

SR 667



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Drive Safe Nevada

KIETZKE LANE SAFETY MANAGEMENT PLAN

FINAL REPORT

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Submitted By:

PARSONS

Submitted to:



KIETZKE LANE SAFETY MANAGEMENT PLAN

EXECUTIVE SUMMARY

The Nevada Department of Transportation (NDOT) has determined the establishment of Safety Management Plans for critical roadway corridors is an effective way to address safety issues that can be identified and mitigated as part of a statewide safety improvement plan. Similar to road safety audits, the safety management plan is a more in-depth review of the highway corridor that includes observation of pedestrian, bicycle, transit and vehicular interactions and the safety issues associated with those interactions.

The 3.8 mile Kietzke Lane corridor between Galletti Way and South Virginia Street was selected by NDOT to address safety issues for all forms of transportation, including pedestrians (with and without disabilities), bicyclists, transit and vehicles. Kietzke Lane (SR 667) is a state highway and has a diversity of land uses that include industrial, commercial, residential areas and public schools.

Crash Analysis

The crash analysis for each roadway segment includes the Overall Crash Data, crash rate comparison to 2010 Nevada Functional Classification Crash Rate table, Predominate Crash Type, Pedestrian/Bicycle Crashes and Light Conditions.

The crash rate of 3.755 crashes per million vehicle-miles traveled for this corridor is 1.6 times higher than the average crash rate for similar arterials in Nevada and was primary factor in NDOT's decision to choose this corridor for the development of a Safety Management Plan. There were also 20 pedestrian and 15 bicycle crashes in the study section that resulted in 4 fatalities during the period from October 1, 2006 to September 30, 2011. The predominant crash type on the corridor was rear-end crashes followed by angle crashes. For the five year crash data period, the five intersections with the highest number of crashes (including side street crashes) are Moana Lane (131 crashes), Plumb Lane (99 crashes), Mill Street (78 crashes), Peckham Lane (65 crashes) and South Virginia Street (59 crashes). The detailed crash data can be found in the Appendix.

For data presentation purposes the corridor was divided into the following five segments:

- Segment 1 - Galletti Way to Kuenzli Street
- Segment 2 - Kuenzli Street to Mill Street
- Segment 3 - Mill Street to Plumb Lane
- Segment 4 - Plumb Lane to Moana Lane
- Segment 5 - Moana Lane to South Virginia Street

The crash analysis summaries show the Segment 3, 4 and 5 overall crash rates exceed the Nevada average for Principal Arterials by 53%, 56% and 168%, respectively. These higher crash rates reflect the need to address safety issues along the Kietzke Lane corridor.



Traffic Count Analysis

The traffic counts done for the Kietzke Lane corridor were focused on the ten signalized intersections and one non-signalized intersection for the AM and PM peak periods and included vehicles, pedestrians and bicycles. The following five signalized intersections had the highest total peak period (both AM and PM) vehicular traffic volumes:

- Plumb and Kietzke – 8,162
- Mill and Kietzke – 7,492
- Moana and Kietzke – 6,129
- 2nd and Kietzke – 5,376
- Vassar and Kietzke – 5,024

The six intersections shown below had the highest pedestrian counts (on crosswalks within the intersection) from both peak hours:

- Grove and Kietzke – 68
- Plumb and Kietzke – 65
- Vassar and Kietzke – 63
- Peckham and Kietzke – 60
- South Virginia and Kietzke – 49
- Roberts and Kietzke – 43 (non-signalized)

The intersections at Grove, Plumb and Vassar serve residential areas with higher density apartments. Plumb and Vassar are the primary crossing points for students that attend Wooster High School located east of Kietzke Lane. Roberts Street is the only non-signalized intersection of the above group and was the location of a fatal pedestrian crash in 2010 and two pedestrian injury crashes in 2011.

The bicycle counts represent the number of bicyclists that traversed the intersection during the two peak periods and include north-south and east-west bicycle movements. The six intersections shown below had the highest bicycle counts from both peak periods:

- Grove and Kietzke – 23
- Galletti and Kietzke – 18
- Gentry and Kietzke – 15
- South Virginia and Kietzke – 15
- 2nd and Kietzke – 13
- Mill and Kietzke – 12



Approximately 58% of all the bicycle counts were in the north-south direction.

A review of the seven NDOT traffic count stations on the Kietzke Lane corridor shows the 2010 traffic counts range between 14,600 to 24,000 vehicles per day. The detailed traffic count data can be found in the Appendix.

Policies, Plans and Studies

A research effort identified all policies, plans and studies that related to the Kietzke Lane study corridor. These included the following sources of information from Washoe RTC, NDOT and the City of Reno:

Washoe RTC

- Reno/Sparks Bicycle and Pedestrian Plan – Master Plan Document – this document is the official RTC policy for the development of bicycle and pedestrian facilities in the Truckee Meadows area. The Master Plan document has the following three partner documents – Northern Nevada Pedestrian Safety Action Plan, Bicycle and Pedestrian Design Manual and the Reno Sparks Public Right of Way ADA Transition Plan.
- Regional Transportation Plan (2008-2030) - The RTP outlines the regions long-range transportation plans to accommodate the master-planned developments in the City of Reno, City of Sparks and Washoe County. It addresses travel by all modes including automobiles, transit, bicycles, pedestrians, and aviation, rail and goods movement as well as transportation management strategies to make the system more efficient.

Nevada Department of Transportation

- Access Management System and Standards Manual – This manual contains the NDOT access control policy which controls the access on all State owned and maintained highways.
- NDOT Design Manual – This document requires the construction of sidewalks where current or anticipated pedestrian traffic presents a potential conflict.
- Past NDOT Projects – There were two separate road safety audits (RSAs) conducted on the Kietzke Lane corridor. In 2010 a RSA was conducted at the Roberts and Kietzke intersection where a fatal pedestrian crash had occurred and in 2011 a pedestrian focused RSA was conducted on the Kietzke Lane corridor between Galletti Way and South Virginia Street. The most recent pavement rehabilitation project on Kietzke Lane was completed in 2005.

City of Reno

- The City of Reno involvement along Kietzke Lane includes land use planning, issuance of building permits and maintenance of traffic signals and warning flashers. Traffic signal timing plans are a collaborative effort between the City of Reno, RTC and NDOT.

Transit Needs

The transit needs evaluation utilized a review of transit field operations and bus stops, interviews with RTC Transit staff and passenger data provided by RTC Transit. No single bus route currently serves the entire length of Kietzke Lane, but three bus routes (Routes 6, 9 and 13) provide service directly on portions of Kietzke Lane. Out of the 26 total transit routes in the Truckee Meadows Route 6 has the 11th highest ridership, Route 9 has the 5th highest ridership and Route 13 has the 15th highest ridership. The local service bus stops along Routes 6, 9 and 13 are spaced approximately every 0.2 mile, or every 3-4 blocks on average.

The Kietzke roadway lanes are generally in good condition and are satisfactory at the many bus stops along the route. In general, there appears to be no need for concrete pads at the bus stop lane/dwell areas since the asphalt pavement appears to be good condition. The bus operations do not appear to be hindered or delayed by traffic volumes or intersection operations; the run times are generally within a few minutes (plus or minus) of the scheduled run times. For local bus operations, the current speeds and travel times along Kietzke Lane are reasonable.

Issues and Recommendations

The issues found on the Kietzke Lane corridor were grouped into four categories that include ADA (American Disabilities Act), Transit, Roadway, Pedestrians and Bicycles. This section of the study also included the right of way needs that would be required by some of the recommended improvements. The primary goal of the study recommendations is to improve safety on the Kietzke Lane corridor. This report ranks proposed improvements into three priority categories. The improvement recommendation priorities are:

- **Priority 1 – Improvements or actions that can be undertaken in the immediate future by NDOT District 2 staff or NDOT Headquarters staff.**
- **Priority 2 – Improvements that can be included in a future NDOT or RTC project.**
- **Priority 3 – Improvements that can be included in a long range improvement plan.**

A summary of the Issues and Recommendations can be found in the Appendix.



ADA Issues

- Sidewalks – Includes missing sidewalk/curb and gutter, damaged sidewalk (vertical/horizontal displacement, holes, utility covers, etc.), non-contiguous sidewalk and obstructions with less than 32” of horizontal clearance (utility poles and guy wires, sign posts, traffic signal poles/cabinets, fire hydrants and vegetation).
- Curb Ramps and Pedestrian Push Buttons – Includes missing ramps, missing detectable warning strips, ramp slopes of 10% or greater, gutter slope plus curb ramp slope of 14% or greater, no top landing space, no flush transition at pavement edge and not aligning with the marked crosswalks. Pedestrian Push Button issues at signalized intersections includes the size of push button (2” diameter button is compliant), no level landing area next to the button, the button height exceeds 48” and buttons are out of reach.
- Driveways – Includes significant cross slopes that make it difficult to traverse the driveways for persons using wheelchairs and walkers and the lack of level areas at the back of driveways.

ADA Recommendations

The overall ADA recommendation is to address all ADA issues as part of a planned and funded program.

Transit Stop Issues

Transit stop issues include inadequate space to service wheelchairs from the transit vehicle and transit shelters and benches at transit stops with inadequate space to accommodate wheelchairs. Transit stops that are on opposite sides of the street can result in pedestrian jaywalking between the transit stops.

Transit Stop Recommendations

Transit stop recommendations include an assessment of all Kietzke Lane corridor transit stops to determine where short term improvements can be made to address ADA requirements or that can be done as part of a future project. Also included in the recommendations was determining the feasibility of implementing bus turn-outs at the Kietzke Lane transit stops.

Roadway Issues

- Kietzke Lane at Plumb Lane and 2nd Street Intersections - These two intersections have large radii, sweeping right turn lanes that do not work well in an urban environment. Operational and safety issues result from the lack of merge lanes at most of the cross street tie-in points.
- Moana Lane Southbound Approach on Kietzke Lane - When the dual left turn lanes were implemented on the north leg (southbound traffic) of the Moana Lane/Kietzke Lane



intersection, it required that southbound through traffic be moved over to go around the left turn lanes causing some southbound motorists to get in the outside left turn lane instead of the southbound through lane.

- Street Lighting - Street lighting on the Kietzke Lane corridor primarily exists at the signalized intersections. At night there is ambient light from the adjacent businesses, however this light is insufficient for any pedestrian crossing and bicycle lane activity.
- Access Management - There are raised medians at some of the signalized intersection approaches. Left turns to and from Kietzke Lane at driveways that are in close proximity to signalized intersections with no raised medians result in increased traffic conflicts and crashes.
- Traffic Signal Head Visibility - The visibility of traffic signal heads is critical for drivers approaching a signalized intersection especially at night. If traffic signal heads are not aligned properly with the traffic lanes drivers may inadvertently cross into adjacent lanes while traversing the intersection.
- Drainage - A drainage issue exists on the west side of Kietzke Lane, south of Lewis Street (335 Kietzke Lane) due to a lack of a drainage inlet and where the sidewalk ends into a paved access that blocks stormwater flow and causes water to cover the active travel lane.
- Traffic Signal Timing - Traffic signal timing parameters may have an impact on the safe operations of signalized intersections. This would include gap out time, yellow clearance time and all-red time.

Roadway Recommendations

- Kietzke Lane at Plumb Lane and 2nd Street Intersections – As an interim measure, replace the sweeping right turn lanes at these two intersections with standard right turn only lanes. For a long term solution perform a feasibility study to implement roundabouts at these intersections.
- Moana Lane Southbound Approach on Kietzke Lane – Install a dotted line on the left side of the left through lane to provide better guidance for through traffic.
- Street Lighting – Develop and implement a corridor-wide street lighting plan.
- Access Management – Install center raised medians on the north and south legs of the signalized intersection that do not currently have them; perform a feasibility study to determine the need for raised medians between the major intersections and enforce the misuse of the center medians for truck loading and unloading.
- Traffic Signal Head Visibility – Realign traffic signal heads over travel lanes and install retroreflectorized sheeting on all traffic signal head backplates.
- Drainage – Address the drainage issue at 335 Kietzke Lane.



- Traffic Signal Timing - Address traffic signal timing issues on the Kietzke Lane corridor.

Pedestrian Issues

- Pedestrian Signal Heads – The pedestrian signal heads at the Kietzke Lane signalized intersections do not have the countdown timers to assist pedestrians crossing the street.
- Non-signalized Pedestrian Crossings – There are a number of pedestrian crossing locations on Kietzke Lane that are uncontrolled. Some have a marked crosswalk and the rest have no markings or signing. Most of the pedestrian crashes occurred at these uncontrolled locations.
- Pedestrian Access to the Reno Sparks Indian Colony (RSIC) Medical Clinic – The medical clinic is several blocks from the RSIC land and requires crossing Kietzke Lane to access the clinic.

Pedestrian Recommendations

- Pedestrian Signal Heads – Upgrade all pedestrian signal heads on Kietzke Lane to have countdown timers.
- Non-signalized Pedestrian Crossings – Nine locations on Kietzke Lane have been identified to be evaluated for the installation of pedestrian safety facilities.
- Pedestrian Access to the Reno Sparks Indian Colony Medical Clinic – NDOT is currently coordinating with the Washoe County Flood Control District to provide a walking path along the Truckee River that would provide access to the medical clinic from the Indian Colony land.

Bicycle Issues

- Existing Bicycle Lane Adjacent to High Speed Traffic – Bicyclists using the Kietzke Lane bike lane are adjacent to vehicles traveling 40 mph or greater.
- Existing Bicycle Lane Needs Additional Signing and Pavement Markings – Need for additional bicycle lane signs and pavement markings to better delineate the bicycle lane.
- Missing Bicycle Lane in the Vicinity of Moana Lane and Peckham Lane – Southbound bicycle lane north of Moana was eliminated when dual southbound left turn lanes were created at Moana Lane.
- Bicycle Lane Width at Less Than 4 Feet – Four segments of bicycle lane on Kietzke Lane were identified with a width of less than 4 feet.
- Bicycle Safety Issues at Signalized Intersections – The major conflict points between bicyclists and vehicles typically occurs at signalized intersections.

Bicycle Recommendations

- Existing Bicycle Lane Adjacent to High Speed Traffic – Install buffered bicycle lanes on Kietzke Lane where space is available. This would require the removal of on-street parking.
- Existing Bicycle Lane Needs Additional Signing and Pavement Markings – Install additional Bike Lane signs and Bike Symbols on the pavement at selected locations on Kietzke Lane.
- Missing Bicycle Lane in the Vicinity of Moana Lane and Peckham Lane – Install Bicycles May Use Full Lane sign as an interim measure and acquire right of way to widen southbound Kietzke Lane and install the southbound bicycle lane north and south of Moana Lane.
- Bicycle Lane Width at Less Than 4 Feet – Evaluate the four sections of bicycle lane with less than 4 feet of width and determine the appropriate action needed to provide a bicycle lane width of 4 feet or more.
- Bicycle Safety Issues at Signalized Intersections – Evaluate the “bike box” concept and the feasibility of implementing this concept at Kietzke Lane intersections.

Right of Way Needs on the Kietzke Lane Corridor

Right of Way needs were identified at number of locations on the Kietzke Lane corridor. The required right of way would be used to address ADA, transit and bicycle improvements.

Benefit/Cost (B/C) Analysis

The NDOT Safety Division conducted a benefit/cost (B/C) analysis for a number of the Priority 2 and 3 recommendations using methods from the Crash Modification Warehouse.

Public and Agency Involvement

The public and agency involvement for the project included the formation of a Technical Advisory Committee (TAC) with members from Washoe Regional Transportation Commission, City of Reno, NDOT, Federal Highway Administration, Reno Police Department, Nevada Highway Patrol, Washoe County Public Works, Washoe County Sheriff, Washoe County School District and the Reno-Sparks Indian Colony. Also, two public information meetings were held to allow the general public and business owners to participate in the project.



KIETZKE LANE SAFETY MANAGEMENT PLAN

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1.0 KIETZKE LANE SAFETY MANAGEMENT PLAN PROJECT INTRODUCTION

1.1 PROJECT INTRODUCTION

The Nevada Department of Transportation (NDOT) has determined the establishment of Safety Management Plans for critical roadway corridors is an effective way to address safety issues that can be identified and mitigated as part of a statewide safety improvement plan. Similar to road safety audits, the safety management plan is a more in-depth review of the highway corridor that includes observation of pedestrian, bicycle, transit and vehicular interactions and the safety issues associated with those interactions. The Kietzke Lane corridor is the first of many Safety Management Plans to be developed by NDOT that addresses all forms of transportation and includes pedestrians (with and without disabilities), bicyclists, transit and vehicles.

The 3.80 mile study section of Kietzke Lane (SR 667), between Galletti Way and South Virginia Street, is a state highway and has a diversity of land uses that include industrial, commercial, residential, and public schools. The majority of the study section is classified as an Other Principal Arterial. The crash rate of 3.755 crashes per million vehicle-miles traveled for this corridor is 1.6 times higher than the average crash rate for Other Principal Arterials in Nevada. There were also 20 pedestrian and 15 bicycle crashes in the study section that resulted in 5 fatalities during the period from October 1, 2006 to September 30, 2011. For data presentation purposes the corridor was divided into the following five segments:

- Segment 1 - Galletti Way to Kuenzli Street
- Segment 2 - Kuenzli Street to Mill Street
- Segment 3 - Mill Street to Plumb Lane
- Segment 4 - Plumb Lane to Moana Lane
- Segment 5 - Moana Lane to South Virginia Street

The project scope of work included the following elements:

- ❖ Existing Conditions – This element identified the safety issues along the Kietzke Lane corridor and included field observations, collecting and analyzing crash data, collecting and analyzing vehicle, pedestrian and bicycle data, performing observations of transit operations along the corridor and reviewing all current and past policies, plans and studies. The safety issues were categorized by ADA and Roadway, Pedestrians and Bicycles and grouped by the segments shown above.

- ❖ Develop and Evaluate Recommendations – This element identified potential improvement measures to address the safety issues found during the Existing Conditions review. This element included ADA and roadway improvements, pedestrian and bicycle improvements, transit improvements, identified right of way needs and reviewed current and future land use along the corridor. The improvement measures were categorized and grouped the same as the safety issues. All proposed improvements were prioritized as follows:
 - Priority 1 – Improvements or actions that can be undertaken in the immediate future by NDOT District 2 staff or NDOT Headquarters staff
 - Priority 2 – Improvements that can be included in a future NDOT or RTC project.
 - Priority 3 – Improvements that can be included in a long range improvement plan.
- ❖ Public and Agency Involvement – This element included the establishment of the project Technical Advisory Committee (TAC) with members from Washoe Regional Transportation Commission, City of Reno, NDOT, Federal Highway Administration, Reno Police Department, Nevada Highway Patrol, Washoe County Public Works, Washoe County Sheriff, Washoe County School District and the Reno-Sparks Indian Colony. Four TAC meetings were held between January and December in 2012. A Citizens Advisory Committee (CAC) was formed to allow businesses and property owners on Kietzke Lane to participate in the project. Only a few persons participated on the CAC. Two CAC meetings were held in 2012. Two public information meetings were held to allow the general public and business owners to participate in the project. These meetings were held on February 28, 2012 and February 21, 2013 at Wooster High School and allowed the public to voice their safety concerns about the Kietzke Lane study corridor.

The study revealed there is a significant amount of infrastructure that is not compliant with the American Disabilities Act (ADA) requirements. This ranges from sidewalks to driveways to curb ramps and transit stops. Of the total cost to address all of the safety issues in the study section, the ADA issues identified on Kietzke Lane accounted for 94% of those costs. Proposed improvements along the corridor covered many issues relating to vehicle, pedestrian, bicycle and transit.

2.0 KIETZKE LANE SAFETY MANAGEMENT PLAN CRASH DATA ANALYSIS

2.1 CRASH ANALYSIS INTRODUCTION

The crash data for the Kietzke Lane SMP project was collected and analyzed for the five year period from October 1, 2006 through September 30, 2011. The Kietzke Lane project area was divided into the following five segments:

- Segment 1 – Galletti Way to Kuenzli Street (200' east of Galletti to 200' north of Kuenzli)
- Segment 2 – Kuenzli Street to Mill Street (200' north of Kuenzli to 200' north of Mill)
- Segment 3 – Mill Street to Plumb Lane (200' north of Mill to 200' north of Plumb)
- Segment 4 – Plumb Lane to Moana Lane (200' north of Plumb to 200' north of Moana)
- Segment 5 – Moana Lane to South Virginia Street (200' north of Moana to 200' south of South Virginia)

Kietzke Lane is classified as an Other Principal Arterial between South Virginia Street and Kuenzli Street and a Minor Arterial Street between Kuenzli Street and Galletti Way. The segment boundaries were chosen to include all the crashes within each of the major intersection or where the functional classification changed.

