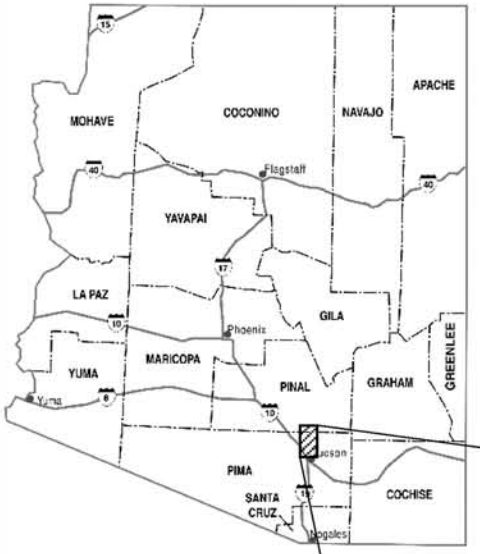
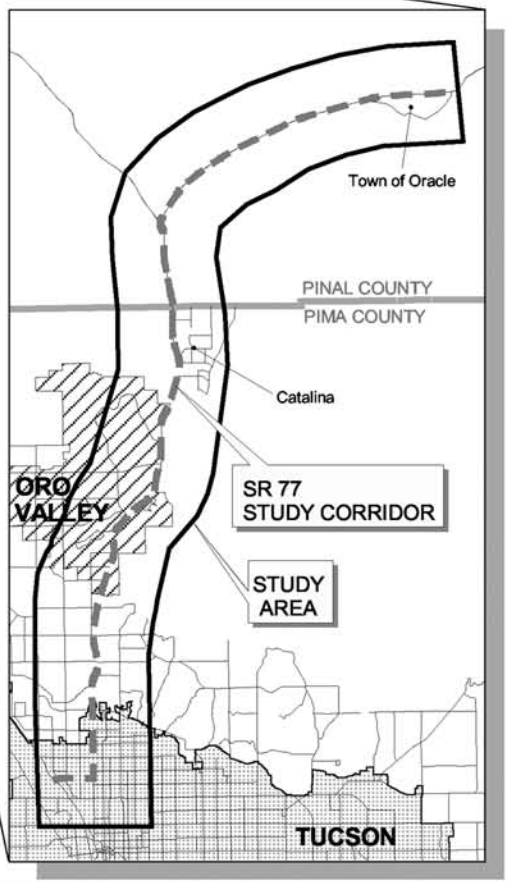
SR 77/Oracle Road Multimodal Corridor Profile Study





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MMLA, Inc.

Rillito Consulting Group

ADOT

SR 77/ORACLE ROAD
MULTIMODAL CORRIDOR PROFILE STUDY

May 2007

Final Report

SR 77/ORACLE ROAD MULTIMODAL CORRIDOR PROFILE STUDY

FINAL REPORT

Prepared for
Arizona Department of Transportation

Prepared by
TransCore ITS, Inc.
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Harris Environmental Group, Inc.
TranSystems Corporation
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May 2007

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

In fulfillment of the planning requirements of the Intermodal Surface Transportation Efficiency Act, the Arizona Department of Transportation (ADOT) 1994 State Transportation Plan identified 33 transportation corridors of statewide significance as a focus of multimodal planning efforts. The corridors of statewide significance are defined as broad geographic areas through which various modes of travel provide connections for the movement of people, goods, and services. Each corridor includes one or more state highways and may include other modes of transportation such as railroads, bus routes, and pipelines.

State Route 77 (SR 77), in Pinal and Pima Counties, serves as a major transportation corridor linking the Tucson metropolitan core, the suburban community of Oro Valley, sections of unincorporated Pima County, and Pinal County. The project corridor is between the I-10 interchange at Miracle Mile (milepost 68.10) and the northeast entrance to the Town of Oracle (milepost 103.32), approximately 35 miles apart. Within the project area, SR 77 is referred to as Miracle Mile between MP 68.10 and MP 69.56 and Oracle Road between MP 69.56 and the Pima County border. Except for the segment of Miracle Mile between I-10 and Oracle Road, SR 77 travels in a north/south direction. The project corridor extends two miles on either side of SR 77/Oracle Road and encompasses other major north/south arterials including La Cholla Boulevard, Flowing Wells Road/La Cañada Drive, Stone Avenue, First Avenue, and Campbell Avenue (up to River Road). At the southern end, the corridor boundaries extend as far south as Speedway Boulevard, an arterial that is parallel to Miracle Mile. Exhibit 1-1 shows the project location.

1.2 STUDY PURPOSE

The corridor profile study is intended to provide information for establishing priorities and identifying additional improvement strategies which should be incorporated into the statewide multimodal plan. The main purposes of this study are to 1) identify issues in the SR 77 relating to established performance criteria, 2) aid the selection of priority projects for the state, as scarce resources are allocated, and 3) assist ADOT in achieving its goal of enhancing the mobility of people, goods, and services.

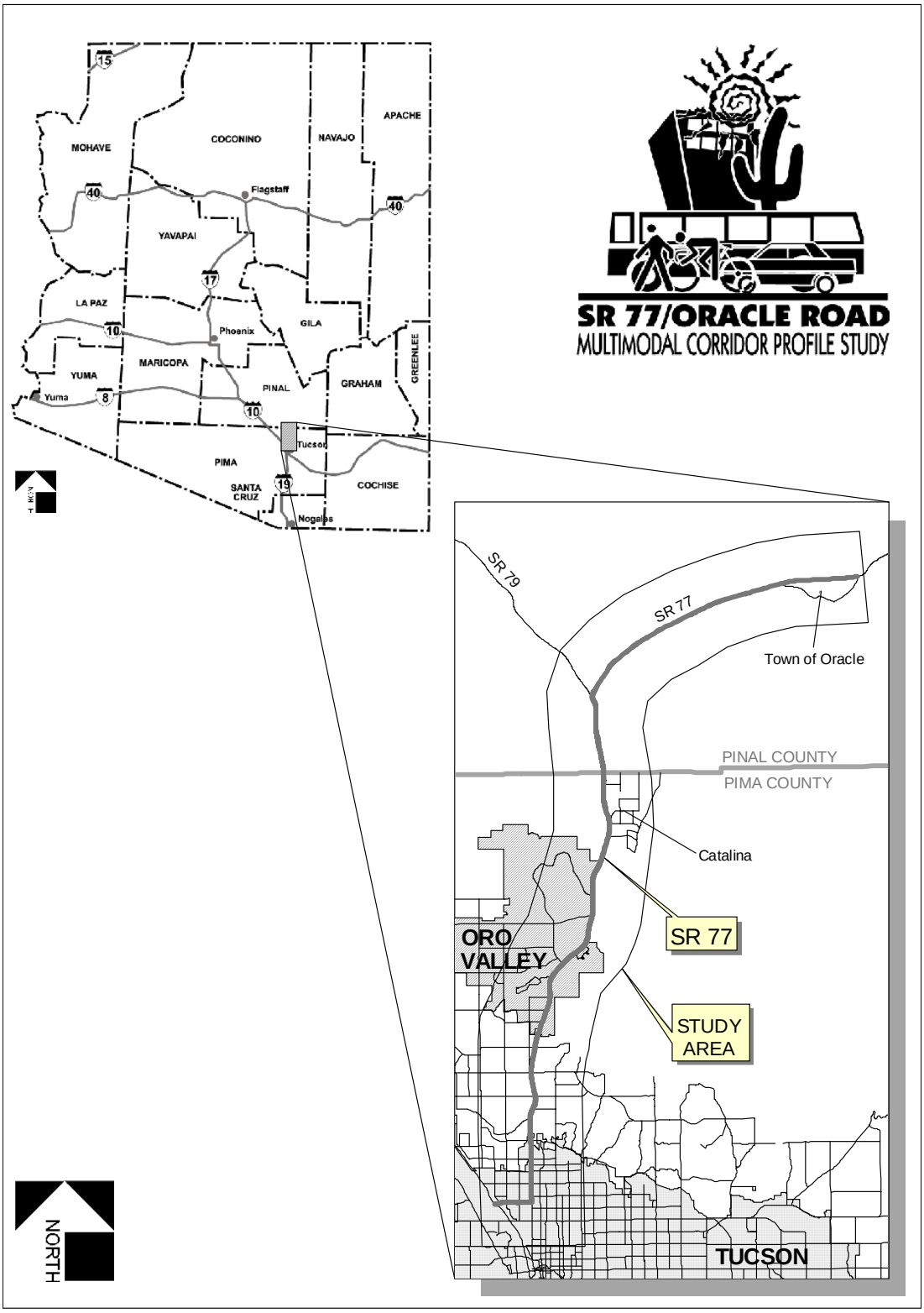
1.3 STUDY GOALS AND OBJECTIVES

Corridor profile studies fulfill many of ADOT's planning obligations. The following goals and objectives are designed to assist in meeting these obligations.

1.3.1 Goals

- To resolve major planning issues prior to initiation of project programming and engineering development plans;
- To identify transportation right-of-way issues and potential right-of-way needs;
- To provide a preliminary identification of potential environmental screening issues;
- To identify potential Title VI issues; and
- To identify candidate projects that can be incorporated into the priority programming process.

Exhibit 1-1
SR 77/ORACLE ROAD CORRIDOR STUDY AREA



1.3.2 Objectives

The primary objectives of this study are:

- Analyze, document, and recommend alternative transportation opportunities (including opportunities for roadway improvements, bus transit, light rail transit, bicycle, and pedestrian systems).
- Perform an analysis at an appropriate, economic level of detail.
- Coordinate the process with state, regional, local, and private interests.
- Provide the opportunity for public involvement at selected points during the planning process.
- Analyze and document environmental issues and concerns.
- Perform analyses of transportation alternatives.
- Analyze and document Environmental Justice issues as they may relate to low income and minority populations.
- Analyze, document, and recommend Intelligent Transportation Systems (ITS) alternatives.
- Develop guidelines that local government agencies may adopt for land development opportunities within and near the corridor, and which are compatible with adopted land use plans.
- Identify likely future development that will affect the travel demand within the corridor.
- Assess the effects of that development.
- Identify, evaluate, and prioritize potential actions to preserve and/or improve the corridor's ability to meet the existing and future travel demand.
- Analyze, document, and recommend road and street management actions and investment opportunities.

1.4 STUDY OUTLINE AND PRODUCTS

The SR 77/Oracle Road Multimodal Corridor Profile Study is divided into five phases:

- Inventory and Analysis of Existing and Projected Needs and Deficiencies
- Identification and Analysis of Opportunities for Improvements and Feasible Investment Options Under Present and Future Scenarios
- Recommended Projects: Cost Estimates, Environmental Screens, Environmental Justice Considerations and Public Feedback
- Public Involvement Process
- Report Preparation

The study products for this project are the following:

- Working Paper 1: Inventory and Analysis of Existing and Projected Needs and Deficiencies (June, 2003)
- Working Paper 2: Identification and Analysis of Opportunities for Improvements and Feasible Investment Options Under Present and Future Scenarios (February, 2004)

- Working Paper 3: Recommended Projects: Cost Estimates, Environmental Screens, Environmental Justice Considerations and Public Feedback
- Working Paper 4: Draft Final Report
- Final Corridor Profile Report and Executive Summary

1.5 PUBLIC INVOLVEMENT PROCESS

This study includes a public involvement process designed to disseminate information to the public on project activities, and solicit information from the public on transportation issues and concerns within the corridor. Public involvement activities included two transit workshops used to develop corridor transit system alternatives for consideration, and two series of public open houses to disseminate information to the public and gather feedback from the public on potential transportation system improvements. The overall public involvement process is described in Chapter 10 of this report.

1.6 ACKNOWLEDGMENTS

The project team for the SR 77 Multimodal Corridor Profile Study acknowledges the participation, contribution, and information received from the following agencies:

- ADOT - Transportation Planning Division
- ADOT - Tucson District
- City of Tucson
- Central Arizona Association of Governments
- Pima Association of Governments
- Pima County
- Pinal County
- Town of Oro Valley

1.7 PROJECT TEAM

The following organizations are acknowledged for their participation on the project team.

TransCore ITS, Inc.
Morrison-Maierle, Inc.
Lima & Associates
Rillito Consulting Group
Harris Environmental Group
The Planning Center
MMLA
TranSystems Corporation

2. STUDIES, CONTACTS AND ISSUES

This chapter provides an overview of all planning activities within the corridor and summarizes a list of the issues identified by the study. A review of recent studies and plans pertinent to the SR 77 corridor was conducted as part of this study. A brief description of these studies and plans is included in this chapter. Information gathering meetings with key agency stakeholders also took place at the beginning of the study. Issues identified in these meetings are summarized in this chapter. The documents reviewed for this study have been grouped into the following categories, and are summarized in Exhibit 2-1:

- Arizona Department of Transportation documents and information
- PAG Regional planning documents and information
- CAAG regional planning documents and information
- Pinal County planning documents and information
- Town of Oro Valley planning documents
- City of Tucson planning documents and information
- Miscellaneous information pertinent to the study corridor

This overview provides a brief description of each document and describes how it is relevant to the SR 77 study. Where applicable, project recommendations that are within the corridor boundaries are summarized.

2.1 ARIZONA DEPARTMENT OF TRANSPORTATION DOCUMENTS AND INFORMATION

2.1.1 ADOT 5-Year Transportation Facilities Construction Program (FY 2003-2007) Airports and Highways

This five-year construction program is a budget of what the Arizona Department of Transportation expects to receive in funds from various sources for the Fiscal Years 2003 to 2007 and how these funds will be allocated to projects. Each year the program is evaluated and updated through a comprehensive review process. The projects are categorized by type of project and by county. This report provides an overview of what funded projects are planned to be conducted on state routes within the project area over the next five years (FY 2003 to 2007). The projects that are within the SR 77 study area (by category) are documented in Chapter 6 of this document.

2.1.2 ADOT MoveAZ Plan - Phase I Report, August 2002, Cambridge Systematics

The Move AZ Plan is a statewide long-range transportation plan for Arizona that is currently under development. The plan consists of three phases, which are described as follows:

- Phase I creates a strategic direction to guide Arizona's transportation investments for the next 20 years. This process includes developing a broad mission statement and a set of clear and concise goals and objectives. A report for Phase I has been completed and is available.

Exhibit 2-1
LIST OF STUDY DOCUMENTS

Arizona Department of Transportation Documents and Information

1. *ADOT 5-Year Transportation Facilities Construction Program (FY 2003-2007) Airports and Highways*
2. *ADOT MoveAZ Plan – Phase I Report,* August 2002, Cambridge Systematics
3. Arizona State Highway Access Policy and Legislation Study, Lima & Associates, DMJM-Harris, March 2001
4. *Final Design Concept Report, Shoulder Widening Tucson-Oracle Junction Highway (SR77) River Road to Ina Road, Pima County, Arizona (Tracs No. 077 PM 072 H 6000 01-L, Project No. S 077-A-201),* Johnson-Brittain & Associates, Revised April 30, 2002
5. *Final Project Assessment SR 77, Junction I-10 to Oracle Road,* ADOT Roadway Predesign Section, October 2002
6. *Scoping Letter SR 77, River Road to First Avenue, Project PM 74 H5257 01C,* ADOT Predesign Program Management Section, June 20, 1996
7. *Final Project Assessment, SR 77, Ina Road to Pusch View Lane,* ADOT Roadway Predesign Section, April 2000
8. *Final Report Assessment, SR 77 at Hardy Road, Oro Valley, (Tracs No. 077 PM 076 H 4458 01C),* SFC, May 1997
9. *Location and Design Study for Tangerine Road, Avra Valley to First Avenue,* SBP-483-302PE, Parsons Brinckerhoff, December 1998.
10. *Tucson-Globe-Holbrook Multimodal Corridor Profile Study,* Leigh, Scott & Cleary, Inc., September 8, 1998
11. *US 89 Access Control Study,* JHK & Associates, May 1991
12. *Initial Project Assessment, SR 77: Calle Concordia to Tangerine Road,* Aztec, March 2003
13. *Final Project Assessment, SR 77,Junction Miracle Mile – Ina Road, Tucson – Oracle Junction Highway,* June 2000, ADOT
14. *Final Project Assessment, SR 77, First Avenue – Tangerine Road, Tucson – Oracle Junction – Globe Highway,* December 1996, ADOT
15. *Final Project Assessment, SR 77, Biosphere II Conference Center, Project 77 PN 096 H3024 01 C,* RS Engineering, November 1991
16. *Final Project Assessment, SR 77, Willow Springs – Oracle, Tucson – Oracle Highway,* ADOT, June 1995
17. *Final Project Assessment, SR 77, Junction SR 79 to Oracle, Tucson – Oracle Junction – Globe Highway,* ADOT, January 2001
18. *Final Project Assessment, SR 77 at Pinto Lane, Catalina, Tucson – Oracle Junction – Globe Highway,* ADOT, May 1997
19. *Arizona Statewide Plan Intelligent Transportation Infrastructure,* ADOT, December 2002
20. Miscellaneous ADOT Project Assessments (see list in text)
21. Oracle Highway (SR77) Bicycles Safety Shoulders Improvement Project, Transportation Enhancement Proposal, August 23, 2002.
22. *Arizona Transportation Board Policies,* November 7, 2002, ADOT
23. *ADOT Map of Suitable Bicycle Routes on the State Highway System,* November 1996
24. *1998 ADOT State Highway System Log,* Arizona Department of Transportation Data Section
25. *ADOT State Highway System K, D, and T Factors,* 1998
26. *Arizona State Highway System Average Annual Daily Traffic (AADT) Volumes,* 1993 through 1998
27. *State Route 77, Oracle Road, Traffic Signal Timing,* BRW, September 2002
28. *Arizona Transportation Information Systems Map Book,* ADOT, July 2002
29. *Arizona State Transportation Plan,* ADOT, December 1994

Exhibit 2-1
LIST OF STUDY DOCUMENTS
(Continued)

PAG Regional Planning Documents

1. *2030 Regional Transportation Plan*, Pima Association of Governments, Adopted June 29, 2005, and amended to include the Regional Transportation Authority (RTA) projects.
2. *Our Mobility – A $2.1 Billion Regional Transportation Plan,* PAG Regional Transportation Authority.
3. *PAG Draft Transportation Improvement Program (2007-2011TIP)*, Pima Association of Governments
4. *PAG ITS Strategic Deployment Plan*, Pima Association of Governments, 1996
5. *PAG ITS Strategic Deployment Plan Progress Update*, Pima Association of Governments, February 1998
6. *PAG Regional Plan for Bicycling*, Pima Association of Governments, 2000
7. *PAG Regional Pedestrian Plan*, Pima Association of Governments, July 2000
8. *PAG 1995-2000 Regional Transportation System Performance Assessment,* Pima Association of Governments
9. *PAG Intermodal Management System Study*, Parsons Brinckerhoff, September 1995

Pinal County Planning Document and Information

1. *Pinal County Comprehensive Plan 2001*, Pinal County Planning and Zoning Commission, December 6, 2001
2. *Pinal County Transportation Plan Final Report*, 2000 Update, Lima & Associates, September 2000
3. *Southern Pinal County Regional Transportation Plan*, Entranco, Inc., April 2003

Town of Oro Valley Planning Documents and Information

1. *Focus 2020 Oro Valley General Plan*, 1996, (with Transit Services Amendment adopted July 1999)
2. *Transit Development Plan, Fiscal Years 2003-2012*, Town of Oro Valley, November 2002
3. *Final Location Report, La Cañada Drive Extension, Tangerine Road to Moore Road,* Curtis Lueck & Associates, July 28, 1999
4. *Implementation of the Pedestrian & Bicycle Plan Annual Report*, Town of Oro Valley, April 2002
5. *Traffic Impact Study for the Oro Valley Town Center Development*, The WLB Group, Inc., April 2002
6 *Oro Valley Trails Task Force Report* ,Oro Valley Tails Task Force, November 2002
7. *Traffic Impact Analysis for Rancho Vistoso Neighborhoods 3 and 4*, Kimley-Horn and Associates, Inc., May 2000
8. *Traffic Impact Study Steam Pump Ranch, A Planned Area Development*, Stantec Consulting, Inc., July 2000
9. *Oracle Road Corridor Study, Calle Concordia to Rancho Vistoso Boulevard*, Curtis Lueck & Associates, March 3, 2003

City of Tucson Planning Documents and Information

1. *Oracle-South Sixth Corridor Study, Executive Summary and Final Report,* Parsons Brinckerhoff, September 1991

Miscellaneous Information Pertinent to the Study Corridor

1. *El Tour De Tucson Route Map*, 2001
2. *Oracle Road/Linda Vista Boulevard Traffic Impact Analysis Report*, Revision One, PFS Traffic Engineering, LLC, December 20, 1999
3. *Pusch Ridge Christian Academy Traffic Impact Analysis Report*, PFS Traffic Engineering, LLC, February 2002

- Phase II is an ongoing public involvement process. This overlaps the other two phases and allows Arizona residents and businesses to participate in the creation of the plan.
- Phase III includes detailed technical analyses of transportation system needs; evaluation of policies, programs, and projects; and the creation of a final Long Range Plan.

This plan relates to the SR 77 corridor profile study because information on the database, transportation system needs and the long-range plan will be used in the development of long-range transportation projects for the SR 77 corridor.

2.1.3 Arizona State Highway Access Policy and Legislation Study, Lima & Associates, DMJM-Harris, March 2001

A primary objective of the study was to develop draft access management policies to provide overall policy guidance to ADOT for managing access on State highways. Another key objective was to prepare draft "Model" Access Management legislation that provides the legal "teeth" of enacting and enforcing access management on State highways. A third objective was to develop Draft Access Management System and Standards that provide guidelines to planners and designers for implementing access management techniques. The SR 77 corridor study will use the policy guidance from this report to recommend improvements related to access within the corridor.

2.1.4 Final Design Concept Report, Shoulder Widening Tucson-Oracle Junction Highway (SR 77) River Road to Ina Road, Pima County, Arizona (Tracs No. 077 PM 072 H 6000 01-L, Project No. S 077-A-201), Johnson-Brittain & Associates, Revised April 30, 2002

The Final Design Concept Report (DCR) for shoulder widening on SR 77 between River Road and Ina Road was prepared by Johnson-Brittain & Associates in April 2002. The purpose of the project was to widen the shoulders for bicycle use on each side of SR 77 from River Road to Ina Road. The project will connect the bike lanes existing along SR 77 north of Ina Road to the existing bike lanes that run along River Road from Thornydale Road to First Avenue. In addition to the shoulder widening, northbound and southbound right turn lanes will be added to the Orange Grove Road intersection. The project is scheduled for construction in fiscal year 2003, using Transportation Enhancement funding and HURF revenues.

2.1.5 Final Project Assessment, SR 77, Ina Road to Pusch View Lane, Project 77 PM 74 H5257 01 C, ADOT Roadway Predesign Section, April 2000

This Project Assessment was prepared to assess a pavement preservation project to mill and replace AC in driving lanes and place a ½" AR-ACFC for the full width of the roadway. Based on a field review, the original project limits were revised somewhat to MP 74.84 (just south of Ina Road) to MP 79.13 (just north of Pusch View Lane), a distance of 4.29 miles. At the time of the preparation of the PA, the project was not yet programmed, however it was listed in the FY 2000-04 ADOT Five-Year Highway Construction Program under the pavement preservation section for fiscal year 2002. This Project Assessment is relevant to the SR 77 project because it provides background information on this area of the corridor.

2.1.6 Final Project Assessment, SR 77 at Hardy Road, Oro Valley (TRACS No. 077 PM 076 H 4458 01C), SFC, May, 1997

This Project Assessment was prepared for an intersection improvement at the SR 77/Hardy Road intersection in Oro Valley. The project limits begin at MP 76.94 and extend through the intersection. The project scope was to install a new traffic signal at this intersection and to construct geometric improvements associated with this signal installation. The signal at this intersection has since been installed.

2.1.7 Location and Design Study for Tangerine Road, Avra Valley to First Avenue, SBP-483-302 PE Parsons Brinckerhoff, December 1988

This report, prepared in 1988, examined the physical, environmental, and cost considerations for construction of a new roadway on the Tangerine Road alignment from Avra Valley Road to Interstate 10 (I-10), and the improvement of Tangerine Road between I-10 and First Avenue. At the time of the study, no funds had been programmed for any improvements in the corridor between Avra Valley Road and First Avenue. The report stated that a two-mile segment of the corridor, which provides a direct connection from First Avenue to Oracle Road, was being designed and was scheduled for construction in 1988. This report provides historic traffic data for Tangerine Road near SR 77.

2.1.8 Tucson-Globe-Holbrook Multimodal Corridor Profile Study Final Report and Executive Summary, Leigh, Scott & Cleary, Inc., September 8, 1998

This study, completed by Leigh, Scott and Cleary in 1998, provided an analysis of project priorities for the Tucson-Globe-Holbrook corridor, which was identified by ADOT as one of the 14 high priority transportation corridors in the state. The corridor comprises portions of two major highways, State Route 77 from Tucson to Holbrook; and US 60 from Globe to Show Low. Based on an analysis of existing traffic conditions, expected future travel demand, and project costs, areas along the corridor with capacity or other traffic engineering deficiencies were identified and a suggested implementation plan developed. The project recommendations that are located within the SR 77 study area (MP 68.10 to 103.32) are summarized as follows:

Highway Projects for Capacity Deficiencies

- MP 92-103 – Add passing lanes at selected locations to allow traffic to pass slow-moving vehicles.
- MP 103-109 – Add passing lanes at selected locations where none exist to allow traffic to pass slow moving vehicles. Some downhill direction passing lanes may also be an option (i.e., this might be a four-lane cross section.).
- MP 74.8 – Construct an interchange at Ina Road[1].
- MP 75.8 – Construct an interchange at Magee Road[2] .
- MP 81.8 – Construct an interchange at Tangerine Road (this was excerpted from the US 89 Access Control Study Recommendations).

[1] *US 89 Access Control Study*
[2] *US 89 Access Control Study*

Transportation System Management Strategies

SR 77 – Develop an access control plan for both rural and urban portions of SR 77[3].

Transit Service Improvements

- Entire SR 77 Corridor – Provide basic and later expanded intercity transit service from Tucson to Holbrook, one trip each way three times per week.
- Encourage rideshare, carpool, and vanpool programs.
- Initiate and sponsor innovative transit programs such as Share/Care mileage reimbursement for carpool trips into activity centers.
- Coordinate regional services so transit can be provided to persons whose trips may be funded through a variety of different funding sources.
- Introduce a marketing program to create an awareness of transportation services that are offered in the area, and other information about the services.
- Establish a five-year Transit Development Plan and Transit Advisory Committee.

Pedestrian/Bicycle Facilities

- Consider eliminating the rumble strips to permit the use of shoulders as a bicycle facility. The report did note that these have benefits to highway safety.

Traveler Services

- SR 77 – Construct additional rest areas. In the study area, this would be between Winkelman and Oro Valley.
- SR 77 – Implement ITS elements such as variable message displays, traffic monitoring, pavement condition monitoring, travel information kiosks at rest areas, and other developing technologies.

2.1.9 US 89 Access Control Study, JHK & Associates, May 1991

This study, performed by JHK & Associates (predecessor firm to TransCore) evaluated access problems along the 16-mile US 89 corridor (from Ina Road to Oracle Junction), and recommended planning, engineering, and administrative strategies to maintain a high degree of mobility and safety as the land within the corridor developed. Although much land use development has occurred in the 12 years since the study was conducted, many of the recommendations are still relevant to this study. Recommendations from that study that relate to the SR 77 Corridor Profile study are:

Grade-Separated Intersections

- Future grade-separated intersections may be warranted at the intersections of SR 77 with Oracle Road, Ina Road, Magee Road and Tangerine Road. The report stated that a GSI was being considered (at the time of the report preparation) under a separate study for the Oracle Road/Orange Grove Road intersection.

[3] *US 89 Access Control Study*

Intersection Spacing, Location, and Access Control

- Recommended use of divided cross section.
- Non-signalized intersections should be no closer than 1,200 feet.
- Signalized intersections should be no closer than one-half mile, preferably one mile apart.
- Driveways and median openings should not be allowed in the functional area of an intersection ("functional area" defined as containing storage, transition, and maneuver areas)

Driveways and Curb Cuts

- Direct access to US 89 should be discouraged unless the access is of such a significant nature as to be considered a collector roadway.
- Current undeveloped parcels that might have legal access to US 89, may be alternatively served by a frontage road rather than direct access.

Median and Median Openings

- Recommend use of a divided roadway with a median rather than a five-lane cross section, with the exception of MP 86 to MP 88 (Catalina area).
- Provide spacing of median openings no closer than 1,200 feet and no further than one-mile intervals.

Frontage Roads

- Provide a frontage road system in the Catalina area.
- Consider the establishment of a collector system using Mainsail Boulevard and Stallion Lane.
- An alternate to frontage roads in the Catalina area would be the construction of a bypass route from MP 84 to approximately MP 88 north of the Pima/Pinal County line. The bypass route would be primarily on Arizona State Land Department property.

Signalized Intersections

Proposed signalized intersection locations are:

- Oracle Road/ Hardy Road (MP 76.8) (This signal has been installed.)
- Oracle Road/ Rancho Vistoso Boulevard (MP 82.8) (This signal has been installed.)
- Oracle Road/ southern terminus of proposed bypass route
- Oracle Road/ Marshall Boulevard (MP 86.5)
- Oracle Road/ Edwin Road (northern terminus of proposed bypass route)
- Oracle Road/ Saddlebrooke Boulevard (MP 88.5) (This signal has been installed.)
- Oracle Road/ approximately MP 89.6
- Junction US 79 /SR 77 (MP 91)

2.1.10 Initial Project Assessment, SR 77, Calle Concordia to Tangerine Road, TRACS No: 077 PM 077 H5459 01L, AZTEC Engineering, March 2003

This project assessment was prepared for a roadway widening project on SR 77, and was divided into two segments in order to match into a project being designed and constructed by the Town of Oro Valley to widen SR 77 to six lanes from Pusch View Lane to La Reserve. Segment 1 is from Calle Concordia (MP 77.5) to Pusch View Lane (MP 79.2). Segment 2 is from La Reserve (MP 79.8) to Tangerine Road (MP 82.0). The proposed improvements consist of symmetrically widening SR 77 from a four-lane roadway to a six-lane roadway. The widened six-lane roadway will be carried through the intersection of Tangerine Road and will then be tapered down to match the existing four-lane section. The existing rumble strip will be milled and replaced with asphaltic concrete (AC) pavement and the entire roadway will be overlaid with asphalt rubber-asphalt concrete friction course (AR-ACFC). The existing raised median will remain and dual left-turn bays and dedicated right-turn bays will be added where noted in the traffic report for the project.

2.1.11 Final Project Assessment, SR 77, Junction Miracle Mile to Ina Road, Project 77 PM 69 H5256 01C, Roadway Predesign Section, June 2000

This project is a pavement preservation project in Pima County, partially within City of Tucson limits. The project limits are from MP 69.50 to MP 74.84. The project involves the following elements:

- Mill and replacing the travel lanes and turn lanes with asphaltic concrete (AC).
- Apply a rubber-asphalt concrete friction course (AR-ACFC) (full width).
- Pave the major crossroads to the end of the curb returns.

2.1.12 Final Project Assessment, SR 77, First Avenue-Tangerine Road, Project 77 PM 79 H4203 01C, Roadway Predesign Section, December 1996

This project is a pavement preservation project located on SR 77 from MP 79.2 to MP 82.2, within the Town of Oro Valley. Key elements of the project scope are:

- Mill and replace asphaltic concrete (AC) full-width, excluding the Cañada Del Oro Bridge.
- Mill and replace additional depth of existing AC in the travel lanes 50 lineal feet prior to the northbound and southbound bridge approach slabs.
- Place asphalt rubber-asphalt concrete friction course (AR-ACFC) on travel lanes and turn lanes.
- Place new AR-ACFC overlay on the Cañada Del Oro Bridge.

2.1.13 Final Project Assessment, SR 77, Biosphere II Conference Center, Project 77 PN 096 H 3024 01 C, RS Engineering, Inc., November 1991

This project, located at the SR 77/ Biosphere II Conference Center intersection, was an intersection improvement project to add turning lanes and acceleration/deceleration lanes at the intersection. The project begins at MP 96.4 to accommodate the added northbound through lane and exclusive right-turn lane at the intersection. It ends at MP 96.9 because of the approach channelization and pavement widening to accommodate both the southbound exclusive left-turn

lane and the northbound acceleration lane. The project also involved installation of underground conduit for a future traffic signal installation.

2.1.14 Final Project Assessment, SR 77, Willow Springs to Oracle, Project 77 PN 95 H3995 01C, ADOT Roadway Predesign Section, June 1995

This project, located on SR 77 from MP 95.8 to MP 103.87, is a pavement preservation project, which is an addition of an asphalt-rubber concrete friction course (ARACFC). In addition to the pavement preservation project, the project includes build-up shoulders with milled material, striped the roadway for new left-turn lane from MP 99.3 to MP 100.15. This project is located within the SR 77 corridor area, and describes roadway and traffic engineering characteristics for this area.

2.1.15 Final Project Assessment, SR 77, Junction SR 79 to Oracle, Project 77 PN 92 H493101C, ADOT Roadway Predesign Section, January 9, 2001

This project is for the development of northbound passing lanes at various locations within the project area, which is on SR 77 from MP 91.21 to MP 95.35. The first passing lane location (MP 91.21 to MP 92.13, is just northeast of the SR 79/SR 77 intersection. The second location extends from MP 94.13 to Willow Springs Road at MP 95.35. This project is relevant because it is located within the SR 77 corridor area, and describes the justification for these roadway improvements, as well as roadway and traffic engineering characteristics for this area. The project involves widening the northbound section at two locations 12 feet on the outside shoulder to provide for passing lanes. The new cross section consists of two 12-foot travel lanes, a 12-foot northbound passing lane, and two eight-foot shoulders.

2.1.16 Final Project Assessment, SR 77 at Pinto Lane, Catalina, Project 77 PN 87 H445701C, Stantec Consulting, June 2, 1997

This project is an intersection improvement project at the T-intersection of SR 77 and Pinto Lane in the Town of Catalina. It is relevant to the SR 77 corridor study because the intersection is within the project area and it describes roadway and traffic engineering characteristics of the intersection. This project involved the installation of a traffic signal and the construction of a northbound right-turn lane on SR 77 and a left-turn lane on Pinto Lane. The project also involved construction of an embankment spillway approximately 100 meters south of the intersection, and repair of pavement drainage and installation of vehicle presence loops in Pinto Lane.

2.1.17 ADOT Statewide Plan Intelligent Transportation Infrastructure, ADOT Intermodal Transportation Division Technology Group, December 2002

This plan is an update of a 1996 plan and is used to continue prioritization of ITS infrastructure on state highways. On SR 77 a Road Weather Information System is proposed on SR 77, north of Tucson.

2.1.18 Miscellaneous ADOT Project Assessments

There were a number of Project Assessments within the study area that were not available from ADOT, however, a brief description of the work was available. These documents are summarized in the following table.

Route Location	TRACS No.	Date	Description of Work
SR 77, Calle Concordia to Tangerine Road	H545901C	4/25/02	Widen to six lanes
SR 77 at Pinto Lane	HX4601C	12/19/97	Install traffic signal
SR 77, Pinal County to Oracle Junction	H200801C	10/19/90	R/W Acquisition
SR 77, Junction Old SR 77	H327001C	5/4/93	Intersection Improvement
SR 77, Old SR 77 - San Manuel Road	H525801C	7/2/99	RR, ARFC
SR 77, Rillito Road - Oracle Road	H381001C	6/19/95	Remove, replace the EB & WB AC on Miracle Mile Road to the Junction of Oracle Road and at all intersections to the end of the curb returns.

2.1.19 Oracle Highway (SR 77) Bicycle Safety Shoulders Improvement Project, Transportation Enhancement Proposal, August 23, 2002

This Enhancement Grant application was to construct paved bicycle safety shoulders where needed on segments of Oracle Highway between the community of Catalina to the community of Oracle (mileposts 85.8 to 101.0) and to upgrade the conditions of existing paved shoulders to improve safety for bicyclists. The proposed project was to provide six-foot paved shoulders and new bicycle safe rumble strips on two miles of SR 77 in the community of Oracle (MP 99.0 to MP 101.0). In addition, the project would replace 11.1 miles of existing rumble strip and one-inch pavement lip on Oracle Highway (from MP 87.9 to MP 99.0) with new bicycle-safe rumble strip and smooth shoulder paving. The project also includes restriping of the roadway for a 2.1-mile section within Catalina to achieve 5.5-foot paved shoulders (MP 85.8 to 87.9). The project was not approved for transportation enhancement funding, but it is useful to this project because it identifies bicycle safety issues on segments of SR 77 between the community of Catalina, Arizona, to the community of Oracle, Arizona.

2.2 PIMA ASSOCIATION OF GOVERNMENTS (PAG) REGIONAL PLANNING DOCUMENTS

2.2.1 *2030 Regional Transportation Plan*, as Amended, Pima Association of Governments, Adopted June 29, 2005

The Regional Transportation Plan, adopted by PAG in 2005, identifies planned, programmed and unfunded/planned projects for eastern Pima County. Capacity improvements, non-capacity improvements, and transit expansions are included in this plan. Many of those projects are within the project corridor. These projects are summarized in Chapter 9 of this document. The

amended Regional Transportation Plan includes the projects contained in the 2006 Regional Transportation Authority (RTA) list of projects.

2.2.2 PAG ITS Strategic Deployment Plan, Pima Association of Governments, 1996

This study provided initial recommendations for ITS implementation in the PAG planning area. Oracle Road, from Miracle Mile Road to Magee Road, was a recommended route for ITS coverage in this study, and was recommended as an initial deployment route. The recommendation was to install an advanced traffic management system (ATMS) along the route. This system was recommended to include signal interconnection, video based detection systems, CCTV camera incident management, integration of ADOT and Oro Valley traffic signals into the City of Tucson central signal control system, and field testing of a transit vehicle pre-emption system.

2.2.3 PAG ITS Strategic Deployment Plan – Progress Update, Pima Association of Governments, February 1998

This study summarized accomplishments for the deployment of the recommendations contained in the 1996 ITS Strategic Deployment Plan. These accomplishments included ADOT bringing four additional signals on line with the City of Tucson's traffic control system along Oracle Road, at Rudasill Road, Orange Grove Road, Ina Road, and Magee Road.

2.2.4 PAG Regional Plan for Bicycling, Pima Association of Governments, 2000

The PAG Regional Plan for Bicycling is policy-oriented and provides AASHTO references for designing bike facilities. Included, as an attachment to the document is a map of existing, programmed and planned bikeway facilities. As of November, 2000 programmed bikeways included:

- Lambert Lane, La Cholla Boulevard to First Avenue – Programmed bike route with striped shoulder
- Oracle Road, Ina Road to River Road – Programmed bike route with paved shoulder
- Orange Grove Road, Thornydale Road to Oracle Road – Programmed bike route with striped shoulder
- Ruthrauff Road/Wetmore Road – La Cholla Boulevard to Fairview Avenue – Programmed bike route with striped shoulder
- River Road, First Avenue to Campbell Avenue – Programmed bike route with striped shoulder

Planned bikeways include:

- Cañada del Oro – Shared use path
- Oracle Road, River Road to Roger Road – bike route with striped shoulder

2.2.5 PAG Regional Pedestrian Plan, Pima Association of Governments, July 2000

This plan is primarily a policy plan. An attachment to the plan shows pedestrian activity areas, which include bus routes, parks, schools, and shared use paths. A shared use path is denoted on SR 77 between Wilds Road and Golder Ranch Road. Shared use paths are also noted on River

Road, east and west of SR 77 and on Lambert Lane, between La Cañada Drive and First Avenue in Oro Valley. A short shared-use path segment is also noted on Magee Road, between La Cañada Drive and Oracle Road.

2.2.6 PAG, 1995-2000 Regional Transportation System Performance Assessment, Pima Association of Governments

The PAG Regional Transportation System Performance Assessment is a brochure that is periodically issued by PAG that summarizes selected system performance measures. The document shows Average Daily Traffic (ADT) on selected highway segments. It is useful to the SR 77 study to provide background on historical trends.

SR 77 study area segments include Oracle Road, Orange Grove Road to River Road, and River Road, Oracle Road to Stone Avenue. The document shows ADT growth from 1980 to 2000, in 10-year increments, as shown below:

Year	Oracle Road, Orange Grove Road to River Road	River Road, Oracle Road to Stone Avenue
1980	28,000	8,800
1990	53,000	17,100
2000	66,010	38,896

This document also presents a section on intersection performance identifying the 20 busiest intersections by delay and by traffic volumes.

2.2.7 PAG Transportation Improvement Program (2007-2011 TIP), Pima Association of Governments

The TIP is a five-year schedule of proposed transportation improvements within the Pima County, Tucson urbanized area. Highway and transit projects that are federally funded must be included in the TIP. The TIP also includes regionally significant projects funded from non-federal sources. Projects identified in the 2007-2011 TIP within the corridor are identified in Chapter 9 of this document.

2.2.8 PAG Intermodal Management System Study, Parsons Brinckerhoff, September 1995

This study shows the location of intermodal facilities and provides a future plan for intermodal facilities. Intermodal facilities that are shown within or near the SR 77 corridor include:

- Airports – La Cholla Airpark is located west of La Cañada Drive, and north of Moore Road, in Tortolita.
- Park-and-Ride Lots – There are three park-and-ride lots located east of Oracle Road within the study area, one south of Overton Road, and two located between Orange Grove Road and River Road. There is one-park-and-ride lot located on the west side of Oracle Road, north of River Road. Other park-and-ride lots located within the corridor are on La Cañada Drive north of Ina Road, at the Tohono Tadai Transit Center, and one on Grant Road east of First Avenue, and one on Roger Road between First Avenue and Campbell Avenue.

- Park-and-Ride Lots with bike lockers – one is located west of Oracle Road and south of Ina Road.
- Truck Terminals – within the SR 77 study area, there are two truck terminals on Grant Road east of Oracle Road, one truck terminal on the east side of La Cañada Drive north of Grant Road, and one truck terminal on the west side of SR 77 between Speedway Boulevard and Grant Road.
- Transit Center – the Tohono Tadai Transit Center is located in northwest Tucson on Stone Avenue and Wetmore Road. It serves eight Sun Tran bus routes.
- Rail Line Facilities – Rail lines are located east of I-10.

The project recommendations involve strategies for developing funding and implementing projects. There were no specific projects recommended within the SR 77 corridor.

2.3 CAAG REGIONAL PLANNING DOCUMENTS AND INFORMATION

No studies concerning SR 77 within the limits of this study were provided by the Central Arizona Association of Governments.

2.4 PINAL COUNTY PLANNING DOCUMENTS AND INFORMATION

2.4.1 Pinal County Comprehensive Plan 2001, Pinal County Planning and Zoning Commission, December 6, 2001

The Comprehensive Plan provides a guide for growth and decision by the Pinal County Planning and Zoning Commission and the county Board of Supervisors concerning the growth and development. Each of the plan elements contains a series of goals, objectives, and policies used to guide public decision making. Elements include land use, natural environment, transportation, water, and area plans. One subarea, Planning Area 4B, includes the part of the SR 77 corridor that is in Pinal County

The Transportation Element of the plan discusses transportation issues and goals, objectives, and policies. Transportation objectives which directly affect SR 77 are:

- Encourage limiting of direct access on State Highways and principal arterials to enhance and protect the capacity and safety of the transportation system and reduce potential traffic conflicts.
- Encourage the establishment of a scenic corridor designation and development of an overlay district for the Pinal Pioneer Parkway, SR 77 and 79, to ensure the protection of scenic views and adjoining vegetation.

Other policies relevant to the corridor include:

- Encourage limiting access to SR 77 and SR 79 to ensure its continuance as a high-speed transportation corridor.
- Discourage linear or strip commercial developments along SR 77 and 79 frontages to minimize negative visual impacts and traffic circulation.

2.4.2 Pinal County Transportation Plan Final Report, 2000 Update, Lima & Associates, September 2000

This study is a long-range transportation plan for roads of regional significance in Pinal County, including Interstates 8 and 10, state routes, and major county roads. This project is relevant to the SR 77 corridor study because it contains access management recommendations by roadway classification, contains roadway classifications and recommends future projects. The study involved analyzing existing socioeconomic and transportation conditions, developing and analyzing future conditions to determine deficiencies and developing a program to identify transportation projects to correct deficiencies. SR 77 and SR 79 are functionally classified as minor arterials in the existing (Year 1999) conditions section of the plan. Other routes that are in the project corridor are classified as follows:

- Saddlebrooke Boulevard – minor collector
- Biosphere Road – minor collector
- American Avenue – major collector

The Transportation Plan for Pinal County consists of a Transit Element and a Street Element. The Transit Element recommends establishment of a task force to develop and maintain partnerships among human service providers, major employers, and municipalities. The task force would begin identifying the most appropriate institutional arrangement for the delivery of transit services. The Street Element includes a future functional classification system and recommended cross sections for each classification. SR 77 in Pinal County is classified as minor arterial in the future plan between SR 79 and Winkelman. SR 77 is classified as principal arterial between the Pinal County southern boundary and SR 79. SR 79 is classified as a principal arterial its entire length within Pinal County. The plan includes recommended cross sections associated with each roadway classifications. Access management recommendations are provided in the report, including driveway spacing, driveway corner clearance, and driveway location restrictions. The report also presented level of service estimates assuming three future population levels. There is one future project within the study area, which is to widen SR 79, from Oracle Junction to SR 287, to four lanes.

2.4.3 Southern Pinal County Regional Transportation Plan, Entranco, Inc., April 2003

This transportation plan was developed for Southern Pinal County, which includes the area south of Coolidge, Florence and Kelvin, and east of Casa Grande and Chuichu. Most of the land in this area is undeveloped. The goal of the project was to determine the mitigation measures necessary to ensure quality transportation as the region develops. The results of the study determined that nearly 18,000 new homes would likely be constructed in the Pinal County region, increasing population by nearly 55,000 persons. Adding to this residential development are more than 13,000 jobs. New development throughout the county could increase traffic by more than 60 percent over the next 20 years. One improvement was recommended within the study area, which is to widen SR 77, from SR 79 to Reddington Road from two to four lanes. Traffic volumes are anticipated to increase from 12,500 vpd to 16,400 vpd.

2.5 TOWN OF ORO VALLEY PLANNING DOCUMENTS AND INFORMATION

2.5.1 Focus 2020 Oro Valley General Plan and Transit Amendment, 1996, Town of Oro Valley

This General Plan is useful to the SR 77 Corridor Study because it describes the goals for the Circulation and Transportation Element of the General Plan for Oro Valley. The report talks about the following corridors and projects:

- Oracle Road Corridor – The report discusses grade-separated interchanges (GSIs) at both Ina Road and Orange Grove Road and that they will present a financial challenge to the region.
- La Cañada Road Extension from Tangerine Road to Moore Road – This extension is needed to provide alternative access to the Rancho Vistoso neighborhood so that Oracle Road and First Avenue are not overwhelmed by the anticipated travel demand.
- First Avenue Corridor – This corridor is projected to be the most heavily traveled roadway within Oro Valley with the exception of Oracle Road. The report indicated that there were no funding sources available at the time to pay for needed improvements and that a combination of development impact fees and state/federal funding may be possible.
- La Cañada Corridor – The report discussed widening La Cañada Drive from Lambert Lane to Naranja Drive (at the time of this report, design plans were being prepared).
- La Cholla Boulevard and Thornydale Road – Pima County and Marana were seeking funding to improve these facilities.
- Tangerine Road Corridor – La Cañada Drive to First Avenue is maintained by the Town of Oro Valley. There were on-going multi-jurisdictional discussions to plan for future expansion needs so that ADOT would maintain the full length of this state highway.
- Ina Road and Orange Grove Road Corridors – The reports stated that Pima County and Marana are responsible for maintenance of these corridors and have plans for future expansion.

2.5.2 Transit Development Plan, Fiscal Years 2003-2012, Town of Oro Valley, November 2002

The *Transit Development Plan* calls for a balanced transit service consisting of paratransit, expanded fixed route commuter service on Oracle Road and development of a neighborhood shuttle service connecting major activity centers within Oro Valley. The Oracle Road expansion would go north of Rancho Vistoso Boulevard. This plan is relevant to the SR 77 corridor study because it provides recommendations for future transit service within the corridor study. The neighborhood circulator route would intersect Oracle Road at Rancho Vistoso Boulevard and First Avenue and would serve Oracle Road between those streets.

2.5.3 Final Location Report, La Cañada Drive Extension, Tangerine Road to Moore Road, Curtis Lueck and Associates, July 28, 1999

This study, based on a Transportation Action Plan and a comparative study of reasonable alternative alignments, provides a recommended final roadway alignment for the extension of La Cañada Drive from Tangerine Road to Moore Road. This study is relevant to the SR 77 corridor study because La Cañada Drive is within the corridor study. This extension would provide an

alternative access to the Rancho Vistoso area in northern Oro Valley. The study recommended the use of Alternative B2 for the alignment for reasons because:

- It does not have major property impacts on the affected properties except the Alden property, and the affected property owners indicated that they would accept this alternative due to the access advantages.
- The alignment is located primarily within the Town of Oro Valley jurisdictional limits.
- The alignment does not have major impacts on natural and riparian areas.
- The alternative has a reasonable planning level cost and good feasibility of cost recovery with respect to resale of right of way.
- It is one of the least disruptive of the alternatives on existing residences located outside the Town limits in terms of noise and other traffic related impacts.
- It provides one of the most direct routes between La Cañada Drive and the Rancho Vistoso Access Road.

2.5.4 Implementation of the Pedestrian and Bicycle Plan, Annual Report, Town of Oro Valley, Department of Public Works, April 2002

This report provides information as to the implementation status of the Revised Bikeway Plan that was adopted in April 2001. This document relates to the SR 77 corridor study because it describes newly implemented bike and pedestrian facilities in the study area and it discusses planned projects. Completed projects within the study area are:

- Copper Creek Loop: Signs have been installed along Copper Springs Tail, Copper Creek Trail and Silver Leaf Drive
- Arrowsmith Drive: Signings and striping were completed by the Public Works Department in the Spring of 2001 giving cyclists a connection for Rancho Vistoso to Woodburne Avenue.
- Moore Road: Upon completion of the newly paved portion of Moore Road west of Woodburne Avenue, bike lane striping and signage were installed.
- Woodburne Avenue, north of Moore Road, was signed for bikes with information directing cyclists to the path leading through Woodshade Park.
- Hidden Springs has been striped and signed for bicycle travel. This is the western connector from Woodshade Park heading north toward Stone Canyon and the Golf Villas.
- Vistoso Highlands, the northwestern-most bike route in Oro Valley, has been signed and striped.
- Copper Spring Trail north of Tangerine Road , now signed and soon to be striped for cyclists, makes the connection between Moore Road and Cooper Creek Loop.
- Proposal for Revised Striping Plan on Del Webb and Sun City: The existing bike facilities along Del Webb and Sun City were originally striped and signed on one side only.
- General Plan Update: Drafts for both the Circulation Element and the Bicycle/Pedestrian component have been submitted to the Planning Department for review.
- A Transportation Enhancement Grant proposal was submitted to PAG (Pima Association of Governments) for a half-mile segment of the proposed shared use path along the CDO behind Home Depot that had no programmed funding.

- A Feasibility Study was completed on the proposed construction of the shared use path along the CDO Wash from La Cañada Drive to First Avenue and was presented to various Town Departments for their review and ownership.
- An Enhanced Pedestrian Safety and Crossing Evaluation Study is being conducted.
- Adopted Bicycle Facility Standards: A uniform standard for bicycle facilities has been proposed.
- Transportation Enhancement Grant: In July 2002 a grant proposal will be submitted to PAG for building the 2.7 mile path along the southern bank of the CDO Wash between La Cañada Drive and First Avenue.
- Pedestrian Safety Projects: The Bicycle Program Coordinator reviewed three specific areas that are potentially hazardous for pedestrians. First was the intersection north and southbound on Woodburne Avenue at Moore Road.

Proposed Projects

- With the possibility of annexation of adjacent existing roadways, an inventory of available bike routes has been conducted and proposed additions have been mapped.
- Proposed roadways that are currently in design for reconstruction will all have an eight-foot multi-use lane (paved shoulder) available for cyclists. Most will also have a separate shared use path. Currently in design are Tangerine Road, First Avenue, Lambert Lane, La Cañada Drive, and Pusch View Lane.
- The seven-mile shared-use path along the CDO Wash and Big Wash. This project will slowly unfold as funding is available and development occurs adjacent to the washes.
- Proposed is a 12-foot wide paved path for cyclists, skaters and pedestrians with dirt shoulders suitable for jogging.

2.5.5 Traffic Impact Study for the Oro Valley Town Center Development, DMJM Harris, April 2002

The Oro Valley Town Center is a proposed commercial/residential development located on the east side of SR 77, between Pusch View Lane and La Reserve Drive in Oro Valley, Arizona. The planned development includes retail shopping facilities, a pharmacy/drug store, office space, restaurants, hotel, bank, convenience store, parking, and residential townhomes. The study stated that the Town of Oro Valley has plans to establish an improvement district between the property owners on the east and west sides of Oracle Road to share in the costs of improving Oracle Road. The improvements tentatively include widening Oracle Road to include widening to three lanes in each direction from Pusch View Lane to La Reserve Drive. Access to the site will be obtained by two signalized intersections, one at Pusch View Lane and one at First Avenue, and via three driveways that allow right-turn in, right-turn out movements. An internal road system will allow internal movements for both commercial and residential properties without the need to reenter Oracle Road.

The Oro Valley Town Center development is expected to generate 44,000 trips per weekday. The relevant recommendations of the study are:

1. Reconstruct Oracle Road to a six-lane roadway with raised median from south leg of Pusch View Lane through the north leg of La Reserve Drive.

2. Provide a median wide enough on Oracle Road to accommodate dual left-turn lanes from Pusch View Lane to First Avenue.
3. Construct turn lanes at intersections with the Recommended Minimum Storage Lengths noted in report.
4. Improve the Pusch View Lane/Oracle Road Intersection to include the following:
   - Dual right-turn lanes and dual left-turn lanes and a single through lane on the eastbound approach to the intersection.
   - A right-turn lane and dual left-turn lanes on the northbound approach.
   - A left-turn, through, and right-turn lane on the westbound approach.
   - Dual left-run lanes and a right-turn lane on the southbound approach.
5. Improve the La Reserve Drive/Oracle Road Intersection to include the following:
   - A left-turn lane and a right/through lane on the eastbound approach to the intersection.
   - A left and right-turn lane on the northbound approach.
   - Dual left-turn lanes, a through lane, and a right-turn lane on the westbound approach.
   - A left and right-turn lane on the southbound approach.
6. Construct Driveways A, B, and C to allow ingress and egress of large and semi type trucks, with 250 feet long right-turn lanes on Oracle Road are recommended at each driveway.

2.5.6 Oro Valley Trails Task Force Report, Oro Valley Trails Task Force, November 2002

The Oro Valley Trail System is a network of unpaved trails for the shared use of hikers, mountain bicyclists, and equestrians to use for recreation and accessing land uses within the Town of Oro Valley. This report relates to the SR 77 Corridor study because it presents an overview of trails that are in proximity to the corridor and outlines a plan of future trail improvements. The report defines trails that are protected, which are trails that are legally secured. Thirty-six percent of Oro Valley's trails system is protected. An annual action plan was presented in the report.

There are proposed protected trails that cross the SR 77 corridor at the Cañada del Oro Wash, Linda Vista Boulevard (#226), Calle Concordia (#A-8). There is an existing protected trail also on the Cañada del Oro Wash (#2). The Cañada del Oro Wash Trail includes a trail at the wash bottom, as well as trails along the flood walls west of La Cañada Drive and east of La Cañada Drive at Cañada del Oro Wash Bridge to Oracle Road. Recommendations for improvements to this trail included constructing pedestrian bridges to link flood wall sections, creating connectors to the Town's bike path system, constructing paved ramps under the First Avenue bridge to link the flood wall paths, and providing directional signage.

Recommendations for the Linda Vista Boulevard Trail (#226) include providing a means for equestrians to increase crossing time at the Oracle Road signalized intersection, nominating the trail to the State Trails System, providing directional signing, securing an easement to create and east-west link, and constricting trail per trail standard recommendations.

Recommendations for the Calle Concordia Trail (#A-8) include providing a means for equestrians to increase the crossing time at Oracle Road and Calle Concordia, working with the Coronado National Forest to construct a parking lot at the end of Calle Concordia and the Forest Service Boundary, providing directional and information signs, and constructing the trail per trial design guidelines.

2.5.7 Traffic Impact Analysis for Rancho Vistoso Neighborhoods 3 and 4, Kimley-Horn and Associates, May, 2000.

This report documents the traffic impact analysis for planned Rancho Vistoso neighborhood developments in the Town of Oro Valley. Neighborhood 3 is located west of Oracle Road between Rancho Vistoso Boulevard and Tangerine Road. Neighborhood 4 is located west of Oracle Road and south of Tangerine Road. At buildout, the development will include a hospital, regional and community commercial, and Campus Park industrial uses. The results of the study that affect the SR 77 study area are:

- It is recommended that cross-section recommendations for Oracle Road be reviewed at such time as an updated regional model becomes available.
- It is recommended that the Extension of Street "C" to Oracle Road be constructed at such time as traffic volumes in the vicinity of Rancho Vistoso Neighborhoods 3 and 4 warrant its provision.
- It is recommended that at buildout a channelized slip-right with yield traffic control be constructed on the eastbound approach of the intersection of Street "A" and Oracle Road.

2.5.8 Traffic Impact Study Steam Pump Ranch, Stantec Consulting, February 26, 2001

The purpose of this report is to analyze traffic impacts of a proposed Planned Area Development in Oro Valley, Arizona, adjacent to SR 77. The Planned area development will consist of a retail shopping center and hotel on approximately 42 acres. This project relates to the SR 77 Corridor study because it lies north of MP 80 on SR 77 between SR 77 and the Cañada Del Oro Wash. It has approximately 4,100 feet of frontage on SR 77. Approximately 1,200 feet south of the site is La Reserve Drive. It is anticipated that the development will generate 1,627 trips in the PM peak hour, and it is planned to have six driveways on SR 77. Three of the drives will be located at the existing median openings. Three other drives will be restricted to right-turn in, right-turn out traffic movements only. An internal road system will promote trip interaction within the site. The analysis found that five years after buildout, the Driveway 6/Rams Field Pass intersection might warrant a traffic signal. When the signal becomes warranted, the developer/owners will pay 100 percent of the cost of the traffic signal. A continuous southbound right-turn lane will be provided on SR 77 for all the driveways beginning 175 feet north of Driveway 6.

2.5.9 Oracle Road Corridor Study, Calle Concordia to Rancho Vistoso Boulevard, March 3, 2003, Final Draft Report

This study provided corridor recommendations for a six-mile long section of SR 77. The study included the inventory and assessment of current land use and transportation conditions and approved land development and roadway improvement, updated the Oro Valley Travel Demand Model and Forecast Future Conditions, and provided recommendations on how to manage

development in the corridor and program needed improvements. A summary of the recommendations identified in this final draft report follows:

1. Access management must be maintained throughout the corridor.
2. Ongoing roadway improvements and development projects must provide sufficient capacity at intersections, median openings, and driveways to accommodate turning vehicles.
3. Work closely with PAG to aggressively implement improvements to La Cholla Boulevard as a parallel corridor, to ensure the long-term viability of Oracle Road.
4. Assess the benefit and costs of future GSIs to encourage the use of alternate routes in more detail to see if their selective use would be beneficial to preserving the Oracle Corridor.
5. An Oracle Road Oversight Committee should be established to periodically examine the state of the corridor and monitor its current and future performance. The committee should include representation from Oro Valley, Pima County, Pinal County, and ADOT.
6. Require traffic assessments for new land uses in the study section and into southern Pinal County that examine the impact on corridor operations.
7. Create a coordinating group between northern Pima County agencies and Southern Pinal County agencies to deal with mutual planning and infrastructure issues in an open and cooperative manner.

2.6 CITY OF TUCSON PLANNING DOCUMENTS AND INFORMATION

2.6.1 Oracle-South Sixth Corridor Study, Parsons Brinckerhoff, September 1991, Executive Summary and Final Report

This study investigated the feasibility of various busway and light rail transit alternatives for the Oracle Road - South Sixth Avenue Corridor, which was defined as a one-mile wide corridor between the Tucson Mall and the Tucson International Airport. In addition, the alternatives would be tested that would be compatible with busway and light rail transit alternatives that had been investigated for the Broadway Corridor Study (Phase II). The study analyzed four alternative concepts, which were:

- Oracle Road and South Sixth Avenue combined for light rail transit
- Oracle Road, South Sixth Avenue, and Broadway Boulevard combined for light rail transit
- Oracle Road and South Sixth Avenue combined for a busway
- Oracle Road, South Sixth Avenue, and Broadway Boulevard combined for a busway

The study also investigated three physical alignments north of downtown to the Tucson Mall, including Oracle Road, 10th Avenue, and Stone Avenue. Physical alignments in the southern half of the corridor were also studied.

Conclusions and recommendations from the study included:

- Without a dedicated local funding source for public transit infrastructure, it will be difficult to develop a stable transit program that will sustain growth.

- A near term transit development program should concentrate on enhancing service in the three corridors identified in the report by providing different levels of service as well as more frequent and faster service in peak periods.
- The three corridors identified should be given the highest priority designation as urban transit development corridors and should be specifically directed at increasing transit service.
- It is recommended that major transit investment corridors for the Tucson Metropolitan area use the Oracle Road alignment from Downtown to the Tucson Mall, the South Sixth Avenue alignment from downtown to the Tucson International Airport, and the Broadway Corridor Study alignment. Light rail transit, should be the long-range technology or mode chosen for these corridors.
- The station areas identified in the report should be formally adopted as major transit activity centers or nodes, and specific development plans and zoning should be adopted within a one-half mile radius of the identified intersection. Actions to enhance the nodes were provided. The nodes in SR 77 study area were:
    1. Tucson Mall
    2. Oracle Road/Roger Road
    3. Oracle Road/Prince Road
    4. Oracle Road/Fort Lowell Road
    5. Oracle Road/Grant Road
    6. Oracle Road/Speedway Boulevard

2.7 MISCELLANEOUS INFORMATION PERTINENT TO THE STUDY CORRIDOR

2.7.1 El Tour De Tucson Route Map, 2001

El Tour De Tucson is an annual bicycle race attracting thousands of bicyclists to ride the route, which encircles Tucson. SR 77, between Ina Road and Rancho Vistoso Boulevard, has been used as part of the bike route for this bike race held each November. Although the race is held only once a year, it underscores the importance of bicycle considerations on the corridor.

2.7.2 Oracle Road/Linda Vista Boulevard Traffic Impact Analysis Report, Revision One, PFS Traffic Engineering, LLC, December 20, 1999

This traffic impact study assessed a 14.38 acre site, owned by the Miller Family Trust located on the west side of Oracle Road, from Linda Vista Boulevard to Desert Sky Road with offices, a restaurant, and a drive-in bank. Notations in the report indicated that the bank use might change to a brokerage, which would affect the recommendations noted below. The property has approximately 1,300 feet of frontage along Oracle Road, and three new driveways are proposed to connect Oracle Road. Additionally, three new driveways are proposed to connect to Desert Sky Road and to Linda Vista Boulevard. The initial results of the report indicated that a third lane south bound was need along SR 77 from Desert Sky Road to Linda Vista Boulevard, to be used, initially as a right-turn lane. Along the property fronting Linda Vista Boulevard, it was recommended that the property owner should dedicate additional right-of-way and widen Linda Vista Boulevard to four lanes between Oracle Road and their site driveway. These off -site

improvements will require modifications of the traffic signal installation at Oracle Road/Linda Vista Boulevard. It was also recommended that the existing phasing of the traffic signal be altered so that eastbound and westbound Linda Vista Boulevard is served by the same phase. At Oracle Road and Desert Sky Road, consideration should be given to prohibiting the eastbound left-turn.

2.7.3 Pusch Ridge Christian Academy Traffic Impact Analysis Report, PFS Traffic Engineering, LLC, February 8, 2002

The Pusch Ridge Christian Academy is located on the east side of Oracle Road from Calle Concordia to Linda Vista Boulevard. The academy currently has 325 students, however the master plan anticipates growing through five phases to reach an enrollment of 1,200 students by about 2010. The property currently as three accesses: one is south (via easement) across the parking field of the Canyon del Oro Baptist Church to Calle Concordia. The second is a driveway connection directly to Oracle Road about 0.2 miles north of Calle Concordia. This main entrance (Academy Driveway) provides for right turn in and out of the site. There is no median opening. The third access is a driveway connection to Linda Vista Boulevard some 480 feet east of Oracle Road's east right-of-way line. Access to this driveway is seldom used and is controlled by a padlocked gate. The results of the study indicated that the planned widening of Oracle Road north of Calle Concordia would bring significant benefits to the users of this corridor. Both legs of Linda Vista Boulevard should be widened to provide three approach lanes (left/through/right). Consideration should be given to modifying the existing signal phasing so that east-west through movements occur on the same phase which is then followed by an east-west lagging left-turn phase. The amount of traffic contributed by the academy to the east leg of Linda Vista Boulevard is relatively small. Conversely, if the northeast corner is not developed, no improvement to this leg of Linda Vista Boulevard would be required.

At Oracle Road and Calle Concordia, the approaches of both legs of Calle Concordia should be widened to three lanes. On the west leg, separate left/through/right lanes would be designated. On the east leg, left/through/right lanes may be initially designated, but the potential ultimate designation would be for double left-turn lanes and one through-right turn lane. Since the volumes were dependent on the academy's trip generation rates, it was recommended that the rates be reexamined when the enrollment reaches 700 students, because the east leg of Calle Concordia need not be improved before then. If trip generation rates have not been reduced, a third lane should be added. If trip generation rates have been reduced, timing of the foregoing improvements can be delayed until warranted.

2.8 KEY STAKEHOLDER MEETINGS

Information gathering meetings with personnel from key agency stakeholders along the corridor were conducted early during the study process. Information from each meeting is documented in this section.

2.8.1 Pima Association of Governments

The following summarizes major comments from Pima Association of Governments representatives:

- The Miracle Mile to Fort Lowell Road connection and GSI analyses are to be conducted to determine if these are reasonable projects for the future.
- PAG has peripheral information on developments in Pinal County and wants this study to document all known future developments there.
- Multimodal issues are very important.
- A future transit route, including a major transit facility at Tangerine Road/Oracle Road, to provide transit service from Oro Valley to Raytheon (Bus Rapid Transit or light rail) may be considered. Transit service would probably use SR 77 to Stone Avenue to the Tohono Tadai Transit Center and then provide service to Raytheon.
- There are many demands for and limitations on bicycle and pedestrian facilities on Oracle Road.
- Demographic issues regarding transit and bicycle usage should be included in the study.
- Addition of bike lanes to parallel collector streets is important.
- PAG has daily boarding maps for top 200 bus stops. Several of them occur on Oracle Road.
- The effects of the future connection of La Cholla Boulevard to I-10 will impact circulation on SR 77. A concern was raised about diversion of traffic from Oracle Road to La Cholla Boulevard if La Cholla Boulevard is improved to six lanes.
- La Cañada Drive will possibly be improved to four lanes.
- A future alignment extending La Cholla Boulevard to Oracle Junction should be explored.
- There was a discussion about alternative transit modes including light rail on Oracle Road. PAG is doing a high-capacity corridor study as part of a regional transit study. Comments from PAG's recent public participation effort as part of the RTP indicated that there is a desire for freeways and light rail.

2.8.2 Pima County

The following summarizes major comments from Pima County representatives:

- There are many Pima County projects in the corridor. La Cholla Boulevard is a key corridor. Other important corridors include Wetmore Road/Ruthrauff Road and La Cañada Drive.
- There is concern about what the function of SR 77 will be. PAG's 20-year forecast for Oracle Road is 80,000-90,000 vehicles per day.
- The Ina Road/Oracle Road intersection is severely congested. Westbound traffic backs up almost a mile during peak periods.
- GSI analysis will be done on three high volume intersections (to be selected).
- There was discussion on widening Orange Grove Road.
- The Pima County Traffic Engineer indicated support for the idea of the Fort Lowell/Miracle Mile connection.
- First Avenue should be studied as a north-south "relief valve" up to Ina Road.
- The shoulder-widening project on SR 77 from River Road to Ina Road goes to construction soon.

- There are several Transportation Enhancement projects to improve bicycle and pedestrian facilities. There is a proposed TE project from Roger Road to River Road.
- There are many access and pedestrian crossing safety concerns at the intersection of River Road/Oracle Road.
- ADOT does not have a statewide pedestrian policy. Draft policies are being developed.
- There is no regional north-south or east/west bike route. Oracle Road is the sensible north-south route as indicated by the Tucson/Pima County bike community.
- There are 43 bus stops north of River Road. Most do not have ADOT permits and are not ADA compliant.

2.8.3 City of Tucson

The following summarizes major comments from City of Tucson representatives:

- Access issues are very important along Oracle Road.
- A new Home Depot is planned to be constructed on the east side of Oracle Road between Limberlost Road and Wetmore Road.
- Oracle Road is on 120-second cycle.
- The traffic signal at the Oracle Road/Auto Mall intersection is being revised to provide eight-phase control.
- Transit issues are very important in the corridor. Several jurisdictions are responsible for bus transit in the corridor.
- The Oracle Road/Drachman Street and Speedway Boulevard/Stone Avenue signalized intersections will be redesigned for the future Stone Avenue project. Dual left-turn lanes were proposed at Speedway Boulevard/Main Avenue to encourage traffic to continue south on Oracle Road/Main Avenue to Speedway Boulevard.
- A bus stop program was begun within the City of Tucson.
- Amphitheater School District school buses stop traffic on Oracle Road.
- There have been public comments regarding provision of bike facilities on Oracle Road. There are concerns with trucks and roadway width.
- The City of Tucson is concerned with driveway and other access locations on SR 77.
- A diamond lane was suggested to improve transit, bicycle and access facilities.
- The provision of dual eastbound left-turn lanes at Flowing Wells Road/Miracle Mile should be studied.
- Non-standard median area street lighting on Miracle Mile should be relocated to standard location.
- There may be a possible consideration of making a Florida T configuration at Oracle Road/Miracle Mile/Fort Lowell Road, although there are problems with access with a Florida T.
- The City of Tucson has developed access management policies.
- Several pedestrian issues were discussed including discontinuity on Miracle Mile, pelican vs. hawk signals and quarter mile crossings. There are legal issues addressed regarding

unmarked crosswalks. Quarter mile pelican crossings were suggested. More frequent pelican crossings would cause congestion.

- An alternatives analysis is being conducted for transit on Oracle Road.

2.8.4 Arizona Department of Transportation, Tucson District

The following issues were discussed at a meeting with ADOT Tucson District representatives:

- Bus stops on SR 77 from River Road to Ina Road are not currently permitted and many are not ADA-compliant. ADOT is working with Sun Tran and the Department of Public Safety to improve these conditions. The SR 77, River Road to Ina Road shoulder widening project should mitigate many of these problems.
- There is an enhancement project for sidewalks on Miracle Mile between I-10 and Oracle Road. Sidewalks will be constructed/improved on both sides of Miracle Mile.
- There is another sidewalk project on Oracle Road from Miracle Mile to Prince Road. West side sidewalk improvements including relocating lighting poles and the traffic signal pole at Fort Lowell Road/Oracle Road for ADA compliance.
- The slip ramp on the southwest corner of Miracle Mile/Oracle Road will be removed and a right-turn lane will be put in. This project is based on a proposal from the City of Tucson.
- Some driveways on Miracle Mile will be removed as part of the sidewalk project.
- In the Oracle Road section within the City of Tucson, the City issues all driveway permits for ADOT and they are supposed to fulfill ADOT standards for access. Since the Intergovernmental Agreement (IGA) in 1982, no permits have been provided to ADOT.
- There is a development plan at Limberlost Road/Oracle Road for a new Home Depot.
- It seems that the City of Tucson and the County wants to put traffic on SR 77 rather than onto adjoining cross streets. An example of this is that there is no left-turn arrow for north/south turns at Oracle Road and Limberlost Road because the neighbors want to minimize intrusion onto Limberlost Road. Pima County also denied access onto Chula Vista Road (south of Ina Road) from a new development, so traffic will access the development from two driveways on SR 77. This should not be the responsibility of ADOT to accommodate traffic from Pima County developments.
- There is a provision in the IGA with the County and City that allows ADOT to remove the permit authority with 30 days notice if rules are not followed regarding access requirements.
- ADOT indicated that the project should consider monorail as an alternative.
- Several traffic impact studies have been conducted for developments within the project corridor.

2.8.5 Town of Oro Valley

The following issues were discussed at a meeting with Town of Oro Valley representatives.

- There is a box culvert underneath Oracle Road that is too small. It is located at approximately just south of Pusch View Lane and Oracle Road. Drainage on the east side of the road is affected.

- The land use of the Willow Springs project up on SR 79 toward Florence could have a big impact on Oracle Road. The development is planned to include 15,000 homes plus businesses.
- The traffic being generated from the Oracle area has increased.
- The traffic coming into Catalina from the north is greatly increased. One of the reasons is because the San Manuel mine closed, and residents are commuting south to work.
- Blackhorse Run, off of Golder Ranch Road, is under construction with 540 new homes.
- Another Pima County development is proposed in north of Catalina with 500 homes.
- Eagle Crest, which is in Pinal County, is developing rapidly and 500 or more homes are anticipated to be built.
- Phase II of Saddlebrooke is preparing to build a development of 800 homes.
- It is anticipated that six years from now there will be approximately 3,000 new homes in the Catalina area.
- A Basha's grocery store is under development in Catalina just north of Golder Ranch Road on the east side of SR 77. They are negotiating with ADOT for a driveway access permit. Once they have the permit they will start construction. There will be small shopping complex with Basha's as an anchor, along with a fast food restaurant.
- Wildlife corridors are needed. Pima County has a preserve initiative which would create a connection between the Tortolita Mountains and the Catalina Mountains. There is no designated area where that connection will be, or funding for the connection. The timetable for the initiative for the western portion is being considered by the State Land Department. The eastern portion is on hold by Pima County.
- The first meeting for the Tangerine Road expansion from Oracle Road to First Avenue is coming up in the near future. A hospital is being built at Tangerine Road and Oracle Road. The construction starts early summer 2003. To the south major retail development at Neighborhood 4. That connection is what will be in the design.
- The Oro Valley Parks and Recreation Department's interest is how people are going to travel from the west side of Oracle Road to the east side to trail connections off of Oracle Road.
- Trail corridors are advisable to connect trails from the Canada del Oro Wash to Catalina State Park.
- Equestrian activated crossing buttons are desired at Oracle Road and Linda Vista.
- Sun Tran buses back up traffic at every light at 8:00 AM, which doesn't help capacity. It's a big problem. From Ina Road there is no place for the bus to pullover. Just north there are wide shoulders so they can pull over.
- The Town of Oro Valley would like to promote the use of Park-and-Ride lots. Park-and-Ride facilities could share parking lots with movie theaters, etc. The Home Depot location north of First Avenue and Oracle Road could be a potential Park and Ride location.
- Sidewalks are on private property. It would be preferable to have a 10- to 12-foot multiuse lane along Oracle Road. A separate bike/ped facility would also be advisable, however the available right-of-way has topographical restraints.

