



# ADOT Pedestrian Safety Action Plan

PGKG 3267  
Contract # TO849U0001

---

## Working Paper No. 2 **Goals and Emphasis Areas to Improve Pedestrian Safety in Arizona**

**ADOT MPD Task Assignment 04-08**

*Prepared by:*



Kimley-Horn  
and Associates, Inc.

In association with:

*Designing Streets for Pedestrians & Bicycles, LLC  
InterTribal Council of Arizona, Inc.*

*Prepared for:*

ARIZONA DEPARTMENT OF TRANSPORTATION

August 19, 2008  
091374020



<b>1.0 INTRODUCTION.....</b>	<b>4</b>
<b>1.1 Problem and Need Statement .....</b>	<b>4</b>
<b>1.2 Study Overview .....</b>	<b>4</b>
<b>1.3 Study Area.....</b>	<b>5</b>
<b>1.4 Purpose of Working Paper 2 .....</b>	<b>7</b>
<b>1.5 Goals and Emphasis Areas Defined.....</b>	<b>7</b>
<b>1.6 Existing Goals of Federal and State Plans.....</b>	<b>7</b>
<b>2.0 REVIEW OF FINDINGS OF CRASH ANALYSIS.....</b>	<b>8</b>
<b>2.1 Census 2000 Data on Walking .....</b>	<b>8</b>
<b>2.2 National and Arizona Pedestrian Crash Trends .....</b>	<b>9</b>
<b>2.3 Tier Analysis of Arizona Pedestrian Crash Data, 2002 to 2006.....</b>	<b>9</b>
2.3.1 <i>Tier 1 Analysis: Pedestrian Crashes Statewide (All Roadways in Arizona).....</i>	<i>9</i>
2.3.2 <i>Tier 2 Analysis: Pedestrian Crashes on State Highways.....</i>	<i>9</i>
2.3.3 <i>Tier 3 Analysis: Pedestrian Crashes in Urban Areas and Tribal Communities .....</i>	<i>10</i>
2.3.4 <i>Tier 4 Analysis: Corridors and Locations with a Higher Number of Pedestrian Crashes .</i>	<i>15</i>
<b>3.0 PROPOSED PEDESTRIAN SAFETY GOALS AND EMPHASIS AREAS.....</b>	<b>23</b>
<b>3.1 Pedestrian Safety Goal for State Highways in Arizona .....</b>	<b>23</b>
<b>3.2 Pedestrian Safety Emphasis Areas for State Highways in Arizona.....</b>	<b>24</b>



## LIST OF EXHIBITS

Exhibit 1-1 – Study Area.....	6
Exhibit 2-1 – Pedestrian Crashes on State Highways, 2002 -2006, Urban Areas .....	11
Exhibit 2-2 – Focus Urban Area Contributing Factors .....	11
Exhibit 2-3 – Focus Urban Area, Summary of Issues Identified by Jurisdiction Staff.....	12
Exhibit 2-4 – Summary of Higher Crash Segment Locations .....	18
Exhibit 2-5 – Summary of Higher Crash Interchange Locations.....	19
Exhibit 2-6 – Summary Statistics of Higher Crash State Highway (Non-Interstate) Segments.....	20
Exhibit 2-7 – Summary Statistics of Higher Crash State Highway (Non-Interstate) Segments by Signalized Intersection, Unsignalized Intersection, and Mid-Block .....	21
Exhibit 2-8 – Summary of Statistics of Higher Crash Interstate Interchanges .....	22
Exhibit 3-1 – Pedestrian Safety Goal for Arizona State Highways .....	24
Exhibit 3-2 – Pedestrian Safety Emphasis Areas for State Highway System .....	25



## 1.0 INTRODUCTION

### 1.1 Problem and Need Statement

In 2005, Arizona ranked 5th among states in pedestrian fatalities per 100,000 residents, with 164 pedestrian fatalities on Arizona's roadways—a nearly 30 percent increase from 2003 levels. To reduce the number of pedestrian crashes throughout Arizona, the state of Arizona is participating with the Federal Highway Administration (FHWA) as one of fourteen “focus states<sup>1</sup>” receiving technical assistance to reduce pedestrian crashes, fatalities, and injuries. The Arizona Department of Transportation (ADOT) is leading the initiative in coordination with FHWA Arizona Division Office and the Arizona Governor's Office of Highway Safety.

In addition, as part of the FHWA “focus state” initiative, four cities with the highest pedestrian fatality counts were selected to participate with the FHWA to reduce pedestrian crashes in their jurisdictions. The City of Phoenix is one of the four “focus cities<sup>2</sup>” with the highest pedestrian fatality counts. The other focus cities with the highest pedestrian fatality counts are Chicago, Los Angeles, and New York City.

### 1.2 Study Overview

The purpose of the ADOT Pedestrian Safety Action Plan is to recommend actions that when funded and implemented will reduce the number and rate of pedestrian crashes, fatalities, and injuries on the Arizona State Highway System. The Plan will establish a framework and identify practical and achievable strategies to improve pedestrian safety on the State Highway System.

The Plan includes stakeholder input, problem identification, and prioritization of solutions. The success of the Plan will be gauged by its effectiveness in reducing the number and rate of pedestrian crashes on roadways included in the Arizona State Highway System.

Specifically, the Pedestrian Safety Action Plan will include:

- Summary profile of pedestrian safety in Arizona;
- Pedestrian safety goals and objectives (hereafter referred to as emphasis areas) for ADOT;
- Procedure to identify promising pedestrian safety countermeasures projects and programs;
- High-priority pedestrian safety projects for the state highways;
- Prioritization system to rank competing projects;
- Cost estimates for the high-priority projects;
- Assessment of the funding gap for safety projects on the state highways;
- Potential funding alternatives for pedestrian infrastructure and programs; and
- Safety countermeasures, projects, and programs to meet pedestrian safety goals for emphasis areas

---

<sup>1</sup> States for FY2008 are Arizona, California, District of Columbia, Florida, Georgia, Hawaii, Illinois, Nevada, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, and Texas. The 14 “focus states” were selected if they had at least 150 pedestrian fatalities in 2005, or a pedestrian fatality rate per 100,000 population of greater than 2.5.

<sup>2</sup> Four cities with the highest pedestrian fatality count are Chicago, Los Angeles, New York City, Phoenix



