



# North Havasu Area Transportation Study Final Report



March 2010

# TABLE OF CONTENTS

	<u>Page</u>
<b>1. INTRODUCTION AND EXECUTIVE SUMMARY .....</b>	<b>1</b>
PURPOSE.....	1
PUBLIC INVOLVEMENT AND STAKEHOLDER COORDINATION .....	1
ORGANIZATION OF FINAL REPORT .....	3
EXECUTIVE SUMMARY .....	3
<b>2. CURRENT CONDITIONS .....</b>	<b>10</b>
REVIEW OF PREVIOUS STUDIES AND PLANS .....	10
SOCIOECONOMIC CONDITIONS.....	20
PHYSICAL, NATURAL, AND CULTURAL ENVIRONMENTS AND LAND USE .....	25
TRANSPORTATION CONDITIONS AND ISSUES.....	39
MULTIMODAL CONDITIONS .....	52
<b>3. FUTURE NORTH HAVASU AREA CHARACTERISTICS .....</b>	<b>56</b>
ESTABLISHMENT OF TRAFFIC ANALYSIS ZONES (TAZ) .....	56
INFLUENCES ON FUTURE GROWTH .....	57
FUTURE SOCIOECONOMIC CONDITIONS .....	59
FUTURE ROADWAY NETWORK.....	70
FUTURE TRAFFIC CONDITIONS .....	79
<b>4. PLAN FOR IMPROVEMENTS.....</b>	<b>89</b>
EVALUATION MEASURES FOR TRANSPORTATION OPTIONS .....	89
ROADWAY NETWORK AND OTHER MODE ALTERNATIVES.....	95
SHORT-, MID-, AND LONG-RANGE PLAN.....	109
ENVIRONMENTAL JUSTICE CONSIDERATIONS .....	114

**TABLE OF CONTENTS**

	<u>Page</u>
<b>5. IMPLEMENTATION PLAN.....</b>	<b>116</b>
ROADWAY CROSS-SECTIONS .....	116
ACCESS MANAGEMENT .....	119
ACTION PLAN .....	123
COSTS .....	124
FUNDING SOURCES .....	125
REVENUE ESTIMATES .....	130
<b>PUBLIC INVOLVEMENT SUMMARY REPORT .....</b>	<b>(Under separate cover)</b>
<b>APPENDIX A. 2015, 2020, AND 2030 POPULATION, HOUSEHOLDS, AND     EMPLOYMENT DETAILS.....</b>	<b>131</b>
<b>APPENDIX B. POTENTIAL ROADWAYS IN THE NHA</b>	
<b>REFERENCES .....</b>	<b>139</b>

## LIST OF TABLES

	<u>Page</u>
2.1. SUMMARY OF STUDIES AND PLANS .....	10
2.2. WESTERN ARIZONA TRI-CITY AREA, REGIONAL FRAMEWORK STUDY: LAKE HAVASU AREA SCENARIOS, 2050 .....	14
2.3. POPULATION CHANGE 2000 TO 2008, ARIZONA, MOHAVE COUNTY, AND THE TRI-CITY AREA .....	21
2.4. POPULATION AND DWELLING UNITS, CENSUS 2000 .....	21
2.5. SUMMARY OF ENVIRONMENTAL JUSTICE POPULATIONS .....	23
2.6. SR 95 ANNUALIZED AVERAGE DAILY TRAFFIC .....	42
2.7. LEVEL OF SERVICE THRESHOLDS AND DESCRIPTIONS .....	43
2.8. SUMMARY OF TRAFFIC CRASHES IN NORTH HAVASU AREA.....	45
2.9. ROADWAY SEGMENTS ON SR 95 CORRIDOR .....	47
2.10. ACCESS POINTS LOCATED WITHIN LAKE HAVASU CITY LIMITS.....	48
2.11. NORTH HAVASU AREA TRANSPORTATION NEEDS AND DEFICIENCIES: STAKEHOLDER COMMENTS.....	49
3.1. LAKE HAVASU AREA FUTURE POPULATION AND HOUSEHOLDS .....	60
3.2. NORTH HAVASU AREA FUTURE POPULATION AND HOUSEHOLDS.....	61
3.3. NORTH HAVASU AREA FUTURE TOTAL EMPLOYMENT .....	67
3.4. NORTH HAVASU AREA 2030 EMPLOYMENT BY CATEGORY.....	67
3.5. SUMMARY OF RECOMMENDED PROJECTS IN THE 2005 SATS OR CIP.....	71
3.6. HIGHEST DAILY TRAFFIC VOLUMES 2020.....	80
3.7. HIGHEST DAILY TRAFFIC VOLUMES 2030.....	84
3.8. DAILY TRAFFIC VOLUMES COMPARED FOR 2030, KEY LOCATIONS .....	85
4.1. PERFORMANCE MEASURES .....	90
4.2. FEASIBILITY MEASURES.....	91

## LIST OF TABLES (Continued)

	<u>Page</u>
4.3. PLANNING PHASES DEFINITIONS, CONTRASTS .....	96
4.4. HIGHEST MID-RANGE ALTERNATIVE DAILY TRAFFIC VOLUMES .....	102
4.5. HIGHEST LONG-RANGE ALTERNATIVE DAILY TRAFFIC VOLUMES .....	105
5.1. MINIMUM ROAD DESIGN AND ACCESS CRITERIA .....	122
5.2. NORTH HAVASU AREA TRANSPORTATION ACTION PLAN.....	123
5.3. ROAD MILEAGE FOR RECOMMENDED NETWORKS (EXCLUDING SR 95 REALIGNMENT).....	124
5.4. MATRIX OF KEY FUNDING SOURCES .....	126
5.5. FY 2008 FEDERAL FUNDING SOURCES FOR ARIZONA (IN MILLIONS OF DOLLARS).....	128
5.6. TRANSPORTATION INVESTMENT STRATEGY IN LAKE HAVASU CITY AREA .....	130
A-1. 2015, 2020, AND 2030 POPULATION AND HOUSING.....	134
A-2. 2015, 2020, AND 2030 EMPLOYMENT .....	135

## LIST OF FIGURES

	<u>Page</u>
1.1. NORTH HAVASU STUDY AREA .....	2
2.1. GENERAL PLAN UPDATE FUTURE TRANSPORTATION/ CIRCULATION PLAN .....	15
2.2. GENERAL PLAN UPDATE FUTURE LAND USE PLAN (SEPTEMBER 2008) ..	15
2.3. SR 95 CENTRAL CORRIDOR OPTIONS .....	17
2.4. COMPARISON OF PERCENTAGES OF TITLE VI POPULATIONS .....	23
2.5. LAND OWNERSHIP.....	26
2.6. LAND OWNERSHIP: SHARE BY OWNER .....	27
2.7. SPECIAL BLM AREAS (RECREATION, CRITICAL ENVIRONMENTAL CONCERN) .....	30
2.8. CURRENT LAND USE.....	33
2.9. ZONING.....	35
2.10. EXISTING COMMERCIAL AND FUTURE AIR PARK .....	36
2.11. ANNEXATION AREAS .....	38
2.12. FUNCTIONAL CLASSIFICATION: MOBILITY VERSUS ACCESS.....	39
2.13. FUNCTIONAL CLASSIFICATION.....	40
2.14. EXAMPLES OF ROADWAY LEVEL OF SERVICE.....	43
2.15. 2007 AVERAGE ANNUAL DAILY TRAFFIC .....	44
2.16. LOCATIONS OF TRAFFIC VIOLATIONS 2003-2007 .....	46
2.17. PUBLIC TRANSIT AND POTENTIAL TRAILS.....	54
3.1. TRAFFIC ANALYSIS ZONES AND 2030 BASE ROADWAY NETWORK.....	58
3.2. HYPOTHETICAL DEVELOPMENT, TAZ 10 (PART).....	61
3.3. 2020 POPULATION DENSITY (PER SQUARE MILE) .....	62

## LIST OF FIGURES (Continued)

	<u>Page</u>
3.4. 2020 HOUSEHOLD DENSITY (PER SQUARE MILE).....	63
3.5. 2030 POPULATION DENSITY (PER SQUARE MILE) .....	65
3.6. 2030 HOUSEHOLD DENSITY (PER SQUARE MILE).....	66
3.7. 2020 EMPLOYMENT DENSITY (PER SQUARE MILE) .....	68
3.8. 2030 EMPLOYMENT DENSITY (PER SQUARE MILE) .....	69
3.9. 2020 BASE NETWORK FUNCTIONAL CLASSIFICATION.....	75
3.10. 2020 BASE NETWORK WITH NUMBER OF LANES .....	76
3.11. 2030 BASE NETWORK FUNCTIONAL CLASSIFICATION.....	77
3.12. 2030 BASE NETWORK WITH NUMBER OF LANES .....	78
3.13. 2020 DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE .....	81
3.14. SEASONAL VARIATION IN TRAFFIC ON SR 95 .....	82
3.15. 2020 PEAK SEASON DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE .	83
3.16. 2030 DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE .....	86
3.17. 2030 PEAK SEASON DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE .	88
4.1. MID-RANGE (2025-2030) ALTERNATIVE NETWORK FUNCTIONAL CLASSIFICATION .....	98
4.2. MID-RANGE (2025-2030) ALTERNATIVE NETWORK WITH NUMBER OF LANES .....	99
4.3. LONG-RANGE (2035-2040) ALTERNATIVE NETWORK FUNCTIONAL CLASSIFICATION .....	100
4.4. LONG-RANGE (2035-2040) ALTERNATIVE NETWORK WITH NUMBER OF LANES .....	101
4.5. MID-RANGE (2025-2030) ALTERNATIVE TRAFFIC VOLUMES AND LEVEL OF SERVICE.....	103

## LIST OF FIGURES (Continued)

	<u>Page</u>
4.6. MID-RANGE (2025-2030) ALTERNATIVE DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE SEASONALLY ADJUSTED.....	104
4.7. LONG-RANGE (2035-2040) ALTERNATIVE DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE .....	106
4.8. LONG-RANGE (2035-2040) ALTERNATIVE DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE SEASONALLY ADJUSTED.....	107
4.9. MID-RANGE PLAN (2025-2030) .....	110
4.10. LONG-RANGE PLAN (2035-2040) .....	111
5.1. RURAL DIVIDED HIGHWAY CROSS-SECTION .....	117
5.2. BOULEVARD CROSS-SECTION .....	118
5.3. AVENUE CROSS-SECTION .....	118

## **1. INTRODUCTION AND EXECUTIVE SUMMARY**

The Planning Assistance for Rural Areas (PARA) program is sponsored by the Arizona Department of Transportation (ADOT) Multimodal Planning Division, and provides federal funds for the purpose of conducting transportation planning studies. The PARA program is available only to communities outside the large metropolitan areas. Large metropolitan areas have separate funding sources and programs tailored to their needs.

Lake Havasu City (LHC) first participated in another ADOT program for local governments, the Small Area Transportation Study (SATS) program, in 1991. Under the SATS program the Lake Havasu City government (the City) successfully developed a citywide roadway plan, and then took part in the SATS program to update the plan in 1997 and 2005. The PARA program is flexible and allows for studies of neighborhoods or sub-areas within jurisdictions. The sub-area program provision made it possible for the City to apply for and receive PARA funding for the North Havasu Study Area (NHA; Figure 1.1).

### **PURPOSE**

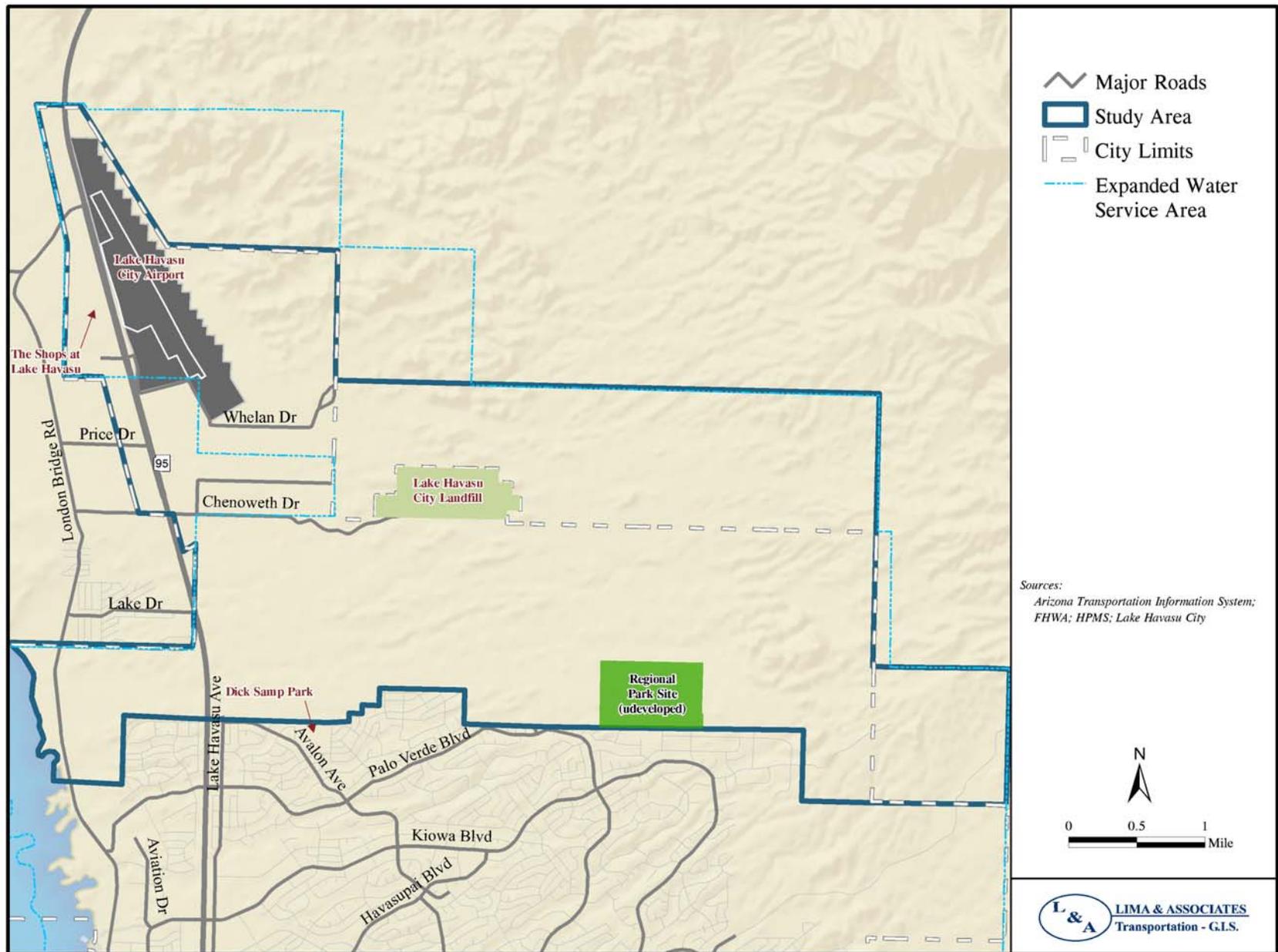
As a PARA, the North Havasu Area Transportation Study (NHATS) has been a joint effort of ADOT and the City. The study has resulted in mid-range and long-range transportation plans for the NHA, evaluated against an agreed upon set of performance and feasibility measures. The plans are consistent with the City's land use, annexation, and mountain preservation principles. The study also considered short-range needs and reconfirmed projects planned in the City's Community Improvement Program. The study was coordinated with ongoing local and regional transit planning. An implementation plan outlines actions to accomplish roadway and non-motorized projects, transportation system management strategies, and access management strategies.

### **PUBLIC INVOLVEMENT AND STAKEHOLDER COORDINATION**

All of the NHATS Working Papers benefited from the insights of many people. Stakeholders were interviewed early in the planning process. The stakeholders included several Technical Advisory Committee (TAC) members and representatives from groups that have special knowledge of land use, development trends, roads, trails and/or traffic conditions.

Two open houses were conducted to receive comments from the public concerning the findings of the NHATS. The first occurred on June 2, 2009, and focused upon current conditions in North Havasu and previous plans for the area. The second NHATS open house took place on the evening of December 2, 2009, and focused upon future conditions in North Havasu and the draft transportation plan. The consultant reviewed the insights of the meeting participants and they were incorporated into this Final Report (Report) as appropriate. The public meetings are more fully documented in the Public Involvement Summary (under separate cover).

**FIGURE 1.1. NORTH HAVASU STUDY AREA**



Four TAC meetings occurred:

- January 2009 - to initiate the NHATS.
- June 2009 - to review the findings of stakeholder meetings and draft Working Paper 1: Current Conditions. The TAC also reviewed proposed traffic analysis zones (TAZ) and the base road network.
- September 2009 - to review Working Paper 2: Future Conditions and to begin devising alternatives to the base.
- December 2009 - to review draft Working Paper 3: Transportation Plan.

## **ORGANIZATION OF FINAL REPORT**

The remainder of Chapter 1 is the Executive Summary. The other chapters of this Report are a compilation and refinement of the NHATS's three Working Papers. Chapter 2, Current Conditions, includes an inventory of previous planning and an analysis of current socioeconomic, physical, environmental, and transportation conditions. Chapter 3, Future Conditions, describes the projection of households and employment for the short-range, mid-range, and long-range timeframes, which is the basis of travel demand. Chapter 3 then indicates the travel demand generated by the households, employment, and other activities in the NHA for the short-range, mid-range, and long-range future and indicates how the base roadway network would perform in meeting that demand.

The Plan for Improvements, Chapter 4, first considered alternatives to the base roadway network and alternatives for other modes, to meet future travel demand. Transportation plan recommendations resulted from evaluating and selecting projects after modeling both the base network and the alternatives. Additional recommendations concern alternate modes. Finally, Chapter 5, Implementation Plan describes two items for the City's toolkit (standard roadway cross-sections and access management tools), a transportation action plan, and financial prospects. The Public Involvement Summary Report (under separate cover) describes the public involvement process.

## **EXECUTIVE SUMMARY**

A summary of findings in key topical areas addressed in the Current Conditions and Future Conditions Working Papers appears below. The section is followed by a summary of the Plan for Improvements and Implementation Plan (Plan).

### **Background From Current Conditions and Future Conditions Working Papers**

#### ***Land Ownership Overview***

Most of the NHA land is owned by three primary public landowners. Privately-owned land is split between commercial development and vacant land. The primary landowners are:

- Arizona State Land Department (ASLD), which holds lands in trust for the benefit of the people of Arizona, holds the bulk of the lands in North Havasu. Past trends indicate the next State Trust Lands to be marketed for disposition and development would be along the existing SR 95 corridor. Programming of any SR 95 realignment construction would likely spur interest in State trust lands in the eastern portion of North Havasu.
- The Bureau of Land Management (BLM) holds a modest share of North Havasu's land, and encourages joint planning with the City and other agencies in the "interface area" between the City and the vast BLM land area to the northeast.
- The Havasu National Wildlife Refuge on the west edge of the NHA protects numerous sensitive plant and animal species. Several additional sensitive species may be present elsewhere in North Havasu.
- Privately-held lands are currently concentrated along existing SR 95 and some are developed as commercial properties.

### *Land Use Planning Overview*

As the originally platted City approaches buildout, North Havasu is to be planned for development. Current City policy is articulated in the Lake Havasu City General Plan, the 2008 City Annexation Policy Plan, and the Mountain Preservation Task Force recommendations. Together the documents indicate that North Havasu will have clustered development combined with open space to preserve undeveloped lands, washes, and hillsides, making pedestrian-friendly neighborhoods, and yielding a low average residential density.

The state land commissioner and the ASLD's selection board must approve any annexation area. Any annexation of State Trust Land must be in the best interest of the Trust by enhancing the value of the property. In addition, annexations which include State Trust Land now require a preannexation development agreement which outlines requirements for completing an annexation.

The ASLD has adopted a Lake Havasu City Conceptual plan for State Trust Land inside of the City's planning area in 2004 (2004 Plan), and has coordinated with the City regarding integrating the Conceptual plan into the municipality's general land use plan. The State Land Commissioner has approved the 2004 Plan, but has not yet formally approved any updates to the 2004 Plan such as any changes in minimum development density for State Trust Lands.

During the preparation of this Report, the ASLD noted the City's reference to the parkway/SR Realignment as an urban containment boundary (Chapter 2, Annexation section). The ASLD commented upon the urban containment boundary and stated the importance of City coordination with ASLD and compliance with Arizona's growing smarter statutes. The ASLD's comments are covered at greater detail in the Annexation section of Chapter 2.

## ***Planning for an Access-Controlled Highway as an Alternative to Existing SR 95***

Several previous studies considered possible corridors for an access-controlled highway around the City to alleviate traffic congestion on SR 95. The City's General Plan Update in 2004 included a possible 4-lane parkway alignment that would head east from SR 95 at Chenoweth Drive (shown on Figure 2.1 of this Report). The ASLD accepted that alignment as part of the Conceptual plan approval in 2004.

A somewhat different Parkway alignment was recommended in the Lake Havasu City SATS Update, 2005. In the early phase of a subsequent study (2008-2009), the *ADOT Corridor Location Study & Environmental Overview*, the access-controlled highway alternatives were designated as a possible SR 95 Realignment in the Lake Havasu Area, rather than simply as a Parkway. The various alternatives in the *ADOT Corridor Location Study* appear in Figure 2.3. Travel demand modeling was performed in the *ADOT Corridor Location Study* for a limited number of the alternatives.

The purposes of the NHATS required that travel demand modeling for the NHA include an SR 95 realignment corridor as a part of the NHA network. The TAC agreed upon the realignment location to be used for modeling purposes in this Report. The location is similar to the *ADOT Corridor Location Study's* 2030 4-Lane Freeway North Option 1 & 2. The maps in this Report show the SR 95 realignment corridor as a line to provide a simple representation of the SR 95 realignment corridor, so that it might be seen clearly on the various maps among many other map features and labels. The lines on the maps should not be interpreted as specific road centerline alignments. Additional planning and engineering studies are required to define centerline alignments and right-of-way.

While the exact location of the SR 95 realignment is not yet known, the City intends that the realignment as eventually constructed would be an urban containment boundary. As noted in the land use planning overview, above, more details on the urban containment boundary and comments upon it by ASLD are in the Annexation section of Chapter 2.

## ***Future Travel Demand and Performance of the Base Roadway Network***

Future NHA characteristics are described in Chapter 3. The future time periods are identified with the future years 2015, 2020, and 2030 as specified in the original scope of work developed by ADOT and the City. The TAC confirmed that the socioeconomic projections for 2015, 2020, and 2030 were reasonable at the time of the travel demand modeling in light of available data and projections done by others in the recent past. The 2030 projections for the NHATS were lower than those in the Lake Havasu City Small Area Transportation Study Update 2005 (2005 SATS). The figures appear in summary Tables 3.2 and 3.3. Further details appear in other tables and figures in Chapter 3. Some of the highlights of the socioeconomic projections for the travel demand model were:

- NHA population was expected to grow from no population in 2010 to approximately 6,500 persons by 2030.

- NHA employment was expected to grow to 5,000 persons by 2030. Jobs in the commercial sector were projected to be most numerous. The City is preparing an industrial park southeast of the airport and there are other private commercial and industrial properties available in that same area. Commercial development was projected to be concentrated on SR 95 north of Chenoweth Dr and west of the airport, where the Shops at Lake Havasu would build out by the time the mid-range facilities were needed.
- Besides the gross amount of land available, influences on development include established land use plans (such as the Lake Havasu City General Plan and the Airport Master Plan), zoning, terrain, and floodplains. While some of the influences limit where development could occur, there is more than sufficient land in each North Havasu TAZ to accommodate both 2030 and later buildout development.

The base model network for 2015, 2020, and 2030 in Chapter 3 yielded the following performance characteristics:

- The base future model results generally yielded acceptable levels of service for traffic on NHA roadways. The base model roadway network met general criteria to provide adequate collectors and arterials for the NHA.
- The future traffic volumes associated with the parkway/SR 95 realignment are consistent with those found in the *2005 SATS* and the *SR 95 Realignment Study*, as discussed in the 2030 Traffic Conditions section of Chapter 3 and listed in Table 3.8.

### **Plan for Improvements and Implementation Plan**

The Plan comprises Chapter 4, the Plan for Improvements, and Chapter 5, the Implementation Plan.

During the development of the recommended transportation plan the TAC members recognized that due to the economic downturn the amount of growth projected for the years 2010 through 2030 would not occur until later than originally expected. Recently, there has been a decline in the City's population, which will likely be temporary.

Therefore, the original 2030 projection numbers were relabeled as "long-range" projections. It is estimated that the horizon year when the "long-range" projections would be reached would be between 2035 and 2040. In the remainder of this Report (Chapter 4) the phases are labeled as short-range (through 2020), mid-range (2025-2030), and long-range (2035-2040).

### ***Alternatives***

Equipped with results of the base future model, alternatives were devised to further improve levels of service and other measures. The greatest differences between the base and alternative roadway networks were:

- In the mid-range phase (Figure 4.1), Bentley Boulevard was shifted to intersect with the SR 95 realignment further west, which would make for more use by those traveling from central Lake Havasu City.
- In the long-range phase (Figure 4.3), frontage roads were added parallel to the SR 95 realignment (both on the north and south side of the realignment), and Desert Lake Drive was added.

The mid-range change in Bentley Boulevard was helpful to network performance and was retained in the Plan, while the addition of Desert Lake Drive made little difference and Desert Lake was not included subsequently in the recommended Plan.

### *Performance and Feasibility Measures*

The evaluation incorporated two types of measures summarized in Tables 4.1 and 4.2:

- ADOT performance measures applied to State Route 95 (SR 95), since the highway is on the State Highway System (SHS).
- Measures specific to the City's vision for mountain preservations and up-to-date cost considerations used by Arizona cities during the current economic recession.

### *Roadway Network Plans (Short-range, Mid-range, Long-range)*

**Short-Range Plan.** Very little residential development will occur in the short-range and the employment growth will be largely served by the existing roadway network. Transportation projects will be limited to some upgrades that were already recommended in the 2005 Lake Havasu City SATS and/or the Community Improvement Program.

**Mid-Range Plan.** The mid-range Plan (Figure 4.9) recommends actions that would result in completion of the SR 95 realignment as a two-lane rural principal arterial. ADOT studies and activities would be required to determine any of those actions, including:

- Reserving SR 95 realignment right-of-way.
- Constructing two-lane SR 95 Realignment and intersections.
- Constructing two-lane SR 95 Realignment frontage road from Chenoweth Rd to Bentley Blvd.

Other mid-range recommendations that would be managed by the City include:

- Extending the Havasu Area Transit (HAT) facilities as North Havasu development occurs.
- Extending Lake Havasu Ave.
- Reconstructing existing Chenoweth Rd.
- Constructing Bentley Blvd to two lanes.
- Implementing access management techniques on existing SR 95 in the NHA.

**Long-Range Plan.** The long-range Plan (Figure 4.10) recommends actions that would result in completion of the SR 95 realignment as a four-lane rural or urban divided highway during the long-range phase. ADOT studies and activities would be required to determine any of those actions, including:

- Constructing four-lane SR 95 Realignment and interchanges.
- Constructing two-lane SR 95 Realignment frontage road from Bentley to Bison Blvd.

Other long-range recommendations that would be managed by the City include:

- Extending HAT facilities to full North Havasu development.
- Extending Lake Havasu Ave to Chenoweth Rd.
- Extending and Constructing Chenoweth Rd to SR 95 realignment.
- Widening London Bridge Rd to five lanes between Chenoweth and Centre Blvd.
- Infrastructure providers and the City would continue to coordinate new infrastructure construction with transportation improvements.
- The important intermodal connections at the airport would be largely within the airport boundary and would be managed by the Airport Master Plan update approved by City Council in January 2009.
- The future North Havasu trail system would include four trails as outlined in the Lake Havasu City Trails plan, with additional connections to residential areas.
- The MCC Regional Park would be developed. Mohave Community College (MCC) was the former owner of the acreage and the undeveloped park's master plan designates it as MCC Regional Park, a name likely to change in the future. The park's transportation connections would be to:
  - SR 95 realignment via the Park Access Rd.
  - Neighborhoods on local roadways.
  - The City trail system.

### ***Implementation Plan***

The City requested assistance in four types of implementation processes, which are addressed in Chapter 5, the Implementation Plan:

- A recommended Rural Divided Highway cross-section proposed by ADOT for the SR 95 Realignment appears in Figure 5.1. Recommended City boulevard and avenue cross-sections appear in Figures 5.2 and 5.3, respectively.
- Access management can reduce vehicle crashes and reduce travel time both for through trips and those accessing a destination in a local area. Access management tools recommended for the City appear in Table 5.1 and include design criteria, traffic regulation, and appropriate transit, pedestrian, and bicycle facilities.

- The action plan for implementation of improvements is in Table 5.2. The table shows a phased program for the short-range, mid-range, and long-range, identifies implementation actions, and names one or more agencies responsible for carrying out each action.
- Financial prospects are set out in the final section of the Plan, including costs, funding sources, and one possible investment strategy (Table 5.6).

## 2. CURRENT CONDITIONS

This chapter reviews studies, plans, and programs related to transportation in the NHA.

### REVIEW OF PREVIOUS STUDIES AND PLANS

Table 2.1 summarizes the documents that were reviewed. More details on studies and plans are presented in Working Paper 1: Current Conditions. Following the table, additional detail is provided on specific studies that are anticipated to influence the development of the NHATS.

**TABLE 2.1. SUMMARY OF STUDIES AND PLANS**

Study	Description
<b>Federal Studies and Plans</b>	
Bureau of Land Management Approved Resource Management Plan and Final Environmental Impact Statement, 2007, Lake Havasu Field Office.	Presents analyses of the five alternatives for management of 1.3 million acres of public land. The plan provides for a balance between authorized resource use and the protection and long-term sustainability of sensitive resources. Major issues addressed in the plan for the Bureau of Land Management lands that are in and near Lake Havasu City include findings for the Havasu Urban Special Recreational Management Areas. <a href="http://www.blm.gov/az/st/en/info/nepa/environmental_library/arizona_resource_management/LHFO_ROD_07.html">http://www.blm.gov/az/st/en/info/nepa/environmental_library/arizona_resource_management/LHFO ROD 07.html</a>
<b>State Studies and Plans</b>	
Arizona Framework Studies, On-going.	A consortium of state, regional, and local stakeholders is working on the planning process <i>Building a Quality Arizona</i> for state transportation infrastructure needs. As part of this process, Regional Framework Studies will feed into the Statewide Transportation Planning Framework. The Framework studies are long-range visionary plans focusing on transportation needs in the 2030-2050 timeframe. <a href="http://www.bqaz.gov/weaz.asp">http://www.bqaz.gov/weaz.asp</a>
Western Arizona Regional Framework Study. Working Paper: Existing Conditions, April 2008.	The Western Arizona Region includes Mohave, La Paz, and Yuma Counties. Products completed to date include: Working Paper 2: Existing Conditions and Community Workshops, Round 1, March/April 2008. Working Paper 2 compiles an inventory and analysis of the Existing and Future Conditions gathered from previous and current studies.  Work has also been accomplished as part of the overall Western Arizona Framework Study on population and employment forecasts and the development of a Statewide travel demand model. <a href="http://www.bqaz.gov/PDF/Western_WorkingPaper2.pdf">http://www.bqaz.gov/PDF/Western_WorkingPaper2.pdf</a>

**TABLE 2.1. SUMMARY OF STUDIES AND PLANS (Continued)**

<p>Arizona Governor’s CANAMEX Task Force, Meeting Summary, January 31, 2006.</p>	<p>The CANAMEX Corridor is envisioned to connect Mexico, the United States, and Canada. In addition to its primary route through Arizona, CANAMEX could include a Western Passage that was championed by Communities located in Yuma, La Paz, and Mohave Counties. The Task Force designated the Western Passage as follows on January 31, 2006:</p> <ul style="list-style-type: none"> <li>- United States Route 195 to Route 95 from San Luis to its intersection with I-40</li> <li>- I-40 to its intersection with Route 93 in the vicinity of Kingman.</li> </ul> <p>The Arizona State Transportation Board also stated its support in 2006. The Western Passage continues to be considered in the <i>Building a Quality Arizona</i> studies cited above.</p> <p><a href="http://www.canamex.org/PDF/CCC_013106_MTG_Summary.pdf">http://www.canamex.org/PDF/CCC_013106_MTG_Summary.pdf</a></p>
<p>Final Corridor Location Report &amp; Environmental Overview, SR 95 Realignment, Lake Havasu Area. August 2009</p>	<p>ADOT, Mohave County, and Lake Havasu City, in coordination with FHWA and BLM, conducted a study of potential corridors in which to realign the portion of SR 95 that passes through Lake Havasu City, to meet travel demand in Western Arizona. SR 95 would potentially be realigned between Milepost (MP) 175 and MP 191 to a new corridor east of Lake Havasu City.</p> <p><a href="http://www.azdot.gov/highways/districts/kingman/SR95_Realignment.asp">http://www.azdot.gov/highways/districts/kingman/SR95_Realignment.asp</a></p>
<p>2003 Arizona Climbing Lanes and Passing Lane Prioritization, May 2004.</p>	<p>This study identifies and prioritizes climbing lane and passing lane projects to be considered on State Routes for the ADOT Five-Year Transportation Facilities Construction Program.</p>
<p>Arizona Access Management Study, Temporarily suspended.</p>	<p>ADOT has been conducting a statewide access management study to develop an access management classification system for the State Highways, and to develop a comprehensive access management manual to guide access management on State Routes. Access categories have been proposed for State Routes throughout the state.</p> <p><a href="http://www.azaccessmanagement.com/">http://www.azaccessmanagement.com/</a></p>
<p>Access Management Study State Route 95, I-40 to Bill Williams Bridge, July 2004.</p>	<p>The purpose of this study was to prepare an access management plan for SR 95 from I-40 to Bill Williams Bridge, to maintain reasonable future service levels, capacity, and safety along SR 95. Goals of the study were:</p> <ol style="list-style-type: none"> <li>1. Resolve major planning issues prior to the initiation of project programming and engineering development.</li> <li>2. Preserve needed transportation right-of-way.</li> <li>3. Develop a list of locally approved access control design elements.</li> <li>4. Obtain local-ADOT consensus on access management.</li> </ol>

**TABLE 2.1. SUMMARY OF STUDIES AND PLANS (Continued)**

Arizona Transit Needs Study, May 2008.	ADOT worked with state, regional, and local stakeholders to identify rural transit needs and develop regionally-based solutions to rural public transportation in Arizona. The Study establishes Arizona’s long-term strategic direction for rural transit service provision. <a href="http://mpd.azdot.gov/transit/ArizonaRuralTransitNeedsStudy.asp">http://mpd.azdot.gov/transit/ArizonaRuralTransitNeedsStudy.asp</a>
Arizona Statewide Bicycle and Pedestrian Plan, 2006.	The Arizona Statewide Bicycle and Pedestrian Plan provides a long-term plan for a statewide system of interconnected bicycle facilities that will guide ADOT transportation decisions relating to bicycle and pedestrian travel, planning, and facility development.
Multimodal Freight Analysis Study, 2008.	Describes and evaluates Arizona’s existing freight infrastructure, including SR 95 and the Lake Havasu City airport. The Study identifies unmet needs and recommends projects for improving the efficiency of the movement, collection, and distribution of freight. <a href="http://mpd.azdot.gov/planning/freightstudy.php">http://mpd.azdot.gov/planning/freightstudy.php</a>
State Transportation Board Policies, Rev. 2003.	Presents policies pertaining to the following areas; priority programs; establishing, altering or vacating highways; construction contracts, accelerated funding mechanisms; local government airport grants; and designating scenic or historic highways.
<b>Local Studies and Plans</b>	
Lake Havasu City SATS Update, 2005.	The purpose of the SATS was to evaluate future travel demand throughout the City and to develop a roadway plan to meet the demand. The City had prepared its first SATS in 1991 and had previously updated that study in 1997.
Lake Havasu City Community Investment (CIP) Program.	Community Investment Program includes many varied projects. Public Works project categories are streets and drainage (together), water, and sewer. Some projects in the NHA are Air Industrial Park-Phase I, and State Route 95 Landscaping-Phase I.
Lake Havasu City General Plan 2002, as revised through 2008.	Presents an overall citywide plan for development in Lake Havasu City. The plan includes five elements: the Land Use, Growth Management, Transportation/Circulation, Open Space and Recreation, and Public Facilities and Services/Cost of Development elements.
Lake Havasu City Annexation Policy Plan, May 2008.	The plan provides Lake Havasu City elected officials information and strategies for future annexation of lands adjacent to the existing corporate boundaries.
Airport Master Plan for Lake Havasu City Municipal Airport (2008 update), 2008.	This study update evaluates the airport’s capabilities and role, forecasts future aviation demand, and plans for timely development of new or expanded facilities. The plan was adopted in February 2009.

**TABLE 2.1. SUMMARY OF STUDIES AND PLANS (Continued)**

Lake Havasu City Trails Plan, May 2006.	This plan details recreational trip attractors, related planning efforts, existing trails network, Arizona state trails system, proposed trails network, trail design guidelines, trail plan cost estimate, and potential funding programs. The Plan briefly mentions the bicycle and pedestrian network that was identified in the 1998 Pedestrian and Bicycle Plan, but there is no other mention of bike paths. Approximately five trails in this plan run through or could connect to the NHA.
Lake Havasu City Pedestrian & Bicycle Plan, 1998.	The plan mapped a network of sidewalks, multi-use paths, and bike routes using striping and signing to integrate with the existing roadway system and to provide safe travel for transportation and recreation purposes. Two planned pedestrian walks, the “Sand Dunes” and the “Favorite Short Walk,” are in the NHA. Other paths end at the edge of the NHA and could be extended into the NHA if that were appropriate to the design of future development.
Lake Havasu City Parks Master Plan, Mohave Community College Park Site, 2005.	This undeveloped Park Site is in Township 14N, Range 19W, Section 30, just north of existing neighborhoods. Its major motorized access is to be from the proposed SR 95 bypass, while there are other access points around the periphery. The site is planned for a variety of recreational uses both passive and active (including individual and team sports) and some special facilities such as an astronomy science center. Washes in the park would be preserved to serve their natural drainage function.
Mohave County, AZ General Plan, 1995, as revised through 2005.	The Mohave General Plan is the overall plan for development of most of the unincorporated County. The plan includes the following elements Natural Resources, Land Use, Housing, Economic Development, Public Infrastructure (including Transportation) and Public Facilities.

**Western Arizona Regional Framework Study (BQAZ)**

A consortium of state, regional, and local stakeholders is working on the planning process *Building a Quality Arizona* for state transportation infrastructure needs. As part of this process, regional framework studies will feed into the statewide transportation planning framework. The framework studies are long-range visionary plans focusing on transportation needs in the 2030-2050 timeframe.

The Western Arizona Region includes Mohave, La Paz, and Yuma Counties. Products completed to date include an inventory and analysis of the existing and future conditions gathered from previous and current studies. Some work has been completed on population and employment forecasts and the development of a statewide travel demand model.