The Kietzke Lane crash analysis included two scenarios. The first scenario included all crashes on Kietzke Lane and those crashes on the cross streets up to 500 feet on either side of the intersection. This crash data is shown in Table 2.1. The second scenario included only those crashes on the Kietzke Lane corridor. Those crashes were used to calculate the crash rates for the Kietzke Lane corridor and are shown in Table 2.2.

Table 2.1 is the summary of crashes (932) by total and type along Kietzke Lane at every intersection as well as non-intersection locations and includes the side street crashes that occurred within 500 ft. of the intersection. **This crash data includes 3 fatal crashes on Kietzke Lane and 2 fatal crashes on side streets, i.e. pedestrian fatal on Peckham Lane east of Kietzke Lane and a bicycle fatal on Mill Street on the westbound approach at Kietzke Lane.** For the five year crash data period, the five intersections with the highest number of crashes (including side street crashes) are Moana Lane (131 crashes), Plumb Lane (99 crashes), Mill Street (78 crashes), Peckham Lane (65 crashes) and South Virginia Street (59 crashes).

Table 2.2 is the summary of only those intersection and non-intersection crashes (545) that occurred on Kietzke Lane. This crash data was used to calculate the total and segment crash rates along Kietzke Lane between South Virginia Street and Galletti Way. **This crash data**



TABLE 2.1 KIETZKE LANE - SOUTH VIRGINIA STREET TO GALLETTI WAY CRASH ANALYSIS SUMMARY (OCT. 1, 2006 TO SEPT. 30, 2011) (INCLUDES SIDE STREET CRASHES)

KIETZKE LANE CRASH SUMMARY	TOTAL CRASHES						Pedestrian				Pedal Cycle (Bicycle)				Angle				Backing			Head On			Non-Collision				Rear End			Sideswipe Meeting			Sideswipe Overtaking			Unknown or Other									
	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Total Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Injury Crashes	Injuries	PDO Crashes	Injury Crashes	Injuries	PDO Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Injury Crashes	Injuries	PDO Crashes	Injury Crashes	Injuries	PDO Crashes	Injury Crashes	Injuries	PDO Crashes						
Kietzke Lane (Full Corridor)	5	5	366	496	561	932	3	3	14	15	3	1	1	12	12	2	1	1	131	174	154	2	2	47	5	6	9	4	4	32	33	26	180	260	208	7	9	36	6	9	50	3	3	31			
South Virginia Street	0	0	33	49	26	59	0	0	1	1	1	0	0	1	1	0	0	0	12	17	8	0	0	1	0	0	1	0	0	1	1	2	19	30	9	1	1	2	0	0	2	0	0	1			
Mid Block	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peckham Lane	0	0	27	36	38	65	0	0	1	1	2	0	0	0	0	1	0	0	8	10	12	0	0	1	1	1	0	0	0	3	3	2	14	20	17	1	2	3	0	0	3	0	0	0			
Mid Block	1	1	8	11	1	9	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	2	2	0	5	8	1	0	0	0	0	0	0	0	0	0			
Moana Lane	0	0	64	83	67	131	0	0	2	2	0	0	0	0	0	0	0	0	24	28	21	0	0	2	0	0	0	0	0	3	3	2	35	50	26	0	0	9	2	2	6	0	0	1			
Gentry Way	0	0	26	35	26	52	0	0	3	3	0	0	0	4	4	0	0	0	11	16	11	0	0	0	0	0	0	0	0	4	4	1	11	15	11	0	0	1	0	0	2	0	0	0			
Mid Block	0	0	6	7	8	14	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4	0	0	0	1	2	1	0	0	0	0	1	3	3	0	0	0	0	0	0	1	0	0	1			
Linden Street	1	1	6	6	15	22	0	0	1	1	0	0	0	0	0	0	0	0	2	2	6	0	0	2	0	0	0	1	1	2	2	0	1	1	4	0	0	1	0	0	0	1	1	2			
Bunting Way	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Grove Street	0	0	11	17	25	36	0	0	0	0	0	0	0	0	0	0	0	0	5	10	7	1	1	1	0	0	1	0	0	2	2	1	3	4	11	0	0	2	0	0	2	0	0	0			
Mid Block	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Apple Street	0	0	4	7	3	7	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	1	0	0	0	1	2	0	1	2	0	0	0	1	0	0	2	0	0	0			
Steen Drive	0	0	6	11	7	13	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Margrave Drive	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0						
Plumb Lane	0	0	37	59	62	99	0	0	1	1	0	0	0	0	0	1	0	0	5	9	9	0	0	2	1	1	0	0	0	2	2	0	27	43	37	0	0	5	1	1	7	1	1	2			
Casazza Drive	0	0	1	1	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	1	1	3	0	0	1	0	0	0						
Vassar Street	0	0	21	24	23	44	0	0	1	1	0	0	0	0	0	0	0	0	5	5	10	0	0	1	0	0	0	0	0	2	2	3	12	14	5	2	3	1	0	0	2						
Miami Way	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0						
Mid Block	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0						
Taylor Street	0	0	7	8	7	14	0	0	0	0	0	0	0	2	2	0	0	0	4	4	6	0	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0	1	1	0						
Automotive Way	0	0	4	6	9	13	0	0	1	2	0	0	0	0	0	0	0	0	2	2	5	0	0	0	0	0	0	0	0	0	0	1	2	4	1	0	0	0	0	0	1						
Roberts Street	1	1	20	24	20	41	1	1	2	2	0	0	0	0	0	0	1	1	9	10	3	0	0	0	0	0	1	0	0	1	1	0	10	13	15	0	0	0	0	0	0						
Market Street	0	0	5	6	7	12	0	0	1	1	0	0	0	0	0	0	0	0	4	5	3	0	0	1	0	0	0	0	0	0	0	0	1	1	3	0	0	0	0	0	0						
Dayton Way	0	0	3	4	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Mill Street	1	1	33	42	44	78	0	0	0	0	0	1	1	2	2	0	0	0	12	14	9	0	0	1	1	1	2	1	1	2	2	0	18	25	19	0	0	5	0	0	9						
Prosperity Street	1	1	2	6	3	6	1	1	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	0	0	0	0	1	1	0	0	0	1	4	1	0	0	0	0	0	0						
Lewis Street (N)	0	0	4	6	5	9	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0	0	1	0	0	0	0	0	1	1	1	1	2	0	0	0	0	0	0	1						
2 nd. Street	0	0	12	12	21	33	0	0	0	0	0	0	0	1	1	0	0	0	3	3	4	0	0	0	0	0	0	0	0	0	0	1	5	5	14	2	2	0	0	0	2	1	1	0			
Kuenzli Street	0	0	3	3	6	9	0	0	0	0	0	0	0	0	0	0	0	0	3	6	4	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	1						
Galletti Way	0	0	9	13	16	25	0	0	0	0	0	0	0	0	0	0	0	0	4	8	4	0	0	2	0	0	0	0	0	1	1	0	4	4	9	0	0	0	0	0	1						



TABLE 2.2 KIETZKE LANE - SOUTH VIRGINIA TO GALLETTI WAY CRASH ANALYSIS SUMMARY (OCT.1, 2006 TO SEPT. 30, 2011) (DOES NOT INCLUDE SIDE STREET CRASHES; KIETZKE CORRIDOR CRASHES ONLY)

KIETZKE LANE CRASH SUMMARY	Total Crashes					Light Conditions				Pedestrian					Pedal Cycle					Angle Crashes					Backing Crashes					Head-On Crashes					Non-Collision Crashes					Rear-End Crashes					Sideswipe Crashes					Unknown Crashes														
	Fatal Crashes	Fatalities	Injury Crashes	Injuries	Property Damage Only Crashes	Total Crashes	Daylight	Dark	Dusk	Dawn	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Total Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Total Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Total Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Total Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Total Crashes	Fatal Crashes	Fatalities	Injury Crashes	Injuries	PDO Crashes	Total Crashes																		
Kietzke Lane (Full Corridor)	3	3	205	270	337	545	455	68	17	5	3	3	11	12	0	14	0	0	7	7	2	9	1	1	65	81	87	153	0	0	1	1	35	36	0	0	4	5	7	11	2	2	18	19	23	43	0	0	108	151	110	218	0	0	7	11	51	58	0	0	2	2	24	26
South Virginia Street	0	0	7	7	50	57	53	1	3	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	2	2	5	7	0	0	0	0	16	16	0	0	1	1	2	3	0	0	4	4	7	11	0	0	0	0	7	7	0	0	0	0	11	11						
Virginia-Peckham Mid Block	0	0	3	4	6	9	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	3	5	0	0	0	0	0	0	0	0	1	1	1	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1						
Peckham Lane	0	0	12	16	29	41	35	3	3	0	0	0	1	1	0	1	0	0	0	0	1	1	0	0	1	1	9	10	0	0	1	1	4	5	0	0	0	0	3	3	0	0	8	11	7	15	0	0	1	2	2	3	0	0	0	0	4	4						
Peckham-Moana Mid Block	1	1	15	21	4	20	17	3	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	3	3	3	6	0	0	0	0	0	0	1	1	2	2	0	3	0	0	10	16	1	11	0	0	0	0	0	0	0	0	0	0	0	0						
Moana Lane	0	0	22	26	35	57	49	6	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	3	3	7	10	0	0	0	0	3	3	0	0	1	1	2	3	0	0	18	22	13	31	0	0	0	0	10	10	0	0	0	0	0	0						
Moana-Gentry Mid Block	0	0	2	6	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	1	3	0	0	0	0	0	0	0	0	0	0	0	0						
Gentry Way	0	0	18	26	19	37	28	7	1	1	0	0	3	3	0	3	0	0	0	0	0	0	0	0	8	13	6	14	0	0	0	0	0	0	0	0	1	1	2	3	0	0	9	12	6	15	0	0	0	0	5	5	0	0	0	0	0	0						
Gentry - Plumb Mid Block	0	0	30	40	54	84	65	18	1	0	0	0	1	1	0	1	0	0	3	3	0	3	0	0	11	17	19	30	0	0	0	0	4	4	0	0	6	7	4	10	0	0	9	11	11	20	0	0	1	1	9	10	0	0	1	1	4	5						
Plumb Lane	0	0	10	14	25	35	28	4	3	0	0	0	1	1	0	1	0	0	0	0	1	1	0	0	2	2	1	3	0	0	0	0	1	1	0	0	1	1	0	1	0	0	5	7	17	22	0	0	1	3	5	6	0	0	1	1	1	2						
Plumb - Vassar Mid Block	0	0	1	1	5	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0						
Vassar Street	0	0	12	15	23	35	31	4	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	3	3	10	13	0	0	0	0	1	1	0	0	1	1	3	4	0	0	7	10	5	12	0	0	1	1	3	4	0	0	0	0	1	1						
Vassar - Mill Mid Block	1	1	40	49	40	81	68	8	5	0	1	1	2	3	0	3	0	0	2	2	0	2	1	1	18	19	15	34	0	0	0	0	2	2	0	0	2	2	1	3	0	0	18	25	19	37	0	0	2	3	1	3	0	0	0	0	1	1						
Mill Street	0	0	18	23	17	35	26	7	0	2	0	0	0	0	0	0	0	0	1	1	0	1	0	0	8	9	2	10	0	0	0	0	2	2	0	0	1	1	0	1	0	0	8	12	8	16	0	0	0	0	4	4	0	0	0	0	0	0						
Mill - 2nd Mid Block	1	1	8	15	10	19	16	3	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	3	5	2	5	0	0	0	0	2	2	1	1	1	1	3	5	0	0	4	9	1	5	0	0	0	0	2	2	0	0	0	0	0	0						
2nd Street	0	0	5	5	14	19	16	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4	4	7	11	0	0	1	1	1	2	0	0	0	0	1	1						
2nd-Kuenzli St. Mid Block	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Kuenzli Street	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0												
Kuenzli - Galletti Mid Block	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Galletti Way	0	0	2	2	4	6	6	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	5	0	0	0	0	0	0												



**Kietzke Lane Safety Management Plan
Crash Analysis
Galletti Way to South Virginia Street**

A crash study was conducted for Kietzke Lane from Galletti Way to South Virginia Street. The crash data was for the five year study period from October 1, 2006 thru September 30, 2011. The following data was compiled:

Overall Crash Data

- 545 Total crashes during the time period (10/1/2006 to 9/30/2011) (3.62 Miles)
 - 205 injury crashes with 270 injuries.
 - 3 fatal crashes with 3 fatalities
- Crash Rate Comparison:

	Classification	Crash Rate	Fatal Crash Rate	Injury Crash Rate	PDO Crash Rate
Kietzke Lane Corridor	Other Principal Arterial	3.755	0.021	1.412	2.322
2010 Functional Classification Crash Rate for Nevada	Principal Arterial Urban	2.40	0.01	0.95	1.44
Rates per million vehicle miles traveled					

Predominant Crash Type

- 215 Rear-end crashes
 - 108 injury crashes with 151 injuries
- 153 Angle crashes
 - 65 injury crashes with 81 injuries
 - 1 fatal crash with 1 fatality
- 58 Sideswipe crashes
 - 7 injury crashes with 11 injuries
- 43 Non-collision crashes
 - 18 injury crashes with 19 injuries
 - 2 fatal crashes with 2 fatalities
- 36 Backing crashes
 - 1 injury crash with 1 injury
- 29 Unknown crashes
 - 2 injury crashes with 2 injuries
- 11 Head On crashes
 - 4 injury crashes with 5 injuries

Pedestrian/Bicycle Crashes

- 14 Pedestrian crashes
 - 11 injury crashes, with 12 injuries
 - 3 fatal crash with 3 fatalities
- 9 Bicycle crashes
 - 7 injury crashes, with 7 injuries

Light Conditions

- 353 Daylight crashes
 - 158 injury crashes, with 209 injuries
 - 2 fatal crashes with 2 fatalities
- 53 Not Listed crashes
- 45 Dark-Spot Lighting crashes
 - 22 injury crashes, with 27 injuries
- 41 Not Reported crashes
- 17 Dark-Continuous Lighting crashes
 - 11 injury crashes, with 14 injuries
- 17 Dusk crashes
 - 7 injury crashes, with 11 injuries
- 6 Dark-No Lighting crashes
 - 4 injury crashes, with 6 injuries
 - 1 fatal crash with 1 fatality
- 5 Dawn crashes
 - 2 injury crashes, with 2 injuries
- 5 Unknown crashes
- 3 Other crashes
 - 1 injury crash, with 1 injury

**Kietzke Lane Safety Management Plan
Crash Analysis
Segment 1 - Galletti Way to Kuenzli Street**

A crash study was conducted for Kietzke Lane from Galletti Way to Kuenzli Street. The crash data was for the five year study period from October 1, 2006 through September 30, 2011. The following data was compiled:

Overall Crash Data

- 7 Total crashes during the time period (10/1/2006 to 9/30/2011)(0.13 Miles)
 - 2 injury crashes with 2 injuries.
 - 0 fatal crash with 0 fatality

- Crash Rate Comparison:

	Classification	Crash Rate	Fatal Crash Rate	Injury Crash Rate	PDO Crash Rate
Kietzke Lane Segment 1	Minor Arterial	2.249	0.000	0.643	1.607
2010 Functional Classification Crash Rate for Nevada	Minor Arterial Urban	2.590	0.010	1.070	1.500
Rates per million vehicle miles traveled					

Predominant Crash Type

- 5 Rear-end crashes
 - 1 injury crash with 1 injury
- 1 Angle crash
 - 1 injury crash with 1 injury
- 1 Sideswipe crash

Pedestrian/Bicycle Crashes

- 0 Pedestrian crash
 - 0 fatal crash with 0 fatality
- 1 Bicycle crash
 - 1 injury crash, with 1 injury

Light Conditions

- 7 Daylight crashes
 - 2 injury crashes, with 2 injuries

**Kietzke Lane Safety Management Plan
Crash Analysis
Segment 2 -Kuenzli Street to Mill Street**

A crash study was conducted for Kietzke Lane from Kuenzli Street to Mill Street. The crash data was for the five year study period from October 1, 2006 through September 30, 2011. The following data was compiled:

Overall Crash Data

- 36 Total crashes during the time period (10/1/2006 to 9/30/2011)(0.63 Miles)
 - 11 injury crashes with 17 injuries.
 - 1 fatal crash with 1 fatality
- Crash Rate Comparison:

	Classification	Crash Rate	Fatal Crash Rate	Injury Crash Rate	PDO Crash Rate
Kietzke Lane Segment 2	Other Principal Arterial	1.593	0.044	0.487	1.062
2010 Functional Classification Crash Rate for Nevada	Principal Arterial Urban	2.40	0.01	0.95	1.44
Rates per million vehicle miles traveled					

Predominant Crash Type

- 14 Rear-end crashes
 - 6 injury crashes with 10 injuries
- 8 Angle crashes
 - 3 injury crashes with 5 injuries
- 4 Sideswipe crashes
 - 1 injury crash with 1 injury
- 7 Non-collision crashes
 - 1 injury crash with 1 injury
 - 1 fatal crash with 1 fatality
- 2 Backing crashes
- 1 Unknown crash

Pedestrian/Bicycle Crashes

- 1 Pedestrian crash
 - 1 fatal crash with 1 fatality
- 0 Bicycle crash
 - 0 injury crash, with 0 injury

Light Conditions

- 16 Daylight crashes
 - 9 injury crashes, with 14 injuries
- 6 Not Listed crashes
- 2 Dark-Spot Lighting crashes
 - 1 injury crash, with 2 injuries
- 7 Not Reported crashes
- 2 Dark-Continuous Lighting crashes
- 1 Dawn crash
 - 1 injury crash, with 1 injury
- 1 Unknown crash
- 1 Dark-No Lighting crash
 - 1 fatal crash with 1 fatality

**Kietzke Lane Safety Management Plan
Crash Analysis
Segment 3 - Mill Street to Plumb Lane**

A crash study was conducted for Kietzke Lane from Mill Street to Plumb Lane. The crash data was for the five year study period from October 1, 2006 through September 30, 2011. The following data was compiled:

Overall Crash Data

- 158 Total crashes during the time period (10/1/2006 to 9/30/2011) (1.10 Miles)
 - 73 injury crashes with 91 injuries.
 - 1 fatal crash with 1 fatality
- Crash Rate Comparison:

	Classification	Crash Rate	Fatal Crash Rate	Injury Crash Rate	PDO Crash Rate
Kietzke Lane Segment 3	Other Principal Arterial	3.666	0.023	1.694	1.949
2010 Functional Classification Crash Rate for Nevada	Principal Arterial Urban	2.40	0.01	0.95	1.44
Rates per million vehicle miles traveled					

Predominant Crash Type

- 70 Rear-end crashes
 - 36 injury crashes with 51 injuries
- 59 Angle crashes
 - 29 injury crashes with 31 injuries
 - 1 fatal crash with 1 fatality
- 11 Sideswipe crashes
 - 3 injury crashes with 4 injuries
- 8 Non-collision crashes
 - 4 injury crashes with 4 injuries
- 5 Backing crashes
- 2 Unknown crashes
- 3 Head On crashes
 - 1 injury crash with 1 injury

Pedestrian/Bicycle Crashes

- 4 Pedestrian crashes
 - 3 injury crashes, with 4 injuries
 - 1 fatal crash with 1 fatality
- 3 Bicycle crashes
 - 3 injury crashes, with 4 injuries

Light Conditions

- 110 Daylight crashes
 - 57 injury crashes, with 73 injuries
 - 1 fatal crash with 1 fatality
- 12 Not Listed crashes
- 11 Dark-Spot Lighting crashes
 - 6 injury crashes, with 6 injuries
- 9 Not Reported crashes
- 8 Dark-Continuous Lighting crashes
 - 5 injury crashes, with 6 injuries
- 5 Dusk crashes
 - 3 injury crashes, with 4 injuries
- 2 Dawn crashes
 - 1 injury crash, with 1 injury
- 1 Other crash
 - 1 injury crash, with 1 injury

**Kietzke Lane Safety Management Plan
Crash Analysis
Segment 4 - Plumb Lane to Moana Lane**

A crash study was conducted for Kietzke Lane from Plumb Lane to Moana Lane. The crash data was for the five year study period from October 1, 2006 through September 30, 2011. The following data was compiled:

Overall Crash Data

- 158 Total crashes during the time period (10/1/2006 to 9/30/2011) (0.90 Miles)
 - 58 injury crashes with 80 injuries.
 - 0 fatal crash with 0 fatality
- Crash Rate Comparison:

	Classification	Crash Rate	Fatal Crash Rate	Injury Crash Rate	PDO Crash Rate
Kietzke Lane Segment 4	Other Principal Arterial	3.743	0.000	1.374	2.369
2010 Functional Classification Crash Rate for Nevada	Principal Arterial Urban	2.40	0.01	0.95	1.44
Rates per million vehicle miles traveled					

