



# PUBLIC WORKS DEPARTMENT AGENDA ITEMS - ACTION

Board of Supervisors Meeting  
April 5, 2017



## Action Item # 7

### Approve the Traffic Safety Study on Williamson Valley Road (District 4 - Supervisor Brown).

- ▣ In April 2016, Yavapai County selected Lee Engineering to conduct a traffic study on Williamson Valley Road
  - 11 mile segment: Pioneer Parkway to Nancy Drive
  - Considered 39 cross-street intersections
  - Evaluated existing conditions, 2025 conditions, and 2040 conditions
  
- ▣ Project Goal:
  - To identify potential improvements in safety, capacity, access control, and operation
  - Propose improvement projects and a prioritization plan for programming and implementation



## Safety Study Components

### Data Analysis:

- Sight Distance Analysis
- Signal Warrant Analysis
- Capacity Analysis
- Turn Lane Warrant Analysis
- Existing Turn Lane Adequacy Analysis
- Crash Analysis



# Sight Distance Analysis

- 7 Intersections identified with obstructed sight distance

Intersection	Direction	Cause of Sight Distance Concern			
		Vertical Curvature	Horizontal Curvature	Embankment	Vegetation
Buena Vista Trail	Looking South	X			
Ridge Drive	Looking North				X
Pemberton Drive	Looking South	X	X	X	X
Kelly Drive	Looking North	X			
Stringfield Drive	Looking North	X			
Granite Park Drive	Looking North	X			
Dome Road	Looking South	X		X	





Pemberton Drive Looking South onto Williamson  
Valley Road (Vertical/Horizontal Curvature,  
Vegetation, Embankment)





## Kelly Drive Looking Northbound Onto Williamson Valley Road (Vertical Curvature)



# Moving Vision Obstruction at Outer Loop Road Looking South onto Williamson Valley Road







# Signal Warrant Analysis

- ▣ The following 9 intersections along Williamson Valley Road were evaluated and existing conditions did not meet signal warrants:

Intersection	2016 Existing Volumes					
	Meets Warrant 1A?		Meets Warrant 1B?		Meets Warrant 2?	
	100%	70%	100%	70%	100%	70%
Longview Drive	No	No	No	No	No	No
Cliff Rose/Pemberton	No	No	No	No	No	No
Bridle Path Road	No	No	No	No	No	No
Glenshandra Drive	No	No	No	No	No	No
American Ranch Road	No	No	No	No	No	No
Outer Loop Road	No	No	No	No	No	No
Stazenski Road	No	No	No	No	No	No
Almosta Ranch Road	No	No	No	No	No	No
Nancy Drive	No	No	No	No	No	No





# Signal Warrant Analysis (2025 & 2040)

Intersection	2025 Projected Volumes					
	Meets Warrant 1A?		Meets Warrant 1B?		Meets Warrant 2?	
	100%	70%	100%	70%	100%	70%
Longview Drive	No	No	No	No	No	No
Cliff Rose/Pemberton	No	No	No	No	No	No
Bridle Path Road	No	No	No	No	No	No
Glenshandra Drive	No	No	No	No	No	No
American Ranch Road	No	No	No	No	No	No
Outer Loop Road	No	Yes	No	No	No	Yes
Stazenski Road	No	No	No	No	No	No
Almosta Ranch Road	No	No	No	No	No	No
Nancy Drive	No	No	No	No	No	No

Intersection	2040 Projected Volumes					
	Meets Warrant 1A?		Meets Warrant 1B?		Meets Warrant 2?	
	100%	70%	100%	70%	100%	70%
Longview Drive	No	No	No	No	No	No
Cliff Rose/Pemberton	No	No	No	No	No	No
Bridle Path Road	No	No	No	No	No	No
Glenshandra Drive	No	No	No	No	No	No
American Ranch Road	No	No	No	No	No	No
Outer Loop Road	Yes	N/A	No	Yes	Yes	N/A
Stazenski Road	No	No	No	No	No	No
Almosta Ranch Road	No	No	No	No	No	No
Nancy Drive	No	No	No	No	No	No