2.8.6 Pinal County

Issues raised at the meeting with Pinal County representatives were:

- Willow Springs, which is north of State Route 77/79, is a 4,000 acre development with 20,000 planned homes. This development is planned to open in two years. It is unclear what the access will be to State Route 77.
- Saddlebrooke Ranch is a new development planned to be built.
- Eagle Crest, which is next to Saddlebrooke, is another development that is planned to be built.
- La Osa development is a 14,000 acre development.
- There is a planned development in the Red Rock area near Park Link Drive and I-10.
- The Arizona Bicycle Club uses SR 77 frequently.
- Copper Hills development is under construction.

2.9 KEY ISSUES

Many issues were raised during the key stakeholder meetings, however, three major issues were identified for the SR 77 Corridor that need to be addressed in detail in this corridor profile analysis study. They include the impact of new developments on the corridor, transit availability and expansion on SR 77, and bicycle and pedestrian facility improvements within the corridor. Access conditions and policies in the corridor were also a general concern and are discussed in this section.

2.9.1 Planned Developments

Meeting attendees were generally concerned about the impact new business and residential developments will have on the existing condition of the corridor. While capacity projects have been identified in PAG, ADOT and Pinal County five-year and long-range plans, the general consensus was that even with the implementation of these projects, there is concern that the resultant roadway network may have insufficient capacity to handle the projected travel demand in the corridor.

Within the southern region of the project corridor, new businesses, such as the recent Lowe's and the planned Home Depot stores, both in the vicinity of SR 77 and Limberlost Road, were identified as access concerns. The City of Tucson is working with neighborhoods in the vicinity of these two businesses to reduce the impact of anticipated traffic associated with the businesses on the local street system. ADOT staff has indicated that this would only create additional burden on SR 77 as traffic would be encouraged to avoid the local streets and to access the businesses from Oracle Road.

Many new residential and mixed-used developments are planned or being implemented in Oro Valley. Major developments in this vicinity are the Rooney Ranch and Rooney Ranch South mixed use developments, the Steam Pump Village mixed use development, Kelly Ranch, Rancho Vistoso Commercial, and Rancho Vistoso Technology Park. In addition, Black Horse Ranch is a large residential development planned in Catalina.

North of the Pima County line into Pinal County, there are four major developments that are predicted to impact capacity on SR 77. Eagle Crest Ranch is a primarily residential community with over 900 dwelling units planned along with a major grocery store and a new school. Saddlebrooke is an existing age-restricted community north of the Pima County line, just east of SR 77, which is being expanded to include an additional 769 dwelling units. Saddlebrooke Ranch is a new community planned north of the SR 77/SR 79 junction, with over 6000 dwelling units and 150 acres of commercial, industrial and resort uses.

The Willow Springs community is being developed north of the SR 77/SR 79 junction. This master planned community will have over 8,500 dwelling units on 4600 acres, and 3,500 commercial and industrial employees are envisioned for the businesses at Willow Springs.

Stakeholder meeting attendees were concerned about the impact the Pinal County developments would have on SR 77 in Pima County. Although primary access to the State Highway system will be to SR 79 from Willow Springs, southbound traffic will merge onto SR 77 at the SR 77/SR 79 junction.

2.9.2 Transit Issues

The Transit Element of the 2030 PAG Regional Transportation Plan (The PAG Transit Study) was underway at the same time as this corridor study. The PAG Transit Study is a comprehensive examination of potential public transportation improvements through the year 2030. The results of this study were incorporated into the PAG 2030 Regional Transportation Plan as amended.

Many of the public agencies stakeholders identified transit service availability as an important issue in the corridor. PAG staff indicated that the investigation of future transit services and facilities along the corridor was a primary consideration in developing the scope of work for this corridor study with ADOT. Transit alternatives to fixed route service were discussed, such as express bus and light rail. The possibility of providing an exclusive bus lane/right-turn lane along Oracle Road was also discussed.

An important issue raised at the meetings is the provision of a future transit route that would serve Raytheon workers living in Oro Valley. According to PAG, there are over 900 Raytheon employees living in Oro Valley. Residents in Catalina have also expressed interest in extending transit service farther north than its current availability.

Regional transit commuters today have no direct express transit service to downtown Tucson from Oro Valley. Riders must now transfer at the Tohono Tadai which adds several minutes to the commute. Northbound routes (Sun Tran Routes #16 and #62) must detour from Oracle Road at Wetmore to serve the Tohono Tadai Transit Center.

2.9.3 Bike and Pedestrian Issues

Bicycle and pedestrian facilities were discussed at each of the agency stakeholder meetings. Within the City of Tucson, sidewalks (or the lack of sidewalks) were discussed as were existing bicycle facilities on SR 77. ADOT rates SR 77 as having a “more suitable” designation for bicycle facilities, indicating that the current condition of bike facilities is acceptable with wide

enough shoulders, and feasibility for shoulder widening where there are not wide enough shoulders. The segment of SR 77 between Roger Road and River Road still lacks a wide shoulder for bicyclists to ride on comfortably, however. A shoulder widening project is currently in process on SR 77 between River Road and Ina Road which will widen the shoulders by seven feet in both northbound and southbound directions.

2.9.4 Access Issues

The SR 77 corridor exhibits practically every type and degree of access issue due to the varying roadway cross sections and different types of development through the length of the study area. Access issues include the growing traffic, need to control direct access to many driveways, left-turn vehicle conflicts, need for separation of turning movements, cross traffic conflicts, conflicts due to decelerating vehicles, and pedestrian/vehicle conflicts. Pedestrian facilities along the corridor vary from non-existent to narrow, often discontinuous sidewalks. Opportunities for pedestrians crossing the roadway are very limited. Also, sections with limited access management exhibit vehicle/pedestrian conflicts. The existing roadways have very limited opportunities to accommodate transit stops along the corridor.

Access issues were identified as being very important by the participants in the key stakeholder meetings. Although not identified specifically as "access issues", concerns related to pedestrian, bicyclist and transit user activities, new development plans and roadway construction and improvement projects influence the flow of traffic in the corridor, including the ability of users to access the corridor.

The development of access strategies along the corridor must be guided by clear access goals, concepts, and principles. As part of this study, and to respond to the concerns regarding access issues in the corridor from the key stakeholder meetings and the other public participation activities associated with this project, a corridor access management master plan will be developed to define the access concepts and principles for the varying cross sections along the corridor for existing and future land use.

3. SOCIOECONOMIC ENVIRONMENT

This chapter presents the socioeconomic environment along the SR 77 corridor. Included are discussions on the population and employment characteristics and projections, and Title VI and Environmental Justice Considerations.

3.1 EXISTING AND PROJECTED POPULATION

The land within the corridor is divided between rural in the northeastern portion of the corridor and urban in the southern portion, within the urbanized areas of Tucson, Oro Valley, and Catalina. Exhibit 3-1 shows the current population of the counties and communities. The year 2002 total population in the two counties is approximately 1.06 million persons.

Exhibit 3-1
CURRENT POPULATION STATISTICS FOR COUNTIES AND COMMUNITIES IN THE SR 77 CORRIDOR

Geographic Area	Population		Annual Growth Rate
	1990	2002	1990-2002
Pinal County	116,379	190,140	4.3%
Pima County	666,880	890,545	2.4%
Oracle	3,043	3,814	1.9%
Catalina	4,864	7,414	3.6%
Oro Valley	6,670	34,050	14.6%
Tucson	405,390	507,085	1.9%

Source: U.S. Census Bureau and Arizona Department of Economic Security, Population Statistics Unit

Pinal County and Pima County are expected to be among the fastest growing counties in the nation. Exhibit 3-2 shows the Arizona Department of Economic Security population forecasts for select years through the year 2030. Projections for the community of Catalina were not available. The two counties are forecast to have a total population of over 1.6 million persons, an increase of 47 percent over year 2002 estimates. Oracle and Oro Valley are projected to have high growth rates through the year 2030.

3.2 EMPLOYMENT LEVELS

Exhibit 3-3 presents labor force data for the major communities. Unemployment rates have ranged from 1.6 percent to 6.5 percent within the corridor counties and communities within the last 10 years.

3.2 TITLE VI AND ENVIORNMENTAL JUSTICE CONSIDERATIONS

Title VI of the Civil Rights Act of 1964 and related statutes assure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination on the basis of race, color, national origin, age, sex, or disability. Executive Order 12898 on Environmental Justice directs that programs, policies, and activities not have a disproportionately high and

Exhibit 3-2
FUTURE POPULATION PROJECTIONS FOR COUNTIES AND COMMUNITIES IN THE SR 77 CORRIDOR

	Population				Increase	
Geographic Area	2002	2005	2015	2030	2002-2030	Annual
Pinal County	190,140	246,660	486,363	852,463	348.3%	5.5%
Pima County	890,545	957,635	1,175,967	1,442,420	65.7%	1.7%
Oracle	3,814	5,687	7,048	8,596	125.4%	2.9%
Catalina	7,414	N/A	N/A	N/A	N/A	N/A
Oro Valley	34,050	39,400	51,228	68,914	102.4%	2.6%
Tucson	507,085	529,770	565,736	631,889	24.6%	0.2%

Sources: U.S. Census Bureau and Arizona Department of Economic Security, Population Statistics Unit

Exhibit 3-3
LABOR FORCE STATISTICS FOR COUNTIES AND COMMUNITIES IN THE SR 77 CORRIDOR

	1993			2001		
Geographic Area	Civilian Labor Force	Total Employed	Unemploy-ment Rate	Civilian Labor Force	Total Employed	Unemploy-ment Rate
Pinal County	45,054	42,141	6.5%	72,188	68,801	4.7%
Pima County	328,939	315,636	4.0%	415,242	400,683	3.5%
Oracle	1,209	1,185	2.0%	1,665	1,639	1.6%
Catalina*	1,430	1,335	6.6%	2,454	2,370	3.4%
Oro Valley	3,322	3,232	2.7%	3,973	3,881	2.3%
Tucson	204,697	195,548	4.5%	244,151	234,825	3.8%

Sources: U.S. Census Bureau and Arizona Department of Economic Security, Population Statistics Unit.
*Catalina data available for Year 1991 and Year 2001

adverse human health and environmental effect on minority and low-income populations. Alternative transportation improvements should not adversely impact such groups disproportionately. Moreover, an array of alternatives should be developed which provide transportation service to all groups.

ADOT has issued the document, *Guidance on Title VI and Environmental Justice*, to provide information on ensuring that Title VI and Environmental Justice factors are considered in project development, Environmental Assessments, and Environmental Impact Statements. Although the document is for projects in the development and environmental stages, the general approach outlined in the document is used here to identify related issues for potential projects analyzed in the planning process.

Demographic data from the 2000 Census was used to screen the populations of each jurisdiction within the SR 77 corridor and identify those areas with high minority, low income, disabled and elderly (over the age of 65) populations. Data indicating which portions of the corridor study area aggregated by census block groups exceed the PAG region averages for each category are graphically presented in Exhibits 3-4 through 3-7.

Many communities within the SR 77 corridor have high populations of minorities living below the average regional low-income level. Furthermore, many of these areas have high populations of elderly persons. Therefore, Title VI and Environmental Justice factors need to be considered for transportation projects within the corridor.

Data on the number and percentage of elderly, disabled and low income persons are presented in Exhibit 3-8. Persons over the age of 65 were considered elderly. Data on the number and percentage of minorities in the corridor area are presented in Exhibits 3-9 and 3-10.

Transportation improvement options, presented later in this document, and recommendations were screened for the possibility of disproportionately affecting minority, disabled, elderly and/or low-income populations. This is discussed in the evaluation of environmental issues and constraints for the recommended projects.

Exhibit 3-4
SR 77 CORRIDOR MINORITY POPULATION
EXCEEDING REGIONAL AVERAGE

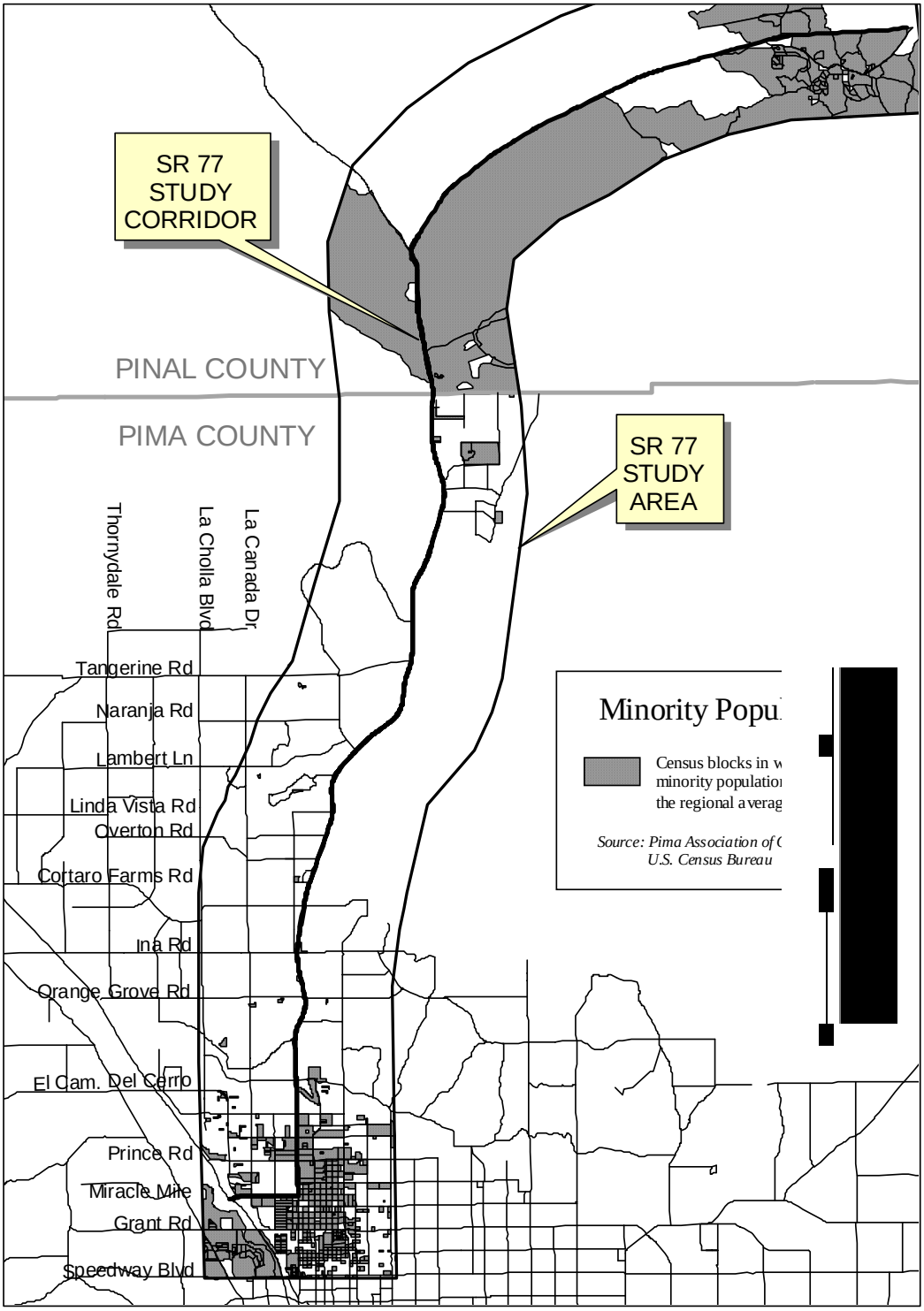


Exhibit 3-5
SR 77 CORRIDOR ELDERLY POPULATION
EXCEEDING REGIONAL AVERAGE

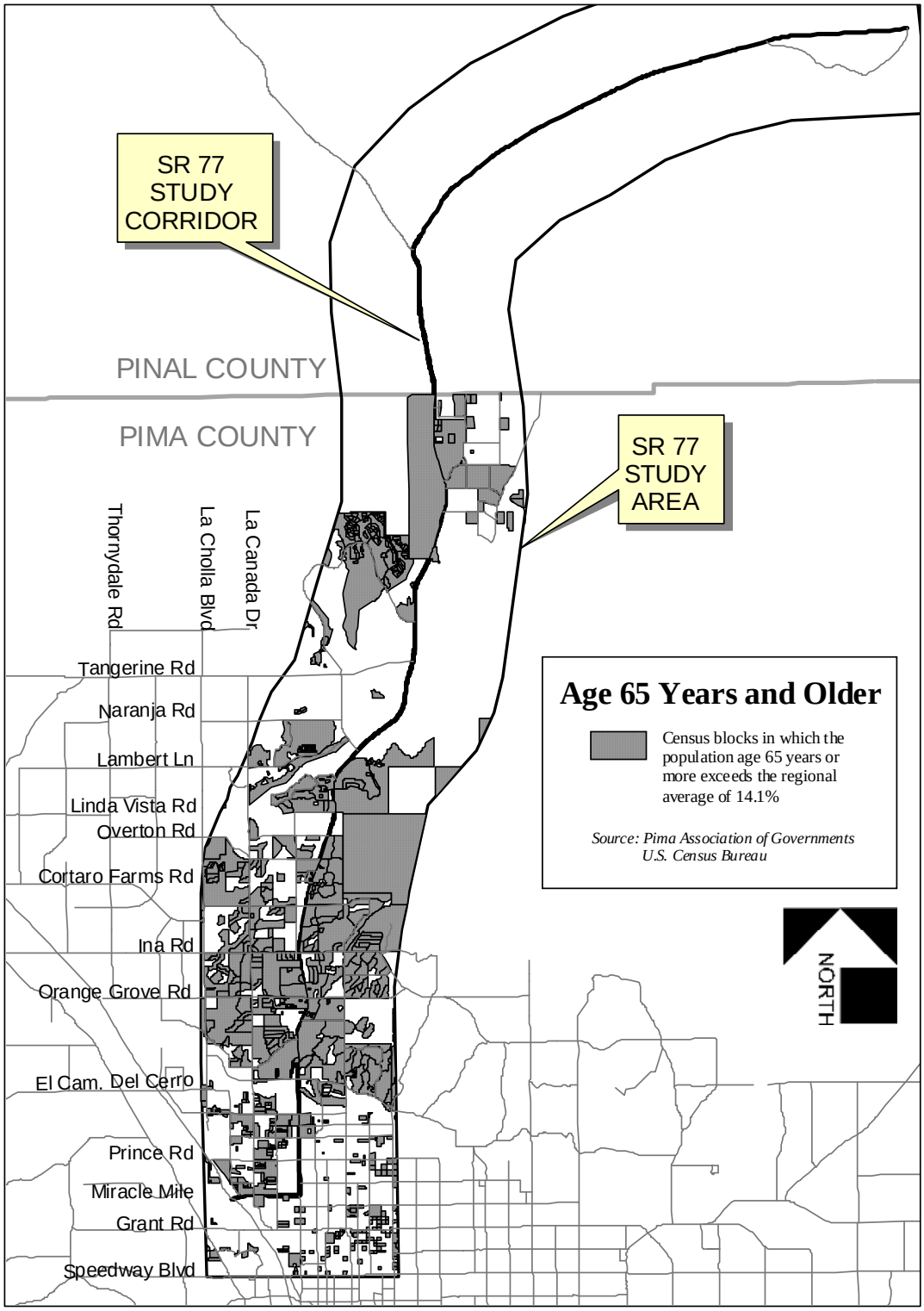


Exhibit 3-6
SR 77 CORRIDOR DISABLED PERSONS POPULATION
EXCEEDING REGIONAL AVERAGE

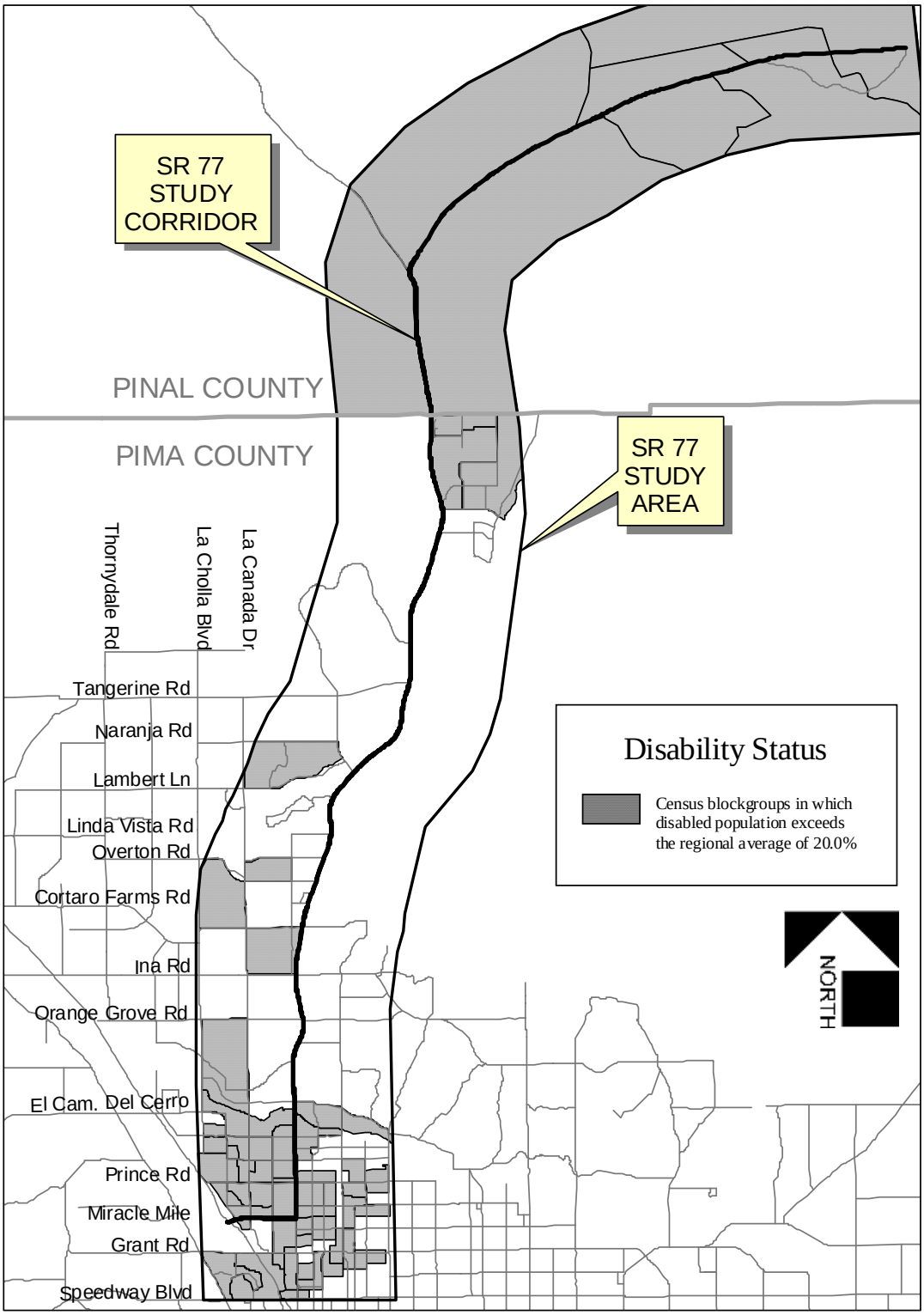


Exhibit 3-7
SR 77 CORRIDOR LOW INCOME POPULATION
EXCEEDING REGIONAL AVERAGE

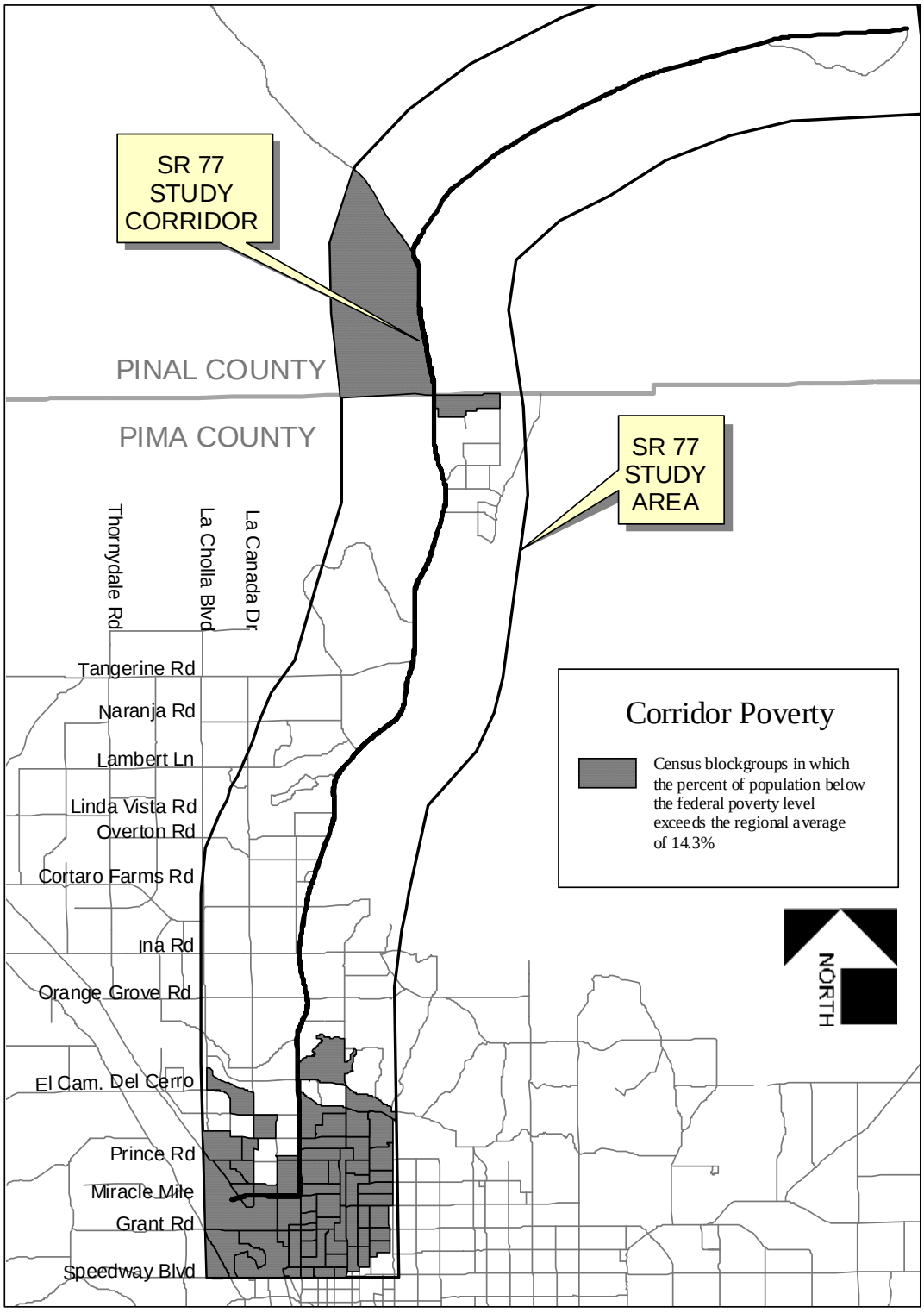


Exhibit 3-8
AGE, DISABLED, AND LOW-INCOME POPULATION DISTRIBUTION FOR AREAS WITHIN THE SR 77 CORRIDOR

Geographic Area	Population over Age 65	Percent over Age 65	Disabled Population	Percent Disabled	Population Below Poverty Level	Percent Below Poverty Level
Pinal County – All	29,116	16.2%	35,207	22.5%	27,816	16.9%
Pinal County – Corridor	883	19.8%	5,064	45.1%	791	17.7%
Pima County – All	119,812	14.2%	155,566	20.1%	120,778	14.7%
Pima County - Corridor	25,539	16.8%	28,961	21.2%	24,236	16.8%
County Line to Ina Road*	10,450	23.1%	7,192	17.3%	2,210	5.1%
Ina Road to River Road*	5,337	23.4%	4,598	18.5%	2,269	8.8%
River Road to Speedway Boulevard*	9,752	11.6%	17,171	24.5%	19,757	26.4%

*Within SR 77 Corridor Study Area
Sources: U.S. Census Bureau and Pima Association of Governments

Exhibit 3-9
DISTRIBUTION OF MINORITIES BY POPULATION FOR AREAS WITHIN THE SR 77 CORRIDOR

Geographic Area	Race							
	White, Not Hispanic	African American	American Indian	Asian, Pacific Islander	Other	Hispanic Any	Total Minority Population	Total Population
Pinal County – All	105,641	4,958	14,034	1,232	28,149	52,671	74,086	179,727
Pinal County – Corridor	2,948	8	55	25	630	1,408	1,510	4,458
Pima County – All	518,720	25,594	27,178	18,301	112,217	247,578	210,359	843,746
Pima County – Corridor	105,989	3,811	3,071	4,331	14,982	33,106	45,930	151,919
County Line to Ina Road*	38,635	458	255	762	1,535	4,840	6,698	45,333
Ina Road to River Road*	19,025	350	160	683	610	2,365	3,816	22,841
River Road to Speedway Boulevard*	48,329	3,003	2,656	2,886	12,837	25,901	35,416	83,745

*Within SR 77 Corridor Study Area
Source: U.S. Census Bureau and Pima Association of Governments

Exhibit 3-10
DISTRIBUTION OF MINORITIES BY PERCENTAGE FOR AREAS WITHIN THE SR 77 CORRIDOR

Geographic Area	Percentage of Race Per Area						
	White, Not Hispanic	African American	American Indian	Asian, Pacific Islander	Other	Hispanic Any	Total Minority Population
Pinal County – All	58.8	2.8	7.8	0.7	15.7	29.9	41.2
Pinal County - Corridor	66.1	0.2	1.2	0.6	14.1	31.6	33.9
Pima County – All	61.5	3.0	3.2	2.1	13.3	29.3	38.5
Pima County – Corridor	69.8	2.5	2.0	2.9	9.9	21.8	30.2
County Line to Ina Road *	85.2	1.0	0.6	1.7	3.4	10.7	14.8
Ina Road to River Road*	83.3	1.5	0.7	3.0	2.7	10.4	16.7
River Road to Speedway Boulevard*	57.7	3.6	3.2	3.4	15.3	30.9	42.3

*Within SR 77 Corridor Study Area
Source: U.S. Census Bureau and Pima Association of Governments

4. PHYSICAL AND NATURAL ENVIRONMENT

This chapter identifies the pertinent environmental characteristics of the SR 77 Corridor. It also provides a basis for an environmental screening of the corridor to identify environmental constraints.

4.1 GENERAL TOPOGRAPHY, VEGETATION, AND CHARACTER OF THE CORRIDOR

The SR 77 Corridor is part of the Basin and Range physiographic province, one of the three geological provinces in Arizona. Basin and Range topography is characterized by mountain ranges that trend northeast-southwest, separated by deeply in-filled valleys. The SR 77 Corridor passes through a valley flanked by the Tortolita Mountains to the west and the Santa Catalina Mountains to the east; both are classified as metamorphic core complex ranges. The SR 77 Corridor gradually, but steadily, increases in elevation from approximately 2,300 feet at the southern terminus (Tucson) to approximately 4,200 feet (Oracle), and vegetation in the corridor changes along this elevational gradient. The southernmost portion of the corridor is surrounded by the City of Tucson. The corridor crosses the Rillito River within the city limits. Continuing north, the corridor passes through areas of native vegetation typical of the Arizona Upland Subdivision of the Sonoran Desert. This biotic community is characterized by saguaro, palo verde, mesquite, brittlebush, and various other cacti and annual species. The Towns of Oro Valley and Catalina also are located within this biotic community. At the junction of SR 77 and SR 79, the vegetation shifts to semi-desert grassland, with an increase in the abundance of mesquite. Other common plants of this biotic community include soaptree yucca and various grass species. As the corridor approaches Oracle, oak and pinyon pine trees become part of the vegetation composition. Exhibit 4-1 shows a list of the common plants along the SR 77 Corridor.

Invasive, non-native plants are common along the SR 77 Corridor. The most pervasive species include buffelgrass, fountain grass, and Lehmann's lovegrass. These grasses can have many ecological ramifications, including competition with native species, change in species composition, and change in fire disturbance regime. These species are all hardy perennial bunchgrasses that fill the areas between widely-spaced native species, creating fuel for fire. These species are fire-adapted, which means that after a fire, they can dominate the landscape and exclude native Sonoran Desert species, which are not fire-adapted. This is of concern in transportation projects because vehicle traffic increases human-caused fire potential.

4.2 WILDLIFE

The habitats in the corridor support numerous smaller mammals, birds, and reptiles. Exhibit 4-2 lists common fauna associated with each biotic community.

4.3 SPECIAL STATUS SPECIES AND HABITATS

In the state of Arizona, there are 52 species of plants and animals that are listed as threatened or endangered by the U. S. Fish and Wildlife Service (USFWS). These species and their habitats

Exhibit 4-1
COMMON PLANTS ALONG THE SR 77 CORRIDOR

Scientific Name	Common Name	Scientific Name	Common Name
Acacia constricta	White-thorn acacia	*Larrea divaricata*	Creosote
Acacia greggii	Catclaw acacia	*Lycium* sp.	Wolfberry
Acourtia nana	Desert holly	*Lupinus sparsiflorus*	Lupine
Agave sp.	Agave	*Mammillaria* sp.	Pincushion cactus
Ambrosia confertiflora	Slimleaf bursage	***Melilotus indicus***	**Yellow sweetclover**
Ambrosia deltoidea	Triangle leaf bursage	*Mentzelia sp.*	Stickleaf
Ambrosia dumosa	White bursage	*Opuntia acanthocarpa*	Staghorn cholla
Argemone gracilenta	Prickle poppy	*Opuntia arbuscula*	Pencil cholla
Aristida purpurea	Purple three awn	*Opuntia bigelovii*	Teddybear cholla
Aristida ternipes	Poverty three awn	*Opuntia engelmannia*	Engelmann's prickly pear
Atriplex canescens	Four-wing saltbush	*Opuntia fulgida*	Jumping cholla
Baccharis sarothroides	Desert broom	*Opuntia leptocaulis*	Christmas cholla
Baileya multiradiata	Desert marigold	***Opuntia* sp.**	**Exotic prickly pear**
Brickellia coulteri	Coulter's brickellbush	*Opuntia spinosior*	Cane cholla
Calliandra eriophylla	Fairy duster	*Parkinsonia florida*	Blue paloverde
Carnegiea gigantea	Saguaro	*Parkinsonia microphylla*	Foothills paloverde
Celtis pallida	Desert hackberry	***Pennisetum ciliare***	**Buffelgrass**
Chorizanthe rigida	Desert spiny herb	***Pennisetum setaceum***	**Fountain grass**
Cirsium neomexicanum	New Mexico thistle	*Phoradendron californica*	Mistletoe
Cynodon dactylon	**Bermuda grass**	*Pinus edulis*	Pinyon pine
Datura sp.	Sacred datura	*Porophyllum gracile*	Odora
Dasilyrion wheeleri	Sotol	*Prosopis velutina*	Velvet mesquite
Ditaxis sp.	Ditaxis	*Psilostrophe cooperi*	Paperflower
Echinocereus sp.	Hedgehog cactus	*Quercus sp.*	Oak
Encelia farinosa	Brittlebush	***Salsola iberica***	**Russian thistle**
Ephedra trifurca	Mormon tea	*Simmondsia chinensis*	Jojoba
Ericameria laricifolia	Turpentine bush	***Sorghum halapense***	**Johnson grass**
Erionueron pulchellum	Fluff grass	*Sphaeralcea* sp.	Globemallow
Erodium cicutarium	**Filaree**	*Sporobolis airoides*	Sand dropseed
Euphorbia sp.	Spurge	*Trixis californica*	Trixis
Ferocactus wislizenii	Fishhook barrel cactus	*Verbena gooddingii*	Goodding verbena
Fouquieria splendens	Ocotillo	*Zinnia pumila*	Desert zinnia
Gutierrezia sarothrae	Snakeweed	*Ziziphus obtusifolia*	Graythorn
Heteropogon contortus	Tanglehead		
Heterotheca subaxillaris	Telegraph plant		
Hibiscus coulteri	Desert hibiscus		
Isocoma tenuisecta	Burrowweed		
Jatropha cardiophylla	Limberbush		
Krameria sp.	Range ratany		

Species in **bold type** are non-native, invasive species.

Exhibit 4-2
COMMON FAUNA

Biotic Community	Common Fauna
Arizona Upland Sonoran Desertscrub	Mule deer, Sonoran pronghorn, javelina, jackrabbit, cottontail, Harris antelope squirrel, red-tailed hawk, mourning dove, cactus wren, lesser nighthawk, cactus mouse, Harris's Hawk, western whiptail, Sonoran desert tortoise.
Semidesert Grassland	Black-tailed prairie dog, meadow lark, northern Aplomado falcon*, quail, red-tailed hawk, whooping crane*, rattlesnake, Sonoran desert tortoise, western yellow bat.

* Denotes sensitive species

are protected by the Endangered Species Act (ESA) of 1973, and must be considered prior to development. Consultation with the USFWS may be required if development will impact any of these species or designated critical habitat. Exhibit 4-3 (see next page) presents the combined Pinal and Pima County lists of Threatened and Endangered Species; there are 18 Listed Endangered, 5 Listed Threatened, 1 Proposed Endangered, 1 Proposed Threatened, and 3 Candidate species in these two counties. Candidate species are not offered protection under the ESA, however they should be considered in the planning process. Specific habitat requirements such as elevation or a permanent water source may exclude many of the species listed for the SR 77 Corridor. Further analysis will be required to determine which species may be impacted by construction. **Note that at the time this study was being completed, the Cactus Ferruginous Pygmy Owl (CFPO) was de-listed, but there was a pending injunction request with the court to block the de-listing. The Pygmy Owl may become listed again, and impacts to the Owl should be considered. The SR 77 corridor is in a CFPO survey zone 2 where suitable, but unoccupied habitat is present.**

The Arizona Game and Fish Department (AGFD) Heritage Data Management System documents the known locations of special status species in the state and seven special status species were identified by AGFD that are known to occur within the vicinity of the project area. Exhibit 4-4 lists these special status species. AGFD did not offer any specific recommendations regarding these species at this time: however, these species will be addressed during the design of specific projects and mitigated for if necessary. The Heritage Data Management System can be used as a guide of potential species and habitats that have been documented in the SR 77 Corridor. It is important to note that other species may occur in the areas that have not yet been documented.

4.4 NATIONAL PARKS, MONUMENTS, AND WILDLIFE REFUGES

The National Park Service (NPS) does not administer any parcels within the project area. The closest NPS land is the Tucson Mountain District of Saguaro National Park, west of I-10 at milepost 248 northwest of Tucson. There are no National Wildlife Refuges within the vicinity of the project area.

4.5 WILD AND SCENIC RIVERS

A review of the "Arizona Statewide Wild and Scenic Rivers Final Legislative Environmental Impact Statement" (U.S. Department of Interior, Bureau of Land Management, December 1994)

Exhibit 4-3
US FISH AND WILDLIFE SERVICE THREATENED AND ENDANGERED SPECIES LIST FOR PINAL AND PIMA COUNTIES, ARIZONA

LISTED ENDANGERED

Common Name	Scientific Name	County
Arizona hedgehog	*Echinocereus triglochidiatus* var. *arizonicus*	Pinal
Cactus ferruginous pygmy owl[1]	*Glaucidium brasilianum cactorum*	Both
California brown pelican	*Pelecanus occidentalis californicus*	Both
Desert pupfish	*Cyprinodon macularius*	Both
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	Both
Huachuca water umbel	*Lilaeopsis schaffneriana* ssp. *recurva*	Pima
Jaguar	*Panthera onca*	Pima
Kearney blue star	*Amsonia kearneyana*	Pima
Lesser long-nosed bat	*Leptonycteris cursoae yerbabuenae*	Both
Masked bobwhite	*Colinus virginanus ridgewayi*	Pima
Mexican gray wolf	*Canis lupus baileyi*	Pima
Nichol Turk's head cactus	*Echinocactus horizonthalonius* var. *nicholii*	Both
Ocelot	*Leopardus pardalis*	Pima
Pima pineapple cactus	*Coryphantha scheeri* var. *robustispina*	Pima
Razorback sucker	*Xyrauchen texanus*	Pinal
Sonoran pronghorn	*Antilocapra americana sonoriensis*	Pima
Southwestern willow flycatcher	*Empidonax trailii extimus*	Both
Yuma clapper rail	*Rallus longirostris yumanensis*	Pinal

LISTED THREATENED

Common Name	Scientific Name	County
Bald eagle	*Haliaeetus leucocephalus*	Both
Chiricahua leopard frog	*Rana chiricahuensis*	Pima
Loach minnow	*Tiargoa cobitis*	Both
Mexican spotted owl	*Strix occidentalis lucida*	Both
Spikedace	*Meda fulgida*	Both

PROPOSED ENDANGERED

Common Name	Scientific Name	County
Gila chub	*Gila intermedia*	Both

PROPOSED THREATENED

Common Name	Scientific Name	County
Mountain plover	*Charadrius montanus*	Both

CANDIDATE

Common Name	Scientific Name	County
Acuña Cactus	*Echinocactus erectocentrus var. acuñensis*	Both
Sonoyta mud turtle	*Kinostemon sonoriense longifemorale*	Pima
Yellow-billed cuckoo	*Coccyzus americanus*	Both

[1] At the time that this study was being completed (June 2007), the Pygmy Owl was de-listed, but may become listed again.

Exhibit 4-4
ARIZONA GAME AND FISH DEPARTMENT SPECIAL STATUS SPECIES KNOWN TO OCCUR IN THE VICINITY OF THE CORRIDOR AREA

Common Name	Scientific Name	Status
Arizona metalmark	*Calephelis rawsonii arizonensis*	S (USFS)
California leaf-nosed bat	*Macrotus californicus*	SC, S (BLM), WSC
Thornber fishhook cactus	*Mammillaria thornberi*	SR
Pima Indian mallow	*Abutilon parishii*	SC, S (USFS), SR
Sonoran Desert tortoise	*Gopherus agassizii* (Sonoran population)	SC, WSC
Lowland leopard frog	*Rana yavapaiensis*	SC, S (USFS), WSC
Giant spotted whiptail	*Cnemidophorus burti stictogrammus*	SC, S (BLM), WSC

Status Definitions

WSC: Wildlife of Special Concern in Arizona. Species whose occurrence in Arizona is or may be in jeopardy, or with known perceived threats or population declines, as described by the AGFD's listing of **Wildlife of Special Concern in Arizona** (WSCA, in prep.) Species included in WSCA are currently the same as those in **Threatened Native Wildlife in Arizona** (1988).

SC: Species of Concern. The terms "Species of Concern" or "Species at Risk" should be considered terms-of-art that describe the entire realm of taxa whose conservation status may be of concern to the USFWS, but neither term has official status (currently all former C2 species).

S: Sensitive. Species classified as "sensitive" when occurring on lands managed by U.S. Forest Service (USFS) or Bureau of Land Management (BLM).

SR: Salvage Restricted. Arizona Native Plant Law (1999) requires a permit for collection.

found no established or suitable wild and scenic rivers within or near the SR 77 corridor. The only designated wild and scenic river in the state of Arizona is the Verde River in Yavapai and Gila counties in northern Arizona.

4.6 WILDERNESS AREAS

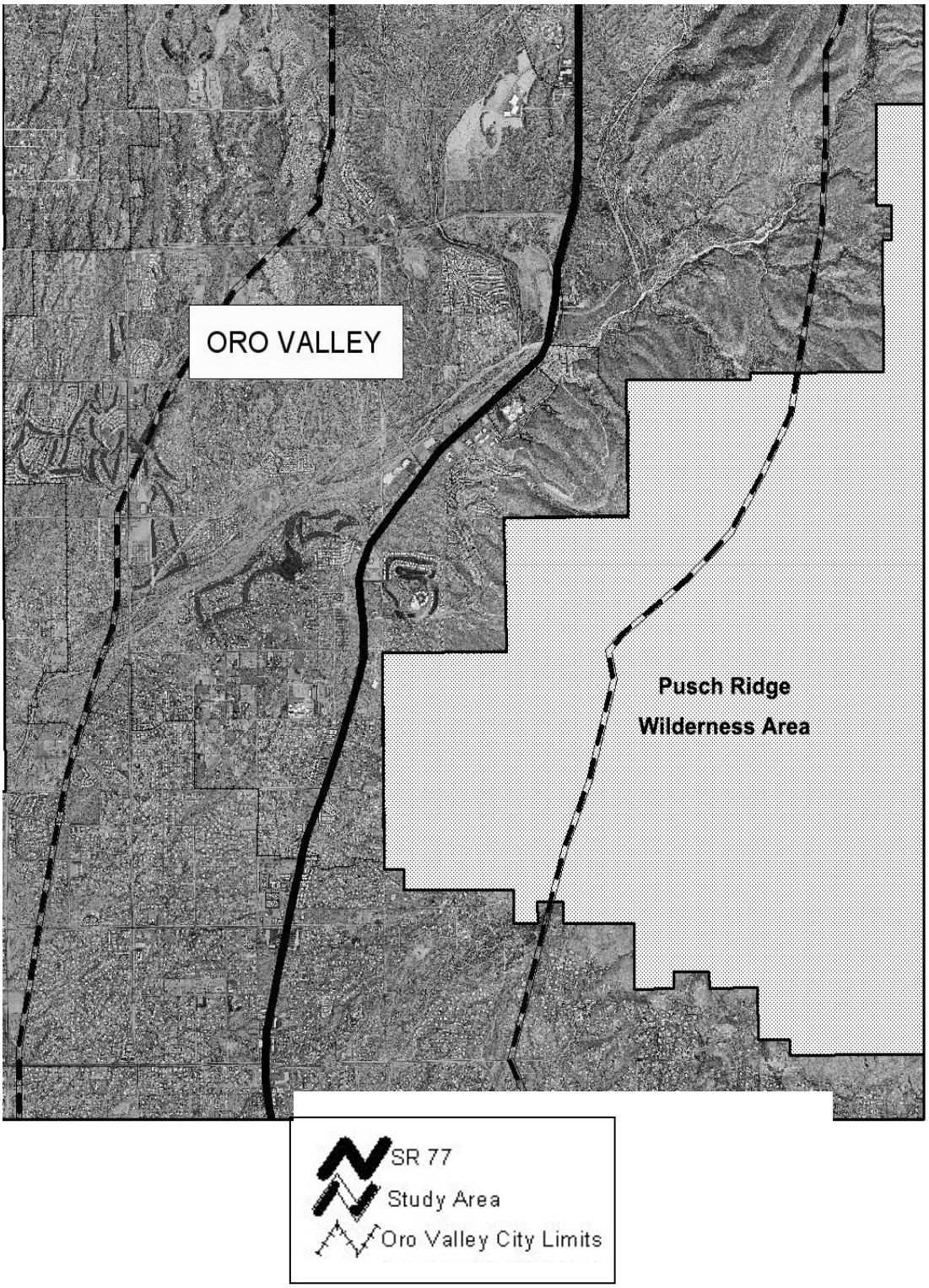
The National Wilderness Preservation Act of 1964 protects and preserves such designated lands by prohibiting human facilities such as roads, power lines, and other development on these lands. It was enacted as a means of protecting what remains of irreplaceable natural resources. The Pusch Ridge Wilderness Area of the Coronado National Forest (CORONADO NATIONAL FOREST) (Santa Catalina Ranger District) is located just east of State Route 77, in the vicinity of Oro Valley (Exhibit 4-5). This wilderness area is among the most biologically diverse in the nation. The SR 77 Corridor includes approximately 5.5 square miles (3,565 acres) of the Pusch Ridge Wilderness Area and six square miles (3,990 acres) of the adjacent Catalina State Park.

4.7 UNIQUE WATERS AND SOLE SOURCE AQUIFERS

The Arizona Department of Water Resources (ADWR) regulates groundwater use in five Active Management Areas (AMAs) in the state. These AMAs were established pursuant to the Arizona Groundwater Code (1980) which stipulates conservation requirements for municipal and agricultural water use. The Tucson AMA covers 3,866 square miles in three southeastern

Arizona counties: Pima, Pinal, and Santa Cruz, and includes the incorporated cities and towns of Tucson, South Tucson, Oro Valley, Marana, and Sahuarita. There are two groundwater sub-basins in the AMA, the Avra Valley Sub-basin and the Upper Santa Cruz Sub-basin north of the Pima/Santa Cruz County line.

Exhibit 4-5
PUSCH RIDGE WILDERNESS AREA



The statutory goal of the Tucson AMA is to achieve "safe yield" by 2025. Safe yield means that the amount of groundwater pumped from the aquifer annually must not exceed the amount that is naturally or artificially recharged. The primary water supply for the Tucson AMA is groundwater from the Upper Santa Cruz and Avra Basin Aquifer. Depth to groundwater in Tucson has declined 170 feet since 1940, creating a large cone of depression. Water usage is roughly 50 percent municipal, 30 percent agricultural and 20 percent industrial.

The Upper Santa Cruz and Avra Basin Aquifer were designated as a sole source aquifer (SSA) by the U. S. Environmental Protection Agency (EPA) on 24 January 1984 (49 CFR 2948). The area covered by the aquifer is shown on the EPA Region 9 SSA Map. A sole source aquifer supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s) which could physically, legally, and economically supply all those who depend upon the aquifer for drinking water. Proposed federally financed projects which have the potential to contaminate the designated sole source aquifer are subject to EPA review, which may lead to recommendations or additional pollution prevention requirements as a condition of funding.

4.8 LAKES, RIVERS, CREEKS, AND WETLANDS

The SR 77 Corridor encompasses portions of two major watersheds in southeastern Arizona, the Santa Cruz and the San Pedro rivers. A majority of the project is located within the upper Santa Cruz River watershed, and minimal portion (near Oracle, Arizona) contains tributaries of the upper San Pedro River watershed.

The headwaters of the Santa Cruz River are located in the mountains of northern Sonora, Mexico. The river begins by flowing southward, then turns and flows northward, crossing the International Border into Arizona. It continues its course northward through Tubac and Tucson toward the Gila River at Casa Grande. Two main tributaries of the Santa Cruz River, the Cañada del Oro Wash and the Rillito River, are located within the SR 77 Corridor (Exhibit 4-6).

The San Pedro River, like the Santa Cruz River, originates in Sonora, Mexico and flows from south to north into Arizona. It joins the Gila River at Winkelman, Arizona, after traversing northwesterly through Cochise County.

A number of washes are located in the vicinity of the corridor (listed in Exhibit 4-7). According to Pima County records, the following perennial streams are located in the SR 77 Corridor: portions of Cañada del Oro Wash, Honey Bee Canyon, and Romero Canyon. Intermittent washes identified by Pima County include portions of Cañada del Oro Wash, Pima Canyon, two reaches of Romero Canyon, Santa Cruz River, and Sutherland Wash (PAG 2000).

A few streams of Pinal County also are located within the corridor. In the Pinal County Comprehensive Plan, it is stated that all surface waters in Pinal County are ephemeral. An ephemeral stream is defined as "A stream that flows briefly and only in direct response to local precipitation, and whose channel is always above the water table." There are two ephemeral washes in Pinal County that are located within the SR 77 Corridor: Big Wash and Twenty-seven Wash. The U.S. Army Corps of Engineers (Corps) has jurisdiction over the "waters of the

Exhibit 4-6
DRAINAGES AND RIPARIAN AREAS

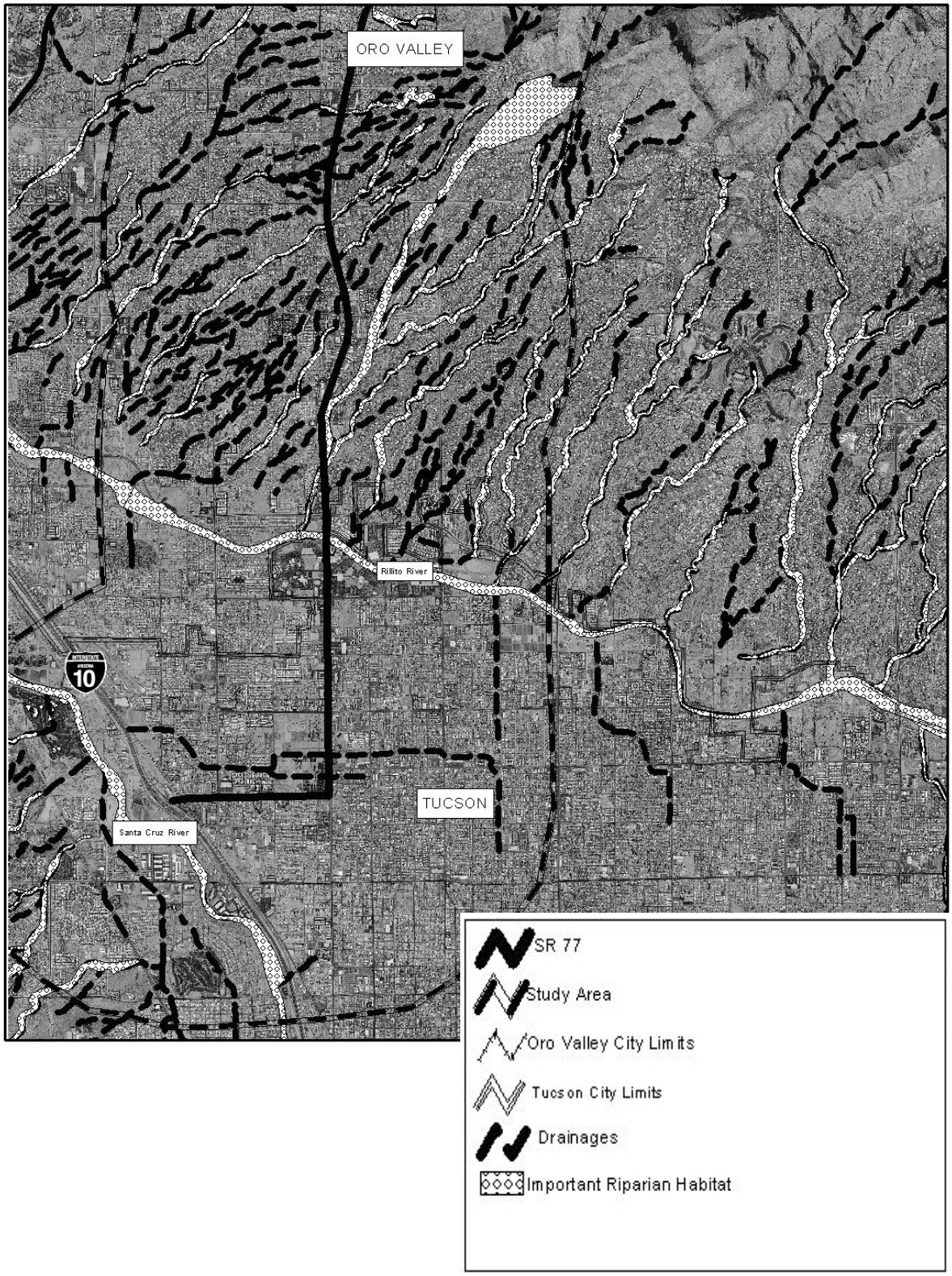


Exhibit 4-6
DRAINAGES AND RIPARIAN AREAS
(Continued)

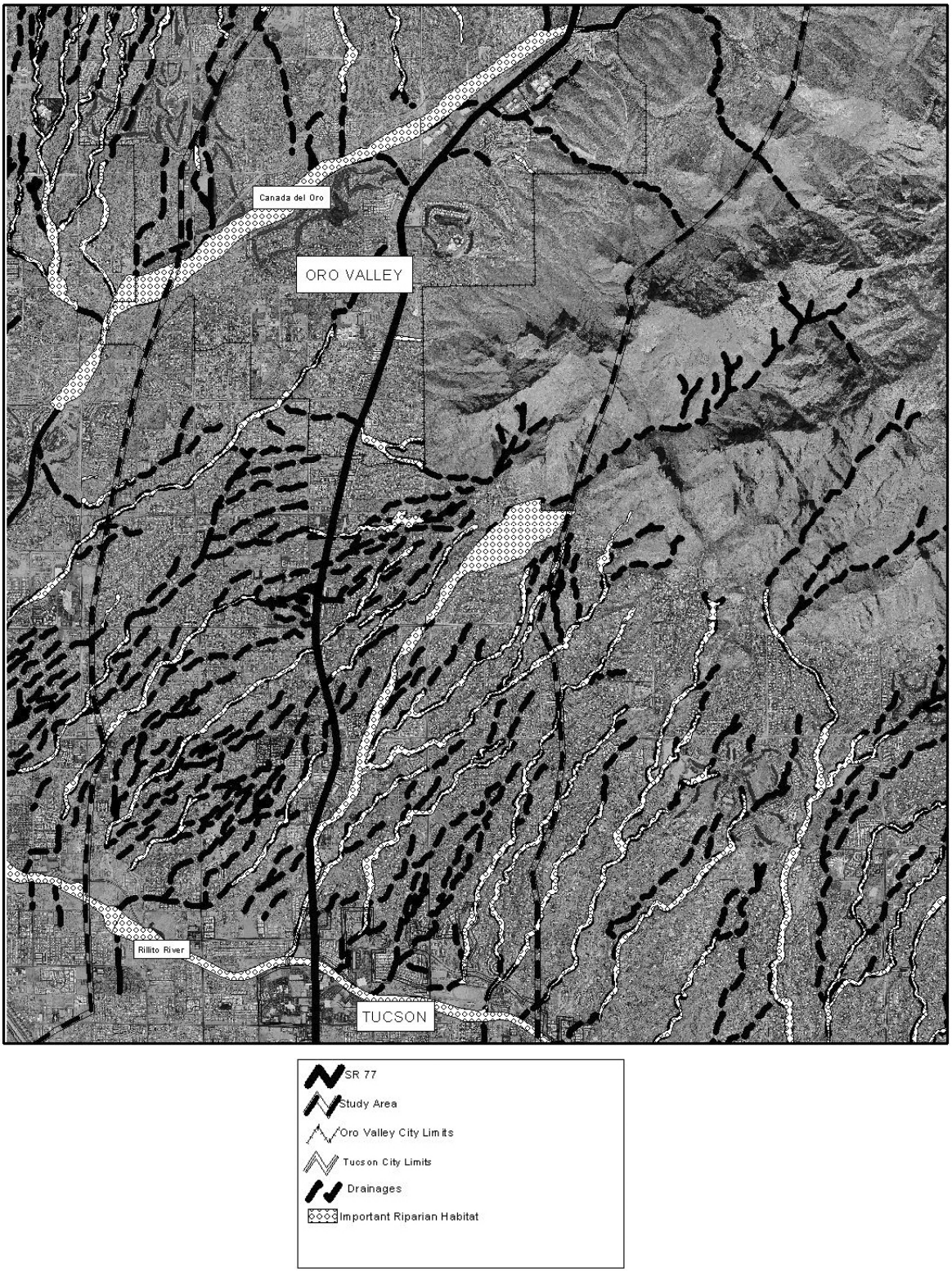


Exhibit 4-6
DRAINAGES AND RIPARIAN AREAS
(Continued)

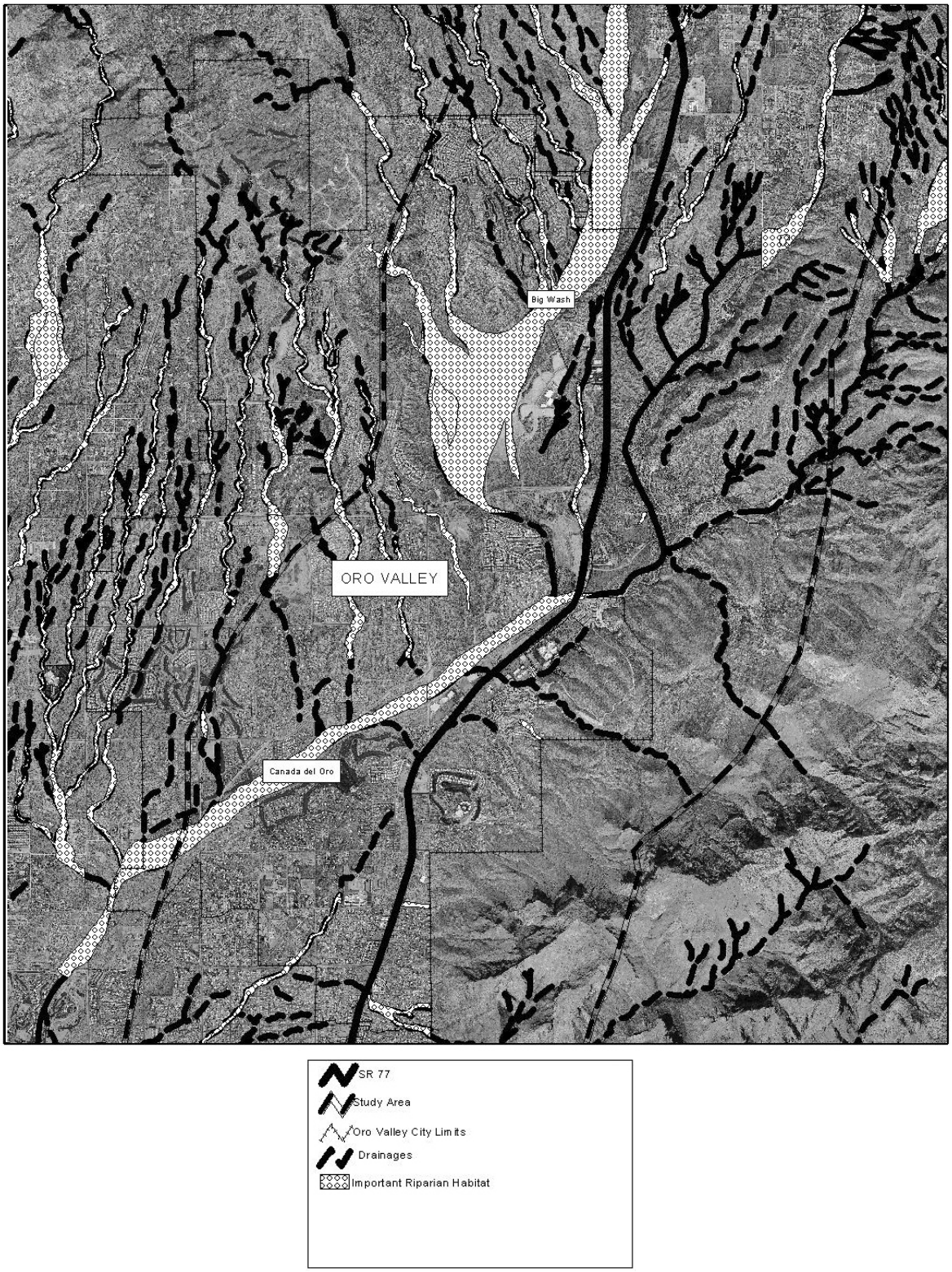


Exhibit 4-6
DRAINAGE AND RIPARIAN AREAS
(Continued)

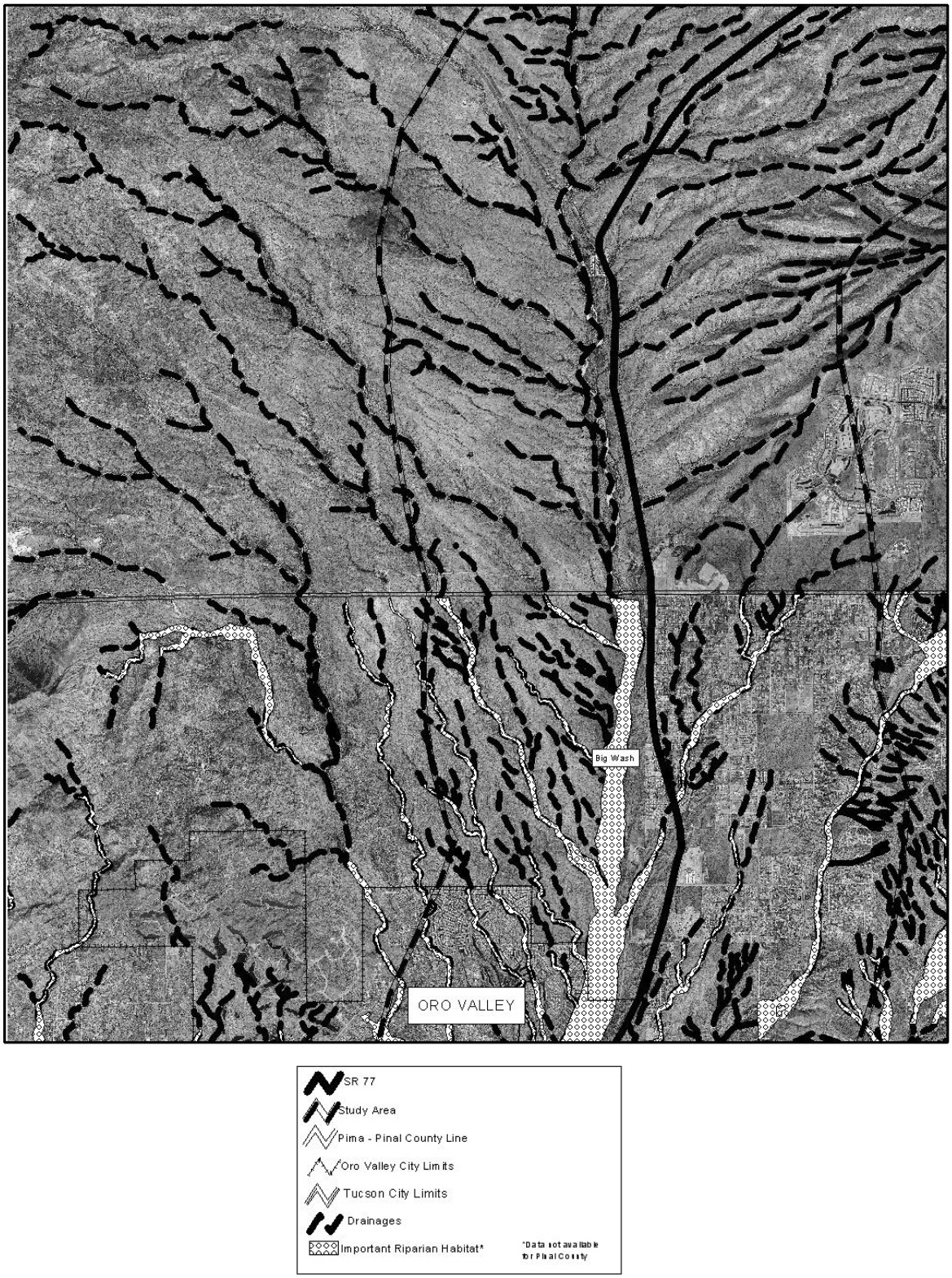


Exhibit 4-7
STREAMS AND WATER FEATURES CONTRIBUTING TO THE UPPER SANTA CRUZ RIVER WATERSHED IN THE VICINITY OF THE SR 77 CORRIDOR

MAJOR TRIBUTARY	CONTRIBUTING STREAMS	CONTRIBUTING STREAMS, LAKES, AND SPRINGS	
Rillito River			
	Pima Canyon		
	Tanque Verde Creek		
		Sabino Canyon	
		Bear Canyon	
Cañada del Oro			
	Copper Hill Wash		
		Blackman Wash	
	Big Wash		
		Threeway Wash	
		Cruz Wash	
		Rainbow's End Wash	
		Faraway Wash	
		Copper Creek	
		Twentynine Wash	
		Chirreon Wash	
		Sahuarita Wash	
		Twentyseven Wash	
		Twin Lakes	
		Chalk Creek	
		Rancheria Spring	
		Pig Spring	
		Carnisito Spring	
		Honey Bee Canyon	
			Batamote Wash
			Sausaulito Creek
		Romero Canyon	
			Sutherland Wash
			Alamo Canyon

Streams and water features in **bold type** are in the watershed, but not within the corridor.

United States." The phrase "waters of the United States" generally means waters used in interstate commerce. Prior to initiating projects that will disturb waters under the jurisdiction of the Corps, a jurisdictional delineation will need to be made and submitted to the Corps.

4.9 VISUAL RESOURCES

Visual environmental resources are classified and managed by the USDA Forest Service Scenery Management System. The most important visual resources in the SR 77 Corridor occur within Coronado National Forest and Catalina State Park, where the Santa Catalina Mountains comprise the dominant landscape focal point. The bajada and foothills that approach the mountains are important for the attractive open expanses of native vegetation.

Scenic Classes represent the relative importance of scenic resources on the Coronado National Forest. They should be used at the broad scale as the Coronado National Forest Plan is revised and refined during project level planning. Scenic Classes are the result of combining elements: the scenic attractiveness of lands (i.e., the intrinsic beauty and distinctiveness of lands within a region) and landscape visibility (i.e., who is viewing the landscape and from what distance).

The Scenery Management System has seven Scenic Classes, which measure the relative importance of scenery. Coronado National Forest is comprised of the most unique landscapes in southeastern Arizona, the mountains. Additionally, the lands of Coronado National Forest are extremely visible from many different vantage points, both within and off of the forest. Therefore, Coronado National Forest lands do not include any Scenic Class 6 or 7 lands, which generally have low public value.

4.9.1 Definitions of Scenic Classes

Scenic Class 1: Scenery has extremely high public value
Scenic Class 2: Scenery has very high public value
Scenic Class 3: Scenery has high public value
Scenic Class 4: Scenery has moderately high public value
Scenic Class 5: Scenery has moderate public value

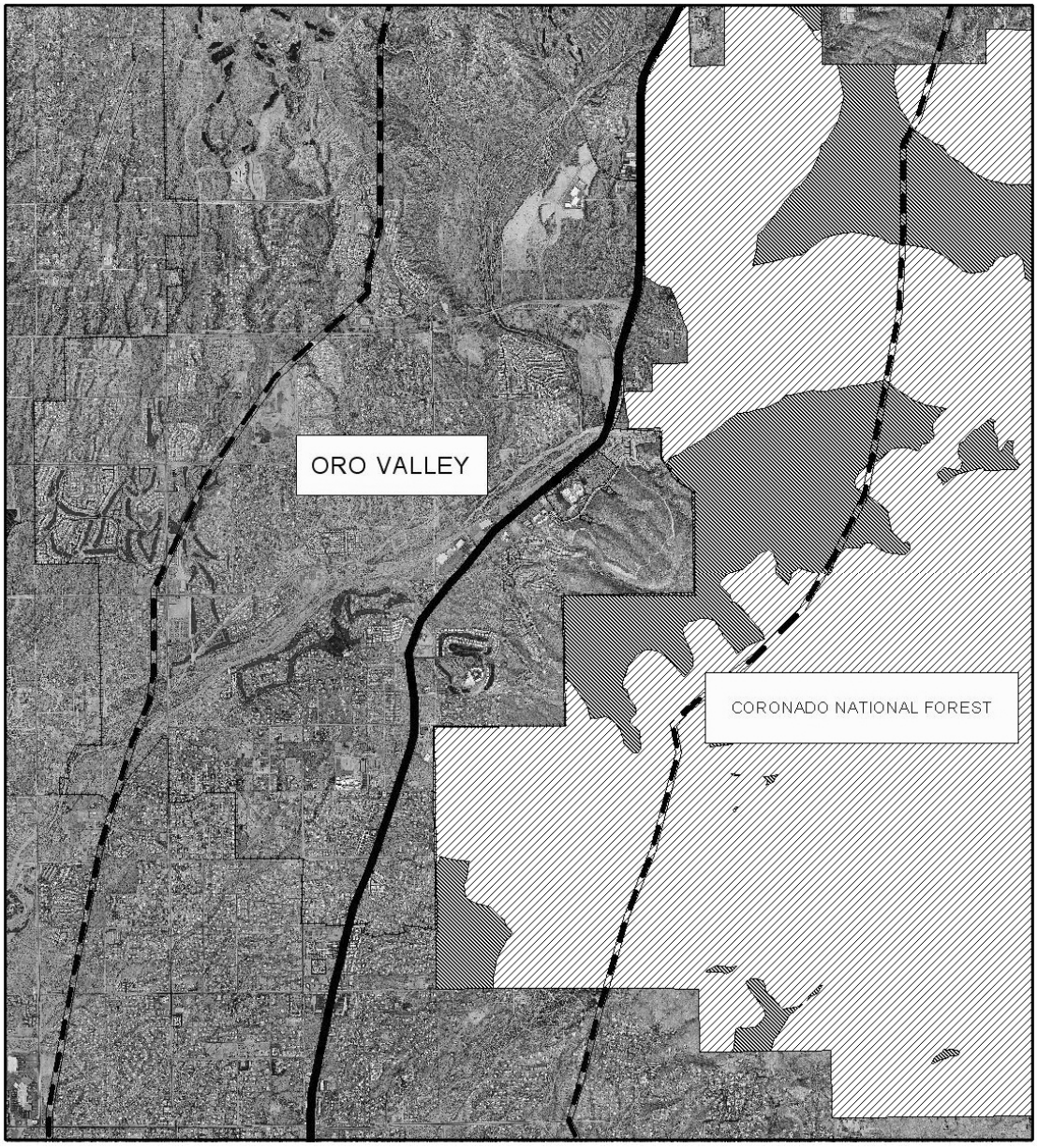
Within the SR 77 Corridor, visual scenery in Coronado National Forest and Catalina State Park is ranked into Scenic Classes 1 and 2 (Exhibit 4-8).

4.10 AIR QUALITY ATTAINMENT

4.10.1 Carbon Monoxide

The Clean Air Act was passed in 1970, with major revision enacted in 1990. According to this act, EPA establishes limits on the concentrations of common air pollutants, called National Ambient Air Quality Standards (NAAQS). When a geographic area fails to meet the primary standards, the area is deemed a "non-attainment" area. In 1978, Tucson was designated as in non-attainment for carbon monoxide (CO) concentrations. Since 1984, there have been no violations of the CO NAAQS recorded, and CO is not currently considered to be a health threat in the Tucson region. This is primarily because of federally mandated tailpipe emission standards for new cars and the annual state inspection and maintenance program. As population in the region grows, however, the benefits of these programs are offset by the increase in daily

Exhibit 4-8
USDA FOREST SERVICE SCENERY MANAGEMENT SYSTEM CLASSES IN SR 77 CORRIDOR



vehicle miles traveled (VMT). On April 25 2000, EPA approved Arizona's request to reclassify the Tucson region as in compliance with the national standard for CO pollution. To ensure that future violations of the CO standard do not occur, the Pima Association of Governments developed and submitted to EPA a Limited Maintenance Plan (LMP). EPA approved the LMP, effective July 10, 2000. The Tucson CO maintenance area incorporates the Tucson metropolitan region as far north as the Pima County line, and includes the SR 77 Corridor within Pima County.

One of the requirements of the LMP is that PAG use microscale air quality monitoring of the top three highest volume intersections and the top three highest congested intersections in the PAG region. The intersection of Ina Road and Oracle Road, which is the highest volume intersection along SR 77, was ranked #2 in the PAG region by volume in 1999. The microscale model resulted in an eight-hour CO average concentration of 5.4 ppm. The intersection was modeled again in 2001, resulting in an eight-hour CO average of 5.8 ppm. These results are well below the NAAQS for CO of 9 ppm for an eight-hour average. The role of PDEQ in the LMP is to monitor air quality in the region and announce when CO levels exceed 85 percent of the eight-hour standard.