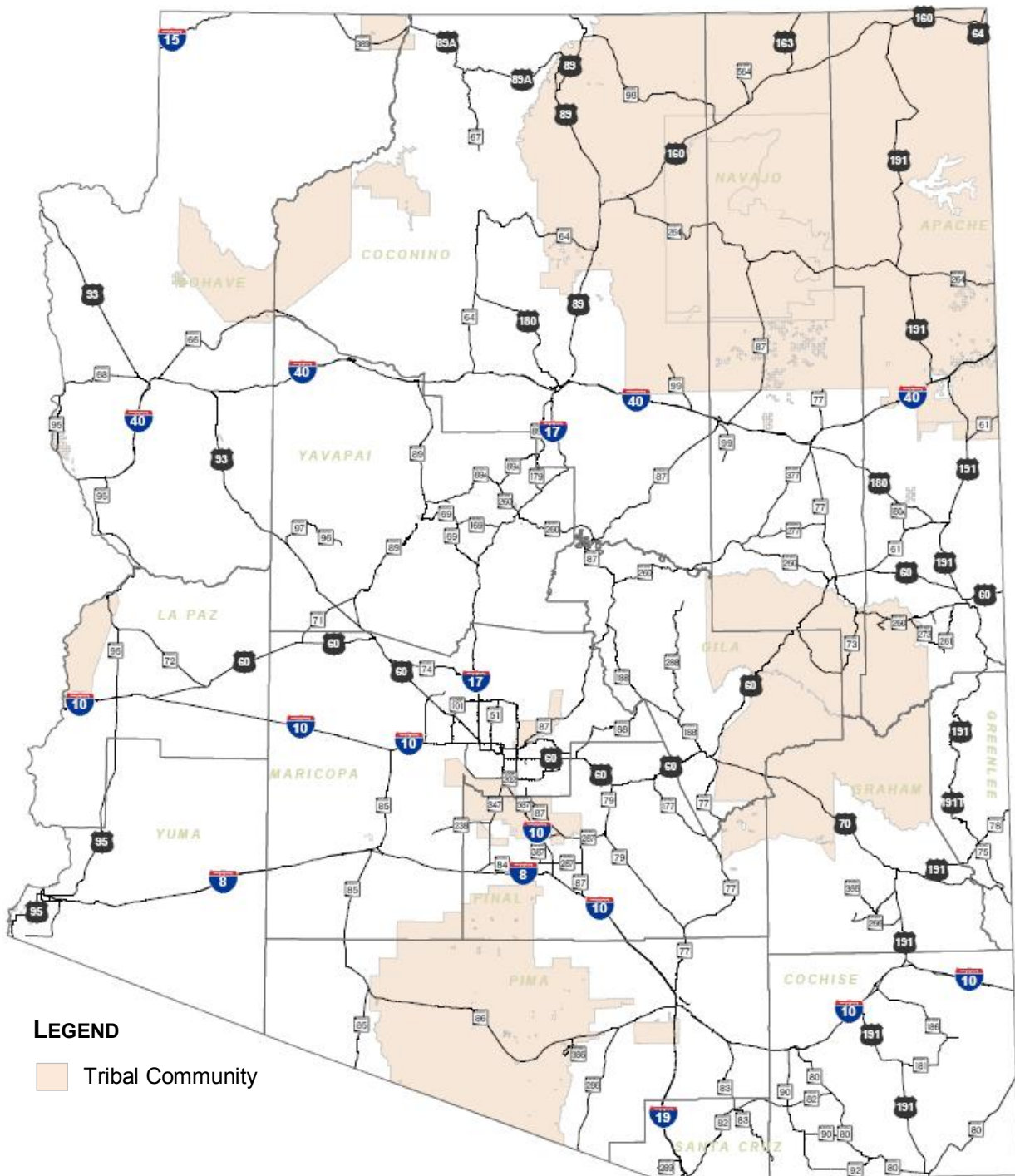
The ADOT Pedestrian Safety Action Plan is being developed using guidance provided in the FHWA Report entitled *How to Develop a Pedestrian Safety Action Plan* and the Arizona Supplement that was completed in April 2007 by the ADOT Highway Enhancements for Safety Team.

ADOT Pedestrian Safety Action Plan Study Team and Technical Advisory Committee members recognize that pedestrian crashes on state highways represent only a fraction (approximately 10 percent) of pedestrian crashes that occur statewide in Arizona. Developing the ADOT Pedestrian Safety Action Plan is just one step to improving pedestrian safety in Arizona. Local agencies, jurisdictions, and tribal communities must also develop and implement Pedestrian Safety Action Plans for roadways within their jurisdiction that cumulatively will improve pedestrian safety in Arizona.

### **1.3 Study Area**

The study area for the ADOT Pedestrian Safety Action Plan consists of the Arizona State Highway System, including intersections of state highways with major arterial streets, such as freeway ramp termini and major arterial streets that intersect with other state highways. **Exhibit 1-1** displays Arizona's state highways.

### Exhibit 1-1 – Study Area





## 1.4 Purpose of Working Paper 2

The purpose of *Working Paper 2, titled Goals and Emphasis Areas to Improve Pedestrian Safety in Arizona*, is to document pedestrian safety goals and emphasis areas for ADOT. Goals and emphasis areas are based on findings from *Working Paper 1*, and from existing stakeholder goals found in local, regional and federal plans.

Working Paper 2 contains the following:

1. Introduction – Project Overview
  - Review of goals found in state and federal plans
2. Review of findings of crash analysis
3. Proposed Pedestrian Safety Goals and Emphasis Areas
  - Proposed Pedestrian Safety Goals for Arizona State Highway System
  - Proposed Pedestrian Safety Emphasis Areas for Arizona State Highway System

## 1.5 Goals and Emphasis Areas Defined

Goals, for the purposes of this paper, represent the desired outcome of activities or programs that may be implemented to improve pedestrian safety in Arizona. A “Goal” is a long-term end toward which programs or activities are ultimately directed. Goals define the desired state of pedestrian safety at the end of a specified time frame and represent what can realistically be achieved. Effective goals are “SMART” – Specific, Measurable, Achievable, Realistic, and Time Sensitive.

Emphasis areas represent the pedestrian safety areas that most need to be addressed. Selection of emphasis areas is data driven, based on the analysis of pedestrian safety presented in Working Paper No. 1. Practical and achievable strategies and countermeasures will be identified for each emphasis area in future project phases.

## 1.6 Existing Goals of Federal and State Plans

### Federal Highway Administration (FHWA)

*Goal:*

- The Federal Highway Administration (FHWA) has established a goal of reducing pedestrian fatalities and injuries (nationwide) by 10 percent by the year 2011, as compared to 2008 estimates.

The FHWA has identified several activities that will help them to achieve this goal, including:

- Work with states, local jurisdictions, and tribal communities to develop Pedestrian Safety Action Plans
- Provide training to create pedestrian safety action plans
- Publish *How to Develop a Pedestrian Safety Action Plan* that is aimed at guiding states and jurisdictions in the creation of a pedestrian safety action plan



## **Governor's Traffic Safety Advisory Council (GTSAC)**

*The Arizona Governor's Traffic Safety Advisory Council developed the Arizona Strategic Highway Safety Plan. The Plan identifies vision and associated goals for reducing crashes in Arizona.*

*Goal:*

- The vision of the Arizona Strategic Highway Safety Plan is “zero fatalities on Arizona roads, your life depends on it” (the Every One Counts vision).
- The Every One Counts vision is supported by a state “stretch” goal designed to bring about clear progress towards the Every One Counts vision. The goal requires a reduction in the number of fatalities on Arizona’s roadways of approximately 12 percent by the year 2012. The base year of comparison will be 2007.

To help to achieve this vision and goal, the Arizona Strategic Highway Safety Plan identifies a need to improve the operation of pedestrian and bicycle facilities and to promote the implementation of the a Statewide Pedestrian Safety Action Plan.

## **2.0 REVIEW OF FINDINGS OF WORKING PAPER NO. 1**

Section 2 summarizes key findings of Working Paper No.1. The purpose of the review is to facilitate identification of key considerations leading to the development of goals and emphasis areas. To this end, each section below includes a *Key Considerations* summary that serves as input to definition of specific goals and emphasis areas in Chapter 3.