# Capacity Analysis

## (Peak Hour Level of Service)

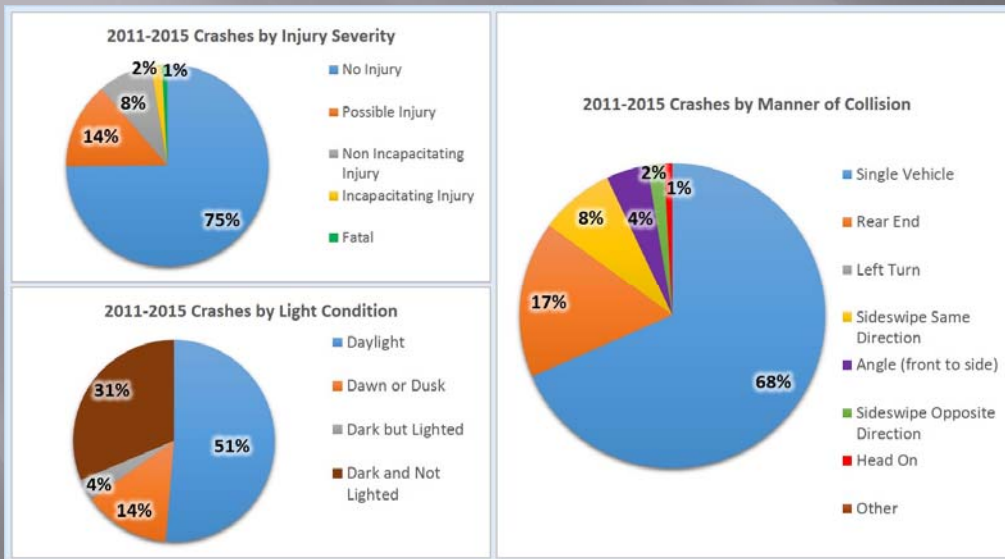
### Two-Way Roadway Analysis

	Corridor Level of Service					
	2016 Existing		2025 Projected		2040 Projected	
	Northbound PM	Southbound AM	Northbound PM	Southbound AM	Northbound PM	Southbound AM
Intersection Corridor (South to North)						
Pioneer Parkway to Kelly Drive	D	D	D	E	E	E
Kelly Drive to <u>Mendiburo Way</u>	D	D	D	E	E	E
<u>Mendiburo Way</u> to <u>Glenshandra</u>	D	D	D	E	D	E
<u>Glenshandra</u> to Outer Loop Road	C	D	D	D	D	D
Outer Loop Road to Whispering Canyon	B	B	C	C	D	C
Whispering Canyon to Nancy Drive	B	B	C	C	C	C

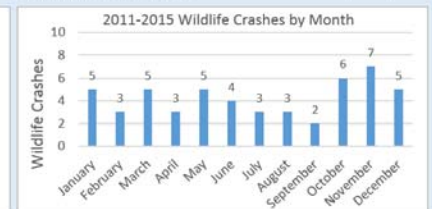
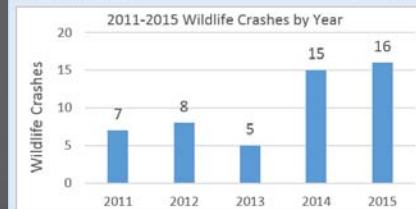
Level of Service (LOS) is based on average travel speed (ATS) and percent of time spent following (PTSF) behind slower vehicles.

# Crash Analysis

- Five years of crash data was evaluated, from 2011-2015.
- Total of 115 crashes
- Most common crash included wildlife 44%



2011-2015 Crashes by First Harmful Event			
First Harmful Event	Crashes	First Harmful Event	Crashes
Animal Wild Game	51	Parked Motor Vehicle	2
Motor Vehicle in Transport	30	Traffic Signal Support	2
Other Fixed Object	9	Cyclist	2
Overturn or Rollover	7	Cargo Equipment Loss	1
Traffic Sign Support	5	Tree or Bush Stump	1
Not Reported	2	Other Traffic Barrier	1
Run Off Road Left	2	Other Post Pole or Support	0





