SOUTHERN GREENLEE COUNTY

SMALL AREA TRANSPORTATION STUDY

ADDENDUM TO TRANSPORTATION PLAN

LIMA & ASSOCIATES
Transportation - G.I.S.

AUGUST 2009

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1. INTRODUCTION AND PURPOSE

INTRODUCTION

This document is an addendum to the *Southern Greenlee County Small Area Transportation Study*, *Final Report*, January 2008. The Final Report presented the findings and recommendations of the Southern Greenlee County Small Area Transportation Study (SATS); the report provided the County with a long-range multimodal transportation plan, practical tools for day-to-day programming, and funding of transportation improvements. Figures 1 and 2 depict the study area along with the 2007 Average Annual Daily Traffic (AADT).

The SATS focused on regionally significant County roads and major roads within the Town of Duncan and Town of Clifton. The study did not include the analysis of state highways. The SATS developed 5-, 10-, and 20-year transportation plans for Southern Greenlee County by identifying deficiencies and recommending projects needed to improve mobility and safety and encourage tourism and development. The improvements were then prioritized to maximize project benefits within budget limitations. Funding strategies and potential funding sources were provided.

PURPOSE

This update to the SATS presents the analysis of needs and deficiencies on the state highways in Southern Greenlee County and recommends improvement projects for the state highways. The County will present this information to the Arizona Department of Transportation (ADOT) for consideration for the Eastern Arizona ongoing Framework Study. Although the primary focus of the update was the analysis of the state highways, a review and update was also conducted for the local road projects.

The update included the following steps:

- Consultation with Greenlee County Public Works and ADOT Safford District
- Review of previous and ongoing plans and programs
  - Greenlee County Small Area Study
  - Arizona East Framework Study
  - ADOT *Five-year Transportation Facilities Construction Program. FY 2010-2014*
  - ADOT Road Safety Assessments
- Review of the ADOT Video Photo Log for each of the state highways
- Analysis and documentation of deficiencies and needs of state highways including the analysis of crashes on the state highways
- Recommendations for improvements on state highways
- Review and update of County and local projects
- Presentation of draft recommendations to Greenlee County Board of Supervisors (June 19, 2009)

FIGURE 1. STUDY AREA AND 2007 AVERAGE ANNUAL DAILY TRAFFIC (AADT)

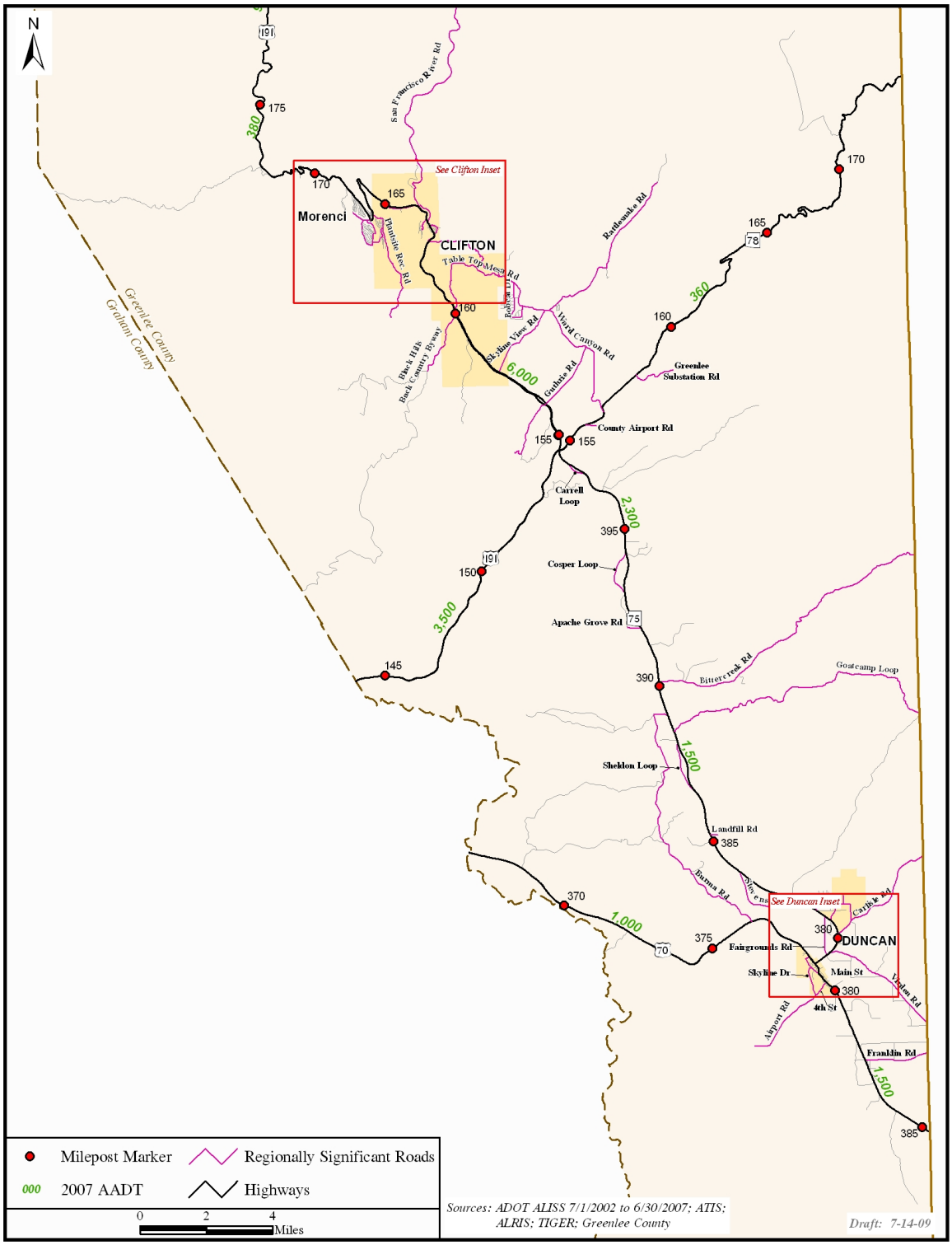
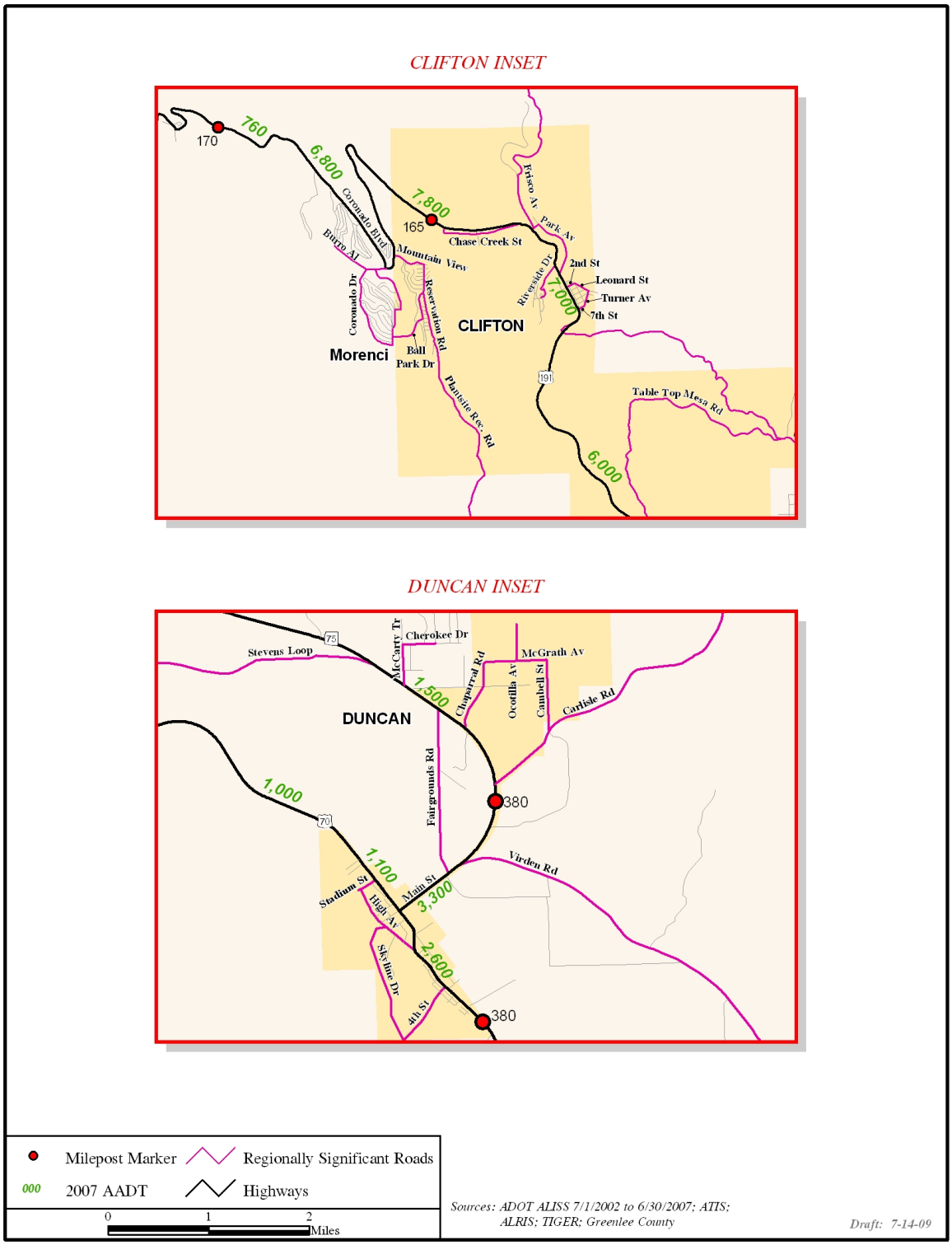