Working Paper No. 1 included a review of pedestrian statistics and crash data, including a review of national and Arizona pedestrian statistics based on U.S. Census 2000, a review of national pedestrian crash statistics, and an analysis of Arizona pedestrian crash data for the years 2002 to 2006. Arizona pedestrian crash data for 2002 to 2006 was analyzed in a tiered approach.

**Tier 1:** Pedestrian crashes statewide (all roadways in Arizona).

**Tier 2:** Pedestrian crashes on the state highway system, including a summary of crashes by urban area.

**Tier 3:** Pedestrian crashes for a cross-section of representative jurisdictions and Tribal Communities that rely on the state highway system.

**Tier 4:** Pedestrian crashes on specific corridors and locations with a high number of pedestrian crashes.

### **2.1 Census 2000 Data on Walking**

Key findings of 2000 United States Census, Journey to Work data for workers 16 years and older are:

- Census data for Arizona residents indicates that 2.6 percent of the 2,210,395 workers reported that they typically walk to work. This represents approximately 57,000 workers. Nationwide, approximately 2.9 percent of workers reported that they walk to work.

*Key considerations:*

- *Arizona residents, as reported in the U.S. Census data, walk to work less than the national average.*



## 2.2 National and Arizona Pedestrian Crash Trends

- In 2005, pedestrian fatalities in Arizona accounted for nearly 13 percent of all traffic related fatalities in the state, higher than the national average of 11.2 percent.
- Pedestrian crashes in Arizona have been generally increasing since 2003.
- In Arizona in 2005, 78 percent of pedestrian fatalities occurred in darkness or dawn. Nationally, based on 2001 data, approximately two-thirds of pedestrian fatalities occurred in dark conditions.
- Nationally, in 2006, 22 percent of pedestrian fatalities were attributed to improper crossing of a roadway or intersection. In Arizona, in 2006, 44 percent of pedestrian fatalities were attributed to improper crossing of a roadway or intersection.

### *Key considerations:*

- *A high percentage of pedestrian crashes in Arizona occur in dark conditions.*
- *A high percentage of pedestrian fatalities in Arizona are attributed to improper crossing of a roadway or intersection.*

## 2.3 Tier Analysis of Arizona Pedestrian Crash Data, 2002 to 2006

### 2.3.1 Tier 1 Analysis: Pedestrian Crashes Statewide (All Roadways in Arizona)

8,294 pedestrian crashes were reported statewide between January 1, 2002 and December 31, 2006. Key findings of the analysis area:

- 90 percent of crashes occur in urban areas
- 38 percent of crashes occurred in dark conditions
- 14 percent of pedestrians were reported as “pedestrian had been drinking”
- 71 percent of pedestrians involved in crashes were male
- 19 percent of drivers failed to yield the right of way
- 23 percent of vehicles were turning (12 percent right turns, 11 percent left turns)
- 64 percent of crashes occurred on two-way roadways with no median or a passive median (painted stripe)
- 15 percent of crashes occurred on two-way roadways with a curbed median
- 57 percent of pedestrians were crossing the road

### *Key considerations*

- *A high percentage of pedestrian crashes occur in urban areas.*
- *A high percentage of pedestrian crashes involved turning vehicles (right turns, left turns).*
- *A high number of pedestrian crashes occurred on two-way roadways with no median or a passive median (painted stripe).*

### 2.3.2 Tier 2 Analysis: Pedestrian Crashes on State Highways

In the Tier 2 analysis, it was found that 771 pedestrian crashes were reported on state highways between January 1, 2002 and December 31, 2006. Key findings of the analysis area:



- 65 percent of pedestrian crashes on state highways occurred in urban areas
- 56 percent of crashes on state highways occurred in dark conditions
- 23 percent of crashes were reported as “pedestrian had been drinking”
- 24 percent of pedestrian crashes reported the physical condition of the pedestrian as unknown
- 71 percent of pedestrians involved in crashes were male
- 12 percent of drivers failed to yield the right of way
- 18 percent of vehicles were turning (10 percent right turns, 8 percent left turns)
- 48 percent of crashes occurred on two-way roadways with a passive median (painted stripe)
- 30 percent of crashes occurred on roadways with a curbed median
- 50 percent of pedestrians were crossing the road

*Key considerations*

- *A high percentage of crashes on state highways occurred in urban areas.*
- *A high percentage of pedestrian crashes occurred in dark conditions.*
- *Alcohol consumption, by the pedestrian, was reported in a high percentage of pedestrian crashes*
- *A high number of pedestrian crashes occurred on two-way roadways with a passive median (painted stripe).*

### 2.3.3 Tier 3 Analysis: Pedestrian Crashes in Urban Areas and Tribal Communities

#### ***Focus Urban Areas***

**Exhibit 2-1** displays pedestrian crashes by urban area. Over 60 percent of pedestrian crashes on state highways occurred in 15 urban areas. In Working Paper No. 1, focus urban areas were subsequently selected for which additional detailed crash analysis was conducted. Focus urban areas were selected based on the following criteria:

- Focus area ranked in the top 15 urban areas statewide in terms of number of pedestrian crashes, and had ten or more crashes in a five-year period (2002 to 2006);
- A state highway passes through the focus area; and
- Jurisdiction staff from a focus area jurisdiction participated in a telephone interview to discuss pedestrian safety within their respective jurisdiction.

**Exhibit 2-2** presents selected crash statistics for each urban area. **Exhibit 2-3** includes a summary of pedestrian safety concerns of state highways as expressed by the staff of the focus urban area. Key findings of the analysis are:

- 25 percent of crashes on state highways occurred in the Phoenix and Tucson metropolitan areas
- The percentage of pedestrians who were identified as had been drinking range from 0 percent in Nogales to 58 percent in Holbrook
- The percentage of pedestrian crashes that occurred in dark conditions ranges from 12 percent in Casa Grande to 72 percent in Holbrook
- With exception to the Phoenix metropolitan area, the pedestrian was crossing the road in a majority of the crashes
- The percentage of crashes involving left turning vehicles is significantly higher than the percentage involving right turn vehicles in Coolidge, Casa Grande, and Nogales. In Phoenix and Yuma, the



percentage of crashes involving right turning vehicles is significantly higher than percentage involving left turning vehicles.

**Exhibit 2-1 – Pedestrian Crashes on State Highways, 2002 -2006, Urban Areas**

Urban Area	County	Number of Pedestrian Crashes	Percentage of Total Crashes on all State Highways
Phoenix urbanized area	Maricopa	137	17.77 %
Flagstaff	Coconino	69	8.95 %
Tucson urbanized area	Pima	60	7.78 %
Yuma	Yuma	35	4.54 %
Casa Grande	Pinal	27	3.50%
Bullhead City	Mohave	24	3.11 %
Holbrook	Navajo	18	2.33 %
Winslow	Navajo	17	2.20 %
Sierra Vista	Cochise	15	1.95 %
Payson	Gila	13	1.69 %
Sedona	Yavapai	12	1.56 %
Coolidge	Pinal	10	1.30 %
Nogales	Santa Cruz	10	1.30 %
Prescott	Yavapai	10	1.30 %
Kingman	Mohave	7	0.91 %

