69	768				✓					✓
1475 East & US 89	✓	0	0	8	9	8	25	288				✓					
Sunset Drive & US 89	✓	0	0	2	16	8	26	234				✓					
Adams Avenue & US 89	✓	0	1	11	30	25	67	705					✓				
5000 South & US 89	✓	0	2	2	8	6	18	329	✓						✓		✓
4700 South & US 89	✓	0	0	1	12	8	21	167							✓		
40th Street & US 89	✓	1	1	21	51	62	136	2,091			✓						✓
Riverdale Road & US 89	✓	0	0	2	13	3	18	195				✓					✓
31st Street & US 89	✓	0	0	5	18	10	33	326		✓		✓					
30th Street & US 89	✓	1	3	13	26	34	77	1,789	✓	✓	✓						
24th Street & US 89	✓	0	0	18	33	24	75	800		✓				✓		✓	✓
22nd Street & US 89	✓	0	0	6	19	8	33	358				✓					✓
20th Street & US 89	✓	0	2	13	20	31	66	735		✓	✓		✓		✓		
12th Street & US 89	✓	0	1	25	61	36	123	1,380		✓		✓		✓			
North Street & US 89	✓	0	3	7	14	14	38	610	✓						✓		
Independence Boulevard & US 89	✓	0	0	4	15	11	30	271				✓					✓

Project Description/How is safety improved?

This project improves safety through the systemic installation of raised medians along the entire length of the corridor. Other improvements include lane narrowing through Ogden to allow for the installation of a bicycle lane from 22nd St. to 2nd St. An evaluation should be performed to see if lane reduction along this segment is possible to allow for a buffered bicycle lane and other pedestrian improvements like bulbouts or mid-block crossings. Re-timing for existing signals along the corridor to implement leading pedestrian intervals due to the high pedestrian and bicycle crash representation is also included.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Corridor Access Management



Bicycle Lanes



Leading Pedestrian Interval

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Install Raised Medians on Roadways with Existing TWLTL	0.29	All Crashes	13.84	MILE	\$ 928,000	\$ 12,843,520
Traffic Calming - Lane Narrowing	0.68	All Crashes	2.23	MILE	\$ 39,000	\$ 86,970
Install Bicycle Lane	0.51 - 0.694	Bicycle	2.23	MILE	\$ 21,000	\$ 46,830
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	3.00	INT	\$ 19,000	\$ 57,000
Install Pedestrian Hybrid Beacons (PHB) or HAWK	0.453	Pedestrian	1.00	EACH	\$ 200,000	\$ 200,000
Include a Leading Pedestrian Interval (LPI)	0.87	Pedestrian	14.00	INT	\$ 3,000	\$ 42,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$ 13,276,320
Mobilization: (% +/-)* 10%	\$ 75,000
Traffic Control: (% +/-) 5%	\$ 663,816
Items Not Estimated / Contingency: (% +/-) 30%	\$ 3,982,896
Estimated Construction Cost:	\$ 17,998,032

Local Match[†]: 20% \$ 4,571,600

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 2,159,764
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 2,699,705
Estimated Project Total:		\$ 22,858,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Evaluate if traffic volumes warrant lane reductions from 22nd St to 2nd St instead of lane narrowing
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project improves safety at intersections on 500 East. Improvements include changing existing doghouse style signal heads to flashing yellow arrow types (US 89), adding signal heads for left turns (5350 South). Also included are unsignalized intersection improvements at 5250 S. and 5700 S. and further evaluation for signalization. An intersection control evaluation study is recommended for the US 89 intersection due to the unique layout (two existing slip lanes and a local road intersection spaced close to the intersection). Systemic corridor improvements include median installation and lane narrowing for traffic calming, speed management, and wider shoulders for bicycling.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Stop-Controlled Intersection Systemic Countermeasures



Appropriate Speed Limits for All Road Users



Bicycle Lanes



Corridor Access Management

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Traffic Calming - Lane Narrowing	0.68	All Crashes	0.70	MILE	\$ 39,000	\$ 27,300
Install Raised Medians on Roadways with Existing TWLTL	0.29	All Crashes	0.70	MILE	\$ 928,000	\$ 649,600
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Adequate Number/Visibility of Signal Heads	0.85	All Crashes	1.00	INT	\$ 24,000	\$ 24,000
Perform an Intersection Control Evaluation and Implement	NA	All Crashes	1.00	INT	\$ 225,000	\$ 225,000
Change a 5-section "Doghouse" to Flashing Yellow Arrow	0.75 - 0.93	Left-Turn	1.00	INT	\$ 8,000	\$ 8,000
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	2.00	INT	\$ 19,000	\$ 38,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:		\$ 971,900
Mobilization: (% +/-)*	10%	\$ 75,000
Traffic Control: (% +/-)	5%	\$ 48,595
Items Not Estimated / Contingency: (% +/-)	30%	\$ 291,570
Estimated Construction Cost:		\$ 1,387,065

Local Match[†]: 20% \$ 352,400

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 166,448
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 208,060
Estimated Project Total:		\$ 1,762,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Evaluate signalization at warranted intersections _____
- Additional Improvements #2: _____
- Additional Improvements #3: Add striped bicycle marking to the shoulder _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

Disclaimer: The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

Project Description/How is safety improved?