4.10.2 Ozone

Ground-level ozone concentrations have remained relatively steady, according to PDEQ, with 2001 summertime measurements approaching but not exceeding the NAAQS. When two or more of the monitoring sites exceed 0.0084 ppm for the one-hour average, the American Lung Association issues an ozone advisory to the public. There were no advisories issued in 2001. (The year 2001 is the most recent year for which annual air quality data have been summarized.)

4.10.3 Particulate Matter

PM_{10} refers to particulate matter with an aerodynamic diameter of 10 microns or less, while $PM_{2.5}$ refers to particulate matter with an aerodynamic diameter of 2.5 microns or less. In 1999, Pima County violated the PM_{10} Standard set by the EPA. After this violation, which included four exceedences of the NAAQS, PDEQ provided technical documentation that showed the exceedences to be the result of natural events. A Natural Events Action Plan (NEAP) was submitted to ADEQ and EPA in June 2001. The NEAP boundary incorporates eastern Pima County, and contains the SR 77 Corridor within Pima County. The plan allows Pima County to remain in attainment for PM_{10}, following the Best Available Control Measures outlined in the NEAP in an effort to protect public health and welfare on days with high ambient levels of PM_{10}. The highest reading in 2001 was 149 ug/m^3, which was recorded at the monitoring site located at 2498 North Geronimo Avenue (within the SR 77 Corridor).

$PM_{2.5}$ has been linked to health problems including respiratory and heart conditions, and can also contribute to poor visibility and urban haze. There have been no exceedences of that NAAQS for $PM_{2.5}$.

4.10.4 Nitrogen Dioxide and Sulfur Dioxide

The portion of the corridor within Pima County is in attainment for both nitrogen dioxide (NO_2) and sulfur dioxide (SO_2). NO_2 averages about 34 percent of the standard and SO_2 averages

seven percent of the standard. According to PDEQ, no significant change in the levels of these two pollutants has been seen in the past 10 years. In addition, the levels of SO_2 in the San Manuel area do not meet primary air quality standards because of a copper smelter and fugitive dust emissions in the area. The San Manuel non-attainment area is north of the SR 77 Corridor.

4.11 BLM AREAS OF CRITICAL ENVIRONMENTAL CONCERN

There are only very scattered parcels of BLM land within the vicinity of the project area, and none contain land classified as Areas of Critical Environmental Concern (ACEC). The closest ACEC is White Canyon ACEC, approximately 40 miles from the northern terminus of the SR 77 corridor.

4.12 CULTURAL RESOURCES

4.12.1 National Register of Historic Places (NRHP) Properties

Ten National Register of Historic Places sites are located within the SR 77 Corridor. Appendix A contains detailed information for all National Register of Historic Places within the corridor. NRHP sites within the project area include three historic districts, two residences, a school, a materials plant, a church, a ranch, and a racetrack. These properties were nominated to the National Register of Historic Places between 1980 and 1997. Eight of the properties are located within the City of Tucson and two are located in Oracle.

4.12.2 Previously Recorded Archaeological Sites Not Listed on the NRHP

Over 200 archaeological sites have been recorded within the two-mile wide SR 77 study corridor that are not currently on the National Register of Historic Places. Many of these sites are considered eligible for inclusion to the National Register of Historic Places, but adequate assessments have not been conducted at this time.

The majority of sites (50.4 percent) recorded within the project area are prehistoric artifact scatters, followed by prehistoric agricultural sites (10.8 percent), historic structures/habitation sites (6.2 percent), prehistoric potential habitation sites (5.8 percent), prehistoric habitation sites (7.6 percent), historic Native American sites (3.1 percent), historic trash scatters (3.1 percent), prehistoric resource processing sites (3.1 percent), historic roads (2.4 percent), prehistoric rock art (1.9 percent), historic homesteads (1.5 percent), prehistoric burials (1.0 percent), prehistoric trash mounds (1.0 percent), historic transmission lines (0.5 percent), historic railroads (0.5 percent), prehistoric rock shelter sites (0.5 percent), and multiple component (containing both prehistoric and historic elements) sites (0.5 percent).

The level of disturbance at these sites varies throughout the SR 77 Corridor, although those sites within highly developed municipal areas are more likely to exhibit greater disturbance. However, surface disturbance may not be indicative of subsurface disturbance. An archaeological site can often remain undisturbed despite significant surface damage. Archaeological testing may be required to determine if the potential for subsurface archaeological deposits exists. Following the archaeological testing, a determination regarding the site's eligibility shall occur and management tactics may include preservation, monitoring, or data recovery.

An archaeological survey is recommended prior to any ground disturbing activities related to the widening or realignment of SR 77 (that is outside of current ADOT right-of-way which has been surveyed). In instances where survey coverage is greater than 10 years old or an area has not been previously investigated, an archaeological survey is necessary before work proceeds. A listing of previous archaeological surveys within the study area is provided in Appendix B.

In addition to the previously recorded sites and surveys within the SR 77 Corridor, several areas are considered highly sensitive for cultural resources (see Appendix C). These include areas near the Santa Cruz River, the Rillito River, Cañada del Oro Wash, and Big Wash. Previous archaeological research has found that floodplains and the confluences of major drainages were repeatedly occupied during the prehistoric and historic periods. The likelihood of finding archaeological sites in those areas is high. The Sonoran Desert Conservation Plan (SDCP) has labeled the area in the vicinity of these drainages as "High Sensitivity" for cultural resources. This encompasses the portion of SR 77 between Roger Road and River Road and most of the parcels north of Magee Road to the Pima County line. Archaeological sensitivity for the portion of the study area within Pinal County has not been delineated.

4.12.3 Cemeteries

Two privately owned cemeteries are within the study corridor and require consideration. Holy Hope Cemetery (3555 North Oracle Road) and Evergreen Memorial Park (3015 North Oracle Road) are positioned along SR 77 near the junction of Miracle Mile and Oracle Road. Holy Hope Cemetery opened in 1906 and Evergreen Memorial Park opened in 1907. These institutions are more than 50 years old.

4.13 SECTION 4(f) LANDS

If improvements identified during the course of this corridor study would require any ground disturbing activities, Section 4(f) evaluations may be necessary for each specific improvement identified. Section 4(f), of the U.S. Department of Transportation Act of 1966, states that the Federal Highway Administration "may approve a transportation program or project requiring publicly-owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state or local significance, or land of a historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if there is no prudent or feasible alternative to using that land and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use" (49 U.S.C. 303).

4.13.1 Public Parks and Recreation Areas

Several city or county parks are within or near the two-mile wide study corridor.

- **Tucson Metro Area Parks**
  - Balboa Heights Park, De Anza Park, Don Hummel Park, Francisco Elias Esquer Park, Estevan Park, Jacinto Park, Jacobs Park, Joaquin Murrieta Park, Juhan Park, Mansfield Park, Manuel Valenzuela Park, Mitchell Park, Pascua Park, Riverview Park, Santa Cruz River Park, Silverbell Municipal Golf Course, and Trini Alvarez El Rio Golf Course

- **Pima County Parks**
  - Catalina Neighborhood Park, Children's Memorial Park, Coronado Middle School Park, Rillito Park, and Rillito River Park
- **Oro Valley Parks**
  - Cañada del Oro Riverfront Park
  - James D. Kriegh Park
- **Catalina State Park**
- **Coronado National Forest**

4.13.2 Public School Facilities

Public schools are designated as 4(f) properties due to public access to and use of sports facilities and other recreational facilities. Public schools within the corridor are listed in Exhibit 4-9.

4.14 NOISE QUALITY

The FHWA has issued regulations for highway noise evaluation in 23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." The primary objective of the regulation is "to provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23, United States Code."

There are two project types defined in the regulations, Type I or Type II. Type I projects include the construction of a highway on a new location, or the physical alteration of an existing highway which significantly changes the horizontal or vertical alignment or increases the number of through traffic lanes. Type II projects are those proposed strictly for noise abatement on an existing highway. In general, the Arizona Department of Transportation follows the FHWA criteria for all Type I projects, and does not have an approved program of Type II projects (all Type II projects must have been approved by FHWA by November 28, 1995).

Specific noise abatement criteria have been established that serve as an upper limit of acceptable traffic noise levels for various types of land use. These are summarized in Exhibit 4-10.

Wilderness areas and wildlife refuges could be considered Activity Category A. Pusch Ridge Wilderness Area (see Exhibit 4-4) is the sole activity Category A in the SR 77 corridor. The following activity category B areas are sensitive to noise impacts and should be examined for impacts during a noise study:

- **SR 77, Town of Oracle to Pinal County Line –** Eagle Crest Ranch development on east side of corridor has residential property under construction.
- **SR 77, Pinal County Line to Golder Ranch Road** – Residential, primarily on the east side of the corridor, Catalina Park Recreational Center (east side of SR 77), Quail Ridge Estates Mobile Home Park (west side SR 77).
- **SR 77, Golder Ranch Road to Rancho Vistoso Boulevard** – Church is under construction on the east side of SR 77, residential land uses primarily in the Vistoso

Exhibit 4-9
PUBLIC SCHOOLS WITHIN THE SR 77 CORRIDOR

Richey Elementary	2209 North 15th Avenue
Jefferson Park Elementary	1701 East Seneca Street
F. O. Holaway Elementary	3500 North Cherry Avenue
Walter Douglas Elementary	3302 North Flowing Wells Road
Flowing Wells High School	3725 North Flowing Wells Road
Amphitheater High School	125 East Yavapai Road
L. M. Prince Elementary	125 East Yavapai Road
Amphitheater Middle School	315 East Prince Road
Tucson Youth Development High School	1901 North Stone Avenue
E. C. Nash Elementary	515 West Kelso Street
Helen Keeling Elementary	2837 North Los Altos Avenue
Iola Francis Elementary	1556 West Prince Road
Laurent School for Deaf Elementary	3902 North Flowing Wells Road
Inscape Alternative Middle School	1949 West Gardner Lane
Rio Vista Elementary	1351 East Limberlost Road
Centennial Elementary	2200 West Wetmore Road
Flowing Wells Middle School	4545 North La Cholla Road
Homer Davis Elementary	4250 North Romero Road
Lulu Walker Elementary	1750 West Roller Coaster Road
La Cima Middle School	5600 North La Cañada Drive
Orange Grove Middle School	1911 East Orange Grove Road
Marion Donaldson Elementary	2040 West Omar Drive
Cross Middle School	1000 West Chapala Drive
Winifred Harelson Elementary	826 West Chapala Drive
Mesa Verde Elementary	1661 West Sage Street
Canyon Del Oro High School	25 West Calle Concordia
Copper Creek Elementary	11620 North Copper Spring Trail
Painted Sky Elementary	12620 North Woodburne Avenue
Coronoda Middle School	3401 East Wilds Road, Catalina
Mountain Vista School 1-8	HCR BOX 2743, Oracle
Coronado Elementary	3401 East Wilds Road

Exhibit 4-10
NOISE ABATEMENT CRITERIA
HOURLY A-WEIGHTED SOUND LEVEL IN DECIBELS (DBA)

Activity Category	L_{aeq1h},	*Description of Activity Category*
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67(exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72(exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	---	Undeveloped lands
E	52(interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Note: L_{aeq1h}, =The equivalent energy level, L_{eq} is the steady state level that contains the same amount of sound energy as a time-varying sound level for a given time period. In other words, it is the average energy level. The hourly A-weighted Leq in dBA is abbreviated L_{aeq1h}, and is the descriptor used to determine existing and future noise levels and noise impacts.

neighborhood west of SR 77. Catalina State Park on the east side of SR 77. Coronado (K-8) School is on the east side, near Wilds Road, Catalina Mountain Juvenile Institution on east side of SR 77, between Wilds Road and Rollins Road.

- **SR 77, Rancho Vistoso Boulevard to First Avenue** – Limited residential on east side of SR 77, north of Rams Field Pass Road. La Reserve residential area on east side of SR 77, near 1st Avenue. Catalina State Park also continues on the east side of SR 77 in this area.
- **SR 77, First Avenue to Calle Concordia** – Hotel on east side of SR 77 at El Conquistador Way, residential uses on the west side of SR 77, Palo Verde Christian Academy on east side of SR 77, between Linda Vista Boulevard and Calle Concordia, James Kriegh Park west of SR77 on Calle Concordia.
- **SR 77, Calle Concordia to Magee Road** – Residential on east and west sides on SR 77.
- **SR 77, Magee Road to Ina Road** – Tohono Chul Park on west side of SR 77 on Ina Road.
- **SR 77, Ina Road to Orange Grove Road** – Apartments on east side of SR 77, north of Orange Grove Road.
- **SR 77, Orange Grove Road to River Road** – Primarily commercial, however some scattered apartments and townhomes, on both sides of SR 77.
- **SR 77, River Road to Prince Road** – Friendly Village of the Catalinas Mobile Home Park, east of SR 77, south of River Road.
- **SR 77, Prince Road to Miracle Mile Road** – Amphitheater High School, east of SR 77, Holy Hope and Evergreen Cemeteries west of SR 77, between Prince Road and Miracle Mile Road.
- **SR 77, Oracle Road to Flowing Wells Road** – Evergreen Cemetery north of SR 77.
- **SR 77, Flowing Wells Road to I-10** – Mobile homes on north side of SR 77, near I-10.

5. EXISTING TRANSPORTATION FACILITIES, SERVICES AND CONDITIONS

An inventory and analysis of all transportation facilities and services within the SR 77 Corridor study area were completed for this study and is presented in this chapter. The analysis of these facilities and services is the basis for identifying existing transportation deficiencies within the corridor.

5.1 STATE MAINTAINED HIGHWAYS

Roadway data presented in this section includes roadway geometrics, pavement conditions, structures, traffic interchanges, drainage, terrain, and posted speed limit.

5.1.1 Functional Classification

The current roadway functional classification for the study area roadways is provided in Exhibit 5-1. This information was obtained from the Pima County geographic information system database and the 1998 State of Arizona functional classification of the State highway system.

5.1.2 Roadway Geometrics

Throughout the project area, SR 77 has between one and three lanes in each direction of travel. The one and a quarter mile Miracle Mile segment (I-10 to Oracle Road) of the project is a four-lane divided roadway. A six-lane divided section extends from Miracle Mile to Calle Concordia in Oro Valley. From Calle Concordia to Golder Ranch Road in Catalina, SR 77 is a four-lane divided roadway. From Golder Ranch Road to MP 88.08, north of the Pima/Pinal County Line, SR 77 is a five-lane roadway (four lanes with a two-way left-turn lane). From MP 88.08 to Oracle Junction (MP 91.23), SR 77 is a four-lane divided road. East of Oracle Junction, SR 77 is a two-lane section between MP 91.55 to MP 96.45. The section between MP 96.45 and MP 96.91 is a short three-lane section in the vicinity of the Biosphere Road. At MP 96.91, the road transitions back to a two-lane section up to MP 99.02, where a two-mile section of a three-lane roadway begins. At MP 101.00, SR 77 transitions back to a three-lane section up to MP 102.85. From MP 102.85, to the end of the project, there is one north/eastbound lane and two south/westbound lanes. Exhibit 5-2 shows the cross section geometry on SR 77 by milepost and general location. Exhibit 5-3 provides this information graphically on a map base.

5.1.3 Right-of-Way (ROW)

Existing right-of-way data were obtained from the current Highway Performance Monitoring System data on SR 77. Along SR 77 right-of-way varies throughout the project area from 100 to 260 feet. Exhibit 5-4 shows typical existing right-of-way. More detailed ROW information is provided in the Opportunities and Constraints section of this report.

Exhibit 5-1
ROADWAY FUNCTIONAL CLASSIFICATIONS

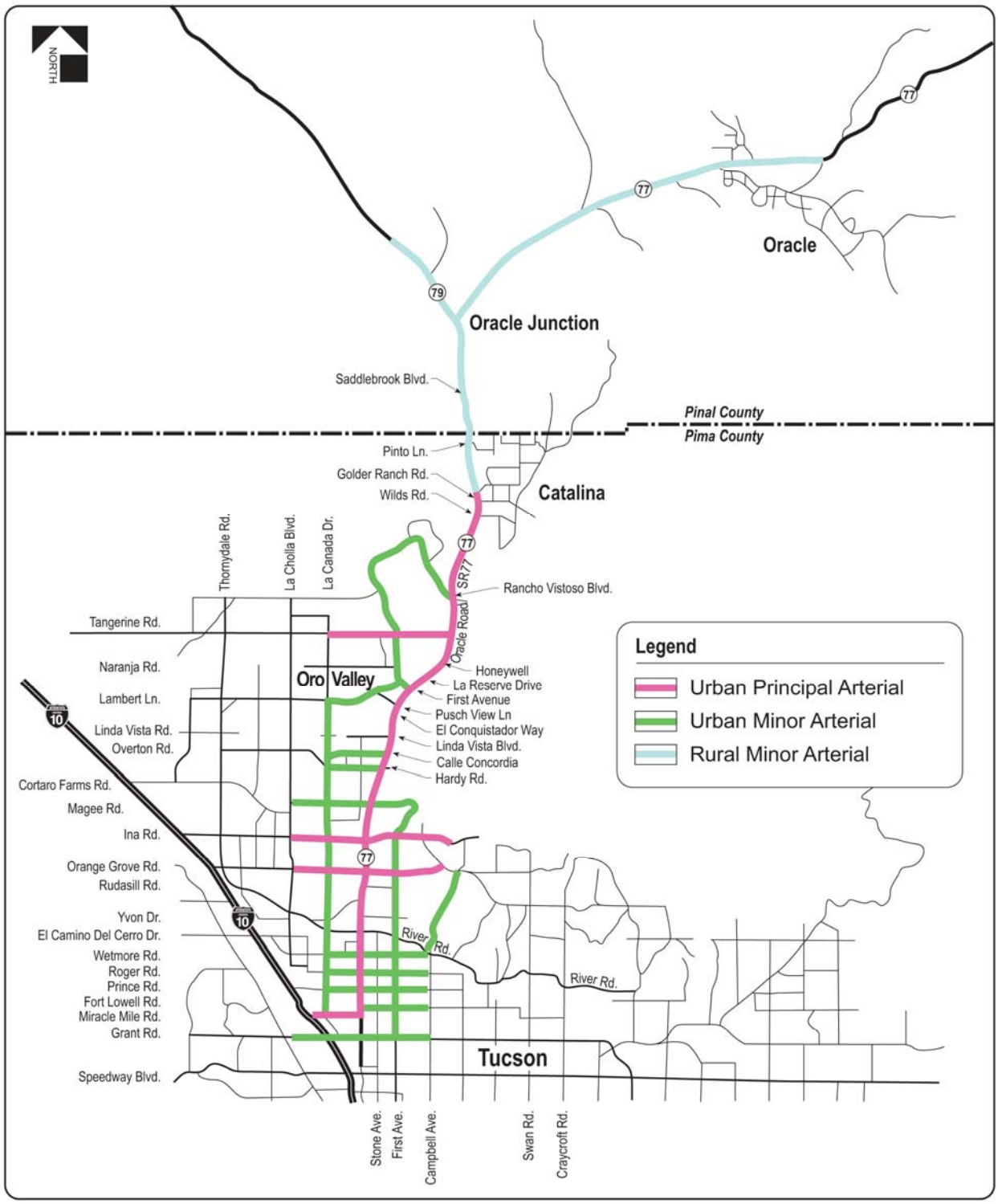


Exhibit 5-2
CROSS SECTION GEOMETRY ON SR 77

MP	Cross Section	General Location
68.10 to 69.51	4 Lane Divided	Miracle Mile/I-10 Interchange to Oracle Road
69.51 to 77.55	6 Lane Divided	Miracle Mile to Calle Concordia
77.55 to 79.13	4 Lane Divided	Calle Concordia to Pusch View Lane
79.13 to 79.74	6 Lane Divided	Pusch View Lane to La Reserve Drive
79.74 to 85.85	4 Lane Divided	La Reserve Drive to Golder Ranch Road
85.85 to 88.08	5 Lane (w/TWLTL)	Golder Ranch Road to MP 88.08 (just north of Pima /Pinal County Line)
88.08 to 91.23	4 Lane Divided	MP 88.08 to Oracle Junction
91.23 to 91.55	2 Lane Divided	
91.55 to 96.45	2 Lane Undivided	
96.45 to 96.91	3 Lane (w/TWLTL)	Vicinity of Biosphere Road Entrance
96.49 to 99.02	2 Lane Undivided	
99.02 to 101.03	3 Lane (w/TWLTL)	Vicinity of Southwest Entrance of Town of Oracle
101.03 to 102.85	2 Lane Undivided	
102.85 to 103.32	3 Lane (2 SB-1 NB)	Vicinity of Northeast Entrance To Town of Oracle

Exhibit 5-3
LOCATION OF CROSS SECTION TYPES ON SR 77

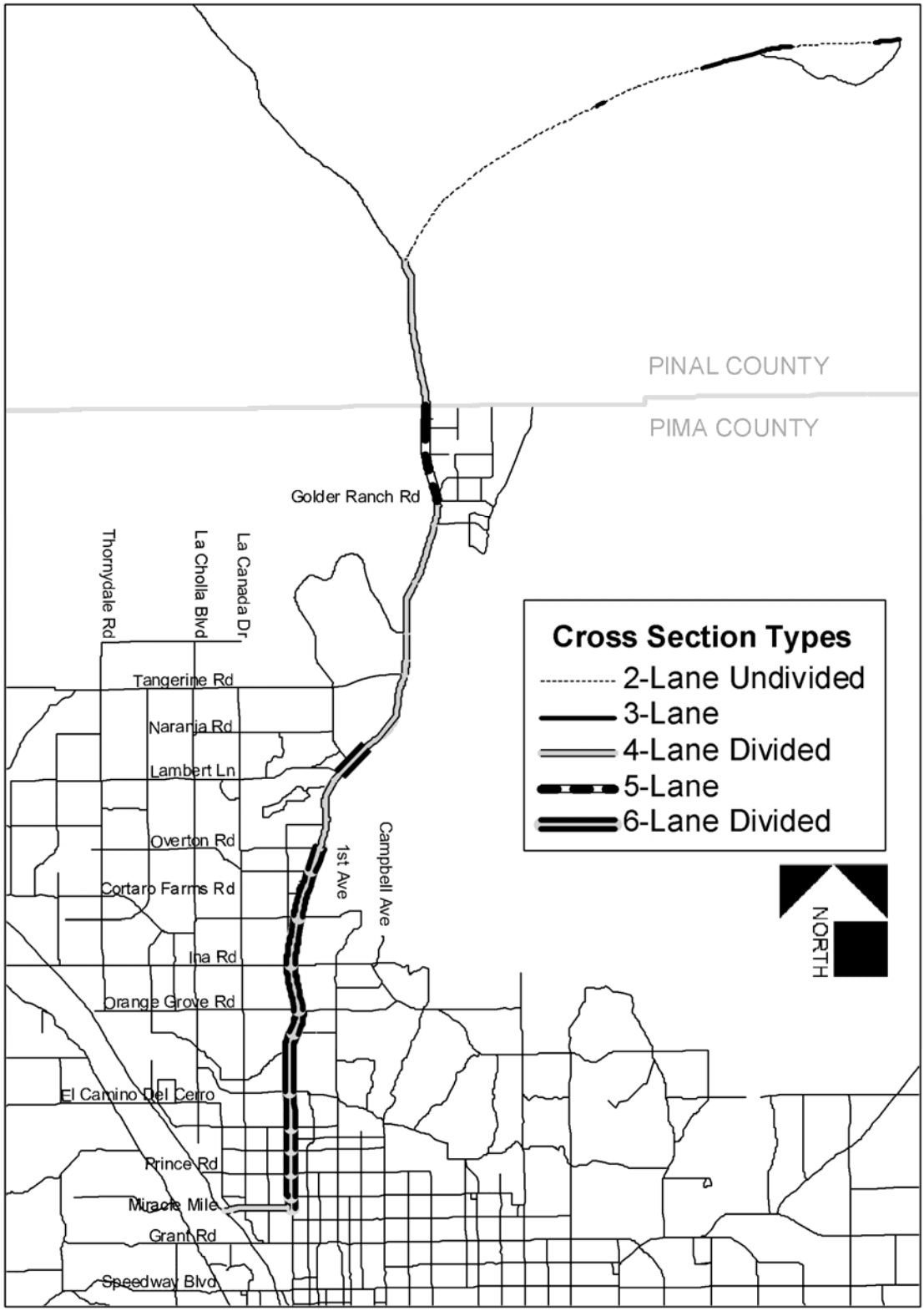
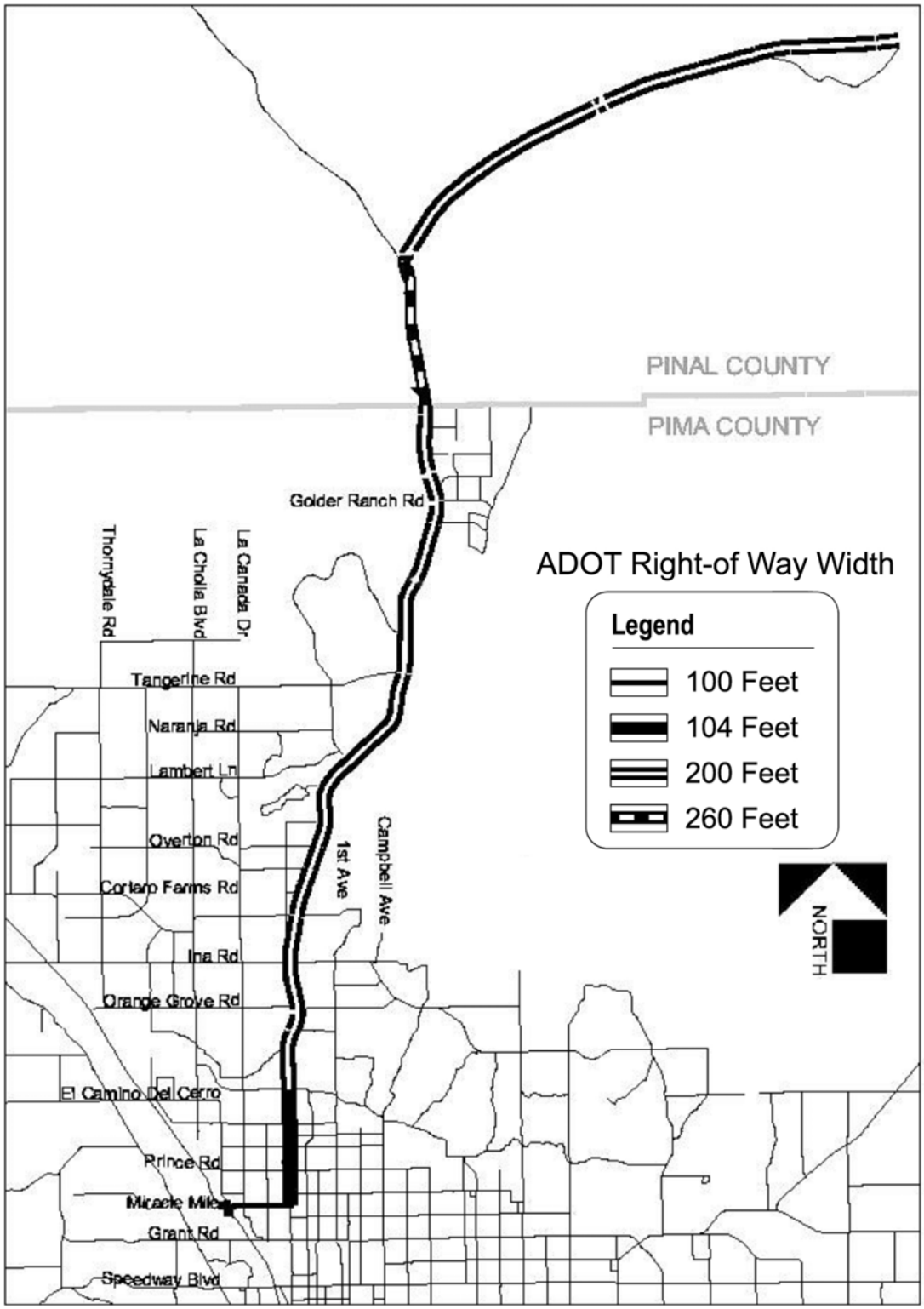


Exhibit 5-4
TYPICAL RIGHT-OF-WAY WIDTH ALONG SR 77



5.1.4 Pavement Type and Condition

Data on the pavement type and year built for SR 77 were obtained from the State Highway System Log. Exhibit 5-5 summarizes pavement type data for SR 77. Pavement condition data were obtained from the current Highway Performance Monitoring System data on SR 77. The condition of pavement is measured by the Pavement Serviceability Rating (PSR) with qualitative descriptors measuring the quality of the observed pavement. PSR ratings are from 5.0, which is a new and distress free (sufficiently free of cracks and patches) pavement, to a PSR rating of 0.0 which represents pavements in extremely deteriorated conditions, passable only at reduced speeds, and with considerable ride discomfort. Large potholes and deep cracks exist on pavements with PSR ratings close to 0.0. The PSR ratings for the project section of SR 77 are shown in Exhibit 5-6.

As shown in the exhibit, most of the segments on SR 77 have a PSR rating over 3.0, representing pavements that exhibit few, if any, visible signs of surface deterioration. The segments between MP 69.80 and MP 71.30 have PSR ratings slightly under 3.0; however, these segments were part of a recently completed pavement overlay project.

5.1.5 Structures

Bridge condition data were obtained from the ADOT Information Data Warehouse (AIDW) bridge data which is maintained by the ADOT Bridge Group. There are 23 structures in the Bridge Record that are on SR 77 within the corridor. These include a traffic interchange (with a railroad overpass), drainage structures and bridges over rivers. Sufficiency ratings (also shown in the list of structures) are used to determine a structure's condition. The bridge sufficiency rating is expressed as a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient bridge. Bridges with sufficiency ratings below 80 percent are classified as structurally deficient structures and are eligible for rehabilitation. Bridges with sufficiency ratings below 50 percent may need replacement. Exhibit 5-7 is a table identifying bridge sufficiency ratings and descriptions of the ratings. A list of all the structures on SR 77 in the corridor is shown in Exhibit 5-8.

In addition to structurally deficient structures, there are functionally obsolete structures. Functionally obsolete structures include bridges with horizontal and vertical clearances which met AASHTO clearance standards when originally constructed, but which may not meet updated standards for both sets of clearances.

Twelve of the 22 structures have a sufficiency rating at or below 80 percent and are thus eligible for rehabilitation. These are listed in Exhibit 5-8.

5.1.6 Drainage

Pinal County Line to Oracle

As State Route 77 continues north from the Pinal County line to the Town of Oracle, it transects both local and regional watersheds which lie east of Big Wash (see Exhibit 5-9). Throughout this stretch at-grade and culvert crossings serve to convey the flow to the west. Of these numerous crossings, nine have been identified as primary watersheds, with five of these

Exhibit 5-5
PAVEMENT TYPE ON SR 77

Location	Travel Surface	Shoulder Surface
MP 68.10 (I-10 TI)	Mixed Bituminous, Low Type	Mixed Bituminous, High Type
MP 68.25 to 69.56	Asphaltic Concrete	Asphaltic Concrete
MP 69.56 to MP 87.44	Asphaltic Concrete	Mixed Bituminous, High Type
MP 87.44 to MP 91.24	Asphaltic Concrete	Asphaltic Concrete
MP 91.24 to 91.40	Bituminous Surface Treated	Bituminous Surface Treated
MP 91.40 to MP 95.94	Asphaltic Concrete	Asphaltic Concrete
MP 95.94 to MP 96.52	Asphaltic Concrete	Mixed Bituminous, High Type
MP 96.52 to MP 96.78	Asphaltic Concrete	Asphaltic Concrete
MP 96.78 to MP 103.87	Asphaltic Concrete	Mixed Bituminous, High Type

Exhibit 5-6
PAVEMENT SERVICEABILITY
RATING ON SR 77

Location	Pavement Serviceability Rating (PSR)
MP 68.10 to MP 68.26	3.3
MP 68.26 to MP 69.44	3.2
MP 69.44 to MP 69.80	3.2
MP 69.80 to MP 70.30	2.9
MP 70.30 to MP 70.80	2.8
MP 70.80 to MP 71.30	2.9
MP 71.30 to MP 72.05	3.0
MP 72.05 to MP 73.33	3.2
MP 73.33 to MP 74.84	3.1
MP 74.84 to MP 75.86	3.7
MP 75.86 to MP 76.91	3.8
MP 76.91 to MP 77.44	3.6
MP 77.44 to MP 78.99	3.7
MP 78.99 to MP 83.87	4.0
MP 83.87 to MP 85.20	4.1
MP 85.20 to MP 85.70	3.9
MP 85.70 to MP 87.44	3.6
MP 87.44 to MP 87.78	3.5
MP 87.78 to MP 87.86	4.0
MP 87.86 to MP 91.10	4.3
MP 91.10 to MP 91.37	4.2
MP 91.37 to MP 96.56	4.3
MP 96.56 to MP 96.74	4.2
MP 96.74 to MP 103.32	4.3

Exhibit 5-7
BRIDGE SUFFICIENCY RATINGS

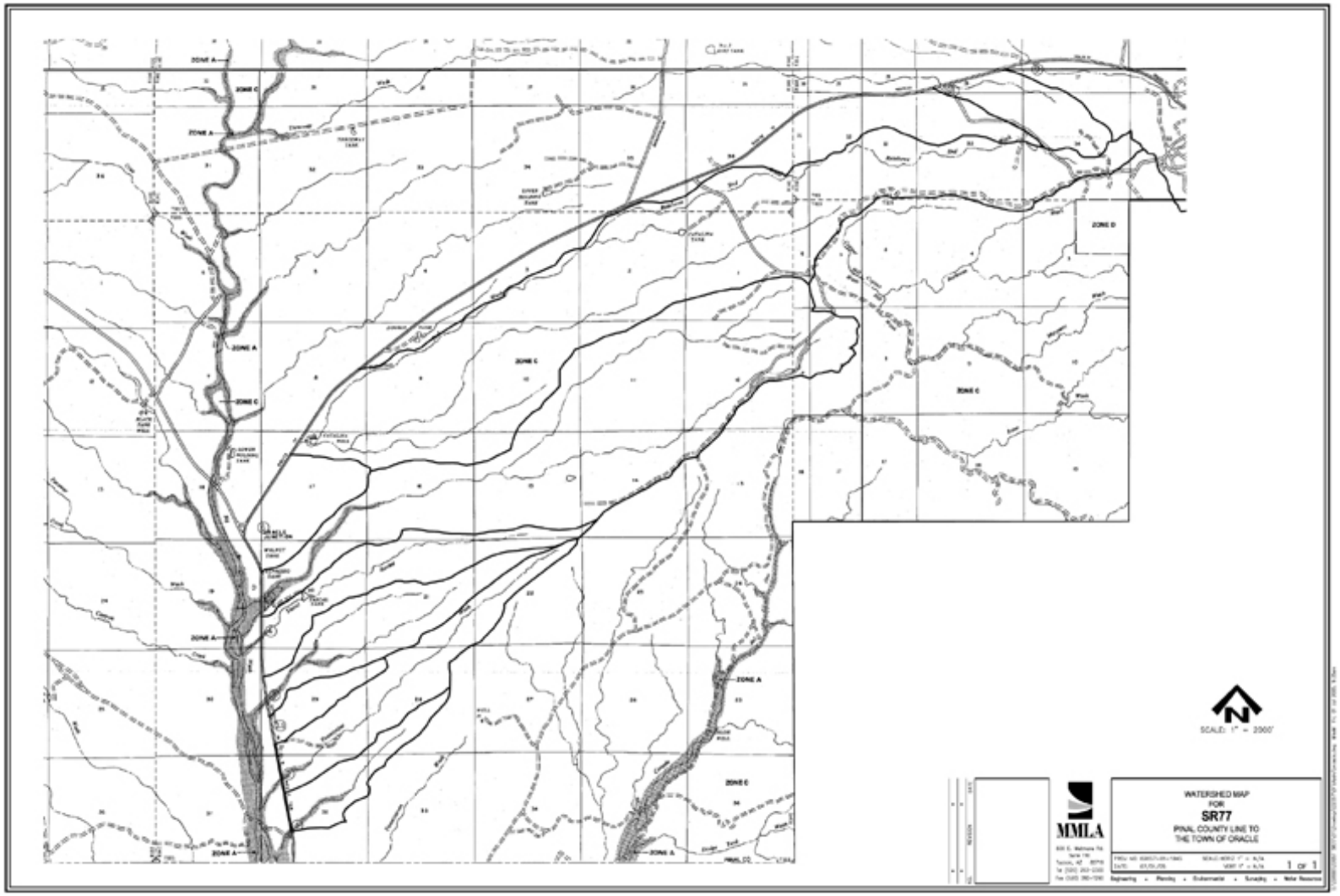
Bridge Rating	Description
0-49 percent	Eligible for replacement
50-80 percent	Eligible for Rehabilitation
Over 80 percent	Good condition
"F"	Indicates a Functionally Obsolete Bridge
"S"	Indicates a Structurally Deficient Bridge

Exhibit 5-8
EXISTING SR 77 STRUCTURES

Structure Number	Structure Name	Mile Marker	Offset	Reconstruction Year	Structure Material	Structure Design	Structure Length (ft)	Original Project No.	SR
2362	Miracle Mile TI UP	M255 (I-10)	0.1	0000	Pre-stress concrete continuous	Box beams or girders – single (CIP mutlicell box)	256	IR-10-4(109)	85.35
6830	RCB*	M092	0.06	1973	Concrete continuous	Culvert	42	AFE 7714	84.98
6574	Big Wash RCB	M099	0.97	0000	Concrete continuous	Culvert	32	F-031-1(9)	84.98
6575	Tucson Wash RCB	M102	0.42	0000	Concrete continuous	Culvert	32	F-031-1(9)	84.98
4728	RCB	M69	0.73	1979	Concrete continuous	Culvert	25	F-031-1(501)	82.00
4829	RCB	M069	0.92	1979	Concrete continuous	Culvert	38	F-031-1(501)	82.00
4734	RCB	M088	0.59	1995	Concrete continuous	Culvert	33	S-111(9)	81.51
4735	RCB	M089	0.34	0000	Concrete continuous	Culvert	3	STP-031-(1640)	81.51
4736	RCB	M090	0.3	1994	Concrete continuous	Culvert	76	S-111(9)	81.51
4737	RCB	M090	0.85	0000	Concrete continuous	Culvert	26	STP-031-(1640)	81.51
2006	Cañada Del Oro Br	M080	0.78	0000	Pre-stress concrete continuous	Stringer/multi-beam or girder	455	BP-031-1-513	80.00
4733	Twenty-Seven Wash RCB	M085	0.99	1989	Concrete continuous	Culvert	90	S-111(8)	80.00
1550	Rillito Creek Bridge	M071	0.79	0000	Pre-stress concrete	Stringer/multi-beam or girder	315	F-031-1(7)	78.22
4730	Pima Wash RCB	M072	0.46	1970	Concrete continuous	Culvert	59	S-111(6)	70.00
6754	RCB	M075	0.71	0000	Concrete continuous	Culvert	26	F-031-1(11)	70.00
7115	CMP**	M076	0.41	0000	Steel	Culvert	21	F-031-1(11)	70.00
4731	RCB	M076	0.68	1979	Concrete continuous	Culvert	53	S-111(7)	70.00
6755	RCB	M077	0.13	0000	Concrete continuous	Culvert	26	F-031-1(11)	70.00
6756	RCB	M078	0.37	0000	Concrete continuous	Culvert	45	F-031-1(11)	70.00
6757	RCB	M078	0.8	0000	Concrete continuous	Culvert	62	F-031-1(11)	70.00
4732	RCB	M078	0.9	1979	Concrete continuous	Culvert	53	S-111(7)	70.00
6812	RCB	M079	0.82	0000	Concrete continuous	Culvert	98	BP-031-1-513	65.00

* RCB = Reinforced Concrete Box
** CMP = Corrugated Metal Pipe

Exhibit 5-9
WATERSHED MAP FOR SR 77 – PINAL COUNTY LINE TO THE TOWN OF ORACLE



(Watershed 1 – Watershed 5, excluding Watershed 2.5) containing FEMA Zone A regulatory floodplains. The topography of the area generally slopes down off the northwestern flank of the Santa Catalina Mountains piedmont. The alluvial channels have slope values ranging from two to five percent, with an average around three percent. The vegetation, as would be expected in this arid climate, concentrates along the washes and on north facing slopes. Vegetative densities vary greatly but average around 25 percent.

Because Zone A represents an approximate floodplain study for which no detailed hydrologic or hydraulic information is available. A preliminary hydrologic analysis was performed. The analysis used HEC-HMS hydrologic models generated for each watershed utilizing the NOAA Atlas 14 rainfall distribution upper bound of the 90 percent confidence interval values. Rainfall distribution and loss were based on SCS curve numbers and SCS hypothetical storms. A curve number of 86 was assumed for each watershed. Six-hour storms with Type II distribution were used for each watershed with an area less than or equal to one square mile. Twenty-four hour storms with Type I distribution were used for each watershed with an area greater than one square mile. Watersheds were delineated on 1"=2000' USGS quadrangle maps with 40' contour intervals. The watersheds and associated Concentration Points (C.P.) are shown on the effective FIRM panels 0400771475C and 0400771500C, effective date August 15, 1983. The resultant discharges are summarized in the table in Exhibit 5-11.

In addition to the HEC-HMS model, Regional Regression Equations were utilized for comparison to the HEC-HMS output. The regression equations were taken from the USGS Open File Report 93-419, *Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States*, 1994. Since the Regional Regression Equations do not account for the elongated shape of the watersheds and the subsequent attenuation of the discharge hydrograph, as well as the fact that the Regional Regression Equations are not storm specific but are based on extrapolating known gauge data; it stands to reason the discharges calculated by the Regional Equation would be higher. The results of this analysis are also provided in the summary table in Exhibit 5-10.

Pinal County Line to the South

The general topography of the corridor region yields drainages that generally flow from east to west. Watersheds vary from natural undeveloped foothills to urban impervious surfaces. Discharges for wash crossing organized by information source are provided in Exhibit 5-11.

Each of the major culvert and bridge wash conditions for SR 77 is summarized below:

- At the intersection of SR 77 and Hawser Street at approximately Milepost 86, the highway crosses Twenty-Seven Mile Wash. The floodplain of this wash is not delineated on the FEMA FIRM panel.
- South of the intersection with Tangerine Road, just above the confluence with Big Wash, SR 77 crosses the Canada del Oro. The roadway remains in Shaded Zone X associated with the Canada del Oro Wash south to approximately Mile Post 78.6.

Exhibit 5-10
SUMMARY OF HYDROLOGIC ANALYSIS (EXISTING CONDITIONS)

C.P.	Approx. Mile Post	Wash Name	Area (ac)	Design Storm	HEC-HMS	Regional Regression
					Q_{100} (cfs)	Q_{100} (cfs)
1	88.2	Unnamed	366	6-Hr	321	1283
2	88.6	Twentynine Wash	899	24-Hr	501	2359
2.5	89.0	Unnamed	310	6-Hr	384	1138
3	89.4	Unnamed	774	24-Hr	493	2141
4	90.1	Tascal Ravine	752	24-Hr	451	2101
5	90.5	Represso Tank	3640	24-Hr	944	5392
6	91.1	Walnut Tank	494	6-Hr	650	1584
7	92.0	Rainbows End Wash	4634	24-Hr	1802	6135
8		Unnamed	435	6-Hr	373	1450

Exhibit 5-11
DISCHARGES FOR WASH CROSSINGS ON SR 77
MIRACLE MILE TO PINAL COUNTY LINE

FEMA Flood Insurance Study

River	Crossing	Q_{10} (cfs)	Q_{50} (cfs)	Q_{100} (cfs)	Q_{500} (cfs)
Rillito River	At First Avenue	12,500	23,000	32,000	64,000
Pima Wash	Above confluence with Rillito River	1,800	4,050	5,300	10,700
Cañada del Oro	Above confluence with Big Wash	6,400	15,400	21,000	35,000

Collins-Piña, Final Report for 27 Mile Wash Floodplain Delineation Study, PCDOT&FCD

River	Crossing	Q_{10} (cfs) (Ex)	Q_{50} (cfs) (Future)	Q_{100} (cfs) (Ex)	Q_{500} (cfs) (Future)
27 Mile Wash	At SR 77	1,849	2,488	3,690	4,499

City of Tucson Stormwater Management Study

River	Crossing	Node	Q_{100} (cfs)	Status
Navajo Road	At SR 77	DG-N0260	2,015	Draft
Delano Street	At SR 77	DG-N0310	1,053	Draft

Town of Oro Valley – Townwide Drainage Study (Kimley-Horn and Associates)

River	Crossing	Node	Q_{100} (cfs)	Status
Cañada Del Oro Wash	At SR 77	CP090	7,723	Draft
Rooney Wash	At SR 77	CP454	2,267	Draft
Pusch Wash	At SR 77	CP487	1,608	Draft

Note: Q = flow
Cfs = cubic feet per second
Ex = existing

- At approximately Milepost 79.4, SR 77 parallels Rooney Wash until the wash crosses SR 77 at approximately Milepost 78.9.
- South of the crossing of Rooney Wash, SR 77 exits the Shaded Zone X floodplain of the Canada del Oro Wash and crosses the Zone A Floodplain of Pusch Wash approximately 500 feet downstream of the downstream limits of detailed study for that floodplain. The Pusch Wash crossing is just north of the intersection of SR 77 and Greenock Drive.
- South of Rudasill Road SR 77 begins to parallel the floodplain of Pima Wash. A culvert crossing designed to handle the 500-year flow of Pima Wash passes under SR 77 at approximately Milepost 72.45.
- The bridge for the SR 77 crossing of the Rillito River is located at approximately Milepost 71.75-71.9.
- South of Milepost 70, SR 77 crosses the Zone AE floodplain of Navajo Wash. The culvert crossing for this wash is undersized for the 100-year event. Significant overtopping of the roadway results in a significant drainage issue at this crossing.
- South of Fort Lowell Road at Delano Road, the highway crosses the Zone AE floodplain of Cemetery Wash. The culvert crossing for this wash is undersized for the 100-year event. Significant overtopping of the roadway results in a significant drainage issue at the crossing.

5.1.7 Terrain

The SR 77 Corridor elevation increases gradually from approximately 2,300 feet in Tucson to approximately 4,200 feet in Oracle. Because the increase in elevation is gradual, the terrain for the entire length of SR 77 within the corridor can be considered level for the purpose of highway capacity analyses.

5.1.8 Posted Speed Limit

The posted speed limit varies from 40 miles per hour (mph) to 55 mph throughout the project section. Within the Tucson City Limits, the speed limit is 40 mph (I-10 to River Road). From River Road to Ina Road, the speed limit increases to 45 mph. North of Ina Road to Tangerine Road, the speed limit is 50 mph. From Tangerine Road to Lupine Place, the speed limit is 55 mph. North of Lupine Place within the community of Catalina, the speed limit reduces to 45 mph. At the Pima/Pinal County line, the speed limit increases to 55 mph and continues through to the end of the project segment. Posted speed limits are shown in Exhibit 5-12.

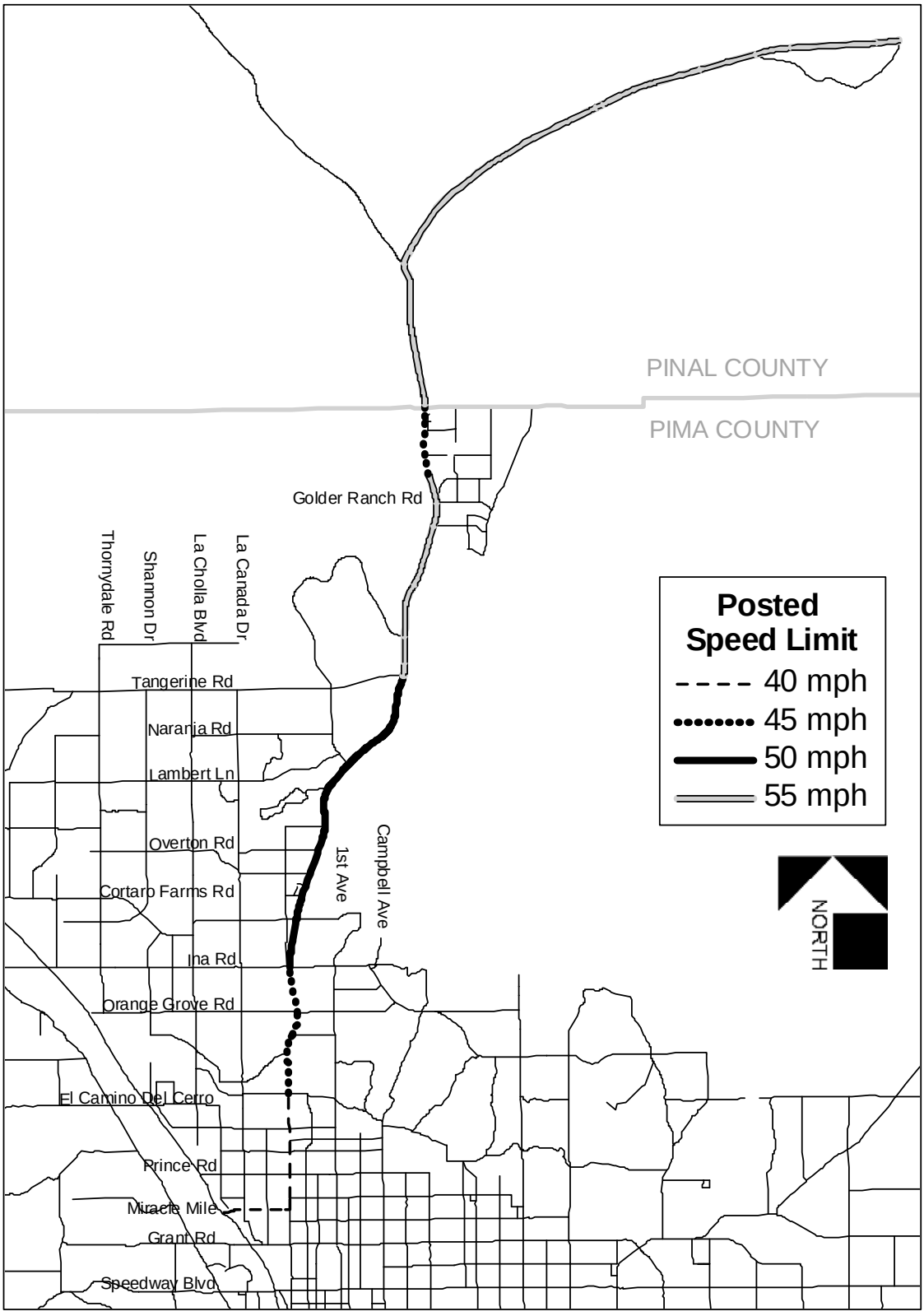
5.1.9. Traffic Data

Traffic data gathered included average daily traffic volumes, traffic volume factors, existing level of congestion, future volumes and future level of congestion.

Traffic Volumes

The Tucson metropolitan area and the SR 77 corridor have experienced rapid growth. Along with this growth, came an increase in urban and inter-urban travel demand. In general, the greatest growth in the traffic volumes within the corridor has occurred on streets north of Ina Road. For example, traffic volumes on SR 77 north of Ina Road have at least doubled from 1992

Exhibit 5-12
POSTED SPEED LIMITS ON SR 77



to 2002, which translates into annual growth rates ranging as high as nine percent. Low-volume east-west streets north of Ina Road have experienced extraordinarily high growth rates. First Avenue, Hardy Road, Tangerine Road, and Lambert Lane have all experienced many-fold increases in traffic volumes over the last 10 years. Likewise, segments of north-south streets located north of Ina Road have seen the greatest percent growth. For example, La Cholla Boulevard north of Magee Road has seen a 75 percent increase in traffic volume in the last 10 years, and La Cañada Drive north of Ina Road has seen a 50 percent increase. Arterial streets close to the urban core have seen less rapid growth over the last 10 years, and some volumes have remained relatively constant (e.g., Wetmore Road, First Avenue south of Ina Road, and Campbell Avenue south of River Road). Exhibits 5-13 shows counted daily traffic volumes in 1992 and 2002, and provides year 2030 traffic forecasts along SR 77 based on the most current data available at the time this study was completed .

Traffic volume factor data are from the ADOT *State Highway System KDT 1998 Traffic Factor Tables.* Peak hour factors, lane directions splits and percentage of truck traffic are shown in Exhibit 5-14.

Level of Congestion

Level of congestion information for the existing conditions was provided by the Pima Association of Governments (PAG). PAG uses estimates of roadway segment volume to capacity ratio (V/C) to establish the segment level of congestion. Four congestion levels are estimated: no to low congestion (V/C between 0 and 0.5), moderate congestion (V/C between 0.5 and 0.75), heavy congestion (V/C between 0.76 and 1.0), and severe congestion (V/C greater than 1.0). Locations estimated to have heavy and severe levels of congestion for the year 2002 are provided in Exhibit 5-15. Year 2030 congestion levels and a comparison to year 2002 congestion are provided in Chapter 6.

Existing traffic congestion on Oracle Road/SR 77 ranges from low to moderate through most of the study area. Heavy to severe congestion is found between Orange Grove Road and First Avenue. Other segments in the project corridor including portions of I-10, First Avenue, La Canada Drive, Ina Road, Orange Grove Road, River Road, La Cholla Boulevard, Grant Road, First Avenue/Euclid Avenue, and Speedway Boulevard also experience heavy to severe congestion under existing conditions.

5.1.10 Traffic Crash Summary

An evaluation of traffic crashes along SR 77 was conducted for the five-year period from December 1997 through November 2002. Crash data were provided electronically by the Arizona Department of Transportation from the State's accident database. At the signalized intersections along SR 77 the crash data includes intersection related crashes on the cross streets as well as those occurring on SR 77. Detailed tabular information from the crash analysis is provided in Appendix D.

Exhibit 5-13
YEAR 1992, 2002 AND FORECAST YEAR 2030 DAILY TRAFFIC VOLUMES

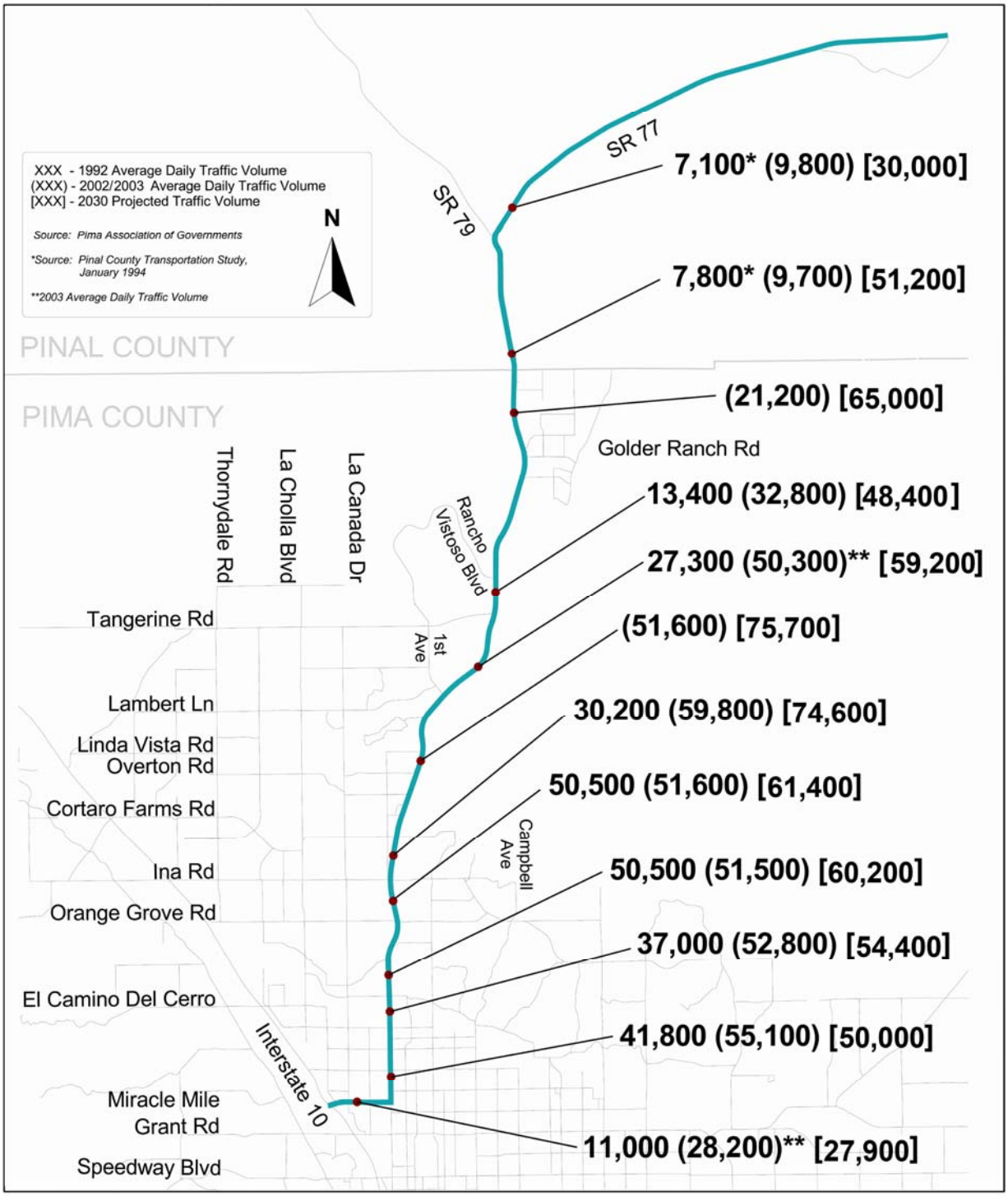


Exhibit 5-14
SR 77 TRAFFIC VOLUME FACTORS AND TRUCK PERCENTAGES

From		To				
MP	**Location**	**MP**	**Location**	**Peak Hour Factor (K)**	**Daily Directional Split (D)**	**Percentage of Truck Traffic (T)**
68.10	I-10 TI	69.55	Oracle Road	6%	51%	9%
69.55	Oracle Road	70.79	Roger Road	6%	51%	9%
70.79	Roger Road	72.09	River Road	6%	51%	9%
72.09	River Road	74.84	Ina Road	6%	50%	9%
74.84	Ina Road	77.40	Calle Concordia	6%	51%	9%
77.40	Calle Concordia	79.00	Tangerine Road	6%	50%	9%
79.00	Tangerine Road	88.05	Goodman Road	6%	50%	9%
88.05	Goodman Road	91.14	SR 79 North-Oracle Junction	6%	50%	9%
91.14	SR 79 North-Oracle Junction	100.26	South Jct Oracle Road – Oracle	14%	50%	9%
100.26	South Jct Oracle Rd – Oracle	103.32	North Jct Oracle Road – Oracle	14%	50%	9%

Source: ADOT State Highway System KDT 1998 Traffic Factor Tables.

Exhibit 5-15
YEAR 2002 LEVELS OF CONGESTION

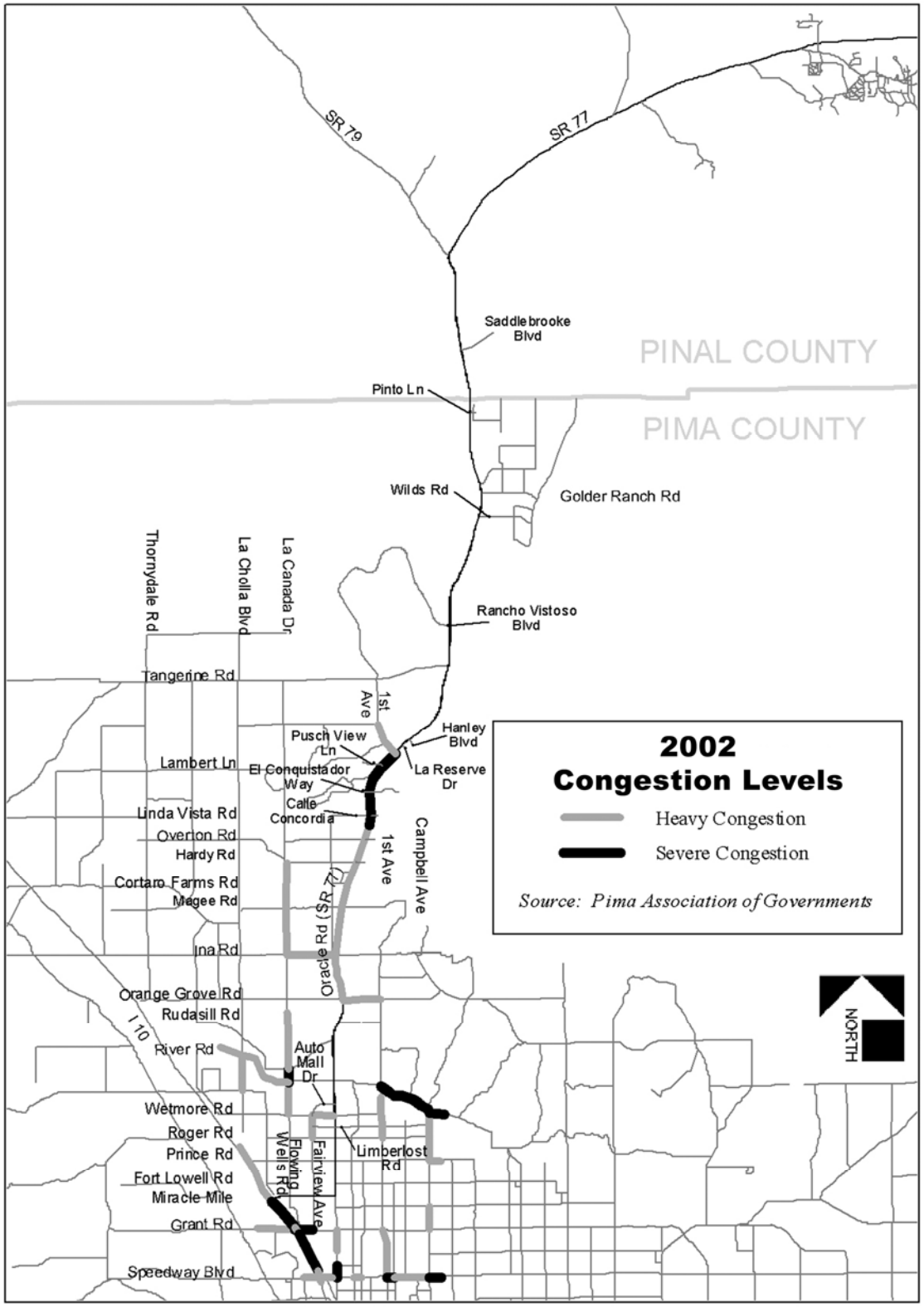


Exhibit 5-16 provides a summary of the five-year crash data for SR 77. There has been a total of 4,961 crashes with 17 fatalities, 2,725 injuries reported (non-fatal), 65 crashes involving bicyclists, and 42 crashes involving pedestrians. Fifty-three percent of the crashes were rear ends, 11 percent left-turn crashes, 10 percent angle crashes, and 10 percent sideswipes. Overall, five percent of the crashes were reported to involve alcohol.

Exhibit 5-16
TOTAL CRASH CHARACTERISITCS
(December 1997 through November 2002)

Crash Type	Number of Crashes	Percent of Total Crashes
Fatal Crashes	17	0.3
Injuries Occurred	2,725	54.9
Pedestrians Involved	42	0.8
Bike Involved	65	1.3
Alcohol Related	249	5.0
Angle	501	10.0
Left-Turns	567	11.4
U-Turns	100	2.0
Head-On	11	0.2
Rear Ends	2,621	52.8
Sideswipes	484	9.7
Total Crashes	**4,961**	

The evaluation of traffic crash data were segregated based on crashes that were indicated to be "intersection related" and those that are “non-intersection related.” Crashes are designated as intersection-related or non-intersection-related by the reporting police officer based on the circumstances of each crash. Only crashes designated as intersection-related were included in the crash statistics for signalized intersections. Non-intersection-related crashes were included in the statistics developed for the roadway segments between traffic signals.

Crash rates were developed separately for each of three years (1998, 2000, and 2002) and as a composite three-year rate. The annual crash rates were developed to assist in identifying any trends in the crash rates at specific intersections and along roadway segments. Annual crash rates were not developed for each of the five years of data because sufficient traffic volume data for 1999 and 2001 were not available. The primary source of traffic volume data was the Pima Association of Government's (PAG) traffic count program. These data are updated periodically, but not annually. Review of all of the data available for roadway segments and intersections provided sufficient data for 1998, 2000, and 2002 to allow for a meaningful estimation of crash rates during these years. This was not the case for 1999 or 2001.

The crash rate for intersections was computed as the number of crashes per million vehicles entering the intersection from all approaches. The crash rate for roadway segments was computed as the number of crashes per million vehicle-miles of travel over the length of the segment. Roadway segments were defined as the roadway between signalized intersections,

except for the first segment listed in the Appendix D tables, which begins at the northern terminus of the corridor as defined in this study.

Signalized Intersection Crash Summary

There were 29 signalized intersections along SR 77 within the study boundaries at the time this analysis was conducted. Exhibit 5-17 indicates the intersections with the highest crash rate, highest total number of crashes, and the highest increase in crash rate over the five-year analysis period.

Exhibit 5-17
INTERSECTION CRASH SUMMARY

Highest Crash Rates [1.]	Highest Number of Crashes [2.]	Highest Increases in Crash Rate
1. River Road – 1.92	1. River Road – 267	1. Tangerine Road – 650%
2. Flowing Wells Road – 1.42	2. Ina Road – 225	2. Pusch View Lane – 437 %
3. Ina Road – 1.40	3. Prince Road – 161	3. La Reserve Drive – 194%
4. Prince Road – 1.20	4. Orange Grove Road – 136	4. Flowing Wells Road – 123%
5. Wetmore Road – 1.13	5. Wetmore Road – 134	

1. Crashes per million vehicles entering the intersection.
2. Total for 5-year analysis period, December 1997 through November 2002.

Road Segment Crash Characteristics

Exhibit 5-18 summarizes road segment crash characteristics. The crash rate for segments were computed as the number of crashes per million vehicle miles of travel into the segment.

Exhibit 5-18
ROAD SEGMENT CRASH SUMMARY

Highest Crash Rates [1.]	Highest Number of Crashes [2.]	Highest Increases in Crash Rate
1. Limberlost Drive to Roger Road – 4.76	1. Ina Road to Orange Grove Road - 298	1. First Avenue to Pusch View Lane – 217%
2. Wetmore Road to Limberlost Drive – 4.55	2. Magee Road to Ina Road - 259	2. Pusch View Lane to El Conquistador Way – 106%
3. Orange Grove Road to Rudasill Road – 4.04	3. Rudasill Road to River Road - 238	3. El Conquistador Way to Linda Vista Boulevard – 95%
4. Roger Road to Prince Road – 3.97	4. Orange Grove Road to Rudasill Road - 195	
5. Auto Mall Drive to Wetmore Road – 3.74	5. Hardy Road to Magee Road - 182	

1. Crashes per million vehicle-miles of travel on the segment.
2. Total for 5-year analysis period, December 1997 through November 2002.

Night Versus Day Crash History

An analysis of the nighttime versus daytime crash history was conducted to determine if the lack of roadway lighting could be considered a deficiency at locations along the corridor. Roadside lighting exists along SR 77 within the City of Tucson from Interstate 10 to River Road, a

distance of 3.8 miles. There is no roadside lighting north of River Road to the northern terminus of the project, a distance of 31.3 miles. Intersection lighting exists at all signalized intersections.

The analysis computed the nighttime and daytime crash rates for each roadway segment and used these values to compute the ratio of the nighttime to daytime crash rate. In addition, a procedure used by the City of Tucson (*Comprehensive Roadway Illumination Study – Phase IV,* January 2003) to evaluate roadway lighting needs was employed to rank roadway segments. This analysis takes into account geometric, operational, and roadside environmental factors to compute an overall ranking score for each segment. The higher the ranking score, the more the potential benefit from roadway lighting. A summary of the results from the lighting analysis is provided in Appendix E. These results indicate that, in general, the unlighted segments of SR 77 have higher nighttime crash rates than the lighted segments. Six of the unlighted segments have nighttime crash rates that are 2.2 to 3.5 times higher than the daytime crash rates. The segment from Rancho Vistoso Boulevard to Tangerine Road has the highest night/day crash rate ratio of 3.5. The segments ranked the highest, considering all factors, are in the area from Saddlebrooke Boulevard south to First Avenue. The five highest ranked segments considering all factors, in order of ranking, are:

1. Tangerine Road to Hanley Boulevard
2. Pinto Lane to Golder Ranch Road
3. Golder Ranch Road to Wilds Road (low number of crashes on this segment does not support a need for lighting)
4. Wilds Road to Rancho Vistoso Boulevard
5. First Avenue to Pusch View Lane

This analysis does not indicate that roadway lighting alone will improve the incidence of nighttime crashes on these segments. It does suggest that lighting should be considered if the already planned capacity improvements do not reduce the incidence of nighttime crashes.

5.1.11 SR 77 Access Points and Crashes

An analysis was conducted evaluating the relationship between the number of driveways and total number of crashes along SR 77 road segments. This analysis was conducted by direction of travel. Exhibits containing the physical characteristics (segment length, number of driveways and unsignalized cross streets) and access related crash data (sideswipe, rear end, head on, U-turn, left turn, and angle crashes) along SR 77 between the end segment and I-10 are provided in Appendix D. State Route 77 was broken down into 29 segments from end segment to I-10 for the initial analysis. Access points per mile were determined by number of driveways and unsignalized cross streets within the road segment. Access related crashes is the sum of sideswipe, rear end, head-on, U-turn, left turn and angle crashes that occur within the road segment. Total crashes are from the five-year history in each direction of travel.

Comparing the number of access points per mile to access related crashes and total crashes for northbound and southbound travel, revealed several trends.

- Access related crashes account for more than 50 percent of total crashes along the road segments. This trend holds for 90 percent of the road segments in both directions.

- In general, as the number of access points per mile increases, the number of total crashes and access related crashes increase. This trend is visible in both directions of travel.
- The majority of access related crashes occur between Magee Road and Rudasill Road, and between Prince Road and Roger Road.
- Regression analysis indicated that approximately 59 percent of the variation in the segment crash rate is explained by the variation in access points per mile (see Appendix D), suggesting a fairly strong correlation between the number of driveways and crash rate for the corridor.

5.2 TRANSIT SYSTEM AND SERVICE

5.2.1 Sun Tran Transit System

Sun Tran, the transit system provided by the City of Tucson, operates fixed-route services in the study area. Special needs services are operated by VanTran, Sun Tran's affiliate dial-a-ride system, and by Coyote Run, which targets seniors in the Oro Valley area but will make trips as far south as St. Mary's Hospital in Tucson.

Sun Tran operates 26 local fixed routes and 11 express routes in the greater Tucson area. Of these, eight of the local routes and five of the express routes operate wholly or partially within the corridor. These include local Route 16, which travels over Oracle Road as far north as Ina Road before heading west on Ina Road. Express routes 103, the "Oldfather Express" and 162, the "Oro Valley express," operate several trips each way during the morning and evening peak periods only. The "Oro Valley Express" also functions as a reverse commute, carrying Honeywell employees from Tucson out to the aerospace firm's Oro Valley facility.

Sun Tran's Tohono Tadai transfer center, located on the northeast corner of Stone Avenue and Wetmore Road, serves as a hub for the fixed route services in the area. Sun Tran also advertises three park-and-ride lots in the corridor: Ina Road/Via Ponte (southwest corner - on Ina Road, one block west of Oracle Road), Oracle Road/Magee Road (southeast corner - Plaza Escondida - 7900 North Oracle Road), and Oracle Road/Orange Grove Road (southeast corner - Oracle Plaza). Corridor transit routes and facilities are shown in Exhibit 5-19.

In an inventory and analysis of transit services and facilities conducted as Phase 1 for the Transit Element of the 2030 Regional Transportation Plan (PAG Transit Study), The Transpo Group developed a listing of the levels of service, headways, and hours of service for all of the Sun Tran Routes. Exhibit 5-20 presents this information for the routes in the SR 77 Corridor study area.

During peak hours, Routes 6, 15, and 16 offer service as frequently as every 15 minutes in each direction. The most frequent service offered by any of the other routes is every 30 minutes. Routes 6 and 16 offer some 30-minute service on Saturdays, but most Saturday service, and all Sunday service, is offered on 60-minute headways. Service hours on the local routes during the week range from a high of almost 18 hours provided by Route 10 to about 14 hours provided by Route 61. Weekend hours of operation are somewhat shorter.

