

FINAL SEPTEMBER 2016

2nd Street and Arlington Avenue Safety Management Plan

Prepared for



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2nd Street and Arlington Avenue Safety Management Plan

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ES.0 Executive Summary

ES.1 Study and Corridor Introduction

The Nevada Department of Transportation (NDOT) has undertaken a series of Safety Management Plans (SMPs) throughout the State of Nevada. SMPs are a transportation analysis effort that incorporates corridor study, crash analysis, access management, public and stakeholder input, roadway engineering and application of the Highway Safety Manual (HSM) methods to improve transportation safety for all users. The SMP process is consistent with the Nevada Strategic Highway Safety Plan's goals of reducing crashes.

HSM methodologies and tools are applied at identified locations to define safety issues, consider mitigations and select the best alternatives. These predictive methods allow engineers to calculate the predicted safety effects of different design applications and alternatives.

NDOT, in cooperation with The City of Reno (City) and the Regional Transportation Commission of Washoe County (RTC), has selected portions of 2nd Street, Kuenzli Street and Arlington Avenue for analysis under this SMP. The exact limits of analysis are:

- ❖ 2nd Street from Keystone Avenue to Galletti Way
- ❖ Kuenzli Street from 2nd Street to Kirman Avenue
- ❖ Arlington Avenue from Court Street to W 6th Street.

The entire 4-miles of the study area lies within the City of Reno, Nevada with the exception of Galletti Way which lies within the City of Sparks, Nevada. See **Figure ES-1** for the study limits.

Figure ES-1: SMP Study Limits



These corridors were selected due to their potential for meaningful reconfiguration and resulting safety benefits as well as the important community centers that these corridors serve.

The 2nd Street, Arlington Avenue and Kuenzli Street corridors serve three different and somewhat distinct segments within the limits of the overall study area. These can be described as follows:

- ❖ **Downtown Reno Core** – This 1-mile segment extends from Keystone Avenue to Kuenzli Street and serves Reno's Downtown commercial and gaming district and the transitional neighborhood west of Arlington Avenue.
- ❖ **Couplet System** – The 1-mile segment from Kuenzli Street to Kietzke Lane is dominated by the couplet system of eastbound 2nd Street and westbound Kuenzli Street.
- ❖ **I-580 Area** – From Kietzke Lane to Galletti Way, 2nd Street becomes more active due to the I-580 interchange.

ES.2 Crash Data Analysis

An important consideration in determining appropriate safety alternatives is identifying locations and segments with a history of

crashes. This information can help focus the analysis to hot spot locations with the greatest potential for crash reduction. To that end, the study team obtained five year crash history for the period of July 2009 to July 2014. A “heat map” was developed to illustrate crash activity for the five year period as shown in **Figures ES-2** and **ES-3**.

Figure ES-2: 5-Year Crashes, Keystone Ave. to Kirman Ave.

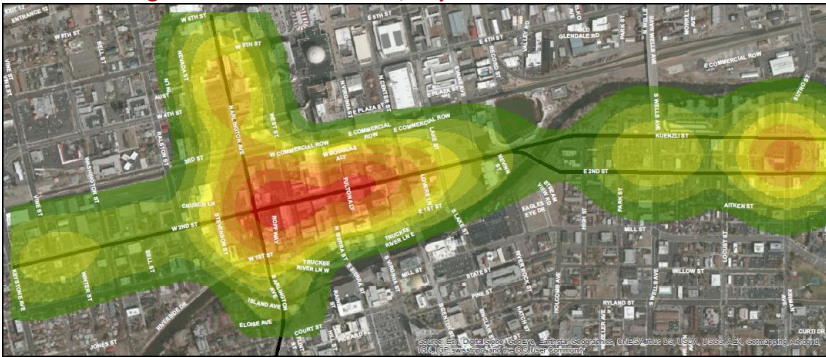
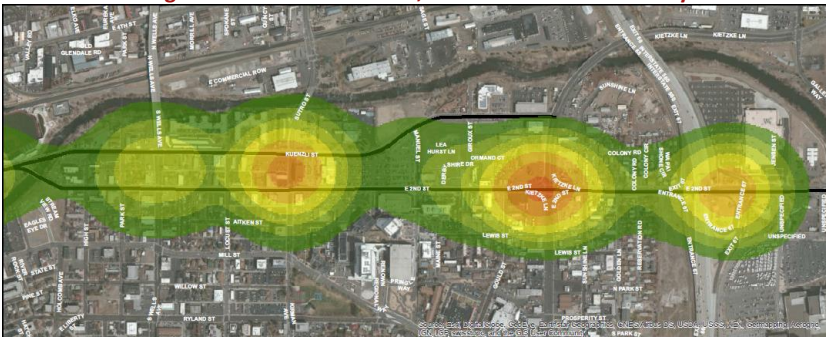


Figure ES-3: 5-Year Crashes, Wells Ave. to Galletti Way



The five year crash data was categorized to differentiate between mode (vehicle, bike, pedestrian and motorcycle) and severity (property damage only, injury and fatality). Each crash location, type and severity was then displayed graphically on plan sheets (**Appendix**

A). Also included on the plan sheets is a crash summary by intersection. Key crash locations can be summarized as follows:

- ❖ 2nd St./Arlington Ave. – 21 crashes including two motorcycle injury crashes, a bicycle injury crash and one pedestrian fatality.
- ❖ 2nd St./Sierra St. – 17 crashes including one pedestrian injury.
- ❖ 2nd St./Virginia St. – 19 crashes including one motorcycle injury crash.
- ❖ 2nd St./Center St. – 13 crashes including one pedestrian and bicycle injury.
- ❖ 2nd St./Kirman Ave. – 17 crashes including one pedestrian injury.
- ❖ 2nd St./Kietzke Ln. – 24 crashes including one bicycle injury.
- ❖ 2nd St./Northbound I-580 – 18 crashes including one injury crash for each pedestrian, bicycle and motorcycle mode.
- ❖ Kuenzli St./Kirman Ave. – 17 crashes including one pedestrian injury.
- ❖ Arlington Ave./West 1st St. – 10 crashes including two pedestrian injuries, two motorcycle injuries and one pedestrian crash.

These locations were of particular focus during the development of proposed safety improvements and mitigations.

ES.3 Existing Traffic Analysis

Vehicle, pedestrian, bicycle and motorcycle traffic counts were collected at 25 intersections. Vehicular intersection Level of Service (LOS) and corridor multi-modal LOS analyses were performed at each study intersection and study roadway segment, respectively.

The purpose of the traffic analysis is to identify locations that do not currently meet operating standards. Traffic operational issues could encourage crash activity. Furthermore, current traffic performance informs alternative development as proposed alternatives cannot degrade roadway operations below standards. **Table ES-1** presents existing study intersection traffic operations under existing intersection traffic volumes.

As shown, the two-way stop-controlled Gould Street/2nd Street intersection is currently operating at PM peak hour LOS “E” conditions and the two-way stop-controlled Sunshine Lane/2nd Street intersection is currently operating at MD/PM peak hour LOS “E/F” conditions (below the RTC LOS “D” standard). This is due to the influence of queues from the Kietzke Lane intersection backing up and blocking movements from these two nearby intersections.

All of the remaining study intersections are currently operating at acceptable LOS “D” or better conditions during the MD and PM peak hours under existing conditions, suggesting intersection operations are not a critical concern for the study area.

Multi-modal LOS analysis was performed using HCM-2010 and National Cooperative Highway Research Program (NCHRP) Project 3-70 methodologies to yield planning-level multi-modal corridor LOS outputs for auto, pedestrian, bike and transit modes.

In general, transit mode typically presents the most frequent occurrence of LOS “E” and “F” on most study corridors. This is due to low transit frequency (buses/hour) at transit stops along study segments and a relatively low number of routes being served by each stop. The transit LOS is not an indicator of underserved demand and the low frequency and routes likely reflect existing transit demand.

Table ES-1: Existing Intersection Traffic Operations

	Intersection	Control Type ¹	MD Peak Hour		PM Peak Hour	
			Delay (S/V)	LOS	Delay (S/V)	LOS
1	Vine St / 2 nd St	TWSC	11.7	B	13.3	B
2	Washington St / 2 nd St	TWSC	12.5	B	14.7	B
3	Ralston St / 2 nd St	Signal	12.8	B	12.9	B
4	Sierra St / 2 nd St	Signal	12.2	B	12.4	B
5	Virginia St / 2 nd St	Signal	14.7	B	15.2	B
6	Center St / 2 nd St	Signal	10.8	B	11.6	B
7	Lake St / 2 nd St	Signal	8.4	A	9.6	A
8	Wells Ave / 2 nd St	Signal	14.7	B	13.4	B
9	Wells Ave / Kuenzli St	Signal	9.0	A	8.5	A
10	Kirman Ave / 2 nd St	Signal	15.4	B	15.3	B
11	Kirman Ave / Kuenzli St	Signal	14.7	B	13.4	B
12	Gould St / 2 nd St	TWSC	23.8	C	38.1	E
13	Kietzke Ln / 2 nd St	Signal	23.7	C	33.9	C
14	Sunshine Ln / 2 nd St	TWSC	45.8	E	71.1	F
15	I-580 SB Ramps / 2 nd St	Signal	8.1	A	6.6	A
16	I-580 NB Ramps / 2 nd St	Signal	15.1	B	16.9	B
17	GSR Entrance / 2 nd St	Signal	20.1	C	6.2	A
18	2 nd St / Galletti Way	Signal	17.8	B	17.6	B
19	Arlington Ave / 6 th St	AWSC	11.2	B	10.3	B
20	Arlington Ave / 5 th St	Signal	12.3	B	13.8	B
21	Arlington Ave / 4 th St	Signal	21.0	C	20.2	C
22	Arlington Ave / 3 rd St	TWSC	14.4	B	19.0	C
23	Arlington Ave / 2 nd St	Signal	8.3	A	8.1	A
24	Arlington Ave / 1 st St	Signal	12.4	B	11.9	B
25	Arlington Ave / Island Ave	TWSC	14.9	B	20.4	C

Notes:

1. For TWSC (Two-Way-Stop-Control) intersections, worst-case movement delay (in seconds/vehicle) are indicated. “Average” control delays (in seconds/vehicle) are indicated for AWSC (All-Way-Stop-Control) and Signal-Control intersections.

Overall, auto, pedestrian, and bike modes perform at LOS “D” or better.

ES.4 Relevant Plans and Studies

Over the past several years, different agencies have either identified the 2nd Street, Kuenzli Street, and Arlington Avenue corridors in previous planning efforts, have identified specific overarching regional goals that would pertain to those corridors or have projects in place to address previously identified issues within those corridors. Many of the recommendations are identified by multiple plans, which demonstrates the consistency among the regional goals of both the City of Reno, RTC and NDOT for modernizing the regional road network for accommodation of multi-modal uses. The plans and studies reviewed and summarized include the following:

- ❖ NDOT Road Safety Assessment (RSA) Report
- ❖ Kietzke Lane Safety Management Plan
- ❖ Glendale Improvement Project
- ❖ Keystone Avenue Corridor Study
- ❖ Reno Sparks Bicycle and Pedestrian Masterplan
- ❖ City of Reno Masterplan
- ❖ Oddie Boulevard/Wells Avenue Corridor Study
- ❖ RTC Regional Transportation Plan 2035

The most common themes across the multiple plans include reducing travel lanes when existing capacities are not warranted, adding new bicycle and pedestrian facilities, improving corridors to be more ADA compliant and traffic operations improvements. The SMP will build upon the efforts and recommendations that have already been established through these previous planning efforts in order to create a clear direction for improving the 2nd Street, Kuenzli Street, and Arlington Avenue Corridors.

ES.5 Demographics, Land Use and Economic Development

Several data sources were analyzed to determine both demographics and land uses in the study area. These include the 2009-2013 U.S. Census American Community Survey (ACS) for population demographics, the U.S. Census Longitudinal Employment-Household Dynamics (LEHD) for work-based datasets, population and employment data from Washoe RTC and forecasts prepared for the Economic Development Authority of Western Nevada (EDAWN). City of Reno databases and discussions with staff were used to identify planned projects in the area. The study area is defined as a one-half mile buffer around the corridors. Details regarding the demographics, land use and economic development analysis can be found in the Economic Development Opportunities Technical Memorandum in **Appendix E**.

The information in this section helps to define the characteristics of the study area which may influence existing travel patterns as well as inform the development of alternatives. Furthermore, by analyzing the area’s development potential, assumptions can be made as to how travel patterns and demand may change over time, further informing alternatives. In general, the following trends were identified:

- ❖ Compared to residents of the City of Reno and Washoe County overall, corridor residents are more likely to be male, low income, living alone, age 55-75 or 18-25, divorced and renters.
- ❖ The half-mile corridor study area clearly includes a population disadvantaged due to low incomes. These low income residents appear to be spread throughout the corridor subareas. Taken as

a whole, the corridor is no more or less ethnically diverse than the City or County overall.

- ❖ More than 95% of corridor jobs are filled by people commuting into the study area. Of the 6,500 employed area residents, 22% stay inside the study area to work, while the remaining 78% commute outside the corridor.
- ❖ Traffic in the corridor, whether vehicular or pedestrian, is largely generated by the residents and employees who live and work in the corridor. Significant additional traffic, however, also comes from visitors not otherwise accounted for by job and population estimates.
- ❖ The 2nd Street and Arlington Avenue Corridors have a mix of uses ranging from the Downtown Reno Casino Core, a variety of commercial uses, the Aces Baseball Stadium, two Hospitals (Renown & Saint Marys), and a mix of single and multi-family residential. The corridors have many different “Districts” with individual identities.
- ❖ Most of the identified land capacity (300 of 363 total acres) is zoned for mixed-use development. Just 15 acres are zoned exclusively as residential (9 acres multifamily, 5 acres single family). Approximately 28 acres are zoned industrial, with the remaining 20 zoned as commercial of some form.

ES.6 SMP Alternatives

Vehicular, bicycle and pedestrian safety alternatives have been categorized into both corridor and spot improvements. Corridor alternatives consist of reconfigurations of the existing roadway section for a segment of the corridor. These segments include:

- ❖ 2nd Street, Keystone Avenue to Arlington Avenue
- ❖ 2nd Street, Arlington Avenue to Kuenzli Street
- ❖ 2nd Street, Kuenzli Street to Kirman Avenue and Kuenzli Street from Giroux Street to 2nd Street
- ❖ 2nd Street, Kirman Avenue to Giroux Street

Roadway reconfigurations east of Giroux Street were not proposed given the pending improvements from NDOT’s Glendale Improvement Project. Spot safety improvement alternatives are those that affect a singular, finite location such as a protected pedestrian crossing or intersection improvements.

To help organize the range of corridor alternatives and segment combinations, alternative themes were developed. These alternative packages consist of the following:

Early Action Complete Streets – This alternative focuses on restriping the existing roadway to generally reduce vehicular lanes and incorporate bike lanes. The existing curb line remains as is, thereby making this alternative relatively easy and inexpensive to implement.

Roadway Streetscapes – This alternative incorporates raised landscape areas such as medians and sidewalk buffers to not only improve safety but enhance roadway and community aesthetics.

Pedestrian Focus – The Pedestrian Focus alternative emphasizes sidewalks and pedestrian features in conjunction with other complete streets elements. These include corner bulb-outs/parklets at intersections. The Pedestrian Focus alternative would require significant reconstruction of the curb line which does increase costs.

It is important to note that the three corridor alternatives are designed to fit within the existing right-of-way.

The corridor alternatives were analyzed to predict the affects to the study area from a planning-level and to allow for comparisons among alternatives. This includes predictive methodologies for estimating crash reduction. **Table ES-2** summarizes the comparison of corridor alternatives.

Table ES-2: Corridor Alternatives Comparison

Alternative	Potential Crash Reduction	Cost	Traffic Performance	Livability
1. Early Action Complete Streets	up to 19%	\$	●	🌲
2. Roadway Streetscapes	up to 2%	\$\$\$\$	●	🌲🌲🌲
3. Pedestrian Focus	up to 20%	\$\$\$\$	●	🌲🌲

Details of each of these comparison elements are outlined in Section 6 including the following costs:

- ❖ Early Action Complete Streets: **\$2.2 - \$2.8 million**
- ❖ Roadway Streetscapes: **\$21.0 - \$22.5 million**
- ❖ Pedestrian Focus: **\$23.5 - \$27.5 million**

Each of the corridor alternatives exhibit various benefits with the intensity of each benefit affected by external factors such as available funding, area development, private interests and other local and regional priorities. Understanding this and with similar crash reductions expected for each, this SMP is not recommending any particular corridor alternative. Furthermore, it is recognized that proposed corridor reconfigurations associated with each alternative can be mixed and matched between segments to address local preferences and needs.

In addition to the corridor alternatives that effect segments of the study area roadways, spot alternative improvements have also been identified to improve safety at select locations. Some recommendations can be implemented quickly through public works maintenance efforts while others may require additional study and engineering analysis. A total of 15 spot alternatives were identified as listed below and described in Section 6.

- ❖ Combine Lanes and Install Bulb-Outs at Keystone Ave.
- ❖ Install Bulb-Outs at Cross Streets with On-Street Parking
- ❖ Install Crosswalks at Winter and Stevenson Streets
- ❖ Install Loading Zone at School
- ❖ Pedestrian Only Scramble Phase
- ❖ Create Right-in/Right-out at Evans Ave.
- ❖ Install Rapid Flashing Beacon
- ❖ Convert Kirman Avenue Intersections into Roundabouts
- ❖ Install Danish Offset at Renown
- ❖ Eliminate Outside Turn Lane at Giroux St.
- ❖ Convert the 2nd St./Kietzke Ln. Intersection to a Roundabout
- ❖ Convert the 2nd St./I-580 Northbound Intersection to a Roundabout
- ❖ Combine Transit Stops and Install Pedestrian Fencing
- ❖ Install Speed Feedback Sign
- ❖ Island Avenue Intersection Modifications

In addition to the modes analyzed above, transit improvements have also been considered. The types of improvements include infrastructure changes to stop locations and improved amenities. Changes to system routing and frequency are beyond the scope of

this SMP as they are thoroughly analyzed by the RTC through existing processes as the area's transit provider. **Appendix G** contains proposed transit recommendations.

ES.7 Stakeholder Coordination and Public Outreach

The study team incorporated an active collaboration process to coordinate and shape the development of the SMP. A Technical Advisory Committee (TAC) was assembled to provide a venue for interagency collaboration. Participating agencies included NDOT Safety Division, NDOT District II, RTC Planning, RTC Engineering, City of Reno Traffic Engineering and City of Reno Public Works. Similar to the TAC, a Stakeholder Working Group (SWG) was convened at the outset. The SWG provided a venue for input and collaboration with major corridor interests. After initiation, the TAC and SWG were combined. A total of two meetings were held.

The general public was given an opportunity to provide input on the SMP as well. On April 20, 2016 a public meeting was held at McKinley Arts and Culture Center in Reno from 4:00pm till 7:00pm. The meeting was advertised in the Reno Gazette Journal two weeks ahead, the day before and the day of the meeting. In addition, notices were mailed to property owners and residents within a ¼ mile of the study area.

1.0 Study and Corridor Introduction

1.1 Study Overview

The Nevada Department of Transportation (NDOT) has undertaken a series of Safety Management Plans (SMPs) throughout the State of Nevada. SMPs are a transportation analysis effort that incorporates corridor study, crash analysis, access management, public and stakeholder input, roadway engineering and application of the Highway Safety Manual (HSM) methods to improve transportation safety for all users. The SMP process is consistent with the Nevada Strategic Highway Safety Plan’s goals of reducing crashes.

HSM methodologies and tools are applied at identified locations to define safety issues, consider mitigations and select the best alternatives. These predictive methods allow engineers to calculate the predicted safety effects of different design applications and alternatives.

1.2 Study Limits

NDOT, in cooperation with The City of Reno (City) and the Regional Transportation Commission of Washoe County (RTC), has selected portions of 2nd Street, Kuenzli Street and Arlington Avenue for analysis under this SMP. The exact limits of analysis are:

- ❖ 2nd Street from Keystone Avenue to Galletti Way
- ❖ Kuenzli Street from 2nd Street to Kirman Avenue
- ❖ Arlington Avenue from Court Street to W 6th Street.

The entire 4-miles of the study area lies within the City of Reno, Nevada with the exception of Galletti Way which lies within the City of Sparks, Nevada. See **Figure 1-1** for the study limits.

Figure 1-1: SMP Study Limits



These corridors were selected due to their potential for meaningful reconfiguration and resulting safety benefits as well as the important community centers that these corridors serve.

1.3 Roadway Characteristics

The 2nd Street, Arlington Avenue and Kuenzli Street corridors serve three different and somewhat distinct segments within the limits of the overall study area. These can be described as follows:

- ❖ **Downtown Reno Core** – This 1-mile segment extends from Keystone Avenue to Kuenzli Street and serves Reno’s Downtown commercial and gaming district and the transitional neighborhood west of Arlington Avenue.
- ❖ **Couplet System** – The 1-mile segment from Kuenzli Street to Kietzke Lane is dominated by the couplet system of eastbound 2nd Street and westbound Kuenzli Street.
- ❖ **I-580 Area** – From Kietzke Lane to Galletti Way, 2nd Street becomes more active due to the I-580 interchange.

These segments and key area attractions/destinations are displayed in **Figure 1-2**.

Figure 1-2: Key Area Attractions



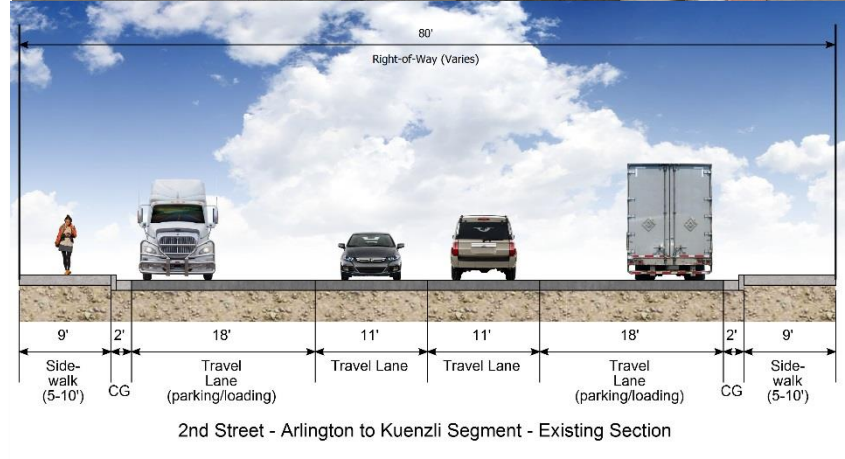
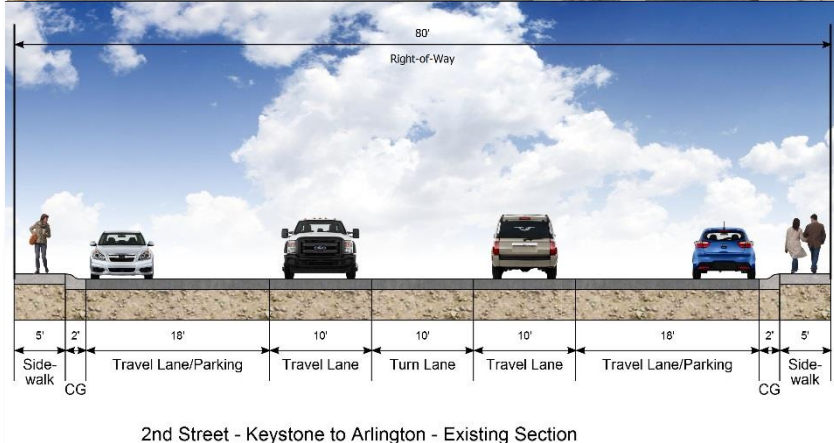
1. Saint Marys Hospital	2. Downtown Casino Core	3. Wingfield Park	4. Freight House District	5. Renown Hospital	6. RGJ Newspaper	7. Reno-Sparks Indian Colony	8. Walmart	9. Grand Sierra Resort
Regional hospital with emergency vehicle access from Arlington Ave.	The gaming heart of downtown Reno with events and pedestrian generators	Summer concert and event venue generating high pedestrian activity during events	Home of the Reno Aces baseball stadium with high volumes during games and events	Largest area hospital and major area employer with high pedestrian traffic crossing 2 nd St.	Largest employer along the Kuenzli St. corridor	Tribe colony with facilities both north and south of 2 nd St. resulting in frequent crossings	Busiest Walmart shopping center in the area with heavy activity	Large casino, event location and area attraction

Just as the study area’s attractions/destinations vary so do the characteristics of the roadway cross sections. The existing roadway sections and traffic volumes are described as follow:

Keystone to Arlington - 2nd Street from Keystone Avenue to Arlington Avenue consists of two lanes in each direction, a center turn lane, roadside parking and sidewalks.

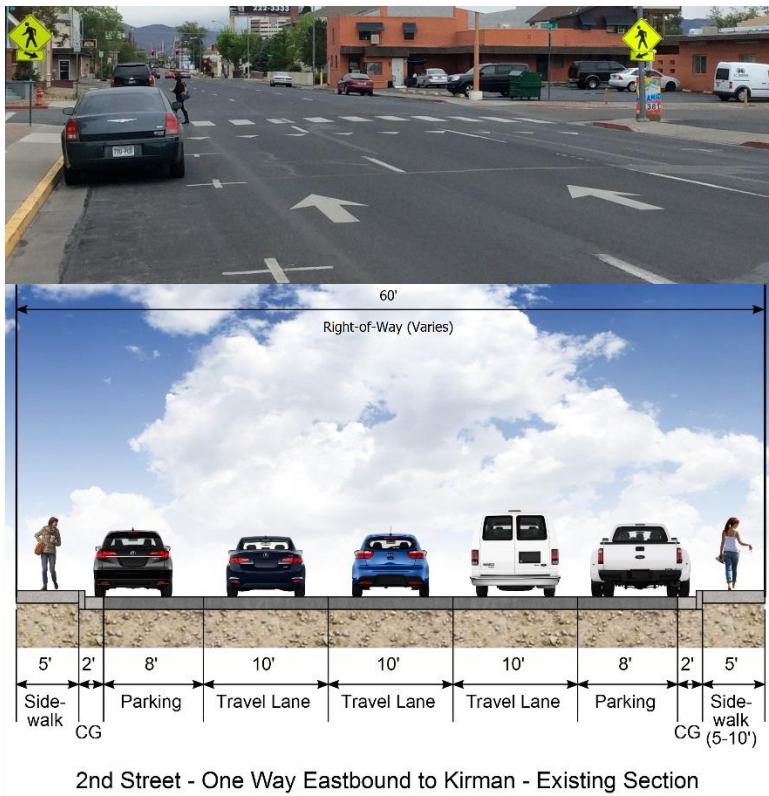
Traffic volumes are low in this segment at approximately 4,800 AADT, or average annual daily traffic. The roadside parking is moderately utilized depending on the adjacent land use and alternate parking options.

Arlington to Kuenzli – 2nd Street from Arlington Avenue to Kuenzli Street generally consists of two lanes in each direction, intermittent roadside parking/commercial loading zones, varying width sidewalks and left turn lanes at most cross streets.



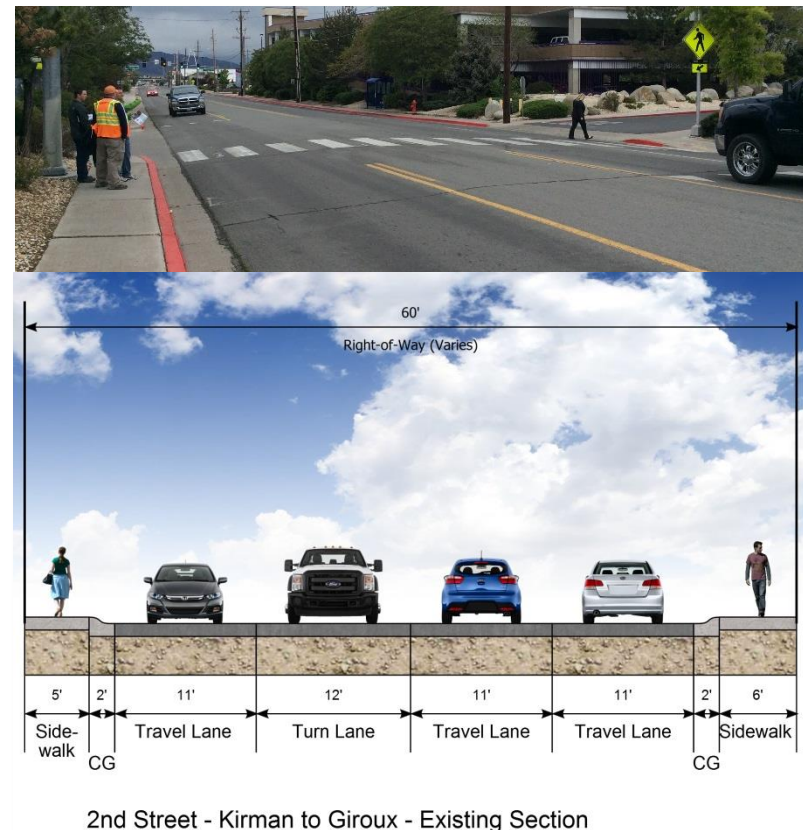
Traffic volumes in this segment increase, however, are still relatively low at 6,300 AADT. Pedestrian activity can be heavy, particularly during events. Due to these volumes, the intersection of 2nd Street and Virginia Street has the areas only pedestrian only signal phase.

Kuenzli to Kirman – 2nd Street from Kuenzli Street to Kirman Avenue is a one-way couplet system with Kuenzli Street and shares the same cross section as Kuenzli Street from 2nd Street to Giroux Street. This section consists of three travel lanes, roadside parking and sidewalks.



Traffic volumes in these segments are low at around 3,200 AADT, reflecting the fact that both 2nd Street and Kuenzli Street are carrying only one direction of travel. Pedestrian activity is low to moderate with roadside parking sparsely utilized.

Kirman to Giroux – This short segment of 2nd Street from Kirman Avenue to Giroux Street was converted from the one-way cross section to two lanes eastbound, one lane westbound, a center turn lane and sidewalks with no on-street parking.



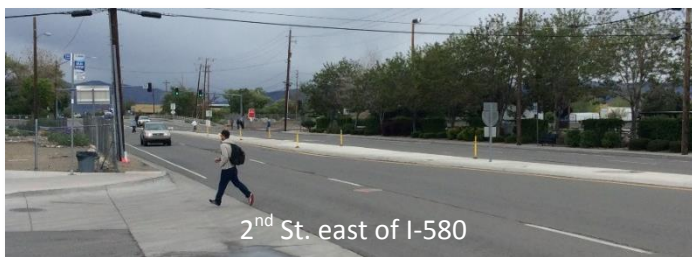
Renown is a major attraction on the south side of this segment. The hospital’s staff parking is on the north side of 2nd Street, creating heavy pedestrian crossings. Vehicular traffic is still low at under 5,000 AADT (est.), however, east of Renown’s employee parking and closer to Kietzke Lane, volumes increase to about 13,500 AADT.

Kietzke to Galletti – 2nd Street from Kietzke Lane to Galletti Way varies on either side of the I-580 interchange. To the west, 2nd Street consists of two travel lanes in each direction, a center turn lane, sidewalks and roadside parking.



2nd St. west of I-580

To the east, 2nd Street consists of two travel lanes in each direction and sidewalks. The center turn lane and street parking are not present, however, a raised median exists for most of the segment. Sidewalk is missing on the north side east of Walmart.



2nd St. east of I-580

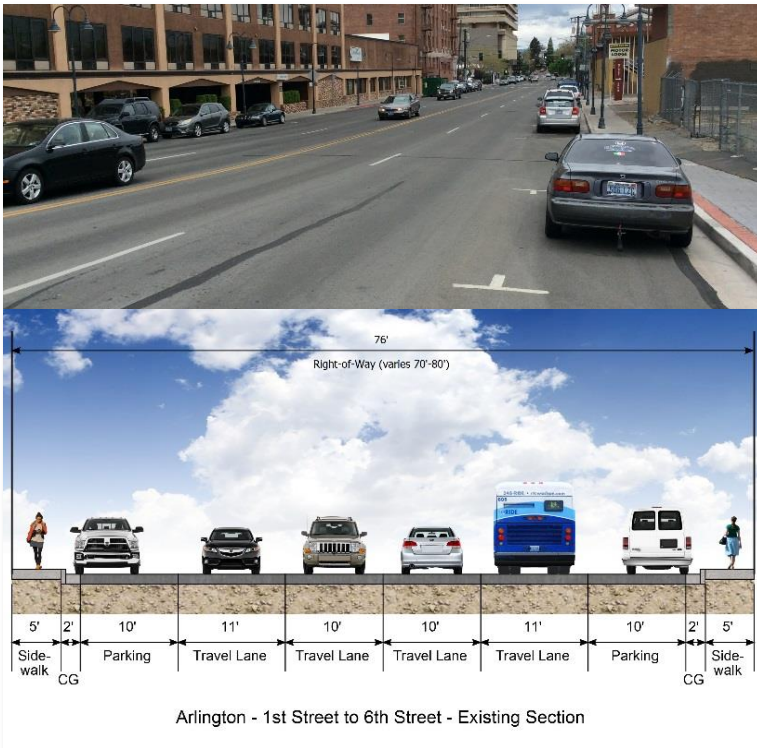
With the I-580 interchange, vehicular traffic is the heaviest in the study area at around 17,000 AADT west of the interchange and 14,000 AADT east of the interchange. Pedestrian activity is moderate to the west of I-580 with frequent crossing by residents of the Reno Sparks Indian Colony and very high to the east of I-580 associated with Walmart.

Special Note: This segment of 2nd Street (also known as Glendale Avenue) from Kietzke Lane to Galletti Way lies within the limits of an ongoing roadway improvement design project. NDOT is currently preparing design plans for Glendale Avenue. The design includes pavement rehabilitation, sidewalk and ADA improvements and proposed bike lanes. Since this project will incorporate many of the improvements that would typically be recommended under this SMP, the study only took a cursory look at this segment. Greater corridor emphasis was placed on the rest of the study area.

Court to W 6th – Arlington Avenue from Court Street to West 6th Street transitions from one travel lane in each direction, intermittent center turn lanes, bike lanes and sidewalks (no on-street parking) south of West 1st Street to two travel lanes in each direction, on-street parking and sidewalks north of West 1st Street.



Arlington Ave. south of West 1st St.



Traffic volumes along Arlington Avenue are low at about 7,900 AADT. Pedestrian volumes are steady and spike during events such as the Reno Riverfest and concerts at Wingfield Park.

2.0 Crash Data Analysis

2.1 Crash Analysis Overview

An important consideration in determining appropriate safety alternatives is identifying locations and segments with a history of crashes. This information can help focus the analysis to hot spot locations with the greatest potential for crash reduction. To that end, the study team obtained five year crash history for the period of July 2009 to July 2014. A “heat map” was developed to illustrate crash activity for the five year period as shown in **Figures 2-1** and **2-2**.

Figure 2-1: 5-Year Crashes, Keystone Ave. to Kirman Ave.

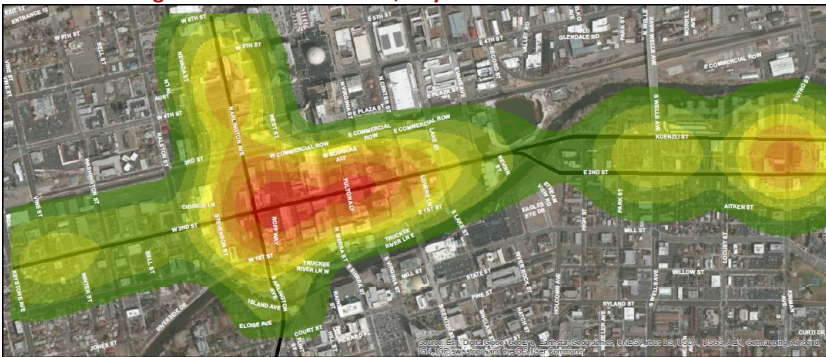
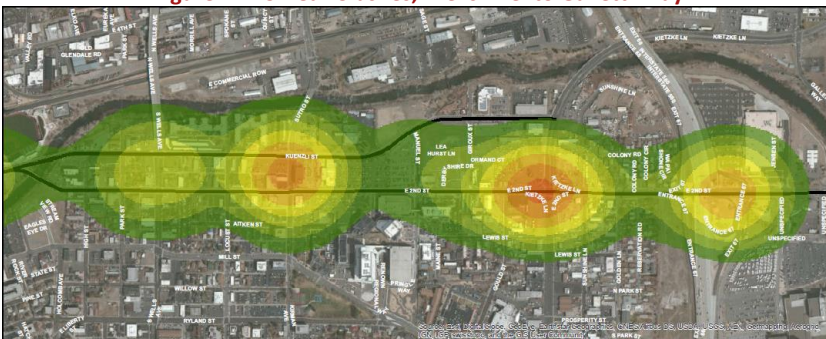


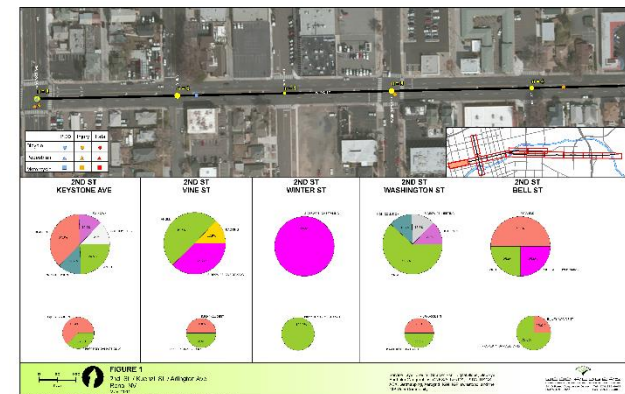
Figure 2-2: 5-Year Crashes, Wells Ave. to Galletti Way



2.2 Crash Analysis Results

The five year crash data was categorized to differentiate between mode (vehicle, bike, pedestrian and motorcycle) and severity (property damage only, injury and fatality). Each crash location, type and severity was then displayed graphically on plan sheets. Also included on the plan sheets is a crash summary by intersection as shown on the example in **Figure 2-3**. Plan sheets covering the study area can be found in Appendix A.

Figure 2-3: Example Crash Analysis Plan Sheet



As can be seen from the “heat map” and detailed in the plan sheets, the corridor

experiences increased crashes at select locations. As with most facilities, these locations are typically intersections.

Downtown Reno Core

The downtown core experiences high crash activity due to the combination of heavy overall traffic for all modes and closely-spaced intersections with key north/south routes. The following are some of the prevalent crash locations:

- ❖ 2nd St./Arlington Ave. – 21 crashes including two motorcycle injury crashes, a bicycle injury crash and one pedestrian fatality.

- ❖ 2nd St./Sierra St. – 17 crashes including one pedestrian injury.
- ❖ 2nd St./Virginia St. – 19 crashes including one motorcycle injury crash.
- ❖ 2nd St./Center St. – 13 crashes including one pedestrian and bicycle injury.

A review of the details of these crashes does not suggest a regular pattern but are indicative of the overall level of activity in the downtown area.

Couplet System

The couplet system generally experiences fewer crashes overall, however, the 2nd Street and Kuenzli Street intersections with Wells Avenue and Kirman Avenue do experience significant crashes as shown in **Table 2-1** below.

Table 2-1: Couplet System Crashes of Note

	Wells Avenue	Kirman Avenue
2 nd Street	9 Crashes	17 Crashes
Kuenzli Street	7 Crashes	17 Crashes

Both Wells Avenue and Kirman Avenue north of the study area have bridges over the Truckee River. It is possible that the unobstructed expanse of vehicles traveling south across the bridges encourages high speeds entering the signalized intersections represented in Table 2-1. This is particularly true for Kirman Avenue given it experiences over twice as many crashes than Wells Avenue while carrying 55-percent fewer traffic volumes.



Wells Avenue Bridge over the Truckee River

I-580 Area

Further east, the I-580 area experiences the highest traffic volumes in the study area and correspondingly the highest crash activity. Of particular note is the intersection of 2nd Street and Kietzke Lane. The 5-year data shows 24 crashes occurred at this intersection. If the adjacent intersections at Gould Street and Sunshine Lane are included given they lie within the influence area of the Kietzke Lane intersection, the crash total rises to 38. The high volumes, large intersection footprint, large sweeping dedicated right turns and roadway speeds all likely contribute to the high crash rate at this intersection.

Similarly in this segment, the two 2nd Street intersections with the I-580 ramps also experience high volumes and corresponding crashes. The 2nd Street intersection with the I-580 southbound ramps reported

10 crashes while the 2nd Street intersection with the I-580 northbound ramps reported 18 crashes. Of note at the northbound intersection are the multi-modal crashes. These include one injury crash for a pedestrian, a bicyclist and a motorcyclist as well as a property damage only for a pedestrian. This is likely due to the intersection’s high activity associated with the Walmart entrance at the north leg of the intersection.

Arlington Avenue

Focusing on Arlington Avenue, there are some noteworthy locations. The Arlington Avenue intersection with Island Avenue does not experience an overall high number of crashes at six compared to other locations in the study area; however, given Island Avenue’s very low volumes and three bicycle injury crashes, it does solicit attention. On the other end of the Wingfield Park area is the Arlington Avenue/West 1st Street intersection. This location had 10 crashes including two pedestrian injuries and two motorcycle injuries as well as a pedestrian non-injury crash. Given the heavy visitor activity associated with Wingfield Park and other area attractions, these numbers do warrant consideration.



One of the Many Events at Wingfield Park

Further north, the Arlington Avenue intersections with West 4th Street and West 5th Street experience significant crash activity at 16 crashes each. The crashes at the intersection with West 4th Street include a pedestrian fatality and a bicycle injury while the intersection with West 5th Street includes three pedestrian injury crashes.

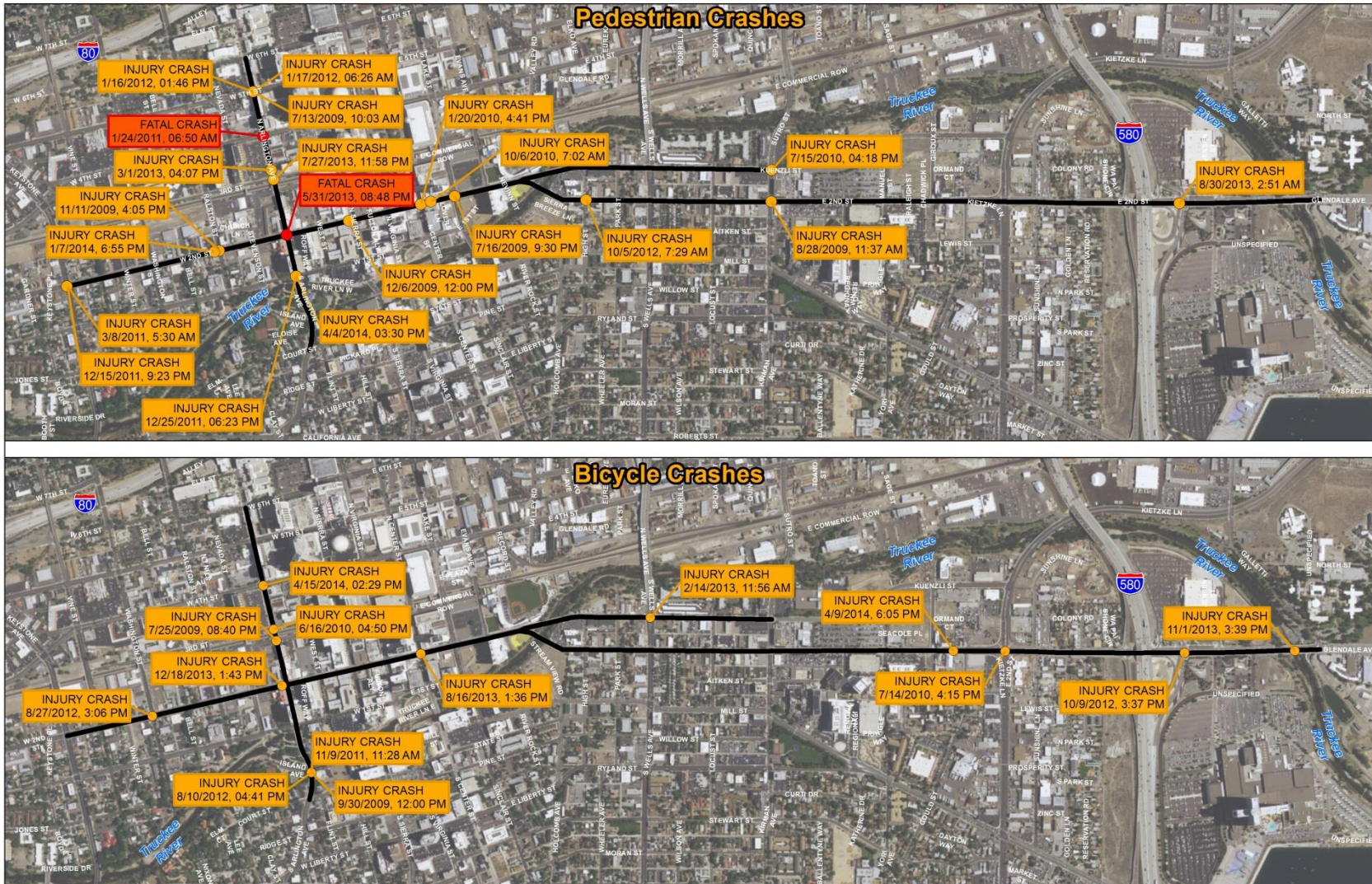
Looking at the entire Arlington Avenue corridor within the study area, this 0.6 mile segment experiences a relatively high propensity of multi-modal crashes as summarized in **Table 2-2**.

Table 2-2: Arlington Avenue Multi-Modal Crash Summary

	Injury	Fatal
Pedestrian	7	
Bicycle	7	2
Motorcycle	3	

Multi-modal crashes for the entire study area are graphically summarized in **Figure 2-4** on the following page.

Figure 2-4: Multi-Modal Crash Summary (Insert 11X17)



3.0 Existing Traffic Analysis

3.1 Traffic Analysis Overview

This section describes traffic operations along the 2nd Street and Arlington Avenue corridors under existing traffic and roadway conditions. Vehicle, pedestrian, bicycle and motorcycle traffic counts were collected at 25 intersections along the study corridors. Vehicular intersection Level of Service (LOS) and corridor multi-modal LOS analyses were performed at each study intersection and study roadway segment, respectively.

The purpose of the traffic analysis is to identify locations that do not currently perform adequately and do not meet operating standards. Traffic operational issues could encourage crash activity. Furthermore, current traffic performance informs alternative development as proposed alternatives cannot degrade roadway operations below standards.

3.2 Existing Traffic Volumes

Mid-day (MD) and PM peak hour vehicular, pedestrian, bicycle, wheelchair and motorcycle traffic counts were conducted Wednesday-Thursday, May 27-28, and Tuesday-Thursday, June 9-11, 2015 at the following intersections:

1. Vine Street / W 2nd Street
2. Washington Street / W 2nd Street
3. Ralston Street / W 2nd Street
4. Sierra Street / W 2nd Street
5. Virginia Street / 2nd Street
6. Center Street / E 2nd Street
7. Lake Street / E 2nd Street
8. Wells Avenue / E 2nd Street

9. Wells Avenue / Kuenzli Street
10. Kirman Avenue / E 2nd Street
11. Kirman Avenue/Sutro Street / Kuenzli Street
12. Gould Street-Commercial Driveway / 2nd Street
13. Kietzke Ln / E 2nd Street
14. Sunshine Ln / E 2nd Street
15. I-580 Southbound Ramps / E 2nd Street
16. I-580 Northbound Ramps-Commercial Driveway / E 2nd Street
17. Grand Sierra Resort Entrance / E 2nd Street
18. W 2nd Street / Galletti Way
19. Arlington Avenue / W 6th Street
20. Arlington Avenue / W 5th Street
21. Arlington Avenue / W 4th Street
22. Arlington Avenue / W 3rd Street
23. Arlington Avenue / W 2nd Street
24. Arlington Avenue / W 1st Street
25. Arlington Avenue / Island Avenue

The MD peak hour is defined as the highest one hour of traffic flow counted between 12:00 PM and 2:00 PM on a typical weekday, and the PM peak hour is defined as the highest one hour of traffic flow counted between 4:00 PM and 6:00 PM on a typical weekday. The MD peak hour was used over more traditional AM peak hours per local agency recommendation based on their observations of the peak period in the downtown environment.

Additionally, 7-day, 24-hour vehicular counts were collected for the week of June 8-14, 2015, at the following roadway segments:

- ❖ W 2nd Street east of Sierra Street
- ❖ E 2nd Street east of Wells Avenue
- ❖ Arlington Avenue south of W 1st Street
- ❖ Kuenzli Street west of Wells Avenue

The use of summer count data (schools not in session) for both 24-hour and turning movement counts was considered acceptable due to the lack of existing schools in the area. As the study area is located in an urban center, peak hour pedestrian volumes are generally highest on 2nd Street between Ralston Street and Lake Street and on Arlington Avenue between Island Avenue and W 4th Street.

Existing traffic volumes within the study area and existing intersection lane geometrics are detailed in the *Existing Traffic Operations and Analysis Technical Memorandum* in **Appendix B**.

3.3 Intersection Level of Service

Traffic operations in this study have been quantified through the determination of "Level of Service" (LOS). Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to study facilities, representing progressively worsening traffic operations. LOS has been calculated for all intersection control types using methods documented in the Transportation Research Board publication *Highway Capacity Manual, Fourth Edition, 2010* (HCM-2010).

The delay-based HCM-2010 LOS criteria for different types of intersection controls are outlined in **Appendix B**. *Synchro 8* operations analysis software was used to complete the intersection LOS analysis procedures. **Table 3-1** presents existing study intersection traffic operations under existing intersection traffic volumes.

Table 3-1: Existing Intersection Traffic Operations

	Intersection	Control Type ¹	MD Peak Hour		PM Peak Hour	
			Delay (S/V)	LOS	Delay (S/V)	LOS
1	Vine St / 2 nd St	TWSC	11.7	B	13.3	B
2	Washington St / 2 nd St	TWSC	12.5	B	14.7	B
3	Ralston St / 2 nd St	Signal	12.8	B	12.9	B
4	Sierra St / 2 nd St	Signal	12.2	B	12.4	B
5	Virginia St / 2 nd St	Signal	14.7	B	15.2	B
6	Center St / 2 nd St	Signal	10.8	B	11.6	B
7	Lake St / 2 nd St	Signal	8.4	A	9.6	A
8	Wells Ave / 2 nd St	Signal	14.7	B	13.4	B
9	Wells Ave / Kuenzli St	Signal	9.0	A	8.5	A
10	Kirman Ave / 2 nd St	Signal	15.4	B	15.3	B
11	Kirman Ave / Kuenzli St	Signal	14.7	B	13.4	B
12	Gould St / 2 nd St	TWSC	23.8	C	38.1	E
13	Kietzke Ln / 2 nd St	Signal	23.7	C	33.9	C
14	Sunshine Ln / 2 nd St	TWSC	45.8	E	71.1	F
15	I-580 SB Ramps / 2 nd St	Signal	8.1	A	6.6	A
16	I-580 NB Ramps / 2 nd St	Signal	15.1	B	16.9	B
17	GSR Entrance / 2 nd St	Signal	20.1	C	6.2	A
18	2 nd St / Galletti Way	Signal	17.8	B	17.6	B
19	Arlington Ave / 6 th St	AWSC	11.2	B	10.3	B
20	Arlington Ave / 5 th St	Signal	12.3	B	13.8	B
21	Arlington Ave / 4 th St	Signal	21.0	C	20.2	C
22	Arlington Ave / 3 rd St	TWSC	14.4	B	19.0	C
23	Arlington Ave / 2 nd St	Signal	8.3	A	8.1	A
24	Arlington Ave / 1 st St	Signal	12.4	B	11.9	B
25	Arlington Ave / Island Ave	TWSC	14.9	B	20.4	C

Notes:
1. For TWSC (Two-Way-Stop-Control) intersections, worst-case movement delay (in seconds/vehicle) are indicated. "Average" control delays (in seconds/vehicle) are indicated for AWSC (All-Way-Stop-Control) and Signal-Control intersections.

As shown, the two-way stop-controlled Gould Street/2nd Street intersection is currently operating at PM peak hour LOS “E” conditions and the two-way stop-controlled Sunshine Lane/2nd Street intersection is currently operating at MD/PM peak hour LOS “E/F” conditions (below the RTC LOS “D” standard). This is due to the influence of queues from the Kietzke Lane intersection backing up and blocking movements from these two nearby intersections.

All of the remaining study intersections are currently operating at acceptable LOS “D” or better conditions during the MD and PM peak hours under existing conditions, suggesting intersection operations are not a critical concern for the study area.

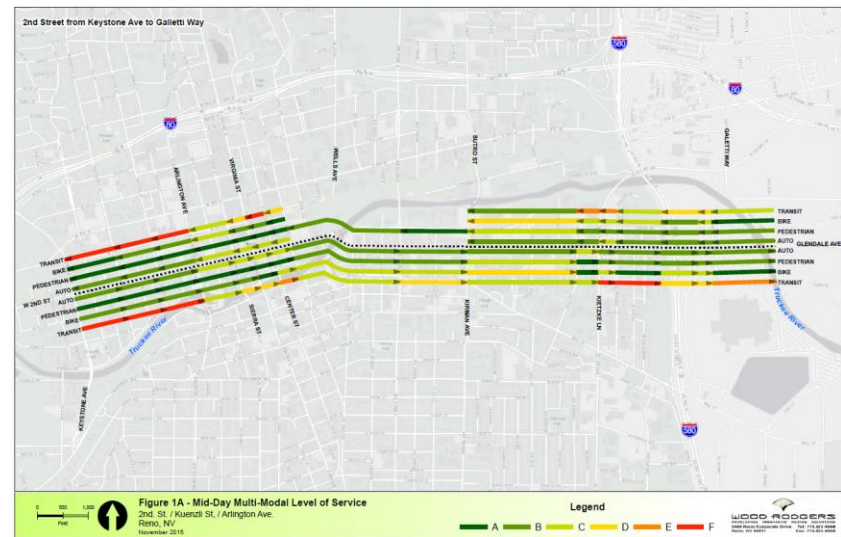
3.4 Multi-Modal Level of Service

Multi-modal LOS analysis was performed using HCM-2010 and National Cooperative Highway Research Program (NCHRP) Project 3-70 methodologies to yield planning-level multi-modal corridor LOS outputs for auto, pedestrian, bike and transit modes. Inputs for LOS+ include pedestrian and vehicle flow rate, roadway cross section data, and transit availability along each study segment. Multi-modal LOS can be used as an indicator to mobility deficiencies for all modes and help identify locations for improved infrastructure.

Multi-modal LOS analysis for auto, pedestrian, bike and transit modes was performed for the following study roadway corridors:

- ❖ 2nd Street from Keystone Avenue to Galletti Way
- ❖ Arlington Avenue from Court Street to W 6th Street
- ❖ Wells Avenue from E 2nd Street to Kuenzli Street
- ❖ Kirman Avenue from E 2nd Street to Kuenzli Avenue
- ❖ Kuenzli Street from E 2nd Street to Kirman Avenue

Multi-modal corridor LOS for all study roadways are detailed in **Appendix B**. In general, transit mode typically presents the most frequent occurrence of LOS “E” and “F” on most study corridors. This is due to low transit frequency (buses/hour) at transit stops along study segments and a relatively low number of routes being served by each stop. The transit LOS is not an indicator of underserved demand and the low frequency and routes likely reflect existing transit demand. Overall, auto, pedestrian, and bike modes perform at LOS “D” or better.



Example Multi-Modal LOS Figure Found in Appendix B

4.0 Relevant Plans and Studies

4.1 Relevant Plans and Studies Overview

Over the past several years, different agencies have either identified the 2nd Street, Kuenzli Street, and Arlington Avenue corridors in previous planning efforts, have identified specific overarching regional goals that would pertain to those corridors or have projects in place to address previously identified issues within those corridors. Many of the recommendations are identified by multiple plans, which demonstrates the consistency among the regional goals of both the City of Reno, RTC and NDOT for modernizing the regional road network for accommodation of multi-modal uses.

The most common themes across the multiple plans include reducing travel lanes when existing capacities are not warranted, adding new bicycle and pedestrian facilities, improving corridors to be more ADA compliant and traffic operations improvements. The SMP will build upon the efforts and recommendations that have already been established through these previous planning efforts in order to create a clear direction for improving the 2nd Street, Kuenzli Street, and Arlington Avenue Corridors.

4.2 Coordination with Other Plans and Studies

The study team assembled and reviewed numerous relevant documents and policies. As noted above, there is significant consistency among agencies and efforts to improve and encourage mobility across all modes of transportation in the study area as documented in the *Summary of Relevant Plans and Studies Technical Memorandum* found in **Appendix C**. The sources outlined in the document include the following:

- ❖ NDOT Road Safety Assessment (RSA) Report
- ❖ Kietzke Lane Safety Management Plan
- ❖ Glendale Improvement Project
- ❖ Keystone Avenue Corridor Study
- ❖ Reno Sparks Bicycle and Pedestrian Masterplan
- ❖ City of Reno Masterplan
- ❖ Oddie Boulevard/Wells Avenue Corridor Study
- ❖ RTC Regional Transportation Plan 2035

While these documents and their pertinent elements are detailed in the appendix, below is a summary of the more relevant elements.

NDOT RSA – NDOT Traffic Safety Engineering conducted a RSA for the subject corridors that was reviewed and considered by the SMP. Based on field reviews, the RSA team generally recommended consideration of more street lighting, improving pedestrian facilities, installing bicycle facilities, replacing or upgrading striping and signage where needed, and retiming signals to help reduce crashes. A copy of the RSA can be found in **Appendix D** and the recommendations are incorporated by reference into this SMP.

Kietzke Lane SMP – In 2013, NDOT Safety Engineering completed the state’s first SMP on Kietzke Lane from South Virginia Street to Galletti Way. This includes the intersection with 2nd Street. The SMP suggested the conversion of the signalized intersection to a roundabout. This concept was further considered as part of this study and is described in the Section 6 Alternatives.

Glendale Improvement Project – As mentioned earlier, NDOT is currently completing final design plans for Glendale Avenue from Kietzke Lane to McCarran Boulevard. Multi-modal improvements are planned and the overlapping limits with this SMP were only

considered for spot safety improvements. The study team does recommend NDOT install full complete street improvements if not already planned.

RTC Regional Transportation Plan 2035 – As the regions Metropolitan Planning Organization (MPO), the RTC prepares the Regional Transportation Plan (RTP). This document outlines community goals and responding transportation projects over a 20 year horizon within the MPO boundary as well as sets priorities, policies and funding.

The 2035 RTP identifies the regional road system including those in the study area as shown in **Table 4-1**.

Table 4-1: RTP Regional Road System

Roadway	Functional Classification	Policy Access Control
2 nd St., Keystone to Kuenzli	Arterial	Low
2 nd St., Kuenzli to Kietzke	Arterial	Moderate
Glendale Ave., Kietzke to Meredith	Arterial	Moderate
Kuenzli St., 2 nd to Kietzke	Arterial	Moderate
Arlington Ave., Skyline to 6 th	Arterial	Moderate

In addition, the 2035 RTP identifies proposed projects within the MPO boundaries. Proposed projects relevant to this SMP are summarized in **Table 4-2**. These projects provide an opportunity to incorporate proposed SMP alternatives, particularly spot safety improvements. It is anticipated that corridor improvement alternative(s) will be added to future updates of the RTP.

Table 4-2: RTP Regional Road Improvements

Horizon Years	Primary Route	Limits	Description
2013-2017	Kietzke Ln	Virginia St to Galletti Wy	Multi-modal Improvements
2018-2022	Kietzke Ln	Virginia St to Galletti Wy	Phase 2 Improvements
2013-2017	Keystone Ave	California Ave to W 7 th St	Multi-modal Improvements
2013-2017	Oddie Blvd/Wells Ave	Kuenzli Ln to Pyramid Wy	Multi-modal Improvements
2018-2022	Oddie Blvd/Wells Ave	Kuenzli Ln to Pyramid Wy	Phase 2 Improvements
2023-2035	Kirman Ave	Mill St to W 2 nd St	Widen 2-4 Lanes
2023-2035	Glendale Ave	Galletti Wy to Rock Blvd	Widen 4-6 Lanes

Relevant goals and policies identified in the 2035 RTP as well as further details on the other relevant plans and studies are described in **Appendix C**.

5.0 Demographics, Land Use and Economic Development

5.1 Background

Several data sources were analyzed to determine both demographics and land uses in the study area. These include the 2009-2013 U.S. Census American Community Survey (ACS) for population demographics, the U.S. Census Longitudinal Employment-Household Dynamics (LEHD) for work-based datasets, population and employment data from Washoe RTC and forecasts prepared for the Economic Development Authority of Western Nevada (EDAWN). City of Reno databases and discussions with staff were used to identify planned projects in the area. The study area is defined as a one-half mile buffer around the corridors. Details regarding the demographics, land use and economic development analysis can be found in the Economic Development Opportunities Technical Memorandum in **Appendix E**.

The information in this section helps to define the characteristics of the study area which may influence existing travel patterns as well as inform the development of alternatives. Furthermore, by analyzing the area’s development potential, assumptions can be made as to how travel patterns and demand may change over time, further informing alternatives.

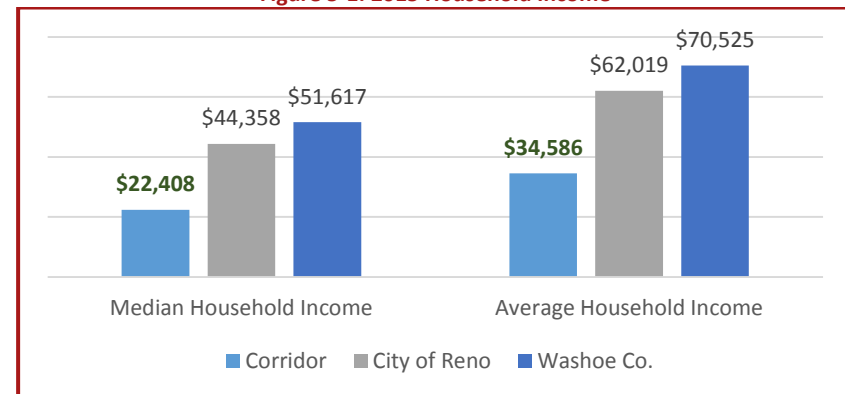
5.2 Study Area Demographics

When compared to residents of the City of Reno and Washoe County overall, corridor residents are far more likely to be:

- ❖ Male
- ❖ Low income
- ❖ Living alone
- ❖ Age 55 to 75, or 18 to 25
- ❖ Renters
- ❖ Divorced

The corridor as a whole, as shown in **Figure 5-1** includes populations well below both City and County averages. Resident median household incomes range from a low of approximately \$11,800 for the block group just east of 2nd Street and Virginia Avenue to a high of nearly \$60,000 south of the Truckee River, just west of Arlington Avenue.

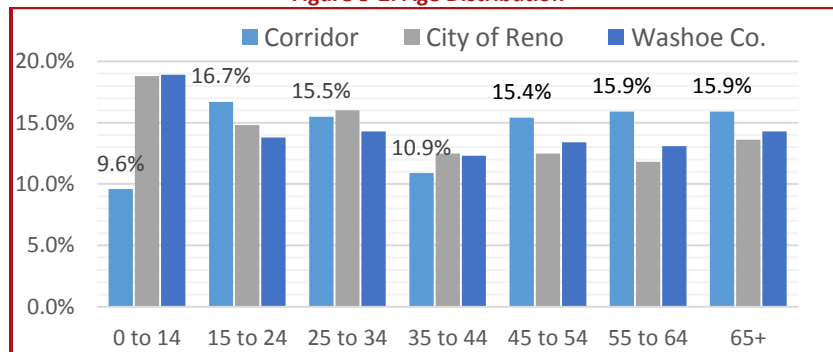
Figure 5-1: 2015 Household Income



As many as 3,000 study area households were living at or below the poverty level during the 2009-2011 ACS 5-year estimation period.

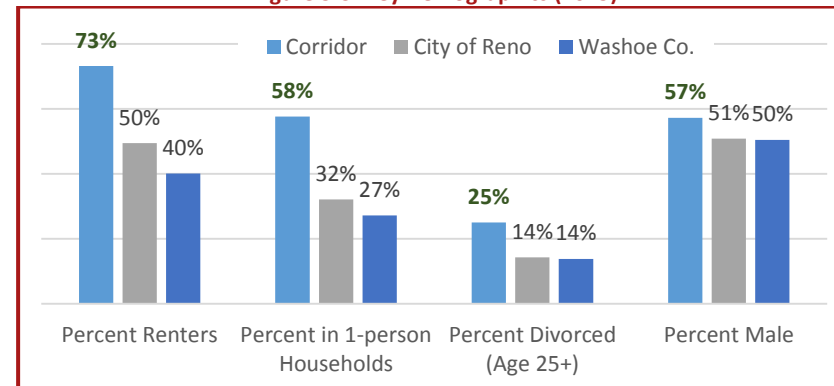
In terms of age, corridor study area population is proportionally under-represented for children age zero to 14, and skews higher for ages 45 and up, as compared to the City of Reno or Washoe County and shown in **Figure 5-2**. While children are less common in the corridor, teens and young adults (ages 15 to 24) skew somewhat higher than the local and regional comparison areas.

Figure 5-2: Age Distribution



The strong corridor propensity to rent versus own is also consistent with this age distribution pattern. The skews towards male versus female residents and disproportionately high share of divorced adults are likely driven by the presence of single-room-occupancy housing in the corridor. See **Figure 5-3**. This demographic also suggests that the majority of the corridor experiences high turnover with few long-term residents compared to other areas of the Truckee Meadows. This can affect corridor familiarity. Furthermore, the tendency for an older population suggests alternatives that reduce speeds and improve visibility may be effective.

Figure 5-3: Key Demographics (2015)



5.3 Title VI Considerations

The half-mile corridor study area clearly includes a population disadvantaged due to low incomes. These low income residents appear to be spread throughout the corridor subareas.

Taken as a whole, the corridor is no more or less ethnically diverse than the City or County overall. There are, however, readily identifiable minority groups to be found throughout the corridor. Of an estimated total 2015 population of nearly 18,000, the counts of minority residents are shown in **Table 5-1**.

As an SMP project with safety improvements as a primary goal, it is unlikely that recommended changes to transportation infrastructure will place disproportionate *burdens* on this group. Nevertheless, any major proposed changes should take these population segments into consideration.

Table 5-1: 2015 Total Estimated Minority Populations

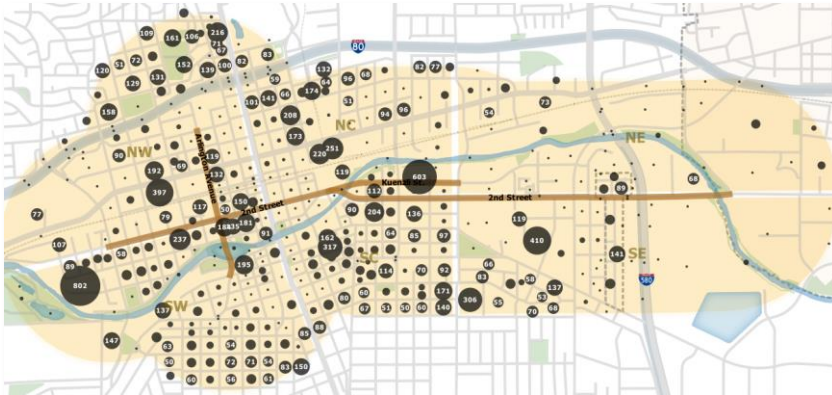
Minority Group	Estimated Corridor Residents
Black Alone	914
American Indian Alone	681
Asian Alone	1,112
Pacific Islander Alone	161
Some Other Race Alone	1,632
Two or More Races	771
Hispanic Origin	3,514

Source: ESRI 2015, based on U.S. Census ACS 2009-2013 5-year estimates

5.4 Population and Employment

Figure 5-4 illustrates the population density along the study area corridor. 2010 block populations are labeled within the proportionally sized dots. Note that density in the eastern subareas, especially beyond Interstate 580 is considerably lower than to the west. In total, the corridor’s 2010 population was 14,496 within 8,674 households.

Figure 5-4: 2010 Population by Census Block. (See Appendix E)



By applying a 0.8-percent annual growth rate (EDAWN “Epic” Study), the 2015 corridor population can be estimated at approximately 15,085 residents.

While the study team found variability among the data sources for employment, **Figure 5-5** illustrates the U.S. Census LEHD counts for 2013 which totals 34,500 jobs in the study area. As noted in **Appendix E**, 39,300 as estimated by EDAWN’s “EPIC” study may be a more accurate estimate.

Figure 5-5: 2013 Employment Density. (See Appendix E)



According to Census LEHD analysis of 2013 commuting patterns, less than 5% of those employed within the subject corridor also live in the corridor. In other words, more than 95% of corridor jobs are filled by people commuting into the study area. Of the 6,500 employed area

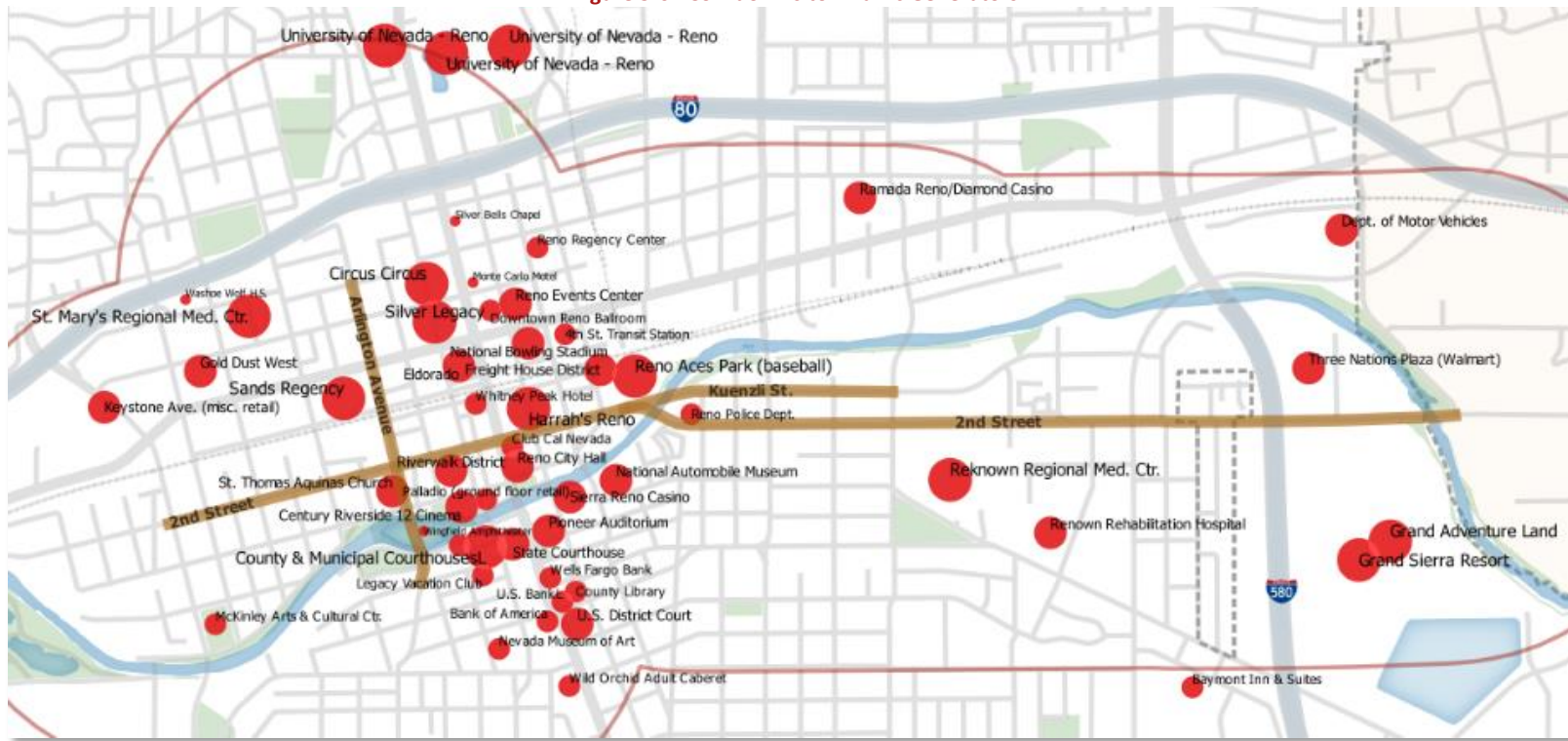
residents, 22% stay inside the study area to work, while the remaining 78% commute outside the corridor.

Traffic in the corridor, whether vehicular or pedestrian, is largely generated by the residents and employees who live and work in the corridor. Significant additional traffic, however, also comes from visitors not otherwise accounted for by job and population estimates. Whether tourists from outside the region or shoppers, diners and errand-runners from outside the corridor, these visitors are drawn to

predictable activity centers such as casinos, hotels, retail/restaurant clusters, government buildings, hospitals and schools.

These traffic-generating activity centers are depicted on **Figure 5-6**, with symbols sized to roughly correspond with each site's non-local trip generation potential. Note that visitor traffic is likely most intense in the downtown area, east of Arlington Avenue, on either side of 2nd Street.

Figure 5-6: Corridor Visitor Traffic Generators



5.5 Existing Land Use and Zoning

The 2nd Street and Arlington Avenue corridors lie within specific planning areas of the City of Reno. These planning areas are defined, in part, by the policies of the Truckee Meadows Regional Plan. Downtown Reno is identified as a regional center, and includes the western portion of the 2nd Street Corridor from Keystone Avenue east to Wells Avenue and the Arlington Avenue Corridor from California Avenue to W 6th Street. The central portion of the 2nd Street Corridor, from Wells Avenue east to Kietzke Lane, is within the Medical Regional Center. As such, much of the land within these portions of the Arlington Avenue and 2nd Street corridors have a “Mixed Use” (MU) zoning designation. The eastern portion of the 2nd Street Corridor from Kietzke Lane east to Galletti Way is not within a specific planning area and has a mix of zoning designations including “Industrial” (I), “Mixed Use” (MU), “Public Facility” (PF), and also include the Reno-Sparks Indian Colony. See **Figure 5-7** and **Figure 5-8** for Planning Areas and Existing Zoning maps on the following pages.

The Downtown Regional Center encourages concentrated development, pedestrian safety enhancements, streetscape, and supports Transit Oriented Development (TOD). The Downtown Regional Center is divided into 5 districts, which the Summary of Relevant Plans and Studies Technical Memorandum (Appendix C) provides a detailed summary and background for specific planning districts within the 2nd Street and Arlington Corridors:

- ❖ **Entertainment District** - Tourist element of Downtown appropriate for hotel/casinos, destination resorts, major

recreation facilities, cultural facilities, tourist shopping, services, and activities.

- ❖ **Truckee River District** – Preservation of the Downtown benefits of the Truckee River with building design and pedestrian corridors that enhance the river corridor and encourage the District.
- ❖ **California Avenue District** – Preservation of the office portion of the regional center with land use including residential, retail, restaurant, and cultural facilities playing a key role in making this a vibrant district.
- ❖ **The Keystone Avenue and Wells Avenue Districts** – Maintain general services within the regional center encouraging mixed land use at lower intensities and densities to transition to surrounding neighborhoods. A portion of the Keystone District permits gaming (between Keystone Avenue and Vine Street within the 2nd Street corridor).

The 2nd Street and Arlington Avenue Corridors have a mix of uses ranging from the Downtown Reno Casino Core, a variety of commercial uses, the Aces Baseball Stadium, two Hospitals (Renown & Saint Marys), and a mix of single and multi-family residential. As described above, the corridors have many different “Districts” with individual identities. These Districts are described in detail in the Existing Land Use – Opportunities & Challenges Technical Memorandum found in **Appendix F**.