This project recommends traffic calming improvements to reduce speeds and improve the safety of the parked way, consistent with the over-represented crash types in the area. These countermeasures would encourage slower speed on the roadways, in addition to providing additional visibility and protection for pedestrians:

- Narrowing travel lanes on Laker Way between S 100 E and 350 E and 5000 S between 150 E and 350 E, by providing clearer striping of the residential parking areas on the north side of Laker Way and on both sides of 5000 S.
- Bulbouts at key intersections and pedestrian crossings along Laker Way, including at S 100 E, S 200 E, S 350 E and the pedestrian crossing just east of S 200 E.
- Bulbouts at key intersections and pedestrian crossings along 5000 S, including at S 150 E and S 350 E.
- Installation of a raised crosswalk on Laker Way at the crossing just east of S 200 E.

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Crosswalk Visibility Enhancements

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Traffic Calming - Lane Narrowing	0.68	All Crashes	0.52	MILE	\$ 39,000	\$ 20,280
Traffic Calming - Bulbouts	0.68	All Crashes	12.00	EACH	\$ 36,000	\$ 432,000
Install Raised Crosswalk	NA	Pedestrian	1.00	EACH	\$ 71,000	\$ 71,000
Install Driver Feedback Speed Limit Signs	NA	All Crashes	6.00	EACH	\$ 10,000	\$ 60,000
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -
						\$ -

Improvements Subtotal:	\$	583,280
Mobilization: (% +/-)*	10%	\$ 58,330
Traffic Control: (% +/-)	5%	\$ 29,164
Items Not Estimated / Contingency: (% +/-)	30%	\$ 174,984
Estimated Construction Cost:	\$	845,758

Local Match[†]: 20% \$ 215,000

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design	12%	\$ 101,491
Utilities**		\$ -
ROW**		\$ -
Construction Engineering/Management	15%	\$ 126,864
Estimated Project Total:		\$ 1,075,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Safe Routes to School
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

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Project Description/How is safety improved?

This project recommends traffic calming improvements to reduce speeds and improve the safety of the parked way, consistent with the over-represented crash types in the area. These improvements would encourage lower travel speeds and improve delineation of parking areas, in addition to improving pedestrian visibility and safety near the school:

-Narrowing of travel lanes along the 4400/4300 S corridor between US 89 and Ridgeline Dr, by providing clearer striping of the residential parking areas on both sides of the 4400 S corridor.

-Speed feedback signs along 4400 S along the segment between S 300 W and S 300 E.

-Bulbouts on to support pedestrian crossings at the following intersections with 4400 S: 250 W, 125 W, and 175 E to calm speeds near the Elementary School.

-Raised crossings and crossing visibility enhancements on 4400 S at 250 W, 125 W and 175 E; although these improvements are related to pedestrian safety, they

This project description represents potential safety improvement strategies that could be implemented at this location, as well as other locations with similar conditions. Additional improvement strategies could be considered subject to engineering analysis.

Proposed Proven Safety Countermeasures



Appropriate Speed Limits for All Road Users



Crosswalk Visibility Enhancements



Corridor Access Management

Opinion of Probable Construction Cost

Segment Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Traffic Calming - Lane Narrowing	0.68	All Crashes	0.89	MILE	\$ 39,000	\$ 34,710
Traffic Calming - Bulbouts	0.68	All Crashes	6.00	EACH	\$ 36,000	\$ 216,000
Install Driver Feedback Speed Limit Signs	NA	All Crashes	2.00	EACH	\$ 10,000	\$ 20,000
Install Raised Crosswalk	NA	Pedestrian	3.00	EACH	\$ 71,000	\$ 213,000
					\$	-
					\$	-
					\$	-
					\$	-
					\$	-
					\$	-
					\$	-

Intersection Improvements

Item Description	CMF	Applicable Crashes	Quantity	Unit	Unit Price	Item Cost
Corridor Access Management-Driveway Consolidation (Urban)	0.69 - 0.75	Fatal & Injury	3.00	DRIVEW	\$ 7,000	\$ 21,000
Systemic Low-Cost Countermeasures at Stop-Control Intersection	0.73 - 0.9	All Crashes	1.00	INT	\$ 19,000	\$ 19,000
					\$	-
					\$	-
					\$	-
					\$	-
					\$	-
					\$	-
					\$	-
					\$	-