The concepts for the Lake Havasu City area in the three scenarios are described in Table 2.2.

**TABLE 2.2. WESTERN ARIZONA TRI-CITY AREA, REGIONAL FRAMEWORK STUDY: LAKE HAVASU AREA SCENARIOS, 2050**

<b>Scenario</b>	<b>Theme</b>	<b>Common Characteristics</b>	<b>Other Characteristics</b>
A	Personal Vehicle Mobility	All three scenarios include a SR 95 bypass to the east, an upgrade of the existing SR 95, and similar local bus service.	Intercity bus connections to Bullhead City and Kingman.
B	Transit Mobility		Passenger Rail, connecting to Kingman and Parker. Rail/bus connection to Bullhead City.
C	Focused Growth		Passenger Rail, connecting to Kingman and Parker. Rail/bus connection to Bullhead City. A transit center in Lake Havasu City

In the Lake Havasu City area, the greatest difference between the scenarios is the presence or absence of passenger rail.

**Lake Havasu City General Plan 2002, As Revised Through 2008/Lake Havasu City SATS Update 2005**

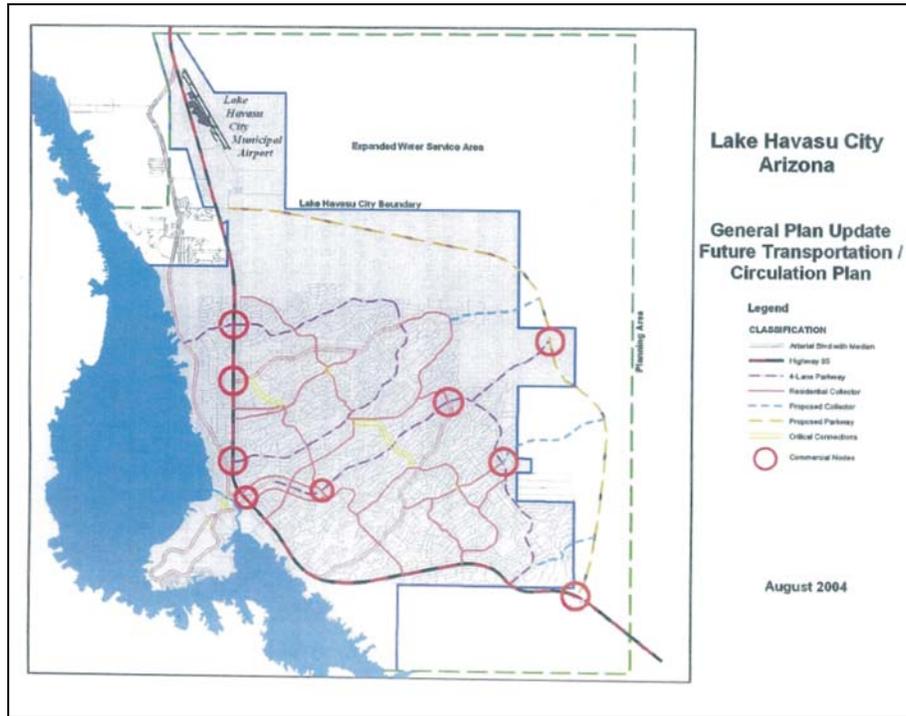
The Lake Havasu City planning area, according to the City’s General Plan, includes the entire NHA (Figures 2.1 and 2.2). The General Plan’s planning area also extends two additional miles both to the north and east of the NHA. Lake Havasu City’s extraterritorial planning authority lets the City plan for future anticipated planning areas and areas of influence.

The goals expressed in the General Plan relating to transportation in the NHA are:

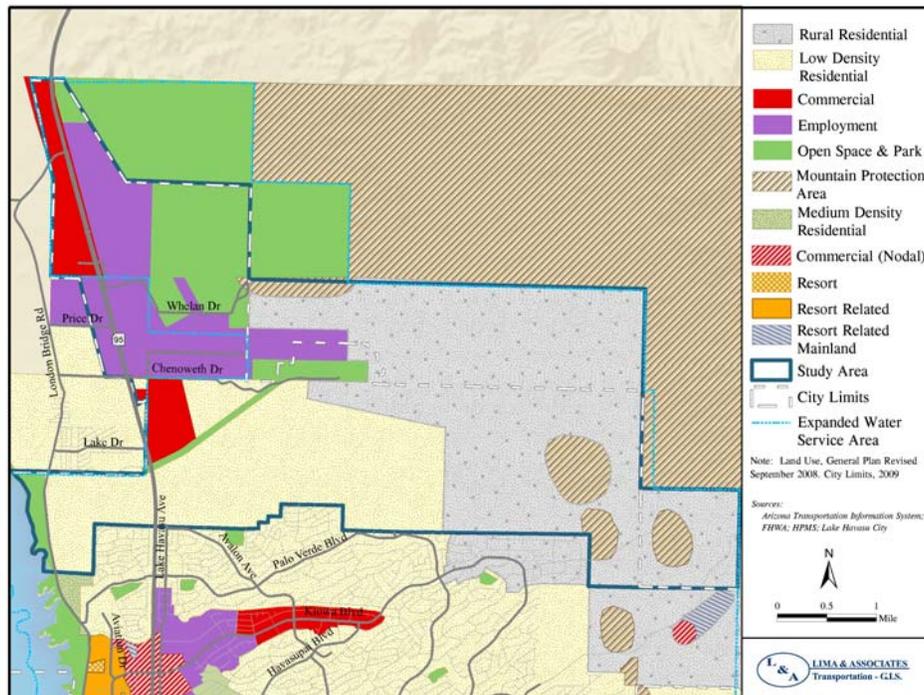
- 1) *Provide for the mobility of all segments of the population in an efficient, cost-effective, and safe multimodal transportation system.*
- 2) *Develop a basic network of facilities to serve pedestrians and bicyclists.*

The 2008 Lake Havasu City General Plan update included a Future Transportation/Circulation Plan map (not revised after 2004), which appears in Figure 2.1. The same plan included a Future Land Use Plan, which appears in Figure 2.2.

**FIGURE 2.1. GENERAL PLAN UPDATE FUTURE TRANSPORTATION/CIRCULATION PLAN**



**FIGURE 2.2. GENERAL PLAN UPDATE FUTURE LAND USE PLAN  
(September 2008)**



## **Mohave County AZ General Plan 1995, as Revised through 2005**

The Land Use Diagrams of the Mohave County General Plan show land uses in various “development subareas” of the County, one of which is the Lake Havasu “Urban Development Area”. The unincorporated portion of the NHA and Desert Hills are within that subarea. Desert Hills is just west of the intersection of SR 95 and Chenoweth Blvd, and is directly adjacent to the NHA, containing several subdivisions and resort parks. Desert Hills is a U.S. Census Designated Place.

The Desert Hills Fire District Community Association Area Plan was adopted in November 2009 as an amendment to the Mohave County General Plan. Therefore, the Desert Hills plan became available for use in the NHATS as the final draft was being prepared. The Desert Hills plan set a goal for the improvement of an area of London Bridge Road to include curbs, gutters, and multimodal transportation facilities. The Desert Hills community indicated that the improvements should extend further north than the improvements that are recommended in this NHATS (Figure 4.10). Still, the Desert Hills community’s goal for the portion of London Bridge Road south of the Shops at Lake Havasu is consistent with the NHATS recommendation of an urban cross-section in the same area. That area could be in the City’s jurisdiction sometime during the planning period if area residents expressed interest in a voluntary annexation.

## **SR 95 Realignment, Lake Havasu Area, Corridor Location Study and Environmental Overview**

The stated purpose and need for the study included traffic delays at area intersections, lack of access control, Lake Havasu City’s projected growth, the status of SR 95 as a regional traffic corridor, and the need to improve traffic flow and safety.

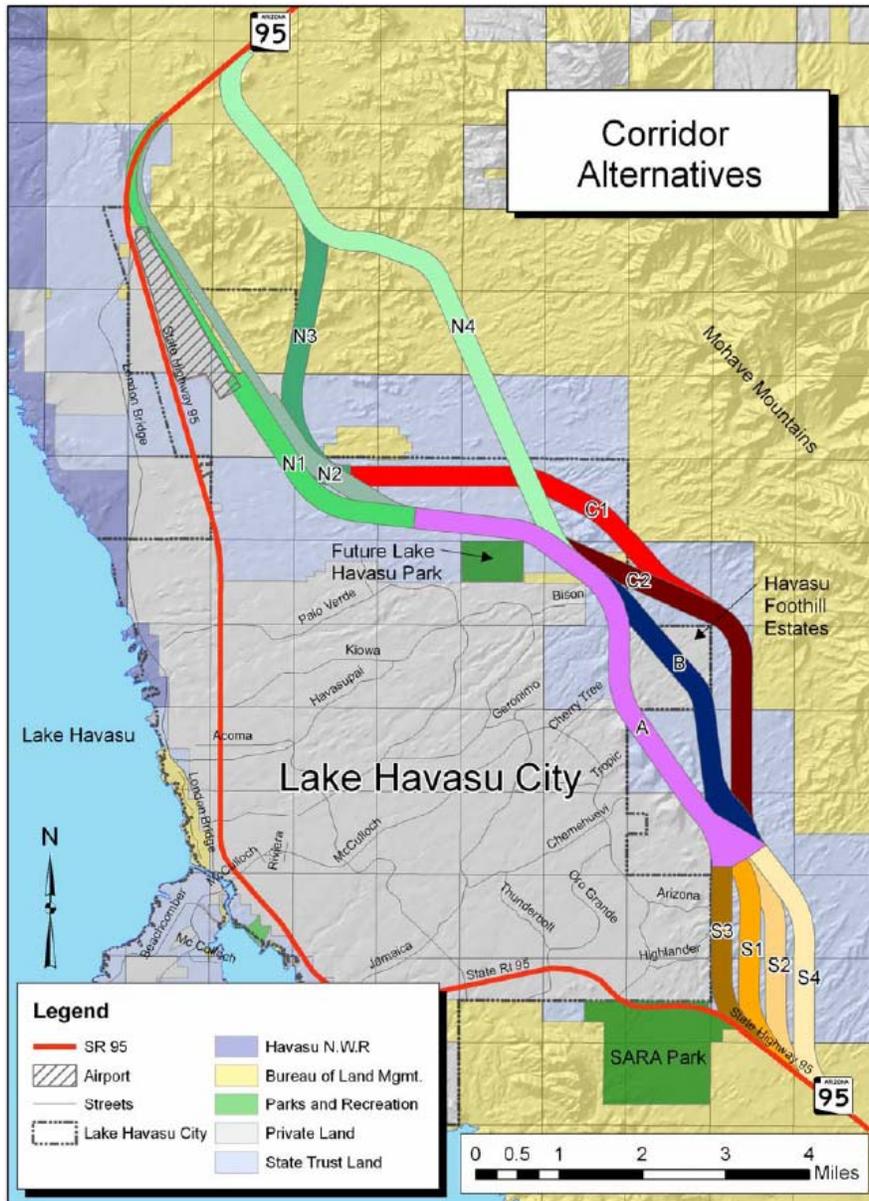
Prior studies supporting the effort were the SR 95 Access Management Study, the Lake Havasu City SATS, and the Bullhead City SR 95 Realignment Study.

The study developed and evaluated corridor alternatives in the North and East Havasu Areas and an environmental overview was performed. Corridor evaluation criteria included:

- Traffic
- Environmental
- Physical Characteristics
- Land Use
- Public/Community Input

The Arizona State Land Department, Lake Havasu City Council (Interim Public Works Director, as directed by City Council), and Lake Havasu City Planning Commission submitted comments on the corridor locations. The ASLD expressed support for Corridor A. The City Council expressed support for Corridor C (without specifying a preference for C1 or C2). The Planning Commission expressed support for the “combination C1/C2 corridor,” see Figure 2.3.

**FIGURE 2.3. SR 95 CENTRAL CORRIDOR OPTIONS**



Source: SR 95 Realignment Lake Havasu Area, Final Corridor Location Report & Environmental Overview, August 2009.

Corridors A and C were recommended for further evaluation. Corridor C was preferred by LHC because it avoids conflicts with existing residential areas. ASLD could not endorse corridor C without further study because it potentially restricts future development. ASLD felt that corridor A was most consistent with their charter.

Corridors N1 and N2 were also recommended for further evaluation. The projected level of service (LOS) for the no-build alternative was E or worse on existing SR 95 through LHC. However, the no-build alternative is considered a viable alternative and will remain so during the future design concept and environmental studies (NEPA).

The preferred corridor for the portion of the SR 95 realignment that touches the NHA consists of alternative corridor segments A, C2, N1, and N2. Effects on City development would differ depending on which corridors were ultimately selected. Those effects would be most different in the portion of the corridors that are outside the NHA to the southeast. Inside the NHA, the corridors are not as far apart so the effects would not differ as much from one corridor to another.

Recommended access points to the bypass are Craggy Wash Area north of the Lake Havasu City Airport (terminus at existing SR 95), Chenoweth Blvd, Bentley Blvd, and Bison Blvd.

The implementation plan in the final report assumed that the project would be completed in two phases, interim and ultimate, with the following characteristics:

Interim:

- One travel lane in each direction.
- At-grade intersections.
- Right-of-way acquisition (for the ultimate roadway).

Ultimate:

- Full rural access-controlled divided highway with two travel lanes in each direction.
- Grade-separated interchanges at approximately 2-mile intervals.

The traffic analysis study included five travel demand models. The SR 95 Realignment corridor was a part of three of the models, each of which modeled the corridor as follows:

- A two-lane highway by 2030.
- A four-lane freeway by 2030.
- A four-lane freeway by 2040.

The final report's recommendations made no assumptions about the years of completion of the interim or ultimate highway.

### **Special Studies Pertinent to the NHA**

#### ***The Airport Master Plan, 2008***

The Airport Master Plan for Lake Havasu City Municipal Airport evaluates the airport's capabilities and role, forecasts future aviation demand, and plans for timely development of new or expanded facilities. The planning period of the Lake Havasu City Municipal Airport Master Plan has an end year of 2027, similar to the 2030 end year of the NHATS. The primary objective of the airport master plan is "to develop and maintain a financially feasible, long-term development program which will satisfy aviation demand; be compatible with community development, other transportation modes, and the environment; and be a source of employment and revenue for the City and surrounding areas."

The land use discussion of this NHATS Report addresses the compatibility of airport land use and airport operations with adjacent land use in North Havasu, including noise, environmental, and safety compatibility. The Airport Master Plan identifies a need for the airport to acquire several acres of land.

### ***Lake Havasu City Annexation Policy Plan, May 2008***

The City adopted the Annexation Policy Plan to provide information and strategies for future annexation of lands adjacent to the existing corporate boundaries. The Annexation Policy Plan's purpose statement asserts:

Annexation of adjacent lands can ensure the City has control of urban development, protection of valuable natural resources, managing traffic and infrastructure, and providing additional revenue sources.

The Lake Havasu City General Plan identifies an urban containment area, expanded water service area, and planning area. Future annexations should be strategically implemented to incorporate land within these areas that is currently outside City limits. The incorporation of these areas will allow for the City to efficiently manage land uses and infrastructure.

An Annexation Policy Plan will allow the City Council to make informed decisions on future annexations as well as take a proactive approach to annexation when benefits are in the best interest of the City.

The City contemplates an ambitious five-year annexation program (2008-2013), much of which would involve the NHA. More details concerning prospective annexations and their relationship to the NHATS are discussed later in this Chapter.

The ASLD notes that there is a statutory requirement under ARS 9-471.A.1 for the approval of any annexation area by the state land commissioner and the selection board. Any annexation of State Trust Land must be in the best interest of the Trust by enhancing the value of the property.

### **Transportation Projects Pertinent to the NHA**

#### ***Air Industrial Park***

The City continues work on the Air Industrial Park. A detailed plat for Phase 1 of the park was recorded by the City in April 2009. The City is developing infrastructure for the park, especially roadways that can provide appropriate commercial access to each parcel. Additional information about the status of the Air Industrial Park appears later in the Report.

### *State Route 95 Landscaping Project*

ADOT has several projects currently undergoing design for highways in and around Lake Havasu City. The most visible of those projects is the State Route 95 landscaping between Mesquite and Swanson Aves, in the central part of the City, expected to be under construction in spring 2009.

The City, Bradley Chevrolet, and ADOT cooperated to install landscaping on SR 95 frontage near Acoma Blvd about two miles south of the NHA. The project is an example of landscaping for aesthetic purposes and to create shade, anticipated along much of the SR 95 corridor.

### *Passing Lane on State Route 95*

An ADOT project to design a passing lane on State Route 95 North of Lake Havasu City is underway. As of June 2009, review of the project's 30 percent plans was complete.

## **SOCIOECONOMIC CONDITIONS**

Lake Havasu City was one of Arizona's fastest-growing communities from the 1970s through the 1990s. The City's growth continued to outpace the state's growth from the year 2000 through 2008, although the growth rate declined somewhat as some neighborhoods in the originally-platted City reached buildout. Employment growth has kept pace with population. Average household incomes in the City are under the averages for the state, but are higher than those in most of Arizona outside the large metropolitan areas.

The NHA is largely undeveloped and residential population is considered to be zero for purposes of this Report. A large portion of the current and future travel demand through the NHA will come from outside its boundaries. The remainder of Lake Havasu City to the south of the NHA currently is the area where most trips that use NHA roadways either start or end. The other area that accounts for travel demand through the area is Desert Hills, an unincorporated Census Designated Place that comprises several subdivisions to the west of the NHA. Desert Hills had a population of 2,183 in the year 2000. Socioeconomic information for Desert Hills appears in the same tables as information for the NHA below.

Lake Havasu City passed the 50,000 population threshold in approximately 2003. That is an important threshold for transportation planning and funding purposes, because urbanized areas of over 50,000 persons are required by federal law to have a Metropolitan Planning Organization (MPO), a regional transportation policy, and planning body. The governor designates the MPO in cooperation with local jurisdictions. New MPOs are usually designated following a decennial Census, so MPO status is likely in store for Lake Havasu City shortly after 2010. Therefore, most of the future facilities in the NHA would be constructed within the MPO planning regime. Some transportation programs, including certain transit programs, are only available to MPOs.

## Population and Housing

Lake Havasu City is the largest City in the Tri-City area of Southern Mohave County, which also include Bullhead City and Kingman. Recent population statistics for the region appear in Table 2.3. The latest statistics showing total and occupied dwelling units for each area in the region are from Census 2000, as shown in Table 2.4.

As the City grew, it appears that the average number of persons per household remained within the range 2.3 to 2.4 over the five-year period. The number of households living in renter-occupied units increased slightly from 22 percent to about 27 percent. The median age has remained about the same at roughly 46 years old.

The region has formed a Tri-City Council to work together on regional economic development and environmental issues. The NHA is one of the larger developable areas that are not yet developed in the Tri-City area. The highest growth rate in the Tri-City area in the past few years has been in Kingman. Lake Havasu City has grown faster than Bullhead City and at about the same rate as Mohave County overall.

**TABLE 2.3. POPULATION CHANGE 2000 TO 2008  
ARIZONA, MOHAVE COUNTY, AND THE TRI-CITY AREA**

Area	DES Estimate July 1, 2008	Population, Census 2000	Numeric Change	Percent Change
Arizona	6,629,455	5,130,632	1,498,823	29.2%
Mohave County	205,862	155,032	50,830	32.8%
Lake Havasu City	55,429	41,938	13,491	32.2%
Bullhead City	41,187	33,769	7,418	22.0%
Kingman	28,823	20,069	8,754	43.6%

Source: Arizona Department of Commerce (previously Department of Economic Security). US Census 2000

**TABLE 2.4. POPULATION AND DWELLING UNITS, CENSUS 2000**

Area	Population, Census 2000	Dwelling Units	Occupied Dwelling Units
Arizona	5,130,632	2,189,189	1,901,327
Mohave County	205,862	80,062	62,809
Lake Havasu City	41,938	23,018	17,911
North Havasu Study Area	1,691	1,056	770
Desert Hills CDP	2,183	1,463	997

Source: US Census 2000

CDP – Census Designated Place

## Environmental Justice (Title VI Populations)

Title VI of the Civil Rights Act of 1964 and related statutes ensure that individuals are not discriminated against based on race, color, national origin, age, sex, or disability. Following the issuance in 1994 of Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, procedures were developed to analyze the effects of transportation plans and facilities upon environmental justice populations. This Report addresses the environmental justice protected classes including the elderly (Aged 65 and older), minority and low-income populations, and mobility-limited populations. Environmental justice issues related to transportation in the NHA are addressed throughout this Report in the following manner:

- **Working Paper 1: Current Conditions** - presents US Census data that describes the population living within geographic areas that could be affected by proposed transportation improvements.
- **Transportation Plan** - analyzes whether the recommended projects may differentially affect environmental justice populations. Examines the potential effects, both positive and negative, that those projects may have on the environmental justice populations. Explains the considerations that dictated this recommendation over alternative actions, if any of the potential projects places a disproportionate burden on elderly, minority, low income, or mobility-limited populations.
- **Public Involvement Activities** - concerted effort to reach minority and low-income populations when conducting the NHATS's public meetings.

The proportion of the population in each of the four protected classes immediately adjacent to the NHA is compared to the corresponding proportions in the State of Arizona shown in Figure 2.4. Relatively more elderly and working-age mobility limited persons are in the area surrounding North Havasu than in the State. Relatively fewer minority persons and persons with incomes below the poverty line are in that area than in the State. The maps that follow show the densities calculated for the entire blocks or block groups of which North Havasu is a part. Given that North Havasu is not populated, the densities actually represent immediately adjacent areas.

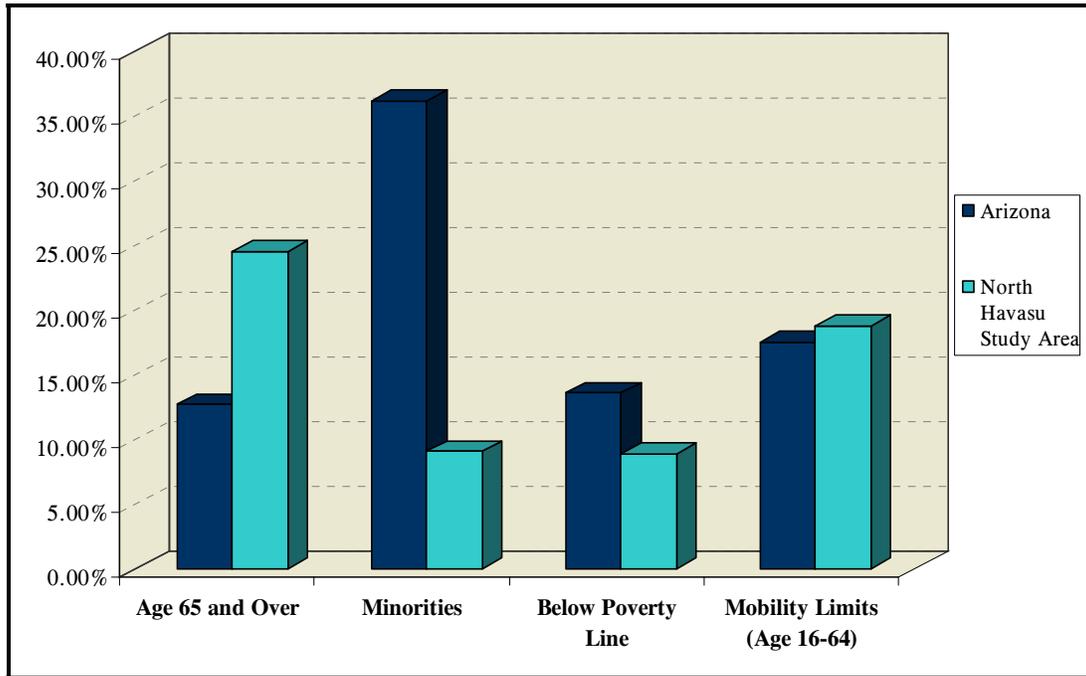
**Elderly Population:** The elderly population was over 24 percent of the total persons in the area surrounding North Havasu in the year 2000, and over 27 percent of the persons in adjacent Desert Hills (Table 2.5).

**Minority Population:** The minority population was over 9 percent of the total persons in the area surrounding North Havasu in the year 2000, and just over 11 percent of the persons in adjacent Desert Hills (Table 2.5).

**Mobility-Limited Population:** The mobility-limited population was over 18 percent of the total persons in the area surrounding North Havasu in the year 2000, and over 31 percent of the persons in adjacent Desert Hills (Table 2.5).

**Low-Income Population:** The population under the poverty level was over 8 percent of the total persons in the area surrounding North Havasu in the year 2000, and over 14 percent of the persons in adjacent Desert Hills (Table 2.5).

**FIGURE 2.4. COMPARISON OF PERCENTAGES OF TITLE VI POPULATIONS**



Source: US Census 2000

**TABLE 2.5. SUMMARY OF ENVIRONMENTAL JUSTICE POPULATIONS**

<b>Minority And Elderly Population</b>					
Area	Population	Population 65 & Over	Percent Population 65 & Over	Minority Population	Percent Minority Population
Arizona	5,130,632	667,839	13.02%	1,856,374	36.18%
Mohave County	155,032	31,728	20.47%	24,749	15.96%
Desert Hills CDP	2,183	598	27.39%	241	11.04%
North Havasu Study Area	1,691	415	24.54%	154	9.11%

<b>Mobility Limited And Below Poverty Level Population</b>					
Area	Population	Mobility Limited	Percent Mobility Limited	Population Below Poverty	Percent Below Poverty
Arizona	5,130,632	1,021,844	19.92%	698,669	13.62%
Mohave County	155,032	42,058	27.13%	21,252	13.71%
Desert Hills CDP	2,183	745	31.46%	337	14.23%
North Havasu Study Area	1,691	1,460	18.82%	693	8.93%

Source: US Census 2000

## **Employment**

The *Economy of Lake Havasu City* was one of a series of reports sponsored by the Arizona Department of Commerce and was published in 2008. Most of the information was dated 2004. This summary begins with key data from that report.

Employment in Lake Havasu City was approximately 18,500 in 2004. The per capita employment was 337 per 1,000 residents. That figure is higher than the median jobs-to-population ratio for Arizona cities and towns. Private-sector employment jobs-to-population was in the top 25 percent of all Arizona cities and towns.

The 2000 census counted 17,625 employed Lake Havasu City residents, more than the number of jobs located in Lake Havasu City in 2001. Thus, some Lake Havasu City residents worked in other communities or were self employed, and are not included in the Census Bureau data. Further, according to the 2000 census, a lower-than-average share of Lake Havasu City residents was of working age (the proportion of senior citizens was quite high). Retail trade employed the largest number of persons, followed by the construction category, and the accommodation and food services category.

## **Economy of the North Havasu Area**

At least two employment centers and some individual employers in North Havasu have economic impacts outside the area. The commercial area including the *Shops at Lake Havasu* and other commercial properties along SR 95 are patronized by customers from throughout the Tri-City area, tourists, and others. The *Shops at Lake Havasu* is an open-air center with a center court and other amenities, employing 1,000 persons as of early 2009. Wal-Mart, the largest store in the *Shops*, opened with 479 employees. Home Depot is another large establishment in the immediate area.

The other employment center is the Lake Havasu City Airport and environs. As reported in the *Airport Master Plan for Lake Havasu City Municipal Airport*, ADOT estimated in 2002 that the airport itself accounts for 82 jobs. Visitor spending accounts for 119 additional jobs and a multiplier effect accounts for 160 more jobs. The total employment associated with the airport is therefore about 361 jobs.

Currently, there are some employers in the Chenoweth Drive area. Lowe's is at the intersection of Chenoweth Drive and SR 95, Anderson Chrysler-Jeep-Dodge is directly south of Lowe's, and an RV resort park and other businesses are in the first mile of Chenoweth Drive east of SR 95.

Municipal services employ several persons in the airport area. The Lake Havasu City Landfill is 2.5 miles east of SR 95 on Chenoweth Dr and the North Regional Wastewater Treatment Plant is on Airpark Rd.

The City's industrial park is under development just south of the airport, further described in the Land Use section of this Chapter.

## **PHYSICAL, NATURAL, AND CULTURAL ENVIRONMENTS AND LAND USE**

The NHA is a portion of Lake Havasu City that is north of the master-planned community developed by the McCulloch Company and incorporated as a City in 1978. The NHA is the closest part of the City to I-40, Bullhead City, and Kingman to the north. The NHA is also closest to the Mohave Mountains, which ring the City on the north and east. Many washes cross the rolling slopes of North Havasu and empty the waters that run rarely, yet swiftly, into the Colorado River to the west.

Key physical and political boundaries appear in Figure 1.1. As stated above, the NHA is entirely within the Lake Havasu City General Plan area. Most of the NHA is inside the current City limits. Figure 2.5 displays the land ownership in North Havasu. A large share of the land is held in trust by the Arizona State Land Department. The chart (Figure 2.6) indicates a 73 percent share of North Havasu land is State Trust land.

Privately-held lands are present along the SR 95 corridor, and some of the private lands have been developed. Federal BLM land includes the Lake Havasu City landfill (under a public purposes lease to the City), an area in the southeast corner of North Havasu, and more than one square mile east of the airport. The City has assumed ownership of former BLM lands on the site known as the "MCC Park site," to be developed into a future regional park. Finally, the NHA includes a small sliver of the huge Havasu National Wildlife Refuge.

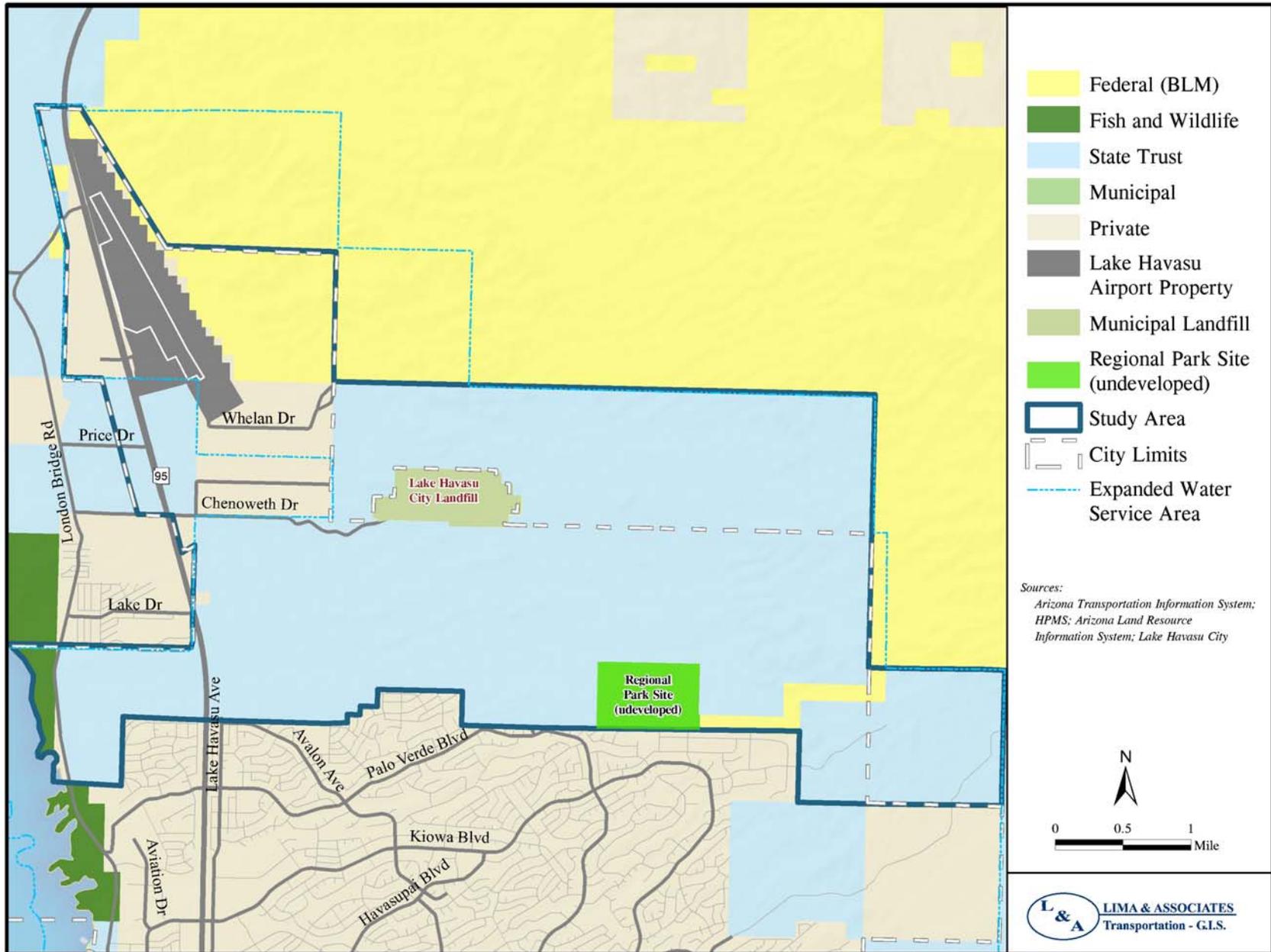
Most of the NHA is inside the City government's water service area (Figure 2.5). The water service area is known as the "expanded water service area." The west-central portion of the NHA, while within the City limits, is not served by the City, but rather by the Arizona-American Water Company in the Desert Hills Water service area.

### **Wildlife and Vegetation**

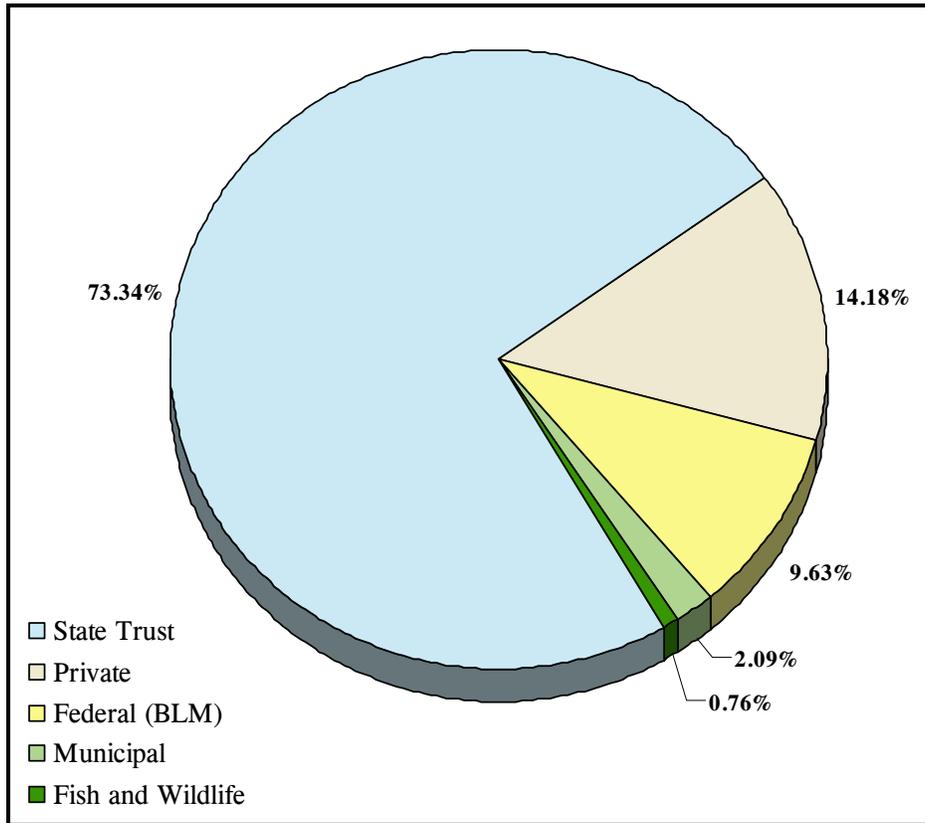
The bulk of the NHA is upland and in the mixed paloverde vegetative community. A variety of vegetative communities exists in the Havasu National Wildlife Refuge and environs. Native plant associations include the Dalea and Fremont's Cottonwood (*Populus Fremontii*). Non-native species include the Tamarisk or Salt Cedar (*Tamarix Pentandra*), which spreads rapidly and consumes large amounts of water. Reduction of tamarisk spreading is of ongoing concern.

The river waters at the NHA boundary are critical habitat for the bonytail chub, a native endangered fish.

**FIGURE 2.5. LAND OWNERSHIP**



**FIGURE 2.6. LAND OWNERSHIP, SHARE BY OWNER**



A group of special status species has been identified in areas of Mohave County having the same vegetative communities and elevation range as the NHA:

<u>Species</u>	<u>Status</u>
Bald eagle	Threatened
Bonytail chub	Endangered
California Brown pelican	Proposed delisted
Desert tortoise Mohave population	Threatened
Razorbacks sucker	Endangered
Southwestern willow flycatcher	Endangered
Yuma clapper rail	Endangered
Yellow-billed cuckoo	Candidate
American peregrine falcon	Delisted

**Refuges, Preserves, and Wilderness Areas**

The NHA includes a portion of the Havasu National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service. The mission of the agency is to manage the refuge for wildlife and

wildlife habitat. When found to be appropriate and compatible, wildlife-oriented recreation (specifically hunting, fishing, wildlife observation, wildlife photography, environmental education and environmental interpretation) is encouraged and promoted. The lands between London Bridge Rd and the bank of the Colorado River and the waters of the river are a part of the refuge, which provides the visitor relief from the creosote flats and smoke tree/palo verde washes associated with the area.

Just south of the NHA, there are two fishing piers in the refuge, located in Mesquite Bay 1 and Mesquite Bay 2. Each bay is set aside for visitor use without watercraft disturbance, is closed to all watercraft entry, and has constructed underwater fish habitat areas.

The refuge manager has informed the NHATS consultant that the refuge would not be advocates for changes that negatively affect the refuge's mission, and that the refuge does not have any plans specific to the NHA.

No preserves exist in the NHA, although the Havasu National Wildlife Refuge's Havasu Wilderness extends along the Colorado River for 10 miles from a point one-fourth mile north of Fathom Dr north to I-40. The wilderness is within a mile of the NHA at the north end of London Bridge Rd.

### **State Lands**

The ASLD holds land in trust to provide for 13 beneficiaries, the largest of which is the Common Schools. The Common Schools are those who provide K-12 public education in the State. Many State Trust Lands are leased before the eventual disposition of the lands. Large State Trust Lands that are not leased may be used for recreational purposes, by permit only. All vehicular travel on State Trust Lands must be on designated roads and trails.

Over 73 percent of the land in North Havasu is State Trust Land. (Figures 2.5 and 2.6). The land along SR 95, because of its proximity to the highway and other facilities, will likely be marketed first. A sales contract for a parcel of 449 acres in the southwest corner of the NHA (known as the "South of Price" property) was returned to the ASLD because of a mortgage default.