FIGURE 2. STUDY AREA AND 2007 AVERAGE ANNUAL DAILY TRAFFIC (AADT) CLIFTON AND DUNCAN INSETS



2. EVALUATION OF DEFICIENCIES AND NEEDS

This chapter presents the measures that were used to evaluate candidate State Highway projects that were omitted from the first phase of the project as well as re-evaluate projects on County roadways and multimodal projects within the Study Area.

REVISED DEFICIENCIES AND NEEDS

The previous phase of the Southern Greenlee County Small Area Transportation Study (SATS) focused on roadways operated and/or maintained by the County and the Towns of Duncan and Clifton, with the direction of the Arizona Department of Transportation (ADOT). A major impetus for conducting this subsequent phase of the SATS was to examine the deficiencies and needs of State Highway segments located within the Southern Greenlee County study area. The current goal of ADOT to develop a Statewide Transportation Framework as a vision for the 2050 horizon necessitates a closer look at all state-maintained roadways.

The criteria used to evaluate candidate transportation projects for the first phase of the project with respect to both need and feasibility were:

Need

- Potential to address travel demand
- Potential to serve residents
- Potential to provide connectivity and/or improve mobility between places and major roads

Feasibility Constraints

- Environmental and physical impacts
- Topographical constraints
- Constructability

Roadway capacity needs in the study area vary significantly due to the cyclical nature of copper mining activity and the accompanying fluctuations in the size of the workforce at the Morenci Mine. The criteria are:

Need

- Infrastructure Conditions (System Preservation)
- Safety (Reduction in Crashes)
- Potential to serve residents
- Potential to provide connectivity and/or improve mobility between places and major roads
- Potential to provide adequate mobility during periods of peak Morenci Mine activity

Feasibility Constraints

- Environmental and physical impacts
- Topographical constraints
- Constructability
- Costs/Right-of-way/Funding

SAFETY - CRASH ANALYSIS

Crash data on roads in Southern Greenlee County was obtained from ADOT's Accident Location Identification Surveillance System (ALISS) for the period of July 2002 through June 2007. During this five-year period, 259 traffic crashes occurred in Southern Greenlee County. The injury severity among the 259 crashes was:

- Six fatal crashes
- 167 non-injury crashes
- 69 injury crashes
- 15 possible injuries
- Two unknown

Figures 3 and 4 depict the crash locations and Figures 5 and 6 show the fatal crashes. As illustrated in the figures, the vast majority of the crashes and the fatal crashes took place on State or US Highways. Crash rates are illustrated in Figures 7 and 8. SR 78 has the statistically highest crash rate of 1.1 crashes per million vehicle miles traveled due to the relatively low traffic volumes on the state highway and number of crashes. A segment of US 191 that parallels Chase Creek Street in Clifton (Figure 8, top frame) may be exhibiting a very low accident rate due to the 25 mph speed limit posted on a stretch of roadway that is straight and level compared with adjoining segments.

Depending upon the speed involved, roadway geometrics at the crash location, road and weather conditions, driver reaction, and other issues, a traffic crash may involve one or more phases. For example, two cars may first collide; subsequently one or both may overturn, strike a third vehicle, or strike a fixed object. The First Harmful Definition is the first action that causes damage to a motor vehicle, its occupants, a pedestrian, or a fixed object.

As illustrated in Figure 9, approximately 30 percent of the total crashes reported during the time period began as a collision of a motor vehicle with a guardrail or other fixed object. The second most frequent "first harmful definition" was a collision with another motor vehicle, over 20 percent of the total.

Most crashes on Greenlee County roads did not take place at intersections (See Figure 10). However, 13 crashes, or approximately 5.0 percent, of the crashes were driveway access related and another 46 crashes, or 17.8 percent, were intersection related

Table 1 shows the segments of state highways with significant numbers of crashes. The one-mile segments listed in the table for US 95, SR 75 and SR 78 had the highest number of crashes within one-mile segments on the state highways within Southern Greenlee County.