Figure 5-7: City of Reno Downtown Districts (Insert 11X17)

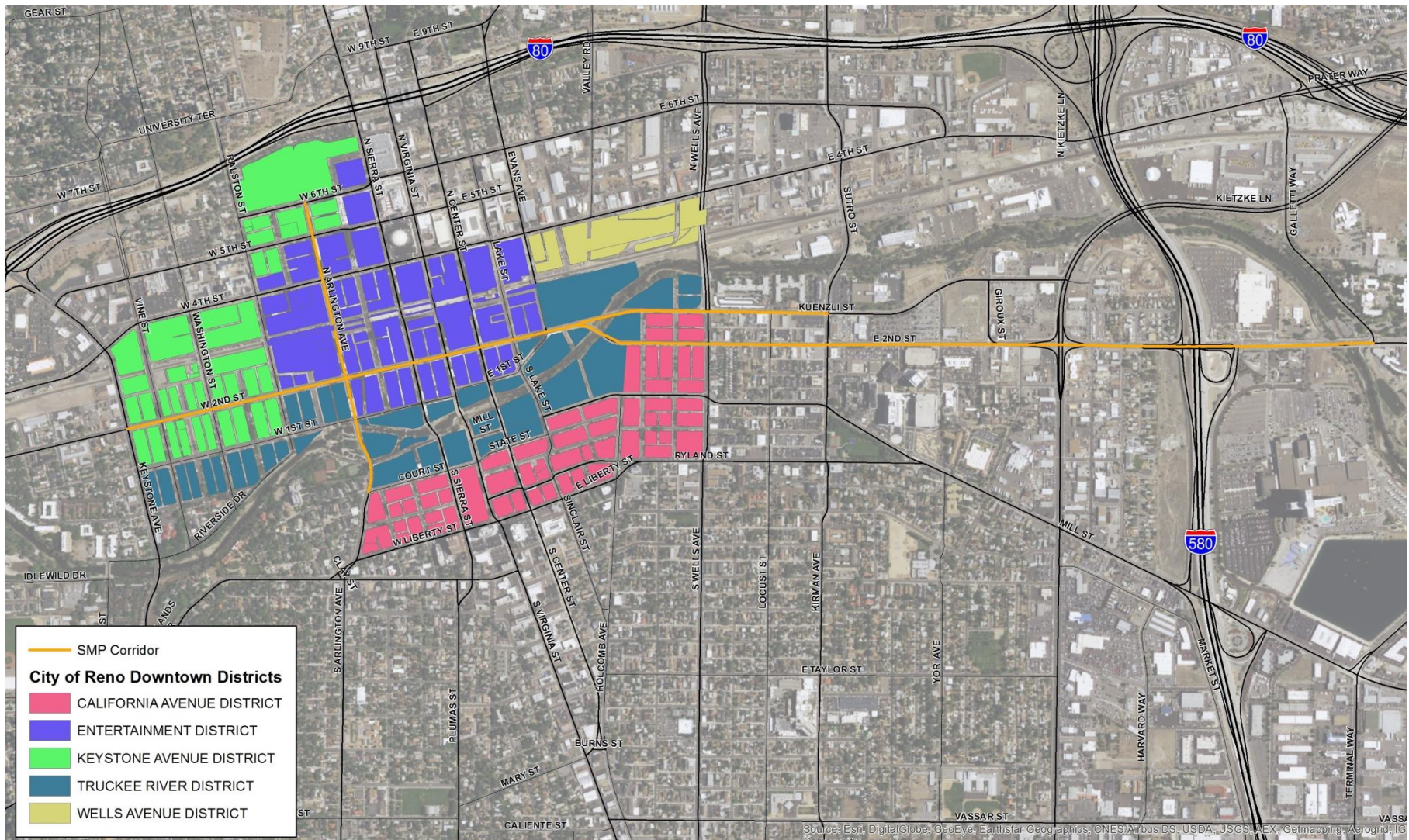
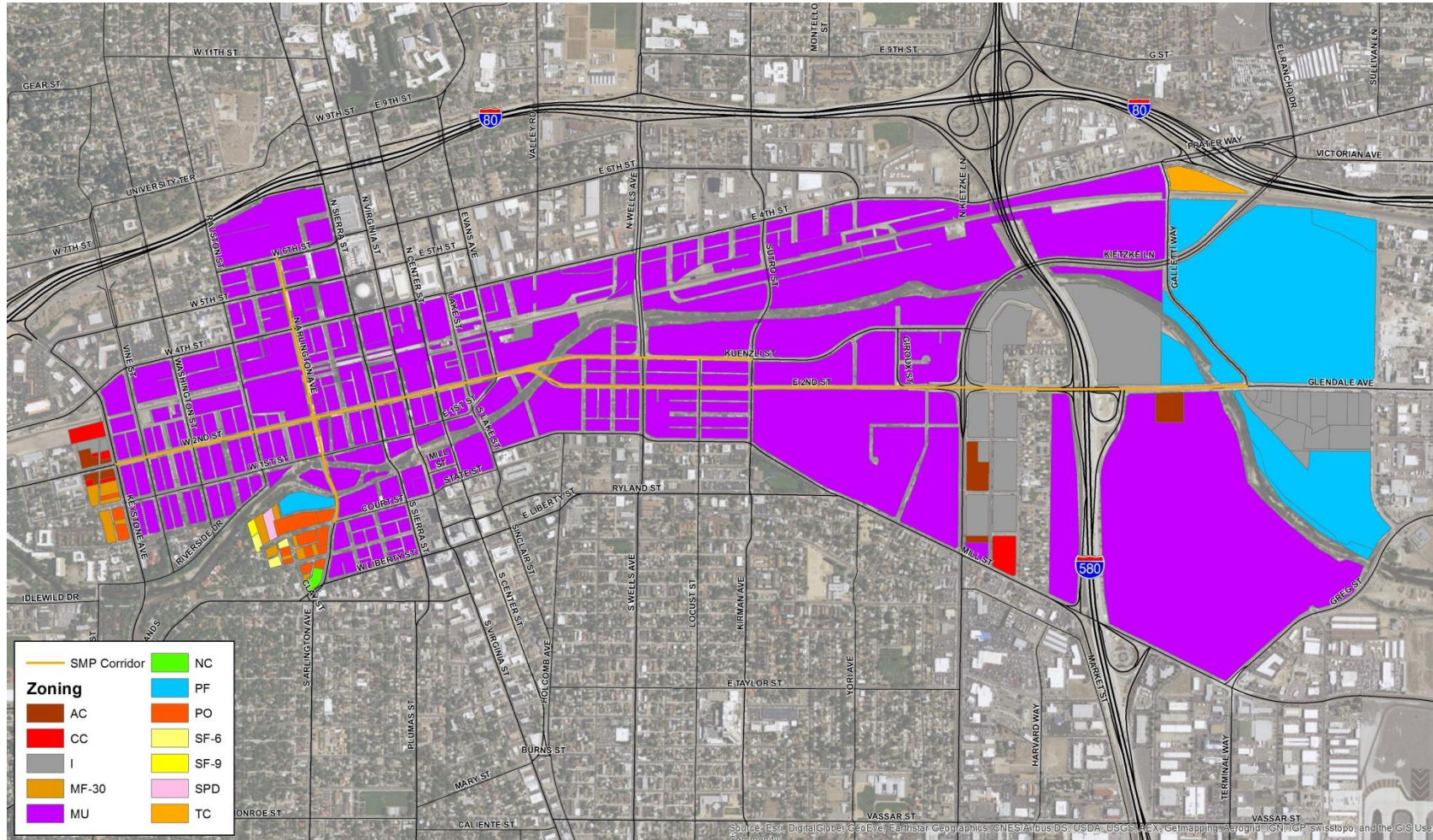


Figure 5-8: Existing Zoning (Insert 11X17)



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, ICF, swisstopo, and the GIS User Community

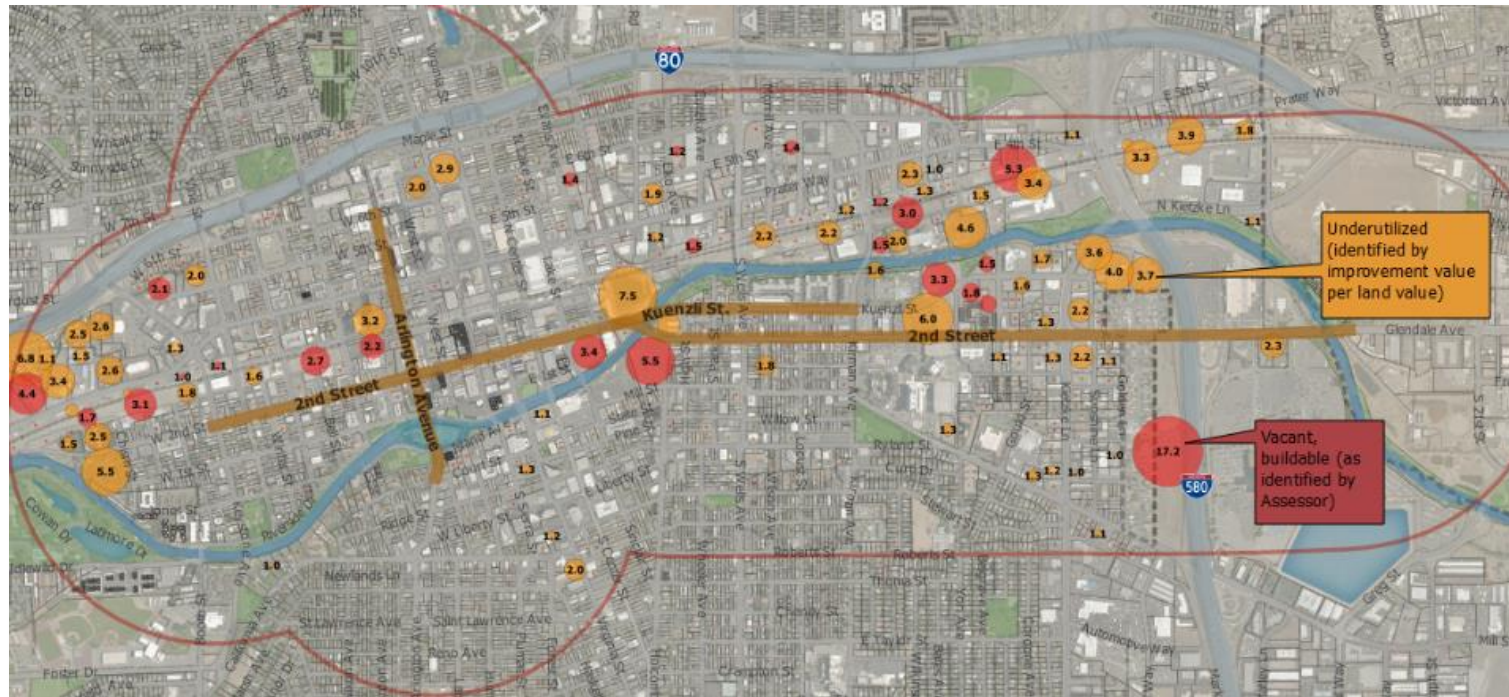
5.6 Economic Development

Because the corridor is now at or near maximum occupancy, future population gains would have to rely on the construction of additional housing units going forward. **Figure 5-9** highlights and shows acreages for parcels identified as vacant and buildable (per the Assessor) or as underutilized (as identified by comparing improvement values to land values). Only parcels greater than 0.2 acres, zoned for development, are included.

The greatest concentration of vacant or underutilized land capacity is found in the Northwest and Northeast corridor subareas. In fact, nearly 250 of the 363 total corridor capacity acres are located north of 2nd Street. The largest capacity parcel south of 2nd Street (and the largest parcel in the overall study area) is the 17.3 acre Mallard Company property located between the tribal enclave and I-580, in the Southeast subarea. However, this property does experience access challenges that could affect development potential.

Most of the identified land capacity (300 of 363 total acres) is zoned for mixed-use development. Just 15 acres are zoned exclusively as residential (9 acres multifamily, 5 acres single family). Approximately 28 acres are zoned industrial, with the remaining 20 zoned as commercial of some form. See **Appendix E** for details.

Figure 5-9: Vacant and Underutilized Land Capacity (Insert 11X17)



6.0 SMP Alternatives

6.1 Alternatives Background

Vehicular, bicycle and pedestrian safety alternatives have been categorized into both corridor and spot improvements. Corridor alternatives consist of reconfigurations of the existing roadway section for a segment of the corridor. These segments include:

- ❖ 2nd Street, Keystone Avenue to Arlington Avenue
- ❖ 2nd Street, Arlington Avenue to Kuenzli Street
- ❖ 2nd Street, Kuenzli Street to Kirman Avenue and Kuenzli Street from Giroux Street to 2nd Street
- ❖ 2nd Street, Kirman Avenue to Giroux Street

Roadway reconfigurations east of Giroux Street were not proposed given the pending improvements from NDOT’s Glendale Improvement Project. Spot safety improvement alternatives are those that affect a singular, finite location such as a protected pedestrian crossing or intersection improvements.

The alternatives were developed by focusing on high activity locations identified in the cash analysis, field reviews/observations and by applying engineering judgement. Existing and future traffic volumes were taken into account to ensure proposed alternatives would not have a negative impact on traffic operations. Fortunately, the low traffic volumes experienced in much of the corridor, namely west of Kietzke Avenue, allow for significant flexibility with the roadway configuration without degrading traffic performance below adopted thresholds.

“Complete Streets are streets for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work.” *Smartgrowthamerica.org*

6.2 Corridor Alternatives

To help organize the range of corridor alternatives and segment combinations, alternative themes were developed. These alternative packages consist of the following:

Early Action Complete Streets – This alternative focuses on restriping the existing roadway to generally reduce vehicular lanes and incorporate bike lanes. The existing curb line remains as is, thereby making this alternative relatively easy and inexpensive to implement.

Roadway Streetscapes – This alternative incorporates raised landscape areas such as medians and sidewalk buffers to not only improve safety but enhance roadway and community aesthetics.

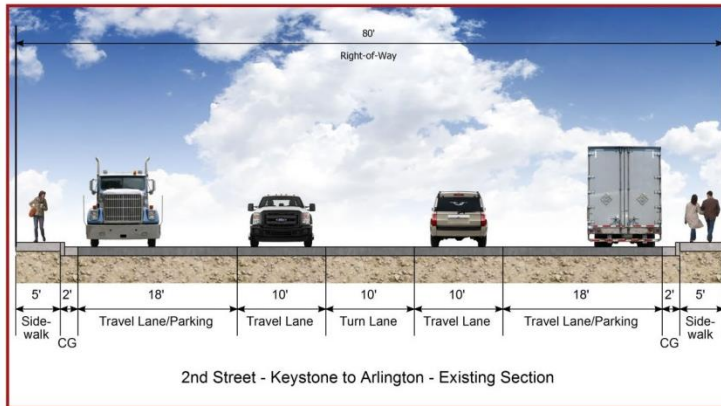
Pedestrian Focus – The Pedestrian Focus alternative emphasizes sidewalks and pedestrian features in conjunction with other complete streets elements. These include corner bulb-outs/parklets as shown in **Figure 6-1** below. The Pedestrian Focus alternative would require significant reconstruction of the curb line which does increase costs.

It is important to note that the three corridor alternatives are designed to fit within the existing right-of-way. The alternatives are described on the following pages grouped by segment for easy comparison.

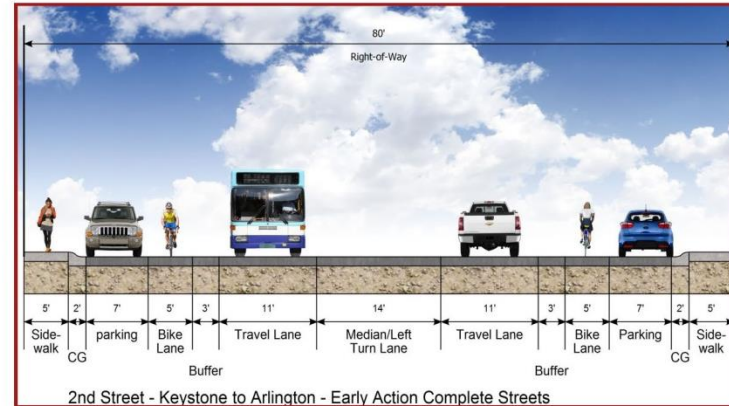
Figure 6-1: Bulb-out Parklet Concept Rendering



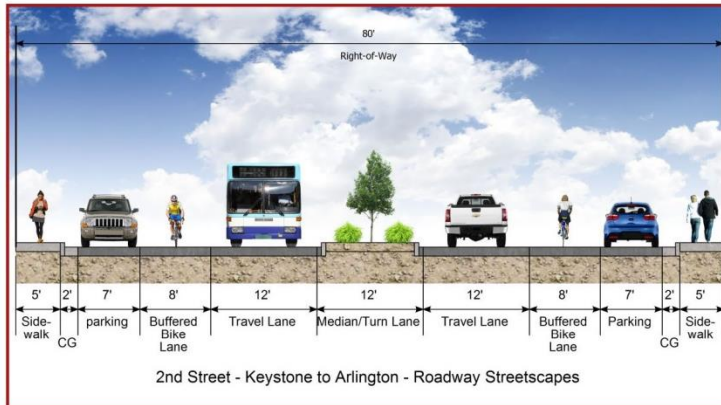
2nd Street Keystone Avenue to Arlington Avenue



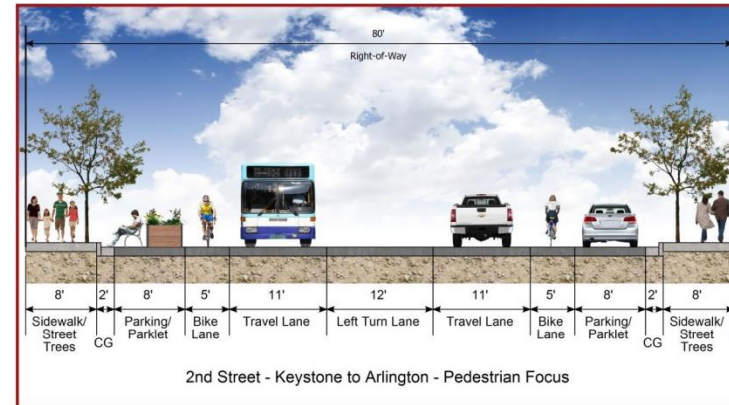
The existing section consists of two travel lanes in each direction, a center turn lane, roadside parking and standard sidewalks.



Early action complete streets would reduce to one travel lane in each direction, a center turn lane, and add buffered bike lanes. Roadside parking and standard sidewalks would remain.

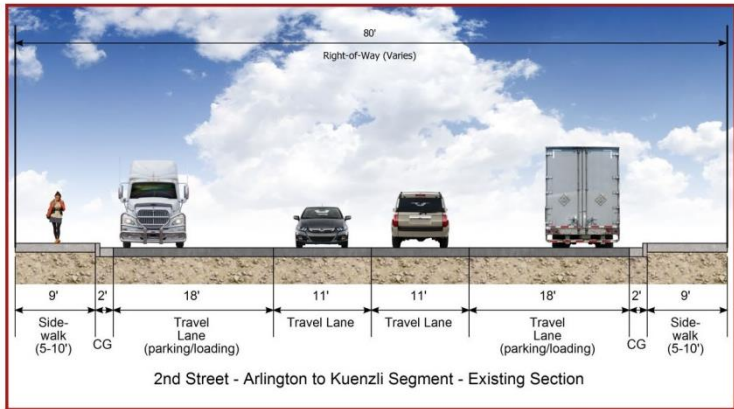


Roadway streetscapes would reduce to one travel lane in each direction, install raised landscaped medians with turn areas and buffered bike lanes. Roadside parking and standard sidewalk would remain.

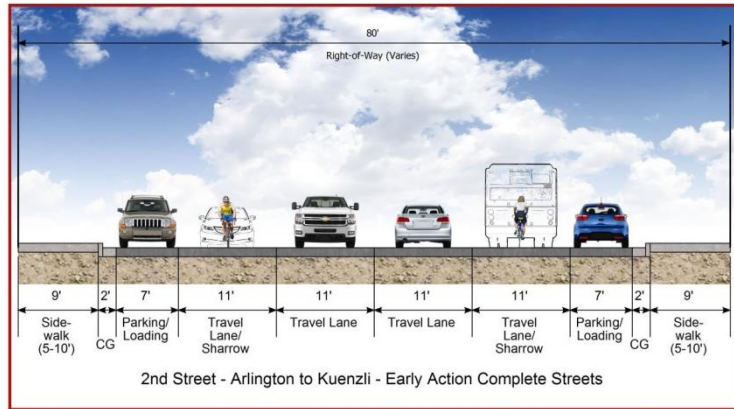


Pedestrian focus similarly reduces to one lane in each direction with a center turn lane and bike lanes. Sidewalks are widened and roadside parking is replaced with bulb-out parklets at cross streets.

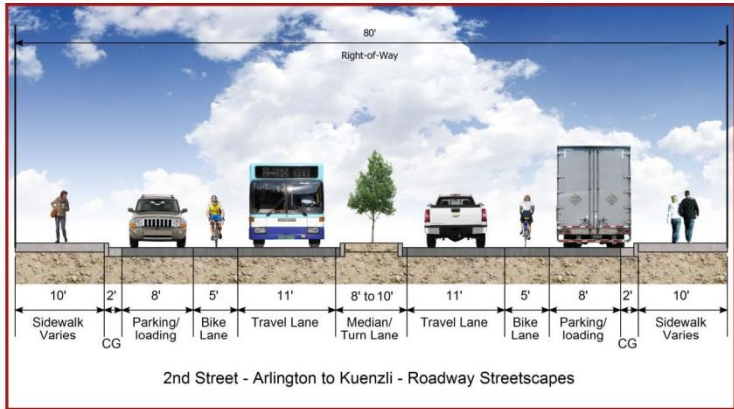
2nd Street Arlington Avenue to Kuenzli Street



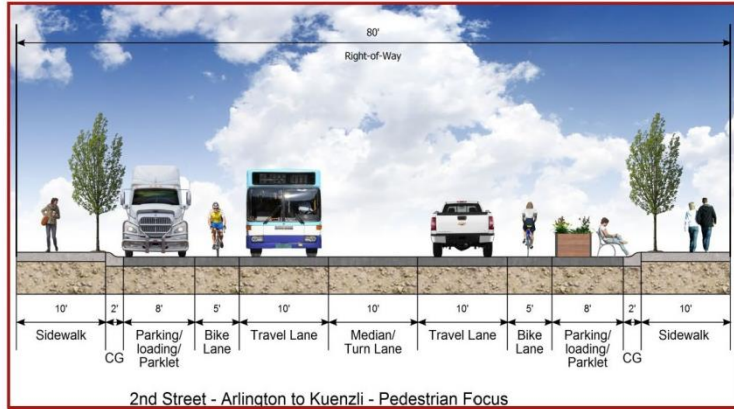
The existing section consists of two travel lanes in each direction, roadside parking/loading zones and variable width sidewalks.



Due to downtown activity, early action complete streets would simply add sharrows to the outside lanes for bicycle connectivity. Roadside parking and variable width would remain.

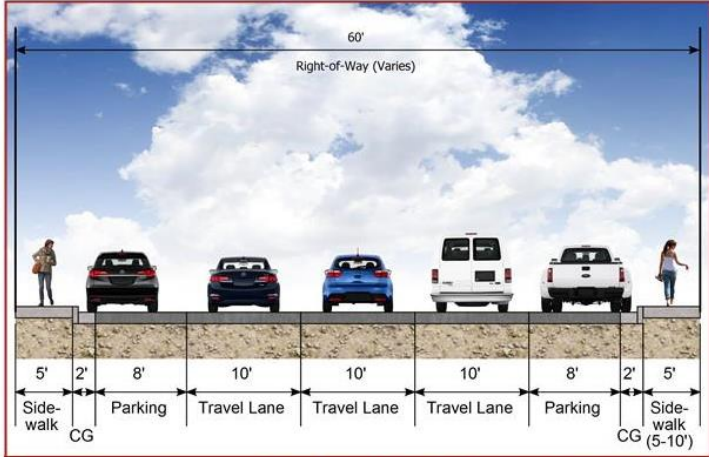


Roadway streetscapes would reduce to one travel lane in each direction, install raised landscaped medians and bike lanes. Medians would widen to minimum left turn lanes at cross streets.

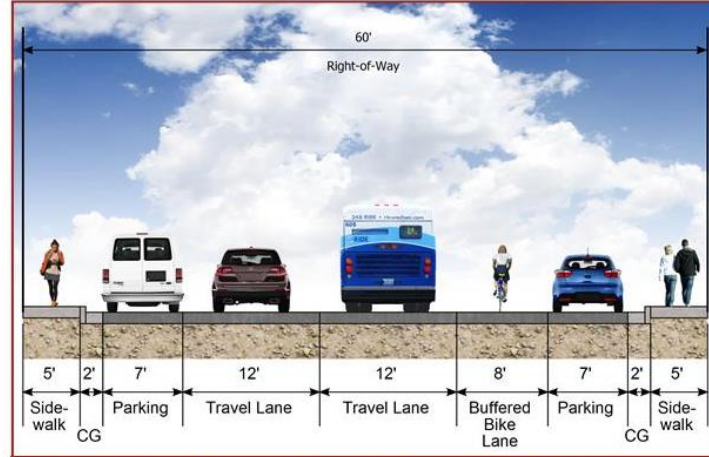


Pedestrian focus reduces to one lane in each direction, a center turn lane and bike lanes. Sidewalks are widened to a consistent 10' and roadside parking is replaced with bulb-out parklets at cross streets.

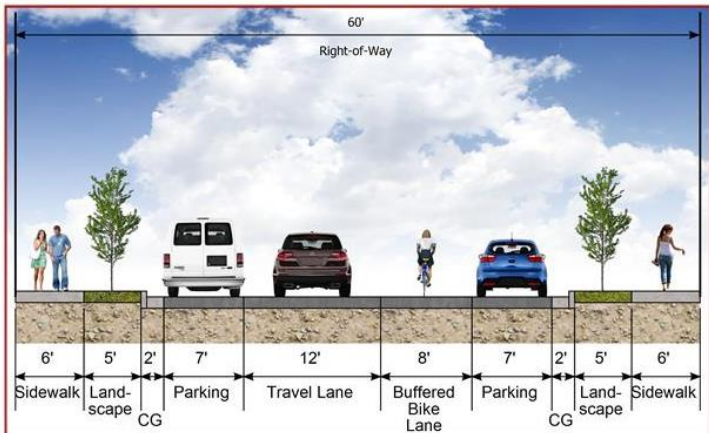
2nd Street, Kuenzli Street to Kirman Avenue Kuenzli Street, 2nd Street to Giroux Street



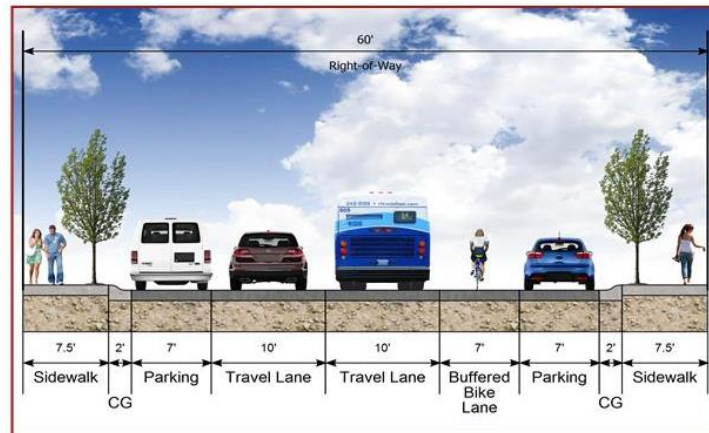
The existing section consists of three travel lanes in one direction, roadside parking and standard sidewalks.



Early action complete streets would reduce to two travel lanes in one direction with a buffered bike lane. Roadside parking and standard width sidewalks would remain.

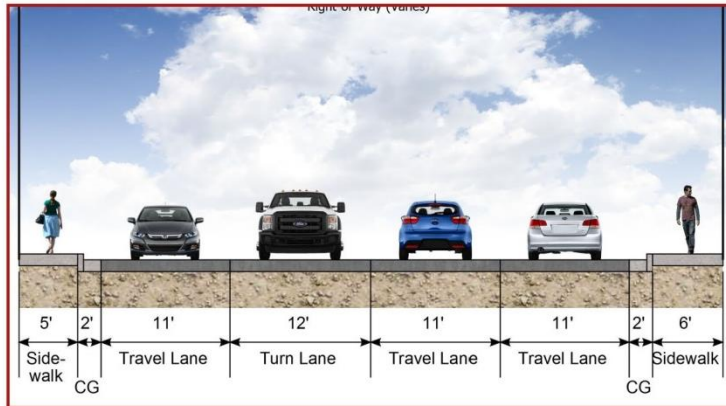
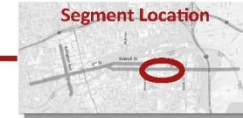


Roadway streetscapes would reduce to one travel lane in one direction, with a buffered bike lane, roadside parking and raised landscape pedestrian buffers with wider sidewalks on the outside.

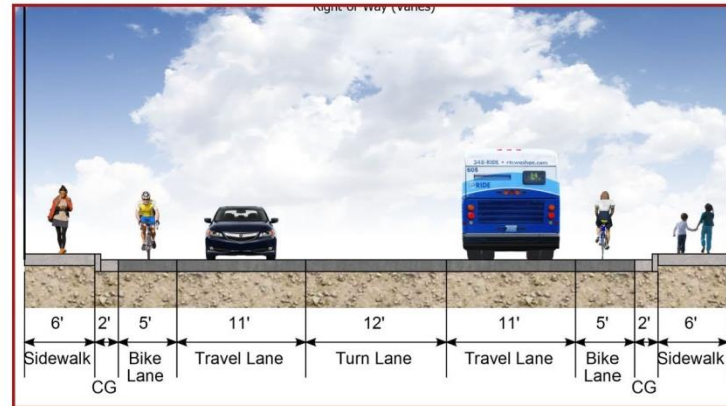


Pedestrian focus reduces to two travel lanes in one direction, a bike lane and roadside parking as well as widened sidewalks with intermittent street trees on the outside.

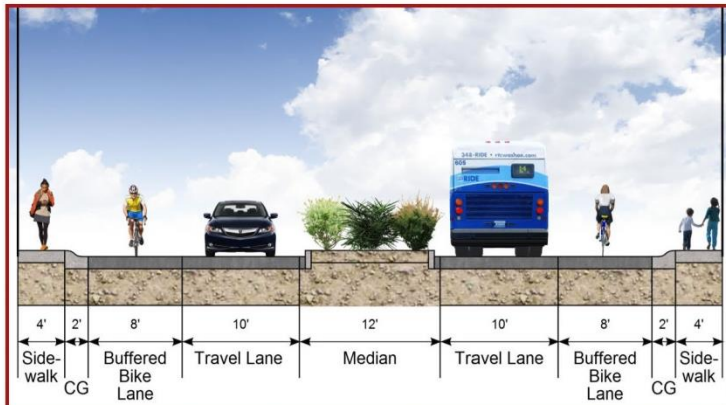
2nd Street Kirman Avenue to Giroux Street



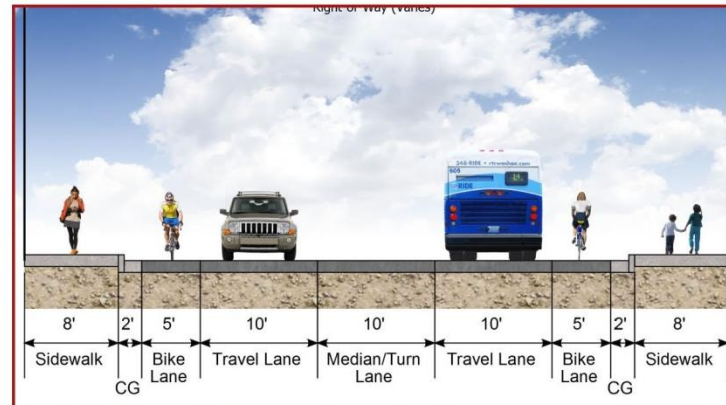
The existing section consists of two eastbound travel lanes, one westbound travel lane, a center turn lane and sidewalks.



Early action complete streets would reduce to one travel lane in each direction with standard bike lanes. The existing sidewalks would remain.



Roadway streetscapes would reduce to one travel lane in each direction, install a raised landscaped median and bike lanes. The existing sidewalks would remain, however, there is an opportunity to widen.

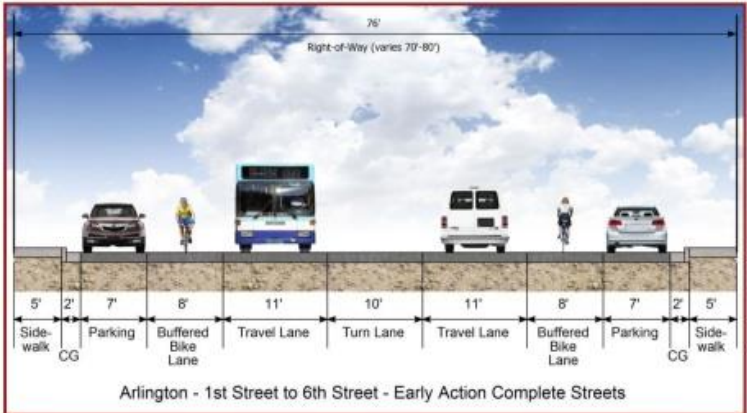


Pedestrian focus reduces to one lane in each direction, a center turn lane, bike lanes and widened sidewalks.

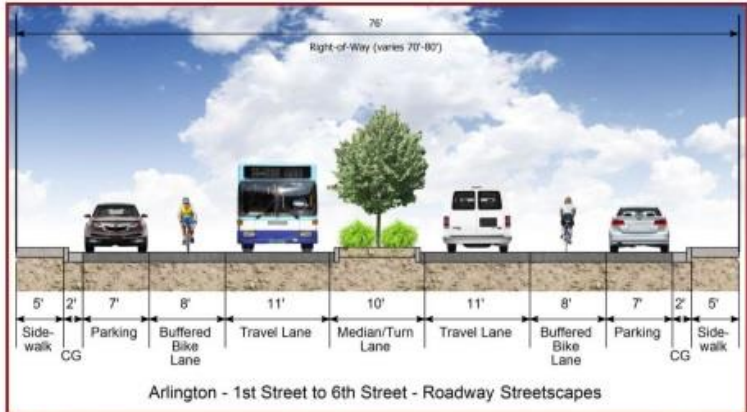
Arlington Avenue W 1st Street to W 6th Street



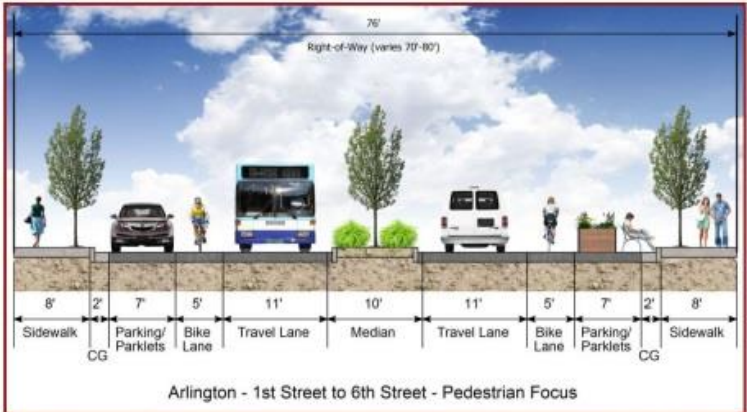
The existing section consists of two travel lanes in each direction, roadside parking and sidewalks. Single left turn lanes exist at major intersections.



Early action complete streets would reduce lanes to one in each direction with a center turn lane and buffered bike lanes. Roadside parking and standard sidewalk would remain.



Roadway streetscapes would reduce to one travel lane in each direction, install raised landscaped medians and buffered bike lanes. Roadside parking and standard sidewalk would remain.



Pedestrian focus reduces to one lane in each direction, a raised median and bike lanes. Sidewalks are widened to 8' with intermittent trees. Roadside parking remains with select bulb-out parklets.

6.3 Corridor Alternatives Comparison

The corridor alternatives were analyzed to predict the affects to the study area from a planning-level and to allow for comparisons among alternatives. This includes predictive methodologies for estimating crash reduction. The Highway Safety Manual (HSM) outlines procedures for estimating crashes for both roadway reconfigurations as well as spot improvements. The Interactive Highway Safety Design Module (IHSDM) is a computer application tool that helps automate the application of HSM methods and was used where appropriate.

The study team applied HSM methods to predict crash performance where possible. The IHSDM does not currently include methods applicable to one-way streets (the couplet system) or unbalanced roadway sections (2nd Street from Kirman Street to Giroux Street). Estimations of similar roadway sections and engineering judgement were used in these locations and combined with results from the rest of the study corridor to develop an overall estimated crash performance. **Table 6-1** summarizes the four corridor alternative comparison metrics followed by an explanation of each result.

Table 6-1: Corridor Alternatives Comparison

Alternative	Potential Crash Reduction	Cost	Traffic Performance	Livability
1. Early Action Complete Streets	up to 19%	\$	●	🌲
2. Roadway Streetscapes	up to 2%	\$\$\$\$	●	🌲🌲🌲
3. Pedestrian Focus	up to 20%	\$\$\$\$	●	🌲🌲

6.4 Potential Crash Reduction Comparison

As mentioned, a combination of IHSDM analysis results, crash reduction factors and engineering judgement were combined to estimate potential crash reduction for each corridor alternative. The results identified in **Table 6-1** represent the maximum crash reduction estimated for a corridor segment. The maximum segment was used to illustrate the greatest potential crash reduction that may be experienced and to account for the large variability among segments. This variability is due to the applicability of the IHSDM for certain roadway configurations and for proposed segment improvements that work within the larger context of the alternative but may have negligible crash reduction within individual segments.

Table 6-2 below depicts the estimated crash reduction for each corridor alternative per corridor segment.

Table 6-2: Estimated Alternative Crash Reduction By Segment

Alternative Segment	Early Action Complete Sts	Roadway Streetscape	Pedestrian Focused
2 nd , Keystone to Arlington	19%	6%	10%
2 nd , Arlington to Kuenzli	0%	4%	0%
2 nd , Kuenzli to Kirman	1%	1%	1%
2 nd , Kirman to Giroux	11%	11%	11%
Kuenzli, 2 nd to Kirman	1%	1%	1%
Arlington, 1 st to 6 th	19%	20%	20%

As can be seen, there is large variability among segments. This is due to the constrained ability to make significant roadway reconfigurations in Downtown Reno and the minimal benefit of reducing lanes in the multi-lane couplet area which experiences low traffic volumes. This does not suggest the proposed improvements within these segments are not important for other transportation and continuity factors.

6.5 Corridor Alternative Cost Estimates

Planning-level cost estimates were prepared for each of the corridor alternatives. The estimated costs include construction costs, soft costs and a 25-percent contingency in current dollars. Costs are provided as a range to account for variations in the potential project scope. For example, the Pedestrian Focus alternative significantly changes the existing drainage flow lines and could affect roadway cross slope in certain segments. This variation could be the difference between the selection of roadway milling to improve the road surface and reconfigure stripping and a full roadway reconstruction. With this understanding the cost estimates are:

- ❖ Early Action Complete Streets: **\$2.2 - \$2.8 million**
- ❖ Roadway Streetscapes: **\$21.0 - \$22.5 million**
- ❖ Pedestrian Focus: **\$23.5 - \$27.5 million**

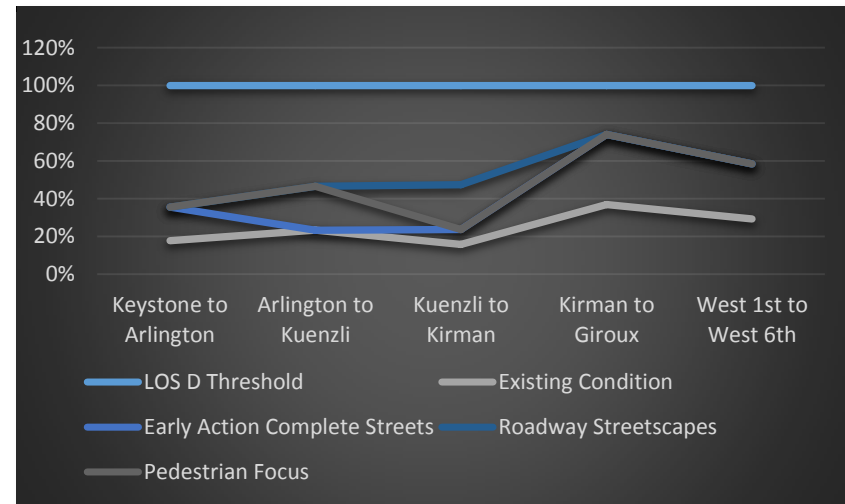
6.6 Corridor Alternatives Traffic Comparison

The proposed corridor alternatives will have an impact on the traffic operational performance of the study roadways. The study team considered the effects at a planning level to ensure there was no potential for vehicular operations to be degraded below the regional standard of LOS D.

The planning-level review looked at daily volumes (AADT) to determine initial performance by comparing existing AADTs for each segment against thresholds for the conceptual LOS D carrying capacity. Any segment that nears the threshold capacity would have to be further analyzed to consider peak hour LOS performance as well as future performance under future travel demand. As shown in **Figure 6-1**, each segment remains well within conceptual thresholds under each proposed alternative. This suggests that, while each alternative may change traffic operational behavior, no changes in

traffic operations are expected to significantly degrade performance below the adopted policy LOS.

Figure 6-1: Corridor Alternatives Traffic Performance



It should be noted that both the Roadway Streetscapes and Pedestrian Focus do come within almost 20-percent of the conceptual volumetric threshold for the segment between Kirman Avenue and Giroux Street. If traffic volumes were to increase unexpectedly through this segment, these two corridor alternatives have less of a factor of safety to absorb additional volumes before performance could be degraded to a point of concern.

6.7 Corridor Alternatives Livability Comparison

Transportation projects and investment have both direct and indirect effects to neighborhoods and communities. In many cases, transportation investments can spur community revitalization and improve area livability by increasing safety, enhancing mobility and

making the streetscape a useable and engaging community asset. Understanding this, the study team included livability as a qualitative metric for corridor alternative comparison.

While there are academic and institutional studies around the country that analyze the impacts of public works investments on the community, this in-depth analysis is beyond the scope of this SMP. Rather, the team conceptually considered how changes to the roadway would enhance various elements of livability as described below.

Early Action Complete Streets

- Creates a safer environment for travelers
- Enhances opportunities for active modes of transportation
- Reduces speeds and makes roadways feel like less of a barrier between neighborhoods

Roadway Streetscapes

- Creates a safer environment for travelers
- Enhances opportunities for active modes of transportation
- Reduces speeds and makes roadways feel like less of a barrier between neighborhoods
- Improves the visual character of the streetscape through landscaping and potential hardscape elements
- Creates opportunities for active use of the right-of-way by incorporating opportunities for parklets

Pedestrian Focused

- Creates a safer environment for travelers
- Enhances opportunities for active modes of transportation
- Reduces speeds and makes roadways feel like less of a barrier between neighborhoods
- Creates opportunities for increased pedestrian activity and active use of the right-of-way in the downtown area for installments such as sidewalk cafes

6.8 Corridor Alternative Summary

Each of the corridor alternatives exhibit various benefits with the intensity of each benefit affected by external factors such as available funding, area development, private interests and other local and regional priorities. Understanding this and with similar crash reductions expected for each, this SMP is not recommending any particular corridor alternative. While it is important to note that the Early Action Complete Streets alternative is the only alternative to have a Benefit/Cost ratio over 1.00 (5.18) and the Roadway Streetscapes and Pedestrian Focus alternatives Benefit/Cost ratios are less than 1.00 (0.47 and 0.41 respectively), these calculations consider only the benefits associated with crash reduction and the “true” benefit of each alternative must be considered within the context of other community changes and enhancements.

The corridor alternatives define various possibilities for roadway reconfigurations and safety enhancements and, with the varying nature of the study area segments, corridor alternatives can be mixed and matched. For example, the Roadway Streetscapes may be most applicable for 2nd Street from Kuenzli Street to Kirman Avenue given the character of the neighborhood whereas the Pedestrian Focus may be most applicable from Arlington Avenue to Kuenzli Street given the high pedestrian activity and opportunity to incorporate widened sidewalks as usable spaces for cafes, bistro dining, etc.

However, it is recommended that the Early Action Complete Streets corridor alternative be considered up front. This low cost alternative can be incorporated into any pavement preservation project with little to no impact on the construction budget. Local agencies are encouraged to review their pavement preservation work programs to identify opportunities to incorporate this alternative.

Special Note: A new development has been proposed in the study area. The “West 2nd District” comprises a major transformation of the portion of the study area extending from Washington Street to the west, Arlington Avenue to the east, West 1st Street to the south and the train trench to the north. The project proposes to build 30 new buildings comprised of 2,000 residences, two hotels, 750,000 square feet of office and commercial space and 5,000 parking spaces located mostly in garages.

The study team met with the West 2nd District developers to discuss the SMP alternatives and to understand their vision of the corridor. The developer’s current plans are to incorporate significant complete streets elements into West 2nd Street as well as surrounding roadways. The pedestrian zone is to be greatly emphasized with Stevenson Street converted to a pedestrian esplanade.

While the study team recognizes the dynamic nature of private development of this nature, it is clear that the focus of both this SMP and the West 2nd District are aligned on creating a safer, slower, walkable and bikeable West 2nd Street. All of the corridor alternatives considered are consistent with this philosophy.

Figure 6-2: West 2nd District rendering. (Source: west2nndistrict.com)



6.9 Spot Location Alternatives

In addition to the corridor alternatives that effect segments of the study area roadways, spot alternative improvements have also been identified to improve safety at select locations. These spot recommendations are in addition to and in conjunction with those identified in the NDOT Road Safety Assessment. RSA recommendations tend to be more finite in nature and focus on existing features that do not meet current standards whereas SMP spot improvements tend to suggest modifications to existing conditions and/or new installations. Granted, this differentiation is a generalization and there is some overlap in the RSA and SMP recommendations.

Spot location alternatives were identified through a combination of field reviews and data analysis, as well as, applying engineering judgement and safety best practices. Some recommendations can be implemented quickly through public works maintenance efforts while others may require additional study and engineering analysis. A total of 15 spot alternatives were identified.

Prior to implementing the intersection conversion spot improvements recommended below, it may be prudent for the responsible agency to complete an Intersection Control Evaluation (ICE) analysis to confirm the most applicable intersection type.

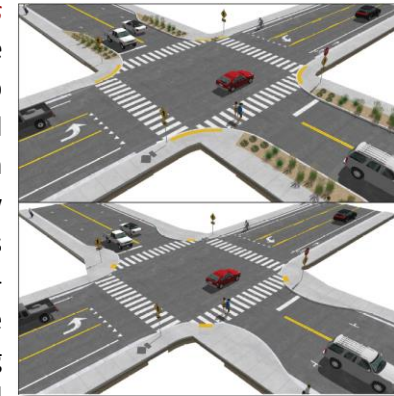
1. Combine Lanes and Install Bulb-Outs at Keystone Ave. –

The westbound approach of the 2nd St./Keystone Ave. intersection currently consists of dedicated left and right turn lanes and one through lane. Through volumes are extremely low with few destinations west of Keystone Avenue and do not necessitate a dedicated through lane. The crash history identifies three pedestrian crashes at this location, two of which were injury. It is recommended to combine the dedicated right turn and through lanes into a single lane. This provides the opportunity to install a bulb-out on the northeast quadrant across 2nd Street. The southeast quadrant has sufficient existing width to accommodate a matching bulb-out. This would reduce the crossing distance for pedestrians and slow down movements to/from 2nd Street. Details regarding drainage and turning radius will have to be analyzed during design. Adding pedestrian lead time to the signal phasing can be considered as well. The approximate construction cost is \$15,000.



2. Install Bulb-Outs at Cross Streets with On-Street Parking –

The segment from Keystone Avenue to Arlington Avenue crosses several neighborhood streets with on street parking. The relatively low volumes on the cross streets combined with propensity for on-street parking to block the pedestrian’s view of oncoming traffic makes these locations ideal for bulb-outs.



With two pedestrian injury crashes at Ralston Street, this location in particular should be considered. Elongated bulb-outs with landscaping are a variation that may fit the residential character of many of the cross streets. The approximate construction cost ranges from \$6,000 to \$10,000 per bulb-out. *The reader is reminded of the special note in Section 6.8 when considering these improvements.*

3. Install Crosswalks at Winter and Stevenson Streets –

Between Keystone Avenue and Arlington Avenue, two intersections currently have crosswalks in all directions. A crosswalk spanning 2nd Street on the east side of Winter Street is recommended to service Innovation School students. Similarly, a crosswalk spanning 2nd Street on the west side of Stevenson Street is recommended to service pedestrians accessing to/from the Greyhound Bus Station.



Crosswalks can reduce crash

potential by as much as 65-percent. The approximate construction cost is \$1,000 per crosswalk.

4. Install Loading Zone at School – The Innovations Charter School is located at the northeast corner of the 2nd St./Winter St. intersection. The school experiences sizable pick-up and drop-off traffic during bell times. While some curb restrictions exist, a formal loading zone delineation could help define and protect students during bell times. The approximate construction cost is \$300.

5. Pedestrian Only Scramble Phase – A pedestrian only scramble phase allows pedestrians to cross intersections both perpendicularly and diagonally. They are ideally suited for highly urban locations with heavy pedestrian volumes. One is currently in operation at the 2nd St./Virginia St. intersection. With over 40-percent higher pedestrian volumes at the 2nd St./Center St. intersection, a pedestrian only phase should be considered at this location. One may also be considered at the 2nd St./Sierra St. intersection as well to create a family of pedestrian signals. However, pedestrian volumes are about 10-percent less at Sierra Street versus Virginia Street. The approximate construction cost is estimated at \$8,000 but could vary considerably based on existing signal infrastructure.



6. Create Right-in/Right-out at Evans Ave. – The 2nd St./Evans Avenue intersection is a signalized 3-leg intersection and lies within 0.04 miles of the signalized



intersection at Jones Vargas Court. This spacing is well below the recommended 0.25 mile spacing. Evans Avenue experiences little traffic, however, it does provide some local connectivity. Pedestrian volumes crossing back and forth across Evans Avenue during stadium events can be quite heavy. The existing signal provides little benefit and should be considered for removal. It could potential be replaced with a right-in/right-out intersection. This would allow for some circulation to be perpetuated while eliminating the issue of closely-spaced intersections and reduces pedestrian conflicts. This alternative should be coordinated with RTC Transit to ensure it does not impede any unpublished bus routing to the 4th Street Transit Center. All published routes currently use nearby Lake Street and not Evans Avenue. The approximate construction cost is \$65,000.

7. Install Rapid Flashing Beacon – There is an existing pedestrian crossing on 2nd Street located east of Kuenzli Street and the bridge over the Truckee River.

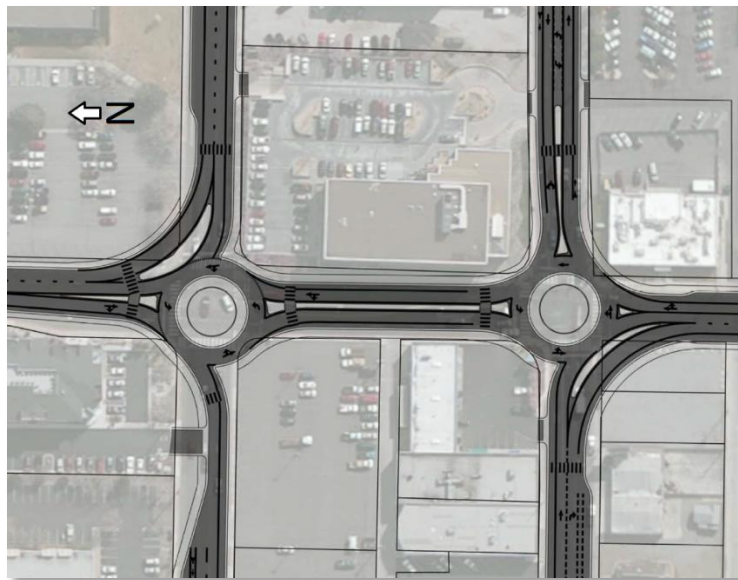


It provides access to/from the Reno Police Department, the Truckee River Trail and a transit stop. With a horizontal curve upstream of the crossing location, vehicles traveling from the west encounter the crossing quickly. While there is an existing crosswalk and static flashers, the installation of a rapid flashing beacon (RFB) would help to make pedestrian crossings more visible to drivers. The approximate construction cost is \$15,000.

8. Convert Kirman Avenue Intersections into Roundabouts – Given relatively low volumes, the 2nd Street and Kuenzli Street intersections

with Kirman Avenue (a.k.a. Sutro Street) experience a high number of crashes at a combined 34. This could be due to a variety of factors including the long expanse of bridge over the Truckee River to the north, the introduction of two-way operations on 2nd Street on the east leg and/or intersection operational issues. Regardless, the study considered modifications to the intersections. Most promising would be the conversion of each to a roundabout intersection. This conversion must be in conjunction with lane reductions for approaching roadways. The combined roundabouts have the potential to significantly reduce the crashes experienced in these two intersections.

Figure 6-3: Kirman Avenue Roundabouts Concept



One important challenge with this spot alternative is the impact it would have on surrounding properties. In order to properly fit the

two roundabouts in these locations would impact approximately 7,000 square feet of adjacent privately owned property including a small clip of the existing parking structure located in the southeast quadrant of the Kuenzli Street and Kirman Avenue intersection. The approximate construction cost ranges from \$4 million to \$6 million depending on design complexity and right-of-way requirements.

9. Install Danish Offset at Renown – Employee parking for Renown Hospital is located north of 2nd Street while the hospital is south creating numerous pedestrian crossings. There is an existing crosswalk with pedestrian activated roadside RFBs and static overhead warning signs. Considering the heavy pedestrian volumes at various times throughout the day, it is recommended the crossing be further enhanced with the installation of a danish offset.

While the existing RFBs help make pedestrians visible to drivers, they do not encourage pedestrians to actively identify oncoming vehicles and make eye contact with drivers. A danish offset can help encourage pedestrians to be more proactive and reduce the potential for crashes. It would also allow for RFBs to be installed in the median versus the static overhead sign. The estimated construction cost is \$25,000.



10. Eliminate Outside Turn Lane at Giroux St. – Westbound travelers on 2nd Street from Kietzke Avenue accessing destinations west of Kirman Avenue must route up Giroux Street and west on Kuenzli Street due to the one-way couplet. Westbound 2nd Street to northbound Giroux Street consists of two lanes which cross a crosswalk with a raised porkchop island in the median. This freeflow turn has a large radius allowing for higher speeds compared to a typical obstruct the sight distance between pedestrians in the crosswalk and vehicles. Given the generally low volumes, it is recommended the outside turn lane be eliminated and the movement be restricted to the single inside lane. The estimated construction cost is \$2,500.



11. Convert the 2nd St./Kietzke Ln. Intersection to a Roundabout – With 24 crashes over the five years of data analyzed and another 14 crashes at closely adjacent intersections, the intersection of 2nd Street and Kietzke Lane is of concern. The intersection experiences fairly high volumes, has high speed approaches on Kietzke Lane and large, sweeping dedicated right turn lanes that encourage high speeds. All of these elements combine to create a high crash intersection that is very unwelcoming for bicyclists and pedestrians.

The *Kietzke Lane Safety Management Plan, 2013* identified this intersection as a high crash location and considered crash reduction improvements and modifications. Converting the signalized intersection to a multi-lane roundabout was recommended for further consideration. Upon review, the 2nd Street and Arlington

Avenue SMP study team concurred with the roundabout concept. To advance its consideration as a viable concept, a traffic operations analysis was performed using SIDRA 6 intersection analysis software.



The results show a multi-lane roundabout does function with a 160' inscribed diameter, right turn bypass lanes in the east leg and reduced entry angles. At a projected LOS B, this design exceeds the locally adopted LOS D standard under current volumes. Based on this conceptual design, approximately 1200 square feet of right-of-way will be required to accommodate the free right turn movements.

While the crash reduction factors vary, this conversion would typically experience around a 30-percent reduction in crashes with serious injury and fatal vehicular crashes reduced in excess of 60-percent. Furthermore, a modern roundabout can be designed to make the pedestrian experience both safer and more attractive compared to the existing signalized intersection. The study team highly recommends the roundabout be advanced into preliminary

design. The estimated construction cost ranges from \$5 million to \$8 million depending on design complexity and right-of-way needs.

12. Convert the 2nd St./I-580 Northbound Intersection to a Roundabout – With 17 crashes including three multi-modal crashes at the 2nd Street intersection with northbound I-580, spot improvement alternatives were considered. Initially a “tear drop” interchange was considered, converting both the northbound and southbound I-580 intersections into roundabouts. This configuration would also help alleviate crashes experienced at the southbound intersection (10 vehicular). However, upon further examination, there are significant volumes traveling westbound on 2nd Street to northbound I-580 via the loop ramp in the southeast quadrant of the interchange. Under the “tear drop” concept, this movement becomes very circuitous, requiring travelers to traverse through both roundabouts before entering the loop ramp. With this in mind, a roundabout ramp terminal intersection was developed for the eastern intersection only. This concept would require approximately 6,500 square feet of right-of-way. Similar to the roundabout proposed at Kietzke Lane, crash reduction in the order of 30-percent could be realized.



Improvements affecting changes in access to the interstate system require extensive analysis and federal approvals. Therefore, the proposed roundabout ramp terminal intersection conversion is considered a long term opportunity. It is recommended that it be considered as part of larger traffic and transportation analyses of I-580 and the nearby Spaghetti Bowl. The estimated construction cost ranges from \$6 million to \$8.5 million depending on design complexity and interstate requirements.

13. Combine Transit Stops and Install Pedestrian Fencing – RTC transit route 18 serves the 2nd Street corridor east of downtown and currently has two eastbound stops between I-580 and Galletti Way. These stops are closely spaced. The one closest to the



Truckee River can be eliminated and combined with a stop at the I-580 intersection. This would provide for a protected crossing for riders accessing Walmart. Furthermore, with numerous pedestrians going to/from the Walmart, jaywalking through this area is rampant. To discourage jaywalking and improve safety, pedestrian fencing is recommended for installation in the raised median, as well as, “do not cross” signs. The approximate construction cost is \$65,000.

14. Install Speed Feedback Sign – Northbound Arlington Avenue near Court Street has a downgrade before entering the pedestrian area around Wingfield Park. Today, there are numerous pedestrian warning signs (two static and one flasher). The numerous signs are not overly effective. A single speed feedback sign between Court Street and Island Avenue would be more effective by reducing visual clutter and being more visually dynamic. The estimated construction cost is approximately \$10,000.



15. Island Avenue Intersection Modifications – The intersection of 2nd Street and Island Avenue experienced three bicycle injury crashes during the 5-year data period. This location experiences high multi-modal activity, especially during summer events. Arlington Avenue traffic turning onto Island Avenue have dedicated left turn lanes both northbound and southbound. The traffic on Island Avenue is extremely low given that it serves a couple of small condominium buildings. Therefore, the turn lanes could be eliminated to reduce the number of active lanes



pedestrians have to cross and improve sight lines. Left-turning traffic would simply stay in the through lane until there is a gap. Given the low volumes accessing Island Avenue, this should not have a noticeable effect on Arlington Avenue operations. Furthermore, the existing pedestrian crossing at Island Avenue could be relocated to Wingfield Park. Activity around the park has increased since the kayak course was added to the Truckee River and Island Avenue may no longer be the point of primary crossing demand. The estimated construction cost is approximately \$11,000.

6.10 Transit Recommendations

In addition to the modes analyzed above, transit improvements have also been considered. The types of improvements include infrastructure changes to stop locations and improved amenities. Changes to system routing and frequency are beyond the scope of this SMP as they are thoroughly analyzed by the RTC through existing processes as the area’s transit provider.

Appendix G contains proposed transit recommendations. Improvements to transit amenities are shown in the Transit Amenity Analysis Summary on the appendix. The analysis methodology compared existing amenities to RTC-supplied ridership data. Those stops that experience more than 10 daily riders should contain a bench and shelter. Those locations that experience more than 20 daily riders should contain two benches and two shelters. This analysis methodology results in a total 46 proposed shelters, 25 proposed benches and 10 trash receptacles.

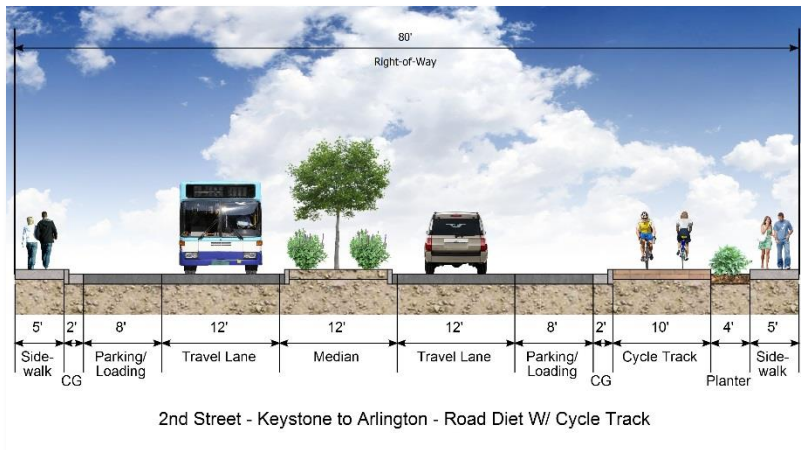
Observations made to improve safety around transit stops are noted in the **Appendix G** plan sheets. Example improvements include parking restrictions, stop relocations and crosswalks.

6.11 Alternatives Considered but Rejected

Other alternatives in addition to those described above were considered but did not advance. It is important that these be documented to help inform future decisions.

For corridor alternatives, two were considered and not advanced. The first was a Bicycle Focus alternative. This alternative developed significant bicycle facilities throughout the study area including several segments with dedicated cycle tracks. It was later determined that the existing bicycle traffic was not enough to warrant a significantly higher level of infrastructure investment and the corridor alternative was not advanced.

Figure 6-4: Example Bicycle Focus Alternative Segment



A second corridor alternative considered but rejected was known as the Reinvented Streets alternative. The idea was to completely reconfigure the roadway to significantly slow down traffic and create a sense of neighborhood by moving the roadside parking to angled parking located in the roadway center. The center parking would be

connected to sidewalks through raised pedestrian crossings which introduce traffic calming.



While the team appreciated the ability for this concept to slow speeds and change roadway character, the facilities included in the study may not be appropriate as they do provide regional connectivity. With that said, this concept could be considered for spot locations such as north Arlington Avenue.

6.12 Environmental Considerations

Due to the conceptual nature of the alternatives outlined above, impacts to the natural and human environment were not considered quantitatively or in detail but rather at a planning level. This consideration did not have a significant impact on alternative development. However, within the study area, known environmental resources do exist. A review of these reveal the following resources of note:

- ❖ Historic architecture, particularly in Downtown Reno
- ❖ Section 4(f) properties including historic architecture and publicly owned parks and recreation facilities
- ❖ The Lahontan Cutthroat Trout, a federally listed species known to inhabit the Truckee River
- ❖ Environmental justice communities as outlined in Section 5
- ❖ Impacts to property owned by the Reno Tahoe Indian Colony
- ❖ Changes to air quality and noise
- ❖ Potential hazardous materials associated with abandoned oil tanks throughout downtown

7.0 Stakeholder Coordination and Public Outreach

7.1 Stakeholder Coordination

The study team incorporated an active collaboration process to coordinate and shape the development of the SMP. This element was particularly important given the fact that much of the study area is under the City of Reno’s jurisdiction and involvement with the RTC. A Technical Advisory Committee (TAC) was assembled to provide a venue for interagency collaboration. Participating agencies included NDOT Safety Division, NDOT District II, RTC Planning, RTC Engineering, City of Reno Traffic Engineering and City of Reno Public Works. Two meetings were held. The first to review the purpose of the SMP, outline the process, review crash history and discuss the process forward. The second meeting focused on a review of the alternatives, both corridor and spot alternatives, and to discuss a public meeting. Materials from each of these meetings can be found in **Appendix H**.

Similar to the TAC, a Stakeholder Working Group (SWG) was convened at the outset. The SWG provided a venue for input and collaboration with major corridor interests. **Table 7-1** lists those who were contacted to participate in the SWG.

Table 7-1: SWG Contact List

Contacted Entities		
Regional Alliance for Downtown	Reno Bike Project	Reno Aces
Ward 3, 5, 1 NABs	Reno Police Department	Renown
Downtown Makeover	Washoe County Sheriff	Reno Sparks Indian Colony
Harrah’s Casino	Cal Neva Casino	Grand Sierra Resort
Cal Neva Casino		

Despite the numerous invitations, SWG participation was light with Renown and the Reno Sparks Indian Colony the primary participants. Two meetings were held covering the same topics as the TAC meetings. In fact, with the light participation of the SWG in the first meeting, the TAC and SWG were combined for meeting number two.

7.2 Public Outreach

The general public was given an opportunity to provide input on the SMP as well. On April 20, 2016 a public meeting was held at McKinley Arts and Culture Center in Reno from 4:00pm till 7:00pm. The meeting was advertised in the Reno Gazette Journal two weeks ahead, the day before and the day of the meeting. In addition, notices were mailed to property owners and residents within a ¼ mile of the study area.

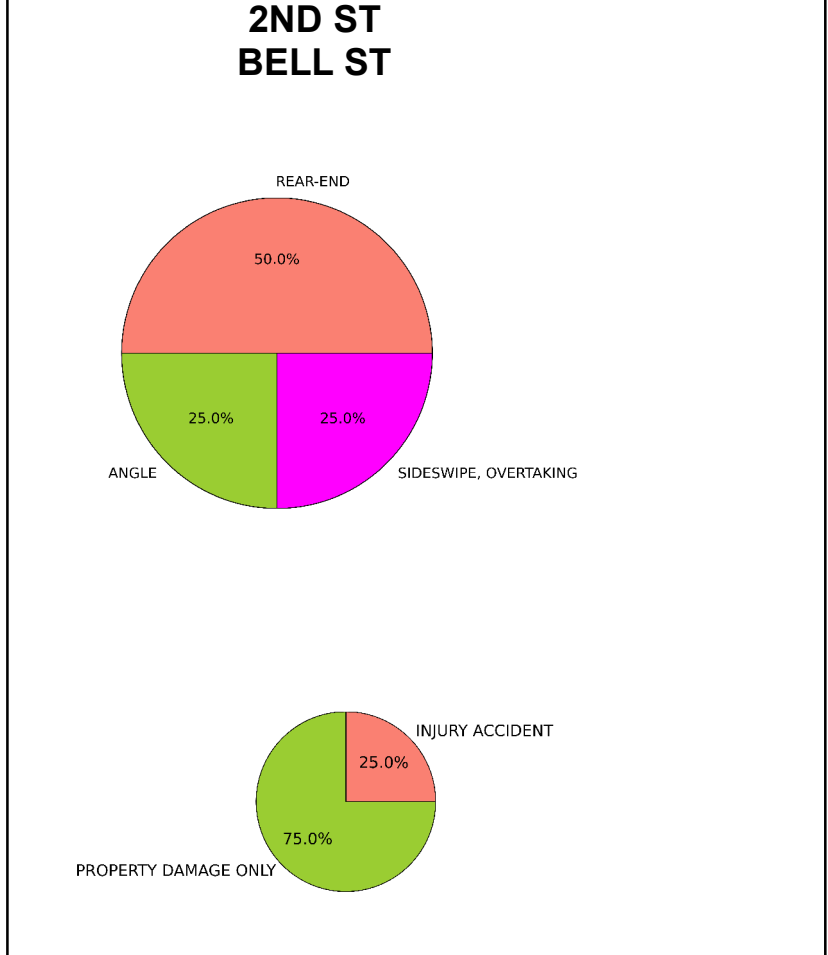
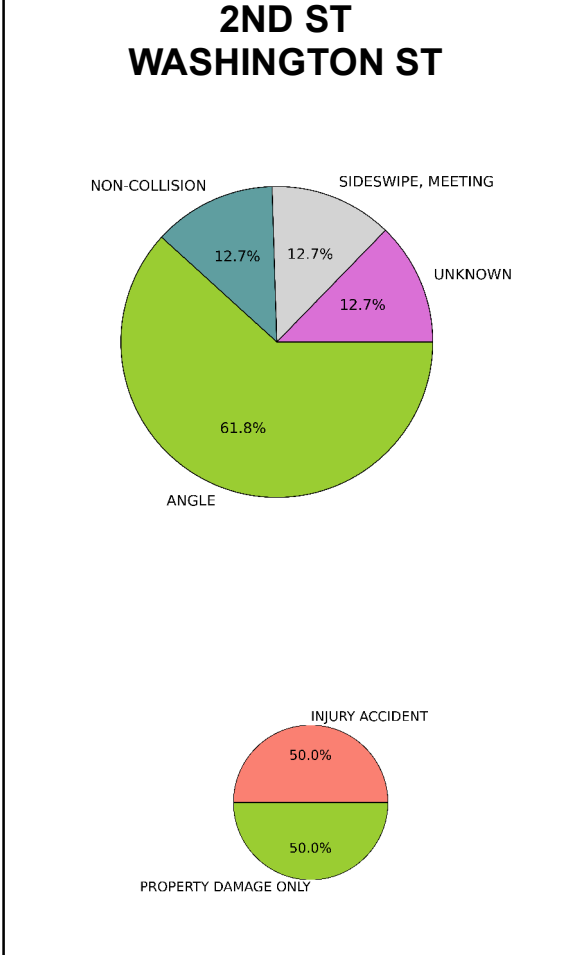
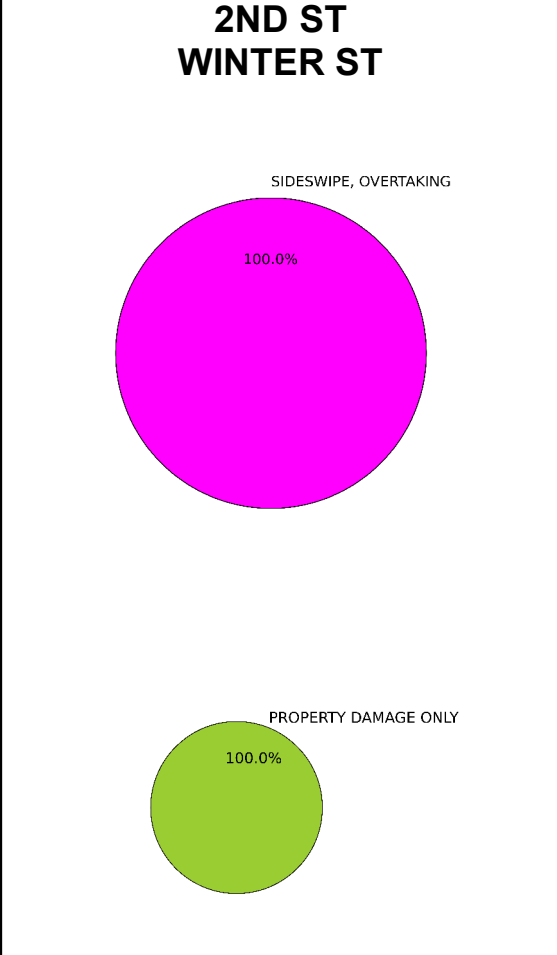
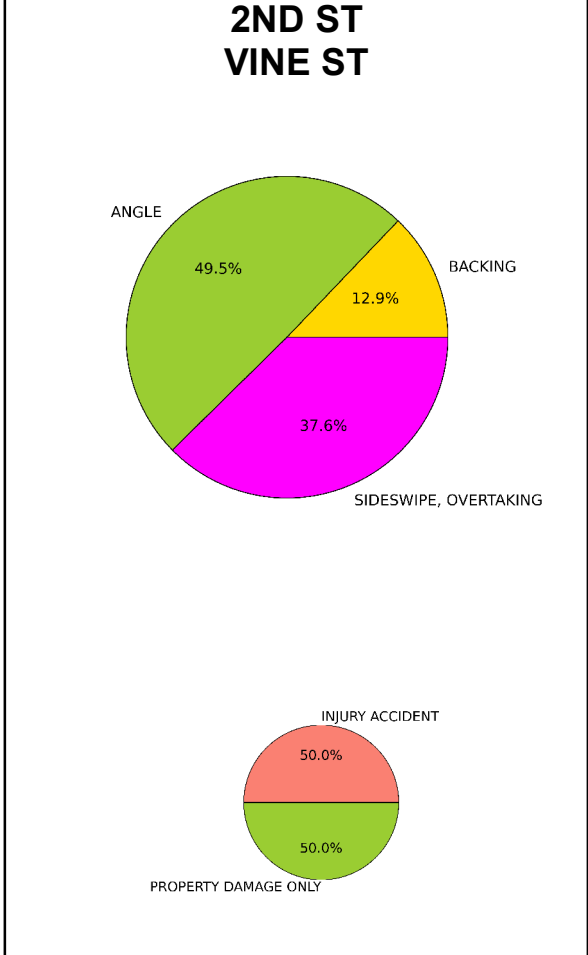
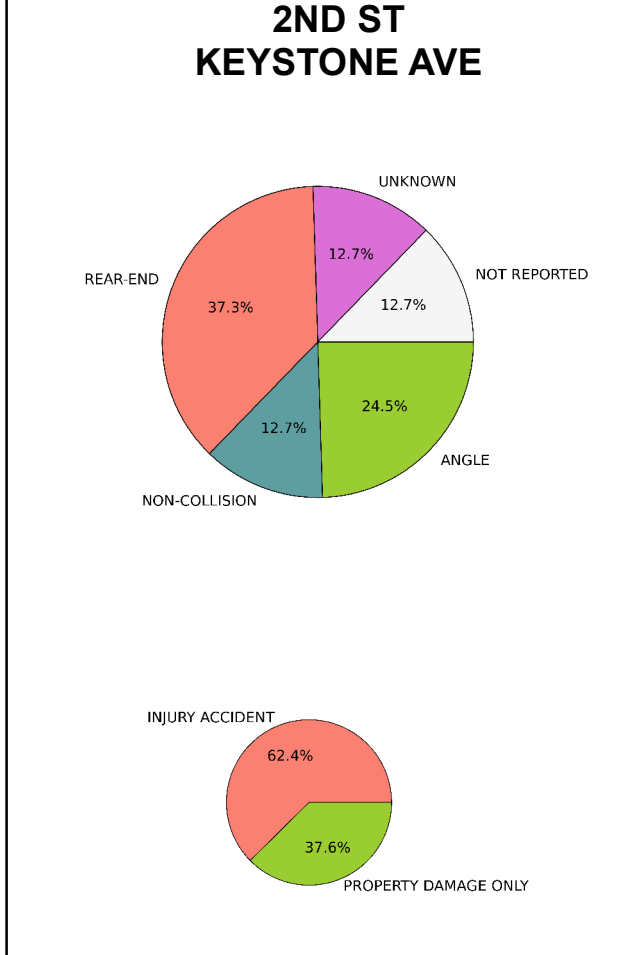


Attendance was relatively low at approximately 16 participants. A formal presentation was given at 5:30 pm followed by a brief question and answer session. Attendees were also provided the opportunity to give comments to a stenographer or via comment sheets. See **Appendix H** for copies of the public meeting materials and the comments received. The comments were minor and did not have a material effect on alternative development or recommendations.