Predominant Crash Type

- 58 Rear-end crashes
 - 22 injury crashes with 29 injuries
- 47 Angle crashes
 - 21 injury crashes with 32 injuries
- 21 Sideswipe crashes
 - 2 injury crashes with 4 injuries
- 14 Non-collision crashes
 - 8 injury crashes with 9 injuries
- 5 Backing crashes
 - 1 injury crash with 1 injury
- 6 Unknown crashes
 - 2 injury crashes with 2 injuries
- 5 Head On crashes
 - 2 injury crashes with 3 injuries
- 1 Rear-to-Rear
- 1 Not Reported

Pedestrian/Bicycle Crashes

- 5 Pedestrian crashes
 - 5 injury crashes, with 5 injuries
- 4 Bicycle crashes
 - 3 injury crashes, with 3 injuries

Light Conditions

- 96 Daylight crashes
 - 45 injury crashes, with 63 injuries
- 22 Dark-Spot Lighting crashes
 - 8 injury crashes, with 10 injuries
- 15 Not Reported crashes
- 10 Not Listed crashes
- 5 Dusk crashes
- 4 Dark-Continuous Lighting crashes
 - 3 injury crashes, with 4 injuries
- 3 Dark-No Lighting crashes
 - 2 injury crashes, with 3 injuries
- 2 Unknown crashes
- 1 Dawn crash

Kietzke Lane Safety Management Plan
Crash Analysis
Segment 5 - Moana Lane to South Virginia Street

A crash study was conducted for Kietzke Lane from Moana Lane to South Virginia Street. The crash data was for the five year study period from October 1, 2006 through September 30, 2011. The following data was compiled:

Overall Crash Data

- 186 Total crashes during the time period (10/1/2006 to 9/30/2011) (0.82 Miles)
 - 61 injury crashes with 80 injuries.
 - 1 fatal crash with 1 fatality
- Crash Rate Comparison:

	Classification	Crash Rate	Fatal Crash Rate	Injury Crash Rate	PDO Crash Rate
Kietzke Lane Segment 5	Other Principal Arterial	6.426	0.035	2.107	4.284
2010 Functional Classification Crash Rate for Nevada	Principal Arterial Urban	2.40	0.01	0.95	1.44
Rates per million vehicle miles traveled					

Predominant Crash Type

- 68 Rear-end crashes
 - 42 injury crashes with 59 injuries
- 38 Angle crashes
 - 11 injury crashes with 12 injuries
- 24 Backing crashes
 - 1 injury crash with 1 injury
- 21 Sideswipe crashes
 - 1 injury crash with 2 injuries
- 16 Unknown crashes
- 14 Non-collision crashes
 - 5 injury crashes with 5 injuries
 - 1 fatal crash with 1 fatality
- 3 Head On crashes
 - 1 injury crash with 1 injury
- 2 Rear-to-Rear crashes

Pedestrian/Bicycle Crashes

- 4 Pedestrian crashes
 - 3 injury crashes with 3 injuries
 - 1 fatal crash with 1 fatality
- 1 Bicycle crash

Light Conditions

- 127 Daylight crashes
 - 48 injury crashes with 63 injuries
 - 1 fatal crash with 1 fatality
- 22 Not Listed crashes
- 10 Dark-Spot Lighting crashes
 - 7 injury crashes with 9 injuries
- 10 Not Reported crashes
- 3 Dark-Continuous Lighting crashes
 - 3 injury crashes with 4 injuries
- 2 dark-No Lighting crashes
 - 2 injury crashes with 3 injuries
- 7 Dusk crashes
 - 1 injury crash with 1 injury
- 2 Unknown crashes
- 2 Other crashes
- 1 Dawn crash

includes only the 3 fatal crashes that occurred on Kietzke Lane. Table 2.2 also includes a column for Light Conditions to show the distribution of nighttime crashes.

Figure 2.1 is a graphical representation of the pedestrian and bicycle crashes that occurred on the Kietzke Lane Corridor between October 1, 2006 and September 30, 2011. **This figure includes the 3 pedestrian fatal crashes on Kietzke Lane and the 1 bicycle fatal crash that occurred on the westbound approach at the Kietzke Lane and Mill Street intersection.** This figure was developed for use at the two project public meetings.

2.2 CRASH ANALYSIS BY ROADWAY SEGMENT

The crash analysis summaries shown in this section were developed for the entire study corridor and for each of the roadway segments:

- Kietzke Lane (entire corridor) – Galletti Way to South Virginia Street
- Segment 1 – Kietzke Lane from Galletti Way to Kuenzli Street
- Segment 2 – Kietzke Lane from Kuenzli Street to Mill Street
- Segment 3 – Kietzke Lane from Mill Street to Plumb Lane
- Segment 4 – Kietzke Lane from Plumb Lane to Moana Lane
- Segment 5 – Kietzke Lane from Moana Lane to South Virginia Street.

The crash analysis for each roadway segment includes the Overall Crash Data, crash rate comparison to 2010 Nevada Functional Classification Crash Rate table, Predominate Crash Type, Pedestrian/Bicycle Crashes and Light Conditions. The crash analysis summaries show the Segment 3, 4 and 5 overall crash rates exceed the Nevada average for Principal Arterials by 53%, 56% and 168%, respectively. These higher crash rates reflect the need to address safety issues along the Kietzke Lane corridor.

Figure 2.1 shows the distribution, dates and times of the pedestrian and bicycle crashes that occurred on the Kietzke Lane corridor during the 5 year crash analysis period. These crash events are distributed along the corridor in a random fashion and include intersection and non-intersection locations. There were 20 pedestrian and 15 bicycle crashes that included 3 pedestrian fatalities and 1 bicycle fatality. During the study period in May of 2012 there was a pedestrian fatality at the intersection of Kietzke Lane and Gentry Way and was not included in Figure 2.1.

Figure 2.1



3.0 KIETZKE LANE SAFETY MANAGEMENT PLAN TRAFFIC COUNT ANALYSIS

3.1 TRAFFIC COUNT ANALYSIS INTRODUCTION

Traffic counts for the Kietzke Lane SMP project were limited to peak hour counts (AM and PM) at the ten Kietzke Lane intersections controlled by traffic signals and at one Kietzke Lane intersection controlled by a Stop Sign on the side street. The counted intersections are as follows:

- Galletti Way
- 2nd Street
- Mill Street
- Roberts Street (Stop Sign controlled)
- Vassar Street
- Plumb Lane
- Grove Street
- Gentry Way
- Moana Lane
- Peckham Lane
- South Virginia Street

All counts were done manually between January 10 and January 25, 2012. The counts include all vehicle and bicycle movements through the intersection and pedestrians using the intersection crosswalks. The AM peak counts were done between 7:00 and 9:00 am and the PM peak counts were done between 4:00 and 6:00 pm.

The traffic count data sheets are found in the Appendix.

3.2 TRAFFIC COUNT SUMMARY

When the traffic counts were completed the data was summarized by Vehicles, Pedestrians and Bicycle and is shown in Table 3.1. The table also shows the date of the counts and specific time when the AM and PM peak hour occurred for each intersection.

3.2.1 Vehicles

The five intersections shown below had the highest peak period vehicular traffic (in order of traffic volume counted and total traffic for both peak periods):

- Plumb and Kietzke – 8,162
- Mill and Kietzke – 7,492
- Moana and Kietzke – 6,129
- 2nd and Kietzke – 5,376
- Vassar and Kietzke – 5,024

The above five streets that intersect with Kietzke Lane are the primary east/west streets that serve land uses on both sides of Kietzke Lane and the I-580 freeway. The count data shows the PM peak hour at most of the intersections has a higher volume of traffic than the AM peak hour. This is primarily due to a greater number of trip purposes that occur during the PM peak period.

3.2.2 Pedestrians

The pedestrian counts shown in Table 3.1 represent pedestrians using the crosswalks during the count period. Pedestrian counts on the north and south legs are traveling east/west and the counts on the east and west legs are traveling north/south. The five intersections shown below had the highest pedestrian counts from both peak hours:

- Grove and Kietzke – 68
- Plumb and Kietzke – 65
- Vassar and Kietzke – 63
- Peckham and Kietzke – 60
- South Virginia and Kietzke – 49

The intersections at Grove, Plumb and Vassar serve residential areas with higher density apartments. Plumb and Vassar are the primary crossing points for students that attend Wooster High School located east of Kietzke Lane. The Peckham intersection is the primary crossing point that connects the south Reno hotel/casinos (Atlantis and Peppermill) to the high density residential areas east of Kietzke and I-580. The pedestrian counts for all of the intersections were impressive considering the counts were taken in mid-January.

It should be noted that the non-signalized intersection at Roberts and Kietzke had the sixth highest pedestrian peak hour count (43). This is the location of a fatal pedestrian crash in 2010 and two pedestrian injury crashes in 2011.

**Table 3.1 KIETZKE LANE SAFETY MANAGEMENT PLAN
TRAFFIC COUNT SUMMARY**

*Intersection/Peak Period	Vehicles					Pedestrians					Bicycles					Vehicles Only		Count Date
	North Leg	East Leg	South Leg	West Leg	TOTAL	North Leg	East Leg	South Leg	West Leg	TOTAL	North Leg	East Leg	South Leg	West Leg	TOTAL	AM Peak	PM Peak	
Galletti Wy. - AM Peak	115	830	161	284	1390	6	1	3	4	14	3	4	0	1	8	7:30 to 8:30		1/19/2012
Galletti Wy. - PM Peak	184	460	346	947	1937	8	0	3	4	15	3	2	2	3	10		4:30 to 5:30	1/19/2012
2nd St. - AM Peak	708	763	464	370	2305	4	4	2	9	19	1	0	2	2	5	7:30 to 8:30		1/18/2012
2nd St. - PM Peak	549	644	1025	893	3111	2	9	3	6	20	0	3	5	0	8		4:15 to 5:15	1/18/2012
Mill St. - AM Peak	560	1279	743	670	3252	3	7	2	3	15	1	0	1	4	6	7:45 to 8:45		1/11/2012
Mill St. - PM Peak	734	1143	1253	1155	4285	4	3	1	1	9	2	1	0	3	6		4:15 to 5:15	1/11/2012
Roberts St. - AM Peak	665	0	610	56	1331	4	1	4	9	18	2	0	2	0	4	8:00 to 9:00		1/10/2012
Roberts St. - PM Peak	903	0	1173	76	2152	5	9	2	9	25	1	0	4	1	6		4:15 to 5:15	1/10/2012
Vassar St. - AM Peak	573	350	595	399	1917	0	23	1	15	39	1	0	4	0	5	7:15 to 8:15		1/12/2012
Vassar St. - PM Peak	1045	678	991	404	3118	0	15	1	8	24	2	1	1	0	4		4:30 to 5:30	1/12/2012
Plumb Ln. - AM Peak	701	1121	621	759	3202	7	1	6	26	40	2	1	1	0	4	7:30 to 8:30		1/12/2012
Plumb Ln. - PM Peak	635	1885	1736	704	4960	4	9	4	8	25	1	2	3	1	7		4:15 to 5:15	1/12/2012
Grove St. - AM Peak	602	109	575	176	1462	3	0	18	16	37	5	0	4	5	14	8:00 to 9:00		1/11/2012
Grove St. - PM Peak	954	234	1115	253	2556	7	10	6	8	31	4	0	5	0	9		4:30 to 5:30	1/11/2012
Gentry Wy. - AM Peak	509	105	575	209	1398	2	1	4	2	9	0	1	2	0	3	8:00 to 9:00		1/17/2012
Gentry Wy. - PM Peak	973	160	1136	421	2690	8	9	8	3	28	3	3	4	2	12		4:00 to 5:00	1/17/2012
Moana Ln. - AM Peak	605	939	392	414	2350	2	2	3	1	8	1	2	0	0	3	8:00 to 9:00		1/19/2012
Moana Ln. - PM Peak	944	1054	924	857	3779	8	8	8	5	29	1	0	4	1	6		4:45 to 5:45	1/19/2012
Peckham Ln. - AM Peak	350	373	232	181	1136	1	5	0	5	11	1	3	0	0	4	8:00 to 9:00		1/18/2012
Peckham Ln. - PM Peak	593	741	742	551	2627	6	19	1	23	49	1	1	1	0	3		4:15 to 5:15	1/18/2012
So. Virginia St. - AM Peak	240	439	217	335	1231	6	8	1	2	17	0	1	0	6	7	8:00 to 9:00		1/25/2012
So. Virginia St. - PM Peak	477	864	639	674	2654	7	13	9	3	32	1	3	2	2	8		4:30 to 5:30	1/25/2012
TOTALS	13619	14171	16265	10807		97	157	90	170	514	36	28	47	31	142			

* All intersections are controlled by traffic signals except for the Roberts Street intersection.

AM Peak Count Period - 7:00 to 9:00 am

PM Peak Count Period - 4:00 to 6:00 pm



3.2.3 Bicycles

The bicycle counts shown in Table 3.1 are the number of bicycles that traversed the intersections during the two peak periods. The six intersections shown below had the highest bicycle counts from both peak hours:

- Grove and Kietzke – 23
- Galletti and Kietzke – 18
- Gentry and Kietzke – 15
- South Virginia and Kietzke – 15
- 2nd and Kietzke – 13
- Mill and Kietzke – 12

The total number of bicycles counted was 142 and 83 (58%) of those were traveling north/south on Kietzke Lane. The high bicycle count at Grove and Kietzke had 18 of the 23 bicycles going north/south on Kietzke Lane.

3.2.4 NDOT Counts

The Nevada Department of Transportation has seven traffic count stations on Kietzke Lane between Galletti Way and South Virginia Street. Six of the locations are seasonal count locations and one is full time count station. The count locations and their 2010 Annual Average Daily Traffic (AADT) volumes are at the following sites:

<u>Count Station</u>	<u>2010 AADT</u>
• ATR 0312210 – 0.15 mile south of Galletti Way (full time count station)	14,600
• 0310250 – 0.2 mile south of 2 nd Street	19,000
• 0310224 – 150 ft. south of Mill Street	24,000
• 0310194 – 0.3 mile north of Plumb Lane	22,000
• 0310191 – 0.3 mile south of Plumb Lane	23,000
• 0310171 – 0.1 mile north of Peckham Lane	22,000
• 0310169 – 150 ft. south of Peckham Lane	16,000

The NDOT traffic count data is shown in the Appendix. The data from these NDOT count stations shows a 10 year count history and indicates there has been little or no traffic growth along Kietzke Lane between 2001 and 2010.

4.0 KIETZKE LANE SAFETY MANAGEMENT PLAN POLICIES, PLANS AND STUDIES

4.1 POLICIES, PLANS AND STUDIES INTRODUCTION

A research effort was made to identify all policies, plans and studies that related to the Kietzke Lane study corridor. These are found in the following sub-sections:

4.2 REGIONAL TRANSPORTATION COMMISSION OF WASHOE COUNTY

4.2.1 Reno/Sparks Bicycle and Pedestrian Plan – Master Plan Document – prepared by Fehr& Peers for the RTC of Washoe County (October 2011) – This is the official policy document that addresses the development of bicycle and pedestrian facilities in the Truckee Meadows area. The master plan has three partner documents that were also prepared by Fehr & Peers for RTC. They include the following:

- Northern Nevada Pedestrian Safety Action Plan – The document identifies, assesses and develops pedestrian safety policies and practices.
- Bicycle and Pedestrian Design Manual – Provides a toolbox of bicycle and pedestrian facility design options that include standard bike lane configurations, mid-block crosswalk guidelines and innovative bike treatments.
- Reno Sparks Public Right of Way ADA Transition Plan – Identifies ADA deficiencies on sidewalks, curb ramps, crosswalks and other pedestrian facilities. This document includes the results of the deficiency review for Kietzke Lane from 4th Street in Sparks to Neil Road in Reno (includes the Kietzke Lane SMP project limits). The deficiency review covered curb ramps, driveways, transit stops and obstructions.

4.2.2 Regional Transportation Plan (2008-2030) – The RTP outlines the regions long-range transportation plans to accommodate the master-planned developments in the City of Reno, City of Sparks and Washoe County. It addresses travel by all modes including automobiles, transit, bicycles, pedestrians, and aviation, rail and goods movement as well as transportation management strategies to make the system more efficient.

- Street and Highway Element
 - Kietzke Lane from Neil Road to Victorian Avenue is classified as an Arterial with the Moderate Access Control standard. The Moderate Access Control standard has a posted speed limit within the 40-45 mph range; allows 3 or less traffic signals per mile with a minimum spacing of 1590 feet; utilizes raised or painted medians with turn pockets; allows left turns from the street onto private property with a 500 ft. minimum spacing from signalized intersections; does not allow left turns from driveways if the street has 6 or 8 lanes without traffic signals; requires a

right turn deceleration lane at driveways when the peak-hour right turn volume exceeds 60 and requires driveway spacing of 300 ft. between driveways and 200 ft. from signalized intersections.

- The RTP shows proposed roadway improvements in Truckee Meadows from 2008 to 2040. The only portion of Kietzke Lane shown for improvement between 2008 and 2040 is from Moana Lane to Grove Street in the 2016-2018 time period and indicates a widening project from 4 lanes to 6 lanes. The highest 2030 traffic volume for this section of Kietzke Lane is 37,000 and likely would not justify an expansion from 4 lanes to 6 lanes.
- Bicycle and Pedestrian Element
 - The Bicycle and Pedestrian Element does not show any existing bicycle facilities on Kietzke Lane between Galletti Way and South Virginia Street (Figure 5-1 of the RTP); however the majority of this portion of Kietzke Lane currently has bike lanes in both directions and is shown on RTC's 2012 Reno/Sparks Bike Map. The Future Bike Facilities – Central Area map (Figure 5-4 of the RTP) shows bike lanes on the Kietzke Lane SMP section.
 - SAFETEA-LU requires communities to include bicycle facilities into their planning process.
 - Bicycle Policies – the following bicycle policies are part of the Bicycle and Pedestrian Element:
 - ❖ Provide a continuous regional network of safe and convenient bikeways connected to other transportation modes and local bikeways systems. Provide ongoing maintenance of bicycle facility surfaces to maintain smooth surfaces free of potholes and debris.
 - ❖ Integrate multi-use paths with on-street bikeways where possible.
 - ❖ Coordinate with local jurisdictions, NDOT and other public agencies to identify high-frequency, bicycle-related crash locations and improvements to address safety concerns in these locations.
 - ❖ Focus bikeway funding on projects that have regional benefits, are multi-jurisdictional, promote safety and/or that close existing gaps in the bike network. Develop travel-demand forecasting, data collection, user, and surveys for bicycle use and integrate with regional transportation planning efforts.
 - ❖ All newly constructed or reconstructed bikeway facilities will be constructed to meet or exceed the requirements of the Manual of Uniform Traffic Control Devices (MUTCD), American Association of Street and Highway Transportation Officials (AASHTO) and the

Americans with Disabilities Act (ADA) where practical and appropriate.

- ❖ Develop a Regional Bikeway Master Plan that integrates local bikeway plans and encourages connections between communities and provides consistent design standards.
- ❖ All new development (including major employment centers, recreation facilities, schools, transportation centers, etc.) will be encouraged to construct bicycle facilities (including routes, lanes, paths and parking), as appropriate, that are internal or adjacent to the development.
- ❖ Support public and private employer subsidization of non-auto travel in cases where auto travel is being subsidized, i.e., parking subsidies.
- ❖ Implementation of the Bicycle Element will be accomplished in a way to maximize the positive impact on air quality and energy conservation.
- ❖ Construct bicycle lanes in accordance with the Bicycle Element whenever roads are constructed, reconstructed or rehabilitated where appropriate.
- ❖ Promote and education and safety program for bicyclists and motorists.
- ❖ Insure that bicycle parking is adequate to promote bicycle use at transit stations and transfer facilities.
- ❖ Bicycle facilities that serve as alternatives to automobile travel will be given a higher priority than those bicycle facilities that do not serve as alternatives to automobile travel.
- Pedestrian Policies – the following pedestrian policies are part of the Bicycle and Pedestrian Element:
 - ❖ Provide pedestrian access appropriate to existing and planned land uses as part of all transportation projects.
 - ❖ Give funding priority to pedestrian projects that contribute to a seamless walking network with links to alternative modes/major attractions.
 - ❖ Integrate pedestrian access needs into planning, programming, design and construction of all transportation projects.
 - ❖ Design the pedestrian environment to be safe, convenient, attractive, accessible for all users and consistent with requirements in MUTCD, AASHTO and ADA.
 - ❖ Work with local, regional and state jurisdictions to provide landscaping, pedestrian-scale lighting and benches to enhance the pedestrian environment.