# Turn Lane Warrant Analysis

## Future Turn Lane Warrants

Turn Lane Warrants Met by 2040 (Lanes That Do Not Currently Exist)	
Buena Vista Trail	NB Left-Turn
Pemberton Drive	NB Left-Turn
Rainmaker	NB Left-Turn
Blackjack Ridge Road	NB Right-Turn
Outer Loop Road	SB Left-Turn
Sharps Road	NB Left-Turn
Stazenski Road	NB Left-Turn
Cielo Grande	NB Left-Turn

## Adequacy of Existing Turn Lanes

Existing Turn Lanes with Inadequate Storage Length (Turn Lanes Warranted by 2040)		Existing Storage Length (ft)	Minimum* Storage Length (ft)
Merrill Drive	NB Right-Turn	60	205
Kelly Drive	NB Right-Turn	55	205
Oneal Road	NB Right-Turn	90	205
Single Tree Street	NB Right-Turn	100	205
Glenshandra Drive	NB Right-Turn	70	205
Bard Ranch Road	NB Right-Turn	175	205
American Ranch Road	NB Left-Turn	80	205
Stazenski Road	NB Right-Turn	160	205
Whispering Canyon Drive	NB Left-Turn	175	205
<i>*Based on ADOT Turn Lane Design Criteria</i>			

# Turn Lane Warrant Analysis

Intersections	Northbound							
	Left-Turn Lane			Turn Lane Exists?	Right-Turn Lane			Turn Lane Exists?
	Meets ADOT Criteria?				Meets ADOT Criteria?			
	2016	2025	2040		2016	2025	2040	
Pioneer Parkway	-	-	-	N/A	N/A	N/A	N/A	Yes
Buena Vista Trail	X	✓	✓	No	-	-	-	N/A
Longview Road	-	-	-	N/A	✓	✓	✓	Yes
Ridge Road	-	-	-	N/A	X	X	X	No
Cliff Rose Road	-	-	-	N/A	X	X	X	Yes
Pemberton Drive	✓	✓	✓	No	-	-	-	N/A
Merrill Drive	-	-	-	N/A	X	X	✓	Yes
McIntosh Drive	X	X	X	No	X	X	X	Yes
Kelly Drive	-	-	-	N/A	X	X	✓	Yes
Stringfield Drive	X	X	X	No	-	-	-	N/A
Oneal Road	-	-	-	N/A	X	X	✓	Yes
Bridle Path Road	X	X	X	No	X	X	X	No
Lariat Lane	-	-	-	N/A	X	X	X	Yes
Levie Lane	X	X	X	No	-	-	-	N/A
Mendiburo Way	X	X	X	No	-	-	-	N/A
Single Tree Street	-	-	-	N/A	✓	✓	✓	Yes
Rainmaker	X	✓	✓	No	-	-	-	N/A
Love Ln	X	X	X	No	-	-	-	N/A
Shane Drive	-	-	-	N/A	X	X	X	No
Granite Park Drive	X	X	X	Yes	-	-	-	N/A
Granite Vista Road	X	X	X	No	-	-	-	N/A
Glenshandra Drive	-	-	-	N/A	✓	✓	✓	Yes
Granite Oaks Drive	X	X	X	No	✓	✓	✓	Yes
Bard Ranch Road	-	-	-	N/A	✓	✓	✓	Yes
Buchanan Drive	X	X	X	No	-	-	-	N/A
Scarlett Drive	X	X	X	No	-	-	-	N/A
Chipmunk Road	-	-	-	N/A	X	X	X	No
Blackjack Ridge Road	-	-	-	N/A	X	✓	✓	No
American Ranch Road	✓	✓	✓	Yes	X	X	X	Yes
Outer Loop Road	X	X	X	No	X	✓	✓	Yes
Sharps Road	X	✓	✓	No	-	-	-	N/A
Stazenski Road	X	✓	✓	No	X	✓	✓	Yes
Cielo Grande	X	✓	✓	No	X	X	X	No
Marlow Road	-	-	-	N/A	X	X	X	No
Whispering Canyon Dr	X	✓	✓	Yes	-	-	-	N/A
Almosta Ranch Rd	✓	✓	✓	Yes	X	X	X	No
Inscription Canyon Dr	X	✓	✓	Yes	-	-	-	N/A
Nancy Drive (To West)	X	X	X	No	-	-	-	N/A
Nancy Drive (To East)	-	-	-	N/A	X	X	X	No