FIGURE 3. SOUTHERN GREENLEE COUNTY CRASH LOCATIONS

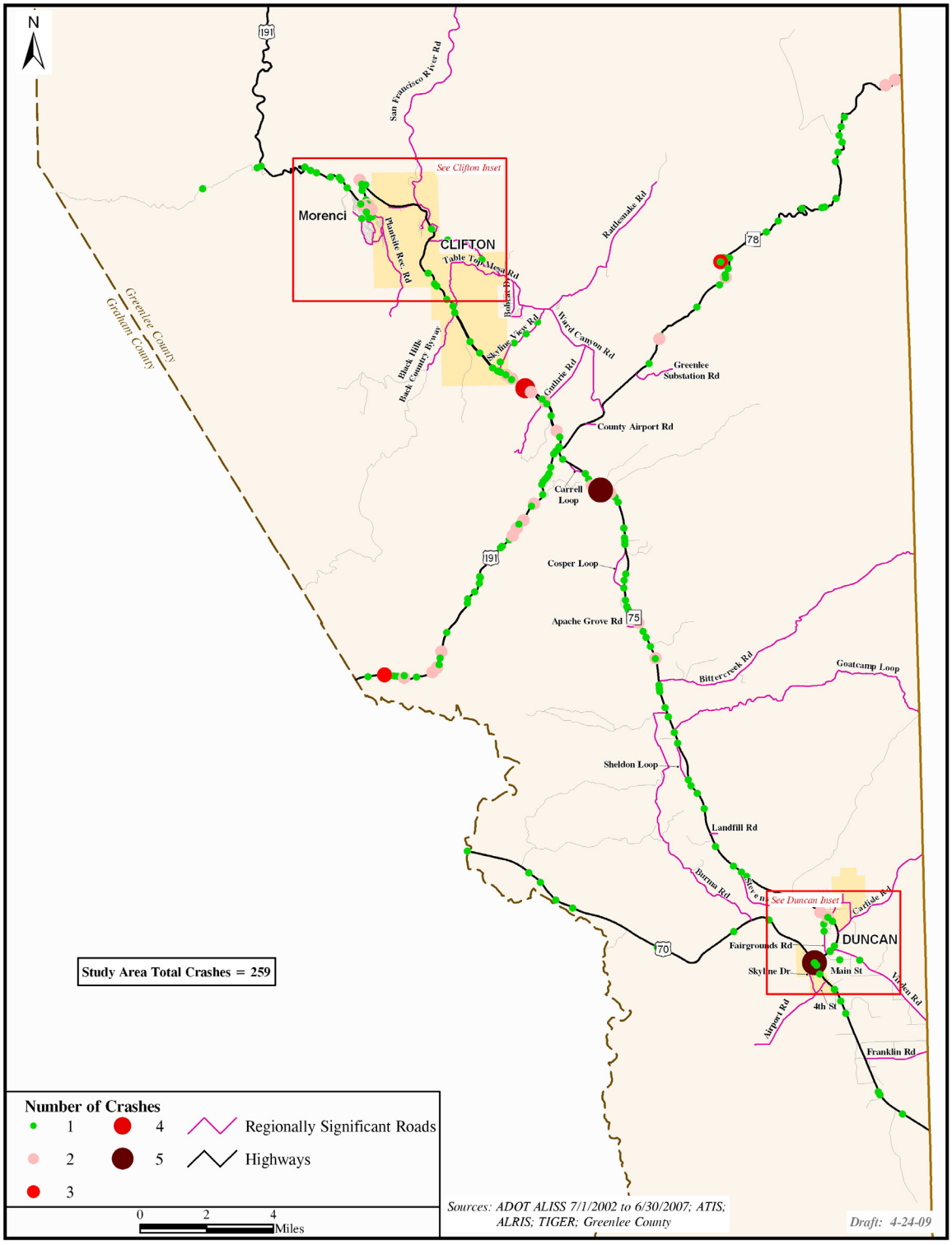


FIGURE 4. SOUTHERN GREENLEE COUNTY CRASH LOCATIONS CLIFTON AND DUNCAN INSETS

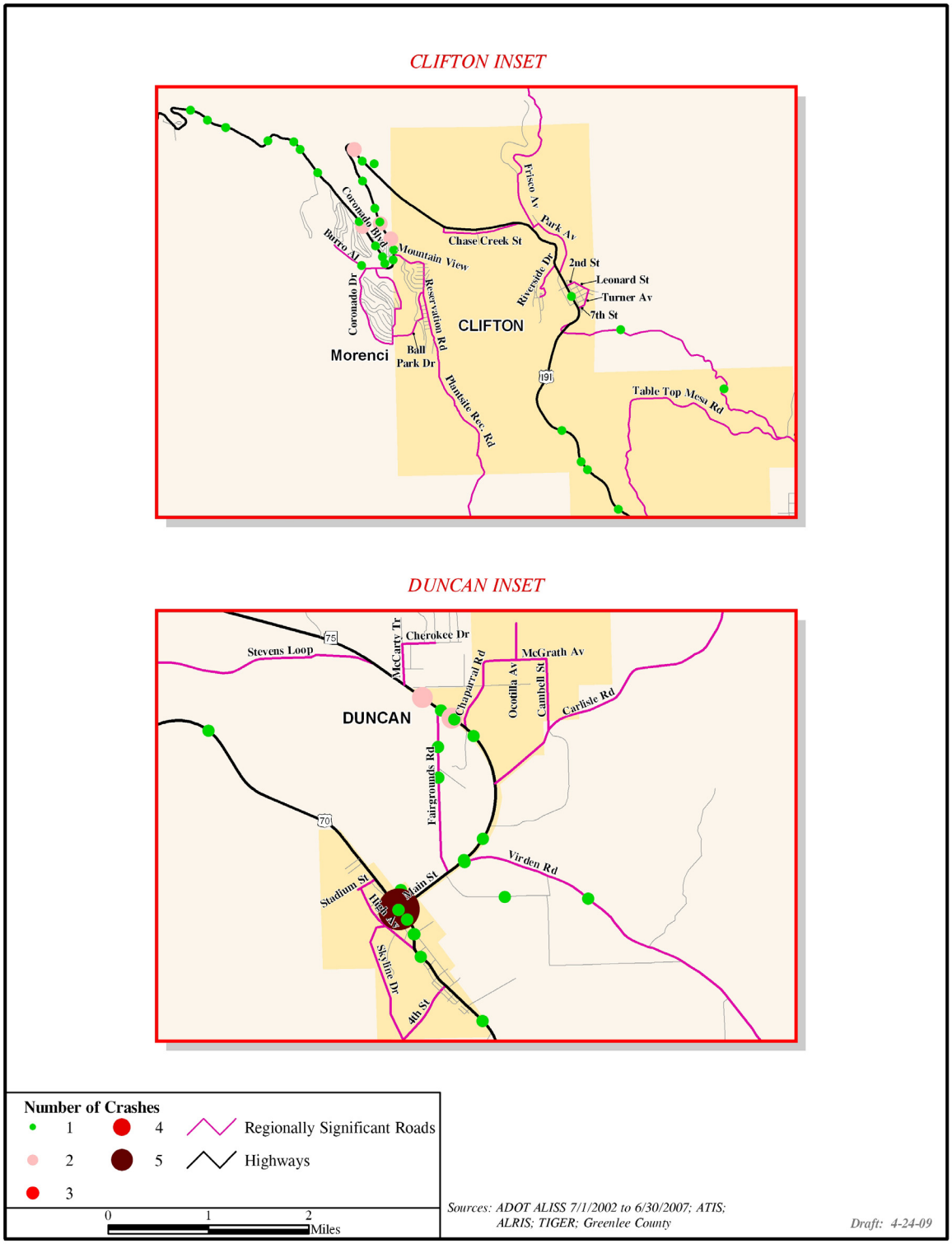


FIGURE 5. SOUTHERN GREENLEE COUNTY FATAL CRASHES

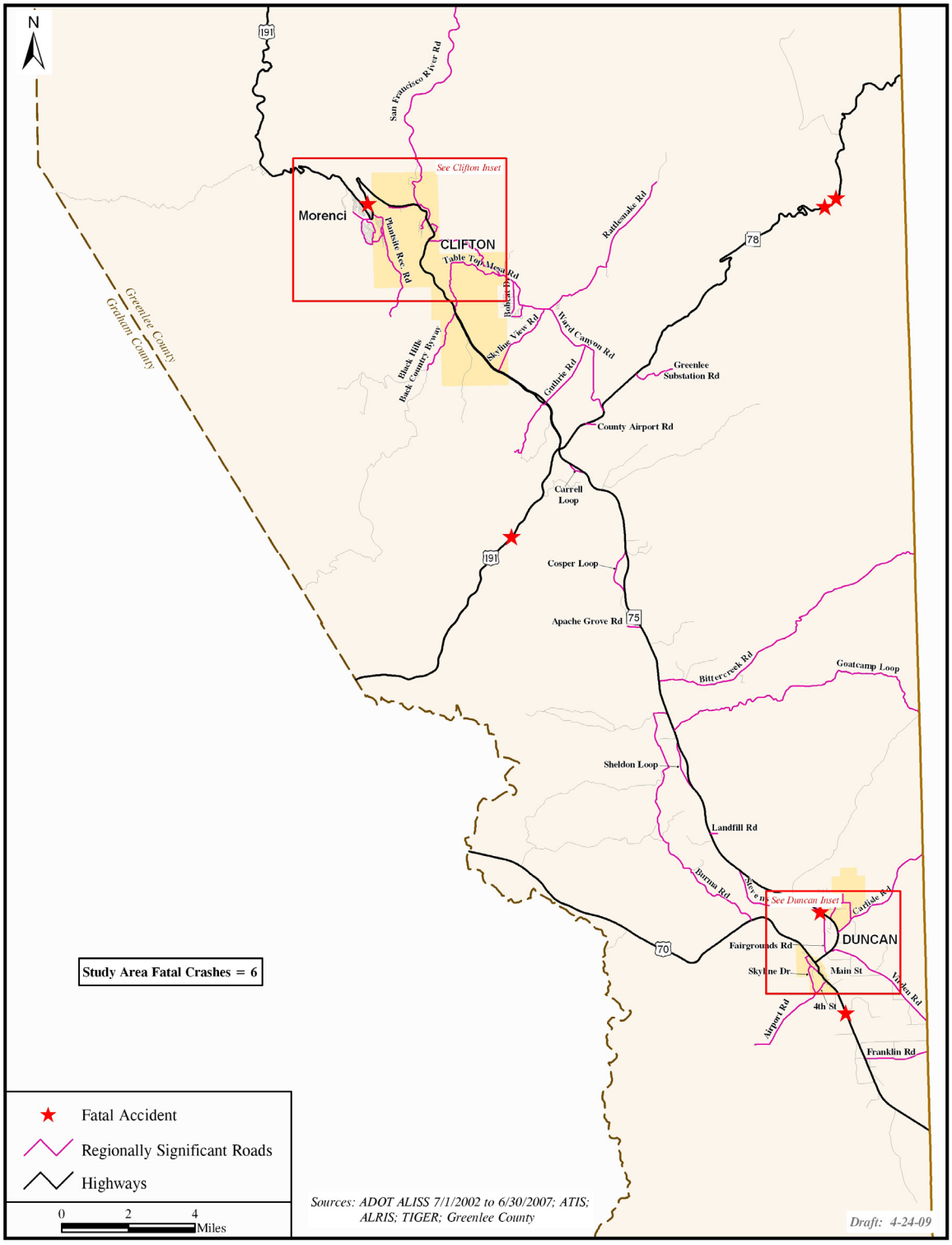


FIGURE 6. SOUTHERN GREENLEE COUNTY FATAL CRASHES CLIFTON AND DUNCAN INSETS

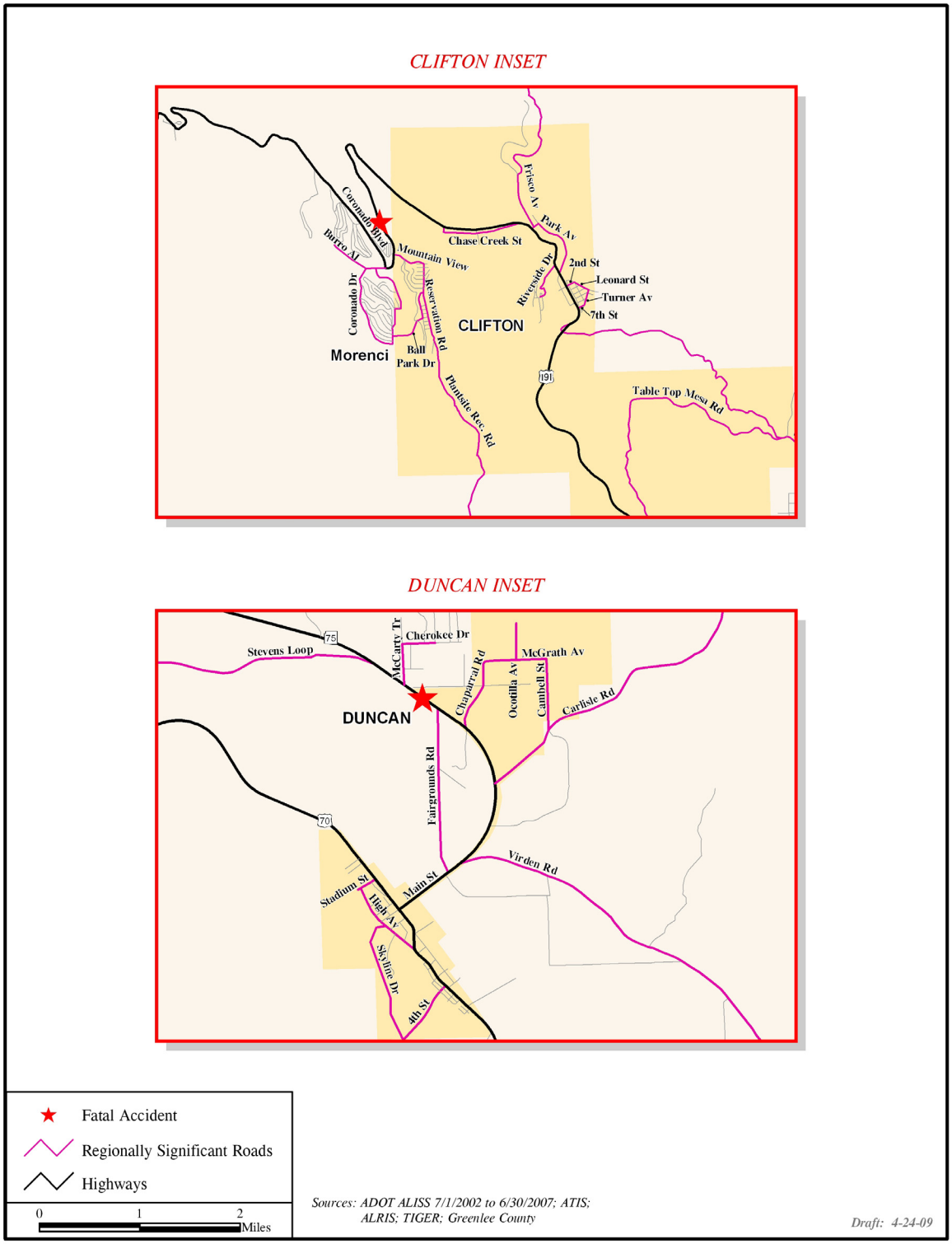


FIGURE 7. SOUTHERN GREENLEE COUNTY CRASH RATE

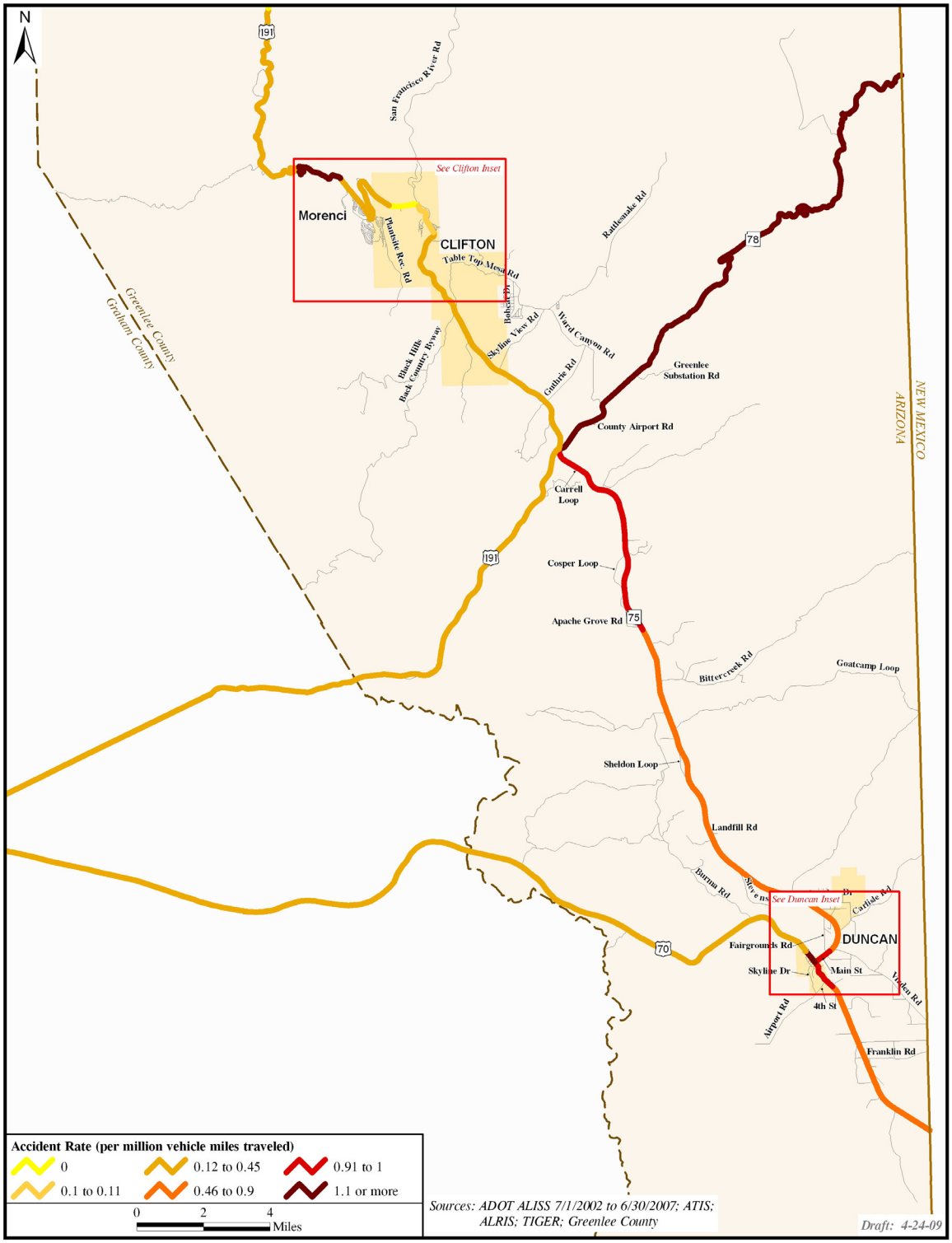