Appendix A – Crash Summary Plan Sheets





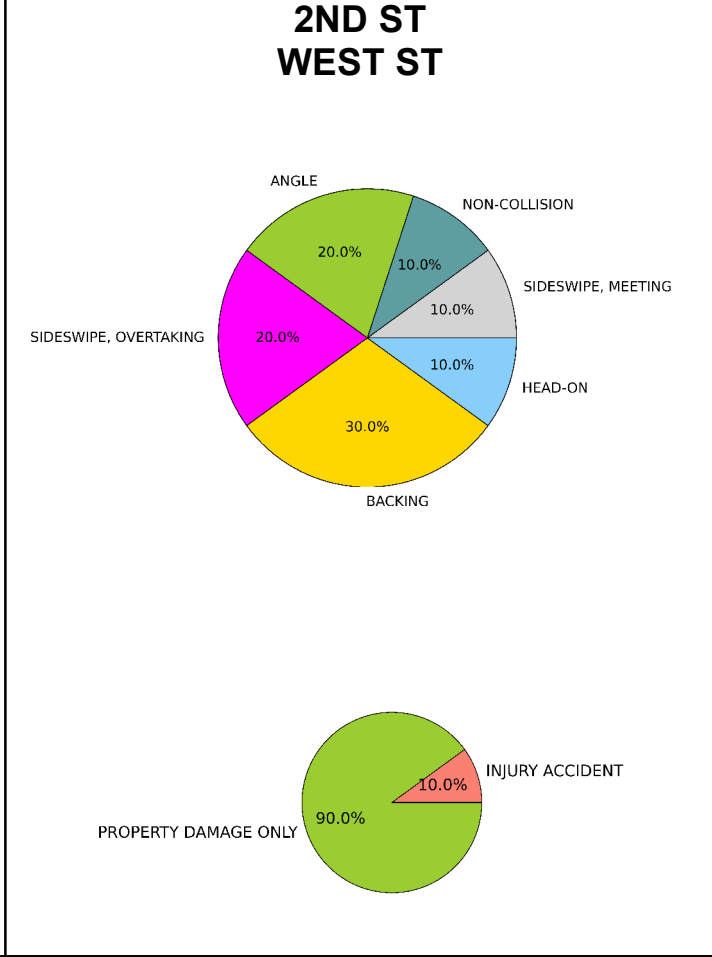
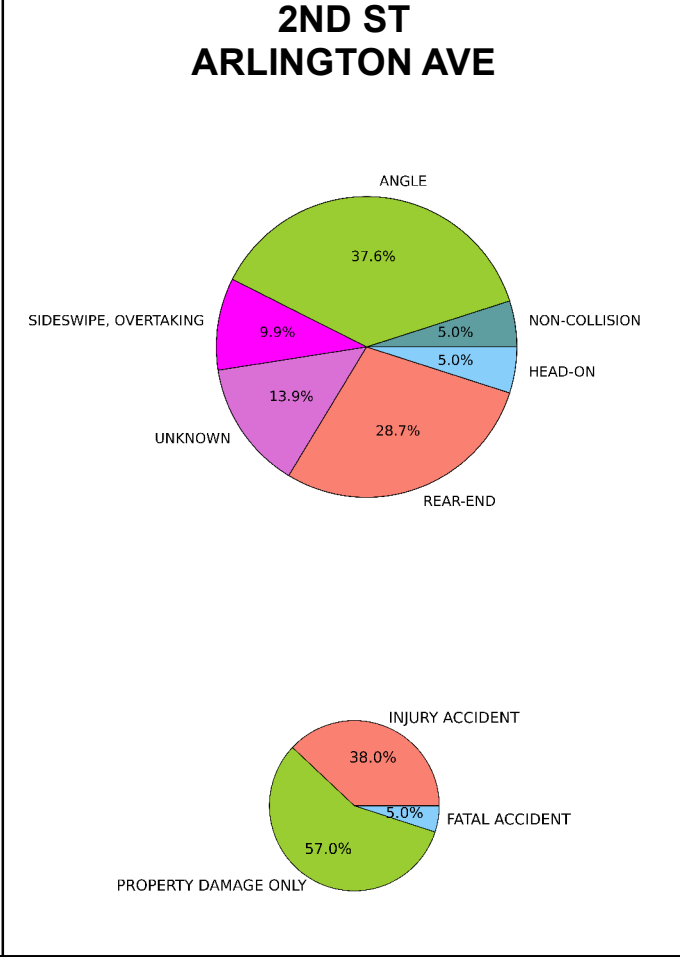
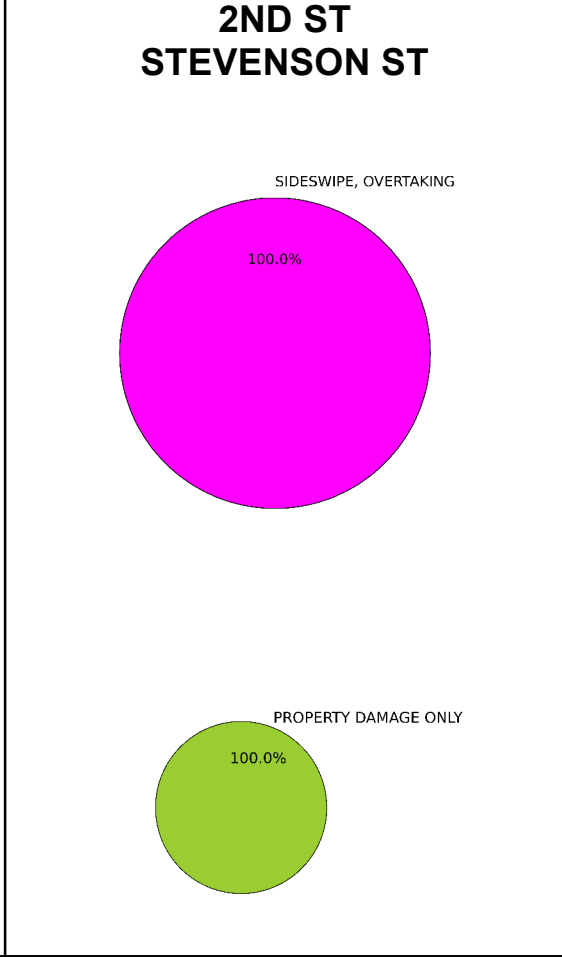
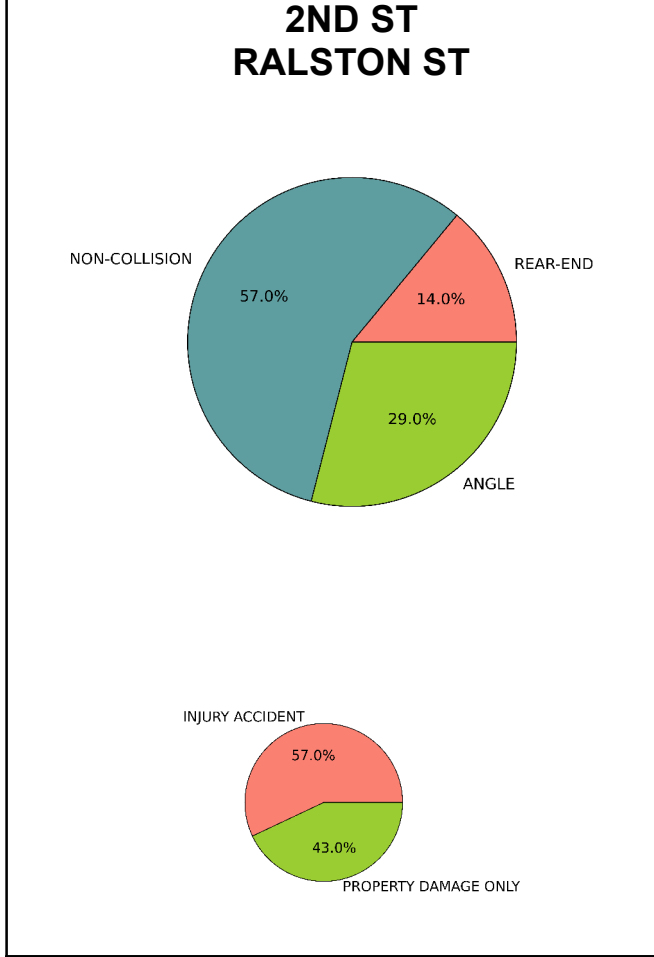
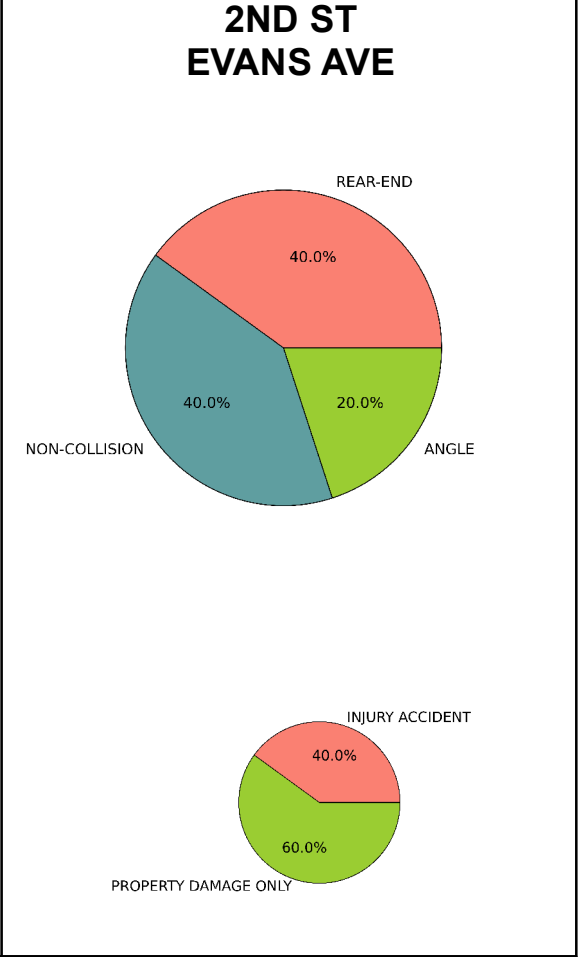
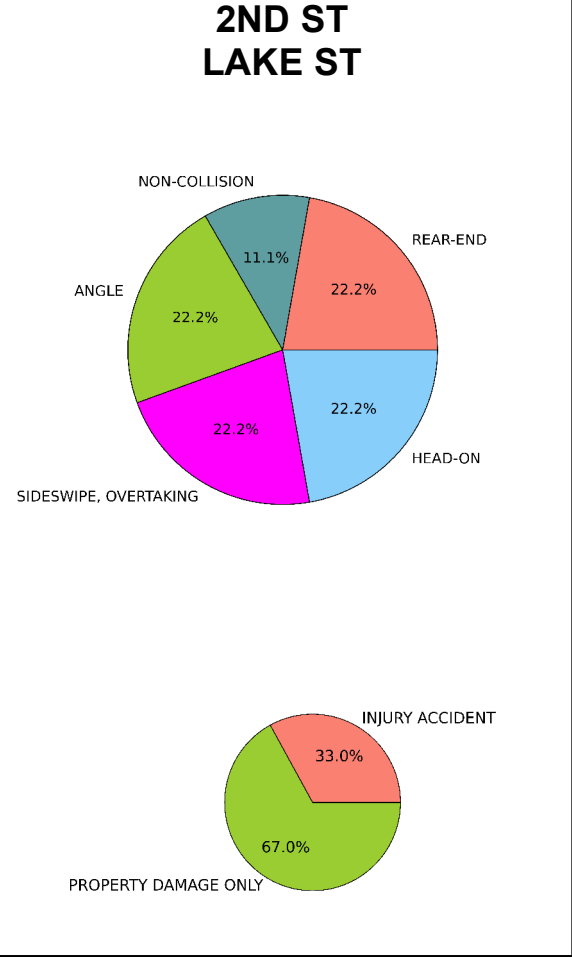
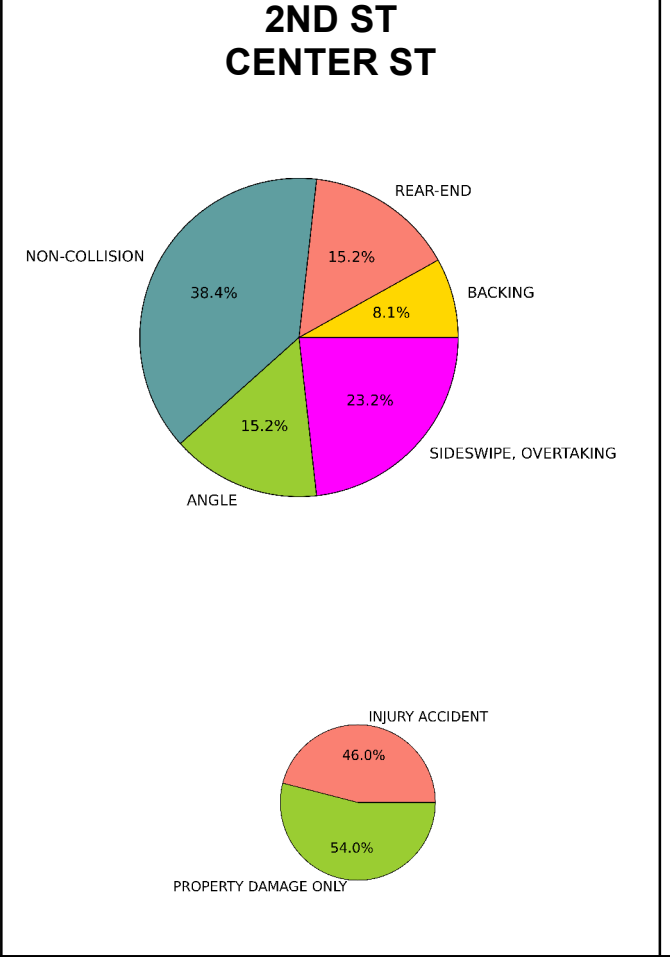
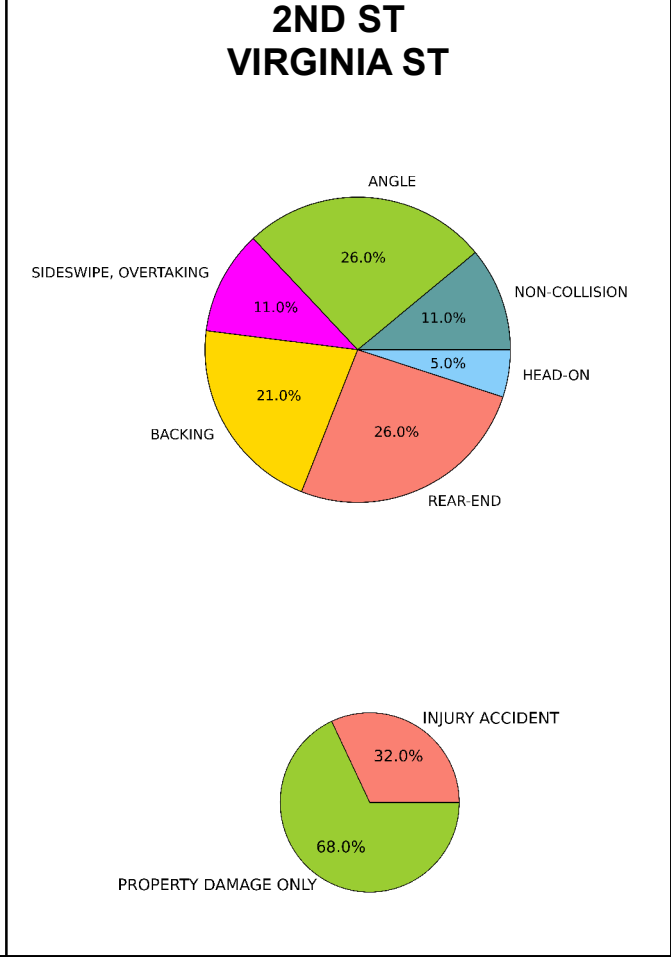
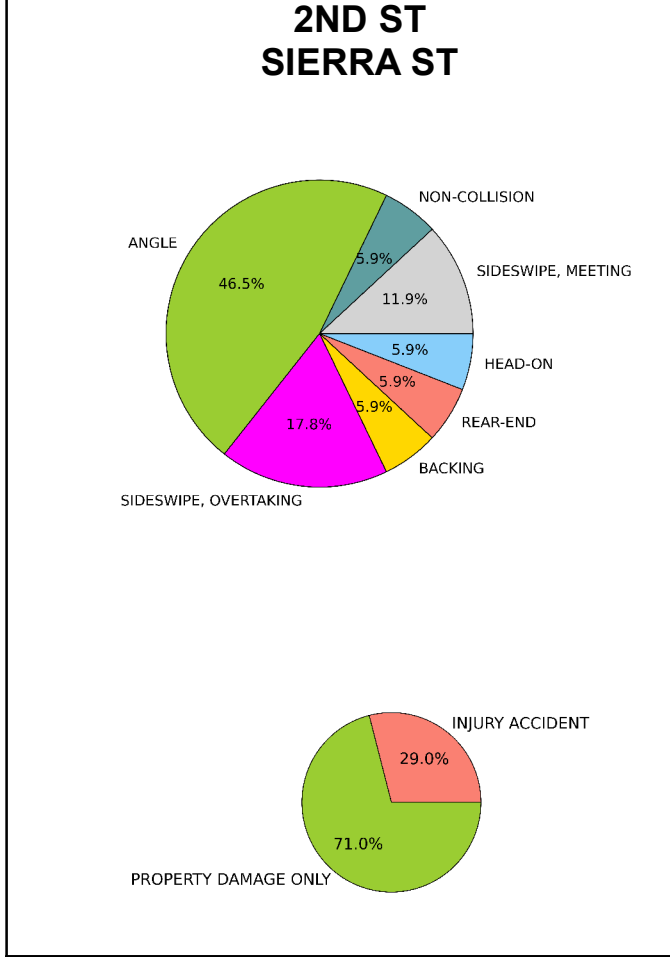
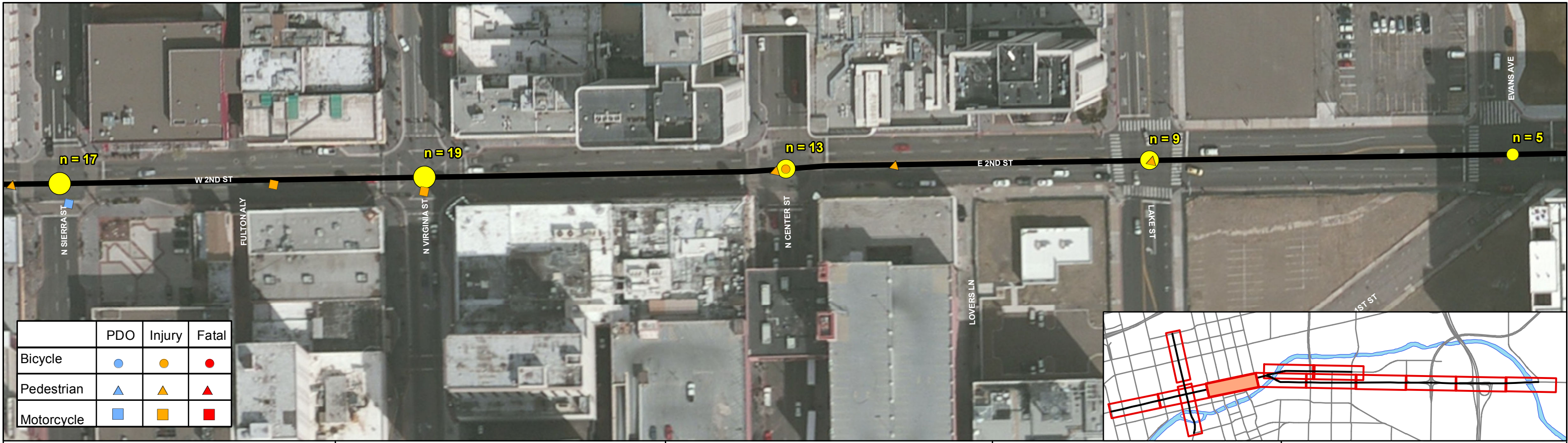


FIGURE 2
 2nd. St. / Kuenzli St. / Arlington Ave.
 Reno, NV
 May, 2015

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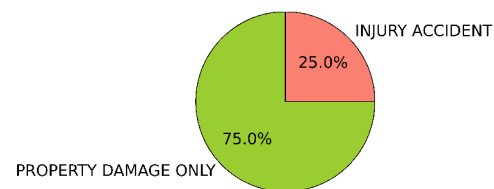
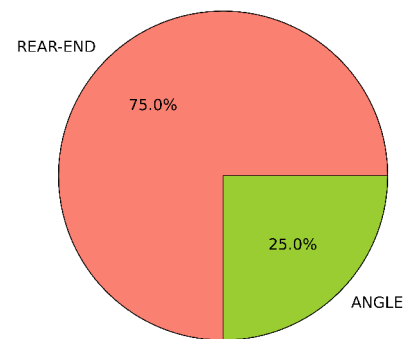




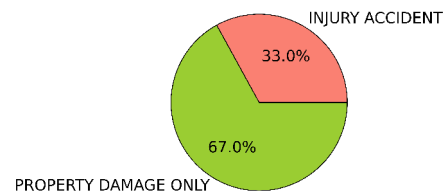
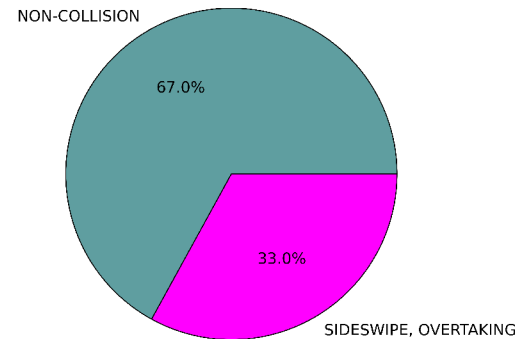


	PDO	Injury	Fatal
Bicycle	●	●	●
Pedestrian	▲	▲	▲
Motorcycle	■	■	■

**2ND ST
KUENZLI ST**



**2ND ST
HIGH ST**



**2ND ST
PARK ST**

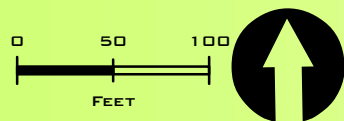
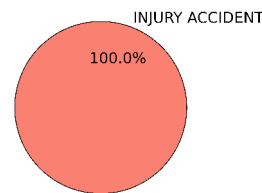
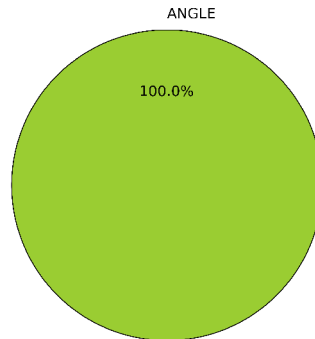


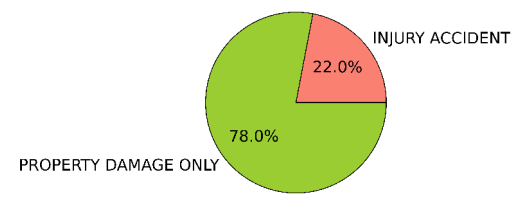
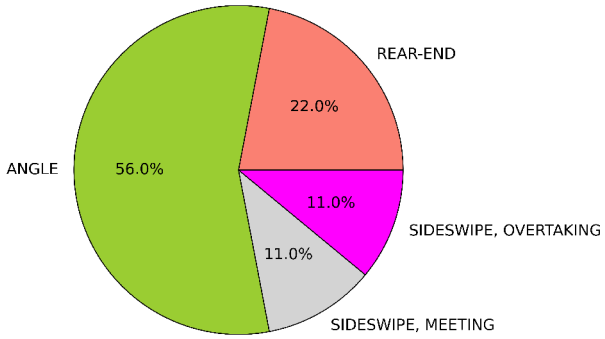
FIGURE 4
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Reno, NV
May, 2015

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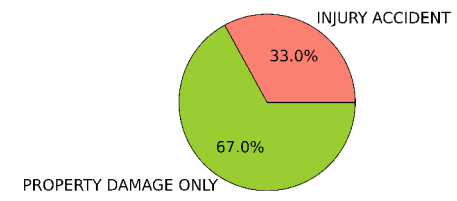
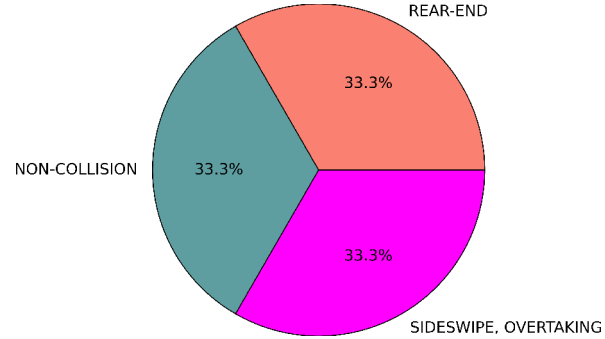




**2ND ST
WELLS AVE**



**2ND ST
LOCUST ST**



**2ND ST
KIRMAN AVE**

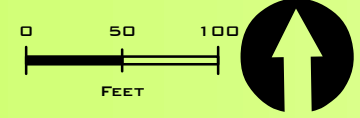
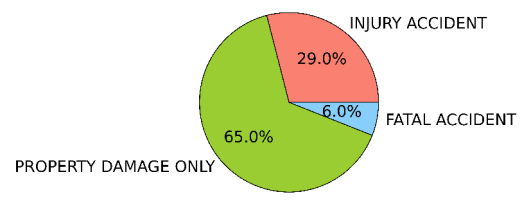
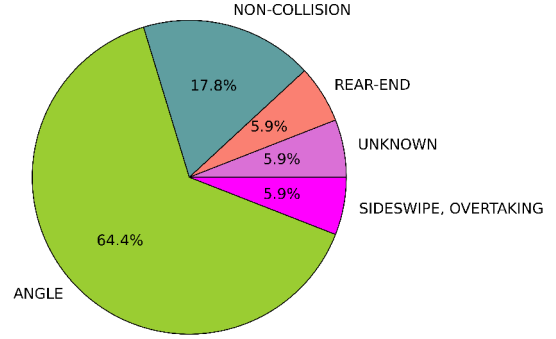


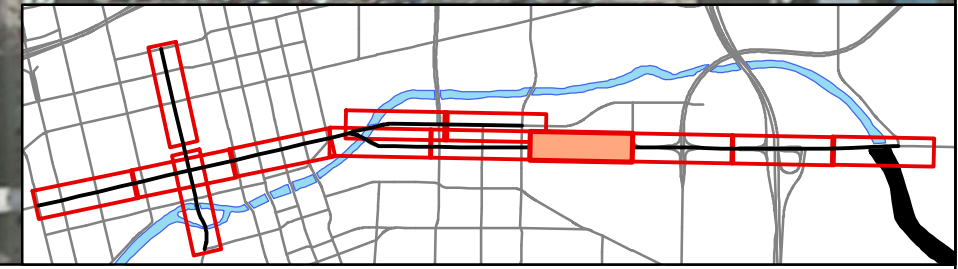
FIGURE 5
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May, 2015

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Bicycle	●	●	●
Pedestrian	▲	▲	▲
Motorcycle	■	■	■



**2ND ST
MANUEL ST**

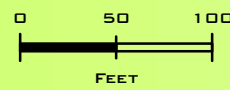
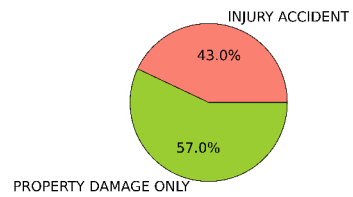
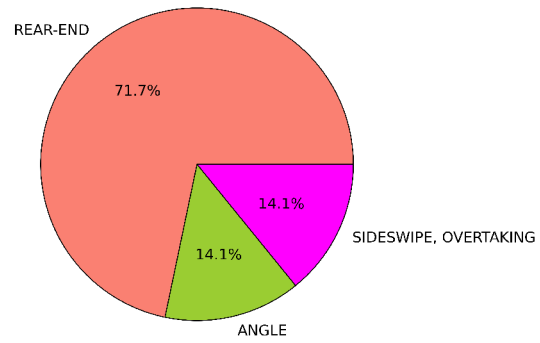
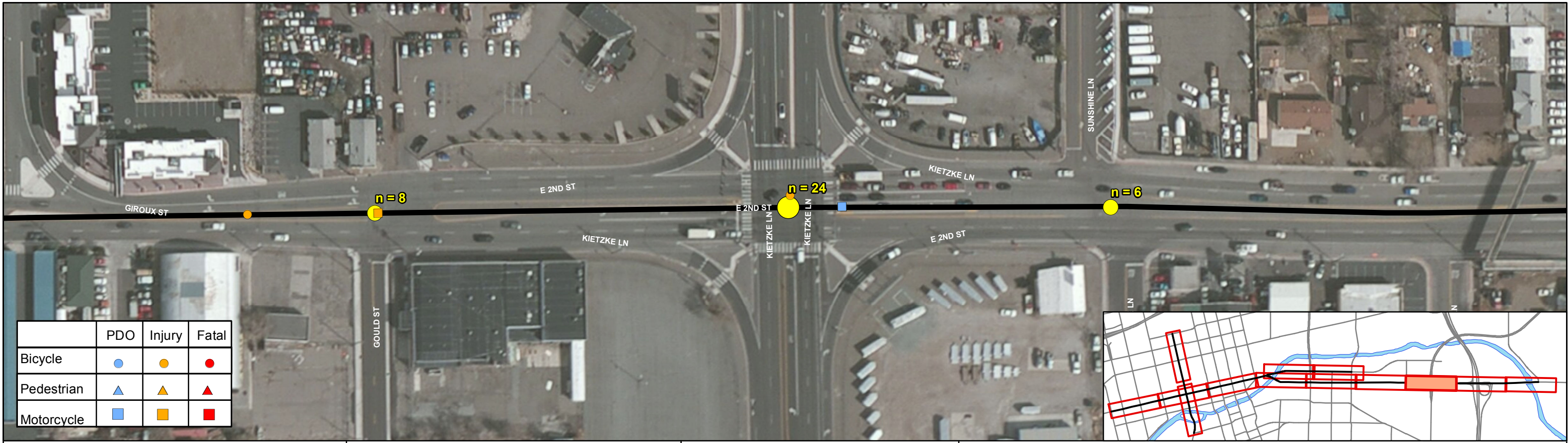


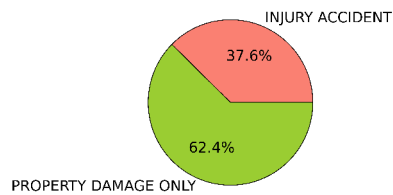
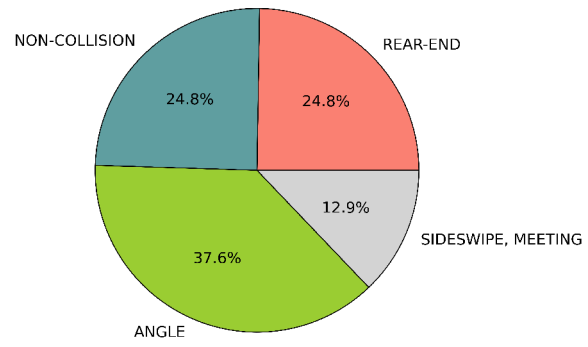
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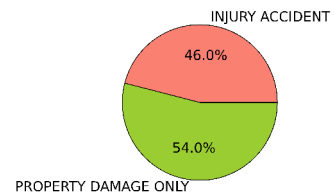
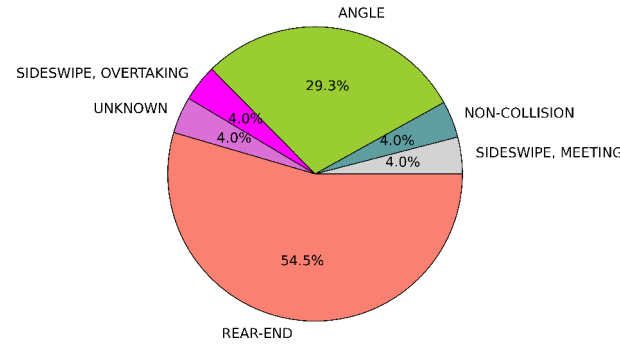




**2ND ST
GOULD ST**



**2ND ST
KIETZKE LN**



**2ND ST
SUNSHINE LN**

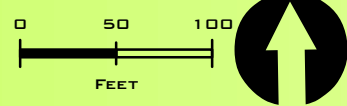
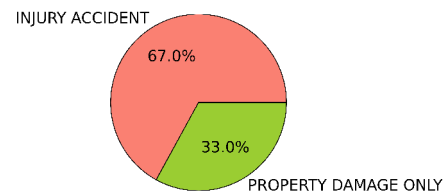
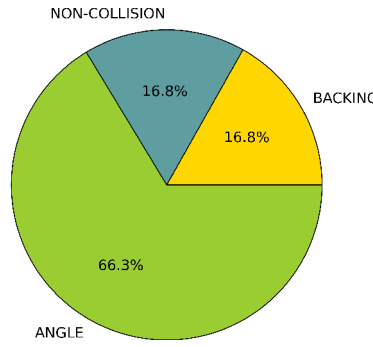
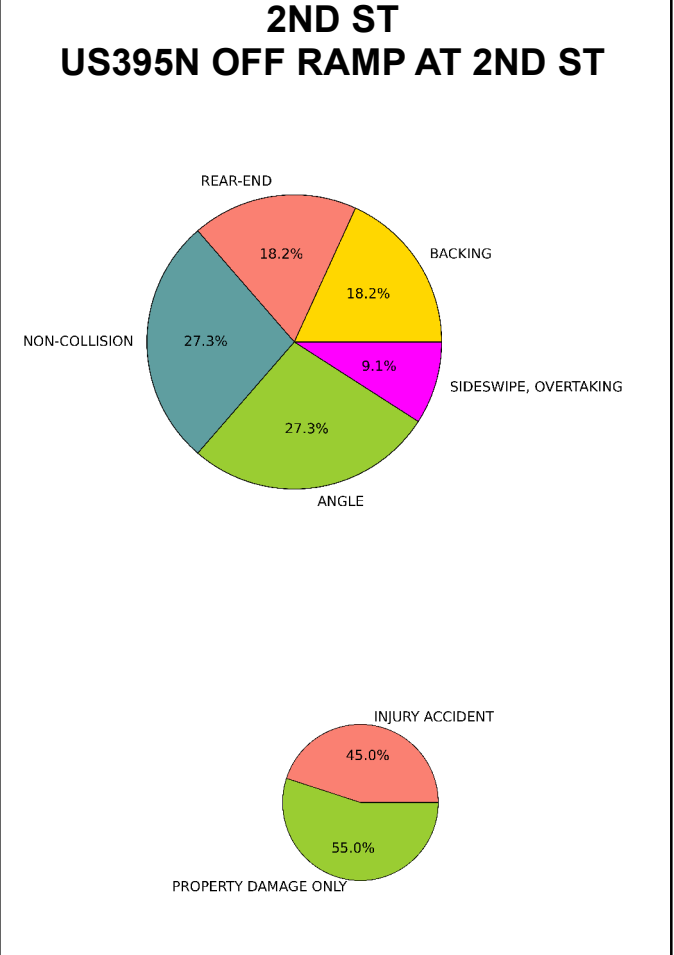
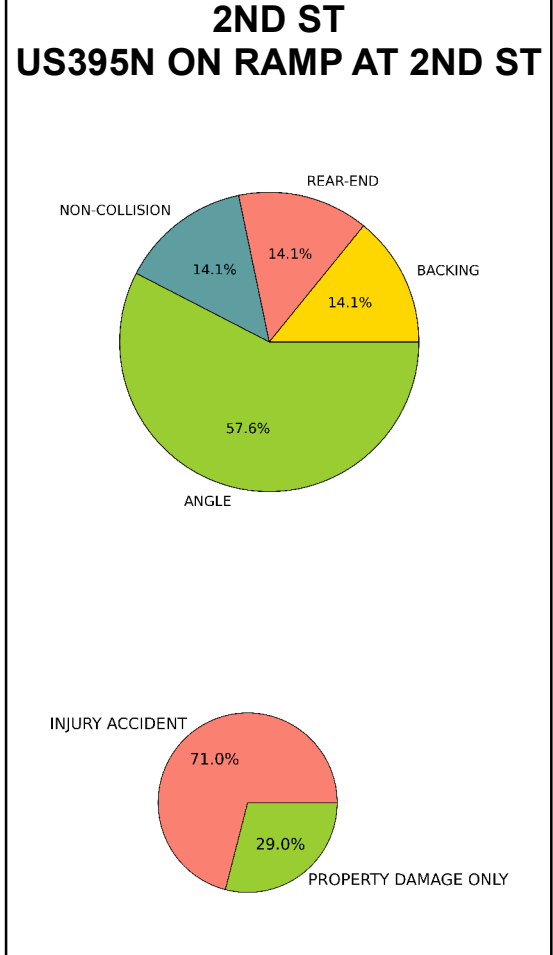
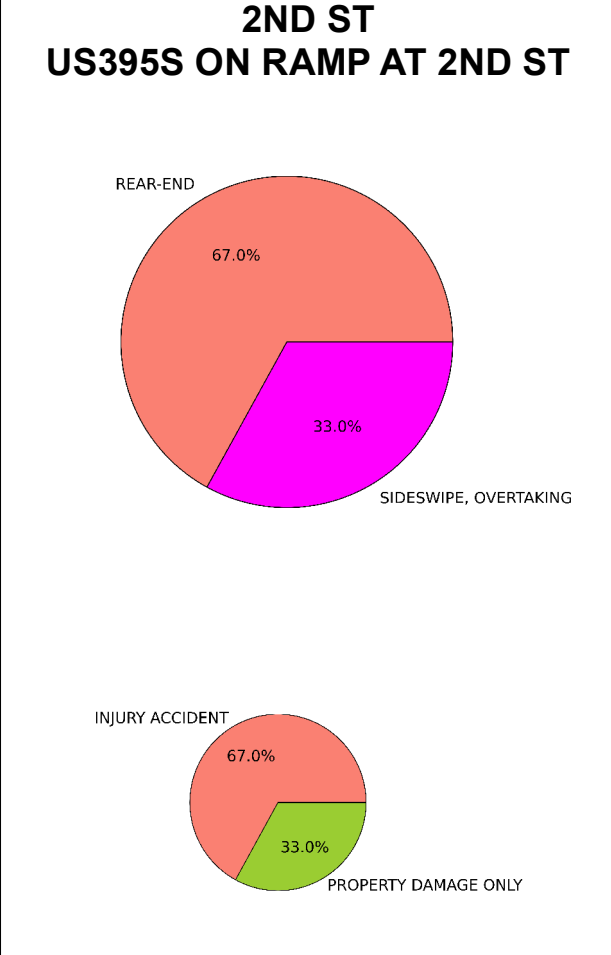
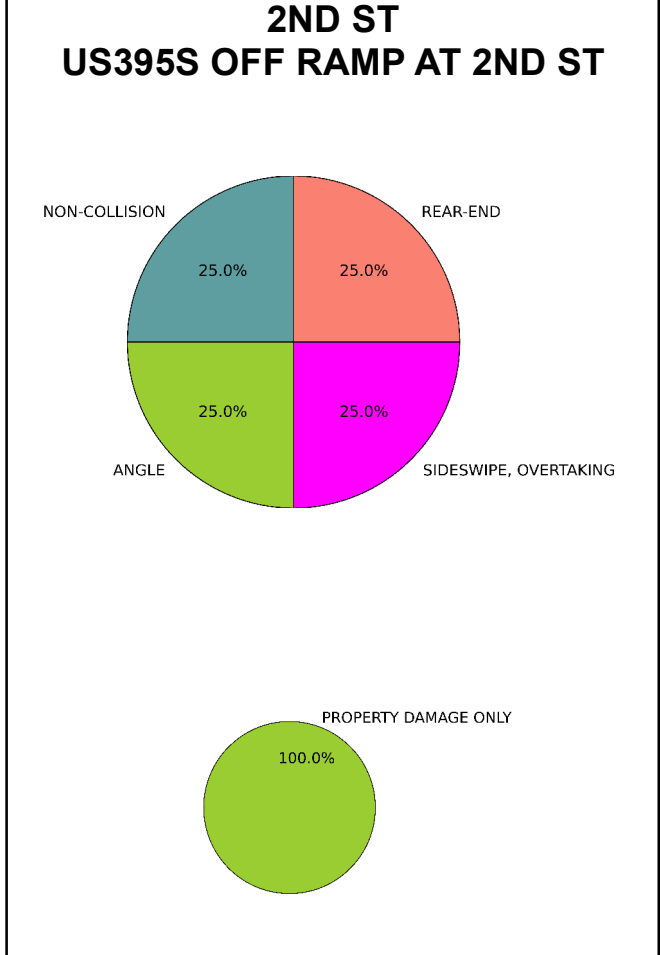
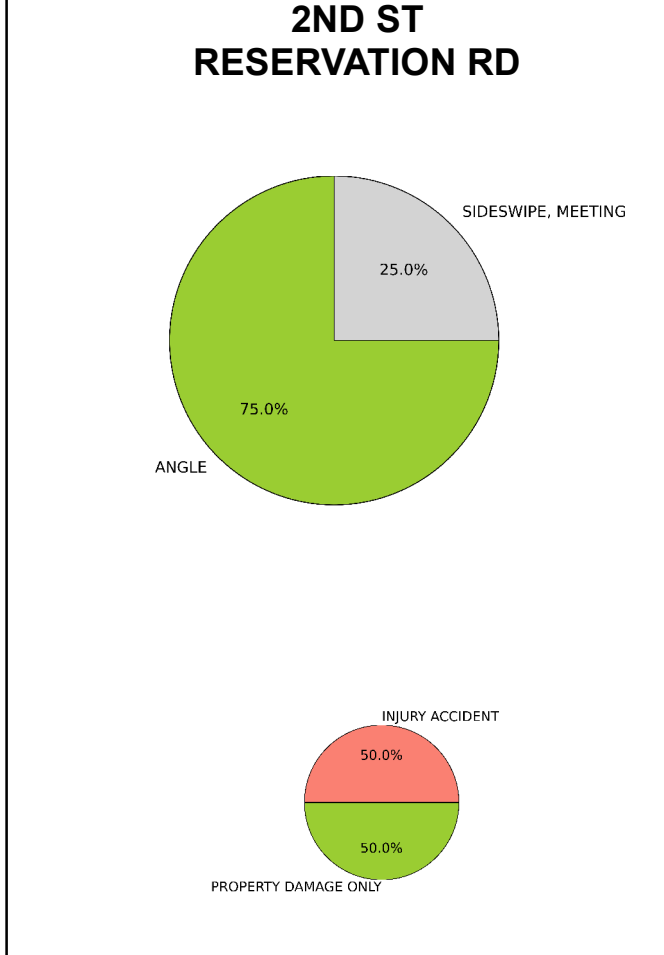


FIGURE 7
2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
May, 2015

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	PDO	Injury	Fatal
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Pedestrian	▲	▲	▲
Motorcycle	■	■	■

**GLENDALE AVE
GALLETTI WAY**

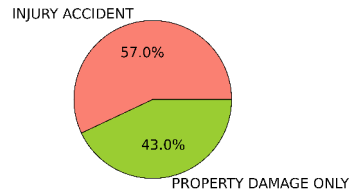
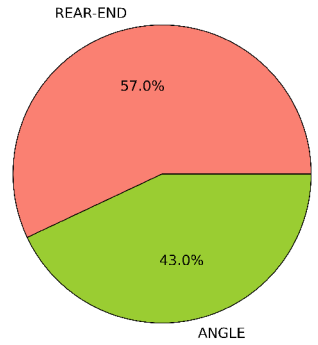


FIGURE 9

2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
May, 2015

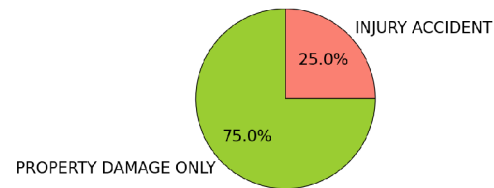
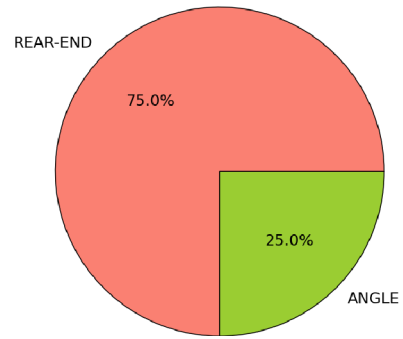
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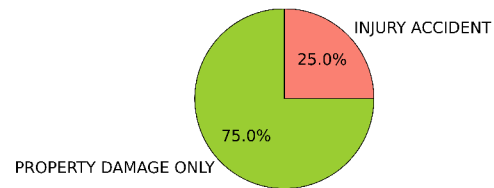
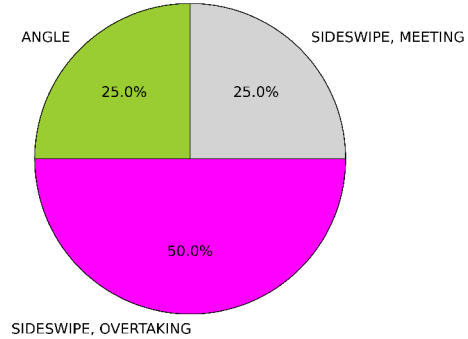


	PDO	Injury	Fatal
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Pedestrian	▲	▲	▲
Motorcycle	■	■	■

**KUENZLI ST
2ND ST**



**KUENZLI ST
PARK ST**



**KUENZLI ST
WELLS AVE**

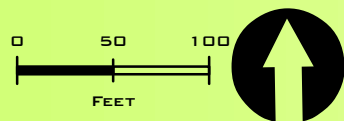
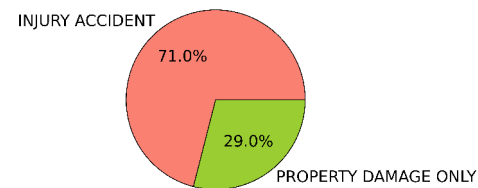
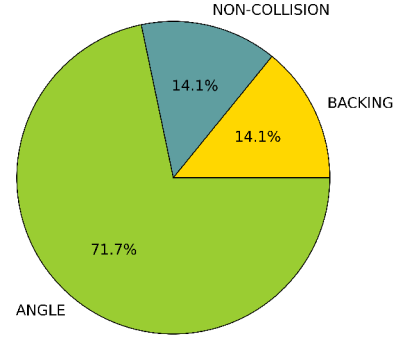


FIGURE 10

2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
May, 2015

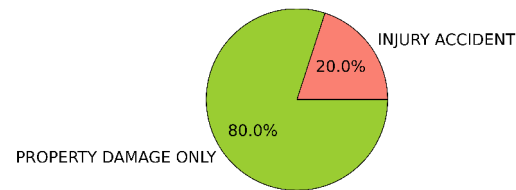
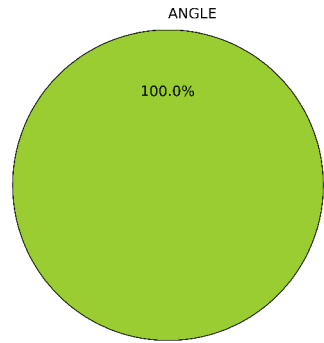
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community





	PDO	Injury	Fatal
Bicycle	●	●	●
Pedestrian	▲	▲	▲
Motorcycle	■	■	■

**KUENZLI ST
LOCUST ST**



**KUENZLI ST
KIRMAN AVE**

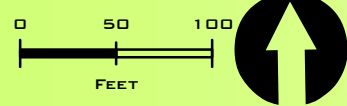
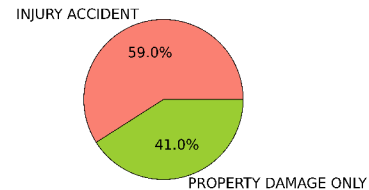
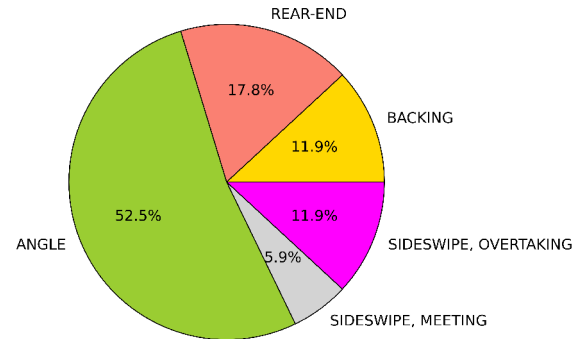
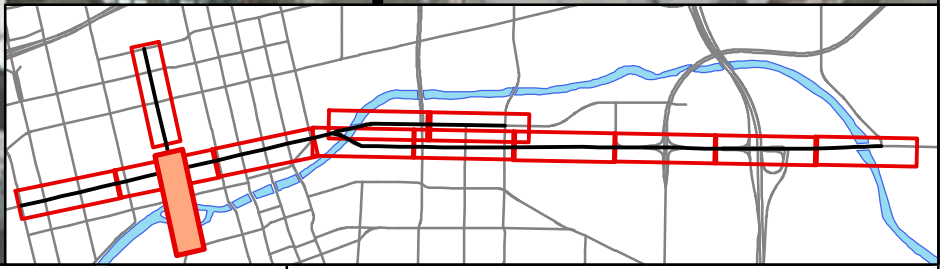


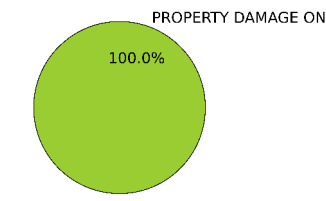
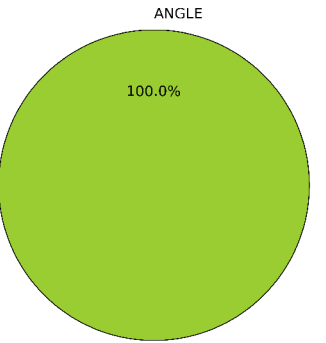
FIGURE 11
2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
May, 2015

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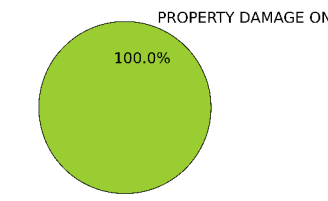
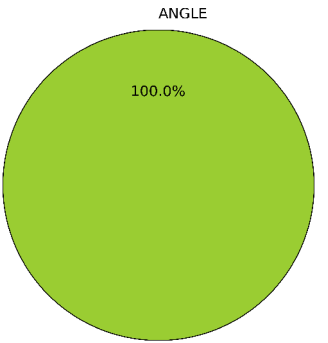




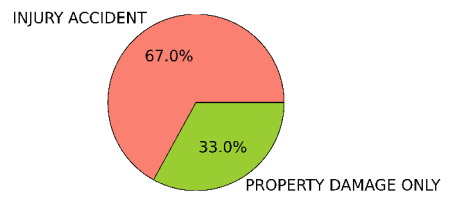
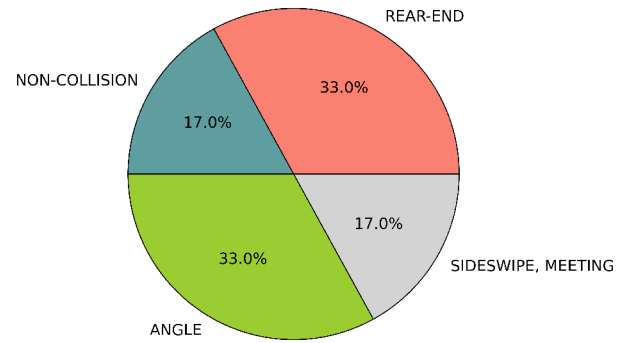
ARLINGTON AVE COURT ST



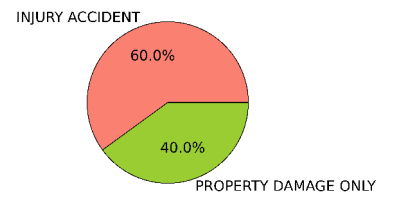
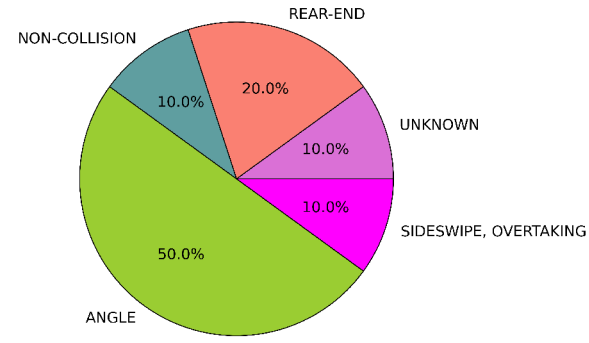
ARLINGTON AVE ELOISE AVE



ARLINGTON AVE ISLAND AVE



ARLINGTON AVE 1ST ST



ARLINGTON AVE 2ND ST

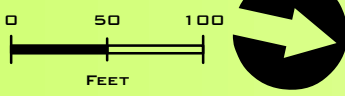
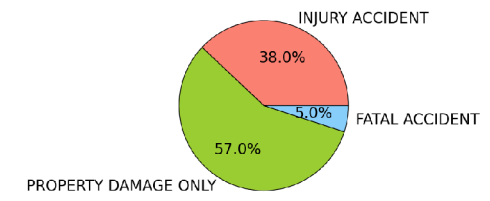
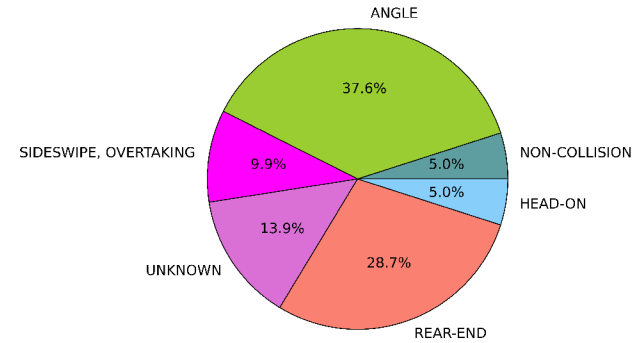


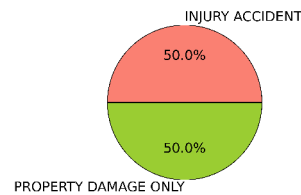
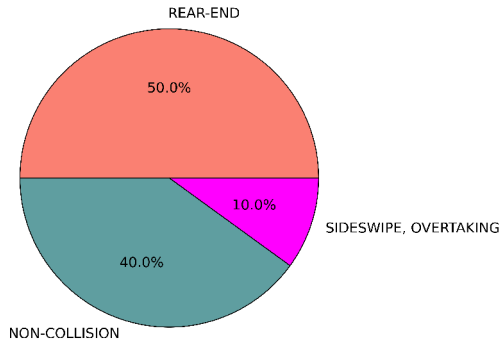
FIGURE 12
2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
May, 2015

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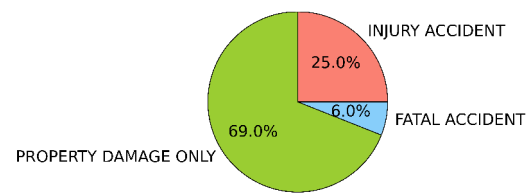
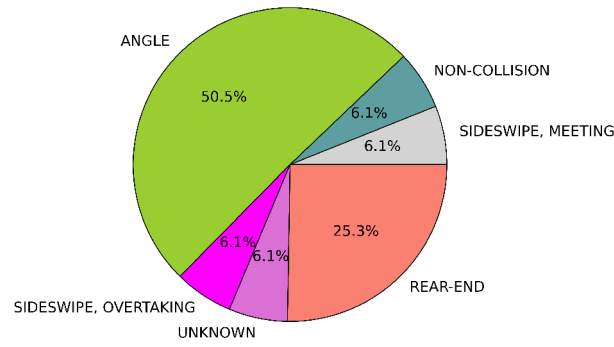




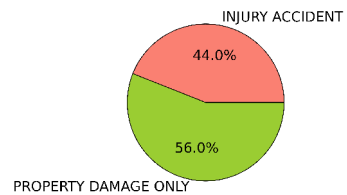
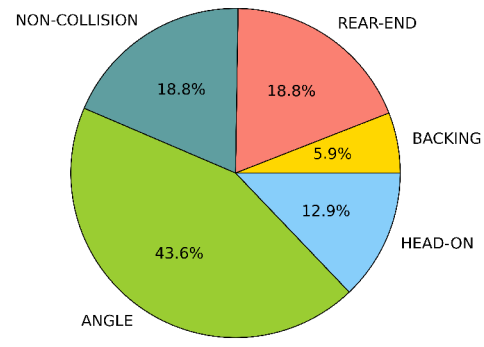
**ARLINGTON AVE
3RD ST**



**ARLINGTON AVE
4TH ST**



**ARLINGTON AVE
5TH ST**



**ARLINGTON AVE
6TH ST**

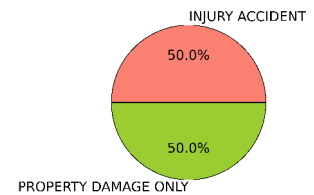
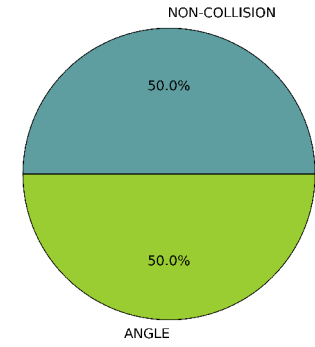


FIGURE 13

2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
May, 2015

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community





Appendix B – Existing Traffic Technical Memo





EXISTING TRAFFIC OPERATIONS AND ANALYSIS

This section describes traffic operations along the 2nd Street (from Keystone Avenue to Galletti Way) and Arlington Avenue (from Court Street to W 6th Street) corridors under existing traffic and roadway conditions. Vehicle, pedestrian, bicycle, and motorcycle traffic counts were collected at 25 intersections along the study corridors. Vehicular intersection Level of Service (LOS) and corridor multi-modal LOS analyses were performed at each study intersection and study roadway segment, respectively. Crash analysis along 2nd Street and Arlington Avenue was performed using *Interactive Highway Safety Design Model* (IHSDM) software to yield crash rates along roadway segments within the study area under existing conditions as well as predictive crash rates associated with the implementation of potential safety improvement opportunity roadway geometric improvements.

1. EXISTING TRANSPORTATION SETTING

A. Roadway System

The Arlington Avenue and 2nd Street corridors in downtown Reno, Nevada can generally be characterized as part of the City's urban center. Within the study area, Arlington Avenue, 2nd Street, and Kuenzli Street are classified as arterials with low-to-moderate access control. Roadways that currently provide primary transportation circulation within the study area are as follows:

2nd Street is an east-west arterial that passes through downtown Reno. 2nd Street extends from Dickerson Road in the west to Galletti Way in the east, where it enters the City of Sparks and becomes Glendale Avenue. 2nd Street is designated as State Route 648 east of the Kietzke Lane / 2nd Street intersection. From Keystone Avenue to Kuenzli Street, 2nd Street is a four-lane undivided roadway and a three-lane one-way roadway between Kuenzli Street and Kirman Avenue. East of Kirman Avenue, 2nd Street is primarily a four-lane roadway with intermittent two-way left-turn median lanes and raised medians. There are marked crosswalks at all signalized and stop-controlled study intersections, with the exception of the Gould Street and Sunshine Lane intersections with 2nd Street. Pedestrians are controlled by pedestrian pushbuttons and pedestrian signals with countdown timers.

Arlington Avenue is a north-south arterial that passes through downtown Reno. Arlington Avenue extends from W 6th Street in the north to Skyline Boulevard in the south. Arlington Avenue is a four-lane roadway between W 6th Street and 1st Street and a two-lane roadway with striped bike lanes south of W 1st Street. There are marked crosswalks at all signalized and stop-controlled study intersections with Arlington Avenue. Pedestrians are controlled by pedestrian pushbuttons and pedestrian signals with countdown timers.

Kuenzli Street is a westbound three-lane one-way arterial roadway within the study area. Kuenzli Street merges with 2nd Street east of Evans Avenue and terminates in the east at Sunshine Lane. There are pedestrian sidewalks on all four legs of the signalized study intersections with Wells



Avenue and Kirman Avenue and pedestrians are controlled by pedestrian pushbuttons and pedestrian signals with countdown timers.

Interstate 580 (I-580) is a north-south interstate highway that runs concurrently with U.S. Highway 395 through Reno. The route begins at the Interstate 80 interchange in Reno and travels south to Carson City, Nevada. The I-580 Southbound and Northbound off- and on-ramps at 2nd Street form signalized intersections that include marked crosswalks, pedestrian pushbuttons and pedestrian signals with countdown timers.

B. Existing Traffic Volumes

Mid-day (MD) and PM peak hour vehicular, pedestrian, bicycle, wheelchair, and motorcycle traffic counts were conducted Wednesday-Thursday, May 27-28, and Tuesday-Thursday, June 9-11, 2015 at the following intersections. The MD peak hour is defined as the highest one hour of traffic flow counted between 12:00 PM and 2:00 PM on a typical weekday, and the PM peak hour is defined as the highest one hour of traffic flow counted between 4:00 PM and 6:00 PM on a typical weekday. The MD peak hour was used over more traditional AM peak hours per local agency recommendation based on their observations of the peak period in the downtown environment.

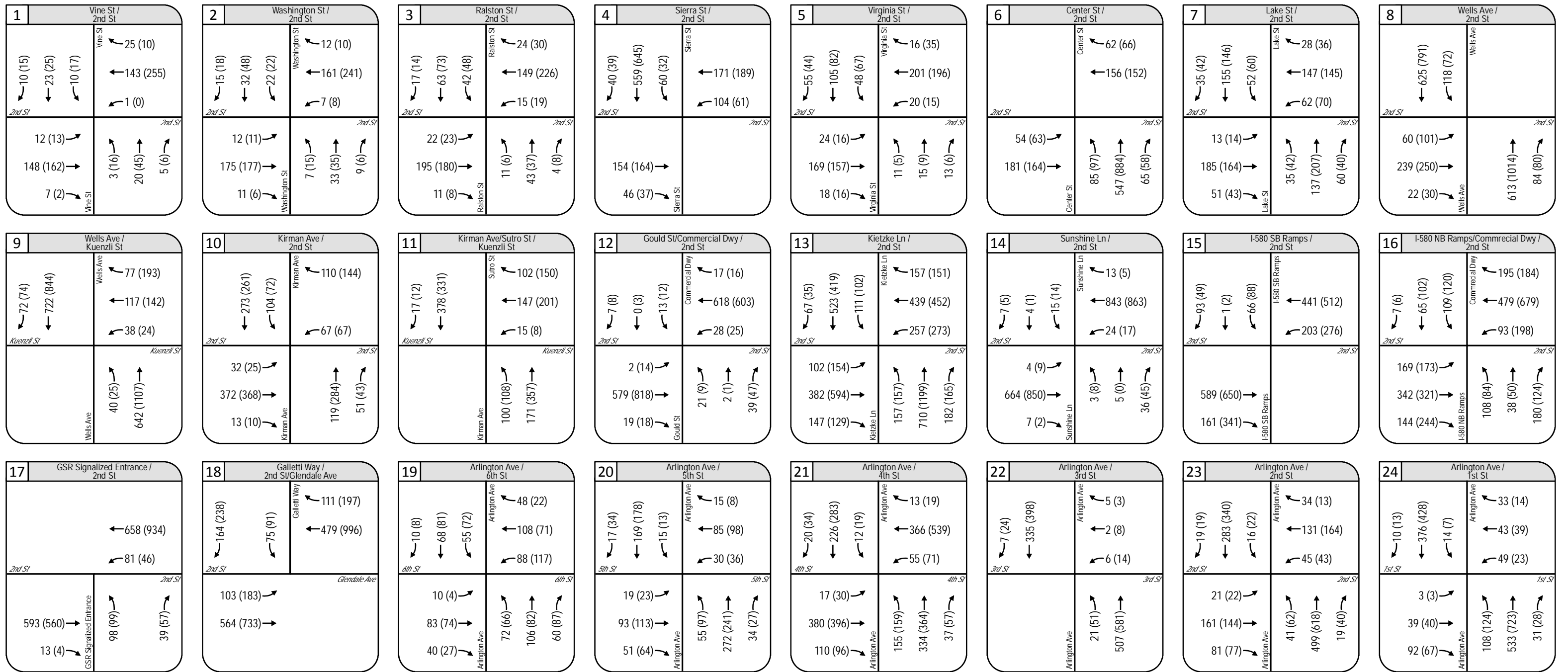
1. Vine Street / W 2nd Street
2. Washington Street / W 2nd Street
3. Ralston Street / W 2nd Street
4. Sierra Street / W 2nd Street
5. Virginia Street / 2nd Street
6. Center Street / E 2nd Street
7. Lake Street / E 2nd Street
8. Wells Avenue / E 2nd Street
9. Wells Avenue / Kuenzli Street
10. Kirman Avenue / E 2nd Street
11. Kirman Avenue/Sutro Street / Kuenzli Street
12. Gould Street-Commercial Driveway / 2nd Street
13. Kietzke Ln / E 2nd Street
14. Sunshine Ln / E 2nd Street
15. I-580 Southbound Ramps / E 2nd Street
16. I-580 Northbound Ramps-Commercial Driveway / E 2nd Street
17. Grand Sierra Resort Entrance / E 2nd Street
18. W 2nd Street / Galletti Way
19. Arlington Avenue / W 6th Street
20. Arlington Avenue / W 5th Street
21. Arlington Avenue / W 4th Street
22. Arlington Avenue / W 3rd Street
23. Arlington Avenue / W 2nd Street
24. Arlington Avenue / W 1st Street
25. Arlington Avenue / Island Avenue



Additionally, 7-day, 24-hour vehicular counts were collected for the week of June 8-14, 2015, at the following roadway segments:

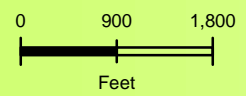
- W 2nd Street east of Sierra St
- E 2nd Street east of Wells Avenue
- Arlington Avenue south of W 1st Street
- Kuenzli Street west of Wells Avenue

The use of summer count data (schools not in session) for both 24-hour and turning movement counts was considered acceptable due to the lack of existing schools in the area. As the study area is located in an urban center, peak hour pedestrian volumes are generally highest on 2nd Street between Ralston Street and Lake Street and on Arlington Avenue between W 4th Street and W 1st Street. **Figure 1** illustrates “Existing” traffic volumes within the study area and **Figure 2** illustrates the existing intersection lane geometrics and control.



Legend
 XXX (XXX) = Mid-Day (PM)
 Peak Hour Values

Figure 1 - Traffic Volumes
 2nd. St. / Kuenzli St. / Arlington Ave.
 Reno, NV
 December 2015



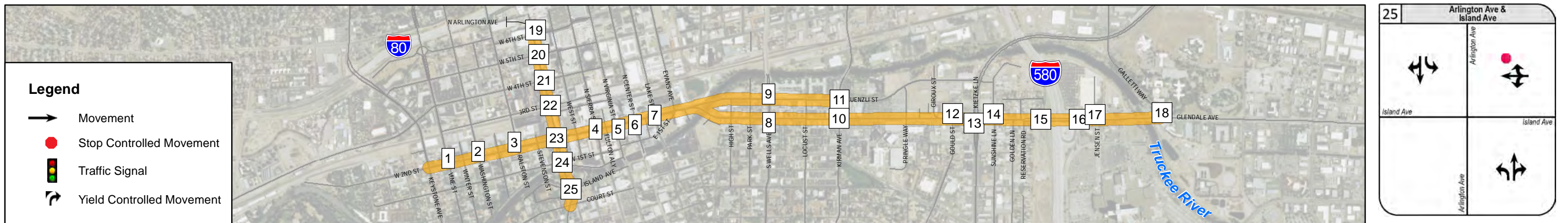
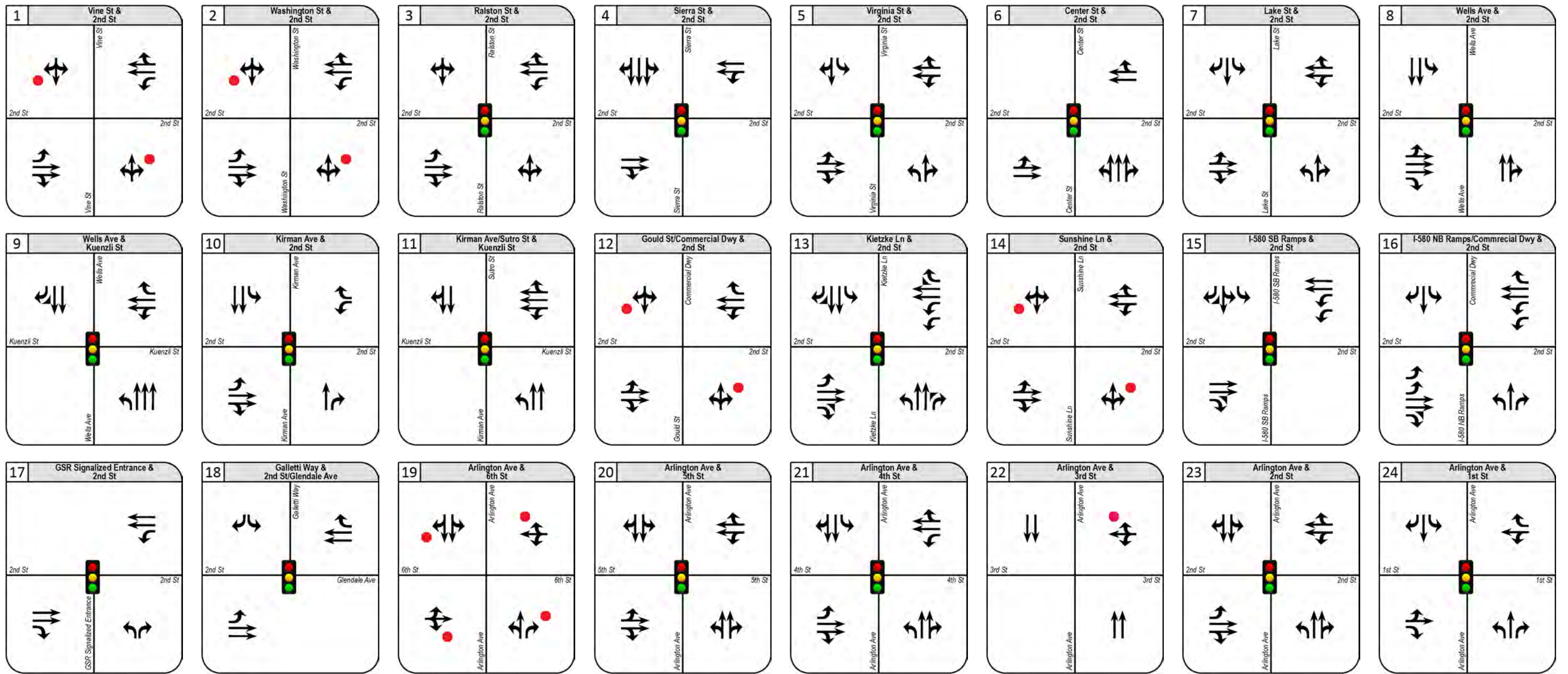


Figure 2 - Lane Geometrics and Control

2nd. St. / Kuenzli St. / Arlington Ave.

Reno, NV

December 2015



2. INTERSECTION LEVEL OF SERVICE

Traffic operations in this study have been quantified through the determination of "Level of Service" (LOS). Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to study facilities, representing progressively worsening traffic operations. LOS has been calculated for all intersection control types using methods documented in the Transportation Research Board Publication *Highway Capacity Manual, Fourth Edition, 2010* (HCM-2010). For two-way-stop-controlled (TWSC) intersections, the "worst-case" movement delays and LOS are reported. For signalized and all-way-stop-controlled (AWSC) intersections, the intersection delays and LOS reported are the "average" values for the whole intersection. The delay-based HCM-2010 LOS criteria for different types of intersection controls are outlined in **Appendix Table 1**. *Synchro 8* operations analysis software was used to complete the intersection LOS analysis procedures.

B. Intersections Operations

Table 1 presents existing study intersection traffic operations under existing intersection traffic volumes (illustrated in **Figure 1**) and existing intersection geometrics and control (illustrated in **Figure 2**).

Table 1. Existing Conditions Intersection Traffic Operations

Intersection	Control Type ¹	MD Peak Hour		PM Peak Hour		
		Delay (S/V)	LOS	Delay (S/V)	LOS	
1	Vine St / 2 nd St	TWSC	11.7	B	13.3	B
2	Washington St / 2 nd St	TWSC	12.5	B	14.7	B
3	Ralston St / 2 nd St	Signal	12.8	B	12.9	B
4	Sierra St / 2 nd St	Signal	12.2	B	12.4	B
5	Virginia St / 2 nd St	Signal	14.7	B	15.2	B
6	Center St / 2 nd St	Signal	10.8	B	11.6	B
7	Lake St / 2 nd St	Signal	8.4	A	9.6	A
8	Wells Ave / 2 nd St	Signal	14.7	B	13.4	B
9	Wells Ave / Kuenzli St	Signal	9.0	A	8.5	A
10	Kirman Ave / 2 nd St	Signal	15.4	B	15.3	B
11	Kirman Ave / Kuenzli St	Signal	14.7	B	13.4	B
12	Gould St / 2 nd St	TWSC	23.8	C	38.1	E
13	Kietzke Ln / 2 nd St	Signal	23.7	C	33.9	C
14	Sunshine Ln / 2 nd St	TWSC	45.8	E	71.1	F
15	I-580 SB Ramps / 2 nd St	Signal	8.1	A	6.6	A
16	I-580 NB Ramps / 2 nd St	Signal	15.1	B	16.9	B
17	GSR Entrance / 2 nd St	Signal	20.1	C	6.2	A
18	2 nd St / Galletti Way	Signal	17.8	B	17.6	B
19	Arlington Ave / 6 th St	AWSC	11.2	B	10.3	B
20	Arlington Ave / 5 th St	Signal	12.3	B	13.8	B
21	Arlington Ave / 4 th St	Signal	21.0	C	20.2	C
22	Arlington Ave / 3 rd St	TWSC	14.4	B	19.0	C
23	Arlington Ave / 2 nd St	Signal	8.3	A	8.1	A
24	Arlington Ave / 1 st St	Signal	12.4	B	11.9	B
25	Arlington Ave / Island Ave	TWSC	14.9	B	20.4	C

Notes:

1. For TWSC (Two-Way-Stop-Control) intersections, worst-case movement delay (in seconds/vehicle) are indicated. "Average" control delays (in seconds/vehicle) are indicated for AWSC (All-Way-Stop-Control) and Signal-Control intersections.



As shown in **Table 1**, the two-way stop-controlled Gould Street / 2nd Street intersection is currently operating at PM peak hour LOS “E” conditions and the two-way stop-controlled Sunshine Lane / 2nd Street intersection is currently operating at MD/PM peak hour LOS “E/F” conditions (below the Nevada Department of Transportation (NDOT), Washoe County Regional Transportation Commission (RTC), and City of Reno LOS “D” standard). All of the remaining study intersections are currently operating at acceptable LOS “D” or better conditions during the MD and PM peak hours under existing conditions.



3. MULTI MODAL LEVEL OF SERVICE

Multi-modal LOS analysis was performed using *Fehr & Peers' LOS+ Tool*. The LOS+ Tool utilizes HCM-2010 and *National Cooperative Highway Research Program (NCHRP) Project 3-70* methodologies to yield planning-level multi-modal corridor LOS outputs for auto, pedestrian, bike, and transit modes. Inputs for LOS+ include pedestrian and vehicle flow rate, roadway cross section data, and transit availability along each study segment.

Multi-modal LOS analysis for auto, pedestrian, bike, and transit modes was performed for the following study roadway corridors:

- 2nd Street from Keystone Avenue to Galletti Way
- Arlington Avenue from Court Street to W 6th Street
- Wells Avenue from E 2nd Street to Kuenzli Street
- Kirman Avenue from E 2nd Street to Kuenzli Avenue
- Kuenzli Street from E 2nd Street to Kirman Avenue

Multi-modal corridor and intersection LOS for all study roadways are summarized in **Figures 1A, 1B, 2A, and 2B**. In general, transit mode typically presents the most frequent occurrence of LOS "E" and "F" on most study corridors. This is due to low transit frequency (buses/hour) at transit stops along study segments and a relatively low number of routes being served by each stop. The transit LOS is not an indicator of underserved demand. Overall, auto, pedestrian, and bike modes perform at LOS "D" or better. Pedestrian LOS may be improved by increasing sidewalk width, presence of a pedestrian buffer, and increased shoulder parking occupancy. Bicycle LOS may be improved by the presence of bike lanes, increased vehicle travel lane width, increased shoulder parking width, and decreased shoulder parking occupancy.

4. HSDM CRASH ANALYSIS

IHSDM crash analysis software was used to obtain crash rate predictions for potential roadway improvement scenarios along the study corridors. The following segments of 2nd Street and Arlington Avenue were analyzed using the Crash Prediction module of the IHSDM:

- 2nd Street from Keystone Avenue to Arlington Avenue
- 2nd Street from Arlington Avenue to Kuenzli Street
- 2nd Street from Giroux Street to Galletti Way
- Arlington Avenue from Court Street to W 6th Street

Crash data along 2nd Street and Arlington Avenue from July 1, 2009 to July 1, 2014 was obtained from NDOT and used to calculate overall crash rates, fatal and injury crash rates, and property damage only crash rates for existing conditions along each modeled study segment. Individual crashes were generally specified by type (multi-vehicle, vehicle-bicycle, vehicle-pedestrian, or single



vehicle) and by severity (“fatal or nonfatal injury”, “fatal or serious injury”, or “property damage only”) and were generally assumed to be intersection-related.