**Exhibit 2-2 – Focus Urban Area Contributing Factors**

Focus Urban Area	Darkness	Had been Drinking (Pedestrian)	Violation Type			Unit Action		
			Pedestrian: Did not use crosswalk	Driver: Failed to Yield	Driver: Speed too fast for conditions	Pedestrian: Crossing the Road	Driver: Making Left Turn	Driver: Making Right Turn
Bullhead City	62 %	22 %	26 %	0 %	7 %	70 %	11 %	4 %
Casa Grande	12 %	13 %	27 %	19 %	0 %	67 %	22 %	7 %
Coolidge	40 %	7 %	7 %	30 %	0 %	79 %	40 %	10 %
Flagstaff	56 %	38 %	21 %	28 %	5 %	72 %	18 %	20 %
Holbrook	72 %	58 %	32 %	6 %	0 %	58 %	6 %	6 %
Nogales	50 %	0 %	25 %	30 %	0 %	58 %	20 %	0 %
Phoenix metropolitan	49 %	13%	16 %	9 %	13 %	42 %	6 %	13 %
Sedona	54 %	38 %	23 %	31 %	8 %	54 %	15 %	15 %



**Exhibit 2-2 – Focus Urban Area Contributing Factors (continued)**

			Violation Type			Unit Action		
Tucson metropolitan	47 %	12 %	28 %	22 %	5 %	65 %	16 %	11 %
Yuma	42 %	15 %	21 %	15 %	15 %	73 %	12 %	27 %

**Exhibit 2-3 – Focus Urban Area, Summary of Issues Identified by Jurisdiction Staff**

Focus Urban Area	General Comments	Issues identified by staff of local urban area			
		Lighting	Pedestrian Crossings: Mid-Block Crossings, Uncontrolled	Discontinuous Sidewalks / Lack of Sidewalks / Maintenance needed	Speed
Bullhead City	<ul style="list-style-type: none"> <li>▪ Sidewalk discontinuities</li> <li>▪ Pedestrians crossing at mid-block and uncontrolled locations</li> <li>▪ Lighting is of concern on SR 68</li> </ul>	✓	✓	✓	
Casa Grande	<ul style="list-style-type: none"> <li>▪ Sidewalks immediately adjacent to the street</li> <li>▪ Pedestrians crossing at mid-block and uncontrolled locations</li> <li>▪ Gaps in sidewalks</li> </ul>		✓	✓	
Coolidge	<ul style="list-style-type: none"> <li>▪ Receive requests for mid-block crossings to access activity centers</li> </ul>		✓		
Flagstaff	<ul style="list-style-type: none"> <li>▪ Pedestrian crossing is largest concern</li> <li>▪ High speed of vehicles</li> </ul>		✓		✓
Holbrook	<ul style="list-style-type: none"> <li>▪ High number of transients</li> </ul>			✓	
Nogales	<ul style="list-style-type: none"> <li>▪ Primary concern is with train/pedestrian crashes</li> </ul>				
Phoenix metropolitan area	<ul style="list-style-type: none"> <li>▪ Wide intersections contribute to crashes</li> <li>▪ Sidewalks adjacent to roadway</li> </ul>		✓	✓	
Sedona	<ul style="list-style-type: none"> <li>▪ Several improvements underway to SR 89A</li> </ul>			✓	✓
Tucson metropolitan area	<ul style="list-style-type: none"> <li>▪ Several improvements recently made to Oracle Road (SR 77)</li> </ul>	✓	✓	✓	✓
Yuma	<ul style="list-style-type: none"> <li>▪ Recently began using channelized right turn lanes</li> <li>▪ Move sidewalks back from streets</li> </ul>	✓		✓	



#### *Key considerations*

- *Dark conditions are a significant contributing factor to pedestrian crashes*
- *Mid-block pedestrian crossings are a concern of local agency staff*
- *Discontinuous or a lack of sidewalks are of concern of local agency staff*

#### ***Tribal Communities***

Pedestrian crash data for 2002 to 2006 for state highways on tribal communities was reviewed. The study team recognizes that available pedestrian crash data for state highways on Tribal Communities may be incomplete. As such, Tribal Communities were contacted and requested to provide specific input to the Pedestrian Safety Action Plan.

Input received from Tribal Communities (as of August 2008) is listed below. Input was derived from recent reports, conference proceedings, etc. as well as from surveys that were completed by Tribal staff. General pedestrian safety concerns from Tribal Communities includes speeding, poor lighting, narrow roadway widths, vertical and horizontal curves with poor sight distance, and alcohol and drug use by pedestrians are of concern.

#### *Arizona Tribal Safety Summit:*

The Arizona Tribal Safety Summit was held on May 14-15, 2008. A review of the draft proceedings of the Safety Summit identified several issues related to pedestrian safety on Tribal Communities, including:

#### Infrastructure:

- Need for shoulder improvements.
- Need for vegetation control.
- Need for additional sidewalks and pedestrians paths.

#### Enforcement:

- Violations of pedestrian Right-of-Way.

#### Data:

- Using Geographic Positioning Systems (GPS) to pinpoint crash data; using standardized data fields; obtaining the support of high level officials; obtaining funds.
- Linking roadway characteristics (inventory data) to crash data.

#### *Gila River Indian Community*

- General concerns:
  - Overpasses without any sidewalks
- Specific concerns:
  - Pedestrians and bicyclists on SR 587, near milepost 220. Fast traffic and minimal shoulders make it unsafe for bicyclists and pedestrians
  - Bicyclists (non-community members) on SR 87 which is a heavy truck route
  - Bicycle and pedestrian concerns on 51<sup>st</sup> Avenue
  - BIA Route 7, SR 87 to Last Chance



- Baseline Road, no sidewalks near schools
- Casa Blanca Road (BIA Route 1)
- Blackwater School Road (BIA Route 104)

Navajo Nation

- General concerns:
  - Insufficient lighting
  - Lack of sidewalks
- Specific areas of concern:
  - SR 89, milepost 465 to 470 (Cameron): lack of sidewalks and street lighting
  - Junction SR 160 / 89 (MP 481): lack of street lighting
  - SR 264 / 160, milepost 320 to 325 (Tuba City): lack of street lights and sidewalks
  - SR 160 / 163 (milepost 390 to 395 (Kayenta): lack of sidewalks and street lights
  - SR 191, milepost 445 to 450 (Chinle), pedestrian overpass
  - SR 264, milepost 445 and 440: pedestrian overpass
  - SR 163, milepost 145, Kayenta: pedestrian overpass
  - SR 264, milepost 473 (Window Rock): pedestrian overpass

As part of a study completed for the ADOT Bicycle and Pedestrian Program in 2007, the Navajo Nation provided the following input as to areas of pedestrian activity:

Priority	Indian Reservation Name and State Route #	Segment Beginning Milepost	Segment Ending Milepost	Description of Existing Pedestrian Facility	Description of Pedestrian Attraction
5	SR 264	426	427	None	Steamboat: Chapter Housing to housing areas (for a bike path)
2	SR 264	446.3	447.9	None	Ganado: NPS / Hubble Trading Post to School
6	US 89	466.2	467	None	Cameron – Chapter House to Trading Post and Bridge
1	US 160	321.8	323.2	Partially paved sidewalks	Tuba City: Main Street to Fairground
4	US 191	396.6	397.2	None	Klagetoh: Chapter House to housing areas
3	US 191	461.3	462.5	None	Many Farms: School and housing areas

Tohono O’odham Nation

- General concerns:
  - Roadways with a lack of shoulders
- Specific areas of concern:



- SR 86, from west of milepost 55 to east of milepost 145. There are no shoulders for pedestrians or cyclists. Roads are narrow and vegetation is right up to the road. A lack of lighting makes it dangerous at night.
- Local schools have several bus stops along SR 86. One of the local schools in Sells is located right off of SR 86 near milepost 114.