FIGURE 8. SOUTHERN GREENLEE COUNTY CRASH RATE CLIFTON AND DUNCAN INSETS

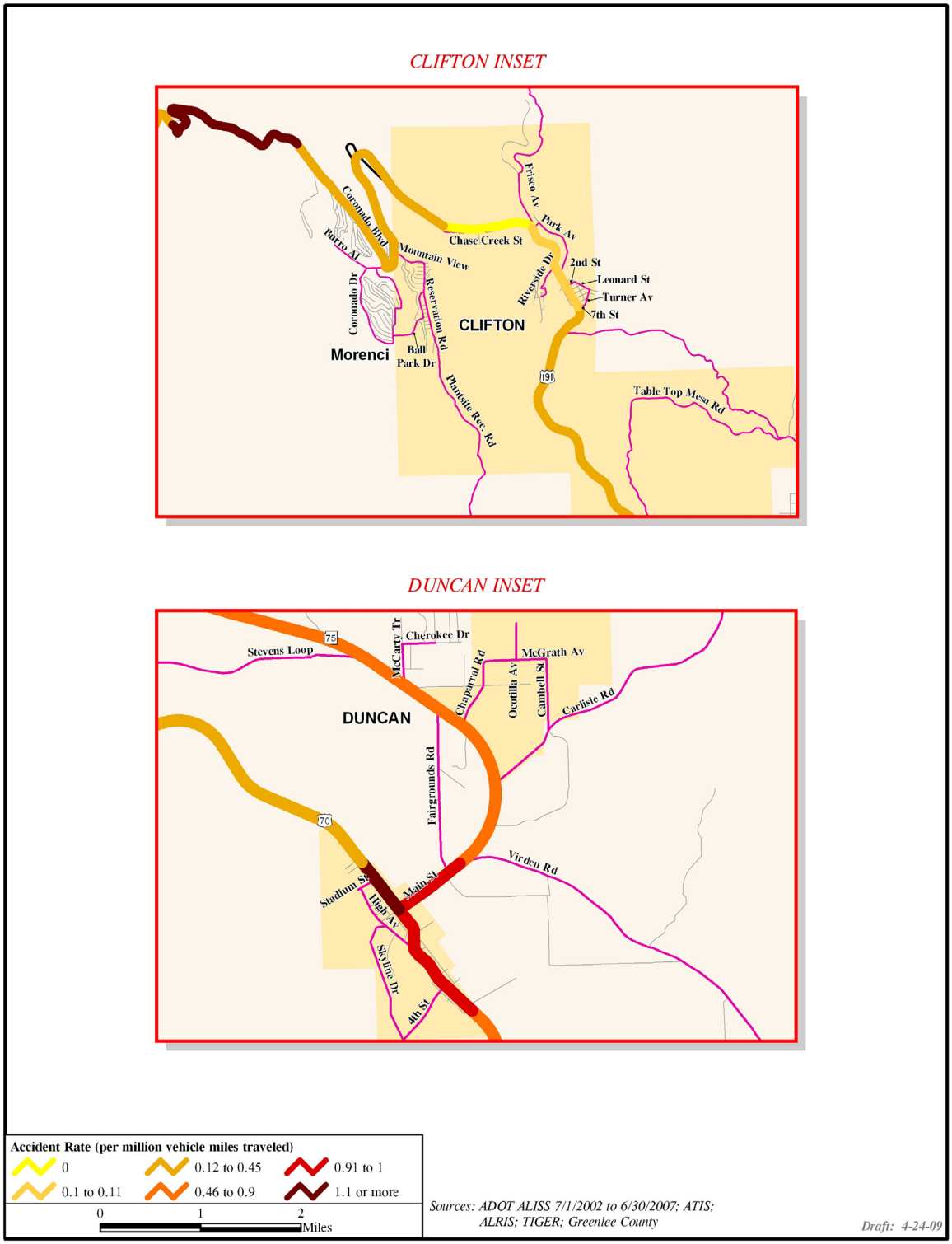
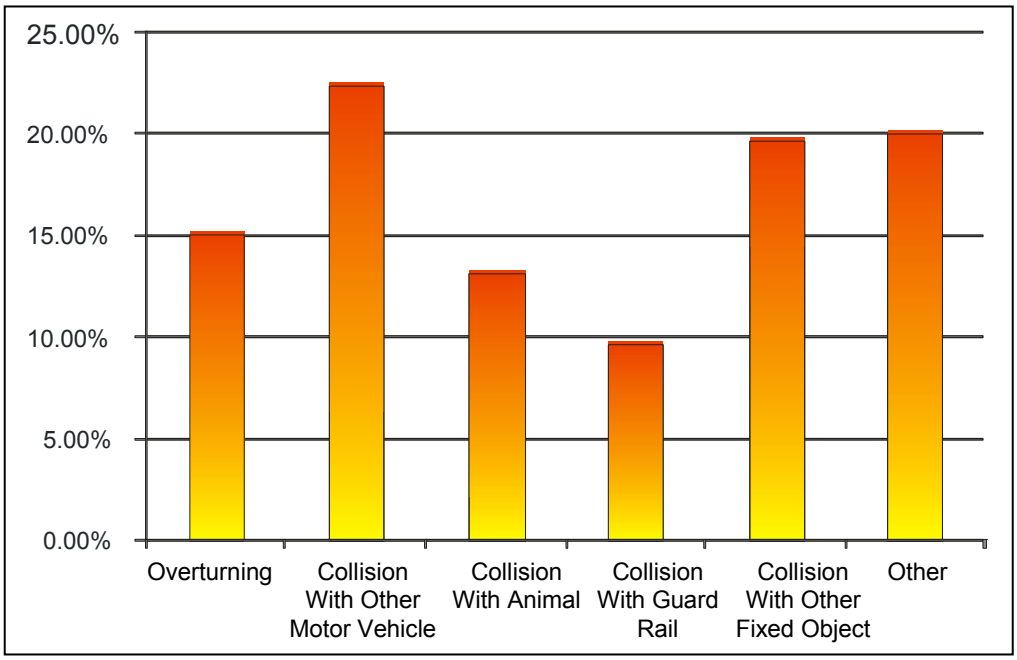
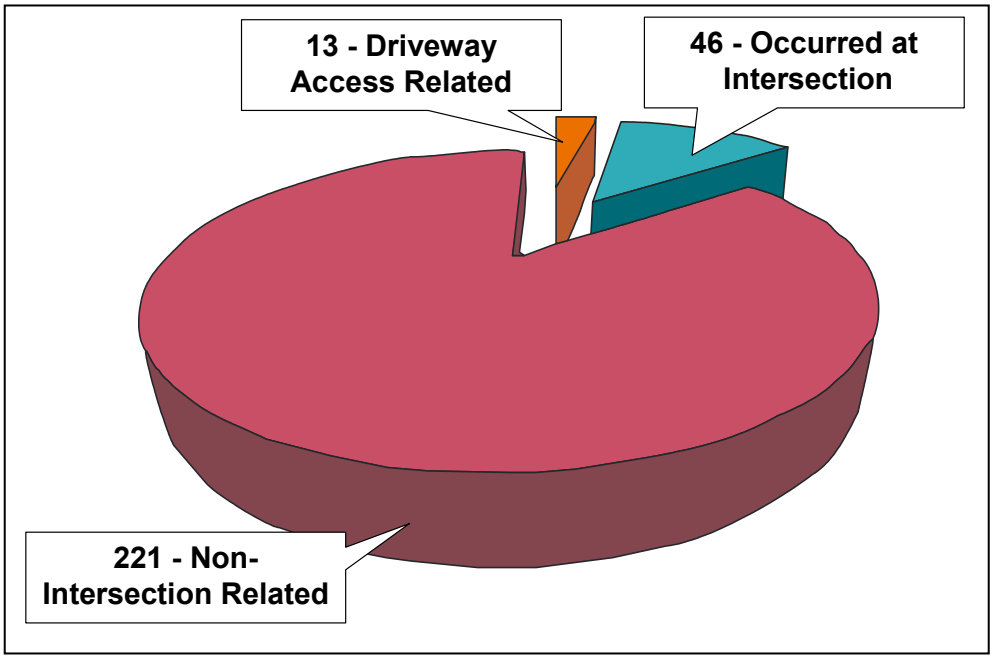


FIGURE 9. FIRST HARMFUL DEFINITION FOR CRASHES ON STATE HIGHWAYS IN SOUTHERN GREENLEE COUNTY



Source: ADOT ALISS between July 1, 2002 and June 30, 2007

FIGURE 10. RELATIONSHIP OF CRASH TO INTERSECTION ON CRASHES ON STATE HIGHWAYS IN SOUTHERN GREENLEE COUNTY



Source: ADOT ALISS between July 1, 2002 and June 30, 2007

TABLE 1. ROADWAY SEGMENTS WITH SIGNIFICANT NUMBERS OF CRASHES

Highway	Beginning	End	Number of Crashes*
US 191	MP 151.0	MP 152.0	14
US 191	MP 167.0	MP 168.0	11
SR 75	MP 396.2	MP 397.2	11
US 191	MP 145.0	MP 146.0	10
SR 78	MP 162.0	MP 163.0	8
US 191	MP 146.5	MP 147.2	8
US 191	MP 156.2	MP 156.8	8
US 191	MP 157.3	MP 158.0	8

Source: ADOT ALISS July 1, 2002 and June 30, 2007

Crash Countermeasures

Crash countermeasures that are likely to influence crashes based upon the dominant crash type are listed in Table 2. The table lists safety challenges along with potential countermeasures to address each of the challenges.