The ASLD has cooperated with Lake Havasu City per ARS 9-461.05 and adopted the Lake Havasu City Conceptual plan for State Trust Land inside of the City's planning area in 2004, and has coordinated with the City regarding integrating the Conceptual plan into the municipality's general land use plan. The State Land Commissioner has approved the Lake Havasu City Conceptual plan. Updates to the plan have not been formally approved by the commissioner per ARS. 37-331.03.

The ASLD recently noted that as part of the Conceptual plan approval the Department accepted the alignment as shown on the 2004 General Plan for the City. In February 2009 the ASLD also submitted a letter to the ADOT Lake Havasu SR 95 Realignment study favoring

the selection of the Realignment study's Corridor A pending further analysis, and recommended that the further study compare Corridor A and Corridor C.

The next areas ASLD will likely market is the large tracts to the south and northwest of the *Shops at Lake Havasu*. Portions of each of the tracts are within the NHA and also currently within the City limits. The lands will likely go on the market by 2014. One-half square mile of land east of SR 95 at the south end of the NHA is likely to be the next area marketed subsequent to those areas. Once all of those lands are sold, ASLD will still hold over 40 percent of the North Havasu lands. The construction or final planning of any realignment corridor would likely contribute to the marketability of the eastern NHA's State Trust Lands. Despite the fact that the lands in the southeast portion of the NHA are sensitive mountain preservation lands, the State Route 95 realignment will likely thread its way through this corner of the NHA. However, the current economic recession has affected ASLD both because of the decline in land market conditions and because of the state government budget crunch. The lack of funding has led to a pause in any conceptual land use planning by ASLD.

The ASLD has gone on record with a preference for the more westerly corridor (corridor A) for the SR 95 realignment. The final corridor study recommendation was to continue study of both corridors A and C. Note that a fairly narrow corridor remains under consideration in North Havasu; the easterly and westerly corridor options that are to be compared are to the southeast, outside the NHA.

Vandalism and trespass on State Trust Lands are of concern and will continue to be so with the large amount of land to be held for many more years in North Havasu. All policing of State Trust Lands is a matter of local police working cooperatively with the ASLD. Some examples of the specific concerns in North Havasu are Off Highway Vehicles blazing trails east of SR 95, and long-term camping without a permit. On a broader scale, it is illegal to disrupt plant and wildlife on, blaze trails across, visit historic and prehistoric archeological sites on, or remove natural products from State Trust Land.

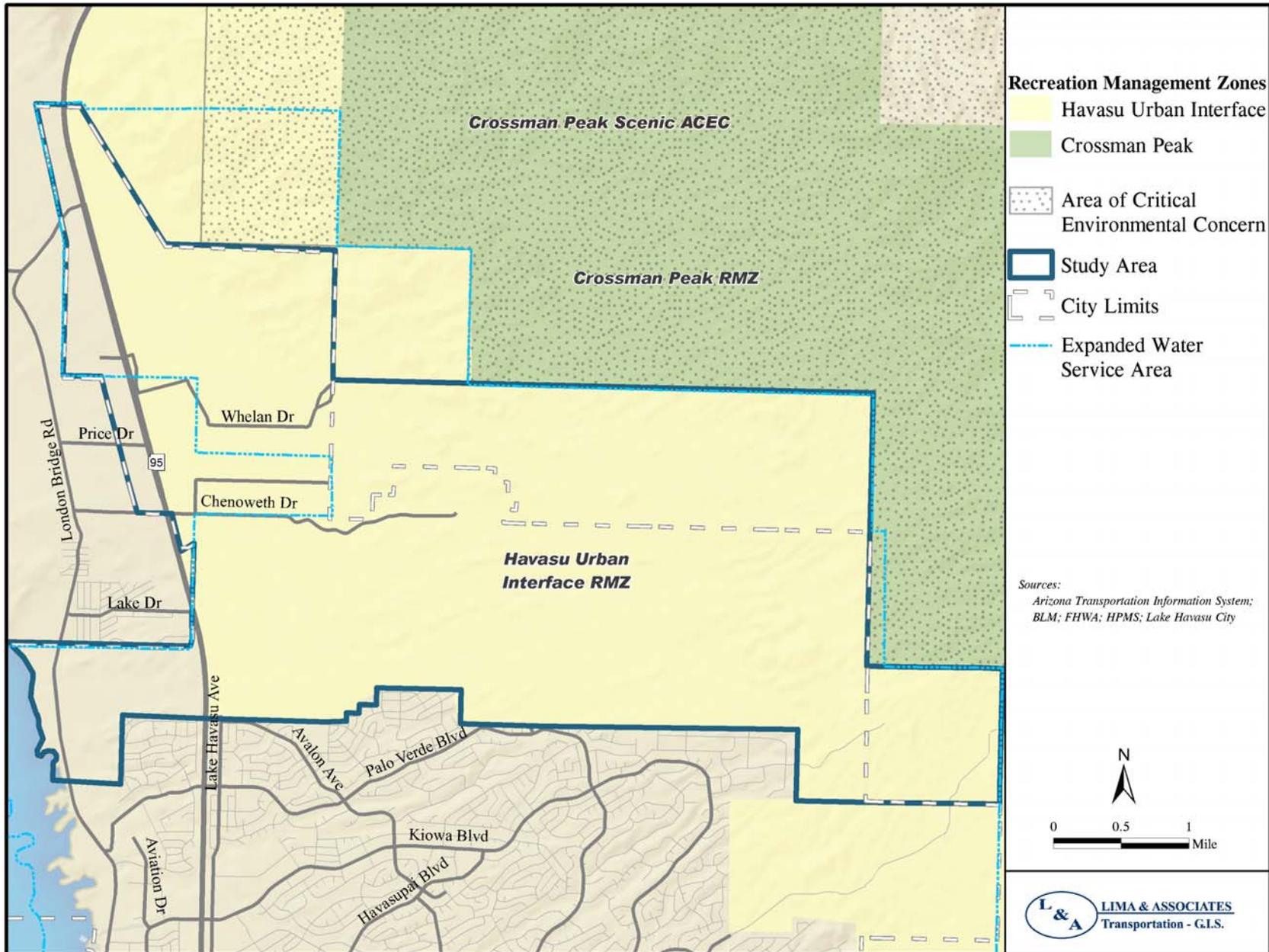
### **Bureau of Land Management Public Lands**

The BLM's *Approved Lake Havasu Field Office Resource Management Plan* (RMP) was finalized in 2007. The plan is a guidebook for management of the BLM public lands in the region. BLM works with other local, state, and federal agencies to plan jointly for a combination of federal and non-federal lands. Usually, the areas of mixed ownership that are addressed in RMPs are adjacent to blocks of federal land, and are called interface areas.

### ***Havasu Urban Interface Recreation Management Zone (RMZ)***

- All of the NHA east of SR 95 falls within the Havasu Urban Interface Recreation Management Zone, as shown in Figure 2.7. The BLM RMP describes this area as a "niche" providing "access to public lands with opportunities for hiking,

**FIGURE 2.7. SPECIAL BLM AREAS (RECREATION, CRITICAL ENVIRONMENTAL CONCERN)**



equestrian use, Off Highway Vehicle (OHV), wildlife and cultural appreciation, and other recreational activities.” Management of this zone should “provide opportunities for visitors and residents quick access to engage in targeted activities and realize benefits to persons, community, and environment,” and it should also allow “opportunities for community residents to engage in sustainable personal discovery, while protecting critical resources located in the area.” The area is described as open space for the residents of Lake Havasu City, and “partnerships will be sought to help improve this RMZ so that within the life of this plan most responsible visitors will attain a greater appreciation for their public lands and the natural and cultural resources found therein.” Primary activities for this zone include hiking, OHV touring, backpacking, equestrian/trail riding, and rockhounding.

### ***The Crossman Peak Recreation Management Zone***

This zone lies adjacent to the NHA on the north and east, and is also shown in Figure 2.7. According to the BLM Approved Resource Management Plan, recreation there will be managed to keep it as a Semi-Primitive area, with “scenic hiking and equestrian opportunities and limited OHV trail riding for personal exploration and discovery.” The management objective for this zone is to “provide visitors and residents with a scenic backdrop to Lake Havasu City and associated Lake Havasu special recreation management area and provide access to those targeted activities.” The zone should be managed to “provide opportunities for community residents to engage in sustainable personal discovery, while protecting critical resources located in the area.” This area also serves as open space for the residents of Lake Havasu City. “Partnerships will be sought to help improve this RMZ so that within the life of this plan most responsible visitors will attain a greater appreciation for their public lands and the natural and cultural resources found therein.” Primary activities for this zone, similar to the Havasu Urban Interface, include hiking, OHV touring, backpacking, equestrian/trail riding, and rockhounding.

### ***Scenic Area of Critical Environmental Concern (ACEC)***

Crossman Peak is also a Scenic Area of Critical Environmental Concern, displayed in Figure 2.7. The area of concern is adjacent to the NHA, and extends westward beyond the Crossman Peak recreational zone. Beyond the NHA to the northeast, the ACEC stretches 48,855 acres and includes the Crossman mountain peak. The ACEC will be managed to “protect and prevent irreparable damage” to the following “relevant characteristics and important values,” as outlined in the RMP:

#### ***Relevance:***

- Significant places of traditional cultural importance.
- Natural scenic backdrop or mountain preserve for Lake Havasu City.
- Major lambing grounds for bighorn sheep.
- Large tract of public land that exhibits high degree of naturalness with little human modification of the landscape.

***Importance:***

- The scenic value of Crossman Peak is irreplaceable to the region.
- Protects a sacred mountain, sites eligible for inclusion on the NRHP, and priority wildlife habitat from impacts of expanding urbanization in the Lake Havasu region.
- Includes large area that provides the region with high opportunity for isolation from the sights and sounds of human development.

**Archaeological and Historical Resources**

The NHA is a part of the traditional homeland of the Chemehuevi people, who know themselves as Nuwu. Within a few miles of North Havasu, according to Havasu National Wildlife Refuge literature, “petroglyphs in Topock Gorge trace the stories of early peoples who lived along the lower Colorado River. A few old mines tell a more recent tale of nineteenth century gold prospectors hoping to strike it rich.” The former Gold Wing Mine, a surface and underground gold and silver mine, is 1.5 miles north of the NHA. Two former mine sites are within the NHA, but have no record of any historical significance.

In its Resource Management Plans, the BLM identifies areas for special land management in a number of the categories that it manages for balanced use. As stated above, portions of the Crossman Peak ACEC were identified as being important for traditional cultural purposes. However, no specific archaeological or historical sites were identified for special management within the NHA.

No archaeological or historical sites on the National Register of Historical Places are in the NHA.

**Environmental Concerns**

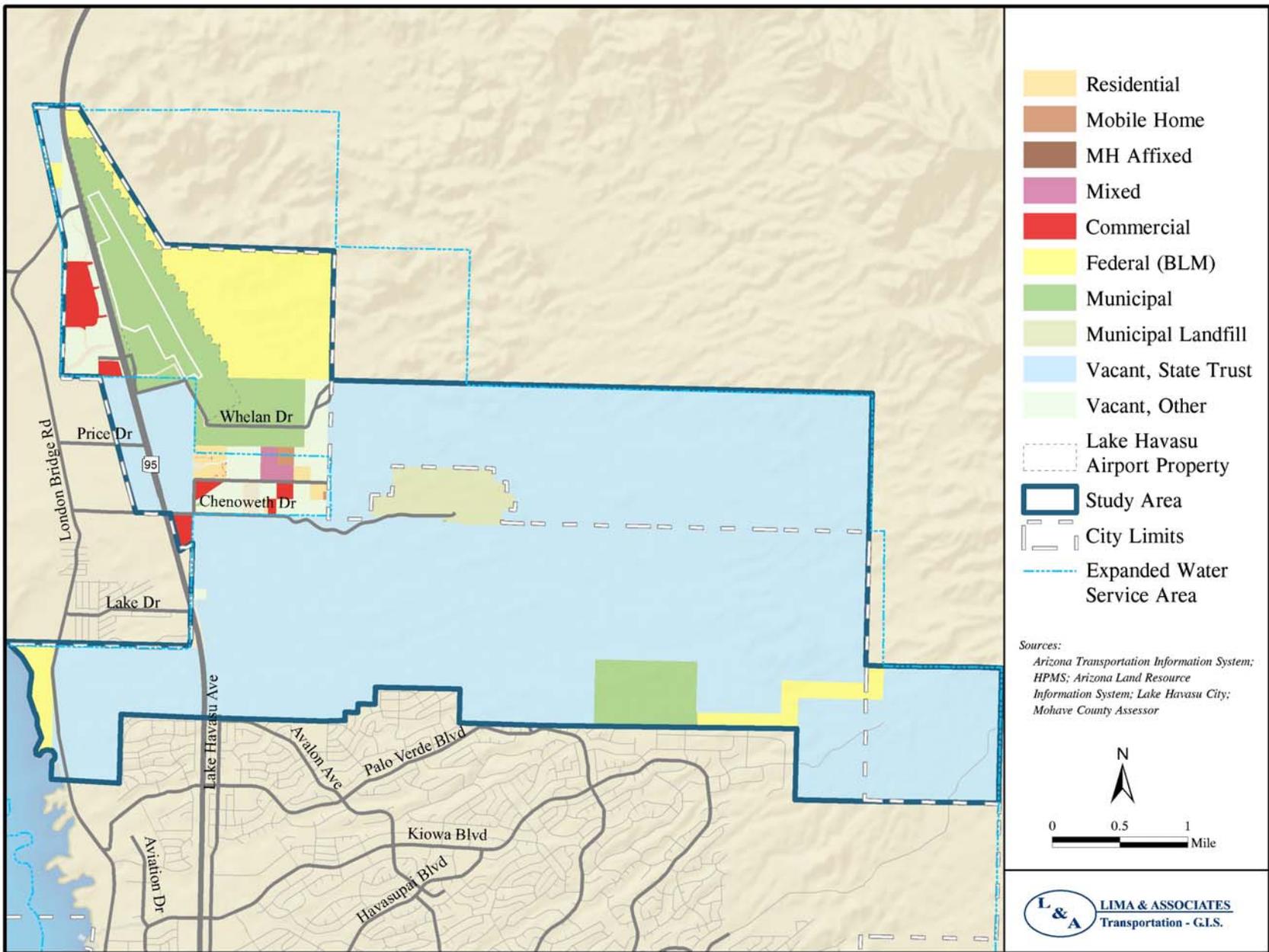
Figure 2.7 illustrates areas of environmental concern within the NHA. Potential concerns include impacts of waste management and treatment facilities, and leaking underground storage tanks. Mine locations may pose environmental and safety concerns.

According to information on the Arizona Department of Environmental Quality (ADEQ) web site, Lake Havasu City and southern Mohave County are in attainment of air quality standards.

**Land Use**

Current land use in the NHA is depicted in Figure 2.8. The land use categories are similar to those typically included in a City’s land use plans. The categories are somewhat more specific, however, than local planning categories, because of information available from the Mohave County Assessor’s.

**FIGURE 2.8. CURRENT LAND USE**



**Zoning.** Current zoning in the NHA appears in Figure 2.9. The commercially-and industrially-zoned areas are coterminous with lands that are in the process of development. The remainder of the NHA that is within the City is generally zoned A1, agricultural/rural residential.

The original platted area of the City was planned at 33,000 lots anticipated to be occupied by homes with a population of 80,000. Only 5,000 of those original lots are not developed. Due to the limited water resource capacity, the net residential density must remain low enough to keep the buildout population at between 100,000 and 110,000 for all of Lake Havasu City, including the currently platted area, the NHA, and all other annexation areas described in the City's annexation plan (described below). Still, City officials and many residents are open to having clustered development with areas of open space, to yield that "low" average residential density.

A number of the master plan zoning categories are likely to be applied in the future in the NHA to accommodate a combination of clustering and open space.

The stakeholder meetings for the NHATS focused on a few issues, one of which was stakeholders' current preferences for land development in NHA. As the NHATS is to be the transportation planning response to the land use planning concepts, the stakeholder comments about land use and the transportation system are reported together in Chapter 5.

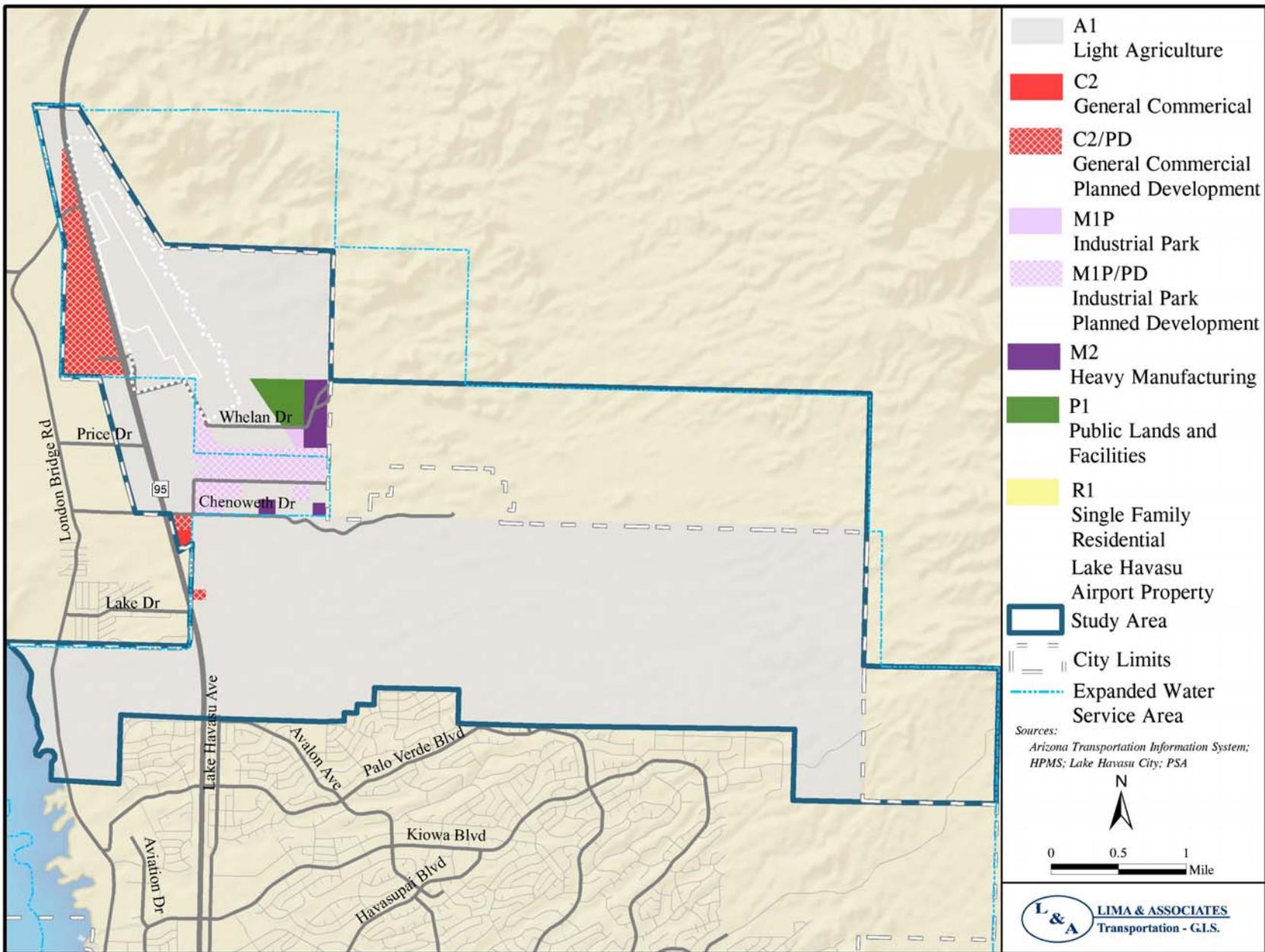
The City's industrial park, comprising three parcels, appears in Figure 2.10, in the context of the areas of existing commercial and industrial development in North Havasu. The City is in the early phase of industrial park development; many floodplain issues have been worked through.

The MCC Regional Park would probably be developed soon after the adjacent State Trust Lands were sold.

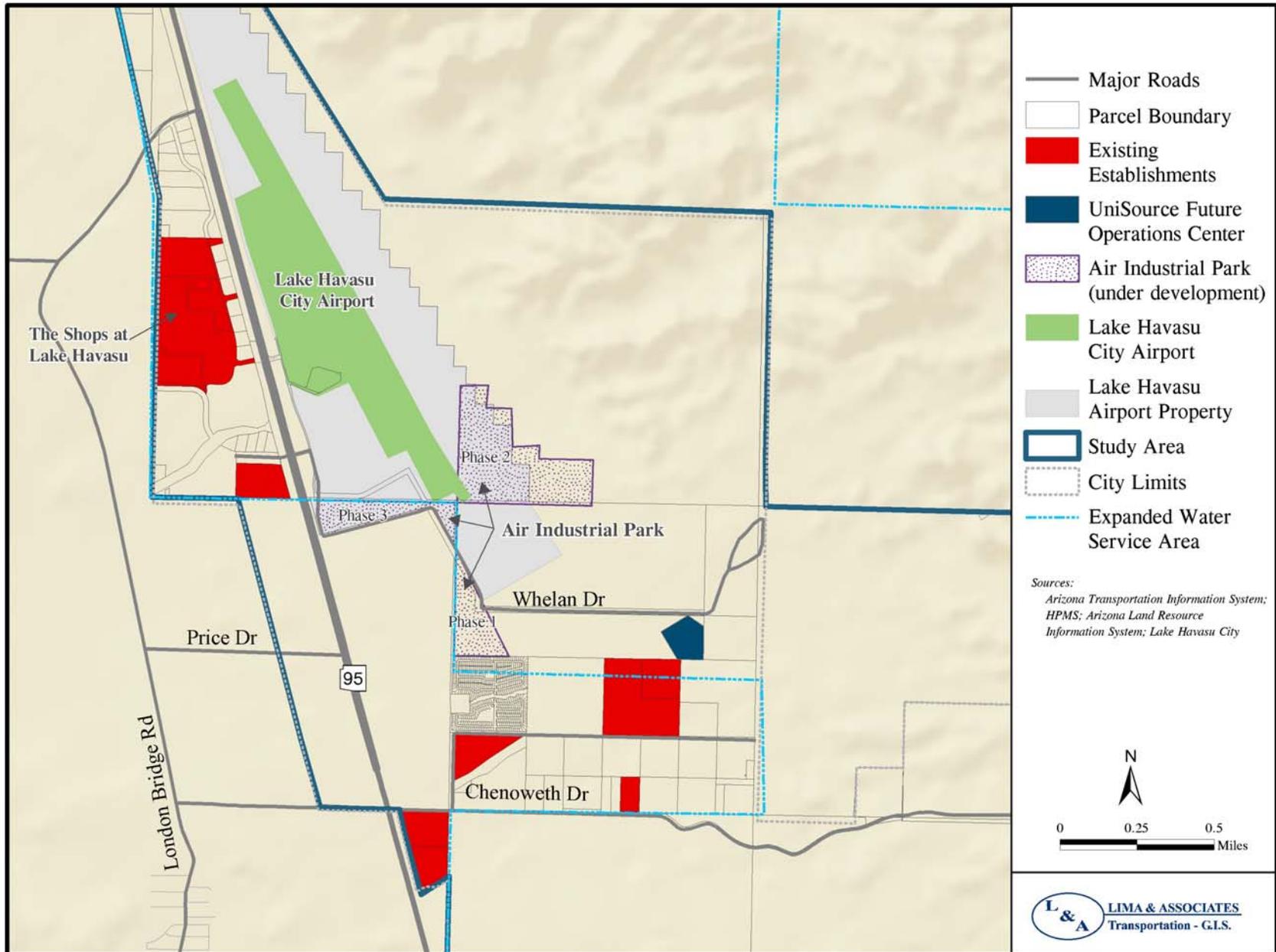
**Annexation.** Lake Havasu City is to abide by the procedures set out for municipalities in ARS 9-471. Municipalities are also required by Section 37-202 to obtain written approval of the State Land Commissioner and the selection board if State Trust Land is included in the territory to be annexed.

Annexations which include State Trust Land now require a pre annexation development agreement which outlines requirements for completing an annexation. The urban containment boundary was included in the 2004 Conceptual Plan and subsequent changes to the City's General Plan have not been adopted by the Commissioner. The urban containment boundary has been discussed as an open space area where there would be no land development. The ASLD asserts that the intent of this boundary may violate the growing smarter statutes (ARS 9-461.06.N) as well as the Conceptual planning statutes (ARS. 37-331.03, discussed on page 27). Actions taken by the City to alter the General Plan (as it affects State Trust Land) without the subsequent approval of the commissioner may not be recognized by ASLD. The ASLD suggested that in lieu of the urban containment boundary the City could focus its open space efforts on those properties that fall within the City's water service area.

**FIGURE 2.9. ZONING**



**FIGURE 2.10. EXISTING COMMERCIAL AND FUTURE AIR PARK**



The City adopted an annexation policy in 2008 pointing toward annexation of all of the lands shown in Figure 2.11 by 2013. The portions of the annexation policy relevant to North Havasu are detailed below.

**Policy: Annexation of areas for the proposed parkway and urban containment boundary.**

A proposed parkway along the eastern part of the community is expected within the next 20 years. The proposed parkway also designates the urban containment boundary. The urban containment area designates areas the City will consider new development in the next 20-25 years.

Portions of the parkway along the eastern portion of the community are not within the City limits. The final alignment of the parkway has not been determined; however, the City should work toward annexation of the areas in and along the proposed parkway to ensure proper planning and implementation of the transportation network along the eastern portion of the community.

**Policy: Annexation of areas designated for Mountain Preservation.**

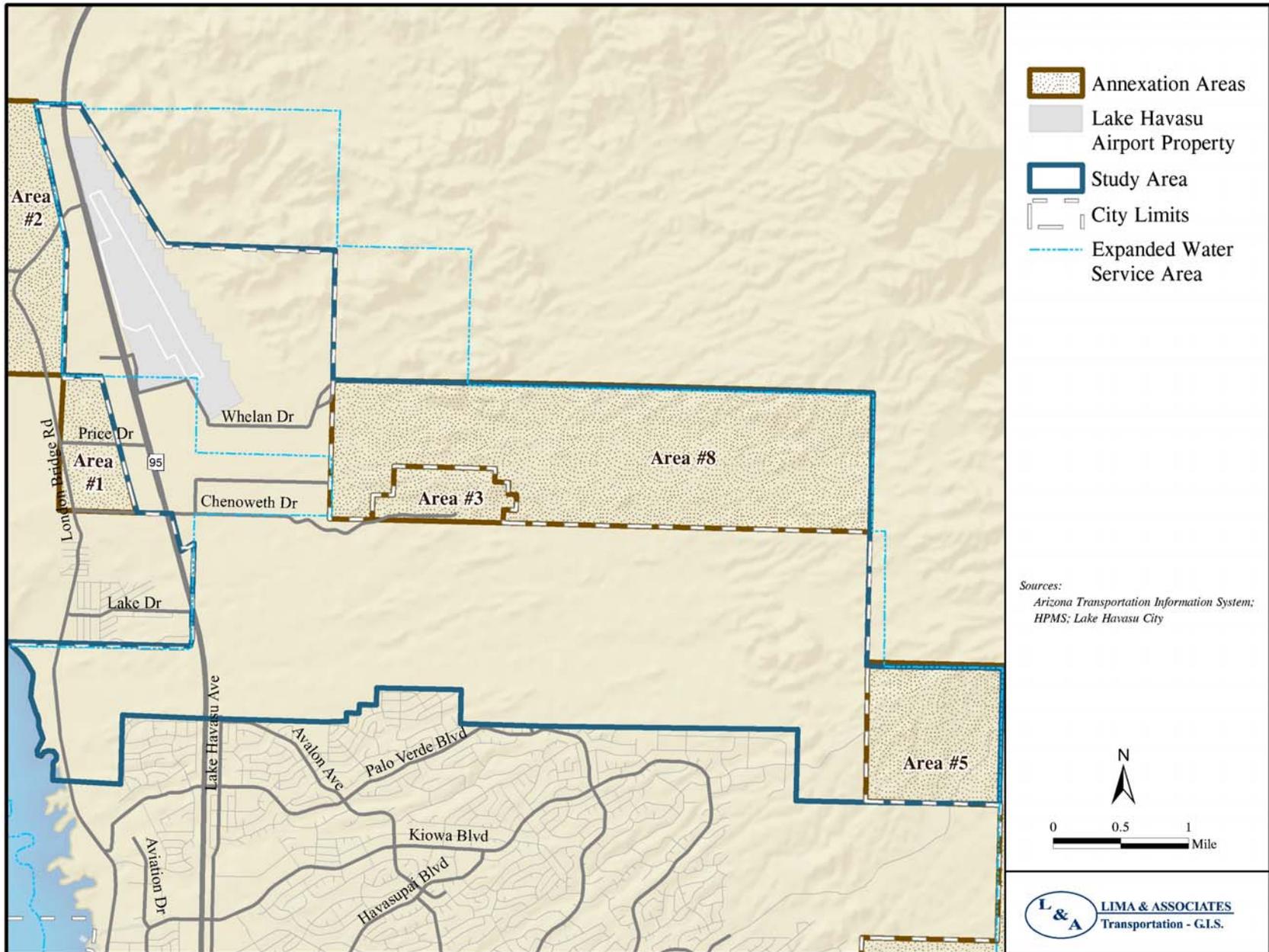
The community has identified areas along the northern and eastern fringes of the community for mountain preservation. The terrain in these areas makes residential development difficult, thus preservation of the natural environment is critical. The annexation of these areas will ensure preservation as outlined in the City's General Plan and Mountain Preservation Task Force recommendations. In Annexation area 8 the typical density might be up to 2 units per acre and the density ceiling is likely to be 4 units per acre.

**Policy: Do not pursue annexation of Desert Hills and surrounding residential areas at present time.**

The Desert Hills area in the past has been contentious in regards to annexation and is unlikely to receive the required percentage of property owners to be in favor of annexation. The City should concentrate annexation efforts to the other areas of the community, primarily along the eastern boundaries.

The Desert Hills and surrounding residential areas (The Refuge, Lakeridge Estates, Sun Lake Villages, etc) should only be considered on a voluntary basis.

**FIGURE 2.11. ANNEXATION AREAS**



## TRANSPORTATION CONDITIONS AND ISSUES

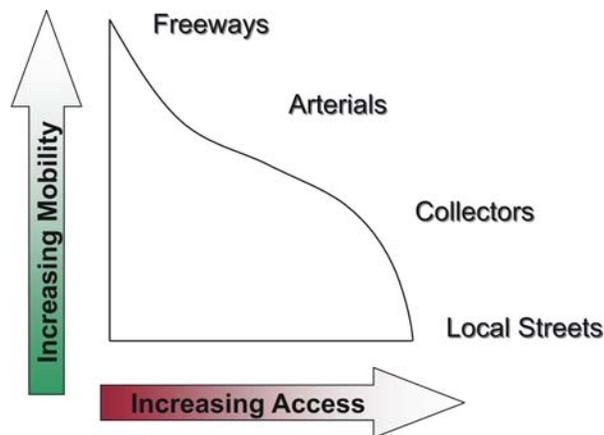
This section presents the current road conditions in the NHA. Road conditions discussed include current roadway network characteristics, roadway infrastructure conditions, traffic volume counts, and level of service. Multimodal conditions are discussed in the next section, including transit characteristics and characteristics of non-motorized facilities.

### Roadway Network Characteristics

This section presents characteristics of the roads in the NHA including functional classification, number of lanes, and speed limits.

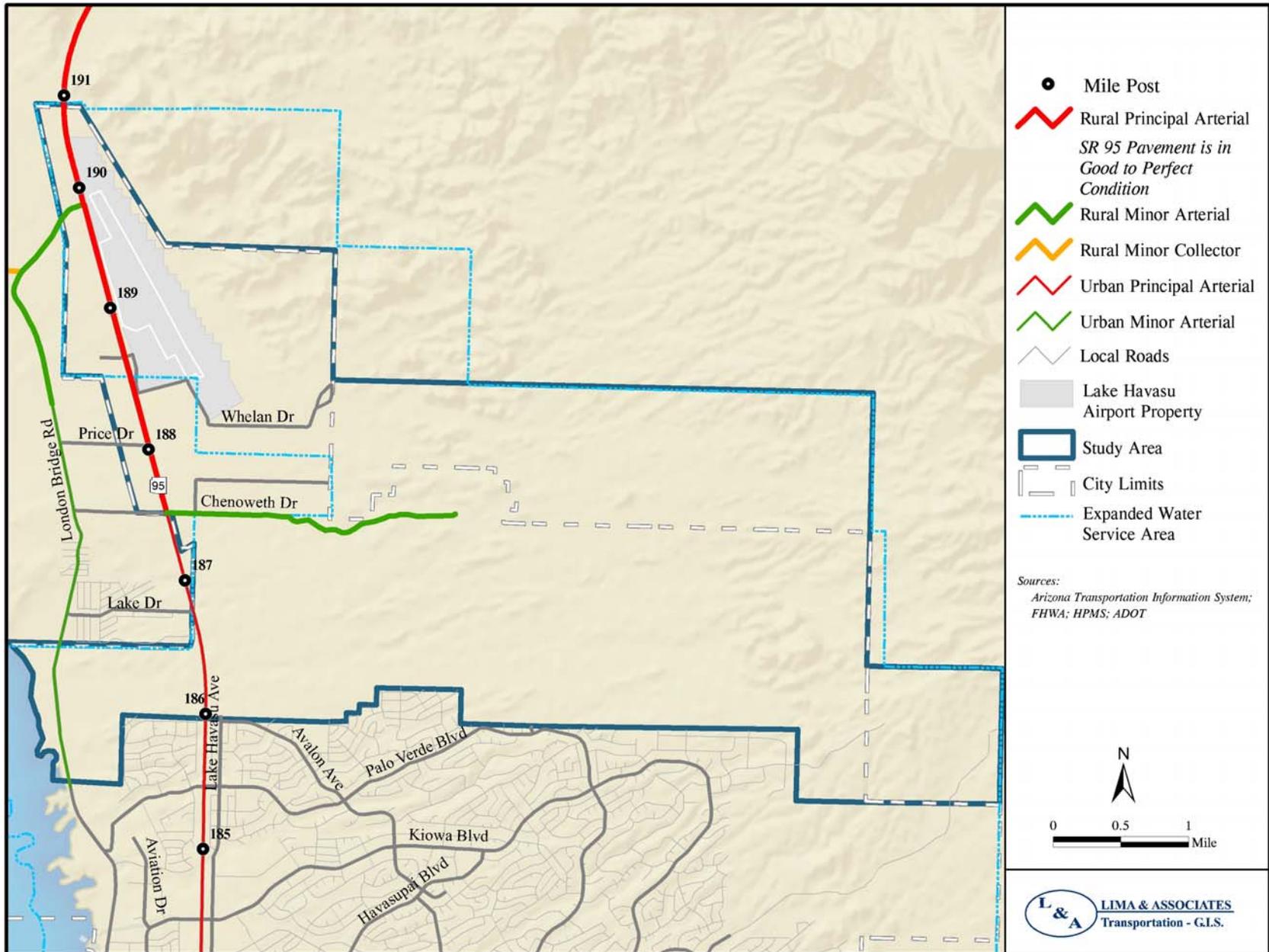
**Functional Classification.** A functional classification groups roadways by mobility and access characteristics. Mobility represents the movement of people and freight from place to place and access represents the connection between roadways and properties along the roadways. Roads are generally classified into freeways, arterials, collectors, and local roads. Figure 2.12 illustrates the relationship of mobility and access to the road classification. A freeway, for example, provides mobility over long distances with minimal access to adjoining properties. Arterials provide a high level of mobility, serve longer distance trips, and provide access to adjacent properties. Collector roads provide mobility between neighborhoods and commercial areas and access to these areas from arterials. Local streets provide access to individual homes and businesses within neighborhoods and commercial areas.

**FIGURE 2.12. FUNCTIONAL CLASSIFICATION: MOBILITY VERSUS ACCESS**



Roadway functional classifications were developed to reflect both urban and rural areas in the NHA. Figure 2.13 displays the functional class of each roadway (collector and above) in the NHA.

**FIGURE 2.13. FUNCTIONAL CLASSIFICATION**



**Freeways** provide high mobility and limit access to traffic interchanges at selected locations. Interstate highways and urban freeways are typically built to freeway standards and capacities.

If the SR 95 realignment is constructed, it is likely that its functional class will be **Rural Divided Highway**, a class higher in capacity than a Rural Principal Arterial, but not as high as a freeway. A Rural Divided Highway provides high mobility and limits access, with traffic interchanges at selected locations and possibly at-grade intersections at other locations. Adjacent properties do not have direct access to rural divided highways.

**Arterials** serve or bypass the primary centers of activity, carry relatively high traffic volumes, and carry the primary portion of trips entering and leaving the area. Some arterials have full or partially controlled access to improve mobility. The only existing principal arterial found in the NHA is State Route 95, and the two existing minor arterials are London Bridge Rd and Chenoweth Dr.

The **collector** road system distributes trips from the arterials to the local streets. Collector streets also provide traffic circulation within residential neighborhoods and low density areas, and direct access to adjacent property. Fathom Rd, just outside the NHA, is an existing collector street.

**Local** streets provide the highest level of access by providing direct access to residential and commercial properties. Specific local streets are not included in the NHATS, but are visible on the transportation system maps.

**Pavement Type and Condition.** Pavement conditions are reported for SR 95 on the ADOT Pavement Management System. Pavement conditions are rated on a Present Serviceability Rating scale ranging from superior (4.0 to 5.0) to very poor (0.0 to 1.0). All segments of SR 95 pavement are in good or superior condition in the NHA.

On the Lake Havasu City street system nearly all paved streets are paved with a two-inch overlay over a four-inch base course.

**Number of Lanes and Speed Limit.** The number of lanes and speed limits appear below for those roadways in North Havasu that are functionally classified. Local roads in Lake Havasu City typically have two lanes and have speed limits of 25 mph.

- SR 95, MP 186 to 190, 4 lanes, 55 mph
- SR 95, MP 190 to 191, 2 lanes, 65 mph
- Chenoweth Dr, 2 lanes, 35 mph
- London Bridge Rd, 2 lanes, 35 mph

## Traffic Volume Data

ADOT annualized average 24-hour volume figures appear in Table 2.6, for SR 95 only. North Havasu segments as well as selected segments to the north and south of the NHA are included.

**TABLE 2.6. SR 95 ANNUALIZED AVERAGE DAILY TRAFFIC**

<b>Route</b>	<b>From MP</b>	<b>Start</b>	<b>To MP</b>	<b>End</b>	<b>AADT 2007</b>
SR 95	183.09	Palo Verde Blvd (South)	183.84	Industrial Blvd	28,900
	184.49	Kiowa Ave	185.46	Palo Verde Blvd (North)	20,400
	185.46	Palo Verde Blvd (North)	187.52	Chenoweth Dr	19,500
	187.52	Chenoweth Dr	190.00	North Study Area limit	10,000
	225.56	California State Line - East of Needles	227.33	Mohave Valley Rd (Ex SR 95 South)	11,800

2007 ADOT annualized average 24-hour volumes, SHS.

## Current Level of Service

Level of Service is a qualitative measure that characterizes how well traffic is flowing and the perception of traffic conditions by motorists and passengers. Levels of service range from LOS A to LOS F where LOS A represents the free flow of traffic with minimum interruptions and delay, and LOS F represents high congestion with significant delay and occasional blockage of intersections stopping traffic on particular road segments. In an urban area, the acceptable level of service is generally LOS C/D or better.