- ❖ Pedestrian facilities that serve as alternatives to automobile travel will be given a higher priority than those pedestrian facilities that do not serve as alternatives to automobile travel.
- Public Transportation Element
 - The RTP does not show any specific public transit improvements on Kietzke Lane through 2012 or into the next 5 year period. Most transit improvements will be focused on the Virginia Street corridor and include Bus Rapid Transit (BRT) and Queue Jumping.

4.3 NEVADA DEPARTMENT OF TRANSPORTATION

4.3.1 Access Control

- The Nevada Department of Transportation controls the access along Kietzke Lane through their permit process. They apply the Access Management System and Standards manual when permits are requested. These standards are applied by roadway classification and Kietzke Lane is classified as an Other Principal Arterial from South Virginia to Kuenzli and a Minor Arterial from Kuenzli to Galletti.

4.3.2 NDOT Design Manual

- Section 2.2.1.4.4 of the Nevada Department of Transportation Design Manual requires construction of sidewalks where current or anticipated pedestrian traffic presents a potential conflict. When NDOT reconstructs or resurfaces public roadways, the correction of sidewalk deficiencies is reviewed in the project scope of work.

4.3.3 Past NDOT Projects

- Pedestrian Focused Road Safety Audit at the Kietzke Lane and Roberts Street Intersection – this RSA was conducted in May 2010 by NDOT Safety/Traffic Engineering as the result of a fatal pedestrian crash on May 8, 2010. The following improvements were made after the RSA was conducted:
 - Installed pedestrian activated Rectangular Rapid Flashing Beacons (RRFB) for both directions on Kietzke Lane at the Roberts Street intersection.
 - Created a pedestrian refuge area in the center of the street using traffic markings.
 - Relocated a transit stop near the intersection to improve pedestrian sight distance.
 - Striped out the shoulder area and prohibited parking on the approach to the intersection.
 - Installed a ladder crosswalk on the south leg of the intersection.

- Pedestrian Focused Road Safety Audit on Kietzke Lane from Virginia Street to Galletti Way – this RSA was conducted in November 2011 by Orth-Rodgers & Associates. A summary of the RSA recommendations includes the following:
 - Adjust pedestrian pushbutton height to meet ADAAG standards.
 - Trim vegetation along the corridor to eliminate sight distance issues.
 - Kietzke and Peckham – review overlap signal timing and replace yield bar with stop bar.
 - Modify striping on Kietzke Lane north of Moana Lane to better accommodate southbound bicyclists where there is no bike lane.
 - Widen Mill Street to extend bike lanes through the Kietzke Lane intersection.
 - Address sidewalk obstructions caused by placement of power poles and guy wires where ADAAG standards are not met.
 - Address ADAAG non-compliant pedestrian facilities at crosswalks and curb ramps.
 - Review bus stops to assess impact of waiting bus riders to sidewalk capacity.
 - Replace damaged sidewalks to eliminate tripping issues and impediment to wheelchair mobility.
 - Review of access management along the corridor to determine need for driveway reduction and control of left turn movements into and out of driveways. Also review the need to upgrade driveways to meet ADAAG standards.
 - Install sidewalks where they are missing along the Kietzke Lane corridor.
 - Evaluate the need for street lighting and install street lighting where it is needed to improve pedestrian safety.
 - Review traffic signal timing parameters to ensure there is adequate clearance time to safely clear the intersection.
 - Install crosswalks at locations where northbound and southbound RTC bus stops are located in close proximity.
 - Consider replacing the high speed right turns at Kietzke Lane and Plumb Lane with conventional right turn lanes or converting the intersection to a roundabout.
- Kietzke Pavement Rehabilitation Project (2005) – The last pavement rehabilitation project on Kietzke Lane was completed in 2005.

4.4 CITY OF RENO

- The City of Reno involvement along Kietzke Lane includes land use planning, issuance of building permits and maintenance of traffic signals and warning flashers. Traffic signal timing plans are a collaborative effort between the City of Reno, RTC and NDOT.



5.0 KIETZKE LANE SAFETY MANAGEMENT PLAN TRANSIT NEEDS

5.1 TRANSIT NEEDS INTRODUCTION

The transit needs evaluation utilized a review of transit field operations and bus stops, interviews with RTC Transit staff and passenger data provided by RTC Transit.

5.2 EXISTING BUS FACILITIES

5.2.1 General Conditions

The Regional Transportation Commission of Washoe County operates 26 fixed bus routes throughout the Reno-Sparks metropolitan area. The basic route structure consists of a hub-and-spoke network. Several of the fixed routes operate on Kietzke Lane as described below. Figure 5.1 on the following page illustrates the current configuration of bus routes that serve portions of Kietzke Lane or intersect it.

The bus stops along Kietzke Lane generally do not have pullouts for the buses, so auto traffic can be blocked in the curb lane behind the buses, although dwell times are typically very short, so the traffic delay is minimal. The curb lane conditions in which the buses operate vary in width and quality throughout the Kietzke Lane corridor, but generally the pavement condition is satisfactory for bus operations; areas requiring improvements are addressed later in this report.

The fixed routes along Kietzke Lane generally provide good connectivity with adjacent land uses. Although most of the adjacent uses have significant setbacks from the curb, including large parking lots between the curb and the specific land use, there generally are no major impediments for bus riders to access the bus stops. Pedestrian and bicycle access is generally good to/from the Kietzke Lane bus stops, with the exception of several locations where the sidewalk is very narrow and/or blocked by a utility pole or other structure, thereby limiting ADA access, e.g., north of Mill Street.

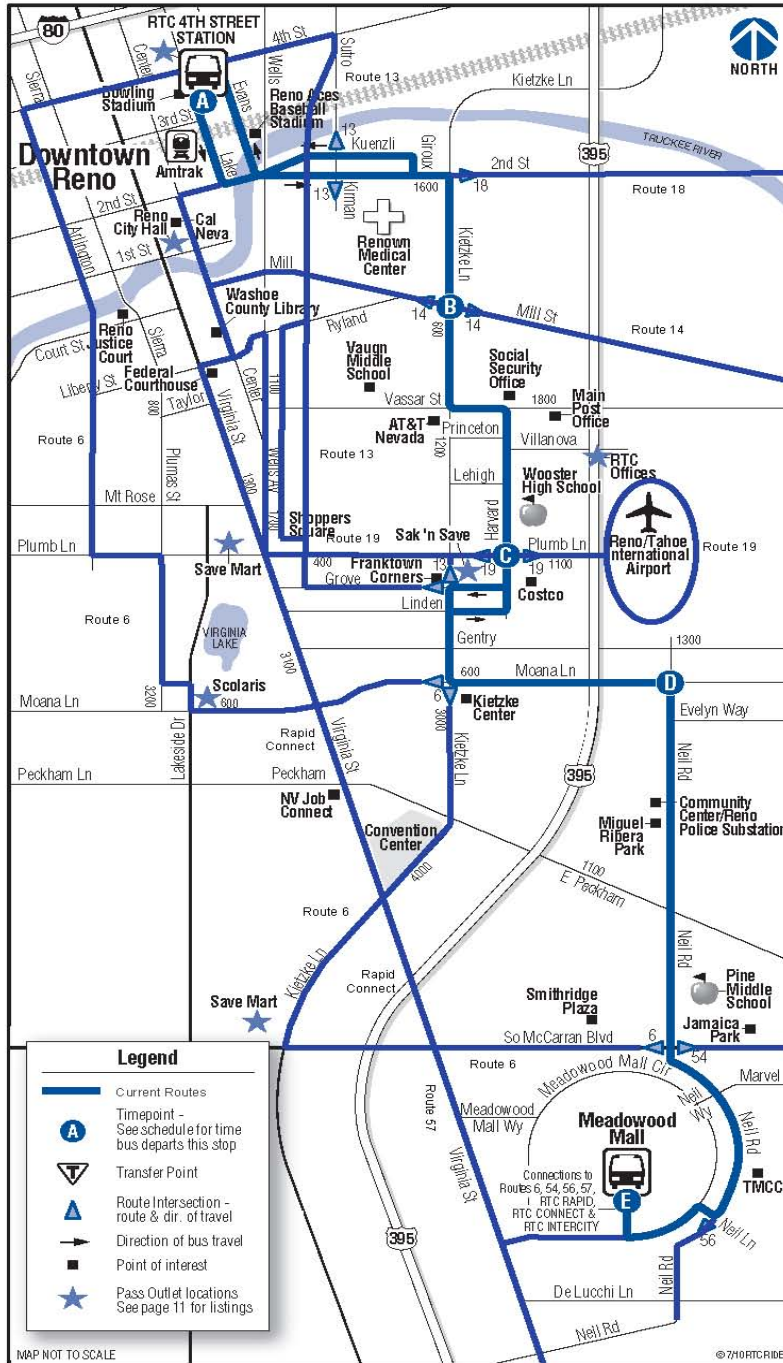
5.2.2 Services

No single bus route currently serves the entire length of Kietzke Lane, but three bus routes provide service directly on portions of Kietzke Lane including:

- Route 6 operates between the RTC 4th Street Station and Meadowood Mall Transit Center, including service on Kietzke Lane between Moana Lane and South McCarran Boulevard, intersecting Route 9 at Kietzke and Moana Lane;

- Route 9 is the primary route serving Kietzke Lane. It operates between the RTC 4th Street Station and Meadowood Mall, including service on Kietzke between 2nd Street and Vassar Street, then diverges to Harvard Street between Vassar and Grove, then back on Kietzke Lane between Grove Street and Moana Lane, and then runs along Moana Lane and Neil Road to Meadowood Mall;
- Route 13 operates between the RTC 4th Street Station and Costco at Harvard and Plumb, along the Kirman/Locust couplet (west of and parallel to Kietzke), plus northbound service on Kietzke between Grove Street and Plumb Lane, and southbound service on Harvard Way between Plumb and Grove. Route 13 overlaps Route 9 along Harvard Way between Plumb and Grove, allowing transfers between the routes.

Figure 5.1 Kietzke Lane Current Bus Route Configuration



The Route 6, 9, and 13 buses operate in mixed flow traffic lanes on the 4-5 lane arterial. The span of service, headways, November 2011 ridership, and relative ranking for each route (out of the total 26 fixed routes) are summarized in Table 5.1 below:

Table 5.1: Kietzke Lane Existing Bus Service

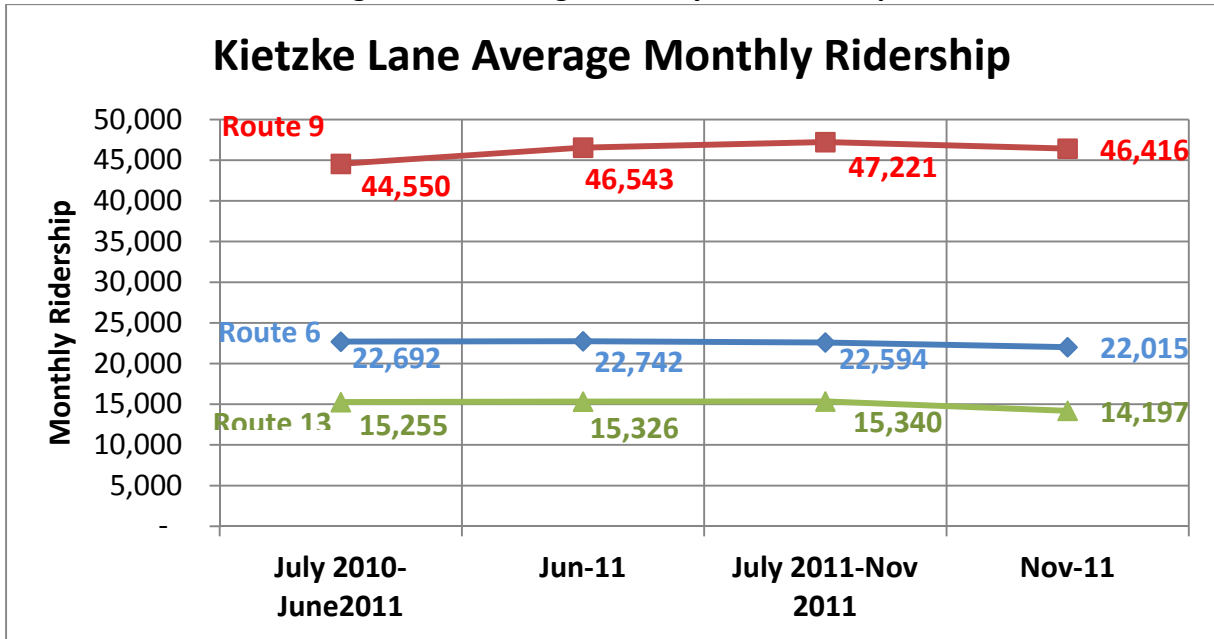
Route	Days of Service	Hours of Service	Peak Headway (minutes)	Off-Peak Headway	Nov. 2011 Ridership	Nov. 2011 Ridership Rank of 26 Routes
6	Weekday	04:32 – 22:45	30	60	22,015	11 th highest in Nov. 10 th highest thru June FY2011
	Saturday	05:32 – 21:45	60	60		
	Sunday/Holiday	06:24 – 16:32	60	60		
9	Weekday	04:06 – 01:11	15	30	46,416	5 th highest for both
	Saturday	05:45 – 01:09	30	60		
	Sunday/Holiday	04:45 – 01:48	30	60		
13	Weekday	06:15 – 00:34	60	60	14,197	15 th highest in Nov. 14 th highest thru June FY2011
	Saturday	06:15 – 00:34	60	60		
	Sunday/Holiday	05:43 – 19:02	60	60		

Source: Washoe RTC

Route 9 on Kietzke Lane has frequent peak and off-peak service and obvious travel demand that produces the 5th highest ridership in the system. Routes 6 and 13 produce somewhat lower ridership but add to the overall transit service level on Kietzke Lane.

Figure 5.2 illustrates the average monthly ridership on the three routes that serve portions of Kietzke Lane. As shown, the average monthly ridership has remained fairly constant with 4.2% growth in Route 9 ridership, but a 3% decline in Route 6 ridership and a 7% decline in Route 13 ridership over the past 18 months, with declines on all three routes between June and November 2011.

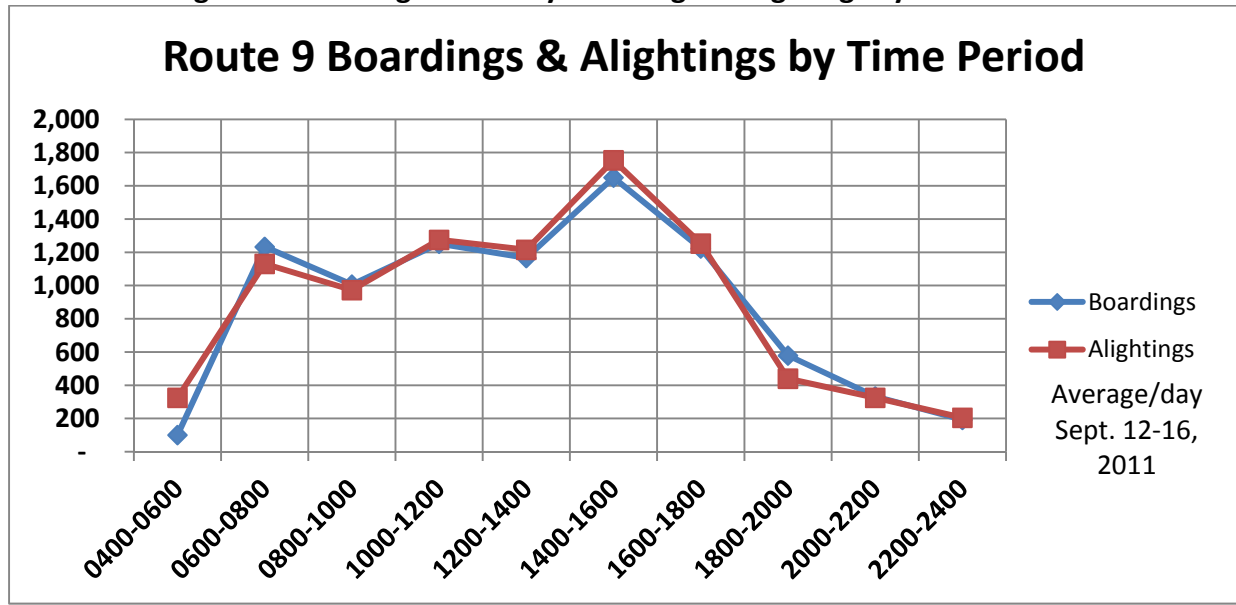
Figure 5.2: Average Monthly Bus Ridership



Source: Washoe RTC

Figure 5.3 illustrates the average weekday boardings and alightings on Route 9 by time period based on counts made on Sept. 12-16, 2011. As shown, the 2:00 pm to 4:00 PM period has the highest ridership and ridership is generally strong between 10:00 AM and 6:00 PM. The 6:00 AM to 8:00 AM morning peak period also has strong ridership.

Figure 5.3: Average Weekday Boardings & Alightings by Time Period



Source: Washoe RTC

5.2.3 Bus Stops

The local service bus stops along Routes 6, 9 and 13 are spaced approximately every 0.2 mile, or every 3-4 blocks on average. For example, there are 70 bus stops along the 13.0-mile roundtrip Route 9. Bus stops always include a sign and often include a bench (74%), and 59% have a trash receptacle, but few (17%) provide a shelter. The sidewalks providing access to the bus stops vary in width and quality throughout the Kietzke Lane corridor; areas requiring improvements are addressed later in this report. Many of the bus stops have concrete pads for the bench/waiting area, but only some have concrete pads for the bus dwell area in the street. The pavement condition at the bus stops is generally satisfactory.



Typical bus stop

Both the 4th Street Station and the Meadowood Mall Transit Center are excellent facilities that operate efficiently; there are no safety issues with either facility.



4th Street Station



Meadowood Mall Transit Center

5.2.4 Transit Passenger Connectivity

The following bus routes cross/intersect with Kietzke Lane routes:

- Route 14 on Mill Street with all day service every day of the week, with weekday peak hour headway of 15 minutes and off-peak headway of 30 minutes; November 2011 ridership was 29,860 (9th highest).
- Route 18 on 2nd Street/Glendale Avenue with all day service every day of the week, with weekday peak hour headway of 30 minutes and off-peak headway of 60 minutes; November 2011 ridership was 19,237 (13th highest).
- Route 19 on Plumb Lane with all day service Monday through Friday, with peak and off-peak headway of 60 minutes; November 2011 ridership was 6,002 (22nd highest).

In addition, Routes 54, 56 and 57 connect with Route 9 at the Meadowood Mall Transfer Center. Passenger transfer data between the various connecting routes and the Kietzke Lane routes are not available. Given the hub-and-spoke configuration of the bus system, the majority of transfers occur between the core routes and the outlying routes at major transfer

centers, e.g., between Route 9 and Routes 56 and 57 at Meadowood Mall, and between Route 9 and the three cross routes serving the 4th Street station.

5.2.5 Transit Speeds/Travel Times

The posted speed limit on Kietzke Lane is generally 40 mph. Schedule time points along the Kietzke Lane portions of the bus routes include:

- Route 6 at 4th Street station, Plumb/Arlington, Moana/Lakeside, Kietzke and Firecreek Shopping Center at Redfield Parkway, Meadowood Mall; scheduled run time for the northbound 5.5-mile route is 35 minutes; average speed is 9.4 mph. For the southbound run, the scheduled run time is 33 minutes with an average speed of 10.0 mph.
- Route 9 at 4th Street station, Kietzke/Mill Street; Harvard/Plumb Lane, Moana/Neil, Meadowood Mall; scheduled run time for the 6.5-mile southbound run is 30 minutes; average speed is 13.0 mph. For the northbound run, the scheduled run time is 40 minutes for an average speed of 10.0 mph.
- Route 13 at 4th Street station, 4th/Sutro, VA Hospital, Franktown Corners (Kietzke/Grove), Harvard/Grove Street; scheduled run time for the southbound 3.6-mile route is 24 minutes; average speed is 9.0 mph. For the northbound run, the scheduled run time is 21 minutes for an average speed of 10.3 mph.

Average drive times and speeds were observed on Tuesday, February 14, 2012. The southbound Route 9 drive was started at the 4th Street station at 1:05 PM; arrived at Kietzke/Mill at 1:11 PM, one minute faster than the scheduled bus run time; arrived at Harvard/Plumb at 1:17 PM, two minutes faster than the scheduled bus run time; arrived at Neil/Moana at 1:25 PM, one minute faster than the scheduled bus run time; and arrived at Meadowood Mall at 1:31 PM, four minutes faster than the scheduled bus run time, for an average speed of 15 mph. Of course, this does not include all of the 35 bus stops and associated dwell time. Similar results were observed for the Route 13 drive times, i.e., with slightly higher speeds and shorter drive times (without stops) than the scheduled bus run times.