In addition to the roadway related safety crash measures shown in Table 2 the following non-roadway-related countermeasures should be implemented:

- Increase alcohol enforcement and education
- Increase speed enforcement
- Increase seat belt enforcement and education
- Provide public information related to accident avoidance and defensive driving

TABLE 2. POTENTIAL ROADWAY RELATED SAFETY COUNTERMEASURES

Identified Safety Challenge	Potential Countermeasures
Intersection related crash issues	• Construct roundabouts to reduce crashes. • Construct left- and right-run lanes to reduce crashes. • Time yellow change intervals to be appropriate for speed and distance traveled at intersection.
Horizontal curve issues	• Provide advance warning signage. • Add chevrons along the curve. • Add embedded pavement markings and enhanced curve delineation. • Add roadside reflectors to delineate curves. • Increase/add pavement markings to provide 6-inch centerlines and/or edge lines.
Sight distance issues	• Provide adequate sight distance at intersections. • Trim or clear trees or bushes obstructing various access points or existing signage. • Add warning signs advising of potential hazards.
Run-off/head-on-road crashes at known location	• Enhance delineation through improved pavement markers or roadside reflectors. • Provide adequate clear zone to minimize crash consequences. • Add guardrail to limit roadway departures. • Construct median barriers to reduce cross-median crashes.
Edge drop-off	• Add safety edge by adding and maintaining fill to prevent drop-off at roadside which limits vehicle ability to re-enter the roadway upon departure. • Identify drop-off cause (e.g., drainage) and improve.
Drainage-related issues	• Ensure adequate drainage. • Clear/clean catch basins with regularity.
Weather-related crashes	• Alter or increase winter weather treatment program. • Utilize warning signs to identify possible hazardous locations for motorists. • Employ changeable message signs to alert motorists of winter weather conditions.
Pedestrian issues	• Adequately mark with advance signage and yield lines any non-intersection cross walks. • Construct median and pedestrian refuge areas. • Provide pathways, sidewalks or paved shoulders along roadways.

TABLE 2. POTENTIAL ROADWAY RELATED SAFETY COUNTERMEASURES (Continued)

Identified Safety Challenge	Potential Countermeasures
Maintenance issues	• Clear brush which may inhibit roadway operations or obstruct existing roadway signage. • Sweep roadways and shoulders regularly. • Fill roadway cracks and potholes. • Replace worn pavement markings and faded signs. • Install object marker/delineation at all headwalls and bridge ends.
Tree or utility pole crashes	• Relocate or remove existing trees or poles in problematic locations. • Add reflectors to trees or poles. • Add guard rail shielding existing trees or poles.
Speed-related crashes	• Ensure roadways are properly posted in accordance with existing speed regulations. • Lower the speed limit where roadway geometrics over a substantial length of road dictate. • Provide advance warning signs with a proper advisory speed where the sight distance is limited. • Consider traffic calming measures to reduce speeds. • Consider experimental optical speed measures. • Restripe to provide narrower lanes. • Ensure regular enforcement of appropriate speed limits.
Parking	• Restrict parking at selected locations including constrained cross-section, near intersections, and on the approaches to pedestrian crosswalks.
Passing issues	• Restrict and enforce passing when adequate passing sight distance is not provided.

Sources: Adapted from *Massachusetts Traffic Safety Toolbox Series*. http://www.mhd.state.ma.us/safetytoolbox/downloads/LowCost_Non-Intersection.pdf.
Kentucky Transportation Center – College of Engineering. *Countermeasures for Fatal Crashes on Two-Lane Rural Roads*. No date.
FHWA Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures. July 10, 2008. http://safety.fhwa.dot.gov/policy/memo071008/

US 191/SR 75/SR 78 Intersection Road Safety Assessment

A Road Safety Assessment of the US 191/SR 75/SR 78 Intersection, known as Three Way was undertaken by the ADOT Traffic Hazard Elimination (HES) Section. (*Road Safety Assessment US 191/SR 75/SR 78 Intersection: Three Way,* Arizona Road Safety Assessment Program. ADOT Traffic HES Section, February 5-7, 2008) The assessment was an examination of user safety of a roadway by a multi-disciplinary team.

Figure 11 is an aerial photograph of the intersection and Figure 12 is a photograph taken from the US 191 southwestern approach looking at SR 78 to the northeast. The assessment documented the following possible opportunities to improve safety:

- Improve sight distance and visibility.
- Improve operation problems that could be corrected by re-striping.
- Eliminate route confusion due to the intersection of the three routes – US 191, SR 75, and SR 78.
- Reduce the confusion of multiple information at the US 191 southbound approach.

The Assessment Team also developed a list of safety countermeasures shown in Table 3 for Three Way.

US 191/Mountain View Road Intersection Safety Assessment

A Road Safety Assessment of the US 191/Mountain View Road Intersection was undertaken by the ADOT HES Section. (*Road Safety Assessment US 191/Mountain View Road,* Arizona Road Safety Assessment Program, ADOT Traffic HES Section, September 8-10, 2008)

The following findings were documented by the assessment:

- Horizontal and vertical curves near the intersection limit sight distance.
- Traffic queues form along Mountain View Road during the peak traffic volume period due to mine shift changes.

The assessment note that the following practices foster a safer operation at the intersection:

- Aggressive enforcement of speed limit.
- Buses for mine employees reduce passenger vehicle traffic volumes.
- Intersection operations work well with current volumes.

The assessment documented the following possible opportunities to improve safety:

- Improve sight distance.
- Improve operations.
- Improve markings and lighting.
- Improve area wide considerations related to the operation of the intersection.

FIGURE 11. AERIAL VIEW OF THREE-WAY JUNCTION

Source: Google

FIGURE 12. PHOTOGRAPH OF THREE-WAY FROM US 191 SOUTHWESTERN APPROACH LOOKING TO THE NORTHEAST

Source: *ADOT Video Photo Log*

TABLE 3. SUGGESTED SAFETY COUNTERMEASURES FOR US 191/SR 75/SR 78 INTERSECTION

Identified Safety Challenge	Potential Countermeasures
Sight Distance and Visibility	• Depress the roadway elevation • Configure intersection so major movement (US 191) is the through movement (similar to Alternative 3 from 191 GE 154 H3030 01C "Three Way Intersection" Final Project Assessment, October 1997) • Re-align intersection to remove the skewed approaches • Consider construction of a roundabout • Use 90 mil extruded thermoplastic or tape for pavement markings • Install raised pavement markers (RPMs) on the approaches, including US 191 southbound right-turn island • Install dribble lines for US 191 northbound left-turn movement • Prohibit parking along SR 75 at the convenience store, possibly with a physical barrier
Operations	• Move US 191 northbound stop bar approximately 25 feet closer to intersection • Re-stripe right-turn lane on SR 75 south to provide acceleration lane for US 191 northbound right-turning vehicles and shorter right-turn lane for ADOT/MDV driveway • Re-stripe SR 75 approach for one through lane instead of two and install dribble lines for this lane through the intersection • Close convenience store driveway on SR 75 and allow store access from the Ranger Station driveway
Route Confusion	• Re-align intersection so US 191 is the through movement • Consider using signing that combines graphical destination information with route numbers (similar to roundabout signing)
US 191 Southbound Approach	• Improve super-elevation of the free-flow right-turn curve • Delineate right-turn island with RPMs • Install roadside delineators along outside edge of right-turn radius • Increase size of the curve warning sign

TABLE 3. SUGGESTED SAFETY COUNTERMEASURES FOR US 191/SR 75/SR 78 INTERSECTION (continued)

Identified Safety Challenge	Potential Countermeasures
	• Consider installation of milled-in transverse rumble strips in the right-turn lane • Re-locate 55 mph speed limit sign to a more visible location and place a second sign on the median side of divided highway section • Replace missing Speed Reduced Ahead sign prior to the 35 mph Speed Limit (right side of road)
Speeding	• Encourage DPS to proceed with plan to provide photo enforcement • Consider use of speed trailer • Conduct speed study
Signs	• Remove/replace junction sign on SR 78 if not breakaway • Evaluate sign retro-reflectivity and upgrade sheeting as needed

Source: Road Safety Assessment US 191/SR 75/SR 78 Intersection: Three Way. Arizona Road Safety Assessment Program, ADOT Traffic HES Section, February 5-7, 2008.

Table 4 lists the countermeasures suggested by the HES section for the US 191/Mountain View Road.