The implementation of unique “safety improvement opportunities” along each segment, such as road diets, raised medians, and bike lanes, was found to generally decrease crash rates by approximately 1-6%. In the case of replacing the Kietzke Lane / 2nd Street intersection with a roundabout, overall crash rate was predicted to decrease by up to 27%. A summary of each safety improvement opportunity and its related crash rate can be found in **Appendix Table X. Safety Improvement Opportunity Crash Rate Summary.**

Appendix Table 2. HCM-2010 Based Level-of-Service (LOS) Definitions and Criteria for Intersections

Level of Service	Flow Type	Operational Characteristics	Intersection Control Delay (seconds/vehicle)	
			Signal Control	Two-Way-Stop or All-Way Stop Control
"A"	Stable Flow	Free-flow conditions with negligible to minimal delays. Excellent progression with most vehicles arriving during the green phase and not having to stop at all. Nearly all drivers find freedom of operation.	≤ 10	0 – 10
"B"	Stable Flow	Good progression with slight delays. Short cycle-lengths typical. Relatively more vehicles stop than under LOS "A". Vehicle platoons are formed. Drivers begin to feel somewhat restricted within groups of vehicles.	> 10 – 20	> 10 – 15
"C"	Stable Flow	Relatively higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant, although many still pass through without stopping. Most drivers feel somewhat restricted.	> 20 – 35	> 15 – 25
"D"	Approaching Unstable Flow	Somewhat congested conditions. Longer but tolerable delays may result from unfavorable progression, long cycle lengths, and/or high volume-to-capacity ratios. Many vehicles are stopped. Individual cycle failures may be noticeable. Drivers feel restricted during short periods due to temporary back-ups.	> 35 – 55	> 25 – 35
"E"	Unstable Flow	Congested conditions. Significant delays result from poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures occur frequently. There are typically long queues of vehicles waiting upstream of the intersection. Driver maneuverability is very restricted.	> 55 – 80	> 35 – 50
"F"	Forced Flow	Jammed or grid-lock type operating conditions. Generally considered to be unacceptable for most drivers. Zero or very poor progression, with over-saturation or high volume-to-capacity ratios. Several individual cycle failures occur. Queue spillovers from other locations restrict or prevent movement.	> 80	> 50

Source: HCM-2010, Exhibits 18-4, 19-1 and 20-2.

2nd Street from Keystone Ave to Galetti Way

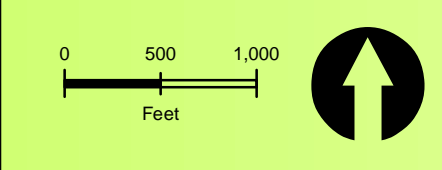
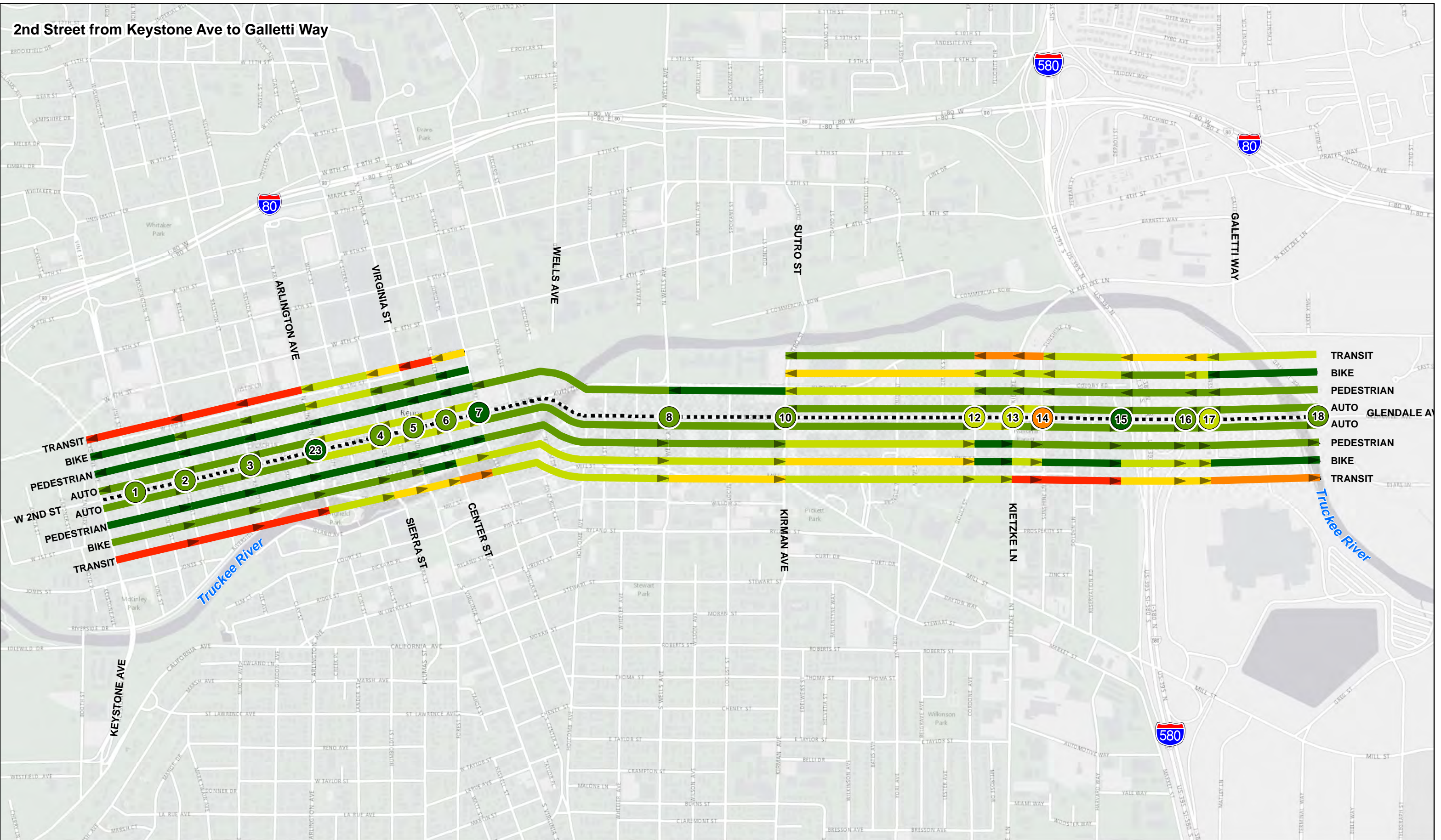


Figure 1A - Mid-Day Multi-Modal Level of Service
 2nd. St. / Kuenzli St. / Arlington Ave.
 Reno, NV
 December 2015

Legend



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 Reno, NV 89511 Fax: 775.823.4066

2nd Street from Court Street to Galletti Way

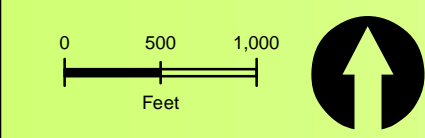
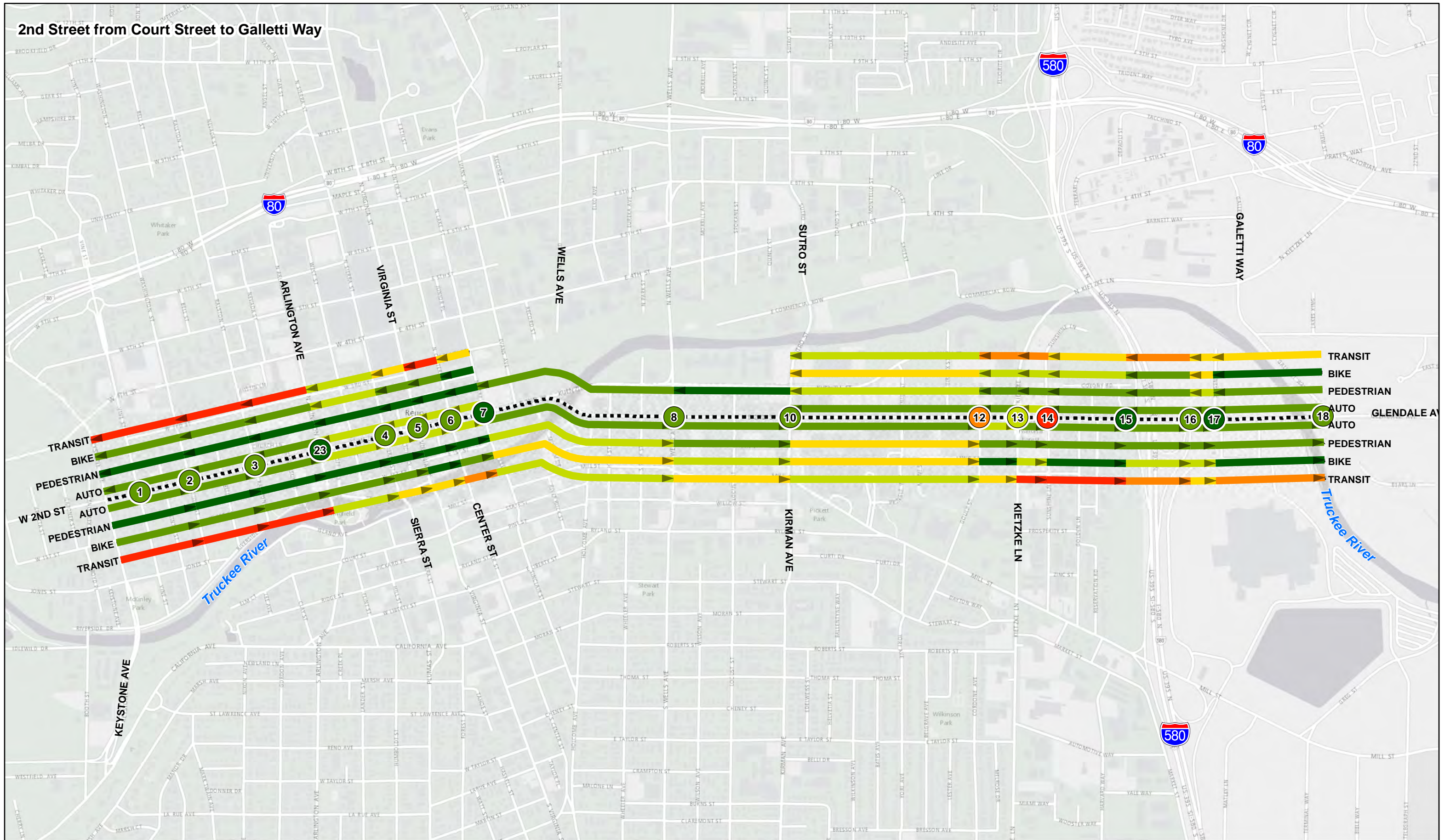
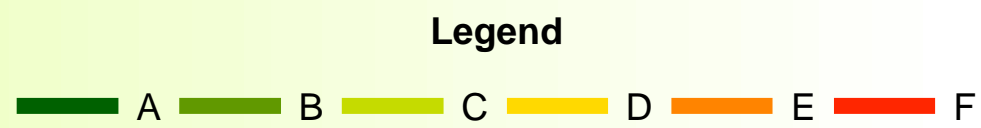


Figure 1B - PM Multi-Modal Level of Service
 2nd. St. / Kuenzli St. / Arlington Ave.
 Reno, NV
 December 2015



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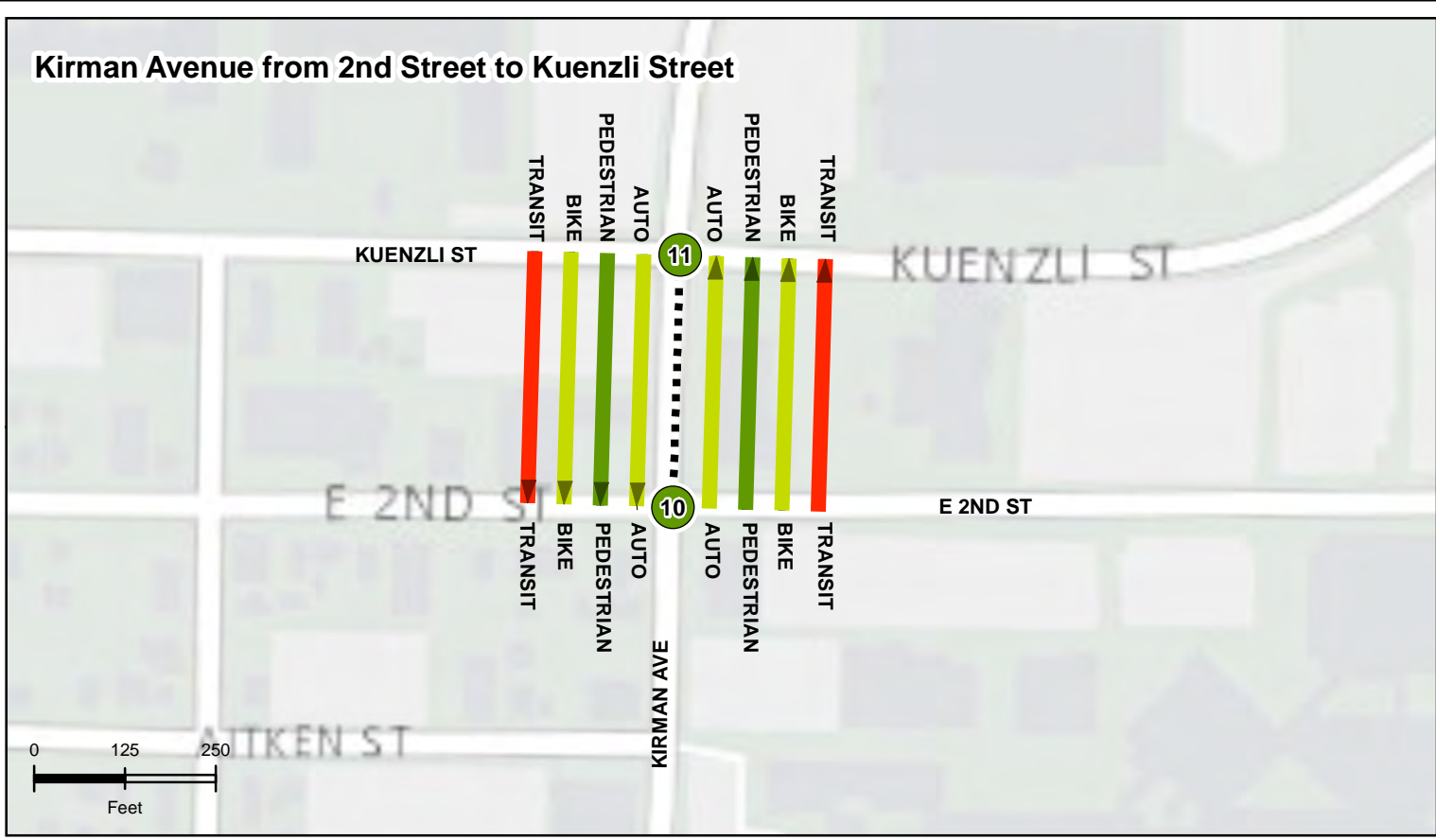
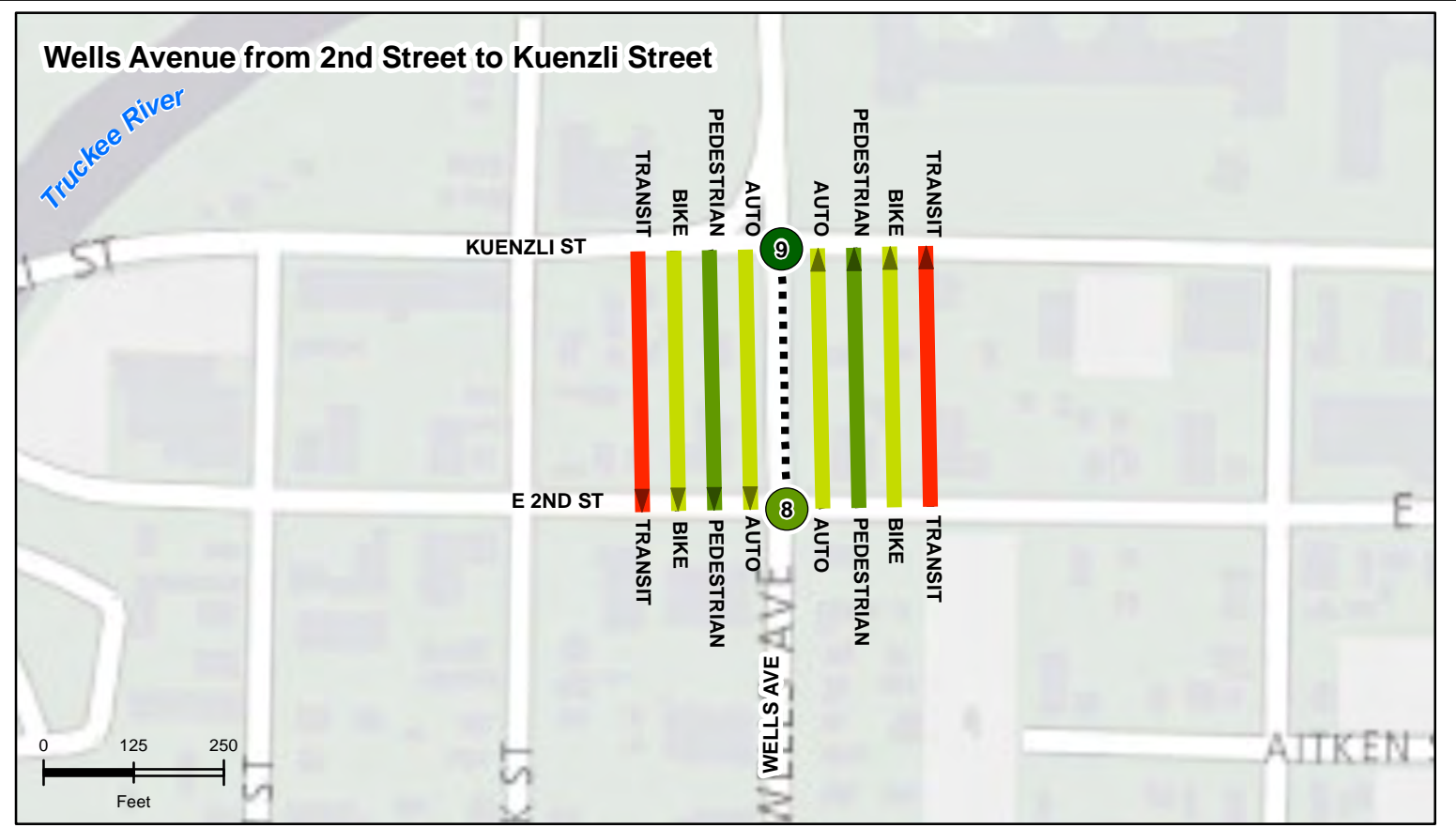


Figure 2A - Mid-Day Multi-Modal Level of Service
 2nd. St. / Kuenzli St. / Arlington Ave.
 Reno, NV
 December 2015

Legend

-
 A
 -
 B
 -
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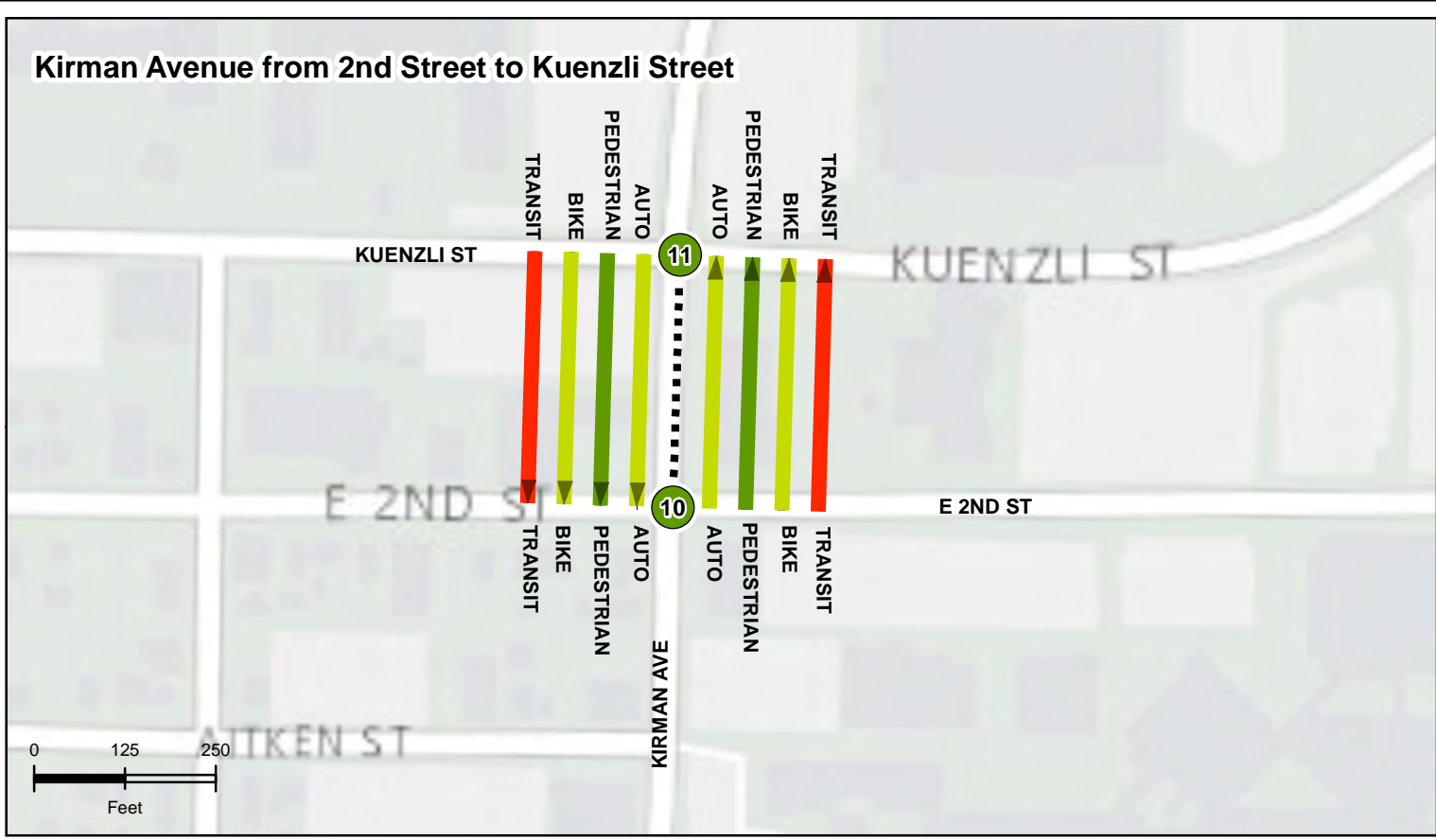
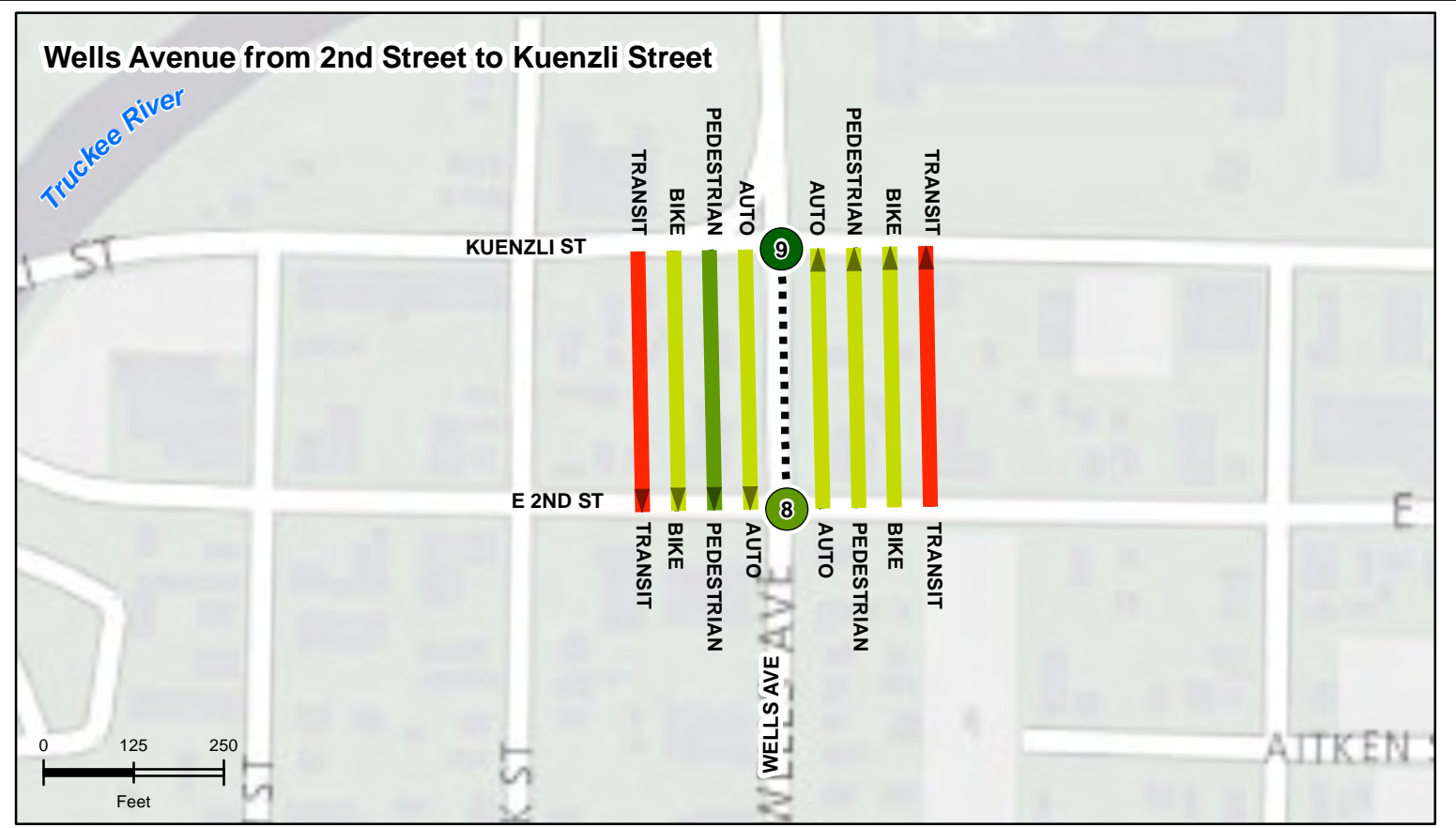


Figure 2B - PM Multi-Modal Level of Service
 2nd. St. / Kuenzli St. / Arlington Ave.
 Reno, NV
 December 2015

Legend

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 A
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Appendix C – Summary of Relevant Plans and Studies





DRAFT TECHNICAL MEMORANDUM

To: Lori Campbell, NDOT Project Manager

From: Bryan Gant, Wood Rodgers Project Manager

Date: July 25, 2015

Re: **2nd Street & Arlington Avenue SMP
Summary of Relevant Plans and Studies**

Background

The Nevada Department of Transportation (NDOT) is undertaking a series of Safety Management Plans (SMPs) throughout the State of Nevada. SMPs are a transportation analysis effort that incorporates corridor study, crash analysis, access management, public and stakeholder input, roadway engineering and application of the Highway Safety Manual (HSM) methods to improve transportation safety for all users. The SMP process is consistent with the Nevada Strategic Highway Safety Plan's goals of reducing crashes and fatalities, particularly at intersections, in half by 2030.

HSM methodologies and tools such as the Interactive Highway Safety Design Model (IHSDM) are applied at identified locations to define safety issues, consider mitigations, and select the best alternatives. These predictive methods allow engineers to calculate the predicted safety effects of different design applications.

NDOT, in cooperation with local transportation partners, has selected portions of 2nd Street, Kuenzli Street and Arlington Avenue for analysis under this SMP. The exact limits of analysis are 2nd Street from Keystone Avenue to Galletti Way, Kuenzli Street from 2nd Street to Kirman Avenue, and Arlington Avenue from Court Street to W 6th Street in the City of Reno, Nevada. The purpose of this document is to identify other relevant transportation and regional planning studies and documents that should be considered during the SMP process.

Coordination with other Plans/Projects

Over the past several years, different agencies have either identified the 2nd Street, Kuenzli Street, and Arlington Avenue corridors in previous planning efforts, have identified specific overarching regional goals that would pertain to those corridors, or have projects in place to address previously identified issues within those corridors. Table 1, at the end of this document, summarizes recommendations or proposed improvements from other existing plans that would be further considered in the 2nd Street and Arlington Avenue Safety Management Plan (SMP). Many of the recommendations are identified by multiple plans, which demonstrates the consistency among the regional goals of both the City of Reno and the Regional Transportation Commission of Washoe County (RTC) for modernizing the regional road



network for accommodation of multimodal uses. The most common themes across the multiple plans include reducing travel lanes when existing capacities are not warranted, adding new bicycle and pedestrian facilities, improving corridors to be more ADA compliant, and traffic operations improvements. The SMP will build upon the efforts and recommendations that have already been established through these previous planning efforts in order to create a clear direction for improving the 2nd Street, Kuenzli Street, and Arlington Avenue Corridors.

The following plans and or projects have been identified as being relevant to the 2nd Street, Kuenzli Street and Arlington Corridors, and are summarized below.

Road Safety Assessment Report in Washoe County on 2nd Street from Keystone Avenue to Galletti Way, Kuenzli Street from Kirman Avenue to 2nd Street and Arlington Avenue from Court Street to 6th Street in Reno – NDOT April 16, 2015

NDOT Safety Engineering conducted a road safety assessment (RSA) for the subject corridors that will be further considered by the SMP. Based on field reviews, the RSA team generally recommended to consider installing more street lighting, improving pedestrian facilities, installing bicycle facilities, replacing or upgrading striping and signage where needed, and retiming signals to help reduce crashes. The RSA developed a series of recommendations for the corridor segments ranging from:

- ◆ Priority 1A – could be completed by City of Reno staff in the near future
- ◆ Priority 1B – could be completed by NDOT staff in the near future
- ◆ Priority 2 – to be included in the SMP.

The majority of the Priority 1A and 1B recommendations are maintenance-level projects consisting of repairing street marking and signage, considering crosswalks, and review of speed limits. The Priority 2 recommendations, which will be further analyzed in this SMP are shown in Table 2 at the end of this document.

Kietzke Lane Safety Management Plan - NDOT August 2013

The Kietzke Lane Safety Management Plan (Kietzke SMP) analyzed Kietzke Lane from Galletti Way south to the South Virginia Street intersection including the Kietzke Lane and 2nd Street intersection, which is also a part of the 2nd Street/Arlington SMP. The Kietzke SMP provides recommendations in four categories: ADA, Transit, Roadway, and Pedestrian and Bicycle. Recommendations are prioritized as 1 – immediate action that can be taken by NDOT staff, 2 – included in future NDOT or RTC projects, 3 – included in long range improvement plans. The Kietzke SMP provided the following recommendations for the Kietzke Lane and 2nd Street intersection:

ADA:

- ◆ Priority 1 – In general NDOT should inventory all damaged sidewalk, and utility obstructions and repair or relocate as necessary with upcoming Kietzke projects.
- ◆ Priority 1 – Install “Sidewalk Closed Ahead – Cross Here” sign (R9-11) on northeast corner of Kietzke/2nd Street intersection where existing sidewalk ends.
- ◆ Priority 2 – Identify all non-ADA compliant driveways, curb ramps and pedestrian push buttons on Kietzke Lane and include in upcoming Kietzke Lane projects or as a safety project.



- ◆ Priority 3 – Address non-ADA compliant driveways, curb ramps and pedestrian push buttons in long range improvement plans.

Transit:

- ◆ Priority 1 – NDOT Coordinate assessment of Kietzke Lane transit stops with RTC to determine short term improvements that can be made to meet ADA requirements.
- ◆ Priority 1 – NDOT and RTC evaluate the feasibility of implementing bus-turnouts at transit stops on Kietzke Lane.
- ◆ Priority 2 – Recommend Kietzke Lane transit stops that cannot be made ADA compliant through short term improvements be included in future projects.

Roadway:

- ◆ Priority 1 – NDOT and City of Reno staff perform review of all signalized intersections and develop a list of traffic signal head locations that need to be modified for proper lane alignment.
- ◆ Priority 1 – NDOT and City of Reno staff review all traffic signal timing on Kietzke Lane and make adjustments as needed.
- ◆ Priority 1 - Perform a feasibility study for a roundabout at Kietzke Lane and 2nd Street.
- ◆ Priority 2 - Replace sweeping right turn lanes with standard turn lanes at major intersections.
- ◆ Priority 2 – All identified traffic signal head alignment issues be addressed with future NDOT or RTC project.
- ◆ Priority 2 – Replace all traffic signal head back plates with retroreflectorized back plates to improve nighttime visibility of the signal heads.
- ◆ Priority 3 – If the feasibility study for a roundabout shows positive benefits, implement a roundabout configuration for the Kietzke/2nd street intersection.

Pedestrian and Bicycle:

- ◆ Priority 1 – Perform evaluation of pedestrian activity at Kuenzli/Kietzke intersection to see if pedestrian safety facilities are warranted.
- ◆ Priority 2 – If feasibility study for Kuenzli/Kietzke warrants pedestrian safety facilities, install marked crosswalks, raised medians with ped path offsets, curb ramps, lighting, warning signs, and ped activated flashers.
- ◆ Priority 1 – Recommend NDOT staff coordinate with Reno Sparks Indian Colony (RSIC) and Washoe County Flood Control representatives for on-going efforts to build a walking path between RSIC property and the medical clinic. This will result in a path along the south side of the Truckee River and traverse under the Kietzke Lane bridge over the Truckee River, similar to the path that exists on the north side in the same area.
- ◆ Priority 2 – Install buffered bike lane on Kietzke Lane where space is available.
- ◆ Priority 1 – NDOT install bike lane signs (R3-17) along Kietzke Lane corridor and install “Begin Right Turn Lane – Yield to Bikes” signs (R4-4) at signalized intersections.
- ◆ Priority 1 – NDOT install Bike symbol and Arrow symbol in the bicycle lane along the Kietzke Lane corridor.



- ◆ Priority 1 – NDOT conduct evaluation of the “bike box” concept to determine the feasibility of installing them on the Kietzke Lane corridor. “Bike box” Concept shown in the RTC Bike and Ped Plan 2011.

Glendale Improvement Project – NDOT 2015

NDOT is currently in the design process for an improvement project on Glendale from Kietzke Lane to East McCarran Boulevard to reconstruct the roadway, curb ramps, driveways and sidewalk to meet ADA compliance. The project includes the following pedestrian improvements between Kietzke Lane and Galletti Way:

- New ADA compliant curb ramps at Sunshine Lane, Golden Lane, Colony Road, Reservation Road, I-580 southbound interchange, Grand Sierra Resort entrances, and Galletti Way.
- New sidewalk in locations where there is no existing sidewalk.

Keystone Avenue Corridor Study Nov. 2014 & Oddie Blvd/Wells Ave Corridor Study Feb. 2013 – RTC Washoe

The Keystone Avenue and Oddie Blvd/Wells Ave Corridor Studies, completed for RTC, analyze a small portion of the 2nd Street corridor. Recommendations from each of those plans relative to the 2nd Street corridor are provided below.

Keystone Avenue Corridor Study – Keystone Avenue and 2nd Street intersection

- ◆ Identified ADA issues including Keystone Avenue and 2nd Street intersection corners missing tactile strip, and the pedestrian push buttons at the north corners are not placed at required distances from the crossing or sidewalk. Coordinate ADA improvements with future projects.
- ◆ Refine signal timing parameters, signal coordination, and eliminate permitted left turn movements.
- ◆ Eliminate and/or consolidate driveways near intersections where possible.
- ◆ Install raised left turn medians to block overlapping traffic movements.
- ◆ Replace eastbound traffic signal and mast arm to a standard pole.
- ◆ Adjust pedestrian signal head on the northwest corner for southwest to northwest crossing, or coordinate with NV Energy to have utility pole relocated to the west, as the existing pedestrian signal is hidden behind the utility pole.
- ◆ Replace sidewalk on northeast corner due to severe cracking.
- ◆ Provide additional storage for eastbound left turn pocket.
- ◆ Vine Street and Washington Street recommended to be modified in order to accommodate bike lanes as an alternative to Keystone Avenue north-south connection.

Oddie Blvd/Wells Ave Corridor Study – Wells Avenue and Kuenzli Street intersection.

- ◆ Implement a wide bike lane (6') with a 2' buffer area on Wells Ave from Kuenzli to Sutro Streets.
- ◆ Further evaluate alternatives to construct a pedestrian/bicycle bridge over the railroad tracks and potentially over the Truckee River with the same structure in order to connect the Truckee River Trail and Kuenzli Street to 4th Street. Lower Wells Ave Bridge could be an option but may not have enough clearance to meet flood management requirements.



Reno Sparks Bicycle and Pedestrian Master Plan October 2011 & the Regional Transportation Plan 2035 – RTC Washoe

“The purpose of the Reno Sparks Bicycle and Pedestrian Master Plan (RSBPMP) is to make the region as bicycle and pedestrian friendly as possible in order to encourage people of all ages, abilities, and means to walk and/or bicycle.” The RSBPMP does not specifically mention planned improvements identified for the 2nd Street, Kuenzli Street, Arlington corridors, but does provide overarching goals and region wide improvements that should be considered for the SMP corridors. Generally those include:

- ◆ Provide bike lanes, shared paths, or boulevards where facilities don’t already exist
- ◆ Improve intersections with bike specific detectors and better signal timing to improve bike and pedestrian clearance intervals
- ◆ Improve east-west bike network connections between Reno and Sparks
- ◆ Provide bicycle facilities to connect schools to nearby neighborhoods
- ◆ Provide bike parking (walking audit specifically identified 2nd St. and Center St. as an opportunity)
- ◆ Improve old sidewalks including curb ramps to meet ADA standards as well as removing barriers such as utility poles
- ◆ Install new sidewalks where gaps in connectivity exist

The Regional Transportation Plan (RTP) developed by RTC was developed with the following goals: to improve safety, integrate land use and economic development, promote healthy communities and sustainability, manage existing systems efficiently, integrate all types of transportation, focus on regional connectivity, promote equity and environmental justice, improve freight and good movement, and invest strategically. The RTP identifies four programmatic investments that will be ongoing throughout the life of the plan: Accessibility Improvements under the Americans with Disabilities Act (ADA) for ongoing implementation of the RTC ADA Transition Plan, Pedestrian and Bicycle Facility Improvements for ongoing implementation of the RSBPMP, Traffic Signals and Intelligent Transportation Systems (ITS) operations for ongoing ITS improvements to promote more efficient travel, and pavement preservation for road maintenance. The SMP would include elements from each of these programmatic projects identified in the RTP. Specifically, those projects programmed in the current RTP that overlap the limits of this SMP are listed and summarized in Table 3 at the end of this document.

City of Reno Master Plan

The City of Reno Master Plan consists of three parts, the Citywide Plans, Center and Corridor Plans, and Neighborhood Plans. The following elements of the Master Plan pertain to the 2nd Street/Kuenzli Street/Arlington Avenue Corridors:

Citywide Plan for Public Services, Facilities, and Infrastructure - Mobility

- ◆ Reno citizens prefer
 - Walkable neighborhoods including a mix of housing, retail, and businesses.
 - Neighborhoods that offer safety and convenience as well as options of walking or using a bicycle.
 - Neighborhoods with narrow streets to slow traffic, and sidewalks separated from the roadways by landscaped parkways.



- They want to travel between neighborhoods, centers, and corridors on landscaped boulevards with main streets redesigned to provide convenient parking and active pedestrian space.
- ◆ Reno is “America’s Adventure Place”
 - Accommodate active lifestyles of residents and visitors by implementing an attractive and safe pedestrian and bicycle system by expanding, and improving the network.
 - Prioritize accommodations for pedestrian and bicyclists
 - Ensure the pedestrian environment is safe, accessible, interconnected, easy to use, and enjoyable.
- ◆ Streets and Parking
 - All streets should be as narrow as possible without compromising auto safety. “Reno will be a city where people can travel safely and smoothly between walkable neighborhoods and centers and corridors on public transit, in their car, on a bicycle, or on their feet.”
 - Projects should incorporate, where appropriate, traffic calming and pedestrian enhancements such as lighted crosswalks, pedestrian refuge islands, chokers, curb bulbs, curb extensions, and traffic circles.
 - Boulevard enhancements within major corridors and center plan areas. Features include landscaped medians, parkways, stone pavers, narrowed travel lanes, widened walkways, and traffic calming.
 - On-street parking should be included in projects in areas where encouraged.

Center and Corridor Plans - The Downtown Reno Regional Center Plan

(Includes The 2nd Street corridor from Keystone Avenue to Wells Avenue and the section of Kuenzli Street from 2nd Street to Wells Avenue, and the Arlington Avenue corridor.)

- ◆ The plan encourages concentrated development and pedestrian safety enhancements, as well as streetscape that supports Transit Oriented Development (TOD) to accommodate and encourage alternative modes of transportation.
- ◆ The plan divides the regional center into the following five Districts:
 - **Entertainment District** - Tourist element of Downtown appropriate for hotel/casinos, destination resorts, major recreation facilities, cultural facilities, tourist shopping, services, and activities.
 - **Truckee River District** – Preservation of the Downtown benefits of the Truckee River with building design and pedestrian corridors that enhance the river corridor and encourage the District.
 - **California Avenue District** – Preservation of the office portion of the regional center with land use including residential, retail, restaurant, and cultural facilities playing a key role in making this a vibrant district.
 - **The Keystone Avenue and Wells Avenue Districts** – Maintain general services within the regional center encouraging mixed land use at lower intensities and densities to transition to surrounding neighborhoods. A portion of the Keystone District permits gaming (between Keystone Avenue and Vine Street within the 2nd Street corridor).



The 2nd Street/Kuenzli Street corridor bisects the Districts by the following segments:

- Keystone to Ralston: **Keystone Ave District**
- Ralston to Washington: **Entertainment District** to the north, **Truckee River District** to the south
- Washington to Lake: **Entertainment District**
- Lake to Evans: **Entertainment District** to the north and **Truckee River District** to the south
- Evans to High: **Truckee River District**
- High to Wells: **Truckee River District** to the north and **California Ave District** to the south

The Arlington Avenue corridor bisects the Districts by the following segments:

- 6th to 5th: **Keystone Ave District**
- 5th to 2nd: **Entertainment District**
- 2nd to 1st: **Truckee River District** to the west and **Entertainment District** to the east
- 1st to Court: **Truckee River District**
- South of Court: **California Ave District**

◆ Circulation

- Primary north-south pedestrian/bicycle routes are located on Washington Street, Arlington Avenue, Virginia Street, and Lake Street providing access from the University of Nevada Regional Center through Downtown to the Truckee River. Washington Street functions as the primary bicycle route connecting Rancho San Rafael Park to the Truckee River.
- Primary east-west pedestrian routes are located along 1st Street, Mill Street, 4th, Street and the Truckee River. The Truckee River has an established pedestrian route along the River Walk.
- Multimodal connectivity should be provided throughout the plan area, particularly at the Amtrack Station/CitiCenter site.
- Development should be designed to include wide sidewalks, landscaped parkways, street trees and furniture, and other pedestrian amenities.
- Streetscapes should be designed to accommodate all modes of transportation with separation between incompatible modes such as bicycle and pedestrians where possible.

At the time of this technical memorandum, the City of Reno has undertaken an initiative to update their City of Reno Masterplan, including their transportation element. However, recent trends within the city do not suggest there will be a shift away from the principles noted above.



Table 1: SMP Proposed Improvement Recommendations

Recommendations to consider for SMP	Keystone Ave Corridor Study	2 nd St-Kuenzli -Arlington Ave Road Safety Audit April 2015	Oddie Blvd/Wells Ave Corridor Study	Kietzke Lane SMP	Glendale Improvement Project	City of Reno Master Plan Update	Regional Transportation Plan 2035	Reno-Sparks Bicycle & Pedestrian Master Plan 2011
Planned bike lanes/Add shared paths, cycle tracks, or boulevards	X	X		X		X	X	X
Consider road diet/ Reduce vehicle & ped conflict points by reducing underutilized travel lanes		X				X	X	X
Lack of connections in bike network b/w Reno and Sparks								X
Lack of connections between RSIC property and medical facility				X				
Bike facilities are needed to connect neighborhoods to schools								X
Bike Parking (2 nd &Center-RTC Bike/Ped Plan)						X		X
Ped/Bike bridge over railroad tracks and potentially river with same structure to connect Truckee River Trail to Kuenzli St and 4 th St. Lower Wells bridge may not meet flood management requirements.			X					
North/South Ped connections Washington St. & Arlington Ave (Downtown Reno Regional Center Plan)						X		
Improve interconnectivity b/w all modes, including modal transfer points, shared bikeways, ped crossings						X	X	
Enhance accessibility and safety of transit stops				X			X	
Move EB bus stop near Walmart		X						
Replace ped signal heads with count-down timer heads				X				
Update to latest PROWAG standards	X	X		X	X	X	X	X
Underground/relocate power poles		X						X
Install sidewalks at existing gap locations/improve degraded sidewalks		X			X	X	X	X
ADA improvements to RSIC pedestrian overpass/RRFB at existing overpass		X						



Recommendations to consider for SMP	Keystone Ave Corridor Study	2 nd St-Kuenzli -Arlington Ave Road Safety Audit April 2015	Oddie Blvd/Wells Ave Corridor Study	Kietzke Lane SMP	Glendale Improvement Project	City of Reno Master Plan Update	Regional Transportation Plan 2035	Reno-Sparks Bicycle & Pedestrian Master Plan 2011
Signal Timing including for bike/Ped Clearance intervals		X		X				X
Change static ped signals to push button		X						
Center signal heads over lanes		X		X				
Bulb outs for parking locations		X				X		
Consider Roundabout at 2 nd /Kietzke if determined to be feasible		X		X				
Raised median b/w Kietzke and US 395 SB		X		X				
Install median island ped fencing		X						
Replace sweeping right turn lanes at 2 nd /Kietzke with standard right turn lanes				X				
Driveway spacing too close to intersections/Driveway consolidation	X		X					
Conduct lighting study		X						
Implement ITS technology for transit and emergency vehicles							X	



Table 2: RSA Priority 2 Recommendations Summary

Review pedestrian clearance times	Modify/install vehicle signal heads over lanes
Review signal timing parameters and detection	Review sidewalks and repair
Conduct feasibility study for street lighting	Conduct feasibility study for bike routes/lanes
Conduct feasibility study for a Road Diet	Improve bus stops
Review ped push button heights and cross ramps	Relocate power poles
Install bulb outs	Realign pedestrian signal heads

Table 3: Summary of Relevant RTP Projects

Horizon Years	Primary Route	Limits	Funding	Notes
2013-2017	Kietzke Ln	Virginia St to Galletti Wy	\$15.6M	Multi-modal Improvements
2018-2022	Kietzke Ln	Virginia St to Galletti Wy	\$8.4M	Phase 2 Improvements
2013-2017	Keystone Ave	California Ave to W 7 th St	\$9.4M	Multi-modal Improvements
2023-2035	Keystone Ave	California Ave to W 4 th St	\$113.3M	Replace Truckee River Bridge and California Ave Intersection
2013-2017	4 th St/Prater Wy	Keystone Ave to Vista Blvd	\$39M	Multi-modal Improvements
2013-2017	Oddie Blvd/Wells Ave	Kuenzli Ln to Pyramid Wy	\$20.1M	Multi-modal Improvements
2018-2022	Oddie Blvd/Wells Ave	Kuenzli Ln to Pyramid Wy	\$24.3M	Phase 2 Improvements
2023-2035	Kirman Ave	Mill St to W 2 nd St	\$14.2M	Widen 2-4 Lanes
2023-2035	Glendale Ave	Galletti Wy to Rock Blvd	\$15.4M	Widen 4-6 Lanes



Appendix D – Road Safety Assessment



ROAD SAFETY ASSESSMENT REPORT

IN WASHOE COUNTY ON

**2ND STREET FROM KEYSTONE AVENUE TO GALLETTI WAY, KUENZLI
STREET FROM KIRMAN AVENUE TO 2ND STREET AND ON ARLINGTON
AVENUE FROM COURT STREET TO 6TH STREET IN RENO**

**PEDESTRIAN FOCUSED
POST-CONSTRUCTION PHASE RSA**



Prepared for:

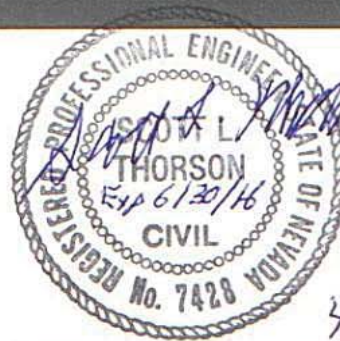
Nevada Department of Transportation

Traffic Safety Engineering

Prepared by:

The Burns Group

April 16, 2015



Scott L. Thorson, PE, PTOE
Nevada License # 7428
Burns Project No. 2015-003

EXECUTIVE SUMMARY

NDOT Safety Engineering requested that a Pedestrian focused Road Safety Assessment (RSA) be conducted on 2nd Street from Keystone Avenue to Galletti Way, Kuenzli Street from Kirman Avenue to 2nd Street and on Arlington Avenue from Court Street to 6th Street. The purpose of the RSA is to identify potential road safety issues and recommend countermeasures to mitigate those safety issues be included in the upcoming Safety Management Plan Corridor project.

Generally, the study corridor along 2nd Street, Kuenzli Street and Arlington Avenue consists of two general purpose lanes in each direction with two way left turn lanes between intersections and left turn lanes at intersections. The posted speed limit varies from 30 mph to 35 mph for the section of 2nd Street from Keystone Avenue to Galletti Way. The posted speed limit is 30 mph on Kuenzli Street. The posted speed limit varies from 15 mph to 25 mph for the section of Arlington Avenue from Court Street to 6th Street. The Average Annual Daily Traffic (AADT) for this segment of 2nd Street varies from 4,700 AADT to 17,000 AADT. The AADT for this segment of Kuenzli Street varies from 3,900 AADT to 4,100 AADT. The AADT for this segment of Arlington Avenue is 7,900 AADT. The AADT for the same locations in 2008 were about the same or a little higher than 2013.

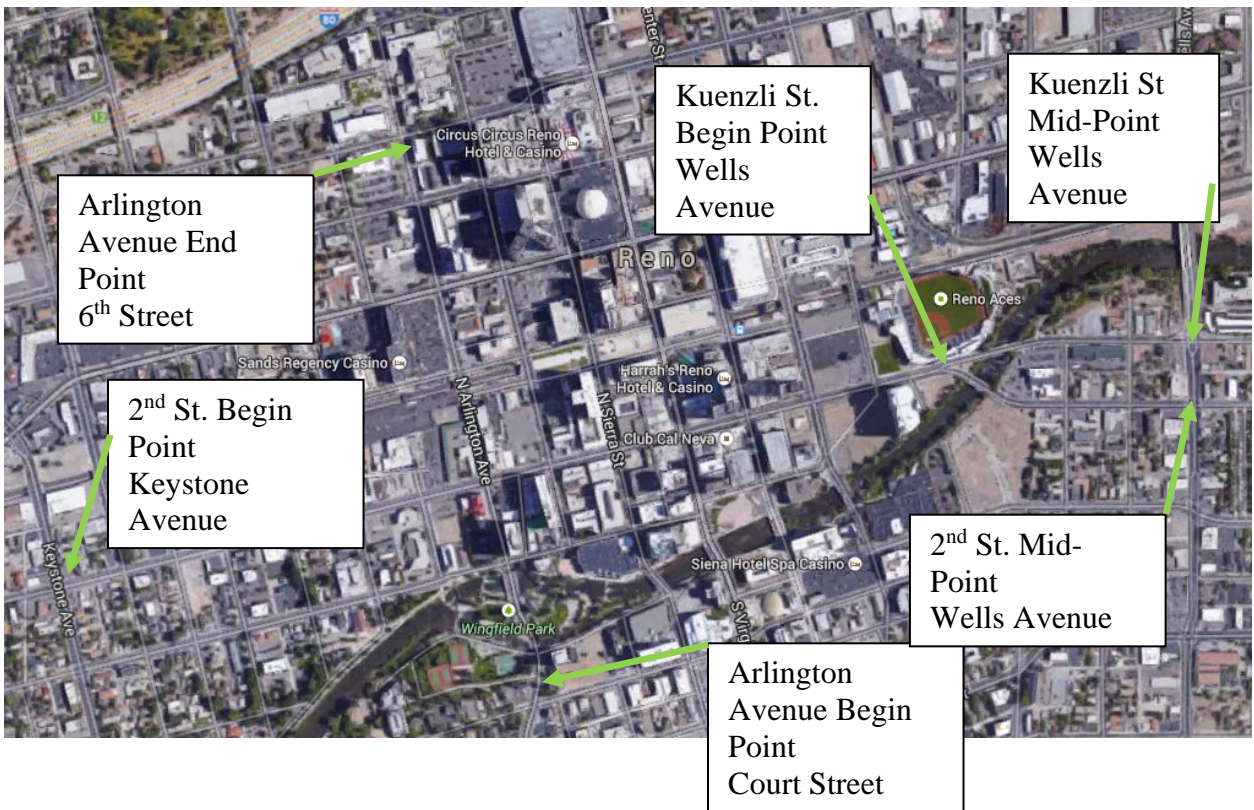
There were a total of 214 crashes that occurred on this section of 2nd Street from July 1, 2011 to June 30, 2014. There were a total of 89 injury crashes with 125 injuries and 125 property damage only (PDO) crashes. Of these 214 crashes, there were 84 angle crashes, 54 rear end crashes, 34 sideswipe crashes, 33 non-collision crashes, 9 bicycle crashes and 8 pedestrian crashes. There were no fatal crashes on this section of 2nd Street. There were a total of 33 crashes that occurred on this section of Kuenzli Street from July 1, 2011 to June 30, 2014. There were a total of 17 injury crashes with 28 injuries and 16 property damage only (PDO) crashes. Of these 33 crashes, there were 23 angle crashes, 5 sideswipe crashes, 2 rear end crashes, 2 non-collision crashes and 1 bicycle crash. There were no fatal crashes on this section of Kuenzli Street. There were a total of 67 crashes that occurred on this section of Arlington Avenue from July 1, 2011 to June 30, 2014. There were a total of 26 injury crashes with 36 injuries and 40 property damage only (PDO) crashes. Of these 67 crashes, there were 28 angle crashes, 18 rear end crashes, 16 non-collision crashes, 8 pedestrian crashes, 3 bicycle crashes. There was 1 fatal crash on this section of Arlington Avenue. The fatal crash occurred just north of the intersection of 2nd Street.

During field reviews, the 2nd Street, Kuenzli Street and Arlington Avenue study corridors was observed to be lit with street lights at most of the intersections with some corridor lighting. General features of the study corridors observed to be in need of improvement included: there is no corridor lighting installed along some of the sections of roadway; some of the pedestrian facilities are not up to current standards or there are not any pedestrian walkways installed; there were no existing bicycle facilities along the corridors; and some signing and striping is difficult to see at night. Based on the above

field observations, the RSA team recommends consider installing more corridor street lighting; consider improving pedestrian facilities along the corridor; consider installing bicycle facilities along the corridor; and replace and/or upgrade striping and signing on the roadway where it is needed and retiming signals to mitigate crashes.

A complete listing of the RSA recommendations can be found on pages 52 – 59 of this document. The RSA team recommendations are subdivided into Priorities 1A, 1B and 2 representing immediate and future safety management plan corridor recommendations.

2nd Street RSA Corridor, West Side, Keystone Avenue to Wells Avenue
Kuenzli Street, West Side, 2nd Street to Wells Avenue
Arlington Avenue RSA Corridor, Court Street to 6th Street



**2nd Street RSA Corridor, East Side, Wells Avenue to Galletti Way
Kuenzli Street, East Side, Wells Avenue to Kirman Avenue**

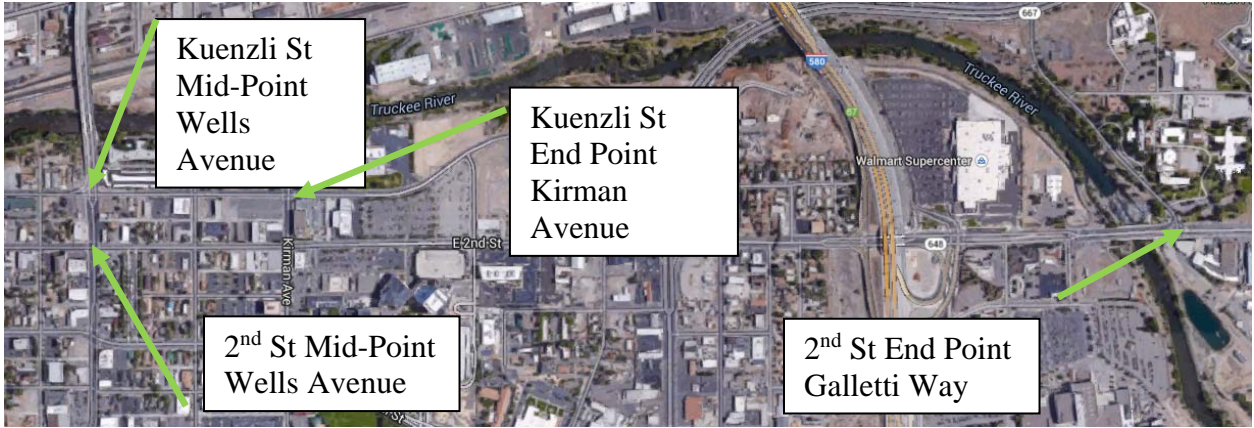


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APPENDIX 60

INTRODUCTION

NDOT Safety Engineering requested that a Pedestrian focused Road Safety Assessment (RSA) be conducted on 2nd Street from Keystone Avenue to Galletti Way and on Arlington Avenue from Court Street to 6th Street. The purpose of the RSA is to identify potential road safety issues and recommend countermeasures to mitigate those safety issues be included in the upcoming Safety Management Plan Corridor project.

SCOPE

The RSA Team conducted a Pedestrian focused Post-Construction Phase for existing roads RSA in Washoe County on 2nd Street from Keystone Avenue to Galletti Way and on Arlington Avenue from Court Street to 6th Street on January 13, 2015. The Road Safety Assessment team recognizes that compliance with design standards does not necessarily result in an optimally safe road design and the failure to comply with standards does not necessarily result in an unsafe design. The goal of this road safety assessment was to identify potential road safety issues and identify opportunities for improvements in safety for all road users. However, the road safety assessment was not intended as a replacement for design quality control or standard compliance checks, a traffic impact or safety impact study, a road safety inventory program, or a traffic safety modeling effort. Nor was the assessment intended as a means of evaluating design work, checking compliance with standards, investigating crashes, or providing a safety review. Instead, the team strived to look at safety issues from a different perspective and develop recommendations for potential safety enhancements.

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.

OBJECTIVES

- Identify potential safety issues that may be addressed by the upcoming Safety Management Plan and included in next scheduled project thereby reducing the risk and severity of crashes.
- From the road user's viewpoint, identify confusing and/or misleading messages.
- Improve awareness of safe maintenance practices.

BRIEFING MEETING

The Briefing Meeting for the RSA Team was held on Tuesday, January 13, 2015 at 9:00 AM at the NDOT District II Main Conference Room in Sparks, Nevada.

Scott Thorson, The Burns Group, gave a brief presentation that covered the NDOT RSA process, purpose, procedures, goals and objectives; crash data, traffic volumes and speed data for the project.

The Briefing Meeting was attended by the following team members:

- Guy Cooper – Reno Police Department
- Deputy Ben Coffindaffer – Washoe County Sheriff
- Jim Poston – Washoe County RTC - Traffic
- Wes Pittman – Washoe County RTC
- Kimberley O’Kelley – NDOT Traffic Safety Engineering
- Jared Feser – NDOT Roadway Design
- Bill Thompson – NDOT Freight Planning
- Bill Story – NDOT Bike and Pedestrian
- Craig Schoenky – City of Reno - Traffic
- K. C. Eben – Reno-Sparks Indian Colony
- Scott Thorson – The Burns Group (Team Leader)

FIELD REVIEW

Following the briefing meeting, 2nd Street and Arlington Avenue were walked during the day and driven at night. The team discussed several items of interest during the field reviews. All of the attendees at the briefing meeting made up the daytime field review team. The nighttime field review included everyone except K. C. Eben and Ben Coffindaffer.

DEBRIEFING MEETING

The debriefing meeting was held on Tuesday, January 13, 2015 at the NDOT District II Main Conference Room in Sparks, Nevada between the daytime and nighttime field reviews. The debriefing meeting was attended by everyone except K. C. Eben and Ben Coffindaffer.

A compilation of the observations and recommendations from the January 13, 2015 field reviews and debriefing meeting follows. Team observations are noted as bulleted items and *recommendations are noted in bold italics*

Recommendations are only one method of mitigation presented by the RSA team for discussion, other mitigation strategies can and should be explored by the Design Team where possible.

Priority 1A - is defined as those improvements that can be done in the immediate future by City of Reno staff during periodic maintenance of this subject road segment.

Priority 1B - is defined as those improvements that can be done in the immediate future by NDOT staff during their periodic maintenance of this subject road segment.

Priority 2 - is defined as those improvements that can be included in the future NDOT Safety Management Plan.

GENERAL INFORMATION

- The study corridor along 2nd Street and Arlington Avenue consists of two general purpose lanes with two way left turn lanes between intersections and left turn lanes at intersections.
- The development along the corridor consists of commercial and/or residential areas.
- 2nd Street is classified as an Other Principal Arterial and Arlington Avenue is classified as a Minor Arterial.
- The posted speed limit:
 - Varies from 30 mph to 35 mph for this section of 2nd Street from Keystone Avenue to Galletti Way
 - 30 mph for the section of Kuenzli Street from Kirman Avenue to 2nd Street
 - Varies from 15 mph to 25 mph for the section of Arlington Avenue from Court Street to 6th Street
- The Average Annual Daily Traffic (AADT) for this segment of 2nd Street from Keystone Avenue to Galletti Way:
 - Varies from 4,700 AADT to 17,000 AADT. The AADT for the same locations in 2008 were about the same or a little higher than 2013. (See traffic count data in appendix).
- The Average Annual Daily Traffic AADT for this segment of Kuenzli Street from Kirman Avenue to 2nd Street:
 - Varies from 3,900 AADT to 4,700 AADT in 2013
- The Average Annual Daily Traffic AADT for this segment of Arlington Avenue from Court Street to 6th Street:
 - 4,700 AADT in 2013
- There were a total of 214 crashes that occurred on this section of 2nd Street from July 1, 2011 to June 30, 2014. There were a total of 89 injury crashes with 125 injuries and 125 property damage only (PDO) crashes.
- Of these 214 crashes, there were 84 angle crashes, 54 rear end crashes, 34 sideswipe crashes, 33 non-collision crashes, 9 bicycle crashes, 8 pedestrian crashes, 6 backing crashes and 3 head-on crashes. There were no fatal crashes on this section of 2nd Street.
- There were a total of 33 crashes that occurred on this section of Kuenzli Street from July 1, 2011 to June 30, 2014. There were a total of 17 injury crashes with 28 injuries and 16 property damage only (PDO) crashes.
- Of these 33 crashes, there were 23 angle crashes, 4 sideswipe crashes, 2 rear end crashes, 2 non-collision crashes, 1 bicycle crashes and 1 head-on crash. There were no fatal crashes on this section of Kuenzli Street.
- There were a total of 67 crashes that occurred on this section of Arlington Avenue from July 1, 2011 to June 30, 2014. There were a total of 26 injury crashes with 36 injuries and 40 property damage only (PDO) crashes.
- Of these 67 crashes, there were 28 angle crashes, 18 rear end crashes, 16 non-collision crashes, 8 pedestrian crashes (4 of these crashes occurred at 3rd Street), 3 bicycle crashes, 2 sideswipe crashes, 2 backing crashes and 1 head-on crash.

There was 1 fatal crash on this section of Arlington Avenue. The fatal crash occurred just north of the intersection of 2nd Street.

- The summary of the intersection and corridor crash data is in the appendix and the complete crash data is on a CD in the back of the report.

Crash Rate Analysis

Corridor	Injury Crash Rate	Fatal Crash Rate	Total Crash Rate
2 nd Street from Keystone Avenue to Galletti Way	3.05	0.00	7.33
Kuenzli Street from 2 nd Street to Kirman Avenue	2.14	0.00	4.28
Functional Classification – Principal Arterial Other*	0.92	0.01	2.22
Arlington Avenue from Court Street to 6 th Street	4.17	0.16	6.42
Functional Classification – Minor Arterial	1.03	0.01	2.41

* Based on 2011 Data (crash rates per million vehicle miles traveled)

OBSERVATIONS AND RECOMMENDATIONS:

2ND STREET FROM KEYSTONE AVENUE TO GALLETTI WAY AND KUENZLI STREET FROM KIRMAN AVENUE TO 2ND STREET



Photo 1 – Typical cross section of the existing roadway on the project

- The general observations are: the current pavements markings, roadway signs, and intersection lighting generally appear to be in good or fair condition; the existing pavement is in fair to good condition; the roadway cross section along 2nd Street generally consists of two general purpose lanes in each direction (with some parking allowed) with two way left turn lanes between intersections and left turn lanes at intersections. Street lighting is installed at some of the intersections and along some of the corridor on this section of 2nd Street. There were a total of 214 crashes on this section of 2nd Street. Of this total there were 84 angle crashes, 54 rear-end crashes, 34 sideswipe crashes and 3 head-on crashes. There were a total of 33 crashes on this section of Kuenzli Street. Of this total there were 23 angle crashes, 5 sideswipe crashes and 2 rear-end crashes. See photos 1 and 2.

- ***Priority 1A – Replace or refresh pavement markings, roadway signs and intersection and corridor lighting as needed.***
- ***Priority 1B – Replace or refresh pavement markings, roadway signs and intersection and corridor lighting as needed.***
- ***Priority 1A – Consider conducting a speed limit study along the corridors to determine if the existing speed limits are appropriate.***

- ***Priority 1B – Consider conducting a speed limit along the corridor to determine if the existing speed limits are appropriate.***
- ***Priority 2 – Pedestrian clearance intervals for the signals along 2nd Street and Kuenzli Street should be reviewed and updated, if needed, to the current standards.***
- ***Priority 2 – Signal timing parameters should be reviewed and advanced detection at signalized intersections along this corridor be verified for location and operation. This could reduce the rear-end crashes on this corridor. The signal parameters such as gap-out time, yellow clearance time and all-red time should be checked to ensure that vehicles in the dilemma zone have time to safely cross the intersection.***
- ***Priority 2 - Conduct a feasibility study to evaluate the need for installing LED intersection and corridor street lighting along this section of 2nd street and Kuenzli Street where it currently does not exist. Installing intersection and corridor street lighting at locations that currently do not have street lighting, may reduce crashes at those intersections and corridors.***
- ***Priority 2 – Conduct a feasibility study to consider installing a road diet on some sections of 2nd street and Kuenzli Street. This may provide some areas for bicycles to ride along sections of 2nd Street and Kuenzli Street.***



Photo 2 – Showing an example of pavement markings that should be replaced.



Photo 3 – Pedestrian Push Button is located above the 42 inches maximum height above the sidewalk.

- There are several pedestrian push buttons that are located above the 42 inch standard for push button height. Also, some of the pedestrian ramps do not have tactile strips installed and the ramps are not directed to the crosswalk. See photos 3 and 4.

■ ***Priority 2 – Review all of the pedestrian push buttons along the 2nd Street and Kuenzli Street corridors to see if they meet current ADAAG and/or PROWAG standards.***

- ***Priority 2 – Recommend that all pedestrian crosswalks be reviewed to determine if they have existing curb cut ramps, tactile strips, curb cuts are aligned with the crosswalk and that they meet current ADAAG and/or PROWAG standards.***
- ***Priority 2 – Consider installing bulb out curbs across the parking lanes on 2nd Street and Kuenzli Street to provide pedestrians with shorter crossing exposure to traffic. This should improve safety of the pedestrians crossing 2nd Street and Kuenzli Street.***



Photo 4 – Showing the lack of tactile strips on a pedestrian ramp and the ramp not aligned to the crosswalk to the left. Also, showing an example of a parking lane along 2nd Street.



Photo 5 – Showing an example of only one signal head for two travel lanes.

- There are several existing signals that do not have one signal head for each travel lane on the mast arms. These signal heads are needed to provide additional lane assignment guidance through the intersection. See photo 5.
- ***Priority 2 – Recommend upgrading existing signal mast arms and installing a signal head centered over each through lane to meet current MUTCD recommended policies along these segments of 2nd Street and Kuenzli Street.***



Photo 6 – Showing an example of a section of sidewalk that has heaved and cracked.

- There are some areas of sidewalk along the roadway that heaved and/or cracked and could be an issue for pedestrians. See photo 6.
- ***Priority 2 – Recommend the existing sidewalks on these sections of roadway be reviewed for sections of sidewalk that have heaved or cracked and need to be replaced.***



Photo 7 – Showing a bicycle driving in the travel lane.

- There are bicyclists riding on 2nd Street and Kuenzli Street in the travel lane. When there is parking allowed, there is not a lot of room for them to ride. See photos 7 and 8.
- ***Priority 2 – Recommend that a feasibility study be conducted on the 2nd Street and Kuenzli Street corridors to determine if bike lanes and/or a bike route could be installed on 2nd Street and Kuenzli Street.***



Photo 8 – Showing a bicycle driving in the travel lane with parking.



Photo 9 – Showing an existing bus stop and power poles in the sidewalk area.

- There are some existing power poles in the existing sidewalk. There are several bus stops along the 2nd Street and Kuenzli Street corridors. See photo 9.
- ***Priority 2 – Recommend that the existing bus stops along these corridors be reviewed to propose improvements that are needed.***
- ***Priority 2 – Recommend that the locations of the existing power poles be reviewed to determine if they can be relocated to provide adequate area for pedestrians to walk on the sidewalk.***

2nd Street and Keystone Avenue Intersection



Photo 10 – looking north at the pedestrian signal head on the northwest corner at the intersection of 2nd Street and Keystone Avenue.

- Pedestrians crossing northbound on the west leg of the intersection of 2nd Street and Keystone Avenue have a visibility issue seeing the pedestrian signal head that is partially blocked by the existing power pole. See photo 10.
- ***Priority 1A – Consider repositioning the pedestrian signal head for pedestrians crossing northbound on the west leg of the intersection of 2nd Street and Keystone Avenue so that it is not blocked by the existing power pole. This will help pedestrians see the pedestrian signal head.***
- ***Priority 2 – If the pedestrian signal head cannot be realigned by maintenance personnel, the realignment of the signal head should be included in the future Safety Management Plan.***

2nd Street and Winter Street Intersection



Photo 11 – looking eastbound on 2nd Street at the intersection of Winter Street showing the new school zone from Winter Street to Washington Street.

- There is an existing school zone on 2nd Street from Winter Street to Washington Street. The school zone speed limit is on from 8:00 am to 3:30 pm during school days. See photo 11.
- ***Priority 1A – Recommend reviewing the times during the day that the existing school speed limit is on and revise the times if needed.***
- ***Priority 1A – Recommend reviewing the pedestrian activity during school hours on 2nd Street at the intersections of Winter Street and Washington Street to determine where crosswalks should be installed across 2nd Street.***

2nd Street and Sierra Street Intersection



Photo 12 – showing the existing crosswalk as you approach the intersection of 2nd Street and Sierra Street.

- The existing crosswalks at the 2nd Street intersections of Sierra Street, Virginia Street and Center Street are difficult to see as you approach the intersections. These intersections do not have ladder style crosswalks installed like the other intersections along 2nd Street located outside the downtown area. See photos 12 and 13.
- ***Priority 1A – Consider installing ladder style crosswalk markings or wider crosswalk markings at the 2nd Street intersections of Sierra Street, Virginia Street and Center Street. This could help motorists see these crosswalk markings sooner as they approach these intersections. This could reduce potential crashes at these intersections.***



Photo 13 – showing the existing crosswalk on the west leg of the intersection of 2nd Street and Sierra Street.

2nd Street and Evan Avenue Intersection



Photo 14 – eastbound at the intersection of 2nd Street and Evan Avenue showing that there is a back plate missing on the signal head.

- There is a back plate missing on the signal head installed on the signal pole for the eastbound direction at the intersection of 2nd Street and Evan Avenue. See photo 14.
- ***Priority 1A – Consider installing a back plate on the signal head located on the signal pole for the eastbound traffic at the intersection of 2nd Street and Evan Avenue. This will help the traffic see the signal head as they are approaching the intersection of 2nd Street and Evan Avenue. This could reduce the potential for vehicles crashes at the intersection.***

2nd Street and Wells Avenue Intersection



Photo 15 – looking northbound on Wells Avenue at the intersection of 2nd Street.

- Northbound vehicles on Wells Avenue at the intersection of 2nd Street cannot turn left on to 2nd Street because it is a one way street to the right (eastbound) and southbound vehicles on Wells Avenue at the intersection of 2nd Street cannot turn right onto 2nd Street because it is a one way street to the left (eastbound). Several southbound vehicles appeared to be driving over the posted speed limit at 2nd Street after coming off of the Wells Avenue overpass at Kuenzli Street. There were 21 reported crashes at this intersection and 11 of those were angle crashes. See photos 15, 16 and 17.
- ***Priority 1A – Consider installing a No Left Turn (symbol) (R3-2) sign on the signal mast arm for traffic northbound on Wells Avenue at the intersection of 2nd Street to remind motorists that they cannot turn left at this intersection. This could reduce crashes at this intersection.***
- ***Priority 1A – Consider relocating the existing No Right Turn (symbol) (R3-1) sign on the signal pole to the signal mast arm for traffic southbound on Wells Avenue at the intersection of 2nd Street. This should give the sign better visibility to help remind motorists that they cannot turn right at this intersection. This could reduce crashes at this intersection.***

- **Priority 2 – Consider installing a radar activated speed feedback sign southbound on Wells Avenue on the existing overhead sign structure between Kuenzli Street and 2nd Street. This could help remind the southbound motorists of the speed limit change from 35 mph to 30 mph. This could reduce crashes at this intersection. See photo 17.**



Photo 16 – looking southbound on Wells Avenue at the intersection of 2nd Street.



Photo 17 – looking southbound on Wells Avenue at the overhead sign bridge just north of the intersection of 2nd Street.

2nd Street and Kirman Avenue Intersection



Photo 18 – Looking westbound on 2nd Avenue at the intersection of Kirman Avenue.

- Northbound vehicles on Kirman Avenue at the intersection of 2nd Street cannot turn left on to 2nd Street and southbound vehicles on Wells Avenue at the intersection of 2nd Street cannot turn right onto 2nd Street because it is a one way street eastbound that ends at Kirman Avenue. 2nd Street is a two-way street east of Kirman Avenue. There were 13 reported crashes at this intersection and 9 of those were angle crashes. See photo 18.
- ***Priority 1A – Consider installing an additional “Do Not Enter” (R5-1) sign on the south side of 2nd Street just west of the intersection of Kirman Avenue to reinforce that the westbound traffic on 2nd street cannot continue westbound because 2nd street is a one-way eastbound west of Kirman Avenue.***
- ***Priority 1A – Consider moving the existing pedestrian signal head and push button on the southwest corner of the intersection of 2nd Street and Kirman Avenue closer to the crosswalks.***

2nd Street and Renown Hospital Driveway Intersection



Photo 19 – Showing that the pedestrian crossing sign is partially hidden by trees and bushes.

- The existing pedestrian crossing sign at the crosswalk is partially hidden by trees and bushes at the intersection of 2nd Street and the Renown hospital driveway. See photo 19.
- ***Priority 1A – Consider trimming the trees and bushes by the Pedestrian Crossing signs at the Renown Hospital driveway so that drivers will be able to see the sign and pedestrians easier. This could reduce the potential crashes at the intersection.***

2nd Street and Kietzke Lane Intersection



Photo 20 – Looking eastbound at the intersection of 2nd Street and Kietzke Lane.

- This intersection has a high volume of traffic. There were 29 total crashes at this intersection with 19 rear end crashes and 7 angle crashes. The See photo 20.
- ***Priority 2 - Signal timing parameters should be reviewed and advanced detection at this intersection be checked for location and operation. This could reduce the rear-end crashes on this corridor. The signal parameters such as gap-out time, yellow clearance time and all-red time should be checked to ensure that vehicles in the dilemma zone have time to safely cross the intersection.***
- ***Priority 2 – Consider installing a roundabout at this intersection to reduce crashes and improve traffic flow.***

2nd Street between Golden Lane and Reservation Road Intersections



Photo 21 – Showing the existing pedestrian overpass located between the intersections of Golden Lane and Reservation Road.