#### Hopi Tribe

- SR 264, Milepost 385, Second Mesa Elementary School: no cross walks.
- SR 264, Milepost 390, First Mesa area: No sidewalks, bus stop provisions, turn lanes.

#### White Mountain Apache Tribe

- General concerns include are speeding traffic, poor lighting at night, poor visibility, narrow road widths, vertical and horizontal curves with poor sight distance and alcohol and drug use by pedestrians.
- The White Mountain Apache tribe expressed safety concerns on SR 73 and SR 260. Specific concerns included incomplete sidewalks and vegetation growing on sidewalks on SR 73, and vegetation on SR 73 from Ft. Apache to SR 260.

#### Key considerations

- *Alcohol consumption, by the pedestrian, was reported in a high percentage of pedestrian crashes*
- *A high percentage of pedestrian crashes occurred in dark conditions.*
- *Lack of shoulders and other geometric deficiencies on state highways are of concern to tribal communities.*
- *Vegetation on state highways on tribal communities is of concern.*

### 2.3.4 Tier 4 Analysis: Corridors and Locations with a Higher Number of Pedestrian Crashes

Tier 4 analysis identified locations, including segments and interchanges, on state highways with the highest numbers of pedestrian crashes. Locations were identified based on density analysis using geographic information system tools and visual review of crash locations. **Exhibit 2-4** lists higher crash state highway segments (non-interstate) and **Exhibit 2-5** lists higher crash interstate segments and interchange locations. It should be noted that a state highway acting as the primary roadway through a small urban area is categorized as “Main Street” while a state highway carrying a significant amount of traffic through a large urban area is considered a “Major Arterial”. A detailed listing of crash locations is contained in *Working Paper No. 1*.

As a part of Tier 4 analysis, over 200 crash reports for pedestrian crashes that occurred at high crash locations on state highways in Arizona were reviewed. Crash types were determined for each of the 200 crashes consistent with definitions in the Pedestrian Bicycle Crash Analysis Tool (PBCAT) and Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE), including the following:

- **Walking in Roadway** - The pedestrian was walking in the roadway prior to the crash, but the crash cannot be further classified.
- **Standing in Roadway** - The pedestrian was standing in the roadway prior to the crash, but the crash cannot be further classified.



- **Walking Along Roadway** - The pedestrian was standing or walking along the roadway on the edge of a travel lane, or on a shoulder or sidewalk.
- **Pedestrian Failed to Yield** - For this report, this crash type was used when the pedestrian was crossing the road in a non-crossing area and failed to yield to the motorist.
- **Motorist Left Turn—Parallel Paths** - The motorist was initially traveling on a parallel path with the pedestrian before making a left turn and striking the individual.
- **Motorist Left Turn—Perpendicular Paths** - The motorist was initially traveling on a crossing path with the pedestrian before making a left turn and striking the individual.
- **Motorist Right Turn—Parallel Paths** - The motorist was initially travelling on a parallel path with the pedestrian before making a right turn and striking the individual.
- **Motorist Right Turn—Perpendicular Paths** - The motorist was initially travelling on a crossing path with the pedestrian before making a right turn and striking the individual.
- **Through Vehicle at Signalized Location** - The pedestrian was struck at a signalized intersection or midblock location by a vehicle that was traveling straight ahead.
- **Through Vehicle at Unsignalized Location** - The pedestrian was struck at an unsignalized intersection or midblock location. Either the motorist or the pedestrian may have failed to yield.
- **Non-Roadway** - The pedestrian was standing or walking near the roadway edge, on the sidewalk, in a driveway or alley, or in a parking lot, when struck by a vehicle.
- **Multiple Threat/Trapped** - The pedestrian entered the roadway in front of stopped or slowed traffic and was struck by a multiple-threat vehicle in an adjacent lane after becoming trapped in the middle of the roadway.
- **Unique Midblock** - The pedestrian was struck while crossing the road to/from a mailbox, newspaper box, or ice-cream truck, or while getting into or out of a stopped vehicle.
- **Miscellaneous** - Other pedestrian crash types such as intentional crashes, driverless vehicle incidents, a pedestrian struck after a vehicle/vehicle collision, a pedestrian struck by falling cargo, or an emergency vehicle striking a pedestrian.

**Exhibit 2-6** displays summary statistics of higher crash state highway (non-interstate) segments. **Exhibit 2-7** displays summary statistics of higher crash state highway (non-interstate) locations categorized by signalized, unsignalized, or midblock location. **Exhibit 2-8** displays summary statistics of higher crash interstate interchange locations.

The analysis of crash types for high crash locations reveals the following:

- 47 percent of state highway (non-interstate) crashes are categorized as pedestrian failed to yield
- 26 percent of state highway (non-interstate) crashes are categorized as turning vehicles (right turns and left turns)
- 17 percent of crashes at signalized intersections were reported as “pedestrian did not use the crosswalk”
- 49 percent of crashes at mid-block locations were reported as “pedestrian did not use the crosswalk”
- 43 percent of pedestrian crashes at interstate interchanges are categorized as pedestrian failed to yield
- 45 percent of interstate interchange crashes were categorized as turning vehicles (right turns and left turns)
- 49 percent of interstate interchange crashes occurred in dark conditions



*Key considerations*

- *A high percentage of pedestrian crashes on state highways are categorized as pedestrian failed to yield.*
- *A high percentage of pedestrian crashes involved turning vehicles (right turns and left turns).*
- *A high percentage of pedestrian crashes occurred in dark conditions.*



### Exhibit 2-4 – Summary of Higher Crash Segment Locations

Location #	Category	Functional Class	City	On Road	From	To	Related SHS	Length (mile)	Number of Crashes	Crashes per mile	Number of Fatal Crashes	Number of Incapacitating Crashes
1A	Main Street	14	Bullhead City	SR-95	North Oatman Rd	SR 68	SR-95	6.21	24	3.9	4	8
1B	Main Street	14	Bullhead City	SR-68	SR-95	Davis Dam Rd	SR-68	1.54	2	1.3	2	0
2	Main Street	14	Bullhead City	SR-95	Joy Ln	Camp Mohave Rd	SR-95	2	7	3.5	3	1
3A	Main Street	14	Casa Grande	SR-287 (Florence Blvd)	SR-387	Arizola Rd	SR-287	2.51	24	9.6	3	2
5A	Main Street	14, 16	Flagstaff	SR-40B (4)	Riordan Rd	Elden St	SR-40B (4)	1.31	30	22.9	0	9
5B	Main Street	14	Flagstaff	SR-89A	University Ave	SR-40B (4)	SR-89A	0.67	16	23.9	1	4
5C	Main Street	14	Flagstaff	US-180	SR-40B (4)	Birch Ave	US-180	0.14	4	28.6	0	1
6	Main Street	14	Flagstaff	SR-40B (4)	Arrowhead Ave	Postal Blvd	SR-40B (4)	0.73	11	15.1	1	2
7	Main Street	14	Flagstaff	US-89	Snowflake Dr / Trailsend Dr	Townsend Winona Rd	US-89	0.58	5	8.6	2	0
9	Main Street	2, 6	Holbrook	SR-40B (8)	5th Ave	I-40 Exit 286 G-Ramp	SR-40B (8)	1.11	17	15.3	1	2
16A	Major Arterial	14	Tucson	SR-77	I-10 (2) Frontage Rd	Limberlost Dr	SR-77	2.88	24	8.3	1	8
16B	Major Arterial	14	Tucson	SR-77	River Rd	Sahuaro Vista	SR-77	3.09	21	6.8	4	6
16C	Major Arterial	14	Tucson	SR-77	Magee Rd	Mountain Vista Dr	SR-77	0.27	6	22.2	0	3