Exhibit 5-19
EXISTING TRANSIT FACILITIES IN THE CORRIDOR

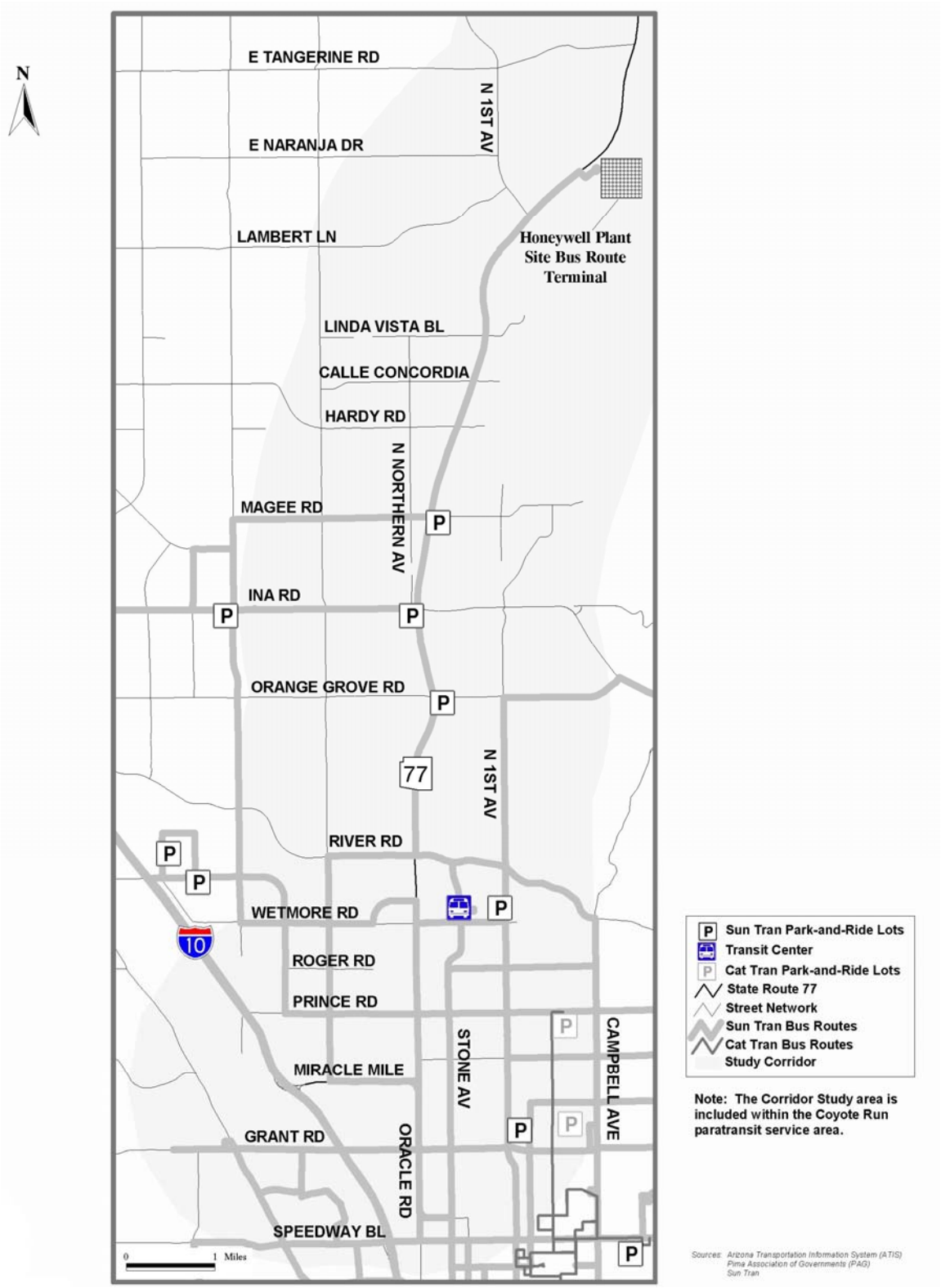


Exhibit 5-20
SUN TRAN LEVEL OF SERVICE AND HEADWAYS ON CORRIDOR AREA ROUTES

Route		Headways					Weekdays		Saturdays		Sundays	
		Peak	Mid	Night (after 8:30)	Sat	Sun	First	Last	First	Last	First	Last
6	S Park/N 1st Ave	15/30	30	-	30/60	60	4:37	20:36	6:39	19:50	6:20	19:36
10	Flowing Wells	30	30	60	60	60	5:19	23:04	7:00	19:55	7:17	19:55
15	Campbell	15/30	15/30	30	60	60	5:34	22:07	6:38	19:18	9:38	19:17
16	12th Ave/Oracle	15	15/30	30	30/60	30	5:04	22:50	5:37	21:28	5:37	20:23
17	Country Club Road/29th St	30	30	-	60	60	5:24	19:44	6:28	19:39	8:15	19:39
19	Stone Avenue	30	30	30	30	60	5:59	21:19	7:32	19:21	7:32	20:21
34	Craycroft Road	30	30	-	60	60	5:44	19:23	7:14	19:05	8:32	18:05
61	La Cholla	30	30	-	60	60	5:36	19:31	6:07	19:00	6:07	18:00
162	Oro Valley Express	30	-	-	-	-	5:50	19:10	-	-	-	-
102	Ina Rd Express	20	-	-	-	-	6:34	17:55	-	-	-	-
103	Oldfather Express	30	-	-	-	-	6:32	17:54	-	-	-	-
105	Sunrise Express	1 trip	-	-	-	-	6:21	18:33	-	-	-	-
186	AeroPark Ina Express	60	-	-	-	-	5:33	18:41	-	-	-	-

Source: *Transit Element of the 2030 Regional Transportation Plan – Phase I, Inventory and Analysis of Transit Services and Facilities*, The Transpo Group, *et al*, 2003.

The express routes operate during peak periods on weekdays only. Route 162 operates six trips during the morning peak period and six during the evening peak period, but the other express service is limited to between one and three trips during the morning and evening.

5.2.2 Paratransit Services

Two operators provide Paratransit services within the SR 77 Corridor study, Van Tran, operated by the City of Tucson, and Coyote Run, operated by the Town of Oro Valley. The service each provides is summarized below:

5.2.2.1 Van Tran Paratransit Service

As required by the Americans with Disabilities Act (ADA), the City of Tucson operates a complimentary paratransit service within the extents of the Sun Tran service area and within three-quarter mile of each Sun Tran fixed route. Van Tran provides service to persons holding an ADA eligibility card.

Reservations for the shared ride system must be made in advance. Requests for pick-up may be made between 7:00 AM and 4:00 PM, 365 days a year. The regular fare is $2.00, or $20.00 for a book of 10, and the economy fare is $ 0.80, or $8.00 for a book of 10.

Van Tran does not guarantee service, and on busy days requests for pick-ups may be denied. Requests are accepted on a "first come, first served" basis, and may be submitted up to seven days in advance.

5.2.2.2 Coyote Run Paratransit Service

The Town of Oro Valley implemented Coyote Run in October of 1996 to serve residents who are 62 years of age or older or are eligible under the ADA. Service is provided within Oro Valley and from Oro Valley to destinations such as medical facilities and social service agencies throughout much of the Tucson area. The Town owned and operated transit service provides over 1,200 trips per month to approximately 667 eligible riders.

Like Van Tran, Coyote Run is a paratransit operation where reservations must be made in advance. Pick-ups are provided Monday through Friday between 8:00 AM and 5:00 PM excluding holidays. Fares are based on a three-zone structure. Travel within Zone A, which corresponds to the Town limits, is $4.00 round trip. Travel within Zone B, which extends west to Thornydale Road, north to the Pinal County line, and south to Wetmore Road, is $8.00 round trip. Travel within Zone C, which is bounded by Camino de Oeste, Wilmot Road, and 22nd Street, and extends north to include Saddlebrooke and Catalina, is $12.00 round trip.

Coyote Run was named the 2003 Outstanding Transit Organization of the Year by the Arizona Transit Association. Oro Valley's elderly population is increasing. Residents aged 60 years and over currently comprise 30 percent of the Town's population and Town officials expect the number of persons eligible to use Coyote Run will continue to increase.

5.3 INTERMODAL FACILITIES

The extent of intermodal facilities in the corridor consists of the transit center and transit park and ride facilities described in the transit section of this chapter.

5.4 BICYCLE FACILITIES

The ADOT Map of Suitable Bicycle Routes on the State Highway System identifies the project section of SR 77 as a "More Suitable" Bicycle Route. This designation is based on criteria associated with shoulder width, pavement condition, and widening feasibility.

The City of Tucson Bike Map identifies the segments of SR 77 as:

- SR 77 (Miracle Mile) from Flowing Wells Road to Fairview Avenue, and SR 77 (Oracle Road) from Miracle Mile to Roger Road: Bike Route with Striped Shoulder.
- SR 77 (Oracle Road) from Ina Road to North of Mainsail Boulevard (just south of the Pinal County Line): Paved Shoulder – On street, with painted edge line, speed limits 30 mph or more.
- SR 77 (Oracle Road) from Wilds Road to Mainsail Boulevard: Shared-use Path – Paved facility, separated from street.

SR 77 from River Road to Ina Road was recently rebuilt by ADOT to have wider shoulders that accommodate bike travel.

There are currently no programmed or planned projects to improve bicycle facilities on SR 77 between I-10 to Flowing Wells Road, Fairview Avenue to Oracle Road, or Roger Road to River Road. Sections of major parallel routes within the corridor are identified on the Tucson Bike Map as bicycle facilities. These include Flowing Wells Road/La Canada Boulevard, La Cholla Boulevard, Fairview Avenue, Stone Avenue First Avenue, Mountain Avenue and Campbell Avenue.

Existing intersection bicycle counts were collected from turning movement counts in 2001 at select intersections. The counts were taken during three time periods, typically during weekdays. They are presented in Exhibit 5-21.

5.5 PEDESTRIAN FACILITIES

An inventory of existing sidewalks was conducted for this project. In general, the project area within the City of Tucson has the most standard sidewalks, although there are several locations of discontinuity. Exhibit 5-22 shows the location of sidewalks on SR 77.

In addition to the inventory of sidewalks, a field review was conducted to determine pedestrian accessibility on SR 77. This field review identified pedestrian opportunities, sometimes in the absence of sidewalks. Exhibit 5-23 identifies pedestrian facility accessibility on SR 77.

Exhibit 5-21
SR 77 CORRIDOR AREA BIKE COUNTS
YEAR 2001 TOTAL ENTERING INTERSECTION COUNTS

Intersection	Total Bikes
Campbell Avenue/Grant Road	99
Campbell Avenue/Speedway Boulevard Intersection	287
Euclid Avenue/Speedway Boulevard Intersection	269
La Canada Drive/Orange Grove Road Intersection	17
La Cholla Boulevard/Orange Grove Road Intersection	6
La Cholla Boulevard/River Road Intersection	16
Oracle Road/First Avenue Intersection	48
Oracle Road/Grant Road Intersection	74
Oracle Road/Ina Road Intersection	50
Oracle Road/Miracle Mile Intersection	51
Oracle Road/Orange Grove Road Intersection	22
Oracle Road/Prince Road Intersection	66
Oracle Road/River Road Intersection	28
Stone Avenue/Speedway Boulevard Intersection	97

Summary counts from weekday turning movement volumes: total over three time periods (7:00 AM to 9:00 AM, 11:00 AM to1:00 PM, 4:00 PM to 6:00 PM); All Directions
Source: Pima Association of Governments

Exhibit 5-22
LOCATIONS OF SIDEWALKS ON SR 77

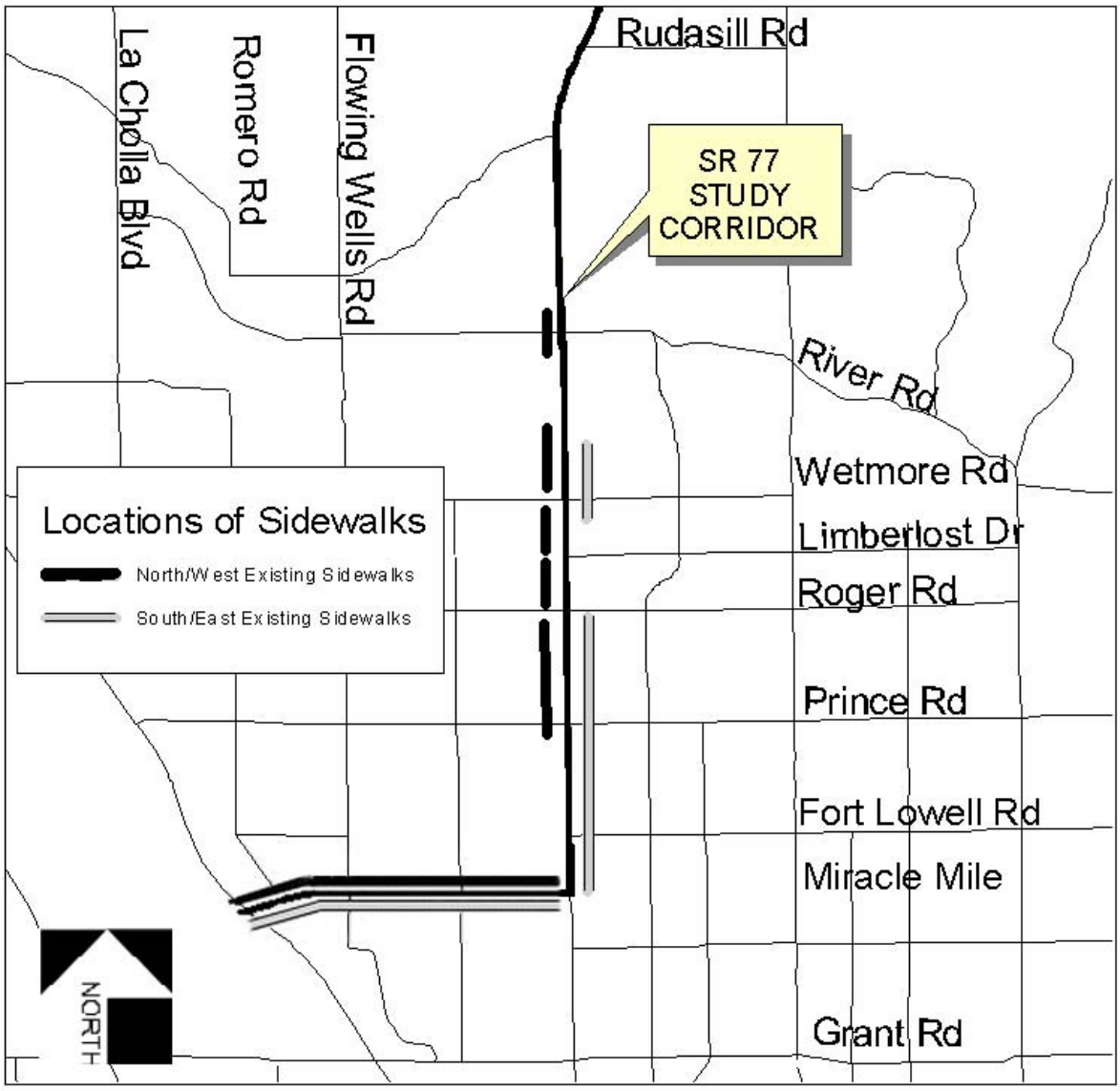


Exhibit 5-23
SR 77 PEDESTRIAN FACILITY ACCESSIBILITY

Northbound (East side of SR 77)

Mile Post	Paved	Accessibility	Wheelchair Accessible	Handicap Ramps	Obstructions
68.28	No	Limited	No	No	Yes
68.45	Intermittent	Yes	No	Yes	Yes
68.59	No	Limited	No	Yes	Yes
68.86	Intermittent	Yes	Limited	Yes	Yes
69.15	Intermittent	Yes	Limited	Yes	Yes
69.53	Yes	Yes	Yes	Yes	No
70.96	Intermittent	Yes	Limited	Yes	No
71.25	Yes	Yes	Yes	Yes	No
71.68	No	Yes	No	No	No
72.01	No	Yes	Limited	Yes	No
72.11	No	Limited	No	No	Yes
73.04	No	Limited	No	No	Yes
73.85	No	Yes	No	Yes	Yes
73.90	No	Limited	No	No	Yes
74.86	No	Limited	No	Yes	Yes
75.20	No	Limited	No	No	Yes
86.67	No	Limited	No	No	Yes
91.55	No	Limited	No	No	Yes

Southbound (West side of SR 77)

Mile Post	Paved	Accessibility	Wheelchair Accessible	Handicap Ramps	Obstructions
103.32	No	No	No	No	Yes
91.14	No	Limited	No	No	Yes
78.46	No	Limited	No	No	Yes
74.51	No	Limited	No	No	Yes
74.34	No	Limited	No	No	Yes
73.48	No	Yes	Limited	Yes	Yes
72.10	Yes	Yes	Yes	Yes	No
71.96	No	Yes	Limited	Yes	No
71.87	Yes	Yes	Yes	Yes	No
71.30	Intermittent	Yes	Limited	Yes	No
71.18	Yes	Yes	Yes	Yes	No
71.12	No	Yes	Yes	Yes	No
70.80	Yes	Yes	Yes	Yes	No
70.23	No	Yes	Limited	Yes	No

5.6 ITS FACILITIES

5.6.1 Traffic Signal System

On SR 77/Oracle Road, there are 32 existing traffic signals within the project limits as described in Exhibit 5-24. An additional signal is planned at Ram's Field Pass (between Honeywell Entrance and Tangerine Road). In addition to the SR 77/Oracle Road signals, there are an additional 84 signals within the four-mile width of the corridor study area.

Exhibit 5-24
EXISTING TRAFFIC SIGNALS ALONG SR 77

Signals on SR 77

- I-10 West/Miracle Mile
- I-10 East/Miracle Mile
- Flowing Wells Road
- Fairview Avenue
- Miracle Mile
- Fort Lowell Road
- Prince Road
- King Road (Fire Department Signal)
- Roger Road
- Limberlost Road
- Wetmore Road
- Auto Mall Drive
- River Road
- Rudasill Road
- Orange Grove Road
- Ina Road
- Suffolk Drive (new 2005)
- Magee Road
- Hardy Road
- Calle Concordia
- Linda Vista Road
- El Conquistador Way
- Pusch View Lane
- First Avenue
- La Reserve Drive
- Honeywell Entrance
- Tangerine Road
- Rancho Vistoso Boulevard
- Wilds Road
- Golder Ranch Road
- Pinto Lane
- Saddlebrooke Boulevard

- 32 Signals, (13 COT, 19 ADOT)
- 1 Future signal (ADOT) at Ram's Field Pass

All of the traffic signals within the corridor are coordinated by the City of Tucson, or ADOT from the I-10/Miracle Mile interchange through to Rancho Vistoso Boulevard in Catalina. ADOT recently coordinated all signals from Rudasill Road to Rancho Vistoso Boulevard.

All of the signals within the corridor except for SR 77/Saddlebrooke Boulevard are connected to the City of Tucson Traffic Management Center.

5.6.2 Other Existing ITS Facilities

Currently there are no other ITS facilities on SR 77 within the project limits. The document, *Intelligent Transportation Systems: ADOT Statewide Plan – Intelligent Transportation Infrastructure,* (ADOT Intermodal Transportation Division Technology Group, December 2002) identifies a future/proposed Variable Message Sign to be located on SR 77 at MP 92. This document also identifies a future/proposed Road Weather Information System (RWIS) on SR 77

north of Tucson. The purposes of the (RWIS) are in part to provide real time weather conditions, provide data for predicting weather conditions, and to determine surface and subsurface temperatures.

5.7 PLANNED AND PROGRAMMED IMPROVEMENTS

5.7.1 Corridor Roadway Projects

The current planned or programmed capacity projects for the study corridor were reviewed to determine which needs and deficiencies would be mitigated by those projects. The current planned or programmed projects were taken from the *PAG 2007-2011 Transportation Improvement Program*, the Central Arizona Association of Governments *2003-2008 Transportation Improvement Program*, the PAG *2030 Regional Transportation Plan Amendment*, the PAG Regional Transportation Authority (RTA) list of projects to be funded by the May 2006 voter approved regional transportation sales tax. Additional strategies are identified later in this document to address the remaining needs and deficiencies. The planned or programmed projects are summarized in tabular form in Exhibits 5-25 through 5-28. The tables list projects located directly on SR 77, projects on other north/south roadways within the study corridor, projects on east/west roadways within the corridor, and alternate mode projects within the corridor. Note that Interstate 10 is listed as a north/south roadway because of its primary direction of travel within the Tucson area. Projects are also categorized as "capacity" projects (projects that are intended to add capacity to the roadway), and "non-capacity" projects (all other types of projects). Projects are listed from north to south on the north/south roadways, and from west to east on the east/west roadways. Exhibit 5-28 lists the corridor alternate mode projects (transit, pedestrian, and bicycle) that are not already accounted for in the capacity improvements.

The location and type of planned or programmed improvements are also illustrated graphically in Exhibits 5-29 and 5-30. The information in these exhibits was used to evaluate how well these projects address existing and forecast future deficiencies in the corridor.

SR 77 Capacity Projects

The list of planned or programmed projects includes 53 capacity projects for the study corridor. Seven of these projects are on SR 77, including widening SR 77 to six lanes from the Pinal County Line south to La Reserve and from Pusch View Lane to Calle Concordia, with additional intersection improvements at First Avenue, Ina Road, Orange Grove Road, Prince Road, and at the Drachman Street/Main Avenue intersection. The *Pinal County Small Area Transportation Study* (2006) recommends widening SR 77 to six lanes from the Pinal County Line north to the junction of SR 77 and SR 79, and recommends that SR 77 be widened to four lanes from the SR 79 junction to the east past the Town of Oracle.

Other North/South Roadway Capacity Projects

Exhibit 5-29 illustrates the locations of the planned and programmed capacity projects on other north/south roadways within the study corridor. Significant capacity improvements are either planned or programmed for every north/south arterial within the study corridor, except for Campbell Avenue. Some congestion problems are anticipated for year 2030 even with these improvements (see Chapter 6).

Exhibit 5-25
SR 77/ORACLE ROAD ALREADY PLANNED AND PROGRAMMED PROJECTS

Project No.	Project Name/Limits	Description	Cost ($000)	Sponsor	Source
Capacity Projects					
1	**SR 77**: Pinal Co. Line to Tangerine Rd.	Widen to 6 lanes.	18,000	ADOT	PAG TIP/2011
2	**SR 77**: Tangerine Rd. to La Reserve, and Pusch View to Calle Concordia	Widen to 6 lanes.	26,500	ADOT	PAG TIP/2011
3	**SR 77**: Oracle/First @ intersection	Intersection improvements	Unknown	ADOT/Oro Valley	PAG RTA
4	**SR 77**: Oracle/Ina @ intersection	Intersection improvements	Unknown	ADOT/Pima County	PAG RTA
5	**SR 77**: Oracle/River @ intersection	Intersection improvements	Unknown	ADOT/Pima County/City of Tucson	PAG RTA
6	**SR 77**: Oracle/Prince @ intersection	Add right turn lanes	330	Tucson	PAG RTP/2030
7	**Oracle/Drachman/Main** Intersection	Reconstruct intersection	2,418	Tucson	PAG TIP/2011

Exhibit 5-26
CORRIDOR NORTH/SOUTH ROADWAY ALREADY PLANNED AND PROGRAMMED PROJECTS

Project No.	Project Name	Description	Cost ($000)	Sponsor	Source
Capacity Projects					
1	**I-10**: Ruthrauff Road to Prince Road	Widen to 8 lanes	55,243	ADOT	PAG TIP/2011
2	**I-10**: Prince Road to 29th Street	Widen to 8 lanes	193,283	ADOT	PAG TIP/2011
3	**I-10**: I-19 to Marana TI	Widen to 8 Lanes	490,830	ADOT	PAG RTP/2030
4	**I-10 @ Cortaro TI**	Reconstruct TI and mainline no RR	19,800	ADOT	PAG TIP/2011
5	**I-10 @ Ina TI**	Reconstruct roadway and add RR grade separation	54,383	ADOT	PAG TIP/2011
6	**I-10 @ Orange Grove TI**	Rebuild interchange	34,800	ADOT	PAG RTP/2030
7	**I-10 @ Prince Road TI**	Construct new TI & RR grade separation	31,000	ADOT	PAG RTP/2030
8	**I-10 @ Ruthrauff TI**	Reconstruct interchange	Unknown	ADOT	PAG RTP/2030
9	**La Cholla Blvd @ Overton Intersection**	Intersection improvements	870	Pima County	PAG RTA
10	**La Cholla Blvd @ Lambert Intersection**	Intersection improvements	986	Pima County	PAG RTA
11	**La Cholla Blvd:** Tangerine to Overton	Widen to 4 lanes	25,050	Oro Valley	PAG TIP/2011
12	**La Cholla Boulevard:** Tangerine Road to Magee Road	Widen to 4 lanes & add bridge	48,333	Pima County	PAG RTA
13	**La Cholla Blvd:** Ruthrauff to River	Widen to 6 lanes with intersection improvements, new bridge at Rillito, bike lanes and sidewalks	14,760	Pima County	PAG TIP/2011 & RTA
14	**La Cholla/Ruthrauff Parkway:** I-10 @ Ruthrauff to Tangerine	Widen to 6 lanes, bike lanes, sidewalks	69,999	Pima County	PAG RTP/2030
15	**La Cañada Drive:** Tangerine Road to Naranja Road	Widen to 4 lanes, bike lanes, drainage	7,600	Oro Valley	PAG TIP/2011
16	**La Cañada Drive:** Calle Concordia to River Rd	Widen to 4 lanes, equestrian trail, drainage & multi-use lanes	41,371	Pima County	PAG RTA
17	**La Canada/Flowing Wells Road:** River Road to Wetmore Road	Widen to 6 lanes, bike lanes, sidewalks	14,380	Pima County	PAG RTP/2030
18	**Stone Avenue Gateway:** Speedway to Drachman	Circulation study and redesign of intersection	7,644	Tucson	PAG TIP/2011
19	**Stone Avenue Gateway:** University to Drachman	Streetscape, add turn lanes, modify intersection	22,600	Tucson	PAG RTP/2030
20	**Stone @ Fort Lowell Intersection**	Turn lanes and signals	775	Tucson	PAG RTP/2030
21	**Stone @ Prince Intersection**	Turn lanes and signals	1,350	Tucson	PAG RTP/2030
22	**First Avenue:** Tangerine Road to Oracle Road	Widen to 4 lanes, including bridge, drainage, & signals	10,000	Oro Valley	PAG TIP/2011
23	**First Avenue**: Ina Road to Orange Grove Road	Widen to 4 lanes with bike lanes and sidewalks	7,256	Pima County	PAG RTA
24	**First Avenue:** River Rd. to Grant Rd.	Widen to 6 lanes with bike lanes and sidewalks	74,398	Tucson	PAG RTA

Exhibit 5-26
CORRIDOR NORTH/SOUTH ALREADY PLANNED AND PROGRAMMED ROADWAY PROJECTS
(Continued)

Project No.	Project Name	Description	Cost ($000)	Sponsor	Source
25	**First Avenue:** Prince @ intersection	Turn lanes and signals	1,200	Tucson	PAG RTP/2030
26	**First Avenue**: Fort Lowell @ intersection	Turn lanes and signals	1,200	Tucson	PAG RTP/2030
27	**First Avenue:** Wetmore @ intersection	Turn lanes and signals	1,650	Tucson	PAG RTP/2030
		Non-Capacity Projects			
28	**Stone Avenue @ Glenn Intersection**	Traffic signal upgrade	250	Tucson	PAG RTA
29	**Stone Avenue**: Wetmore Road to 6th Street	Corridor enhancement/gateway	10,246	Tucson	PAG RTP/2025
30	**Rancho Vistoso Boulevard**: Honey Bee Bridge to Tangerine Road	Resurface existing pavement	1,600	Oro Valley	PAG TIP/2011
31	**Rancho Vistoso Boulevard**: Oracle Road to Tangerine Road	Reconstruct, mill, overlay	3,700	Oro Valley	PAG RTP/2030

Exhibit 5-27
CORRIDOR EAST/WEST ROADWAY ALREADY PLANNED AND PROGRAMMED PROJECTS

Project No.	Project Name	Description	Cost ($000)	Sponsor	Source
Capacity Projects					
1	**Mainsail Boulevard and Twin Lakes Drive**: At 27 Wash vicinity	New 2-lane road & culvert	5,002	Pima County	PAG TIP/2011
2	**SR 989 Tangerine Parkway**: I-10 to La Canada	Widen to 4-lane desert parkway, shared use path, drainage & turn lanes	74,215	Marana, Pima County, Oro Valley, ADOT	PAG RTA
3	**SR 989 Tangerine Parkway**: First to Oracle	Widen to 4 lanes, add multi use path	9,750	ADOT	PAG TIP/2011
4	**Lambert Lane:** Shannon to La Canada	Widen to 4 lanes, bike lanes	10,000	Oro Valley	PAG RTP/2030
5	**Lambert Lane**: Rancho Sonora to First	Widen to 4 lanes, bike lanes, sidewalks	13,500	Oro Valley	PAG TIP/2011
6	**Hardy Road:** Northern Ave./Calle Buena Vista to Oracle	Realign intersection and add bike lanes	2,500	Oro Valley	PAG TIP/2011
7	**Magee Road:** Northern to N. First (Safety)	Reconstruct w/5' shoulders, left turn lanes & multi-use path	2,500	Oro Valley	PAG TIP/2011
8	**Cortaro Farms Road/Magee Road**: Thornydale Road to La Cañada Drive	Widen to 4 lanes, bike lanes, sidewalks (includes realignment of La Cholla intersections	40,270	Pima County	PAG RTA
9	**Magee Road**: La Cañada Drive to Oracle Road	Widen to 4 lanes, bike lanes, sidewalks	9,600	Pima County	PAG RTA
10	**Magee Road:** Shannon N. to Shannon S.	Widen to 6 lanes, including bridge	6,500	Pima County	PAG RTP/2030
11	**Orange Grove Road:** Thornydale to Corona	Widen to 6 lanes, bike lanes, sidewalks	23,012	Pima County	PAG RTP/2030
12	**Orange Grove Road**: Corona to Oracle	Widen to 4 lanes divided, bike lanes, sidewalks	18,048	Pima County	PAG TIP/2011
13	**Orange Grove Road**: Oracle to Skyline	Widen to 4 lanes, bike lanes	23,900	Pima County	PAG RTP/2030
14	**River Road**: Thornydale to Campbell	Widen to 6 lanes, bike lanes, sidewalks	65,425	Pima County	PAG RTP/2030
15	**River Road**: Campbell to Alvernon	Widen to 4 lanes, bike lanes, sidewalks	25,933	Pima County	PAG RTP/2030
16	**Prince Road Grade Separation:** Prince @ UPRR	Construct grade separation	10,000	Tucson	PAG TIP/2011
17	**Grant Road**: Oracle to Swan	Improve to 6 lanes, streetscaping, bike lanes, sidewalks	166,850	Tucson	PAG RTA
18	**Speedway Boulevard**: I-10 to Main Avenue	Widen to 6 lanes including new underpass, bike lanes	43,400	Tucson	PAG RTP/2030
19	**Speedway Boulevard /Main Avenue Intersection**	Reconstruct intersection	1,200	Tucson	PAG TIP/2011
20	**Speedway**: @ Euclid intersection	Add turn lanes	750	Tucson	PAG RTP/2030

Exhibit 5-27
CORRIDOR EAST/WEST ROADWAY ALREADY PLANNED AND PROGRAMMED PROJECTS
(Continued)

Project No.	Project Name	Description	Cost ($000)	Sponsor	Source
Non-capacity Projects					
21	**SR 989 (Tangerine Road)**: First to Oracle (SR 77)	Repair Embankment Failure	1,500	ADOT	PAG RTP/2030
22	**Hardy Road**: Oracle Road to La Cañada	Realign intersection, add bike lanes, drainage	1,400	Oro Valley	PAG RTP/2030
23	**Naranja Road**: Shannon to La Cholla	Grade, pave, drain	1,000	Oro Valley	PAG RTP/2030
24	**Naranja Road**: La Cholla to La Canada	Grade, pave, drain, curb, gutter, bike lanes	1,010	Oro Valley	PAG RTP/2030
25	**Naranja Road**: La Canada Boulevard to First Avenue	Grade, pave, drain	2,000	Oro Valley	PAG RTP/2030
26	**Orange Grove Road**: At Geronimo Wash	Reconstruct box culvert	1,200	Pima County	PAG TIP/2011
27	**Rudasill Road**: Genematis Drive Vicinity	Roadway realignment to straighten curve	360	Pima County	PAG RTP/2030

Exhibit 5-28
CORRIDOR ALREADY PLANNED AND PROGRAMMED ALTERNATE MODE PROJECTS [1]

Project No.	Project Name	Description	Cost ($000)	Sponsor	Source
Non-capacity Alternate Mode Projects					
1	**SR 77**: Rodger Rd. to River Rd.	Construct new sidewalk, bike lanes, and landscaping.	694	ADOT	PAG TIP/2011
2	**SR 77:** Ina to River	Construct new sidewalks	Unknown	ADOT	PAG RTA
3	**CDO Shared Use Path:** CDO Wash from La Canada to First Ave.	Construct new 12' wide linear trail	1,603	Oro Valley	PAG TIP/2011
4	**Oro Valley Circulator Service**	Develop new system in Oro Valley	7,730	Oro Valley	PAG RTA
5	**Oro Valley Park-and-Ride**	Develop new park-and-ride facilities	2,450	Oro Valley	PAG RTA
5	**Coyote Run Service Expansion**	Expand service within Oro Valley	2,500	Oro Valley	PAG TIP/2011
6	**OV Transit Program**	Purchase paratransit/vanpool vehicles	264	Oro Valley	PAG TIP/2011
7	**Oro Valley Pedestrian and Bikeway Program**	Construct bike lanes/shared use paths per OV Plan	4,780	Oro Valley	PAG RTP/2030
8	**Stone Avenue: @** Limberlost Ped Safety Improvement	Construct 3 new pedestrian islands	276	Tucson	PAG TIP/2011
9	**La Canada Dr/Flowing Wells Rd.:** Rodger to River	Construct bike lanes	3,200	Pima County	PAG RTP/2030
10	**Transit – Community Circulator- Oro Valley**	Connections to SunTran @ Oracle. Provide new transit circulator – 18 years of service	9,960	Oro Valley	PAG RTP/2030
11	**Transit – Paratransit – Coyote Run**	Paratransit services in Oro Valley. Maintain existing Coyote Run paratransit service.	11,000	Oro Valley	PAG RTP/2030
12	**Transit – Rapid Bus**	Downtown to Tangerine via Oracle Rd – 15 years of service	38,000	Oro Valley	PAG RTP/2030
13	**Transit – SunTran – Service Area Extensions #1**	Route 16 – Oracle/Catalina. Extend route	9,222	Tucson Transit	PAG RTP/2030

1. Excludes bicycle facility and sidewalk projects included with roadway widening projects in other tables.

East/West Capacity Projects

Significant capacity projects are also planned or programmed for the east/west arterials in the study corridor as illustrated in Exhibit 5-29. Ina Road and Speedway Boulevard are two major arterials that are not anticipated to have capacity improvements by year 2030, and each of these roadways is forecast to have congestion problems in the future. While improvements are anticipated for Grant Road, this roadway is still forecast to have some congestion problems, particularly near the I-10 interchange.

5.7.2 Alternate Mode and Other Non-Capacity Projects

Numerous non-capacity and alternative mode improvements are also planned and programmed for the corridor. These projects are summarized in Exhibits 5-28 and 5-30. These projects include pedestrian, bicycle, and transit service improvements. In general, the pedestrian and bicycle system improvements are included in the roadway widening projects planned for the corridor.

Exhibit 5-29
PLANNED AND PROGRAMMED CAPACITY PROJECTS

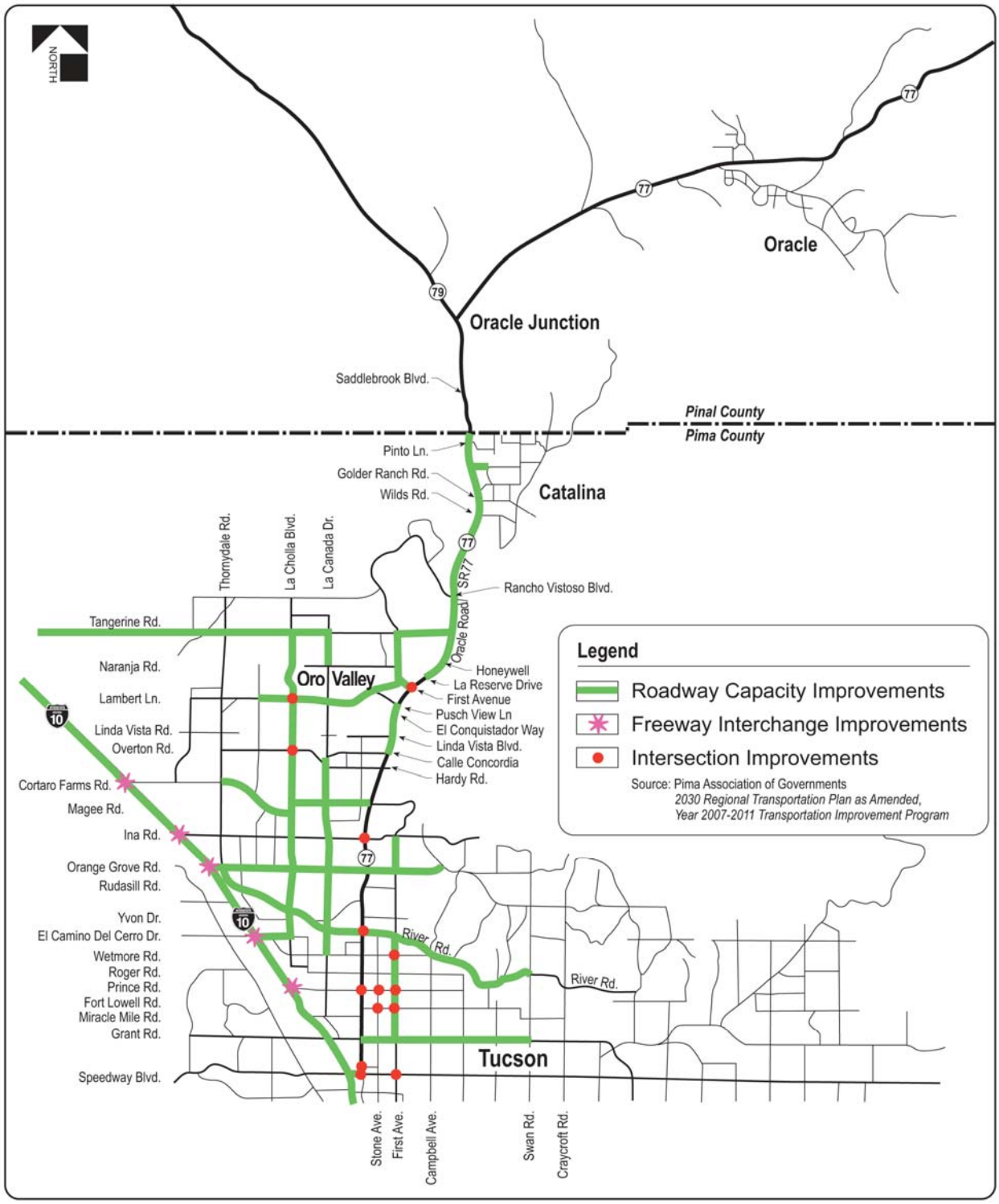
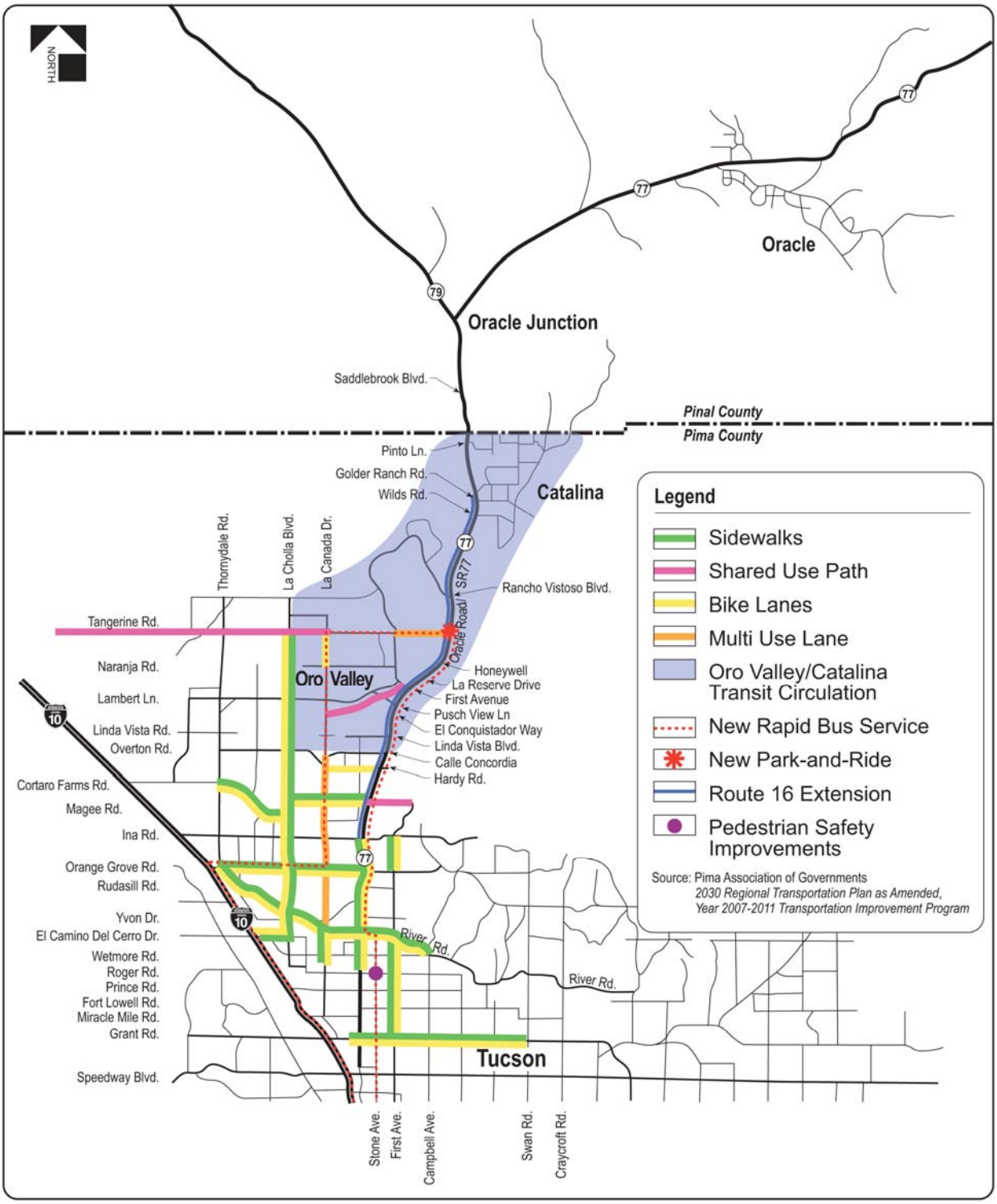


Exhibit 5-30
PLANNED AND PROGRAMMED ALTERNATIVE MODE IMPROVEMENTS



6. EXISTING AND PROJECTED NEEDS AND DEFICIENCIES

A technical analysis of the existing and future needs and deficiencies of the transportation facilities and services within the SR 77 Corridor was conducted as part of this study. Other information on needs and deficiencies was also gathered as part of a series of public open houses held early in the project, a series of two transit workshops, discussions with corridor stakeholders, and a corridor field trip held with project Technical Advisory Committee (TAC) members. The needs and deficiencies identified have been organized into the following categories for summary:

- Roadway system, including existing (year 2002) and future (year 2030) congestion, safety, and access control
- Public transit facilities and service
- Bicycle facilities
- Pedestrian facilities
- Bridges and structures
- Pavement condition
- AASHTO Design Standards
- Intelligent Transportation Systems (ITS)

6.1 ROADWAY SYSTEM

6.1.1 Congestion

Exhibit 6-1 indicates the segments of SR 77 with existing (year 2002) and forecast (year 2030 congestion levels identified as heavy (v/c, or daily traffic volume to daily roadway capacity > 0.75) and severe (v/c > 1.0). These segments are defined between signalized intersections. According to the *Pima Association of Governments 2030 Regional Transportation Plan* (PAG RTP) "travel under severe congestion represents roadway conditions that are moving into 'forced or breakdown flow' and travel conditions are at, or nearing a standstill."

Exhibit 6-1
SR 77 ROADWAY SEGMENTS WITH
HEAVY AND SEVERE CONGESTION LEVELS

Beginning Milepost	Roadway Segment	2002 Congestion Level	2030 Congestion Level
69.0	Fairview Avenue to Oracle Road		Heavy
69.5	Miracle Mile to Wetmore Road		Heavy
71.3	Wetmore Road to Rudasill Road		Heavy
73.4	Rudasill Road to Orange Grove Road		Heavy
73.9	Orange Grove Road to Ina Road	Heavy	Heavy
74.9	Ina Road to Calle Concordia	Heavy	Severe
77.5	Calle Concordia to First Avenue	Severe	Severe
79.5	First Avenue to Tangerine Road		Heavy
81.8	Tangerine Road to Pinal County Line		Heavy
87.8	Pinal County Line to SR 79 Junction		
91.1	SR 79 Junction to Biosphere Road		Severe

Source: Pima Association of Governments

The existing and forecast levels of heavy and severe congestion for the entire corridor are shown respectively in Exhibits 6-2 and 6-3. The year 2030 forecast assumes that the improvements contained in the Pima Association of Governments (PAG) *2007-2011 Transportation Improvement Plan* (TIP), the *PAG 2030 Regional Transportation Plan Amendment*, and the Central Arizona Association of Governments (CAAG) *2003-2007 Transportation Improvement Plan* are in place.

Since funded projects identified in the 2030 PAG RTP are assumed to be constructed by year 2030, this indicates that even with six lanes on SR 77 to the Pima/Pinal County line, the project roadway will be approaching or experiencing unacceptable levels of heavy or severe congestion. The PAG 2001-2025 *Regional Transportation Plan Amendment*, adopted January 28, 2004, makes the following statement regarding Oracle Road:

> "The Oracle Road Corridor continues to show traffic volumes exceeding capacity by the year 2025 based upon assumptions of growth in Catalina and Southern Pinal County along with significant trip generators being constructed in and around the Town of Oro Valley. Scheduled widening projects will not be sufficient to meet the anticipated needs of this Corridor." (PAG *2001- 2025 Regional Transportation Plan Amendment*, Adopted January 28, 2004, page 10-5)

The forecast congestion conditions for SR 77 with the PAG 2030 RTP and RTA projects in place do not appear substantially different than that forecast for the year 2025 condition. There are no significant improvements along SR 77 to address the identified future year 2030 congestion related deficiencies. In addition, potential new development north of Oro Valley and in southern Pinal County, which may not be accounted for in the PAG regional traffic forecast, could significantly exacerbate congestion along SR 77.

Additional information on congestion related deficiencies was provided by participants at the project open houses held in May 2003 and at meetings with stakeholders held in early 2003. These deficiencies included the following:

MP 68.1 to MP 68.5 (I-10 off ramp to Flowing Wells Road) – At the SR 77 (Miracle Mile)/Flowing Wells Road intersection, the eastbound left-turn lane experiences heavy turning movements during the peak hours. An analysis should be conducted to identify appropriate system and geometric improvements for mitigating any operational deficiencies at this intersection.

MP 71.0 to MP 71.3(Limberlost Road to Wetmore Road) – A new Home Depot has been built on the east side of Oracle Road between Limberlost Road and Wetmore Road. This new development is anticipated to increase traffic on a section of Oracle Road that is already projected to have a "severe" congestion level in the future.

MP 71.3 to MP 71.6 **(Auto Mall Drive)** – The southbound left-turn lane backs up into through lanes at the SR 77/Auto Mall Drive intersection. This is particularly problematic during the Christmas shopping season.

Exhibit 6-2
CORRIDOR CONGESTION DEFICIENCIES YEAR 2002

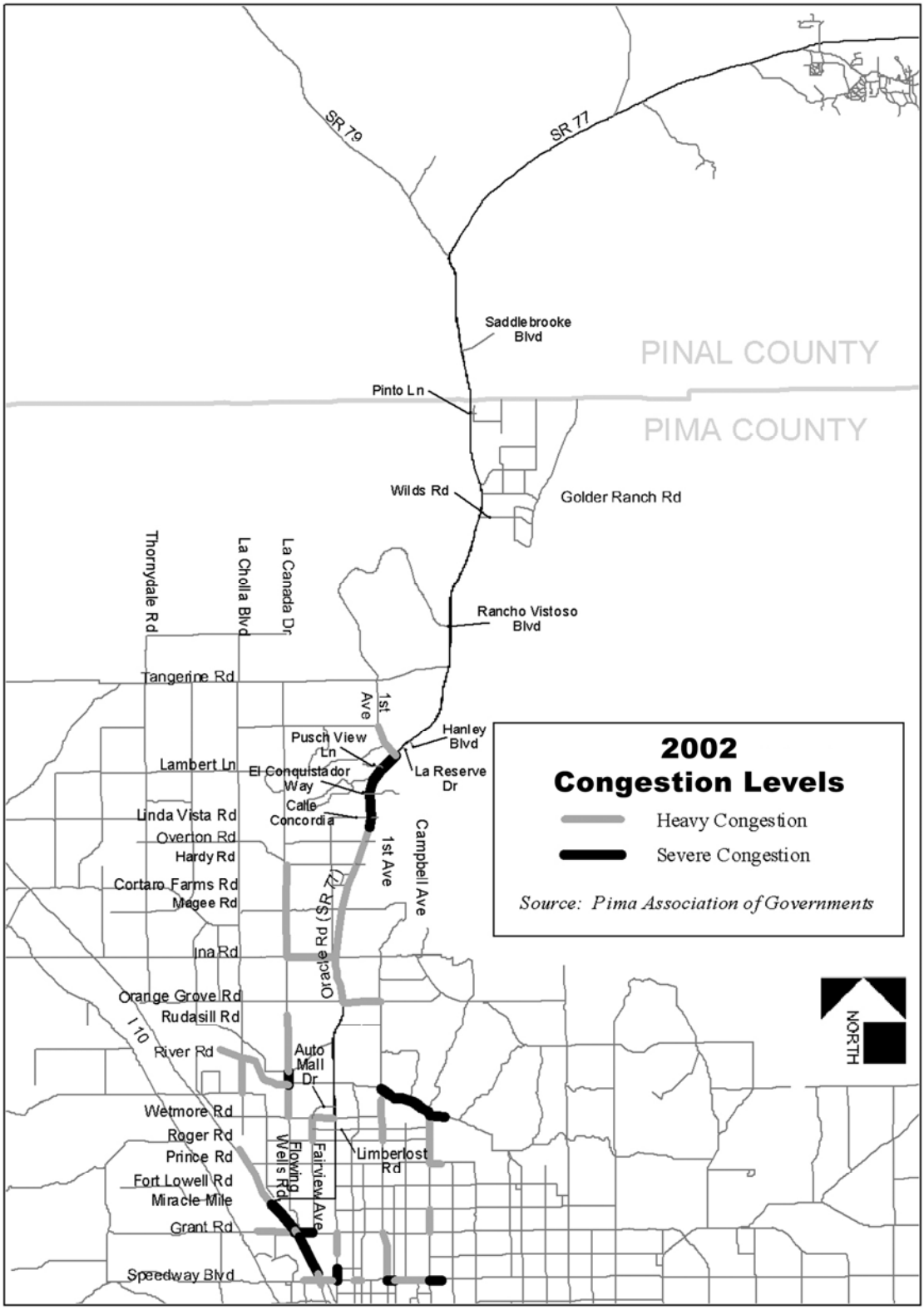
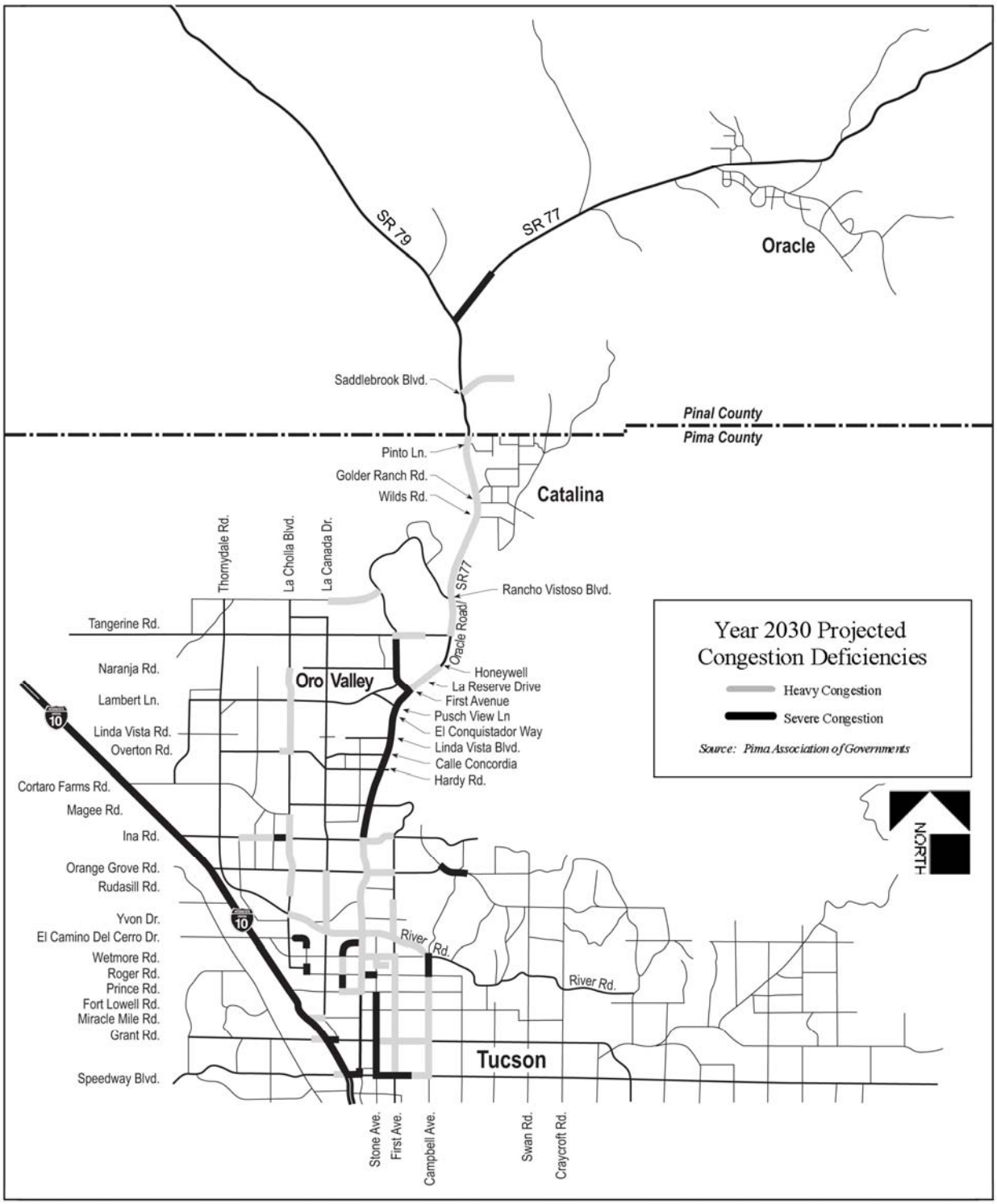


Exhibit 6-3
CORRIDOR CONGESTION DEFICIENCIES YEAR 2030



***MP 73.8 to MP 74.9* (Orange Grove Road to Ina Road)** – The westbound right-turn movement at the SR 77/Ina Road intersection experiences significant queues during PM peak hours. (Note that a recent study by Catalina Engineering for Pima County suggested that dual westbound right-turn lanes combined with the elimination of the southbound U-turn movement would reduce intersection delays at this intersection.)

Although there is a bus stop on the east side of SR 77, south of Ina Road, buses serving Routes 16 and 103 which travel north on SR 77 and turn west onto Ina Road, do not stop at this stop. This is because the bus drivers cannot then enter the northbound left-turn lanes from the bus stop because of long northbound queues at the intersection. This stop only serves Route 162, an express route that travels north on SR 77 to Air Research Park.

Property owners in the vicinity of this intersection have expressed displeasure with some potential geometric improvements to this intersection, such as the provision of a future GSI which may reduce business access and the elimination of U-turns at this intersection which property owners have indicated would impact business.

MP 78.5 to MP 79.1(El Conquistador Way to Pusch View Lane) – Southbound SR 77 backs up in the morning peak hour. This occurs because of heavy southbound commuter traffic. The horizontal and vertical alignment of the road may also contribute to the congested condition on the southbound approach to the SR 77/El Conquistador Way intersection. This segment is also projected to experience "severe" congestion in the future.

MP 79.1 to MP 79.5(Pusch View Lane to First Avenue) – The northbound left-turn lane at SR 77/First Avenue backs up into the through traffic lanes creating safety issues, and contributes to the "severe" congestion problem. This problem was addressed in 2005 with the provision of an additional left-turn lane for the movement.

MP 80.2 to MP 81.8 (Honeywell Corp. Entrance: Hanley Drive) – Because of the existing and planned development, including the new Northwest Hospital branch west of SR 77, on Tangerine Road, there may be a need for a revision of the traffic signal phasing, including the provision of left-turn phases.

MP 81.8 to MP 82.8 (Tangerine Road to Rancho Vistoso Boulevard) – The northbound left-turn lane at Tangerine Road backs up into the through lanes. This problem was addressed in 2005 with the provision of a left-turn signal phase for this movement.

6.1.2 Evaluation of Concept Design of Realigned Segment of Fort Lowell Road/ Miracle Mile

The purpose of this evaluation was to determine the desirability of providing a direct connection from Fort Lowell Road to Miracle Mile through a roadway realignment. The concept design for a realigned segment of Fort Lowell Road would eliminate the double "T" intersections at the SR 77 intersections of Fort Lowell Road/Oracle Road and Miracle Mile/Oracle Road to provide a continuous through movement for traffic traveling east/west on Fort Lowell Road and Miracle Mile. These intersections are approximately 1/4 mile apart. Exhibit 6-4 shows the location of the intersections and Exhibit 6-5 shows the realignment alternative that was evaluated. A summary of the analysis results and recommendations is presented below.

Exhibit 6-4
STUDY AREA FOR FORT LOWELL ROAD/MIRACLE MILE REALIGNMENT

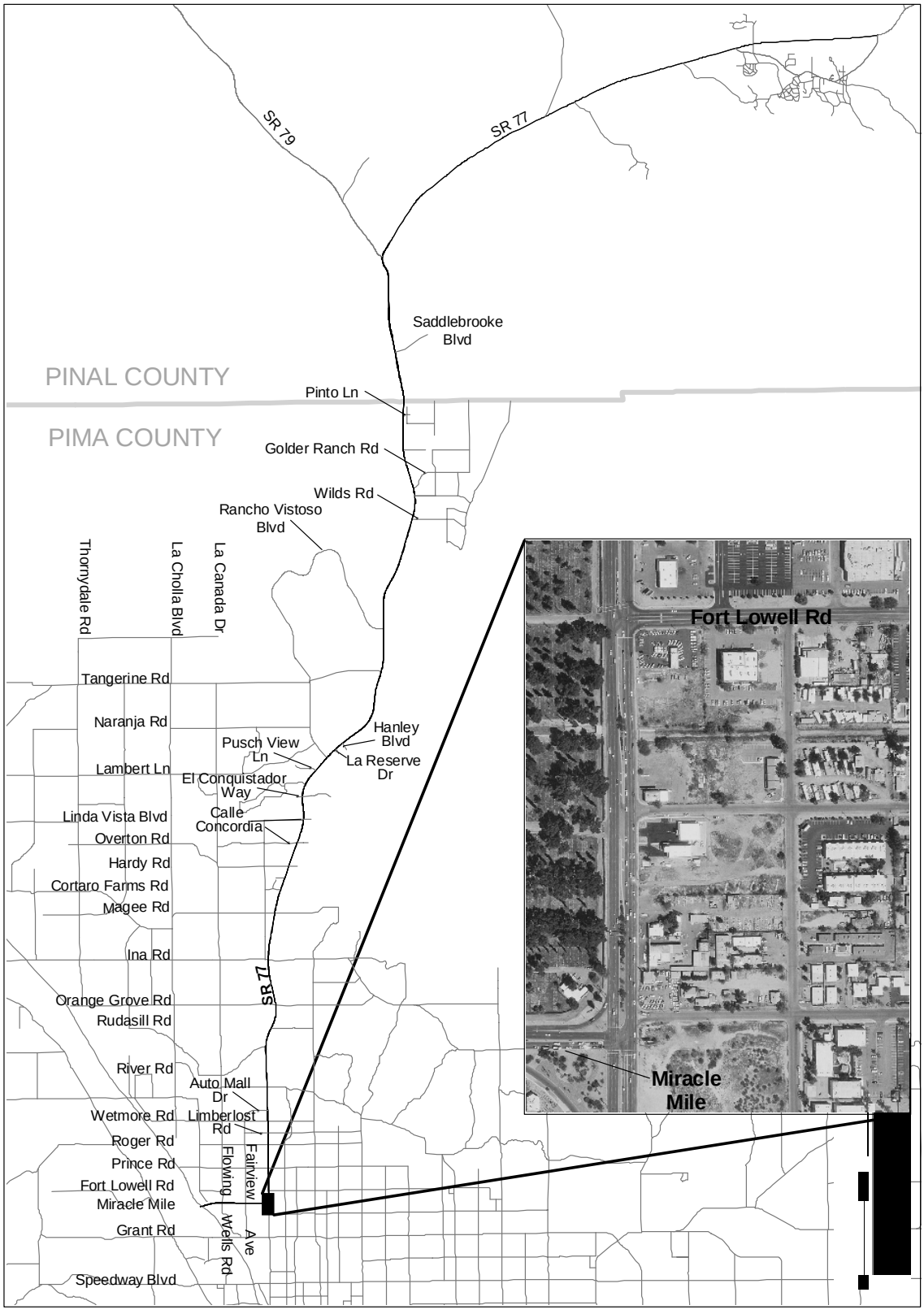


Exhibit 6-5

FORT LOWELL/MIRACLE MILE REALIGNMENT ALTERNATIVE

The realignment alternative selected for evaluation extends the Miracle Mile alignment east of SR 77 and then curves north through existing commercial and residential development to connect with the Fort Lowell Road alignment. This alignment was selected over an alignment extending Fort Lowell Road to the west because the extension of Fort Lowell Road would significantly impact the existing cemeteries west of SR 77. This alignment creates a new east leg at the existing Miracle Mile/Oracle Road intersection.

Traffic operations and level of service were evaluated for the existing intersections for years 2003 and 2025 traffic conditions. The traffic operations analysis indicated that the congestion levels at the existing intersections are acceptable under 2003 traffic conditions, providing level of service (LOS) C and D operations. Year 2025 traffic is estimated to operate with only slightly higher congestion levels, with the intersections still providing LOS C and D operations for the peak traffic hours.

Based on the estimated reduction in travel time and crashes through the area affected by the realignment, and an estimated cost of $4.5 million, a Benefit/Cost (B/C) ratio for the alternative was calculated as 3.7. This exceeds the minimum B/C ratio of 1.0 that indicates economic viability of the project. However, the realignment was judged to have significant right-of-way and Title VI impacts.

Even though the project B/C ratio of 3.7 indicates an economically viable project, the overall change in the intersection operating conditions does not suggest that this should be considered a high priority project, as there are many other more severe deficiencies identified along the corridor. The right-of-way and Title VI impacts of the project are also considered significant disadvantages for this project. **Therefore, this project is not recommended for implementation.**

6.1.3 Safety

A five-year history of crashes along SR 77 was evaluated (December 1, 1997 to November 30, 2002) for this study. Details of the crash analysis are presented in Chapter 5 of this document. The analysis indicated that there are several intersections and roadway segments along the corridor where improvements could reduce the number and rate of crashes. In addition, a few roadway segments were identified having a disproportionate night to day crash history, indicating a possible benefit from roadside lighting. A strong correlation was also found to link crash history on the corridor with the location of driveways, median openings and cross streets.

The locations of the roadway segments and intersections with safety deficiencies are provided in Exhibit 6-6. Locations where roadside lighting might be effective in reducing crashes are illustrated in Exhibit 6-7.

Exhibit 6-6
CORRIDOR SAFETY DEFICIENCIES

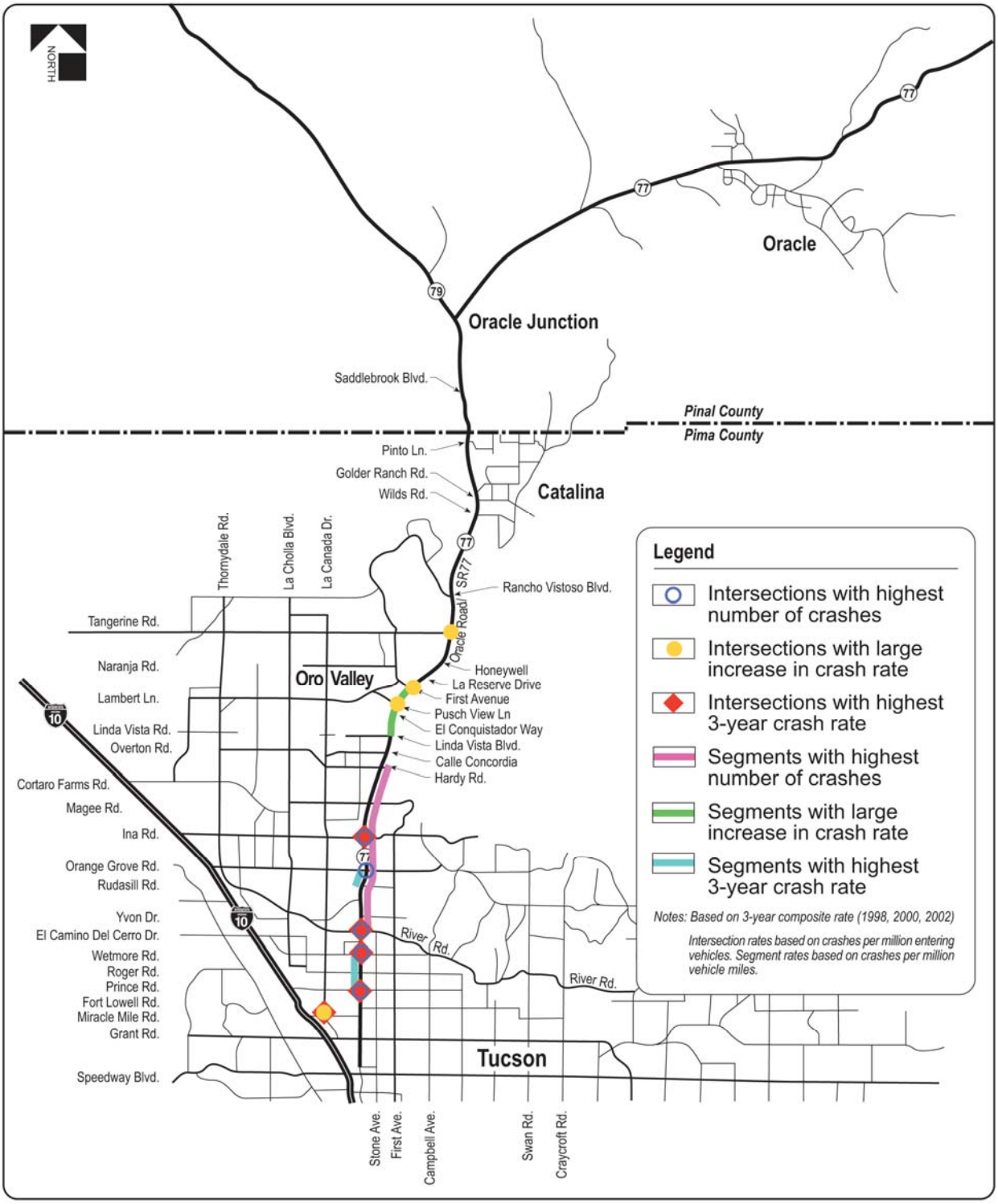
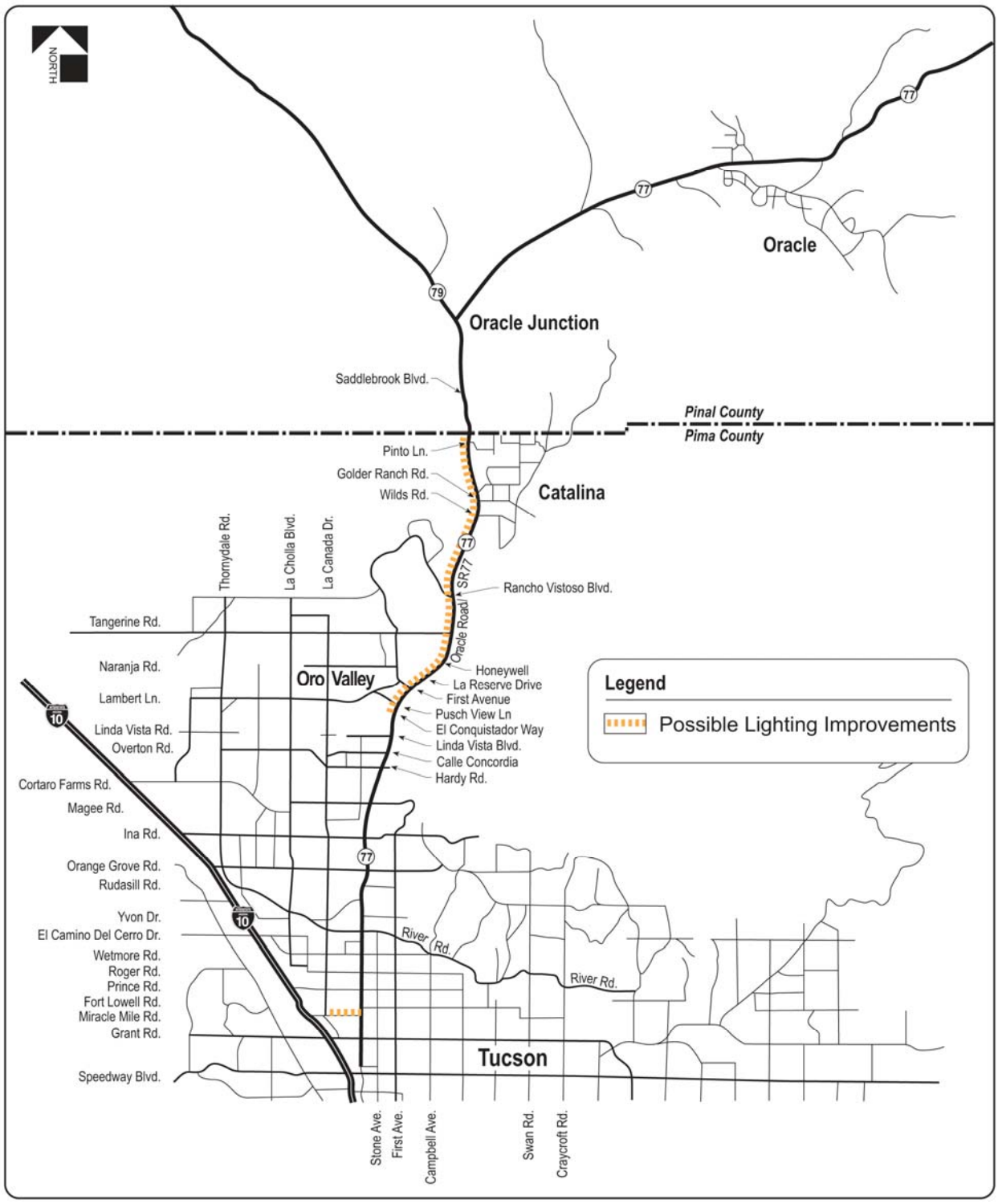


Exhibit 6-7

SEGMENTS FOR POSSIBLE LIGHTING IMPROVEMENTS



6.1.4 Access

The need for consolidating driveways along SR 77 was identified through an analysis of driveway density and crash types that can be related to access. Roadway segments along SR 77 were inventoried to identify need to consolidate driveways based on driveway density and crash rates over a three-year history. The segments were divided into three levels of the need to consolidate the number of driveways, as shown in Exhibit 6-8.

Exhibit 6-8
CRITERIA TO IDENTIFY THE LEVEL OF NEED TO CONSOLIDATE DRIVEWAYS

Level	Segment
Level 1	Segments with Crash Rates greater than 1.5 and Access Points per Mile greater than 40.01
Level 2	Segments with Crash Rates greater than 1.5 and Access Points per Mile between 20.01-40
Level 3	Segments with Crash Rates less than 1.5 and Access Points per Mile less than 20

Note: Level 1 represents the highest need and Level 3 represents the lowest needs.

Exhibit 6-9 shows the segments along SR 77 that fall within each level of need. Some roadway segments were placed into a higher level due to a high crash rate or other criteria. Exhibit 6-10 shows the locations of the Level 1 and Level 2 access management segments along the corridor. Other segments were included in a given level to form a consistent larger segment. It is recommended that these segments be studied in detail to develop specific access management design concepts for each segment.

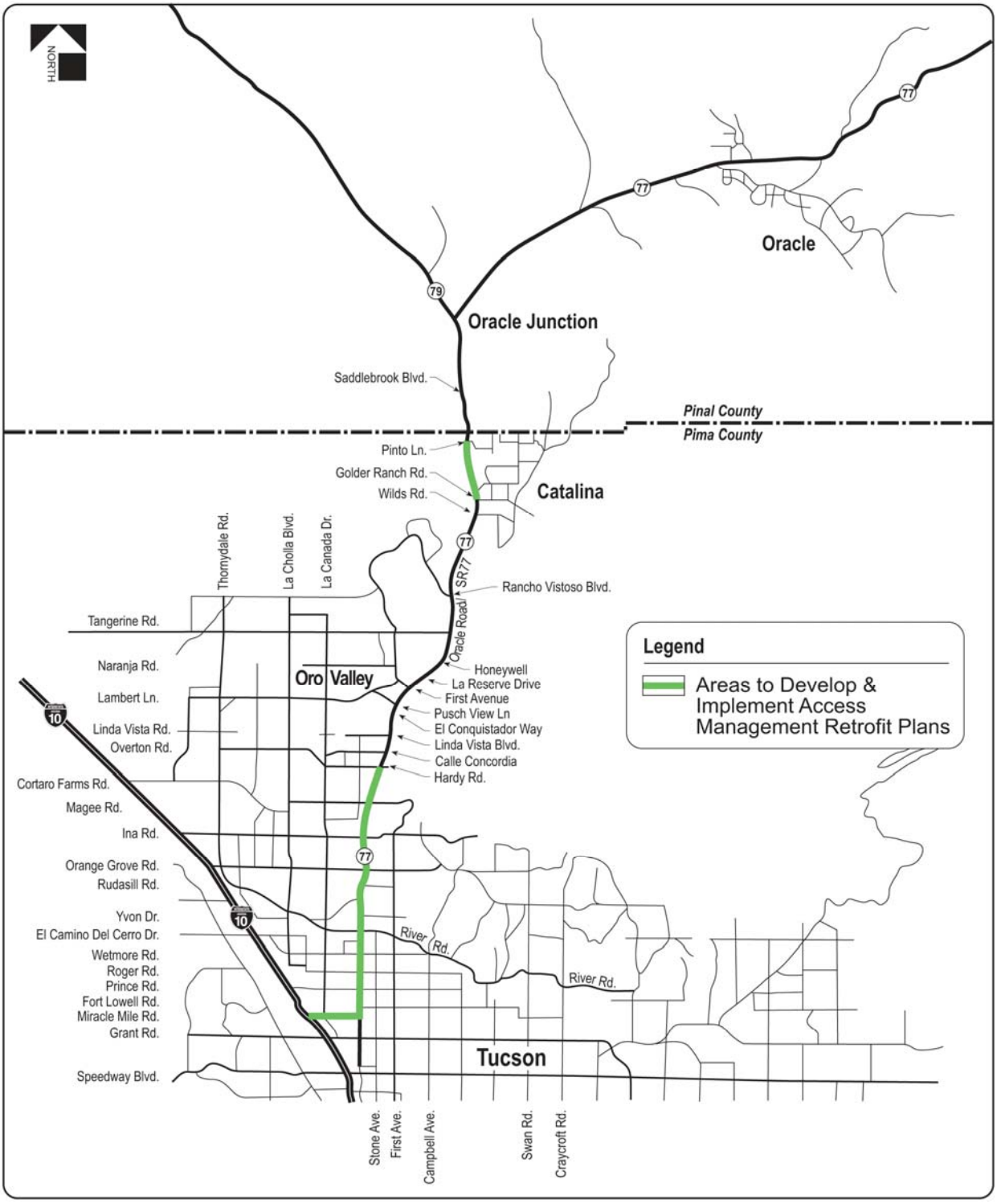
Exhibit 6-9

SR 77 SEGMENTS WITHIN LEVELS OF NEED FOR DRIVEWAY CONSOLIDATION

Level of Need for Driveway Consolidation	Segment
Level 1	I-10 to Oracle Road; Miracle Mile to River Road
Level 2	River Road to Hardy Road; Pinto Lane to Golder Ranch Road
Level 3	Hardy Road to end of corridor (except for the segment of Pinto Lane to Golder Ranch Road)

Note: Level 1 indicates the highest need for driveway consolidation and Level 3 indicates the lowest level

Exhibit 6-10
LOCATION OF LEVEL 1 AND LEVEL 2 ACCESS MANAGEMENT SEGMENTS



6.1.5 Public Comments on Safety and Access Needs

A sample of public comments received at the first round of open houses related to safety and access includes:

- The speed limit on La Cañada Drive should be 35 mph near school crossings. There should be pedestrian cycle initiated crossing lights or signal lights.
- The intersection of Oracle Road and First Avenue has severe left-turn problems when turning to go north.
- These should be limited access from residential areas.
- In the area north of Rancho Vistoso Boulevard, the curb cuts into small housing developments create a safety issue.
- All roads within the corridor need right- and left-turn lanes.
- Limit access to Oracle Road to increase speeds, decrease accidents.
- Create an expressway for the Pinal County section of SR 77. Limit access to one mile or greater intervals.