Average bus operating speeds and travel times vary as summarized in Table 5.2 below:

Table 5.2: Kietzke Lane Average Bus Travel Times/Speeds

Segment	Distance (miles)	October 2011	
		Run Time	Speed
Route 9 SB 2nd/Gould to Kietzke/Vassar	1.11	4.33	15.4
Route 9 SB Grove/Kietzke to Kietzke/Moana	0.72	3.01	14.4
Route 9 NB Kietzke/Vassar to Kietzke/Prosperity	0.85	3.5	14.6
Route 9 NB Kietzke/Moana to Kietzke/Linden	0.84	5.31	9.5
Route 6 NB Kietzke/McCarran to	1.23	7.99	9.2
Route 6 SB Kietzke/Moana to Kietzke/McCarran	1.23	6.92	10.7
Route 13 NB Kietzke/Grove to Kietzke/Plumb	0.29	3.14	5.6

Source: Washoe RTC

Parsons staff observed/measured average bus run times and speeds on Wednesday, February 15, 2012. The northbound Route 9 bus run was started at the Meadowood Mall at 12:28 PM; arrived at Moana/Neil at 12:37 PM, two minutes later than the scheduled bus run time; arrived at Plumb/Harvard at 12:47 PM, same as the scheduled bus run time; arrived at Kietzke/Mill at 12:52 PM, two minutes faster than the scheduled bus run time; and arrived at the 4th Street station at 1:03 PM, five minutes ahead of the scheduled bus run time, for an average speed of 11.1 mph.

The southbound Route 9 bus run was started at the 4th Street station at 2:15 PM; arrived at Kietzke/Mill at 2:24 PM, two minutes later than the scheduled bus run time; arrived at Harvard/Plumb at 2:32 PM, three minutes later than the scheduled bus run time; arrived at Neil/Moana at 2:41 PM, five minutes later than the scheduled bus run time; and arrived at Meadowood Mall at 2:49 PM, four minutes later than the scheduled bus run time, for an average speed of 11.3 mph.

The current operating speeds are fairly low but typical of bus operations in mixed traffic flow with frequent stops. As expected, bus operating speeds are lowest during peak periods, particularly the PM peak, when traffic volumes are highest. In some cases, there are bus pullouts at the bus stops and traffic volumes delay the driver's ability to reenter the mixed flow traffic lane. Dwell times at the bus stops along the routes typically vary from 12 seconds to 40 seconds (average around 20 seconds), depending on the number of people boarding/alighting,



loading of bicycles on the front rack, and time spent with the onboard fare collection. Loading of wheelchair passengers, for example on Route 13 at the VA Medical Center on Kirman Street or Locust Street, can require upwards of 2-1/2 to 3 minutes, but this is typical of most bus operations; wheelchair unloading typically is faster, generally requiring about 1 minute.

5.2.6 Bus Crashes

Overall, bus crash rates per 100,000 miles of service have increased a small amount system wide in the past 1-1/2 years as shown in Table 3. Except for an unusual number of crashes in 2007, Reno RTC has had a safer record of operations than the national average, and since 2007, RTC's number of crashes and crash rate have been trending downward as illustrated in Table 5.3 and in Figure 5.4 below.

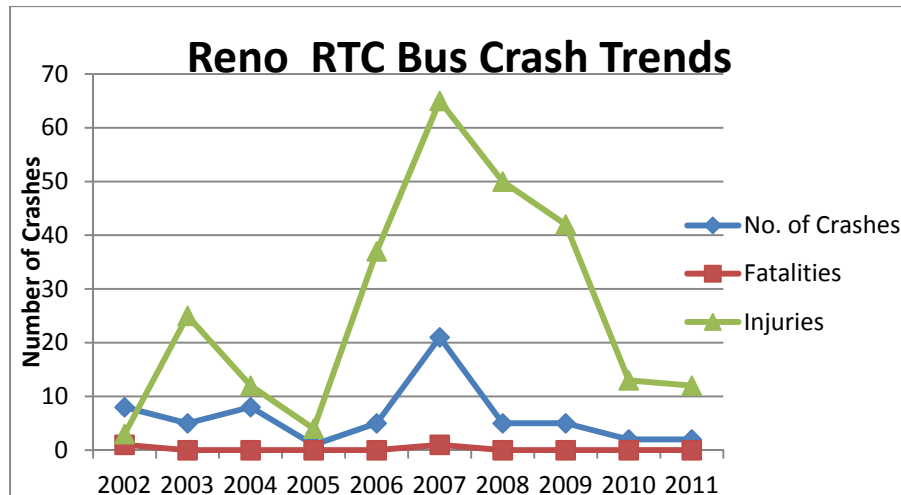
Table 5.3 Bus Crash Trends in Reno

Year	# of Crashes	Fatalities	Injuries	Crashes per 100,000 vehicle revenue miles	
				RTC	U.S. Average
2002	8	1	3	0.27	0.43
2003	5	0	25	0.17	0.38
2004	8	0	12	0.25	0.39
2005	1	0	4	0.03	0.40
2006	5	0	37	0.14	0.44
2007	21	1	65	0.58	0.41
2008	5	0	50	0.14	0.16
2009	5	0	42	0.16	0.16
2010	2	0	13	0.07	0.17
2011	2	0	12	0.07	0.16

Source: FTA Transit Database



Figure 5.4: Reno RTC Bus Crash Trends



Source: FTA Transit Database

In terms of specific transit crashes on Kietzke Lane, there was an angle crash involving a Route 9 bus and an automobile at Kietzke and Moana Lane in April 2010, and there was a rear-end crash involving a Route 9 bus at Kietzke and Roberts Street in August 2008.

5.2.7 Summary of Current Conditions

Kietzke Lane generally is served reasonably well with frequent transit service on Route 9 that generates the 5th highest ridership among the 26 fixed routes in the system. But there is no continuous service along Kietzke between 2nd Street and Meadowood Mall since the Route 9 service diverges from Kietzke at Moana Lane and then continues to Meadowood Mall via Neil Road. However, the Route 6 service connects with Route 9 at Moana/Kietzke and continues along Kietzke to Meadowood Mall, so the majority of Kietzke is served. The Route 13 service overlaps only a small portion of the Route 9 service on Kietzke between Plumb Lane and Grove Street (0.29 mile), and only for northbound buses. Those buses can operate at high speed (29 mph observed) between the two intersection stops.

Along Kietzke Lane, there are a few examples of poor sidewalk conditions, lack of sufficient ADA access, and poor lighting in some areas such as at the Kietzke/Grove intersection bus stops. The bike lanes along both sides of Kietzke appear to be little used, but provide virtual bus pullout areas at many of the bus stops. This generally provides a safer condition/environment for the autos in the curb lane, buses and passengers, but sometimes causes minor delays for buses reentering the traffic flow. As previously stated, where there are no bus pullouts, autos occasionally have to stop behind the buses in the curb lane, but the bus stop dwell times are short, so the delay is minimal. Bus crashes on the routes serving Kietzke Lane have been infrequent, indicating generally safe operating conditions and attentive bus and auto drivers.

The Kietzke roadway lanes are generally in good condition and are satisfactory at the many bus stops along the route. In general, there appears to be no need for concrete pads at the bus stop lane/dwell areas since the asphalt pavement appears to be good condition. The bus operations do not appear to be hindered or delayed by traffic volumes or intersection operations; the run times are generally within a few minutes (plus or minus) of the scheduled run times. For local bus operations, the current speeds and travel times along Kietzke Lane are reasonable.

Traffic signals and cross walks at the major intersections provides safety for bus passengers crossing the streets and/or transferring between bus routes. Some of the minor bus stop locations along Kietzke Lane are near minor cross streets and some bus passengers occasionally jaywalk, creating a minor safety issue. Several examples of this problem are the bus stops at Kietzke Lane and Roberts Street, the stops at Kietzke and Gentry Way, and the bus stops along Kietzke between Vassar Street and Plumb Lane.

5.3 FUTURE BUS FACILITIES

The RTC's FY 2012-2016 *Plan2Ride Short Range Transit Plan (SRTP)* identifies the need to strategically modify the existing fixed route structure to respond to innovative network designs improved technology, changing travel patterns, and potential funding shortages, and to enhance productivity. RTC staff has indicated that they intend to simplify the route structure with one route (Route 9) serving Kietzke Lane to provide better continuity along a longer portion of the route and reduce the need for transfers. The SRTP indicates the following changes to routes serving on or near Kietzke Lane (likely in October 2012):

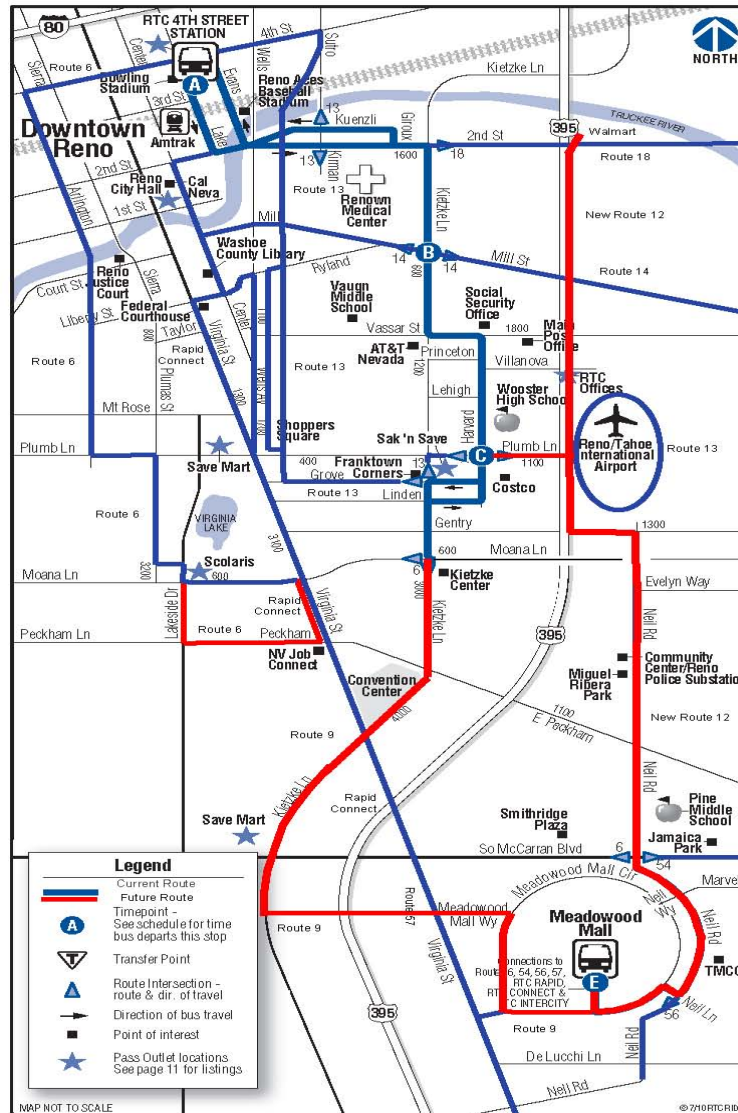
- Route 6 – the southern portion of the route shifts off of Moana east of Virginia and off of Kietzke, and terminates in a loop using Moana, Virginia, Peckham and Lakeside; no connection/transfers with Route 9. Route 6 service would start at 5:00 AM rather than the current 4:32 AM and end at 10:00 PM rather than the current 10:45 PM. Saturday and Sunday service would also be reduced.
- Route 9 – replaces Route 6 on Kietzke south of Moana, continues south on Kietzke past Virginia to Sierra Rose Drive, then to Meadowood Mall Way to the transit center. This allows travelers on Route 9 to continue south on Kietzke without a forced transfer to Route 6. Route 9 service would start at 5:00 AM rather than the current 4:06 AM and end at 10:00 PM rather than the current 1:11 AM. Saturday and Sunday service would also be reduced. A new Route 12 will operate along Neil Road between the airport and Meadowood Mall, and north along Terminal Way to the new Walmart store at 2nd Street.
- Route 13 – replaces Route 19 service to the airport; transfers between Routes 9 and 13 remain at Kietzke/Grove. Route 13 service would start at 6:00 AM rather than the

current 6:15 AM and end at 10:00 PM rather than the current 12:34 AM. Saturday and Sunday service would have the same service hours as weekdays.

- Route 14 – minor changes but still serves Mill Street and intersects Route 9 on Kietzke. Route 14 service would start at 5:00 AM rather than the current 5:15 AM and end at 10:00 PM rather than the current 1:06 AM. Saturday/Sunday service would be reduced.
- Route 18 – service on Glendale is reduced; replaced by more direct routes with one-seat rides to the employment belt; transfers between Routes 9 and 18 at Kietzke/2nd.
- Route 19 – service is eliminated; replaced by Route 13 changes to serve Plumb Lane and the airport, and by RAPID service on Virginia.
- Route 54 – no changes; transfers with Route 9 at Meadowood Mall.
- Routes 56 and 57 – Service would start at 5:00 AM rather than the current 5:24 AM and end at 10:00 PM rather than the current 6:23 PM; transfers with Route 9 at Meadowood Mall.

Figure 5.4 illustrates the future configuration of bus routes that serve portions of Kietzke Lane or intersect it, as proposed in the *Short Range Transit Plan*.

Figure 5.4 Kietzke Lane Proposed Bus Route Configuration



5.4 TRANSIT ISSUES TO BE ADDRESSED

As discussed under the summary of existing conditions, there are few transit safety issues along Kietzke Lane. The roadway is wide enough to provide sufficient capacity out to the model 2035 horizon year forecasts to maintain an acceptable level of service for all vehicular traffic, including buses, without excessive travel delay. In fact, RTC has a 95% on-time performance record throughout the transit system. This includes bus operations through all of the major

intersections along Kietzke, with no need for queue jump lanes or transit signal priority improvements.

Pedestrian crossings should be provided where possible in locations where there is a lot of bus passenger/pedestrian activity and crossings of Kietzke, as described above. However, this need must meet signal warrants if traffic signal control of the crossing is considered and be balanced with overall traffic operations in the area. High level, pedestrian activated warning systems may also be considered for these crossing and would be similar to the warning flashers now in use at the Kietzke Lane/Roberts Street intersection. Sidewalk improvements, particularly to ensure ADA access, and to facilitate passenger access to bus stops, represent another important area of transit-related safety improvements that should receive attention.

5.5 PROPOSED TRANSIT IMPROVEMENTS

Beyond the bus route changes listed above, RTC will continue to identify needed bus service improvements, but no major improvements are anticipated in the near future. RTC is in the process of improving bus stops on all routes, particularly in terms of providing benches at all stops.

On an ongoing basis, RTC also evaluates all bus operations, ridership trends, transfers, and costs, and identifies opportunities for improvements as required. RTC places strong emphasis on safety throughout the transit operation and will continue to work with NDOT and the City of Reno to identify any needed safety improvements along all transit system routes including Kietzke Lane. RTC management also gets input from bus operators since they have the best “eyes on the street” on a daily basis and can identify issues, including safety, which should be addressed along each bus route.

6.0 KIETZKE LANE SAFETY MANAGEMENT PLAN ISSUES AND RECOMMENDATIONS

6.1 ISSUES AND RECOMMENDATIONS INTRODUCTION

This section documents the safety issues found on the Kietzke Lane corridor between Galletti Way and South Virginia Street and the potential recommended improvements to address these issues. This section is presented in four issues categories that include **ADA (American Disabilities Act), Transit, Roadway, Pedestrians and Bicycles**. This section also includes a sub-section on right of way needs that would be required by some of the recommended improvements. The primary goal of the recommendations is to improve safety on the Kietzke Lane corridor. Tables 6.1 and 6.2 can be found in the Appendix and are the summary matrices for the Kietzke Lane Issues and Recommendations.

6.2 ADA ISSUES AND RECOMMENDATIONS

The Regional Transportation Commission of Washoe County (RTC) Reno/Sparks ADA Transition Plan (October 2011) identified sidewalk, curb ramp, driveway and transit stop ADA issues on Kietzke Lane between Galletti Way and South Virginia Street. These issues are in three location priority categories:

- High Location Priority – State and local government offices and facilities, transportation (includes bus stops) and areas identified at public outreach meetings.
- Medium Location Priority – Places of public accommodation (private sector facilities covered by ADA Title III) and places of employment.
- Low Location Priority – Other areas.

The ADA deficiencies are documented in the RTC ADA Transition Plan, Appendix B – Matrix of Deficiencies.

This report ranks proposed improvements into three priority categories. The improvement recommendation priorities are:

- **Priority 1 – Improvements or actions that can be undertaken in the immediate future by NDOT District 2 staff or NDOT Headquarters staff.**
- **Priority 2 – Improvements that can be included in a future NDOT or RTC project.**
- **Priority 3 – Improvements that can be included in a long range improvement plan.**

- **Sidewalk Issues** – Sidewalk issues include missing sidewalk/curb and gutter, damaged sidewalk (vertical/horizontal displacement, holes, utility covers, etc.), non-continuous sidewalk and obstructions with less than 32” of horizontal clearance (utility poles and guy wires, sign posts, traffic signal poles/cabinets, fire hydrants and vegetation). Sidewalk issues identified in the Reno/Sparks ADA Transition Plan on the Kietzke Lane SMP segment included 6 High Priority locations and 165 Medium Priority locations.

Photos 1-11 illustrate sidewalk issues and Photo 12 shows a potential mitigation for sidewalk obstructions:



Photo 1 – Damaged sidewalk



Photo 2 – Damaged sidewalk



Photo 3 – Utility pole obstruction



Photo 4 – Traffic signal cabinet obstruction



Photo 5 – Missing sidewalk



Photo 6 – Missing sidewalk



Photo 7 – Fire hydrant obstruction



Photo 8 – Damaged utility cover



Photo 9 – Utility pole guy wire obstruction



Photo 10 – Vegetation obstruction



Photo 11 – Sidewalk not continuous



Photo 12 – Example of obstruction pass-around

Sidewalk Recommendations

- ❖ ***Priority 1 – Recommend developing an inventory of all damaged sidewalk for replacement in upcoming Kietzke Lane projects or as part of a project funded as a safety improvement project.***

- ❖ ***Priority 1 – Recommend NDOT District 2 installs a “Sidewalk Closed Ahead – Cross Here” sign (R9-11) on the northeast corner of the Kietzke Lane/2nd Street intersection. Pedestrians can cross Kietzke Lane from this corner using the traffic signal and use the sidewalk on the west side of Kietzke Lane. See Photo 11.***

- ❖ *Priority 2 – Recommend the replacement of damaged sidewalk along the Kietzke Lane corridor.*
- ❖ *Priority 2 – Recommend the installation of sidewalk/curb and gutter where it is currently missing on the Kietzke Lane corridor between Galletti Way and South Virginia Street.*
- ❖ *Priority 2 – Recommend including sidewalk obstruction mitigation in upcoming Kietzke Lane projects by removing/relocating obstructions where feasible from the sidewalk area or provide additional sidewalk width (pass-around) on the back side of the obstruction. See Photo 12.*
- ❖ *Priority 2 – Recommend the traffic signal controller cabinet that is obstructing the sidewalk on the southwest corner of the Kietzke/Gentry intersection be moved behind the sidewalk. This will require an easement or acquisition of right of way for the new cabinet location. See Photo 4.*
- ❖ *Priority 3 – Recommend addressing sidewalk obstructions not mitigated in upcoming Kietzke Lane projects by widening the sidewalk into the parking area to attain the required ADA spacing around the obstructions. This will require the removal of on-street parking along some sections of Kietzke Lane and possible reprofiling of the pavement in the travel lane adjacent to the new sidewalk/curb and gutter.*
- **Curb Ramp and Pedestrian Push Button Issues** – Curb ramp issues include missing ramps, missing detectable warning strips, ramp slopes of 10% or greater, gutter slope plus curb ramp slope of 14% or greater, no top landing space, no flush transition at pavement edge and not aligning with the marked crosswalks. Pedestrian Push Button issues at signalized intersections includes the size of push button (2" diameter button is compliant), no level landing area next to the button, the button height exceeds 48" and buttons are out of reach. Curb ramp and Pedestrian Push Button issues identified in the RTC ADA Transition Plan on the Kietzke Lane SMP segment included 15 High Priority locations and 123 Medium Priority locations.