- There is a residential neighborhood located on the south side of 2nd Street and the Reno-Sparks Indian Colony Smoke Shop is located on the north side of 2nd Street at the existing pedestrian overpass. There are several pedestrians and vehicles crossing 2nd Street in this area. See photo 21.
- ***Priority 1B – Consider moving the westbound RTC Bus Stop further to the west to improve sight distance for vehicles exiting Colony Road onto 2nd Street.***
- ***Priority 2 – Conduct a feasibility study for installing raised median islands and concrete bulb outs on 2nd Street between Kietzke Lane and the US 395 southbound ramps to control turning movements conflicts at the intersections and driveways.***
- ***Priority 2 – Conduct a feasibility study to install a pedestrian crosswalk (at an appropriate location) with ADA ramps and a Pedestrian Hybrid Beacon or RRFB's.***
- ***Priority 2 – Conduct a feasibility study on the existing overhead pedestrian structure to determine an economical way of meeting the ADA requirement for the ramps.***

2nd Street between the Grand Sierra Resort unsignalized and signalized Intersections



Photo 22 – Looking eastbound on 2nd Street toward the Grand Sierra Resort signalized intersection showing pedestrian walking on the street and gravel area on the north side of 2nd Street.

- There are existing bus stops for eastbound and westbound busses on 2nd Street located between the Grand Sierra Resort’s unsignalized driveway and signalized intersection. Pedestrians are crossing the roadway between these intersections after getting off the eastbound bus on the south side of the roadway to go to the Walmart on the north side of the road. Some of the pedestrians getting off of the westbound bus are walking on the existing gravel area or on the paved shoulder to get to Galletti Way. See photos 22 and 23.
- ***Priority 2 – Consider paving the sidewalk on the north side of 2nd Street from the bus stop east to Galletti Way. This would improve the safety of the pedestrians walking along this corridor.***
- ***Priority 2 – Consider moving the eastbound bus stop closer to the signalized intersection at the US 395 northbound ramps or the signalized intersection at the Grand Sierra Resort entrance on 2nd Street. This would encourage the pedestrians to cross at the signalized intersection and not cross midblock.***

- ***Priority 2 – Consider installing pedestrian fencing on the median island on 2nd Street from the signalized intersection at the US 395 northbound ramps to the signalized intersection at the Grand Sierra Resort entrance. This should discourage pedestrians from crossing 2nd Street at midblock.***



Photo 23 – Showing pedestrians crossing 2nd Street between the Grand Sierra Resort unsignalized driveway and signalized intersection after getting off the eastbound RTC transit bus.

Kuenzli Street and Kirman Avenue Intersection



Photo 24 – looking northbound on Kirman Avenue at the intersection of Kuenzli Street.

- Northbound vehicles on Kirman Avenue at the intersection of Kuenzli Street cannot turn right on to Kuenzli Street because it is a one way street to the left (westbound) and southbound vehicles on Kirman Avenue at the intersection of Kuenzli Street cannot turn left onto Kuenzli Street because it is a one way street to the right (westbound). There were 19 reported crashes at this intersection and 14 of those were angle crashes. See photos 24 and 25.
- ***Priority 1A – Consider installing a No Right Turn (symbol) (R3-1) sign on the signal mast arm for traffic northbound on Kirman Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn right at this intersection. This could reduce crashes at this intersection.***
- ***Priority 1A – Consider installing a No Left Turn (symbol) (R3-2) sign on the signal mast arm for traffic southbound on Kirman Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn left at this intersection. This could reduce crashes at this intersection.***



Photo 25 – looking southbound on Kirman Avenue at the intersection of Kuenzli Street.

Kuenzli Street and Wells Avenue Intersection

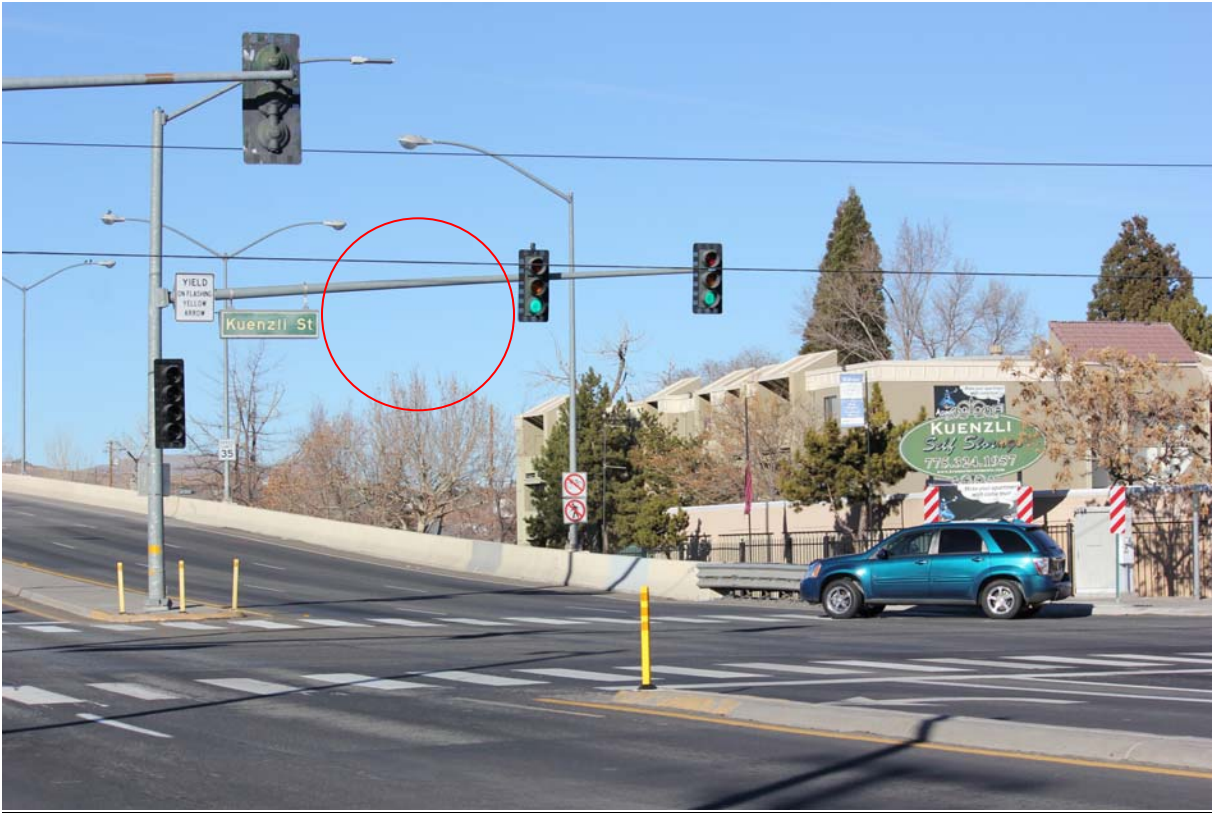


Photo 26 – looking northbound on Wells Avenue at the intersection of Kuenzli Street.

- Northbound vehicles on Wells Avenue at the intersection of Kuenzli Street cannot turn right on to Kuenzli Street because it is a one way street to the left (westbound) and southbound vehicles on Wells Avenue at the intersection of Kuenzli Street cannot turn left onto Kuenzli Street because it is a one way street to the right (westbound). There were 7 reported crashes at this intersection and 4 of those were angle crashes. See photos 26, 27 and 28.
- ***Priority 1A – Consider installing a No Right Turn (symbol) (R3-1) sign on the signal mast arm for traffic northbound on Wells Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn right at this intersection. This could reduce crashes at this intersection.***
- ***Priority 1A – Consider installing a No Left Turn (symbol) (R3-2) sign on the signal mast arm for traffic southbound on Wells Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn left at this intersection. This could reduce crashes at this intersection. See photo 27.***

- *Priority 1A – Consider installing lane-reduction arrows instead of through lane-use arrows in the lane the motorist turning right from southbound Wells Avenue onto westbound Kuenzli Street ends up in. This will let the motorist know that their lane is transitioning into the through lane on Kuenzli Street instead of getting their own lane. See photo 28.*



Photo 27 – looking southbound on Kirman Avenue at the intersection of Kuenzli Street.



Photo 28 – looking westbound on Kuenzli Street after turning right from southbound Wells Avenue. The lane transitions into the right westbound through lane on Kuenzli Street.

ARLINGTON AVENUE FROM COURT STREET TO 6TH STREET



Photo 29 – Typical cross section of the existing roadway on the project

- The general observations are: the current pavements markings, roadway signs, and intersection lighting generally appear to be in good or fair condition; the existing pavement is in fair to good condition; the roadway cross section along Arlington Avenue generally consists of two general purpose lanes in each direction (with some parking allowed) and left turn lanes at some intersections. Street lighting is installed at some of the intersections and along some of the corridor on this section of Arlington Avenue. There were a total of 67 crashes on this section of Arlington Avenue. Of this total there were 28 angle crashes, 18 rear-end crashes, 16 non-collisions, 8 pedestrian crashes and 3 bicycle crashes. See photos 29 and 30.
- ***Priority 1A – Replace or repair pavement markings, roadways signs and intersection and corridor lighting as needed.***
 - ***Priority 1A – Consider conducting a speed limit study along the Arlington Avenue corridor to determine if the existing speed limits are appropriate.***
 - ***Priority 2 – Pedestrian clearance intervals for the signals along Arlington Avenue should be reviewed and updated, if needed, to the current standards.***

- ***Priority 2 – Signal timing parameters should be reviewed and advanced detection at signalized intersections along this corridor be verified for location and operation. This could reduce the rear-end crashes on this corridor. The signal parameters such as gap-out time, yellow clearance time and all-red time should be checked to ensure that vehicles in the dilemma zone have time to safely cross the intersection.***
- ***Priority 2 - Conduct a feasibility study to evaluate the need for installing LED intersection and corridor street lighting along this section of Arlington Avenue where it currently does not exist. Installing intersection and corridor street lighting at locations that currently do not have street lighting, may reduce crashes at those intersections and corridors.***
- ***Priority 2 - Conduct a feasibility study to consider installing a road diet on some sections of Arlington Avenue. This may provide some areas for bicycles to ride along sections of Arlington Avenue.***



Photo 30 – Showing an example of pavement markings that should be replaced.



Photo 31 – Pedestrian Push Button is located above the 42 inches maximum height above the sidewalk.

- There are several pedestrian push buttons that are located above the 42 inch standard for push button height. Also, some of the pedestrian ramps do not have tactile strips installed and the ramps are not directed to the crosswalk. See photos 31 and 32.

■ ***Priority 2 – Review all of the pedestrian push buttons along the Arlington Avenue corridor to see if they meet current ADAAG and/or PROWAG standards.***

- *Priority 2 – Recommend that all pedestrian crosswalks be reviewed to determine if they have existing curb cut ramps, tactile strips and curb cuts are aligned with the crosswalk and that they meet current ADAAG and/or PROWAG standards.*
- *Priority 2 – Consider installing bulb out curb across the parking lanes on Arlington Avenue to provide pedestrians with shorter crossing exposure to traffic. This should improve safety of the pedestrians crossing Arlington Avenue.*



Photo 32 – Showing the lack of tactile strips on a pedestrian ramp and the ramp not aligned to the crosswalk to the right at the intersection of Arlington Avenue and 5th Street.



Photo 33 – Showing an example of only one signal head for two travel lanes.

- There are several existing signals that do not have one signal head for each travel lane on the mast arms. These signal heads are needed to provide additional lane assignment guidance through the intersection. See photo 33.
- ***Priority 2 – Recommend upgrading existing signal mast arms and installing a signal head centered over each through lane to meet current MUTCD recommended policies along this segment of Arlington Avenue.***



Photo 34 – Showing an example of a section of sidewalk that has heaved.

- There are some areas of sidewalk along the roadway that heaved and/or cracked and could be an issue for pedestrians. See photo 34.
- ***Priority 2 – Recommend the existing sidewalks on this section of Arlington Avenue be reviewed for sections of sidewalk that have heaved and/or cracked and need to be replaced.***



Photo 35 – Showing parking along Arlington Avenue.

- There are bicyclists riding on Arlington Avenue in the travel lane. When there is parking allowed, there is not a lot of room for them to ride. There are existing bike lanes on Arlington Avenues between Court Street and 1ST Street. See photo 35.
- ***Priority 2 – Recommend that a feasibility study be conducted on the Arlington Avenue corridor to determine if bike lanes and/or a bike route could be installed on Arlington Avenue from 1st Street to 6th Street.***



Photo 36 – Showing existing power poles in the sidewalk area.

- There are some existing power poles in the existing sidewalk along the Arlington Avenue Corridor that are restricting the area for pedestrian to walk on the sidewalk. See photo 36.
- ***Priority 2 – Recommend that the locations of the existing power poles be reviewed to determine if they can be relocated to provide adequate area for pedestrians to walk on the sidewalk.***



Photo 37 – Showing an existing bus stop in the sidewalk area.

- There are several bus stops along the Arlington Avenue corridor. See photo 37.
- ***Priority 2 – Recommend that the existing bus stops along the Arlington Avenue corridor be reviewed to propose improvements that are needed.***



Photo 38 – example of vegetation encroaching on the sidewalk area.

- There are some sections of the sidewalk that have vegetation encroaching on and/or overhanging the sidewalk. This could reduce the effective width of the sidewalk for the pedestrian to use. See photo 38.
- ***Priority 1A – Recommend that the vegetation along the corridor be trimmed so that it is not encroaching on the sidewalk and blocking pedestrians from using the sidewalk.***

Arlington Avenue and Court Street Intersection



Photo 39 – Looking northbound at the intersection of Arlington Avenue and Court Street.

- This intersection is very dark at night which makes it difficult to see pedestrians. There is only one existing street light installed on northwest corner of the intersection of Arlington Avenue and Court Street. See photo 39.
- ***Priority 2 – Consider installing additional street lighting at the intersection of Arlington Avenue and Court Street. This will help motorists see pedestrians at this intersection at night.***

Arlington Avenue and Island Avenue Intersection



Photo 40 – Looking southbound on Arlington Avenue at the intersection of Island Avenue.

- At the intersection of Arlington Avenue and Island Avenue there is an existing overhead pedestrian crossing sign with flashing lights that are on continuously. See photo 40.
- ***Priority 2 – Consider installing pedestrian activated flashing lights on the existing overhead pedestrian crossing sign instead of having it flash continuously at Arlington Avenue and Island Avenue. This will let motorists know when there is a pedestrian crossing at the intersection instead of the lights being on all the time.***

Arlington Avenue between Island Avenue and 1st Street Intersections



Photo 41 – Looking northbound on Arlington Avenue toward the bridge over the Truckee River just south of the intersection of 1st Street.

- The existing bike lane northbound on Arlington Avenue stops on the south side of the Truckee River just south of the 1st Street intersection. See photo 41.
- ***Priority 1A – Consider installing a Bike Lane sign (R3-17) and Bike Lane Ends plaque (R-17bP) northbound on Arlington Avenue before the bike lane ends on the south side of the Truckee River Bridge south of the intersection of 1st Street. This will let bicyclists know that the existing bike lane is ending.***
- ***Priority 2 - Recommend that a feasibility study be conducted on the Arlington Avenue from 1st Street to 6th Street to determine if bike lanes and/or a bike route could be installed on this section of Arlington Avenue.***

Arlington Avenue and 1st Street Intersection



Photo 42 – Looking at the existing crosswalk on the south leg of the intersection of Arlington Avenue and 1st Street.

- The existing crosswalk on the south leg of the intersection Arlington Avenue and 1st Street intersection does not have a ladder style crosswalk installed like the other 3 legs of the intersection. See photo 42.
- ***Priority 1A – Consider installing a ladder style crosswalk on the south leg of the intersection of Arlington Avenue and 1st Street to match the other 3 ladder style crosswalk markings installed at the intersection. This will make the crosswalk on the south leg of the intersection more visible to the motorists approaching this crosswalk.***

Arlington Avenue and 2nd Street Intersection



Photo 43 – Looking northbound on Arlington Avenue and the intersection of 2nd Street.

- The existing crosswalks look good and there are street lights on all four quadrants at the intersection. There are no pedestrian push buttons installed at this intersection. The pedestrian signal indications come up for each vehicle green cycle for that direction. There was a fatal pedestrian crash just north of this intersection. A northbound vehicle hit a pedestrian who was crossing the street while intoxicated. See photo 43.
- ***Priority 1A – Consider installing pedestrian push buttons at the intersection of Arlington Avenue and 2nd Street. This should help pedestrians cross the street at this intersection.***

Arlington Avenue at Commercial Row and 3rd Street Intersections



Photo 44 – Looking northbound on Arlington Avenue at the intersection of 3rd Street from the intersection of Commercial Row.

- The existing crosswalks on Arlington Avenue at the Commercial Row and 3rd Street intersections do not have ladder style crosswalk markings. Looking northbound on Arlington Avenue from Commercial Row toward the 3rd Street intersection you cannot see the crosswalk at 3rd Street and have a difficult time seeing the pedestrians crossing at 3rd Street. Looking southbound on Arlington Avenue from 3rd Street toward the Commercial Row intersection you cannot see the crosswalk at Commercial Row and have a difficult time seeing the pedestrians crossing at Commercial Row. There were 11 crashes at the intersection of 3rd Street. 4 of these crashes involved pedestrians. See photos 44 and 45.
- ***Priority 1A – Consider installing a ladder style crosswalk at the intersection of Arlington Avenue and Commercial Row and at the intersection of Arlington Avenue and 3rd Street. This should make these crosswalks more visible to the motorists approaching them.***

- ***Priority 1A – Consider installing pedestrian activated flashing lights on the existing pedestrian crossings signs at the intersection of Arlington Avenue and 3rd Street and/or at the intersection of Arlington Avenue and Commercial Row. This should help motorists see pedestrians crossing the street at these intersections.***
- ***Priority 2 – If installing pedestrian activated flashing lights on the existing pedestrian crossings signs at the intersection of Arlington Avenue and 3rd Street and/or at the intersection of Arlington Avenue and Commercial Row cannot be installed by maintenance, they should be considered to be installed in the upcoming Safety Management Plan.***

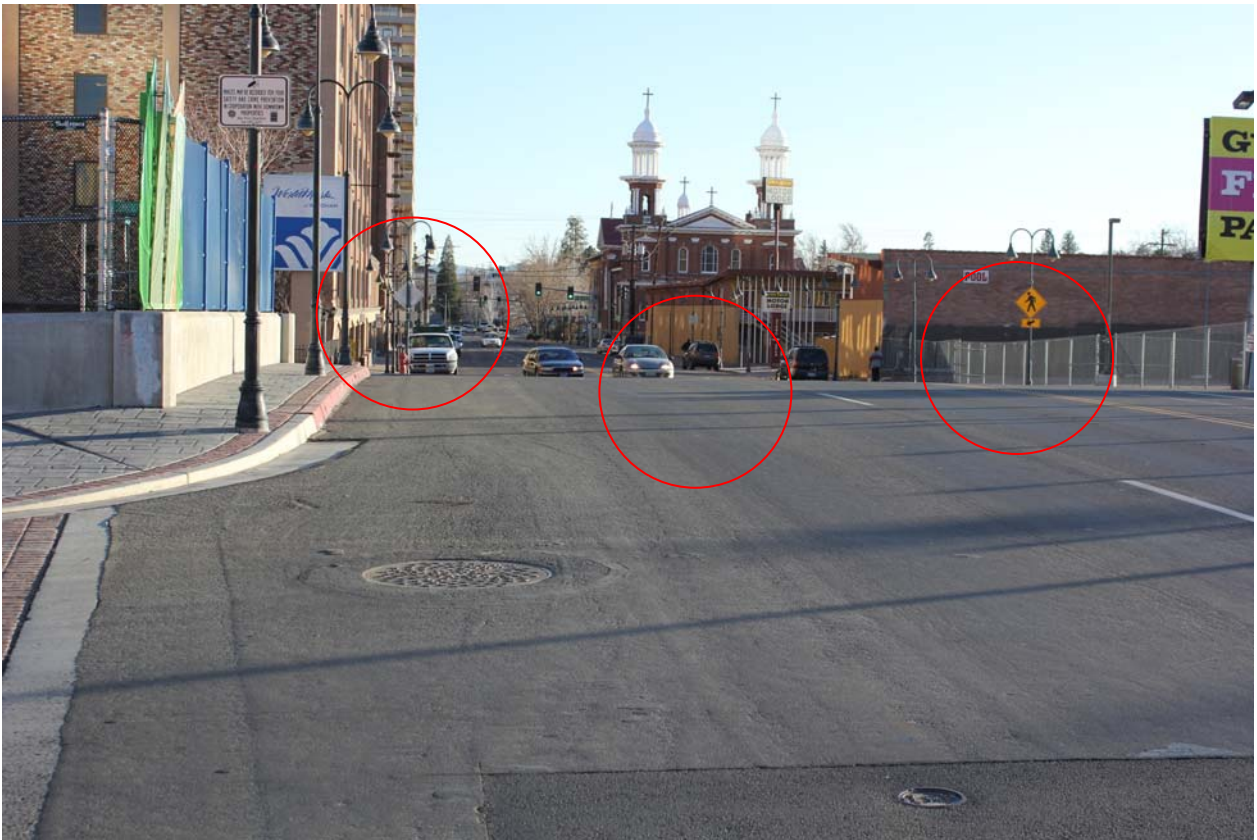


Photo 45 – Looking southbound on Arlington Avenue at the intersection of Commercial Row from the intersection of 3rd Street.

Arlington Avenue and 5th Street Intersection



Photo 46 – Looking northbound on Arlington Avenue and the intersection of 5th Street.

- The existing crosswalks at this intersection are not the ladder style crosswalks. There are street lights installed on three of the four corners. There is no street light installed on the north east corner of the intersection. There were 17 crashes at the intersection of 5th Street. 3 of these crashes involved pedestrians. See photo 46.
- ***Priority 1A – Consider installing ladder style crosswalks at the intersection of Arlington Avenue and 5th Street. This should make these crosswalks more visible to the motorists approaching them.***
- ***Priority 2 – Consider installing a street light on the signal pole located on the northeast corner of the intersection of Arlington Avenue and 5th Street. This should help motorists see pedestrians in the northeast corner area of the intersection.***

SUMMARY OF RECOMMENDATIONS

2ND STREET FROM KEYSTONE AVENUE TO GALLETTI WAY AND KURNZLI STREET FROM KIRMAN AVENUE TO 2ND STREET

Priority 1A - is defined as those improvements that can be done in the immediate future by City of Reno staff during their periodic maintenance of this subject road segment.

1. Replace or refresh pavement markings, roadways signs and intersection and corridor lighting as needed. See Pages 6 and 7 and Photos 1 and 2.
2. Consider conducting a speed limit study along the corridor to determine the existing speed limits are appropriate. See Pages 6 and 7 and Photos 1 and 2.
3. Consider repositioning the pedestrian signal head for pedestrians crossing northbound on the west leg of the intersection of 2nd Street and Keystone Avenue so that it is not blocked by the existing power pole. This will help pedestrians see the pedestrian signal head. See Page 15 and Photo 10.
4. Recommend reviewing the times during the day that the existing school speed limit is on 2nd Street from Winter Street to Washington Street and revise the times if needed. See Page 16 and Photo 11.
5. Recommend reviewing the pedestrian activity during school hours on 2nd Street at the intersections of Winter Street and Washington Street to determine where crosswalks should be installed across 2nd Street. See Page 16 and Photo 11.
6. Consider installing ladder style crosswalk markings or wider crosswalk markings at the 2nd Street intersections of Sierra Street, Virginia Street and Center Street. This could help motorists see these crosswalks markings sooner as they approach these intersections. This could reduce potential crashes at these intersections. See Pages 17 and 18 and Photos 12 and 13.
7. Consider installing a back plate on the signal head located on the signal pole for the eastbound traffic at the intersection of 2nd Street and Evan Avenue. This will help the traffic see the signal head as they are approaching the intersection of 2nd Street and Evan Avenue. This could reduce the potential for vehicles crashes at the intersection. See Page 19 and Photo 14.
8. Consider installing a No Left Turn (symbol) (R3-2) sign on the signal mast arm for traffic northbound on Wells Avenue at the intersection of 2nd Street to remind motorists that they cannot turn left at this intersection. This could reduce crashes at this intersection. See Pages 20, 21 and 22 and Photos 15, 16 and 17.

9. Consider relocating the existing No Right Turn (symbol) (R3-1) sign on the signal pole to the signal mast arm for traffic southbound on Wells Avenue at the intersection of 2nd Street. This should give the sign better visibility to help remind motorists that they cannot turn right at this intersection. This could reduce crashes at this intersection. See Pages 20, 21 and 22 and Photos 15, 16 and 17.
10. Consider installing an additional “Do Not Enter” (R5-1) sign on the south side of 2nd Street just west of the intersection of Kirman Avenue to reinforce that the westbound traffic on 2nd street cannot continue westbound because 2nd street is a one-way eastbound west of Kirman Avenue. See Page 23 and Photo 18.
11. Consider moving the existing pedestrian signal head and push button on the southwest corner of the intersection of 2nd Street and Kirman Avenue closer to the crosswalks. See Page 23 and Photo 18.
12. Consider trimming the trees and bushes by the Pedestrian Crossing signs at the intersection of 2nd Street and Renown Hospital driveway so that drivers will be able to see the sign and pedestrians easier. This could reduce the potential crashes at the intersection. See Page 24 and Photo 19.
13. Consider installing a No Right Turn (symbol) (R3-1) sign on the signal mast arm for traffic northbound on Kirman Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn right at this intersection. This could reduce crashes at this intersection. See Page 29 and Photos 24.
14. Consider installing a No Left Turn (symbol) (R3-2) sign on the signal mast arm for traffic southbound on Kirman Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn left at this intersection. This could reduce crashes at this intersection. See Pages 29 and 30 and Photo 25.
15. Consider installing a No Right Turn (symbol) (R3-1) sign on the signal mast arm for traffic northbound on Wells Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn right at this intersection. This could reduce crashes at this intersection. See Page 31 and Photo 26.
16. Consider installing a No Left Turn (symbol) (R3-2) sign on the signal mast arm for traffic southbound on Wells Avenue at the intersection of Kuenzli Street to remind motorists that they cannot turn left at this intersection. This could reduce crashes at this intersection. See Pages 31 and 32 and Photo 27.

17. Consider installing lane-reduction arrows instead of through lane-use arrows in the lane the motorist turning right from southbound Wells Avenue onto westbound Kuenzli Street ends up in. This will let the motorist know that their lane is transitioning into the through lane on Kuenzli Street instead of getting their own lane. See Pages 31, 32 and 33 and Photo 28.

Priority 1B - is defined as those improvements that can be done in the immediate future by NDOT staff during their periodic maintenance on this subject road segment.

1. Replace or refresh pavement markings, roadway signs and intersection and corridor lighting as needed. See Pages 6 and 7 and Photos 1 and 2.
2. Consider conducting a speed limit study along the corridors to determine if the existing speed limits are appropriate. See Pages 6 and 7 and Photos 1 and 2.
3. Consider moving the westbound RTC Bus Stop further to the west of the intersection of 2nd Street and Colony Road to improve sight distance for vehicles exiting Colony Road onto 2nd Street. See Page 26 and Photo 21.

Priority 2 – is defined as improvements that can be included in the future NDOT Safety Management Plan.

1. Pedestrian clearance intervals for the signals along 2nd Street and Kuenzli Street should be reviewed and updated, if needed, to the current standards. See Pages 6 and 7 and Photos 1 and 2.
2. Signal timing parameters should be reviewed and advanced detection at signalized intersections along this corridor be verified for location and operation. This could reduce the rear-end crashes on this corridor. The signal parameters such as gap-out time, yellow clearance time and all-red time should be checked to ensure that vehicles in the dilemma zone have time to safely cross the intersection. See Pages 6 and 7 and Photos 1 and 2.
3. Conduct a feasibility study to evaluate the need for installing LED intersection and corridor street lighting along this section of 2nd street and Kuenzli Street where it currently does not exist. Installing intersection and corridor street lighting at locations that currently do not have street lighting, may reduce crashes at those intersections and corridors. See Pages 6 and 7 and Photos 1 and 2.
4. Conduct a feasibility study to consider installing a road diet on some sections of 2nd street and Kuenzli Street. This may provide some areas for bicycles to ride along sections of 2nd Street and Kuenzli Street. See Pages 6 and 7 and Photos 1 and 2.

5. Review all of the pedestrian push buttons along the 2nd Street and Kuenzli Street corridors to see if they meet current ADAAG and/or PROWAG standards. See Pages 8 and 9 and Photos 3 and 4.
6. Recommend that all pedestrian crosswalks be reviewed to determine if they have existing curb cut ramps, tactile strips, curb cuts are aligned with the crosswalk and that they meet current ADAAG and/or PROWAG standards. See Pages 8 and 9 and Photos 3 and 4.
7. Consider installing bulb out curbs across the parking lanes on 2nd Street and Kuenzli Street to provide pedestrians with shorter crossing exposure to traffic. This should improve safety of the pedestrians crossing 2nd Street and Kuenzli Street. See Pages 8 and 9 and Photos 3 and 4.
8. Recommend upgrading existing signal mast arms and installing a signal head centered over each through lane to meet current MUTCD recommended policies along these segments of 2nd Street and Kuenzli Street. See Page 10 and Photo 5.
9. Recommend the existing sidewalks on these sections of roadway be reviewed for sections of sidewalk that have heaved or cracked and need to be replaced. See Page 11 and Photo 6.
10. Recommend that a feasibility study be conducted on the 2nd Street and Kuenzli Street corridors to determine if bike lanes and/or a bike route could be installed on 2nd Street and Kuenzli Street. See Pages 12 and 13 and Photos 7 and 8.
11. Recommend that the existing bus stops along these corridors be reviewed to propose improvements that are needed. See Page 14 and Photo 9.
12. Recommend that the locations of the existing power poles be reviewed to determine if they can be relocated to provide adequate area for pedestrians to walk on the sidewalk. See Page 14 and Photo 9.
13. If repositioning the pedestrian signal head for pedestrians crossing northbound on the west leg of the intersection of 2nd Street and Keystone Avenue so that it is not blocked by the existing power pole cannot be realigned by maintenance personnel, the realignment of the signal head should be included in the future Safety Management Plan. See Page 15 and Photo 10.
14. Consider installing a radar activated speed feedback sign southbound on Wells Avenue on the existing overhead sign structure between Kuenzli Street and 2nd Street. This could help remind the southbound motorists of the speed limit change from 35 mph to 30 mph. This could reduce crashes at this intersection. See Pages 20, 21 and 22 and Photos 15, 16 and 17.

15. Signal timing parameters should be reviewed and advanced detection at this intersection be checked for location and operation. This could reduce the rear-end crashes on this corridor. The signal parameters such as gap-out time, yellow clearance time and all-red time should be checked to ensure that vehicles in the dilemma zone have time to safely cross the intersection of 2nd Street and Kietzke Lane. See Page 25 and Photo 20.
16. Consider installing a roundabout at the intersection of 2nd Street Kietzke Lane to provide better traffic flow and a reduction in delay at the intersection. This could also reduce the crashes at the intersection. See Page 25 Photo 20.
17. Conduct a feasibility study for installing raised median islands and concrete bulb outs on 2nd Street between Kietzke Lane and the US 395 southbound ramps to control turning movement conflicts at the intersections and driveways. See Page 26 and Photo 21.
18. Conduct a feasibility study to install a pedestrian crosswalk (at an appropriate location between Golden Lane and Reservation Road) with ADA ramps and a Pedestrian Hybrid Beacon or RRFB's. See Page 26 and Photo 21.
19. Conduct a feasibility study on the existing overhead pedestrian structure between Golden Lane and Reservation Road to determine an economical way of meeting the ADA requirement for the ramps. See Page 26 and Photo 21.
20. Consider paving the sidewalk on the north side of 2nd Street from the bus stop near Walmart east to Galletti Way. This would improve the safety of the pedestrians walking along this corridor. See Pages 27 and 28 and Photos 22 and 23.
21. Consider moving the eastbound bus stop on 2nd Street closer to the signalized intersection at the US 395 northbound ramps or the signalized intersection at the Grand Sierra Resort entrance. This would encourage the pedestrians to cross at the signalized intersection and not cross midblock. See Pages 27 and 28 and Photos 22 and 23.
22. Consider installing pedestrian fencing on the median island on 2nd Street from the signalized intersection at the US 395 northbound ramps to the signalized intersection at the Grand Sierra Resort entrance. This should discourage pedestrians from crossing 2nd Street at midblock. See Pages 27 and 28 and Photos 22 and 23.

ARLINGTON AVENUE FROM COURT STREET 6TH STREET

Priority 1A - is defined as those improvements that can be done in the immediate future by City of Reno staff during their periodic maintenance of this subject road segment.

1. Replace or refresh pavement marking, roadway signs and intersection and corridor lighting as needed. See pages 34 and 35 and Photos 29 and 30.
2. Consider conducting a speed limit study along the Arlington Avenue corridor to determine the existing speed limits are appropriate. See Page 34 and Photo 29.
3. Recommend that the vegetation along the corridor be trimmed so that it is not encroaching on the sidewalk and blocking pedestrians from using the sidewalk. See Page 43 and Photo 38.
4. Consider installing a Bike Lane sign (R3-17) and Bike Lane Ends plaque (R-17bP) northbound on Arlington Avenue before the bike lane ends on the south side of the Truckee River Bridge south of the intersection of 1st Street. This will let bicyclists know that the existing bike lane is ending. See Page 46 and Photo 41.
5. Consider installing a ladder style crosswalk on the south leg of the intersection of Arlington Avenue and 1st Street to match the other 3 ladder style crosswalk markings installed at the intersection. This will make the crosswalk on the south leg of the intersection more visible to the motorists approaching this crosswalk. See Page 47 and Photo 42.
6. Consider installing pedestrian push buttons at the intersection of Arlington Avenue and 2nd Street. This should help pedestrians cross the street at this intersection. See Page 48 and Photo 43.
7. Consider installing a ladder style crosswalk at the intersection of Arlington Avenue and Commercial Row and at the intersection of Arlington Avenue and 3rd Street. This should make these crosswalks more visible to the motorists approaching them. See Pages 49 and 50 and Photos 44 and 45.
8. Consider installing pedestrian activated flashing lights on the existing pedestrian crossing signs at the intersection of Arlington Avenue and Commercial Row and at the intersection of Arlington Avenue and 3rd Street. This should make these crosswalks more visible to the motorists approaching them. See Pages 49 and 50 and Photos 44 and 45.

9. Consider installing ladder style crosswalks at the intersection of Arlington Avenue and 5th Street. This should make these crosswalks more visible to the motorists approaching them. See Page 51 and Photo 46.

Priority 2 – is defined as improvements that can be included in the future NDOT Safety Management Plan.

1. Pedestrian clearance intervals for the signals along Arlington Avenue should be reviewed and updated, if needed, to the current standards. See Page 34 and Photo 29.
2. Signal timing parameters should be reviewed and advanced detection at signalized intersections along this corridor be verified for location and operation. This could reduce the rear-end crashes on this corridor. The signal parameters such as gap-out time, yellow clearance time and all-red time should be checked to ensure that vehicles in the dilemma zone have time to safely cross the intersection. See Pages 34 and 35 and Photo 29.
3. Conduct a feasibility study to evaluate the need for installing LED intersection and corridor street lighting along this section of Arlington Avenue where it currently does not exist. Installing intersection and corridor street lighting at locations that currently do not have street lighting, may reduce crashes at those intersections and corridors. See Pages 34 and 35 and Photo 29.
4. Conduct a feasibility study to consider installing a road diet on some sections of Arlington Avenue. This may provide some areas for bicycles to ride along sections of Arlington Avenue. See Pages 34 and 35 and Photo 29.
5. Review all of the pedestrian push buttons along the Arlington Avenue corridor to see if they meets current ADAAG and/or PROWAG standards. See Pages 36 and 37 and Photos 31 and 32.
6. Recommend that all pedestrian crosswalks be reviewed to determine if they have existing curb cut ramps, tactile strips and curb cuts are aligned with the crosswalk and that they meet current ADAAG and/or PROWAG standards. See Pages 36 and 37 and Photo 32.
7. Consider installing bulb out curb across the parking lanes on Arlington Avenue to provide pedestrians with shorter crossing exposure to traffic. This should improve safety of the pedestrians crossing Arlington Avenue. See Pages 36 and 37 and Photo 32.
8. Recommend upgrading existing signal mast arms and installing a signal head centered over each through lane to meet current MUTCD recommended policies along this segment of Arlington Avenue. See Page 38 and Photo 33.

9. Recommend the existing sidewalks on this section of Arlington Avenue be reviewed for sections of sidewalk that have heaved and/or cracked and need to be replaced. See Page 39 and Photo 34.
10. Recommend that a feasibility study be conducted on the Arlington Avenue corridor to determine if bike lanes and/or a bike route could be installed on Arlington Avenue from 1st Street to 6th Street. See Page 40 and Photo 35.
11. Recommend that the locations of the existing power poles be reviewed to determine if they can be relocated to provide adequate area for pedestrians to walk on the sidewalk. See Page 41 and Photo 36.
12. Recommend that the existing bus stops along the Arlington Avenue corridor be reviewed to propose improvements that are needed. See Pages 42 and Photos 37.
13. Consider installing additional street lighting at the intersection of Arlington Avenue and Court Street. This will help motorists see pedestrians at this intersection at night. See Page 44 and Photo 39.
14. Consider installing pedestrian activated flashing lights on the existing overhead pedestrian crossing sign instead of having it flash continuously at the intersection of Arlington Avenue and Island Avenue. This will let motorists know when there is a pedestrian crossing at the intersection instead of the lights being on all the time. See Page 45 and Photo 40.
15. Recommend that a feasibility study be conducted on the Arlington Avenue from 1st Street to 6th Street to determine if bike lanes and/or a bike route could be installed on this section of Arlington Avenue. See Page 46 and Photo 41.
16. If installing pedestrian activated flashing lights on the existing pedestrian crossings signs at the intersection of Arlington Avenue and 3rd Street and/or at the intersection of Arlington Avenue and Commercial Row cannot be installed by maintenance, they should be considered to be installed in the upcoming Safety Management Plan. See Pages 49 and 50 and Photos 44 and 45.
17. Consider installing a street light on the signal pole located on the northeast corner of the intersection of Arlington Avenue and 5th Street. This should help motorists see pedestrians in the northeast corner area of the intersection. See Page 51 and Photo 46.

APPENDIX

The following items are found in the appendix:

- Summary of Crash Data on 2nd from Keystone Avenue to Galletti Way
- Summary of Crash Data on Kuenzli Street from Kirman Avenue to 2nd Street
- Summary of Crash Data on Arlington Avenue from Court Street to 6th Street
- Traffic Count Data
- US 95A Aerial Photo with Summary of Recommendations
- Crash Data on 2nd Street from Keystone Avenue to Galletti Way is on CD on located on back cover
- Crash Data on Kuenzli Street from Kirman Avenue to 2nd Street is on CD on located on back cover
- Crash Data on Arlington Avenue from Court Street to 6th Street is on CD on located on back cover

**2nd Street from Keystone Avenue to Kietzke Lane
 NDOT Crash Database
 July 1, 2011 to June 30, 2014**

Corridor/ Intersection	Crash Severity					Crash Type										Corridor/ Intersection
	Fatal	Injury	Injuries	PDO	Total	Angle	Backing	Head-On	Non-Collision	Rear-End	Sideswipe Meet	Sideswipe Overtake	Pedestrian	Pedal Cycle		
2nd Street	0	89	125	125	214	84	6	3	33	54	5	29	8	9	2nd Street	
Keystone Ave *	0	7	8	12	19	5	-	-	5	8	-	1	2	2	Keystone Ave *	
Vine St	0	4	6	2	6	4	1	-	-	-	-	2	-	-	Vine St	
Washington St **	0	3	3	5	8	6	-	-	1	-	1	-	-	-	Washington St **	
Bell St	0	1	2	2	3	1	-	-	-	2	-	-	-	-	Bell St	
Ralston St *	0	2	2	3	5	1	-	-	1	2	-	1	1	-	Ralston St *	
Stevenson St	0	0	0	2	2	-	-	-	-	-	-	2	-	-	Stevenson St	
Arlington Ave *	1	8	9	10	19	9	-	1	3	6	-	-	1	1	Arlington Ave *	
Roff Way	0	0	0	2	2	-	1	-	-	-	-	1	-	-	Roff Way	
West St *	0	2	3	7	9	3	2	1	-	-	1	2	-	-	West St *	
Sierra St *	0	4	5	9	13	7	-	-	-	3	1	2	-	-	Sierra St *	
Virginia St *	0	5	8	12	17	5	1	-	2	7	1	1	-	-	Virginia St *	
Center St *	0	3	4	11	14	3	-	-	3	4	-	4	1	1	Center St *	
Lake St *	0	7	9	9	16	5	-	-	4	3	1	3	3	1	Lake St *	
Evan Ave *	0	2	2	3	5	1	1	-	2	1	-	-	-	-	Evan Ave *	
Kuenzli St **	0	0	0	1	1	-	-	-	1	-	-	-	-	-	Kuenzli St **	
High St ** \$	0	1	2	2	3	1	-	-	1	-	-	1	1	-	High St ** \$	
Park St	0	1	1	0	1	1	-	-	-	-	-	-	-	-	Park St	
Wells Ave *	0	11	19	10	21	11	-	-	2	4	2	2	-	-	Wells Ave *	
Locust St	0	1	1	1	2	1	-	1	-	-	-	-	-	-	Locust St	
Kirman Ave *	0	6	11	7	13	9	-	-	2	2	-	-	-	-	Kirman Ave *	
Manuel St * \$	0	1	3	2	3	-	1	-	-	1	-	1	-	-	Manuel St * \$	
Giroux St	0	1	1	3	4	1	-	-	1	-	1	1	-	1	Giroux St	
Gould St	0	0	0	3	3	1	-	-	1	1	-	-	-	-	Gould St	
Kietzke Ln *	0	13	19	16	29	7	-	-	1	19	2	-	-	-	Kietzke Ln *	
Sunshine Ln	0	3	6	0	3	3	-	-	-	-	-	-	-	-	Sunshine Ln	
Golden Ln	0	0	0	1	1	-	1	-	-	-	-	-	-	-	Golden Ln	
Reservation Rd	0	1	1	1	2	-	-	-	1	-	1	-	-	-	Reservation Rd	
US 395 *	0	9	15	12	21	6	2	-	5	4	-	4	1	1	US 395 *	
Casino Signal *	0	3	5	0	3	-	-	-	-	3	-	-	-	-	Casino Signal *	
Galletti Way *	0	1	2	2	3	-	1	-	-	2	-	-	-	-	Galletti Way *	

Intersection crash summary contains crash data for all approaches to the intersection.

* Signalized Intersection

** Marked Pedestrian Crosswalk

\$ Mid-block Marked pedestrian crosswalk to the west

**Kuenzli Street from 2nd Street to Kirman Avenue
NDOT Crash Database
July 1, 2011 to June 30, 2014**

Corridor/ Intersection	Crash Severity					Crash Type									Corridor/ Intersection
	Fatal	Injury	Injuries	PDO	Total	Angle	Backing	Head-On	Non-Collision	Rear-End	Sideswipe Meet	Sideswipe Overtake	Pedestrian	Pedal Cycle	
Kuenzli St	0	17	28	16	33	23	-	1	2	2	4	1	-	1	Kuenzli St
2nd St **	0	0	0	1	1	-	-	-	1	-	-	-	-	-	2nd St **
High St **	0	0	0	1	1	-	-	-	1	-	-	-	-	1	High St **
Park St	0	1	2	0	1	-	-	-	-	-	1	-	-	-	Park St
Wells Ave *	0	3	5	4	7	4	-	1	1	1	-	-	-	1	Wells Ave *
Locust St *	0	1	1	3	4	4	-	-	-	-	-	-	-	-	Locust St *
Kirman Ave *	0	10	17	9	19	14	-	-	1	2	1	1	-	-	Kirman Ave *
Manuel St	0	0	0	3	3	2	-	-	-	-	1	-	-	-	Manuel St

Intersection crash summary contains crash data for all approaches to the intersection.

* Signalized Intersection

** Marked Pedestrian Crosswalk

Arlington Avenue from Court Street to 6th Street
NDOT Crash Database
July 1, 2011 to June 30, 2014

Corridor/ Intersection	Crash Severity					Crash Type									Corridor/ Intersection
	Fatal	Injury	Injuries	PDO	Total	Angle	Backing	Head-On	Non-Collision	Rear-End	Sideswipe Meet	Sideswipe Overtake	Pedestrian	Pedal Cycle	
Arlington Ave	1	26	36	40	67	28	2	1	16	18	-	2	8	3	Arlington Ave
Court St **	0	0	0	2	2	1	-	-	-	-	1	-	-	-	Court St **
Island Ave **	0	3	3	1	4	-	-	-	3	1	-	-	-	2	Island Ave **
1st St *	0	4	4	6	10	4	-	-	2	3	-	1	2	-	1st St *
2nd St *	1	8	9	10	19	9	-	1	3	6	-	-	1	1	2nd St *
3rd St **	0	5	9	6	11	1	-	-	5	4	-	1	4	-	3rd St **
4th St *	0	7	12	8	15	8	-	-	2	4	-	1	-	1	4th St *
5th St *	0	4	4	13	17	8	1	1	4	3	-	-	3	-	5th St *
6th St ***	0	2	2	4	6	1	4	-	1	-	-	-	-	-	6th St ***

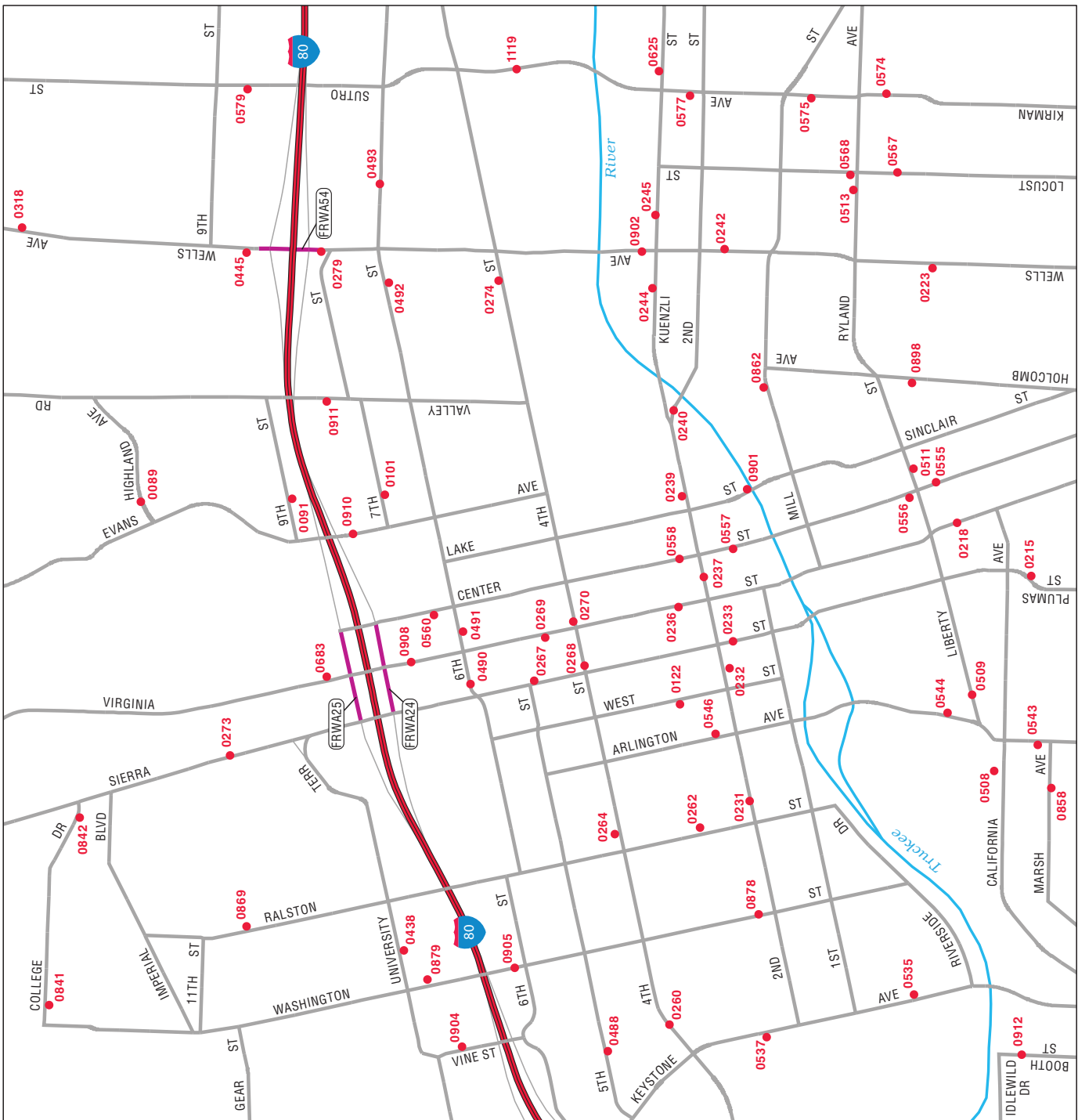
Intersection crash summary contains crash data for all approaches to the intersection.

* Signalized Intersection

** Marked Pedestrian Crosswalk

*** Four-way Stop with Crosswalks





Downtown Reno

Washoe (031)

Station	Route / Location	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
		AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT
0310211	Mayberry Dr, .9 mi E of the bridge over the Truckee River & .1 mi W of Fenno Rd.	4,050	4,500	4,750	5,000	4,800*	4,000	4,000	4,000*	4,500	3,800
0310213	SR647, 4th St, .2 mi W of Mayberry Dr.	7,000*	7,900	9,450	8,800	9,000*	7,300	7,600	7,400	7,300*	8,400
0310214	SR647, E 4th St, .4 mi E of Mayberry Dr.	5,150	6,050	7,150	6,600	6,800*	5,600	5,600	5,500	6,200	6,000
0310215	Plumas St, 75 ft S of Marsh Av.	7,950	8,500	7,750	7,400	7,400	7,000	6,800*	7,000	7,000*	6,500
0310218	S Virginia St, 100ft N of Stewart St.	21,300	21,000*	20,300*	19,000	17,000	16,000	17,000	16,000	14,000	14,000
0310223	Wells Av, 70ft S of Stewart St.	17,700*	18,000*	17,600*	18,000	16,000	16,000	15,000*	15,000	11,500	13,500
0310224	SR667, Kietzke Ln, 150ft S of Mill St & 30ft N of Stewart St.	27,800	27,500	28,100	26,000	25,000	23,000	24,000	23,000*	23,000	22,000*
0310225	SR647, E 4th St, .15 mi W of Stoker Av.	10,200	10,400	10,600	9,800	9,400	8,400	9,400	8,800	9,800	8,700
0310227	SR647, E 4th St, .35 mi E of Stoker Av.	11,800	12,000*	12,500*	12,000*	13,000	10,000	10,000*	9,900*	11,500	11,000*
0310231	W 2nd St, 200ft E of Ralston St.	8,000	8,000*	8,100*	5,600	4,800	5,000	4,600	4,800	5,400	4,700
0310232	W 2nd St, 200ft W of N Sierra St	9,000*	9,000*	8,700*	5,900	5,500	5,800	6,000	5,000	7,000	5,900
0310233	N Sierra St, 75ft S of SR-648 (W 2nd St)	11,500	11,000*	11,100*	10,000*	10,000*	9,200	6,700	7,000	7,200	7,500
0310236	N Virginia St, 300ft N of SR-648 (W 2nd St).	14,400	14,200	12,100	11,000*	12,000	11,000	11,000	10,000	10,500*	10,000
0310237	E 2nd St, 150ft W of Center St.	8,200*	8,550	11,200	8,000	7,300	7,700	7,800*	6,900	6,800*	6,500
0310239	E 2nd St, E of Lake St and 30ft W of 1st St.	7,900*	7,600*	7,500*	8,100*	7,600	7,300	7,300	7,100	7,000*	6,300
0310240	E 2nd St, 250ft E of Nevinn St	5,250	5,000*	4,500*	4,200*	3,800	3,700	3,600*	3,400	3,700	3,200
0310242	Wells Av, 100ft S of SR-648 (E 2nd St).	20,200*	20,000*	20,700*	21,000	20,000	20,000	21,000	20,000	20,000*	16,500
0310244	Kuenzli Ln, 25ft E of Park St	5,750	5,600*	5,200*	4,700	4,500	4,300	4,300	4,400	3,300	4,100
0310245	Kuenzli Ln, 250ft E of SR-663 (Wells Av)	6,350	6,150	5,000	4,500	4,300	4,100	4,000	4,300	3,600	3,900

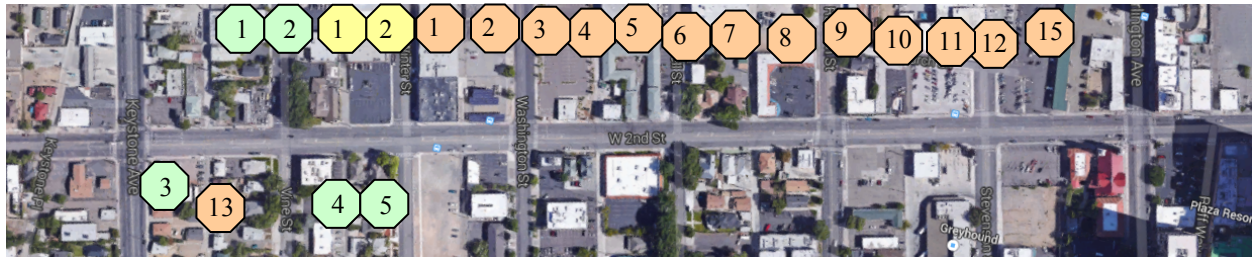
Station	Route / Location	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
		AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT
0310249	E 2nd St, 300ft W of SR-667 (Kietzke Ln).	16,100	16,200	17,600	18,000	16,000	15,000	13,000	15,000	14,000	13,500
0310250	SR667, Kietzke Ln, .2 mi S of SR-648 (E 2nd St).	21,100	21,000*	20,900*	21,000	20,000*	18,000	19,000*	20,000	18,500	16,500
0310251	SR648, Glendale Av, .1 mi E of SR-667 (Kietzke Ln).	16,500	17,000*	16,700*	16,000	13,000*	14,000	13,000	13,000*	14,000*	17,000
0310253	SR648, Glendale Av, .1 mi W of SR-659 (McCarran Bl).	12,900	12,000*	12,600*	12,000	11,000	10,000	11,000	11,000	11,000	10,500
0310254	SR659, McCarran Bl, .1 mi N of SR-648 (Glendale Av).	37,000*	38,000	37,000	35,000	35,000	30,000	30,000*	31,000	30,500	31,000
0310255	SR659, McCarran Bl, .1 mi S of SR-648 (Glendale Av).	27,000	28,000*	27,100*	26,000	24,000	21,000	25,000	25,000	22,500	25,500
0310256	East Greg St, 300ft W of Spice Island Dr.	20,500*	22,900	20,700	20,000	16,000	14,000	17,000	17,000	16,500	14,500
0310257	SR659, McCarran Bl, .1 mi S of Greg St.	29,800	31,000	31,500	31,000*	27,000	25,000	24,000*	24,000*	22,000*	28,000
0310258	SR659, McCarran Bl, .1 mi S of Mill St.	27,600	27,500	26,700	24,000*	23,000	24,000	22,000	22,000*	22,000*	21,000
0310259	Keystone Av, .1 mi S of I-80	33,000*	35,500	31,500	29,000	23,000	28,000	30,000	30,000*	29,500*	29,000*
0310260	SR647, E 4th St, 295ft E of Keystone Av.	14,000*	14,000*	11,800*	11,000	11,000	10,000	11,000	11,000*	10,500*	10,500*
0310262	Ralston St, 75ft S of 3rd St at the RxR tracks.	3,050	3,550	3,950	3,200	2,500	2,500	3,000	2,600	2,600*	2,500*
0310264	SR647, E 4th St, 130ft E of Ralston St.	16,000*	15,000	15,400	15,000	13,000	13,000	13,000*	12,000*	12,000*	12,000*
0310267	N Sierra St, 75ft S of W 5th St	11,900	11,800	12,100	9,900	8,300	9,000	9,100	9,900	9,900	10,500
0310268	SR647, E 4th St, 60ft E of Sierra St.	16,000*	10,700	15,500	14,000	13,000	12,000	12,000	13,000	13,500	13,000*
0310269	N Virginia St, 300ft N of SR-647 (4th St).	13,800*	14,000*	14,500*	13,000	11,000	8,900	11,000	10,000	10,000*	9,700*
0310270	SR647, E 4th St, 150ft E of SR-430 (N Virginia St).	13,000*	12,000*	12,100*	11,000*	10,000*	13,000	13,000*	14,000	13,500*	13,500*
0310273	N Sierra St, 150ft S of Imperial	9,100*	9,100*	9,250*	11,000	11,000	8,600	11,000	8,500	10,000*	9,700*

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Station	Route / Location	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT
0310517	SR659, McCarran Bl, .2 mi S of SR-646 (E Prater Wy).	30,500	32,000	31,500	30,000	28,000	27,000	26,000	26,000	26,500	26,000*
0310518	Vassar St, 100 ft W of Wells Ave.	3,500	4,850	4,000	3,300	2,900	3,300	3,000	2,900	3,600	3,700*
0310520	Vassar St, 150ft E of Kirman Av.	6,400	6,950	6,500	6,500	5,900	4,600	4,700	3,700	4,800	4,900
0310522	Vassar St, 300ft E of SR-667 (Kietzke Ln).	11,800*	12,800	12,600	12,000	11,000	10,000	10,000*	9,900*	9,000	8,900
0310523	Vassar St, 250ft W of Terminal Wy.	7,800*	8,350	8,550	8,000*	7,200	6,800	6,700	6,600	6,000	5,800*
0310525	W Moana Ln, 50ft E of Skyline Bl.	4,400	4,200	4,200	4,400	4,200	3,800	3,800	3,900	3,500	3,400*
0310527	E Moana Ln, 450ft W of SR-667 (Kietzke Ln).	25,700	27,000*	33,500*	28,000	28,000	26,000	28,000*	26,000	26,500	25,500*
0310528	Neil Rd, 238ft S of Mauldin Ln.	14,700	14,100	12,700	9,100	8,000	8,000	6,800	7,000	6,100	6,400
0310529	Neil Rd, 200ft S of E Peckham Ln.	7,000*	6,800	6,050	5,300	5,100	5,200	3,900	5,000	3,800	3,700*
0310534	Hunter Lake Dr, 100ft S of Mayberry Dr.	9,900	8,550	8,650	8,000*	8,800	8,300	7,700	8,500	8,200	9,400
0310535	Keystone Av, 100ft S of Jones St.	14,000*	13,400	16,000	12,000	14,000	13,000	13,000	13,000	11,000	12,000
0310537	Keystone Av, 300ft S of SR-647 (W 4th St).	25,000*	24,900	26,100	22,000	24,000	23,000	22,000	22,000	21,500*	21,000
0310538	Keystone Av, 120ft S of 7th St.	30,000*	32,000*	28,000*	28,000*	26,000	25,000	25,000	23,000	22,500*	25,500
0310539	Keystone Av, 200ft N of W 7th St.	16,200	17,100	16,600	15,000	17,000	17,000	16,000	14,000	13,500*	13,500*
0310541	Keystone Av, 300ft N of Coleman Dr.	4,250	4,300	4,150	3,400	3,800	3,800	3,800	3,900	3,700	3,600*
0310543	Arlington Av, 25ft N of Marsh Av.	13,200	14,000	15,100	12,000	12,000	11,000	11,000	11,000	10,000	10,000
0310544	Arlington Av, 125ft N of W Liberty St.	13,800	13,000*	9,700*	13,000	12,000	12,000	12,000*	11,000	11,500	10,500
0310546	Arlington Av, 100ft N of SR-648 (W 2nd St).	12,800	12,000*	10,000*	9,800	9,600	8,200	8,700	8,600*	8,100	7,900*
0310547	US395, N/B off-ramp of the Cold Springs Valley Intch 'Exit 80'.	3,800	4,000	3,850	4,000	3,800	3,800	3,600	3,300	3,400	3,100
0310548	Cold Springs Valley Rd, 325ft E of the N/B ramps of the Cold	7,150	7,300	7,050	7,300	6,900	6,800	6,600*	6,500*	6,500*	6,100

Station	Route / Location	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
		AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT
0310585	S Rock Bl, 150ft S of Freeport Bl.	19,000	21,700	21,800	19,000	18,000	16,000	16,000	16,000	14,500	14,500
0310586	Rock Bl, 75ft N of 'D' St.	16,500	21,700	20,100	16,000	15,000	15,000	14,000	14,000	12,000	13,500
0310587	Probasco Wy, 60ft N of 'J' St.	2,950	2,950	3,000	2,800	3,000	2,700	2,200	2,200	2,200	2,200
0310588	Probasco Wy, 125ft N of Quail St.	2,850	2,550	2,650	2,600	2,600	2,400	2,100	2,000	2,100	1,900
0310589	Probasco Wy, btwn Gault Wy & N McCarran Bl.	2,450	2,250	2,250	2,200	2,200	2,000	1,900	1,800*	1,800	1,700
0310590	Arrow Creek Pk, 200 ft W of Zolezzi Ln.	19,100	18,700	18,900	18,000	18,000	17,000	18,000	18,000	8,500	11,000
0310591	Zolezzi Ln, 200ft W of Oak Glen Rd.	4,700	4,100	4,100	3,900	3,900	3,700	3,600	3,500	2,800	2,700*
0310593	Rock Bl, .2 mi S of Mill St.	16,000*	17,900	17,900	17,000	16,000	16,000	16,000*	16,000*	13,000*	12,500*
0310594	Mill St, .3 mi W of SR-668 (S Rock Bl).	20,300	20,500	19,100	18,000	18,000	17,000	15,000	16,000	17,000	15,500
0310595	Mill St, 300ft W of N Edison Wy.	12,000	11,800	10,200	10,000	9,200	8,600	7,900	8,300	8,100	8,700
0310596	SR648, E 2nd St, 100ft E of the E entrance to the Grand Sierra.	21,200*	19,700	16,600	16,000	15,000	14,000	13,000	15,000	16,500	14,000*
0310597	Eastlake Bl, .2 mi S of Jumbo Grade Rd.	1,800*	1,750	1,800	1,700	1,600	1,700	1,600	1,500	1,600	1,300
0310598	Eastlake Bl, 200ft N of Coyote Dr.	3,150	3,150	3,300	3,100	2,900	3,000	2,800	2,700	2,600	2,400
0310599	EI Rancho Dr, 100ft SE of Clinton Ct.	14,500	17,500	15,300	15,000	14,000	12,000	12,000	10,000	10,000	10,500
0310600	SR443, Sun Valley Dr, .1 mi N of Gepford Pk.	27,500	26,800	26,000	26,000	26,000	25,000	24,000	23,000	21,000	20,500*
0310602	SR427, Main St, .2 mi E of the Truckee River.	2,350	2,400	2,350	2,400	2,200	2,300*	2,300	2,300	2,300*	2,300*
0310604	US395, N/B on-ramp of the Cold Springs Valley Intch 'Exit 80'	20	20	30	20	20	20	20	20	30*	30*
0310605	US395, S/B off-ramp of the Cold Springs Valley Intch 'Exit 80'	30	30	30	30	30	30	30	30	20*	30*
0310607	US395, Btwn the Cold Springs Vly Intch 'Exit 80' and the Bordertown Intch 'Exit 83'.	13,500*	13,500*	12,600*	15,000	14,000	15,000	14,000*	13,000	13,000*	13,000*

Summary of Recommendations

2nd Street RSA in Washoe County, Keystone Avenue to Arlington Avenue



Keystone Ave

Arlington Ave

Priority 1A

1. Replace/repair markings, signs, and lighting
2. Conduct speed study
3. Relocate pedestrian signal head
4. Review/revise school speed limit times
5. Consider crosswalks

Priority 1B

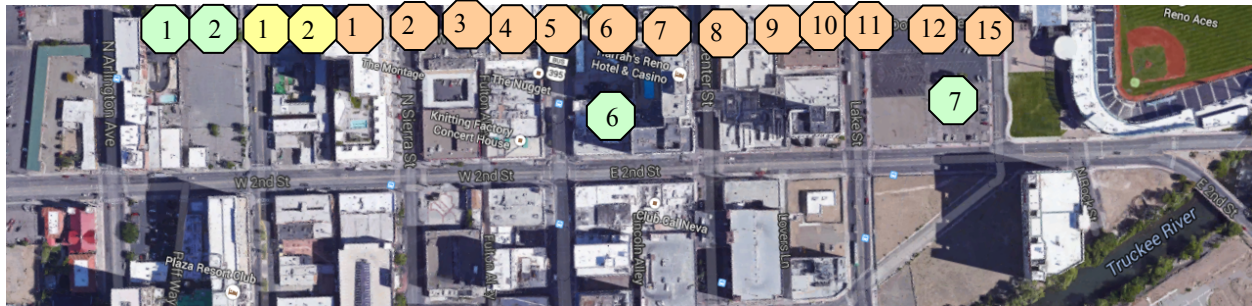
1. Replace/repair markings, signs, and lighting
2. Conduct speed study

Priority 2

1. Review pedestrian clearance times
2. Review signal timing parameters and detection
3. Conduct feasibility study for street lighting
4. Conduct feasibility study for Road Diet
5. Review pedestrian push button heights
6. Review pedestrian crosswalk ramps
7. Install bulb-outs
8. Modify/Install vehicle signal heads over lanes
9. Review sidewalks and repair
10. Conduct feasibility study for bike routes/lanes
11. Improve bus stops
12. Relocate power poles
13. Realign pedestrian signal head
15. Review signal timing parameters

Summary of Recommendations

2nd Street RSA in Washoe County, Arlington Avenue to Aces Ballpark



Arlington Ave

Aces Ballpark

Priority 1A

1. Replace/repair markings, signs, and lighting
2. Conduct speed study
6. Install ladder style crosswalks
7. Install back plate

Priority 1B

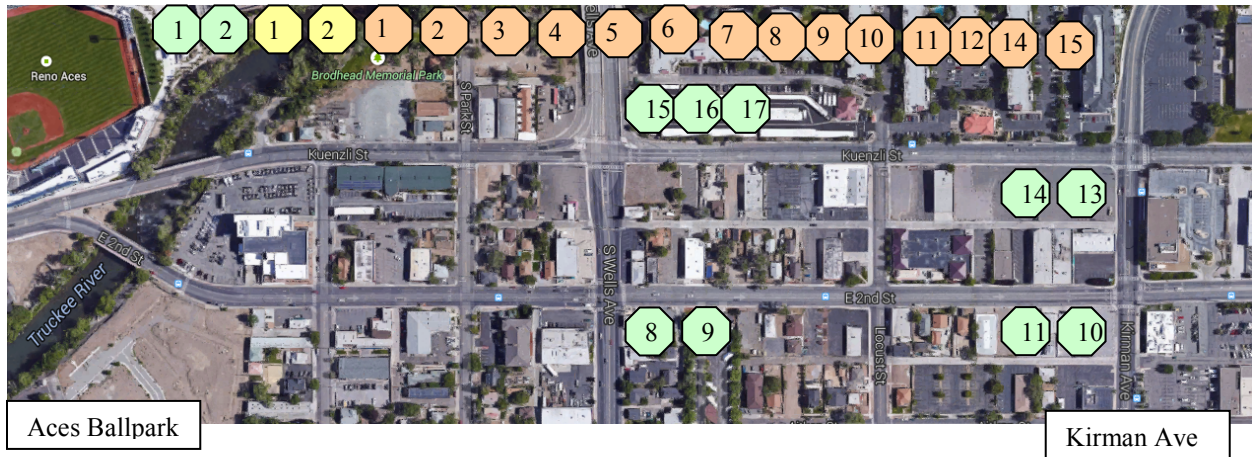
1. Replace/repair markings, signs, and lighting
2. Conduct speed study

Priority 2

1. Review pedestrian clearance times
2. Review signal timing parameters and detection
3. Conduct feasibility study for street lighting
4. Conduct feasibility study for Road Diet
5. Review pedestrian push button heights
6. Review pedestrian crosswalk ramps
7. Install bulb-outs
8. Modify/Install vehicle signal heads over lanes
9. Review sidewalks and repair
10. Conduct feasibility study for bike routes/lanes
11. Improve bus stops
12. Relocate power poles
15. Review signal timing parameters

Summary of Recommendations

2nd Street RSA in Washoe County, Aces Ballpark to Kirman Avenue



Priority 1A

1. Replace/repair markings, signs, and lighting
2. Conduct speed study
8. Install “No Left Turn” sign (R3-2)
9. Relocate “No right Turn” sign (R3-1)
10. Install “Do Not Enter” sign (R5-1)
11. Relocate pedestrian signal head and push button
13. Install “No Right Turn” sign (R3-1)
14. Install “No Left Turn” sign (R3-2)
15. Install “No right Turn” sign (R3-1)
16. Install “No Left Turn” sign (R3-2)
17. Install lane-reduction arrows

Priority 1B

1. Replace/repair markings, signs, and lighting
2. Conduct speed study

Priority 2

1. Review pedestrian clearance times
2. Review signal timing parameters and detection
3. Conduct feasibility study for street lighting
4. Conduct feasibility study for Road Diet
5. Review pedestrian push button heights
6. Review pedestrian crosswalk ramps
7. Install bulb-outs
8. Modify/Install vehicle signal heads over lanes
9. Review sidewalks and repair
10. Conduct feasibility study for bike routes/lanes
11. Improve bus stops
12. Relocate power poles
14. Install radar activated speed feedback sign
15. Review signal timing parameters

Summary of Recommendations

2nd Street RSA in Washoe County, Kirman Avenue to Kietzke Lane



Kirman Ave

Kietzke Ln

Priority 1A

1. Replace/repair markings, signs, and lighting
2. Conduct speed study
12. Trim vegetation

Priority 1B

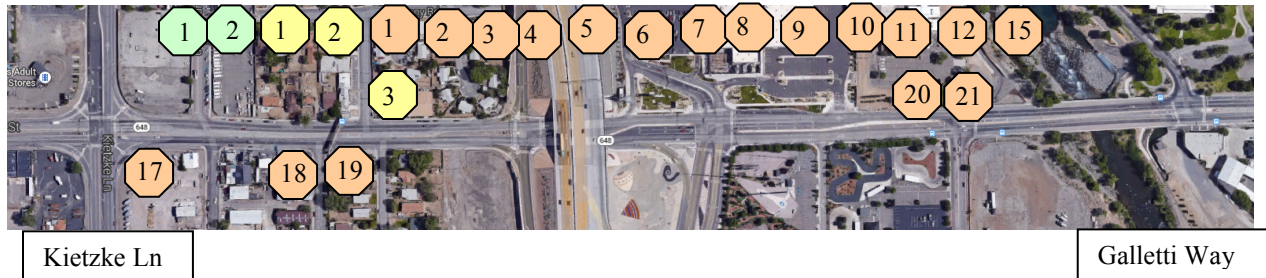
1. Replace/repair markings, signs, and lighting
2. Conduct speed study

Priority 2

1. Review pedestrian clearance times
2. Review signal timing parameters and detection
3. Conduct feasibility study for street lighting
4. Conduct feasibility study for Road Diet
5. Review pedestrian push button heights
6. Review pedestrian crosswalk ramps
7. Install bulb-outs
8. Modify/Install vehicle signal heads over lanes
9. Review sidewalks and repair
10. Conduct feasibility study for bike routes/lanes
11. Improve bus stops
12. Relocate power poles
15. Review signal timing parameters
16. Install roundabout

Summary of Recommendations

2nd Street RSA in Washoe County, Kietzke Lane to Galletti Way



Priority 1A

1. Replace/repair markings, signs, and lighting
2. Conduct speed study

Priority 1B

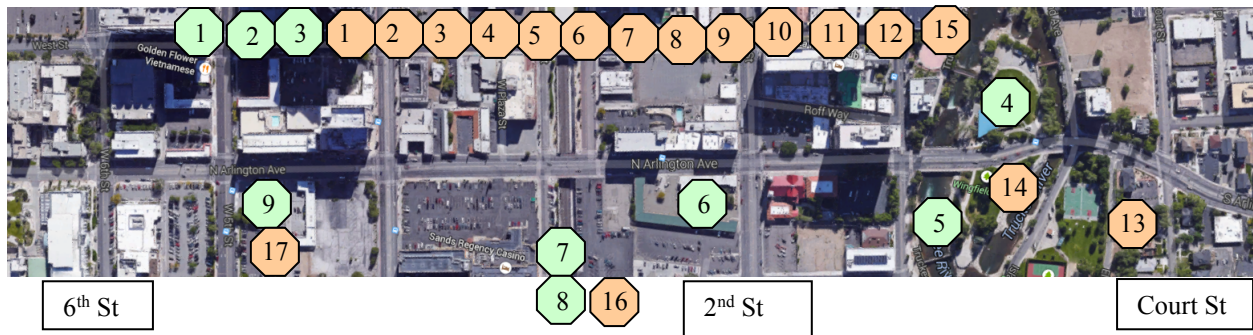
1. Replace/repair markings, signs, and lighting
2. Conduct speed study
3. Relocate RTC bus stop

Priority 2

1. Review pedestrian clearance times
2. Review signal timing parameters and detection
3. Conduct feasibility study for street lighting
4. Conduct feasibility study for Road Diet
5. Review pedestrian push button heights
6. Review pedestrian crosswalk ramps
7. Install bulb-outs
8. Modify/Install vehicle signal heads over lanes
9. Review sidewalks and repair
10. Conduct feasibility study for bike routes/lanes
11. Improve bus stops
12. Relocate power poles
15. Review signal timing parameters
17. Conduct feasibility study for raised medians
18. Conduct feasibility study for pedestrian activated crosswalk
19. Conduct feasibility study for pedestrian bridge ramps
20. Install paved sidewalk
21. Relocate RTC bus stop

Summary of Recommendations

Arlington Avenue RSA in Washoe County, Court Street to 6th Street



Priority 1A

1. Replace/repair markings, signs, and lighting
2. Conduct speed study
3. Trim vegetation
4. Install “Bike Lane” sign (R3-17) and “Bike Lane Ends” plaque (R3-17bP)
5. Install ladder style crosswalk
6. Install pedestrian push buttons
7. Install ladder style crosswalk
8. Install pedestrian activated flashers
9. Install ladder style crosswalk

Priority 2

1. Review pedestrian clearance times
2. Review signal timing parameters and detection
3. Conduct feasibility study for street lighting
4. Conduct feasibility study for Road Diet
5. Review pedestrian push button heights
6. Review pedestrian crosswalk ramps
7. Install bulb-outs
8. Modify/Install vehicle signal head over lanes
9. Review sidewalks and repair
10. Conduct feasibility study for bike routes/lanes
11. Relocate power poles
12. Improve bus stops
13. Install street lighting
14. Install pedestrian activated flashers
15. Conduct feasibility study for bike routes/lanes
16. Install pedestrian activated flasher
17. Install street luminaire on NE corner



Appendix E – Economic Development Technical Memo



DRAFT TECHNICAL MEMORANDUM

To: Lori Campbell, NDOT Project Manager

From: Bryan Gant, Wood Rodgers Project Manager
Ted Kamp, Leland Consulting

Date: January 7, 2016

Re: **2nd Street & Arlington Avenue SMP
Economic Development Opportunities**

Background

The Nevada Department of Transportation (NDOT) is undertaking a series of Safety Management Plans (SMPs) throughout the State of Nevada. SMPs are a transportation analysis effort that incorporates corridor study, crash analysis, access management, public and stakeholder input, roadway engineering and application of the Highway Safety Manual (HSM) methods to improve transportation safety for all users. The SMP process is consistent with the Nevada Strategic Highway Safety Plan's goals of reducing crashes and fatalities, particularly at intersections, in half by 2030.

HSM methodologies and tools such as the Interactive Highway Safety Design Model (IHSDM) are applied at identified locations to define safety issues, consider mitigations, and select the best alternatives. These predictive methods allow engineers to calculate the predicted safety effects of different design applications.