**Road Segment Levels of Service.** Table 2.7 describes the ranges of volume-to-capacity (v/c) ratios used to calculate the level of service on road segments in the *2005 Lake Havasu City SATS*. Table 2.7 also demonstrates that as the ratio of daily traffic volume to capacity increases, the level of service experienced by the drivers deteriorates until it exceeds the road capacity and bottlenecks occur. Figure 2.14 presents photographs representing the various levels of service.

In the *2005 Lake Havasu City SATs*, portions of Lake Havasu City roads operated at a LOS of D or worse; however, no segment in the NHA had an LOS worse than C. Both Chenoweth Rd and London Bridge Rd operated as a LOS A, while SR 95 functioned as a LOS C with a v/c ratio just over .47.

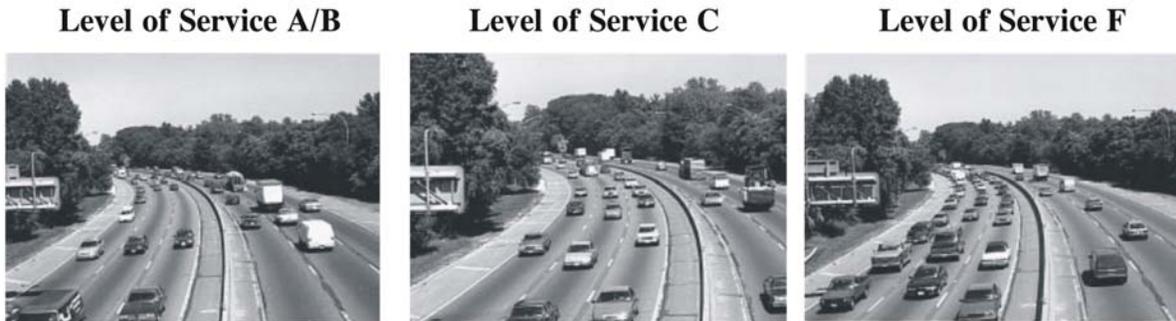
The average annual daily traffic (AADT) volumes in 2007 for the major roadways in the NHA appear in Figure 2.15. These AADT figures are according to the Highway Performance Monitoring System (HPMS).

**TABLE 2.7. LEVEL OF SERVICE THRESHOLDS AND DESCRIPTIONS**

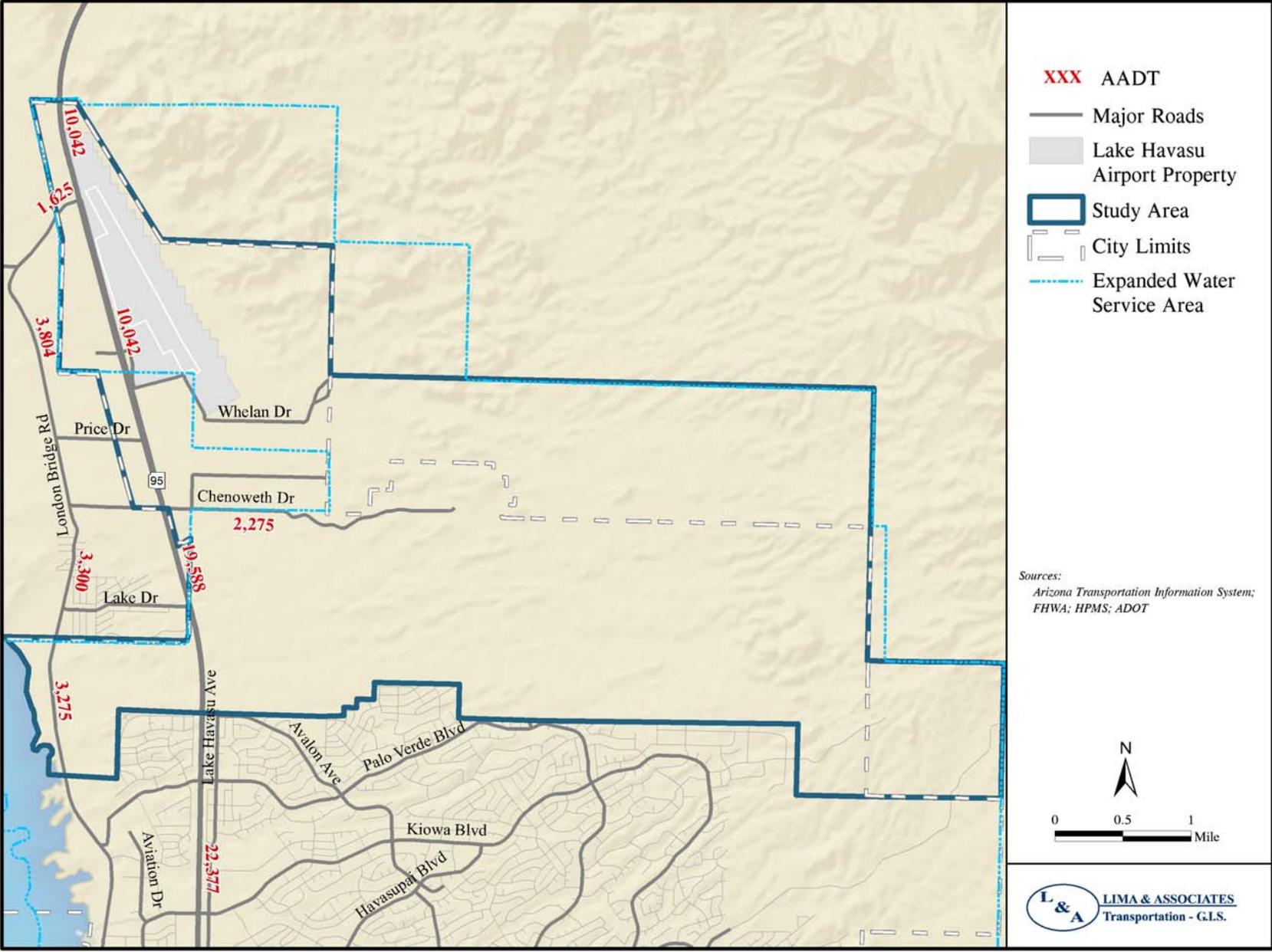
<b>LOS</b>	<b>V/C Ratio</b>	<b>Range Description</b>
A	0.0 to 0.29	Free flow, low volumes and densities, high speeds. Drivers can maintain their desired speeds with little or no delay and are unaffected by other vehicles.
B	0.30 to 0.47	Reasonably free flow. Traffic is noticeable, but drivers have reasonable freedom to select their speeds and lanes.
C	0.48 to 0.68	Speeds remain near free flow, but freedom to maneuver is restricted.
D	0.69 to 0.88	Speed begins to decline with increasing volume and drivers have limited maneuverability.
E	0.89 to 1.00	Unstable flow with volume at or near capacity. Freedom to maneuver is extremely limited.
F	Greater than 1.00	Gridlock conditions with speeds dropping to zero at times.

Source: Highway Capacity Manual, 2000, Exhibit 21-2, p. 21-3.

**FIGURE 2.14. EXAMPLES OF ROADWAY LEVEL OF SERVICE**

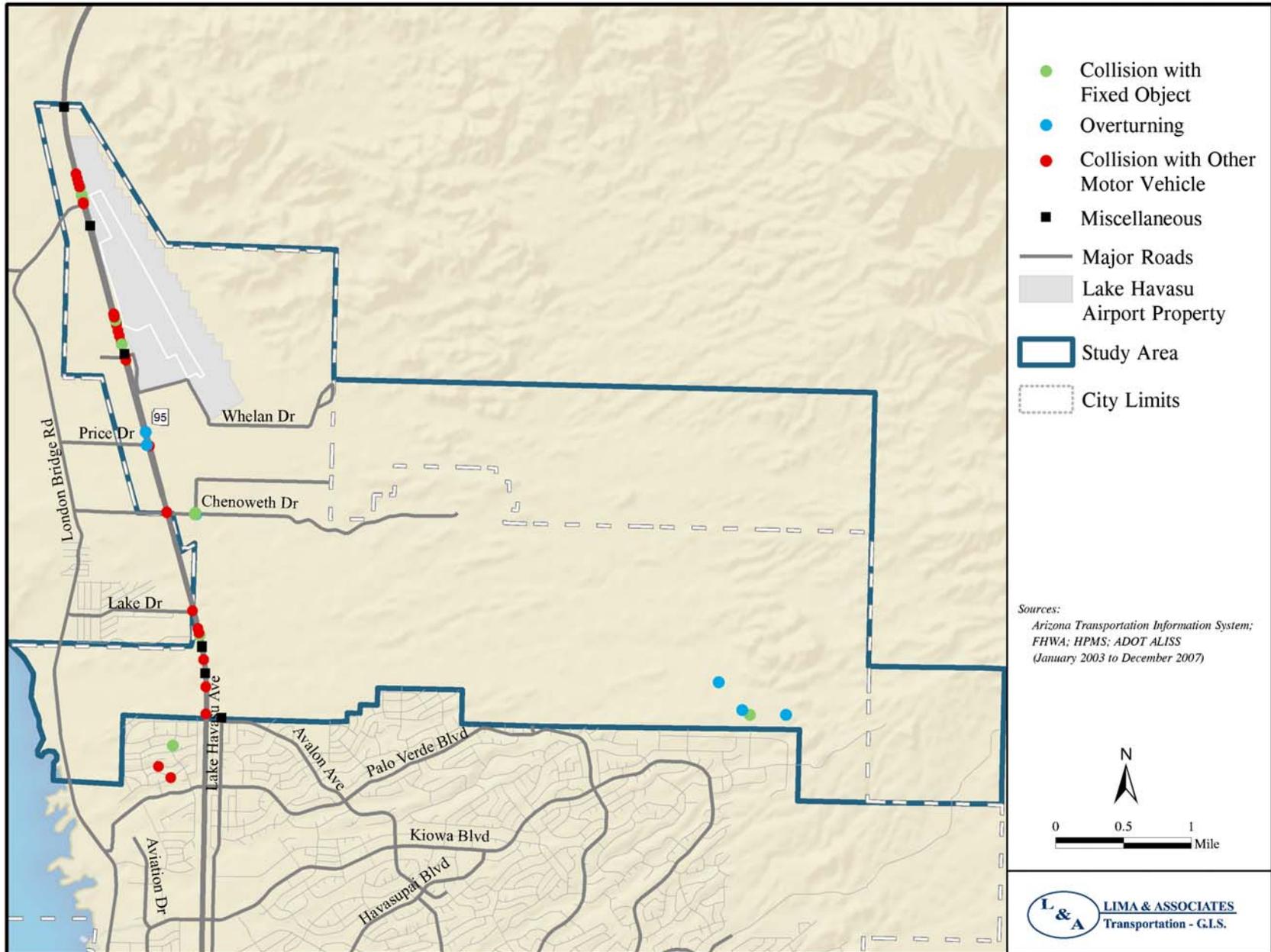


**FIGURE 2.15. 2007 AVERAGE ANNUAL DAILY TRAFFIC**





**FIGURE 2.16. LOCATIONS OF TRAFFIC COLLISIONS 2003-2007**



## Access Management

The *Access Management Study State Route 95, I-40 to Bill Williams Bridge, July 2004* included all of existing SR 95 within Lake Havasu City. The *Access Management Study* also addressed the possible SR 95 realignment around Lake Havasu City. The goal of an access management program is to successfully balance the roadway operation needs with the land development needs. The main benefits of an access management plan are the preservation of safety and service. A key tool in maximizing mobility is appropriate limits on the number of access points to public highways from adjoining property.

Table 2.9 is an excerpt from the *Access Management Study* that illustrates typical corridor segments. The NHA includes SR 95 mileposts 186 to 191, so the segments including those mileposts appear in the excerpt.

**TABLE 2.9. ROADWAY SEGMENTS ON SR 95 CORRIDOR**

<b>Segment in NHA</b>	<b>From MP</b>	<b>To MP</b>	<b>Type of Traffic</b>	<b>Type of Facility</b>
North segment (and beyond)	201.2	190.4	Rural type development, accommodate medium to long-distance trips, access to adjacent land subordinate	Full access controlled highway, multilane, divided
Middle	190.4	187.5	Transitional	Urban arterial, medium access control
South segment (and beyond)	187.5	184.9	Urban	Urban arterial, medium access control

Table 2.10, also an excerpt from the *Access Management Study*, presents a listing of all currently existing driveways and intersections and identifies the status of the access points for the interim and ultimate facility.

No time horizon was established when the ultimate level of access control would be implemented, and it was noted that design concept reports would be needed to determine final design of the facilities and final traffic interchange locations. The *Access Management Study* also included several strategies to be pursued to implement the study recommendations, and to be carried out jointly by ADOT, ASLD, BLM, Mohave County, and Lake Havasu City.

ADOT has access categories under development for the SHS. Existing SR 95 in the NHA is proposed to be in the Urban 1 (U1) Category. U1 is proposed to be applied to new urban alignments and to emphasize travel at least at medium speeds, volumes, and distances, with through traffic dominant over direct access service. The statewide access management study was temporarily suspended in 2009.

**TABLE 2.10. ACCESS POINTS LOCATED WITHIN LAKE HAVASU CITY LIMITS**

<b>MP, Direction</b>	<b>Comment</b>	<b>Permitted/Type of Access</b>
189.80 West	Old London Bridge Rd New Alignment	Yes / Full Access, Signal
189.40 West	Center Loop	Yes / Full Access, Signal
189.00 East and West	Airport Center	Yes / Full Access, Signal*
188.70 West*	Retail Center Blvd	Yes / Full Access, Signal*
188.72 East	Driveway	Close*
188.55 East and West	Driveway	Yes / RI/RO
188.04 West	Price Dr	Yes / Full Access
186.59 West	Jacobs Row	Yes / Full Access
186.02 West	Driveway	Yes / RI/RO
185.45 East and West	Palo Verde Blvd North	Yes / Full Access

\*Airport Center and Retail Center Blvd full access and signals have been constructed and Retail Center Blvd has full access both East and West.

### **North Havasu Area Transportation Needs: Stakeholder Comments**

The following table (Table 2.11) expresses both the understanding and opinions of NHA stakeholders as of April 2009, regarding NHA transportation system needs and deficiencies.

A decision on a corridor location for any SR 95 realignment would have a major influence upon subsequent planning for the local transportation system. Any reference to the SR 95 realignment options in the stakeholder comments should be considered to reflect the stakeholders' current understanding, but might not refer to the final recommended option for the SR 95 realignment.

The recommended location and design of any SR 95 realignment has a bearing on the modeling done for the NHATS. A rural access-controlled divided highway cross section would have different travel characteristics than an interstate/freeway cross section. Some stakeholders favor each of those options at this time. A key question to be addressed by the NHATS was: How many more arterials would be needed through 2030 in the eastern portion of the NHA, beyond the realigned SR 95 and potential frontage roads? That question was answered by using the most current information on the City's preferred densities and conceptual land use patterns in the area. Future network alternatives reflected the resulting travel demand that was analyzed in the sketch planning model.

Some information was shared by City Council, the Planning Commission, and City staff regarding densities and conceptual land use patterns. The stakeholder comments (Table 5.7) include several comments on the development of the NHA.

**TABLE 2.11. NORTH HAVASU AREA TRANSPORTATION NEEDS AND DEFICIENCIES:  
STAKEHOLDER COMMENTS**

---

**Existing SR 95:**

- The access control recommended in previous plans should be implemented on existing SR 95.
- There is limited opportunity to widen existing SR 95 because right of way is not available.
- Although legal, it is too dangerous for buses to stop in the traffic lanes of SR 95.
- Bus pullout lanes are needed, with the right-of-way to accommodate them.
- More bus turnaround areas are needed than are available.

---

**Possible SR 95 Realignment, Interchanges and Other Relationships to the North Havasu Area:**

- The SR 95 realignment would serve through traffic, especially freight, rather than local traffic or regional traffic with a North Havasu destination.
- The North Havasu Area will compete with the SR 95 interchange with I-40 (Exit 9) for some, but not other commercial development.
- Corridor preservation is important to begin soon for future arterials in the North Havasu Area.
- Appropriate signage at the northern end of the realignment and at the Chenoweth interchange could help direct travelers to the commercial corridor on existing SR 95.
- There would be, at most, two full interchanges and another one or two off ramps within the North Havasu Area.
- The SR 95 realignment right of way should be wide enough to accommodate any anticipated transit options, including buses or passenger rail.
- Underpasses beneath the SR 95 realignment should be considered for up to three new arterial roadways in North Havasu.
- Bidirectional frontage roads, especially on the south side of the realignment, might be key arterial(s) in North Havasu.
- SR 95 realignment frontage road control would transfer to the City only if the City agreed to significant access control.
- Developers would be asked to dedicate frontage road and landscape acreage.
- The timing on beginning development of the regional park (“MCC site”) would likely be upon completion of the realignment.

---

**Other Arterials, Street Pattern:**

- An extension of Lake Havasu Ave to the north parallel to existing SR 95 would work well (several stakeholders).
  - The terrain and acquisition costs for an extension of Lake Havasu Ave might make it preferable to improve London Bridge Rd.
  - Lake Havasu Ave and London Bridge Rd perform different functions. Both the extension of Lake Havasu Ave and the improvement of London Bridge Rd may be needed.
  - Two “stub” streets off Palo Verde would make good North-South arterial connections.
  - Vehicle fuel costs may be an impetus to adopting more compact development patterns.
  - Development nodes along arterials, especially a “walkable neighborhood” setting, might serve a maximum number of activities with a minimum of vehicle miles traveled.
  - Verrado (a Buckeye, AZ development) or DC Ranch “nodes” could be an example for the North Havasu Area. The Foothills has some similarities to Verrado.
  - Some prefer rural and low-density residential except near the Chenoweth and SR 95 corridors.
  - North Havasu could have “continuum of care” retirement developments that might be very transit-dependent.
-

**TABLE 2.11. NORTH HAVASU AREA TRANSPORTATION NEEDS AND DEFICIENCIES:  
STAKEHOLDER COMMENTS (Continued)**

---

**Arterial and Collector Configuration and Design:**

---

- Arterials should be in a grid pattern. Arterials should be curved as needed to accommodate topography and drainage.
  - Arterials should not be curved into a U-shape that would duplicate the “plate of spaghetti” pattern in the remainder of the City (noted by the majority of stakeholders). That pattern is too confusing.
  - The Bullhead City SR 95 alternate and its arterial intersections were designed and constructed well.
  - Significant drainage work has been done in the development of the airport and in the “Shops at Lake Havasu” area that is downslope from the airport. Drainage infrastructure may be a large cost factor in the development of arterials elsewhere in North Havasu.
  - Standard arterial pavement widths will be increased from 54 to 64 feet, including a 5 foot bicycle lane in each direction.
  - Roundabouts should be considered as an intersection design option for collectors and local streets.
  - Fire safety and service by Lake Havasu City and Desert Hills Fire District should be a factor in all roadway design.
  - Signage should be improved throughout the area. SR 95 at the City limits should have a better City entrance sign.
  - Traffic lights should be synchronized from Palo Verde to the *Shops at Lake Havasu*.
  - Lake Havasu City roadway cross sections are usually wide enough for easements; preferred widths electric utility easements are 10 ft.
  - Access, without obstacles, is the most important requirement for electric line maintenance.
  - The median of limited access highways would be a preferred cable utility location, from the industry perspective.
  - Cable in North Havasu is aerial fiber and is the line that is “closest to the ground” of all utilities. Therefore, the utility coordinates with any roadwork, as the aerial fiber could be affected by it.
- 

**Transportation Funding:**

---

- Lake Havasu City should maintain and monitor its development impact fees.
- 

**Transit:**

---

- The SR 95 realignment right of way should be wide enough to accommodate any anticipated transit options, including buses or passenger rail.
  - A designated park-n-ride in North Havasu might serve regional and local commuters.
  - Someday the City will have one or two more transit centers and North Havasu may be the best location for one of them.
  - Activity centers in new developments should be served by HAT at the most suitable locations for transit stops and routes.
  - Co-location of a commercial node and a high school would generate a high demand for transit.
  - Increased demand will be from residents and part-year visitors rather than by weekend visitors or tourists arriving by air.
  - Demand might increase for travel between the Havasu Landing Casino in California and the Shops at Lake Havasu, by a combination of ferry and bus.
  - While Tri-City transit is of interest, current demand is greater between Kingman and Bullhead City than between North Havasu and either of those cities.
  - Lake Havasu City should have a transit system more like that in Flagstaff.
-

**TABLE 2.11. NORTH HAVASU AREA TRANSPORTATION NEEDS AND DEFICIENCIES:  
STAKEHOLDER COMMENTS (Continued)**

---

**Trails (Bicycle, Equestrian, Pedestrian):**

- The Foothills is a good example of how trails could be developed.
- Additional transit and trails would be advantageous.
- Within residential neighborhoods pedestrians and equestrians prefer dirt paths over curb, gutter, and sidewalk.

---

**Environmental Issues:**

- Wildlife impacts should be limited and mitigated.
  - Mountain protection areas and the Army Corps of Engineers' regulations regarding washes must be honored when laying out new arterials.
  - As development occurs, established trails should replace "social trails" now in most washes.
  - Some perceive that the realignment would be too noisy for residential development to be nearby. Noise mitigation walls would likely be particularly unpopular in Lake Havasu City because landscape viewpoints are so important to residents.
  - UniSource will meet its required Renewable Energy Standards for Arizona electric utilities, by buying such power and using, e.g., overhead 69Kv transmission lines to serve North Havasu. The solar, wind, etc. would be generated by a provider to UniSource.
-

## MULTIMODAL CONDITIONS

### Public Transportation Services

Havasu Area Transit has five routes, with service six days per week. The green route is the only one that travels north into the NHA (Figure 2.17), with three stops within North Havasu. The northernmost destination and turnaround point is the *Shops at Lake Havasu*.

Total ridership on the HAT system was up 35 percent for July 2008 through February 2009 compared to the equivalent period the previous year. The total rides per month ranged from 9,080 in July 2008 to 10,669 in October 2008. The *Shops at Lake Havasu* service began in March 2008.

Currently, there is one transit center (transfer point). As Lake Havasu City grows, it is anticipated that eventually there will be two or three transit centers. The City does not have an official park-and-ride site. Some commuters park near the transit center and take the green route to the mall.

HAT also provides a curbside service to a limited service area for seniors over 65 years of age and qualified special needs customers. Reservations are required 24 hours in advance for this service.

Additionally, HAT offers a senior transportation program, which provides free rides to the Senior Center lunch meal Monday through Thursday and rides to shopping and medical appointments Tuesday through Friday.

The recent *Tri-City Transit Connector Study* yielded a daily demand for 59 one-way trips between Lake Havasu City and Kingman, 24 one-way trips between Lake Havasu City and Bullhead City, and 137 one-way trips between Kingman and Bullhead City.

Lake Havasu City grade schools and high schools do not have school bus service (middle schools do have school bus service). Some potential, therefore exist, for future public transit to be of service to high school students. However, federal funding regulations do not allow a transit route to have student transportation to and from school as its primary purpose. Some communities have found that there is significant transit use by high school students in cases where a high school is near a commercial area and the commercial area is the primary destination for a route.

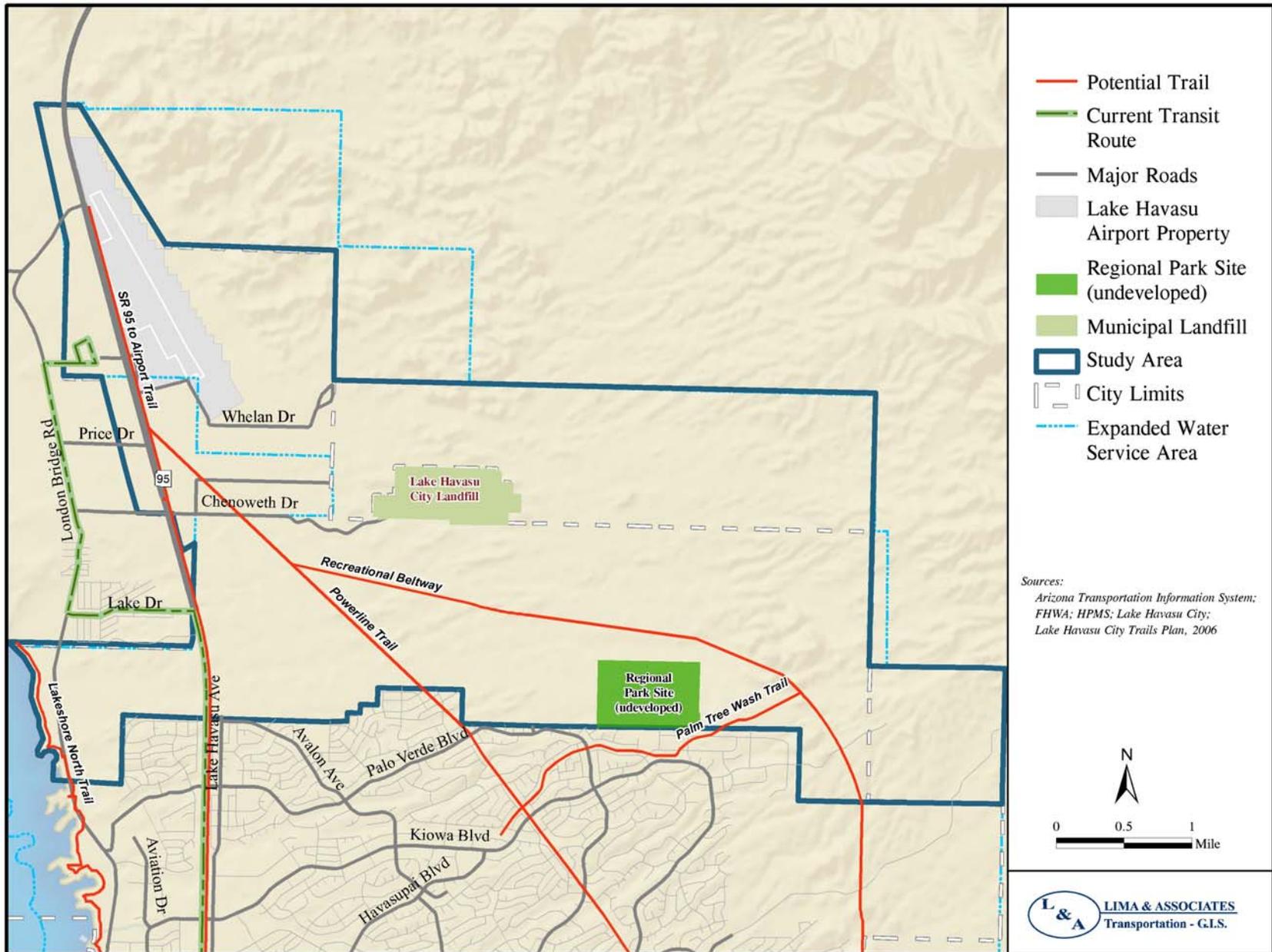
### Trails

The City completed the *Lake Havasu City Trails Plan* in May 2006. The resulting recommendations include five proposed trail corridors that cross, or may potentially connect to, the NHA, as part of a citywide trails network (Figure 2.17). The five relevant trail corridors are listed below. The final trail alignments would be determined through site

planning prior to development (in each case the City’s terminology was “Trail,” but it should be interpreted as a “Trail Corridor”):

- **Powerline Trail** - The Powerline Trail cuts in a northeast/southwest direction along the existing Western Area Power Administration (WAPA) powerline right-of-way. WAPA markets and delivers hydroelectric power in a 15-state region. The trail would be a multi-use, natural surface trail, providing cross-town access and connections to other trails. No formal parking lots are needed, because the trail could be accessed from many locations along streets and washes.
- **Lakeshore North Trail** - The Lakeshore North Trail would be a paved lakeside pathway from London Bridge through Lake Havasu State Park and into the National Wildlife Refuge, at which point the trail would cross in the NHA. Within the refuge, the trail would also have the potential for interpretive opportunities, but with tightly controlled use so as not to disturb wildlife. Parking would be located in the Lake Havasu State Park.
- **Palm Tree Wash Trail** - The Palm Tree Wash Trail would be paved along part or all of the wash, but it may also be integrated with the sidewalks proposed in the 1998 Pedestrian Plan. This wash runs east/west along the northern portion of the City, but just south of the NHA. At the trail’s eastern extent, it crosses up into the NHA to connect with the Recreational Beltway trail, and could potentially open up the foothills area to residents within the City center.
- **Recreational Beltway** - The Recreational Beltway would be mostly unpaved winding north-easterly and would be constructed in conjunction with the future SR 95 bypass. The beltway would link two regional parks—North Park and MCC Regional Park—which would allow for alternative access and use of the park’s parking lots for trailhead access as well as potential access to more remote areas in the northern part of the City and foothills (such as in the NHA). Parking would be available where the trail intersects with other trails in the network.
- **SR95-to-Airport Connector Trail** - The SR95-to-Airport Connector Trail would be an extension of a paved multi-use trail along SR 95 north to the airport. The trail would make use of existing right-of-way and provide access not only to the airport, but to the activity centers and commercial opportunities in the north.

**FIGURE 2.17. PUBLIC TRANSIT AND POTENTIAL TRAILS**



## **Bicycle Facilities**

The *Lake Havasu City Pedestrian and Bicycle Plan, 1998* identified a transportation network for bicyclists and pedestrians. The plan identified sidewalks, multi-use pathways, and on-street bicycle paths and facilities. On-street routes have striping and signing to integrate with the existing roadway system and to provide safe travel for transportation and recreation purposes. Two planned pedestrian walks, the “Sand Dunes” and the “Favorite Short Walk,” were recommended for the NHA. Other paths were to end at the edge of the NHA and could be extended into the NHA if that were appropriate to the design of future development.

In 1998, the striped parking lane that already existed on Acoma Blvd was cited as a facility that received much use. In the 2006 trails plan, the Acoma Blvd parking lane and the Acoma Blvd sidewalks were again cited as safe, popular pathways. The Acoma Blvd bicycle route and sidewalks could serve as an example for one type of bicycle facility in North Havasu.

The SR 95 Multi-Use Trail was a major facility recommended in the 1998 plan that was constructed and in use by 2006. The trail parallels SR 95 between N. Palo Verde and South McCulloch. The path is a meandering 10 foot to 12 foot paved path, offset from the roadway, with no striping. Minimal signage is seen along the path, and no accompanying landscaping. Extension of the SR 95 Multi-Use Trail to the north into the NHA would be one possibility for a future major bicycle facility.

SR 95 is designated on the statewide bicycle network between Bullhead City and Parker. The shoulder of SR 95, varying in width, is available for bicycle use throughout that distance.

## **Municipal Airport**

The *Airport Master Plan for Lake Havasu City Municipal Airport* evaluates the airport’s capabilities and role, forecasts future aviation demand, and plans for timely development of new or expanded facilities. The Plan is an extensive study of on-airport facilities, both airside and landside. Additionally, the Plan discusses the relationship of the airport property and operations to the surrounding area.

One of the effects of airport location of most interest to any community is the effect of airport noise. The *Airport Master Plan’s* noise analysis determined that the existing noise contours are entirely contained within the existing airport property, and the future noise contours would extend slightly off the property to the northwest and southeast of the runway. The FAA guidelines, codified within 14 CFR Part 150, identify suitable land uses for development near airport facilities. The guidelines state that residential development is incompatible with noise at a particular level—the 65 DNL—measured by the Yearly Day-Night Average Sound Level (DNL). No residences or other noise-sensitive development are located within the 65 DNL noise contour. The conclusion was that existing and anticipated future operations at the airport will not likely result in significant noise or compatible land use impacts.

### 3. FUTURE NORTH HAVASU AREA CHARACTERISTICS

This chapter presents future socioeconomic projections and transportation forecasts for the years 2010, 2015, 2020, and 2030 that were specified in the original scope of work developed by ADOT and the City. The projections reported here were developed and adjusted based on previous work by the Arizona Department of Commerce, 2005 Lake Havasu City SATS, and original expectations of the City. However, the reader will notice that later in the Report the recommended transportation plan refers to the range of years of 2025-2030 for the mid-range and 2035-2040 for the long-range planning horizons. This was a result of the TAC members recognizing that due to the economic downturn, the amount of growth originally projected for the years 2010 through 2030 would actually occur in later years than originally expected. Therefore, the TAC decided that the planning horizon years for the final transportation plan would be 2025-2030 for the mid-range and 2035-2040 for the long-range planning horizons. However, this chapter of the Report presents the projections as they were originally developed for the years 2010 through 2030 to preserve substantial work in developing socioeconomic projections and transportation forecasting.

#### ESTABLISHMENT OF TRAFFIC ANALYSIS ZONES (TAZ)

The first step in modeling the overall travel demand and its geographic distribution is the definition of geographic areas called traffic analysis zones. The TAZs were established as the building blocks of a geographic framework for the future conditions analysis. The TAZ areas contain the beginning and ending points of trips, while the trips are carried by the roadway network.

Both the shape and the size of each TAZ were set carefully in order for the model to faithfully characterize travel in the area:

- **Shape.** The shape of a TAZ is most often determined by using roadways on the network as TAZ boundaries. Barriers to travel, such as a steep slopes or a stream not crossed by a bridge, may also be TAZ boundaries.
- **Size.** In densely developed areas with many major roadways, it is appropriate to have many small TAZs. There are many route choices for households and establishments in such areas, and the many route possibilities can best be reflected by devising small TAZs with many connections to the roadway network. In less developed areas each TAZ is typically larger.

The guidelines were applied to the NHA, which resulted in the creation of thirteen (13) TAZs. A secondary consideration in configuring the TAZs was enabling comparisons between the findings of this NHATS and the 2005 Lake Havasu City SATS. The TAZs and base roadway network in the 2005 Lake Havasu City SATS contain little detail for North Havasu, and a prospective SR 95 realignment corridor that served as the boundary for several TAZs is in a different location than in the more recent realignment study. In order to compare

socioeconomic data, the portion of each 2005 SATS TAZ's population and employment in each NHATS TAZ was estimated, and the data were regrouped into the NHATS TAZ form.

Figure 3.1 shows the TAZs in the NHA and in areas surrounding the NHA (numbered 13 through 62). The roadway network is already developed at urban densities serving Lake Havasu City to the south. The additional TAZs permitted comparison to the 2005 Lake Havasu City SATS and the use of the planning model to distribute an appropriate number of trips to arterials outside the NHA.

## **INFLUENCES ON FUTURE GROWTH**

The Lake Havasu City Planning Commission stated an interest in having the SR 95 realignment serve as an Urban Containment Boundary (in a planning commission letter to Jacobs Engineering, April 22, 2009). This project's TAC indicated in June 2009 that the NHATS land development assumptions should be consistent with the Planning Commission viewpoint. Therefore, no residential development and very little employment were projected for the area to the north and to the east of the SR 95 realignment corridor. The comments of the ASLD concerning statutory requirements and the authority of the State Land Commissioner (Annexation section, page 34) should be noted. The City's land use planning would be coordinated with the Conceptual planning of the ASLD before there would be any changes in minimum development density for State Trust Lands.

Other background data considered included the City's General Plan as amended through 2008, the current zoning map, terrain, and floodplains. A brief description of the data review process appears below. The process resulted in an assessment of where development would be likely, where it would be unlikely, and where constraints might be mitigated through design and additional investment.

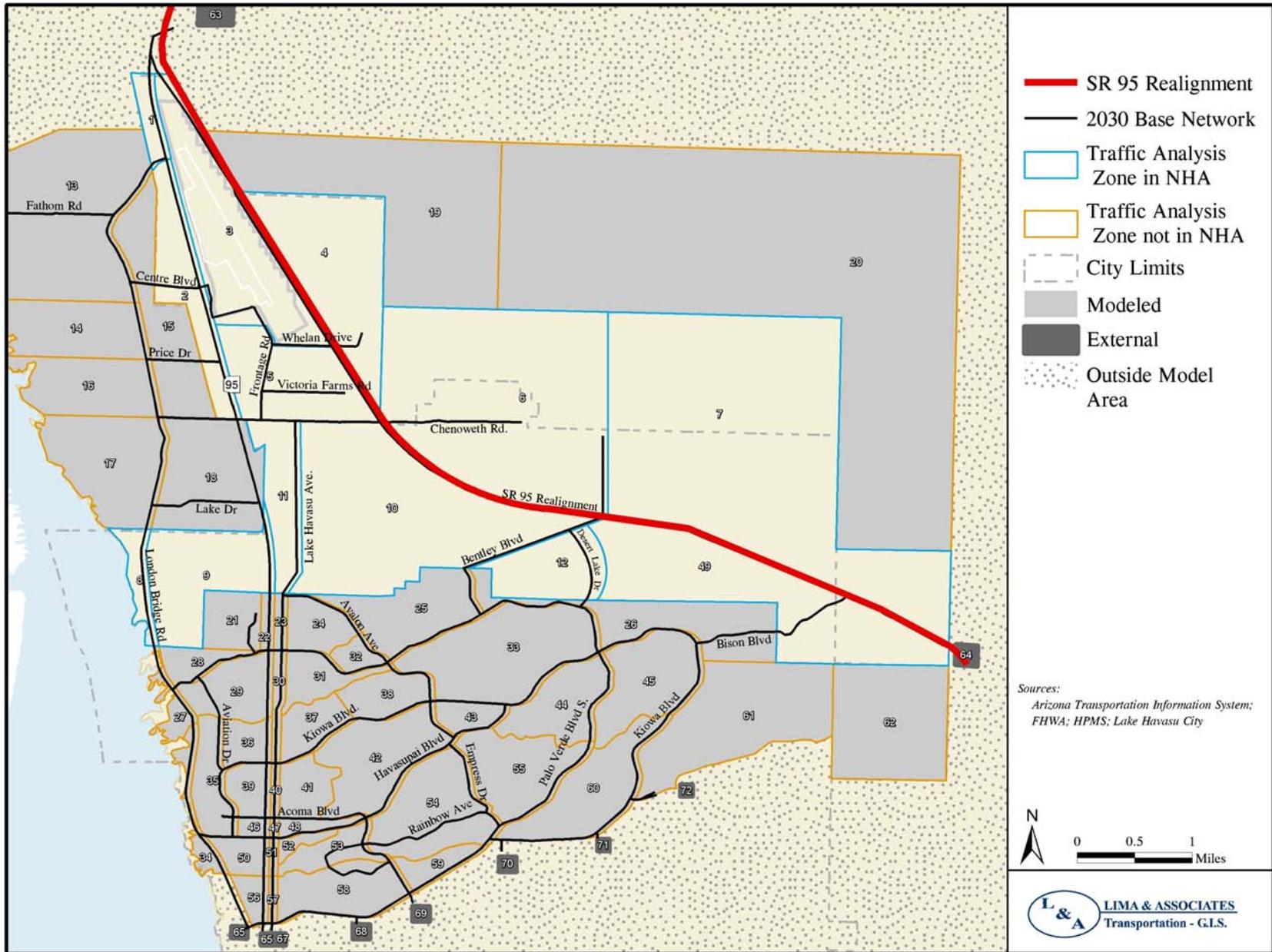
### **Land Ownership**

The bulk of the NHA lands are held in trust by the Arizona State Land Department. State lands adjacent to SR 95 would be the first to be sold and developed, while the sale of State lands would later proceed east along the SR 95 realignment corridor.