6.2 PUBLIC TRANSPORTATION

6.2.1 Transit Workshops

The first of the two transit workshops involving community and transportation group representatives, was held August 20, 2003, to identify transit needs and concerns. A brainstorming session was conducted in which workshop participants were asked to identify transit-related needs and concerns. The greatest number of needs and concerns were expressed relating to bus routing, particularly a perceived need for additional service in the northern portion of the corridor. Pedestrian facilities were also a particular concern, together with roadway design and access.

On December 2, 2003, the second transit workshop was conducted. Workshop participants were presented with background information relating to determining thresholds for different levels of transit service (these are discussed in Chapter 4). The participants were then divided into three groups, each of which was presented several large-scale worksheet maps of the corridor and color markers with which to draft transit service concepts. The three draft concept maps were used by the Project Team to assist in formulating transit alternatives, which are presented in Chapter 4.

6.2.2 Technical Advisory Committee Field Review

Subsequent to the first transit workshop, the Project Team and the Technical Advisory Committee conducted a field review of the corridor. Key transit-related observations made by team members during the inspection of the corridor include the following:

- The Town of Oro Valley has programmed the construction of a new roadway, Innovation Park Drive, which will run north and south, west of Oracle Road. The Town envisions the implementation of a new transit route using this road between the Honeywell plant (at Hanley Boulevard/Oracle Road) and the Rancho Vistoso area.

- A need exists for a grade-separated wildlife crossing to recognize an existing wildlife corridor connecting Cañada del Oro and Big Wash. Also needed are a multi-use path and grade separated equestrian passage. Field trip participants suggested locations for these facilities approximately 1½ miles north of the Catalina State Park entrance. A report prepared by Hector Conde for the Technical Advisory Committee of the Sonoran Desert Conservation Plan reviewed three alternatives for a biological corridor which are:

    A. A corridor relying principally on Cañada del Oro wash;
    B. A corridor using only State Trust Land;
    C. A corridor using both State Trust Land and some land that is now privately owned.

  All of these alternatives involved wildlife crossings, either using the CDO wash or underpasses under Oracle Road.

- A local school has constructed a transit shelter and stop on the west (southbound) side of Oracle Road south of First Avenue. However the stop is not ADA compliant because of the grade between the shelter area, which is set back from the roadway, and the bus stop pad itself. The adjacent Fry's Shopping Center cannot be accessed from the stop without traversing an intervening ravine. No corresponding facility exists on the northbound side of the road.

6.2.3 Transit Deficiencies Identified in Plans and Studies

A matrix of transit needs and deficiencies identified by pertinent plans and studies is presented in Exhibit 6-11.

Public Open House Comments on Transit Related Needs

A sample of public comments received at the first round of open houses related to public transportation deficiencies includes:

- Lack of bus pullouts and shaded benches for bus passengers. Provide cement pads with smoothed transition from parking lot to pad.
- Additional traffic lanes for bus use only at major bus stops. Can be used for bus or buses/bikes.
- More mass transit needed.
- Buses need to run more frequently so that people can go shopping and return in an hour or two.
- Trolley/light rail along more developed areas.

6.3 BICYCLE FACILITIES

Although the PAG *2001-2025 Regional Transportation Plan* identifies the portion of SR 77 within the PAG region as a future bikeway and shared-use route, there are currently no plans to widen SR 77 from Roger Road to River Road to include a bike route. There are gaps shown on the Tucson Bike Map on Miracle Mile where there are no bicycle routes between I-10 and Flowing Wells Road, and again from Fairview Road to Oracle Road. ADOT is considering 15-foot curb lanes from Roger Road to River Road and this may be included as a Transportation Enhancement (TE) project.

Exhibit 6-11
MATRIX OF EXISTING TRANSIT NEEDS AND DEFICIENCIES IN CORRIDOR

Issue	Transit Element – 2025 PAG RTP	PAG Intermediate Range RTP	Town of Oro Valley General Plan	Oro Valley Transit Development Plan
Level of Service	Need more service outside Tucson city limits	Insufficient transit service in some areas	Insufficient to capture significant share of travel market	Need neighborhood shuttle
Service Coordination	Lack of coordination among systems regarding schedules and information sharing	Lack of coordination among services		
Facilities		Lack of bus shelters, transit centers, and other transit facilities	Need better, less cramped passenger facilities	Need park and ride lots and bus shelters
Operating Issues	Sun Tran demand has declined	Overlapping transit service provision		
Funding Issues	Lack of dedicated funding limits planning, implementation	Multiple and competitive funding sources	Funding is limited for all transportation projects	Need dedicated source of funding
Planning Issues	Lack of planning coordination	Loosely coordinated transit system planning	Plan for transit facilities when widening roads	Phase improvements over 10-year period
Regional and Commuter Service	Lack of direct regional connections, express service, sufficient park and ride lots	Limited regional service		Need to extend Express Route 162
Paratransit	Some persons denied requests for service on busy days by Van Tran		Need improved productivity (Coyote Run)	Need expanded paratransit service
Pedestrian Facilities			Need to facilitate walking	
Bicycle Facilities			Need to facilitate bicycling	

In addition, key stakeholders identified maintenance issues on SR 77 including the need to provide periodic sweeping of the shoulders in the vicinity of Oro Valley, where dirt and gravel accumulate creating hazardous conditions for bicyclists on the shoulder of SR 77. Other stakeholder issues identified safety concerns for bicyclists on SR 77 in the vicinity of Pusch View Lane and La Reserve Drive in Oro Valley because of the continuous right turn lane on southbound SR 77.

North of the SR 77/SR 79 junction, a recent restriping project reduced the shoulder area on SR 77 to almost no shoulder. This issue was identified during the development of the ADOT Statewide Bicycle and Pedestrian Plan. Pima County recently prepared a $950,000 Transportation Enhancement grant proposal to replace rumble strips on SR 77 north of Catalina with more bicycle-compatible rumble strips; to widen the bike lane/paved shoulder through the Town of Catalina; and to add six-foot paved shoulders on SR 77 for a two-mile section approaching the Town of Oracle. A summary of the bicycle facility issues is provided in Exhibit 6-12 along with information on pedestrian facilities.

6.3.1 Public Open House Comments on Bicycle-Related Improvement Needs

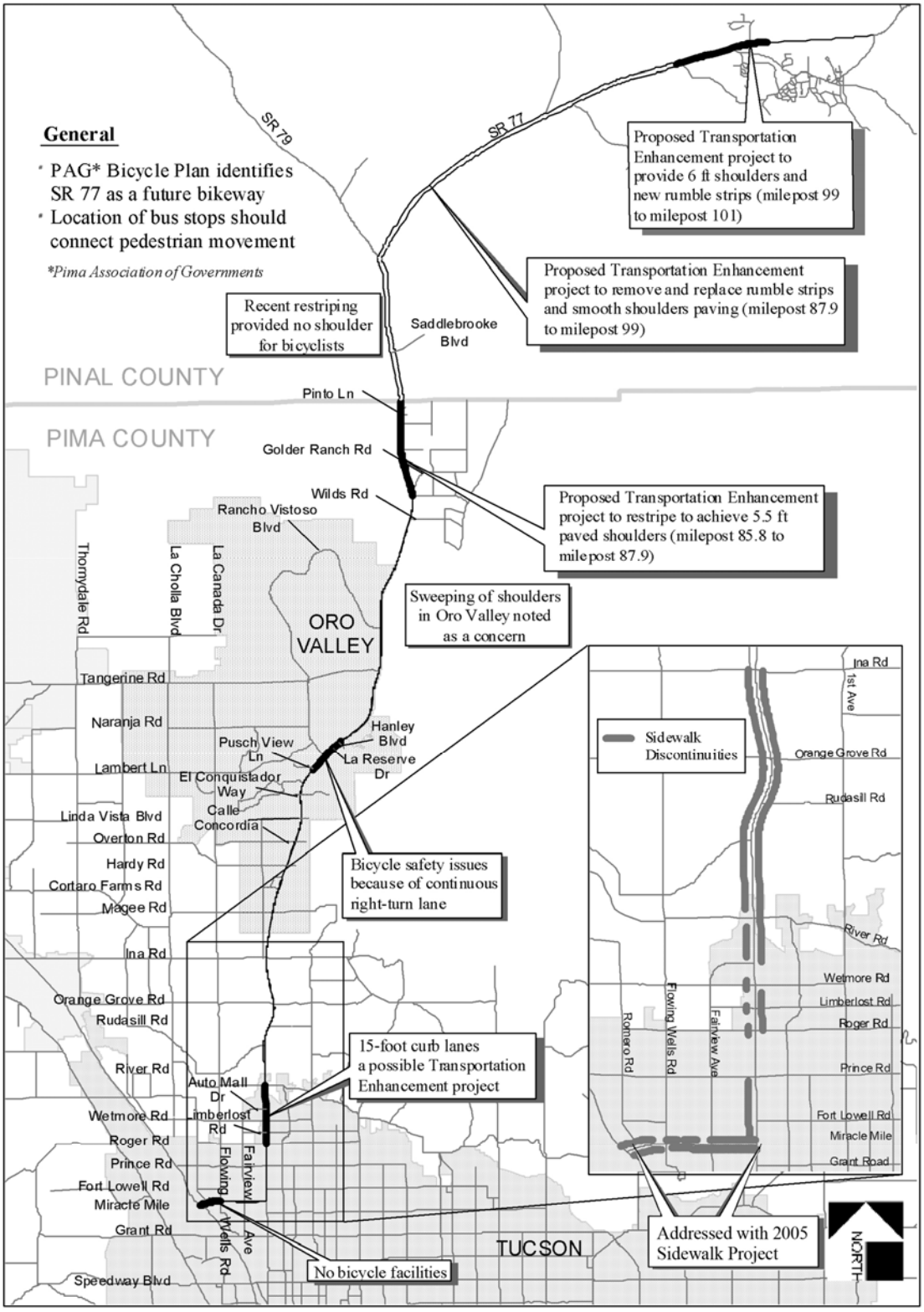
A sample of public comments received at the first round of open houses related to bicycle facility improvements includes:

- Shoulders are needed from Prince Road to River Road as well as in the Town of Oracle turn off area.
- Complete striped shoulder from Roger Road to River Road.
- Need bicycle lane in Catalina.
- No exit from Rillito Park bike path on east side of Oracle Road.
- Avoid rumble strips in the emergency lane.
- Bike lanes should be at least five feet wide.
- Lack of bicycle lanes from MP 99 to MP 100 outside town of Oracle.
- Keep the corridor safe for bikes: no rumble strips in the bike lane, bike-friendly storm drains, right-turn areas signed for safe bicycle transition.

6.4 PEDESTRIAN FACILITIES

The existence of sidewalks along SR 77 is primarily limited to locations south of River Road. Even the existing sidewalks are discontinuous, as illustrated in Exhibit 6-12. The inventory of sidewalk conditions indicated that over 32 miles of the 35-mile corridor has no sidewalks. In some locations non-maintained pedestrian paths have been worn by pedestrian traffic, but these paths may have limited accessibility for the ambulatory and are not considered accessible for those in wheelchairs. Where sidewalks do exist, ramps are provided at intersections. In some cases where there are sidewalks there may also be obstructions (e.g., utility poles, sidewalk discontinuities, fire hydrants, etc.) that limit accessibility. Sun Tran bus stops located north of River Road are not accessible via a sidewalk.

Exhibit 6-12
PEDESTRIAN/BIKE ISSUES



6.4.1 Open House Comments on Pedestrian Improvements

A sample of public comments received at the first round of open houses related to pedestrian improvements includes:

- The combination of shared bicycle/skate/pedestrian paths are good because they allow people to travel away from traffic.
- Look into better medians for pedestrians.
- Trying to cross Oracle Road (at Orange Grove Road) is too dangerous. Cars turning right from Orange Grove Road do not pay attention to pedestrians.

6.5 BRIDGES AND DRAINAGE STRUCTURES

Bridge condition data were obtained from ADOT's bridge record, which is maintained by the ADOT Bridge Group. Reported sufficiency ratings (SR) were used to determine a bridge's condition. The bridge sufficiency rating is expressed as a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient bridge. Bridges with sufficiency ratings at or below 80 percent are classified as structurally deficient structures and are eligible for rehabilitation. Bridges with sufficiency ratings below 50 percent may need replacement. Exhibit 6-13 provides a list of the structurally deficient structures on SR 77. None of the bridges have sufficiency ratings less than 50 percent, so none are identified as being eligible for replacement based on the sufficiency rating.

Exhibit 6-13
BRIDGES WITH SUFFICIENCY RATINGS
AT OR LESS THAN 80 PERCENT

Structure Number	Structure Name	Mile Marker	Sufficiency Rating
2006	Cañada Del Oro Bridge	80.78	80.00
4733	Twenty-Seven Wash RCB Culvert	85.99	80.00
1550	Rillito Creek Bridge	71.79	78.22
4730	Pima Wash RCB Culvert	72.46	70.00
6754	RCB Culvert	75.71	70.00
7115	CMP Culvert	76.41	70.00
4731	RCB Culvert	76.68	70.00
6755	RCB Culvert	77.13	70.00
6756	RCB Culvert	78.37	70.00
6757	RCB Culvert	78.80	70.00
4732	RCB Culvert	78.90	70.00
6812	RCB Culvert	79.82	65.00

Note: RCB = Reinforced Concrete Box
CMP = Corrugated Metal Pipe

According to the document, *Final Project Assessment, SR 77, Junction Miracle Mile to Ina Road, Project 77 PM 69 H5256 01C, Roadway Predesign Section, June 2000*, the ADOT Bridge Management Section's Bridge Evaluation report dated May 27, 1999, for Structure #4728, RCB (MP 69.73) and Structure #4729 RCB (MP 69.92) indicates that although the existing bridge

barriers are geometrically deficient, they are structurally adequate. The Bridge Management Section did not recommend any revision to these existing bridge barriers.

In addition to structurally deficient structures, there are functionally obsolete structures. Functionally obsolete structures include bridges with horizontal and vertical clearances or other functional limitations which met AASHTO clearance standards when originally constructed, but which may not meet updated standards. None of the structures on SR 77 were identified as functionally obsolete in the bridge record.

Based on input from the Central Arizona Association of Governments a box culvert at Oracle Junction (approximately MP 91) is recommended to be extended in order to move the existing culvert headwalls out of the clear zone.

6.6 PAVEMENT

The Pavement Serviceability Rating (PSR) of each segment of SR 77 was identified from the current Highway Performance Monitoring System data on SR 77 as part of the project inventory. Most of the segments on SR 77 have a PSR rating over 3.0, representing pavements that exhibit few, if any, visible signs of surface deterioration. The segments between MP 69.80 and MP 71.30 have PSR ratings slightly under 3.0; however, these segments were part of a recently completed pavement overlay project, which is not reflected in the pavement ratings.

Most of the traveled way on SR 77 is asphaltic concrete (AC). This type of pavement has a design life of approximately 10 years. After that time, the AC pavement is generally in need of milling and replacement. Based on the design life of pavement surfaces, it is expected that all pavement surfaces on SR 77 within the project limits will need to be rehabilitated within the next 20 years. Pavement rehabilitation should accompany widening projects identified in the PAG *2030 Regional Transportation Plan* and ADOT *Five Year Facilities and Construction Program*.

6.7 AASHTO DESIGN STANDARDS

The horizontal and vertical geometric deficiencies are defined in terms of the most recent standards or criteria set forth by the American Association of State Highway and Transportation Officials (AASHTO). The following design element deficiencies were identified:

- Vertical curvature not meeting stopping sight distance criteria for given design speed of the roadways;
- Horizontal curvature not falling within limits for maximum and minimum superelevation;
- Horizontal curvature exceeding the recommended or maximum degree of curvature; and
- Recommended maximum roadway grade of four percent is exceeded.

To identify project deficiencies in the SR 77 corridor, project assessment reports prepared for segments in the corridor were reviewed. Several project assessments required an AASHTO Controlling Design Criteria Report, which gives a description of each design deficiency. Deficiencies identified in the corridor are summarized in Exhibits 6-14 and 6-15.

Exhibit 6-14
EXISTING AASHTO DESIGN DEFICIENCIES
FROM PROJECT ASSESSMENT REPORTS

Project Assessment	Begin MP	End MP	Horizontal Curves Have Excessive or Insufficient Superelevation for Design Speed	Vertical Curves Exceed Criteria for Maximum Grade	Vertical Curves Have Insufficient Stopping Sight Distance for Design Speed
Junction Miracle Mile to Ina Road	69.50	74.84	3		
Calle Concordia to Tangerine Road	77.50	82.0	1*		
First Avenue to Tangerine Road	79.20	82.20			1
Willow Springs to Oracle Road	95.80	103.87		2	

***** Excessive but not deficient superelevation.

6.8 ITS

The document, *Intelligent Transportation Systems: ADOT Statewide Plan – Intelligent Transportation Infrastructure*, (ADOT Intermodal Transportation Division Technology Group, December 2002) identifies a future/proposed variable message sign to be located on SR 77 at MP 92. This document also identifies a future/proposed Road Weather Information System (RWIS) on SR 77 north of Tucson. The purposes of the RWIS are in part to provide real time weather conditions, provide data for predicting weather conditions, and to determine surface and subsurface temperatures.

With the exception of Pinto Lane, none of the ADOT traffic signals on SR 77 north of River Road communicate with the City of Tucson's Traffic Operations Center (TOC). Exhibit 6-16 shows signalized intersection locations on SR 77 where there is no communication to the TOC, as indicated by TOC staff.

6.9 SUMMARY OF CORRIDOR DEFICIENCIES

Exhibit 6-17 summarizes corridor deficiencies for each segment of SR77. Segments are defined as the section of the roadway between traffic signals except for the junction with SR 79.

Exhibit 6-15
AASHTO DESIGN DEFICIENCIES

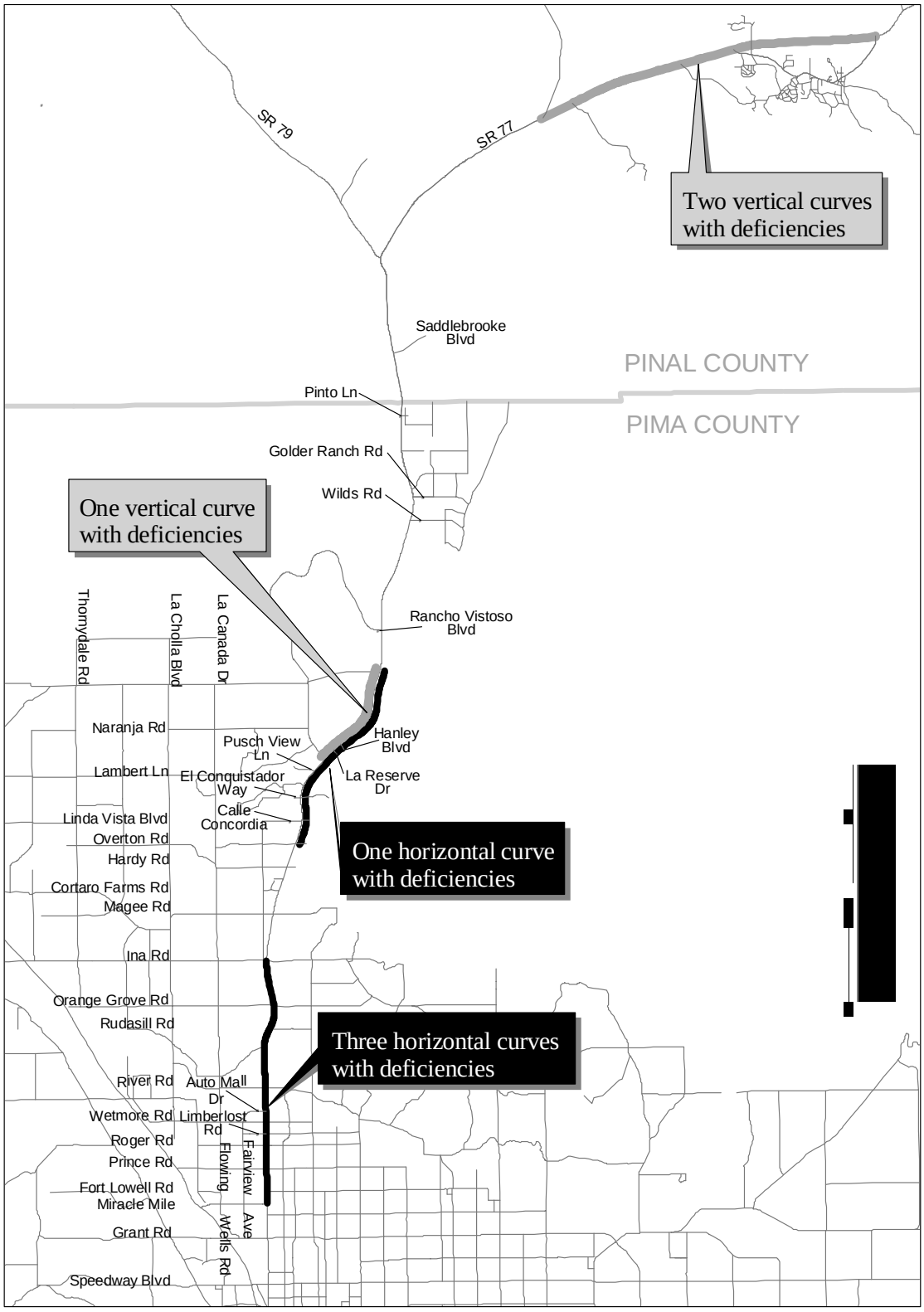


Exhibit 6-16
ITS DEFICIENCIES

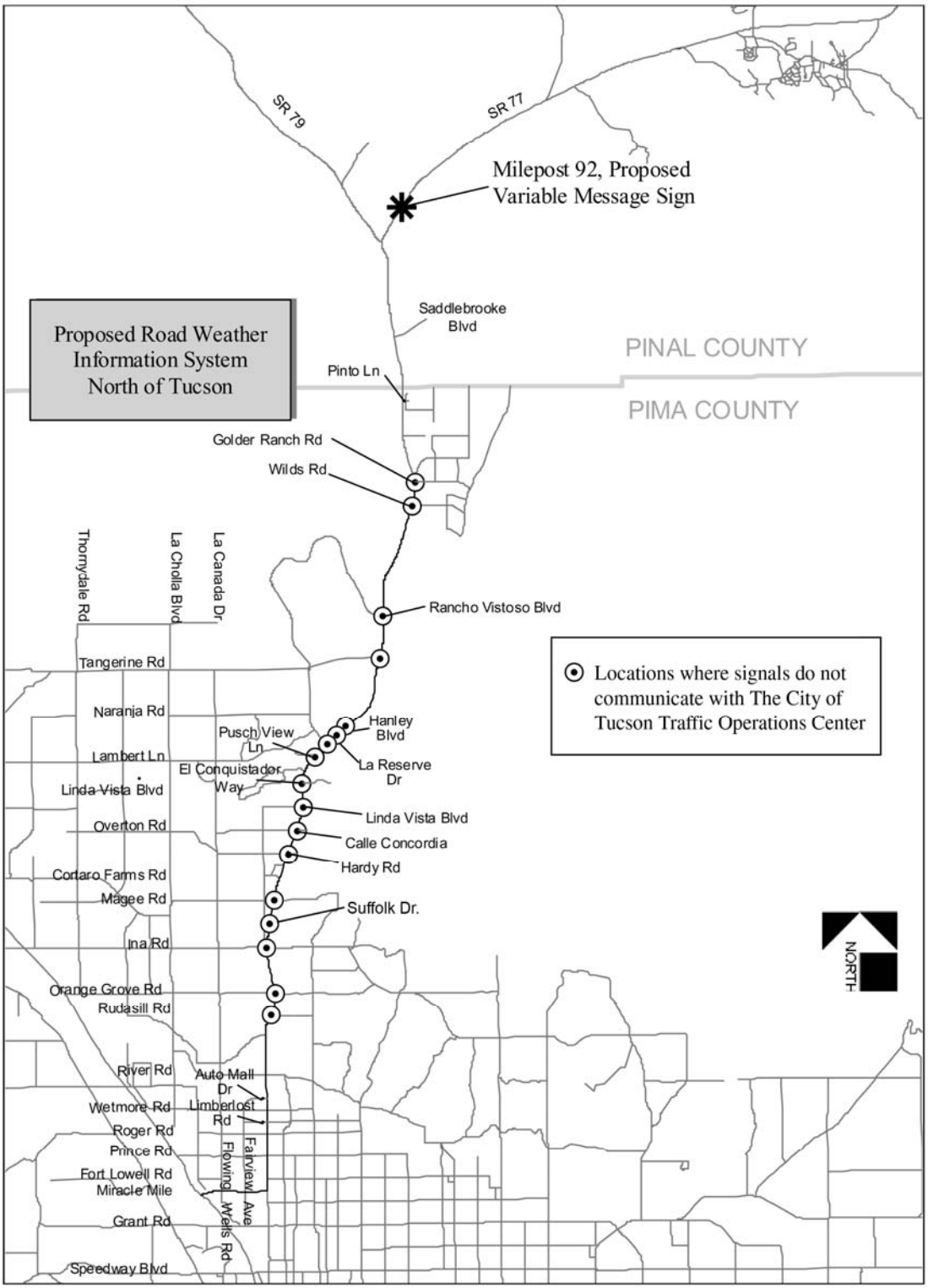


Exhibit 6-17
DEFICIENCIES BY SEGMENT

From MP	To MP	SR 77 Segment	Deficiencies
103.3	91.1	Northern Terminus to SR 79	**Roadway:** Poor future LOS due to severe congestion. (SR 79 to Biosphere Road). **Bicycle:** No bike lanes in areas with 3-lane section. **Pedestrian:** No pedestrian facilities. **ITS:** Proposed variable message sign north of SR 79 junction at milepost 92 is not yet installed.
91.1	88.9	SR 79 to Saddlebrooke Boulevard	**Roadway:** Safety issues mentioned regarding SR 77/SR 79 junction at open house: elevation changes, narrow road, poor sight distance, late afternoon sun blinds motorists. Fifth highest ratio of night/day crash rates (2.21). Drainage culvert at Oracle Junction was recommended to be extended to move culvert headwalls out of the clear zone. **Bicycle:** Narrow bike lanes. **Pedestrian:** No pedestrian facilities.
88.9	87.6	Saddlebrooke Boulevard to Pinto Lane	**Roadway:** Poor future LOS due to heavy congestion. Fourth highest ratio of night/day crash rates (2.31). **Bicycle** Narrow bike lanes. **Pedestrian:** No pedestrian facilities.
87.6	85.8	Pinto Lane to Golder Ranch Road	**Roadway:** Poor future LOS due to heavy congestion. Lack appropriate striping/signing at right turns for bike lane transitions. Access analysis indicates a need for access control. **Bicycle:** Narrow bike lanes. **Pedestrian:** No pedestrian facilities. **Bridge:** Culvert with Sufficiency Rating of 80.00. **ITS:** Golder Ranch Road traffic signal does not communicate with the Tucson TOC.

Existing congestion level is year 2002 from PAG.
Future congestion level is year 2025 with PAG RTP projects assumed in place.

Exhibit 6-17
DEFICIENCIES BY SEGMENT
(Continued)

From MP	To MP	SR 77 Segment	Deficiencies
85.8	85.3	Golder Ranch Road to Wilds Road	**Roadway** Poor future LOS due to heavy congestion. Second highest ratio of night/day crash rates (tied with Wild Road to Rancho Vistoso Boulevard segment) **Bicycle** Narrow bike lanes. **Pedestrian** No pedestrian facilities. **ITS** Wilds Road traffic signal does not communicate with the Tucson TOC.
85.3	82.8	Wilds Road to Rancho Vistoso Boulevard	**Roadway:** Poor future LOS due to heavy congestion. Second highest ratio of night/day crash rates (2.52) (tied with Golder Ranch Road to Wilds Road segment) **Pedestrian:** No pedestrian facilities. **ITS:** Rancho Vistoso Boulevard traffic signal does not communicate with the Tucson TOC.
82.8	81.8	Rancho Vistoso Boulevard to Tangerine Road	**Roadway:** Poor future LOS due to severe congestion. Insufficient NB left-turn lane capacity (NB left-turn traffic at Rancho Vistoso Boulevard periodically backs into through lanes). Highest ratio of night/day crash rates (3.53). **Pedestrian:** No pedestrian facilities. **Other:** SR 77 creates a barrier for east-west trail connections. **ITS:** Tangerine Road traffic signal does not communicate with the Tucson TOC.
81.8	80.2	Tangerine Road to Hanley Boulevard (Honeywell entrance)	**Roadway:** 650 percent increase in crash rate at Tangerine Road intersection. Third highest ratio of night/day crash rates (2.34). **Transit** No fixed route service north of Honeywell entrance. **Pedestrian:** No pedestrian facilities. **Bridge:** CDO Bridge Sufficient Rating 80.00 **Other:** SR 77 creates a barrier for east-west trail connections. **ITS:** Hanley Boulevard traffic signal does not communicate with the Tucson TOC.

Existing congestion level is year 2002 from PAG.
Future congestion level is year 2025 with PAG RTP projects assumed in place.

Exhibit 6-17
DEFICIENCIES BY SEGMENT
(Continued)

From MP	To MP	SR 77 Segment	Deficiencies
80.2	79.7	Hanley Boulevard (Honeywell entrance) to La Reserve Drive	**Roadway:** Poor future LOS due to heavy congestion. **Transit** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **Bridge:** Reinforced concrete box with Sufficiency Rating of 65.00. **ITS:** La Reserve Drive traffic signal does not communicate with the Tucson TOC.
79.7	79.5	La Reserve Drive to First Avenue	**Roadway:** Poor future LOS due to heavy congestion. 194 percent increase in crash rate at La Reserve Drive intersection. **Transit** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **ITS:** First Avenue traffic signal does not communicate with the Tucson TOC.
79.5	79.1	First Avenue to Pusch View Lane	**Roadway:** Poor future LOS due to severe congestion. 217 percent increase in segment crash rate. **Transit:** Bus stops are not ADA compliant. **Bicycle:** Conflict with SB right-turn lane and bicycles. **Pedestrian:** No pedestrian facilities. Difficult for pedestrians to cross at First Avenue. **ITS:** Pusch View Lane traffic signal does not communicate with the Tucson TOC.

Existing congestion level is year 2002 from PAG.
Future congestion level is year 2025 with PAG RTP projects assumed in place.

Exhibit 6-17
DEFICIENCIES BY SEGMENT
(Continued)

From MP	To MP	SR 77 Segment	Deficiencies
79.1	78.5	Pusch View Lane to El Conquistador Way	**Roadway:** Poor existing and future LOS due to severe congestion. Southbound LOS is poor during AM peak – may be related to roadway grade. 437 percent increase in crash rate at Pusch View Lane intersection. 106 percent increase in segment crash rate. **Transit:** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. No pedestrian path from SR 77 at El Conquistador Way to Hotel for hotel employees/guests. **Bridge:** Box culvert under SR 77 that is too small south of Pusch View Lane. Two reinforced concrete boxes with Sufficiency Rating of 70.00. **ITS:** El Conquistador Way traffic signal does not communicate with the Tucson TOC.
78.5	78.0	El Conquistador Way to Linda Vista Boulevard	**Roadway:** Poor existing and future LOS due to severe congestion. 95 percent increase in segment crash rate. **Transit:** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **Bridge:** Reinforced Concrete Box with Sufficiency Rating of 70.00. **ITS:** Linda Vista traffic signal does not communicate with the Tucson TOC.
78.0	77.5	Linda Vista Boulevard to Calle Concordia	**Roadway:** Poor existing and future LOS due to severe congestion. **Transit:** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **ITS:** Calle Concordia traffic signal has poor communications quality to Tucson TOC. **Other:** Equestrian sidewalk button and signage needed at Linda Vista Boulevard to cross SR 77. **ITS:** Calle Concordia traffic signal does not communicate with the Tucson TOC.

Existing congestion level is year 2002 from PAG.
Future congestion level is year 2025 with PAG RTP projects assumed in place.

Exhibit 6-17
DEFICIENCIES BY SEGMENT
(Continued)

From MP	To MP	SR 77 Segment	Deficiencies
77.5	76.9	Calle Concordia to Hardy Road	**Roadway:** Poor existing LOS due to heavy congestion. Poor future LOS due to severe congestion. **Transit:** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **Bridge:** Reinforcement Concrete Box with Sufficiency Rating of 70.00. **ITS:** Hardy Road traffic signal does not communicate with the Tucson TOC.
76.9	75.9	Hardy Road to Magee Road	**Roadway:** Poor existing LOS due to heavy congestion. Poor future LOS due to severe congestion. High crash incident segment (ranked No. 5). **Transit:** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **Bridge:** Corrugated metal pipe with Sufficiency Rating of 70.00. Reinforced concrete box with Sufficiency Rating of 70.00. **ITS:** Magee Road traffic signal does not communicate with the Tucson TOC.
75.9	74.9	Magee Road to Ina Road	**Roadway:** Poor existing LOS due to heavy congestion. Poor future LOS due to severe congestion. High crash incident segment (ranked No. 2). **Transit:** Bus stops are not ADA compliant. Park and Ride lot on southeast quadrant of SR 77/Magee Road is unauthorized. **Pedestrian:** No pedestrian facilities. **Bridge:** Reinforced Concrete Box with Sufficiency Rating of 70.00. **ITS:** Ina Road traffic signal does not communicate with the Tucson TOC.

Existing congestion level is year 2002 from PAG.
Future congestion level is year 2025 with PAG RTP projects assumed in place.

Exhibit 6-17
DEFICIENCIES BY SEGMENT
(Continued)

From MP	To MP	SR 77 Segment	Deficiencies
74.9	73.8	Ina Road to Orange Grove Road	**Roadway:** Poor existing LOS due to heavy congestion. Poor future LOS due to heavy congestion. High crash incident segment (ranked No. 1). High crash rate intersection at Ina Road (ranked No. 3). High crash incident intersection at Ina Road (ranked No. 3). Westbound traffic on Ina Road backs up almost a mile during peak periods. **Transit:** Bus stops are not ADA compliant. No bus pullouts, Sun Tran buses back up traffic on Oracle Road. NB congestion impacts bus stop on southeast quadrant at Ina Road. Express buses cannot use this stop and then access NB left-turn lane. Fix curb cut on southwest corner at Ina Road. **Pedestrian:** No pedestrian facilities. **ITS:** Orange Grove Road traffic signal does not communicate with the Tucson TOC.
73.8	73.3	Orange Grove Road to Rudasill Road	**Roadway:** Poor future LOS due to heavy congestion. High crash rate segment (ranked No. 3). High crash incident segment (ranked No. 4). **Transit:** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **ITS:** Rudasill Road traffic signal does not communicate with the Tucson TOC.
73.3	72.1	Rudasill Road to River Road	**Roadway:** Poor future LOS due to heavy congestion. High crash incident segment (ranked No. 3). High crash rate intersection at River Road (ranked No. 1). High crash incident intersection at River Road (ranked No. 1). **Transit:** Bus stops are not ADA compliant. **Pedestrian:** No pedestrian facilities. **Bridge:** Pima Wash reinforced concrete box with Sufficiency Rating of 70.00.
72.1	71.6	River Road to Auto Mall Drive	**Roadway:** Poor future LOS due to heavy congestion. **Transit:** No local transit routes on this segment. **Bicycle:** No shoulder for bicyclists. No exit from Rillito Park bike path on east side of SR 77. **Pedestrian:** Pedestrian safety concerns at SR 77 River Road. **Bridge:** Rillito Creek Bridge Sufficiency Rating 78.22.

Existing congestion level is year 2002 from PAG.
Future congestion level is year 2025 with PAG RTP projects assumed in place.

Exhibit 6-17
DEFICIENCIES BY SEGMENT
(Continued)

From MP	To MP	SR 77 Segment	Deficiencies
71.6	71.3	Auto Mall Drive to Wetmore Road	**Roadway:** Poor future LOS due to heavy congestion. Insufficient capacity for southbound left-turn lane at Auto Mall Drive/Oracle Road. High crash rate segment (ranked No. 5). High crash rate intersection at Wetmore Road (ranked No. 5). High crash incident intersection at Wetmore Road (ranked No. 5). **Transit:** No local transit routes on this segment. **Bicycle:** No shoulder for bicyclists.
71.3	71.0	Wetmore Road to Limberlost Road	**Roadway:** Poor future LOS due to heavy congestion. High crash rate segment (ranked No. 2) Access analysis indicates need for driveway consolidation. **Bicycle:** No shoulder for bicyclists.
71.0	70.8	Limberlost Road to Roger Road	**Roadway:** Poor future LOS due to heavy congestion. High crash rate segment (ranked No. 1). High driveway density. Access analysis indicates need for driveway consolidation. **Bicycle:** No shoulder for bicyclists.
70.8	70.3	Roger Road to Prince Road	**Roadway:** Poor future LOS due to heavy congestion. High crash rate segment (ranked No. 4). High crash rate at Prince Road intersection (ranked No. 4). High crash incident intersection at Prince Road (ranked No. 4). High driveway density. Amphitheatre school buses stop traffic on Oracle Road. Access analysis indicates need for driveway consolidation. **Pedestrian:** Discontinuous sidewalks.
70.3	69.8	Prince Road to Fort Lowell Road	**Roadway:** Poor future LOS due to heavy congestion. High driveway density. Access analysis indicates need for driveway consolidation. **Pedestrian:** Discontinuous sidewalks.

-Existing congestion level is year 2002 from PAG.
Future congestion level is year 2025 with PAG RTP projects assumed in place.

Exhibit 6-17
DEFICIENCIES BY SEGMENT
(Continued)

From MP	To MP	SR 77 Segment	Deficiencies
69.8	69.5	Fort Lowell Road to Miracle Mile	**Roadway:** Poor future LOS due to heavy congestion. High driveway density on east side. Access analysis indicates need for driveway consolidation. **Pedestrian:** Discontinuous sidewalks. Crosswalk on west side of Oracle Road at Miracle Mile intersection is not ADA compliant.
69.5	69.0	Oracle Road to Fairview Avenue	**Roadway:** Non-standard median lighting. High driveway density. Access analysis indicates need for driveway consolidation. **Pedestrian:** Discontinuous sidewalks.
69.0	68.5	Fairview Avenue to Flowing Wells Road	**Roadway:** Non-standard median lighting. Highway driveway density. High crash rate intersection at Flowing Wells Road intersection (ranked No. 2). 123 percent increase in crash rate at Flowing Wells Road intersection. Access analysis indicates need for driveway consolidation. **Transit:** Transit buses cannot make southbound to eastbound right-turn at Fairview Avenue without encroaching into opposing traffic lanes because of position of utility poles at the corner. **Pedestrian:** Discontinuous sidewalks.
68.5	68.1	Flowing Wells Road to Interstate	**Roadway:** Poor future LOS due to heavy congestion. Eastbound left-turn lane at Flowing Wells/Miracle Mile intersection experiences high volumes during peak hours. Non-standard median lighting. High driveway density. **Pedestrian:** Discontinuous sidewalks. **Bicycle:** No bicycle facilities.

Existing congestion level is year 2002 from PAG.
Future congestion level is year 2030 with PAG 2030 RTP and RTA projects assumed in place.

7. INVESTMENT OPTIONS

7.1 SUMMARY OF INVESTMENT OPTIONS TO ADDRESS CAPACITY DEFICIENCIES

The roadway deficiencies described in Chapter 6 of this document were examined on a segment-by-segment basis and roadway improvement options were developed to address these deficiencies. These improvement options were then compared along the entire corridor to provide coordinated and comprehensive alternatives for consideration. Further analysis was then conducted through traffic simulation modeling to refine feasible capacity alternatives and determine the effects of the grade-separated interchange (GSI) alternatives as compared to an eight-lane widening alternative. An analysis of the potential right-of-way impacts of widening portions of the corridor to eight traffic lanes was also conducted to evaluate the potential right-of-way cost of this option and impacts to adjacent properties.

A summary of the capacity improvement alternatives developed for consideration is provided below. It must be noted that the major improvements described would not necessarily be implemented together, but rather these concepts are presented as alternative ways of maintaining or improving traffic operations and safety along SR 77. It should also be noted that it is assumed that these improvements are in addition to those improvements that are already planned or programmed and are included in the PAG Regional Transportation Plan at the time this study was conducted.

7.1.1 Development of an Alternative High-Capacity Corridor

One option is to develop a parallel high-capacity controlled access corridor to divert traffic from SR 77. The concept is to provide sufficient capacity and travel speed on a parallel route such that enough traffic would be diverted away from SR 77 to reduce the need for other major capacity improvements (e.g., widening to eight lanes or constructing grade-separated intersections). This could be accomplished through the use of series of GSIs along a parallel route (e.g., La Cholla Boulevard) or through the development of a fully access controlled freeway corridor to the west of SR 77.

The alternative corridor concept is illustrated in Exhibit 7-1. The corridor could extend as far north as the SR 77/SR 79 junction, thus providing an alternative route for traffic to and from the anticipated development north of the Pima County/Pinal County line. It would connect to Tangerine Road, already planned as a high-capacity corridor connecting to I-10 on the west. This new corridor would extend south, potentially connecting to one or more high-capacity corridors extending east across the core of the urban area.

An analysis of this alternative corridor concept was conducted in The *Oracle Road Corridor Study* (June 20, 2003) prepared for the Town of Oro Valley, which included an analysis of the impacts of a series of grade-separated intersections (GSIs) along La Cholla Boulevard from Tangerine Road south to River Road on SR 77 traffic through the Town. This analysis included the widening of La Cholla Boulevard to a six-lane divided facility. The results indicate that these improvements along La Cholla Boulevard have little impact on the traffic volumes on SR 77. This is consistent with the PAG regional traffic model forecasts that include significant widening improvements along both La Cholla Boulevard and La Cañada Drive, which appear to

provide little congestion relief along SR 77. The Oro Valley study also included an analysis of an extension of La Cholla Boulevard north of Rancho Vistoso connecting to SR 77 in Catalina. This extension was shown to only carry between 5,000 and 6,000 vehicles per day and provided very little traffic diversion from SR 77.

Based on a review of the traffic forecasts from PAG and the results of the Oro Valley study of Oracle Road, it appears that simply widening the arterials parallel to SR 77, even with the inclusion of GSIs, does not provide adequate traffic diversion and congestion management for SR 77. However, it may be possible to divert traffic from SR 77 to a parallel route if this route were a high capacity limited access freeway facility, which would provide sufficient reduction in travel time for regional commuters.

In order to enhance the effectiveness of this new north/south limited access facility to divert traffic from SR 77 it should connect on the southern end with one or more east/west high capacity facilities. The east/west facilities should extend across the City of Tucson to provide an alternative route for the dominant traffic pattern within the region, which is north/south in the SR 77 corridor and then east/west across the valley. This concept of an alternative north/south corridor connecting to one or more improved east/west corridors could provide the levels of traffic diversion needed to reduce forecast traffic demand along SR 77. This concept should be evaluated in more detail to determine whether it could provide sufficient congestion relief for SR 77.

7.1.2 Summary of Other Capacity Improvement Options Along SR 77

Several options are proposed to increase capacity and reduce congestion along SR 77. These are summarized in Exhibit 7-2 and described below.

- Widen SR 77 to four lanes from the SR 79 junction east through the town of Oracle. This is the recommendation of the Southern Pinal County Regional Transportation Plan (April 2003) and it is consistent with the findings of this study.
- Widen SR 77 to eight general-use lanes from Auto Mall Drive north to Golder Ranch Road. This option is presented as a way to directly address the existing and future congestion levels along SR 77. Signalized intersection improvements to provide the turn lane capacity needed to meet future demand would also be implemented with this widening.
- Add a diamond lane for bus transit and right turns on Oracle Road/SR 77 from Drachman Boulevard (south of Grant Road) north to Saddlebrooke Boulevard, with the exception of the roadway segment between Wetmore Road and Auto Mall Drive. SR 77 would be an eight-lane facility, but the additional lane would be reserved for transit vehicles and traffic making right turns at intersections or driveways. This differs from the eight-lane widening alternative, which addresses congestion problems exclusively.
- Add grade-separated intersections at high volume intersections. These would be implemented instead of widening SR 77 to eight lanes. An option with the GSIs could be to use them only from River Road north to Tangerine Road because of the access issues south of River Road. This could be combined with a comprehensive access control plan south of River Road and the possible use of a diamond lane from Drachman Boulevard to Wetmore Road. This initial alternative was refined by the GSI micro-simulation described below in Section 7.1.3 of this chapter.

Exhibit 7-1
POTENTIAL HIGH-CAPACITY ALTERNATE CORRIDOR

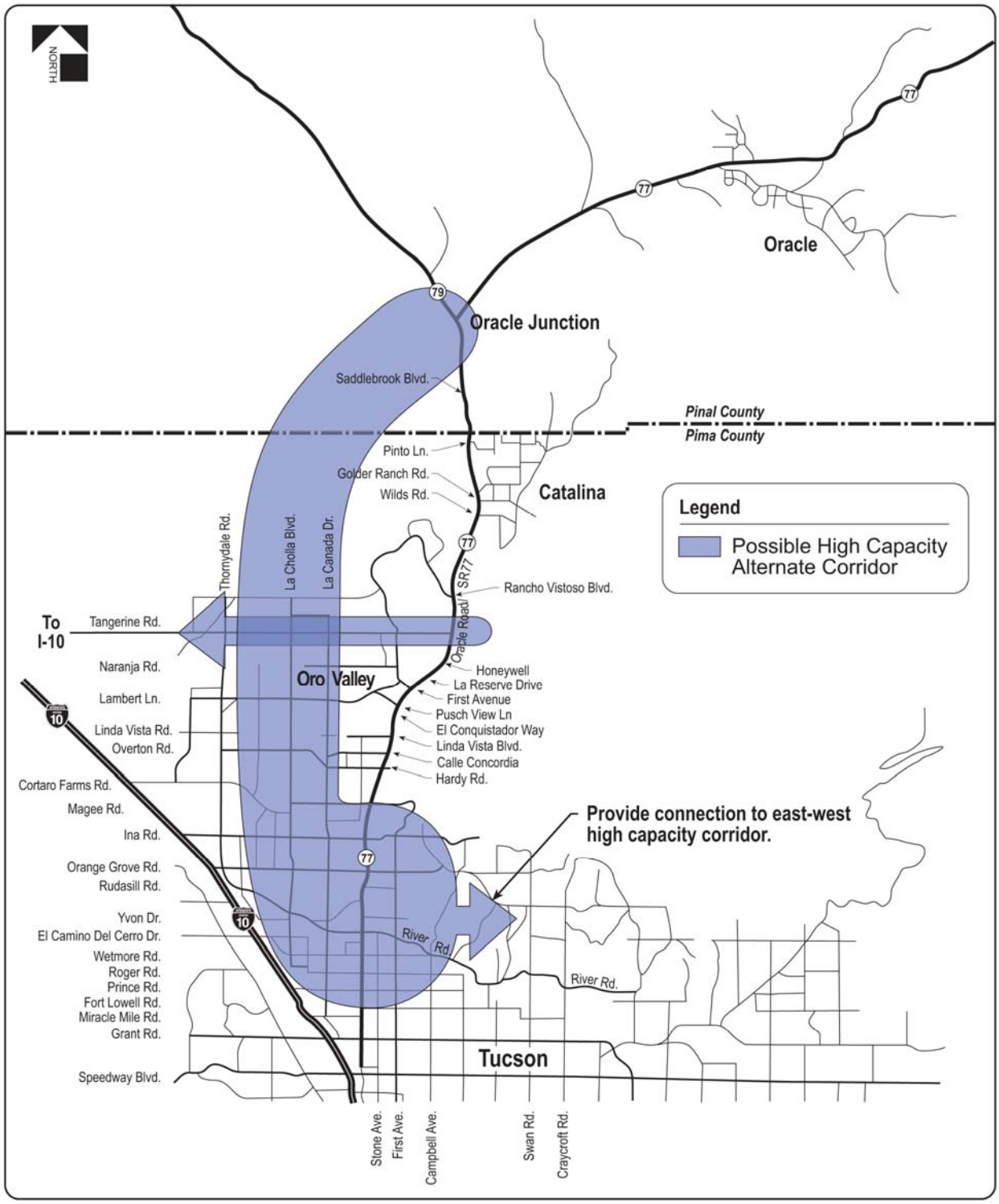
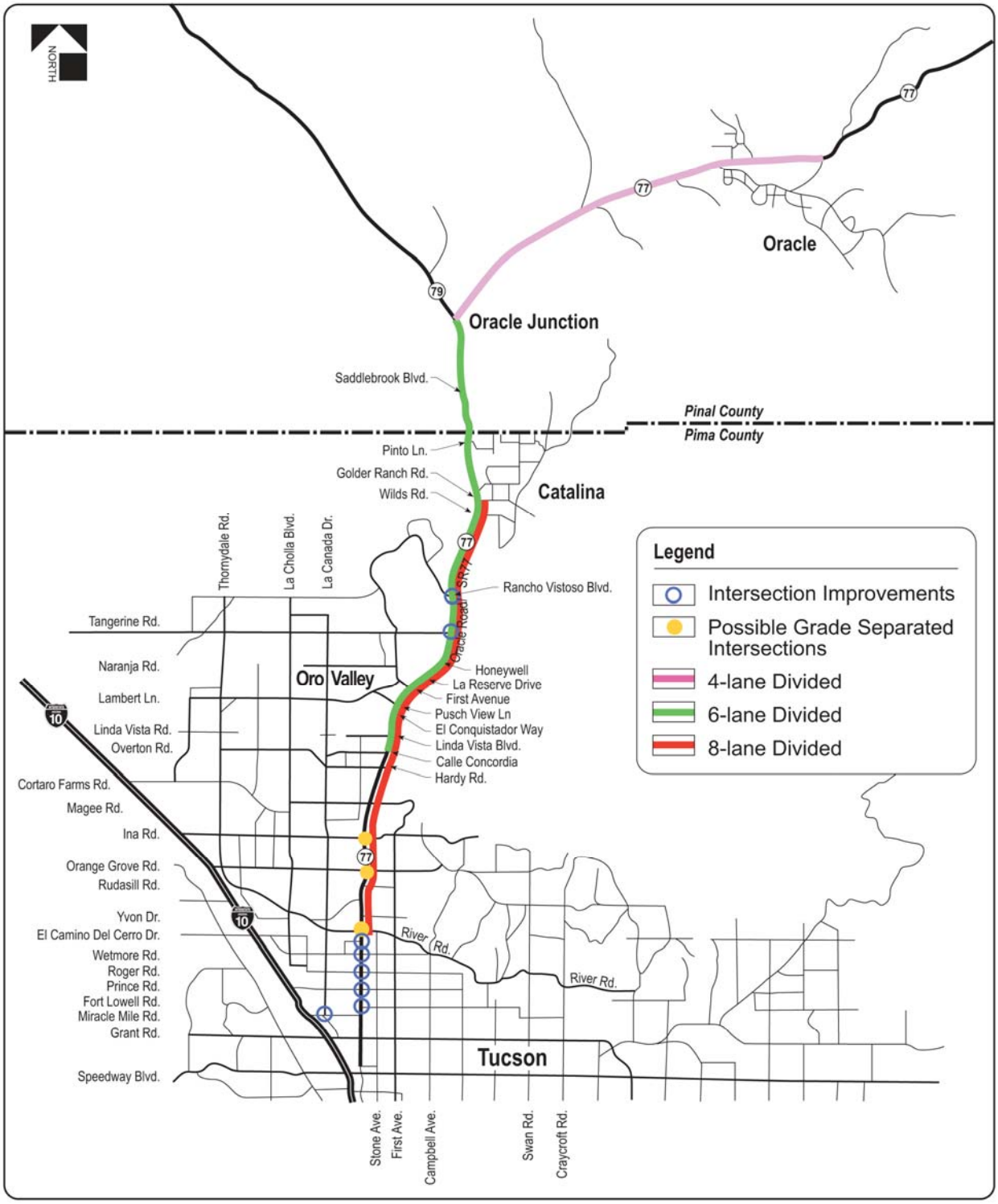


Exhibit 7-2
SUMMARY OF ROADWAY CAPACITY IMPROVEMENT OPTIONS ON SR 77



- Add right-turn lanes at all arterial road intersections that do not currently have them and have immediate capacity needs. This would be an interim improvement only and is not intended as a long-term congestion mitigation measure. These intersections are:
    - Limberlost Road
    - Roger Road
    - Prince Road
    - Fort Lowell Road (northbound only)
- Provide additional left-turn lanes at locations with high left-turn volumes and left-turn delays. Candidates for this type of improvement are northbound SR 77 at Rancho Vistoso Boulevard and southbound SR 77 at Auto Mall Drive. These are considered necessary interim improvements that address immediate roadway capacity needs. However, these improvements will not solve the long-term congestion problems along the corridor.

Other improvements not shown in Exhibit 7-2 are:

- Develop and implement an access control plan for SR 77, particularly south of River Road and in the area between Golder Ranch Road and Wilds Road. Providing improved access control by consolidating driveways and median openings would help to manage congestion and improve traffic safety. This option is discussed in more detail later in this chapter.
- Control future land development along SR 77 to reduce anticipated traffic demand, or alternatively, encourage commercial and employment development along parallel arterials to divert traffic from Oracle Road. This would have to be implemented by the local jurisdictions as ADOT has no authority over land development.
- Provide high capacity transit along SR 77 to divert travel to an alternative mode. This option is described in more detail later in this document.

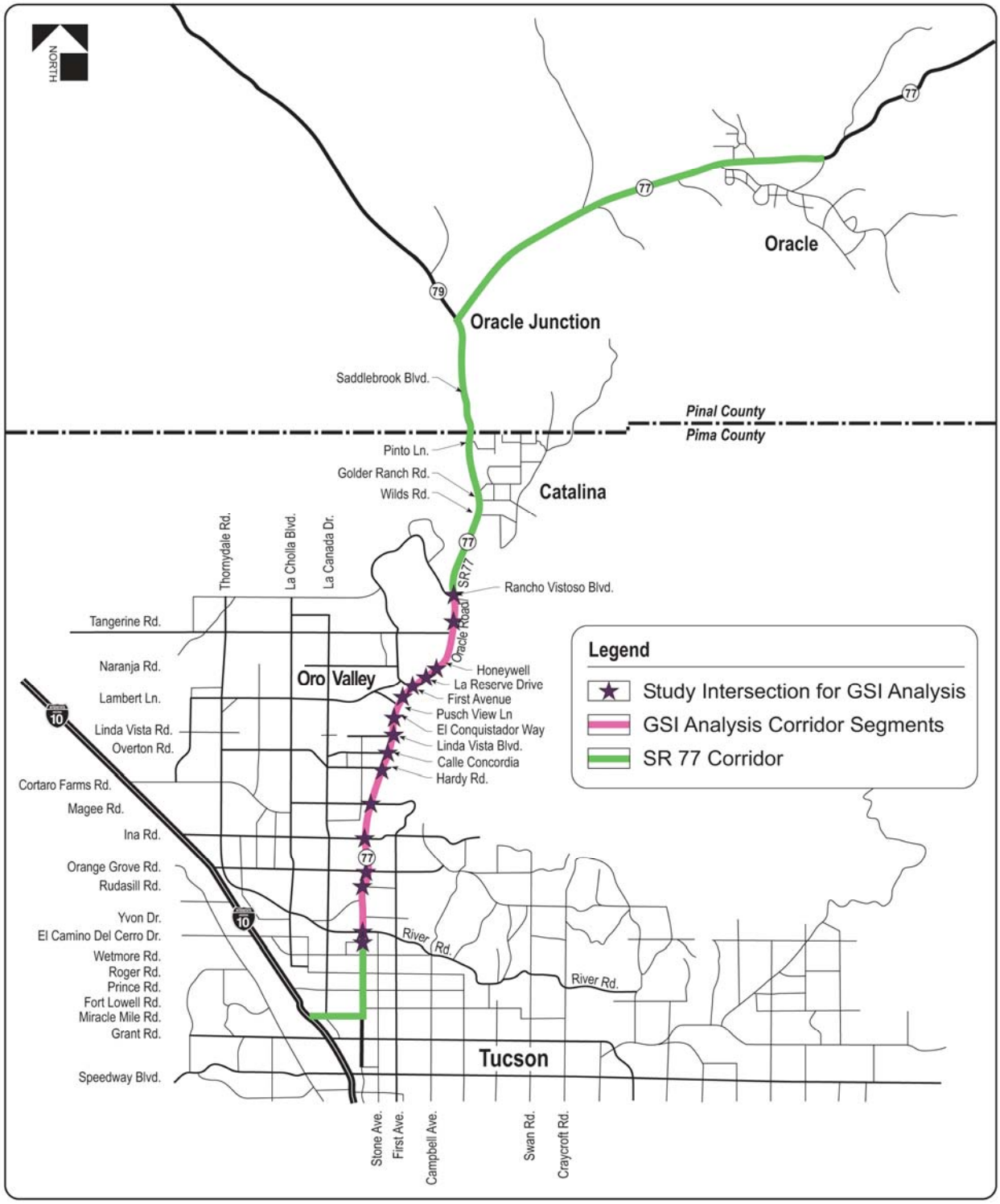
7.1.3 Micro-Simulation Analysis of GSI Alternatives

A micro-simulation analysis was performed to explore the feasibility of constructing Grade-Separated Intersections (GSIs) at critical Oracle Road intersections to facilitate traffic movement in the corridor. The micro-simulation analysis was conducted for a segment of the SR 77 corridor between Auto Mall Drive and Rancho Vistoso Boulevard. The portion of the study corridor and the signalized intersections modeled are shown in Exhibit 7-3.

An analysis of grade-separated interchanges was conducted to show the effect of incrementally adding GSIs on the corridor, based on 2025 congestion levels. The Single Point Diamond Interchange (SPUI) design with the provision of the through movement on the frontage road to accommodate transit was chosen for the analysis. The simulation process can be summarized as follows:

1. Evaluate a GSI first at Ina Road and determine whether a four-lane or six-lane overpass would be preferable at this location.
2. Incrementally add four more GSIs based on 2025 congestion levels (First Avenue, Magee Road, Orange Grove Road, and River Road).
3. Evaluate each GSI location based on vehicle delay and travel time along the corridor.

Exhibit 7-3
PORTION OF THE SR 77 CORRIDOR AND SIGNALIZED INTERSECTIONS INCLUDED IN THE GSI ANALYSIS



The results of the micro-simulation analysis showed that:

1. At Ina Road/SR 77, the four-lane overpass GSI configuration provides traffic operations that are as good as the six-lane overpass configuration, and require less right-of-way and cost. The lane drops and lane adds at the exit and entrance ramps were simulated to result in slightly less delay per vehicle than the use of diverge and merge areas with the off and on ramps. However, this difference in delay per vehicle was typically so small (approximately one second) that it was judged to be insignificant. A literature review was conducted to determine the safety implications of the four-lane overpass GSI with lane drops and adds, in comparison to the six-lane configuration with merge and diverge areas. Research findings indicated that the lane that is added at the on-ramp will improve safety. Therefore, there appears to be no advantage to the provision of a six-lane overpass at this location.
2. The traffic simulation suggests that the provision of a GSI at First Avenue presents traffic operations and design challenges due to the closely spaced intersections upstream and downstream from this location (0.35 miles from Pusch View Lane to First Avenue, 0.27 miles from First Avenue to La Reserve, and 0.39 miles from La Reserve to Honeywell). The simulation required the use of eight lanes on SR 77 from Honeywell to Pusch View Lane to allow these intersections to function properly with the GSI at First Avenue. In addition, traffic entering SR 77 from the First Avenue GSI and then attempting to turn left at the next downstream intersection was simulated to have extreme difficulty in crossing three lanes of traffic in such a short distance. This latter situation would require special consideration during a design process for a First Avenue GSI.
3. The addition of two GSIs on the corridor (Ina Road and First Avenue) provided the highest, incremental improvement in corridor delays among the GSI scenarios tested. However, this scenario required the improvement of SR 77 to eight lanes from Honeywell to Pusch View Lane in order for the GSI at First Avenue to function properly. As a result, the vast majority of the delay reduction resulted from the widening of SR 77 to eight lanes and very little additional improvement resulted from the First Avenue GSI. This suggests that widening of SR 77 to eight lanes from north of Honeywell to south of Pusch View Lane is a better alternative than a GSI at First Avenue.
4. The Ina Road GSI provides significant benefit at this location, and the application of a GSI provides significantly more benefit than widening SR 77 to eight lanes at Ina Road. This is due to the high volume of turn movement traffic at Ina Road, which benefits more from the GSI. However, the GSI at Ina Road has limitations as described below.
5. A GSI at Ina Road should only be considered in tandem with a GSI at Magee Road, or the widening of SR 77 to eight lanes starting south of Magee Road. Without improvements at Magee Road the majority of the benefits of the Ina Road GSI are lost due to increased congestion at Magee Road for northbound traffic.
6. The provision of GSIs at Orange Grove Road and River Road provided significant benefits in delay reduction. While the GSIs provided greater benefits than the eight-lane SR 77 at these specific locations, the incremental benefits may not exceed the incremental costs of the GSI. Therefore, the eight-lane SR 77 may be a more cost effective choice at these locations. Existing right-of-way constraints at Orange Grove Road negatively impacts the potential implementation of a GSI at this location.

7. The assumption of an eight-lane widening from south of River Road to Rancho Vistoso Boulevard provided a large incremental improvement in delay from the Base Case, and was equivalent to adding three GSIs on the corridor.

7.1.4 Right-of-Way Implications and Costs for Widening SR 77 to Eight Lanes

A planning level analysis was conducted to estimate the potential right-of-way implications and costs associated with widening SR 77 to eight-lanes from south of River Road to Golder Ranch Road. A key issue in this process is to decide what roadway elements will be considered to exist within the ROW, and the resulting overall ROW width required for those elements. The elements of the cross-sections described below are provided as examples of what might be constructed, and are considered desirable cross-section components. **Some of these elements and dimensions differ from ADOT standards and policies, and would require ADOT approval. The ROW widths identified below for the sample cross-sections do not take into consideration the requirements for profile grade or drainage necessary for the design of the roadway. These considerations could change the overall ROW requirements.**

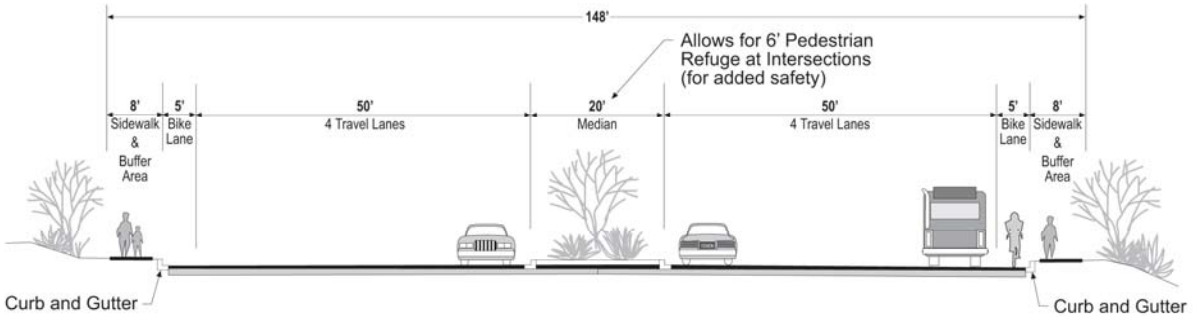
Through discussions with the project Technical Advisory Committee, it was decided that from south of River Road to Ina Road, SR 77 would be planned as an urban cross-section, using curb and gutter with a speed limit reduced to 40 mph to reduce the overall ROW requirements. For the urban section it was deemed desirable to include width for a striped bike lane and sidewalk on both sides of the roadway. The designation of a bike lane on SR 77 from River Road north to Ina Road would require approval by ADOT.

North of Ina Road, SR 77 is assumed to have a fringe urban cross-section, with the additional use of curb and gutter and a 50-mph speed limit. For the fringe urban section the concept was introduced to provide pedestrians and bicyclists with a separate shared-use facility on both sides of the roadway, similar to what is currently provided along Tangerine Road west of First Avenue, in Oro Valley. With a wide, high volume, higher speed facility of this type, it was felt that pedestrians and bicyclists should not have to cross SR 77 to gain access to a shared-use facility. It was also considered desirable to provide the shared-use path for cyclists that might find riding on SR 77 too dangerous. In addition, it was considered an option to continue the on-street bike lanes north of Ina Road for bicycle commuting and more experienced cyclists. This would result in continuous bicycle and pedestrian facilities along SR 77 from I-10 to Golder Ranch Road, when combined with existing, already planned, and additional facilities recommended by this project. **The application of the shared-use paths north of Ina Road may be impractical because of the number of existing roadside access points (commercial driveways and cross streets) in this area. An investigation of the safety and traffic control implications of a share-use path under the existing access conditions should be conducted to determine whether the application is considered appropriate.**

The ROW width for the typical urban section was selected as 146 feet for mid-block sections, and 162 feet at major signalized intersections. Exhibit 7-4 provides an illustration of the typical mid-block urban section. These dimensions provide adequate space for the eight traffic lanes, shoulders, raised curb and gutter, a median, striped bike lanes, areas behind the curb to include sidewalks, and the provision of exclusive turn lanes at major intersections. The use of a 20-foot

median mid-block, rather than the ADOT standard of 16-feet, provides for a 6-foot pedestrian refuge at intersections for additional safety. The urban section could provide for the following:

Exhibit 7-4
EIGHT-LANE URBAN SECTION CONCEPT



- Urban Section - Mid-block (between major signalized intersections)
  - Sidewalk (six feet) and buffer area (two feet):_____ 2 x 8' = 16'
  - Striped bike lane (includes curb and gutter): _____2 x 5' = 10'
  - Travel lanes: Through lanes: _____6 x 12' = 72'
    Through lanes (with curb and gutter): _____ 2 x 14' = 28'
  - Median (allowing for 6' pedestrian refuge at intersections): 1 x 20' = 20'
  - **Total ROW = 146'**

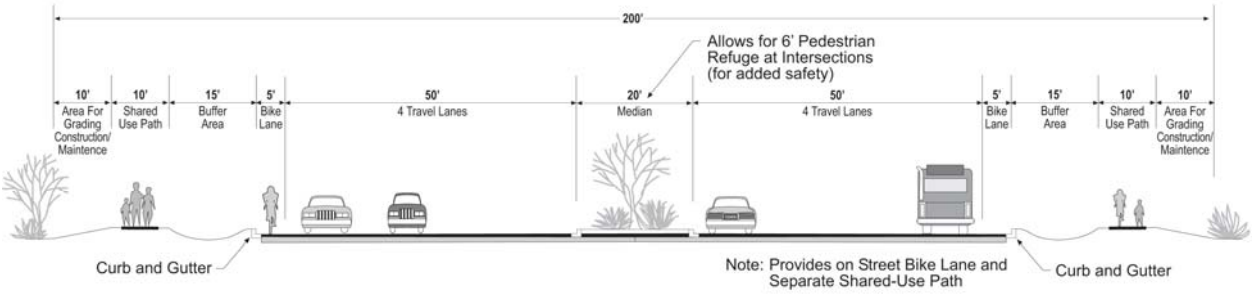
- Urban Section – Major Signalized Intersection
  - Sidewalks (from back of curb): _____2 x 5' = 10'
  - Travel lanes: Through lanes: _____ 8 x 12' = 96'
    Left-turn lane: _____1 x 12' = 12'
    Left-turn lane with curb and gutter: _____ 1 x 14" = 14'
    Right-turn lane with curb and gutter: _____ 1 x 14' = 14'
  - Bike lanes: _____ 2 x 5' = 10'
  - Median (allowing larger refuge for pedestrians): _____ 1 x 6' = 6'
  - **Total ROW = 162'**

The fringe urban section of SR 77 was assumed to require 200 feet of ROW, including the shared-use path on each side of the roadway and the use of curb and gutter. Striped bike lanes were also included within the cross-section to provide on-street facilities in addition to the shared-use paths. An illustration of the fringe urban cross-section is provided in Exhibit 7-5.

The fringe urban section might include the following features:

- Typical Fringe Urban Section – Mid-block
  - Area for grading, construction/maintenance: _____ 2 x 10’ = 20’
  - Shared-use path for pedestrians and bicyclists: _____ 2 x 10’ = 20’
  - Buffer area (landscaping/drainage): _____ 2 x 15’ = 30’
  - Striped bike lane with curb and gutter: _____ 2 x 5’ = 10’
  - Travel lanes: Through lanes:_____ 6 x 12’ = 72’
    Through lanes with curb and cutter: _____ 2 x 14’ = 28’
  - Raised median: _____ 1 x 20’ = 20’
  - **Total ROW = 200’**

Exhibit 7-5
EIGHT-LANE FRINGE URBAN SECTION CONCEPT



There is some flexibility in the use of the 200 feet of ROW with the fringe urban cross-section. For example, in areas where the ROW is limited or at intersections, the buffer area could be reduced in size. This flexibility should provide sufficient ROW for the fringe urban application at major intersections within the 200-foot ROW constraint.

An analysis of the potential ROW impacts using the above ROW width assumptions was conducted to estimate the potential ROW costs of expanding SR 77 to an eight-lane facility. It should be noted that this is a planning level analysis and is not based on actual ROW survey data or a site-specific roadway design. The analysis was conducted using the Pima County Geographic Information System (GIS) database of parcel lines and the Pima Association of Governments (PAG) year 2002, color ortho-photography, geographically rectified to the street network.

The ROW analysis was conducted by combining the total assumed width of the roadway ROW for the urban and fringe urban sections with the parcel based data using ArchView 3.3. For simplicity, it was assumed that the ROW width would be developed symmetrically on both sides of the centerline of the existing roadway. The edge of the ROW line was compared to the parcel lot lines and the parcels where the ROW lines and the lot lines overlapped were identified. The entire corridor was plotted at a 1” to 200’ scale with the lot lines and the assumed ROW lines shown over the aerial photograph base. The plot was visually inspected to determine where there were locations along the corridor where the centerline of the roadway could be shifted to reduce or even eliminate the overlap between the lot lines and the roadway ROW lines. As it turns out, the existing roadway is not always constructed with its centerline on the centerline of the

available ROW. Parcels were eliminated from the list of affected properties if the centerline of the assumed ROW could reasonably be shifted such that the edge lines would not overlap the parcel lot lines. Additional parcels were eliminated from the affected property list if the overlap between the ROW line and the lot line created an area that was so small that it was considered insignificant and the impacted area of the lot is currently vacant.

A review of the existing ROW information and parcel boundary lines for the corridor revealed that from Ina Road south to River Road, the existing ROW varies from a minimum of approximately 140 feet to a maximum of over 200 feet. North of Ina Road, the existing ROW is generally a minimum of 200 feet. The results of the evaluation of the ROW impacts of an eight-lane Oracle Road from south of River Road to Golder Ranch Road are provided in Exhibit 7-6. Exhibit 7-6 indicates the estimated square footage of additional ROW from each individual parcel that would be required for the eight-lane facility. Exhibit 7-6 also indicates the current size of parcel, and the remaining size of each parcel assuming the additional ROW is taken. In addition, Exhibit 7-6 provides information on the existing land use of the parcel, and the existing condition of the additional ROW needed for the roadway expansion. The parcel locations are organized from south to north in the exhibit. The location of Ina Road is noted in Exhibit 7-6 as 7200 North Oracle Road. Addresses less than 7200 North Oracle Road are south of Ina Road, where the eight-lane facility is assumed to be an urban cross-section. Addresses greater than 7200 North Oracle Road are north of Ina Road, where the eight-lane facility is assumed to be a fringe urban cross-section with 200 feet of ROW.

The investigation indicated that it appears as though an eight-lane facility could be developed under the assumed ROW needs for the urban and fringe urban sections with only minimal impacts to existing properties. In most cases where some additional land might need to be acquired, this land is currently either vacant frontage to SR 77 for a developed parcel, or a portion of a completely vacant parcel. No existing buildings would be impacted along the corridor. In most cases where the ROW needs might possibly encroach on developed property, the development that is impacted is a small portion of an existing parking lot. One possible impact of some significance is at 6000 North Oracle, where the ROW could encroach on existing parking for a bank.

Another possible impact of some significance is at 6100 North Oracle where a portion of an internal circulation driveway/roadway serving the existing townhouse development could be impacted. It may be possible to shift the alignment of the Oracle Road to avoid this latter impact.

The ROW cost estimates contained in Exhibit 7-6 were provided by the Arizona Department of Transportation in May 2005. The estimated total cost of ROW for the eight-lane widening alternative is estimated to be approximately $1.5 million.

7.2 SUMMARY OF INVESTMENT OPTIONS TO ADDRESS NON-CAPACITY DEFICIENCES

7.2.1 Roadway Lighting Investment Options

The results of the analysis of the night versus day crash history indicates that the SR 77 corridor segment from Pinto Lane to Pusch View Lane (west) could benefit from roadway lighting. One

area of this segment, from Rancho Vistoso Boulevard to Tangerine Road, was ranked somewhat lower than the other segments (ranked seventh, instead of in the top five segments), however, this segment was included to provide a continuous road segment. This lighting may only be required if the reconstruction of the roadway to a six-lane divided facility with improved access management does not improve the nighttime crash condition. The roadway segments for consideration of possible roadway lighting are summarized in Exhibit 7-7. The segment of SR 77 from I-10 to Oracle Road was found to have non-standard lighting, which is recommended to be upgraded to current standards.