NDOT, in cooperation with local transportation partners, has selected portions of 2nd Street, Kuenzli Street and Arlington Avenue for analysis under this SMP. The exact limits of analysis are 2nd Street from Keystone Avenue to Galletti Way, Kuenzli Street from 2nd Street to Kirman Avenue, and Arlington Avenue from Court Street to W 6th Street in the City of Reno, Nevada. The purpose of this document is to identify other relevant transportation and regional planning studies and documents that should be considered during the SMP process.

ECONOMIC DEVELOPMENT

Analytic Objectives:

This economic analysis is an input to a broader transportation planning effort with improving pedestrian and transportation safety as its primary goal. To that end, the key informational objectives addressed here are the following:

- ◆ **Profile resident and workforce populations** found along the subject corridors. Those living and working in the corridor stand to benefit from any planned safety improvements and should be

well understood. Special consideration should be given to identifying at-risk or disadvantaged demographic segments, due to poverty, minority status and transit-dependency.

- ◆ **Document and comment on population and employment growth forecasts** along the corridor. Traffic in the study area, whether pedestrian or vehicular, is ultimately a function of the number of residents and jobs in that area. Growth in households, jobs and retail/dining/accommodation destinations must be accurately gauged to efficiently allocate safety-improvement investments.
- ◆ **Locate and graphically depict major (re)development sites likely to generate traffic growth.** Maps and accompanying GIS data supplement the simple numeric projections, helping to guide site-specific planning and design efforts.

APPROACH

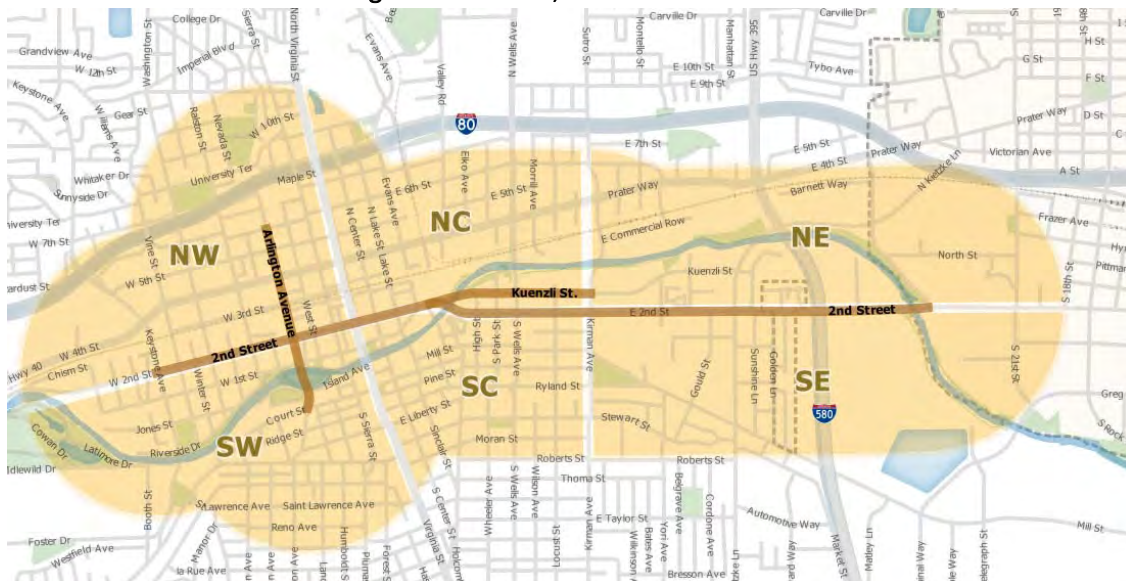
Timeframe

Although the SMP process addresses many long-term (20 to 30+ year) planning goals, the objective described above here will focus on a shorter, 10-year horizon. Any development project already considered planned or proposed will likely be constructed and absorbed within a decade. Also, ten years is something of a “sweet spot” for development forecasting – long enough to encompass more than one business cycle upswing or recession, but not so long as to be overly clouded by unforeseen future circumstances.

Study Area Geography

This analysis focuses on the project corridor(s) of Arlington Avenue and 2nd Street (including a portion of Kuenzli Street), along with a half-mile buffer area, where traffic generation and project benefits are likely to be most relevant. Where possible, findings and recommendations from this study are broken into summaries for six different corridor subareas: Northwest, North Central, Northeast, Southwest, South Central and Southeast, abbreviated in Figure 1.

Figure 1: Corridor, Half-Mile Buffer and Subareas





Key Data Sources, Definitions & Assumptions

Demographic Characteristics

The U.S. Census is a resource for needed data in two main forms. American Community Survey (ACS) 2009-2013 5-year demographic estimates provides profile information for resident populations, as a survey-based supplement to the decennial census. ACS data is used to generate maps showing block-group level differences across key demographic variables, for the corridor and vicinity. A private demographic data provider, ESRI, uses the most recent Census ACS figures to generate 2015 estimates across socio-demographics used.

Secondly, the U.S. Census Longitudinal Employment-household Dynamics (LEHD) dataset summarizes 2013 data on employees, for both home and workplace, at the census block level, including wage brackets, industry types, and basic worker demographics. LED data on individual blocks are occasionally somewhat inaccurate due to a “blurring” algorithm intended to preserve some firm-level privacy. For this reason, caution is advised in interpreting LED data from very zoomed-in geographies.

Existing Counts and Growth Projections for Population and Employment

In their role as the regional transportation planning body, the Washoe RTC prepares 2015 estimates and 2035 forecasts for both population and employment. These are produced at the Traffic Analysis Zone (TAZ) level – a geography typically larger than a Census block but smaller than a Census block group.

Another forecasting effort, just completed in August of 2015, was prepared by economists RCG for the Economic Development Authority of Western Nevada (EDAWN) as part of that group’s 2015 Economic Planning Indicators Committee (EPIC) report. The report, titled Northern Nevada Regional Growth Study 2015-2019, was a major undertaking involving input by numerous municipal and regional bodies (including RTC). Projections from that study are of more recent vintage than RTC TAZ-level inputs, but are less geographically fine-grained – aggregated at the census tract level (larger than block groups or TAZs) – and are available through 2019 only.

Finally, 2010 U.S. Census block level population counts are shown for comparison to the above sources for existing conditions. Although of older vintage, these figures have the advantage of using smaller geographies and are 100% counts, rather than survey-based estimates with associated margins of error.

Both sets of estimates are aggregated for this report at the subarea level (per Figure 1) and again at the overall corridor half-mile buffer level.

Planned and Proposed Projects

The City of Reno’s Community Development Department – Building, Planning and Engineering Division, maintains a list (and interactive on-line map) of “Current Planning/Engineering Cases & Projects” where they briefly profile projects under review and/or development. Using that database, along with conversations with project team members and local developers (and internet searches for corroboration on specific project details), we developed and refined a composite map of corridor planned development projects.

Land Capacity

Known vacant land and land identified as underutilized, if zoned for private use and of reasonable size, is considered for this analysis to be part of the land capacity available for redevelopment.

Using Washoe County Assessor parcel data, we first flag parcels that are already identified as vacant along with parcels where appraised improvement (building) values are less than the appraised value of the land. This latter category is a generally reliable indicator of land underutilization and potential for eventual redevelopment.

After eliminating public uses, charitable land and parcels less than 0.25 acres as unlikely for major development, the remaining parcel acreages are tabulated against their zoning designations. Applying reasonable expectations for development density in each zone and an assumption for the relative proportions of residential and commercial use for each parcel (in cases where mixed-use is allowed) allows for a summary of capacity for new commercial square footage and new residential units.

FINDINGS

Resident Demographic Profile

When compared to residents of the City of Reno and Washoe County overall, corridor residents are far more likely to be...

- ◆ Male
- ◆ Low income
- ◆ Living alone
- ◆ Age 55 to 75 (also somewhat more likely to be age 18 to 25)
- ◆ Renters
- ◆ Divorced

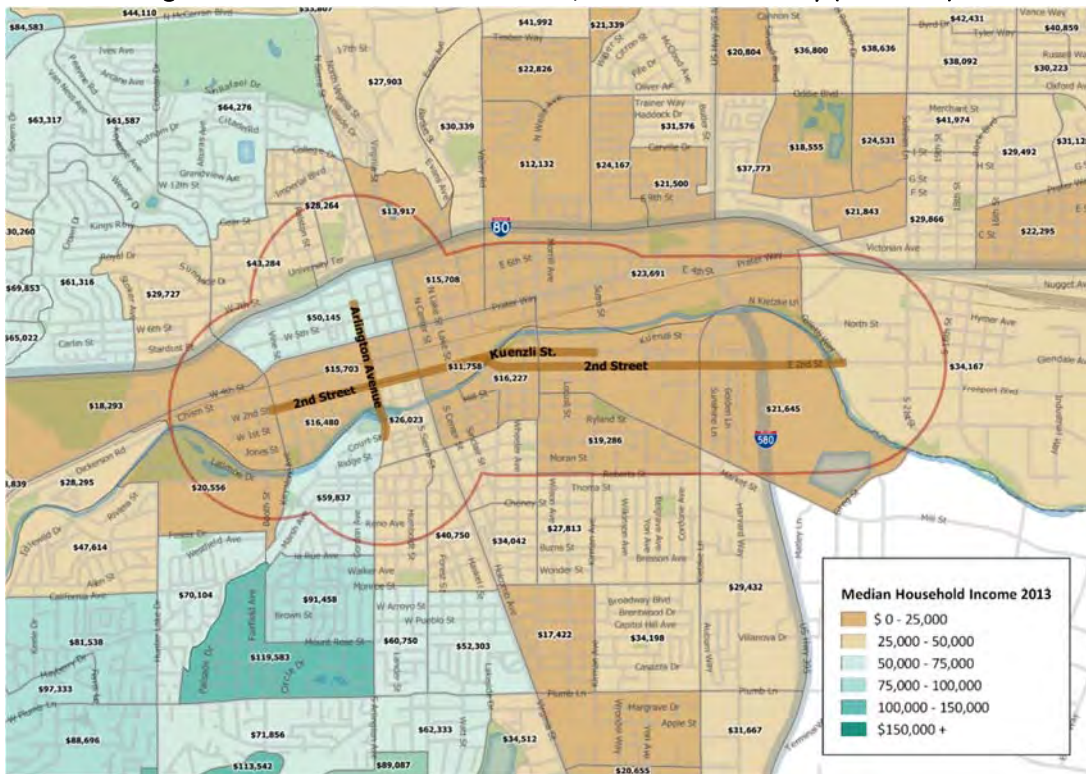
Income Characteristics

While there are two small residential areas on the west end of the corridor with incomes at or slightly above the county median, the corridor as a whole, as shown in Figure 2, includes populations well below both City and County averages. Resident median household incomes range from a low of approximately \$11,800 for the block group just east of 2nd Street and Virginia Avenue to a high of nearly \$60,000 south of the Truckee River, just west of Arlington Avenue.

As many as 3,000 study area households were living at or below the poverty level during the 2009-2011 ACS 5-year estimation period (exact estimation being difficult due to block group overlaps with the study area boundary). Estimated counts of households below poverty are shown in

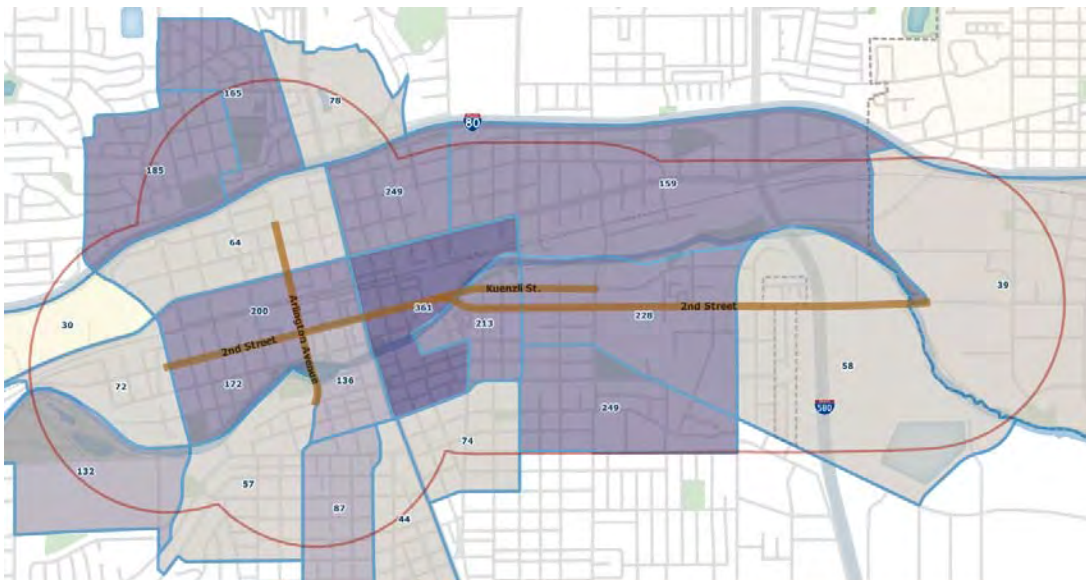
Figure 3.

Figure 2: Median Household Incomes, Corridor and Vicinity (2011 est.)



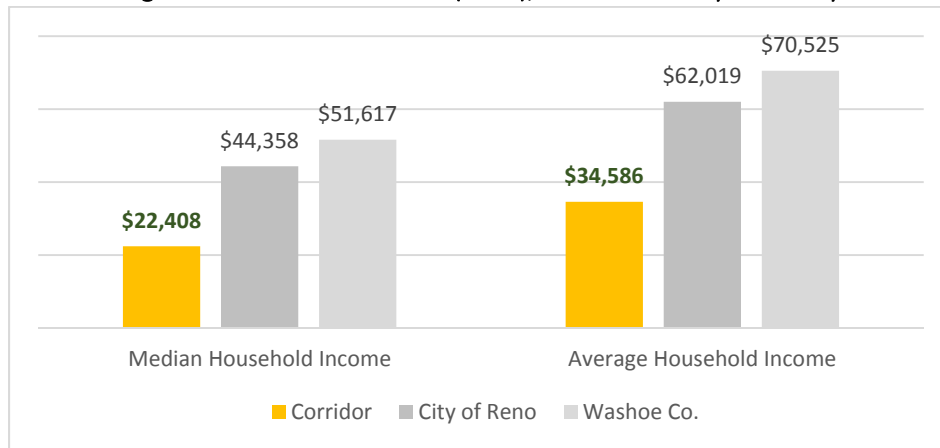
Source: U.S. Census ACS 5-year estimates; Leland Consulting Group

Figure 3: Households Below Poverty Level (2011)



Source: U.S. Census ACS 2009-2013 5-year estimates, by block group

Figure 4: Household Income (2015), Corridor vs. City & County



Other Population and Household Characteristics

In terms of age, corridor study area population is proportionally under-represented for children age zero to 14, and skews higher for ages 45 and up, as compared to the City of Reno or Washoe County. While children are less common in the corridor, teens and young adults (ages 15 to 25) skew somewhat higher than the local and regional comparison areas.

The strong corridor propensity to rent versus own (more than double the county rate) is also consistent with this age distribution pattern. The skews towards male versus female residents and disproportionately high share of divorced adults are likely driven by the presence of single-room-occupancy housing in the corridor.

Figure 5: Key Demographics (2015), Corridor vs. City & County

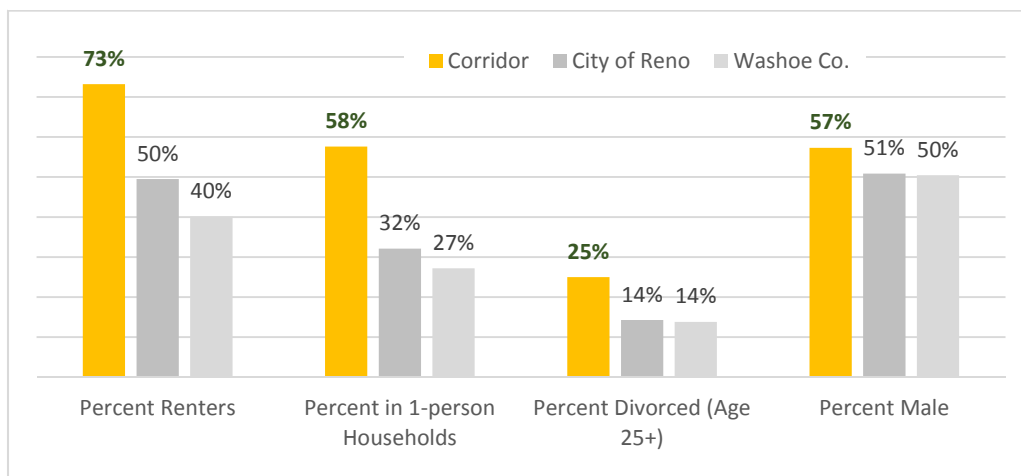
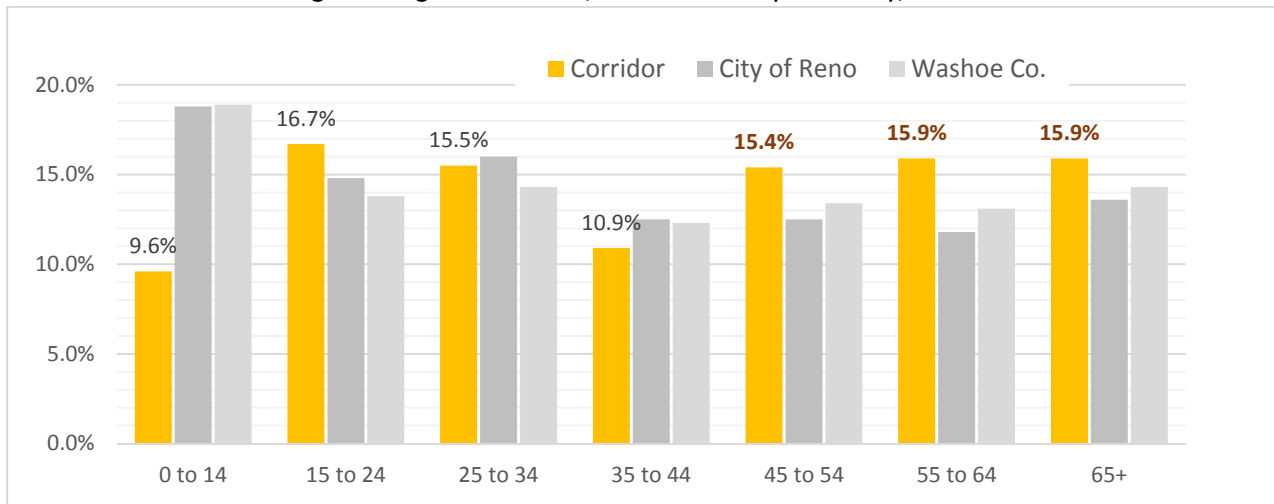


Figure 6: Age Distribution, Corridor vs. City & County, 2015



Like the City and County, the study area’s ethnic makeup is predominantly white. While the corridor population skews significantly higher than the City or County for African American/Black and American Indian racial groups, these groups together account for just over 7% of study area residents. The

Table 1: Estimated Minority Populations, Corridor Total (2015)

Minority Group	Estimated Corridor Residents
Black Alone	914
American Indian Alone	681
Asian Alone	1,112
Pacific Islander Alone	161
Some Other Race Alone	1,632
Two or More Races	771
Hispanic Origin	3,514 (any race)

Source: ESRI 2015 estimates, based on U.S. Census ACS 2009-2013 5-year estimates

corridor has proportionally fewer Hispanic/Latino residents than either the City or County. Figure 7 shows counts of non-White residents and Hispanic residents (regardless of race) by census block group.

Potential Title VI Considerations

The half-mile corridor study area clearly includes a population disadvantaged due to low incomes. These low income residents appear to be spread throughout the corridor subareas.

Taken as a whole, the corridor is no more or less ethnically diverse than the City or County overall. There are, however, readily identifiable minority groups to be found throughout the corridor. Of an estimated total 2015 population of nearly 18,000, the counts of minority residents are shown in Table 1.

Figure 7: Counts of Non-White and Hispanic (Any Race) Residents, by Corridor Block Group



Source: U.S. Census 2009-2013 ACS 5-year Estimates

As an SMP project with safety improvements as a primary goal, it is unlikely that recommended changes to transportation infrastructure will place disproportionate *burdens* on this group. Nevertheless, any major proposed changes should take these population segments into consideration.

Existing Population & Employment Counts

Figure 2 illustrates the population density along the study area corridor. 2010 block population are labeled within the proportionally sized dots. Note that density in the eastern subareas, especially beyond Interstate 580 is considerably lower than to the west. In total, the corridor's 2010 population was 14,496 within 8,674 households.

Table 2: Population, 2010 and 2015 Estimate

	Subarea						Corridor Total
	NW	SW	NC	SC	NE	SE	
2010 Census							
Population	2,228	3,549	3,462	2,953	538	1,766	14,496
2015, est.							
Population	2,319	3,693	3,603	3,073	560	1,838	15,085

Table 2 shows 2010 population for the half-mile corridor study area, based on U.S. Census reporting at the block level. The estimate given for 2015 is based on applying an annual increase of 0.8% (equivalent to EPIC/EDAWN projections for the corridor from 2015 to 2020) over five years¹.

Figure 8: Population Density by Census Block (2010)

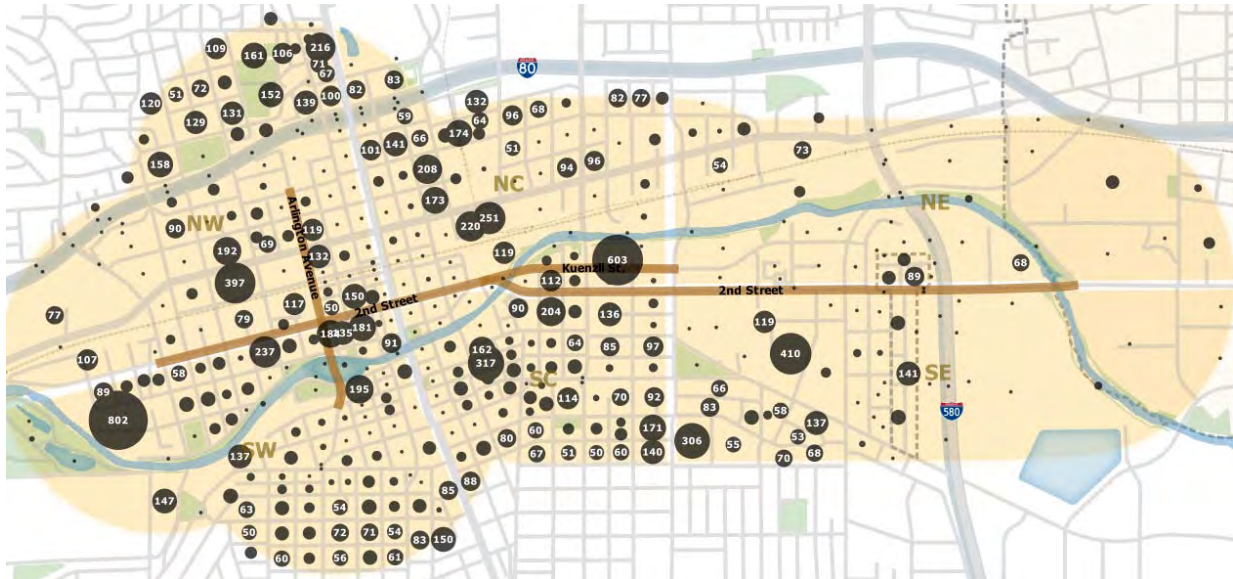


Figure 9: Employment Density by Census Block (2013)



Source: U.S. Census LEHD 2013

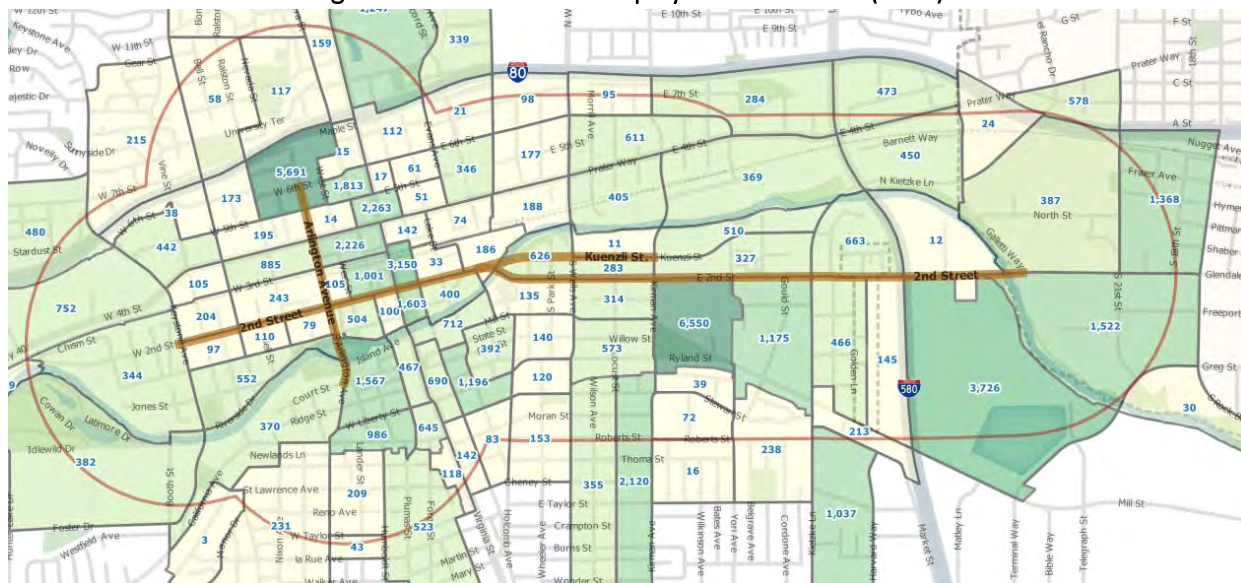
¹ Although 2009-2013 5-year population estimates are available from ACS, those estimates are at the block group level. Because block groups and study area boundaries overlap to varying degrees in many cases, such an estimation would likely be less accurate than the above method.

Current employment is more difficult to assess precisely using available data. A comparison between U.S. Census LEHD 2013 counts (at the block level) and RTC TAZ-level data 2015 estimates (adjusted for approximate study area overlaps), in fact, shows a significant discrepancy in job counts. Census LEHD data shows approximately 34,500 jobs across the study area overall, versus an RTC TAZ-based figure of approximately 56,000. Figure 9 illustrates the Census LEHD counts, while Figure 10 illustrates the TAZ-level RTC counts. Note that while the sum of total employment numbers differ widely, the general distribution of job concentrations is generally comparable across the two sources.

The more recent EPIC/EDAWN demographic analysis was conducted at an even coarser census *tract* geography. Once adjusted for approximate degree of overlap with the study area, however, that report yields 2015 employment estimates of just over 39,300 for the half-mile corridor – much closer to the Census LEHD figure.

Based on a tendency of the payroll-based Census LEHD to slightly undercount employment, and the apparent rigorous nature of the EPIC/EDAWN study, we believe that the EPIC figure is a more accurate count of study area’s existing employment.

Figure 10: RTC TAZ-level Employment Estimates (2015)



According Census LEHD analysis of 2013 commuting patterns, less than 5% of those employed within the subject corridor also live in the corridor. In other words, more than 95% of corridor jobs are filled by people commuting into the study area. Of the 6,500 employed area residents, 22% stay inside the study area to work, while the remaining 78% commute outside the corridor.

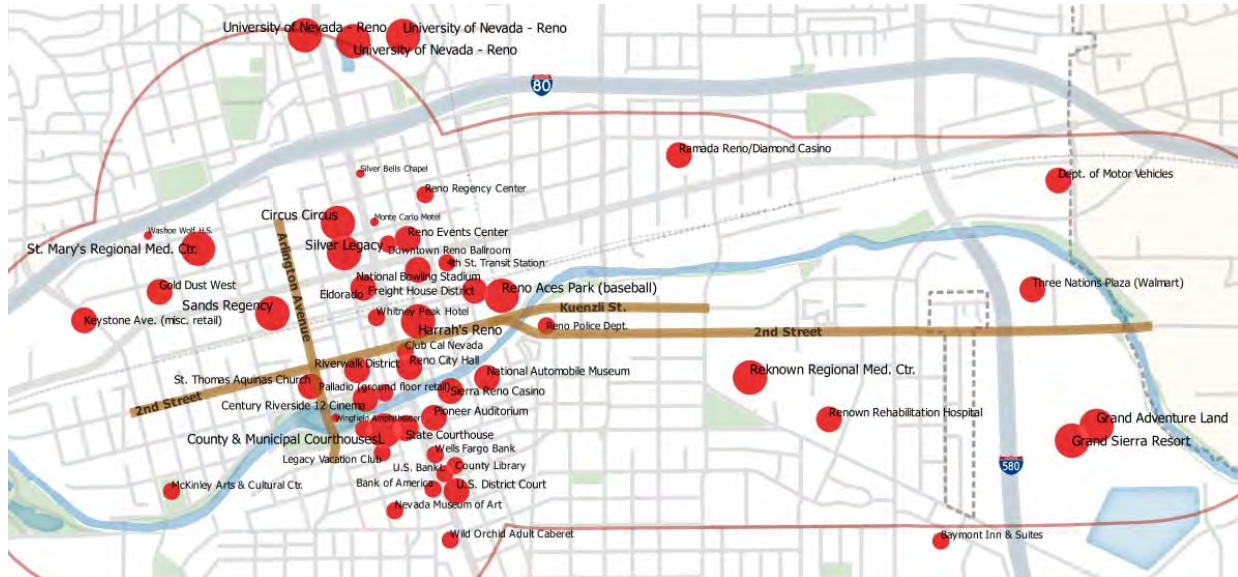
Other Traffic Generators

Traffic in the corridor, whether vehicular or pedestrian, is largely generated by the residents and employees who live and work in the corridor. Significant additional traffic, however, also comes from visitors not otherwise accounted for by job and population estimates. Whether tourists from outside the region or shoppers, diners and errand-runners from outside the corridor, these visitors are drawn to

predictable activity centers such as casinos, hotels, retail/restaurant clusters, government buildings, hospitals and schools.

These traffic-generating activity centers are depicted on Figure 11, with symbols sized to roughly correspond with each site's non-local trip generation potential. Note that visitor traffic is likely most intense in the downtown area, east of Arlington Avenue, on either side of 2nd Street.

Figure 11: Corridor Visitor Traffic Generators



Growth Rates

Washoe County assessor parcel data shows just 137 housing units constructed within the corridor study area since 2010. Two projects accounted for most of the added units: the 41-unit Juniper Ridge apartments at 525 Morrill Avenue (North Central subarea) and the 55-unit River Place senior apartments at Kuenzli Street on the south bank of the Truckee River.

Despite this relatively small addition to the housing stock, the corridor may have added approximately 600 residents to its 2010 base population of 14,496. Most of the gain in population was likely accommodated in the form of filling vacant residential rental units, rather than through new construction. According to the annual Metro Reno/Sparks Apartment Survey conducted by Johnson Perkins Griffin LLC, the Northeast Reno subarea vacancy rate decreased from 11.6% in July of 2010 to 2.2% in Q3-2015. Such an increase in occupancy alone would roughly account for the population gains seen in the corridor over this period.

Because the corridor is now at or near maximum occupancy, future population gains would have to rely on the construction of additional housing units going forward.

Forecasts from EDAWN/EPIC Report

There are ten census tracts that overlap to some degree with the half-mile corridor study area. The 5-year forecast prepared by RCG for the 2015-2019 EPIC report anticipates a **0.8% annual population growth rate** for these tracts in its baseline, expected (“Scenario B”) analysis. The same source forecasts a **2.2% annual rate of employment growth** for the corridor (again, under expected Scenario B).

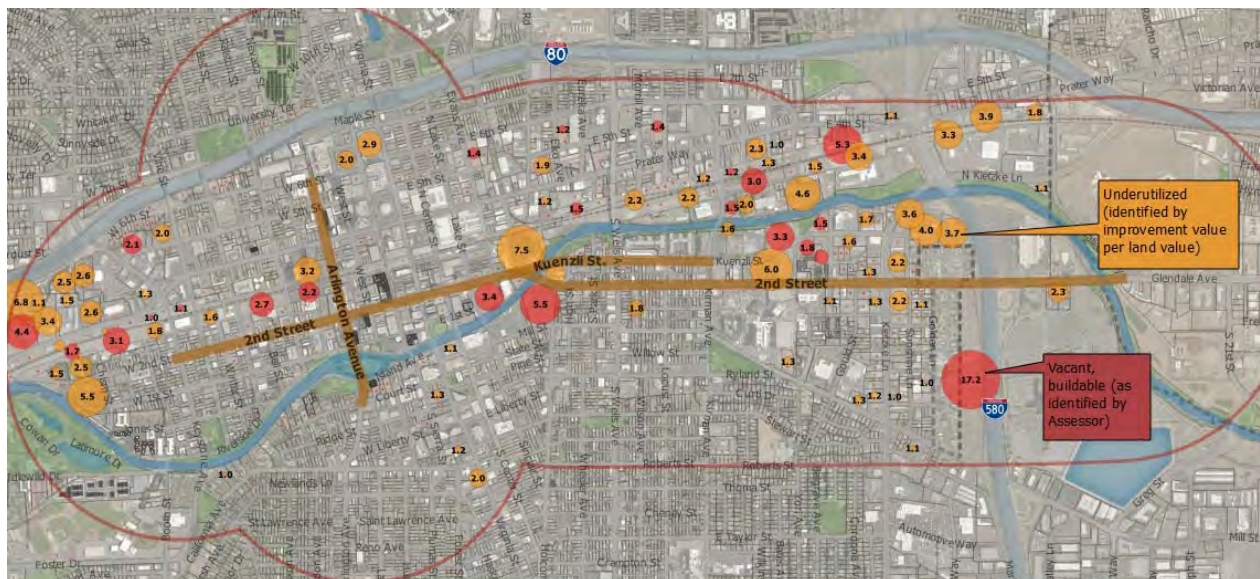
Scenario A, in the full county-wide EPIC report, is the more aggressive scenario. For this corridor, however, Scenario A results in a population growth rate only slight higher, at 0.9% annually. Corridor employment growth under Scenario A actually rounds down to the same 2.2% annual rate as B.

An additional what-if scenario (B2) included in the EPIC report shows population growing in tandem with employment, effectively increasing population growth rates to the employment growth rates shown above. While this scenario is included as more of a policy-illustrating hypothetical, it is worthy of consideration planning in the subject corridor, given the current imbalance between job and housing downtown.

Land Capacity

Figure 12 highlights and shows acreages for parcels identified as vacant and buildable (per the Assessor) or as underutilized (as identified by comparing improvement values to land values). Only parcels greater than 0.2 acres, zoned for development, are included. Table 3 summarizes the acreages by zone of that potential land capacity across each of the corridor subareas

Figure 12: Vacant and Underutilized Land Capacity



The greatest concentration of vacant or underutilized land capacity is found in the Northwest and Northeast corridor subareas. In fact, nearly 250 of the 363 total corridor capacity acres are located north of 2nd Street. The largest capacity parcel south of 2nd Street (and the largest parcel in the overall study



area) is the 17.3 acre Mallard Company property located between the tribal enclave and I-580, in the Southeast subarea.

Most of the identified land capacity (300 of 363 total acres) is zoned for mixed-use development. Just 15 acres are zoned exclusively as residential (9 acres multifamily, 5 acres single family). Approximately 28 acres are zoned industrial, with the remaining 20 zoned as commercial of some form.



Table 3: Land Capacity by Zoning by Corridor Subarea

Zone	Description	Subarea						Corridor Total
		NW	SW	NC	SC	NE	SE	
AC	Arterial Commercial	2.9			6.4		4.6	13.9
CC	Community Commercial	0.7			0.3	0.2		1.2
I	Industrial	2.4		15.8			9.4	27.5
MF14	Multifamily	0.9			0.7	0.7		2.3
MF21	Multifamily	2.5						2.5
MF30	Multifamily	2.7			1.4			4.1
MUDH	Mixed Use	0.3	0.4		0.5			1.2
MUDR	Mixed Use	47.4	43.4	25.8	13.5	18.4		148.5
MUE4	Mixed Use		5.9	28.1				34.0
MURL	Mixed Use						20.6	20.6
MUSV	Mixed Use				2.7	1.3		4.0
MUW4	Mixed Use	40.1						40.1
MUWM	Mixed Use		1.8	24.7		6.8	18.3	51.6
NC	Neighborhood Commercial	0.6					0.4	1.0
PO	Professional Office				3.8	0.2		4.1
SF6	Single Family	0.4			0.7			1.0
SF9	Single Family				5.2			5.2
	Total	100.9	51.5	94.3	35.3	27.6	53.3	362.9

Known Planned & Proposed Projects

Figure 13 and Table 4 summarize known planned and proposed projects in the study area corridor. This project pipeline is concentrated centrally within the corridor, with all but one identified project lying between Arlington Avenue and I-580. A number of other potential projects, not identified here, may also exist in the form of property holdings for which redevelopment plans have not been initiated.

Figure 13: Planned & Proposed Projects, Subject Corridor





Table 4: Corridor Planned and Proposed Projects

Project Name	Corridor Subarea	Type	Status	Units	Non-Residential s.f.	Notes
Urban @ University	nw	mixed use residential/comm'l	planned	12	5,000	LCG estimates for 0.25 acre MU dvlp, flex zoning
1250 W. 7th	nw	rezone request				2.8 acre parcel requesting rezone from NC to CC
Singer Social Club	nw	nightclub	proposed		3,200	proposed nightclub requesting special use permit
Shelter (nightclub)	sw	nightclub	proposed		83,560	basement nightclub proposed in existing bldg.
Sinclair St. Bungalows	sc	single family residential	proposed	12		9 new, 3 renov units
The Saint	sw	nightclub	proposed		7,667	nightclub with live music, distillery, tap room
360 Kirman Ave Studio	sc	residential	proposed	5		proposed expansion, check unit count
Motorsports Unlimited (auto sales)	se	auto sales facility	proposed		9,148	expansion to existing auto sales
Splash Bar	se	nightclub	proposed		13,750	bar and night club
Reno Aces Ice Rink	nc	outdoor ice rink			50,000	seasonal, Thxgiving to Valentines (s.f. estimated)
The Bluebird		nightclub	proposed		10,857	existing bldg.; to add nightclub w live music
921 N Sierra St. Coffee Shop	nw	cafe	proposed		5,358	requesting permit; with alcohol service
Marriott Courtyard	sc	hotel	under construction		76,000	under construction (spring 2016)
3rd Street Flats	nw	apts. + retail	under construction	94	9,000	upscale redevelopment; may include retail
West Street Plaza	sw	mixed use	conceptual	26	10,000	

CONCLUSIONS

The corridor half-mile study area has approximately 15,000 residents, disproportionately male, older and less affluent than City and County populations overall. These residents are also far more likely to live alone in rental housing. While minorities are not disproportionately over-represented, there are significant, identifiable minority populations present. Population growth should be modest (less than 1% annually) over the next 10 to 20 years.

There are approximately 39,000 employees working along the corridor, a number that is expected to increase by just over 2% annually over the coming decade. Corridor jobs are overwhelmingly (95%) filled by in-commuters.

In addition to these workers and residents, corridor traffic (vehicular and non-vehicular) is highly dependent on a large number of activity centers, including casinos, hotels, shopping, dining, and public facilities.

The corridor has ample land capacity (360+ acres) in the form of vacant and underutilized, zoned parcels, to absorb anticipated growth in the study area.

Many planned and proposed projects in the corridor stalled during the recent recession. New and remaining pipeline projects are generally centrally located in the corridor and tend to be smaller in scale.



Appendix F – Existing Land Use





DRAFT TECHNICAL MEMORANDUM

To: Lori Campbell, NDOT Project Manager

From: Bryan Gant, Wood Rodgers Project Manager

Date: September 18, 2015

Re: **Existing Land Use – Opportunities & Challenges**

Background

The Nevada Department of Transportation (NDOT) is undertaking a series of Safety Management Plans (SMPs) throughout the State of Nevada. SMPs are a transportation analysis effort that incorporates corridor study, crash analysis, access management, public and stakeholder input, roadway engineering and application of the Highway Safety Manual (HSM) methods to improve transportation safety for all users. The SMP process is consistent with the Nevada Strategic Highway Safety Plan's goals of reducing crashes and fatalities, particularly at intersections, in half by 2030.

HSM methodologies and tools such as the Interactive Highway Safety Design Model (IHSDM) are applied at identified locations to define safety issues, consider mitigations, and select the best alternatives. These predictive methods allow engineers to calculate the predicted safety effects of different design applications.

NDOT, in cooperation with local transportation partners, has selected portions of 2nd Street, Kuenzli Street and Arlington Avenue for analysis under this SMP. The exact limits of analysis are 2nd Street from Keystone Avenue to Galletti Way, Kuenzli Street from 2nd Street to Kirman Avenue, and Arlington Avenue from Court Street to W 6th Street in the City of Reno, Nevada. The purpose of this document is to identify the existing land use within the 2nd Street and Arlington Corridors, as well as describe the opportunities and challenges those designations have on improving safety and multimodal connectivity.

Existing Land Use

The 2nd Street and Arlington Avenue corridors lie within specific planning areas of the City of Reno. These planning areas are defined, in part, by the policies of the Truckee Meadows Regional Plan. Downtown Reno is identified as a regional center, and includes the western portion of the 2nd Street Corridor from Keystone Avenue east to Wells Avenue and the Arlington Avenue Corridor from California Avenue to W 6th Street. The central portion of the 2nd Street Corridor, from Wells Avenue east to Kietzke Lane, is within the Medical Regional Center. As such, much of the land within these portions of the Arlington Avenue and 2nd Street corridors have a "Mixed Use" (MU) zoning designation. The eastern portion of the 2nd Street Corridor from Kietzke Lane east to Galletti Way is not within a specific planning area and has a mix of zoning designations including "Industrial" (I), "Mixed Use" (MU), "Public Facility"



(PF), and also include the Reno-Sparks Indian Colony. See attached Planning Areas and Existing Zoning maps.

The Downtown Regional Center encourages concentrated development, pedestrian safety enhancements, streetscape, and supports Transit Oriented Development (TOD). The Downtown Regional Center is divided into 5 districts, which the Summary of Relevant Plans and Studies Memo dated July 25, 2015 (City of Reno Master Plan Section) provides a detailed summary and background for specific planning districts within the 2nd Street and Arlington Corridors:

- ❖ **Entertainment District** - Tourist element of Downtown appropriate for hotel/casinos, destination resorts, major recreation facilities, cultural facilities, tourist shopping, services, and activities.
- ❖ **Truckee River District** – Preservation of the Downtown benefits of the Truckee River with building design and pedestrian corridors that enhance the river corridor and encourage the District.
- ❖ **California Avenue District** – Preservation of the office portion of the regional center with land use including residential, retail, restaurant, and cultural facilities playing a key role in making this a vibrant district.
- ❖ **The Keystone Avenue and Wells Avenue Districts** – Maintain general services within the regional center encouraging mixed land use at lower intensities and densities to transition to surrounding neighborhoods. A portion of the Keystone District permits gaming (between Keystone Avenue and Vine Street within the 2nd Street corridor).

A map of the Downtown Regional Center Districts within the portions of the Arlington and 2nd Street Corridors is attached.

The 2nd Street and Arlington Avenue Corridors have a mix of uses ranging from Downtown Reno Casino Core, a variety of commercial uses, the Aces Baseball Stadium, two Hospitals (Renown & Saint Marys), and a mix of single and multi-family residential. As described above the corridors have many different “Districts” with individual identities. In an effort to more easily discuss the various Districts and corridor segments, the corridors have been dissected into more unique areas that have similar geographic delineators. These segments are discussed below:

“West 2nd Street Urban Transition”

2nd Street from Keystone Avenue to Arlington Avenue

The western end of the 2nd Street Corridor serves as the transitional area for the highest urban density in the Truckee Meadows, the Downtown Casino Core. This portion of the corridor is predominantly older single family residential, old motels, a mix of neighborhood commercial uses, education services, and a Greyhound bus station. The western portion of the 2nd street corridor is intersected by north south connectivity to the Truckee River for large residential areas north of Interstate 80. Land uses and features that influence this portion of the 2nd Street Corridor include:

- ❖ **Truckee River** – The Truckee River and associated multi-use path are located to the south of the 2nd Street Corridor and provide recreational opportunities for the surrounding neighborhoods. Numerous bike and pedestrian access points to the River District cross 2nd Street.

- ❖ **Public Education Facilities** – Washoe Innovations Public High School, and the University of Nevada Reno (UNR) Learning Center are both located within this portion of the 2nd Street Corridor.
- ❖ **Greyhound Bus Station** – The Greyhound bus station is not directly connected to regional transit services. The station is approximately a half mile from the regional RTC bus station or train station located downtown. The closest RTC transit stops are at 2nd Street/Stevenson Street serviced by route 16 and Arlington Avenue/2nd Street serviced by route 6.

Connectivity:

The west 2nd Street Urban Transition area provides connectivity for residential and university traffic north of Interstate 80 heading south to the Downtown and River Districts via the overpasses at Vine, Washington, Ralston Streets and the underpass at Keystone Avenue. Access across the Truckee River is limited to Keystone Avenue and Arlington Avenue within the district limits. Bike and pedestrian connectivity is limited and in most cases non-existent.

Street Environment:



West 2nd Street is indicative of the City of Reno's efforts to improve the downtown area. This portion of 2nd Street has a low traffic volumes of 4800 Annual Average Daily Traffic (AADT) with four lanes and a center turn lane, on-street parking, 5' sidewalks on both sides of the street, and no bicycle facilities. The on-street parking is moderately utilized depending on adjacent land uses and intensity.

Opportunities & Challenges:

At 4800 AADT, West 2nd Street could be reduced to one lane in each direction with center turn pockets creating opportunity to add dedicated bike and pedestrian facilities, improve transit stops, and provide streetscape to improve the aesthetics of the corridor as well as multimodal connectivity. Dedicated bike facilities could easily connect with the Truckee River multiuse path network.

Vacant infill opportunities exist within this portion of the corridor, as well opportunity for older residential units to be converted to commercial and mixed use. Two education centers have recently made improvements within the west 2nd Street corridor which could create the need for additional education services within the area. Mixed use infill projects would promote improved bike and pedestrian use. This portion of 2nd Street is ideal for creating live, work, play development opportunities

Multiple motels are located within the West 2nd Street corridor. The motels offer nightly, weekly, and monthly rentals and vary in quality. The motels represent a challenge for redevelopment efforts in the corridor. Many of the properties appear that the owners do not reinvest in their own facilities.

"Downtown Reno Core"

2nd Street from Arlington Avenue to Wells Avenue (includes Kuenzli Street); Arlington Avenue from Court Street to West 6th Street

The Downtown Reno Core is the regionally identifiable center for the Truckee Meadows. The downtown core within the 2nd Street and Arlington corridors contains predominantly hotel casino properties, entertainment uses, as well as older casinos that have been converted to high density residential

condominium units. Land uses and features that influence this portion of the 2nd Street and Arlington Corridors include:

- ❖ **Truckee River** – Both 2nd Street and Arlington Avenue in the downtown core area provide access to the Truckee River for all modes of transportation. These connections are important for providing condominium residents and tourists with non-auto related access to the River and its associated multiuse trail network, activities, and events.
- ❖ **Downtown Casinos** – Historically the epicenter for the region, the downtown hotel casinos are one of the more predominant features for the corridor. 2nd Street and Arlington Ave both provide vital links in connectivity for tourists staying at the hotel casino properties.
- ❖ **High Rise Condominium Buildings** – Along Arlington Ave and portions of 2nd Street within the downtown core are high rise buildings, once identified as casinos, which have been converted to condominiums in the past 5-10 years. Mostly vacant, they are becoming more popular as redevelopment of downtown continues and the housing market continues to improve.
- ❖ **Freight House District** – Home to the Aces Baseball Stadium, with supporting restaurants and entertainment venues. Also an approved Tourism Improvement District, the District is planned to expand and include additional retail, restaurants, hotel and other mixed use development. 2nd Street is the front door for the District including the stadium itself, and will continue to be the gateway for the redevelopment projects.
- ❖ **St. Mary's Regional Medical Center Campus** – The hospital and associated support medical offices encompass nearly 40+ acres adjacent to Interstate 80 on the north end of the Arlington Avenue Corridor.
- ❖ **Reno Police Station** – On the edge of the Freight House District and the western end of the one way couplet system created by 2nd Street and Kuenzli Street, the police station can be found in the middle of a prime redevelopment area.

Connectivity:

This portion of 2nd Street and Arlington Avenue corridors provide some of the highest levels of connectivity to and from the Downtown Core and River Districts. 2nd Street provides east-west connectivity between the Reno Urban Transition, the Downtown Core, the City of Sparks Industrial/Commercial areas, Reno Sparks Indian Colony, and I-580 while Arlington Avenue provides connectivity to the Truckee River. Dedicated Bike and Pedestrian facilities are limited and in many cases non-existent.

Street Environment:



2nd Street - 2nd Street is indicative of the City of Reno's efforts to standardize streetscape improvements in the downtown area. This portion of 2nd Street has a traffic volume of 6300 AADT with four lanes and left turn lanes at intersections, on-street parking, varying 5'-12' sidewalks on both sides of the street, and no bicycle facilities.

Arlington Avenue - Arlington Avenue is also indicative of the City of Reno's efforts to improve the downtown area. This portion of Arlington Ave has a traffic volume of up to 7,600 AADT with four lanes and left turn lanes at intersections, on-street parking, 5' sidewalks on both sides of the street, and no bicycle facilities. South of 1st Street, Arlington Avenue consists of only one lane in each direction, with 4' bike lanes, 5' sidewalks, and no on-street parking. This segment experiences high pedestrian volumes during the summer months and major events.



Opportunities & Challenges:

Downtown Reno casinos represent Reno/Sparks regional identity. Although growth in these properties is not likely in the foreseeable future, support of the regions downtown and entertainment uses is key to future downtown success. As an attractor for both tourist and locals, the Downtown Casino Core is a vital element of the regions urban center. Safety, multimodal, and aesthetic Improvements to 2nd Street and Arlington Avenue in the Downtown Regional Center is a key component to the future downtown success.

The Freight House Tourism Improvement District also has additional funding mechanisms for redevelopment. The district is home to the Ace's baseball stadium and surrounding commercial development. The district is a growing regional entertainment venue. For example, the owners of the Reno Aces recently announced the acquisition of a minor league soccer team that will be housed in the same stadium. 2nd Street is the gateway for this district and provides opportunity to improve the multimodal connectivity of the area as well as aesthetics to attract people to enjoy the district and downtown area.

Apart from the efforts to redevelop the Freight House District, there are few opportunities for large scale redevelopment within the downtown core. The existing hotel casino properties and condominium towers are relatively large acreages with few opportunities for large scale changes, aside from reusing the existing buildings.

2nd Street and Arlington Avenue both could be reduced to one lane in each direction with center turn pockets creating opportunity to add dedicated bike and pedestrian facilities, improve transit stops, and provide streetscape to improve the aesthetics of the corridors as well as multimodal connectivity. Dedicated bike facilities could easily connect with the Truckee River multi-use path network.

Medical Regional Center

2nd Street from Wells Avenue to Kietzke Lane (Includes Kuenzli Street)

The Medical Regional Center is a large employment center for the region and is surrounded by a mix of residential and commercial uses. Land uses and features that influence this portion of the 2nd Street Corridor include:

- ❖ **Renown Regional Medical Center Campus** – The Hospital and associated support medical offices encompass over 60 acres between 2nd Street/Kuenzli Street to the North and Mill Street to the south. 2nd Street provides direct access from the downtown core to Renown.

- ❖ **Truckee River** – The Truckee River is adjacent and north of the 2nd Street/Kuenzli Street corridor. The Truckee River multi-use trail provides connectivity to 2nd Street/Kuenzli Street and non-auto related access to the Medical Regional Center, and large employment center.

Connectivity:

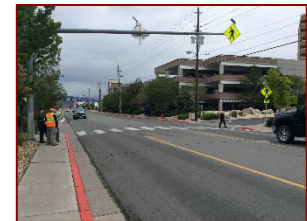
2nd Street and Kuenzli Street create a “couplet system” with 2nd Street providing the eastbound one way access, and Kuenzli Street providing the westbound one way access. The one way streets lack dedicated bike facilities, and do not provide multimodal connectivity between the couplet system and the Truckee River. Driveways are spaces relatively close together and create access challenges. The couplet system ends at Kirman Avenue for 2nd Street, which becomes a two way street in front of Renown. Two way traffic and closely spaced driveways create access challenges for this segment.

Street Environment:



2nd Street one-way section - This portion of 2nd Street has a low traffic volume of 3,200 AADT with three lanes heading east, on-street parking, varying 4’-5’ sidewalks on both sides of the street with numerous utility conflicts, and no bicycle facilities. The low volumes are due in large part to the existing couplet system with Kuenzli Street and represent one direction of travel.

2nd Street near Renown two-way section - This portion of 2nd Street has a traffic volume of 13,500 AADT with three automobile lanes (two eastbound, one west bound) and a center turn lane, 5’ sidewalks on both sides of the street with many utility conflicts, and no bicycle facilities. Renown’s employee surface parking lot is located north of 2nd Street with the hospital south resulting in significant pedestrian crossings at an existing protected crossing.



Kuenzli Street one-way - This portion of Kuenzli Street has a low traffic volume of 2,600 AADT with three one-way lanes westbound, varying 4’-5’ sidewalks on both sides of the street with many utility conflicts, and no bicycle facilities. Again, the low volumes are in large part due to the couplet system and represent travel in one direction.

Opportunities & Challenges:

Renown Medical Campus is a large regional employment center with plans for continued redevelopment. Its close proximity to downtown make this an attractive opportunity for multimodal corridor improvements. Renown has been instrumental in the redevelopment and growth in the area. It will be essential to coordinate with Renown’s Master Plan update to ensure connectivity in the area is improved and includes all modes of transportation. The couplet system may need to be updated with future growth.

Vacant infill opportunities exist within this portion of the corridor, as well opportunity for older residential units and commercial buildings to be converted to commercial and mixed use. This portion of 2nd Street is ideal for creating live, work, play development opportunities.

The couplet system has very low AADT and could benefit from lane reductions creating opportunity to add dedicated bike and pedestrian facilities, improve transit stops, and provide streetscape to improve the aesthetics of the corridors, as well as, multimodal connectivity. Dedicated bike facilities could easily connect with the Truckee River multi-use path network.

Reno Sparks Indian Colony (RSIC), Commercial Center

2nd Street from Kietzke Lane to Galletti Way

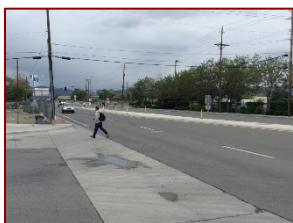
The Reno Sparks Indian Colony (RSIC) consists of a mix of uses including residential, commercial, and industrial, with Walmart on the east end. The Grand Sierra Resort entrance is also located across from Walmart on the east end of the corridor. Land uses and features that influence this portion of the 2nd Street Corridor include:

- ❖ **Truckee River** – The Truckee River and associated multi-use path are located to the north of the 2nd Street Corridor and provide recreational opportunities for the surrounding RSIC neighborhoods as well as visitors from the Grand Sierra Resort.
- ❖ **RSIC Properties** – Tribal lands make up the majority of the corridor, and include both residential and commercial uses. The mix of uses along a busy section of 2nd Street creates challenges for safe multimodal use.
- ❖ **Nevada Dept. of Corrections Northern Nevada Restitution Center** – A new facility is being constructed on the corner of Kietzke Lane and 2nd Street. The old facility near Walmart will be redeveloped by the RSIC.
- ❖ **Walmart** – Large box retail near the Truckee River and east end of the corridor generates a lot of traffic and offers challenges for safe multimodal connectivity.
- ❖ **Grand Sierra Resort** – Hotel and Casino property, another large traffic generator, on the east end of the corridor creates challenges for multimodal connectivity.

Connectivity:

The eastern section of the 2nd Street corridor between Kietzke Lane and Galletti Way has the highest AADT within the corridor at 17,000. There are no bicycle facilities, and the limited pedestrian facilities are out dated and in some cases non-existent. The Interstate 580 on and off ramps also create challenges with connectivity for bikes and pedestrians. Bus stops are not ideally located and encourage illegal pedestrian crossings. There is a lack of connectivity from 2nd Street and the Truckee River.

Street Environment:



2nd Street near Walmart/Grand Sierra Resort - This portion of 2nd Street has a traffic volume of 14,000 AADT with four lanes, 5' sidewalks on the south side, but missing segments on the north side of the street with many utility conflicts, and no bicycle facilities. It is anticipated that an upcoming NDOT roadway improvements project will construct new sidewalk facilities where none currently exist.

2nd Street near RSIC - This portion of 2nd Street has a traffic volume of 17,000 AADT with four lanes and a center turn lane, 5' sidewalks on both sides of the street, but missing segments on the northwest side of the street with many utility conflicts, and no bicycle facilities. An existing pedestrian overpass provides connectivity to the colony across 2nd Street, however, it is underutilized. The NDOT project noted above is also anticipated to include sidewalk improvements to this area as well.

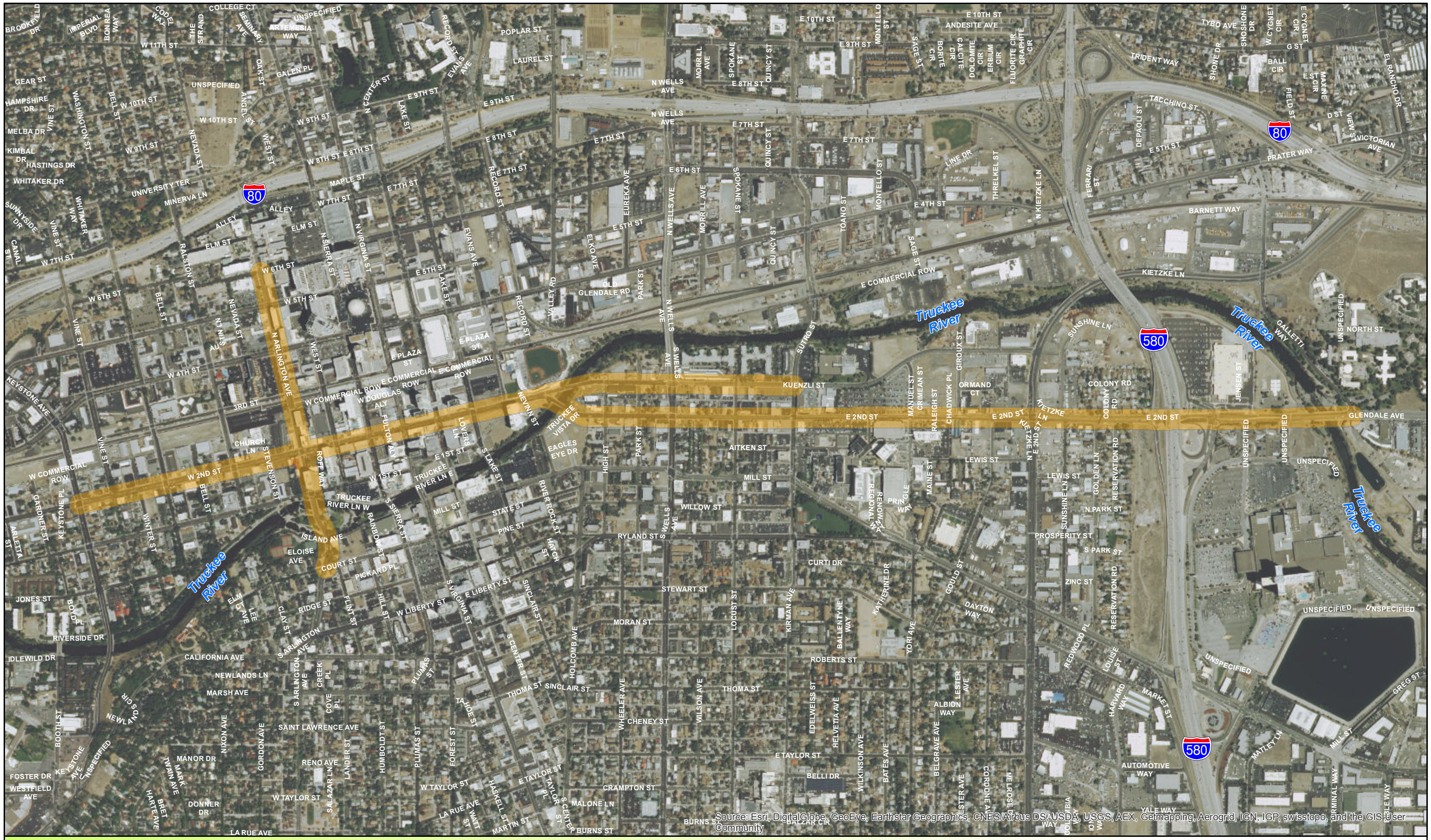


Opportunities & Challenges:

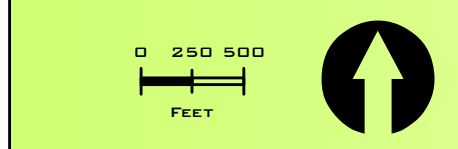
Washoe County through the Truckee River Flood Project has been working with RSIC, and other agencies to identify connectivity for the Truckee River multiuse path and the 2nd Street/Kietzke/RSIC/Walmart areas. This is an important connection for multimodal connectivity in these segment of the 2nd Street Corridor.

With the construction of the new facility, RSIC now has control of the old facility for redevelopment. This creates opportunities for improved access to the Truckee River and eastern portion of 2nd Street.

Apart from the efforts to redevelop the old correctional facility, there are few opportunities for redevelopment within the eastern portion of the corridor. The Walmart and Grand Sierra Resort properties are very large making it challenging for improvements to multimodal connectivity in that area.

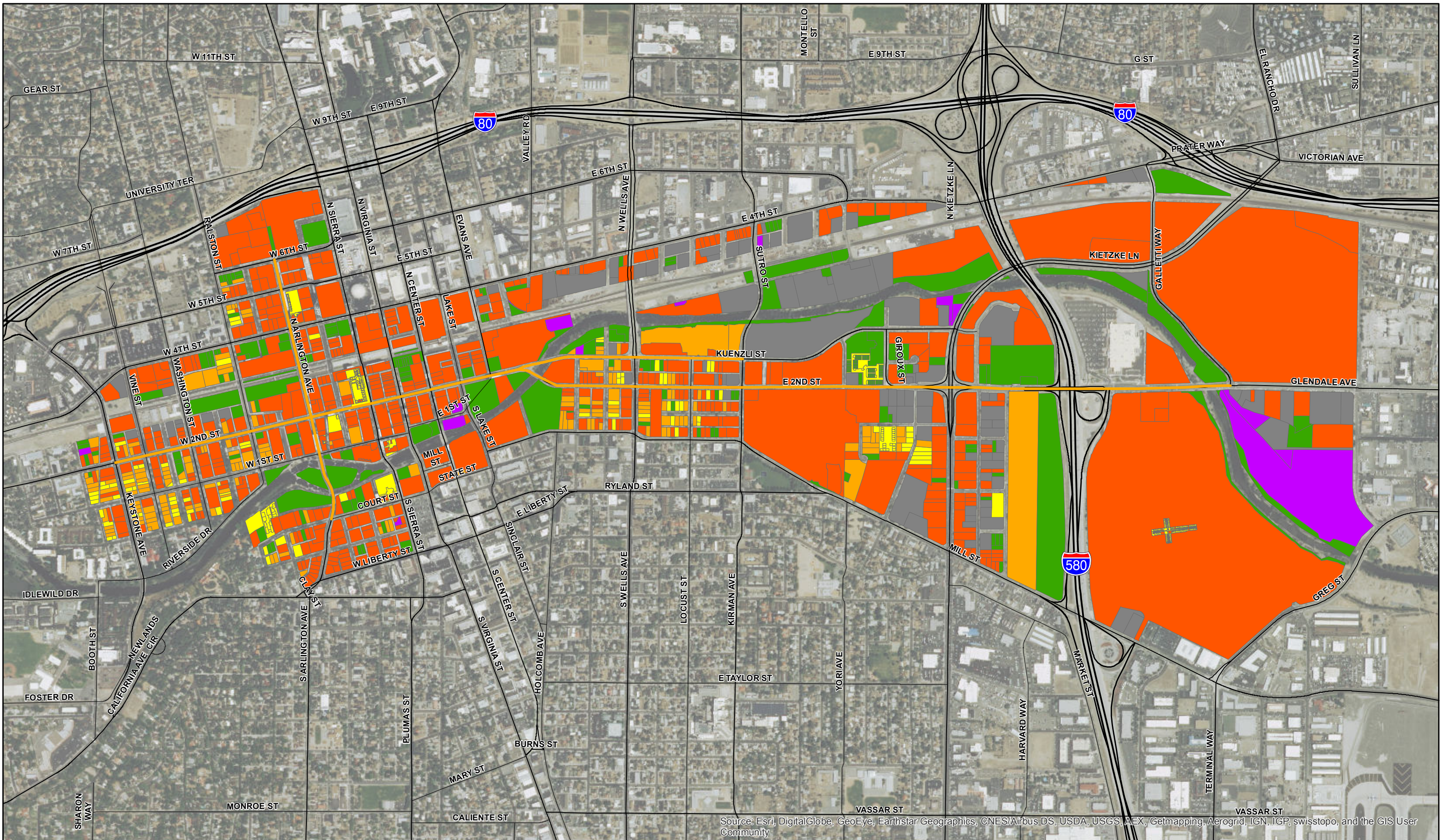


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

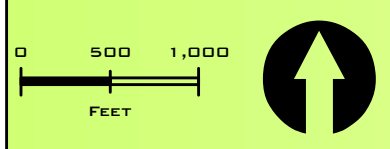


Project Location
2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
September, 2015

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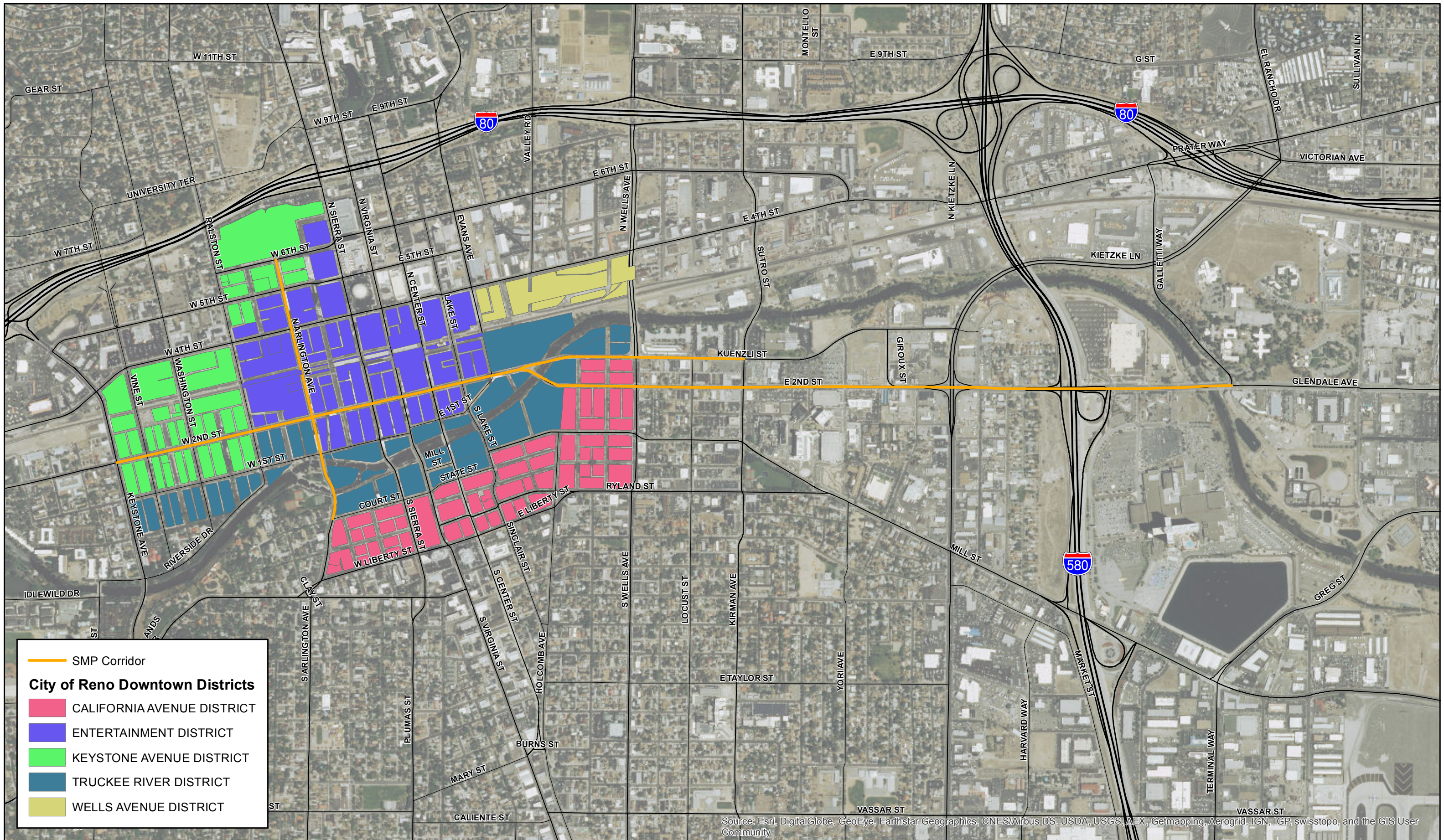








Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community





Existing Land Use
 2nd St. / Arlington Ave. Safety Management Plan
 Reno, NV
 September, 2015

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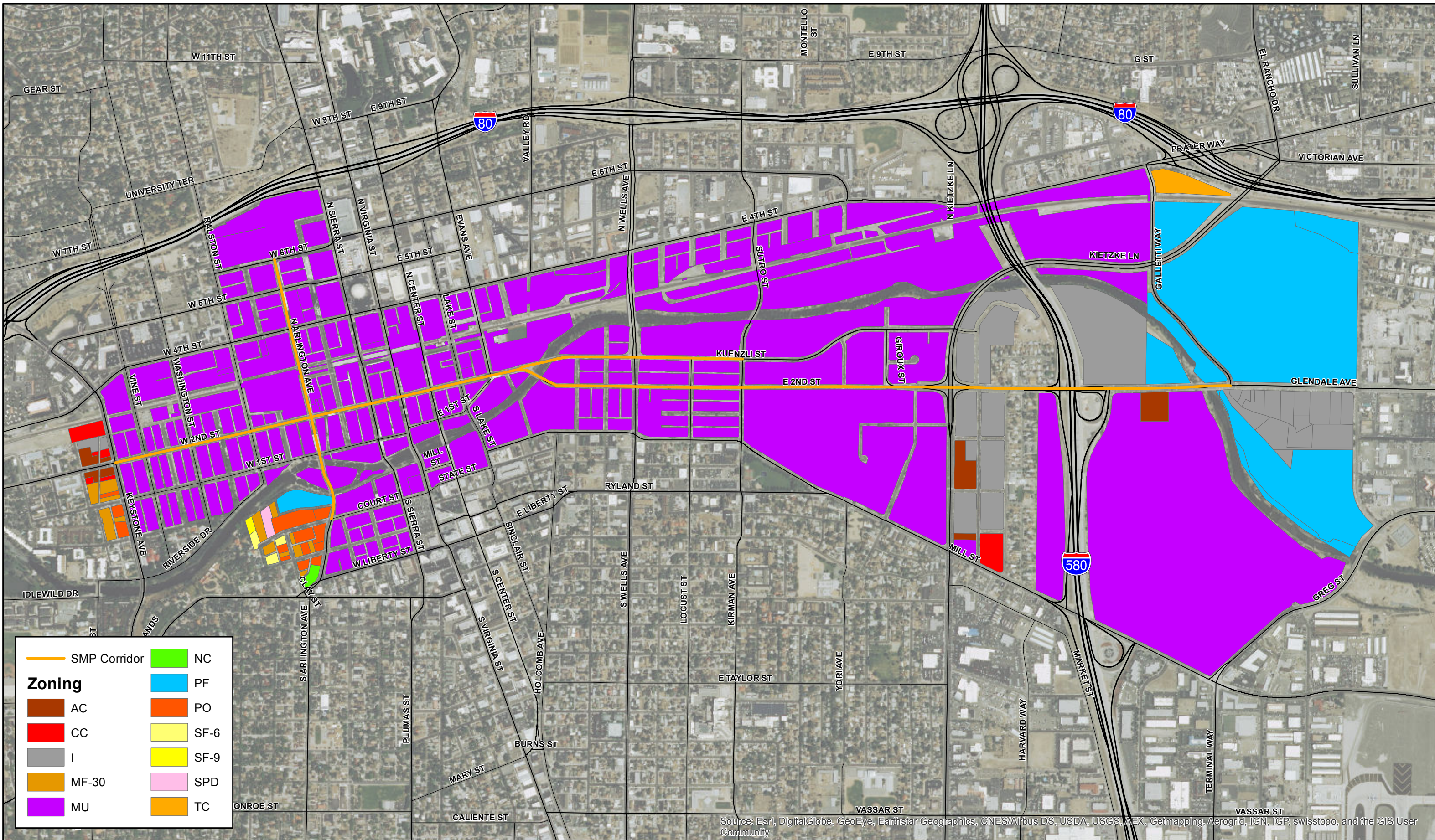
 SMP Corridor
City of Reno Downtown Districts
 CALIFORNIA AVENUE DISTRICT
 ENTERTAINMENT DISTRICT
 KEYSTONE AVENUE DISTRICT
 TRUCKEE RIVER DISTRICT
 WELLS AVENUE DISTRICT

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Downtown Districts
 2nd St. / Arlington Ave. Safety Management Plan
 Reno, NV
 September, 2015

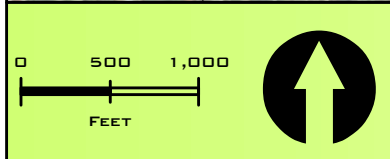

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— SMP Corridor

Zoning	
■ AC	■ NC
■ CC	■ PF
■ I	■ PO
■ MF-30	■ SF-6
■ MU	■ SF-9
	■ SPD
	■ TC

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Existing Zoning
 2nd St. / Arlington Ave. Safety Management Plan
 Reno, NV
 September, 2015

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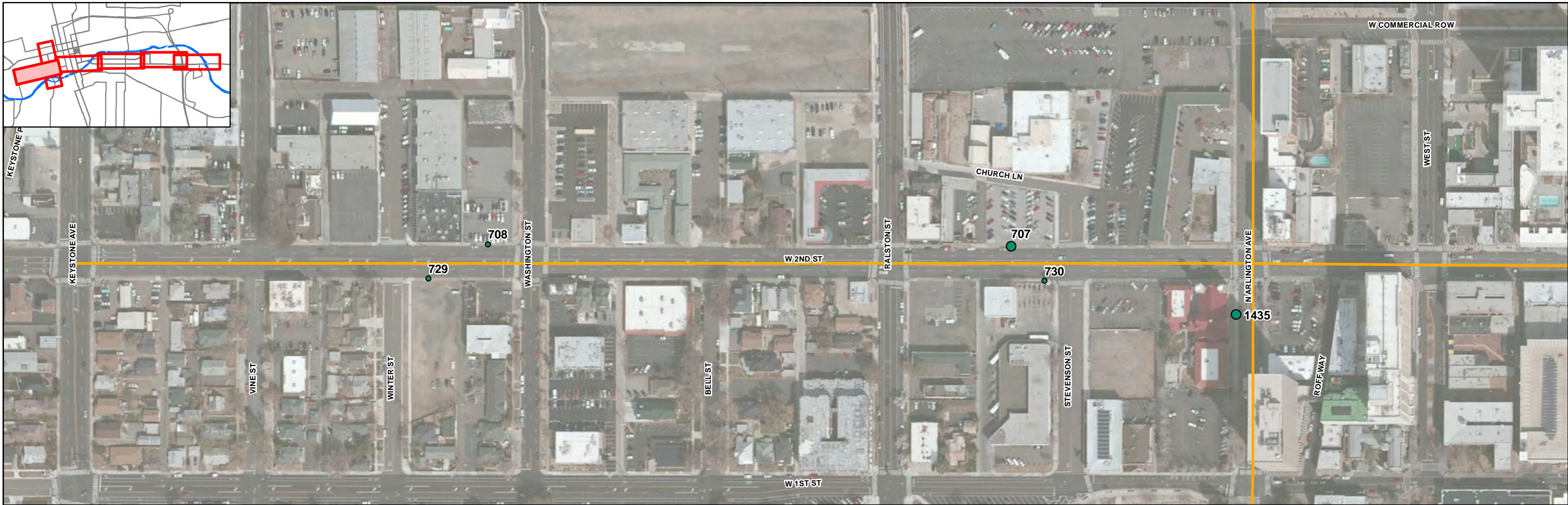


Appendix G – Transit Amenities



Transit Amenity Analysis Summary

Study Area	Primary Route(s)	Stop ID	Stop Location	Daily Ridership	Existing Shelters	Existing Benches	Existing Trash Bins	Proposed Shelters	Proposed Benches	Proposed Trash Bins	
2nd Street	16	707	W 2nd St & Stevenson St	38	0	0	0	2	2	1	
2nd Street	16	708	W 2nd St & Washington St	25	0	1	0	2	1	1	
2nd Street	16	729	W 2nd St & Winter St	9	0	1	1	0	0	0	
2nd Street	16	730	W 2nd St & Stevenson St	22	0	1	1	2	1	0	
2nd Street	12, 18	436	E 2nd St & Lake St	49	0	1	1	2	1	0	
2nd Street	12, 18	437	E 2nd St & High St (Reno PD)	11	0	0	0	1	1	1	
2nd Street	12, 18	439	E 2nd St & Locust St	46	0	1	1	2	1	0	
2nd Street	12, 18	440	E 2nd St & Kirman Ave	22	0	1	0	2	1	1	
2nd Street	12, 18	441	E 2nd St @ Renown	32	1	1	1	1	1	0	
2nd Street	12, 18	442	E 2nd St & Gould St	36	0	1	1	2	1	0	
2nd Street	12, 18	481	E 2nd St & Giroux St	39	1	1	1	1	1	0	
2nd Street	12, 18	742	E 2nd St & Golden Ln	26	0	1	0	2	1	1	
2nd Street	12, 18	745	Glendale & Galletti	70*	0	0	1	2	2	0	
2nd Street	12, 18	777	Glendale & Galletti	70*	1	2	1	1	0	0	
2nd Street	12, 18	778	E 2nd St & Colony Rd	23	0	1	1	2	1	0	
2nd Street	12, 18	1079	E 2nd St @ Walmart	488	1	3	1	1	0	0	
2nd Street	12, 18	1254	E 2nd St & Park St	50	0	1	1	2	1	0	
2nd Street	12, 18	1758	Glendale/Grand Sierra Resort	70*	0	0	1	2	2	0	
2nd Street	12, 18	2000	E 2nd St @ Grand Sierra Resort	199	0	1	0	2	1	1	
Keystone to Galletti				Average Ridership/Proposed Stop				70	31	19	6
Kuenzli St	12, 18	1380	Kuenzli St & Kirman Ave	30	0	1	1	2	1	0	
Kuenzli St	12, 18	483	Kuenzli St & Manuel St	7	0	1	0	0	0	0	
Kuenzli St	12, 18	485	Kuenzli St & Locust St	58	0	1	1	2	1	0	
Kuenzli St	12, 18	486	Kuenzli St & High St	60	0	1	1	2	1	0	
Kuenzli St	12, 18	482	Giroux St & Kuenzli St	11	0	1	0	1	0	1	
2nd to Giroux				Average Ridership/Proposed Stop				33	7	3	1
Arlington Ave	6	1435	N Arlington Ave & W 2nd St	34	0	1	0	2	1	1	
Arlington Ave	6	1436	N Arlington Ave & Island Ave	17	0	1	0	1	0	1	
Arlington Ave	6	1490	Arlington Ave @ Wingfield Park	17	0	1	1	1	0	0	
Arlington Ave	6	1491	N Arlington Ave & W 2nd ST (NS)	0	0	0	0	0	0	0	
Arlington Ave	6, 16	1582	N Arlington Ave & W 4th St	73	0	1	1	2	1	0	
Arlington Ave	6, 16	1680	N Arlington Ave & W 2nd St (FS)	40	0	1	0	2	1	1	
Court to W 6th				Average Ridership/Proposed Stop				30	8	3	3
*Ridership was estimated using the average of the surrounding stops					Study Totals:			46	25	10	



729

	Shelter	Bench	Trashcan
Existing	0	1	0
Proposed	2	1	1

Ridership: 25
Comment: None

708

	Shelter	Bench	Trashcan
Existing	0	1	0
Proposed	2	1	1

Ridership: 25
Comment: None

707

	Shelter	Bench	Trashcan
Existing	0	0	0
Proposed	2	2	1

Ridership: 38
Comment: Sufficient width for bench.