### **Land Use Plans and Zoning**

The Lake Havasu City General Plan was considered in projecting development including land uses and mountain preservation areas. Two other documents reviewed for the previous working paper were also considered: 1) the 2008 City Annexation Policy Plan, and 2) the Mountain Preservation Task Force recommendations for some portions of North Havasu to remain undeveloped, and some portions to be at typical densities not exceeding two units per acre. Some areas outside mountain preservation tracts might be developed at up to four units per acre.

**FIGURE 3.1. TRAFFIC ANALYSIS ZONES AND 2030 BASE ROADWAY NETWORK**



## **Terrain and Floodplains**

Terrain in North Havasu generally slopes down from the adjacent Mohave Mountains on the northeast to the Colorado River on the west, and the area contains many washes. The terrain will affect the density of future development and the design of roadways and trails to serve that development.

The lowest elevations in the NHA are located in the Havasu National Wildlife Refuge on the banks of Lake Havasu, at less than 500 feet. The highest elevation is 2,000 feet in the northeast corner of the NHA. The highest elevation nearby is Crossman Peak at 5,100 feet, 4.3 miles east of the NHA.

- The eastern one-third of the NHA has an average elevation of about 1,600 feet and terrain similar to that in the Havasu Foothills development.
- The middle one-third of the NHA has an average elevation of about 1,100 feet and terrain similar to that on Kiowa Blvd east of Havasupai Elementary School.
- The western one-third of the NHA has an average elevation of about 800 feet and is gently sloping, similar to most densely developed neighborhoods of the City that present some drainage and terrain challenges to development.

The draft Flood Insurance Rate Maps were reviewed. Once TAZs were established, TAZ areas were assessed to estimate the rough proportions of each that are not in a floodplain (less than .2 percent annual probability of a flood), areas with a very low probability of flooding, and areas with a 1 percent annual probability of a flood (with base flood elevations and floodways determined).

## **FUTURE SOCIOECONOMIC CONDITIONS**

Vehicle trips on the NHA's roadway network will start and end in many different places. Many of the trips will be among the homes, workplaces, and other establishments within the NHA. Some trips have one end of the trip (origin or destination) inside the NHA, and the other end outside the area. Some trips are known as "pass-through" trips because they traverse the NHA, although they begin and end outside the NHA.

## **Overview of Lake Havasu Area Future Population, Households, and Employment**

Lake Havasu City manages its development with a realization that available water resources will limit population growth to a buildout population of 100,000 to 110,000. The question is no longer the likely size of the buildout population, but rather, it is the time period within which the City will be built out. Population projections prepared by the Arizona Department of Commerce in 1997 and 2006 and those used for the *2005 Lake Havasu City SATS* were reviewed and shared with the TAC.

The TAC noted that indicators of the current economic recession show the City’s population has leveled off or even declined slightly (based on the number of residential building permits and water customers). The TAC advised the consultant to assume lower 2030 population totals than were first presented.

The final 2030 population projection for the Lake Havasu City planning area, as shown in Table 3.1, was based upon roughly 1 percent annual growth through 2012, followed by 2 percent annual growth through 2030. If the 2 percent growth rate were to continue thereafter, a buildout population of 105,500 would be reached in about 2042.

The recession has also been related to declines in employment in the Lake Havasu City-Kingman Metropolitan Statistical Area (MSA) from 88,400 to 84,700 between July 2008 and 2009. The unemployment rate in July 2009 stood at 10.6 percent and the State of Arizona is forecast to return to pre-recession employment levels in 2013. Those trends were used to project the employment in the Lake Havasu planning area for 2010.

**TABLE 3.1. LAKE HAVASU AREA FUTURE POPULATION AND HOUSEHOLDS**

	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2030</b>
Population	57,225	64,605	71,594	88,021
Households	24,773	28,006	31,073	38,300
Employment	23,200	29,667	33,076	39,602

Source: Lima & Associates in consultation with Technical Advisory Committee

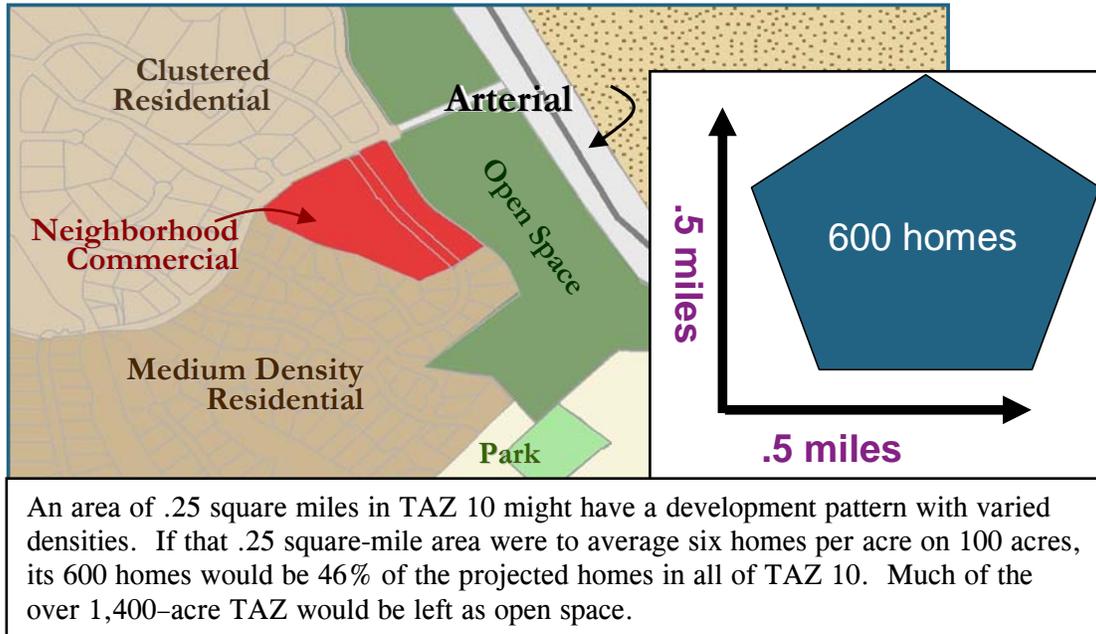
**North Havasu Area Future Population and Households**

The NHA had no year-round population in 2009 and it is assumed that will still be the case in 2010. Since disposition of State Trust Lands has not occurred nor is it in process, there is little capacity for immediate growth. By 2015, it is assumed a parcel or parcels of land east of existing SR 95 (TAZ 10) would be sold to private parties and some residential development would occur. In addition, it is assumed that by 2020 land sales would have continued and residential development would be present in three of the NHA TAZs. Finally, by 2030 there would be land sales further to the east and all of the TAZs south of Chenoweth Rd and the SR 95 realignment corridor would have some development.

None of the TAZs would be near buildout by 2030. Gross residential densities in the five TAZs that would have some residential development would range from .5 housing units per acre up to 1.04 housing units per acre. The gross density is calculated as the number of housing units divided by the total number of acres in the TAZ.

The most populous TAZ in 2030 was projected to be TAZ 10. After consideration of all of the influences that would recommend clustered development in North Havasu, a possible development scenario for a part of TAZ 10 appears in Figure 3.2. The net residential density in that neighborhood would be similar to the current settlement pattern south of the NHA, in the area north of Empress Dr and Palo Verde Blvd S.

**FIGURE 3.2. HYPOTHETICAL DEVELOPMENT, TAZ 10 (PART)**



Source: Lima & Associates' original graphics and calculations

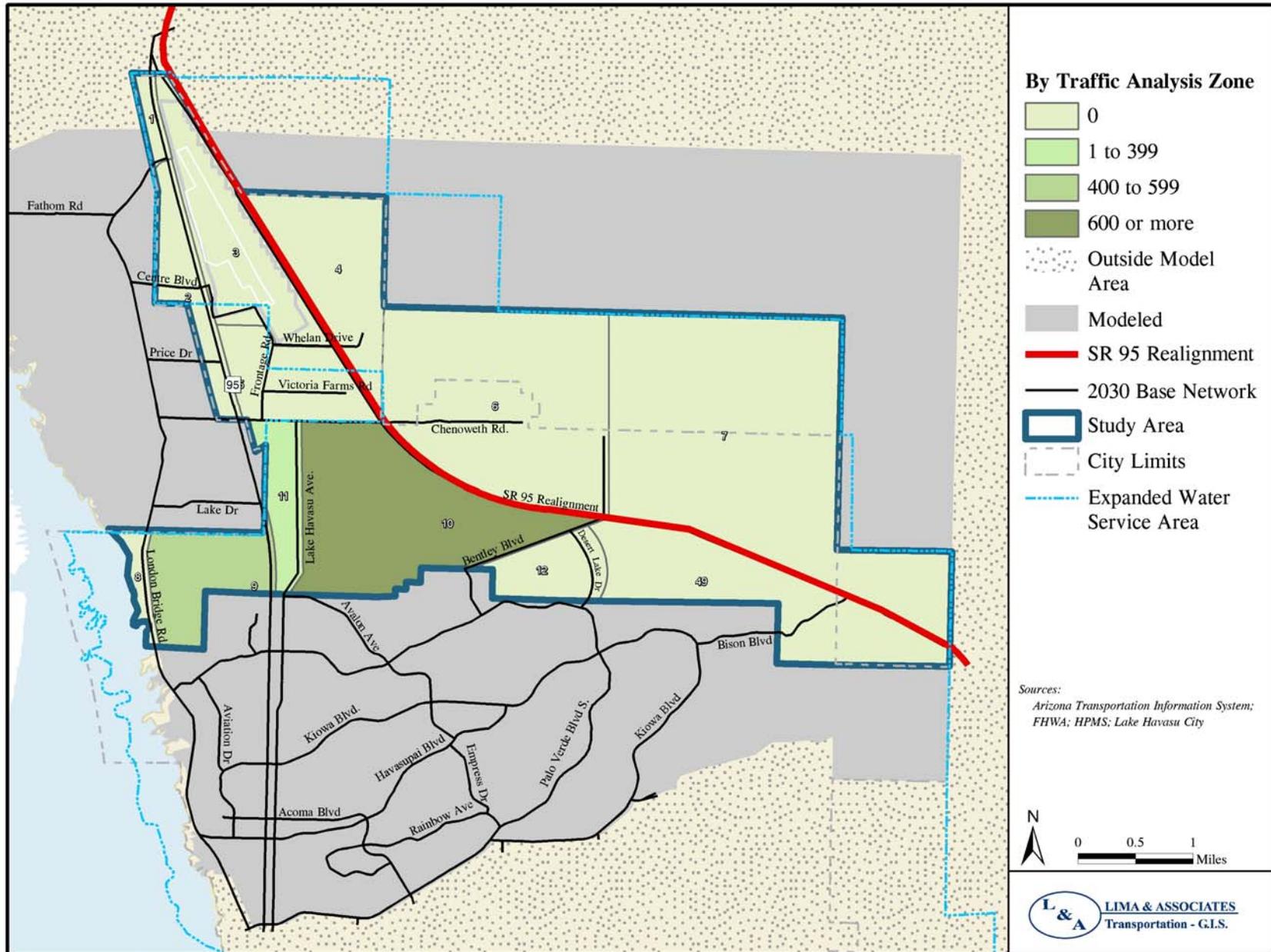
The gradual development of the North Havasu TAZs is projected in Table 3.2, which shows the first households in TAZ 10 by 2015, followed by some development in TAZs 9 and 11 by 2020. Population and household density appear in Figures 3.3 and 3.4 for 2020.

**TABLE 3.2. NORTH HAVASU AREA FUTURE POPULATION AND HOUSEHOLDS**

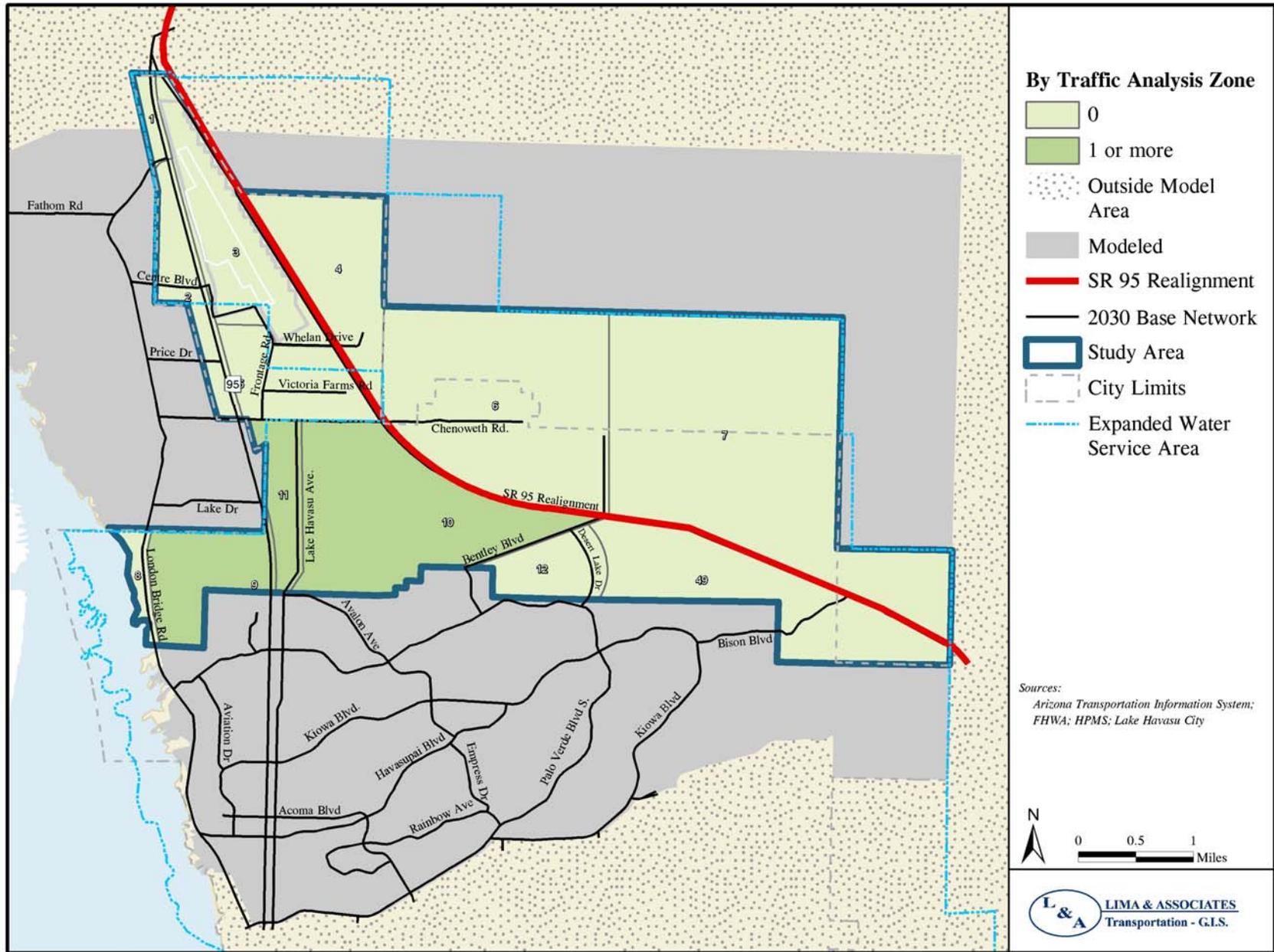
Lima TAZ	Population				Households			
	2010	2015	2020	2030	2010	2015	2020	2030
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	412	1,236	0	0	178	535
10	0	750	1,500	3,000	0	325	649	1,299
11	0	0	133	400	0	0	58	173
12	0	0	0	700	0	0	0	302
49	0	0	0	1,164	0	0	0	504
<b>NHA Total</b>	<b>0</b>	<b>750</b>	<b>2,045</b>	<b>6,500</b>	<b>0</b>	<b>325</b>	<b>885</b>	<b>2,813</b>

Source: Lima & Associates in consultation with Technical Advisory Committee

**FIGURE 3.3. 2020 POPULATION DENSITY (PER SQUARE MILE)**



**FIGURE 3.4. 2020 HOUSEHOLD DENSITY (PER SQUARE MILE)**



Sometime between 2020 and 2030 the connection provided by the extension of Bentley Blvd to the SR 95 realignment could make the development of a large regional park feasible. The prospective park is further described in Working Paper 1. The municipal park site appears on Figure 4.1 in Working Paper 1. Additional State land sales would ensue surrounding the park followed by housing construction in both TAZ 12 and TAZ 49 by 2030. Population and household density appear in Figures 3.5 and 3.6 for 2030.

### **Future Seasonal Housing Units and Visitor Lodging**

Seasonal housing units and lodging are not included in the household projections. Travel demand generated by seasonally-occupied homes is considered to be the increment described later in this chapter as the “peak season” residential demand. The increment of travel demand generated by lodging is calculated by considering them as commercial employment centers, and calculating trips that are in proportion to the number of employees (see employment distribution, below).

### **Future Group Quarters**

Very few people are living in group quarters in Lake Havasu City. Stakeholders discussed the likely demand for future senior citizen housing that might follow the emerging “continuum of care” community’s trend. In such a community, where many residents live in independent households, the residents may move to assisted living group quarters when they have a need for them. Travel demand generated by group quarters is calculated using methodology similar to lodging travel demand.

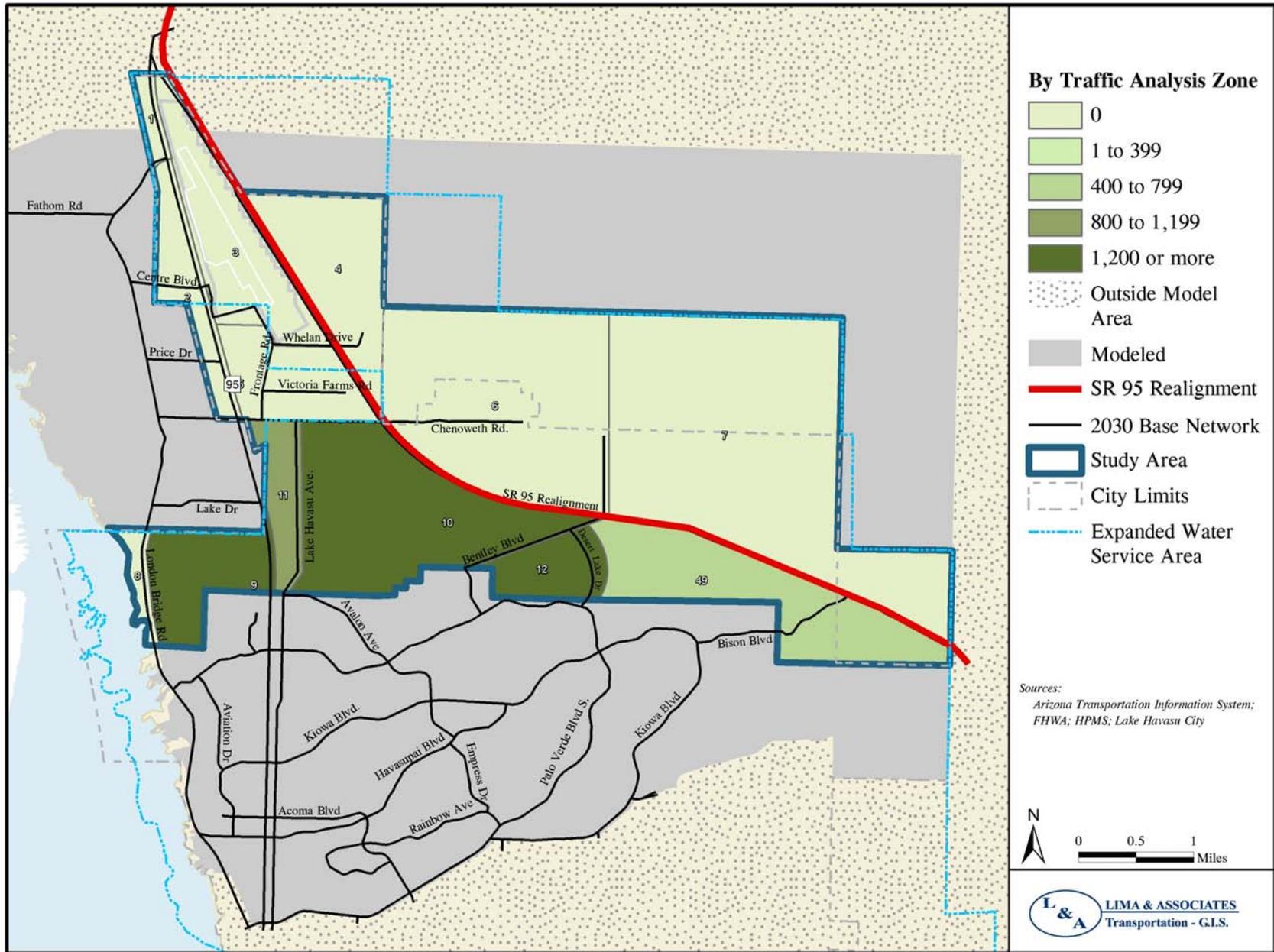
### **North Havasu Area Future Employment**

Table 3.3 shows the projected employment in North Havasu TAZs. There are existing employment centers in some TAZs that do not have any households. Employment within those TAZs would increase gradually through 2015. Employment growth would continue through 2020 as the City’s industrial park infrastructure is put in place and would move into additional areas when State land sales occur further east between 2020 and 2030.

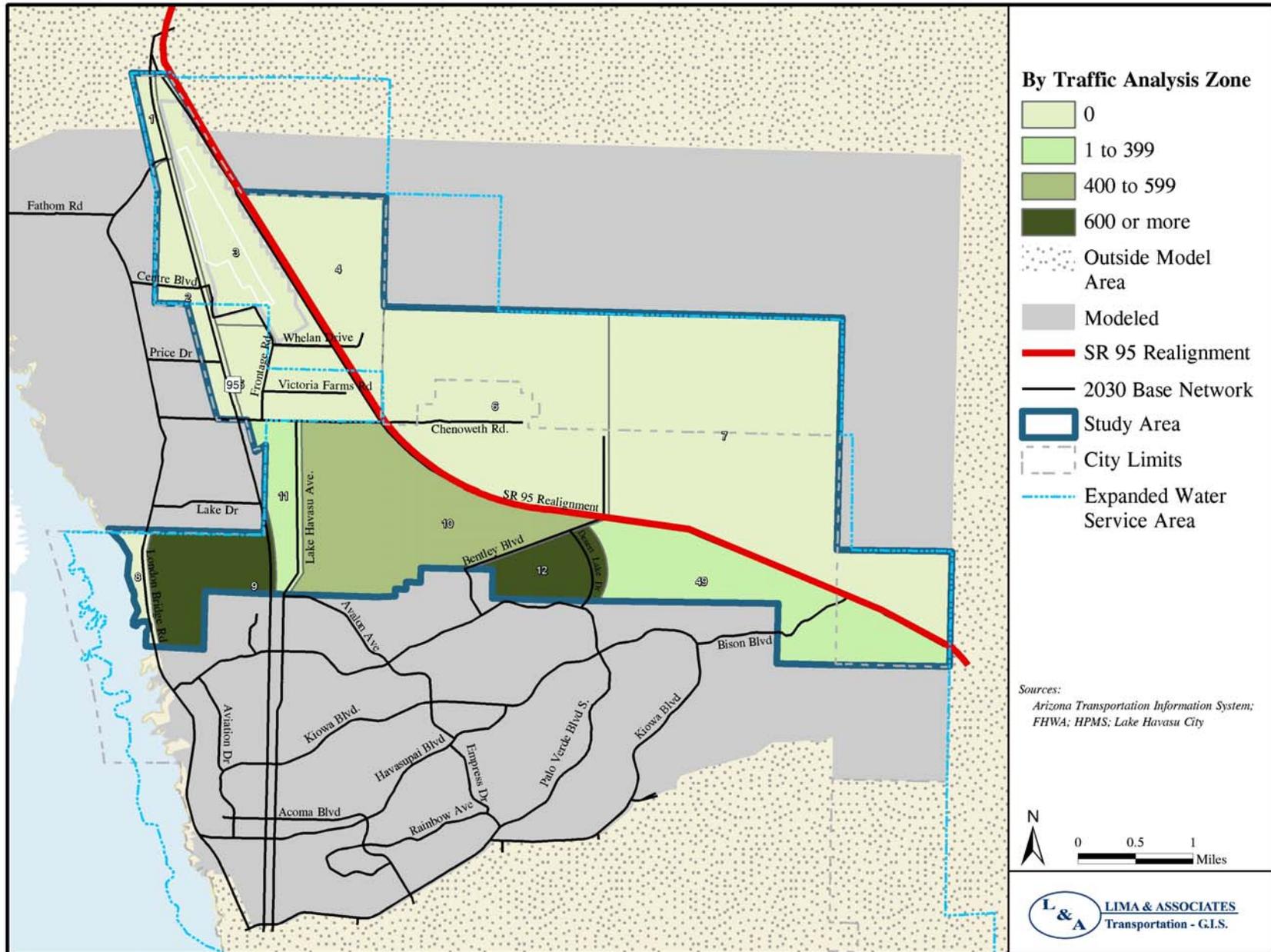
Table 3.4 details employment by three categories: commercial, industrial, and other. Employment was projected in accordance with zoning and future plans for the industrial park and airport. Commercial employment dominates, especially in the early years, with the buildout of the “Shops at Lake Havasu” to 2,200 employees by 2015 (TAZ 2). TAZs 5, 10, and 11 just east of existing SR 95 will also have significant commercial employment. Industrial employment accelerates and concentrates in the new industrial park in TAZ 5 by 2030. Other employment would include schools, government, and office-based (largely business services) jobs.

By 2030, there would be employment in every TAZ except TAZ 8 (the Lake Havasu Wildlife Refuge). TAZ 6 would have a few employees at the landfill and TAZ 7 might have a few jobs based in outdoor recreation or natural resources. TAZ 4 employment would be at the wastewater plant and the anticipated golf course. Other than in those remote TAZs, employment would increase gradually, serving households in North Havasu. Realignment of SR 95 would place employment within convenient commuting, shopping, or recreational trip distance from the remainder of Lake Havasu City and the Tri-Cities Area. Employment density appears in Figures 3.7 for 2020 and Figure 3.8 for 2030.

**FIGURE 3.5. 2030 POPULATION DENSITY (PER SQUARE MILE)**



**FIGURE 3.6. 2030 HOUSEHOLD DENSITY (PER SQUARE MILE)**



**TABLE 3.3. NORTH HAVASU AREA FUTURE TOTAL EMPLOYMENT**

TAZ	Employment			
	2010	2015	2020	2030
1	0	0	30	50
2	1,200	2,300	2,425	2,700
3	250	250	260	260
4	0	0	50	100
5	50	150	350	650
6	0	10	15	20
7	0	0	5	10
8	0	0	0	0
9	0	0	60	110
10	350	400	450	500
11	350	350	375	400
12	0	0	50	100
49	0	0	0	100
<b>North Havasu Area Total</b>	<b>2,200</b>	<b>3,460</b>	<b>4,070</b>	<b>5,000</b>

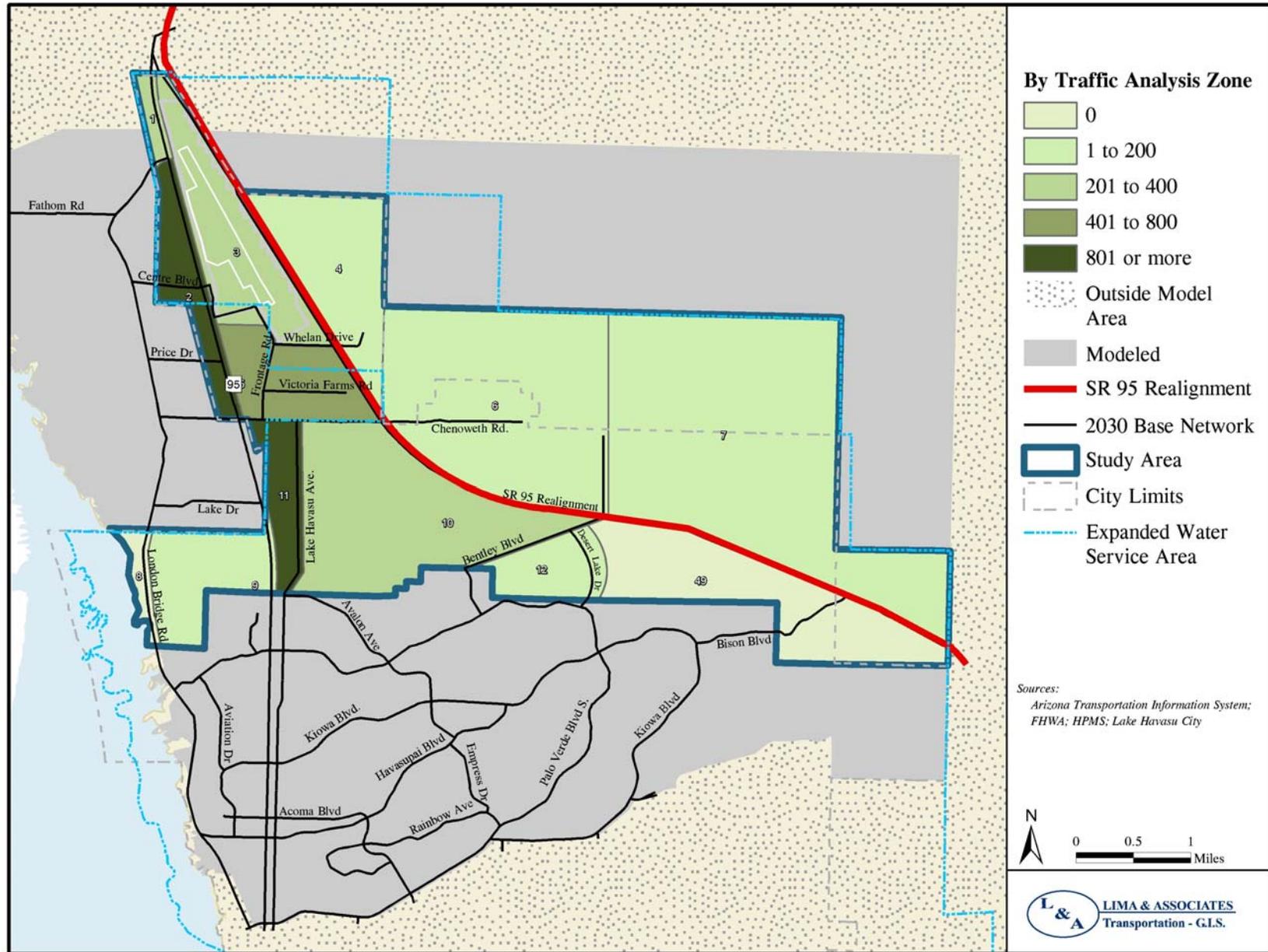
Source: Lima & Associates in consultation with Technical Advisory Committee

**TABLE 3.4. NORTH HAVASU AREA 2030 EMPLOYMENT BY CATEGORY**

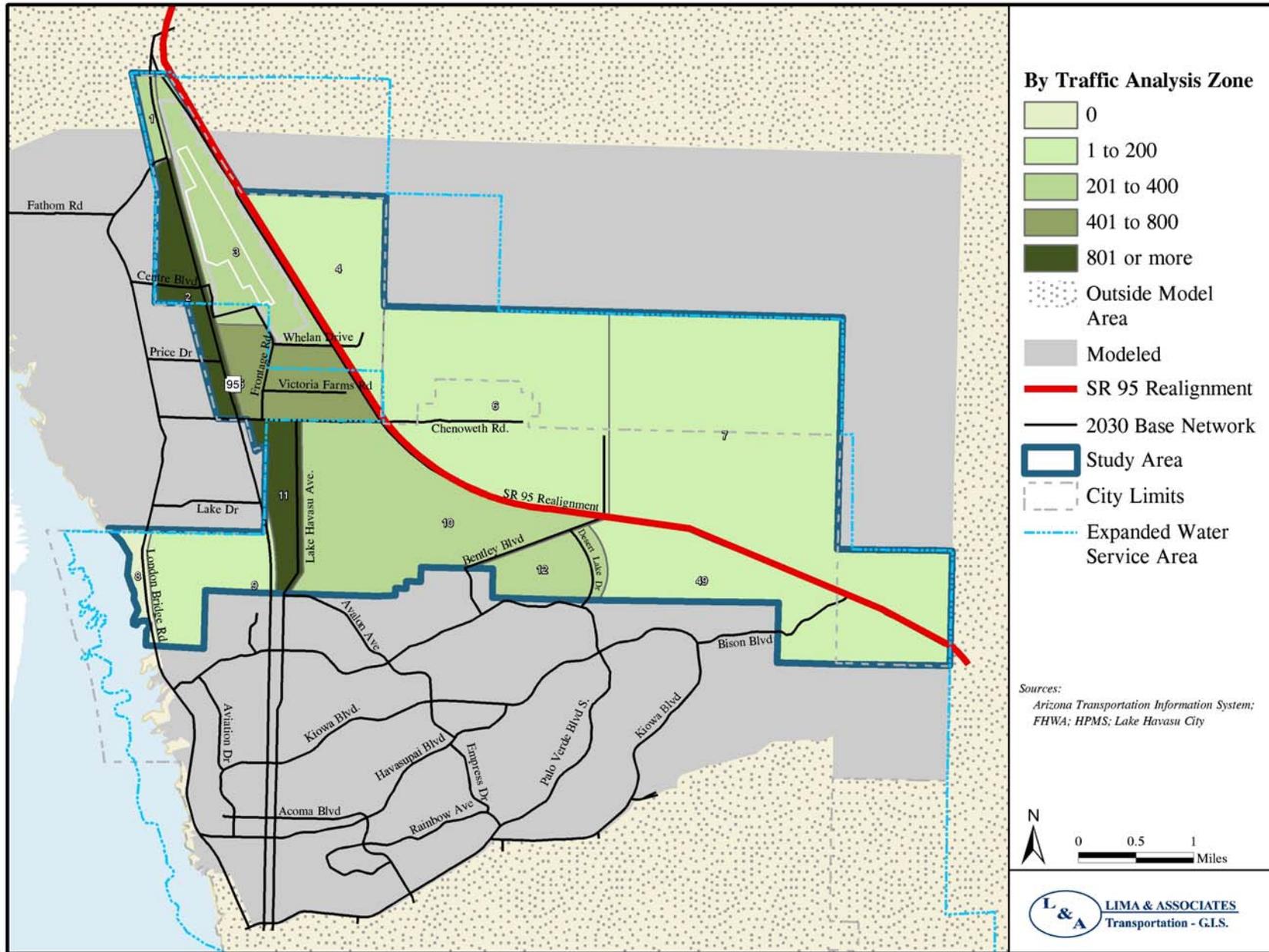
TAZ	Employment			
	Commercial	Industrial	Other	Total
1	50	0	0	50
2	2,350	100	250	2,700
3	50	50	160	260
4	0	0	100	100
5	200	325	125	650
6	0	0	20	20
7	0	0	10	10
8	0	0	0	0
9	60	0	50	110
10	300	0	200	500
11	200	0	200	400
12	50	0	50	100
49	50	0	50	100
<b>NHA Total</b>	<b>3,310</b>	<b>475</b>	<b>1,215</b>	<b>5,000</b>

Source: Lima & Associates in consultation with Technical Advisory Committee

**FIGURE 3.7. 2020 EMPLOYMENT DENSITY (PER SQUARE MILE)**



**FIGURE 3.8. 2030 EMPLOYMENT DENSITY (PER SQUARE MILE)**



## **FUTURE ROADWAY NETWORK**

### **Base Roadway Network Planning Model**

This NHATS included 2020 and 2030 base roadway network travel demand modeling. The modeling for this Report was done using a TransCAD travel demand model and data from the 2005 SATS.

Socioeconomic data from the 2005 SATS was reviewed for the NHA. While employment data contributed to the projections for the NHATS planning model, the household projections were based upon many more details not known when the 2005 SATS was prepared. In the modeling area outside the NHA, the 2005 SATS data was the starting point, but then generally growth factors were reduced by 10 percent since less growth is expected than was anticipated at the time of the 2005 SATS.

The 2005 SATS model generated traffic volumes for the 2005 time period and the results were compared with actual existing traffic. The model was then applied to projected socioeconomic data and a base future road network. Results of the NHATS 2030 base roadway network analysis were compared to the 2005 SATS Parkway option. The 2005 SATS final recommendation for SR 95 realignment was a Parkway. The SATS recommended that a Design Concept Report for a Parkway be prepared jointly by the City and ADOT.

This Study added new TAZs in the NHATS forecasting model to be consistent with the 2005 Lake Havasu City SATS and to distribute an appropriate number of trips to arterials outside the NHA. Beyond areas with TAZ designations a large number of externals were arranged to distribute external trips appropriately. More complete descriptions of NHA planning model inputs and processes are contained in Appendix A.

Table 3.5 shows the projects (other than SR 95 projects) recommended in the 2005 SATS and/or included in the most recent City Community Improvement Program (CIP). The projects were carefully reviewed and most of them were incorporated into the base network for 2020 or 2030, depending on the timing that was a part of some of the recommendations.

Incorporation of recommendations into the NHA base network would be expected to result in an improved level of service on any existing roadways addressed by the projects, as compared to their level of service that appeared in the 2005 SATS model runs. This is because in the SATS model runs the existing roadways such as Chenoweth, Kiowa, or Palo Verde were modeled with their existing number of lanes (before the recommended improvement). The recommendations were made based partly upon the results of those model runs.

The NHA base model results for 2030 were as expected, with levels of service generally one or two levels better than the 2005 SATS 2030 model calculated.