Exhibit 7-6
SUMMARY OF POTENTIALLY IMPACTED PARCELS FOR EIGHT-LANE WIDENING: AUTO MALL DRIVE TO GOLDER RANCH ROAD

Index	Address	Parcel ID	Parcel Area (sq ft)	Impacted Area (sq ft)	Remaining Area (sq ft)	Existing Land Use Description	Condition of Land Impacted by ROW	Acquisition Estimate
1	5903-5929 N. Oracle Rd	10218004A	364,202	649	363,554	Multiple residential	Access road intersecting SR 77-no significant impact	$6,500
2	5931 N Oracle Rd	10221007B	27,622	1,560	26,063	Miscellaneous commercial	Vacant frontage	$23,400
3	5900 block	10221008A	23,719	1,419	22,300	Office Buildings	Vacant frontage	$25,000
4	5960 N Oracle Rd	102210130	45,675	746	44,929	Convenience markets, retail strip stores, supermarkets	Frontage - no significant impact	$13,000
5	6000 N Oracle Rd	102200200	32,309	3,831	28,479	Banks etc.	Frontage - parking, significant impact	$70,000
6	6002-6090 N Oracle Rd	10220019C	175,706	5,768	169,937	Shopping centers	Frontage - possible parking	$80,000
7	6100 N Oracle Rd	102200370	93,722	1,791	91,931	Condominiums/townhouses	Frontage - possible site internal circulation road	$15,000
8	6200 N Oracle Rd	10220003A	454,810	4,618	450,193	Multiple residential	Vacant frontage	$37,000
9	6210 N Oracle Rd	102202450	26,349	983	25,366	Restaurants, night clubs, bars, taverns	Possible site parking	$15,000
10	6251-61 N. Oracle Rd	10220004C	82,130	2,445	79,685	Convenience markets, retail strip stores, supermarkets	Vacant frontage	$30,000
11	6281 N Oracle Rd	10220004B	104,093	2,694	101,398	Religious property	Vacant frontage	$22,000
12	6360 N Barcelona Ln	102153480	514,165	4,844	509,322	Condominiums/townhouses	Vacant frontage	$32,000
13	401 W Orange Grove Rd	10220122A	74,418	1,090	73,329	Vehicle sales, leasing, storage, parts	SW corner - vacant/parking	$22,000
14	6700 N Oracle Rd	102033030	956	318	638	Municipal property	Vacant frontage	$10,000
15	6700 N Oracle Rd	102033030	6,181	5,660	521	Municipal property	Vacant frontage	$67,000
16	6700 N Oracle Rd	102022030	5,988	2,032	3,956	Municipal property	Vacant frontage	$17,000
17	6700 N Oracle Rd	102033020	74,264	618	73,646	Municipal property	Vacant frontage	$30,000
18	6701 N Oracle Rd	102033020	74,264	207	74,057	Municipal property	Vacant frontage	$3,000
19	6702 N Oracle Rd	102033020	74,264	338	73,927	Municipal property	Vacant frontage	$5,000
20	6740 N Oracle Rd	10203150H	43,561	1,026	42,535	Office Buildings	Vacant frontage	$18,000
21	6760-6770 N Oracle Rd	10203150G	52,089	1,069	51,020	Office Buildings	Vacant frontage	$20,000
22	6780 N Oracle Rd	10203150F	28,451	1,480	26,972	Restaurants, night clubs, bars, taverns	Frontage - driveway, vacant	$25,000
23	6812-6818 N. Oracle Rd	10203320A	85,604	3,858	81,746	Office Buildings	Frontage - driveways, vacant	$65,000
24	6831-6893 N Oracle Rd	102033700	204,173	4,243	199,930	Office Buildings	NE corner of parcel - vacant, possible parking	$72,000
25	6831-6893 N Oracle Rd	102033700	204,173	305	203,867	Office Buildings	SE corner, vacant - no impact	$6,000
26	6840-6860 N Oracle Rd	10203059A	188,247	2,747	185,500	Office Buildings	SW corner of parcel - vacant	$42,000

Exhibit 7-6
SUMMARY OF POTENTIALLY IMPACTED PARCELS FOR EIGHT-LANE WIDENING: AUTO MALL DRIVE TO GOLDER RANCH ROAD
(Continued)

	Ina Road - 7200 N. Oracle Road						Total South of Ina Road	$770,900
27	8460 N VIA TIOGA	225151440	383,209	16,057	367,152	Condominiums/townhouses	Vacant frontage	$175,000
28	8700 block	225151450	155,248	1,186	154,061	Vacant	Vacant	$17,000
29	8700 block	22513003B	391,383	298	391,085	Vacant	Vacant	$4,000
30	8700 block	22513003B	391,383	3,830	387,552	Vacant	Vacant	$55,000
31	8700 block	22513003B	391,383	470	390,912	Vacant	Vacant	$7,000
32	10701 N La Reserve Dr	220080090	306,648	3,413	303,235	Care facilities	Vacant frontage	$52,000
33	10800 N Oracle Rd	22008008M	290,512	4,354	286,157	State property	Vacant frontage	$18,000
34	10800 block	220080030	3,999	1,100	2,899	Limited use	Vacant	$5,000
35	10800 block	220090070	3,547	979	2,568	Limited use	Vacant	$5,000
36	10901 N Stallard Pl	22010015A	56,377	2,246	54,132	Vacant	Vacant	$16,000
37	1550 -1580 E Hanley Blvd	22010013B	196,923	7,363	189,560	Industrial warehouses	Vacant frontage	$52,000
38	10921 -10931 N Stallard Pl	22010016A	59,903	3,395	56,507	Vacant	Vacant	$25,000
39	10941 N Stallard Pl	22010017A	60,749	3,637	57,112	Vacant	Vacant	$25,000
40	10956 - 10970 N Stallard Pl	22010006A	222,092	8,368	213,724	Industrial	Vacant frontage	$60,000
41	10980 - 11160 N Oracle Rd	220110740	601,321	23,463	577,858	Office Buildings	Vacant frontage	$140,000
42	13350 N Vistoso Village Dr	219241000	164,424	6,601	157,824	Vacant	Vacant	$40,000
							Total North of Ina Road	**$696,000**
							Overall Total	**$1,466,900**

Source: Arizona Department of Transportation

7.2.2 Pedestrian Investment Options

The *PAG Transportation Improvement Plan (2007-2011)* and *2030 Regional Transportation Plan (Amended)* include a number of sidewalk projects within the corridor, including construction of sidewalks on SR 77 in these areas:

1. Roger Road to River Road
2. River Road to Ina Road

There is a discontinuous sidewalk system between Prince Road and River Road, and there are no sidewalks north of River Road. Sun Tran bus stops north of River Road are not accessible via a sidewalk. The *PAG Regional Pedestrian Plan (July, 2000)* includes a map of pedestrian activity areas, which showed areas served by transit service, locations of schools and other indicators of pedestrian activity. On SR 77, these areas included Miracle Mile, between I-10 and Oracle Road, Oracle Road, between Miracle Mile and the Cañada de Oro Wash crossing of SR 77 (milepost 80.84), and through the Town of Catalina, which is noted as having shared use paths. Pedestrian options were developed to gradually develop a sidewalk system north of River Road, provide a continuous sidewalk system south of River Road, between River Road and Prince Road, and to provide ADA accessibility to bus stops throughout the corridor.

Pedestrian facility improvement recommendations for consideration are (also see Exhibit 7-8):

- In the interim, provide ADA compatible bus stops within the SR 77 corridor area.
- As roadway improvements are implemented, provide sidewalks in areas defined as activity areas in the *PAG Regional Pedestrian Plan* (July, 2000).
- Implement the already planned sidewalk improvements from I-10 to Prince Road.
- Provide continuous sidewalks on both sides of SR 77 from Prince Road to River Road by filling in the sidewalk discontinuities.
- Provide continuous pedestrian facilities in conjunction with the improvement alternative to widen SR 77 to an eight-lane facility from River Road to Golder Ranch Road. North of River Road to Ina Road this would mean providing continuous sidewalks in conjunction with widening SR 77 as an urban roadway section. North of Ina Road to Golder Ranch Road, this would mean developing a continuous shared use path on both sides of the roadway for use by pedestrians and bicyclists.

7.2.3 Bicycle Facility Investment Options

The PAG *2030 Regional Transportation Plan (Amended)* shows the existing and future bikeway and shared use system. On the SR 77 corridor, future bike routes are shown between Ina Road and Prince Road. There was a shoulder-widening project completed in 2005 between Ina Road and River Road that provided a facility for bicyclists to use. Other potential project needs include previous funding application requests for bicycle-compatible rumble strips in the northern areas of the corridor, and roadway restriping to achieve a 5.5-foot paved shoulder in the Town of Catalina. Another possible transportation enhancement project was the implementation of 15-foot curb lanes on Oracle Road, between River Road and Roger Road. Bicycle/vehicle conflicts were noted by the public because of a continuous southbound right turn lane between La Reserve Drive and Pusch View Lane. This road segment was part of a planned road widening project, which was completed in 2005 and corrected the vehicle/bicycle conflict.

Exhibit 7-7
SEGMENTS FOR POSSIBLE LIGHTING IMPROVEMENTS

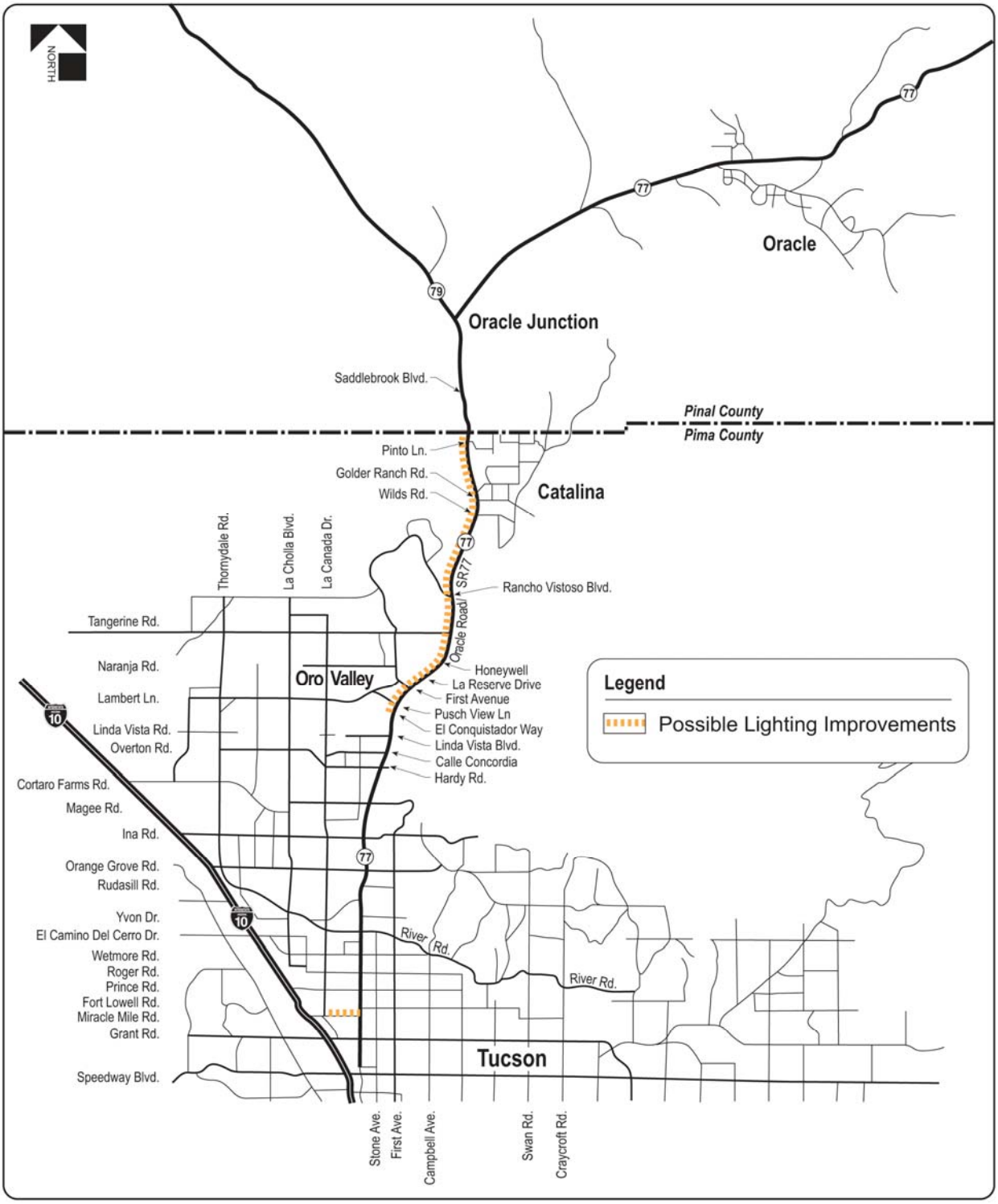
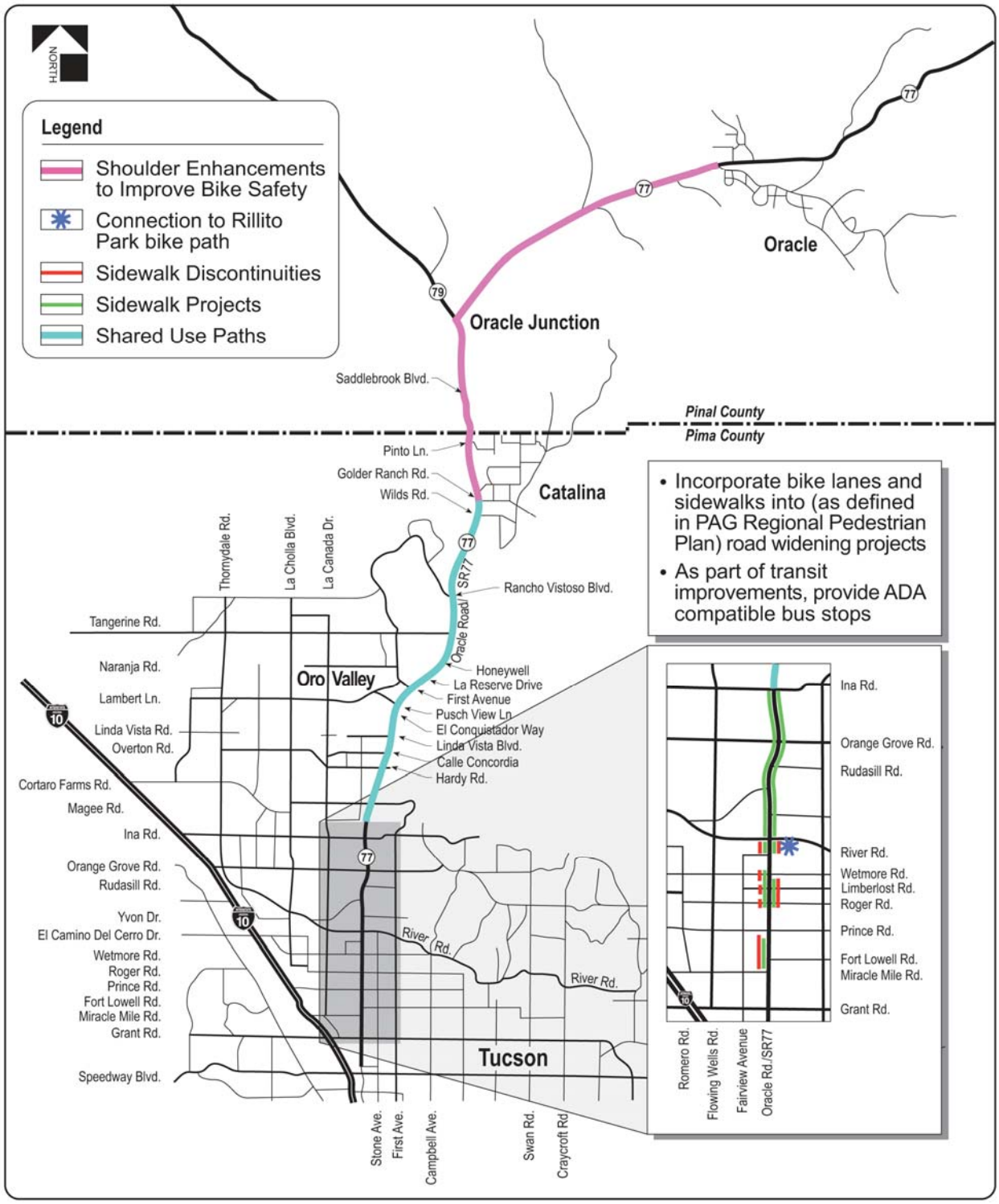


Exhibit 7-8
PEDESTRIAN AND BICYCLE FACILITY
IMPROVEMENT RECOMMENDATIONS



The proposed recommendations for bicycle facilities would ultimately provide continuous facilities from I-10 to the Town of Oracle. Although ADOT does not specifically build bicycle lanes on state routes, cyclists can and do use the shoulders provided on state routes. Bicycle facility improvement recommendations for consideration are (also see Exhibit 7-8):

- In the interim, it is recommended to fund improvements in the previously proposed Transportation Enhancement grant to replace non-compatible rumble strips with more bicycle-compatible rumble strips in the northern area of the corridor, and widen shoulders in the Catalina area to a minimum of 5.5 feet for use by bicyclists.
- The diamond lanes that are proposed as a long-range transit option in the segment from of SR 77 from Saddlebrooke Boulevard to Drachman Road would also provide a multi-use facility for bicyclists.
- Under the improvement alternative to widen SR 77 to an eight-lane facility from south of River Road to Golder Ranch Road, cyclists could use either the wide shoulder, or use the proposed shared-use path north of Ina Road to Golder Ranch Road. **The development of shared-use paths north of Ina Road may be constrained by the existing number of roadside access points (commercial driveways and cross streets) in this area. An investigation of the safety and traffic control implications of a share-use path under the existing access conditions should be conducted to determine whether the application is appropriate.**
- Provide a connection from the east side of SR 77 to the Rillito Park Bike Path just south of River Road.

7.2.4 Transit Investment Options

The consensus of the transit analysis and the results of the transit workshops was that significant improvements or additions to the transit component of the corridor need to be planned for and implemented over time, with a system in place by the 2030 horizon year that recognizes the northward advance of urbanization along the corridor to the Pinal County line and beyond. However, there was disagreement as to when different types of transit service should be implemented or whether some types of service, such as light rail, would ever be suitable in some corridor segments.

The draft concept recommendations from the workshop participants were evaluated and consolidated into two maps, Exhibits 7-9 and 7-10, depicting the north and south halves of the corridor.

Concepts for transit improvements or additions presented on the maps are separated into three phases: near-term, mid-term, and long-term. At the draft concept stage, the threshold horizons for the break points between near-term and mid-term, and mid-term and long-term were left undefined. Generally, more modest recommendations are shown as "near-term," with more significant transit improvements envisioned as occurring in the mid- or long-term time frames as warranted. For example, a dashed line along Oracle Road north of River Road depicts peak-hour express bus service in the mid-term and all-day limited-stop service in the long term.

A key concern expressed by all transit workshop participants was the need to make bus stops and service accessible and to provide adequate sidewalks, crosswalks, shelters, and benches. "Far

side" bus pullouts, located downstream from major intersections, were also recommended unless pre-empted by the use of curb-side diamond bus and carpool lanes such as those used, for example, along east Broadway Boulevard in Tucson. Neighborhood and commercial area circulators were recommended as a means of improving mobility in the Flowing Wells area, near the Tucson Mall, and at key intersections where commercial development is occurring farther north. Exhibits 7-9 and 7-10 also identify the locations of key activity centers, together with suggested locations for additional park-and-ride lots.

High capacity transit may be needed between the vicinity of the Tohono Tadai Transit Center/Tucson Mall area and the University of Arizona and the Tucson Central Business District. Taking into consideration the significant amount of growth projected for Marana and new communities in Pinal County on the I-10 corridor, the need may also arise for a high capacity connection between the Tucson Mall area and the I-10 corridor. Determination of the appropriate high capacity mode, or combination of modes, will require further study, and would be the subject of a future study effort.

7.2.5 Bridge and Drainage Structures Investment Options

None of the bridge or drainage structures were identified as being eligible for replacement based on structural sufficiency ratings. However, these structures should be reviewed and possibly upgraded during planned widening projects, or through road widening projects recommended by this study. A summary of the structures with sufficiency ratings of 80 or less and whether they are included in planned or programmed projects is shown Exhibit 7-11. The structures shown in Exhibit 7-11 that are not included in the planned or programmed projects should be reviewed as part of the design process if the road widening option is selected for these areas of the corridor.

Additionally, the Central Arizona Association of Governments recommends that ADOT program a culvert upgrade at Oracle Junction to move culvert headwalls out of the clear zone.

Two other structures were noted as being geometrically deficient, although structurally adequate. These were:

Structure Number	Structure Name	Mile Marker	Location
4728	Reinforced Concrete Box	69.73	Fort Lowell Road to Miracle Mile
5729	Reinforced Concrete Box	69.92	Prince Road to Fort Lowell Road

In these areas, diamond lanes are an option, and these structures should be reviewed in more detail if the diamond lane option is recommended.

7.2.6 ITS Investment Options

ITS deficiencies that were noted within the corridor include 17 signalized intersection locations where there is no communications to the City of Tucson's Traffic Operations Center (TOC). It is recommended that communications alternatives be investigated and that the most cost-effective method of communications be established so that these signals can be linked to the Tucson TOC.

Exhibit 7-9
CONSOLIDATION OF WORKSHOP RECOMMENDATIONS
(NORTH HALF OF CORRIDOR)

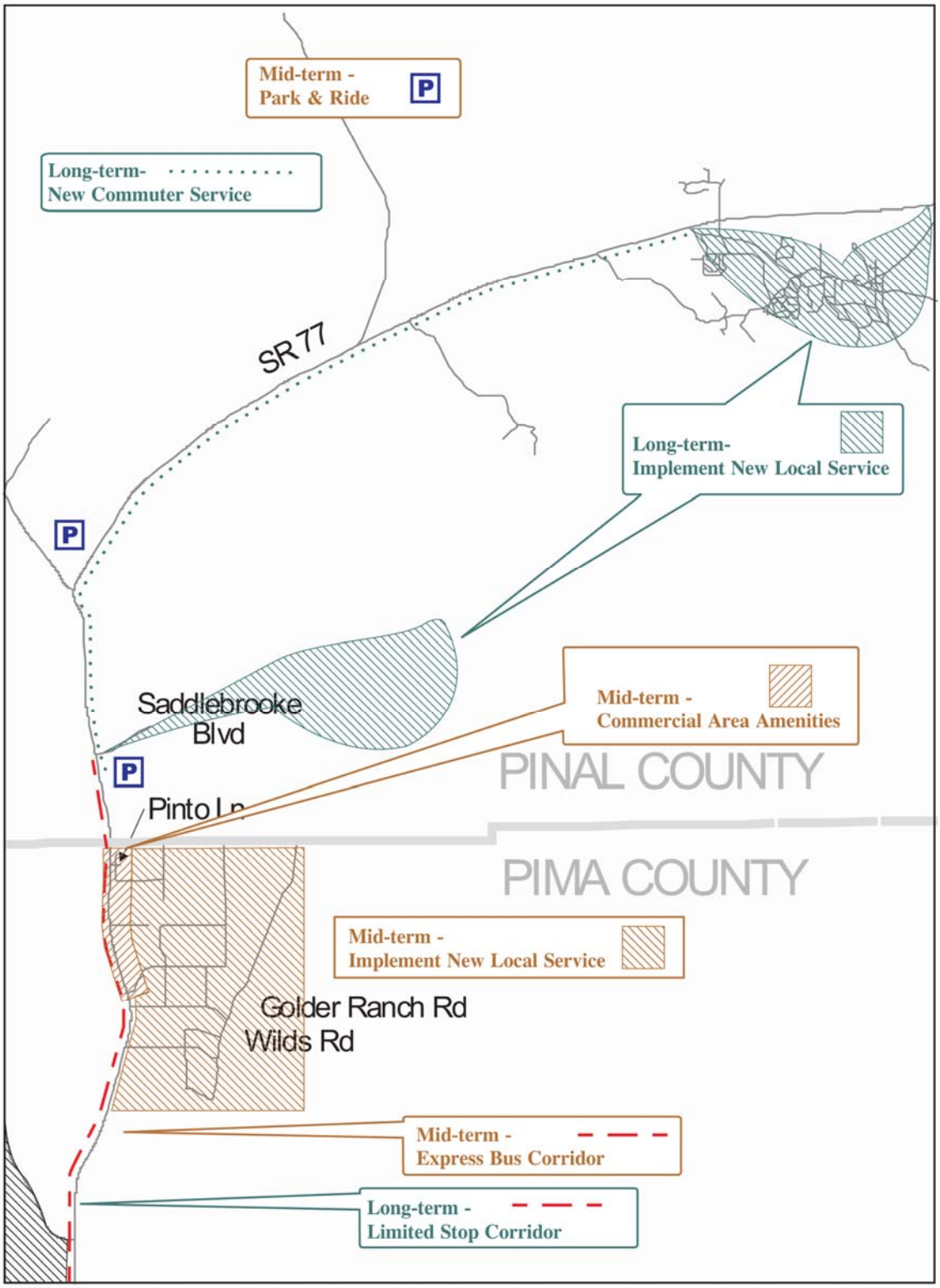


Exhibit 7-10
CONSOLIDATION OF WORKSHOP RECOMMENDATIONS
(SOUTH HALF OF CORRIDOR)

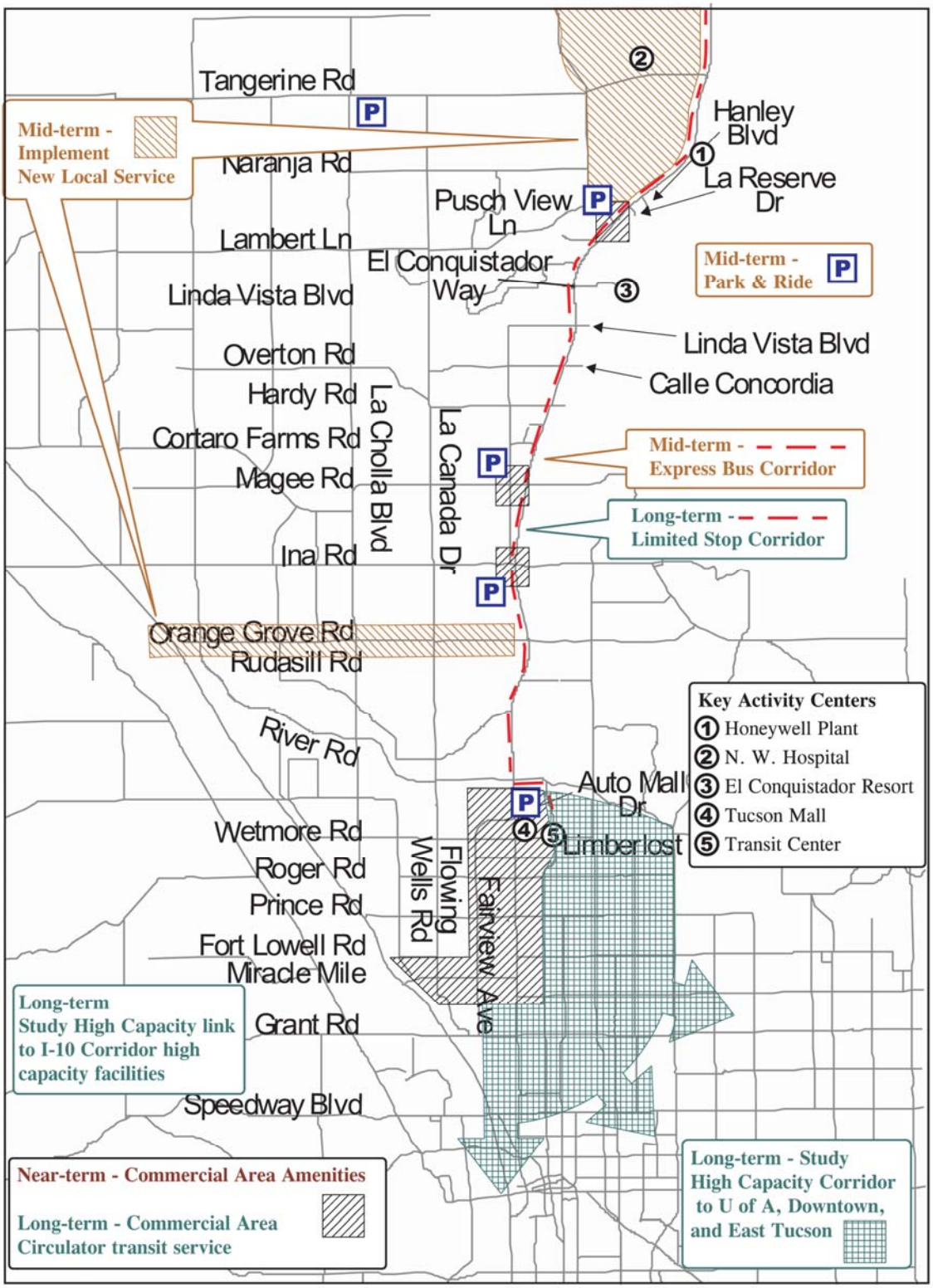


Exhibit 7-11
BRIDGES WITH SUFFICIENCY RATINGS AT OR LESS THAN 80 PERCENT AND WHETHER THEY ARE INCLUDED IN PLANNED OR PROGRAMMED PROJECTS

Structure No.	Structure Name	Mile Marker	Road Segment Location	Sufficiency Rating	Are these addressed in Planned or Programmed Projects?
2006	Cañada Del Oro Bridge	80.78	Tangerine Road to Hanley Boulevard	80.00	Yes, in six-lane widening
4733	Twenty-Seven Wash RCB Culvert	85.99	Pinto Lane to Golder Ranch Road	80.00	Yes, drainage improvement project is planned
1550	Rillito Creek Bridge	71.79	River Road to Auto Mall Drive	78.22	
4730	Pima Wash RCB Culvert	72.46	Rudasill Road to River Road	70.00	Yes, in culvert/shoulder project.
6754	RCB Culvert	75.71	Hardy Road to Magee Road	70.00	
7115	CMP Culvert	76.41	Hardy Road to Magee Road	70.00	
4731	RCB Culvert	76.68	Calle Concordia to Hardy Road	70.00	
6755	RCB Culvert	77.13	Calle Concordia to Hardy Road	70.00	
6756	RCB Culvert	78.37	El Conquistador Way to Linda Vista Boulevard	70.00	Yes, in six-lane widening.
6757	RCB Culvert	78.80	Pusch View Lane to El Conquistador Way	70.00	Yes, in six-lane widening.
4732	RCB Culvert	78.90	Pusch View Lane to El Conquistador Way	70.00	Yes, in six-lane widening.
6812	RCB Culvert	79.82	Hanley Boulevard to La Reserve Drive	65.00	Yes, in six-lane widening.

In addition, ADOT and the local agencies should work together to develop a suitable uniform application of traffic signal preemption equipment along the corridor. Other alternatives include programming the planned Road Weather Information System north of Tucson system in the northern area of the corridor, and a Proposed Variable Message Sign at MP 92. The ITS improvements for the corridor are summarized in Exhibit 7-12.

7.2.7 Investment Options to Address AASHTO Design Deficiencies

AASHTO design deficiencies were identified in project assessments. These included four horizontal curve deficiencies and three vertical curve deficiencies in the corridor. Some of these deficiencies will be addressed in planned or proposed projects, as indicated in Exhibit 7-13.

The deficiencies in the area from Willow Springs to Oracle would be addressed in the option proposed by this study to widen this section to four lanes. The deficiencies in the section from Miracle Mile to Ina Road could be addressed either through the proposed option to widen to eight lanes from Auto Mall Drive north, or the proposed option to construct an additional traffic lane (possibly a diamond lane) through this entire section.

7.2.8 Access Control Investment Options

The procedure to develop an access management concept for the SR 77 corridor, involved dividing the roadway into urban, suburban, and rural segments based on the level of access control compatible with existing and future adjacent land uses.

Exhibit 7-14 presents the current and proposed access conditions. Characteristics include the type of section (urban, suburban, and rural), adjacent land use, signal spacing, an access management strategy or the roadway segment, and driveway density. Access management strategies have been categorized into a "comprehensive strategy" and "retrofit strategies", which are defined below.

Comprehensive Access Management

A comprehensive access management strategy blends land use and high level access management techniques to minimize the impacts of adjacent property on traffic operations and safety on SR 77. The characteristics of this strategy include:

- A multi-lane divided highway with a median.
- Long uniform signal spacing or grade-separated interchanges.
- Median openings between traffic signals or interchanges.
- Low driveway density.

The strategy could also include frontage or "backage" roads connected to intersections or interchanges to provide access to adjacent properties. In addition, subdivisions and commercial properties would be designed with internal parallel streets connecting to major streets intersecting with SR 77.

Exhibit 7-12
ITS IMPROVEMENTS

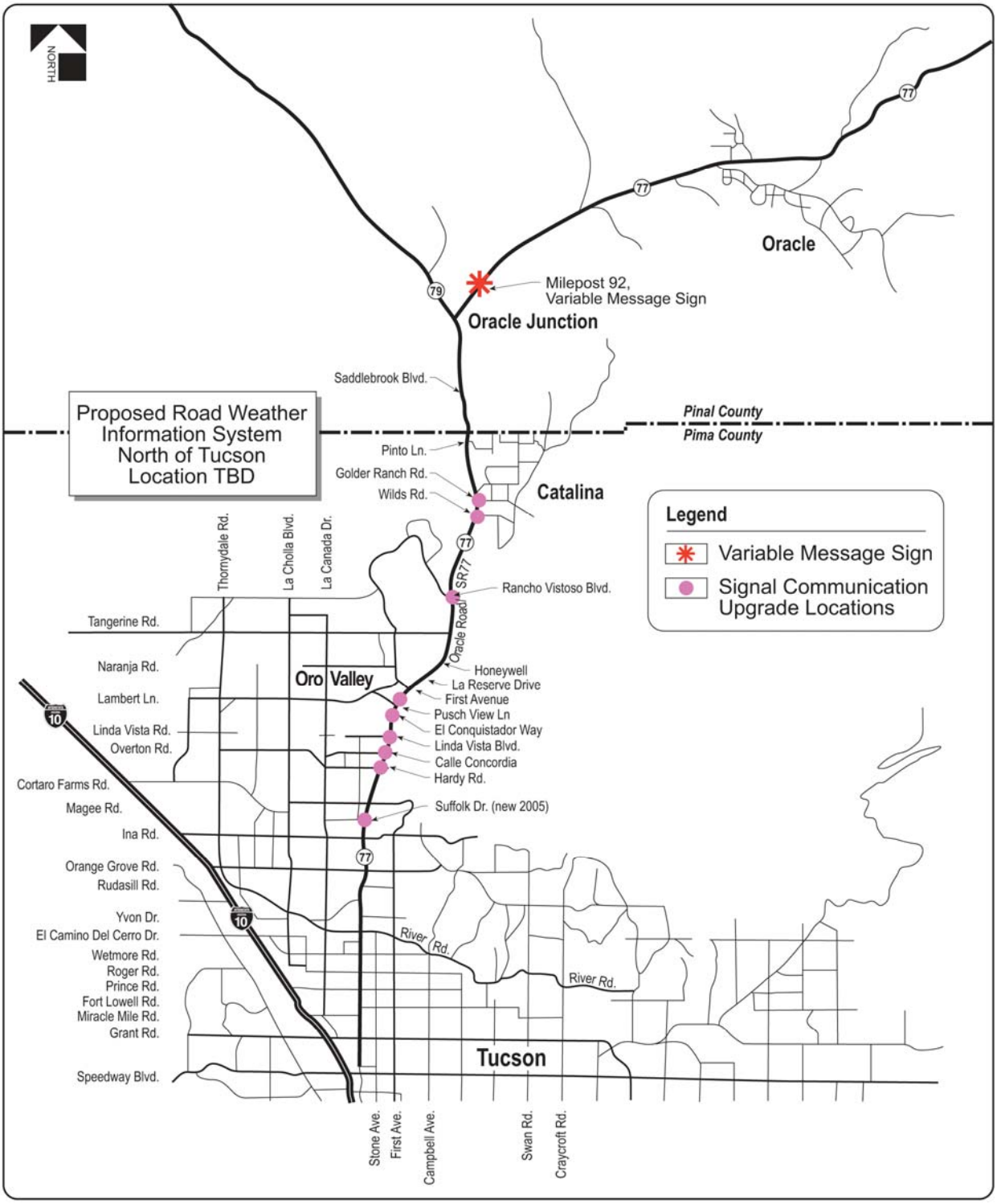


Exhibit 7-13
EXISTING AASHTO DESIGN DEFICIENCIES
FROM PROJECT ASSESSMENT REPORTS

Project Assessment	Begin MP	End MP	Horizontal Curves Have Excessive or Insufficient Superelevation for Design Speed	Vertical Curves Exceed Criteria for Maximum Grade	Vertical Curves Have Insufficient Stopping Sight Distance for Design Speed	Are These Addressed in Planned or Programmed Projects?
Junction Miracle Mile to Ina Road	69.50	74.84	3			No
Calle Concordia to Tangerine Road	77.50	83.0	1*			Yes, widening to six lanes
First Avenue to Tangerine Road	79.20	82.20			1	Yes, widening to six lanes
Willow Springs to Oracle	95.80	103.87		2		No

* Excessive but not deficient superelevation.

Exhibit 7-14
PROPOSED CORRIDOR ACCESS MANAGEMENT CONCEPT
SR 77 – I-10 TO ORACLE

Segment	Length (miles)	Current Access Conditions			Proposed Access Characteristics				
		Land Use	Driveway Density	Signals per Mile	A. Type of Segment	Future Land Use	Access Management Strategy	Driveway Density[1]	Signal Spacing
I-10 to Oracle Road	1.4	Urban Mixed Commercial/ Industrial/Hotel	High	3.6 (>1/4 mile)	Urban	In-fill Redevelop Mixed Use	Retrofit	Moderate	1/4 mile
Miracle Mile to River Road	1.8	Commercial	High	3.9 (1/4 mile)	Urban	Commercial	Retrofit Comprehensive	Moderate	1/4 mile
River Road to Ina Road	4.6	Commercial	Moderate	1.6 (>1/2 mile)	Suburban	Commercial	Retrofit Comprehensive	Low to Moderate	1.5 mile GSI @ River, Orange Grove & Ina
Ina Road to El Conquistador Way	2.6	Commercial/ Multifamily	Low	1.9 (1/2 mile)	Suburban	Redevelopment on southern end. Planned Developments on northern end	Comprehensive	Low	1/2 mile
El Conquistador Way to Golder Ranch Drive	7.3	Residential	Very Low	1.0 (1 mile)	Suburban	Large developments	Comprehensive	Low	1 mile
Golder Ranch Drive to Pinto Lane	1.9	Low Density Residential	Moderate	0.5 (2 mile)	Urban	In-fill Commercial	Retrofit	Low to Moderate	1 mile
Pinto Lane to Saddlebrook Boulevard	1.2	Very Low Density Residential	Low to Very Low	0.8 (1 mile)	Urban	Mixed Use New Development	Comprehensive	Low	1 mile
Saddlebrook Boulevard to End of Corridor	14.5	Very Low Density Residential	Very Low	N.A.	Rural	New Residential Development	Comprehensive	Low	2.0 miles – Redesign SR 79/SR 77 Intersection

1. Driveway densities: Very low – less than 10 access points per mile; Low – greater than 10 and less than 20 access points per mile; Moderate – greater than 20 and less than 40 access points per mile; High – greater than 40 access points per mile

Retrofit Access Management Strategies

Retrofit access strategies are techniques that are applied to existing roadway sections and retrofit techniques can be applied to mitigate the adverse effects of unregulated access. The application of a "retrofit" program to manage access to an existing roadway is often difficult. Restraints, such as the unavailability of land make certain access management techniques impossible. In addition, property rights need to be respected and the resulting legal, social, and political aspects of access management need to be thoroughly understood by the implementing agency and all stakeholders.

A key retrofit strategy is consolidation of driveways. The need for consolidating driveways along SR 77 was identified through an analysis of driveway density and crash types that can be related to access. Roadway segments along SR 77 were inventoried to identify need to consolidate driveways based on driveway density and crash rates over a three-year history.

Exhibit 6-10 (see Chapter 6) shows the locations of the Level 1 and Level 2 access management segments along the corridor. Other segments were included in a given level to form a consistent larger segment. It is recommended that these segments be studied in detail to develop specific access management design concepts for each segment based on the proposed access characteristics provided in Exhibit 7-14.

7.2.9 Other Improvements

Based on input during the Technical Advisory Committee field review and other information, a need exists for a grade-separated wildlife crossing to recognize an existing wildlife corridor connecting Cañada del Oro and Big Wash. Suggestions have been made for this crossing to be located approximately 1-1/2 miles north of the Catalina State Park entrance, near the Cañada del Oro Wash crossing, and other locations using State Trust land. During road improvements in this general area, a wildlife crossing should be implemented.

8. OPPORTUNITIES AND CONSTRAINTS

This chapter identifies financial, right of way, and environmental opportunities and constraints that may impact the development of transportation improvements.

8.1 FINANCIAL OPPORTUNITIES AND CONSTRAINTS

Based on information from the *Pima Association of Governments 2025 Regional Transportation Plan Amendment (Adopted January, 2004)* current revenue sources for the Regional Transportation Plan consist of Federal, State, and local highway funds, which include: State vehicle license tax, revenues from the State transportation taxes distributed to the jurisdictions and the Metropolitan Planning Organization, lottery revenues, development impact fees, construction sales tax, fare box proceeds, and general fund contributions. Most revenue sources are restricted in how they can be used. Federal funds usually require State or local match dollars. An opportunity for additional revenue for all modes of transportation is a local sales tax to fund a voter-approved slate of projects developed through the Regional Transportation Authority.

8.2 RIGHT-OF-WAY OPPORTUNITIES AND CONSTRAINTS

General right-of-way opportunities and constraints along SR 77 were evaluated through a review of right-of-way maps for the corridor. In the review of the right-of-way maps, emphasis was placed on identifying the minimum ROW width on SR 77 segments and using this information to identify areas that had insufficient right-of-way width for either the eight-lane widening alternative or for construction of diamond lanes. These areas are shown in Exhibit 8-1, and shown in tabular form in Exhibit 8-2.

Based on the information presented in Section 7.1.4, it was assumed that the urban cross-section of the eight-lane alternative would have a mid-block width of 146 feet, and the fringe urban cross-section would require 200 feet of ROW. The urban cross-section for the diamond lane alternative was assumed to have the following mid-block characteristics:

- 6 - 2’ travel lanes
- 2 -15’ diamond lanes (buses, bicycles, and right-turns)
- 1 - 20’ median, and
- 2 - 8’ areas behind the curb (including sidewalk)

Total ROW = 138 feet

The fringe urban cross-section is capable of accommodating the diamond lane alternative within the 200 feet of available ROW. Minimum mid-block right-of-way widths for segments of SR 77 are indicated in Exhibit 8-3. These minimum ROW widths were used to identify general constraints to roadway widening along the corridor by comparing these widths to the mid-block cross-section width required for the eight-lane and diamond lane alternatives. The results of this comparison are also shown in Exhibit 8-3.

Exhibit 8-1
SR 77 ROW CONSTRAINTS TO ROADWAY CAPACITY IMPROVEMENTS

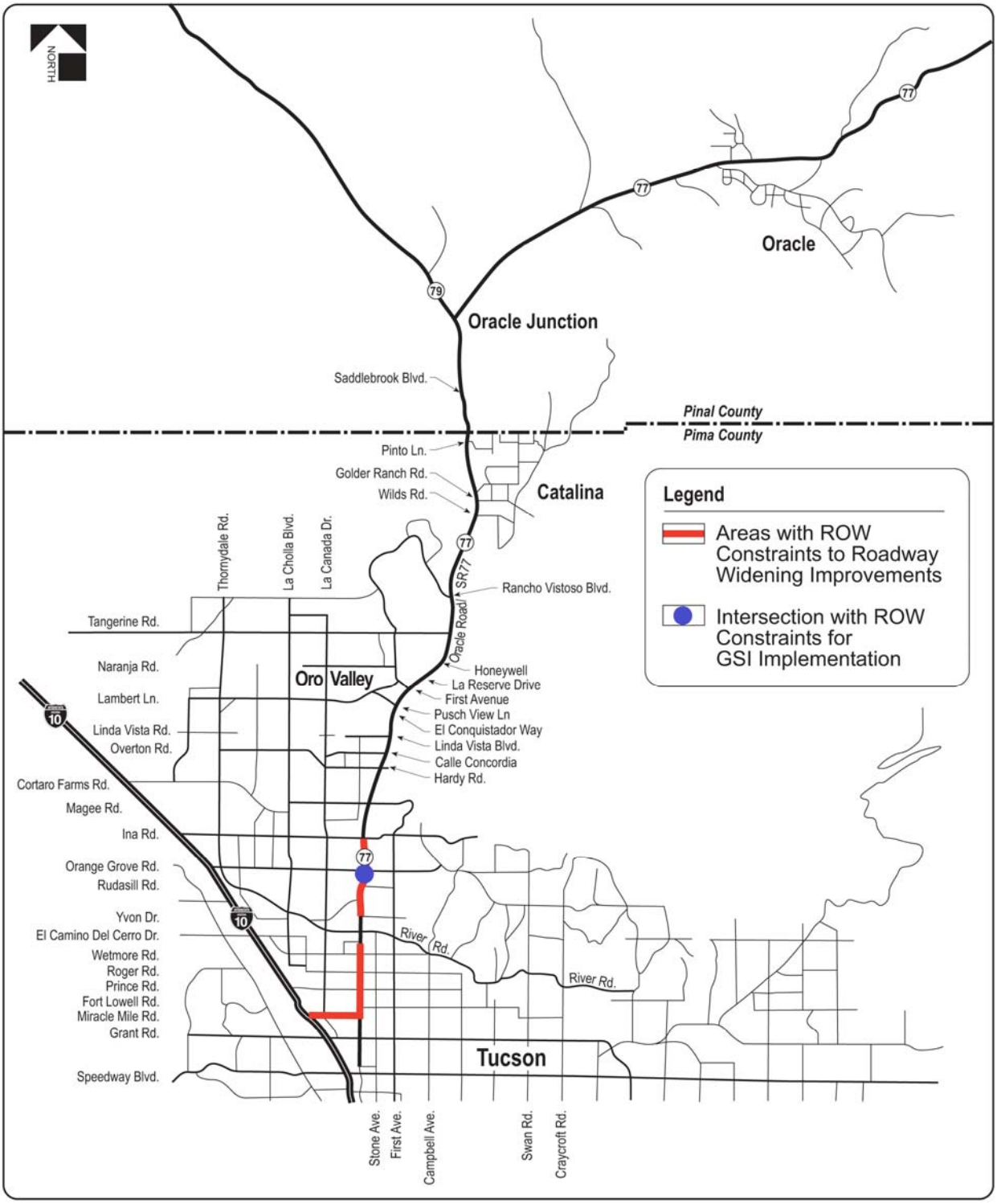


Exhibit 8-2
GENERAL OPPORTUNITIES OR CONSTRAINTS
FOR ROADWAY CAPACITY IMPROVEMENTS

Location	Opportunity or Constraint
Miracle Mile, I-10 to Oracle Road	Constraints from existing development and cemeteries on the north side of the road.
SR 77, Miracle Mile to Limberlost Road	Constraints from limited ROW, existing development, and cemeteries on west side of SR 77, between Miracle Mile and Prince Road.
SR 77, Limberlost Road to Auto Mall Drive	Constraints include limited ROW, and existing development.
Northern Hills Drive to Orange Grove Road	Constraints include lack of available ROW and existing development.
Oracle Road/Orange Grove Road Intersection	Existing development and lack of ROW is a constraint to grade-separated intersection implementation.
SR 77, CDO Wash	Bridge constraints, drainage considerations.
Pinal County border to Project End	Opportunities include limited existing development and available right-of-way.

The analysis indicates that there are some very significant ROW constraints to either the eight-lane or the diamond lane alternatives from Miracle Mile Road to north of Auto Mall Drive. From a location north of Auto Mall Drive to Ina Road the ROW constraints are less severe, but still present, particularly from Casas Adobes Road to Ina Road. This is consistent with the more detailed ROW analysis presented in Section 7.1.4 of this report. The analysis also suggests that from Ina Road north, the existing 200 feet of ROW is generally sufficient to accommodate either the eight-lane roadway alternative or the option to introduce diamond lanes along the corridor. This is also consistent with the more detailed evaluation of ROW provided in Section 7.1.4 of this document.

This evaluation of the ROW constraints lends support to the recommendation that the eight-lane roadway alternative be considered from only north of Auto Mall Drive. This analysis also suggests that the implementation of a diamond lane may not be practical south of River Road.

Preliminary plans for three grade-separated intersections were developed, with one at Ina Road, Orange Grove Road, and River Road. Assuming that a four-lane overpass is used (the detailed micro-simulation indicates that this is operationally feasible), each of the GSIs would require approximately 200 feet of ROW along Oracle Road.

At River Road, the preliminary plan indicates that the GSI would fit within the existing ROW with no property impacts on either Oracle Road or River Road. At Orange Grove Road the 200 feet of ROW required for the GSI would have significant impacts on existing commercial development at the intersection, and this could represent a significant constraint at this location.

Exhibit 8-3
COMPARISON OF SR 77 SEGMENT EXISTING RIGHT-OF-WAY WIDTHS TO REQUIREMENTS FOR EIGHT-LANE OR DIAMOND LANE ALTERNATIVES

Segment From	Segment To	Minimum Mid-Block ROW Width	Mid-Block Width Required for Eight-Lane Alternative (ft)	Is Existing ROW Sufficient?	Mid-Block Width Required for Diamond Lane Alternative (ft)	Is Existing ROW Sufficient?
Miracle Mile/Laguna Street	Delano Street	Unknown	146	No	138	Unknown
Delano Street	Fort Lowell Road	110	146	No	138	No
Fort Lowell Road	South of West Navajo Road	125	146	No	138	No
South of West Navajo Road	North Yavapai Road	123	146	No	138	No
North Yavapai Road	W. Prince Road	120	146	No	138	No
West Prince Road	Pastime Road	114	146	No	138	No
Pastime Road	W. Roger Road	115	146	No	138	No
West Roger Road	Limberlost Drive	125	146	No	138	No
Limberlost Drive	North of Auto Mall Drive	140	146	No	138	Yes
North of Auto Mall Drive	~410 ft. N. of Northern Hills Dr.	200	146	Yes	138	Yes
~410 ft. N. of Northern Hills Dr.	Casas Adobes Road	150	146	Yes	138	Yes
Casas Adobes Road	Ina Road	140	146	No	138	Yes
Ina Road	Tangerine Road	200	200	Yes	200	Yes

Notes

- The mid-block width for the 8-lane alternative is based on dimensions for the urban and rural cross-sections presented in Section 7.1.4.
- The width for the diamond lane alternative is 138 ft. for the urban cross-section, and 198 ft. for the rural cross-section.
- N/A= not available

The impacts to existing businesses, including a potential full take, and the elimination of existing parking could result in an added cost of several million dollars for the GSI at Orange Grove Road. This could result in this alternative becoming more expensive than widening to eight-lanes in this area. Therefore, a GSI at Orange Grove Road is only recommended if it can be shown through a more detailed study to be more cost-effective than widening SR 77 to eight-lanes in this area.

At Ina Road, the GSI appears as though it could be accommodated within the existing ROW along Oracle Road. The traffic analysis at this location indicated the potential need for dual right-turn lanes on westbound Ina Road at Oracle Road. The provision of dual right-turn lanes would have significant ROW impacts on the northeast corner of this intersection.

8.3 ENVIRONMENTAL ISSUES AND CONSTRAINTS

Environmental constraints that could potentially impact development of transportation improvement projects on the corridor are described as follows:

8.3.1 Terrain

The terrain within the project area does not appear to be a critical constraint in the development of improvement projects within the corridor.

8.3.2 Sensitive Species and Habitats

There are 20 species of plants and animals in Pima County, Arizona that are listed as threatened or endangered by the U. S. Fish and Wildlife Service (USFWS), and there are 14 species listed in Pinal County, Arizona. These species and their habitats are protected by the Endangered Species Act (ESA) of 1973, and must be considered prior to development. Consultation with the USFWS may be required if development will impact any of these species or designated critical habitat.

The Arizona Game and Fish Department (AGFD) Heritage Data Management System (HDMS) documents the known locations of special status species in the state. In a letter dated February 10, 2003, Sabra Schwartz, AGFD HDMS Coordinator identified seven special status species that are known to occur within the vicinity of the project area. Exhibit 8-4 lists these special status species. AGFD did not offer any specific recommendations regarding these species at this time; however, these species will be addressed during the design of specific projects and mitigated for if necessary. The HDMS can be used as a guide of potential species and habitats that have been documented in the SR 77 Corridor. It is important to note that other species may occur in the areas that have not yet been documented.

8.3.2.1 Cactus Ferruginous Pygmy Owl Surveys

Portions of the SR 77/Oracle Road Multimodal Corridor are located within Survey Zones 1 and 2 for the pygmy-owl as designated by the U. S. Fish and Wildlife Service (USFWS). These survey zones are shown in Exhibit 8-5.

Survey Zone 1 includes areas within the current range of the pygmy-owl with a high potential for occupancy. This zone includes portions of Pima and southern Pinal Counties and

Exhibit 8-4
AGFD SPECIAL STATUS SPECIES THAT ARE KNOWN TO OCCUR IN THE VICINITY OF THE CORRIDOR AREA

Common Name	Scientific Name	Status
Arizona Metalmark	*Calephelis rawsonii arizonensis*	S (USFS)
California Leaf-Nosed Bat	*Macrotus californicus*	SC, S (BLM), WSC
Thornber Fishhook Cactus	*Mammillaria thornberi*	SR
Pima Indian Mallow	*Abutilon parishii*	SC, S (USFS), SR
Sonoran Desert Tortoise	*Gopherus agassizii*	SC, WSC
	(Sonoran population)	
Lowland Leopard Frog	*Rana yavapaiensis*	SC, S (USFS), WSC
Giant Spotted Whiptail	*Cnemidophorus burti stictogrammus*	SC, S (BLM), WSC

Status Definitions:

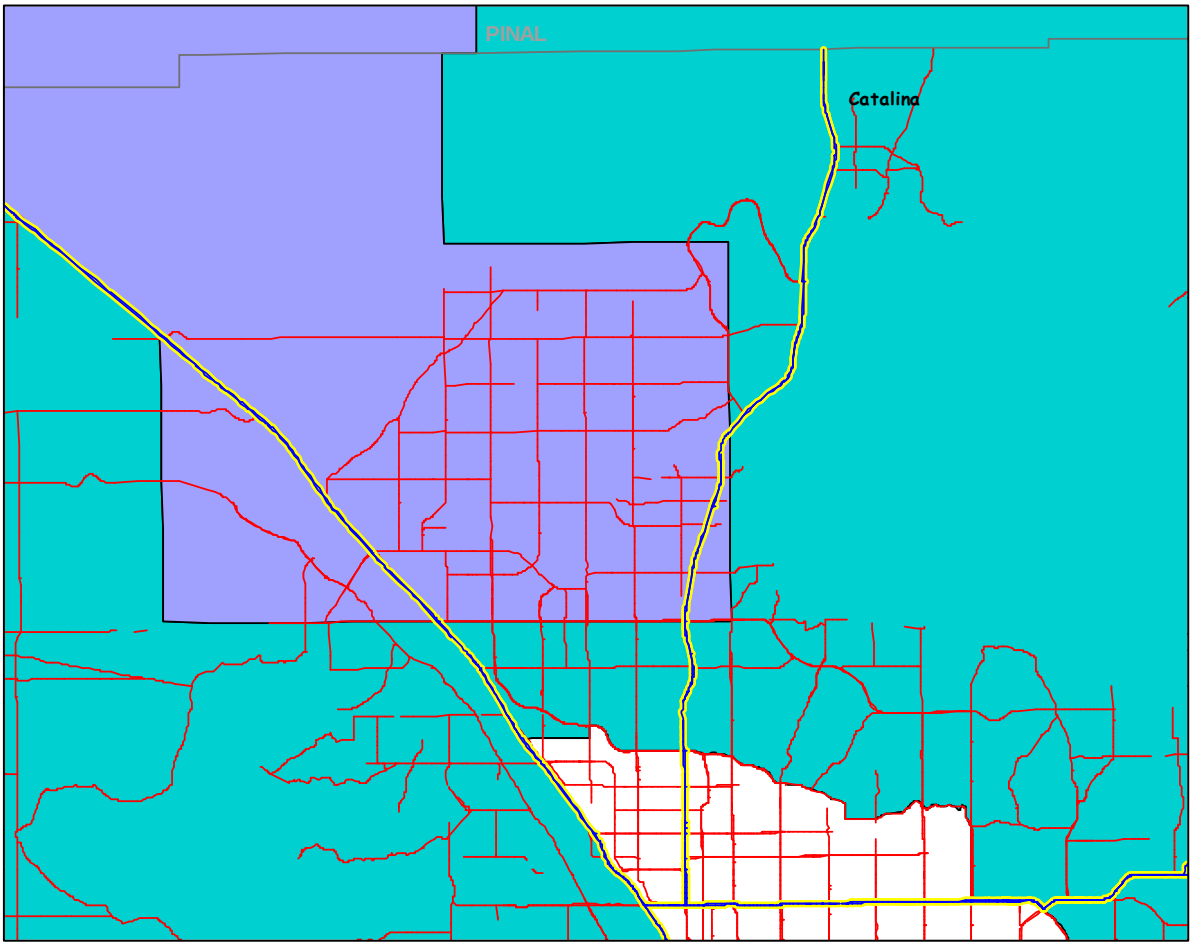
WSC: Wildlife of Special Concern in Arizona. Species whose occurrence in Arizona is or may be in jeopardy, or with known perceived threats or population declines, as described by the AGFD's listing of **Wildlife of Special Concern in Arizona** (WSCA, in prep.) Species included in WSCA are currently the same as those in **Threatened Native Wildlife in Arizona** (1988).

SC: Species of Concern. The terms "Species of Concern" or "Species at Risk" should be considered terms-of-art that describe the entire realm of taxa whose conservation status may be of concern to the USFWS, but neither term has official status (currently all former C2 species).

S: Sensitive. Species classified as "sensitive" when occurring on lands managed by U.S. Forest Service (USFS) or Bureau of Land Management (BLM).

SR: Salvage Restricted. Arizona Native Plant Law (1999) requires a permit for collection.

Exhibit 8-5
PYGMY OWL SURVEY ZONES



Purple = Survey Zone 1
Blue = Survey Zone 2

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encompasses all recent pygmy-owl locations. Within the SR 77/Oracle Road Multimodal Corridor, Survey Zone 1 extends from Ina Road, north to approximately Pusch View Lane.

Survey Zone 2 includes the currently known range of the pygmy-owl within Pima County and southern Pinal County. The USFWS expects pygmy-owls to disperse into suitable habitat in Zone 2 and there is a greater likelihood of documenting new pygmy-owl locations within this zone. Within the SR 77/Oracle Road Multimodal Corridor, Survey Zone 2 extends from River Road north to Ina Road, and from just south of Pusch View Lane north to through the terminus of the project area.

Pygmy-owl surveys could be required where suitable habitat occurs north of River Road prior to any ground disturbance activities. USFWS survey protocol requires three surveys to be conducted each year for two consecutive years prior to construction. At least one survey each year must be conducted during the time period of February 15 to April 15, when the Pygmy-owl is most active.

8.3.3 Cultural Resources

Previously Recorded Archaeological Sites Not Listed on the National Register of Historic Places

Sixteen archaeological sites have been recorded along the current alignment of SR 77 Corridor that are not currently on the National Register of Historic Places (NRHP). Many of these sites are considered eligible for inclusion to the NRHP, but adequate assessments have not been conducted at this time. Six of these sites are prehistoric artifact scatters, five are historic roads, two are multiple component (containing prehistoric and historic elements), one is a historic artifact scatter, and one is a historic steam pump.

An archaeological survey may be required to determine if the potential for subsurface archaeological deposits exists. Following an archaeological survey, a determination regarding site eligibility shall occur and management tactics may include preservation, archaeological testing, monitoring, or data recovery.

If previously unidentified cultural resources are encountered during any activity related to a recommended improvement within the SR 77 corridor, the contractor must stop work immediately at that location and take all reasonable steps to secure the preservation of those resources.

High Capacity Alternative

A high-capacity alternative corridor has been proposed to the west of SR 77, between La Cholla Boulevard and La Canada Drive. If this corridor is used, cultural resources issues will arise that are similar to those identified for the SR 77 corridor. However, the identification of those issues within the alternate corridor is beyond the scope of this project. Additional work will be required to identify resources within the alternate corridor.

Section 4(f) Lands

Section 4(f) evaluations may be necessary for each specific improvement identified where FHWA funds are used. Section 4(f), of the U.S. Department of Transportation Act of 1966, states that the Federal Highway Administration "may approve a transportation program or project requiring publicly-owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the pare, area, refuge, or site) only if there is no prudent or feasible alternative to using that land and the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use" (49 U.S.C. 303).

Cemeteries

Two privately owned cemeteries are immediately adjacent to SR 77 and require careful consideration during the planning phases of this project. Holy Hope Cemetery (3555 North Oracle Road) and Evergreen Memorial Park (3015 North Oracle Road) are positioned along SR 77 near the junction of Miracle Mile and Oracle Road. Holy Hope Cemetery opened in 1906 and Evergreen Memorial Park opened in 1907. These institutions may be eligible to the NRHP and

require special consideration. In addition, the presence of mortuary remains also requires special attention if a project would have use of these properties.

Public Parks

Five parks are adjacent to SR 77 and must be considered when major roadway changes occur.

- Rillito River Park (Pima County)
- Coronado National Forest
- Catalina State Park
- James Kreigh Park
- Pusch Ridge Wilderness Area

8.3.4 Air and Noise Quality

Air Quality

Transportation construction projects on the SR 77 corridor will require an Air Quality Activity Permits from the Pima County Department of Environmental Quality. This permit will address the increased amounts of airborne particulate matter (PM-10) that will result from construction activities, and provide guidelines for dust mitigation. Mitigation measures can be expected to include the use of spray bars, wetting agents, dust suppressants, and the covering of loads.

Transportation construction projects on the SR 77 corridor must also be listed in the Arizona Statewide Transportation Improvement Program (STIP) as required by the Transportation Equity Act for the 21st Century (TEA-21), and must comply with federal National Ambient Air Quality Standards (NAAQS).

Noise Quality

If the project involves additional through lanes (added capacity), changes to the vertical or horizontal alignment, or new alignment, a noise analysis will be required. Noise impacts must be addressed in compliance with Title 23, Code of Federal Regulations, Part 772 (23 CFR 772), Procedures for Abatement of Highway Traffic noise and Construction Noise.

8.3.5 Title VI Issues

Title VI issues need to be considered for any project that may have an impact on members or minority groups or on persons who may be disadvantaged by reason of age, disability, income, or lack of personal transportation. Exhibit 8-6 lists areas within the SR 77 corridor to which Title VI is especially relevant. Specific information on Title VI characteristics of the corridor is provided in Section 3.2 of this document.

Exhibit 8-6
AREAS WITH POSSIBLE TITLE VI ISSUES

Community	Possible Title VI Issues
Northern Project Limits to Pima/Pinal County Border	Higher than average percent below poverty level, and higher than average percent disabled population. Higher than average minority population.
County Line to Ina Road	Higher than average proportion of persons over age 65.
Ina Road to River Road	Higher than average proportion of persons over age 65.
River Road to Speedway Boulevard	Higher than average percent below poverty level, higher than average percent disabled population, and higher than average minority population.

Transportation improvements are based on providing benefits to all, and minimizing negative impacts, particularly to minority, elderly, and low-income groups. Looking at the corridor as a whole, projects recommended are not expected to disproportionately affect minority, elderly, or disadvantaged populations. In particular, the proposed project alternative to realign Fort Lowell Road in the vicinity of SR 77 was not recommended, in part, because of right-of-way impacts to a low-income area. Additionally the transit projects recommended for this corridor will benefit all residents, and particularly areas with Title VI concerns.

Efforts were made throughout the corridor profile study to involve members of minority and low income communities. Three open houses to obtain input on corridor issues are planned to be held to obtain input on the recommendations.

When individual projects are programmed, the specific impacts will be evaluated and those projects that may directly affect the minority, elderly and disadvantaged populations identified in this screening will be incorporated in a continuing public participation process. This process will actively seek input on the impacts and potential mitigation measures related to the specific project.

8.3.6 Pima County Environmentally Sensitive Roadway Guidelines

The portion of the SR77/Oracle Road Multimodal Corridor that is within Pima County qualifies as an Environmentally Sensitive Roadway (ESR) as defined by the Pima County Department of Transportation. The ESR design process incorporates biological, cultural, and visual resource discovery into the design process for projects within Environmentally Sensitive Lands (ESL) with the goal of minimizing disturbances to these valuable resources. In Pima County, ESL are defined by certain Sonoran Desert Conservation Plan (SDCP) Conservation Lands System (CLS) categories and/or the designation of a Scenic and/or Historic Route. ESL may exhibit several characteristics, such as the presence of habitat for special status species, vegetation communities that are growing in scarcity, cultural resources, and designated scenic routes.

8.3.7 Pusch Ridge Wilderness Area

The National Wilderness Preservation Act of 1964 protects and preserves such designated lands by prohibiting human facilities such as roads, power lines, and other development on these lands. The Pusch Ridge Wilderness Area of the Coronado National Forest (Santa Catalina Ranger District) is located just east of SR 77/Oracle Road Multimodal study area, in the vicinity of Oro Valley (see Exhibit 8-7). This wilderness area is among the most biologically diverse in the nation. The SR 77/Oracle Road Multimodal Corridor project area includes approximately 5.5 square miles (3,565 acres) of the Pusch Ridge Wilderness Area and 6 square miles (3,990 acres) of the adjacent Catalina State Park. A critical environmental constraint is that projects for the SR 77 Corridor Profile Study cannot impact the Pusch Ridge Wilderness Area.

8.3.8 Drainage Considerations

100-Year Floodplains

There are several areas within the SR 77/Oracle Road Multimodal Corridor Project that are identified as Federal Emergency Management Agency (FEMA) 100-year floodplains. If project work affects these areas then a Floodplain Permit(s) will need to be obtained for these areas.

Drainage Considerations for Intersection Improvements

Exhibit 7-2 of this document illustrates twelve possible locations for intersection improvements. There are no constraints in regards to drainage for these alternatives. The standard drainage concerns would exist with these improvements. These would include the possible need for new storm drain or cross culvert extensions with the addition of new pavement.

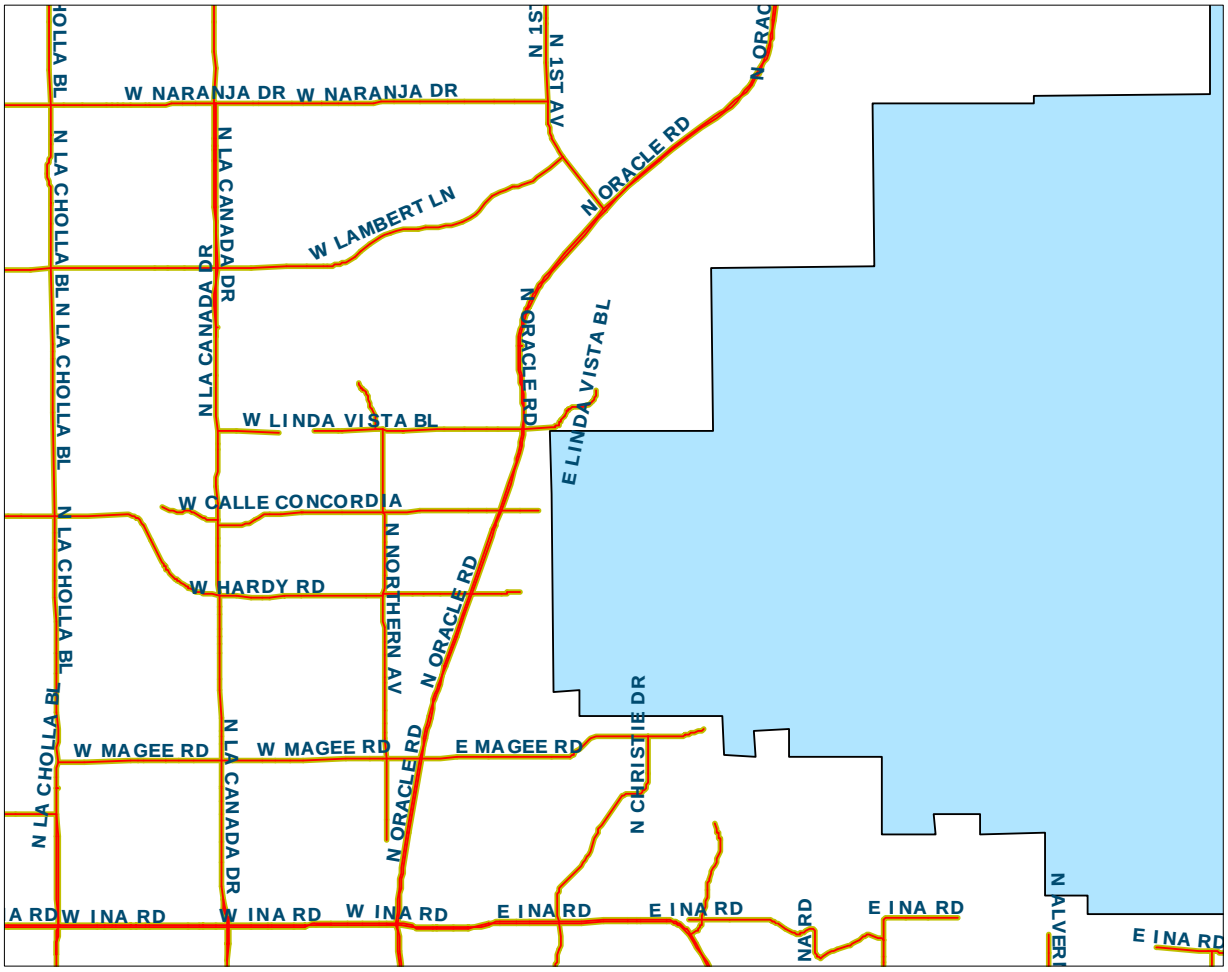
Drainage Considerations for Grade-Separated Interchange Alternatives

The preliminary plans indicate that in all proposed grade-separated alternatives SR 77 will be elevated and the east/west roadway would remain at existing grade. This approach removes the drainage issues at the intersections. A specific example of a constraint if the design is revised to construct below grade is Oracle Road/Orange Grove Road. There are currently two 72" SRPs which collect and convey Casa Adobes Wash north of Orange Grove Road and connect into the existing RCB below Oracle immediately south of the intersection. The culverts are designed to convey the 100-year discharge of 1050 cfs. This is a significant flow and though not impossible to mitigate for, a large pump system would be required to ensure that the underpass would be driveable during intense thunderstorms.

Drainage Considerations for Diamond Lane Alternative

The alternative of constructing diamond lanes along any stretch of the project does not produce any critical constraints with regards to drainage. The installation of a curbed outside lane would only require construction of a new storm drain or depressed curbs spaced at an appropriate interval to allow for runoff to exit the pavement.

Exhibit 8-7
PUSCH RIDGE WILDERNESS AREA
(Shown in Blue)



Drainage Considerations for Roadway Widening Options

The widening of the existing roadway section does not involve any critical constraints. The design would only need to incorporate a storm drain system if curbs were constructed. If the design did not use a curb section then the design would only need to ensure that the roadside drainage swale has sufficient capacity to take into account the increase in runoff.

Drainage Considerations for Alternative High-Capacity Corridor

The east/west alternative of expanding Tangerine Road from SR-77 to I-10 has no critical constraints associated with the project. The roadway widening would follow current design guidelines. The design would require new cross culverts at all of the numerous existing dip sections and possible up sizing of any under capacity existing cross culverts. The two north/ south alternatives have no critical constraints either. Either alternative, like Tangerine Road, would follow current drainage guidelines. The only negative for the La Cholla Boulevard

alternative would be a new bridge over the Cañada del Oro Wash where only a dip section exists today. The La Canada Drive alternative would not have this additional expense since the Town of Oro Valley has a bridge-widening project presently under construction.

Projects that disturb greater than one acre will require a National Pollutant Discharge Elimination System (NPDES) permit (Section 402 of the Clean Water Act). Any construction actions that result in a discharge of dredged or fill material into waters of the U.S., including wetlands, will require a Section 404 permit, and will require Section 401 certification based on the anticipated effects of any construction projects on water quality.

8.3.9 Summary of Environmental Resource Issues

The SR 77/Oracle Road Multimodal Corridor Project will need to address the following constraints during the design process: possible consultation with the USFWS regarding threatened and endangered species, possible surveys for cactus ferruginous pygmy-owls, the proximity to the Pusch Ridge Wilderness Area, Floodplain Permitting, Air Quality Permitting, Section 4(f) Permitting, Noise Permitting, and Clean Water Act Permitting.

The proximity of the final alternative to the Pusch Ridge Wilderness is the only identified biological/ecological constraint that will drive the location and project description for the SR 77/Oracle Road Multimodal Corridor Project. The other constraints will be broadly applied across the project area, regardless of the final project description. Although all of these constraints will need to be addressed during the design process, none of them represent "fatal flaws," or issues that would present any foreseeable hindrance to construction or economic feasibility.

9. DEFICIENCY PRIORITIZATION AND PROPOSED TRANSPORTATION PROJECTS

9.1 PRIORITIZATION OF DEFICIENCIES

The transportation deficiencies identified in Chapter 6 were assigned priorities based on a ranking of "1" to "3" with the "1" indicating the highest priority and "3" the lowest. Priority 1 deficiencies consist of the following:

- Traffic safety needs.
- Existing levels of service "D" or worse.
- Other needs to be addressed by projects in ADOT's current Five-Year Highway Construction Program.

All of the following deficiencies that were not eligible for Priority 1 were classified as Priority 2:

- Needs identified by ADOT District Engineers or local jurisdictions within the corridor.
- Forecast year 2030 levels of service "D" or worse.
- Nonexistent intercity bus service within the corridor.
- Access management needs.

All deficiencies that were not in the categories defined above were assigned Priority 3. Exhibit 9-1 shows the priority ratings assigned to the deficiencies identified throughout the corridor.

9.2 PROPOSED IMPROVEMENT PROJECTS

Exhibit 9-1 lists proposed improvement projects to mitigate the deficiencies identified in summarized in Chapter 6 of this document. The table lists project locations generally from north to south.

Projects include the following categories:

- Roadway Capacity Improvements
- Lighting Projects
- Intelligent Transportation System Projects
- Access Management Projects
- Transit Projects
- Bicycle and Pedestrian Projects
- Projects Previously Programmed

It should be noted that the right-of-way limitations at the intersection of Orange Grove Road could constrain the application of the grade-separated intersection at this location. A more detailed study of the ROW impacts of this alternative should be conducted to determine if a GSI would be more cost-effective than widening SR 77 to eight-lanes through this area. The recommendation of the GSI at Orange Grove is conditional upon the findings of such an investigation.

The capacity and level of service analysis conducted by this study indicates that the planned six-lane cross-section for SR 77 will not provide sufficient capacity to accommodate year 2030 traffic at an acceptable level of service. **However, it should be noted that the Arizona Department of Transportation does not build eight-lane urban or fringe urban arterials.** Several alternative routes have been proposed for improvement by the Pima Association of Governments Regional Transportation Authority Plan being developed at the time this study was conducted. These improvements include widening of La Canada Boulevard, La Cholla Boulevard, and First Avenue. These improvements will provide some congestion relief along some sections of SR 77, but based on the congestion information provided by PAG for this study, it does not appear that these improvements will mitigate congestion along SR 77. It should also be noted that at this time there are only a few projects in the PAG 2030 Regional Transportation Plan (RTP), including the Regional Transportation Authority (RTA) projects, that directly address the congestion, safety, and access management issues on SR 77 identified in this study. Therefore, significant additional multi-modal improvements will be required to mitigate the deficiencies identified by this study.

Transit projects primarily involve feasibility studies to determine the eventual phasing of transit improvements in the corridor. The PAG 2030 RTP and RTA projects include several transit system improvements affecting Oro Valley and the SR 77 corridor that directly address transit issues identified in this study.