730

	Shelter	Bench	Trashcan
Existing	0	1	1
Proposed	2	1	0

Ridership: 22
Comment: consider crosswalk at Stevenson

1435

	Shelter	Bench	Trashcan
Existing	0	1	0
Proposed	2	1	1

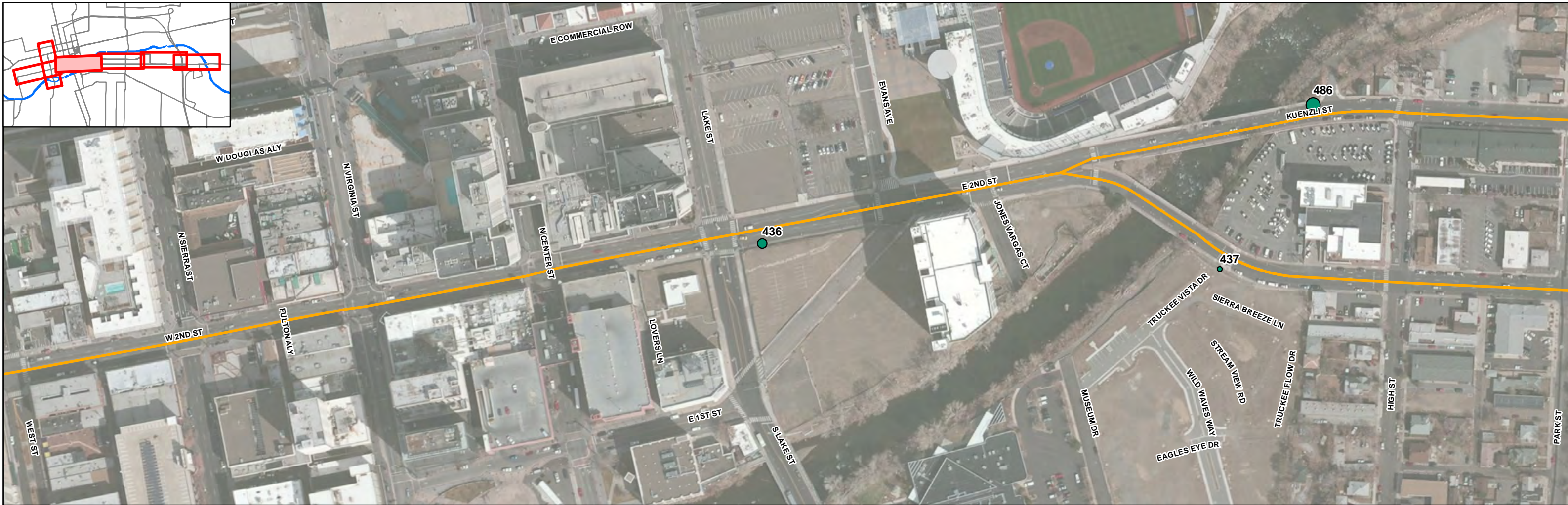
Ridership: 34
Comment: None

	Shelter	Bench	Trashcan
Existing	0	1	1
Proposed	0	0	0

Ridership: 9
Comment: consider crosswalk to Innovations High School

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community





	Shelter	Bench	Trashcan
Existing	0	1	1
Proposed	2	1	0

	Shelter	Bench	Trashcan
Existing	0	0	0
Proposed	1	1	1

	Shelter	Bench	Trashcan
Existing	0	1	1
Proposed	2	1	0

436
 Ridership: 49
 Comment: Consider shadow parking next space. Parking well utilized.

437
 Ridership: 11
 Comment: No amenities. Stop conflicts with driveway and fire hydrant. Consider relocating to east side of ped crossing and adding amenities.

486
 Ridership: 60
 Comment: Consider extending no parking paint west. Moving stop east closer to High Street crosswalk would be beneficial, however, right of way tight.

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FIGURE 2
Transit Amenity Analysis
 2nd / Arlington NDOT SMP
 July, 2016

Route **RIDERSHIP**

- 7 - 26
- 27 - 50
- 51 - 73
- 74 - 199
- 200 - 488

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Stop ID	Shelter	Bench	Trashcan
1254	Existing: 0, Proposed: 2	Existing: 1, Proposed: 1	Existing: 1, Proposed: 0
439	Existing: 0, Proposed: 2	Existing: 1, Proposed: 1	Existing: 1, Proposed: 0
485	Existing: 0, Proposed: 2	Existing: 1, Proposed: 1	Existing: 1, Proposed: 0
1574	Existing: 0, Proposed: 2	Existing: 0, Proposed: 2	Existing: 0, Proposed: 1
1380	Existing: 0, Proposed: 2	Existing: 1, Proposed: 1	Existing: 1, Proposed: 0
440	Existing: 0, Proposed: 2	Existing: 1, Proposed: 1	Existing: 0, Proposed: 1
441	Existing: 1, Proposed: 1	Existing: 1, Proposed: 1	Existing: 1, Proposed: 0
483	Existing: 0, Proposed: 0	Existing: 1, Proposed: 0	Existing: 0, Proposed: 0

<p>Ridership: 50 Comment: Consider shadow parking adjacent space. Parking not highly utilized.</p>	<p>Ridership: 46 Comment: Conflicts with driveway.</p>	<p>Ridership: 58 Comment: Consider shelter due to ample right of way.</p>	<p>Ridership: 36 Comment: Consider adding amenities in landscape area.</p>	<p>Ridership: 30 Comment: Consider improved crossing to service Renown westbound traffic.</p>	<p>Ridership: 22 Comment: Narrow sidewalk. Consider moving bench into landscape area. Bench hard to see due to tree shadow.</p>	<p>Ridership: 32 Comment: Shelter hard to see due to shading from garage.</p>	<p>Ridership: 7 Comment: None</p>
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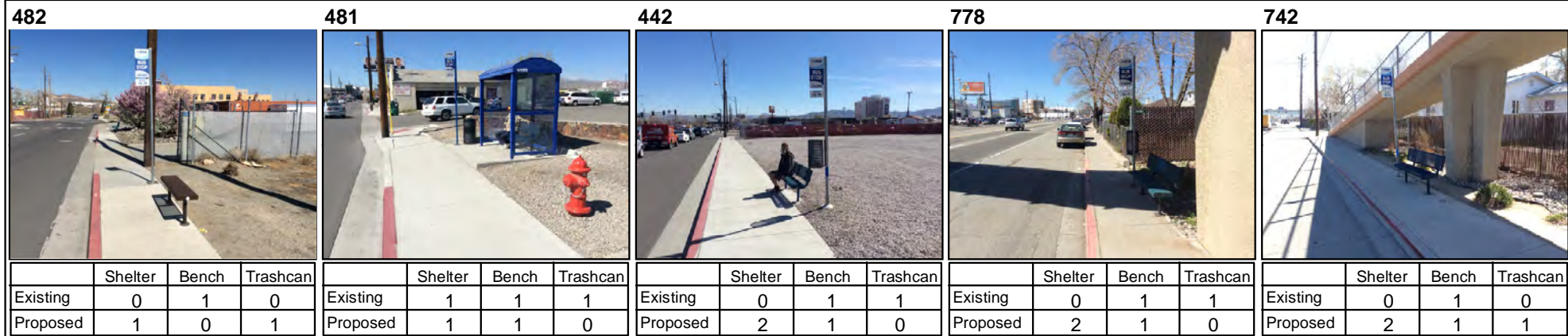
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 3
Transit Amenity Analysis
 2nd / Arlington NDOT SMP
 July, 2016

Route **RIDERSHIP**

- 74 - 199
- 7 - 26
- 27 - 50
- 51 - 73

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 Tel: 775.823.4066 Fax: 775.823.4066



	Shelter	Bench	Trashcan		Shelter	Bench	Trashcan		Shelter	Bench	Trashcan		Shelter	Bench	Trashcan
Existing	0	1	0	482	1	1	1	481	0	1	1	442	0	1	1
Proposed	1	0	1	481	1	1	0	442	2	1	0	778	2	1	0
				442				778				778			
				778				742				742			
				742											

482 Ridership: 11
 Comment: None

481 Ridership: 39
 Comment: Conflicts with accel lane and hydrant.

442 Ridership: 36
 Comment: Location conflicts with southbound Kietzke Lane right turn storage. Also appears to encourage illegal ped crossing of 2nd Street. Consider moving west of Gould Street and adding crosswalk as part of complete streets improvements.

778 Ridership: 23
 Comment: Consider extending no parking paint to west.

742 Ridership: 26
 Comment: None

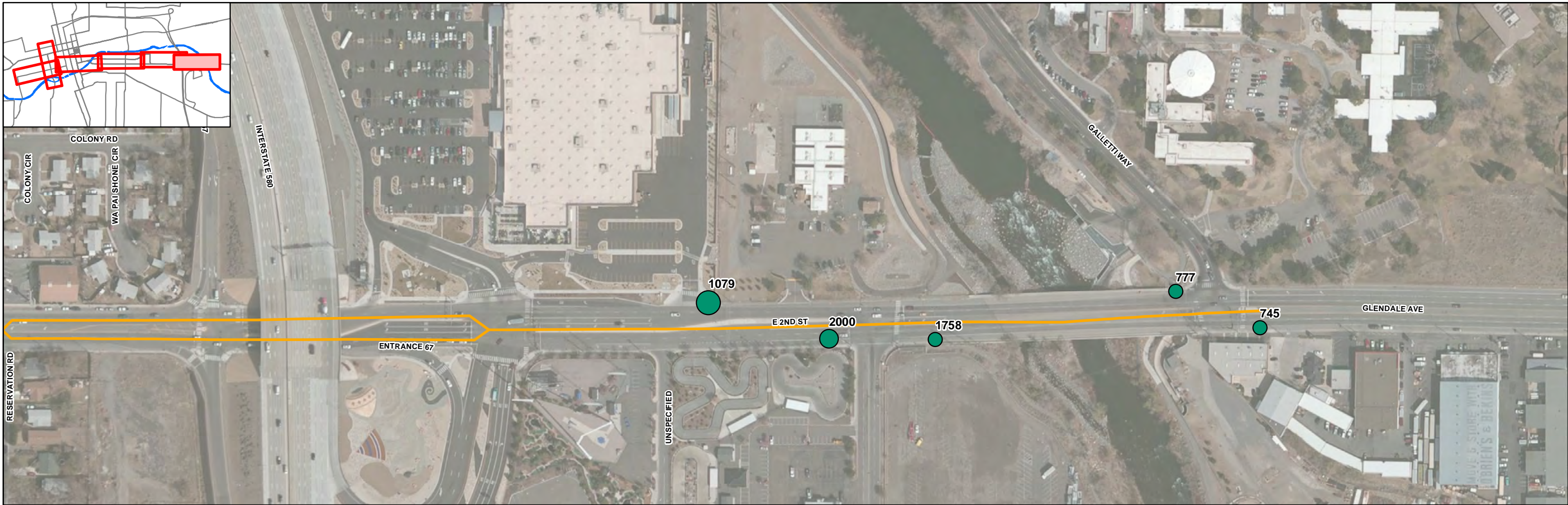
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 4
Transit Amenity Analysis
 2nd / Arlington NDOT SMP
 July, 2016

Route **RIDERSHIP**

- 7 - 26
- 27 - 50
- 51 - 73
- 74 - 199
- 200 - 488

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Stop ID	Shelter	Bench	Trashcan
1079	Existing: 1	Existing: 3	Existing: 1
2000	Existing: 0	Existing: 1	Existing: 0
1758	Existing: 0	Existing: 0	Existing: 1
777	Existing: 1	Existing: 2	Existing: 1
745	Existing: 0	Existing: 0	Existing: 1
1079	Proposed: 1	Proposed: 0	Proposed: 0
2000	Proposed: 2	Proposed: 1	Proposed: 1
1758	Proposed: 2	Proposed: 2	Proposed: 0
777	Proposed: 1	Proposed: 0	Proposed: 0
745	Proposed: 2	Proposed: 2	Proposed: 0

Ridership: 488
 Comment: Conflicts with driveway and fire hydrant. Heavy use. Illegal ped crossings to/from Walmart are common.

Ridership: 199
 Comment: None

Ridership: 70
 Comment: Heavy use. Conflicts with Truckee River trail. Narrow and poor sidewalk. No amenities.

Ridership: 70
 Comment: None

Ridership: 70
 Comment: None

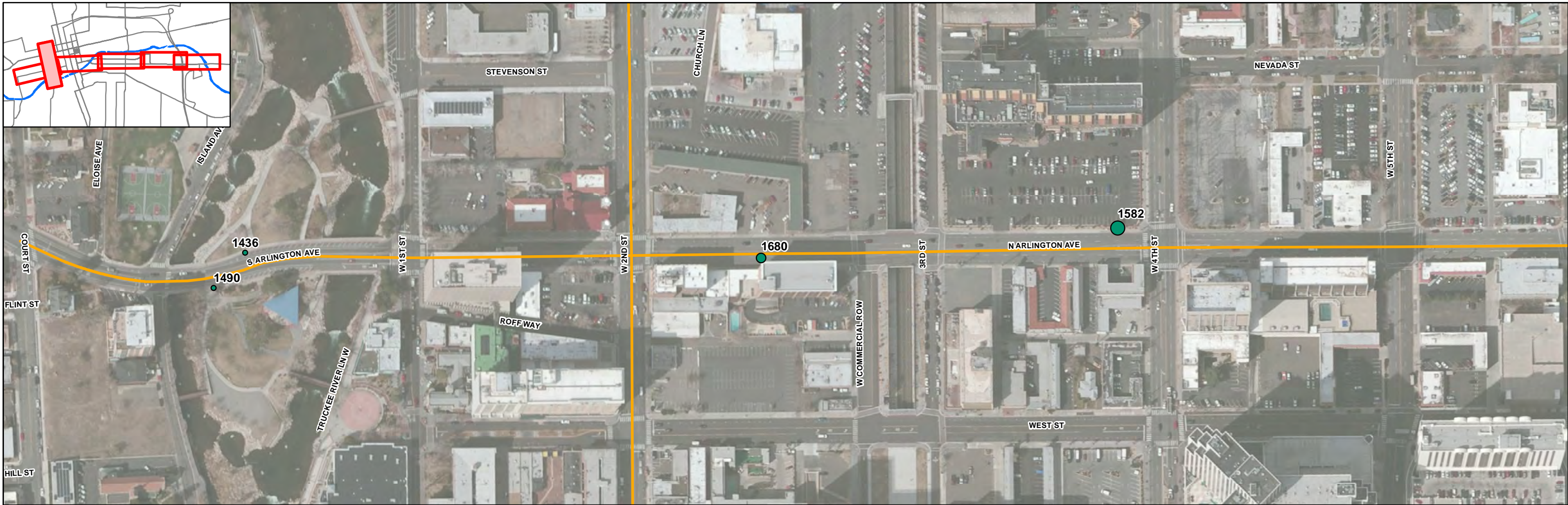
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 5
Transit Amenity Analysis
 2nd / Arlington NDOT SMP
 July, 2016

Route **RIDERSHIP**

- 74 - 199
- 7 - 26
- 27 - 50
- 51 - 73

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Stop ID	Shelter	Bench	Trashcan
1490	Existing: 0	Existing: 1	Existing: 1
1436	Existing: 0	Existing: 1	Existing: 0
1680	Existing: 0	Existing: 1	Existing: 0
1582	Existing: 0	Existing: 1	Existing: 1
	Proposed: 1	Proposed: 0	Proposed: 0
	Proposed: 1	Proposed: 0	Proposed: 1
	Proposed: 2	Proposed: 1	Proposed: 1
	Proposed: 2	Proposed: 1	Proposed: 0

1490
Ridership: 17
Comment: None

1436
Ridership: 17
Comment: None

1680
Ridership: 40
Comment: None

1582
Ridership: 73
Comment: Shadow park one additional space. On street parking underutilized.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

FIGURE 6
Transit Amenity Analysis
2nd / Arlington NDOT SMP
July, 2016

Route **RIDERSHIP**

- 7 - 26
- 27 - 50
- 51 - 73
- 74 - 199
- 200 - 488

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Appendix H – Outreach Materials



Safety Management Plan

2nd Street and Arlington Avenue

Technical Advisory Committee Meeting #1



Agenda

- Introductions
- What is a SMP???
- Corridor Overview
- Other Area Projects & Plans
- Crash Data Analysis
- Sample Recommendations
- Summary of RSA Recommendations
- Study Process & Outreach
- Adjourn

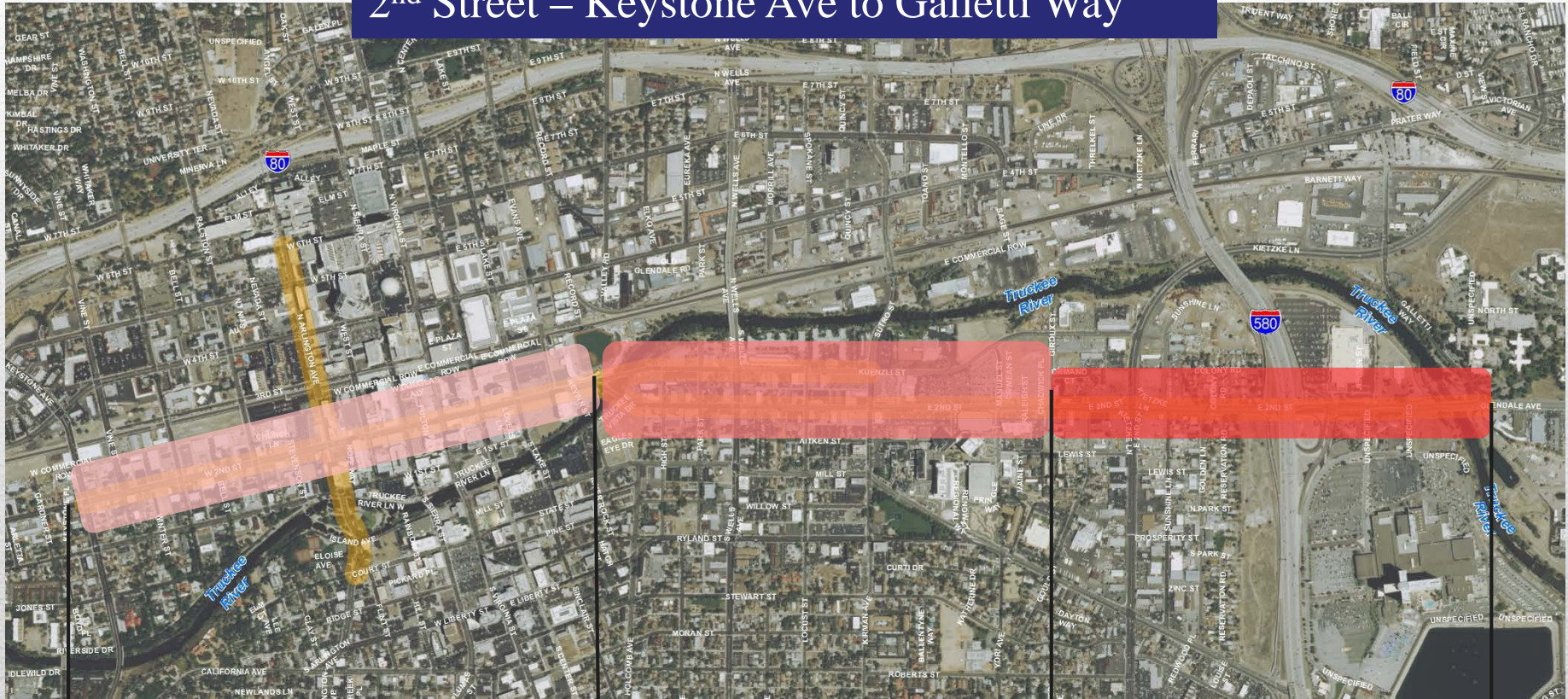
What is a SMP??

- Corridor study focused on safety over traffic operations / capacity analysis
- Incorporates Highway Safety Manual methodologies
 - Calculate estimated crash reduction
 - Tools such as the IHSDM
 - Prioritization based on crash reduction
- SMP \neq RSA
- Final product is a planning document



Corridor Overview

2nd Street – Keystone Ave to Galletti Way



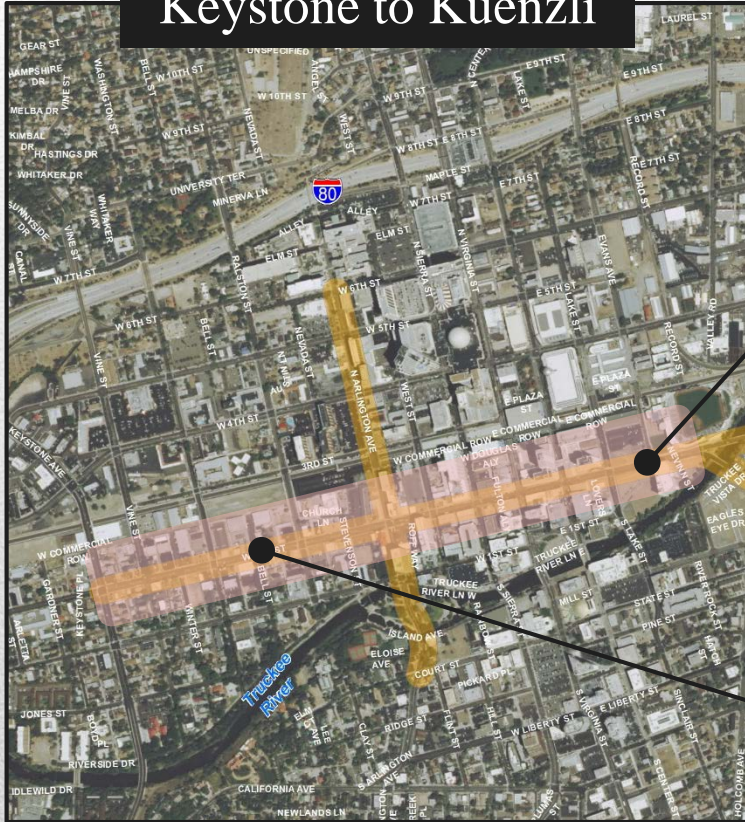
Downtown Reno Core

Couplet System

Kietzke / I-580 Area

Downtown Reno Core

Keystone to Kuenzli



6300 AADT



4800 AADT

Couplet System

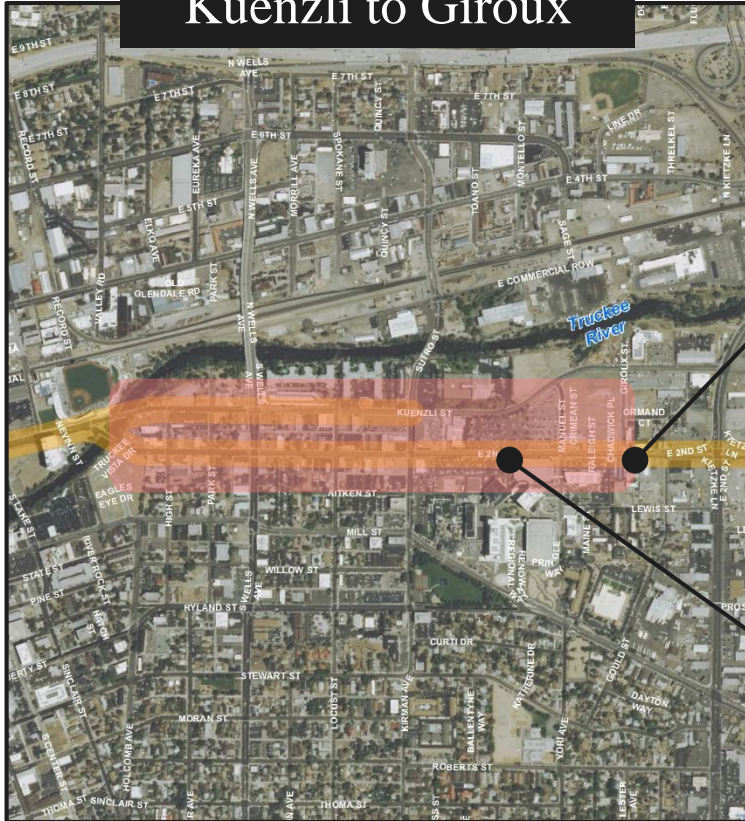
Kuenzli to Giroux



3200 AADT

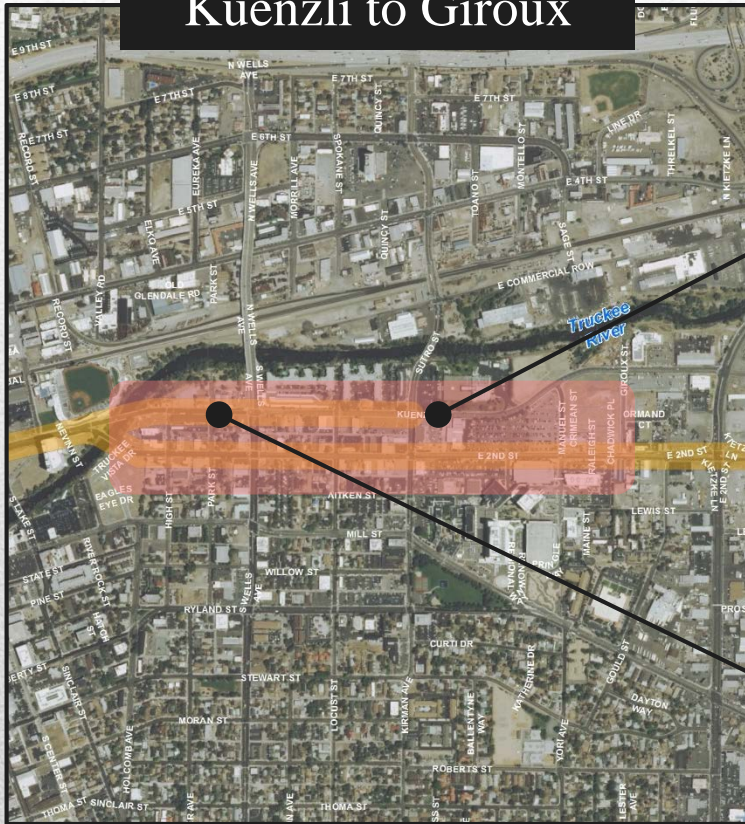
Couplet System

Kuenzli to Giroux



Couplet System

Kuenzli to Giroux



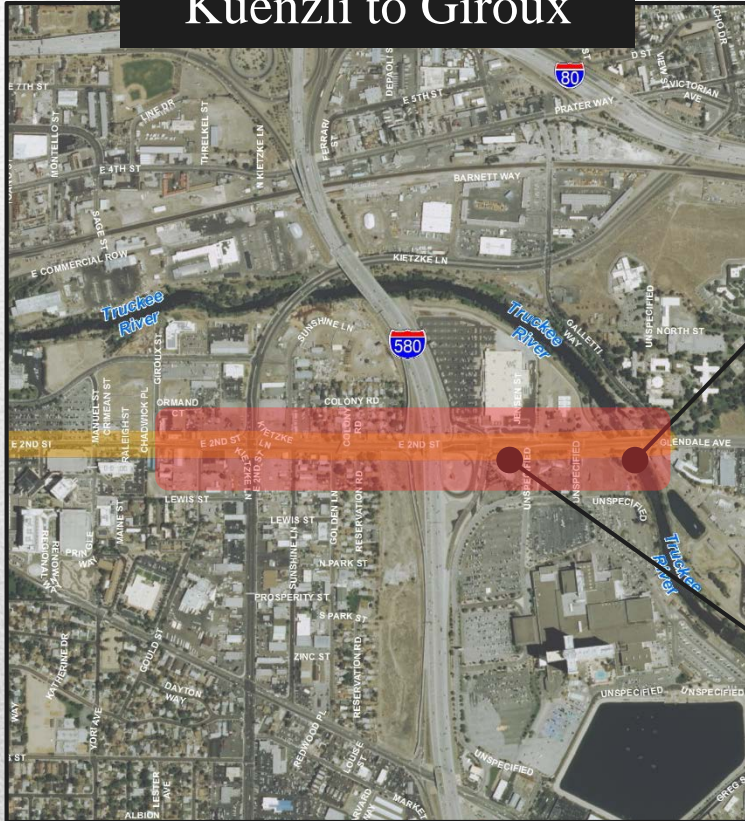
2600 AADT



4100 AADT

Kietzke/I-580 Area

Kuenzli to Giroux

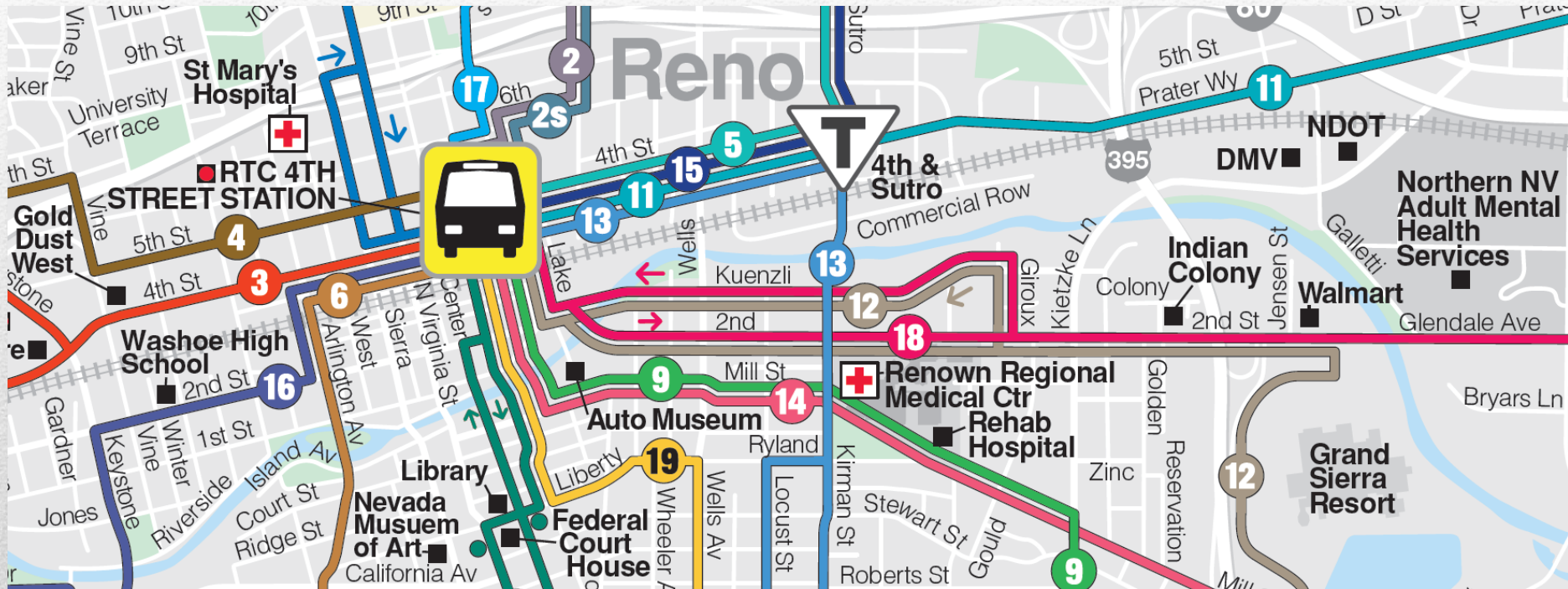


14000 AADT



17000 AADT

Transit System

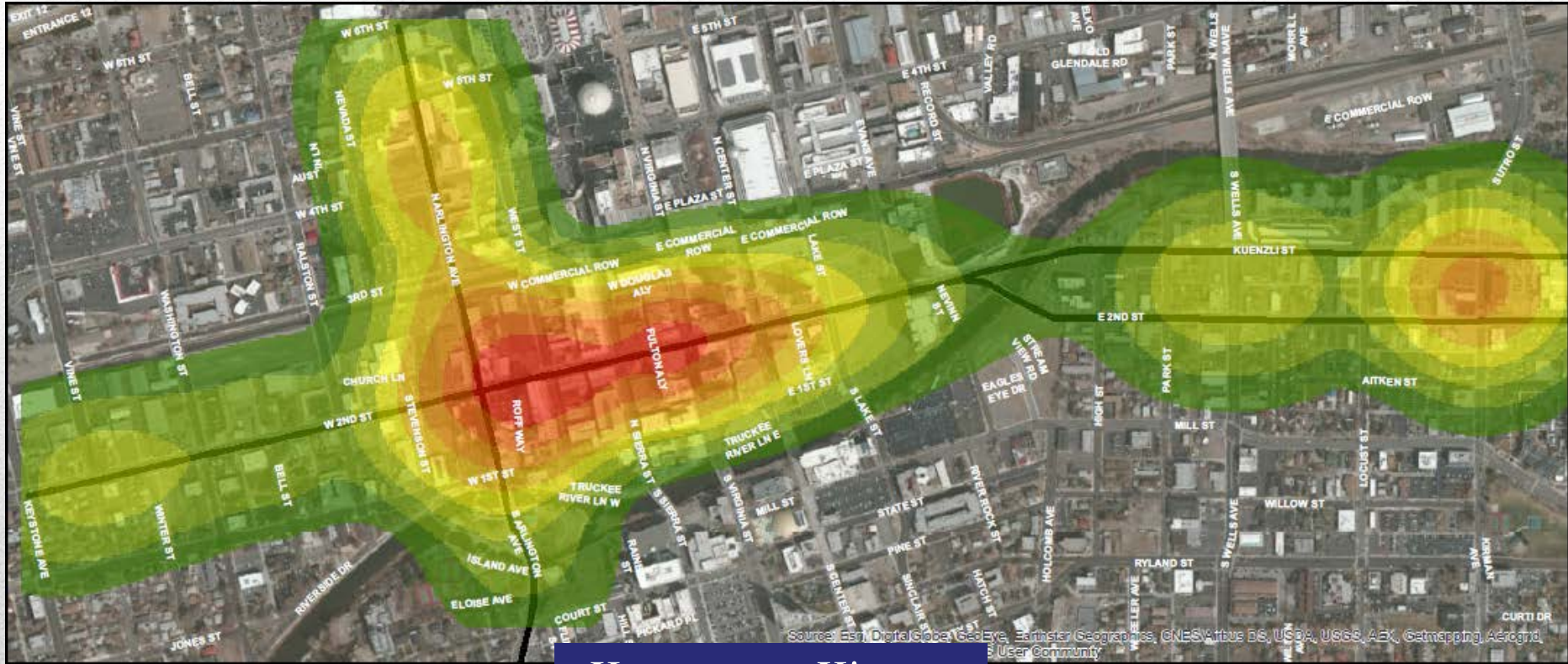


Other Area Project and Plans

- Kietzke Lane SMP
- Keystone Ave Corridor Study
- Glendale Improvement Project
- City of Reno Masterplan Update
- Oddie Blvd/Wells Ave Corridor Study
- Regional Transportation Plan
- Reno-Sparks Bike/Ped Plan
- Others???

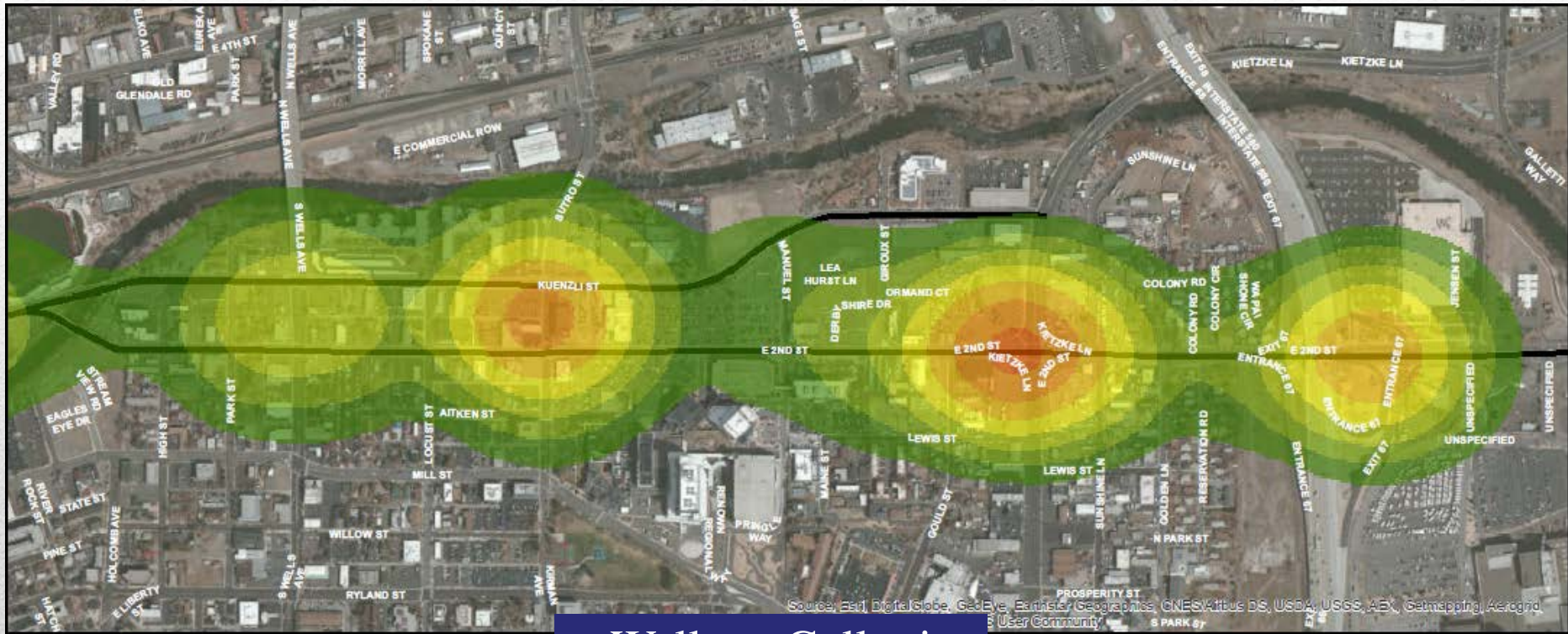


Crash Data Analysis



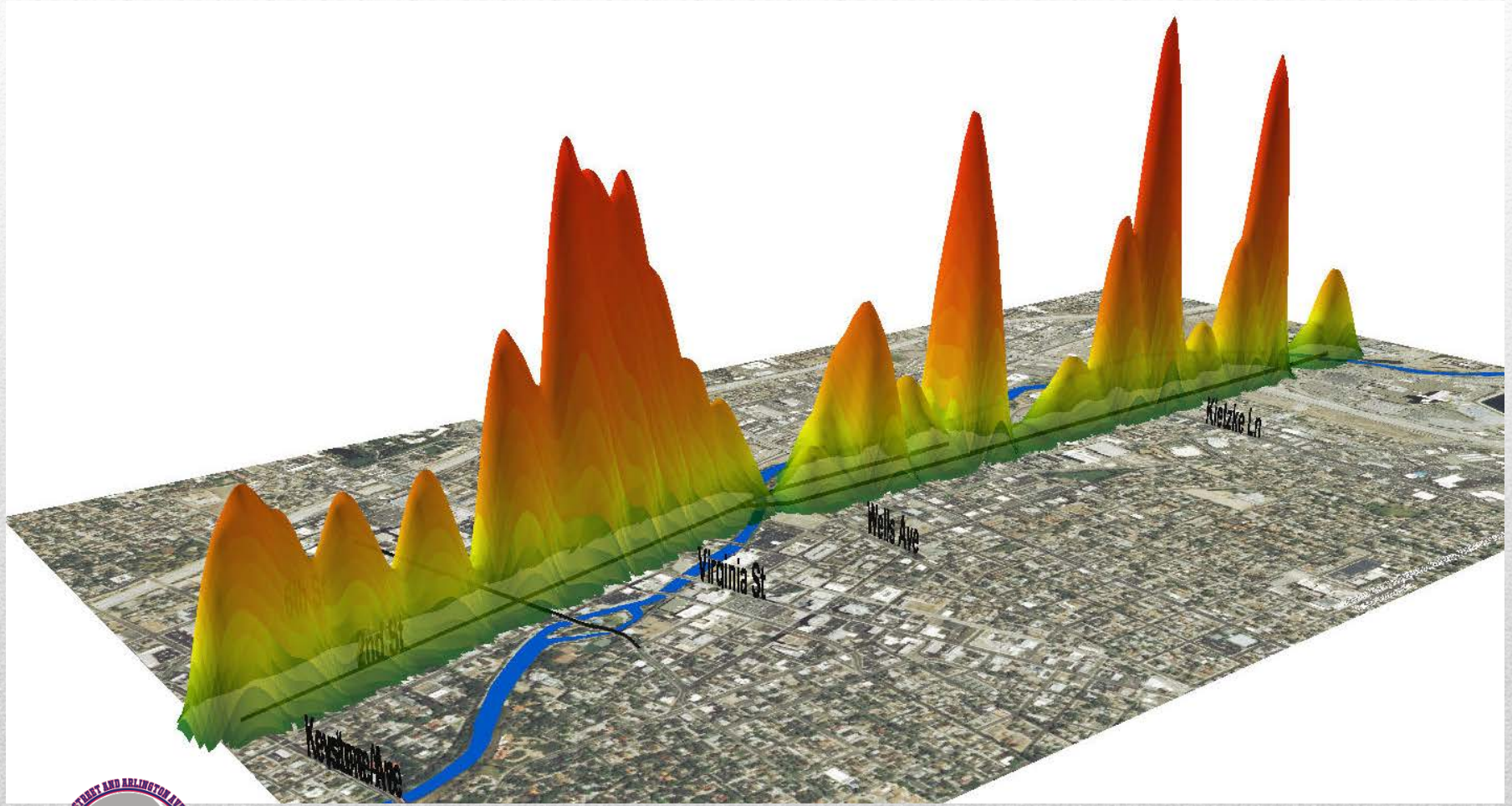
Keystone to Kirman

Crash Data Analysis

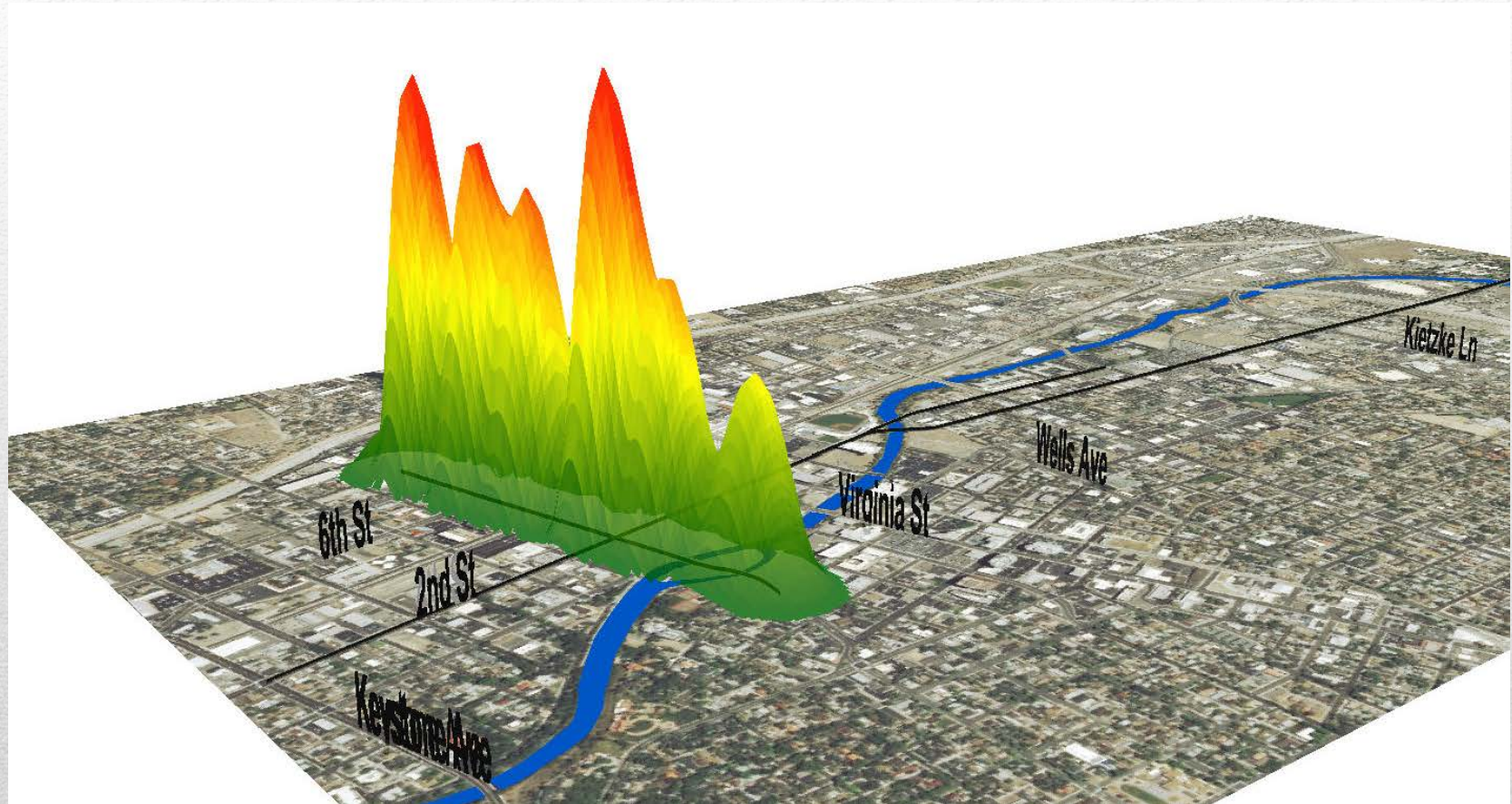


Wells to Galletti

Crash Data Analysis



Crash Data Analysis



Crash Data Analysis

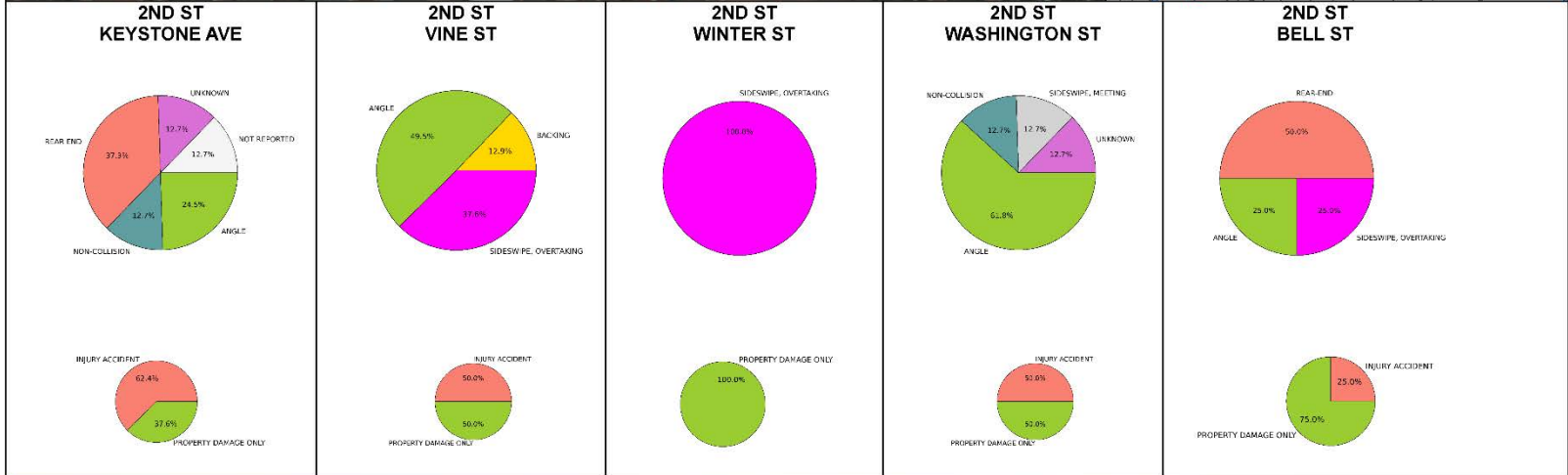


FIGURE 1
2nd. St. / Kuenzli St. / Arlington Ave.
Reno, NV
May, 2015

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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8440 Reno Corporate Drive Tel: 775.825.4088
Reno, NV 89511 Fax: 775.825.4088

Sample Recommendations

- Improved pedestrian crossings
- Roadway lane reductions
- Dedicated turn lanes
- Intersection improvements / roundabouts
- Parking & access management
- Operational improvements
- Speed reduction techniques
- Complete streets / multi-modal integration
- Transit stop and amenity improvements

Summary of RSA Recommendations

2nd St. & Kuenzli St.:

- Signal timing and ped clearance interval
- Conduct lighting study for unlit locations
- Consider road diets and bike lanes
- Bulb-outs for parking locations
- Update to latest PROWAG standards
- Power pole relocations / undergrounding
- Center signal heads over lanes
- Install speed feedback sign on Wells Ave / 2nd St



Summary of RSA Recommendations

2nd St. & Kuenzli St. cont.:

- Consider roundabout at 2nd St and Kietzke Ln
- Raised median between Kietzke Ln and US 395 SB
- RRFB at existing pedestrian overpass location
- ADA improvements to pedestrian overpass
- Install sidewalks at existing gap locations
- Move the EB bus stop near Wal-Mart
- Install median island ped fencing



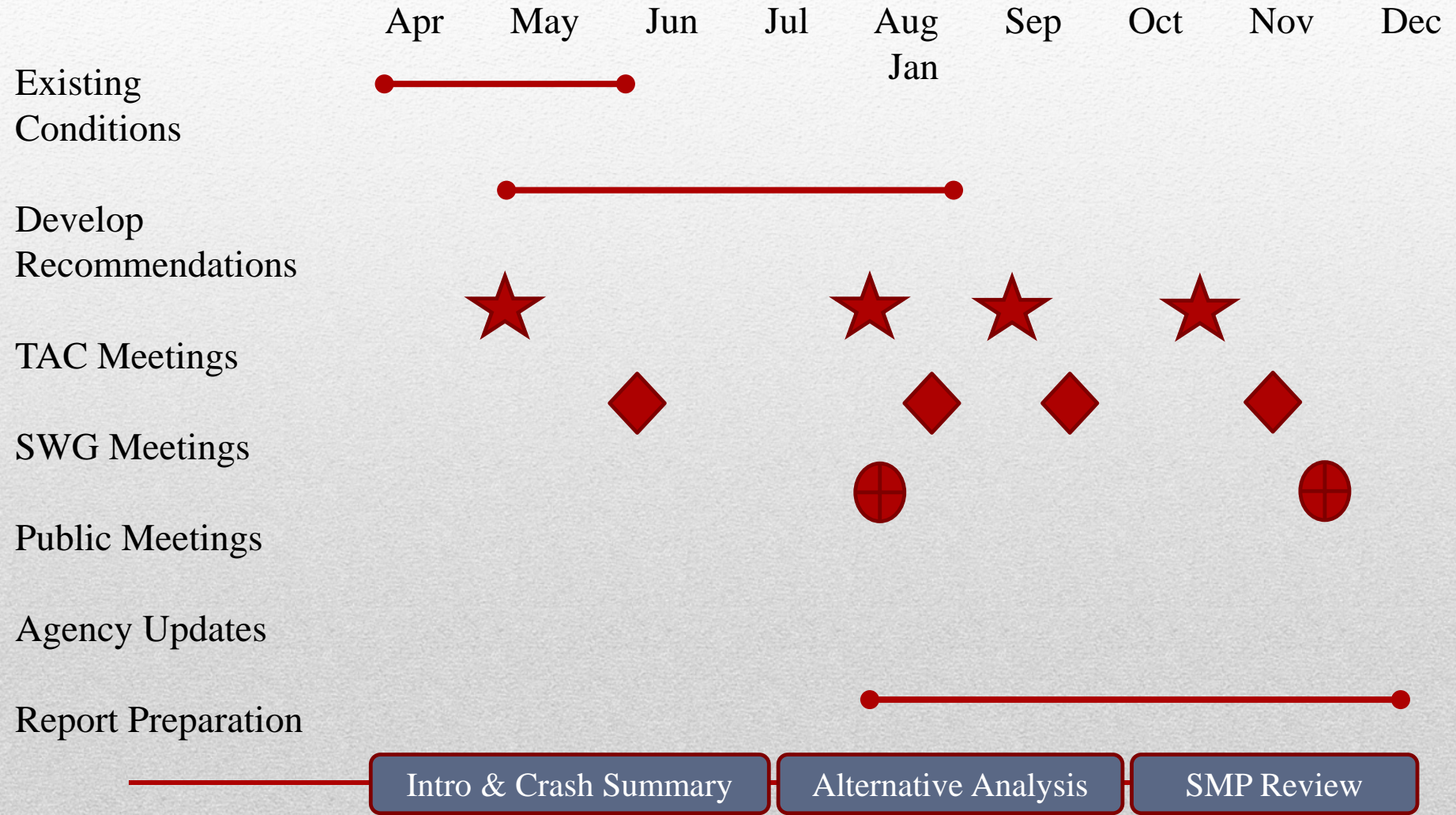
Summary of RSA Recommendations

Arlington Ave:

- Signal timing and ped clearance interval
- Conduct lighting study for unlit locations
- Consider road diets and bike lanes
- Bulb-outs for parking locations
- Update to latest PROWAG standards
- Power pole relocations / undergrounding
- Center signal heads over lanes
- Improve degraded sidewalks
- Change static ped signals to push button



Study Process & Outreach



Stakeholder Working Group

Potential Stakeholder Group Participants

NDOT	Renown Hospital
Downtown Improvement Assoc.	Reno Sparks Indian Colony
Wards 1,3,5 NABs	Reno Gazette Journal
Downtown Makeover	Grand Sierra Resort
Harrah's Reno	Reno Bike Project
Cal Neva Reno	Law Enforcement / Emergency
Reno Aces	Sands Casino

Questions?

Contacts:

Lori Campbell, NDOT

lcampbell@dot.state.nv.us

775-888-7462

Bryan Gant, Wood Rodgers

bgant@woodrodgers.com

775-225-3184



Safety Management Plan

2nd Street and Arlington Avenue

Stakeholder Working Group Meeting #1



Agenda

- Introductions
- What is a SMP???
- Corridor Overview
- Other Area Projects & Plans
- Crash Data Analysis
- Sample Recommendations
- Summary of RSA Recommendations
- Study Process & Outreach
- Adjourn

What is a SMP??

- Transportation corridor study focused on safety over traffic operations / capacity analysis
- Incorporates Highway Safety Manual methodologies
 - Calculate estimated crash reduction
 - Prioritization based on crash reduction
- Final product is a planning document



SMP Goals

Improve Safety Through Overall
Crash Reduction

Better Utilize Existing
Infrastructure Across All Modes

Enhance Livability and the
Users Transportation
Experience

Corridor Overview

2nd Street – Keystone Ave to Galletti Way



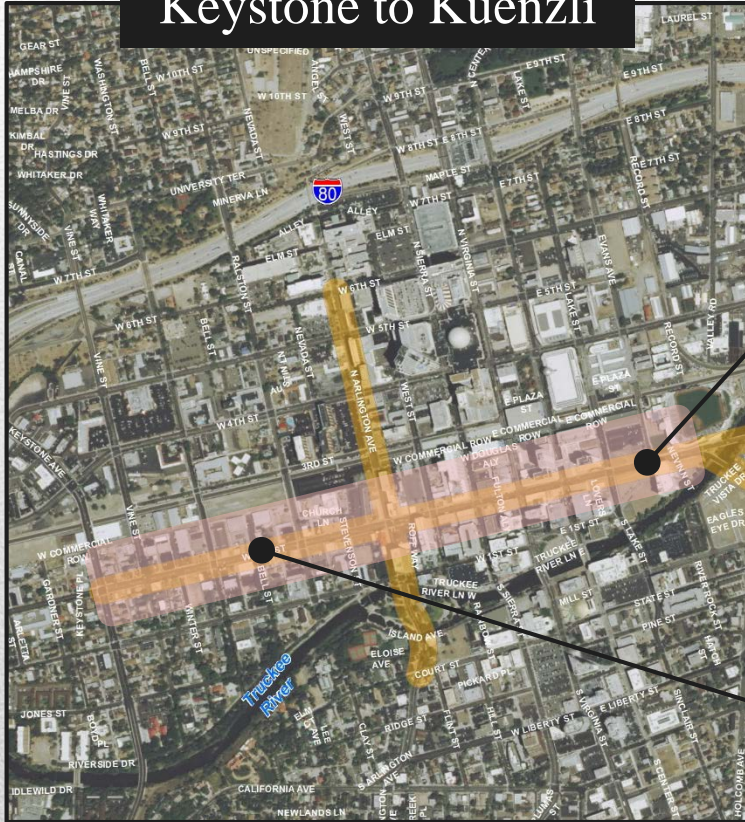
Downtown Reno Core

Couplet System

Kietzke / I-580 Area

Downtown Reno Core

Keystone to Kuenzli



Couplet System

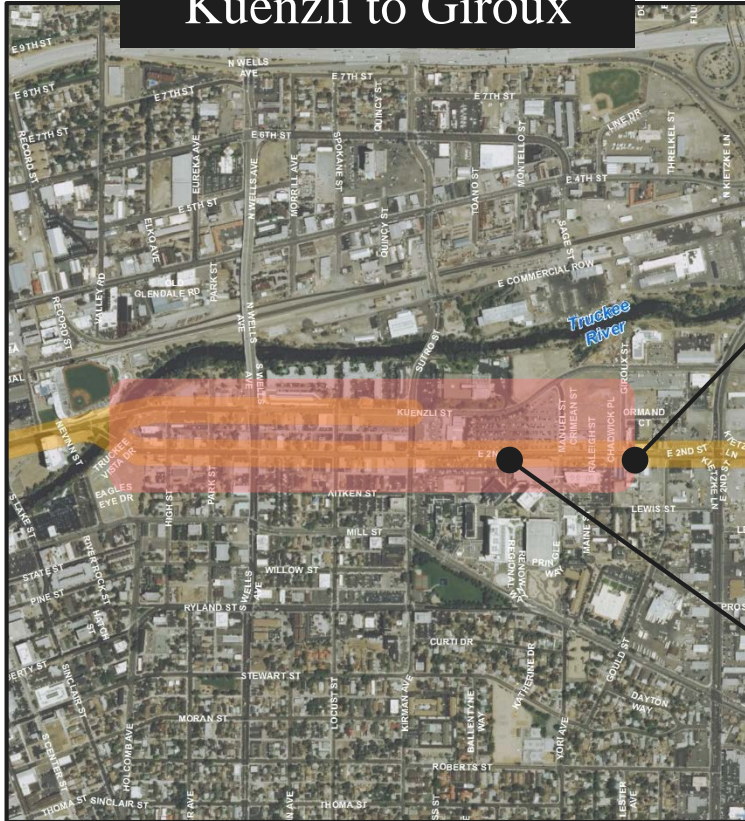
Kuenzli to Giroux



3200 AADT

Couplet System

Kuenzli to Giroux

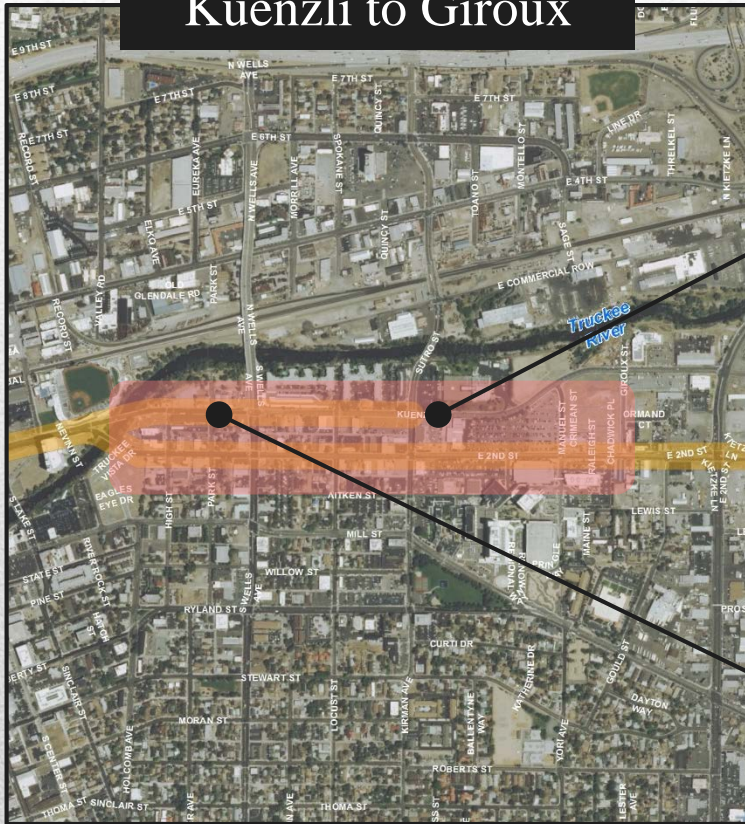


13500 AADT



Couplet System

Kuenzli to Giroux



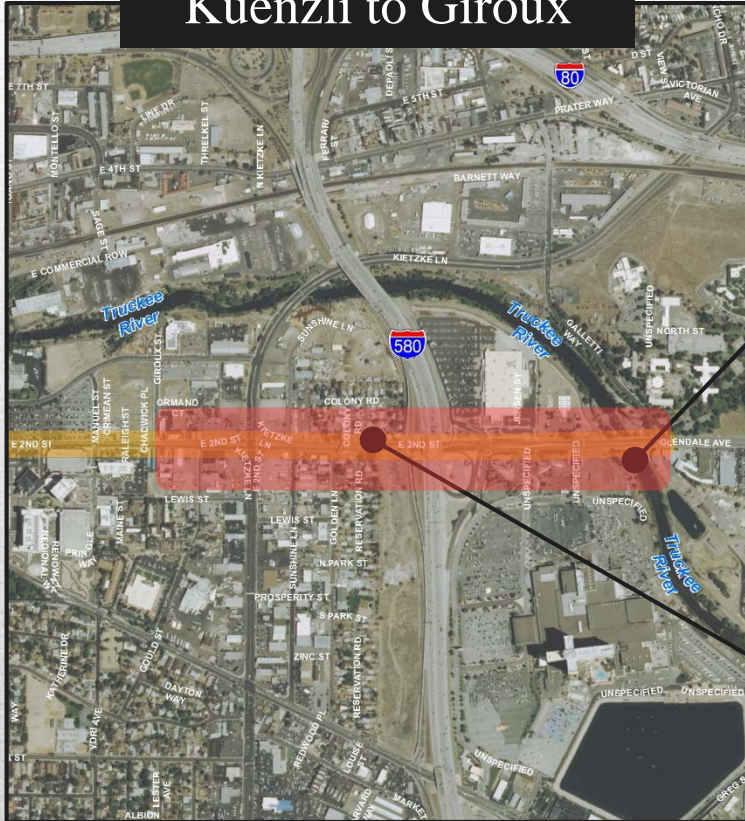
2600 AADT



4100 AADT

Kietzke/I-580 Area

Kuenzli to Giroux

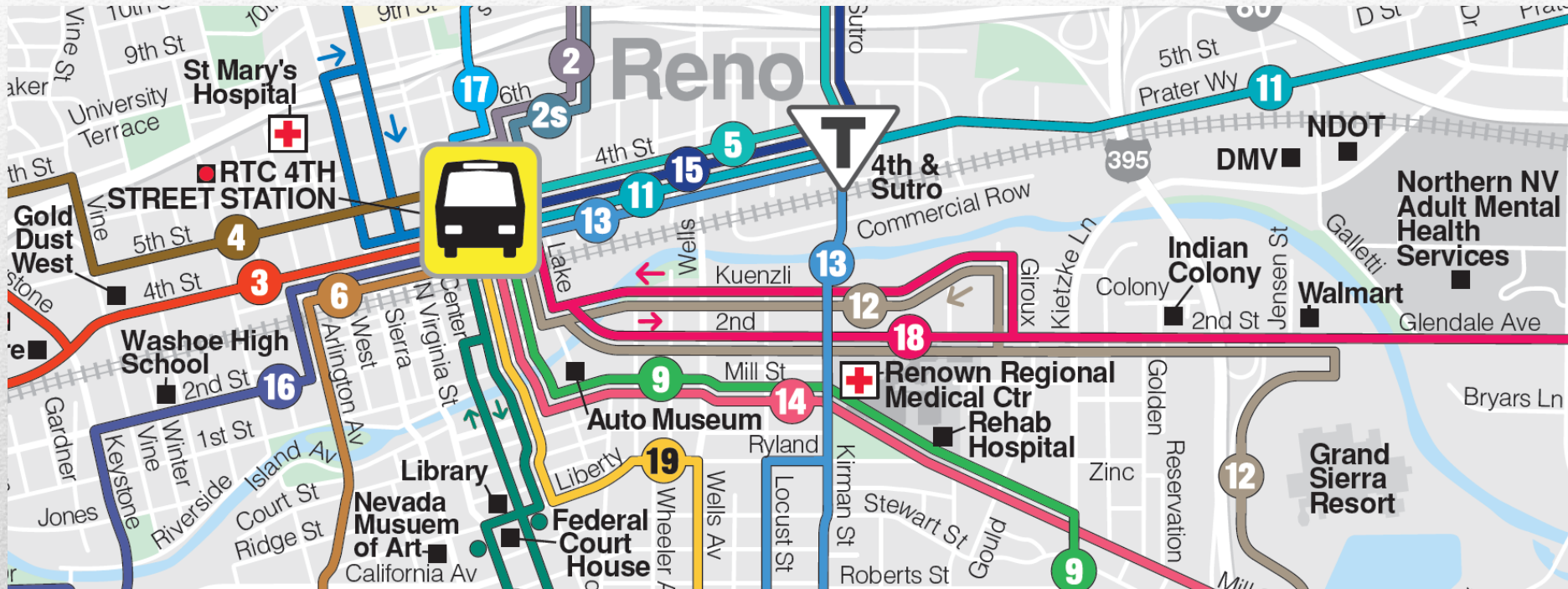


14000 AADT



17000 AADT

Transit System

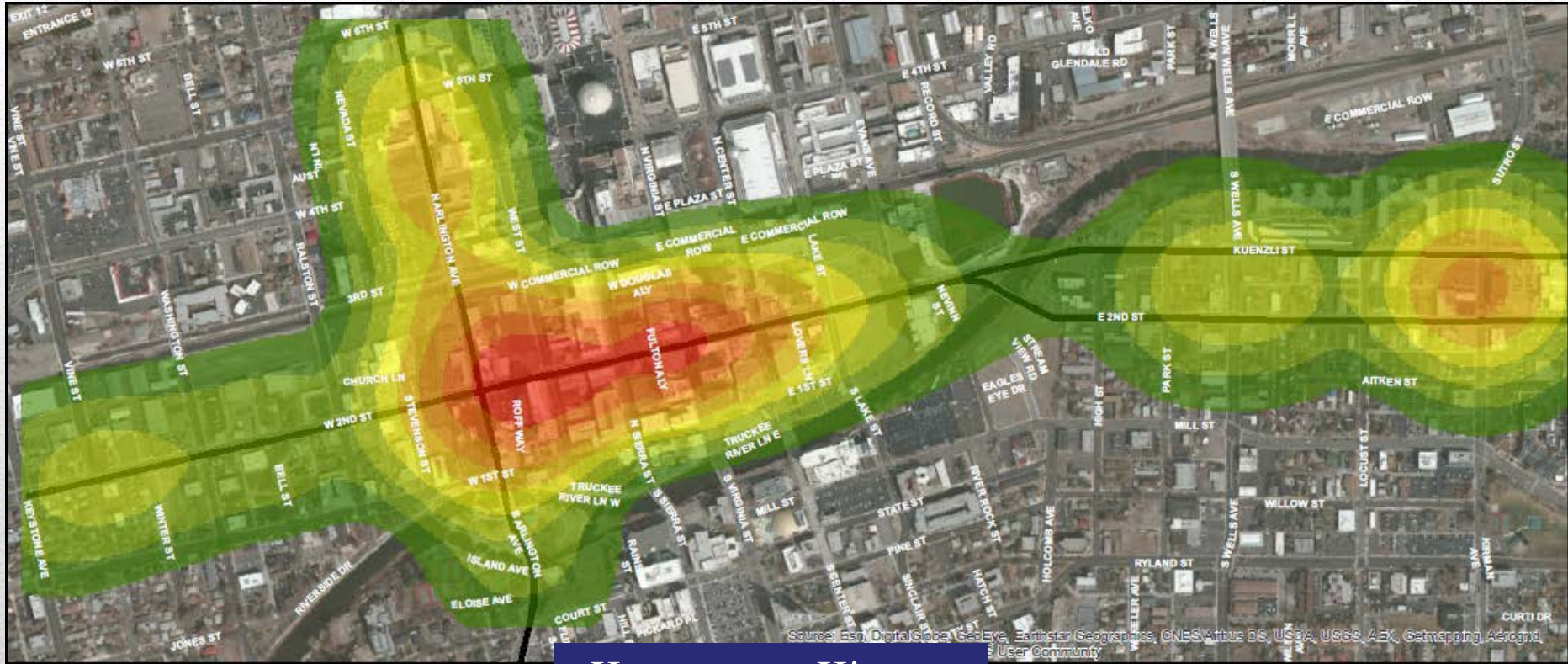


Other Area Project and Plans

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- Glendale Improvement Project
- 4th Street / Prater Way Corridor Study
- City of Reno Masterplan Update
- Oddie Blvd/Wells Ave Corridor Study
- Regional Transportation Plan
- Reno-Sparks Bike/Ped Plan
- Others???