Photos 13-16 illustrate some of the curb ramp and pedestrian push button issues:



Photo 13 – Missing detectable warning on ramp



Photo 14 – Ramp offset from crosswalk



Photo 15 – Missing curb ramp and pedestrian button accessibility



Photo 16 – Missing wheelchair landing

Curb Ramp Recommendations

- ❖ **Priority 2** – *Using the Reno-Sparks ADA Transition Plan, recommend identification of all non-ADA compliant curb ramps and pedestrian push buttons on Kietzke Lane and include in upcoming Kietzke Lane projects or as part of a project funded as a safety improvement project.*
- ❖ **Priority 3** – *Recommend addressing non-ADA compliant curb ramps and pedestrian push buttons not mitigated in upcoming Kietzke Lane projects by inclusion into a long range improvement plan.*
- **Driveway Issues** – Driveway issues include significant cross slopes that make it difficult to traverse the driveways for persons using wheelchairs and walkers and the lack of level areas at the back of driveways. Driveway issues identified in the RTC ADA Transition Plan on the Kietzke Lane SMP segment included 13 High Priority locations and 102 Medium Priority locations. Guidance on driveway design can be found in the NDOT Access Management System and Standards manual and in the Reno Sparks Bicycle & Pedestrian Plan: Design Best Practices manual.

Photos 17-20 illustrate some of the driveway issues:





Photo 18 – Driveway cross slope issue



Photo 19 – Lack of defined driveway



Photo 20 – Lack of defined driveways

Driveway Recommendations

- ❖ ***Priority 2 – Using the RTC Reno-Sparks ADA Transition Plan, recommend identification of all non-ADA compliant driveways on Kietzke Lane and include in upcoming Kietzke Lane projects or as part of a project funded as a safety improvement project. This would also include the consolidation of multiple driveways at parcels with more than one driveway based on the guidelines in the NDOT Access Management System and Standards manual.***
- ❖ ***Priority 3 – Recommend addressing non-ADA compliant driveways not mitigated in upcoming Kietzke Lane projects by inclusion into a long range improvement plan.***

6.3 TRANSIT STOP ISSUES AND RECOMMENDATIONS

- **Transit Stop Issues** – Transit stop issues include inadequate space to service wheelchairs from the transit vehicle and transit shelters and benches at transit stops with inadequate space to accommodate wheelchairs. Transit stops that are on opposite sides of the street can result in pedestrian jaywalking between the transit stops. Transit stop issues identified in the RTC ADA Transition Plan on the Kietzke Lane SMP segment included 11 High Priority locations and 7 Medium Priority locations.

Photos 21 and 22 illustrate some of the transit stop issues:



Photo 21 – Transit stop – limited space for bench or shelter



Photo 22 – Transit stop with limited wheelchair space

Transit Stop Recommendations

- ❖ ***Priority 1 – Recommend a coordinated assessment of the Kietzke Lane transit stops with RTC Transit to determine short term improvements that can be made to meet ADA requirements.***
- ❖ ***Priority 2 – Recommend the Kietzke Lane transit stops that cannot be made ADA compliant through short term improvements be included in future projects.***
- ❖ ***Priority 1 – Recommend RTC Transit and NDOT District 2 staff evaluate the feasibility of implementing bus turn-outs at the transit stops on Kietzke Lane.***

6.4 ROADWAY ISSUES AND RECOMMENDATIONS

- **Kietzke Lane at Plumb Lane and 2nd Street Issues** – These two intersections have large radii, sweeping right turn lanes that do not work well in an urban environment. Operational issues result from the lack of merge lanes at most of the cross street tie-in points. These turn lanes are not pedestrian friendly, have sight distance issues that are not easily resolved and have minimal merging distances for right turning operations. The sweeping right turn lanes also present challenges to older drivers that have a reduced ability to turn their heads to observe on-coming traffic where the right turn lanes merge into the cross street through lanes.

Photos 23 and 24 show the current configuration at the 2nd Street and Plumb Lane intersections:



Photo 23 – Kietzke and 2nd St.



Kietzke Lane intersections at Plumb Lane and 2nd Street Recommendations

- ❖ ***Priority 2 – Recommend the sweeping right turns at the Kietzke Lane intersections at Plumb Lane and 2nd Street be removed and replaced with standard right turn only lanes at the intersection.***
- ❖ ***Priority 1 – Recommend a feasibility study to consider replacing the current Kietzke Lane intersection configurations at Plumb Lane and 2nd Street with a roundabout configuration.***
- ❖ ***Priority 3 – If the feasibility study of the Kietzke Lane intersections at 2nd Street and Plumb Lane show positive benefits from conversion to a roundabout configuration, recommend the roundabout configuration be implemented at one or both of these intersections.***
- **Moana Lane Southbound Approach on Kietzke Lane** –When the dual left turn lanes were implemented on the north leg (southbound traffic) of the Moana Lane/Kietzke Lane intersection it required that southbound through traffic be moved over to go around the left turn lanes. The road safety audit that was conducted on Kietzke Lane in November 2011 noted that some southbound motorists were getting in the outside left turn lane.

Moana Lane Southbound Approach on Kietzke Lane Recommendation

- ❖ **Priority 1 – On southbound Kietzke Lane, north of Moana Lane, recommend that a dotted line be striped along the left side of the left through lane across the opening of the left turn lane to direct southbound through traffic away from the left turn lane.**
- **Street Lighting Issues** – Street lighting on the Kietzke Lane corridor primarily exists at the signalized intersections. At night there is ambient light from the adjacent businesses, however this light is insufficient for any pedestrian crossing and bicycle lane activity. On those sections of Kietzke Lane where no businesses exist, i.e. between Plumb Lane and Vassar Street, the roadway is very dark at night. Approximately 21% of all crashes on Kietzke Lane occur during hours of darkness and at dusk/dawn hours.

Street Lighting Recommendations

- ❖ **Priority 2 – Recommend the development and implementation of a corridor-wide street lighting plan as part of a future corridor improvement plan.**
- **Access Management Issues** – The NDOT Access Management System and Standards manual provides guidance for the functional classifications found on Kietzke Lane, i.e. Principal Arterial and Minor Arterial. The following access requirements for these functional classifications include:
 - Principal Arterial – Opposing traffic movements should be separated by medians; traffic signals should be programmed to coincide with the posted speed limit and have a progressive bandwidth of greater than 45%; public road spacing of 0.25 mile; limited direct access to private property; private driveway spacing of 250 feet minimum and only allow right turns into and out of private driveways.
 - Minor Arterial – Left turns will be allowed into and out of private driveways under certain conditions; traffic signals will be allowed and half-mile spacing with traffic signal progression that allows a 40% bandwidth and roundabouts may be considered on a case by case basis; public road spacing of 0.25 mile; limited direct access to private property and private driveway spacing of 250 feet minimum.

The field surveys of Kietzke Lane found raised medians at 8 of the 10 signalized intersections. The Mill Street and Grove Street intersections have no raised medians and three other signalized intersections have medians on only one approach. Left turns to and from Kietzke Lane at driveways in close proximity to the signalized intersections that have no raised medians result in increased traffic conflicts and crashes. Between intersections there is a two-way left turn lane except between Galletti and Kuenzli where raised median exists for that entire section. Driveway spacing generally does not

meet the access standards and there are numerous driveways that have been closed off and still have a driveway approach. The west side of Kietzke Lane north of Mill Street has no defined driveway due to a lack of curb, gutter and sidewalk. At some locations along the car dealerships frontages the vehicle hauler trucks use the two-way left turn lanes to load and unload vehicles.

In the 5 year study period between October 1, 2006 and September 30, 2011 there were 87 crashes that could be attributed to vehicles turning left into or out of private driveways along the Kietzke study corridor. See Photos 25, 26 and 27 for access management issues:



Photo 25 – Raised median at the Plumb Lane intersection



Photo 26 – Lack of defined driveways



Photo 27 – Vehicle hauler truck using median turn lane

Access Management Recommendations

- ❖ ***Priority 2 – Recommend the installation of center raised median on the north and south legs of the signalized intersections of Kietzke Lane that do not have raised median. The length of the raised medians should extend past the effective left turn***

lanes at these intersections (based on field observations and left turn demand calculations).

- ❖ *Priority 1 – Recommend a feasibility study of those portions of Kietzke Lane that do not have center raised medians (not including signalized intersection approaches) to determine the need to install raised medians to control left turn movements into and out of driveways.*
- ❖ *Priority 3 – Based on the findings of the feasibility study for center raised medians between signalized intersections, recommend installation of center raised medians on Kietzke Lane at selected locations between signalized intersections.*
- ❖ *Priority 2 – Recommend the removal of driveway approaches at those locations on Kietzke Lane where property owners/businesses have physically closed driveways.*
- ❖ *Priority 1 – Recommend that NDOT District 2 staff in coordination with the law enforcement agencies, contact car dealerships along the Kietzke Lane corridor and set a deadline for the prohibition of vehicle hauler trucks from using the two-way left turn lane for the purpose of loading and unloading vehicles.*
- **Traffic Signal Head Visibility** – The visibility of traffic signal heads is critical for drivers approaching a signalized intersection especially at night. If traffic signal heads are not aligned properly with the traffic lanes, drivers may inadvertently cross into adjacent lanes while traversing the intersection (see Photo 28). Older drivers may have difficulties locating the traffic signal heads at night if there are competing light sources behind the signal heads.



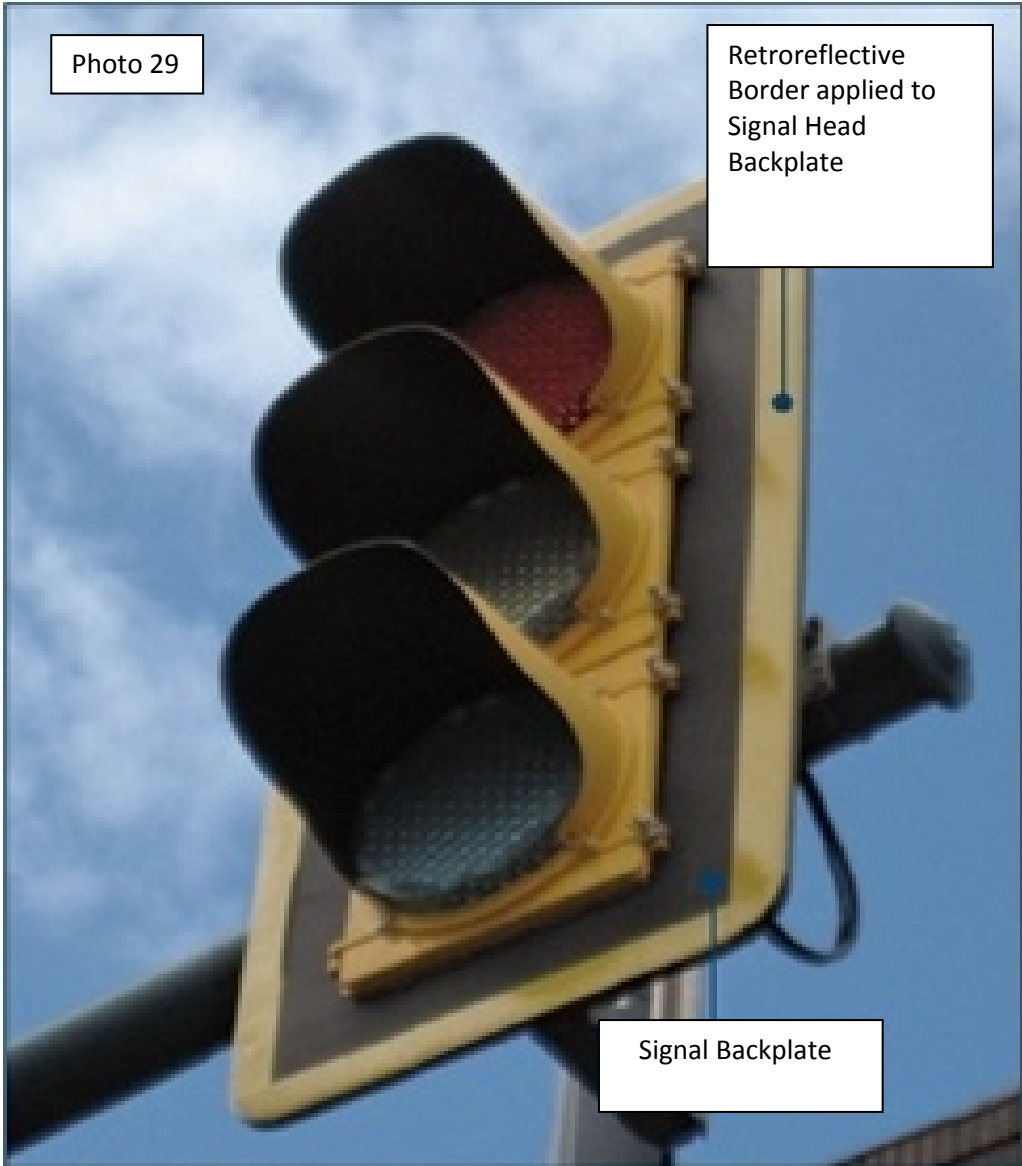
Photo 28 – Traffic signal head lane offset at Vassar Street

Traffic Signal Head Visibility Recommendations

- ❖ ***Priority 1 – Recommend NDOT District 2 staff, in coordination with City of Reno staff, performs a review of all signalized intersections and develops a list of traffic signal head locations that need to be modified for proper lane alignment. This review will determine if the existing mast arms can be modified to reposition the traffic signal heads or if new mast arms, poles and foundations will be required.***
- ❖ ***Priority 2 – Recommend that all identified traffic signal head alignment issues be addressed on a future NDOT or RTC project.***
- ❖ ***Priority 2 – Recommend the backplates on all traffic signal heads on the Kietzke Lane corridor be replaced with retroreflectorized backplates to improve the nighttime target value of the signal heads (see Photo 29).***

Photo 29

Retroreflective
Border applied to
Signal Head
Backplate



Signal Backplate

- **Drainage Issue** – The NDOT District 2 maintenance staff indicated a drainage issue exists on the west side of Kietzke Lane, south of Lewis Street (335 Kietzke Lane) due to a lack of a drainage inlet and where the sidewalk ends into a paved access that blocks stormwater flow and causes water to cover the active travel lane. See Photo 30.



Photo 30 – Drainage issue at 335 Kietzke Lane

Drainage Issue Recommendations

- ❖ ***Priority 2 – Recommend the drainage issue at 335 Kietzke Lane be addressed on a future project. This work would be done in coordination with the resolution of the driveway and sidewalk/curb and gutter improvements north of the drainage issue.***
- **Traffic Signal Timing Issues** – Traffic signal timing parameters may have an impact on the safe operations of signalized intersections. This would include gap out time, yellow clearance time and all-red time. The Kietzke Lane road safety audit conducted in November 2011 also determined the right turn overlap for the westbound to northbound right turn movement at the Kietzke Lane/Peckham Lane intersection may need revision. The crosswalk for this right turn movement is preceded by a stop bar only 31 feet from the traffic signal head which does not meet the distance requirement of 40 feet (Manual on Uniform Traffic Control Devices, Section 4D.14 Longitudinal Positioning of Signal Faces). See Photo 31.



Photo 31 – Kietzke Lane and Peckham Lane

Traffic Signal Timing Issues

- ❖ ***Priority 1 – Recommend NDOT District 2 staff coordinates with the City of Reno Traffic Engineering to review all traffic signal timing parameters at the signalized intersections on the Kietzke Lane corridor and make adjustments as needed.***
- ❖ ***Priority 1- Recommend NDOT District 2 staff coordinates with the City of Reno Traffic Engineering to review the westbound to northbound right turn overlap signal operation at the Kietzke Lane/Peckham Lane intersection.***
- ❖ ***Priority 1 – Recommend NDOT District 2 staff relocates the stop bar for the westbound to northbound movement at the Kietzke Lane/Peckham Lane intersection to be a minimum of 40 feet from the traffic signal head controlling this right turn movement.***
- ❖ ***Priority 1 – Recommend NDOT District 2 install a “No Right Turn on Red” sign for the westbound to northbound right turn movement at the Kietzke Lane/Peckham Lane intersection.***

6.5 PEDESTRIAN/BICYCLE ISSUES AND RECOMMENDATIONS

Four out of five fatal crashes on the Kietzke Lane study corridor and intersecting cross streets between October 1, 2006 and September 30, 2011 involved pedestrians (3 fatalities) and bicycles (1 fatal). The pedestrian fatal crashes occurred on Kietzke Lane between Peckham Lane and Moana, at Prosperity Street, at Roberts Street and on Peckham Lane east of Kietzke Lane. The bicycle fatality occurred on the westbound approach at Kietzke Lane and Mill Street. During this same time period there were an additional 14 pedestrian injury crashes and 12 bicycle injury crashes on the Kietzke Lane corridor.

6.5.1 PEDESTRIAN ISSUES

Pedestrian issues include marked crosswalks at non-signalized intersections with no advance warning signs or pedestrian activated high-level warning devices; long distances between signalized intersections and marked crosswalks at non-signalized intersections; minimal or no street lighting at marked crosswalks at non-signalized intersection, safe pedestrian access for the Reno Sparks Indian Colony to their medical clinic on Kunezli Street and large numbers of Wooster High School students crossing Kietzke Lane at unprotected locations. Most of the pedestrian signals at signalized Kietzke Lane intersections do not utilize the countdown timers.

- **Pedestrian Signal Heads** – Crossing streets at signalized intersections can be confusing for pedestrians that are not familiar with the function of the “Walking Person”, “Hand” and “Flashing Hand” symbols. Adding a countdown sequence to the pedestrian heads eliminates much of the confusion and gives pedestrians a time-definite period for crossing the street. The use of these pedestrian signal heads with countdown timers has become widespread in Nevada.

Pedestrian Signal Head Recommendation

- ❖ ***Priority 2 – Recommend upgrading the pedestrian signal heads at the Kietzke Lane signalized intersections to pedestrian signal heads with countdown timers.***
- **Non-signalized Pedestrian Crossing Assessment** – The pedestrian crash history on Kietzke Lane shows about half of the pedestrian crashes occurred at uncontrolled (non-signalized) intersections or at locations between intersections. The Reno Sparks Bicycle and Pedestrian Master Plan – Northern Nevada Pedestrian Safety Action Plan (October 2011), addressed the issue of uncontrolled pedestrian crossings in Table 1, *Crossing Treatment Recommendations by Roadway Type and Speed* shown below. The table indicates the decision to install uncontrolled pedestrian crossings on the Kietzke Lane corridor should consider high level traffic control devices.

Table 6.1 CROSSING TREATMENT RECOMMENDATIONS BY ROADWAY TYPE AND SPEED												
Number of Vehicle Travel Lanes	Vehicle ADT ≤ 5,000			Vehicle ADT > 5,000 to 12,000			Vehicle ADT > 12,000 to 20,000			Vehicle ADT > 20,000		
	Speed Limit ¹											
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph
2 lanes	1	1	2	1	1	2	1	1	3	1	2	3
3 lanes	1	1	2	1	2	2	2	2	3	2	3	3
4 or more lanes	1	2	2	2	2	3	2	2	3	3	3	3
4 or more lanes (with raised median)	1	2	3	2	2	3	3	3	3	3	3	3

Notes: ¹ Unsignalized locations with a speed limit greater than 40 mph should include more than a striped crosswalk alone.

Crossing Types:
 1 = Crossings should include a minimum of High Visibility Crosswalk Striping, and consider additional treatments such as a Pedestrian Refuge Island and/or Advanced Yield Lines.
 2 = Crossings should include an enhanced treatment such as a Raised Crosswalk, In-Street Pedestrian Crossing Signs, Overhead Flashing Beacons, or Rectangular Rapid Flashing Beacon.
 3 = Controlled crossing treatments such as a HAWK Signal, Pedestrian Signal, or Two-Stage Crossing should be considered. A signal warrant analysis should be performed prior to installation of a traffic signal.

Source: Washoe RTC, Reno Sparks Bicycle & Pedestrian Plan – No. Nevada Pedestrian Safety Action Plan, October 2011

The following locations are candidates to be evaluated for the installation of **pedestrian safety facilities that may include marked crosswalks; crossing and advanced crossing signing; pedestrian oriented pavement messages; pedestrian refuge islands with two stage crossings and pedestrian activated high level warning or traffic control devices:**

- Kuenzli Street at Kietzke Lane (Segment 2) – No crosswalks exists at this Stop sign controlled intersection. This is a potential walking route for the Reno-Sparks Indian Colony (RSIC) residents to access the RSIC medical clinic located west of this intersection on Kuenzli. The Kuenzli Street/Kietzke Lane intersection is approximately 630 feet north of the signalized 2nd Street/Kietzke Lane intersection
- Lewis Street at Kietzke Lane (Segment 2) – This is a Stop sign controlled offset intersection that has no marked crosswalks and no pedestrian crashes in the past 5 years. The Lewis Street/Kietzke Lane intersections are approximately 385 and 540 feet, respectively, from the 2nd Street/Kietzke Lane intersection.
- Prosperity Street at Kietzke Lane (Segment 2) – This is a ‘T’ intersection that has one marked crosswalk, no pedestrian crossing signs and had a pedestrian fatal crash in the past 5 years.