9.3 COST ESTIMATES

Exhibit 9-2 provides generalized unit cost estimates for various types of transportation projects. Most estimates are based on similar project cost estimates from the Regional Transportation Plan, previous corridor profiles, and on costs of similar projects in the current State *Five-Year Transportation Facilities Construction Program*. All costs are in 2005 dollars. It should be emphasized that these are tentative cost estimates for planning purposes only. Site-specific cost estimates will be developed at the time of project scoping. Where a previously planned or programmed project for the PAG 2030 RTP, RTA, or TIP directly address an identified deficiency, the project cost estimate form these planning documents was used in this study.

Also, costs are based on programmed project cost estimates, project assessment reports, and other corridor profile studies. These estimates are for planning purposes and may not be reflective of true construction or implementation cost estimates. A summary of the estimated costs for widening SR 77 to an eight-lane facility in comparison to, and in conjunction with, the use of up to three grade separated intersections is provided in Exhibit 9-3.

Exhibit 9-1
LIST OF PROPOSED PROJECTS

Number	Milepost	Location	SR 77 Deficiency	Deficiency Priority Ranking	Project	Total Cost ($ X 1,000)	Affected Jurisdiction	Time Frame	Planned or Programmed
CAPACITY PROJECTS									
C-1	TBD	TBD	Need for alternative high capacity corridor to relieve congestion along SR 77.	2	Feasibility study for alternative high capacity corridor. Study to evaluate regional impacts of new high capacity corridor N/S connecting to a new high capacity E/W corridor. This study would determine whether sufficient traffic could be diverted from Oracle Rd. to eliminate the need to widen to 8-lanes or construct GSIs.	$400	Pima County, ADOT, Oro Valley, City of Tucson	near	No
C-2	103.3 - 91.1	SR 77-79 junction to Town of Oracle	Poor LOS by 2030	2	DCR for 4-lane widening	$500	Pinal County	long	No
C-3	103.3 - 91.1	SR 77-79 junction to Town of Oracle	Poor LOS by 2030	2	Design of 4-lane widening project	$3,700	Pinal County	long	No
C-4	103.3 - 91.1	SR 77-79 junction to Town of Oracle (12.2 mi)	Poor LOS by 2030	2	Construction of four lane widening	$36,600	Pinal County	long	No
C-5	91.9	Milepost 91.9	Drainage culvert headwall is in the clear zone	1	Reconstruct Drainage Culvert	$650	Pinal County	near	No
C-6	92	SR 77, Milepost 92	Identified need in ADOT *Statewide Plan Intelligent Transportation Infrastructure* (Dec. 2002)	3	Provide Variable Message Sign at MP 92	$200	Pinal County	mid	No
C-7	91.14	SR 77/SR 79 junction	Safety concerns include elevation changes, narrow road, poor sight distance, late afternoon sun blinds motorists. Also, second highest ratio of day to night crashes.	1	Reconstruct intersection with widening. Provide roadway lighting.	$500	Pinal County	near	No
C-8	91.14 - 88.2	SR 77/79 junction to Pinal County Line	Poor LOS by 2030	2	DCR for 6-lane widening	$500	ADOT/Pinal County	long	No
C-9	91.14 - 88.2	SR 77/79 junction to Pinal County Line	Poor LOS by 2030	2	Design for 6-lane widening	$1,800	ADOT/Pinal County	long	No
C-10	91.14 - 88.2	SR 77/79 junction to Pinal County Line	Poor LOS by 2030	2	Widen to 6 lane divided roadway, possibly with roadway segment lighting.	$18,000	ADOT/Pinal County	long	No
C-11	88.2 - 81.8	SR 77: Pinal County Line to Tangerine Road, Phase 1	Capacity deficiencies	1	Widen to 6 lanes	$18,000	ADOT	near	Yes (PP-1)
C-12	81.8 - 79.4 and 79.1 - 77.5	SR 77: Tangerine Road to La Reserve Drive & Pusch View Lane to Calle Concordia	Capacity deficiencies	1	Widen to 6 lanes (incorporate equestrian ped pushbutton at Linda Vista Blvd. Intersection)	$26,500	ADOT	near	Yes (PP-2)
C-13	85.75 - 84.25	SR 77, Golder Ranch Road to Oro Valley Town Limits (north limits)(1.5 miles)	Poor LOS by 2030	1	DCR for 8-lane widening	$200	Pima County	long	No
C-14	85.75 - 84.25	SR 77, Golder Ranch Road to Oro Valley Town Limits (north limits)(1.5 miles)	Poor LOS by 2030	1	Design for 8-lane widening	$1,000	Pima County	long	No
C-15	85.75 - 84.25	SR 77, Golder Ranch Road to Oro Valley Town Limits (north limits)(1.5 miles)	Poor LOS by 2030	1	Construction of 8-lane widening	$10,000	Pima County	long	No
C-16	84.25 - 76.37	SR 77, Oro Valley northern Town limits to Oro Valley southern Town limits (south of Magee Road)	Poor LOS by 2030	1	DCR for 8-lane widening	$500	Town of Oro Valley	long	No
C-17	84.25 - 76.37	SR 77, Oro Valley northern Town limits to Oro Valley southern Town limits (south of Magee Road)	Poor LOS by 2030	1	Design for 8-lane widening	$5,300	Town of Oro Valley	long	No
C-18	84.25 - 76.37	SR 77, Oro Valley northern Town limits to Oro Valley southern Town limits (south of Magee Road)	Poor LOS by 2030	1	Construction of 8-lane widening including $700K for ROW	$53,700	Town of Oro Valley	long	No
C-19	79.5	SR 77 / First Avenue	Crash rate increase	1	Intersection improvements	$500	ADOT / Oro Valley	near	Yes (PP-3)

Exhibit 9-1
LIST OF PROPOSED PROJECTS
(Continued)

Number	Milepost	Location	SR 77 Deficiency	Deficiency Priority Ranking	Project	Total Cost ($ X 1,000)	Affected Jurisdiction	Time Frame	Planned or Programmed
C-20	74.9	SR 77 / Ina Road	Congestion, interim need for WB right turn lanes	1	DCR for intersection improvements. Possible Grade-Separated Interchange (requires additional capacity improvements northbound to Magee Road)	$300	ADOT/ Pima County	near	Yes (PP-4)
C-21	74.9	SR 77 / Ina Road	Congestion, interim need for WB right turn lanes	1	Design of intersection improvements (possible GSI)	To be determined	ADOT/ Pima County		Yes (PP-4)
C-22	74.9	SR 77 / Ina Road	Congestion, interim need for WB right turn lanes	1	Construction of intersection improvements (possible GSI) including $500K for ROW	To be determined	ADOT/ Pima County		Yes (PP-4)
C-23	73.8	SR 77/Orange Grove Road	Congestion	1	DCR for intersection improvements (ROW constraints may prohibit a GSI at this location)	$300	ADOT / Pima County	mid	Partially under PP-8
C-24	73.8	SR 77/Orange Grove Road	Congestion	1	Design of intersection improvements	To be determined	ADOT / Pima County	mid	Partially under PP-8
C-25	73.8	SR 77/Orange Grove Road	Congestion	1	Construction of intersection improvements	To be determined	ADOT / Pima County	mid	Partially under PP-8
C-26	72.06	SR 77/ River Road	Congestion	1	DCR for intersection improvements (possible GSI)	$300	ADOT / Pima County	mid	Yes (PP-5)
C-27	72.06	SR 77/ River Road	Congestion	1	Design of intersection improvements	To be determined	ADOT / Pima County	mid	Yes (PP-5)
C-28	72.06	SR 77/ River Road	Congestion	1	Construction of intersection improvements (possible GSI including $3M for ROW)	To be determined	ADOT /Pima County	mid	Yes (PP-5)
C-29	71.6	SR 77/ Auto Mall Drive	Insufficient capacity for southbound left turn movement	1	Intersection Improvements	$500	ADOT / City of Tucson	near	No
C-30	71.3	SR 77/ Wetmore Road	High intersection crash rate	1	Intersection Improvements	$500	ADOT / City of Tucson	near	No
C-31	71	SR 77/ Limberlost Road	Need for right turn lanes and left turn phasing.	1	Intersection Improvements	$500	ADOT / City of Tucson	near	No
C-32	70.8	SR 77/ Roger Road	Need for right turn lanes northbound and southbound.	1	Intersection Improvements	$500	ADOT / City of Tucson	near	No
C-33	70.3	SR 77/Prince Road	Poor future LOS, need for right turn lanes	1	Intersection Improvements	$300	ADOT / City of Tucson	near	Yes (PP-6)
C-34	69.8	SR 77/ Ft. Lowell Road	Need for right turn lanes	1	Intersection Improvements	$500	ADOT / City of Tucson	near	No
C-35	68.5	Miracle Mile Road/ Flowing Wells Road	High intersection crash rate	1	Intersection Improvements	$500	ADOT / City of Tucson	near	No
C-36	76.37 - 71.56	Oro Valley southern Town limits (south of Magee Rd.) to Auto Mall Drive	Congestion	2	Widen to 8-lanes (This is an alternative to GSIs at River Road, Orange Grove Rd, and Ina Rd.) including $771K for ROW	$36,771	ADOT/Pima County/City of Tucson	long	No
ACCESS CONTROL PROJECTS									
A-1	N/A	SR 77 Corridor	Lack of coordination regarding access policies on the corridor	2	Develop and Adopt Access Management Plan	$350	ADOT and jurisdictions	near	No
A-2	72.1 - 69.5, 68.1 - 69.5	SR 77, River Road to Miracle Mile Road, I-10 to Oracle Road	Highest need for driveway consolidation	2	Develop DCR for Access Retrofit Plan	$50	ADOT/COT	near	No
A-3	76.91 - 72.06	SR 77, Hardy Road to River Road	Need for driveway consolidation	2	Develop DCR for Access Retrofit Plan	$50	ADOT/Pima County	near	No
A-4	87.6 -85.8	SR 77, Pinto Lane to Golder Ranch Road	Need for driveway consolidation	2	Develop DCR for Access Retrofit Plan	Included in roadway widening	ADOT/ Pima County /Catalina	long	No
A-5	72.1 - 69.5, 68.1 - 69.5	SR 77, River Road to Miracle Mile Road, I-10 to Oracle Road	Highest need for driveway consolidation	2	Implement Access Plan	$5,000	ADOT/COT	near	No
A-6	76.91 72.06	SR 77, Hardy Road to River Road	Need for driveway consolidation	2	Implement Access Plan	Included in roadway widening	ADOT/Pima County	long	No
A-7	87.6 - 85.8	SR 77, Pinto Lane to Golder Ranch Road	Need for driveway consolidation	2	Implement Access Plan	Included in roadway widening	ADOT/ Pima County /Catalina	long	No

Exhibit 9-1
LIST OF PROPOSED PROJECTS
(Continued)

Number	Milepost	Location	SR 77 Deficiency	Deficiency Priority Ranking	Project	Total Cost ($ X 1,000)	Affected Jurisdiction	Time Frame	Planned or Programmed
TRANSIT PROJECTS									
T-1	various	SR 77/SR 79 junction, South of Saddlebrooke Boulevard, Near Tangerine Road/La Cholla Blvd. Intersection, First Ave./SR 77 Intersection, Magee Rd,/ SR 77 Intersection, Ina Rd./SR 77 Intersection, River Rd./ SR 77 Intersection	Need for additional Park-and-Ride Lots to support improved transit service.	2	Implement Park & Ride Lots as transit service extends north and service improves.	To be determined	Various	mid	Partially under PP-13
T-2	various	Town of Catalina from Golder Ranch Road north.	Need for improved access to transit service.	2	Amenities for transit access, including sidewalks, crosswalks, shelters, benches, ADA compatible.	To be determined	ADOT, City of Tucson.	mid	Partially under PP-12 and PP-20
T-3	various	From I-10/Miracle Mile to River Road.	Need for improved access to transit service.	2	Amenities for transit access, including sidewalks, crosswalks, shelters, benches, ADA compatible.	To be determined	ADOT, City of Tucson.	near	No
T-4	various	SR 77/Magee Road intersection commercial area.	Need for improved access to transit service.	2	Amenities for transit access, including sidewalks, crosswalks, shelters, benches, ADA compatible.	To be determined	ADOT, Oro Valley	near	No
T-5	various	SR 77/Ina Road intersection commercial area.	Need for improved access to transit service.	2	Amenities for transit access, including sidewalks, crosswalks, shelters, benches, ADA compatible.	To be determined	ADOT, Pima County	near	No
T-6	various	Town of Catalina	Lack of local transit service	2	Implement new local service providing neighborhood circulator and fixed-route service as thresholds met.	To be determined	Town of Catalina / Oro Valley / City of Tucson	mid	Yes (PP-12 and PP-20)
T-7	various	SR 77 from Saddlebrooke Park & Ride lot to Tohono Tadai Transit Center	Peak period transit level of service	2	Peak hour express bus service.	To be determined	Various	mid	Partially under PP-19
T-8	various	From First Ave. /SR 77 area to north of Tangerine Road.	Lack of local transit service	2	Implement new local service providing neighborhood circulator and fixed-route service as thresholds met.	To be determined	Oro Valley	mid	Yes (PP-12 and PP-17)
T-9	various	Orange Grove Rd. corridor from SR 77 to I-10	Lack of local transit service	2	Implement new local service providing neighborhood circulator and fixed-route service as thresholds met.	To be determined	Pima Co.	mid	No
T-10	various	SR 77/Saddlebrooke Blvd. Park & Ride lot to the Town of Oracle.	Lack of local transit service	3	Add new peak period bus service link	To be determined	Pinal Co., Town of Oracle	long	No
T-11	various	Town of Oracle	Lack of local transit service	3	Add neighborhood transit circulator with connection to SR 77 fixed route service.	To be determined	Town of Oracle	long	No
T-12	various	Saddlebrooke development.	Lack of local transit service	3	Add neighborhood transit circulator with connection to SR 77 fixed route service.	To be determined	Pinal County	long	No
T-13	various	SR 77 from Saddlebrooke Park & Ride lot to Tohono Tadai Transit Center	Peak period transit frequency	3	Expanded all-day limited-stop transit service.	To be determined	Various	long	No
T-14	various	SR 77 from Saddlebrooke Park & Ride lot to Tohono Tadai Transit Center	Lack of high-capacity transit service.	3	Study upgrade of transit service to Bus Rapid Transit (BRT). Include possible use of diamond lanes to increase speed.	To be determined	Various	long	No
T-15	various	SR 77 to I-10 Link	Lack of high-capacity transit service.	3	Study high capacity corridor link to I-10 corridor.	To be determined	Various	long	No
T-16	various	SR 77 to University of Arizona, Downtown and east Tucson area links.	Lack of high-capacity transit service.	3	Study high capacity corridor links to U of A, Downtown, and east Tucson.	To be determined	City of Tucson	long	No
BICYCLE /PEDESTRIAN PROJECTS									
BP-1	99 - 101, 87.9 - 99, 85.8 - 87.9	Pinal County , Town of Catalina	Bicyclists have trouble negotiating rumble strips, shoulder deficiencies for bicyclists.	1	Shoulder improvements to improve bicycle safety	To be determined	Pinal County	near	No
BP-2		Rillito Park/SR 77	No exit from Rillito Park bike path on east side of SR 77	3	Construct bike/ped path		ADOT /Pima County	near	No
BP-3	various	Transit stops along SR 77	Lack of ADA compliant access.	1	Provide ADA compliant access to all transit stops.	To be determined	ADOT	mid	No

Exhibit 9-1
LIST OF PROPOSED PROJECTS
(Continued)

Number	Milepost	Location	SR 77 Deficiency	Deficiency Priority Ranking	Project	Total Cost ($ X 1,000)	Affected Jurisdiction	Time Frame	Planned or Programmed
BP-4	79.48	SR 77 / First Avenue	Difficult for pedestrians to cross SR 77 at this location.	1	Address pedestrian needs at this location.	To be determined	ADOT/Oro Valley	near	Possibly through planned roadway widening.
BP-5	78.5	SR 77 / El Conquistador Way	Lack of pedestrian access from transit stop to resort for employees.	2	Study to assess need and develop recommendation.	$15	Oro Valley	near	No
PB-6	72.1 - 71.56	SR 77: North of River Road to Auto Mall Drive	Pedestrian needs	1	Construct sidewalks	$210	ADOT	near	No
PB-7	71.34 - 70.78	SR 77: North of Wetmore Road to south of Rodger Road	Pedestrian needs	1	Construct sidewalks	$219	ADOT	near	No
BP-8	70.29 - 69.53	SR 77: Prince Road to Miracle Mile	Pedestrian needs	1	Construct sidewalks	$316	ADOT	near	No
PB-9	74.9 - 72.06	SR 77: River Road to Ina Road	Lack of sidewalks	3	Construct sidewalks	Cost included in 8-lane widening option	ADOT	long	Yes (PP-10)
PB-10	85.75 – 74.9	SR 77: Golder Ranch Road to Ina Road	Lack of sidewalks	3	Construct Multi-Use Paths	Cost included in 8-lane widening option	ADOT	long	No
LIGHTING PROJECTS									
L-1	87.6 - 79.1	SR 77, Pinto Lane to Pusch View Lane (west)	High proportion of night versus day accidents	1	Possible roadway segment lighting	To be determined	Town of Catalina/Oro Valley	mid	No
L-2	69.5 - 68.1	Miracle Mile, Oracle Road to I-10	Non-standard lighting	3	Upgrade Non-Standard Lighting	$300	ADOT / City of Tucson	near	No
ITS PROJECTS									
I-1	92	SR 77, Milepost 92	Identified need in ADOT *Statewide Plan Intelligent Transportation Infrastructure* (Dec. 2002)	3	Provide Variable Message Sign at MP 92	$200	Pinal County	mid	No
I-2	Various	SR 77 signalized intersections, Rudasill Road to Golder Ranch Road.	No communications with Tucson TOC.	3	Establish and maintain communications with the Tucson TOC.	TBD	Various	near	No
I-3	TBD	SR 77 north of Tucson	Identified in ADOT Statewide Plan Intelligent Transportation Infrastructure	3	Provide Road Weather Information System	$100	Pinal County	near	No
OTHER PROJECTS									
O-1	TBD	Location on SR 77 in Oro Valley-to be determined	SR 77 presents a barrier to wildlife.	3	Study to determine location of wildlife corridor	$100	Oro Valley	near	No
O-2	TBD	To be determined	SR 77 presents a barrier to wildlife.	3	Construct Wildlife Corridor	TBD	Oro Valley	near	No
PREVIOUSLY PLANNED AND PROGRAMMED PROJECTS ALONG SR 77									
PP-1		SR 77: Pinal County Line to Tangerine Road	Capacity deficiencies		Widen to 6 lanes	$18,000	ADOT	mid	PAG TIP/2011
PP-2		SR 77: Tangerine Road to La Reserve Drive & Pusch View Lane to Calle Concordia	Capacity deficiencies		Widen to 6 lanes (incorporate equestrian ped pushbutton at Linda Vista Blvd. Intersection)	$26,500	ADOT	mid	PAG TIP/2011
PP-3		SR 77: Oracle / First @ intersection	Capacity deficiencies		Intersection improvements	Unknown	ADOT / Oro Valley	long	PAG RTA
PP-4		SR 77: Oracle / Ina Road @ intersection:	Capacity deficiencies		Intersection improvements	Unknown	ADOT / Pima County	long	PAG RTA
PP-5		SR 77: Oracle / River @ intersection	Capacity deficiencies		Intersection improvements	Unknown	ADOT/Pima County/ Tucson	long	PAG RTA
PP-6		SR 77/Prince Road Intersection	Capacity deficiencies		Add right turn lanes	$330	Tucson	long	PAG RTP/2030
PP-7		Oracle / Drachman / Main @ intersection	Capacity deficiencies		Reconstruct intersection	$2,218	Tucson	near	PAG TIP/2011

Exhibit 9-1
LIST OF PROPOSED PROJECTS
(Continued)

Number	Milepost	Location	SR 77 Deficiency	Deficiency Priority Ranking	Project	Total Cost ($ X 1,000)	Affected Jurisdiction	Time Frame	Planned or Programmed
PP-8		Orange Grove Road: Corona to Skyline (includes Oracle intersection)	Capacity deficiencies		Widen to 4 lanes, bike lanes and sidewalks	$41,948	Pima County	mid	PAG RTA and RTP/2030
PP-9		SR 77: Rodger Road to River Road	Lack of sidewalks and bike lanes		Construct new sidewalk, bike lanes, and landscaping	$694	ADOT	near	PAG TIP/2011
PP-10		SR 77: Ina Road to River Road	Pedestrian needs		Install sidewalks	Unknown	ADOT	mid	PAG RTA
PP-11		CDO Wash: La Canada Blvd. to First Ave.	Pedestrian and bicycle needs		Construct new 12' wide linear trail	$1,603	Oro Valley	mid	PAG TIP/2011
PP-12		Oro Valley	Lack of local transit service		Oro Valley Circulator Service: Develop new system in Oro Valley	$7,730	Oro Valley	long	PAG RTA
PP-13		Oro Valley	Lack of park-and-ride facilities		Oro Valley Park-and-Ride: Develop new park-and-ride service	$2,450	Oro Valley	long	PAG RTA
PP-14		Oro Valley	Need to expand local paratransit circulator		Coyote Run Service Expansion	$2,500	Oro Valley	mid	PAG TIP/2011
PP-15		Oro Valley	Need to expand transit service		Purchase paratransit/vanpool vehicles	$264	Oro Valley	mid	PAG TIP/2011
PP-16		Oro Valley	Need to expand pedestrian and bicycle facilities		Construct bike lanes/shared use paths per OV plan	$4,780	Oro Valley	long	PAG RTP/2030
PP-17		Oro Valley	Enhance local transit		Connections to SunTran @ Oracle. Provide new transit circulator – 18 years of service	$9,960	Oro Valley	long	PAG RTP/2030
PP-18		Oro Valley	Maintain existing paratransit services		Paratransit services in Oro Valley. Maintain existing Coyote Run paratransit service	$11,000	Oro Valley	long	PAG RTP/2030
PP-19		Oro Valley	Expand rapid bus service		Downtown to Tangerine via Oracle Rd – 15 years of service	$38,000	Oro Valley	long	PAG RTP/2030
PP-20		Oro Valley & Catalina	Extent local transit service		SunTran Route 16 – Oracle/Catalina: Extend route	$9,222	Oro Valley	long	PAG RTP/2030

Exhibit 9-2
COST ESTIMATES FOR CONSTRUCTION PROJECTS

PROJECT TYPE	ESTIMATED COST (in thousands)	SOURCE
Roadway Widening (per lane-mile)	$6,750 per mile[1]	Based on cost of widening Miracle Mile, I-10 to Oracle Road, from 4 to 6 lanes in 2025 Amended RTP
Cost to design and widen a mile of State Highway from two to four lanes is $3,000,000	$3,000	PAG 2007-2011 TIP SR 77 Widening Projects
Cost to design and widen a mile of State Highway from four to six lanes is $3,000,000	$3,000 za	PAG 2007-2011 TIP SR 77 Widening Projects
Widen Intersection for Turn Lanes	$500/mile	
Paved Shoulders	$700/mile	
GSI (based on construction cost estimates prepared for Working Paper #2)	$10,000 – Ina Road $12,000 – Orange Grove Road $13,000 – River Road	SR 77 Corridor Profile Study
Intersection Illumination	$50/intersection	
Road Weather Information Systems	$100/site	
Variable Message Signs $200/site	$200/site	SR 264 Corridor Profile Study
Drainage Upgrade	$650/site	
Feasibility Study	$50-$200	

1. Based on cost of widening Miracle Mile, I-10 to Oracle Road, from 6 to 8 lanes in PAG 2025 Amended RTP, January 28, 2004, (Appendix 2, page 2).
2. Costs excluded cost of right-of-way.

Exhibit 9-3
COST COMPARISON OF WIDENING SR 77
TO EIGHT LANES AND THE USE OF GSIs

Project Description	Estimated Cost
• Widen to eight lanes (14.2 miles) – Golder Ranch Road to south of River Road	$107M
• Widen to eight lanes (12.6 miles) – north of Ina Road to Golder Ranch Road, and Orange Grove Road to south of River Road, with single GSI at Ina Road.	$99M
• Widen to eight lanes (11.6 miles) – north of Ina Road to Golder Ranch Road and north of River Road to Orange Grove Road, with 2 GSIs, (Ina Road, River Road)	102M
• Widen to eight-lanes (10.4 miles) – north of Ina Road to Golder Ranch Road, with 3 GSIs (Ina Road, Orange Grove Road, River Road)	$112M

10. PUBLIC INVOLVEMENT

The public involvement process to date for this project involved a series of open house meetings, held at three locations within the corridor, to explain the purpose of the study, present information about the corridor and obtain input on issues to be considered in developing project alternatives and recommendations. Another element of the public involvement process was a series of two transit workshops to determine alternatives for transit in the corridor. The third element of the public involvement process involved input from the Technical Advisory Committee for the project, particularly during a field review of the project area. These elements of public involvement are summarized below.

10.1 FIRST SERIES OF PUBLIC OPEN HOUSES

The first series of three public open houses on the project were held in May of 2003, at three locations within the corridor: Nash Elementary School (located at the south end of the corridor, on South Kelso Street), the Oro Valley Town Hall, to serve Oro Valley and Pima County residents, and the Coronado School, to serve residents at the northern end of the corridor. Displays were presented describing the existing traffic and environmental conditions within the corridor. Questionnaires were handed out at the open houses and a summary of the responses regarding transportation issues, problems and concerns at each of three open houses is provided in Exhibits 10-1, 10-2, and 10-3.

10.2 TRANSIT WORKSHOPS

The first of the two transit workshops involving community and transportation group representatives was held August 20, 2003, to identify transit needs and concerns. A brainstorming session was conducted in which workshop participants were asked to identify transit-related needs and concerns, as shown in Exhibit 10-4. The greatest number of needs and concerns were expressed relating to bus routing, particularly a perceived need for additional service in the northern portion of the corridor. Pedestrian facilities were also a particular concern, together with roadway design and access.

On December 2, 2003, the second transit workshop was conducted. Workshop participants were presented with background information relating to determining thresholds for different levels of transit service. The participants were then divided into three groups, each of which was presented several large-scale worksheet maps of the corridor and color markers with which to draft transit service concepts. The three draft concept maps were used by the Project Team to assist in formulating transit alternatives.

10.3 TECHNICAL ADVISORY COMMITTEE FIELD TRIP

On September 22, 2003, project TAC members and project staff attended a field trip, hosted by the project team. The field trip was a bus tour of SR 77. The purpose of the field trip was to focus on specific issues in the corridor, and to gather input from the field trip participants. Sun Tran provided a bus and driver to facilitate the field trip.

Exhibit 10-1
OVERVIEW OF SURVEY RESPONSES FROM NASH ELEMENTARY SCHOOL OPEN HOUSE – MAY 2003

Please share with us your comments on any transportation issues, problems, and concerns relating to the SR 77/Oracle Road Corridor.

Roadway:
There will be much more SR 77/Oracle Road traffic by Wetmore Road/Limberlost due to planned Home Depot and other businesses. Must plan now for higher volume. Planned sidewalk improvements on Miracle Mile – please let neighborhood know well before construction.
Timetable of widening Oracle Road to six lanes. Better timing of traffic signals, specifically left-turn signals when no cars are turning.
I've been "rear-ended" two times in the past four years. I was stopped and hit at 40-50 mph. Your work will save a lot of pain. Good for you, good for me.
Limit access to Oracle Road to increase speeds, decrease accidents.

Transit & Light Rail:
Any consideration for smaller buses and extended hours?
Magee Road to Linda Vista Boulevard Shopping Center – buses need to run more frequently so that people can go shopping and return in an hour or two.
Trolley/light rail along more developed areas.
Let transit options help shape future developments.

Bicycle:
Bicycle lane in Catalina.
More bicycle paths/lanes would be great.
Bike route unsafe and dangerous. North of Roger Road need bike paths. No exit from Rillito Park bike path on east side of Oracle Road. Incredibly dangerous as people will exit on west side and cross Oracle Road. Every major north, south, east, west street should have bike path. Bike path maps should be on poles showing local area.
Provide separated bike paths.

Other:
I'm glad some advance planning is going into this problem and I'm convinced a range/variety of solutions is probably required: improved traffic control; park & ride; bicycle routes; light rail. I hope this can all be done interactively with town, county and state government as well as with citizens and developers. No one likes sitting in traffic or breathing bad air.
ADOT should require cities like Oro Valley to charge impact fees on the developers who are causing the traffic concerns and loss of wildlife habitat.
Excessive noise 24 hours a day as southeast corner of Hardy & Oracle Road. Condominiums 50 feet from Oracle Road – a noise barrier is needed.

Exhibit 10-2
OVERVIEW OF SURVEY RESPONSES FROM ORO VALLEY TOWN HALL OPEN HOUSE – MAY 2003

Please share with us your comments on any transportation issues, problems, and concerns relating to the SR 77/Oracle Road Corridor.

Roadway:
This road is almost beyond repair in terms of transportation problems – additional north-south routes need to be examined.
Heavy traffic all day, all night – noise from the road 1 mile away. Property tax has increased by 5 fold in 10 years and to pay for necessary improvements will require more property tax increase and what we get in return is more congestion and noise.
In some cases traffic signals do not favor Oracle or Route 77 long enough. There are times when you have long lines of traffic stopped to allow 1 or 2 cars access to Oracle. Example is Lind Vista some times no cars will come out. Calle Concordia is another example.
Do critical areas very soon. Intersections should be first consideration.
Limit curb cuts. Fix curb cut at southwest corner of Oracle and Ina. Need left turn lights at intersections like Tangerine and Oracle. Get right arrows/left arrows synchronized.
Access management. I would like to see solid transit recommendations for high capacity transit (BRT) to be supported and funded by the state.
Major intersection gridlock at heavy commute times. Left turn back-up impacting through traffic flow as well as having long turn lanes.
Back-up to turn at 1st Avenue.
Seems like additional lanes are needed.
Width to 6 lanes from Calle Concordia to Tangerine Road ASAP.
Traffic congestion is very heavy from Miracle Mile to 1st Avenue on SR 77 and heavy on La Canada from Miracle Mile to Tangerine.
Ever-widening road and grade separated crossings create more traffic by encouraging more long-distance commuters that fill the roads. I've driven too much in Los Angeles to want to import to enlarge to grow, etc. The LA road system is truly cancer. We need a system to get people out of their cars.
Speed limit on La Canada should be 35 mph near school crossings. There should be pedestrian cycle initiated crossing lights or signal lights.

Transit & Light Rail:
Lack of bus pull-outs & shaded benches for bus passengers on cement pads with smoothed transition from parking lot to pad. Lack of school crossings being shown on maps. Indication of new construction and its impact.
I want mass transit /light rail at least along Oracle to Pinal County line. I like the black skies – no lighting.
Rail/transit should be on Rillito River from Cortaro & Thornydale to Alvernon & Grant. Additional traffic lanes for bus use only at major bus stops/Can be bus or bus/bike use.
I am retired & no candidate for regular bus service.

Bicycle:
Bicycles are involved in too many accidents on SR 77. Shoulders are needed from Prince to River Rd. as well as in the Town of Oracle turn off area. This is a critical safety issue will save lives, money and increase visitors to our county.
Complete striped shoulder (5 feet preferred) from Roger to River Road. This is needed to fully complete the Oracle Road bikeway. River to Ina is being done in 2004. We need this section to complete it. Also have space at each intersection for bicycles left of any right turn only lane.
Most bicycle accidents are the fault of the cyclists. What measures are being taken to fully address this?

Exhibit 10-2
OVERVIEW OF SURVEY RESPONSES FROM ORO VALLEY TOWN HALL OPEN HOUSE - MAY 2003
(Continued)

Wildlife:
Much too late to worry about wildlife. Wildlife corridor diminished beyond salvage.
Provide wildlife with bridges or other means to cross Oracle Road.

Other:
The projected number of residences starting at Oracle Junction & south is going to dramatically increase traffic on 77. Financial problems of Arizona are going to limit capacity improvements needed to handle the traffic increases. I see a collision of need vs. resources that is going to leave us with a serious congestion issue.
These plans needed to start 10 years ago. At least you are thinking about it.
I would be willing to pay an additional sales tax plus a property tax increase to widen & resurface. Oracle Rd. from the Pinal County line to Miracle Mile and south into Central Tucson is sorely underfunded. Funding for state projects is insufficient to accommodate anticipated growth of population & traffic.

Exhibit 10-3
OVERVIEW OF SURVEY RESPONSES FROM CORONADO SCHOOL OPEN HOUSE – MAY 2003

1. Please share with us your comments on any transportation issues, problems, and concerns relating to the SR 77/Oracle Road Corridor.

Roadway:
Linda Vista east and west bound traffic needs to move at same time. No left turn is necessary. Three lanes are needed from Calle Concordia north to at least 1st Avenue. Dual left turn lanes north bound Oracle & 1st Avenue.
Create an expressway for Pinal County section of 77. Limit access to 1 mile or greater intervals. In the long run this will increase the value of property and the effect of tax money invested in 77.
Acquire right of way for frontage roads from 1st Avenue north to Oracle junction. Install frontage roads to improve current and future access to housing developments & commercial areas. Use occasional overpasses and very few stoplights for Oracle Road access.
The need for an expressway from Oracle-San Manuel and River Road. Widening Oracle piecemeal is not going to solve the problem. Creating frontage roads and overpasses will cut down on additional traffic lights and congestion.
I support the current road improvement and also those being planned. Good access is important. How about an express lane?
Love the rubberized asphalt!
A freeway system would be a help.
Study looks good-but the need for new highways is now. Way too late in execution.
I believe Oracle should be eight lanes with a four-lane limited access parkway down the center, two lanes each side for business and residential access. Presently it looks like this could be accomplished. From the county line south to Magee, I don't think anything should limit Oracle as a north-south "major highway access to the northeast part of the state or the White Mountains.
Put in passing lanes between Oracle Junction and Oracle.
Provide safe turn/merge lanes at new Willow Springs/77 junction.
The portion between Oracle and Oracle Junction needs passing lanes.
Complete expansion of SR 77 to 6 lanes (to Golder Ranch Road) before 2008. Don't let road become decayed.
Insufficient capacity.
If traffic lights were synchronized would have smoother flow.
There will be a very large increase in traffic Willow Springs and Saddlebrooke Ranch begin construction but road widening probably won't help in time to relieve additional traffic.
La Reserve community would like to know how much of the main entrance at Oracle and La Reserve Drive will need to be changed. How much of the landscape and signage will be removed to expand Oracle?
ADOT address safety issues for motorists and cyclists on SR 77 from Oracle to end of study area. Too narrow at Oracle Junction. Elevation changes create safety issues. Topography changes can slow traffic greatly. Poor sight distance from Oracle Junction to Oracle. More commuting from Oracle to Tucson from mine shut-down. Late afternoon sun orientation causes severe blinding for southbound traffic.
Reduce the number of access areas to Oracle. Keep areas away from intersections at shopping centers, etc.

Transit & Light Rail:
The bus bench is too near our condo. We have problems with it on the corner. Now it is going to move closer to where we are living. The bums occupy it most of the time and use our property for a bathroom. Please someone look into this.
For the Oro Valley area, LRT would be expensive, slow to catch on but ultimately would prove to be a good investment.

Bicycle:
As a member of the bicycling group – I would like to see five feet bicycle "safe" lanes particularly on Oracle from San Manual to Ina, all of Tangerine & 1st Avenue.

Exhibit 10-3
SURVEY RESPONSES FROM CORONADO SCHOOL
OPEN HOUSE – MAY 2003
(Continued)

Bicycle:
Don't forget the bike lanes.
The shoulders for bicycle riding are too narrow going south on Oracle Road from Saddlebrooke. Allow at least five feet of areas not including the rumble strip. Storm drains must be bicycle friendly. At major right hand turns, create bike safe transition and have "begin right turn, yield to bikes" signs. Add bike lanes on Tangerine.
Please consider "safe" cycling lanes from at least Ina Road up to the village of Oracle. Avoid rumble strips in the emergency lane. Bike lanes should be at least five feet wide.
Put back emergency/bike lane at Oracle.
Emergency/ bike lanes should be preserved and should be added to the area between Circle K and Ford dealer.
Please make it bike friendly.
No rumble strips in bike lanes. Bike friendly storm drains. Five feet of bikeable area not including gutter pan and rumble strip. Safe bike-right turn transition. Safer bicycle environment in major commercial areas. At major exits, alert drivers to oncoming cyclists or traffic. No hydrant markers in bike lane. Rejuvenate bike path in Catalina. Check out proposed development in new Robson community.

Wildlife:
Need wildlife corridors (underpasses) between the last housing area on west side and Rancho Vistoso Blvd. on east side of highway. More than one is needed in area. It's the last open space area for connections between Tortolita & Catalina mountains.
Wildlife corridor under Oracle.
Protect wildlife corridor between Tortolita and Santa Catalina Mountains.
The bighorn sheep need to go from Pusch Ridge to the mountains to the north. Horses destroy trails-look at Pusch Ridge trail head.

Other:
Need to define limits of Oro Valley annexation plans to north and west of SR 77. This will impact road needs.
I believe the plans you have in place are solid. We appreciate your setting up the meeting like this one to get local feedback.
Need to ask questions about access to medical care and ambulance service. Also, you need a history of Oracle Road.

Exhibit 10-4
ANALYSIS OF FIRST TRANSIT
WORKSHOP PARTICIPANT INPUT

Verbatim Responses Received from Workshop Participants	Concern	Concept	Proposal
Education and Enforcement			
• Traffic enforcement and education		♦	
• Bike race/traffic coordination		♦	
• Require bike races and running marathons to clean up afterward!			♦
Funding			
• Greatest funding needs are outside current City limits	♦		
Higher Speed Transit			
• Bus rapid transit		♦	
• Establish BRT line (bus rapid transit)			♦
• High speed transit		♦	
• Exclusive transit way		♦	
Park and Ride			
• New/developed park-and-rides			♦
• Park and ride consolidate boarding points			♦
Passenger Facilities			
• Bus shelters		♦	
• Real time bus shelter information		♦	
• Real-time info at major transit stops		♦	
• ADA compliant bus stops			♦
• Coordinated bus stop improvements			♦
• Lights at stops		♦	
Pedestrian Facilities			
• Pedestrian crossing facilities and opportunities		♦	
• Pedestrian crossings		♦	
• Continuous pedestrian facilities “sidewalks”		♦	
• Continuous five-foot sidewalks with shade landscape (urban area)			♦
• Difficult crossing Oracle on foot	♦		
• Sidewalk approaches to stops		♦	
• Sidewalks		♦	
• Shaded pedestrian access to stops			♦
Planning			
• PAG needs to get and use and distribute all their 5303 funds			♦
• A coordinated roadway design concept		♦	

Note: Multiple or similar responses indicate that more than one participant noted the concern

Exhibit 10-4
ANALYSIS OF FIRST TRANSIT
WORKSHOP PARTICIPANT INPUT
(Continued)

Verbatim Responses Received from Workshop Participants	Concern	Concept	Proposal
Roadway Design and Access			
• Multiuse lanes		♦	
• Right turn lane, development access		♦	
• Dedicated bus/bike lane (convert existing)			♦
• Entry/exit aprons for small side roads			♦
• Frontage road in Catalina			♦
• Bike route (lane)		♦	
• Bus pullouts		♦	
• Bus pull-offs at all stops			♦
Routing Service			
• Transit system from south to north part of the town		♦	
• Need to transfer at Tohono to complete trip	♦		
• No service between Wetmore Road and River Road	♦		
• Connect better at south end to UA	♦		
• Coyote Run connects to Sun Tran stops		♦	
• Weekend service past Ina Road		♦	
• Intercity service to Oracle into Pinal County		♦	
• Some type of bus service to Catalina		♦	
• Service to new generators – PCC North		♦	
• Regular route bus service north of Ina		♦	
• Bus route to Rancho Vistoso			♦
• Buses to Catalina, Oracle			♦
• Bus out Tangerine Road			♦
Service – General			
• Frequent bus service		♦	
• More weekend bus service		♦	
• Later night bus service		♦	
• Weekend/evening service increase or addition		♦	♦
• Expand accessibility of transit		♦	
• Door to door transit system		♦	
Signalization			
• Transit signal priority		♦	
• Sufficient pedestrian crossing time across full roadway		♦	
Wildlife Safety and Crossing			
• Crossing area for wildlife (grade separated)		♦	
• Corridor crossing for wild animals		♦	
• Wildlife and horse crossings		♦	

Note: Multiple or similar responses indicate that more than one participant noted the concern

Prior to the tour, the project team asked the TAC members for a list of locations where the bus should stop. Discussion topics (by location) are listed below.

Town of Catalina – The Town of Catalina should have a small area transportation and land use plan developed.

Tangerine Road – ADOT is widening Tangerine Road to four lanes from Oracle Road to First Avenue, and Oro Valley is continuing the widening to the west of First Avenue. The new Northwest Hospital will be complete in 2004. This and other neighborhood, commercial and industrial developments in this area may require modifications to the intersection of SR 77/ Tangerine Road, including northbound dual left-turn lanes. ADOT indicated that these improvements may be included in the planned widening of SR 77 to six lanes in the vicinity of this intersection.

Catalina State Park – Oro Valley requests a provision for maintaining a wildlife corridor from the Oro Valley northern town boundary through to the Tortolita Mountains. A well-designed underpass at the CDO Wash crossing at SR 77 would allow for wildlife to pass under SR 77 safely. The Project Team must consider wildlife corridor and equestrian crossing concerns north of the Catalina State Park entrance. The entrance to Catalina State Park may need a signal, especially when the new Innovation Park Drive connects to Oracle Road from the west at this location.

Rams Field Pass – The Rams Field Pass/Oracle Road intersection may warrant a traffic signal.

Pusch View Lane to First Avenue Segment of SR 77 – This area of SR 77 is planned for improvement to six lanes by Oro Valley. The section from Pusch View Lane to La Reserve Drive will complement the abutting sections of SR 77 that are planned for widening by ADOT to six lanes. Transit issues at this location include non-ADA compliant bus stops and a lack of a park-and-ride lot at this major shopping center area. Pusch View Lane will connect to Lambert Lane. At the First Avenue/Oracle Road intersection, dual left-turn lanes are needed northbound into the Home Depot Center. The Project Team must consider how to get pedestrians across Oracle Road at First Avenue.

El Conquistador Way – Although there is a bus stop near the intersection of SR 77/El Conquistador Way, hotel workers do not have a pedestrian path from SR 77 to the hotel to walk safely. Southbound Oracle Road backs up in the morning peak at El Conquistador Way. The road grade on Oracle Road may contribute to this condition.

Linda Vista Boulevard – Horse riders cross SR 77 at this location. Oro Valley recommends a traffic signal push button high enough for a horse rider to use when crossing SR 77 at this traffic signal. In addition, signs could be posted along SR 77 and Linda Vista Boulevard identifying equestrian activity near this location.

Magee Road – The transit stop at the southwest corner of the Magee Road/Oracle Road intersection is non-ADA compliant. A park-and-ride lot on the east side of SR 77 is not easy to access from the west side bus stop, nor is it an authorized park and ride lot.

Magee Road to Ina Road Segment of SR 77 – Several commercial developments are to be constructed on the west side of SR 77 including a major sporting goods store and a Fry's Shopping Center. At the Magee Road/Oracle Road intersection southbound, the Town of Oro Valley wants a bus pullout and better pedestrian access. The existing bus bench is located in the roadway clear zone, and access is not ADA compliant. This is a transfer point with the Oro Valley transit system. The southeast corner is unofficially a park-and-ride lot for the Sun Tran Route 101 Express bus.

Ina Road – The Ina Road/SR 77 intersection is one of the intersections the project team is studying as a potential location for a grade-separated intersection (GSI). A concern regarding transit service is that there is no transit stop for Sun Tran Route 16 on the northern approach to the SR 77/Ina Road intersection. This is because this transit route travels westbound on Ina Road from SR 77 and drivers cannot turn left from the bus stop because of long queues on the northbound approach to the intersection. The bus stop at this location is only for Route 162 (Honeywell Express Route). At the southeast corner of the Oracle Road/Ina Road intersection there is no sidewalk or pedestrian connection from the curb at the corner to the bank parking lot. A path is worn through the dirt/gravel where pedestrians travel from the curb into the parking lot.

Orange Grove Road – The Orange Grove Road/Oracle Road intersection is one of the potential locations to be analyzed for a GSI, based on comments from the TAC.

River Road – The River Road/Oracle Road intersection is one of the potential locations to be analyzed for a GSI.

Tucson Mall Area – A connection needs to be provided from the Tohono Tadai Transit Center to the Tucson Mall and to the other commercial areas near the transit center. Possible solutions might be a TICET type of shuttle vehicle that would circulate from the transit center to surrounding commercial areas. Another possible connection might be a pedestrian walkway from the transit center to the 2nd floor of the Tucson Mall, possibly with moving sidewalks like those used in airports. Dual left turns are needed for the southbound left-turn movement at the main entrance to the Tucson Mall at Auto Mall Drive.

Prince Road – The Prince Road/Oracle Road intersection is one of the potential locations to be studied for a GSI. Prince Road is a heavy transfer point for transit services, which must be considered in the GSI feasibility analysis.

Fort Lowell Road – ADOT will be constructing sidewalks on the west side of SR 77 from Prince Road to Miracle Mile Road. Several utility and signal poles and equipment will be relocated as a result.

Miracle Mile – An analysis of a connection between Fort Lowell Road and Miracle Mile Road is to be conducted as part of this study. ADOT will be constructing sidewalks on both sides of Miracle Mile from Oracle Road to I-10.

There was a question about whether the bike lane on Miracle Mile could be converted to a diamond lane. Utility poles on the south side of Miracle Mile prohibit the eastbound right-turn to southbound Fairview Avenue.

A number of other pedestrian and transit concerns were discussed including:

1. Sidewalks and lift pads are needed for bus passengers on Oracle Road.
2. There is no place for pedestrians to walk north of River Road.
3. There was a question regarding whether the new shoulder north of River Road could be made wide enough to provide a diamond lane for buses. (How much wider than the planned shoulder must it be to provide a diamond lane?)
4. Bus pullouts and sidewalks north of River Road are key issues.
5. ADOT should have a sidewalk policy, particularly in developing areas, that provides for sidewalks once development reaches a specified density.
6. TransCore must consider bus stop locations and access as part of the GSI analysis.
7. There are quite a few disabled bus passengers along the section of Oracle Road, south of Prince Road, which should be considered in the development of alternatives.

10.4 FINAL SERIES OF PUBLIC OPEN HOUSES

The final series of three public open houses on the project were held in April 2007, at three locations within the corridor: Nash Elementary School (located at the south end of the corridor, on South Kelso Street), the Oro Valley Town Hall, to serve Oro Valley and Pima County residents, and the Coronado School, to serve residents at the northern end of the corridor. Displays were presented describing the following corridor subjects:

- Year 2002 and year 2030 traffic volumes.
- Year 2003 and year 2030 roadway congestion (year 2030 included all planned and programmed capacity projects in the corridor).
- Corridor traffic safety issues.
- Anticipated corridor land development.
- Planned and programmed capacity projects in the corridor.
- Planned and programmed alternative mode projects in the corridor.
- Summary of roadway capacity improvement options and concepts for the corridor.
- Summary of bicycle and pedestrian facility improvement options for the corridor.
- Access management concepts for the corridor.
- Intelligent transportation system (ITS) concepts.
- Possible roadway lighting improvements.
- Transit service improvement concepts for the corridor.

A brief Power Point presentation was also provided at the open houses. Attendees were encouraged to ask questions and comment on the materials presented. A public comment form was handed out at the open houses and a summary of the responses regarding transportation issues, problems and concerns at each of three open houses is provided in Exhibits 10-5. Public comments were also recorded on a large “flip chart” during question and answer periods. These

comments are provided in Exhibit 10-6. Additional public comments were also submitted via email. These comments are provided in Exhibit 10-7.

Exhibit 10-5
PUBLIC COMMENTS SUBMITTED AT THE FINAL SERIES OF OPEN HOUSES

4-23-07	**Coronado School**
Please do more to get articles re these projects in Explorer, Northwest News, Tucson Weekly. Don't make right hand lane (adjacent to bike lanes) too narrow for motor homes with extended mirrors.	
As a bicyclist it is very important to me to continue the bicycle lane on both sides of the road (Route 77) through the town of Catalina. There has already been several cyclists killed and many injured in this area.	
SR 77 through Catalina is extremely dangerous for bicyclers – one life was lost – several other have had serious accidents. It would seem that a very dangerous hazard should not be tabled for "years', but addressed when it is identified.	
1 .Alt. high capacity corridor from Tangerine is a must do ASAP. 2. Repave Calle Concordia between La Cañada and Northern. (Town Road) 3. Please add or widen bike lanes on Hi 77 thru Catalina. 4. Proceed with I 10 Tucson bypass planning, as I 10 cannot handle (even 10 lanes) all the cars and trucks.	
Would like to see signals set so that cars traveling at speed limit – 5 mph not be slowed down by signals. Access & egress to Oracle Rd through Catalina needs to be restricted. Increased traffic has made this extremely dangerous. Enforce &/or lower speed limit thru Catalina.	
1. We need bike lanes on Oracle Rd. We've had one bicycle death in the last yr due to a bike/car collision and there have been several accidents. 2. Communication of meeting needs improvement. There was no newspaper notice of this meeting!! 3. Why wasn't the District Engineer at this meeting?	
Bicyclists need immediate installation of bike lanes through Catalina. This should be done prior to planned 6 lane widening. There will no doubt be many bike accidents and casualties in the next 10 yrs if not done (improvements) soon!	
Access management is a vital and critical part of traffic control, reduction of vehicular accidents and a much safer corridor for cyclist and pedestrians. This has been proven in hundreds of studies. Land development MUST work with ADOT in Planning.	
I believe the best solution for cyclist along RT 77 would be totally separate from roadway. I worked on this type of situation in Ohio for the past 18 years. Public transportation need to extend to at least Oracle junction with park & ride lots all the way along the bus routes.	
I am very concerned about the lack of bike lanes through Catalina. This is an extremely dangerous stretch of road. Rosalie Harmon, a member of the Saddlebrook Cyclemasters, died as a result of a biking accident there in November 2006. In the spring of 2004, a car swerved out of the left-hand lane and crashed into a tandum ridden by Cyclemasters Donna and Jerry Goode. They were life flighted to UMC. Donna spent approximately 4-1/2 months in the hospital and rehabilitation facilities before she returned home. In the fall of 2006 Peggy Siegel was driven off a narrow section of the road by a truck which refused to yield. She has ridden very little since. We desperately need a bike lane!	

Exhibit 10-5
PUBLIC COMMENTS SUBMITTED AT THE FINAL SERIES OF OPEN HOUSES
(Continued)

4-23-07	**Coronado School**
1. I'm a cyclist and am very concerned about having a bike lane of sufficient width. 2. Since construction won't start for at least 5 years thru Catalina, I propose a temporary off-road bike lane be installed thru Catalina. Cost would be minimum. Safety would be greatly improved.	
Immediately eliminate curb through Town of Catalina. Replace with temporary 4-5' wide blacktop through Catalina.	
In serious need of bike lanes and improved bike safety through Catalina and all the way to Oracle.	
Pima Co. is otherwise very bike friendly – We need a bike lane in this Catalina area on RT 77.	
We need a widening of the bike lanes from Golder Ranch Road through Catalina past Pinto Lane. IMMEDIATELY – before any more cyclist are killed! Many more cyclists have been injured!	
1. I'm a cyclist from Saddlebrook, I see the roads are going to be widened up to the junction. We're here listening to the proposal. I think with your predictions Oracle will be heavily traveled. I would like to suggest extending public transportation to the junction which would elevate traffic and make Oracle much safer for all.	
Very happy to see bike lanes thru Catalina.	
Good access from Tucson to Saddlebrook. Widening of bike lanes through Catalina for cycling safety.	
Bike lane improvements through Catalina.	
Please make generous provision for bicycle lanes in your planning	
We are part of a large group of cyclist that reside in Rancho Vistoso. We use Oracle as a route northward and need a safe cycling environment in both directions and we need it soon!	
Wide bike lanes are necessary through Catalina.	
Catalina = wide bicycle lanes are a must. Situation now is dangerous for all but the most experienced and cautious cyclists. Also, rumble strip should just touch the white line, and not be within the bike-riding area. Thanks.	
We need bike lanes through Catalina to create a safe riding area for cyclists. People have been killed and severely injured riding through this area.	
Please remember the many cyclist that use SR 77 / Oracle Rd. We need a safe lane.	

Exhibit 10-6
PUBLIC COMMENTS RECORDED AT THE FINAL SERIES OF OPEN HOUSES

4-16-07	Nash Elementary School
1. Can the Amphi School District use Sun Tran bus pull-outs for school buses? What needs to be done to allow this?	
2. Dangerous school bus stops for high school (Hardy Rd., Calle Concordia, and Linda Vista).	
3. Support provision of continuous sidewalks and bike lanes along Oracle Road Corridor.	

4-18-07	Oro Valley Town Hall
The recommended bicycle/pedestrian improvements along Hwy 77 are a very welcome idea and would be very well received by residents of Oro Valley. Please include this idea in your plans.	

4-23-07	Coronado School
1.	Please study sooner than later your Access Management of SR 77 # Wilds Rd (actually Golder Ranch Road through Pinto Lane, to expand bike lanes through Catalina. It's dangerous for bikers (cyclists) and deaths have occurred.
2.	Why was design and construction process North of Calle Concordia pushed back?
3.	Need better coordination with private development.
4.	What would it take to extend public transit up to SR 77/79 jct? It would make the corridor easier to travel and safer.
5.	Narrow bike lane thru Catalina needs to be mitigated now! Not safe for cyclists.
6.	Pavement seam in bike lane/ cub is dangerous for cyclists. Do something.
7.	Is wildlife corridor being addressed?
8.	Has EIS been done for area from county line north to Town of Oracle?
9.	Section through Catalina is very dangerous and needs to be address now!!!
10.	ADOT should address cycling safety through Catalina now!!
11	Need better communication regarding public meetings. We didn't see any notice in the paper.
12.	Why wasn't anyone here from the District office?
13.	Suggestions: A. Explore restriping to provide wider bike lane thru Catalina. B. Take out the curb and widen shoulder. C. Narrow lanes to 10-11 feet to encourage slower traffic speeds and widen bike lane.
14.	Alternate high capacity is a good idea.
15.	Use 6' bike lane instead of 5'.

Exhibit 10-7
PUBLIC COMMENTS SUBMITTED VIA EMAIL

4-24-07	
It would be such a unique idea if the planners for both development and road projects would ask the citizens that actually reside in the area how they feel about changing the make-up of OUR community. First of all does anyone bother to consider the loss of the beautiful environment of the area and does anyone bother to consider the falling water tables? It does not appear that anyone does. The residents of this area moved here with the express purpose of living in a quiet area with open areas so that our children and grandchildren would know the beauty and peace of such a nice area. We did not care if there were huge shopping centers because it was available within a short drive into Tucson. It is time for our government officials to start saying NO to the developers otherwise our great grandchildren will never see what a beautiful open area is and will only know a concrete jungle. We have been forced to watch as the developers in Eagle Crest have bladed down entire mountains & hills in order to build more housing and deplete our water supply further and congest the roads of our community. Then the huge dirt hauling trucks have moved that dirt and filled in the beautiful valley just past Tangerine Road to build yet another shopping center.	
4-25-07	
I'm sorry I was not able to attend Monday's meeting on the Oracle road corridor but as a cyclist, would like to add my vote that safety features need to be added for the portion of Oracle between the county line and Golder Ranch Road in Catalina. Thank you for your consideration.	

10.5 COMMENTS RECEIVED FROM THE TOWN OF ORO VALLEY

The Town Manager for the Town of Oro Valley provided his comments, as a representative of the Town, in a letter addressed to the Arizona Department of Transportation, Transportation Planning Division. This letter is provided below in Exhibit 10-8.

10.6 COMMENTS RECEIVED FROM PINAL COUNTY

Comments on behalf of Pinal County were provided as shown in Exhibit 10-9. The Pinal County Open Space and Trails Plan referenced in Exhibit 10-9 is provided in Exhibit 10-10.

Exhibit 10-8
COMMENTS FROM THE TOWN MANAGER
OF THE TOWN OF ORO VALLEY

Office of the Town Manager

Oro Valley Administration Building
11000 N. La Canada Drive, 85737-7016
(520) 229-4700 FAX (520) 229-4724

DAVID ANDREWS
Town Manager

February 12, 2007

Mr. Arnold Burnham
State and Regional Planning Manager
Transportation Planning Division
ADOT
206 S. 17th Avenue - Mail Drop 310-B
Phoenix, AZ 85007 – 3213

Re: SR77 / Oracle Road Multimodal Corridor Profile Study

Dear Mr. Burnham:

I am writing this letter to share my concerns in regard to the Alternative High Capacity Corridor Study that is being undertaken by ADOT.

The Town of Oro Valley is very concerned with the transportation issues that Pima County and Oro Valley will face in the future. It is apparent considering the future potential regional growth that transportation alternatives must be investigated for the Oracle Road Corridor. Of special concern is the possible complete failure of the existing corridor to maintain an adequate level of service for north–south bound traffic.

The Town supports transportation studies to determine a variety of solutions that provide acceptable levels of service, which are in harmony with the environment and have low impacts to residents. Some of the solutions, such as alternative corridors on Tangerine Road, La Cholla Boulevard and Thornydale Road, regional bypass routes, and work with Pinal County to develop sustainable communities should be pursued. Failure to pursue these options will have a devastating impact to Oro Valley, northeastern Pima County and the region as a whole.

In light of those considerations, Oro Valley supports the following key concepts:

1. Maintain a regional perspective with respect to transportation issues.

2. Retain the La Cholla Corridor in the profile study, as identified in the draft final report as one option.

3. Add a revised corridor that starts at Oracle Junction, follows Oracle Road south to Tangerine Road, then Tangerine Road west to La Cholla Boulevard, and continues south on La Cholla Boulevard. This should be identified on exhibit 7-1 similar to the existing identification of the La Cholla Corridor.

Exhibit 10-8
(Continued)
COMMENTS FROM THE TOWN MANAGER
OF THE TOWN OF ORO VALLEY

4. Please add Thornydale Road as an additional study corridor and identify it similar to the corridors above.

5. Continue collaboration in the planning of regional bypass routes so that the transportation system will encourage the development of sustainable communities.

6. Collaborate with Pinal County and their local jurisdictions to develop standards that encourage sustainable communities in their comprehensive and general plans.

7. Solicit ideas from the region to develop alternative solutions to transportation issues.

The SR 77 / Oracle Road Multimodal Corridor Profile Study should include language that identifies the need to find suitable alternatives to Oracle Road to best serve the transportation needs of our citizens in the future.

If you have any questions, please do not hesitate to call me.

Sincerely,

David Andrews
Town Manager

PC: Honorable Mayor & Council
Chuck Huckelberry, Pima County Administrator
Gary Hayes, Pima Association of Governments
Greg Gentsch, Arizona Department of Transportation
Sandra Gilbert, Arizona Department of Transportation
Jim Witkowski, Morrison Maierle, Inc.
Jerene Watson, Assistant Town Manager
Craig Civalier, Town Engineer
Sarah More, Planning & Zoning Director

Exhibit 10-9
COMMENTS PROVIDED ON BEHALF OF PINAL COUNTY

Terry Haifley
Director
PO Box 2973
31 N. Pinal Street
Florence, AZ 85232

Pinal County
Administrative Services
Parks, Recreation and Fairgrounds

June 6, 2007

Ms. Sandra Gilbert
Arizona Department of Transportation
206 S. 17 th Avenue, MD 310B
Phoenix, AZ 85007

Subject: SR77/Oracle Road Multimodal Corridor Study

Dear Ms. Gilbert:

Thank you for the opportunity to provide comment on the above referenced corridor study. Pinal County is in the later stages of developing an Open Space and Trails Plan for the County. The area between the Tortalitas and the Coronado Forest/Oracle area, which includes the ADOT study corridor, is a biologically diverse area. Maintaining some of this diversity through open space corridors is one of the underlying concepts of our Open Space and Trails Plan.

This area is also home to a rapidly growing population which, similar to Pima County, enjoys the ability to recreate along this corridor. The community of Saddlebrooke boasts one of the largest bicycle clubs in the state of Arizona. Having access to motorized and non-motorized recreational corridors in this area provides additional recreation opportunities as well as alternative transportation possibilities.

Please consider the following points as you move forward in your planning process:

1) This corridor currently receives high usage by cyclists. In order to improve the safety of this corridor we would recommend that the current road structure in Catalina be improved as soon as possible. Currently there are no wide shoulders or bike lanes available for cyclists in this area (see attached photo).

2) The population in this area is projected for tremendous growth over the next 10 to 20 years. Our recommendation would be for ADOT to acquire the necessary ROW to accommodate for that growth and build the shared use path even if all the traffic lanes are not built at this time. Using the Fringe Urban Concept cross section, this would allow for a shared use path to extend from Oracle to Tucson. This would benefit area residents for recreation and transportation needs. Failure to do this at this time would most likely mean that ADOT would be forced to do it at a later date. The best time to from a planning and financial standpoint would be now, rather than later.

Telephone: (520) 866-6910 Fax: (520) 866-6435

Exhibit 10-9
(continued)
COMMENTS PROVIDED ON BEHALF OF PINAL COUNTY

Terry Haifley
Director
PO Box 2973
31 N. Pinal Street
Florence, AZ 85232

Pinal County
Administrative Services
Parks, Recreation and Fairgrounds

3) I have attached a copy of the proposed Pinal County Open Space and Trails Plan. We recommend that ADOT use this as a guide in developing this corridor. This corridor represents not only a transportation corridor, but has been identified as an important linkage for motorized and non-motorized trails and open space corridors.

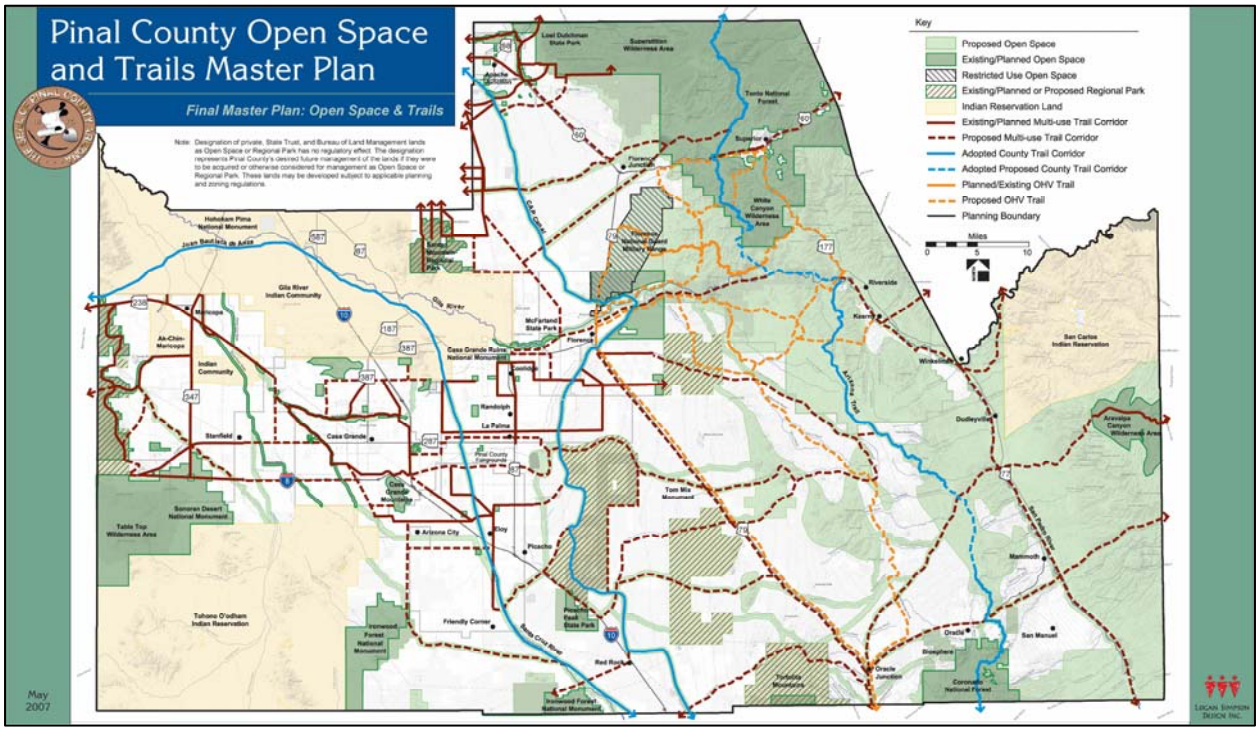
4) We would recommend that the design of this corridor also take into account the recently released Wildlife Linkage data from the Arizona Wildlife Linkages Workgroup. This data shows this corridor as important for not only human movement but also wildlife movement.

Thank you for your time and consideration. Please feel free to contact me with the information provided below if you have any questions.

Kent A. Taylor
Pinal County
Senior Planner, Parks, Open Space and Trails
PO Box 2391
Florence, AZ 85232
520-866-6910
Kent.taylor@co.pinal.az.us

Telephone: (520) 866-6910 Fax: (520) 866-6435

Exhibit 10-10
PINAL COUNTY OPEN SPACE AND TRAILS MASTER PLAN



Source: Pinal County, Arizona, May 2007.