Intersections	Southbound							
	Left-Turn Lane				Right-Turn Lane			
	Meets ADOT Criteria?			Turn Lane Exists?	Meets ADOT Criteria?			Turn Lane Exists?
2016	2025	2040	2016		2025	2040		
Pioneer Parkway	✓	✓	✓	Yes	-	-	-	N/A
Buena Vista Trail	-	-	-	N/A	X	X	X	No
Longview Road	X	X	X	No	-	-	-	N/A
Ridge Road	X	X	X	No	-	-	-	N/A
Cliff Rose Road	X	X	X	No	-	-	-	N/A
Pemberton Drive	-	-	-	N/A	X	X	X	No
Merrill Drive	X	X	X	No	-	-	-	N/A
McIntosh Drive	X	X	X	No	X	X	X	No
Kelly Drive	X	X	X	No	-	-	-	N/A
Stringfield Drive	-	-	-	N/A	X	X	X	No
Oneal Road	X	X	X	No	-	-	-	N/A
Bridle Path Road	X	X	X	No	X	X	X	No
Lariat Lane	X	X	X	No	-	-	-	N/A
Levie Lane	-	-	-	N/A	X	X	X	No
Mendiburo Way	-	-	-	N/A	X	X	X	No
Single Tree Street	X	X	X	No	-	-	-	N/A
Rainmaker	-	-	-	N/A	X	X	X	No
Love Ln	-	-	-	N/A	X	X	X	No
Shane Drive	X	X	X	No	-	-	-	N/A
Granite Park Drive	-	-	-	N/A	X	X	X	No
Granite Vista Road	-	-	-	N/A	X	X	X	No
Glenshandra Drive	X	X	X	No	-	-	-	N/A
Granite Oaks Drive	X	X	X	No	X	X	X	Yes
Bard Ranch Road	X	X	X	No	-	-	-	N/A
Buchanan Drive	-	-	-	N/A	X	X	X	No
Scarlett Drive	-	-	-	N/A	X	X	X	No
Chipmunk Road	X	X	X	No	-	-	-	N/A
Blackjack Ridge Road	X	X	X	No	-	-	-	N/A
American Ranch Road	X	X	X	Yes	X	X	X	Yes
Outer Loop Road	✓	✓	✓	No	X	X	X	No
Sharps Road	-	-	-	N/A	X	X	X	No
Stazenski Road	X	X	X	No	X	X	X	No
Cielo Grande	X	X	X	No	X	X	X	No
Marlow Road	X	X	X	No	-	-	-	N/A
Whispering Canyon Dr	X	X	X	No	X	X	X	No
Almosta Ranch Rd	X	X	X	No	X	X	X	No
Inscription Canyon Dr	-	-	-	N/A	X	X	X	No
Nancy Drive (To West)	X	X	X	No	-	-	-	N/A
Nancy Drive (To East)	-	-	-	N/A	X	X	X	No
	✓	Meets ADOT Criteria						
	X	Does Not Meet ADOT Criteria						
	-	Not Applicable - Minor Street Leg Does Not Exist (T-Intersection)						
		Turn Lane Exists						
	No	Turn Lane Does Not Exist & ADOT Turn Lane Criteria is Met in 2016, 2025 or 2040						

# Project List

- A. 17 Locations were identified for potential improvement, this resulted in the development of 20 capital improvement projects for consideration and possible installation
- B. Two locations have multiple design alternatives. Mitigation of safety concerns is addressed in all options. Project cost and available budget will be considered during project selection.
  - 1. Outerloop Road
    - North/Southbound Turn Lanes Only No Signal
    - Traffic Signal with Turn Lanes
    - Modern Roundabout
  - 2. Buena Vista Trail
    - Two-Way Left Turn Lane No Realignment of intersection
    - Realign Buena Vista and Longview Drive and add NB/SB Left Turn Lanes
- C. Project Evaluation Criteria
  - 1. Safety
  - 2. Public Input
  - 3. Pavement Condition
  - 4. Traffic Counts
  - 5. Level-of-Service
  - 6. Cost