Location #	AADT	Number of Lanes	Bicycle Lane	Sidewalks	Median	Posted Speed Limit (mph)	Illumination	Adjacent Land Use	Building Setback	Crosswalk Locations	Bus Stop Locations
1A	32,598	4	None	Yes	TWLT Median	45	Good	Most commercial.	Majority > 25'	Only at intersections	None
1B	13,041	4	None	Only for a short segment of WB	Raised median, a small segment of TWLT median	45	Poor	Open Space	N/A	Only at intersections	None
2	30,169	4	None	None	TWLT Median	45	Poor	Commercial / Open	Majority > 25'	Only at intersections	None
3A	25,089	4	None	Yes	Majority TWLT median, a short segment of raised median	35 / 45	Good	Most commercial	Majority > 25'	Only at intersections	None
5A	38,293	4	None	Yes	TWLT Median	30	Good	Majority commercial, some open space	Majority < 10', next to sidewalk on WB	Only at intersections	None
5B	35,000	4	None	Yes	TWLT Median	35	Good	Most commercial	Majority > 25'	Only at intersections	None
5C	14,790	2	None	Yes	TWLT Median	25	Good	Most residential	Majority > 15'	Only at intersections	None
6	27,431	4	None	Yes	TWLT Median	40	Good	Commercial on WB, open space on EB	Some at 20', some next to sidewalk	Only at intersections	None
7	26,389	4	None	Yes	TWLT Median	45	Good	Commercial / Open Space	Majority > 25'	Only at intersections	None
9	11,066	4	None	Yes	Majority TWLT median, one segment without median	35	Good	Commercial / Open Space	Next to sidewalk in downtown, others > 25'	Only at intersections	None
16A	40,189	4, 6	Yes	Yes	Raised median	40	Good	Most commercial	Majority > 25'	Only at intersections	Oracle Road
16B	52,062	6	Yes	None	Raised median	45	Only at intersections	Commercial / Open Space	Majority > 25'	Only at intersections	Oracle Road
16C	55,059	6	Yes	None	Raised median	50	Only at intersections	Commercial on SB	Majority > 25'	Only at intersections	None



**Exhibit 2-5 – Summary of Higher Crash Interchange Locations**

Interchange Code	Func.	City	On Road	From	To	Related SHS	Number of Crashes	Number of Fatal Crashes	Number of Incapacitating Crashes
1	/	Phoenix	32nd St			SR-202 Interchange	5	0	2
4	/	Phoenix	Bethany Home Rd	I-17 Front SB - 0.08	I-17 Front NB +0.09	I-17 Interchange	5	1	1
6	/	Phoenix	Camelback Rd	I-17 Front SB - 0.08	I-17 Front NB +0.09	I-17 Interchange	6	1	0
7	/	Phoenix	Dunlap Ave	I-17 Front SB - 0.07	I-17 Front NB +0.09	I-17 Interchange	7	0	2
10	/	Phoenix	University Dr			SR-101 / SB Price Rd Interchange	9	1	3
15	/	Tempe	Baseline Rd	I-10 Ramp SB	I-10 Ramp NB	I-10 Interchange	5	0	0



### Exhibit 2-6 – Summary Statistics of Higher Crash State Highway (Non-Interstate) Segments

Crash Type	Number	Percentage	Intersection-related	Number	Percentage	Violation Type (Driver)	Number	Percentage
Pedestrian Failed to Yield	87	47%	Yes	124	66%	No Improper Driving	102	53%
Walking in Roadway	6	3%	No	64	34%	Speed Too Fast for Conditions	9	5%
Standing in Roadway	1	1%	<b>Total</b>	<b>188</b>	<b>100%</b>	Failed to Yield Right-Of-Way	36	19%
Motorist Left Turn - Parallel Paths	23	12%	<b>Light Conditions</b>			Disregarded Traffic Signal	3	2%
Motorist Left Turn - Perpendicular Paths	2	1%	Daylight	81	43%	Inattention	18	9%
Motorist Right Turn - Parallel Paths	7	4%	Dawn or Dusk	8	4%	Drove in Opposing Traffic Lane	1	1%
Motorist Right Turn - Perpendicular Paths	16	9%	Darkness	99	53%	Made Improper Turn	1	1%
Through Vehicle at Signalized Location	19	10%	<b>Total</b>	<b>188</b>	<b>100%</b>	Other	6	3%
Through Vehicle at Unsignalized Location	7	4%	<b>Control Type</b>			Unknown	15	8%
Multiple Threat/Trapped	2	1%	Signal	61	32%	<b>Total</b>	<b>191</b>	<b>100%</b>
Walking Along Roadway	3	2%	Flashing Signal	1	1%	<b>Violation Type (Pedestrian)</b>		
Non-Roadway	11	6%	Illumination	54	29%	Failed to Yield Right-Of-Way	25	13%
Unique Midblock	1	1%	Striping	100	53%	Disregarded Traffic Signal	5	3%
Miscellaneous	2	1%	Stop Sign	12	6%	Inattention	25	13%
<b>Total</b>	<b>187</b>	<b>100%</b>	Regulatory Sign	0	0%	Did Not Use Crosswalk	59	30%
<b>Crash Type</b>	<b>Fatalities</b>	<b>Percentage</b>	Warning Sign	1	1%	Other	52	26%
Pedestrian Failed to Yield	17	77%	N/A	36	19%	Unknown	32	16%
Walking in Roadway	2	9%	<b>Total</b>	<b>265</b>		<b>Total</b>	<b>198</b>	<b>100%</b>
Standing in Roadway	0	0%	<b>Contributing Factors</b>			<b>Unit Action (Driver)</b>		
Motorist Left Turn - Parallel Paths	0	0%	No Improper Driving	97	51%	Going Straight Ahead	109	57%
Motorist Left Turn - Perpendicular Paths	0	0%	Swerved/Braked to Avoid Pedestrian	4	2%	Making Left Turn	25	13%
Motorist Right Turn - Parallel Paths	0	0%	Swerved/Braked to Avoid Object or Animal	2	1%	Making Right Turn	26	14%
Motorist Right Turn - Perpendicular Paths	0	0%	Driver Distraction Within Vehicle	1	1%	Slowing in Trafficway	7	4%
Through Vehicle at Signalized Location	1	5%	Left Roadway	3	2%	Stopped in Trafficway	0	0%
Through Vehicle at Unsignalized Location	1	5%	Stopped	0	0%	Entering Alley or Driveway	1	1%
Multiple Threat/Trapped	0	0%	Other	69	36%	Leaving Parking Position	6	3%
Walking Along Roadway	1	5%	Unknown	15	8%	Changing Lanes	2	1%
Non-Roadway	0	0%	<b>Total</b>	<b>191</b>	<b>100%</b>	Avoiding Vehicle, Objects, etc.	8	4%
Unique Midblock	0	0%	<b>Physical Conditions (Driver)</b>			Other	3	2%
Miscellaneous	0	0%	No Apparent Influence	156	82%	Unknown	4	2%
<b>Total</b>	<b>22</b>	<b>100%</b>	Had Been Drinking	4	2%	<b>Total</b>	<b>191</b>	<b>100%</b>
<b>Crash Type</b>	<b>Incap. Injury</b>	<b>Percentage</b>	Other	1	1%	<b>Unit Action (Pedestrian)</b>		
Pedestrian Failed to Yield	28	62%	Unknown	30	16%	Crossing Road	137	69%
Walking in Roadway	2	4%	<b>Total</b>	<b>191</b>	<b>100%</b>	Walking Against Traffic	10	5%
Standing in Roadway	0	0%	<b>Physical Conditions (Pedestrian)</b>			Walking With Traffic	5	3%
Motorist Left Turn - Parallel Paths	0	0%	No Apparent Influence	83	42%	Working On/Pushing Vehicle	1	1%
Motorist Left Turn - Perpendicular Paths	0	0%	Had Been Drinking	53	27%	Standing	4	2%
Motorist Right Turn - Parallel Paths	2	4%	Prescription Drugs	1	1%	Lying	0	0%
Motorist Right Turn - Perpendicular Paths	1	2%	Physical Impairment	3	2%	Other	27	14%
Through Vehicle at Signalized Location	5	11%	Other	5	3%	Unknown	14	7%
Through Vehicle at Unsignalized Location	3	7%	Unknown	53	27%	<b>Total</b>	<b>198</b>	<b>100%</b>
Multiple Threat/Trapped	1	2%	<b>Total</b>	<b>198</b>	<b>100%</b>			
Walking Along Roadway	1	2%						
Non-Roadway	1	2%						
Unique Midblock	0	0%						
Miscellaneous	1	2%						
<b>Total</b>	<b>45</b>	<b>100%</b>						