APPENDIX A

Properties Listed on the National Register of Historic Places Within Study Area

NRHP Properties within the Study Area

Name	Address	Year Added	Historical Significance	Area of Significance	Historic Function	Current Function
Acadia Ranch	825 Mt. Lemmon Road (Old SR 77)	1984	Event, Architecture/ Engineering	Health/Medicine, Architecture (1875-1899, 1900-1924, 1925-1949)	Domestic, Government, Health Care (Hotel, Post Office, Resort)	Commerce/Trade, Recreation and Culture (Museum, Specialty Store, Warehouse
All Saint's Church (The Oracle Union Church)	695 E. American Avenue (Old SR 77)	1984	Architecture/ Engineering	Architecture (1900-1924)	Religion, Social (Civic, Religious Structure)	Religion, Social (Civic, Religious Structure)
Antonio Matus House	856 W. Calle Santa Ana, Tucson	1991	Event, Architecture/ Engineering	Native American, Architecture, Social History, (1925-1949, private ownership)	Domestic (Single Dwelling)	Domestic (Single Dwelling)
John Spring Neighborhood Historic District, Building	Roughly bounded by W. Speedway Boulevard., N. Ninth Avenue, W. 5th Street, N. Main Avenue, W. 2nd Street, and N. 10th Street, Tucson	1989	Event, Architecture/ Engineering	Community planning and development, Exploration/Settlement, Architecture, Social History (1875-1949, private and local government ownership)	Domestic (Single Dwelling)	Commerce/Trade, Domestic (Single Dwelling)
Rillito Racetrack--Chute (Rillito Racetrack)	4502 N. First Avenue, Tucson	1986	Event	Entertainment/Recreation (1925-1949, local government ownership)	Recreation and Culture (Sports Facility)	Commerce/Trade
Sabedra--Huerta House	1036--1038 N. 13th Avenue, Tucson	1988	Event, Architecture/ Engineering	Community Planning and Development, Architecture (1900-1924, private ownership)	Domestic (Multiple Dwelling)	Vacant/Not in use
Speedway--Drachman Historic District (University Heights Elementary School	Roughly bounded by Lee Street, Park Avnue., Speedway Boulevard, 7th Avenue, Drachman Street and 2nd Avenue	1989	Event, Architecture/ Engineering	Community Planning and Development, Health/Medicine, Architecture (1900-1949, private and local government ownership)	Domestic, Education, Health (Sanatorium, School, Secondary Structure, Single dwelling)	Domestic, Health Care (Multiple and Single Dwelling, Sanatorium, Secondary Structure)
University Heights Elementary School	1201 N. Park Avenue, Tucson	1983	Event, Architecture/ Engineering	Education, Architecture (1900-1949, local government ownership)	Education (School)	Vacant/Not in use

NRHP Properties within the Study Area

Name	Address	Year Added	Historical Significance	Area of Significance	Historic Function	Current Function
USDA Tucson Plant Materials Center (PMC)	3241 N. Romero Road., Tucson	1997	Event, Architecture/ Engineering	Agriculture, Architecture, Conservation (1925-1949, Federal ownership)	Agriculture/Subsistence, Education, Government (Horticulture Facility, Processing, Reserach Facility, Storage)	Agriculture/Subsistence, Education, Government (Horticulture Facility, Processing, Reserach Facility, Storage)
West University Historic District	Roughly bounded by Speedway Boulevard, 6th Street, Park and Stone Avenues, Tucson	1980	Event, Architecture/ Engineering	Commerce, Art, Education, Politics/Government, Architecture, Religion (1875-1949, local government ownership)	Domestic (Multiple and Single Dwelling)	Domestic (Multiple and Single Dwelling)

APPENDIX B

Previous Archaeological Surveys Within Study Area

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
55-3	Arizona State Museum	Pipline construction	475 ft by 80 ft	15	0	Komerska 1955
73-1	Arizona State Museum	Reconnaissance	4,000 m2	6	No data	Rubicek, Cummings, and Hartmann 1973
76-1	Arizona State Museum	Sewer	15.5 miles by 200 ft	No data		Brew and Rogge 1976
78-75	Pima Community College	Preservation and conservation	1,636 acres	10	0	Heuett 1978
79-22	Arizona State Museum	Development clearance	160 acres	0	No data	Brew 1979
79-35	Arizona State Museum	Development clearance	244.77 acres	0	0	Urban 1979
79-38	Arizona State Museum	Park development	325 acres	33	0	Betancourt 1978
79-39	Arizona State Museum	KV line clearance	40-miles by 50-110 ft	4	0	Rozen 1979
80-10	Arizona State Museum	Development clearance	148.6 acres	No data	No data	Urban 1980a
80-141	Arizona State Museum	Assessment state park	3.5 sq. miles	4	0	Huckell 1980
80-146	Arizona State Museum	Clearinghouse	1 acre	0	0	Urban 1980b
80-152	Arizona State Museum	Park construction	5.3 acre	0	0	Brew 1980
80-155	Arizona State Museum	Intercepter construction	20 miles by 100-150 ft	2	0	Project Registration form on file at ASM
80-159	Arizona State Museum	Subdivision construction clearance	14 acres	0	0	Urban 1980c
81-5	Arizona State Museum	No data	No data	3	0	Creel 1981
81-6	Arizona State Museum	Clearinghouse	9.5 acres	0	0	Urban 1981a
81-28	Arizona State Museum	Clearinghouse	1/7th acre	0	0	Urban 1981b
81-32	Arizona State Museum	Development clearance	9.33 acres	0	0	Urban 1981c
81-38	Arizona State Museum	Low cost housing property clearance	6 acres	None	0	Urban 1981d
81-41	Arizona State Museum	Clearinghouse	2.46 acre	0	0	Urban 1981e
81-45	Arizona State Museum	Housing development clearance	3 acres	0	0	Urban 1881f
81-48	Arizona State Museum	Low income housing clearance	1/3 acre	0	0	Urban 1981g
81-50	Arizona State Museum	Development clearance	379 acres	0	0	Urban 1981h

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
81-53	Arizona State Museum	Clearinghouse	6 acres	No data	No data	Urban 1981I
81-68	Arizona State Museum	Development clearance	6 acres	0	0	George 1981
81-74	Arizona State Museum	Clearinghouse	0.5 acre	0	0	Urban 1981j
81-102	Arizona State Museum	Low income apartment construction clearance	6.33 acres	0	0	Urban 1981k
81-160	Arizona State Museum	Development clearance	31 acres	0	0	Urban 1981l
82-75	Arizona State Museum	Commercial	7 acres	0	0	Madsen 1982a
82-76	Arizona State Museum	Powerline	2 acres	0	0	Madsen 1982b
82-86	Arizona State Museum	Powerline	.30 acres	0	0	Madsen 1982c
82-140	Arizona State Museum	Housing development clearance	15 aces, but should be more like 215	0	0	Urban 1982
82-147	Arizona State Museum	ADOT mineral pit clearance	No data	0	0	Sullivan 1981
82-158	Arizona State Museum	Road widening clearance	9 miles by 250 ft	1	0	Elson 1982a, b
82-179	Arizona State Museum	University of Arizona property sale	70 acres	1	0	Madsen 1982d
82-207	Complete Archaeological Service Associates	Transmission line	80-miles by 100 ft	12	0	Hammack 1883
83-158	Arizona State Museum	Development clearance	160 acres	0	1	Bartlett 1983
83-31	Arizona State Museum	Development clearance	30 acres	0	0	Urban 1983a
83-4	Arizona State Museum	Development clearance	150 acres	1	0	Urban 1983b
83-49	Arizona State Museum	Public Recreation Facility	800 acres	3	2	Madsen 1983
83-68	Arizona State Museum	Low income housing development clearance	1.32 acres	0	0	Urban 1983c
83-77	Arizona State Museum	Housing development clearance	1/8 acre	0	0	Urban 1983d
83-78	Arizona State Museum	Housing development clearance	0.5 acre	0	0	Urban 1883e
83-80	Arizona State Museum	Housing development clearance	2.67 acre	0	0	Urban 1983f
83-99	Arizona State Museum	Material source and haul road	30 acres and .3 miles by 30 ft	0	0	Perrine 1983
84-5	New World Research	Housing development clearance	7.78 acres	1	0	Phillips 1984

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
84-11	Professional Archaeological Services and Technologies	Development clearance	390 acres	0	0	Stephen 1984a
84-19	Professional Archaeological Services and Technologies	Development	74 acres	0	0	Stephen 1984b
84-69	Arizona State Museum	Sewage disposal	.63 acres	1	0	Deaver 1984
84-108	Arizona State Museum	Preserve Rillito Race Track	88 acres	0	0	Hartmann 1984
84-149	Arizona State Museum	Airstrip use	150.42 acres	1	0	Skibo 1984
84-187	Arizona State Museum	Development clearance	3 acres	1	0	Castalia 1984
85-69	Arizona State Museum	School site	9.91 acres	0	0	Rozen 1985
85-76	New World Research	Land development clearance	0.7 acre	0	0	Weed 1985
85-150	Institute for American Research	Water line construction	30.9 miles	11	0	Dart 1985
85-226	New Mexico State University at Las Cruces, CRM	Pipeline clearance	240 miles by 200 ft	32	74	Batche 1985; Higgins 1985
85-228	Archaeological Consulting Services	Buried cable clearance	49.4 miles by 20 ft	4	No data	Effland 1985
86-24	Cultural and Environmental Systems	Pipeline clearance	3 miles by 400 ft	0	4	Heuett 1986
86-138	Cultural and Environmental Systems	Road and bridge	2 miles by 250 ft	0	0	Slawson 1986
86-145	Arizona State Museum	Elk's lodge	2 acres	0	0	Madsen 1986a
86-197	Arizona State Museum	Communication site	20 acres	0	0	Madsen 1986b
86-198	Arizona State Museum	Communication site	10 acres	0	0	Madsen 1986c
86-210	Professional Archaeological Services and Technologies	Road	6.1 miles by 200 ft	0	41	Stephen, Billings, and Craig 1986
86-220	Institute of American Research	Development clearance	8,000 acres	41	128	Craig and Wallace 1987
87-25	Arizona State Museum	Road	.2296 acres	0	0	Madsen 1987a
87-66	Professional Archaeological Services and Technologies	Development clearance	264 acres	1	5	Stephen 1887
87-102	Arizona State Museum	School site	48.22 acres	0	0	Madsen 1987d
87-121	Arizona State Museum	Construction	10 acres	0	0	Madsen 1987c
87-123	Institute of American Research	Research inventory	2,400 acres	29	No data	Elson and Doelle 1987

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
87-209	Institute of American Research.	Road Improvement	0.03 acres	0	0	Mayro 1987a
87-212	Institute for American Reseach/Desert Archaeology	Road improvement extension	1.23-miles by 200 ft	0	0	Bernard-Shaw 1987
87-216	Institute of American Research	Bank stabilization	3.3-miles by 400 ft	2	5	Mayro 1987b
87-217	Institute for American Reseach/Desert Archaeology	Construction clearance	1 acre	1	None	Mayro and Elson 1987
87-222	Dames and Moore	Fiber optic line	862 acres	22	0	O'Brien and Bruder, Gregory, Togge, and Hull 1987
87-237	Archaeological Research Services, Inc.	Road	12 miles by 800 ft	12	36	Stone and Bontrager 1987
87-265	Institute of American Research.	Proposed hotel land clearance	4.5 acres	0	0	Craig 1987
88-93	Cultural and Environmental Systems	Rezoning for development	400 acres	0	100-150	Slawson 1988
88-103	Arizona State Museum	Road widening clearance	3.5-miles by 300 ft	0	0	Goodfellow 1988
88-125	Arizona State Parks	Trade	240 acres	0	6	ASM Site Files Office
88-130	Pima County	Water/flood control	.68 acre	0	0	Mayro 1988
88-201	Cultural and Environmental Systems	Road clearance	1-mile by 50 ft	0	1	Maldonado 1988
89-2	Statistical Research, Inc.	River channelization clearance	No data	No data	No data	ASM Site Files Office
89-42	Archaeological Consulting Services	Utility clearance	16.5 miles by 10 ft	1	8	Rankin 1989
89-136	Cultural and Environmental Systems	Park	254 acres	0	2	Slawson 1989
89-160	Cultural and Environmental Systems	Powerline	11 miles by 30 ft	5	19	Heuett 1989
90-1	Statistical Research, Inc.	Road widening clearance	2.25-miles by 300 ft	0	0	Troncone 1990
90-162	Desert Archaeology, Inc.	Road clearance	6-miles by 20 ft	1	0	Demaagd 1991
91-66	Desert Archaeology, Inc.	Road widening clearance	26 acres	2	6	Dart 1991
91-88	Desert Archaeology, Inc.	Water main replacement	6,000 ft by 100 ft	0	0	Eppley 1991a

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
91-91	Desert Archaeology, Inc.	Road widening clearance	3, 280 ft by 100 ft	0	0	Eppley 1991b
91-169	Archaeological Research Services, Inc.	Road	8.6 miles by 200 ft	2	8	Hathaway 1991
91-176	Cultural and Environmental Systems	Reservoir	81 acres	0	0	Slawson 1991
91-177	Desert Archaeology, Inc.	Water main replacement	4,050 ft by 30 ft	0	0	Eppley 1991c
91-179	Desert Archaeology, Inc.	Water main replacement	3,200 ft by 30 ft	0	0	Eppley, 1991d
91-279	Desert Archaeology, Inc.	Bank stabilization	7,000 ft by 30 ft	1	0	Eppley 1991e
91-297	Professional Archaeological Services and Technologies	Grazing	320 acres	2	0	Stephen 1991
92-38	Cultural and Environmental Systems	Reservoir	16.8 acres	1	0	Maldonaldo 1992
92-62	Archaeological Consulting Services	Pipeline installatin	20-miles by 60 ft	0	13	Adams 1992
92-221	Desert Archaeology, Inc.	Fence	2.75 miles by 82.08 ft	0	15	Levi 1992
93-21	Iguana Archaeological Research	Purchase	40 acres	0	0	Scott 1993
93-42	Tierra Right of Way	Construction	2.8 acres	0	0	Roth, 1993
93-102	Archaeological Consulting Services	Utility clearance	24.6 acres	0	0	Potter 1993
93-142	Frank D. Ayeres	Development clearance	978 acres	4	257	Ayres 1993
93-282	Cultural and Environmental Systems	Road widening clearance	2-miles by 150 ft	0	2	Slawson 1993
94-30	Frank D. Ayeres	Road	4.2 miles by 40 ft	0	0	Ayres 1994
94-48	Desert Archaeology, Inc.	Replacement Water Main	1.5 miles by 40 ft	0	0	Eppley 1994
94-59	Tierra Right of Way	Development clearance	15.27 acres	0	3	Roth 1994
94-115	Cultural and Environmental Systems	Development clearance	80 acres	0	2	Slawson 1994
94-120	Cultural and Environmental Systems	Development clearance	11 acres	0	0	Sullivan 1994
94-279	Western Cultural Resource Management	Transmission line clearance	12.6-miles by 125 ft	19	36	Brown and Rohman1994
94-284	Tierra Right of Way	Development clearance	15 acres	0	0	Carpenter 1994
94-328	Frank D. Ayeres	Development clearance	375 acres	1	43	Ayers 1995

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
94-361	Archaeological Research Services, Inc.	Road maintenance	5 miles by 200 ft	2	3	Woodall 1994
94-498	No data	No data	No data	No data	No data	ASM Site Files Office
95-63	Desert Archaeology, Inc.	Water main improvements	1.2-miles by 8 ft	0	6	Freeman 1995
95-222	Professional Archaeological Services and Technologies	Development clearance	2.35 acres	0	3	Stephen 1995a
95-275	Tierra Right of Way	Development clearance	30 acres	0	1	Tompkins 1995
95-323	Desert Archaeology, Inc.	Paveing and drainage improvements	1-mile by 30 ft	0	0	Swartz 1996a
95-330	Desert Archaeology, Inc.	Park construction	30 acre	0	0	Swartz 1995b
95-363	Professional Archaeological Services and Technologies	Development clearance	1.4 acred	0	0	Stephen 1995b
95-383	Professional Archaeological Services and Technologies	Movie production	12.5 acres	0	0	Stephen 1995c
96-14	Desert Archaeology, Inc.	Development clearance	20 acres	1	7	Wallace 1996
96-40	Desert Archaeology, Inc.	Water main replacement	6,000 ft by 9 ft	0	0	Eppley 1996a
96-46	Desert Archaeology, Inc.	Commercial clearance	6.3 acres	0	No data	Swartz 1996a
96-71	Old Pueblo Archaeological Center	Construction clearance	6.88 acres	1	0	Lorentzen 1996
96-74	Tierra Right of Way	Residential development	0.57 acre	0	0	Lenhart 1996a
96-82	Desert Archaeology, Inc.	Water main replacement	1.6-miles by 12 ft	0	0	Sliva 1996
96-91	Archaeological Research Services, Inc.	Pavement preservation project	1.3-miles by 100-200 ft	1	0	Woodall 1996
96-102	Desert Archaeology, Inc.	Water main installation	1.9-miles by 20 ft	0	0	Swartz 1996b
96-109	Desert Archaeology, Inc.	Road enhancements	7-miles by 5 ft	0	0	Eppley 1996b
96-126	Old Pueblo Archaeological Center	Development clearance	9.47 acres	0	0	Lenhart 1996b
96-178	Professional Archaeological Services and Technologies	Development clearance	3,272 ft by 80 ft; 1,318 ft by 40 ft	0	0	Stephen 1996a
96-247	SWCA Environmental Consultants	Road clearance	12 acres	0	2	Myers 1965

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
96-281	Desert Archaeology, Inc.	Reclaimed water main replacement	36, 000 ft by 10 ft	0	0	Eppley 1996c
96-283	Desert Archaeology, Inc.	Installation of projective jetties	0.1-mile by 10 ft	0	0	Diehl 1998
96-325	Archaeological Research Services, Inc.	Road clearance	1.6 miles by 200-250 ft	1	0	Stone 1996
96-326	Archaeological Research Services, Inc.	Road clearance	1.6-miles by 200-250 ft	1	0	Stone 1996
96-395	Professional Archaeological Services and Technologies	Road	2359 ft by 15 ft	0	0	Stephen 1996b
96-396	P	Development clearance	1.49 acres	0	0	Stephen 1996c
96-400	Professional Archaeological Services and Technologies	Development clearance	18 acres	1	1	Stephen 1996d
97-10	Cultural and Environmental Systems	Development clearance	2.3 acres	0	0	Heuett 1997
97-12	Old Pueblo Archaeological Center	Development clearance	14.192 acres	0	0	Jones 1997a
97-26	Desert Archaeology, Inc.	Water main installation	832 ft by 10 ft	0	0	Eppley 1997a
97-35	Desert Archaeology, Inc.	Water main replacement	4 miles by 10 ft	0	0	Eppley 1997b
97-68	Doug Ayer	Roads	.75 miles by 110 ft	0	0	Ayers 1997
97-123	SWCA Environmental Consultants	Road improvements	2-miles by 120 ft	0	0	Yoder 1997
97-154	Archaeological Research Services, Inc.	Maintenance	8.07 miles by 200 ft	3	16	Lite 1997
97-200	Old Pueblo Archaeological Center	Development clearance	8.67 acres	0	0	Jones 1997b
97-203	No data	No data	No data	No data	No data	ASM Site Files Office
97-306	SWCA Environmental Consultants	Utility clearance	Monitoring Project	0	0	Slaughter 1997
97-311	Old Pueblo Archaeological Center	Development clearance	62.14 acres	2	8	Lorentzen 1997
97-377	Aztlan	Development clearance	17.4 acres	0	2	Sullivan 1997
97-437	Archaeological Research Services, Inc.	Road	3 miles by 200-400 ft	0	7	Barz 1998
97-503	Louis Berger	Construction	28 acres	0	10	Hohmann and Davis 1997
98-9	Old Pueblo Archaeological Center	Development clearance	7.99 acres	0	4	Jones 1998

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
98-60	Desert Archaeology, Inc.	Traffic signal improvement	less than 1 acre	0	0	Eppley 1998
98-67	Desert Archaeology, Inc.	Shoulder grading and road surfacing	2-miles by 15 ft	0	0	Vint 1998
98-88	Desert Archaeology, Inc.	Water main installation	7-miles by 30 ft	1	1	Silva 1998a
98-114	SWCA Environmental Consultants	Construction clearance	2.87 acres	0	0	Wellman 1998
98-148	Desert Archaeology, Inc.	Water main replacement	2.7-miles by 30 ft	0	0	Sliva 1998b
98-172	Arizona State Museum	Land sale	40 acres	0	9	Madsen 1998
98-200	Cultural and Environmental Systems	Development clearance	286.7 acres	0	6	Heuett 1998a
98-201	Cultural and Environmental Systems	Development clearance	64.28 acres	0	0	Heuett 1998b
98-207	Cultural and Environmental Systems	Roads	2.97 miles by 500 ft	0	1	Heuett 1998c
98-209	Cultural and Environmental Systems	Water reclamation utility right of way	.98 miles by 200 ft; .82 miles by 200 ft	0	0	Heuett 1998d
98-211	Cultural and Environmental Systems	Roads and easement	.49 by 500 ft	0	0	Heuett 1998e
98-265	Desert Archaeology, Inc.	Pipe rehabilitation	5.5 miles by 30 ft	0	0	Diehl 1998a
98-267	Desert Archaeology, Inc.	Road and sidewalk improvement	2.4-miles by 30 ft	0	0	Diehl 1998b
98-490	Professional Archaeological Services and Technologies	Residential Clearance	20 acres	1	20	Stephen 1998
98-528	Cultural and Environmental Systems	Development clearance	2,240 acres	4	34	Heuett 1998f
98-529	Archaeological Research Services, Inc.	Highway	26.6 miles by 100-400 ft right of way	11	77	Wright et. al. 1998
99-55	Desert Archaeology, Inc.	Street light installation	3-miles by 80 ft	0	0	Diehl 1999a
99-58	Statistical Research, Inc.	Pre-purchase assessment	12 acres	0	0	Folb and Ezzo 1999
99-78	Old Pueblo Archaeological Center	Development clearance	10.9 acres	0	0	Kaldahl 1999
99-99	Desert Archaeology, Inc.	Pipe rehabilitation	7.5 miles of 30 ft	0	0	Diehl 1999b

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
99-114	Old Pueblo Archaeological Center	Development clearance	1.36 acres	0	0	Dart and Kaldahl 1999
99-134	Logan Simpson Design	Road and facility expansion	59.7 acres	0	12	Schaafsma 1999
99-207	Old Pueblo Archaeological Center	Development clearance	14 acres	0	0	Lorentzen, 1999a
99-222	Desert Archaeology, Inc.	Road widening clearance	0.6-mile of 120 ft	0	0	Diehl and Wocherl 1999
99-257	Old Pueblo Archaeological Center	Day care center	2.5 acres	0	0	Lorentzen 1999b
99-261	Old Pueblo Archaeological Center	Development clearance	2.39 acres	0	0	Lorentzen 1999c
99-390	Professional Archaeological Services and Technologies	Land development clearance	0.64 acre	0	0	Stephen 1999a
99-407	Tierra Right of Way	High school	37.7 acres	1	3	Hayes 1999
99-423	Cultural and Environmental Systems	Development clearance	480 acres	3	7	Heuett 1999
99-444	Tierra Right of Way	Sewer	.25 miles by 200 ft	0	1	Hayes 1999
99-446	Tierra Right of Way	Rezoning	5 acres	0	1	Fratt 1999
99-453	Professional Archaeological Services and Technologies	Park development	173 acres	0	0	Stephen 1999b
99-594	Tierra Right of Way	High school	80 acres	2	26	Fratt 2002
00-3	Old Pueblo Archaeological Center	Road clearance	1.25-miles by 150 ft	0	0	Jones 2000a
00-5	Old Pueblo Archaeological Center	Development clearance	8.92 acres	0	0	Jones 2000b
00-7	Old Pueblo Archaeological Center	Development clearance	11.8 acres	0	0	Jones 2000c
00-9	Old Pueblo Archaeological Center	River Park improvements clearance	7.5 acres	0	0	Jones 2000d
00-60	Tierra Right of Way	Utility clearance	.12 miles by 10 ft	0	0	Hayes 2000a
00-98	Professional Archaeological Services and Technologies	Office construction clearance	10.5 acres	0	0	Stephen 2001
01-102	Old Pueblo Archaeological Center	Box culvert clearance	6.21 acres	0	0	McKee 2001
00-103	Old Pueblo Archaeological Center	Development clearance	10 acres	0	0	Jones 2000e
00-157	Desert Archaeology, Inc.	Light pole replacement	less than 0.5 acres	0	0	Diehl 2001a
00-162	Professional Archaeological Services and Technologies	Development clearance	11.18 acres	1	No data	Stephen 2000a

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
00-163	Professional Archaeological Services and Technologies	Development clearance	440 acre	2	3	Stephen 2000b
00-173	Lone Mountain Archaeological Services	Land development clearance	9.49 acres	0	0	Watson 2000
00-224	Old Pueblo Archaeological Center	Clearance	0.90 acre	0	0	Jones 2000f
00-284	Desert Archaeology, Inc.	Water main component replacement	5 miles of 30 ft	0	0	Diehl 2000
00-352	Lone Mountain Archaeological Services, Inc.	Road	1.7 miles by 180 ft	0	2	Knoblock 2000
00-358	Old Pueblo Archaeological Center	Development clearance	6 acres	0	0	Jones 2000g
00-604	Tierra Archaeological and Environmental Consulting	Development, residential housing	16.5 acres	0	2	Hayes 2000b
00-630	Old Pueblo Archaeological Center	Turbine construction	Excavation	N/A	N/A	Jones 2000h
00-640	Arizona State Parks	Trail	5.8 miles by 50 ft	0	0	Johnson 2001
00-700	Tierra Right of Way	Property development clearance	1.67 acres	0	0	Hayes and Klune 2001a
00-723	Western Cultural Resource Management	Fiber optic line	307.1-mile by 16.5-40 ft	8	15	Kearns, Lennon, Jones, and Mehls 2001
01-17	Old Pueblo Archaeological Center	Cell Tower	0.05 acre	0	0	Kaldahl 2001
01-38	Tierra Right of Way	Assessment state park	1.32 miles by 15 ft	0	1	Hayes 2001
01-93	Tierra Right of Way	Development clearance	No data	0	0	Hayes and Klune 2001b
01-154	No data	No data	2.5 acres	0	0	Kaldahl 2001
01-227	SWCA Environmental Consultants	Road widening and improvements clearance	2 miles by 150 ft	0	1	Tucker 2001
01-244	Desert Archaeology, Inc.	Traffic signal installation	0.5 acre	0	0	Diehl 2001b
01-250	Desert Archaeology, Inc.	Cable	.6 acres	0	1	Diehl 2001c
01-295	Old Pueblo Archaeological Center	Buried cable clearance	5,167 ft and 30 ft	0	0	Jones and Dart 2001a
01-388	Archaeological Research Services, Inc.	Cell Tower	0.12 acres	0	0	Goldstein 2001
01-396	Old Pueblo Archaeological Center	Development clearance	49.94 acres	0	1	Jones and Dart 2001b

Previous Archaeological Surveys within Project Area.

ASM Project Number	Institute Performing Survey	Reason for Performing Survey	Size	Sites Identified	IOs Identified	Reference
01-397	Old Pueblo Archaeological Center	Development clearance	2.55 acres	0	1	Jones and Dart 2001c
01-404	Desert Archaeology, Inc.	Property sale	1.67 acres	0	0	Brack 2001
01-700	SWCA Environmental Consultants	Road widening clearance	22.2 miles by 150 ft	0	2	Plummer 2001

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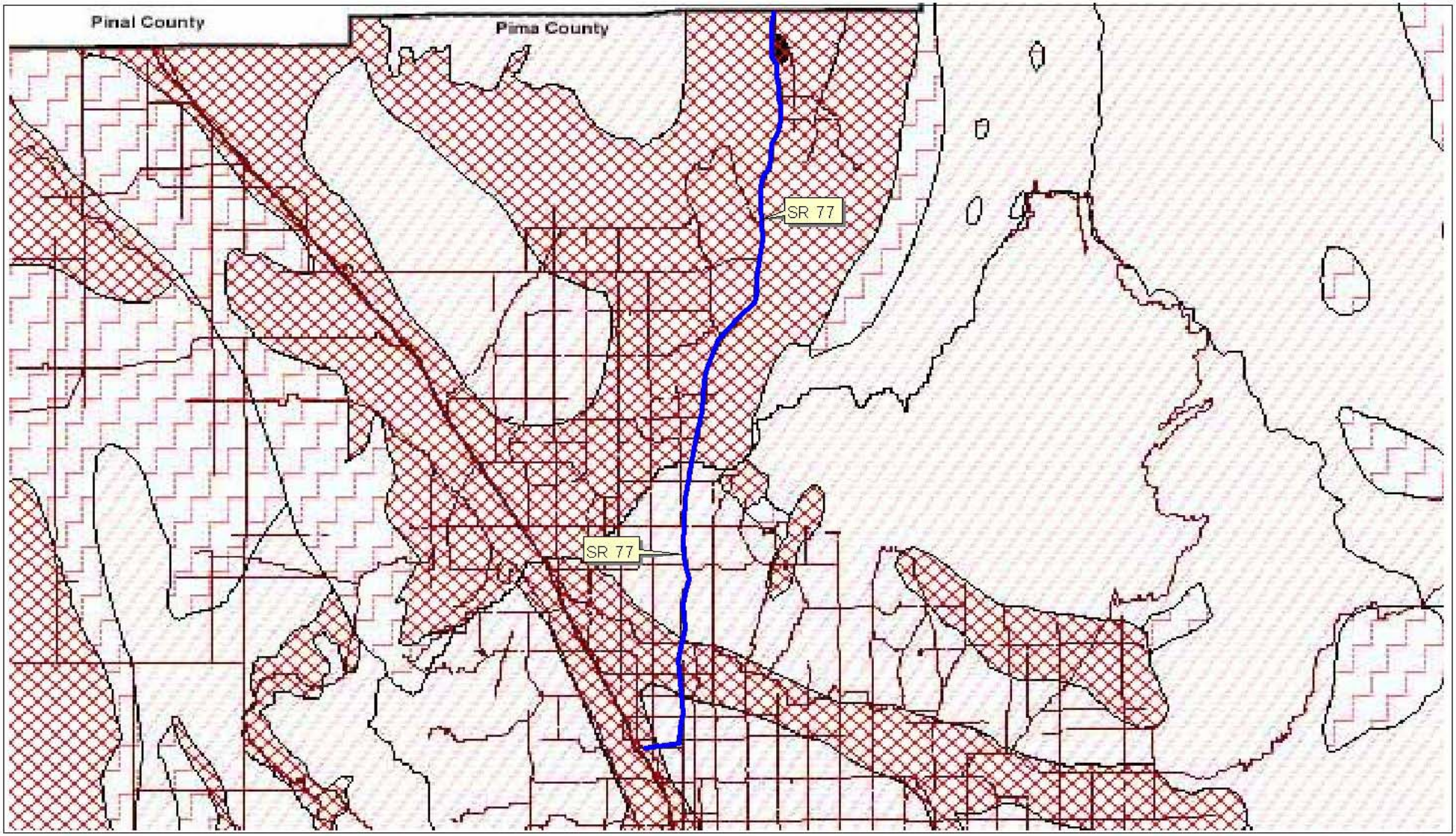
APPENDIX C

Map Showing Sensitivity Zones as Defined by the Sonoran Desert Conservation Plan



Archaeological Sensitivity

Low

Moderate

High

N

W E

S

State Route 77
Corridor Study

HARRIS ENVIRONMENTAL GROUP INC

Appendix E. Archaeological Sensitivity Areas as Defined in the Sonoran Desert Conservation Plan (Source: Sonoran Desert Conservation Plan; www.sdcponline.com).

APPENDIX D

Corridor Crash Characteristics

TOTAL CRASH CHARACTERISITCS

(December 1997 through November 2002)

Total Crashes	4,961
Fatal Crashes	17
Injuries Occurred	2,725
Pedestrians Involved	42
Bike Involved	65
Alcohol Related	249
Angle	501
Left-Turns	567
U-Turns	100
Head-On	11
Rear Ends	2,621
Sideswipes	484

SIGNALIZED INTERSECTION
NUMBER OF CRASHES BY YEAR

Mile Post	Signalized Intersections	Year					Totals	Crashes /Year	Rank
		1998	1999	2000	2001	2002			
88.850	Saddlebrooke Boulevard (East)	2	2	2	0	2	8	1.6	27
87.625	Pinto Lane (East)	0	0	0	2	1	3	0.6	28
85.740	Golder Ranch Road (East)	5	6	3	5	5	24	4.8	23
85.230	Wilds Road (East)	4	2	4	10	2	22	4.4	24
82.750	Rancho Vistoso Boulevard (West)	4	4	11	10	4	33	6.6	20
81.820	Tangerine Road (West)	1	7	7	4	7	26	5.2	22
80.155	HoneyWell Corp.	0	0	0	1	0	1	0.2	29
79.740	La Reserve Drive	2	1	6	1	5	15	3.0	26
79.480	First Avenue	12	17	14	24	17	84	16.8	11
79.125	Pusch View Lane (West)	3	12	9	15	18	57	11.4	14
78.500	El Conquistador Way	8	13	9	7	10	47	9.4	16
77.980	Linda Vista Boulevard	4	3	3	5	6	21	4.2	25
77.460	Calle Concordia	9	9	9	9	10	46	9.2	17
76.920	Hardy Road	11	14	10	8	13	56	11.2	15
75.890	Magee Road	22	17	17	24	24	104	20.8	7
74.850	Ina Road	49	43	30	47	56	225	45.0	2
73.860	Orange Grove Road	26	23	26	33	28	136	27.2	4
73.350	Rudasill Road	8	7	11	8	6	40	8.0	18
72.050	River Road	55	39	59	55	59	267	53.4	1
71.555	Auto Mall Drive (West)	22	17	23	23	18	103	20.6	9
71.300	Wetmore Road	20	25	26	24	39	134	26.8	5
71.050	Limberlost Drive	14	19	20	11	19	83	16.6	12
70.800	Roger Road	22	30	20	20	25	117	23.4	6
70.300	Prince Road	31	30	30	34	36	161	32.2	3
69.775	Fort Lowell Road	12	10	18	16	17	73	14.6	13
69.525	Oracle Road	28	14	19	16	17	94	18.8	10
69.035	Fairview Avenue	3	10	8	6	4	31	6.2	21
68.535	Flowing Wells Road	21	11	19	24	29	104	20.8	7
68.110	I-10 Freeway	5	10	7	10	8	40	8.0	18
	Totals	**403**	**395**	**420**	**452**	**485**	**2155**	**431.0**	

WEEKDAY TOTAL VOLUMES ENTERING SIGNALIZED INTERSECTIONS BY YEAR

Mile Post	Signalized Intersection	Vehicles per Day		
		1998	2000	2002
88.850	Saddlebrooke Boulevard (East)	NA	NA	NA
87.625	Pinto Lane (East)	NA	NA	NA
85.740	Golder Ranch Road (East)	22625	23850	24950
85.230	Wilds Road (East)	23200	25400	26197
82.750	Rancho Vistoso Boulevard (West)	28250	32700	34500
81.820	Tangerine Road (West)	37850	32600	34300
80.155	HoneyWell Corp.	35150	29450	30250
79.740	La Reserve Drive	35950	30250	31050
79.480	First Avenue	47250	49650	51500
79.125	Pusch View Lane (West)	46150	50050	51550
78.500	El Conquistador Way	46000	49900	51400
77.980	Linda Vista Boulevard	45600	48300	49800
77.460	Calle Concordia	47450	48950	50450
76.920	Hardy Road	50600	52500	53500
75.890	Magee Road	58200	66950	65950
74.850	Ina Road	90050	94500	96700
73.860	Orange Grove Road	76200	74000	72200
73.350	Rudasill Road	59150	67550	53200
72.050	River Road	84900	92550	86150
71.555	Auto Mall Drive (West)	66500	62700	63500
71.300	Wetmore Road	77000	70850	71900
71.050	Limberlost Drive	60050	55000	59600
70.800	Roger Road	66300	62900	65800
70.300	Prince Road	78900	77800	80000
69.775	Fort Lowell Road	63800	61700	66850
69.525	Miracle Mile/Oracle Road	71500	56650	59900
69.035	Fairview Avenue	55200	52800	48000
68.535	Flowing Wells Road	59800	45450	36900
68.110	I-10 Freeway	59700	56400	42500

N/A = Not Applicable

SIGNALIZED INTERSECTION
CRASH RATE BY YEAR
(Crashes per million vehicle entering)

Mile Post	Signalized Intersection	Year			3-yr Rate	Rank
		1998	2000	2002		
88.850	Saddlebrooke Boulevard (East)	N/A	N/A	N/A	N/A	28
87.625	Pinto Lane (East)	N/A	N/A	N/A	N/A	28
85.740	Golder Ranch Road (East)	0.65	0.37	0.59	0.53	19
85.230	Wilds Road (East)	0.50	0.46	0.22	0.39	22
82.750	Rancho Vistoso Boulevard (West)	0.41	0.98	0.34	0.58	16
81.820	Tangerine Road (West)	0.08	0.63	0.60	0.42	20
80.155	HoneyWell Corp.	0.00	0.00	0.00	0.00	27
79.740	La Reserve Drive	0.16	0.58	0.47	0.39	22
79.480	First Avenue	0.74	0.82	0.97	0.85	12
79.125	Pusch View Lane (West)	0.19	0.53	1.02	0.59	15
78.500	El Conquistador Way	0.51	0.53	0.57	0.54	18
77.980	Linda Vista Boulevard	0.26	0.18	0.35	0.26	26
77.460	Calle Concordia	0.55	0.54	0.58	0.56	17
76.920	Hardy Road	0.64	0.56	0.71	0.63	14
75.890	Magee Road	1.11	0.74	1.06	0.96	9
74.850	Ina Road	1.59	0.93	1.69	1.40	3
73.860	Orange Grove Road	1.00	1.03	1.13	1.05	6
73.350	Rudasill Road	0.40	0.48	0.33	0.41	21
72.050	River Road	1.89	1.86	2.00	1.92	1
71.555	Auto Mall Drive (West)	0.97	1.07	0.83	0.96	9
71.300	Wetmore Road	0.76	1.07	1.59	1.13	5
71.050	Limberlost Drive	0.68	1.06	0.93	0.89	11
70.800	Roger Road	0.97	0.93	1.11	1.00	7
70.300	Prince Road	1.15	1.13	1.32	1.20	4
69.775	Fort Lowell Road	0.55	0.85	0.74	0.71	13
69.525	Miracle Mile/Oracle	1.15	0.98	0.83	1.00	7
69.035	Fairview Avenue	0.16	0.44	0.24	0.28	25
68.535	Flowing Wells Road	1.03	1.22	2.30	1.42	2
68.110	I-10 Freeway	0.24	0.36	0.55	0.37	24

N/A = Not Applicable

SIGNALIZED INTERSECTION CRASH CHARACTERISTICS FOR FIVE YEARS

Mile Post	Signalized Intersections	Fatal Crashes	Injuries Occurred	Pedestrians Involved	Bikes Involved	Total Crashes	Alcohol Related	Angle	Left-Turns	U-Turns	Head On	Rear Ends	Sideswipes
88.850	Saddlebrooke Boulevard (East)	0	11	0	0	8	0	1	2	0	0	4	0
87.625	Pinto Lane (East)	0	5	0	0	3	0	0	1	0	0	2	0
85.740	Golder Ranch Road (East)	0	30	0	0	24	4	7	8	0	0	7	0
85.230	Wilds Road (East)	0	21	0	0	22	3	6	8	0	0	7	1
82.750	Rancho Vistoso Boulevard (West)	1	20	0	0	32	0	3	5	2	0	19	1
81.820	Tangerine Road (West)	0	13	0	1	26	3	4	2	0	0	15	0
80.155	HoneyWell Corp.	0	1	0	0	1	0	0	0	0	0	0	0
79.740	La Reserve Drive	0	0	0	0	15	1	1	1	0	0	9	3
79.480	First Avenue	0	35	0	0	84	1	9	4	1	0	62	2
79.125	Pusch View Lane (West)	1	35	0	0	57	2	1	4	0	0	50	1
78.500	El Conquistador Way	0	21	0	0	47	0	2	7	0	1	32	3
77.980	Linda Vista Boulevard	0	3	0	0	21	0	3	2	1	0	12	0
77.460	Calle Concordia	0	17	0	1	45	0	2	7	0	0	30	3
76.920	Hardy Road	0	31	0	0	56	3	9	11	0	0	30	3
75.890	Magee Road	0	76	1	0	104	6	8	27	0	0	58	3
74.850	Ina Road	1	116	3	1	225	14	14	30	7	0	146	12
73.860	Orange Grove Road	1	82	1	0	135	9	19	41	3	0	50	15
73.350	Rudasill Road	0	27	1	0	40	5	4	7	2	0	20	3
72.050	River Road	0	169	1	2	267	3	35	71	12	1	123	9
71.555	Auto Mall	0	61	0	2	103	3	11	32	2	0	49	3
71.300	Wetmore Road	0	88	1	1	134	6	10	46	0	0	58	9
71.050	Limberlost Drive	0	69	0	1	83	0	5	24	3	0	45	3
70.800	Roger Road	2	75	1	2	117	7	16	28	3	0	54	6
70.300	Prince Road	0	96	6	1	161	12	13	28	4	0	88	13
69.775	Fort Lowell Road (East)	0	47	0	1	73	6	6	12	0	0	40	5
69.525	Oracle	0	65	2	0	93	8	11	26	0	0	39	5
69.035	Fairview Avenue	1	36	0	0	31	2	11	9	0	0	8	2
68.535	Flowing Wells Road	0	67	3	2	104	6	8	32	4	0	33	16
68.110	I-10 Freeway	0	21	0	0	40	4	1	2	0	0	26	2
	Totals	**7**	**1338**	**20**	**15**	**2151**	**108**	**220**	**477**	**44**	**2**	**1116**	**123**

ROADWAY SEGMENT
NUMBER OF CRASHES BY YEAR

Beginning Mile Post	Roadway Segments	Year					Totals	Crashes /Year	Rank
		1998	1999	2000	2001	2002			
103.340	Northern terminus to Saddlebrooke Boulevard	44	48	27	22	24	165	33.0	7
88.850	Saddlebrooke Boulevard to Pinto Lane	7	5	4	1	7	24	4.8	26
87.625	Pinto Lane to Golder Ranch Road	18	16	12	10	13	69	13.8	15
85.740	Golder Ranch Road to Wilds Road	2	1	4	1	0	8	1.6	28
85.230	Wilds Road to Rancho Vistoso Boulevard	11	9	19	10	15	64	12.8	16
82.750	Rancho Vistoso Boulevard to Tangerine Road	4	6	3	14	7	34	6.8	23
81.820	Tangerine Road to HoneyWell Corp.	3	15	6	5	9	38	7.6	22
80.155	HoneyWell Corp. to La Reserve Drive	4	4	0	5	5	18	3.6	27
79.740	La Reserve Drive to First Avenue	1	1	0	1	2	5	1.0	29
79.480	First Avenue to Pusch View Lane	7	17	12	23	25	84	16.8	12
79.125	Pusch View Lane to El Conquistador Way	6	13	10	9	14	52	10.4	19
78.500	El Conquistador Way to Linda Vista Boulevard	5	0	4	11	11	31	6.2	25
77.980	Linda Vista Boulevard to Calle Concordia	2	12	14	11	8	47	9.4	21
77.460	Calle Concordia to Hardy Road	4	9	5	10	6	34	6.8	24
76.920	Hardy Road to Magee Road	40	40	28	34	40	182	36.4	5
75.890	Magee Road to Ina Road	55	79	49	42	34	259	51.8	2
74.850	Ina Road to Orange Grove Road	62	61	67	50	58	298	59.6	1
73.860	Orange Grove Road to Rudasill Road	48	43	35	31	38	195	39.0	4
73.350	Rudasill Road to River Road	40	48	65	44	41	238	47.6	3
72.050	River Road to Auto Mall Drive	21	36	27	29	27	140	28.0	8
71.555	Auto Mall Drive to Wetmore Road	17	16	25	15	11	84	16.8	13
71.300	Wetmore Road to Limberlost Drive	18	22	27	16	21	104	20.8	10
71.050	Limberlost Drive to Roger Road	21	26	25	21	19	112	22.4	9
70.800	Roger Road to Prince Road	28	35	36	31	46	176	35.2	6
70.300	Prince Road to Fort Lowell Road	24	19	20	24	17	104	20.8	11
69.775	Fort Lowell Road to Miracle Mile/Oracle Road	16	14	15	15	17	77	15.4	14
69.525	Miracle Mile/Oracle Road to Fairview Avenue	7	13	11	14	12	57	11.4	18
69.035	Fairview Avenue to Flowing Wells Road	7	9	15	9	18	58	11.6	17
68.535	Flowing Wells Road to I-10 Freeway	6	12	15	9	7	49	9.8	20
	Totals	**528**	**629**	**580**	**517**	**552**	**2806**	**561.2**	

WEEKDAY TOTAL VOLUMES
BY ROADWAY SEGMENT BY YEAR

Beginning Mile Post	Roadway Segment	Vehicles per Day		
		1998	2000	2002
103.340	Northern terminus to Saddlebrooke Boulevard	14000	11100	8300
88.850	Saddlebrooke Boulevard to Pinto Lane	14000	14000	21200
87.625	Pinto Lane to Golder Ranch Road	19200	19200	21200
85.740	Golder Ranch Road to Wilds Road	19200	19200	21200
85.230	Wilds Road to Rancho Vistoso Boulevard	26300	29100	28100
82.750	Rancho Vistoso Boulevard to Tangerine Road	26300	31500	32800
81.820	Tangerine Road to HoneyWell Corp.	33500	27800	28600
80.155	HoneyWell Corp. to La Reserve Drive	33500	27800	28600
79.740	La Reserve Drive to First Avenue	33500	27800	28600
79.480	First Avenue to Pusch View Lane	43400	47300	48800
79.125	Pusch View Lane to El Conquistador Way	43400	47300	48800
78.500	El Conquistador Way to Linda Vista Boulevard	43400	47300	48800
77.980	Linda Vista Boulevard to Calle Concordia	45800	47300	48800
77.460	Calle Concordia to Hardy Road	45800	47300	48800
76.920	Hardy Road to Magee Road	50600	51100	51600
75.890	Magee Road to Ina Road	46700	63500	59800
74.850	Ina Road to Orange Grove Road	57700	53800	51600
73.860	Orange Grove Road to Rudasill Road	57700	66000	51600
73.350	Rudasill Road to River Road	57700	66000	51500
72.050	River Road to Auto Mall Drive	57200	52900	52800
71.555	Auto Mall Drive to Wetmore Road	56800	52900	52800
71.300	Wetmore Road to Limberlost Drive	56300	51800	54900
71.050	Limberlost Drive to Roger Road	56300	51800	54900
70.800	Roger Road to Prince Road	53700	51800	54900
70.300	Prince Road to Fort Lowell Road	54600	46300	55100
69.775	Fort Lowell Road to Miracle Mile/Oracle Road	54600	47500	50600
69.525	Miracle Mile/Oracle to Fairview Avenue	47400	28200	28300
69.035	Fairview Avenue to Flowing Wells Road	47400	28200	38000
68.535	Flowing Wells Road to I-10 Freeway	47400	37600	21500

ROADWAY SEGMENT
CRASH RATE BY YEAR
(Crashes Per Million Vehicle Miles of Travel)

Beginning Mile Post	Roadway Segment	Segment Length (mi)	Year			3-Yr Rate	Rank
			1998	2000	2002		
103.340	Northern terminus to Saddlebrooke Boulevard	16.19	0.57	0.44	0.52	0.51	26
88.850	Saddlebrooke Boulevard to Pinto Lane	1.23	1.19	0.68	0.79	0.87	20
87.625	Pinto Lane to Golder Ranch Road	1.87	1.47	0.98	0.96	1.13	17
85.740	Golder Ranch Road to Wilds Road	0.51	0.60	1.19	0.00	0.58	24
85.230	Wilds Road to Rancho Vistoso Boulevard	2.50	0.49	0.76	0.62	0.63	23
82.750	Rancho Vistoso Boulevard to Tangerine Road	0.93	0.48	0.30	0.67	0.49	27
81.820	Tangerine Road to HoneyWell Corp.	1.67	0.16	0.38	0.55	0.35	29
80.155	HoneyWell Corp. to La Reserve Drive	0.42	0.84	0.00	1.23	0.71	22
79.740	La Reserve Drive to First Avenue	0.26	0.34	0.00	0.79	0.38	28
79.480	First Avenue to Pusch View Lane	0.36	1.33	2.09	4.22	2.60	9
79.125	Pusch View Lane to El Conquistador Way	0.63	0.65	0.99	1.34	1.01	18
78.500	El Conquistador Way to Linda Vista Boulevard	0.52	0.65	0.48	1.27	0.81	21
77.980	Linda Vista Boulevard to Calle Concordia	0.52	0.25	1.68	0.93	0.96	19
77.460	Calle Concordia to Hardy Road	0.56	0.46	0.56	0.65	0.56	25
76.920	Hardy Road to Magee Road	1.04	2.22	1.54	2.18	1.98	13
75.890	Magee Road to Ina Road	1.02	3.38	2.21	1.63	2.33	10
74.850	Ina Road to Orange Grove Road	1.01	3.11	3.61	3.25	3.32	7
73.860	Orange Grove Road to Rudasill Road	0.50	4.86	3.10	4.31	4.04	3
73.350	Rudasill Road to River Road	1.28	1.58	2.25	1.82	1.90	14
72.050	River Road to Auto Mall Drive	0.50	2.13	2.96	2.96	2.67	8
71.555	Auto Mall Drive to Wetmore Road	0.26	3.43	5.42	2.39	3.74	5
71.300	Wetmore Road to Limberlost Drive	0.26	3.60	5.86	4.30	4.55	2
71.050	Limberlost Drive to Roger Road	0.25	4.45	5.76	4.13	4.76	1
70.800	Roger Road to Prince Road	0.51	3.02	4.02	4.85	3.97	4
70.300	Prince Road to Fort Lowell Road	0.52	2.50	2.45	1.75	2.22	11
69.775	Fort Lowell Road to Miracle Mile/Oracle Road	0.25	3.43	3.69	3.93	3.68	6
69.525	Miracle Mile/Oracle Road to Fairview Avenue	0.49	0.88	2.33	2.53	1.72	16
69.035	Fairview Avenue to Flowing Wells Road	0.50	0.86	3.11	2.77	2.06	12
68.535	Flowing Wells Road to I-10 Freeway	0.43	0.87	2.74	2.24	1.81	15

ROADWAY SEGMENT CRASH CHARACTERISTICS FOR FIVE YEAR

Beginning Mile Post	Roadway Segment	Fatal Crashes	Injuries Occurred	Pedestrians Involved	Bikes Involved	Total Crashes	Alcohol Related	Angle	Left-Turns	U-Turns	Head On	Rear Ends	Sideswipes
103.340	Northern terminus to Saddlebrooke Boulevard	**2**	**114**	**0**	**1**	**165**	**12**	**12**	**3**	**4**	**3**	**30**	**10**
88.850	Saddlebrooke Boulevard to Pinto Lane	**0**	**11**	**0**	**1**	**24**	**1**	**0**	**0**	**0**	**0**	**7**	**2**
87.625	Pinto Lane to Golder Ranch Road	**1**	**43**	**2**	**1**	**69**	**6**	**22**	**3**	**0**	**0**	**24**	**7**
85.740	Golder Ranch Road to Wilds Road	**0**	**0**	**0**	**0**	**8**	**0**	**0**	**0**	**0**	**0**	**3**	**1**
85.230	Wilds Road to Rancho Vistoso Boulevard	**0**	**24**	**0**	**2**	**64**	**2**	**3**	**0**	**1**	**0**	**19**	**9**
82.750	Rancho Vistoso Boulevard to Tangerine Road	**0**	**11**	**0**	**1**	**34**	**1**	**0**	**0**	**0**	**0**	**18**	**1**
81.820	Tangerine Road to HoneyWell Corp.	**0**	**22**	**0**	**1**	**38**	**0**	**6**	**0**	**0**	**0**	**15**	**2**
80.155	HoneyWell Corp. to La Reserve Drive	**0**	**6**	**0**	**0**	**18**	**3**	**1**	**0**	**0**	**0**	**11**	**3**
79.740	La Reserve Drive to First Avenue	**0**	**4**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**5**	**0**
79.480	First Avenue to Pusch View Lane	**0**	**32**	**0**	**2**	**84**	**3**	**0**	**0**	**0**	**0**	**66**	**6**
79.125	Pusch View Lane to El Conquistador Way	**0**	**12**	**0**	**0**	**52**	**2**	**1**	**1**	**0**	**0**	**33**	**10**
78.500	El Conquistador Way to Linda Vista Boulevard	**0**	**14**	**0**	**0**	**31**	**1**	**0**	**1**	**0**	**0**	**19**	**5**
77.980	Linda Vista Boulevard to Calle Concordia	**0**	**16**	**0**	**1**	**47**	**6**	**0**	**0**	**0**	**0**	**37**	**2**
77.460	Calle Concordia to Hardy Road	**0**	**13**	**0**	**1**	**34**	**0**	**1**	**0**	**0**	**0**	**23**	**4**
76.920	Hardy Road to Magee Road	**0**	**81**	**1**	**6**	**182**	**3**	**22**	**6**	**4**	**0**	**84**	**31**
75.890	Magee Road to Ina Road	**0**	**136**	**2**	**3**	**258**	**14**	**37**	**26**	**7**	**2**	**121**	**33**
74.850	Ina Road to Orange Grove Road	**2**	**110**	**3**	**3**	**296**	**15**	**34**	**10**	**4**	**1**	**159**	**54**
73.860	Orange Grove Road to Rudasill Road	**0**	**73**	**3**	**1**	**194**	**9**	**24**	**10**	**5**	**0**	**107**	**30**
73.350	Rudasill Road to River Road	**4**	**134**	**2**	**3**	**236**	**18**	**25**	**3**	**10**	**0**	**130**	**26**
72.050	River Road to Auto Mall Drive	**0**	**67**	**0**	**4**	**140**	**0**	**5**	**3**	**4**	**0**	**96**	**22**
71.555	Auto Mall Drive to Wetmore Road	**0**	**38**	**0**	**1**	**84**	**5**	**13**	**6**	**1**	**0**	**51**	**8**
71.300	Wetmore Road to Limberlost Drive	**0**	**65**	**0**	**1**	**104**	**2**	**7**	**3**	**2**	**0**	**79**	**9**
71.050	Limberlost Drive to Roger Road	**0**	**69**	**0**	**3**	**111**	**2**	**11**	**2**	**2**	**0**	**68**	**21**
70.800	Roger Road to Prince Road	**0**	**108**	**2**	**4**	**176**	**7**	**28**	**3**	**3**	**2**	**108**	**16**
70.300	Prince Road to Fort Lowell Road	**0**	**64**	**1**	**4**	**104**	**5**	**7**	**2**	**2**	**1**	**55**	**24**
69.775	Fort Lowell Road to Miracle Mile/Oracle Road	**0**	**40**	**0**	**2**	**77**	**3**	**3**	**0**	**0**	**0**	**60**	**5**
69.525	Miracle Mile/Oracle to Fairview Avenue	**0**	**30**	**0**	**3**	**57**	**13**	**6**	**3**	**2**	**0**	**25**	**8**
69.035	Fairview Avenue to Flowing Wells Road	**0**	**23**	**2**	**1**	**58**	**3**	**7**	**2**	**1**	**0**	**29**	**7**
68.535	Flowing Wells Road to I-10 Freeway	**0**	**27**	**0**	**0**	**49**	**5**	**6**	**3**	**4**	**0**	**23**	**5**
	Totals	**9**	**1387**	**18**	**50**	**2799**	**141**	**281**	**90**	**56**	**9**	**1505**	**361**

ACCESS RELATED CRASH ANALYSIS
SOUTHBOUND

Segment	Begin MP	End MP	Segment Length (miles)	# of Driveways	Unsignalized Cross Streets	Total Access Points	Access Points Per Mile	Median Openings	# Side Wipe Crashes	# Rear End Crashes	# Head on Crashes	# U-Turns Crashes	# Left Turn Crashes	Angle Crashes	# Related Crashes	Total Crashes
End Segment to Saddlebrooke Boulevard	103.34	88.85	14.49	13	3	16	1.10		5	15	0	2	1	5	28	80
Saddlebrooke Boulevard to Pinto Lane	88.85	87.625	1.22	3	0	3	2.45		0	2	0	0	0	0	2	12
Pinto Lane to Golder Ranch Road	87.625	85.76	1.86	19	1	20	10.72		5	16	0	0	2	17	40	45
Golder Ranch Road to Wilds Road	85.76	85.25	0.51		1	1	1.96			2	0	0	0	0	2	2
Wilds Road to Rancho Vistoso	85.25	82.75	2.50	6	1	7	2.80	1	4	10	0	0	0	2	16	31
Rancho Vistoso to Tangerine Road	82.75	81.82	0.93	1	0	1	1.08	1	1	6	0	0	0	0	7	15
Tangerine Road to HoneyWell Corp.	81.82	80.155	1.66	2	0	2	1.20		1	7	0	0	0	5	13	18
HoneyWell Corp. to La Reserve	80.155	79.74	0.42	2	0	2	4.82		1	6	0	0	0	1	8	11
La Reserve to First Avenue	79.74	79.48	0.26	2	0	2	7.69		0	2	0	0	0	0	2	2
First Avenue to Pusch View Lane	79.48	79.125	0.36	2	0	2	5.63		2	27	0	0	0	0	29	34
Pusch View Lane to El Conquistador Way	79.125	78.5	0.63	2	1	3	4.80		4	15	0	0	1	0	20	21
El Conquistador Way to Linda Vista Boulevard	78.5	77.98	0.52	1	1	2	3.85		3	6	0	0	0	0	9	12
Linda Vista Boulevard to Calle Concordia	77.98	77.465	0.52	1	0	1	1.94		0	26	0	0	0	0	26	30
Calle Concordia to Hardy Road	77.465	76.91	0.56	3	2	5	9.01		0	18	0	0	0	0	18	21
Hardy Road to Magee Road	76.91	75.87	1.04	4	4	8	7.69		18	45	0	1	3	15	82	101
Magee Road to Ina Road	75.87	74.85	1.02	12	0	12	11.76		16	66	1	5	14	17	118	131
Ina Road to Orange Grove Road	74.85	73.84	1.01	14	5	19	18.81		24	83	1	4	2	17	130	157
Orange Grove Road to Rudasill Road	73.84	73.34	0.50	8	3	11	22.00		18	64	0	2	4	8	96	106
Rudasill Road to River Road	73.34	72.06	1.28	26	4	30	23.44		16	94	0	6	1	11	128	147
River Road to Auto Mall Drive	72.06	71.555	0.50	11	1	12	23.76	2	16	75	0	3	2	3	99	105
Auto Mall Drive to Wetmore Road	71.555	71.3	0.26	7	0	7	27.45		8	32	0	1	2	8	51	55
Wetmore Road to Limberlost Drive	71.3	71.04	0.26	10	0	10	38.46		5	32	0	2	2	3	44	44
Limberlost Drive to Roger Road	71.04	70.795	0.25	7	0	7	28.57		13	33	0	1	0	3	50	51
Roger Road to Prince Road	70.795	70.29	0.50	22	3	25	49.50		9	62	0	2	1	17	91	104
Prince Road to Fort Lowell Road	70.29	69.775	0.52	5	0	5	9.71		12	15	0	1	1	4	33	41
Fort Lowell Road to Miracle Mile/Oracle Road	69.775	69.525	0.25	1	1	2	8.00		2	27	0	0	0	1	30	37
Miracle Mile/Oracle to Fairview Avenue	69.525	69.035	0.49	4	0	4	8.16		4	10	0	1	2	2	19	25
Fairview Avenue to Flowing Wells Road	69.035	68.535	0.50	15	1	16	32.00		3	15	0	0	1	5	24	31
Flowing Wells Road to I-10	68.535	68.11	0.42	4	2	6	14.12		1	17	0	2	3	6	29	35

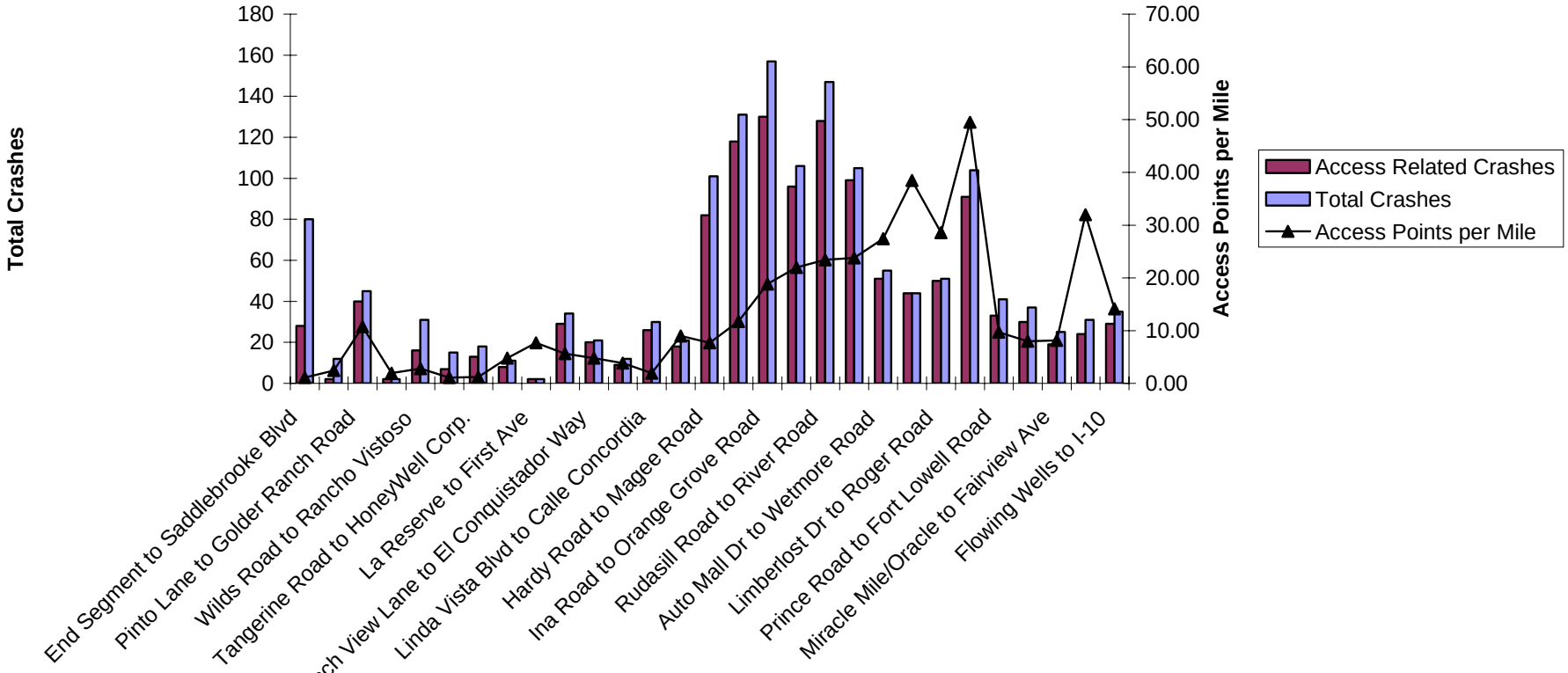
*Median openings that were associated with a driveway, cross street (signalized) or cross street (unsignalized) were not included.

ACCESS RELATED CRASH ANALYSIS
NORTHBOUND

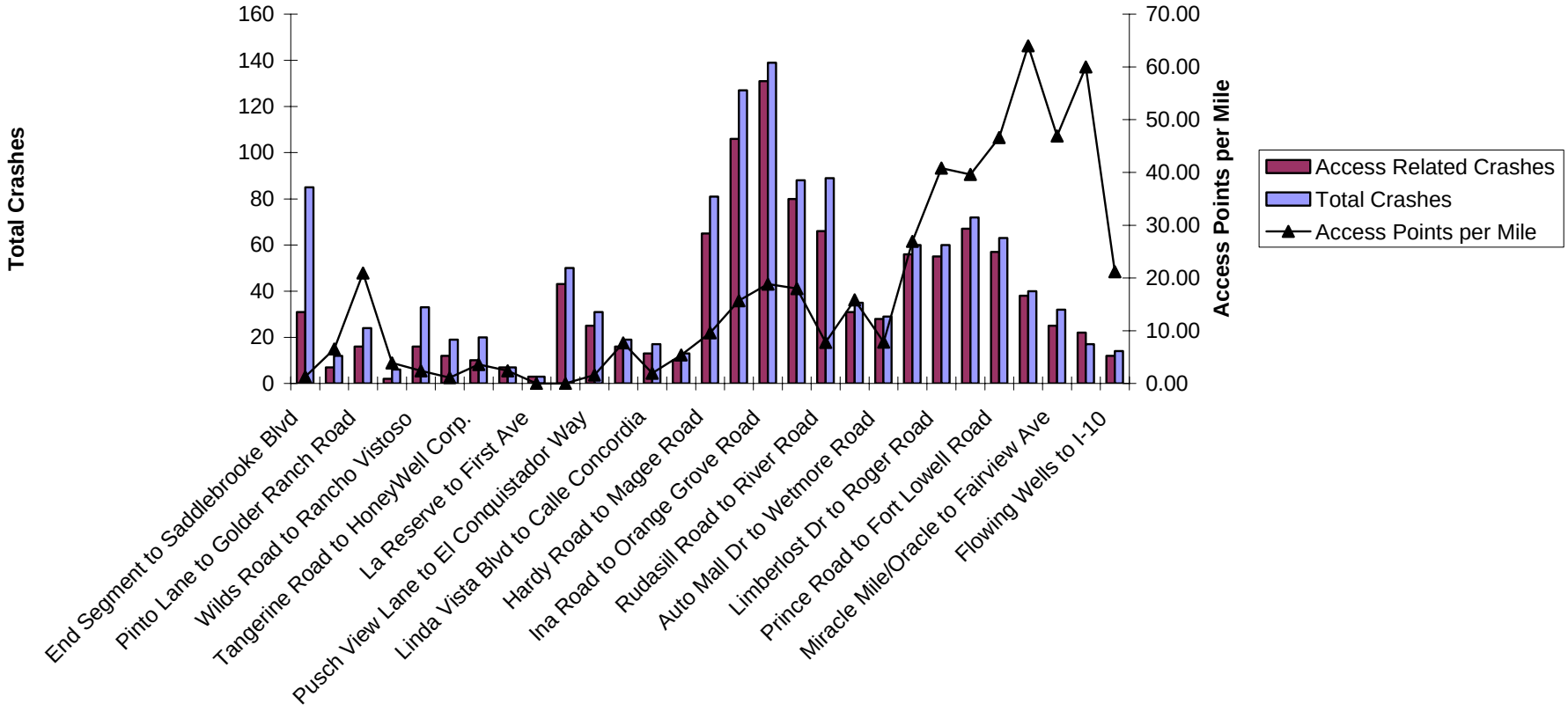
Segment	Begin MP	End MP	Segment Length (miles)	# of Driveways	Unsignalized Cross Streets	Total Access Points	Access Points Per Mile	Median Openings	# Side Wipe Crashes	# Rear End Crashes	# Head on Crashes	# U-Turns Crashes	# Left Turn Crashes	Angle Crashes	Access Related Crashes	Total Crashes
End Segment to Saddlebrooeke Boulevard	103.34	88.85	14.49	13	3	16	1.10		5	15	0	2	1	5	28	80
Saddlebrooke Boulevard to Pinto Lane	88.85	87.625	1.22	3	0	3	2.45		0	2	0	0	0	0	2	12
Pinto Lane to Golder Ranch Road	87.625	85.76	1.86	19	1	20	10.72		5	16	0	0	2	17	40	45
Golder Ranch Road to Wilds Road	85.76	85.25	0.51		1	1	1.96			2	0	0	0	0	2	2
Wilds Road to Rancho Vistoso	85.25	82.75	2.50	6	1	7	2.80	1	4	10	0	0	0	2	16	31
Rancho Vistoso to Tangerine Road	82.75	81.82	0.93	1	0	1	1.08	1	1	6	0	0	0	0	7	15
Tangerine Road to HoneyWell Corp.	81.82	80.155	1.66	2	0	2	1.20		1	7	0	0	0	5	13	18
HoneyWell Corp. to La Reserve	80.155	79.74	0.42	2	0	2	4.82		1	6	0	0	0	1	8	11
La Reserve to First Avenue	79.74	79.48	0.26	2	0	2	7.69		0	2	0	0	0	0	2	2
First Avenue to Pusch View Lane	79.48	79.125	0.36	2	0	2	5.63		2	27	0	0	0	0	29	34
Pusch View Lane to El Conquistador Way	79.125	78.5	0.63	2	1	3	4.80		4	15	0	0	1	0	20	21
El Conquistador Way to Linda Vista Boulevard	78.5	77.98	0.52	1	1	2	3.85		3	6	0	0	0	0	9	12
Linda Vista Blvd to Calle Concordia	77.98	77.465	0.52	1	0	1	1.94		0	26	0	0	0	0	26	30
Calle Concordia to Hardy Road	77.465	76.91	0.56	3	2	5	9.01		0	18	0	0	0	0	18	21
Hardy Road to Magee Road	76.91	75.87	1.04	4	4	8	7.69		18	45	0	1	3	15	82	101
Magee Road to Ina Road	75.87	74.85	1.02	12	0	12	11.76		16	66	1	5	14	17	118	131
Ina Road to Orange Grove Road	74.85	73.84	1.01	14	5	19	18.81		24	83	1	4	2	17	130	157
Orange Grove Road to Rudasill Road	73.84	73.34	0.50	8	3	11	22.00		18	64	0	2	4	8	96	106
Rudasill Road to River Road	73.34	72.06	1.28	26	4	30	23.44		16	94	0	6	1	11	128	147
River Road to Auto Mall Drive	72.06	71.555	0.50	11	1	12	23.76	2	16	75	0	3	2	3	99	105
Auto Mall Drive to Wetmore Road	71.555	71.3	0.26	7	0	7	27.45		8	32	0	1	2	8	51	55
Wetmore Road to Limberlost Drive	71.3	71.04	0.26	10	0	10	38.46		5	32	0	2	2	3	44	44
Limberlost Drive to Roger Road	71.04	70.795	0.25	7	0	7	28.57		13	33	0	1	0	3	50	51
Roger Road to Prince Road	70.795	70.29	0.50	22	3	25	49.50		9	62	0	2	1	17	91	104
Prince Road to Fort Lowell Road	70.29	69.775	0.52	5	0	5	9.71		12	15	0	1	1	4	33	41
Fort Lowell Road to Miracle Mile/Oracle Road	69.775	69.525	0.25	1	1	2	8.00		2	27	0	0	0	1	30	37
Miracle Mile/Oracle Road to Fairview Ave	69.525	69.035	0.49	4	0	4	8.16		4	10	0	1	2	2	19	25
Fairview Avenue to Flowing Wells Road	69.035	68.535	0.50	15	1	16	32.00		3	15	0	0	1	5	24	31
Flowing Wells Road to I-10	68.535	68.11	0.42	4	2	6	14.12		1	17	0	2	3	6	29	35

*Median openings that were associated with a driveway, cross street (signalized) or cross street (unsignalized) were not included.

SR 77 Access Related Crash Analysis-Southbound
Five Year History



SR 77 Access Related Crash Analysis-Northbound
Five Year History

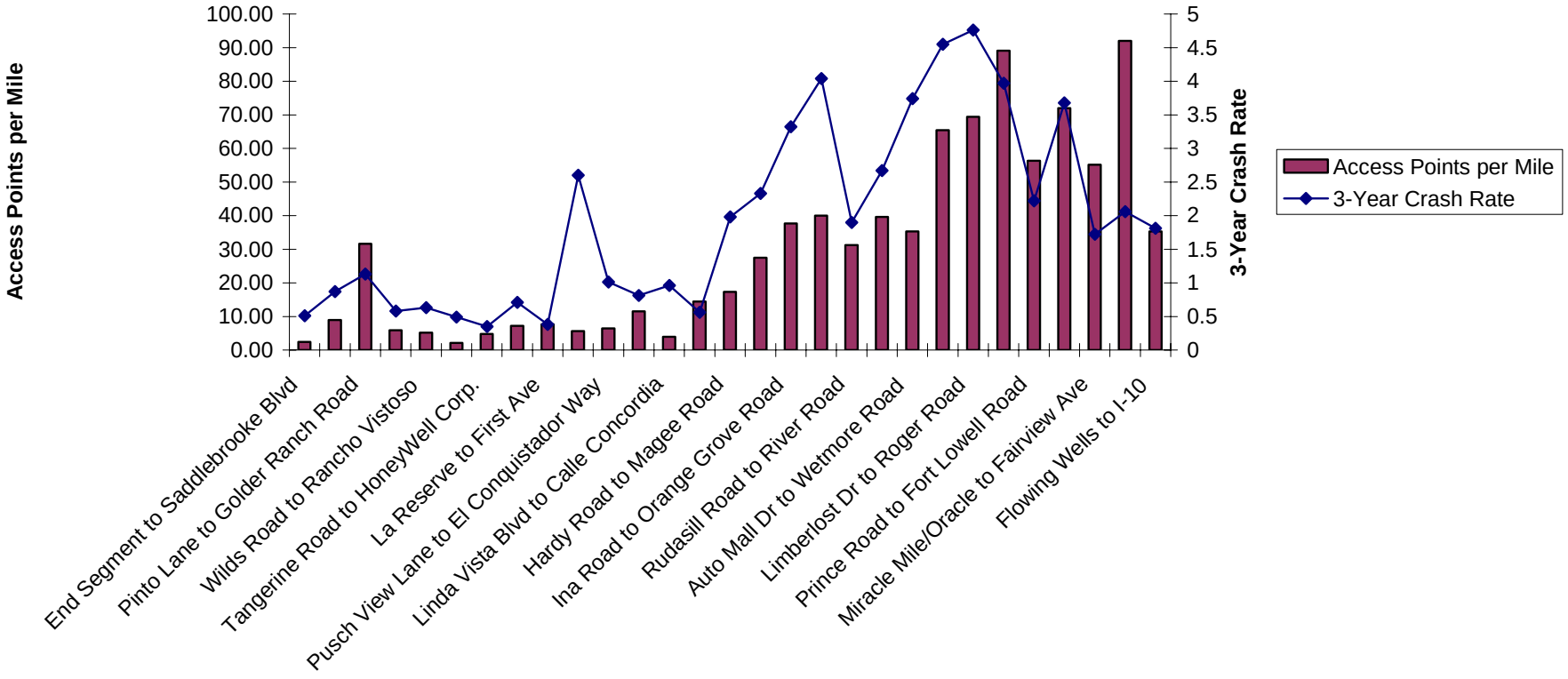


ACCESS RELATED CRASH ANALYSIS
THREE-YEAR HISTORY FOR BOTH DIRECTIONS OF TRAVEL

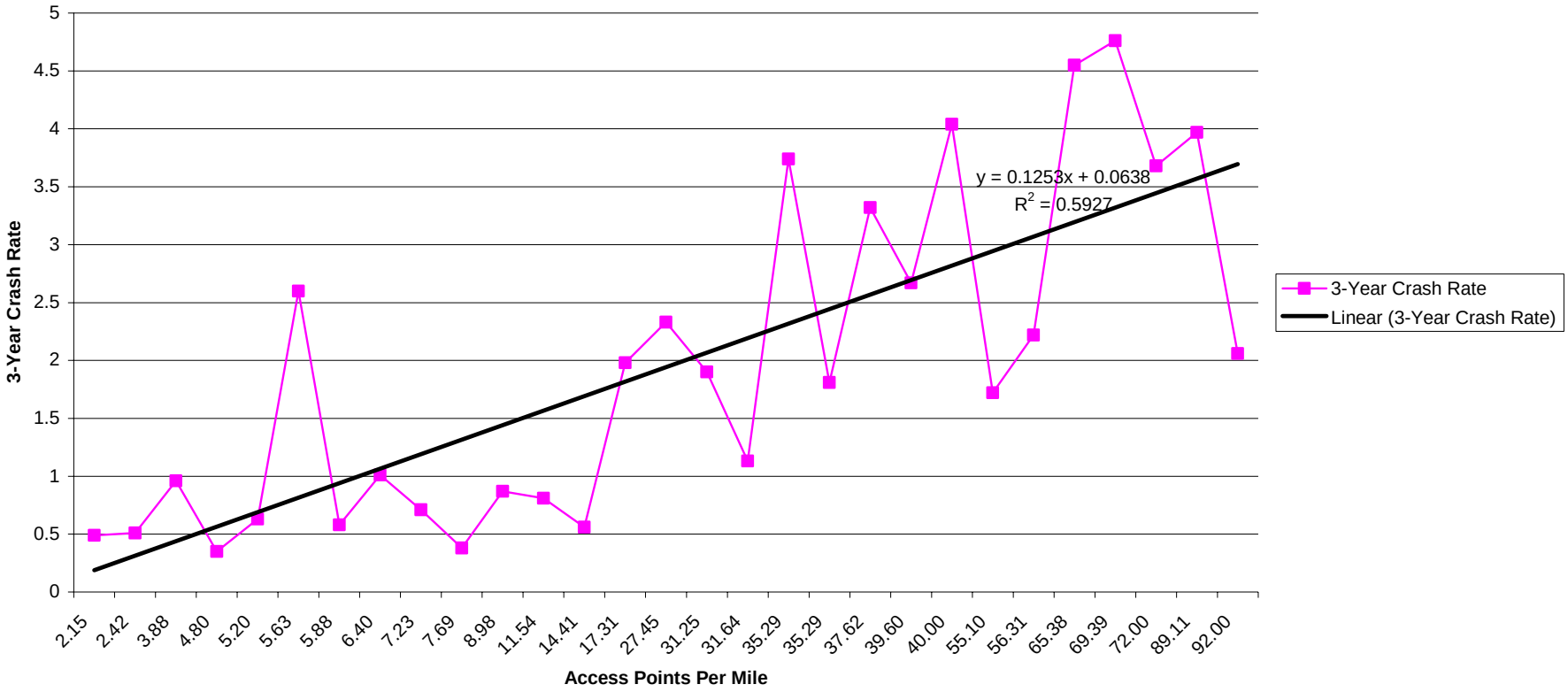
Segment	Begin MP	End MP	Segment Length (miles)	# of Driveways	Unsignalized Cross Streets	Total Access Points	Access Points Per Mile	Median Openings	3-year Crash Rate
End Segment to Saddlebrooke Boulevard	103.34	88.85	14.49	27	8	35	2.42		0.51
Saddlebrooke Boulevard to Pinto Lane	88.85	87.625	1.22	10	1	11	8.98		0.87
Pinto Lane to Golder Ranch Road	87.625	85.76	1.86	48	11	59	31.64		1.13
Golder Ranch Road to Wilds Road	85.76	85.25	0.51	2	1	3	5.88		0.58
Wilds Road to Rancho Vistoso	85.25	82.75	2.50	11	2	13	5.20	1	0.63
Rancho Vistoso to Tangerine Road	82.75	81.82	0.93	2	0	2	2.15	1	0.49
Tangerine Road to HoneyWell Corp.	81.82	80.155	1.66	6	2	8	4.80		0.35
HoneyWell Corp. to La Reserve	80.155	79.74	0.42	2	1	3	7.23		0.71
La Reserve to First Avenue	79.74	79.48	0.26	2	0	2	7.69		0.38
First Avenue to Pusch View Lane	79.48	79.125	0.36	2	0	2	5.63		2.6
Pusch View Lane to El Conquistador Way	79.125	78.5	0.63	3	1	4	6.40		1.01
El Conquistador Way to Linda Vista Boulevard	78.5	77.98	0.52	5	1	6	11.54		0.81
Linda Vista Boulevard to Calle Concordia	77.98	77.465	0.52	2	0	2	3.88		0.96
Calle Concordia to Hardy Road	77.465	76.91	0.56	6	2	8	14.41		0.56
Hardy Road to Magee Road	76.91	75.87	1.04	10	8	18	17.31		1.98
Magee Road to Ina Road	75.87	74.85	1.02	26	2	28	27.45		2.33
Ina Road to Orange Grove Road	74.85	73.84	1.01	30	8	38	37.62		3.32
Orange Grove Road to Rudasill Road	73.84	73.34	0.50	17	3	20	40.00		4.04
Rudasill Road to River Road	73.34	72.06	1.28	34	6	40	31.25		1.9
River Road to Auto Mall Drive	72.06	71.555	0.50	19	1	20	39.60	2	2.67
Auto Mall Drive to Wetmore Road	71.555	71.3	0.26	9	0	9	35.29		3.74
Wetmore Road to Limberlost Drive	71.3	71.04	0.26	17	0	17	65.38		4.55
Limberlost Drive to Roger Road	71.04	70.795	0.25	17	0	17	69.39		4.76
Roger Road to Prince Road	70.795	70.29	0.50	40	5	45	89.11		3.97
Prince Road to Fort Lowell Road	70.29	69.775	0.52	26	3	29	56.31		2.22
Fort Lowell Road to Miracle Mile/Oracle Road	69.775	69.525	0.25	15	3	18	72.00		3.68
Miracle Mile/Oracle Road to Fairview Avenue	69.525	69.035	0.49	23	4	27	55.10		1.72
Fairview Avenue to Flowing Wells Road	69.035	68.535	0.50	44	2	46	92.00		2.06
Flowing Wells Road to I-10	68.535	68.11	0.42	13	2	15	35.29		1.81

*Median openings that were associated with a driveway, cross street (signalized), or cross street (unsignalized) were not included.

SR 77 Multimodal Corridor Profile Study
Crash Rate vs. Access Points
Three-Year History in Two Directions



SR 77 Multimodal Corridor Profile Study
Crash Rate vs. Access Points-Regression
Three-year History for Two Directions



APPENDIX E

Roadway Lighting Analysis

NIGHT/DAY CRASH AND ROADWAY LIGHTING ANALYSIS

SR 77 Segment	Three-Year Crash Rate		Crash Rate Ratio Night/Day	Ranking Score	Ranking
	Night	Day			
Northern terminus to Saddlebrooke Boulevard	0.95	0.43	2.21	63.7	7*
Saddlebrooke Boulevard to Pinto Lane	1.57	0.68	2.31	64.1	6
Pinto Lane to Golder Ranch Road	1.69	1.00	1.69	72.7	2
Golder Ranch Road to Wilds Road	0.55	0.22	2.52	72.4	3
Wilds Road to Rancho Vistoso Boulevard	1.34	.053	2.52	72.1	4
Rancho Vistoso Boulevard to Tangerine Road	1.08	0.31	3.53	63.7	7*
Tangerine Road to Hanley Boulevard	0.63	0.27	2.34	73.2	1
Hanley Boulevard to La Reserve Drive	1.02	0.69	1.47	50.3	10
La Reserve Drive to First Avenue	0.00	0.47	0.00	34.3	19
First Avenue to Pusch View Lane	3.56	2.13	1.67	64.4	5
Pusch View Lane to El Conquistador Way	0.61	1.12	0.54	43.0	15
El Conquistador Way to Linda Vista Boulevard	0.97	0.78	1.25	49.6	11**
Linda Vista Boulevard to Calle Concordia	0.97	0.93	1.04	49.2	13
Calle Concordia to Hardy Road	0.00	0.62	0.00	34.8	18
Hardy Road to Magee Road	2.05	1.95	1.05	49.6	11**
Magee Road to Ina Road	2.38	2.29	1.04	47.2	14
Ina Road to Orange Grove Road	2.85	3.51	0.82	43.2	16
Orange Grove Road to Rudasill Road	4.43	4.08	1.08	40.0	17
Rudasill Road to River Road	2.86	1.76	1.62	60.0	9
River Road to Auto Mall Drive	0.39	3.37	0.12	N/A	N/A
Auto Mall Drive to Wetmore Road	3.92	3.30	1.19	N/A	N/A
Wetmore Road to Limberlost Drive	4.28	4.93	0.87	N/A	N/A
Limberlost Drive to Roger Road	2.45	5.62	0.44	N/A	N/A
Roger Road to Prince Road	1.90	4.48	0.42	N/A	N/A
Prince Road to Fort Lowell Road	1.64	2.45	0.67	N/A	N/A
Fort Lowell Road to Miracle Mile/Oracle Road	3.08	3.60	0.86	N/A	N/A
Miracle Mile/Oracle Road to Fairview Avenue	2.01	1.67	1.20	N/A	N/A
Fairview Avenue to Flowing Wells Road	1.48	2.42	0.61	N/A	N/A
Flowing Wells Road to I-10 Freeway	1.12	1.97	0.57	N/A	N/A

Note: Crash rates based on vehicle miles traveled assuming 250 typical weekday volumes per year, and 115 weekend and holiday volumes assuming 80 percent of the weekday volume.

N/A = Not applicable, segments have roadway lighting.

*Score is the same, both segments ranked 7th.

** Score is the same, both segments ranked 11th.