- Roberts Street at Kietzke Lane (Segment 3) – This Stop sign controlled ‘T’ intersection has a marked crosswalk and pedestrian activated rectangular rapid flashing beacons. It has had one pedestrian fatal crash and two pedestrian injury crashes in the past 5 years.
- Taylor Street/Automotive Way at Kietzke Lane (Segment 3) – These two Stop sign controlled ‘T’ intersections are separated by approximately 150 feet. Neither location has a marked crosswalk. There was one pedestrian injury crash at the Automotive Way intersection.
- Apple Street at Kietzke Lane (Segment 4) – This Stop sign controlled intersection has no marked crosswalks and is approximately 760 feet south of Plumb Lane. Wooster High School students living west of Kietzke Lane have been observed crossing at this intersection. Photo 32 shows a pedestrian at this intersection with a loaded grocery cart and Photo 33 shows the high school students crossing at the same location. There is no pedestrian crash history at this intersection in the past 5 years.
- Grove Street to Gentry Lane (approximately 2100 feet) (Segment 4) – There are two Stop sign controlled public street intersections on this section of Kietzke Lane; one is a full intersection at Linden Street (approximately 400 feet south of Grove Street) and the other exists as a ‘T’ intersection at Snowbird Lane (approximately 400 feet south of Linden Street). This intersection provides access to a mobile home park on the east side of Kietzke Lane. There are no marked crosswalks at either intersection or any other location on this section of Kietzke Lane. There are RTC transit stops on this section of Kietzke Lane on opposite sides of the street. There was one pedestrian injury crash in the past 5 years at the Linden Street intersection. The remainder of Kietzke Lane between Snowbird Lane and Gentry Lane has a collection of private driveways serving mobile home parks and businesses.
- Moana Lane to Peckham Lane (Segment 5) – There are no marked crosswalks or public street intersections on this 2040 foot section of Kietzke Lane. There was one pedestrian fatal crash that occurred north of Peckham Lane.
- Peckham Lane to South Virginia Street (Segment 5) – There are no marked crosswalks or public street intersections on the 1850 foot section of Kietzke Lane. There were no pedestrian crashes on this section of Kietzke Lane in the past 5 years.



Photo 32 – Pedestrian crossing Kietzke at Apple St.



Photo 33 – High school students crossing Kietzke at Apple

Non-signalized Pedestrian Crossing Assessment Recommendations

- ❖ **Priority 1 - Kuenzli Street at Kietzke Lane – Recommend an evaluation of pedestrian activity be conducted at the Kuenzli Street/Kietzke Lane intersection to determine if the installations of pedestrian safety facilities are warranted.**
- ❖ **Priority 1 - Lewis Street at Kietzke Lane – Recommend an evaluation of pedestrian activity be conducted at the Lewis Street/Kietzke Lane intersection to determine if the installations of pedestrian safety facilities are warranted.**
- ❖ **Priority 1 - Prosperity Street at Kietzke Lane - Recommend NDOT District 2 install Crosswalk Warning signs and Advanced Crossing signs in each direction for the marked crosswalk at the Kietzke Lane/Prosperity Street marked crosswalk.**
- ❖ **Priority 1 - Prosperity Street at Kietzke Lane - Recommend an evaluation of pedestrian activity be conducted at the Prosperity Street/Kietzke Lane intersection to determine if the installation of pedestrian safety facilities is warranted.**
- ❖ **Priority 2 - Roberts Street at Kietzke Lane - Recommend the installation of street lights at the Kietzke Lane/Roberts Street intersection. The street lights should be on both sides of the street and cover the marked crosswalk.**
- ❖ **Priority 1 - Taylor Street and Automotive Way at Kietzke Lane - Recommend an evaluation of pedestrian activity be conducted at the Taylor Street and Automotive Way/Kietzke Lane intersections to determine if the installations of pedestrian safety facilities are warranted.**
- ❖ **Priority 1 - Apple Street at Kietzke Lane – Recommend an evaluation of pedestrian activity be conducted at the Kuenzli Street/Kietzke Lane intersection to determine if the installations of pedestrian safety facilities are warranted.**
- ❖ **Priority 1 - Grove Street to Gentry Street – Recommend an evaluation of pedestrian and RTC transit stop activity be conducted on the section of Kietzke Lane that is between 850 and 1500 feet south of Grove Street to determine if the installations of pedestrian safety facilities are warranted.**
- ❖ **Priority 1 - Moana Lane to Peckham Lane section of Kietzke Lane – Recommend an evaluation of pedestrian activity be conducted on Kietzke Lane from the Peckham Lane to a point 900 feet north of Peckham Lane during activities at the Reno-Sparks Convention Center to determine if the installations of pedestrian safety facilities are warranted.**

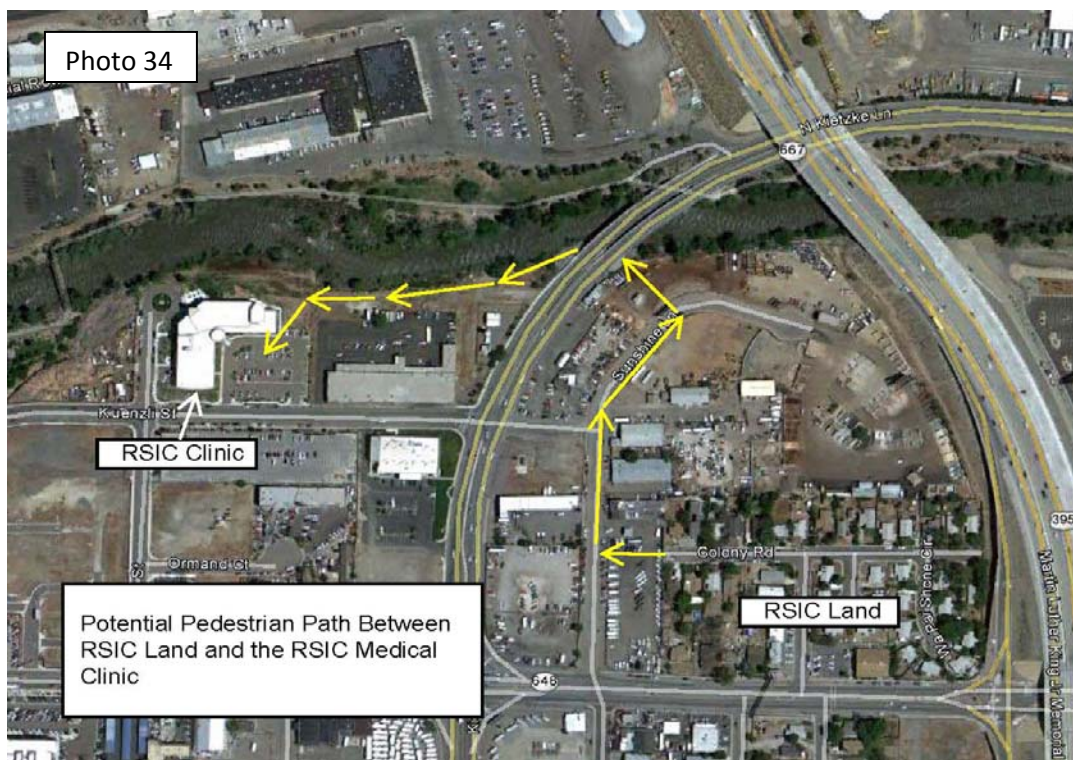
❖ **Priority 2 – If feasibility studies at any of the following locations on Kietzke Lane justify establishing pedestrian crossings, recommend the installation of marked crosswalks, raised medians with pedestrian path offsets, curb ramps, street lighting, warning signs and pedestrian activated flashers/signals:**

- **Kunezli Street**
- **Lewis Street**
- **Prosperity Street**
- **Taylor Street/Automotive Way**
- **Apple Street**
- **Between 850 and 1500 feet south of Grove Street**
- **900 feet north of Peckham Lane**

- **Pedestrian access to the Reno Sparks Indian Colony Medical Clinic** – the Reno Sparks Indian Colony (RSIC) medical clinic on Kuenzli Street is located several blocks from the RSIC land and requires that pedestrian access to the clinic is done by crossing Kietzke Lane . At present few of the colony residents walk to the clinic. In the early phase of the project it was suggested that a safer walking route to the clinic be explored. See Photo 34 below.

Recommendation for safe pedestrian access to the RSIC medical clinic

- ❖ ***Priority 1 – Recommend that NDOT staff coordinate with RSIC and Washoe County Flood Control representatives for on-going effort to build a walking path between the RSIC property and the medical clinic. This will result in an established path along the south side of the Truckee River and traverse under the Kietzke Lane bridge over the Truckee River. It will be similar to the existing shared use path that runs along the north side of the Truckee River in this same area.***



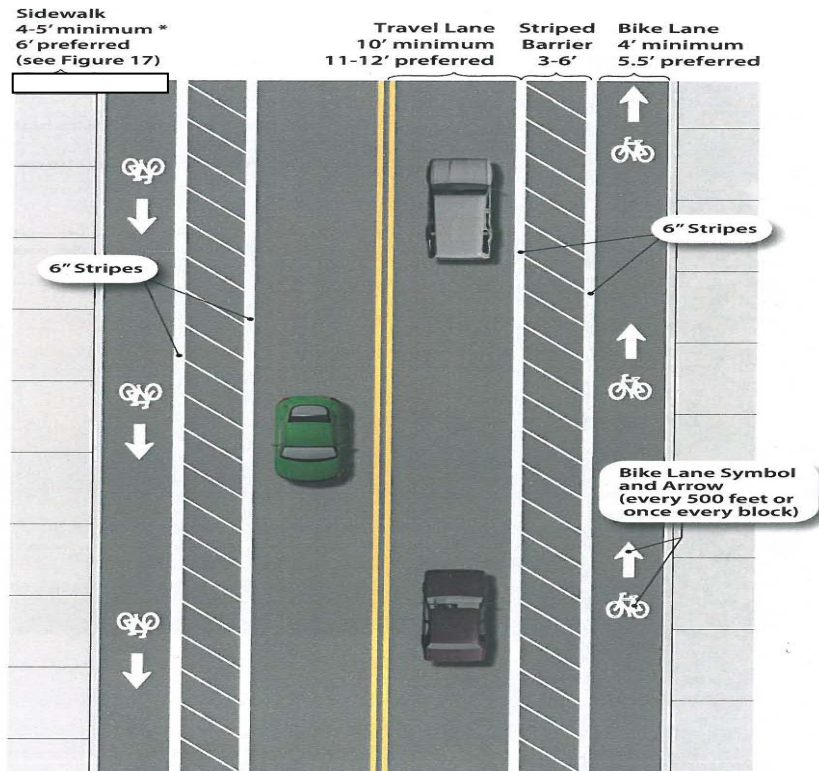
6.5.2 BICYCLE ISSUES

Bicycle issues include the following: existing bicycle lane is directly adjacent to vehicular traffic traveling at 40 mph or greater; the existing bicycle lane needs additional bicycle pavement markings and signing; a critical portion of the bicycle lane was eliminated in the southbound direction between Gentry Way and a point 180 feet south of Moana Lane; the bicycle lane markings are missing in the southbound direction between Peckham Lane to a point 470 feet north of Peckham Lane; the bicycle lane width is less than 4 feet along several sections of Kietzke Lane and signalized intersections present safety issues for bicyclists that need to make left turns or continue through the intersection when the green interval begins.

- **Existing Bicycle Lane Adjacent to High Speed Traffic** – The posted speed limit on the Kietzke Lane corridor is 40 mph and motorists often exceed this speed limit during off-peak times. This puts bicyclists within a few feet of high speed traffic. The RTC Reno Sparks Bicycle & Pedestrian Plan, Design Best Practices (October 2011) offers a buffered bicycle lane concept to provide protection from adjacent vehicular traffic. This concept is shown in the figure below (for conceptual use only):



Conceptual Depiction of Buffered Bicycle Lanes



Source: Reno Sparks Bicycle & Pedestrian Plan – Design Best Practices, October 2011

Recommendations for Existing Bicycle Lane Adjacent to High Speed Traffic

- ❖ **Priority 2 – Recommend the installation of a buffered bicycle lane on Kietzke Lane where space is available. This would require the removal of on-street parking and adding cross hatch markings to the existing bicycle lane. The removal of on-street parking would also allow for the widening of the sidewalk into the street area which would address the sidewalk obstruction issues discussed in the ADA section of this report.**
- **Existing Bicycle Lane Needs Additional Signing and Pavement Markings** – The field reviews indicated a need for additional bicycle lane signing and pavement markings to clearly delineate the bicycle lane along the Kietzke Lane corridor. Pavement markings are also needed at the signalized intersections to delineate the path to take by the bicyclists to traverse the intersection and minimize conflicts with right turning vehicles.

Recommendations for Additional Signing and Pavement Markings for Existing Bicycle Lanes

- ❖ **Priority 1 – Recommend NDOT District 2 install Bike Lane signs (R3-17) at appropriate spacing along the corridor and install “Begin Right Turn Lane – Yield to Bikes” signs (R4-4) at signalized intersections per the guidelines of the Manual on Uniform Traffic Control Devices (MUTCD).**
- ❖ **Priority 1 - Recommend the installation of the Bike Symbol (Bike Symbol or Helmeted Bicyclist Symbol) and Arrow symbol in the bicycle lane at periodic spacing along the corridor.**
- **Missing Bicycle Lane in the Vicinity of Moana Lane and Peckham Lane** – When the southbound dual left turns were implemented at the Moana Lane/Kietzke Lane intersection a portion of the southbound bicycle lane was eliminated between Gentry Way and to a point 180 feet south of Moana Lane. The bicycle lane also does not exist from Peckham Lane to a point 470 feet north of Peckham Lane. A review of the Moana Lane widening project plans (RTC project that is currently underway) indicates there will be no widening on the west side of Kietzke Lane to re-instate the southbound bicycle lane. See Photos 35 and 36.

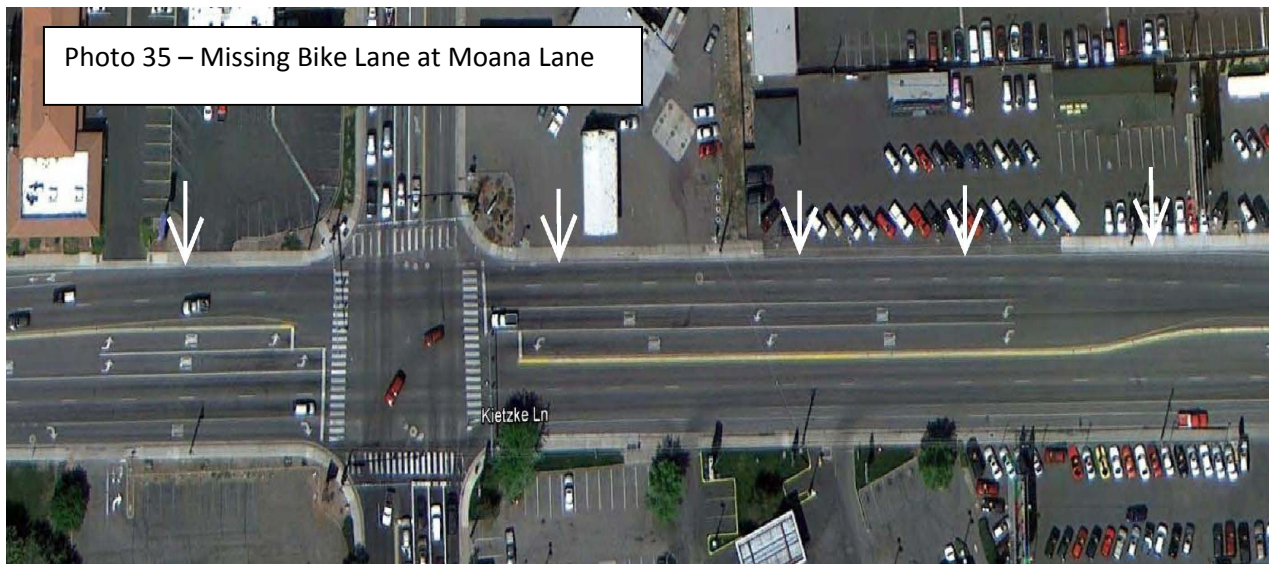


Photo 36 – Missing Bike Lane north of Peckham



Recommendations for Missing Bicycle Lanes at Moana and Peckham

- ❖ ***Priority 1 – Recommend installing “Bicycles May Use Full Lane” signs (R4-11) and “Shared Lane Markings” on the southbound lane of Kietzke Lane, north and south of the Moana Lane intersection where the bicycle lane does not exist.***
- ❖ ***Priority 3 – Recommend installing the bicycle lane north and south of Moana Lane by acquiring right of way and widening along the west side of Kietzke Lane.***
- ❖ ***Priority 3 – Recommend installing the bicycle lane north of Peckham Lane along the west side of Kietzke Lane by removing a portion of the channelizing island at the Reno-Sparks Convention Center driveway and providing the appropriate pavement markings and signing.***
- **Bicycle Lane Width at Less Than 4 Feet** – The RTC Reno Sparks Bicycle & Pedestrian Master Plan (October 2011) identified four segments of bicycle lane on Kietzke Lane that did not meet the minimum width of 4 feet. These are located at: 1) Lewis Street to Mill Street, 2) Stewart Street to Roberts Street, 3) Taylor Street to Vassar Street and 4) Plumb Lane to Apple.
- ❖ ***Priority 1 – Recommend NDOT District 2 staff conduct an evaluation of the four sections of bicycle lane that are less than 4 feet in width and determine the appropriate action needed to provide bicycle lane width of 4 feet or greater. The bicycle lane width between Lewis Street and Mill and Stewart Street and Roberts Street may be increased by eliminating on-street parking. The bicycle lane width between Taylor Street and Vassar Street may require additional pavement on the***

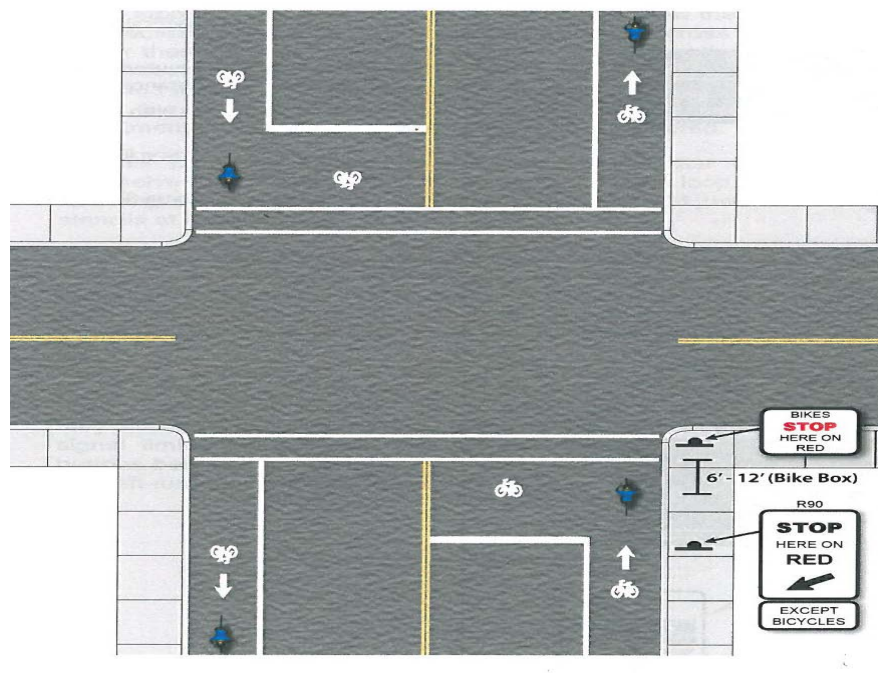
shoulder. The bicycle lane between Plumb Lane and Apple Street needs to be field checked to authenticate the width.

- **Bicycle Safety Issues at Signalized Intersections** – One of the significant conflict points for a bicyclist is traversing signalized intersections. Bicyclists making left turns at signalized intersections must traverse across active travel lanes to access the left turn lanes and often are making left turns as part of the vehicle mix. Another challenge for bicyclists stopped at a signalized intersection and wanting to go straight across the intersection is the potential conflict with vehicles making right turns at the intersection. This type of conflict existed at the Kietzke Lane/Mill Street intersection where a bicyclist was killed in 2011.