TABLE 4. SUGGESTED SAFETY COUNTERMEASURES FOR US 191/MOUNTAIN VIEW ROAD INTERSECTION

Identified Safety Challenge	Potential Countermeasures
Sight Distance	• Reduce speed limit to 35 mph on US 191 approaches • Install Side Road warning signs on US 191 with advance street name sign • Raise height of intersection • Install channelizing island between left- and right-turn lanes on Mountain View Road • Lay back slopes along US 191
Operations	• Install No Left Turn signs on US 191 southbound at bypass ramp • Educate truck drivers to discourage left turns at bypass ramp • Provide an acceleration lane on US 191 for vehicles turning left from Mountain View Road • Install a Yield sign in the island for vehicles turning right from US 191 • Construct a right-turn lane on US 191 • Extend the US 191 left-turn lane • Widen US 191 at the intersection to provide a paved shoulder • Widen the Mountain View Road approach to accommodate large vehicles (WB 67)
Marking and Lighting	• Refresh pavement markings on Mountain View Road with thermoplastic tape • Delineate the curbed island with raised pavement markers • Install mountable curb for the island • Remove the light pole from the island • Install street lights at the intersection
Area Wide Considerations	• Review inter-related intersection operations at Mountain View Road, Burro Alley, and bypass ramp entrance and exit with consideration of the following long term options: 1. Roundabout at Mountain View Road 2. Burro Alley intersection improvements to accommodate large vehicles turning onto US 191 northbound 3. With Burro Alley intersection improvements, consider eliminating the bypass ramp 4. Alternatively, consider making the bypass ramp the main road for US 191 north and south with a new T-intersection north of Burro Alley

Source: Road Safety Assessment US 191/Mountain View Road, Arizona Road Safety Assessment Program, ADOT Traffic HES Section, September 8-10, 2008.

Roundabouts

One of the countermeasures intersections studied by the ADOT HES assessment was the construction of roundabouts. Stakeholders have expressed an interest in the construction of potential roundabouts. General benefits of roundabouts include the following:

- Up to 90 percent reduction in fatal crashes
- Up to 75 percent reduction in injury crashes
- Costs less than traffic signals and does not require expensive equipment or maintenance
- 30-50 percent increase in traffic capacity thereby enhancing traffic flow

(www.azdot.gov/ccpartnerships/Roundabouts)

A rural roundabout would be applicable for Three Way and was one of the countermeasures suggested for consideration by a Road Safety Assessment of the intersection. (ADOT Traffic HES Section, February 5-7, 2008) Rural roundabouts have the following characteristics:

- 50 – 60 mph Approach Speeds
- Larger diameters than urban roundabouts
- Traffic control on approaches to encourage drivers to slow to appropriate speed
- Accommodate Larger Vehicles

(Roundabouts: An Informational Guide, US DOT, Publication No. FHWA-RD-00-067)

Examples of single-lane and two-lane rural roundabouts are illustrated in Figures 13 and 14.

FIGURE 13. EXAMPLES OF SINGLE LANE RURAL ROUNDABOUTS

Leeds, MD

Lisbon, MD

Source: FHWA Resource Center

FIGURE 14. EXAMPLE TWO LANE RURAL ROUNDABOUT

Source: FHWA Resource Center

CONNECTIVITY AND MOBILITY

The state highway system is the transportation spine in Southern Greenlee County. The state highways connect Morenci, Town of Clifton, Town of Safford, and the Town of Duncan. The road system in Southern Greenlee County has the following deficiencies concerning connectivity and mobility.

- No parallel continuous routes to the state highways exist.

- Traffic traveling on two-lane US 191 through Clifton to Morenci and further north experiences major capacity and topographical constraints (See Figure 15). Two countermeasures are suggested:
  - Bypass of US 191 around the Freeport-McMoRan mine.
  - Reconstruction of US 191 through the Freeport-McMoRan mine including replacing bridge and tunnel repairs and widening.

- Through traffic is restricted through developed areas such as the Town of Duncan. The construction of a US 70 bypass around Duncan would significantly improve traffic flow on the state highway.

- Various segments of the state highways such as SR 75 in the York Valley area have multiple driveways accessing the highways creating multiple conflict points (See Figure 16).

- Two-lane segments on some state highways lack passing lanes to permit slow moving vehicles to be passed.

- Various segments of the state highways have off-set intersections that increase the number of traffic conflicts. One example is the off-set intersection of Chaparral Road and Fairgrounds Road on SR 75 in Duncan. (See Figure 17). Widening SR 75 through the area with protected left and right turns at the re-worked Chaparral/Fairgrounds intersection would reduce vehicle conflict points, separate traffic movements, and improve the overall efficiency and safety of the intersection.

- The traffic control devise at some intersections such as the US 70/SR 75 junction in Duncan need to be re-evaluated (See Figure 18)

- Regional access would be greatly improved by linking I-10 to US 70 by extending SR 75 South along the San Simon River from US 70 to I-10.

INFRASTRUCTURE CONDITION

Road deficiencies that occur on the state highways sometimes include:

- Narrow shoulders
- Tight horizontal curves
- Roadside obstructions such as drainage structures and other appurtenances
- Deteriorating pavement conditions

The re-paving cycle for the state highways is an opportunity to remove these deficiencies. For example, a re-paving project could include widening of shoulders and/or the relocation of roadside obstructions.

Due to the high crash rate on SR 78, the highway was visually observed using the ADOT Photo Log. Deficiencies noted along SR 78 included by the visual observations included:

- Tight horizontal curves
- Switch-back cures
- Very narrow shoulders or no shoulders
- Poor pavement conditions (Noted from visual observation using the ADOT Video Log)

FIGURE 15. AERIAL VIEW OF DOWNTOWN CLIFTON

Source: Google

FIGURE 16. AERIAL VIEW OF STATE ROUTE 75 IN YORK VALLEY

Source: Google

FIGURE 17. SR 75/FAIRGROUNDS ROAD/CHAPARRAL ROAD

Source: Google

FIGURE 18. US 70/SR 75 JUNCTION IN DUNCAN

Source: Google Maps

3. ROADWAY RECOMMENDATIONS AND IMPLEMENTATOIN

This chapter presents recommendations for improvements on state highway in Southern Greenlee County. In addition, recommended projects are listed for improving County roads.

Table 5 presents recommended projects on state highways in Southern Greenlee County in the short- to mid-term horizons. The following long-term state highway projects are recommended to be included in the Arizona Framework Study and incorporated into the Arizona Long-Range Plan.

- Construct a US 70 Bypass around Duncan.
- Construct a US 191 Bypass from Clifton to Morenci.
- Reconstruct US 191 through the Freeport-McMoRan mine including replacing bridge and tunnel repairs & widening.
- Extend SR 75 south along the San Simon River from US 70 to I-10.

In the mid-term, it is also recommended that a climbing lane be constructed on Northbound US 191 at approximately MP 141 to 142 in Graham County southwest of the Greenlee/Graham County Boundary. While such a project would not be located within Greenlee County, this is an example of many projects in adjacent Graham County that would benefit Greenlee County.

It is important to note that the Arizona Department of Transportation (ADOT) has the responsibility to determine the improvements on state highways. Stakeholders should recognize it is important that improvements to the state highway system can only be made after in-depth planning and engineering studies are conducted by ADOT, and upon approval of the State Transportation Board. All traffic interchange improvements must be approved by the Federal Highway Administration (FHWA). The recommendations made by this current study for improvements on state facilities can serve only as suggestions for further study.

Table 6 presents recommended County and Local Roadway Projects and County Bridge Replacement and Rehabilitation Projects.

In August 2009, ADOT provided the County with a list of County-maintained bridges listed as Scour-critical by the Federal Highway Administration:

- Bridge 8142, Packer Wash Bridge, located on Fairgrounds Road in Duncan
- Bridge 8144, Medium Wash Bridge, located on Stevens Loop
- Bridge 8145, Waters Wash Bridge, located on Stevens Loop
- Bridge 8146, Goat Camp Canyon Bridge, located on Sheldon Loop
- Bridge 8149, Soap Box Canyon Bridge, located on Ward Canyon Road
- Bridge 8152, Gila River Bridge, located on Old Safford Highway

(Arizona Department of Transportation, List of Scour-Critical Bridges, August 2009)

TABLE 5. RECOMMENDED STATE HIGHWAY IMPROVEMENT PROJECTS

Project Description	Timeframe	Feasibility Constraints
US 191		
• Implement low-cost safety countermeasures at the Three Way intersection in Southern Greenlee County.	Short	Low cost
• Study reconfiguration of Three Way intersection – US 191/SR 78/SR 75.	Mid	Funding priorities
• Reconstruct Three Way intersection	Long	High cost Impacts adjacent properties
US 75		
• Re-stripe SR 75/US 191 NB approach for one through lane instead of two and install dribble lines for this lane through the intersection.	Mid	Low cost
• Implement additional traffic control at SR 75/SR 70 intersection. Reassess configuration, striping, traffic control at SR 75/SR 70 and assess potential for off-street parking.	Short	Low cost
• Implement Access Management along SR 75 in York Valley area.	Short to Mid	Moderate cost Impact on adjacent properties
• Re-design SR 75 from Main St to north of Stevens Loop. o Realign Fairgrounds Rd. and Chaparral Rd. o Add left-turn lanes and acceleration/deceleration lanes. o Realign T-intersections along SR 75 to 90 degrees at Virden, Carlisle, McCary, Stevens Loop	Mid	Moderate cost
• Reconstruct SR 75 from Main St to north of Stevens Loop.	Long	Moderate to high cost Impact on traffic circulation Impact on adjacent properties
US 78		
• Re-pave SR 78, widen shoulders, install guardrail were warranted.	Long	Moderate cost Topographical constraints
• Reconstruct drainage channel in West Duncan to the Gila River	Mid	Moderate cost Funding Priorities