**TABLE 3.5. SUMMARY OF RECOMMENDED PROJECTS IN THE 2005 SATS OR CIP**

<b>Location</b>	<b>From</b>	<b>To</b>	<b>Agency</b>	<b>Study</b>	<b>Comments</b>
<b>Widen To Four Through Lanes With A Continuous Left Turn Lane</b>					
London Bridge Rd	City Limit (south of Chenoweth)	SR 95 (north)	Mohave County	SATS	Partly in NHA, partly in surrounding modeled area
London Bridge Rd	Industrial	City Limit (south of Chenoweth)	LHC	SATS	In surrounding modeled area and NHA
Chenoweth	London Bridge Rd	SR 95	Mohave County	SATS	In NHA
Chenoweth	SR95	New Parkway	LHC	SATS	In NHA
Lake Havasu Ave	Kiowa	North Palo Verde	LHC	SATS, CIP	In surrounding modeled area; a FY2014 project
Lake Havasu Ave	North Palo Verde	Avalon	LHC	SATS	In surrounding modeled area
Victoria Farms Rd	N/S Frontage Rd	Parkway	LHC	SATS, CIP	In NHA; a FY2015 project
Avalon Ave	North Palo Verde	Lake Havasu Ave	LHC	SATS	In surrounding modeled area
North Palo Verde	London Bridge Rd	SR 95	LHC	SATS, CIP	In surrounding modeled area; a FY2014 project
Bison Blvd	Kiowa	New Parkway	LHC	SATS	In NHA
<b>Re-Stripe To Four Through Lanes With A Continuous Left Turn Lane</b>					
North Palo Verde	SR 95	Kiowa	LHC	SATS	In surrounding modeled area
North Palo Verde	London Bridge Rd	SR 95	LHC	SATS	In surrounding modeled area
Kiowa	SR 95	North Palo Verde	LHC	SATS	In surrounding modeled area
Kiowa	South Palo Verde	Jamaica	LHC	SATS	Partially in surrounding modeled area
<b>New Roadway Or Roadway Extension</b>					
Lake Havasu Ave	Northern Terminus	Chenoweth	LHC	SATS	In NHA
N/S Frontage Rd	Victoria Farms Rd	Air Industrial Rd	LHC	SATS	In NHA
Price Dr	City Limit	SR 95	LHC	SATS	In NHA
Price Dr	London Bridge Rd	City Limit	Mohave County	SATS	In NHA
<b>Other Non-Transportation Projects</b>					
Air Industrial Park Ph II				CIP	In NHA; Not a road project, but has parcel, drainage, etc. work set for 2013.

The 2005 SATS model was the starting point for some additional modeling of the SR 95 realignment that was done for the *SR 95 Realignment Study*. Results for the NHATS 2030 base roadway network described below were compared to the 4 Lane Freeway North Options 1&2 (*SR 95 Realignment Study*). The *SR 95 Realignment Study* also modeled two other location options for a 4 Lane Freeway in 2030. All of the freeway location options performed similarly in the model results for 2030.

### **2015 Base Roadway Network**

The 2015 NHA roadway network will differ very little from the existing network. None of the previous plans call for any portion of an SR 95 realignment to be constructed in the NHA by 2015. The projections of this study do not indicate sufficient demand to accelerate the realignment's construction.

Therefore, the 2015 NHA network will have very similar conditions to the existing network, so the 2015 network was not modeled. The network that exists in 2009 is somewhat improved compared to the 2005 SATS modeling network. Between existing SR 95 and London Bridge Rd, Lake Dr, Chenoweth Rd, and Price Dr, and Centre Blvd are now paved two-lane roads and Centre Blvd is a paved four-lane road. Whelan Dr and Victoria Farms Roads have also been improved. Those roadways, as described in this paragraph, are in the 2015 base roadway network.

The purpose of the 2008 City Annexation Policy Plan was stated as follows: "Annexation of adjacent lands can ensure the City has control of urban development, protection of valuable natural resources, managing traffic and infrastructure, and providing additional revenue sources."

The annexation policy is described in detail in Chapter 2, which includes a map of the intended annexation areas near the NHA. The landfill (Area #3) has already been annexed. Once the City annexes all of the designated areas (its intention is to do so by 2013), the City will control the roadway network within those areas and would program any construction or improvements. By the year 2015, the annexations would mean:

- Area #1. Any further improvements to Price Dr would be by the City. At least the north side, and perhaps the entire right-of-way, of Chenoweth Dr west of the current City limit would be under the jurisdiction of the City.
- Area #2. This area North and South of Fathom Dr would be under City jurisdiction. Decisions about the function of London Bridge Rd in handling the traffic in the commercial area of the "Shops at Lake Havasu" would be up to the City.

While the City's plans indicate the following for areas #8 and #5, the previously discussed coordination with the ASLD (Annexation section, page 34) could lead to some changes in implementation.

- Area #8. Any portion of this area in the far north and east of the NHA would be outside the urban containment boundary defined by the ultimate location of the SR 95 realignment corridor. Area #8 (TAZs 6 and 7) would likely be outside the boundary and its buildout density would be limited to about 2 units per acre. Further, any additional area specifically designated for Mountain Preservation would not be developed.
- Area #5 is in the far southeast of the NHA and parts of it are in TAZ 7. While TAZ 49 is inside the urban containment boundary, parts of it are in the area which the annexation policy specifically states should be preserved according to the Mountain Preservation task force recommendations.

### **2020 Base Roadway Network**

The 2020 base network has an assumed two-lane rural principal arterial in the SR 95 Realignment Corridor. As described in Working Paper 1: Current Conditions, recommended corridors were discussed at a public meeting on March 31, 2009, as devised in the *SR 95 Realignment Study*. A two-lane rural principal arterial was assumed for base model purposes, given the population, household, and employment projections for 2020. The results of the base model were reviewed and alternatives to the base model are to be considered in the alternatives phase of this study. The base roadway network is not the recommended network for this study.

Final recommendations for the SR 95 realignment corridor were not available when the modeling occurred. The NHATS study team was faced with a decision concerning which corridor to depict in the NHATS TAZ and road network maps. The SR 95 corridors used for the model were those listed by ADOT as N1 and N2 adjacent to the airport, the portion of Corridor A just north of the future regional park, and C2, continuing across the southeastern part of the NHA before turning south beyond the NHA boundary.

The two-lane rural principal arterial in the SR 95 realignment corridor influenced the decisions made about other changes to the base network by 2020. ADOT has a rule designating two-mile spacing of rural freeway interchanges. The two-lane principal arterial would not be a freeway and it would have at-grade intersections. Still, the intersections would be spaced two miles apart to facilitate the later upgrade to interchanges.

The intersections in and near the NHA would be the following, from northwest to southeast:

- SR 95/Craggy Wash
- Bentley Blvd (extended)
- Chenoweth Dr
- Bison Blvd

New major collectors, all two lanes, would be:

- Lake Havasu Ave (extended north to Chenoweth Dr)
- Bentley Blvd
- Bison Blvd

The functional classification of the North Havasu base network for 2020 appears in Figure 3.9 and the number of lanes appears in Figure 3.10.

Existing SR 95 would continue to be a principal arterial and London Bridge Rd would be a major collector. The functional class changes compared to the existing functional class described in Chapter 2 would be:

- Chenoweth Dr would be two lanes functionally classified as a minor arterial between SR 95 and London Bridge Rd.
- Lake Dr would be two lanes functionally classified as a major collector between SR 95 and London Bridge Rd.
- Price Dr and the Centre Blvd/Retail Centre combination would be two lanes functionally classified as minor collectors between SR 95 and London Bridge Rd.
- The roadway system through the industrial park including Whelan Dr, Frontage Rd, and Victoria Farms Rd would be upgraded to two-lane minor collectors.

The functional class and number of lanes for the additional planning modeling area around the NHA would be as recommended in the 2005 SATS recommended projects.

### **2030 Base Roadway Network**

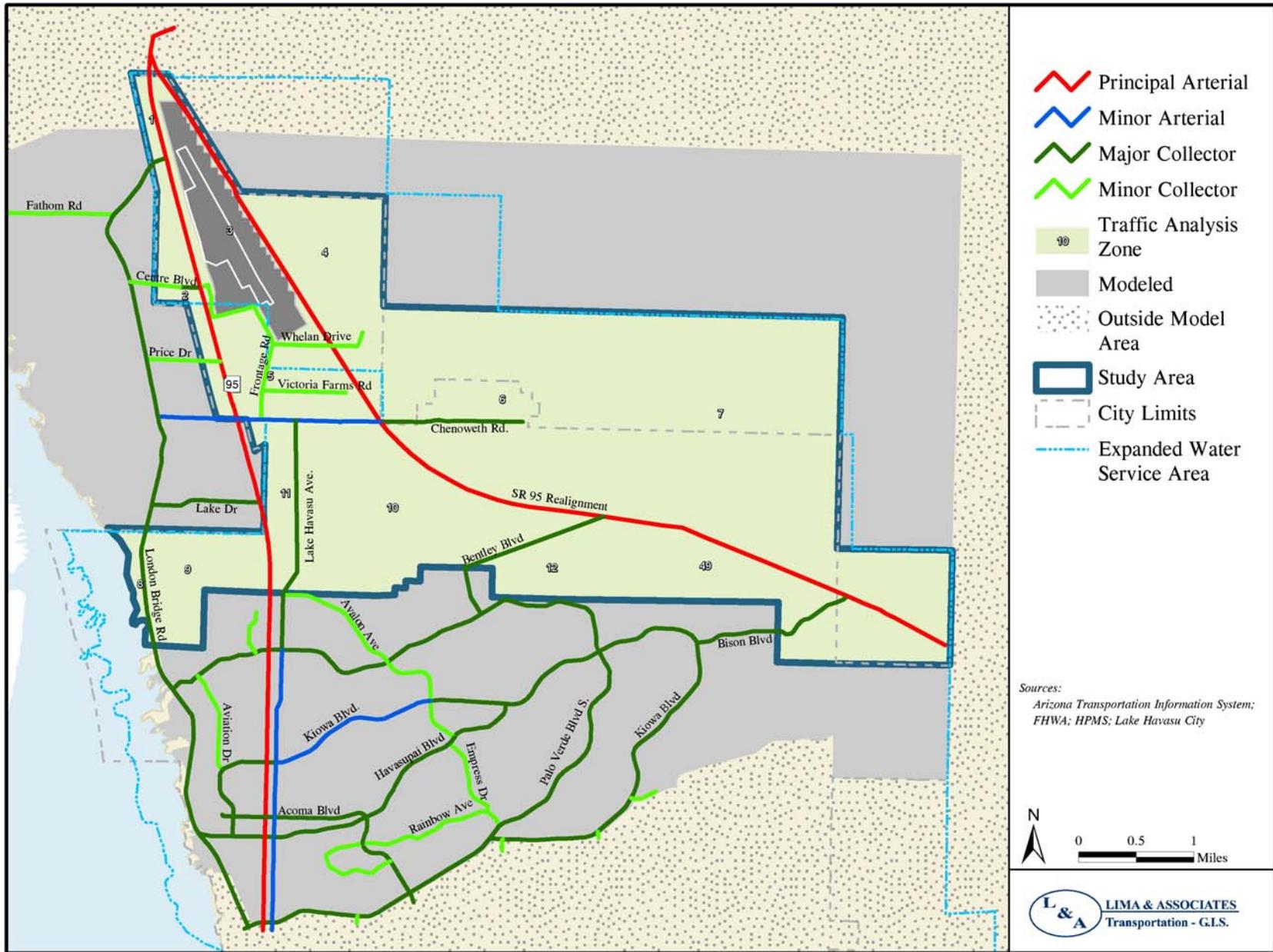
The SR 95 realignment roadway assumed in the 2030 base network is a four-lane Rural Divided Highway. The results of the base model were reviewed and alternatives to the base model were considered in the alternatives phase of the NHATS. The base roadway network is not the recommended network for the NHATS. As described in Chapter 2, the Rural Divided Highway provides high mobility and limits access.

The SR 95 realignment status as a four-lane Rural Divided Highway influenced other decisions about the base network. A Rural Divided Highway would be expected to have two-mile spacing of intersections and interchanges. The intersection at Chenoweth Dr would most likely be a full traffic interchange as soon as the highway was upgraded to four lanes, while Bentley Blvd and Bison Blvd might remain at-grade intersections for a few more years.

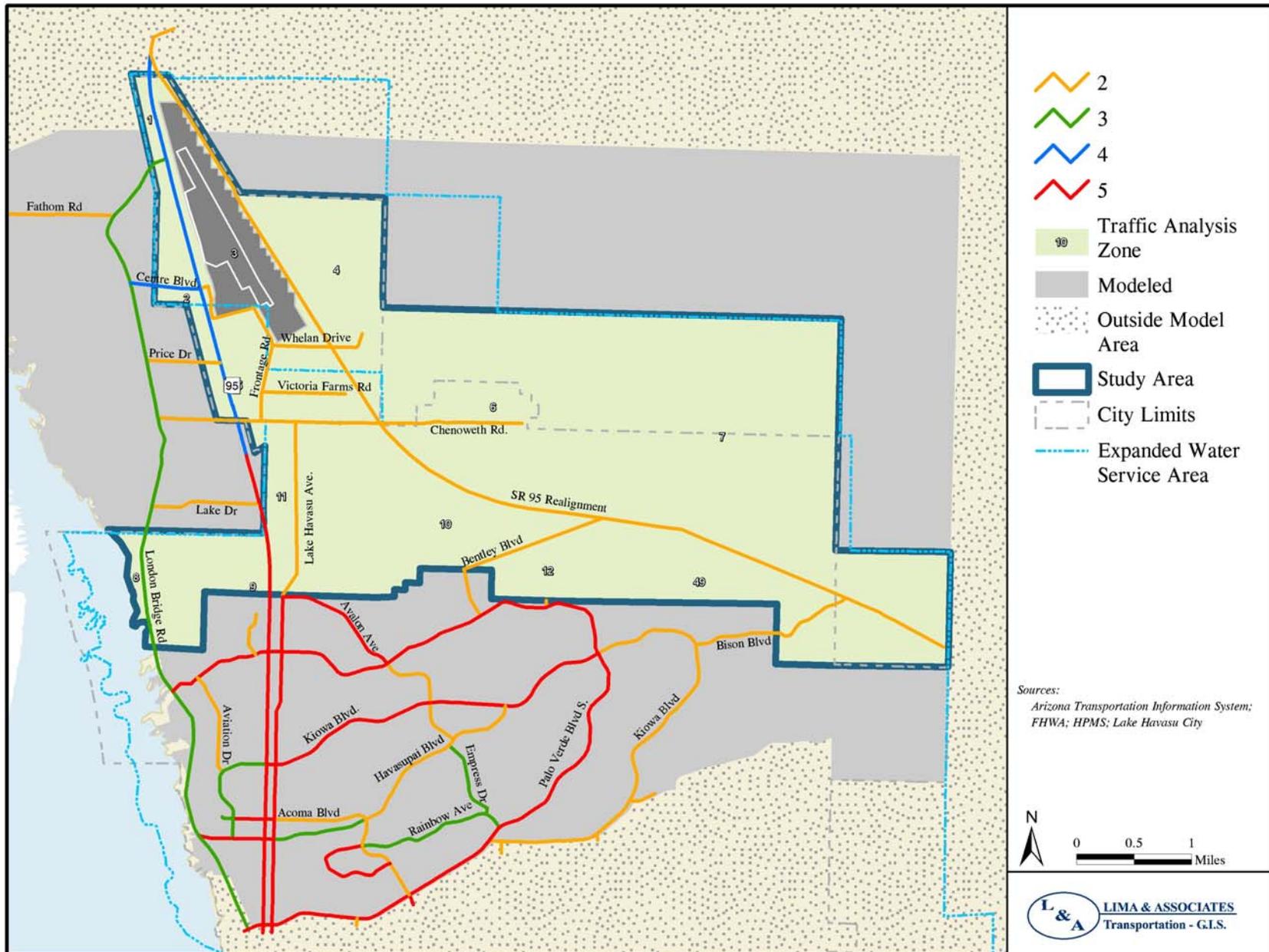
In base network modeling, an extension of Desert Lake Dr would be a new four-lane major collector to serve the regional park that would be developed by 2030. Desert Lake Dr would intersect a four-lane Bentley Blvd which would carry its traffic to the realignment intersection. Note that Desert Lake Dr was modeled in a different configuration in the alternatives (Figures 4.3 and 4.4) and it is not included specifically in the long-range plan (Figure 4.10). Bentley Blvd would be extended due north from the realignment intersection to serve any rural development in TAZ 7 or 8.

The functional classification of the North Havasu base network for 2030 appears in Figure 3.11 and the number of lanes appears in Figure 3.12. There would be no changes to functional class but there would be several changes to the number of lanes:

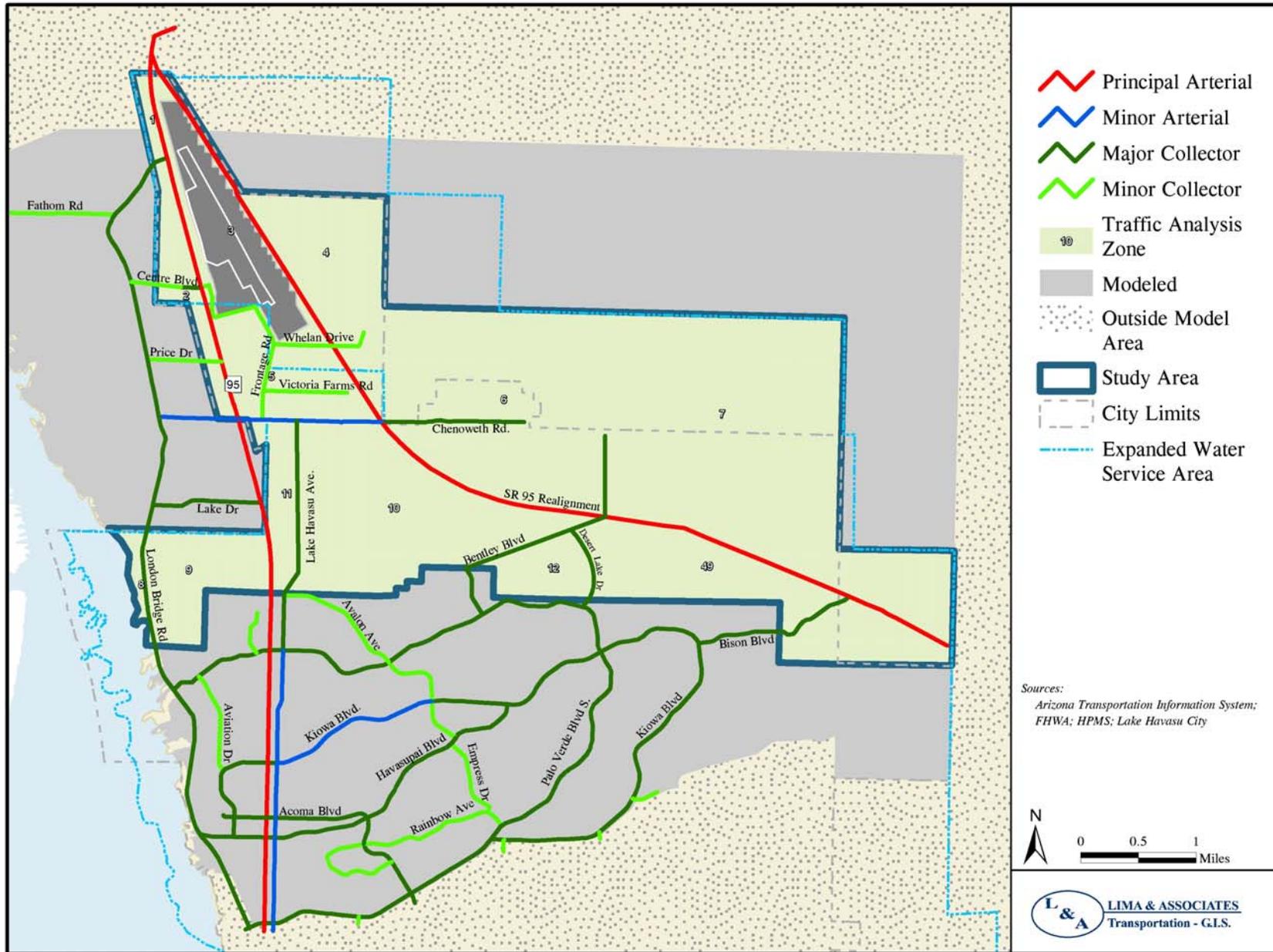
**FIGURE 3.9. 2020 BASE NETWORK FUNCTIONAL CLASSIFICATION**



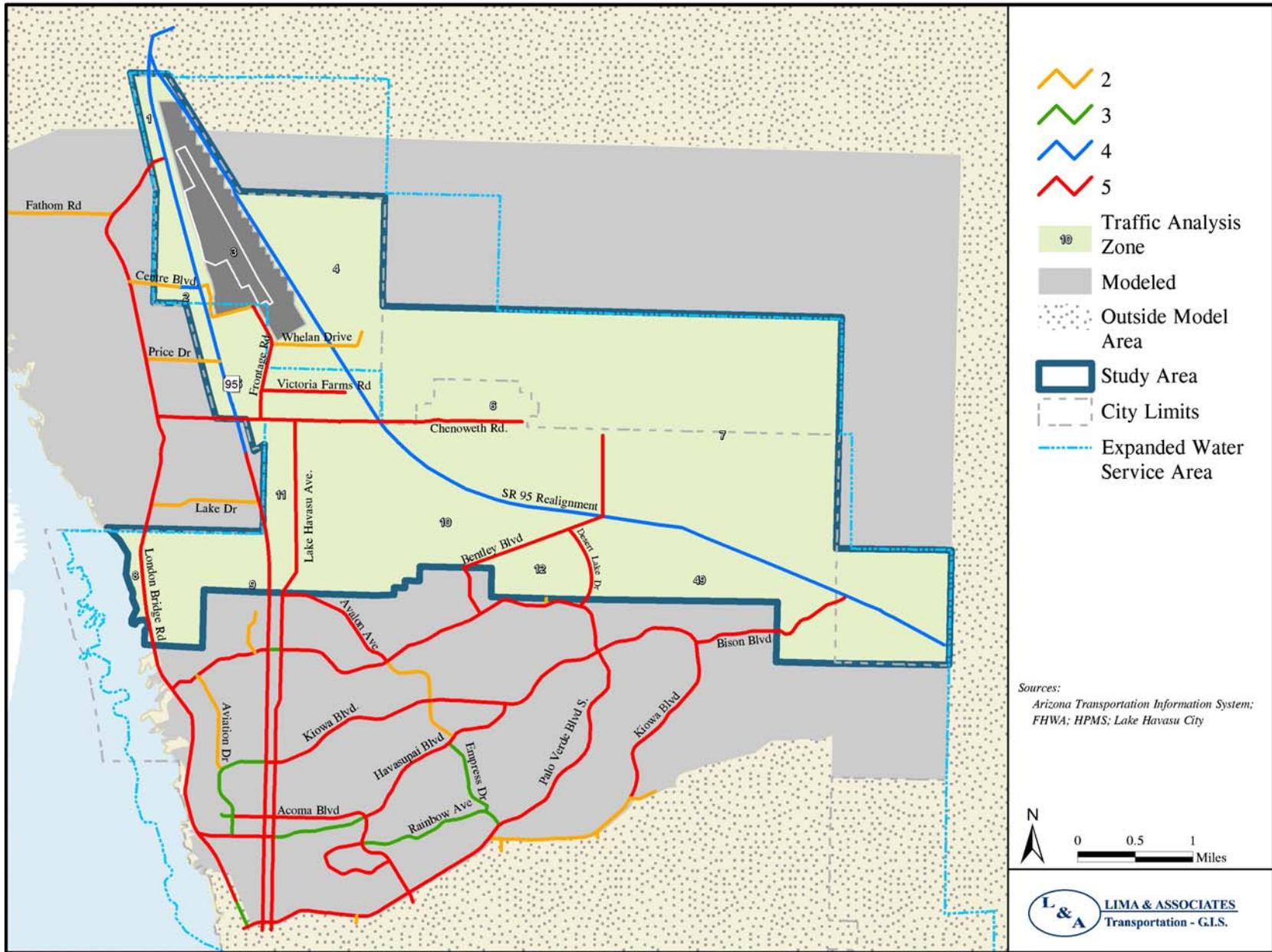
**FIGURE 3.10. 2020 BASE NETWORK WITH NUMBER OF LANES**



**FIGURE 3.11. 2030 BASE NETWORK FUNCTIONAL CLASSIFICATION**



**FIGURE 3.12. 2030 BASE NETWORK WITH NUMBER OF LANES**



- Chenoweth Dr would be four lanes throughout its length from east of the realignment to London Bridge Rd.
- The Frontage Rd and Victoria Farms Rd serving the industrial park would be upgraded to four lanes.
- Lake Havasu Ave and London Bridge Rd would be upgraded to four lanes.
- Bison Blvd would be upgraded to four lanes.

The functional class and number of lanes for the additional planning modeling area around the NHA would be as recommended in the 2005 SATS recommended projects. Note that Kiowa Blvd would be upgraded from two to four lanes sending traffic via Bison Blvd to the realignment intersection.

## **FUTURE TRAFFIC CONDITIONS**

Results of the NHA 2020 and 2030 travel demand models appear in this section. In summary, the base network for each of the years shows a few roadway segments with excessive amounts of congestion. Average Annual Daily Traffic volumes and level of service are the chief measures of traffic conditions described below. The level of service introduced in Chapter 5 of Working Paper 1 is a qualitative measure that characterizes how well traffic is flowing and the perception of traffic conditions by motorists and passengers. LOS ranges from LOS A, free-flowing traffic, to LOS F, high congestion. In an urban area, the acceptable level of service is generally LOS C/D or better.

### **2015 Traffic Conditions**

The entire Lake Havasu City planning area is projected to grow in population by about 8 percent between 2010 and 2015, to a total of about 64,600 in 2015. Very little of that growth is projected to be in the NHA.

Meanwhile, the steady growth of commerce in the SR 95 corridor contributes to some growth in SR 95 traffic in the NHA. On the other hand, during the recession of 2008 and 2009 there have been declines in traffic on the SHS, including SR 95 overall. The lower than average amount of travel per capita may continue until the economy rebounds. Therefore, while traffic is likely to grow by 2015 on existing SR 95 in the NHA, perhaps it would be at a rate less than the growth in commerce might suggest.

Modest growth in employment and little residential development in the NHA would indicate minimal growth pressures between 2010 and 2015. LOS would be C or better throughout the North Havasu network. Therefore, modest overall growth in NHA traffic would not warrant changes in functional class or roadway widening by 2015.

## **2020 Traffic Conditions**

Growth is expected to accelerate in the Lake Havasu planning area between 2015 and 2020, especially in North Havasu. The base roadway network would appear to represent an adequately connected network of roads at a functional class of minor collector or above. The number of lanes assumed in the base network is the limiting factor that would cause some congestion. A few roadway segments would be at a LOS of D or worse, a very few at LOS E, and only the southeast end of the realignment at LOS F.

The highest 2020 base network modeled daily traffic volumes would be on existing SR 95 and the SR 95 realignment, as displayed in Table 3.6. The LOS for the areas of highest volume varies from LOS B to LOS F.

The two-lane realignment would have LOS D or worse all the way from Chenoweth to the southeastern boundary of the NHA. The most congested segment would be southeast of Bison Blvd (LOS F), where much of the congestion would be from traffic that would have neither end of the trip in the NHA (as the vehicles would just travel Bison Blvd and the realignment through a corner of the NHA).

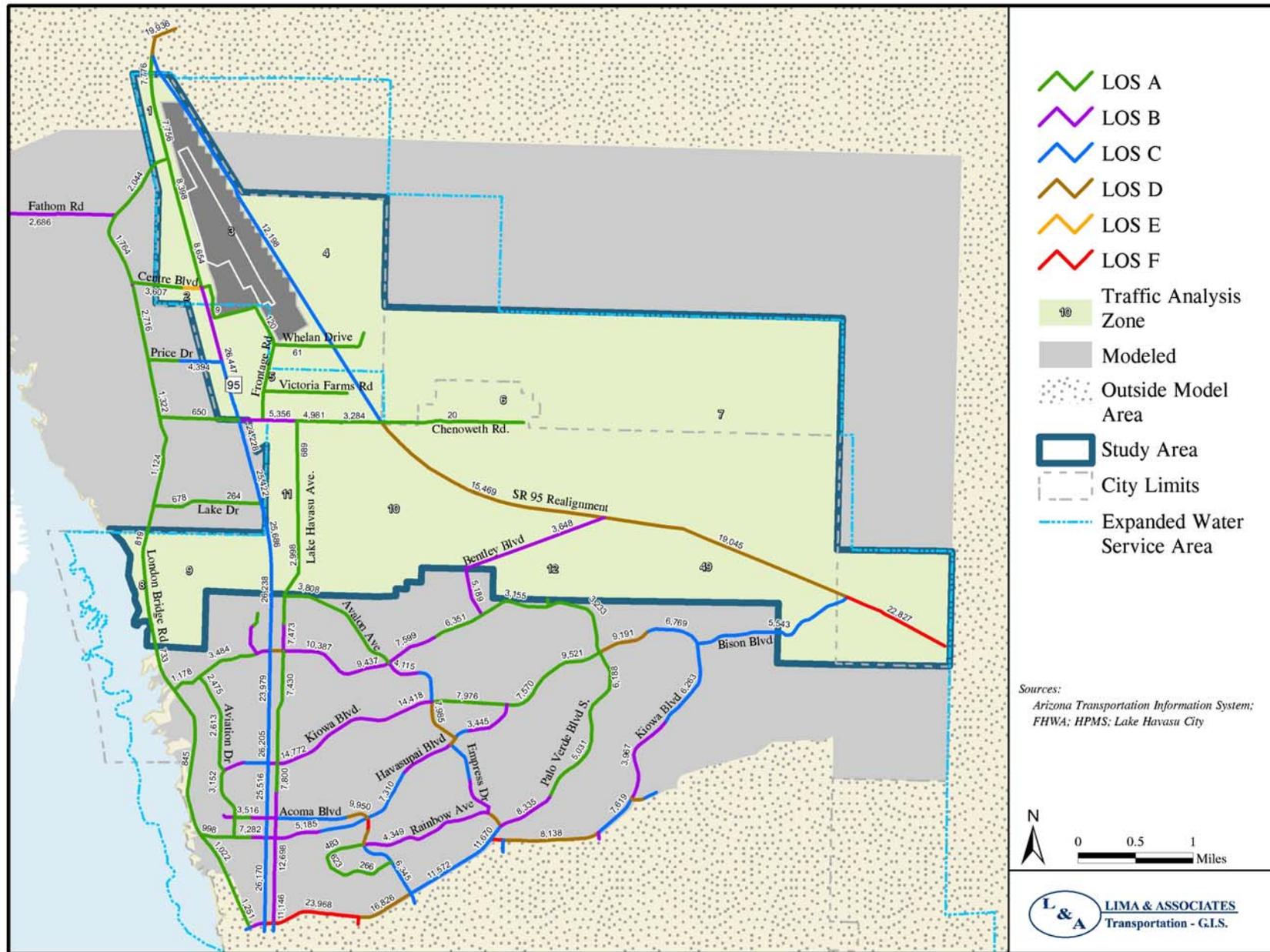
**TABLE 3.6. HIGHEST DAILY TRAFFIC VOLUMES 2020**

<b>Roadway Section</b>	<b>Daily Traffic</b>	
	<b>Volume</b>	<b>LOS</b>
SR 95 between Chenoweth Dr and Price Dr	26,447	LOS C
SR 95 between southern Study Area boundary and Lake Dr	26,238	LOS C
SR 95 Realignment southeast of Bison Blvd	22,827	LOS F
SR 95 between Price Dr and Retail Center Blvd	22,164	LOS B
SR 95 Realignment between Bison Blvd and Bentley Blvd	19,045	LOS D
SR 95 Realignment between Bentley Blvd and Chenoweth Dr	15,469	LOS D

The 2020 traffic volumes could not be compared directly to other model results, as neither the 2005 SATS nor the 2008 SR 95 realignment modeled the 2020 year. The household and employment projections in the future socioeconomic conditions portion of the NHATS were direct inputs to the 2020 model, for the NHA. For the modeled area surrounding North Havasu, a factor of .75 was applied to the trip productions and trip attractions from the 2005 SATS and the same factor was applied to the external volumes. The .75 factor accounted for two items: year 2020 would represent fewer years of growth from the present, and the projections in the NHATS reflect an expectation of lower growth rates than were expected when the 2005 or 2008 studies were done.

Traffic volumes in 2020 throughout the North Havasu network appear in Figure 3.13.

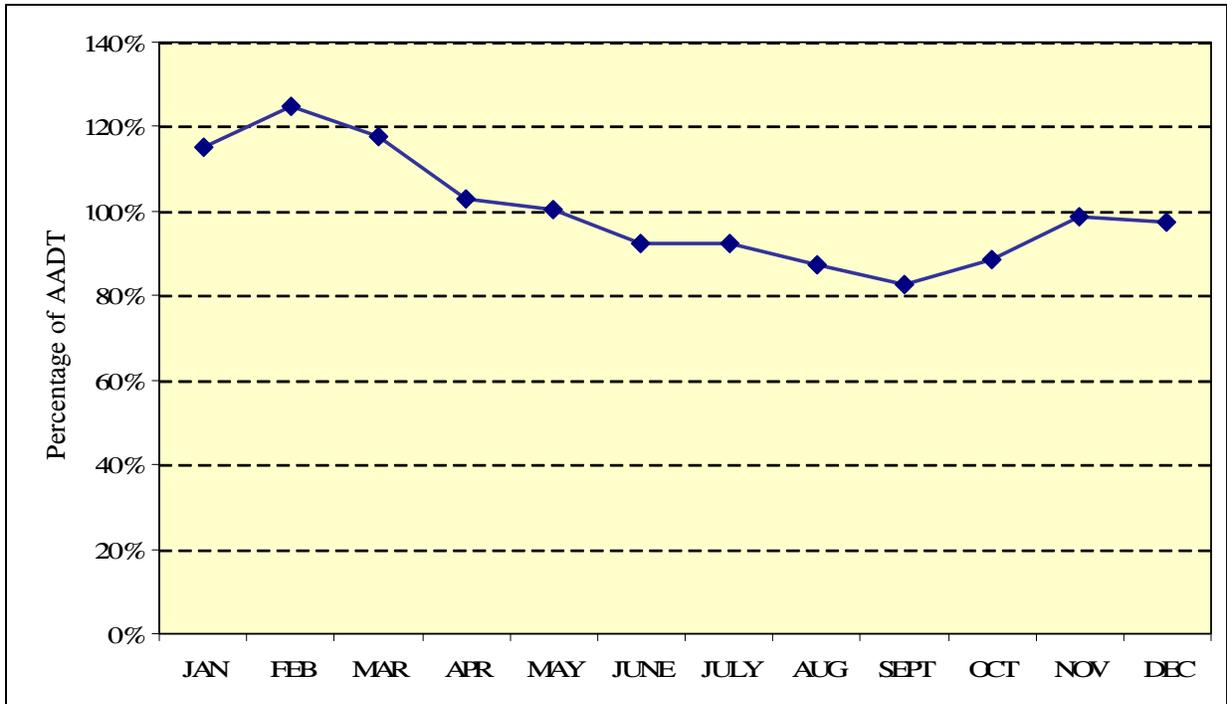
**FIGURE 3.13. 2020 DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE**



### Seasonal Variation in Traffic

The seasonal variation in traffic on SR 95 in the vicinity of Lake Havasu City as of 2008 appears in Figure 3.14. The highest average daily traffic (ADT) is in February, when the ADT is 25 percent higher than the annual average. The lowest ADT is in September, when it is 17 percent lower than the annual average.

**FIGURE 3.14. SEASONAL VARIATION IN TRAFFIC ON SR 95**

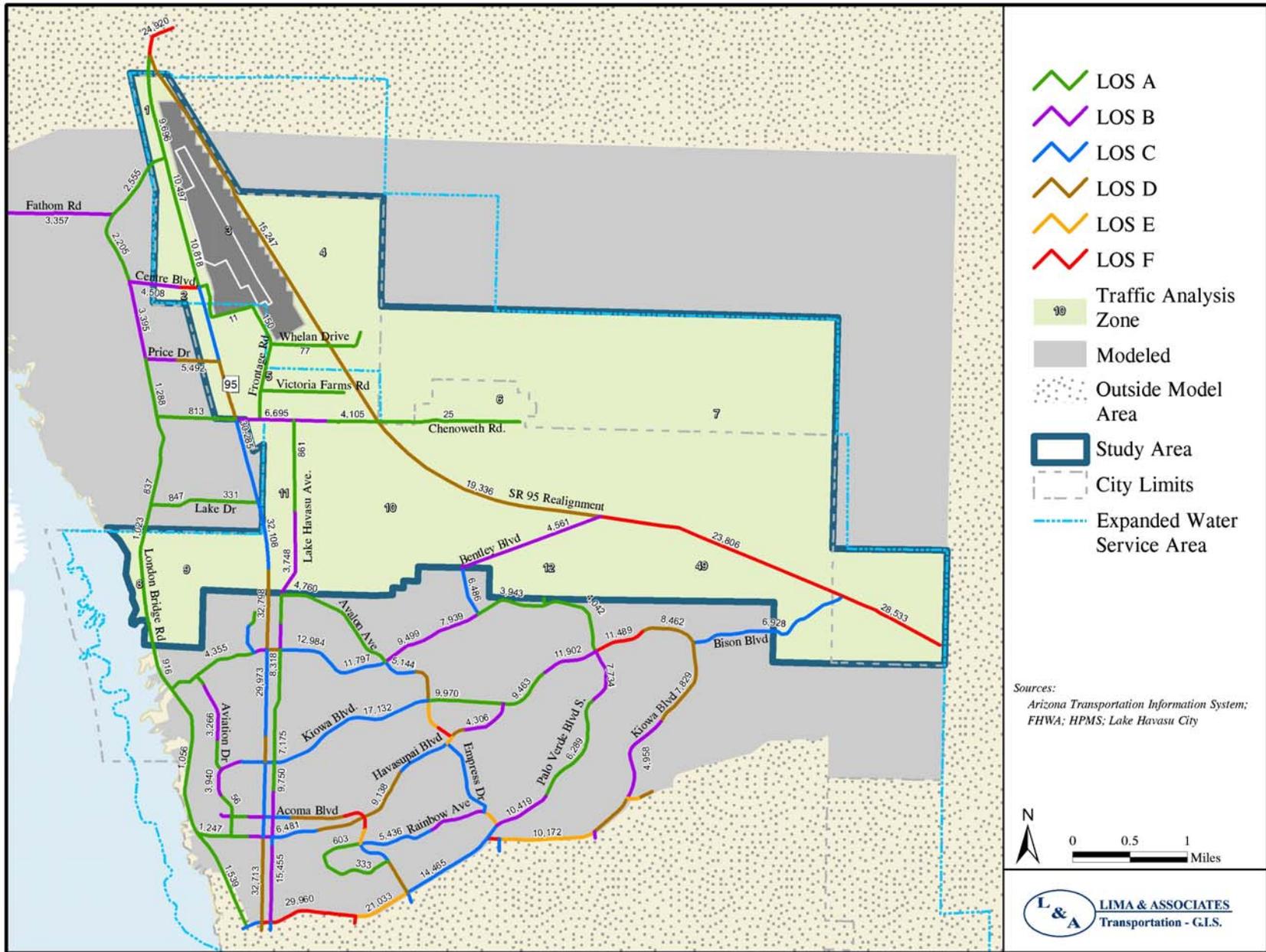


Source: ADOT Multimodal Planning Division Data Section

Seasonal variation in traffic was projected by assuming that there will continue to be a higher population in the winter than in the summer. The seasonal population will include winter visitors who stay for the entire season and tourists who stay for shorter periods of time. City officials expect that the higher number of residents during the winter will generate levels of traffic varying seasonally in a manner similar to the pattern in 2008. Therefore, the peak seasonal traffic was projected to be 25 percent higher than the AADT. The 2020 traffic volumes and base network level of service for the February seasonal peak appear in Figure 3.15.