**Exhibit 2-7 – Summary Statistics of Higher Crash State Highway (Non-Interstate) Segments by Signalized Intersection, Unsignalized Intersection, and Mid-Block**

**CRASHES AT SIGNALIZED INTERSECTIONS**

<b>Violation Type (Driver)</b>	<b>Number of Crashes</b>	<b>Percentage</b>
No Improper Driving	29	40%
Speed Too Fast for Conditions	2	3%
Failed to Yield Right-Of-Way	24	33%
Disregarded Traffic Signal	3	4%
Inattention	6	8%
Drove in Opposing Traffic Lane	0	0%
Made Improper Turn	1	1%
Other	1	1%
Unknown	6	8%
<b>Total</b>	<b>72</b>	<b>100%</b>

<b>Violation Type (Pedestrian)</b>		<b>Percentage</b>
Failed to Yield Right-Of-Way	5	7%
Disregarded Traffic Signal	5	7%
Inattention	6	8%
Did Not Use Crosswalk	12	17%
Other	23	32%
Unknown	21	29%
<b>Total</b>	<b>72</b>	<b>100%</b>

**CRASHES AT UNSIGNALIZED INTERSECTIONS**

<b>Violation Type (Driver)</b>	<b>Number of Crashes</b>	<b>Percentage</b>
No Improper Driving	11	41%
Speed Too Fast for Conditions	2	7%
Failed to Yield Right-Of-Way	4	15%
Disregarded Traffic Signal	0	0%
Inattention	6	22%
Drove in Opposing Traffic Lane	1	4%
Made Improper Turn	0	0%
Other	1	4%
Unknown	2	7%
<b>Total</b>	<b>27</b>	<b>100%</b>

<b>Violation Type (Pedestrian)</b>		
Failed to Yield Right-Of-Way	5	19%
Disregarded Traffic Signal	0	0%
Inattention	5	19%
Did Not Use Crosswalk	7	26%
Other	7	26%
Unknown	3	11%
<b>Total</b>	<b>27</b>	<b>100%</b>

**CRASHES AT MID-BLOCK LOCATIONS**

<b>Violation Type (Driver)</b>	<b>Number of Crashes</b>	<b>Percentage</b>
No Improper Driving	59	75%
Speed Too Fast for Conditions	4	5%
Failed to Yield Right-Of-Way	2	3%
Disregarded Traffic Signal	0	0%
Inattention	3	4%
Drove in Opposing Traffic Lane	0	0%
Made Improper Turn	0	0%
Other	4	5%
Unknown	7	9%
<b>Total</b>	<b>79</b>	<b>100%</b>

<b>Violation Type (Pedestrian)</b>	<b>Mid-Block</b>	<b>Percentage</b>
Failed to Yield Right-Of-Way	13	16%
Disregarded Traffic Signal	0	0%
Inattention	13	16%
Did Not Use Crosswalk	39	49%
Other	10	13%
Unknown	4	5%
<b>Total</b>	<b>79</b>	<b>100%</b>



### Exhibit 2-8 – Summary of Statistics of Higher Crash Interstate Interchanges

Crash Type	Number	Percentage	Light Conditions	Number	Percentage	Violation Type (Driver)	Number	Percentage
Pedestrian Failed to Yield	16	43%	Daylight	18	49%	No Improper Driving	23	61%
Motorist Left Turn - Parallel Paths	0	0%	Dawn or Dusk	1	3%	Speed Too Fast for Conditions	2	5%
Motorist Left Turn - Perpendicular Paths	2	5%	Darkness	18	49%	Failed to Yield Right-Of-Way	5	13%
Motorist Right Turn - Parallel Paths	6	16%	<b>Total</b>	<b>37</b>	<b>100%</b>	Inattention	3	8%
Motorist Right Turn - Perpendicular Paths	9	24%	<b>Control Type</b>			Other	1	3%
Through Vehicle at Signalized Location	4	11%	Signal	18	49%	Unknown	4	11%
<b>Total</b>	<b>37</b>	<b>100%</b>	Flashing Signal	2	5%	<b>Total</b>	<b>38</b>	<b>100%</b>
			Illumination	12	32%	<b>Violation Type (Pedestrian)</b>		
<b>Crash Type</b>	<b>Fatalities</b>	<b>Percentage</b>	Regulatory Sign	9	24%	Failed to Yield Right-Of-Way	6	16%
Pedestrian Failed to Yield	3	100%	N/A	4	11%	Disregarded Traffic Signal	5	14%
Motorist Left Turn - Parallel Paths	0	0%	<b>Total</b>	<b>45</b>		Inattention	4	11%
Motorist Left Turn - Perpendicular Paths	0	0%	<b>Contributing Factors</b>			Did Not Use Crosswalk	11	30%
Motorist Right Turn - Parallel Paths	0	0%	No Improper Driving	23	61%	Walking Against Traffic	1	3%
Motorist Right Turn - Perpendicular Paths	0	0%	Stopped	1	3%	Other	5	14%
Through Vehicle at Signalized Location	0	0%	Other	10	26%	Unknown	5	14%
<b>Total</b>	<b>3</b>	<b>100%</b>	Unknown	4	11%	<b>Total</b>	<b>37</b>	<b>100%</b>
			<b>Total</b>	<b>38</b>	<b>100%</b>	<b>Unit Action (Driver)</b>		
<b>Crash Type</b>	<b>Incap. Injury</b>	<b>Percentage</b>	<b>Physical Conditions (Driver)</b>			Going Straight Ahead	21	55%
Pedestrian Failed to Yield	4	50%	No Apparent Influence	33	87%	Making Left Turn	2	5%
Motorist Left Turn - Parallel Paths	0	0%	Unknown	5	13%	Making Right Turn	13	34%
Motorist Left Turn - Perpendicular Paths	0	0%	<b>Total</b>	<b>38</b>	<b>100%</b>	Slowing in Trafficway	1	3%
Motorist Right Turn - Parallel Paths	2	25%	<b>Physical Conditions (Pedestrian)</b>			Stopped in Trafficway	1	3%
Motorist Right Turn - Perpendicular Paths	2	25%	No Apparent Influence	21	57%	<b>Total</b>	<b>38</b>	<b>100%</b>
Through Vehicle at Signalized Location	0	0%	Had Been Drinking	8	22%	<b>Unit Action (Pedestrian)</b>		
<b>Total</b>	<b>8</b>	<b>100%</b>	Other	1	3%	Crossing Road	25	68%
			Unknown	7	19%	Walking Against Traffic	4	11%
			<b>Total</b>	<b>37</b>	<b>100%</b>	Lying	1	3%
						Other	6	16%
						Unknown	1	3%
						<b>Total</b>	<b>37</b>	<b>97%</b>