TABLE 6. RECOMMENDED COUNTY AND LOCAL IMPROVEMENT PROJECTS

Project Description	Timeframe	Feasibility Constraints
County and Local Roadway Projects		
• Construct or Re-construct estimated $27.3 million County and Local roadway projects. Key projects include: o Reconstruct Skyline View Road o Construct Table Top Mesa Road o Construct Extension of Wards Canyon Road o Construct Rattlesnake Road from Loma Linda Road to USFS Boundary o Reconstruct and pave San Francisco River Road from Frisco Avenue to end	Mid	Cost Impacts on adjacent properties Potential environmental impacts
County Bridge Replacement and Rehabilitation Projects		
• Rehabilitate bridges on Sheldon and Stevens Loops	Short to Mid	Cost Funding priorities Potential environmental impacts
• Preserve historic bridges on Old Safford Road and construct parallel structures	Short to Mid	Cost Funding priorities Potential environmental impacts Impact on cultural resources
• Replace bridges on Ward Canyon Road	Short to Mid	Cost Funding priorities Potential environmental impacts Impact on cultural resources
• Preserve historic San Francisco River bridge in Clifton and construct parallel structure	Short to Mid	Cost Funding priorities Potential environmental impacts Impact on cultural resources
• Rehabilitate bridges over Chase Creek in Clifton	Short to Mid	Cost

Two other bridges on Ward Canyon Road need to be replaced, according to the County: the Niger Canyon Bridge (Bridge #2), and Bridge #3, a narrow structure over drainage.

In addition to the historic Gila River Bridge on Old Safford Highway, the County would like to preserve three other historic structures: an overpass over an abandoned railroad right-of-way, an overpass over the existing Arizona Eastern Railway, and the Pomroy Canyon Bridge. It is proposed to preserve these and construct parallel structures.

FUNDING SOURCES UPDATE

A comprehensive discussion of federal, state, and local funding sources were presented in Chapter 8: Revenue Sources of the *Final Report Southern Greenlee Small Area Study*. An update of the amounts of various funding sources for roadways from the Final Report is presented here.

Tables 7 through 11 update the dollar amounts for the following information:

- Federal Funding Sources for Arizona (Table 7)
- ADOT Revenue Sources (Table 8)
- Arizona Highway User Revenue Fund Distributions To Greenlee County And Communities (Table 9)
- Highway User Funding Revenue Forecast (Table 10)
- ADOT *Five-Year Transportation Facilities Construction Program* Resource Allocations (Table 11)

FEDERAL AMERICAN RECOVERY AND REINVESTMENT ACT FUNDS

A total of $ 1,150,000 Federal American Recovery and Reinvestment Act (ARRA) funds were allocated to two projects in Greenlee County. Both projects were on US 191 as shown in Table 12. Note that both of these projects are State System projects. The County needs to have "shovel- ready" projects to take advantage of any future funding programs.

TABLE 7. FY 2008 FEDERAL FUNDING SOURCES FOR ARIZONA (IN MILLIONS OF DOLLARS)

Description	Amount
Surface Transportation	$138.8
Enhancement (TEA)	$16.5
National Highway System	$174.1
Interstate Maintenance	$128.0
Highway Safety Improvement Program (HISP)	$33.8
Bridge Replacement and Rehabilitation	$22.9
Congestion Mitigation & Air Quality	$35.2
Recreational Trails	$4.9
Planning and Research	$12.6
Metropolitan Planning	$5.3
Border Infrastructure Program	$8.9
Safe Routes to School	$2.8
Equity Bonus	$74.4
Indian Reservation	$0.6
FTA, Section 5310	$2.3
FTA, Section 5311	$9.1
Total	**$607.2**

Source: Arizona Department of Transportation, Funding Sources and Authorities, FY 2008 portion of State Transportation Funds are flexed to FTA for Transit projects Statewide.

TABLE 8. FY 2008 ADOT REVENUE SOURCES – STATE (IN MILLIONS OF DOLLARS)

Description	FY-2008Actual
Gasoline Tax	$492.5
Use Fuel Tax	$207.5
Motor Carrier Fee	$40.2
Vehicle License Tax	$385.2
Registration	$162.8
Other	$56.0
Total	**$1,344.5**

Source: Arizona Department of Transportation, Financial Management Services, Arizona Highway User Revenue Fund, September 2008

TABLE 9. ARIZONA HIGHWAY USER REVENUE FUND DISTRIBUTIONS TO GREENLEE COUNTY AND COMMUNITIES FY 2008

Jurisdiction	Amount
Total Counties in State	$251,942,354
Greenlee County	$947,625
Clifton	$258,235
Duncan	$82,542

Source: Arizona Department of Transportation, Financial Management Services, 2008

TABLE 10. HIGHWAY USER REVENUE FUND REVENUE FORECAST (IN MILLIONS OF DOLLARS)

Fiscal Year	Gasoline	Use Fuel	Motor Carrier	VLT	Registration	Other	HURF Total
2008	492.5	207.9	40.2	385.2	162.8	56.0	1,344.5
2009	498.9	210.9	41.6	408.9	168.5	58.2	1,387.0
2010	514.1	209.8	43.7	439.4	172/3	62.1	1,441.4
2011	528.7	213.9	45.4	478.6	177.6	65.1	1,509.3
2012	546.6	219.9	47.1	519.8	183.0	68.4	1,584.8
2013	562.7	226.7	49.0	567.3	189.0	71.7	1,666.4
2014	578.5	233.8	50.9	614.0	194.5	75.0	1,746.7
2015	597.9	241.2	52.8	664.6	200.2	78.3	1,835.0
2016	614.4	249.0	54.9	720.9	206.2	81.5	1,926.9
2017	629.8	256.1	56.9	774.3	212.2	85.1	2,014.4
2018	643.2	263.9	59.1	836.8	218.4	88.6	2,110.0

Source: Arizona Department of Transportation, Financial Management Services, September 2008

TABLE 11. ADOT FIVE-YEAR TRANSPORTATION FACILITIES CONSTRUCTION PROGRAM RESOURCE ALLOCATIONS (IN THOUSANDS OF DOLLARS)

	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	Total
System Preservation	233,803	200,538	191,959	225,487	223,959	1,075,746
System Management	82,273	74,373	73,173	79,773	77,273	608,038
System Improvements	313,561	145,847	58,583	247,314	256,926	1,022,231
Total Resource Allocations	629,637	420,758	323,715	552,574	558,258	2,484,942

Source: Arizona Department of Transportation, Five-year Transportation Facilities Construction Program 2010-2014

TABLE 12. ARIZONA DEPARTMENT OF TRANSPORTATION
AMERICAN RECOVERY AND REINVESTMENT ACT - APPROVED PROJECTS (MARCH 13, 2009)

Priority	Project ID	RT	Begin MP	Ending MP	CO	Project Name	Type of Work	Programmed	Cost
5	6	191	159.5	160.5	GE	Black Hills Back Country Byway at MP 159.5	Intersection Improvement	No	$ 750,000
20	23	191	175	185	GE	Lower Coronado Trail at MP 175	Drainage Improvement	No	400,000
								TOTAL	**$ 1,150,000**

Source: http://www.azdot.gov/recovery/

IMPLEMENTATION PLAN

The following are recommended actions to implement the recommended improvements:

- Adopt Small Area Transportation Study Update
- Set up Implementation Task Force
  - ADOT
  - Greenlee County
  - Town of Clifton
  - Town of Duncan
  - Southeastern Arizona Association of Governments (SEAGO)
  - Freeport-McMoRan Mine
- Set priorities for projects, studies, and Design Concept Reports (DCRs)
- Identify responsibilities and timeline
- Program ADOT and County Projects
- Continuously collect land use, demographics, traffic, and safety data
  - County Sheriff's office completes accident reports and submits to ADOT
  - County, SEAGO, and ADOT collect traffic counts
  - County updates land use and demographics
- Periodically update Transportation Study Update

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