Levels of service are projected to be generally the same or one level worse for the peak season than for the annual base in 2020. On SR 95 and the SR 95 realignment the LOS are generally one level worse, but the level of service is two levels worse between Bentley Blvd and Bison Blvd on the SR 95 realignment (dropping from LOS D to LOS F).

**FIGURE 3.15. 2020 PEAK SEASON DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE**



## **2030 Traffic Conditions**

In the decade between 2020 and 2030 the number of households in North Havasu is projected to more than triple (from 885 to 2,813 households) and the employment is projected to grow by almost 1,000 to a total of 5,000. Assuming the base 2030 roadway network characteristics stated above, the network would have some roadway segments where congestion in 2030 would exceed that in 2020. Other segments would have less congestion in the later year. Overall, there would be very few roadway segments at LOS D or worse in 2030.

The highest modeled daily traffic volumes on the 2030 base network would include some existing SR 95 and SR 95 realignment segments, and also Chenoweth Dr between SR 95 and Lake Havasu Ave, as displayed in Table 3.7. The LOS for the areas of highest volume in North Havasu varies from LOS B to LOS D.

**TABLE 3.7. HIGHEST DAILY TRAFFIC VOLUMES 2030**

<b>Roadway Section</b>	<b>2030 Traffic Volume</b>	<b>LOS</b>
SR 95 Realignment southeast of Bison Blvd	32,779	LOS D
SR 95 between southern Study Area boundary and Lake Dr	30,527	LOS C
SR 95 between Price Dr and Retail Center Blvd	28,964	LOS C
SR 95 between Chenoweth Dr and Price Dr	28,570	LOS C
SR 95 Realignment between Bentley Blvd and Chenoweth Dr	26,215	LOS C
SR 95 Realignment between Bison Blvd and Bentley Blvd	26,195	LOS C
SR 95 Realignment between Chenoweth Dr and the northern convergence with SR 95	17,748	LOS B
Chenoweth Dr between SR 95 and Lake Havasu Ave	13,143	LOS B

Upgrading the SR 95 realignment to a four-lane rural divided highway would increase its capacity and permit it to carry the higher 2030 volumes. The LOS of the three highest-volume realignment roadway segments would improve their LOS in 2030, compared to their LOS in 2020.

The base model network did not include any changes to the physical characteristics of existing SR 95. Traffic would increase on the roadway, and the segment between Price Dr and Retail Center Blvd would go from LOS B to LOS C, while the other high-volume roadway segments described above for 2020 would retain the same LOS in 2030. Outside the NHA the segment between Lake and Chenoweth would go from LOS B to LOS C.

2030 traffic volumes were compared to results of other studies that modeled the year 2030. However, there were several connections between existing SR 95 and the SR 95 realignment

that were different in each of the three studies. One difference was that the NHATS network does not have a prospective roadway that was present in both of the earlier models. The roadway would be parallel to Chenoweth Dr from existing SR 95 eastward, roughly halfway between Chenoweth Dr and the southern NHA boundary and would intersect the realignment. In the 2005 and 2008 studies, that roadway would carry some traffic that would have otherwise continued south on existing SR 95. That link would mean the LOS of the SR 95 segment to the south would be improved by one level.

The household and employment projections in the future socioeconomic conditions portion of the NHATS were direct inputs to the 2030 model for NHA TAZs. A factor of .90 was applied both to the external volumes and to the trip productions and trip attractions from the 2005 SATS for the modeled area surrounding the NHA. The .90 factor accounted for projections in this study reflecting an expectation of lower growth rates in the planning area outside NHA than were expected when the 2005 and 2008 studies were done.

Volumes for the 2008 *SR 95 Realignment Study* are compared in Table 3.8 to the volumes yielded by the NHATS planning model in several key locations. The volumes differ somewhat because of differences in the model networks. They also differ because of different growth rate assumptions in the NHATS.

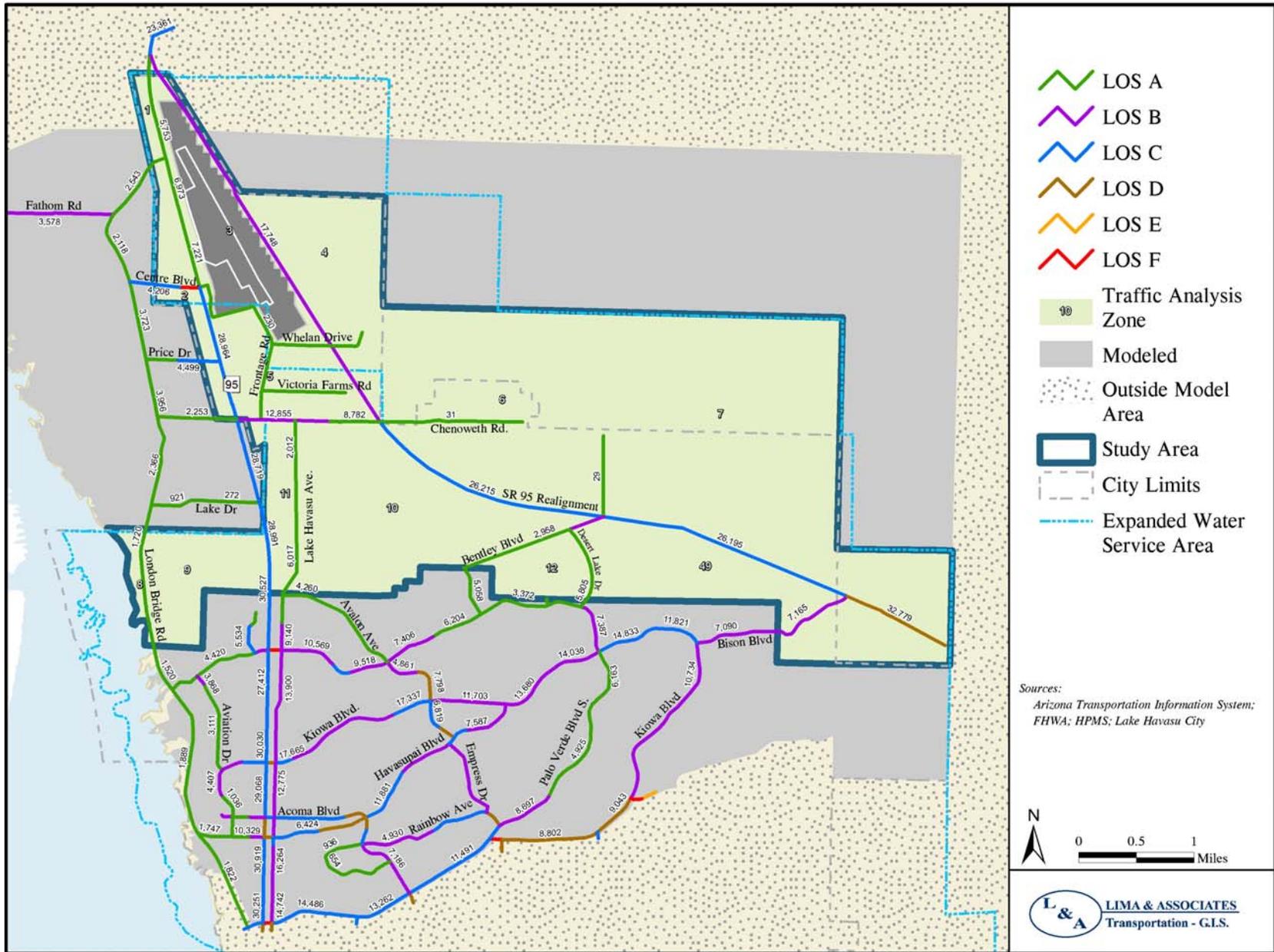
**TABLE 3.8. DAILY TRAFFIC VOLUMES COMPARED FOR 2030, KEY LOCATIONS**

Roadway Section	2009 NHATS	2008 SR 95 Realignment
SR 95 Realignment southeast of Bison Blvd	32,779	35,000
SR 95 Realignment between Bentley Blvd and Chenoweth Dr	26,215	29,000
SR 95 between Industrial Blvd and Palo Verde Blvd South	30,919	39,000
SR 95 between southern Study Area boundary and Lake Dr	30,527	29,000
SR 95 between Price Dr and Retail Center Blvd	28,964	16,000

In addition to the comparisons of one segment at a time, other comparisons also had satisfactory results. In a comparison made between the NHATS and the 2005 SATS, Chenoweth Dr just east of London Bridge Rd had a modeled volume of 20,000 in the 2005 SATS study, and only 6,000 in the NHATS. However, the Chenoweth segment was the only area connection between London Bridge Rd and existing SR 95 in the 2005 SATS model network. Meanwhile, the NHATS included connections at Lake Dr, Price Rd, and Center Blvd in addition to Chenoweth. Taken together, the volumes on the four connections were 16,000. That volume of 16,000 was somewhat lower than the 20,000 stated above for Chenoweth, which was expected, given the lower assumed growth rates.

Traffic volumes in 2030 throughout the NHA and additional modeled area appear in Figure 3.16.

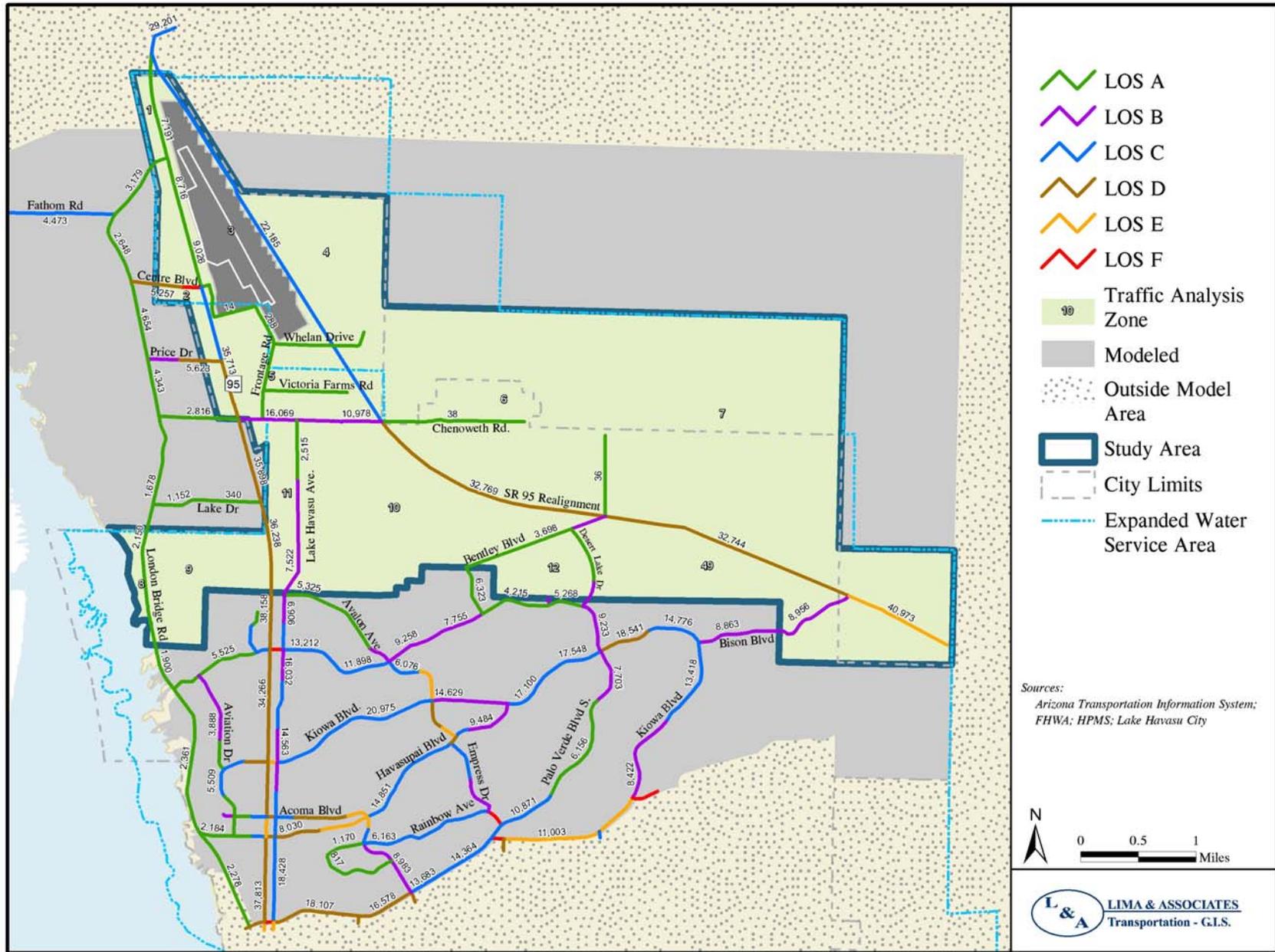
**FIGURE 3.16. 2030 DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE**



The seasonal variation in traffic is described above in the Seasonal Variation in Traffic section. For 2030, just as for 2020, the peak seasonal traffic was projected to be 25 percent higher than the AADT. The 2030 traffic volumes and base network level of service for the February seasonal peak appear in Figure 3.17.

Levels of service are projected to be generally the same or one level worse for the peak season than for the annual base in 2030. On the SR 95 realignment, the LOS south of Bison Blvd drops from LOS D to LOS E. There are no segments with LOS F on the four-lane realignment in 2030, even in the peak season, unlike the LOS F condition on the two-lane realignment in 2020.

**FIGURE 3.17. 2030 PEAK SEASON DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE**



## 4. PLAN FOR IMPROVEMENTS

This chapter presents recommended transportation plans for the range of horizon years of 2025-2030 (mid-range horizon) and 2035-2040 (long-range horizon). As previously noted in Chapter 3, the socioeconomic projections and transportation forecasts were made for the years 2015, 2020, and 2030 that were specified in the original scope of work developed by ADOT and the City. However, the TAC recognized that due to the economic downturn the amount of growth projected here for the years 2015, 2020, and 2030 would actually occur in later years than originally expected. Therefore, the TAC decided that the planning horizon years for the final transportation plan would be 2025-2030 for the mid-range and 2035-2040 for the long-range planning horizons.

### EVALUATION MEASURES FOR TRANSPORTATION OPTIONS

This section discusses the general principles applied in developing a transportation system within North Havasu. Potential alternative improvements were evaluated using a set of performance measures. The feasibility of implementing each improvement was also assessed using a set of evaluation criteria.

The performance and feasibility measures used in this Report are a combination of ADOT measures, state-of-the-art measures used by Arizona cities, and measures specific to Lake Havasu City's vision. Some of the items considered from each of the three sources of measures were:

**ADOT Measures.** Arizona State statutes require that decisions on improvements to the SHS be based upon performance factors. Since SR 95 is an existing State Route and the SR 95 realignment is a prospective State Route, this plan was coordinated with ADOT's studies and performance assessments of SR 95.

**Arizona Cities' Measures.** In the current period of economic recession, shrinking revenues for cities' infrastructure are the most obvious and most serious financial problem. Cost and benefit assumptions were different than they were a few years ago.

**Lake Havasu City's Vision.** In addition to a safe and efficient transportation system, Lake Havasu City's vision calls for the preservation of mountain areas. The environmental resources feasibility measure addressed whether a project would inhibit the City's mountain preservation goals, in addition to other environmental resources.

#### Performance Measures

Potential alternative transportation improvements were evaluated using a set of performance measures listed in Table 4.1.

**TABLE 4.1. PERFORMANCE MEASURES**

---

<b>Performance Measures</b>
Mobility/Congestion Relief (Travel Demand, Street level of service)
Accessibility and Connectivity
System Preservation
Integration and connectivity with other modes
Safety (Reduction in Crashes)
Economic Benefits

---

The measures selected are those mandated in the State Statutes for performance based transportation planning and programming in order to be consistent with regional and statewide transportation planning.

***Mobility/Congestion Relief (Travel Demand, Street Level of Service)***

Each potential improvement was evaluated for its impact on future mobility, the ability of residents and visitors to move from place to place. Mobility is both a quantitative and qualitative measure. Mobility of residents and visitors was assessed for potential road and multimodal transportation improvements including pedestrian, bicycle, and transit improvements. The potential of an improvement to provide a desirable level of service of the roadway system was also measured.

***Accessibility and Connectivity***

The accessibility of the NHA and the connectivity of the NHA to major activity centers and transportation facilities were evaluated for each potential improvement. Particular attention was given to the connectivity of the NHA residents and activity centers with existing SR 95, proposed SR 95 Realignment, and existing City arterial streets. A major activity center inside the NHA is the MCC Regional Park site that is anticipated to be open prior to full development of the SR 95 realignment as a four-lane limited access facility.

***System Preservation***

The preservation and maintenance of the efficiency of an existing and future transportation system is vital, particularly given the existing constrained economy. System preservation was considered for both existing and potential new improvements. Since the NHA is largely undeveloped, the mileage of existing facilities is relatively low. The preservation of existing facilities was considered for existing SR 95 and the relatively low mileage of existing streets. For new improvements such as arterial and collector streets and the SR 95 Realignment;

access management, system management, and travel demand management strategies were considered as maintenance of operational efficiency.

### ***Integration and Connectivity With Other Modes***

A key goal in the development of the transportation system in the NHA is to maximize the use of all modes of transportation including walking, bicycling, and transit use. Each alternative was evaluated in regard to the potential to accommodate alternative modes. Related proposed plans were considered including planning for General Plan, Havasu Area Transit, Trails Plan, and Pedestrian and Bicycle Plan.

In addition, many stakeholders have expressed a preference for clustered, pedestrian-oriented development in portions of North Havasu. Such development would likely be served by a mix of roadways, transit, bikeways, and trails.

### ***Safety (Reduction in Crashes)***

The potential of an improvement to maintain safety by reducing accidents through traffic control, roadway design, and access management was assessed.

### ***Economic Benefits***

The economic benefit of potential improvements was evaluated. Economic benefits of transportation development include travel time and cost savings to residents and businesses, business productivity gains, increased value of land, and access to suppliers and consumers.

### **Feasibility Measures**

The following measures (Table 4.2) were used to evaluate the feasibility of implementing an improvement.

**TABLE 4.2. FEASIBILITY MEASURES**

<b>Feasibility Measures</b>
Socioeconomic, Land Use, State Land Ownership
Environmental and Cultural Resources
Engineering Opportunities and Constraints
Multimodal Considerations
Public Support
Costs/Right-of-way/Funding

Each criterion was assessed to the degree it impacts the feasibility positively or negatively. Based on previous studies general right-of-way needs and order of magnitude costs for the roadway concepts were established. Additionally, the socioeconomic impacts of the concept were evaluated together with other impacts to adjacent property. The general economic and land use impacts were determined and possible economic opportunities and challenges are presented. The results of the feasibility analysis were summarized in an evaluation table in order to identify those criteria that might provide opportunities for developing the roadway network and those that might become constraints for the implementation of improvements.

### ***Socioeconomic, Land Use, State Land Ownership***

The Arizona State Land Department, which holds lands in trust for the benefit of the people of Arizona, holds the bulk of the lands in North Havasu. The next State Trust Lands to be marketed for disposition and development will likely be along the existing SR 95 corridor. The programming of any SR 95 realignment construction would likely spur interest in State Trust Lands in the eastern portion of North Havasu.

Landowners other than ASLD are the City of Lake Havasu City, the Bureau of Land Management, and the U.S. Fish and Wildlife Service. Privately-held lands are currently concentrated, and some are developed as commercial and residential properties, along the existing SR 95.

As the originally platted City approaches buildout, the NHA is to be planned for development. Current preferences indicate that the NHA will have a low average residential density, which will combine higher-density clustered development with areas of open space. The City is preparing an industrial park southeast of the airport and there are other private commercial and industrial properties available in that same area. Increasing commercial development has occurred on SR 95 north of Chenoweth Dr and west of the airport, including the Shops at Lake Havasu (which opened in 2008).

The City's General Plan designates much of the NHA for very low-density residential development. Some of the other lands are designated as open space, park, or mountain protection areas. The general plan also includes sufficient commercial and employment acreage to develop large regional industrial and commercial centers along the northern SR 95 corridor, and the City has initiated economic development strategies to broaden its employment base.

The City considers that the SR 95 realignment will be the City's Urban Containment Boundary, where City services will not be extended or new services provided north of the Containment Line. ASLD owns most of the property that will be directly affected by the Urban Containment Line. While the City's plans indicate the Urban Containment Boundary, the previously discussed coordination with the ASLD (Annexation section, page 34) could lead to some changes in implementation.

The number and type of road connections from the NHA to existing City neighborhoods were a consideration in development potential improvements. Any connection to existing City streets will impact traffic and noise in adjacent neighborhoods.

### ***Right-of-Way***

Right-of-way will be required for new street arterials and collectors as well as for the SR 95 Realignment. Right-of-way should be identified as early as possible and preserved. Since ASLD is the land-owner most directly affected by this decision, close coordination with ASLD should begin now and continue through the development of State Land. Cost considerations for right-of-way are covered in the Costs/Funding/Right-of-way section below.

Since land in the NHA is predominately vacant, it is anticipated that, at most, very few buildings will be acquired for right-of-way.

### ***Environmental and Cultural Resources***

Potential impacts of improvements on environmental and cultural resources were considered in the evaluation of alternatives.

The assessment considered whether a project would inhibit the City's mountain preservation goals. Also, the Havasu National Wildlife Refuge on the west edge of the NHA protects numerous sensitive plant and animal species, and several additional sensitive species may be present elsewhere in North Havasu. Effects on known sensitive species areas affected the type and character of roadway projects. BLM holds a modest share of the NHA's land, and encourages joint planning with the City and other agencies in the "interface area" that is between the City and the vast BLM land area to the northeast. The ADOT SR 95 Realignment Study suggested a corridor that would not touch BLM Areas of Critical Environmental Concern (ACECs), and this Report also suggests the realignment corridor not touch the ACECs.

### ***Engineering***

Engineering considerations include the ability to apply acceptable geometric and traffic operational standards to provide safe and efficient improvements. Engineering challenges in the NHA include topographical and drainage considerations. The NHA generally slopes down from the adjacent Mohave Mountains on the northeast to the Colorado River on the west. The slopes are laced with many smoke tree/palo verde washes.

Possible obstacles were identified that would preclude moving forward with the development of a facility. Also, constraints to the constructability of a potential facility were considered.

Consideration was also given to impacts of the new facility on visual aesthetics, new right-of-way, cultural and environmental resource mitigation and particularly drainage requirements.

### ***Multimodal Considerations***

High quality transportation service in the NHA can be obtained through provision of an array of transportation alternatives including pedestrian, bicycle, and transit facilities. Havasu Area Transit serves the City's many senior citizens, workers in the tourism industry, and others. As residents age and the City grows, transit demand will increase. Many stakeholders have expressed a preference for clustered, pedestrian-oriented development in portions of the NHA. Such development would likely be served by a mix of roadways, transit, bikeways, and trails. Each alternative was evaluated in regard to the potential to accommodate alternative modes.

The intermodal considerations at the Lake Havasu City Airport are generally within the airport boundary and are covered by the Airport Master Plan update approved by City Council in January 2009.

### ***Community Concerns***

The transportation system in the NHA must serve the travel of NHA residents, residents of the remainder of the City who make trips into the NHA, and visitors from outside the City. Through the City General Plan, transit plans, and pedestrian and trails plans, residents have expressed a desire to provide alternative modes of travel.

Common regional interests have strengthened the connections among Lake Havasu City, Bullhead City, and Kingman, which form the Tri-City region of southern Mohave County. The region seeks to foster responsible land development, clean water, and the tourism economy. Some aspects of the regional efforts specifically address easing the current economic downturn. The region is exploring a transit system that would connect the three cities.

Many residents attended the open houses where oral and written questions and comments were received. Mailed and E-mailed comments were also received. Residents were welcome to make comments as individuals or as the representatives of groups.

### ***Costs/Funding***

Specific project costs are not listed for the alternatives and recommended transportation plan due to the conceptual nature of the plan and uncertainty of the configuration of the facilities until development plans are specified in the NHA. However the study did consider the general impact of costs by potential alternatives. Potential costs of the roadway system alternatives would vary considerably based upon the number of lanes for roadways and whether they would be developed according to the Avenue or Boulevard cross-section. The alternative that

contained many Boulevards would have been especially costly. Travel demand could be satisfied with fewer Boulevards and more Avenues, which cost less. The recommendation is for the lower cost network that has relatively more Avenues.

Currently, funding for transportation improvements is severely limited by the overall economy. The current *ADOT 2010-2014 Five Year Transportation Facilities Construction Program* lists \$250,000 allocated to Lake Havasu State Park in FY 2010.

No other projects are listed for the Lake Havasu area in the Five-Year Program, and no funds from the American Recovery and Reinvestment Act of 2009 have been apportioned to the City.

## **ROADWAY NETWORK AND OTHER MODE ALTERNATIVES**

This section reports the results of testing alternative roadway networks using the travel demand model. Working Paper 2: Future Conditions reported the modeling process and the results of modeling the base network for the years 2020 and 2030, including:

- Projections of the number and location of households and workplaces.
- Base roadway networks that were laid out to serve the travel demands of households, workers, and others.
- Results of travel demand modeling that distributed vehicle trips over the base networks over both average and seasonal peak conditions.

Modeling yielded acceptable LOS for traffic in the NHA in 2020 and 2030. The satisfactory results showed no major deficiencies in how the networks would handle traffic, and no major changes were necessary to alleviate projected traffic congestion.

Alternative roadway networks were tested and are reported in comparison to the base networks to see whether:

- They might improve LOS.
- They might be located to better serve anticipated NHA land development patterns.

As previously noted, the years 2010, 2015, 2020, and 2030 were specified in the original scope of work developed by ADOT and the City. However, the recommended transportation plan refers to the range of years of 2025-2030 for the mid-range and 2035-2040 for the long-range horizons. Table 4.3 contains the original analysis years with the final plan years.

Projects are recommended in this transportation plan based partly upon whether they would serve travel demand. The mid-range time period alternatives and plan are based on travel demand that was projected for 2020. The long-range time period alternatives and plan are based on the travel demand that was projected for 2030.

**TABLE 4.3. PLANNING PHASES DEFINITIONS, CONTRASTS**

<b>Original Analysis Years</b>	<b>Final Plan Years</b>
2010 (Current Year)	N/A
2015	Short-range – (2015-2020)
2020	Mid-range – (2025-2030)
2030	Long-range – (2035-2040)

The TAC indicated that socioeconomic trends and travel behavior have changed so rapidly in the past year that the socioeconomic projections approved as inputs to 2020 and 2030 travel demand figures may not be reached until several years after 2020 and 2030, respectively. Therefore, in the alternatives analysis and the remainder of this plan the phases are labeled as mid-range and long-range. A rough estimate is that long-range projections might be reached between 2035 and 2040. The plan sets out a logical sequence of projects for each phase rather than attaching a specific year to the phase. Scheduling of a project for a specific year will become crucial at whatever time the need for the project becomes more immediate. At that future date, specific project scoping, cost estimating, and funding estimation would be attached to the needs and resources of that time period.

The modeling also included projects in and near the NHA that were a part of the 2005 SATS or the most recent Community Improvement Program and were recommended for construction within a few years after 2010. Very few roadway projects were listed for the NHA. Possible projects in the short range are the extension and/or widening of Victoria Farms Rd and some road development associated with utility development in Air Industrial Park Phase II.

### **Roadway Network Alternatives**

No alternatives were developed for the short-range future. Only a few roadway projects are likely and they have already been defined, as stated above.

#### ***Mid-Range (2025-2030) Roadway Network Alternatives***

An alternative roadway network was devised and modeled for the mid-range future. Most of the alternative network matched the base network, previously described. Given the satisfactory performance of the base network, Bentley Blvd was the only roadway that was changed in the alternative.

The extension of Bentley Blvd was configured in the base network so that its intersection with the SR 95 two-lane realignment would be spaced two miles from the intersections on either side. A later upgrade to a rural freeway interchange could easily meet ADOT’s two-mile spacing rule. Still, Lake Havasu City may be designated as an “urban area” before the realignment is built, and urban interchanges are allowed to be only one mile apart.

For the alternative, Bentley Blvd was extended almost due north to intersect the realignment about one mile east of Chenoweth. That alignment would be more direct for those traveling the roadway from central North Havasu, then heading north on the realignment. The land east of existing SR 95 in TAZ 10 would likely have the first residential development in the NHA and the alternative alignment of Bentley Blvd would serve that development well. The roadway was modeled with a 35 miles per hour (mph) speed limit.

The mid-range alternative network modeled functional classification appears in Figure 4.1, and the numbers of lanes on each roadway appear in Figure 4.2.

### *Long-Range (2035-2040) Roadway Network Alternatives*

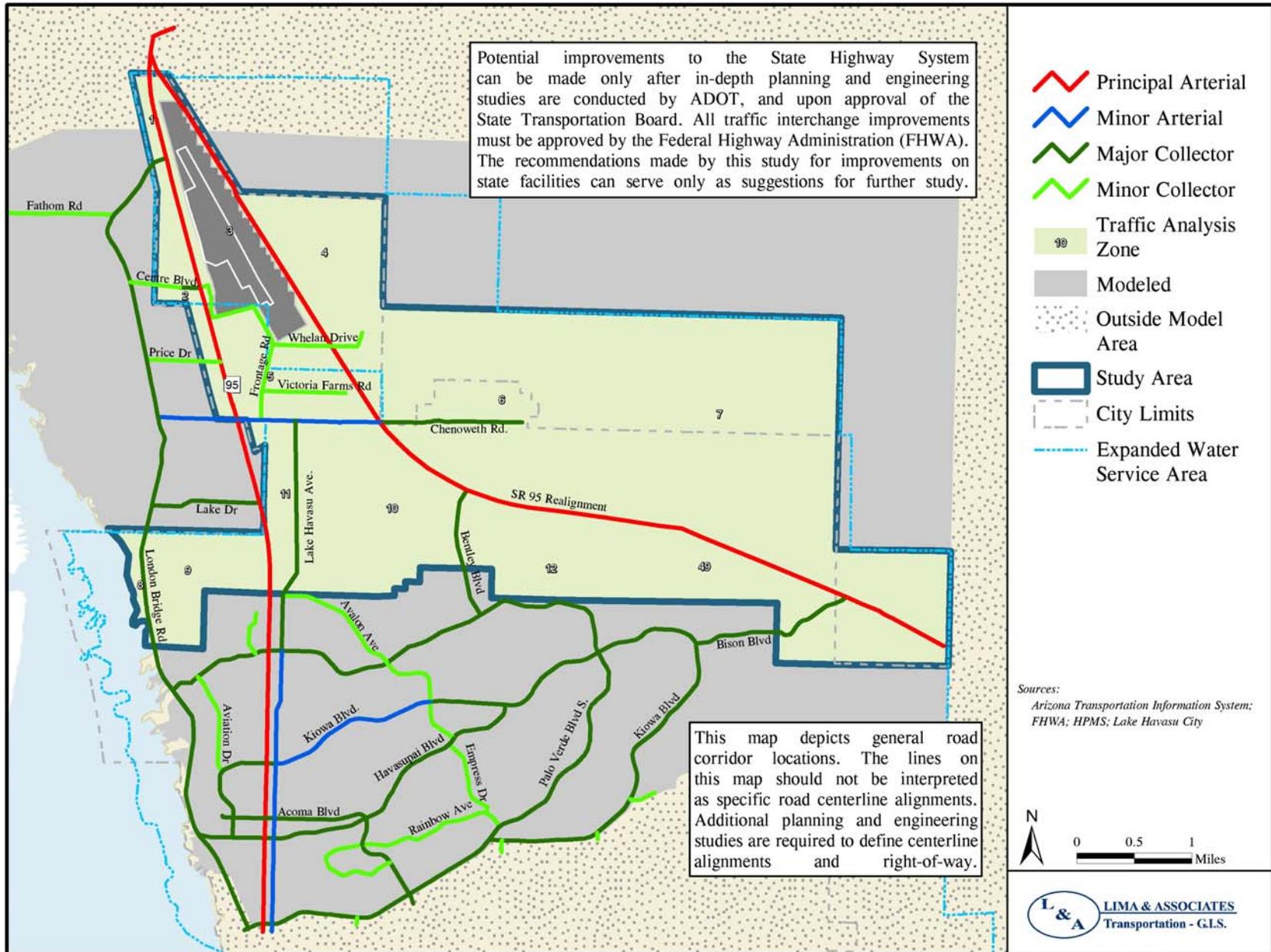
An alternative roadway network was also devised and modeled for the long-range future. The long-range base model network had performed to satisfactory standards, just as was the case for the mid-range base model network. Because development is assumed to reach more portions of the NHA by the long-range time period, there is a more extensive residential and employment development pattern that the roadway network would serve. Adjustments were made to the base network to try to serve the development better.

Descriptions of the portions of the network that are the same as in the base network are found in Working Paper 2. The long-range alternative network modeled functional classifications appear in Figure 4.3, and the numbers of lanes on each roadway appear in Figure 4.4.

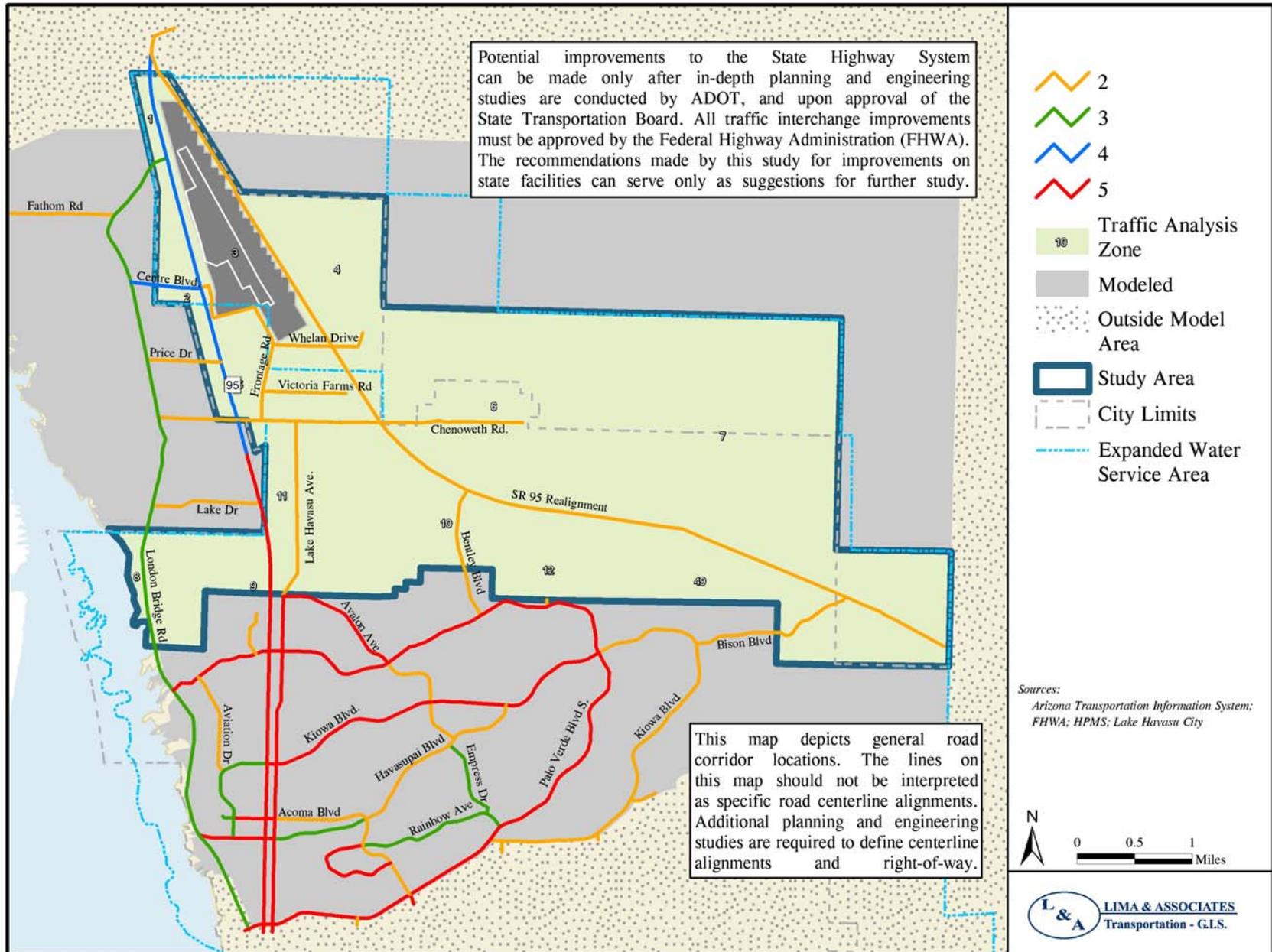
Roadways that were changed in the long-range alternative network comprise:

- **Addition of frontage roads parallel to the SR 95 realignment both on the north and on the south.** The frontage roads could serve local travel in new developments and provide an emergency alternative to the realignment. The roadways were modeled as two-lane major collectors with a 45 mph speed limit.
- **Bentley Blvd and Desert Lake Dr.** Their functional class would remain major collector, but given the addition of the frontage roads, Bentley Blvd would not intersect the realignment. Instead, the frontage road would take Bentley Blvd traffic to the interchanges at Chenoweth Rd or Desert Lake Dr. Desert Lake Dr would head due north through the interchange; compared to the base, its number of lanes would be reduced from five to four on the south and two on the north (Figure 4.4). Both roadways were modeled with a 35 mph speed limit. Note that following evaluation of the alternatives, Desert Lake Dr was not included specifically in the long-range plan (Figure 4.10).