Improvements Subtotal: \$ 523,710

Mobilization: (% +/-)* 10% \$ 52,380

Traffic Control: (% +/-) 5% \$ 26,186

Items Not Estimated / Contingency: (% +/-) 30% \$ 157,113

Estimated Construction Cost: \$ 759,389

Local Match[†]: 20% \$ 193,000

[†] Toward SS4A Implementation Grants

Preconstruction Engineering/Design 12% \$ 91,127

Utilities** \$ -

ROW** \$ -

Construction Engineering/Management 15% \$ 113,908

Estimated Project Total: \$ 965,000

*Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000

**To be evaluated during feasibility study/design

Additional Potential Improvements

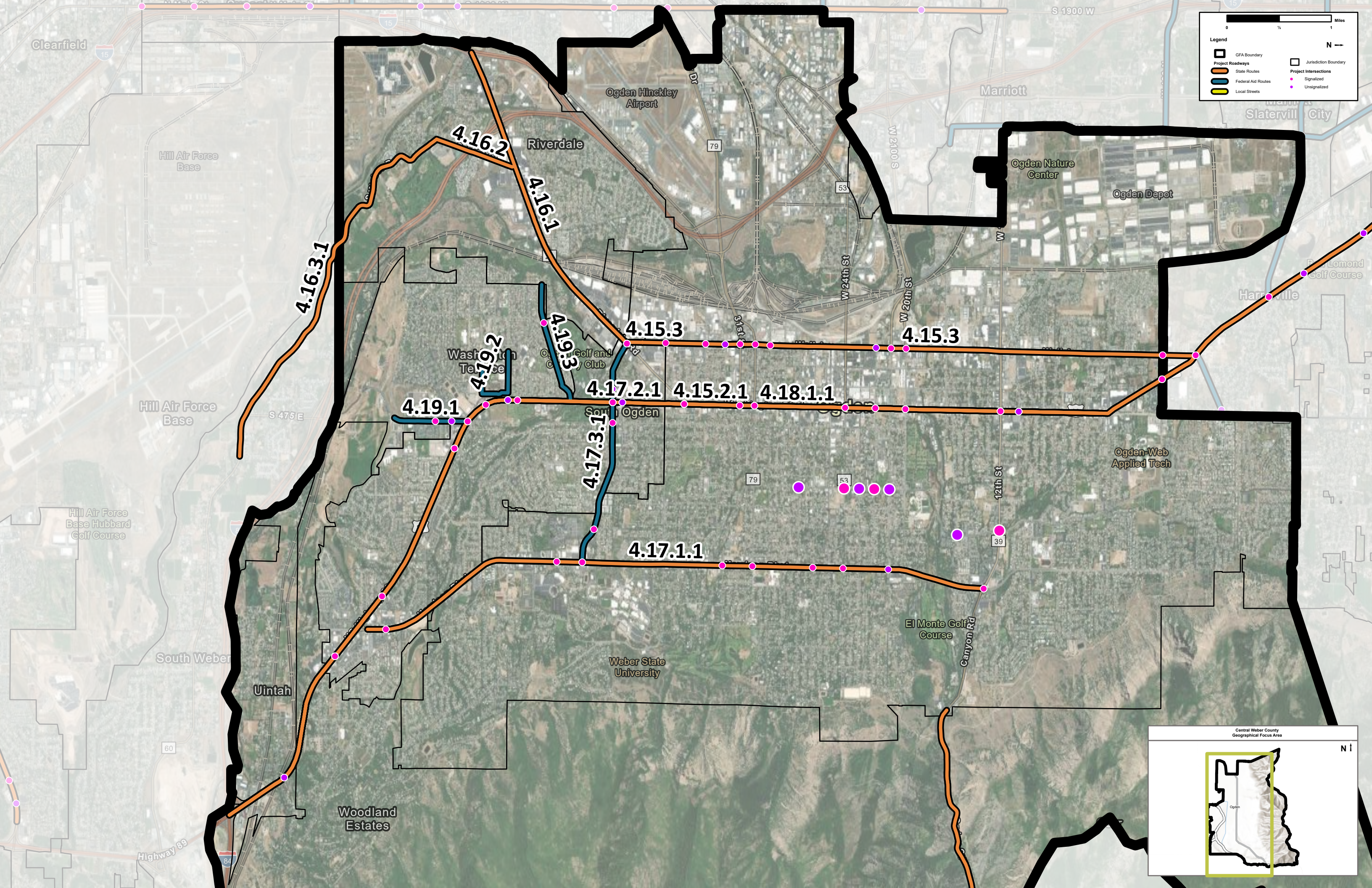
Additional safety improvements could be considered that were not included due to availability of data, need for site-specific information, and/or agency/jurisdiction input. Potential additional countermeasures are listed below. Refer to the **Countermeasure Toolbox** for a complete list of safety countermeasures.

- Additional Improvements #1: Set Appropriate Speed Limits for All Road Users
- Additional Improvements #2: Safe Routes to School
- Additional Improvements #3: _____
- Additional Improvements #4: _____
- Additional Improvements #5: _____

Disclaimer:

The cost estimates provided in this document are for comparison purposes only. Actual project costs will vary. The recommended safety improvement strategies were based on available data and reasonable engineering judgment and a more detailed assessment may suggest additional safety strategies that could be considered.

CENTRAL WEBER COUNTY CASE STUDY PROJECT LOCATION MAP



Legend

- GFA Boundary
- Project Roadways
- State Routes
- Federal Aid Routes
- Local Streets
- Jurisdiction Boundary
- Project Intersections
- Signalized
- Unsignalized

0 1/2 1 Miles

N

Central Weber County
Geographical Focus Area

N

CENTRAL WEBER COUNTY EQUITY INDEX MAP

Equity Need Areas

- High
- Medium
- Low