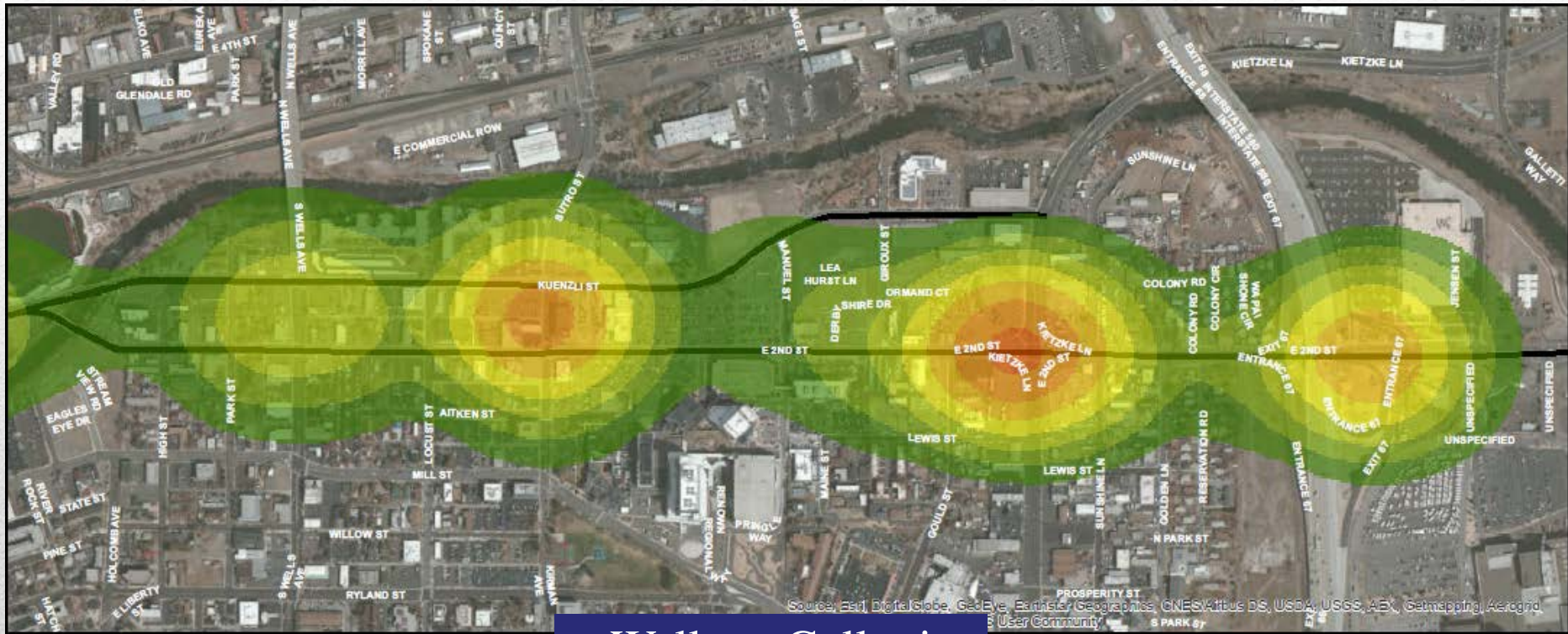
Crash Data Analysis



Keystone to Kirman

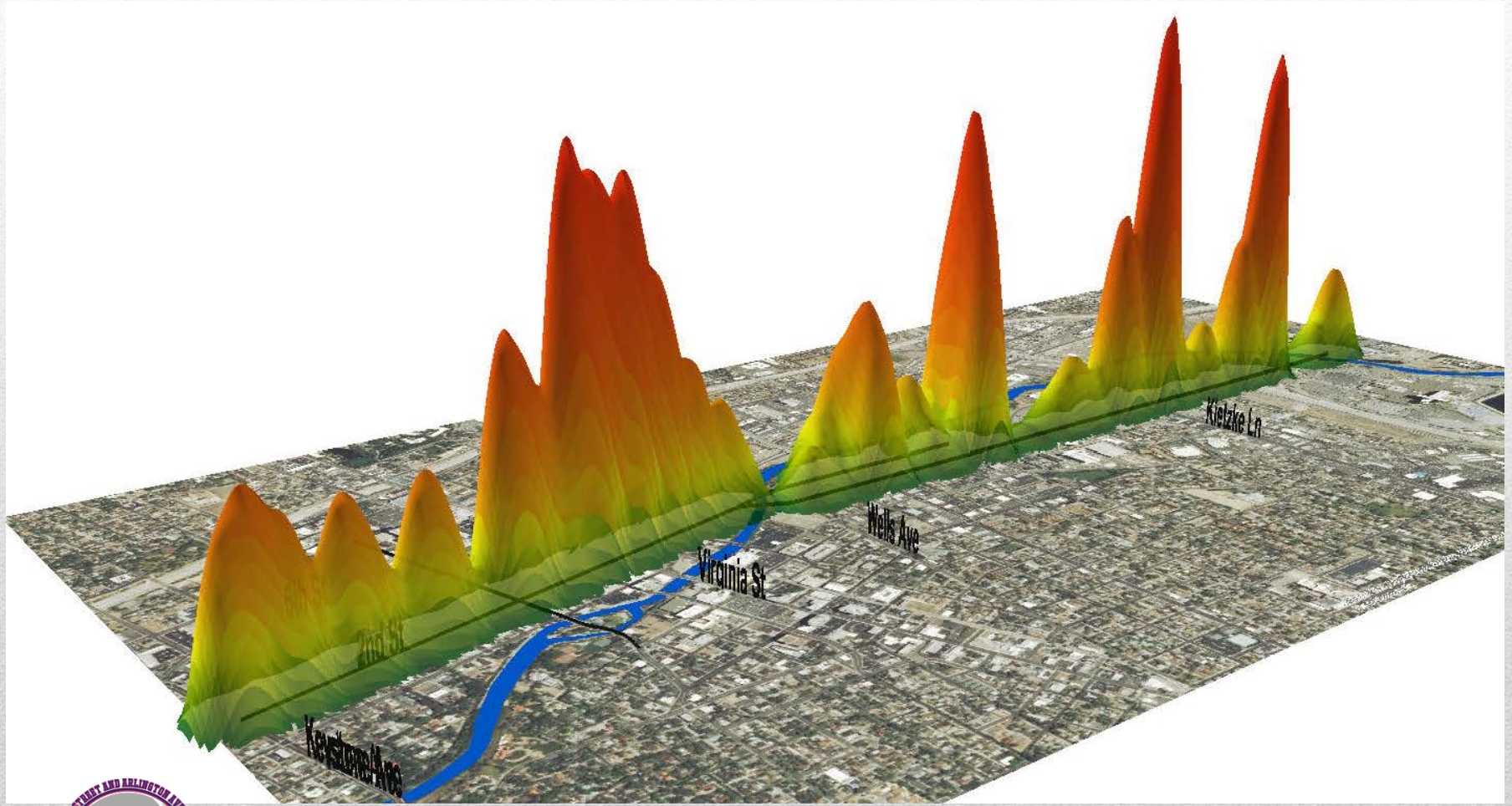
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Getmapping, Aerogrid, User Community

Crash Data Analysis

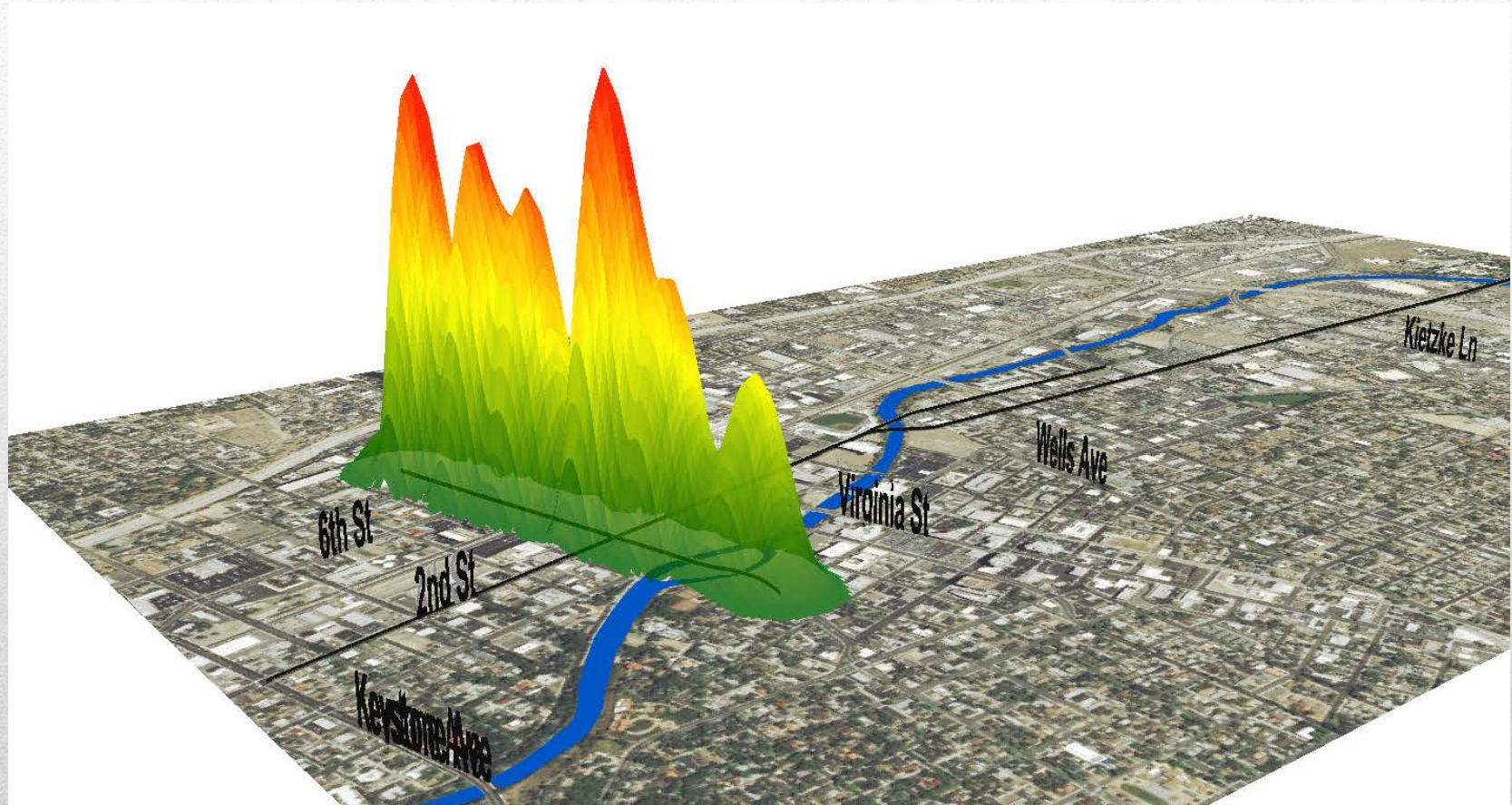


Wells to Galletti

Crash Data Analysis



Crash Data Analysis



Crash Data Analysis

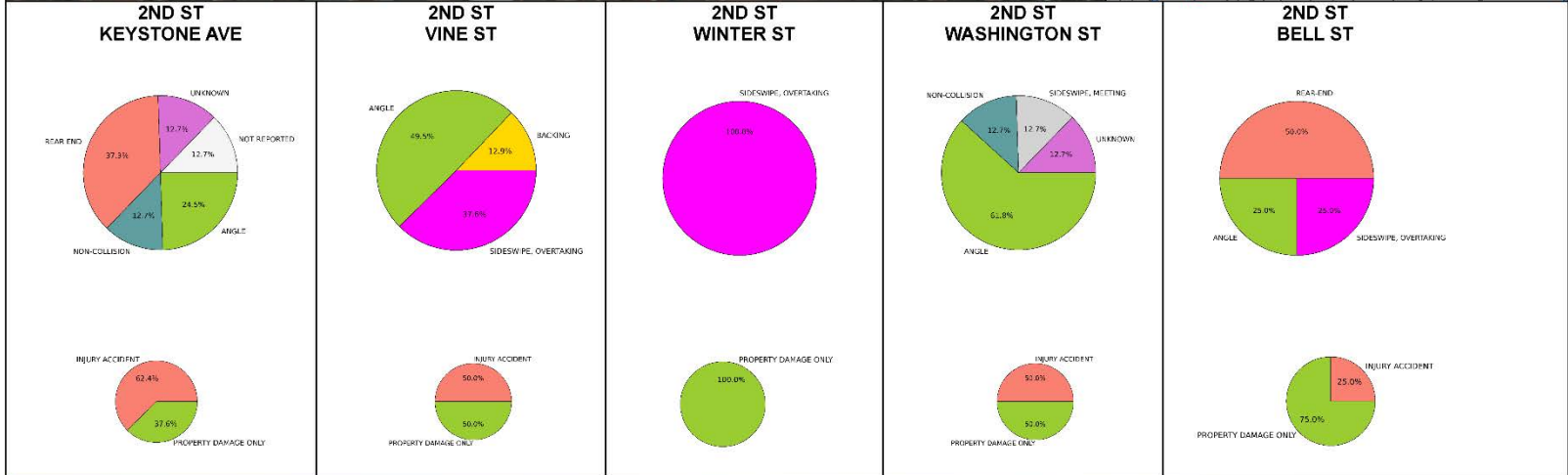


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Reno, NV 89511 Fax: 775.825.4088

Sample Recommendations

- Improved pedestrian crossings
- Roadway lane reductions
- Dedicated turn lanes
- Intersection improvements / roundabouts
- Parking & access management
- Operational improvements
- Speed reduction techniques
- Complete streets / multi-modal integration
- Transit stop and amenity improvements

Summary of RSA Recommendations

2nd St. & Kuenzli St.:

- Signal timing and ped clearance interval
- Conduct lighting study for unlit locations
- Consider road diets and bike lanes
- Bulb-outs for parking locations
- Update to latest PROWAG standards
- Power pole relocations / undergrounding
- Center signal heads over lanes
- Install speed feedback sign on Wells Ave / 2nd St



Summary of RSA Recommendations

2nd St. & Kuenzli St. cont.:

- Consider roundabout at 2nd St and Kietzke Ln
- Raised median between Kietzke Ln and US 395 SB
- RRFB at existing pedestrian overpass location
- ADA improvements to pedestrian overpass
- Install sidewalks at existing gap locations
- Move the EB bus stop near Wal-Mart
- Install median island ped fencing



Summary of RSA Recommendations

Arlington Ave:

- Signal timing and ped clearance interval
- Conduct lighting study for unlit locations
- Consider road diets and bike lanes
- Bulb-outs for parking locations
- Update to latest PROWAG standards
- Power pole relocations / undergrounding
- Center signal heads over lanes
- Improve degraded sidewalks
- Change static ped signals to push button



Study Process & Outreach

Apr May Jun Jul Aug Sep Oct Nov Dec

Existing Conditions



Develop Recommendations



TAC Meetings



SWG Meetings



Public Meetings & Agency Updates



Report Preparation



Intro & Crash Summary

Alternative Analysis

SMP Review

Stakeholder Working Group

Potential Stakeholder Group Participants

NDOT	Renown Hospital
Downtown Improvement Assoc.	Reno Sparks Indian Colony
Wards 1,3,5 NABs	Reno Gazette Journal
Downtown Makeover	Grand Sierra Resort
Harrah's Reno	Reno Bike Project
Cal Neva Reno	Law Enforcement / Emergency
Reno Aces	Sands Casino



Questions?

Lori Campbell, NDOT
lcampbell@dot.state.nv.us
775-888-7462

Bryan Gant, Wood Rodgers
bgant@woodrodgers.com
775-225-3184



Safety Management Plan

2nd Street and Arlington Avenue

Technical Advisory Committee Meeting #2



Agenda

- Introductions
- Refresher / Update
- Alternative Package Review
- Alternative Package Comparison
- Corridor Spot Improvements
- Study Next Steps
- Adjourn

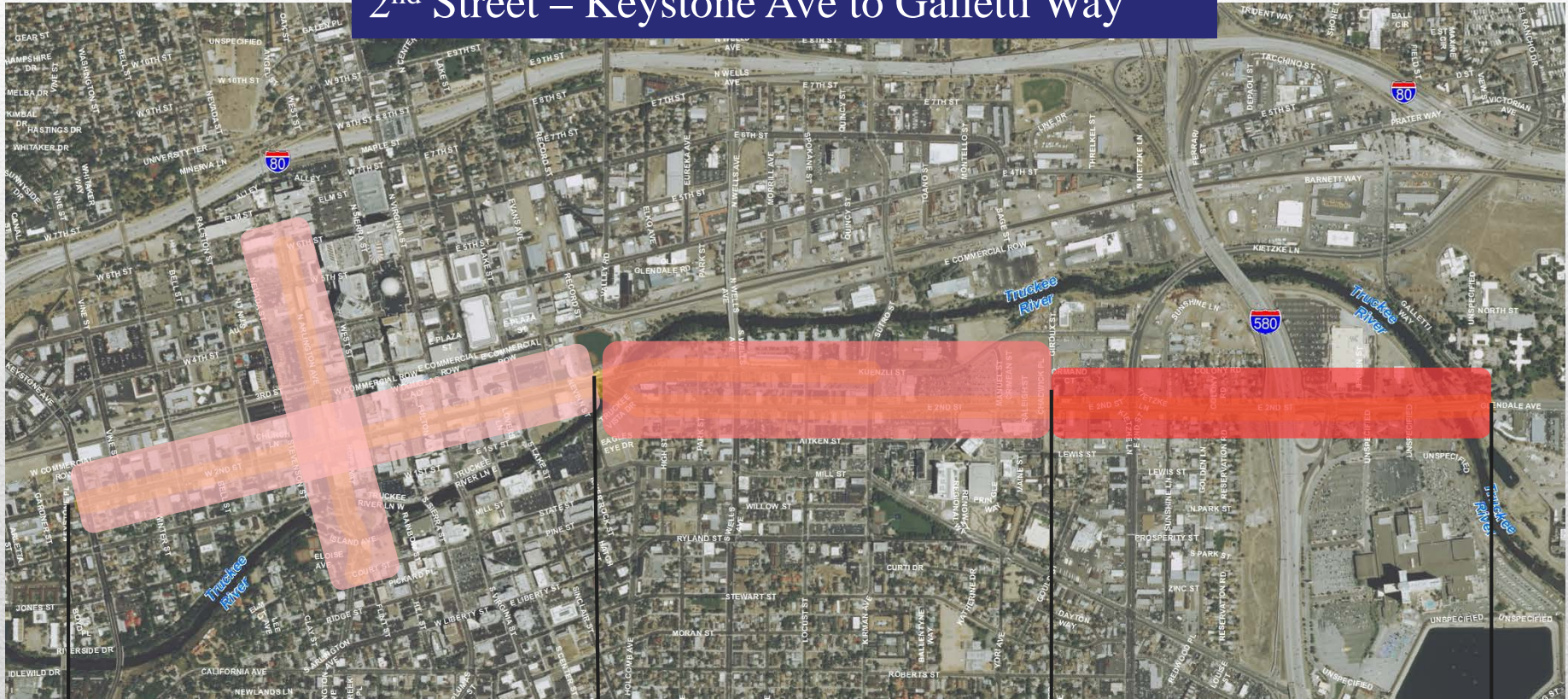
What is a SMP??

- Corridor study focused on safety over traffic operations / capacity analysis
- Incorporates Highway Safety Manual methodologies
 - Calculate estimated crash reduction
 - Tools such as the IHSDM
 - Prioritization based on crash reduction
- Final product is a planning document



Corridor Overview

2nd Street – Keystone Ave to Galletti Way

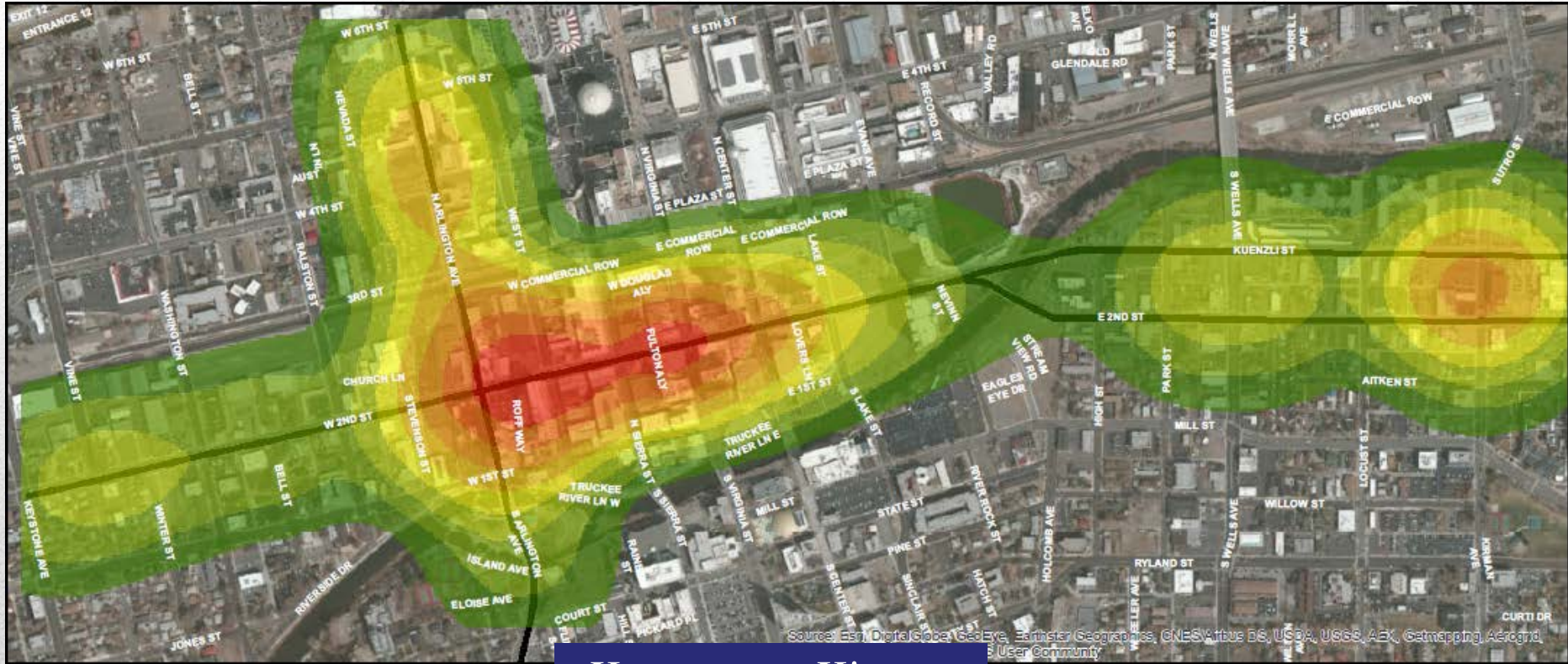


Downtown Reno Core

Couplet System

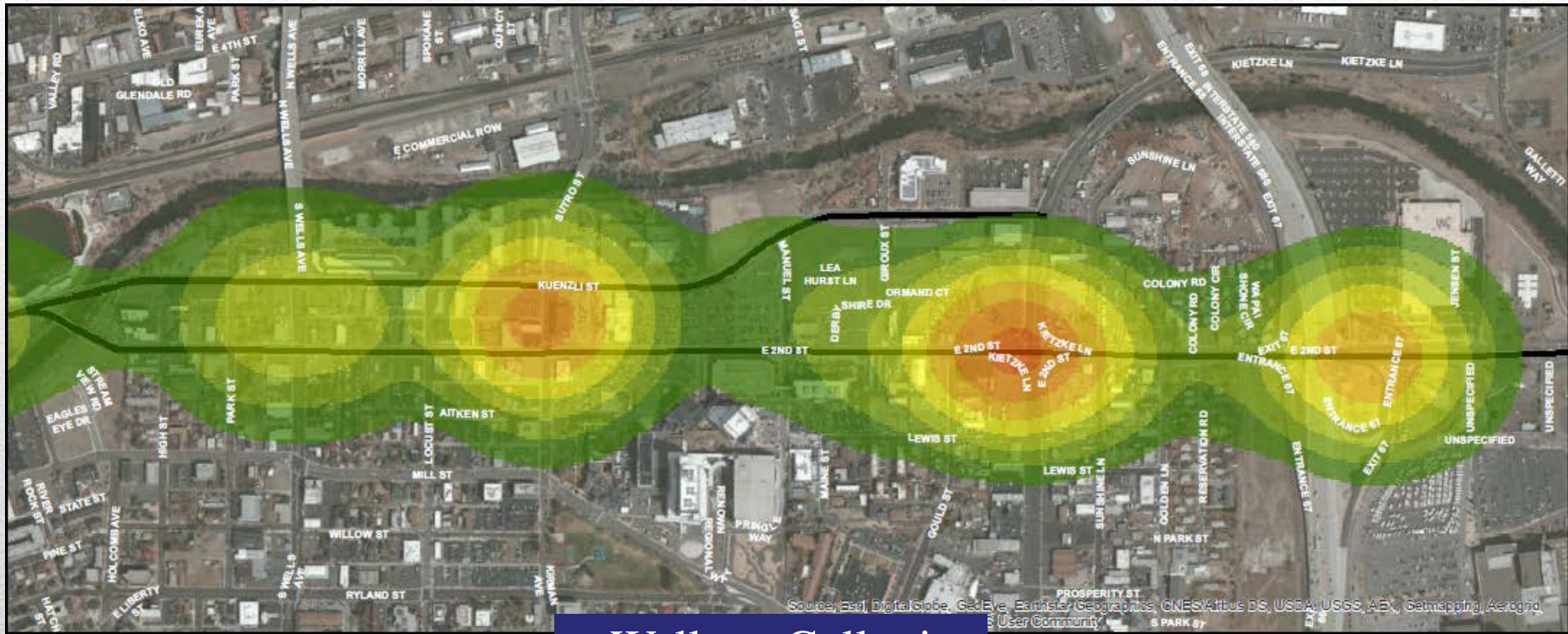
Kietzke / I-580 Area

Crash Data Review



Keystone to Kirman

Crash Data Review



Wells to Galletti

Progress Since Meeting #1

- Finalized Multi-Modal Level of Service Analysis
- Completed Relevant Plans and Studies Tech Memo
- Completed Land Use Analysis Tech Memo
- Submitted Economic Development Opportunities Tech Memo
- Identified Safety Improvement Alternatives and Packages
- Conducted Safety Analysis of Alternatives



Alternative Packaging

1. Early Action Complete Streets
2. Roadway Streetscapes
3. Reinvented Neighborhoods
4. Bicycle Focused
5. Pedestrian Focused

Alternatives Comparison

Alternative	Crash Reduction	Cost	Traffic Ops.	Livability
Early Action Complete Streets	7%	\$	●	1
Roadway Streetscapes	4%	\$\$\$	●	4
Reinvented Neighborhoods	10%	\$\$\$\$	●	5
Bicycle Focused	8%	\$\$\$	●	2
Pedestrian Focused	6%	\$\$\$\$	●	3



\$ - <\$1M
 \$\$ - \$1M to \$5M
 \$\$\$ - \$5M to \$10M
 \$\$\$\$ - \$10M>

- Similar to Existing
- Minor Operational Reduction
- Major Acceptable Operational Change

Livability Scale (1-5)
 1 – Little to no community impact
 5 – Major community enhancement

Spot Improvements

2nd Street – Keystone to Arlington

Install Crosswalks at Winters St. and Stevenson St.

Combine 2nd St. WB thru /right at Keystone and bulb-outs

Shadow parking at transit stops

Install protected left turns at signalized intersections

Install bulb-outs at crossings with on-street parking

Implement loading zone at Innovations School

Install elongated parklet bulb-outs at crossings with on-street parking



Spot Improvements

2nd Street – Arlington to Kirman

Pedestrian only scramble phase at Center St and Sierra St

Right-in / right-out at Evans
(remove signal)

Install bulb-outs at locations with existing on-street parking

RFB at Truckee River crosswalk

2nd Street – Kirman to Galletti

Roundabout at Renown entrance

Danish offset at Renown pedestrian crossings

Roundabout at Kietzke intersection

I-580 roundabout(s)

Spot Improvements



2nd & Kietzke Roundabout

Spot Improvements



I-580 Teardrop Interchange

Spot Improvements



I-580 Teardrop Interchange

Spot Improvements

Arlington – Court to W 6th

Move Island Ave. crossing to Wingfield crossing

Install speed feedback sign at Court

Limit NB static flashers to 1 between California and Island

Eliminate SB left turn to Island

Next Steps

- Update alternatives based on TAC feedback
- TAC meeting #3??
- Complete transit analysis
- Begin final report
- Public meeting April 13th
- Incorporate public comments
- Presentations to RTC committees
- Final report ~ May 2016

Questions?

Contacts:

Lori Campbell, NDOT

lcampbell@dot.state.nv.us

775-888-7462

Bryan Gant, Wood Rodgers

bgant@woodrodgers.com

775-225-3184



Safety Management Plan

2nd Street and Arlington Avenue

Public Information Meeting

April 20, 2016



All information presented is preliminary and subject to revision.

Welcome!

Commenting on this Project:

- Court reporter is recording presentation and is available to take comments before and after the presentation
- Place comment form in comment box
- Submit comment form by mail to:
Lori Campbell, Nevada Department of Transportation
1263 S. Stewart St.
Carson City, NV 89712
- Via email to lcampbell@dot.state.nv.us (reference 2nd St. and Arlington Ave. Safety Management Plan in the subject line)
- Comments accepted until 5:00 p.m. Friday, May 1, 2016



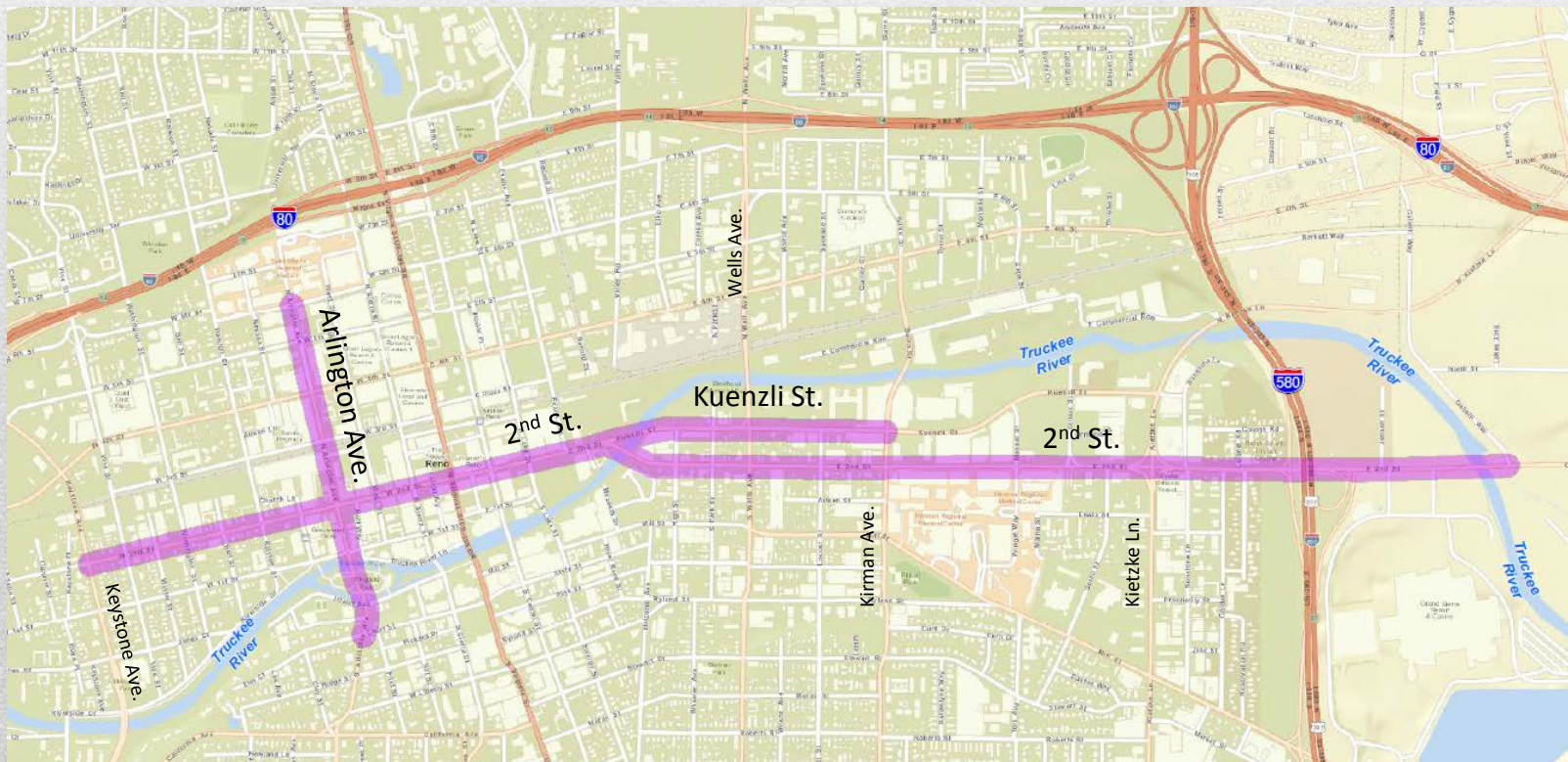
Project Overview

Project Limits:

- 2nd St. – Keystone Ave. to Galletti Wy.
- Kuenzli St. – 2nd St. to Giroux St.
- Arlington Ave. – Court St. to W 6th St.

Purpose:

Study to identify alternatives to improve safety and reduce crashes for all travelers



Why This Project?

||||| 2016-2020 Nevada

Strategic Highway Safety Plan

Occupant
Protection



Always Buckle Up

Impaired
Driving



Don't Drive Impaired

Lane
Departures



Focus on the Road

Intersections



Stop on Red

Pedestrians



Be Pedestrian Safe

Motorcycles



Ride Safe

zero[®]
Fatalities
Drive Safe Nevada



What is a Safety Management Plan?

- Planning level study
- Safety-focused corridor study
- Focuses on all road users
- Stakeholder and public input
- Prioritized list of short and long range improvements
- Strategic Highway Safety Plan (SHSP)
implementation focuses on safety improvement corridors



Corridor Overview

2nd Street – Keystone Ave to Galletti Way

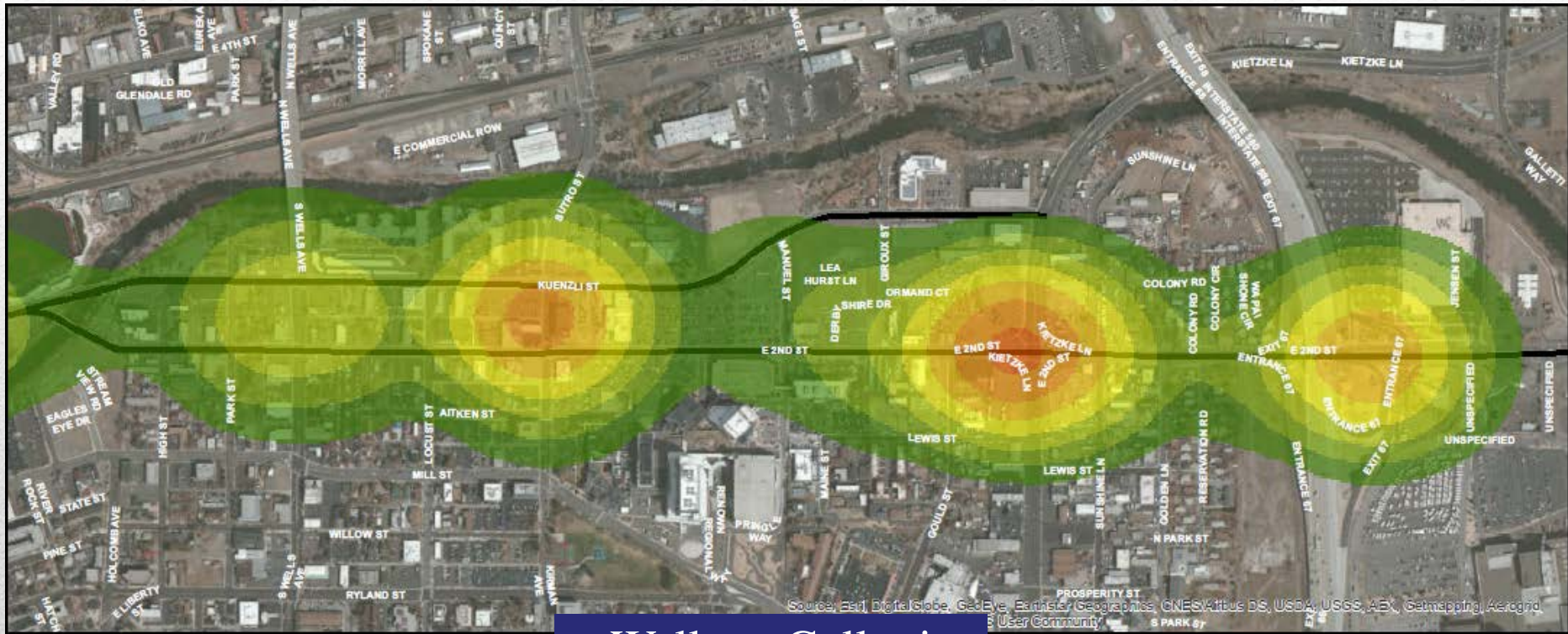


Downtown Reno Core

Couplet System

Kietzke / I-580 Area

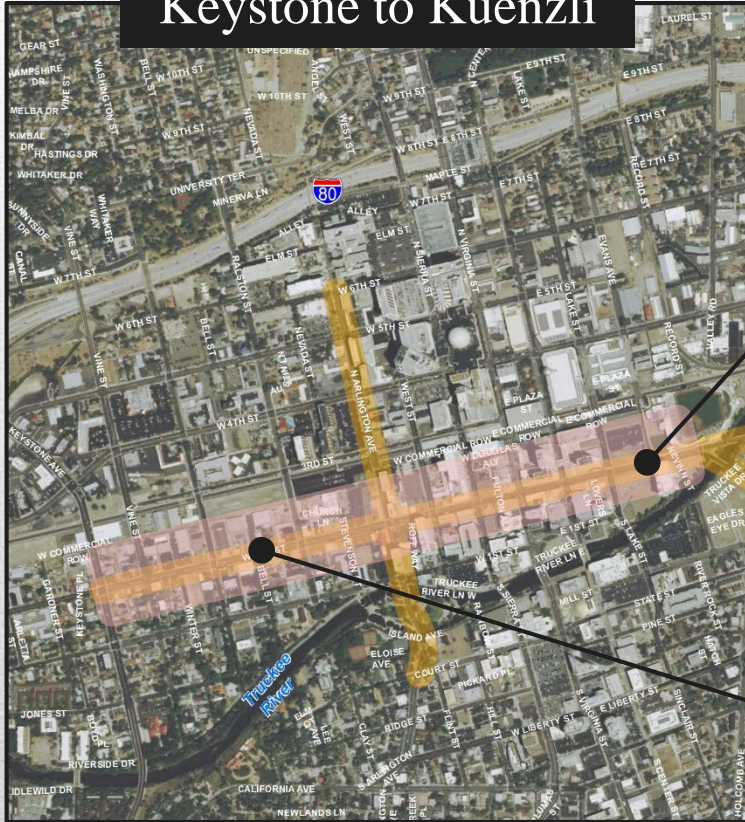
Crash Data Review



Wells to Galletti

Downtown Reno Core

Keystone to Kuenzli



Couplet System

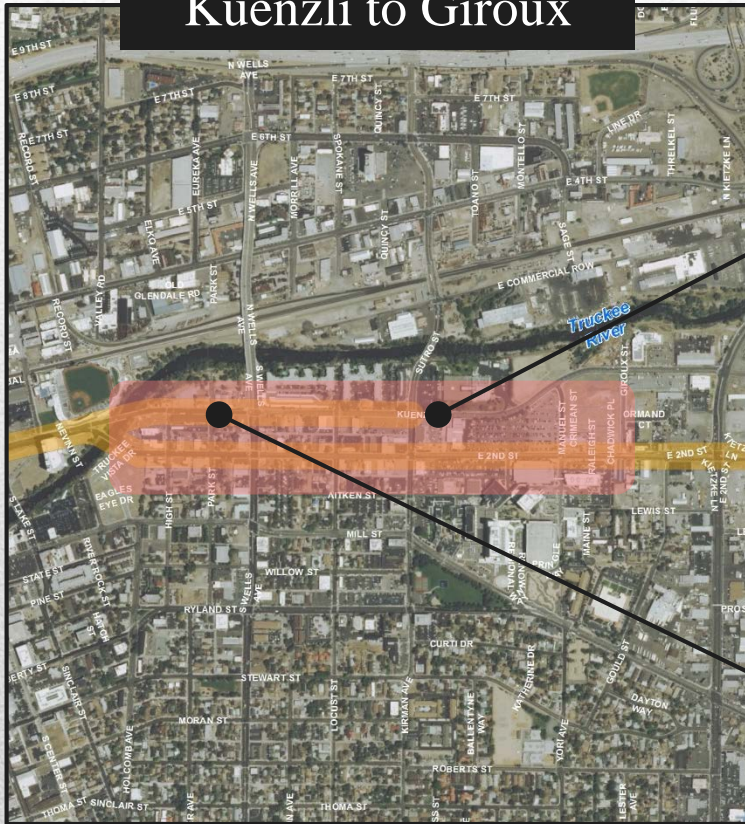
Kuenzli to Giroux



3200 AADT

Couplet System

Kuenzli to Giroux



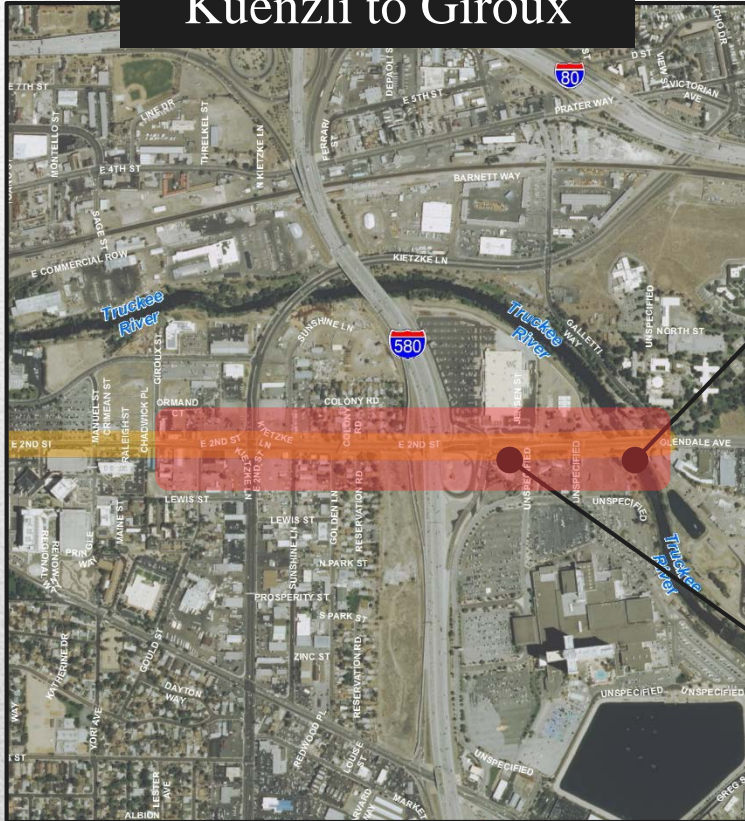
2600 AADT



4100 AADT

Kietzke/I-580 Area

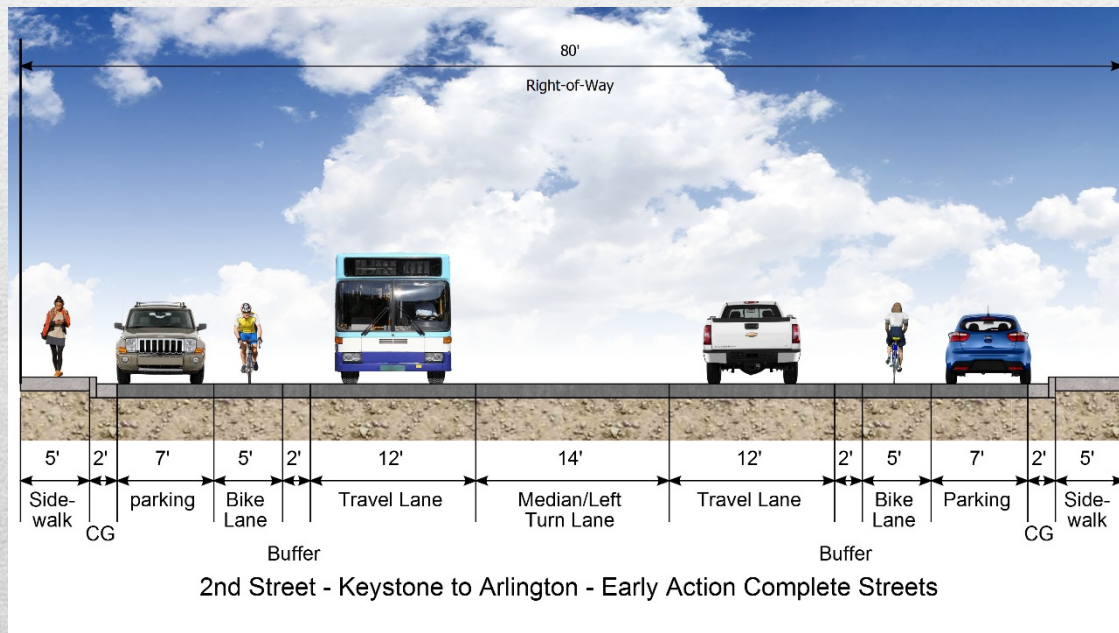
Kuenzli to Giroux



Alternative Descriptions

Alternative 1 – Early Action Complete Streets

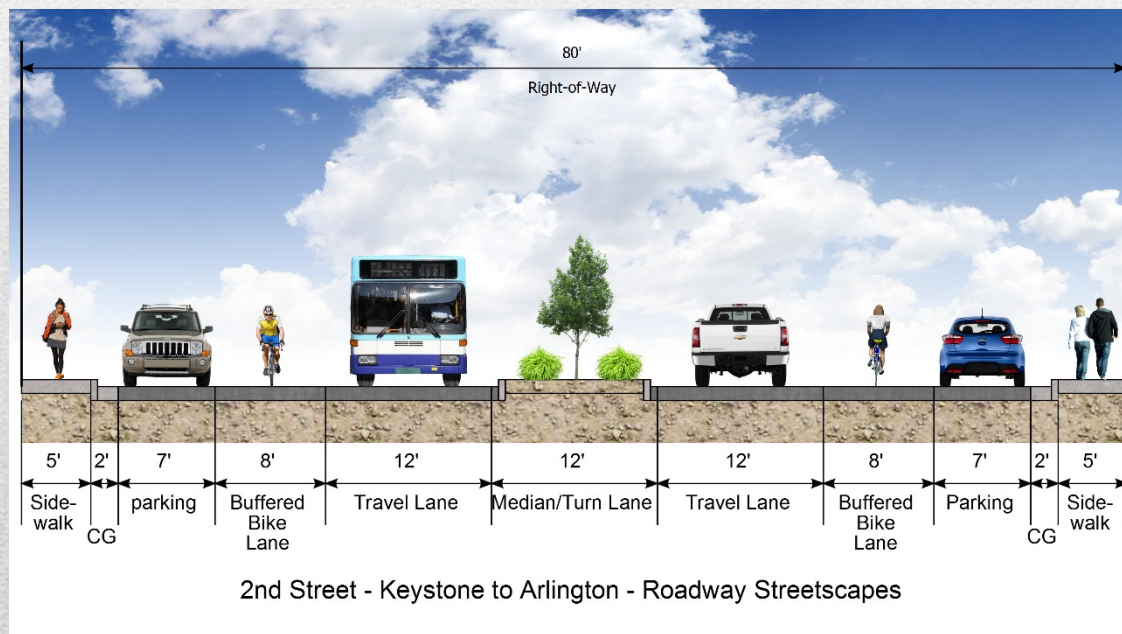
- Primarily restriping the existing roadways to better balance the available space among modes. This is the simplest alternative to implement since it generally does not change the existing curb.



Alternative Descriptions

Alternative 2 – Roadway Streetscapes

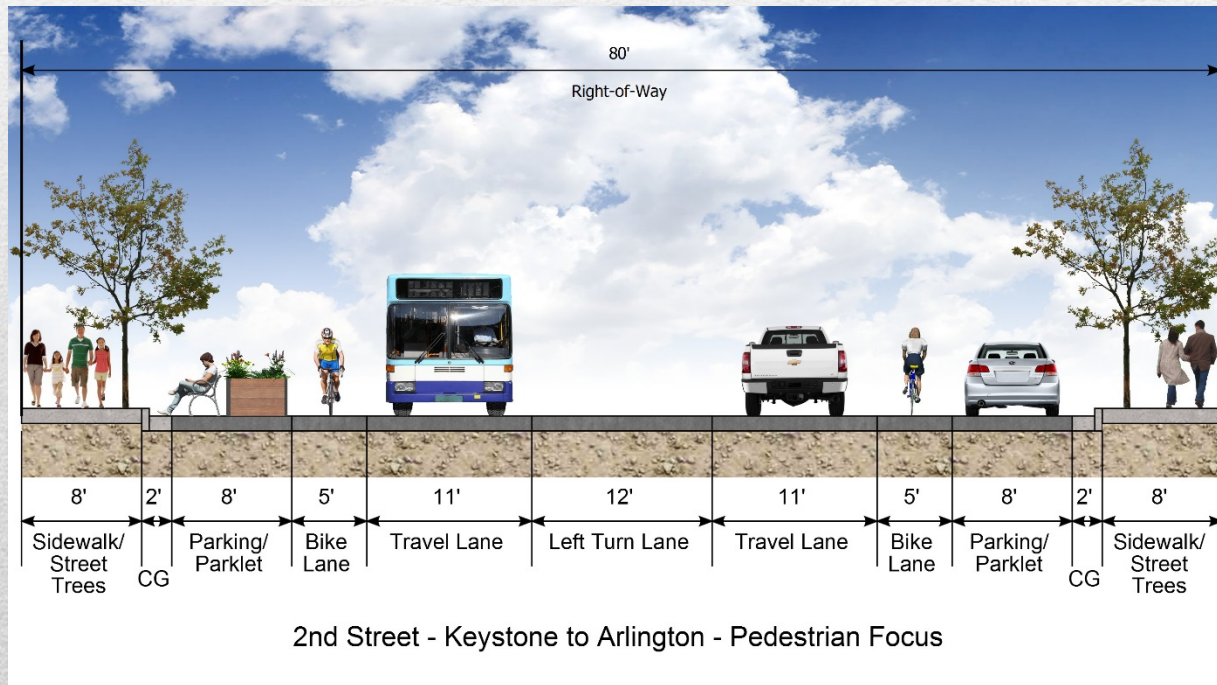
- Rebalances the existing roadway among modes while also incorporating raised medians and landscape areas that both improve safety while also enhancing streetscape aesthetics.



Alternative Descriptions

Alternative 3 – Pedestrian Focus

- Rebalances the available right-of-way among with a specific emphasis on pedestrian ways, primarily through widened sidewalks.



Alternatives Comparison

Alternative	Potential Crash Reduction	Cost Range	Traffic Performance	Livability
1. Early Action Complete Streets	up to 19%	\$-\$\$	●	🌲
2. Roadway Streetscapes	up to 21%	\$\$\$	●	🌲🌲🌲
3. Pedestrian Focused	Up to 15%	\$\$\$\$	●	🌲🌲



\$ - <\$1M
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 \$\$\$ - \$5M to \$10M
 \$\$\$\$ - \$10M>

● Similar to Existing
 ● Minor Performance Reduction
 ● Major Performance Change

Livability Scale
 🌲 Little to no change in community livability
 🌲🌲🌲 Major community enhancement

Spot Improvements

2nd Street – Keystone to Arlington

Install Crosswalks at Winters St. and Stevenson St.

Combine 2nd St. WB thru /right at Keystone and bulb-outs

Shadow parking at transit stops

Install protected left turns at signalized intersections

Install bulb-outs at crossings with on-street parking

Implement loading zone at Innovations School

Install elongated parklet bulb-outs at crossings with on-street parking



Spot Improvements

2nd Street – Arlington to Kirman

Pedestrian only scramble phase at Center St and Sierra St

Right-in / right-out at Evans
(remove signal)

Install bulb-outs at locations with existing on-street parking

RFB at Truckee River crosswalk

2nd Street – Kirman to Galletti

Roundabout at Renown entrance

Danish offset at Renown pedestrian crossings

Roundabout at Kietzke intersection

I-580 roundabout

Questions?

Mail

Lori Campbell

Nevada Department of Transportation

1263 S. Stewart St.

Carson City, NV 89712

Email

lcampbell@dot.state.nv.us

(reference 2nd and Arlington SMP in
your subject line)



Open Comment Period

- Please state your full name and address prior to your question or statement
- Three-minute verbal comment per individual
- A court reporter will be recording the presentation and is available to take comments before and after the presentation



NEVADA DOT



www.nevadadot.com



zero
Fatalities
Drive Safe Nevada



2nd Street and Arlington Avenue Safety Management Plan Presentation at 5:30 p.m.

Wednesday, April 20, 2016

4 - 7 p.m.

Mckinley Arts and Culture Center

925 Riverside Drive

Reno, NV

Brian Sandoval

Governor

Rudy Malfabon

Director

Nevada Department of Transportation

1263 S. Stewart Street

Carson City, NV 89712



ALL INFORMATION PRESENTED IS PRELIMINARY AND SUBJECT TO REVISION



2ND ST. AND ARLINGTON AVE. SAFETY MANAGEMENT PLAN



WELCOME!

April 20, 2016

The Nevada Department of Transportation (NDOT) in cooperation with the City of Reno and the Regional Transportation Commission of Washoe County is studying road improvements on 2nd Street, from Keystone Avenue to Galletti Way, Arlington Avenue, from Court Street to West 6th Street, and Kuenzli Street, from 2nd Street to Giroux Street. The conceptual improvements are intended to enhance safety for all roadway users and reduce crashes.

Proposed improvement alternatives include reconfiguring the existing roadways with various vehicular lane, bicycle lane, and pedestrian configurations along with localized safety improvements.

This meeting is being held in an open house format from 4 to 7 p.m. Project representatives will give a brief presentation beginning at 5:30 p.m. followed by a short question and answer period from the audience. Project representatives will be available to answer your questions before and after the presentation.

During this meeting, and through Friday, May 6, 2016, your comments are welcome regarding this project.

WAYS TO GIVE US YOUR COMMENTS:

- **TODAY (IN PERSON):** During the open house, you may make an oral statement to the court reporter that will be available throughout the meeting.
- **TODAY (IN WRITING):** You may fill out the comment form attached to this handout and deposit it in the comment box or give the completed form to one of the project representatives.
- **BY MAIL:** You may write a letter or mail your completed comment form and any exhibits; these will become part of the official public record for the project. Mail your comments to: Lori Campbell, Project Coordinator, Nevada Department of Transportation, 1263 S. Stewart St., Carson City, NV 89712.
- **BY E-MAIL:** E-mail your comments to lcampbell@dot.state.nv.us. Please reference this project in the subject line. E-mail comments will also be accepted until 5 p.m., May 6, 2016.

Thank you for attending this meeting and for giving us your comments.



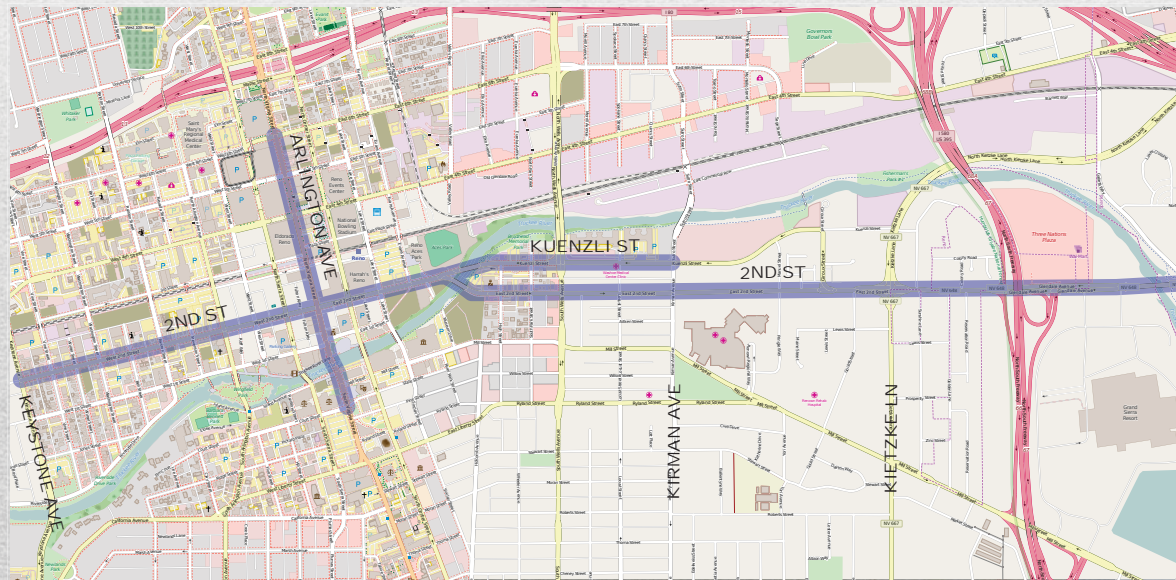
2nd St. and Arlington Ave. Safety Management Plan

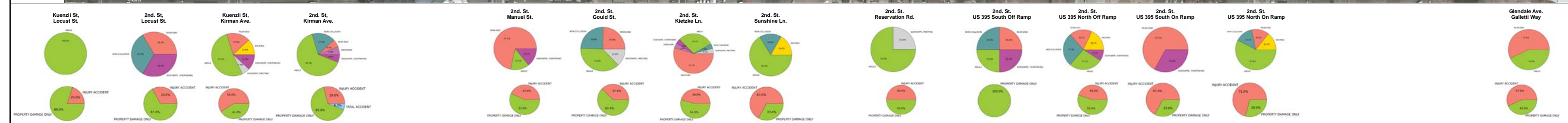
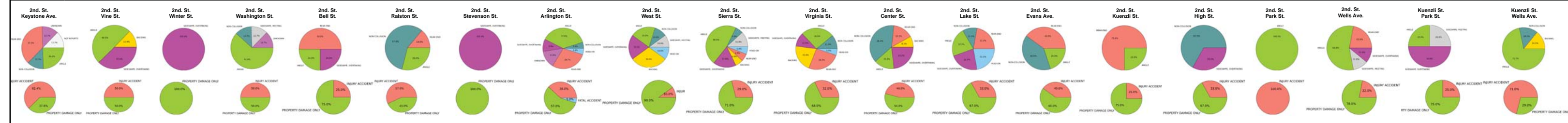
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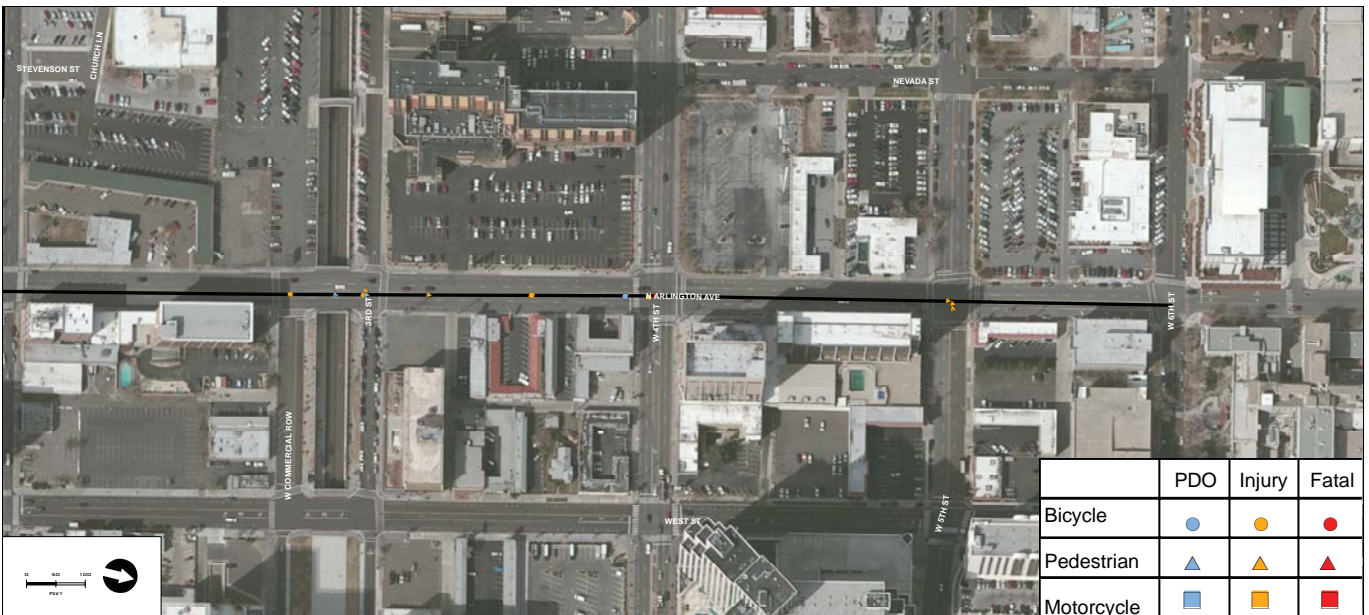
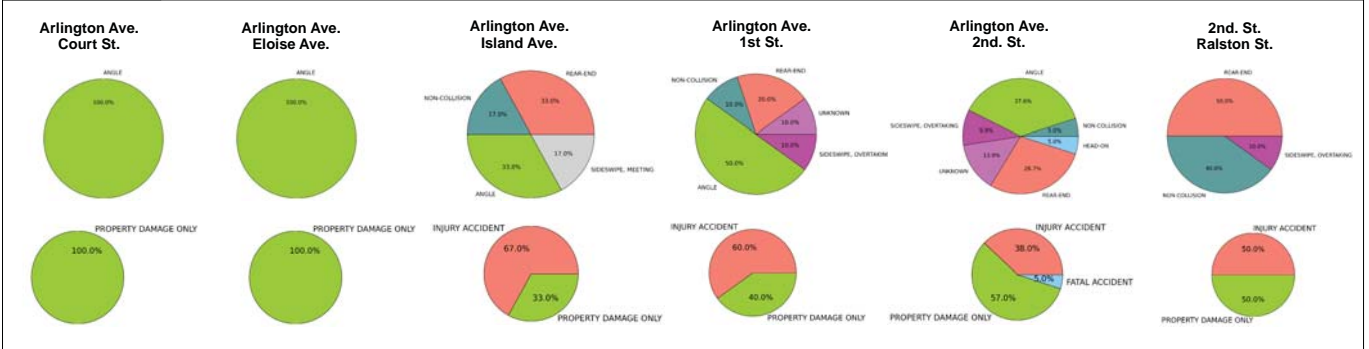
	PDO	Injury	Fatal
Bicycle			
Pedestrian			
Motorcycle			



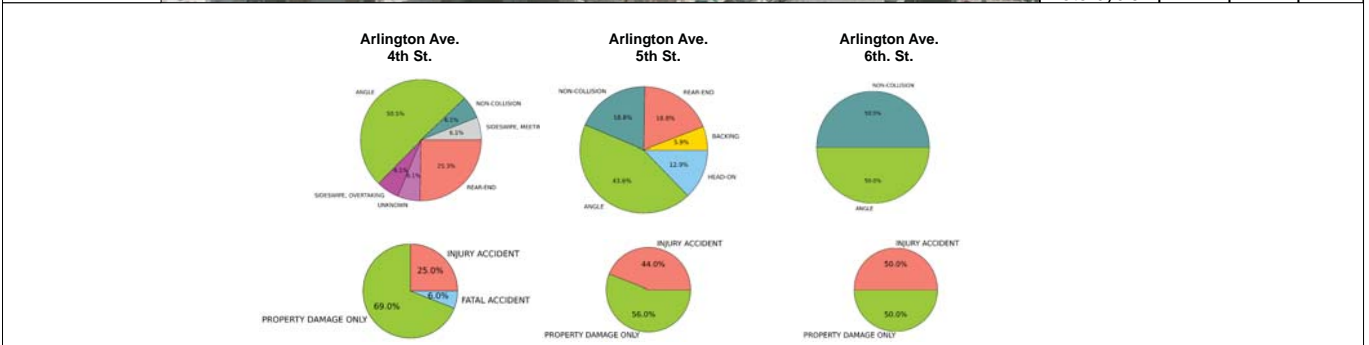
2nd Street and Arlington Ave. Safety Management Plan

Crash Locations and Type

* All information presented is preliminary and subject to revision



	PDO	Injury	Fatal
Bicycle	●	●	●
Pedestrian	▲	▲	▲
Motorcycle	■	■	■



2nd Street and Arlington Ave. Safety Management Plan Crash Locations and Type Arlington Ave

* All information presented is preliminary and subject to revision

Alternative Descriptions

Alternative 1 – Early Action Complete Streets

- Primarily restriping the existing roadways to better balance the available space among modes. This is the simplest alternative to implement since it generally does not change the existing curb.

Alternative 2 – Roadway Streetscapes

- Rebalances the existing roadway among modes while also incorporating raised medians and landscape areas that both improve safety while also enhancing streetscape aesthetics.

Alternative 3 – Pedestrian Focus

- Rebalances the available right-of-way among with a specific emphasis on pedestrian ways, primarily through widened sidewalks.



Alternatives Comparison

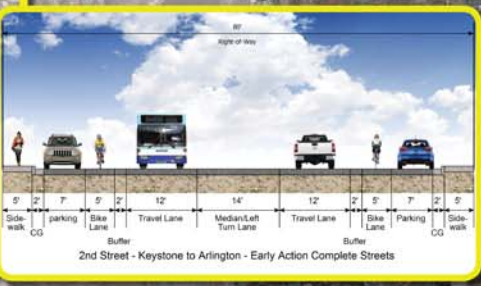
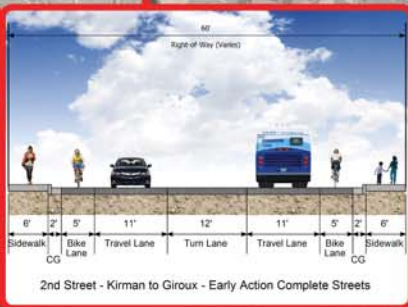
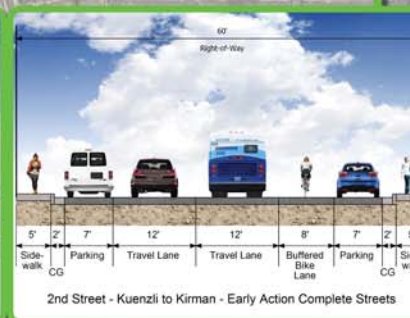
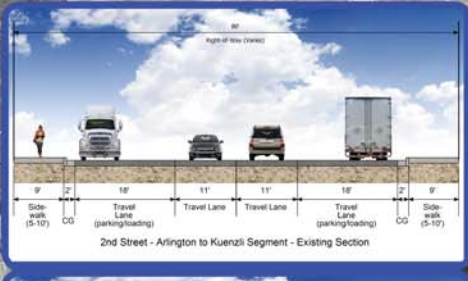
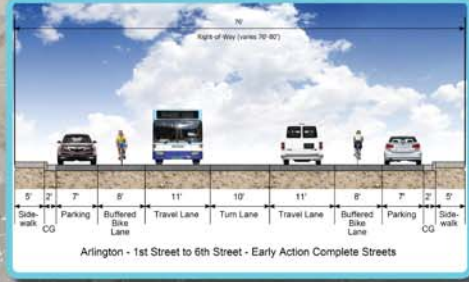
Alternative	Potential Crash Reduction	Cost Range	Traffic Performance	Livability
1. Early Action Complete Streets	up to 19%	\$-\$\$	●	🌲
2. Roadway Streetscapes	up to 21%	\$\$\$	●	🌲🌲🌲
3. Pedestrian Focused	up to 15%	\$\$\$\$	●	🌲🌲



\$ - <\$1M
 \$\$ - \$1M to \$5M
 \$\$\$ - \$5M to \$10M
 \$\$\$\$ - \$10M>

● Similar to Existing
 ● Minor Performance Reduction
 ● Major Performance Change

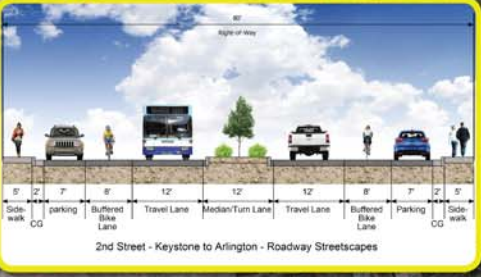
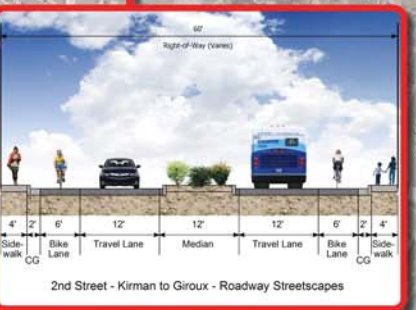
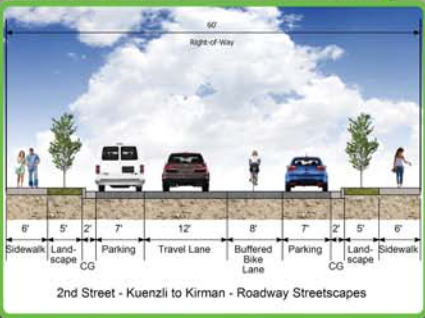
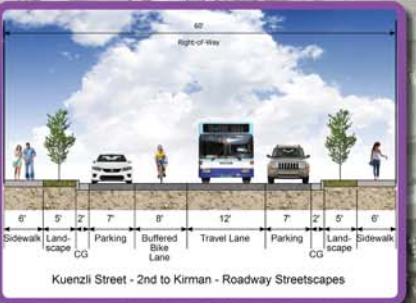
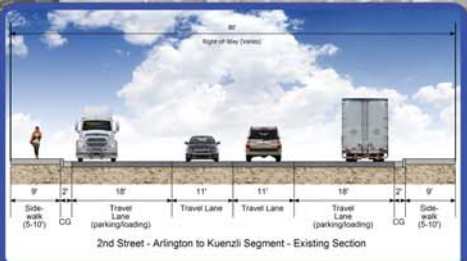
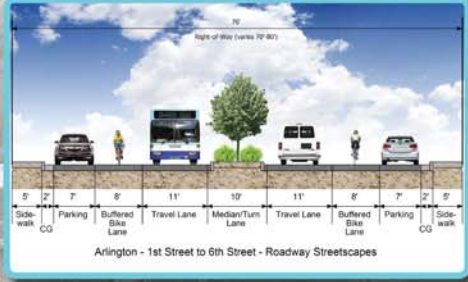
Livability Scale (1-5)
 🌲 – Little to no community change
 🌲🌲🌲 – Major community enhancement



2nd Street and Arlington Ave. Safety Management Plan Corridor Improvements Alternative 1 Early Action Complete Streets

* All information presented is preliminary and subject to revision

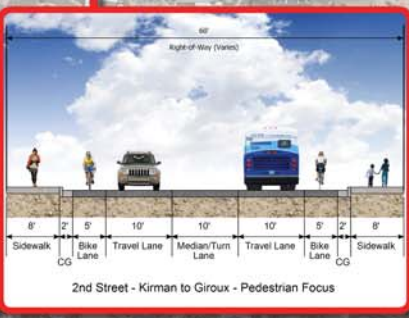
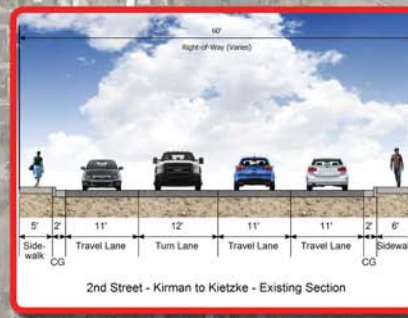
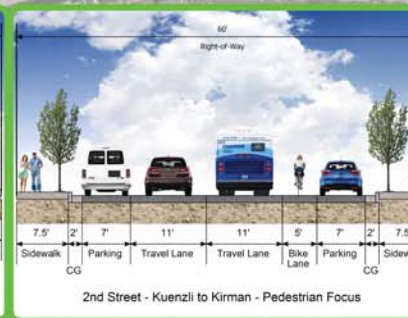
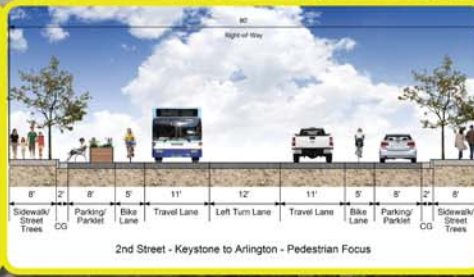
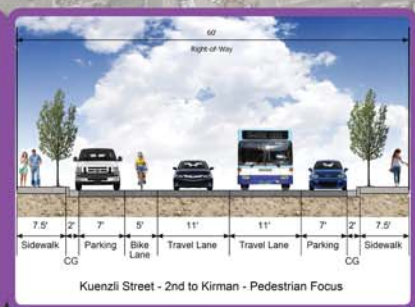
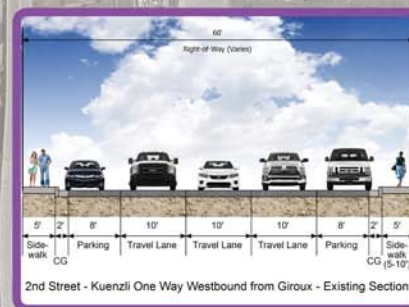
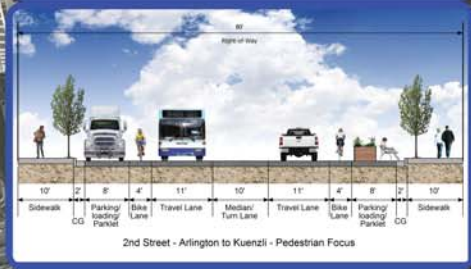
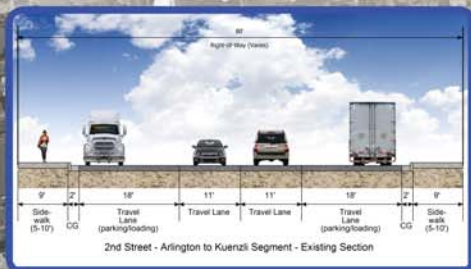




2nd Street and Arlington Ave. Safety Management Plan Corridor Improvements Alternative 2 Roadway Streetscapes

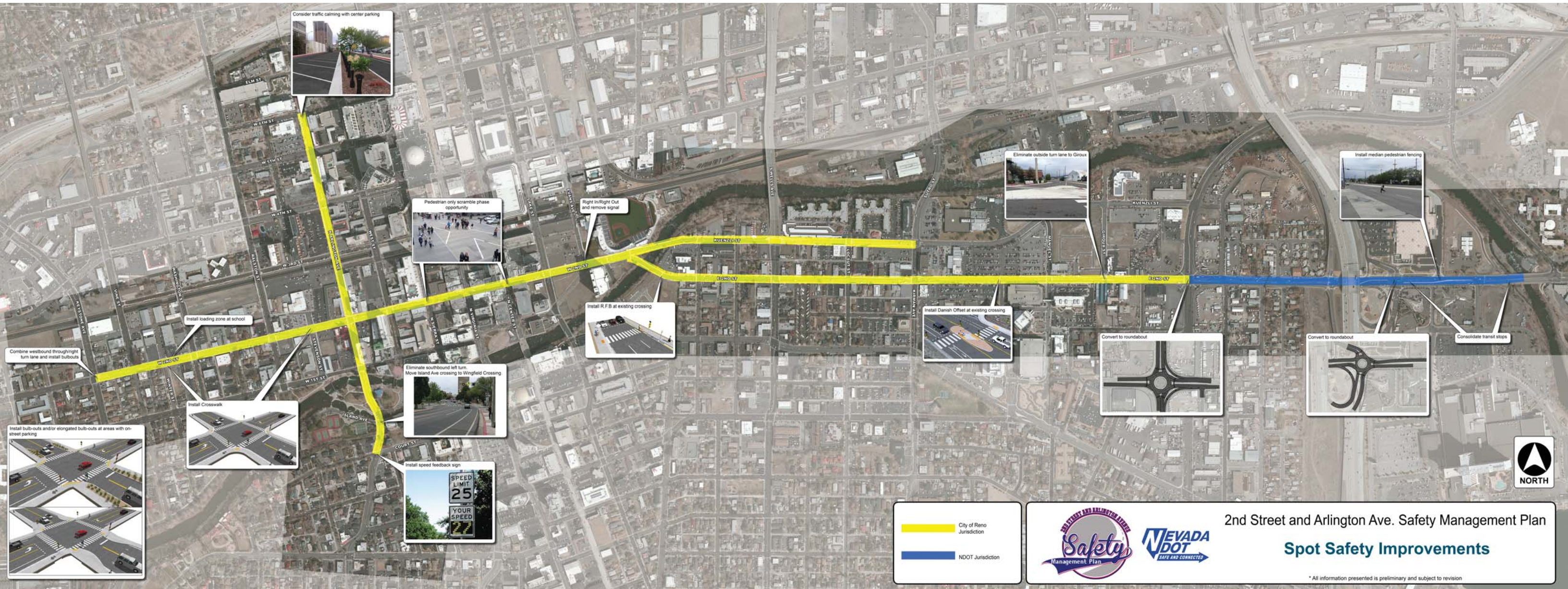
* All information presented is preliminary and subject to revision





2nd Street and Arlington Ave. Safety Management Plan
 Corridor Improvements Alternative 3
Pedestrian Focus

* All information presented is preliminary and subject to revision



Study Next Steps

- Review comments and update alternatives
- Update crash reduction projections
- Prepare Draft Safety Management Plan (SMP)
- Agency and Public Review of Draft SMP
- Incorporate comments into Final SMP
- Expected completion – June 2016





COMMENT FORM

Public Information Meeting
2nd St. and Arlington Ave. Safety Management Plan
Wednesday, April 20, 2016



▪ Please Print Clearly ▪

					Date:				
Name:									
Address:									
City:				State:		ZIP Code:			
Phone (Day):						Phone (Evening):			
E-mail Address:									
Would you like someone to call you to discuss your comment or question?							<input type="checkbox"/> YES		<input type="checkbox"/> NO
Comment/Question:									

Comments will be accepted through 5 p.m., May 6, 2016. Please mail to:
Lori Campbell, Project Coordinator, NDOT, 1263 S. Stewart St., Carson City, NV 89712

Thank you for your time and interest