Recommendation for Bicycle Safety Issues at Signalized Intersections

- ❖ ***Priority 1 – Recommend NDOT conduct an evaluation of the “bike box” concept to determine the feasibility of implementing one or more bike box installations on the Kietzke Lane corridor. This concept is shown as a conceptual intersection treatment in the Reno Sparks Bicycle & Pedestrian Plan – Design Best Practices (October 2011). The following figure is an example of the bike box concept:***

Conceptual Depiction of Bike Boxes at an Intersection



Source: Reno Sparks Bicycle & Pedestrian Plan – Design Best Practices, October 2011

6.6 RIGHT OF WAY NEEDS ON THE KIETZKE LANE CORRIDOR

The right of way needs that have been identified from project field reviews include the following:

- Widen the west side of Kietzke Lane from Gentry Way to a point 180 feet south of Moana Lane approximately 6 feet to restore the southbound bicycle lane on that section of Kietzke Lane.
- Kietzke Lane at Gentry Way – relocate the traffic signal controller cabinet on the southwest corner of the intersection to provide ADA clearance for pedestrians and wheelchairs. This will require Gentry Way right of way through the City of Reno.
- Transit Stops – need right of way easements on Kietzke Lane behind the sidewalk to locate benches and/or shelters to provide adequate space for pedestrians and wheelchairs. This right of way would not be needed if the sidewalk was widened to the street side. Widening the sidewalk to the street side may not be possible at signalized intersections that have separate right turn lanes.
- Sidewalk obstructions – need right of way behind the sidewalk to relocate utility poles that are blocking the sidewalk. This right of way would not be needed if the sidewalk was widened to the street side. Widening the sidewalk to the street side may not be possible at signalized intersections that have separate right turn lanes.

6.7 SUMMARY OF RECOMMENDATIONS

Priority 1 – Recommended Improvements or Actions that can be undertaken in the immediate future by NDOT District 2 staff or NDOT Headquarters staff:

1. *Recommend developing an inventory of all damaged sidewalk to include replacement of damaged sidewalk in upcoming Kietzke Lane projects or as part of a project funded as a safety improvement project.*
2. *Recommend NDOT District 2 installs a “Sidewalk Closed Ahead – Cross Here” sign (R9-11) on the northeast corner of the Kietzke Lane/2nd Street intersection. Pedestrians can cross Kietzke Lane from this corner using the traffic signal and use the sidewalk on the west side of Kietzke Lane.*
3. *Recommend a coordinated assessment of the Kietzke Lane transit stops with RTC Transit to determine short term improvements that can be made to meet ADA requirements.*
4. *Recommend RTC Transit and NDOT District 2 staff evaluate the feasibility of implementing bus turn-outs at the transit stops on Kietzke Lane.*
5. *Recommend a feasibility study to consider replacing the current Kietzke Lane intersection configurations at Plumb Lane and 2nd Street with a roundabout configuration.*
6. *On southbound Kietzke Lane, north of Moana Lane, recommend that a dotted line be striped along the left side of the left through lane across the opening of the left turn lane to direct southbound through traffic away from the left turn lane.*
7. *Recommend a feasibility study of those portions of Kietzke Lane that do not have center raised medians (not including signalized intersection approaches) to determine the need to install raised medians to control left turn movements into and out of driveways.*
8. *Recommend that NDOT District 2 staff in coordination with the law enforcement agencies, contact car dealerships along the Kietzke Lane corridor and set a deadline for the prohibition of vehicle hauler trucks from using the two-way left turn lane for the purpose of loading and unloading vehicles.*
9. *Recommend NDOT District 2 staff, in coordination with City of Reno staff, performs a review of all signalized intersections and develop a list of traffic signal head locations that need to be modified for proper lane alignment. This review will determine if the*

existing mast arms can be modified to reposition the traffic signal heads or if new mast arms, poles and foundations will be required.

- 10. Recommend NDOT District 2 staff coordinates with the City of Reno Traffic Engineering to review all traffic signal timing parameters at the signalized intersections on the Kietzke Lane corridor and make adjustments as needed.*
- 11. Recommend NDOT District 2 staff coordinates with the City of Reno Traffic Engineering to review the westbound to northbound right turn overlap signal operation at the Kietzke Lane/Peckham Lane intersection.*
- 12. Recommend NDOT District 2 staff relocates the stop bar for the westbound to northbound movement at the Kietzke Lane/Peckham Lane intersection to be a minimum of 40 feet from the traffic signal head controlling this right turn movement.*
- 13. Recommend NDOT District 2 install a "No Right Turn on Red" sign for the westbound to northbound right turn movement at the Kietzke Lane/Peckham Lane intersection.*
- 14. Recommend an evaluation of pedestrian activity be conducted at the Kunezli Street/Kietzke Lane intersection to determine if the installations of pedestrian safety facilities are warranted.*
- 15. Recommend an evaluation of pedestrian activity be conducted at the Lewis Street/Kietzke Lane intersection to determine if the installations of pedestrian safety facilities are warranted.*
- 16. Recommend NDOT District 2 install Crosswalk Warning signs and Advanced Crossing signs in each direction for the marked crosswalk at the Kietzke Lane/Prosperity Street marked crosswalk.*
- 17. Recommend an evaluation of pedestrian activity be conducted at the Prosperity Street/Kietzke Lane intersection to determine if the installation of pedestrian safety facilities is warranted.*
- 18. Recommend an evaluation of pedestrian activity be conducted at the Taylor Street and Automotive Way/Kietzke Lane intersections to determine if the installations of pedestrian safety facilities are warranted.*
- 19. Recommend an evaluation of pedestrian activity be conducted at the Apple Street/Kietzke Lane intersection to determine if the installations of pedestrian safety facilities are warranted.*

20. *Recommend an evaluation of pedestrian and RTC transit stop activity be conducted on the section of Kietzke Lane that is between 850 and 1500 feet south of Grove Street to determine if the installations of pedestrian safety facilities are warranted.*
21. *Recommend an evaluation of pedestrian activity be conducted on Kietzke Lane from the Peckham Lane to a point 900 feet north of Peckham Lane during activities at the Reno-Sparks Convention Center to determine if the installations of pedestrian safety facilities are warranted.*
22. *Recommend that NDOT staff coordinate with RSIC and Washoe County Flood Control representatives for on-going effort to build a walking path between the RSIC property and the medical clinic. This will result in an established path along the south side of the Truckee River and traverse under the Kietzke Lane Bridge over the Truckee River. It will be similar to the existing shared use path that runs along the north side of the Truckee River in this same area.*
23. *Recommend NDOT District 2 install Bike Lane signs (R3-17) at appropriate spacing along the corridor and install “Begin Right Turn Lane – Yield to Bikes” signs (R4-4) at signalized intersections per the guidelines of the Manual on Uniform Traffic Control Devices (MUTCD).*
24. *Recommend the installation of the Bike Symbol (Bike Symbol or Helmeted Bicyclist Symbol) and Arrow symbol in the bicycle lane at periodic spacing along the corridor.*
25. *Recommend installing “Bicycles May Use Full Lane” signs (R4-11) and “Shared Lane Markings” on the southbound lane of Kietzke Lane, north and south of the Moana Lane intersection where the bicycle lane does not exist.*
26. *Recommend NDOT District 2 staff conduct an evaluation of the four sections of bicycle lane that are less than 4 feet in width and determine the appropriate action needed to provide bicycle lane width of 4 feet or greater. The bicycle lane width between Lewis Street and Mill and Stewart Street and Roberts Street may be increased by eliminating on-street parking. The bicycle lane width between Taylor Street and Vassar Street may require additional pavement on the shoulder. The bicycle lane between Plumb Lane and Apple Street needs to be field checked to authenticate the width.*
27. *Recommend NDOT conduct an evaluation of the “bike box” concept to determine the feasibility of implementing one or more bike box installations on the Kietzke Lane corridor. This concept is shown as a conceptual intersection treatment in the Reno Sparks Bicycle & Pedestrian Plan – Design Best Practices (October 2011).*

Priority 2 – Recommended Improvements that can be included in a future NDOT or RTC Project:

- 28. Recommend the replacement of damaged sidewalk along the Kietzke Lane corridor.***
- 29. Recommend the installation of sidewalk/curb and gutter where it is currently missing on the Kietzke Lane corridor between Galletti Way and South Virginia Street.***
- 30. Recommend including sidewalk obstruction mitigation in upcoming Kietzke Lane projects by removing/relocating obstructions where feasible from the sidewalk area or provide additional sidewalk width (pass-around) on the back side of the obstruction.***
- 31. Recommend the traffic signal controller cabinet that is obstructing the sidewalk on the southwest corner of the Kietzke/Gentry intersection be moved behind the sidewalk. This will require an easement or acquisition of right of way for the new cabinet location.***
- 32. Using the Reno-Sparks ADA Transition Plan, recommend identification of all non-ADA compliant curb ramps and pedestrian push buttons on Kietzke Lane and include their replacement in upcoming Kietzke Lane projects or as part of a project funded as a safety improvement project.***
- 33. Using the RTC Reno-Sparks ADA Transition Plan, recommend identification of all non-ADA compliant driveways on Kietzke Lane and include their replacement in upcoming Kietzke Lane projects or as part of a project funded as a safety improvement project. This would also include the consolidation of multiple driveways at parcels with more than one driveway based on the guidelines in the NDOT Access Management System and Standards manual.***
- 34. Recommend the Kietzke Lane transit stops that cannot be made ADA compliant through short term improvements be included in future projects.***
- 35. Recommend the sweeping right turns at the Kietzke Lane intersections at Plumb Lane and 2nd Street be removed and replaced with standard right turn only lanes at the intersection.***
- 36. Recommend the development and implementation of a corridor-wide street lighting plan as part of a future corridor improvement plan.***
- 37. Recommend the installation of center raised median on the north and south legs of the signalized intersections of Kietzke Lane that do not have raised median. The length of the raised medians should extend past the effective left turn lanes at these intersections (based on field observations and left turn demand calculations).***

- 38. Recommend the removal of driveway approaches at those locations on Kietzke Lane where property owners/businesses have physically closed driveways.**
- 39. Recommend that all identified traffic signal head alignment issues be addressed on a future NDOT or RTC project.**
- 40. Recommend the backplates on all traffic signal heads on the Kietzke Lane corridor be replaced with retroreflectorized backplates to improve the nighttime target value of the signal heads.**
- 41. Recommend the drainage issue at 335 Kietzke Lane be addressed on a future project. This work would be done in coordination with the resolution of the driveway and sidewalk/curb and gutter improvements north of the drainage issue.**
- 42. Recommend upgrading the pedestrian signal heads at the Kietzke Lane signalized intersections to pedestrian signal heads with countdown timers.**
- 43. Recommend the installation of street lights at the Kietzke Lane/Roberts Street intersection. The street lights should be on both sides of the street and cover the marked crosswalk.**
- 44. If feasibility studies at any of the following locations on Kietzke Lane justify establishing pedestrian crossings, recommend the installation of marked crosswalks, raised medians with pedestrian path offsets, curb ramps, street lighting, warning signs and pedestrian activated flashers/signals:**
- **Kunezli Street**
 - **Lewis Street**
 - **Prosperity Street**
 - **Taylor Street/Automotive Way**
 - **Apple Street**
 - **Between 850 and 1500 feet south of Grove Street**
 - **900 feet north of Peckham Lane**

45. Recommend the installation of a buffered bicycle lane on Kietzke Lane where space is available. This would require the removal of on-street parking and adding cross hatch markings to the existing bicycle lane. The removal of on-street parking would also allow for the widening of the sidewalk into the street area which would address the sidewalk obstruction issues discussed in the ADA section of this report.

Priority 3 – Recommended Improvements that can be included in a long range improvement plan:

46. Recommend addressing sidewalk obstructions not mitigated in upcoming Kietzke Lane projects by widening the sidewalk into the parking area to attain the required ADA spacing around the obstructions. This will require the removal of on-street parking along some sections of Kietzke Lane and possible reprofiling of the pavement in the travel lane adjacent to the new sidewalk/curb and gutter.

47. Recommend addressing non-ADA compliant curb ramps and pedestrian push buttons not mitigated in upcoming Kietzke Lane projects by inclusion into a long range improvement plan.

48. Recommend addressing non-ADA compliant driveways not mitigated in upcoming Kietzke Lane projects by inclusion into a long range improvement plan.

49. If the feasibility study of the Kietzke Lane intersections at 2nd Street and Plumb Lane show positive benefits from conversion to a roundabout configuration, recommend the roundabout configuration be implemented at one or both of these intersections.

50. Based on the findings of the feasibility study for center raised medians between signalized intersections, recommend installation of center raised medians on Kietzke Lane at selected locations between signalized intersections.

51. Recommend installing the bicycle lane north and south of Moana Lane by acquiring right of way and widening along the west side of Kietzke Lane.

52. Recommend installing the bicycle lane north of Peckham Lane along the west side of Kietzke Lane by removing a portion of the channelizing island at the Reno-Sparks Convention Center driveway and providing the appropriate pavement markings and signing.

A cost was estimated for each of the Priority 2 and 3 recommendations using the current bid item list from NDOT. A summary of the issues and recommendations can be found in the Appendix.

6.8 BENEFIT/COST (B/C) ANALYSIS

The NDOT Safety Division conducted a benefit/cost (B/C) analysis for a number of the Priority 2 and 3 recommendations using methods from the Crash Modification Warehouse. This methodology uses Crash Reduction Factors (CRF) that have been previously developed and were available for this analysis. Crash Reduction Factors represent the percentage crash reduction that might be expected after implementing a modification in design or traffic control. Table 6.2 shows the results of the analysis. The cost for each recommendation analyzed was taken from the cost estimates shown in the recommendation summary in the Appendix. All of the recommendations that were analyzed had a B/C ratio of 1.0 or better. Most of the recommendations had B/C ratios that were considerably higher than 1.0, i.e. a B/C ratio of 9.0 would produce \$9.00 in benefit for every \$1.00 spent to implement the recommendation.

Table 6.2 Benefit-Cost Analysis

Work Line Item	Crash Reduction Factor (CRF)	Crash Reduction Factor- notes	Crash Types for CRF	Galletti to Kuenzli		Kuenzli to Mill		Mill to Plumb		Plumb to Moana		Moana to So. Virginia		Work Line Item Cost	Averaged B/C
				Current Cost	Current B/C	Current Cost	Current B/C	Current Cost	Current B/C	Current Cost	Current B/C	Current Cost	Current B/C		
Install sidewalk where it is missing on Kietzke (sqyd)	85.00	**	All	\$1,334,800.00	1.22	\$705,050.00	38.62	\$1,573,340.00	43.29	\$95,860.00	742.64			\$3,709,050.00	206.4425
Remove driveway approaches no longer in use by properties (# @ sqyd)	$-100 * (e^{0.0096(X-Z)} - 1)$		All			\$80,140.00	378.89	\$501,730.00	156.40	\$340,860.00	243.85	\$20,340.00	1933.54	\$943,070.00	678.17
Replace sweeping right turn lanes at the Plumb intersection with standard right turn lanes	38.00		Right Turn & Angle					\$322,000.00	48.81					\$322,000.00	48.81
Replace sweeping right turn lanes at the 2nd Street intersection with standard right turn lanes	38.00		Right Turn & Angle			\$230,000.00	42.52							\$230,000.00	42.52
Implement a corridor wide continuous street lighting plan	37.00		Nighttime			\$209,990.00	55.12	\$661,020.00	3.64	\$515,430.00	14.65	\$438,500.00	4.47	\$1,824,940.00	19.47
Install center raised median on the north and south legs of the existing signalized intersections on Kietzke Lane	39.00		All			\$19,580.00	487.31	\$32,040.00	827.27	\$22,610.00	1171.38			\$74,230.00	828.65
Mitigate traffic signal head alignment (# of new poles with longer mast arm)	7.00		All					\$40,940.00	120.00	\$122,820.00	44.77	\$40,940.00	77.89	\$204,700.00	80.89
Install retroreflectorized backplates on all traffic signal heads that control Kietzke Lane traffic (# Vehicle Signal Heads)	9.80		Nighttime	\$1,555.00	10.63	\$1,470.00	1632.67	\$3,200.00	178.22	\$3,890.00	464.81	\$5,010.00	93.50	\$15,125.00	475.966
If justified by feasibility studies, install street lighting, curb ramps, marked crosswalk, raised median with Danish offset, warning signs and pedestrian activated flashers (RRFB) at existing and future pedestrian crossing locations (# of locations)	28.00	Lighting	Nighttime	\$40,360.00	1.41	\$80,720.00	96.89	\$40,360.00	42.93	\$80,720.00	66.53	\$40,360.00	32.30	\$282,520.00	48.012
If justified by feasibility studies, install street lighting, curb ramps, marked crosswalk, raised median with Danish offset, warning signs and pedestrian activated flashers (RRFB) at existing and future pedestrian crossing locations (# of locations)	36.00	Install Refuge Island*	Pedestrian	\$40,360.00	1.81	\$80,720.00	95.19	\$40,360.00	105.61	\$80,720.00	58.28	\$40,360.00	101.26	\$282,520.00	72.43
If justified by feasibility studies, install street lighting, curb ramps, marked crosswalk, raised median with Danish offset, warning signs and pedestrian activated flashers (RRFB) at existing and future pedestrian crossing locations (# of locations)	72.00	RRFB**	All	\$40,360.00	33.60	\$80,720.00	422.32	\$40,360.00	1338.40	\$80,720.00	716.32	\$40,360.00	811.12	\$282,520.00	664.352
Install street lighting on both sides of the Kietzke/Roberts intersection to enhance pedestrian safety (# street lights - pole, mast arm, fixture, power source)	28.00	Lighting	Nighttime					\$19,090.00	73.83					\$19,090.00	73.83
Remove on-street parking to extend sidewalk width and implement buffered bike lane (# of No Parking signs)	42.00	Prohibit On-Street Parking	All	\$1,610.00	364.46	\$1,340.00	6904.98	\$2,900.00	9643.98	\$2,170.00	13026.75	\$2,030.00	8316.96	\$10,050.00	7651.426
Implement a trial installation of "Bike Boxes" at the Kietzke/Mill intersection (# bike box installations)	35.00		All					\$4,600.00	5417.94					\$4,600.00	5417.94
Install a buffered bike lane on the Kietzke Lane corridor to replace the existing bike lane (will require removal of on-street parking) (# of bike lane pavement markings)	42.00	Prohibit On-Street Parking	All			\$2,650.00	4136.39	\$7,290.00	3979.14	\$5,970.00	5511.93	\$4,970.00	2732.95	\$20,880.00	4090.1025
Cost and apportioned B/C by Segment =				\$1,459,045.00	2.55	\$1,492,380.00	107.68	\$3,289,230.00	103.37	\$1,351,770.00	240.22	\$632,870.00	179.40		

* Michigan DOT
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Work Line Item	Crash Reduction Factor (CRF)	Crash Reduction Factor- notes	Crash Types for CRF	SEGMENT 1 Galletti to Kuenzli		SEGMENT 2 Kuenzli to Mill		SEGMENT 3 Mill to Plumb		SEGMENT 4 Plumb to Moana		SEGMENT 5 Moana to So. Virginia		Work Line Item Cost	Averaged B/C
				Current Cost	Current B/C	Current Cost	Current B/C	Current Cost	Current B/C	Current Cost	Current B/C	Current Cost	Current B/C		
Implement a roundabout design for the Plumb Lane intersection on Kietzke Lane if the feasibility study shows positive benefits (# of roundabouts)	67.00		All							\$2,875,000.00	19.93			\$2,875,000.00	19.93
Implement a roundabout design for the 2nd Street intersection on Kietzke Lane if the feasibility study shows positive benefits (# of roundabouts)	67.00		All			\$2,300,000.00	9.31							\$2,300,000.00	9.31
Implement center raised medians on Kietzke Lane between signalized intersections at selected locations if the feasibility study shows the need to control left turns into and out of driveways (lin.ft. of glue down curb and sq.yd of median filler and cost of both)	39.00	Raised Median	All			\$141,670.00	84.88	\$500,920.00	61.37	\$240,730.00	133.22	\$250,640.00	79.61	\$1,133,960.00	89.77
Install SB bike lane on Kietzke Lane, north and south of Moana (will require acquisition of right of way on the west side of Kietzke Lane)	74.00		Bicycle (Injury)							\$1,064,800.00	1.06			\$1,064,800.00	1.06
Install SB bike lane on Kietzke Lane between the Reno-Sparks Convention Center Driveway and Peckham Lane (will require removal of 4' of channelized island at driveway)	74.00		Bicycle (Injury)									\$4,860.00	20.38	\$4,860.00	20.38
Cost and apportioned B/C by Segment =				\$0.00		\$2,441,670.00	94.19	\$500,920.00	61.37	\$4,180,530.00	21.65	\$255,500.00	78.48		

* Michigan DOT
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