### 3.0 PROPOSED PEDESTRIAN SAFETY GOALS AND EMPHASIS AREAS

Proposed pedestrian safety goals and emphasis areas are presented in Chapter 3.

#### 3.1 Pedestrian Safety Goal for State Highways in Arizona

##### *Arizona's Overall State Safety Vision and Goal*

- The vision of the Arizona Strategic Highway Safety Plan is “zero fatalities on Arizona roads, your life depends on it” (the Every One Counts vision).
- The Every One Counts vision is supported by a state “stretch” goal designed to bring about clear progress towards the Every One Counts vision. The goal requires a reduction in the number of fatalities on Arizona’s roadways of approximately 12 percent by the year 2012. The base year of comparison will be 2007.

##### *Federal Highway Administration Safety Goals*

The goal of the FHWA is to continually improve highway safety by reducing highway fatalities and injuries by 20 percent in ten years. Specifically, the Federal Highway Administration (FHWA) has established a goal of reducing pedestrian fatalities and injuries by 10 percent by the year 2011.

##### *Proposed ADOT Pedestrian Safety Action Plan Goal*

In support of the Arizona safety vision and goal, and the Federal Highway Administration goals, the ADOT Pedestrian Safety Action Plan proposes a goal to reduce pedestrian crashes (both fatal and non-fatal) by 20 percent by the year 2016. The reduction in pedestrian crashes will be measured by a five year average (2012 to 2016). The 5-year average for the years 2002 through 2006 will serve as the base years. This equates to 31 fewer pedestrian crashes per year by the year 2016, as illustrated in **Exhibit 3-1**.

***GOAL: Reduce the number of pedestrian crashes on Arizona state highways by 20 percent by 2016. This will be measured by the average annual number of pedestrian crashes from 2012 to 2016, compared to the average annual number of pedestrian crashes from 2002 to 2006.***



**Exhibit 3-1 – Pedestrian Safety Goal for Arizona State Highways**

Pedestrian Safety Goal	Description	Baseline	Target
<p><b>Reduce the total number of pedestrian crashes</b> (fatalities and non-fatalities) on Arizona state highways by 20 percent by 2016.</p>	<p>The ADOT Pedestrian Safety Action Plan proposes a goal to reduce pedestrian crashes (fatal and non-fatal) by 20 percent by the year 2016.</p> <p>This will be measured by the average annual number of pedestrian crashes from 2012 to 2016, compared to the average annual number of pedestrian crashes from 2002 to 2006.</p>	<p>From 2002 to 2006, the average annual pedestrian crashes on state highways in Arizona were 154 pedestrian crashes.</p>	<p>The 2016 goal is to have fewer than 123 pedestrian crashes on state highways (fatal and non-fatal) per year.</p>

### 3.2 Pedestrian Safety Emphasis Areas for State Highways in Arizona

The ADOT Pedestrian Safety Action Plan will ultimately result in countermeasure recommendations for high pedestrian crash locations on roadways in the state highway system. Countermeasures may include development of statewide programs and policies, as well as location-specific engineering and enforcement solutions. Ideally, countermeasures would be identified for every aspect and location where there was a pedestrian crash. In reality, this is not practical. Identification of emphasis areas will facilitate focusing of resources to areas where the largest benefits can be realized, and the identification of specific action items to improve pedestrian safety on Arizona’s state highways.

Pedestrian safety emphasis areas are proposed in **Exhibit 3-2**. A description and justification for each emphasis area is included in **Exhibit 3-2**.



**Exhibit 3-2 – Pedestrian Safety Emphasis Areas for State Highway System**

<b>Emphasis Area</b>	<b>Description and Justification</b>
<i><b>Reduce pedestrian crashes in urban areas at locations with high pedestrian activity</b></i>	Statewide approximately 90 percent of pedestrian crashes occurred in urban areas. 65 percent of pedestrian crashes on state highways occurred in urban areas.
<i><b>Reduce pedestrian crashes at intersections involving turning vehicles (right and left)</b></i>	Turning vehicle type crashes make up 26 percent of pedestrian crashes on high crash segments in focus urban areas.
<i><b>Reduce pedestrian crashes on two-way roadways with no median or a passive median (painted stripe)</b></i>	Pedestrian crashes occurring on two-way roadways with a passive median account for approximately 64 percent of statewide pedestrian crashes. Passive medians include a striped center line, no stripe, or a painted median.
<i><b>Reduce pedestrian crashes involving pedestrians that had been drinking</b></i>	On high crash segments, crashes involving pedestrians that had been drinking total 27 percent of crashes along segments and 22 percent of pedestrian crashes at interchanges. Alcohol consumption by pedestrians has also been expressed as a concern by local jurisdiction staff and by the tribal communities.
<i><b>Reduce dart/dash / mid-block pedestrian crashes</b></i>	The crash data for the study areas shows that dart/dash crashes make up 50 percent of the pedestrian crashes along segments and 43 percent of pedestrian crashes at interchanges. Targeting these types of crashes can help to reduce a significant amount of pedestrian crashes.  Dash/dart crashes include crashes when the pedestrian walked or ran into the roadway at an intersection or midblock location and was struck by a vehicle.
<i><b>Reduce pedestrian crashes involving turning vehicles at interchanges</b></i>	At interchanges 46 percent of pedestrian crashes are turning vehicle crashes with the majority being right turning vehicles. Focusing on these types of pedestrian crashes may help to make crossing safer for pedestrians at interchanges.  Turning vehicle crashes are crashes where the pedestrian was attempting to cross at an interchange and was struck by a vehicle that was turning right or left.
<i><b>Improve lighting conditions at high pedestrian activity locations</b></i>	Approximately 50 percent of pedestrian crashes in high crash segments occurred in dark conditions. This is significant since exposure is considerably less during the nighttime and early morning hours. A majority of pedestrian fatalities occur in dark conditions.