# Project List

Prioritization Matrix										
Alt #	Segment/Intersection	Description	Overall Score	Weight>>	3	1	1	2	1	0
					Safety	Public Input	Pavement Condition	Traffic Counts	Potential LOS Improvement	Cost
Q	Outer Loop Road	Modern roundabout	4.6	★★★★★	5	5	3	5	5	1
B	Buena Vista Trail/Longview Drive	TWLTL from 300 ft north of Longview Dr to 300 ft south of Buena Vista Trl (No realignment)	4.4	★★★★☆	4	5	3	5	5	3
G	Rainmaker/Single Tree Street	TWLTL from Love Ln to 300 ft south of Single Tree St. Close Rainmaker and create new frontage opening at Single Tree St. Extend NB right-turn lane at Single Tree St	4.2	★★★★☆	4	5	4	4	5	4
C	Cliff Rose Road/Pemberton Drive	Realign Pemberton Dr and add NB and SB left-turn lanes	4.1	★★★★☆	5	5	4	4	1	2
E	Kelly Drive/Stringfield Drive/Oneal Road	TWLTL from 400 ft north of Oneal to 300 ft south of Kelly. Realign Oneal Rd, and extend NB right-turn lanes at Kelly and Oneal	4.1	★★★★☆	4	5	4	4	5	3
P	Outer Loop Road	Traffic signal with NB and SB left-turn lanes	4.1	★★★★☆	4	5	3	5	4	2
A	Buena Vista Trail/Longview Drive	Realign Buena Vista Trl and Longview Dr and add NB and SB left-turn lanes	3.9	★★★★☆	4	5	3	5	1	1
O	Outer Loop Road	Add NB and SB left-turn lanes, convert NB right-turn lane to offset-right turn. (No Signal)	3.5	★★★★☆	3	5	3	5	1	4
F	Silver Juniper Ranch Road/Lariat Lane/Levie Lane	TWLTL from Mendiburo to 300 ft south of Lariat Ln. Create frontage road opening at Lariat Ln. Close Silver Juniper Ranch and connect to west frontage road.	3.1	★★★★☆	1	5	4	4	5	4
M	Blackjack Ridge Road	Add SB left-turn lane and NB right-turn lane	3.0	★★★★☆	3	5	3	3	1	4
D	McIntosh Drive to Merrill Drive	TWLTL from 300 ft north of McIntosh Dr to 300 ft south of Merrill Dr, extend NB right-turn lane at Merrill Drive	2.9	★★★★☆	2	1	3	4	5	4
J	Granite Oaks Drive/Trailhead	TWLTL from 300 ft north and 300 ft south of intersection	2.6	★★★★☆	1	5	2	3	5	4
L	Buchanan Drive	Add NB left-turn lane	2.5	★★★★☆	2	5	2	3	1	5
I	Glenshandra Drive	Extend NB right-turn Lane	2.5	★★★★☆	2	1	3	4	1	5
T	Cielo Grande/Dome Road	Add NB left-turn lane, Improve sight distance at Dome Rd	2.4	★★★★☆	4	1	3	2	1	3
S	Stazenski Road/Williamson Valley Ranch Road	Add NB and SB left-turn lanes, extend NB right-turn lane	2.4	★★★★☆	3	1	2	3	1	4
K	Bard Ranch Road	Add SB left-turn lane, extend NB right-turn lane	2.3	★★★★☆	2	5	2	3	1	4
H	Granite Park Drive	Roadway reconstruction north of Granite Park to improve sight distance	2.3	★★★★☆	2	1	2	4	1	4
R	Sharps Road	Add NB left-turn lane	2.2	★★★★☆	3	1	4	2	1	5
N	American Ranch Road	Extend NB left-turn lane	2.0	★★★★☆	2	1	3	3	1	5

# Questions