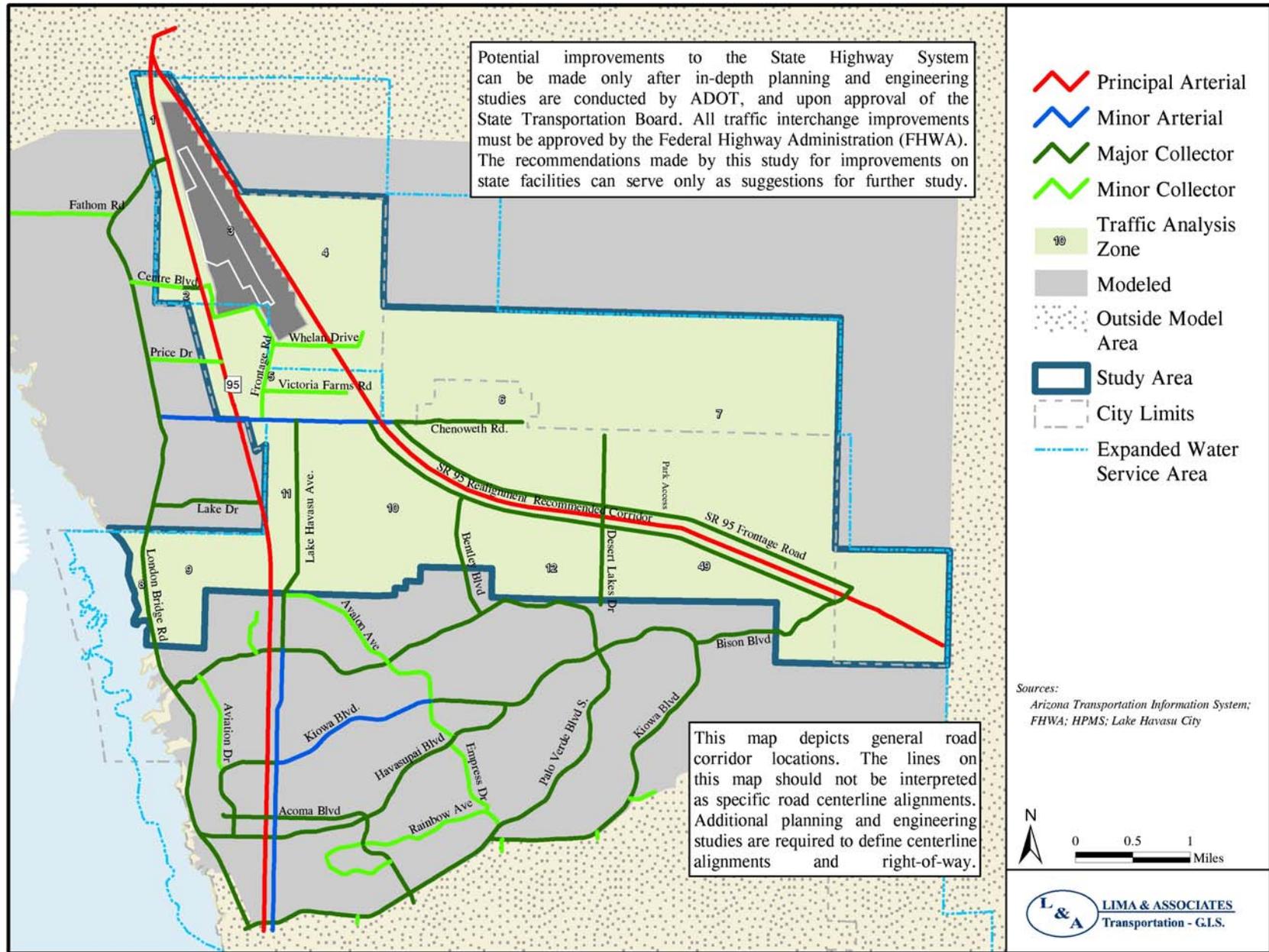
**FIGURE 4.1. MID-RANGE (2025-2030) ALTERNATIVE NETWORK FUNCTIONAL CLASSIFICATION**



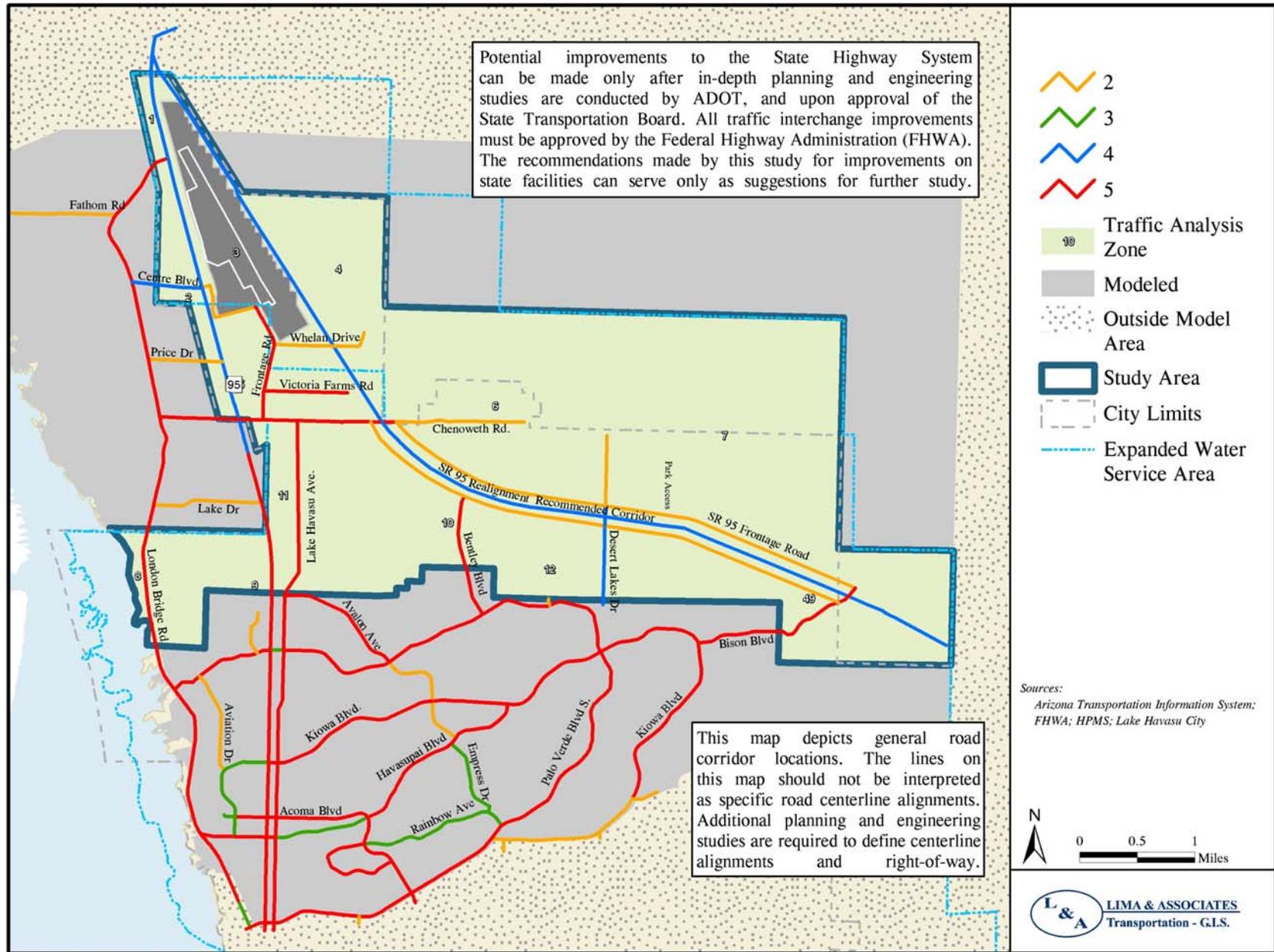
**FIGURE 4.2. MID-RANGE (2025-2030) ALTERNATIVE NETWORK WITH NUMBER OF LANES**



**FIGURE 4.3. LONG-RANGE (2035-2040) ALTERNATIVE NETWORK FUNCTIONAL CLASSIFICATION**



**FIGURE 4.4. LONG-RANGE (2035-2040) ALTERNATIVE NETWORK WITH NUMBER OF LANES**



## Roadway Alternatives Performance

### *Mid-Range (2025-2030) Roadway Alternative Performance*

The mid-range traffic volumes and LOS throughout the NHA network appear on Figure 4.5. The highest mid-range alternative network modeled daily traffic volumes would be on existing SR 95 and the SR 95 realignment, as displayed in Table 4.4. The LOS for the areas of highest volume varies from LOS B to LOS F. The LOS on the highest volume sections would be exactly the same as in the base network.

**TABLE 4.4. HIGHEST MID-RANGE ALTERNATIVE DAILY TRAFFIC VOLUMES**

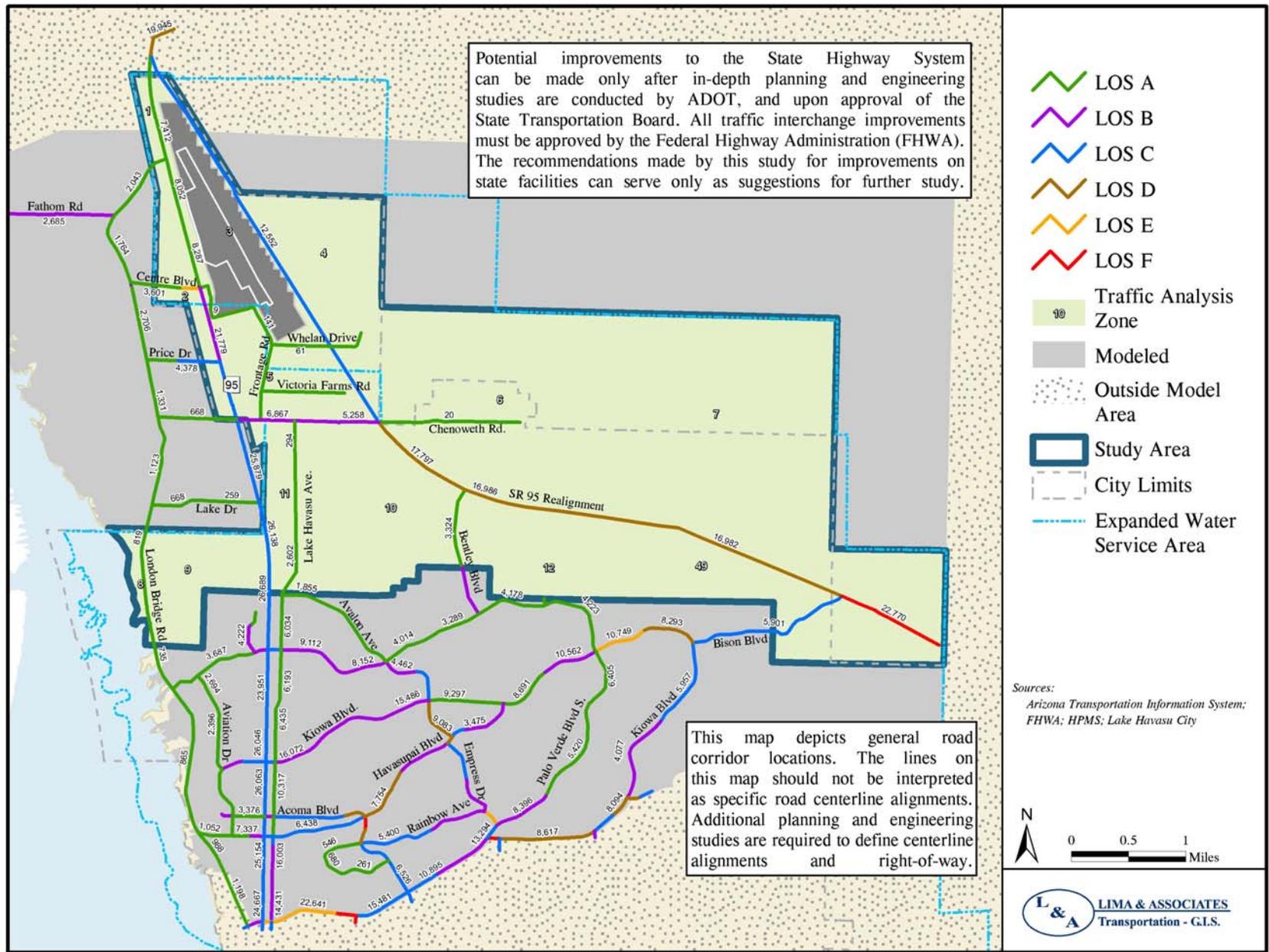
Roadway Section	Daily Traffic	
	Volume	LOS
SR 95 between southern Study Area boundary and Lake Dr	26,138	LOS C
SR 95 between Chenoweth Dr and Price Dr	25,879	LOS C
SR 95 Realignment southeast of Bison Blvd	22,779	LOS F
SR 95 between Price Dr and Retail Center Blvd	21,779	LOS B
SR 95 Realignment between Bentley Blvd and Chenoweth Dr	17,797	LOS D
SR 95 Realignment between Bison Blvd and Bentley Blvd	16,982	LOS D

The two-lane realignment would have LOS D or worse all the way from Chenoweth Dr to the southeastern boundary of the NHA. The most congested segment would be southeast of Bison Blvd (LOS F), where much of the congestion would be from traffic that would have neither end of the trip in the NHA (as the vehicles would just travel Bison Blvd and the realignment through a corner of the NHA).

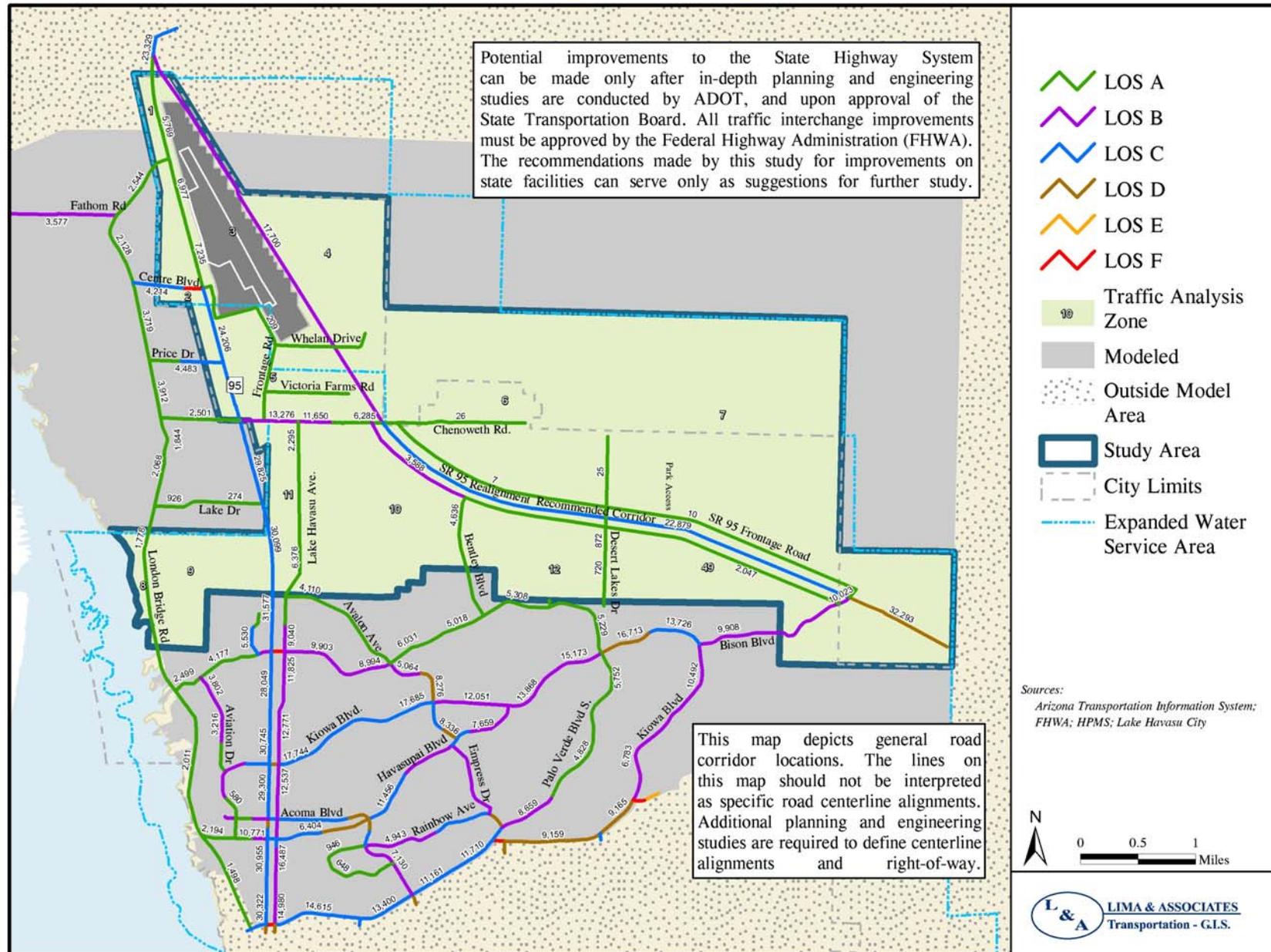
The one change to the network, the Bentley Blvd change in alignment, would slightly affect volumes on nearby portions of the network compared to the base. The alternative alignment of Bentley Blvd would have LOS A, compared to the base alignment of LOS B.

Peak season traffic volumes and LOS were calculated for the mid-range alternative. Levels of service are project to be generally the same or one level worse for the peak season (Figure 4.6) than for the annual mid-range alternative. On SR 95 and the SR 95 realignment the LOS is generally one level worse. The two-lane realignment is the only roadway with several miles of length at LOS E and F.

**FIGURE 4.5. MID-RANGE (2025-2030) ALTERNATIVE TRAFFIC VOLUMES AND LEVEL OF SERVICE**



**FIGURE 4.6. MID-RANGE (2025-2030) ALTERNATIVE DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE SEASONALLY ADJUSTED**



### *Long-Range (2035-2040) Roadway Alternative Performance and Feasibility*

The long-range traffic volumes and LOS throughout the NHA network appear on Figure 4.7. The highest modeled daily traffic volumes on the long-range alternative network would include some existing SR 95 and SR 95 realignment segments, and also Chenoweth Dr between SR 95 and Lake Havasu Ave, as displayed in Table 4.5. The LOS for the areas of highest volume in the NHA varies from LOS B to LOS D.

**TABLE 4.5. HIGHEST LONG-RANGE ALTERNATIVE DAILY TRAFFIC VOLUMES**

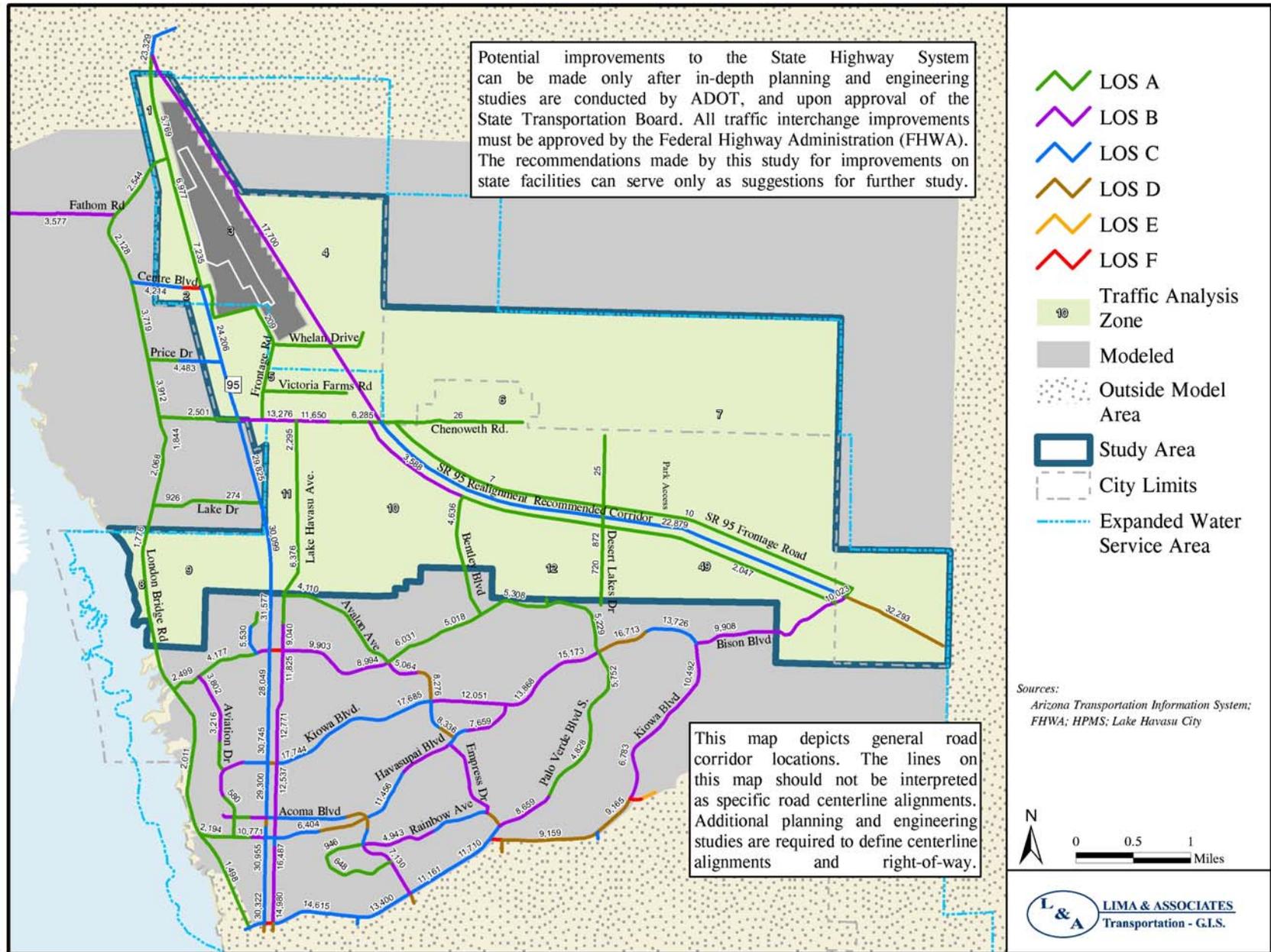
<b>Roadway Section</b>	<b>Daily Traffic</b>	
	<b>Volume</b>	<b>LOS</b>
SR 95 Realignment southeast of Bison Blvd	32,293	LOS D
SR 95 between southern Study Area boundary and Lake Dr	30,099	LOS C
SR 95 between Price Dr and Retail Center Blvd	24,206	LOS C
SR 95 Realignment between Desert Lake Dr and Chenoweth Dr	22,879	LOS C
SR 95 Realignment between Bison Blvd and Bentley Blvd	22,879	LOS C
SR 95 Realignment between Chenoweth Dr and the northern convergence with SR 95	17,700	LOS B
Chenoweth Dr between SR 95 and Lake Havasu Ave	13,276	LOS B

Upgrading the SR 95 realignment to a four-lane rural divided highway would increase its capacity and accommodate the higher long-range modeled volumes. The LOS of the three highest-volume realignment roadway segments would improve their LOS in the long-range time period, compared to their LOS in the mid-range time period.

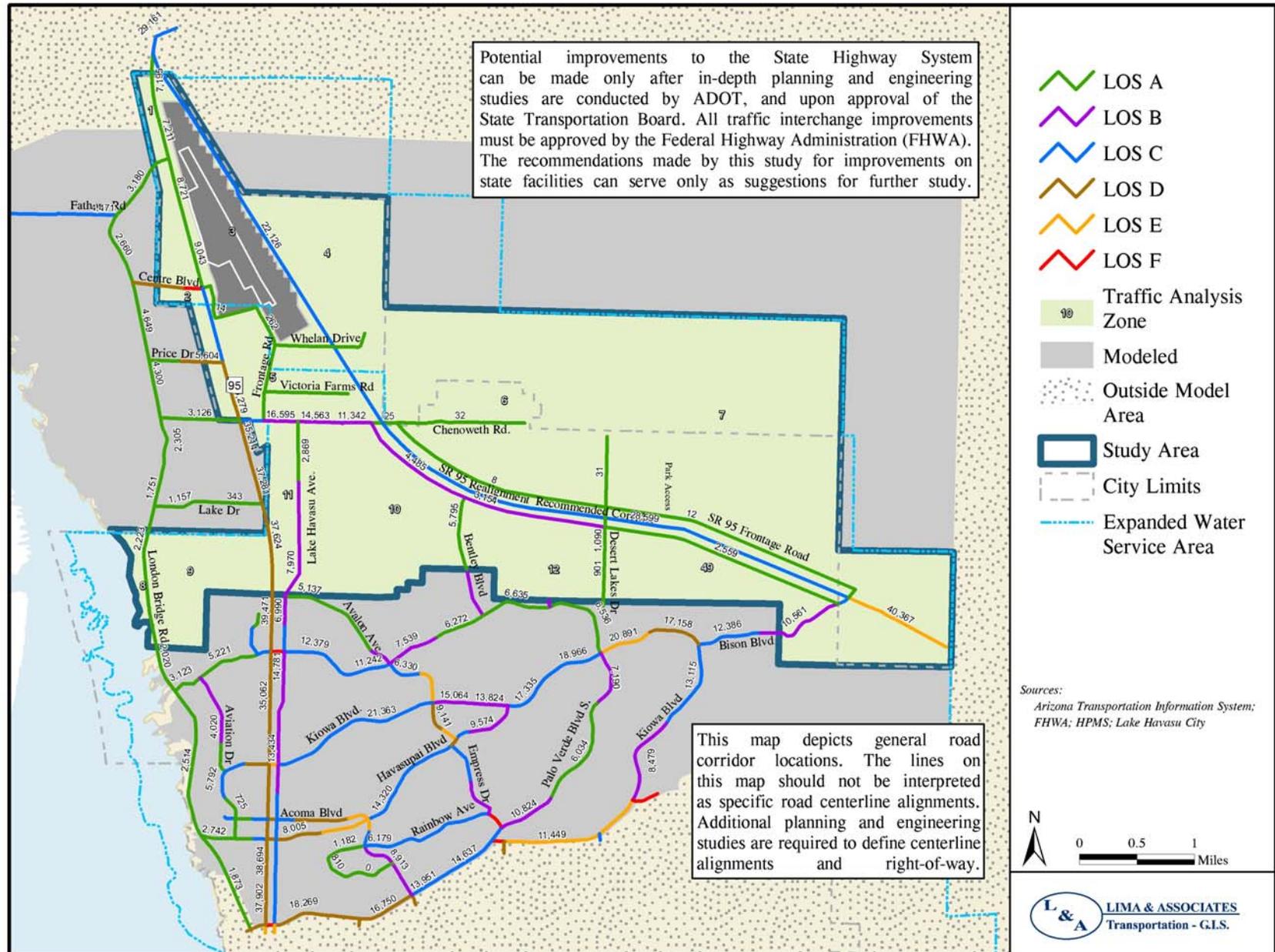
The alternative model network did not include any changes to the physical characteristics of existing SR 95. Traffic would increase on the roadway, and the segment between Price Dr and Retail Center Blvd would go from LOS B to LOS C, while the other high-volume roadway segments described above for the mid-range time period would retain the same LOS in the long-range time period. Outside the NHA, the segment between Lake and Chenoweth would go from LOS B to LOS C.

Levels of service are projected to be generally the same or one level worse for the peak season (Figure 4.8) than for the annual long-range alternative. On SR 95 and the SR 95 realignment the LOS is generally one level worse. On the SR 95 realignment the LOS south of Bison Blvd drops from LOS D to LOS E. No segments of LOS F exist on the four-lane realignment, unlike the LOS F condition on the two-lane realignment in the mid-range time period.

**FIGURE 4.7. LONG-RANGE (2035-2040) ALTERNATIVE DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE**



**FIGURE 4.8. LONG-RANGE (2035-2040) ALTERNATIVE DAILY TRAFFIC VOLUMES AND LEVEL OF SERVICE SEASONALLY ADJUSTED**



## **Other Mode Alternatives**

### ***Public Transportation Services Alternatives***

For the short-range there will be few changes to public transit service. Ridership growth is expected, but the current economic downturn will affect any transit service growth for up to four years. The Tri-City Transit Connector service has advanced to its final planning stage, but funding will most likely delay its implementation until at least 2011 or 2012.

In the mid-range future, transit alternatives are largely dependent on the level of Federal funding. Existing Federal Transit Administration (FTA) transit regulations would move Havasu Area Transit from a rural to an urban transit funding program if the 2010 Census counts a population of more than 50,000 in the City. The practical outcome of the shift would decrease transit operation funding because the City would compete for limited funding with cities up to 200,000 in population. The FTA may be considering keeping cities like Lake Havasu City with populations of 50,000 to 100,000 in the rural program; while funding might be somewhat higher than under the urban program, the funding would still have to be greatly increased to Arizona for adequate distribution levels to program participants.

Given all of the uncertainties, no alternatives were developed for transit routes or transit centers. In the mid- and long-range future, there are two alternatives for transit funding: HAT either would be subsidized by a transit tax added to the local sales tax or would not be subsidized by a transit tax.

### ***Trails Alternatives***

Trails alternatives were not developed because the City has confirmed that trails plans have not changed compared to the plans covered in Working Paper 1.

### **Bicycle Facilities Alternatives**

Bicycle alternatives were not developed because the City has confirmed that bicycle plans have not changed compared to the plans covered in Working Paper 1.

### **Municipal Airport Alternatives**

Airport alternatives were not developed because the airport would be managed by the Airport Master Plan update approved by City Council in January 2009.

## **SHORT-, MID-, AND LONG-RANGE PLAN**

The alternatives were compared with the future base model networks using the performance and feasibility measures. Most recommended projects were selected from the projects as modeled in the base network or in the alternatives. Both the future base model and the alternatives performed well. The locations or characteristics of a few projects were modified slightly in order to make a better connection between the transportation system and the City's land use planning.

All roadway network components are shown as lines on Figures 4.9 and 4.10 for clarity. The cautionary text on those figures is very important: "Maps depict general road corridor locations for any new roadways. The lines on the maps should not be interpreted as specific road centerline alignments. Additional planning and engineering studies are required to define centerline alignments and right-of-way."

"Potential improvements to the SHS can be made only after in-depth planning and engineering studies are conducted by ADOT, and upon approval of the State Transportation Board. All traffic interchange improvements must be approved by the Federal Highway Administration (FHWA). The recommendations made by this Report for improvements on State facilities can serve only as suggestions for further study."

### **Short-Range Status**

A final review was made of the few roadway projects that might be undertaken in the NHA in the short-range. There were no additional recommended projects for the short-range future.

### **Mid-Range (2025-2030) Plan**

The Mid-Range Plan shown on Figure 4.9 suggests that the SR 95 realignment should be constructed as a two-lane rural principal arterial during the mid-range phase. The final location, configuration, and phasing of SR 95 realignment development would be set after completion of the Design Concept Study by ADOT.

The Mid-Range Plan assumes that there will be some State Trust Land disposition and planned development in TAZ 10 and TAZ 11. The roadway system to serve that development should include portions of extended Lake Havasu Ave, SR 95 realignment frontage road, and Bentley Blvd. While the NHATS has been underway, prospects have increased for a state trust land sale in TAZ 9, where the eventual development would have primary access via London Bridge Rd and secondary access through a commercial development area along existing SR 95. Exact alignment of roadways would only be determined after considerable discussion in the NHA Development Partnership to include the City, ASLD, Mohave County, and BLM. Roadway right-of-way preservation would follow alignment selection for roadways to be constructed in the mid-range. Preferably right-of-way preservation would also occur, even if construction were to be in the long-range.

FIGURE 4.9. MID-RANGE (2025-2030) PLAN

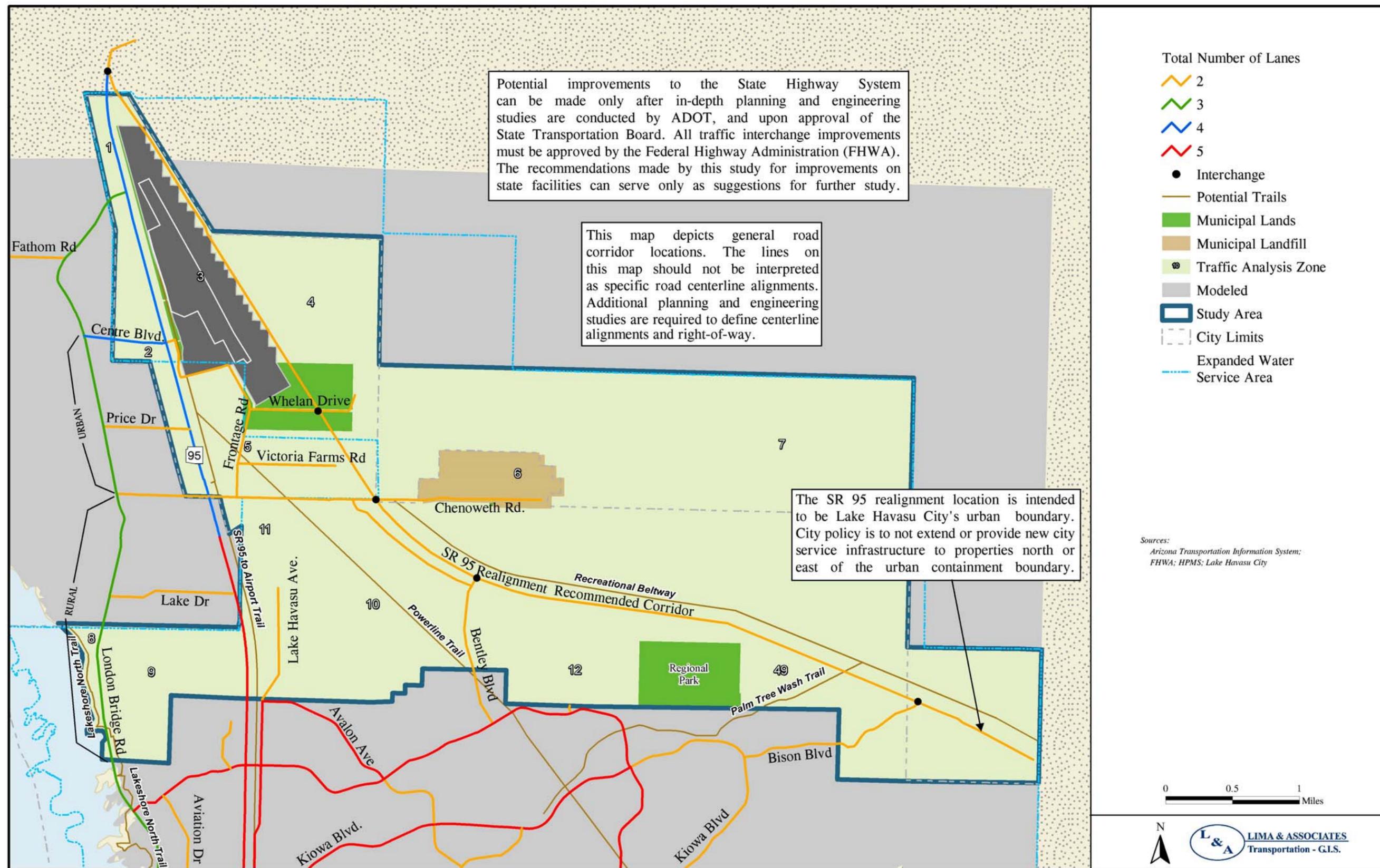
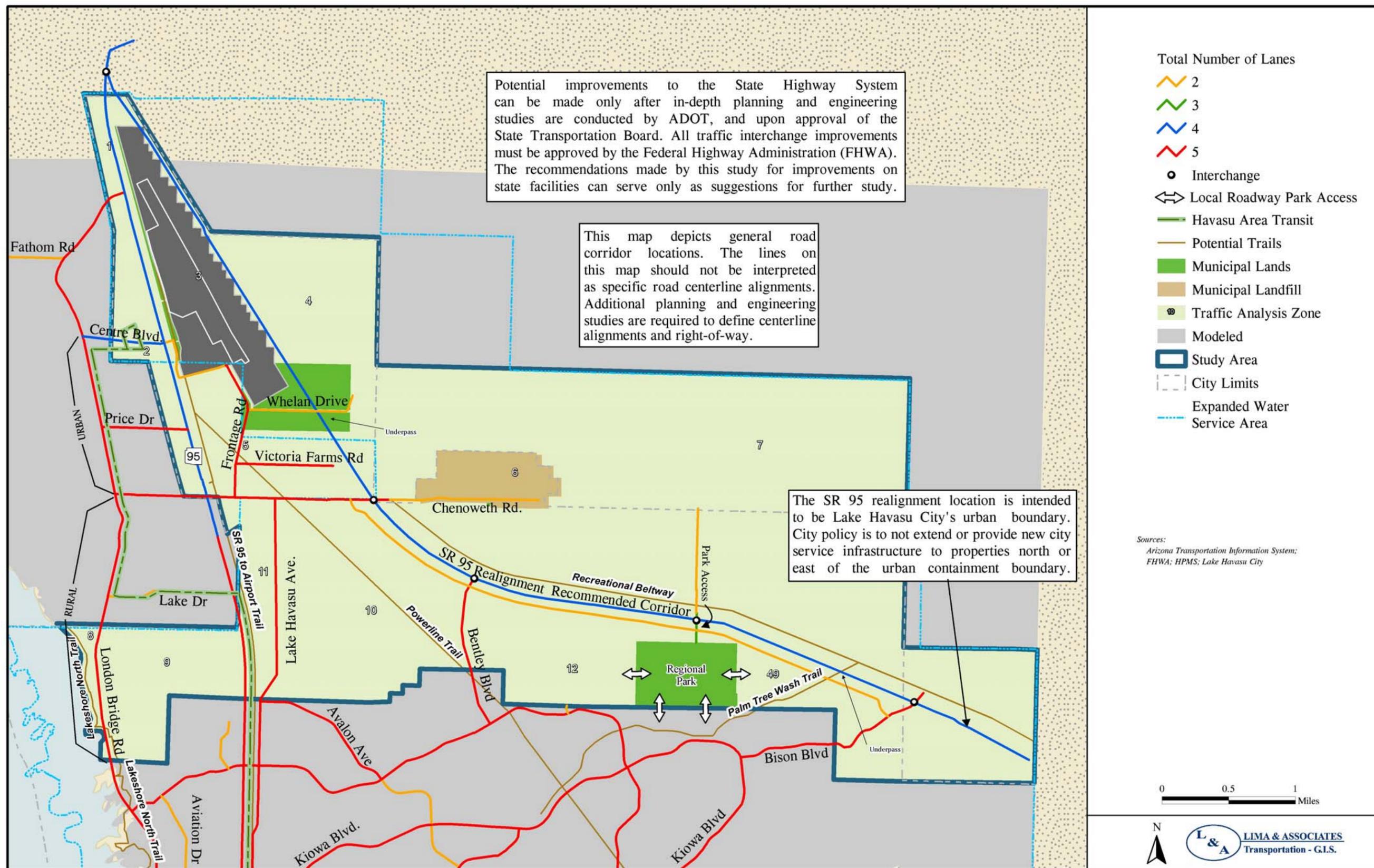


FIGURE 4.10. LONG-RANGE (2035-2040) PLAN



## **Long-Range (2035-2040) Plan**

The long-range socioeconomic projections and their associated travel demand might be reached between 2035 and 2040. The facilities recommended to serve the NHA when that level of travel demand is reached appear in Figure 4.10. The Long-Range (2035-2040) Plan shown on Figure 4.10 suggests that the SR 95 realignment should be upgraded to a four-lane rural or urban divided highway during the long-range phase. The final location, configuration, and phasing of development of the SR 95 realignment would be set after completion of the Design Concept Study by ADOT.

The City considers that the SR 95 realignment (whatever its final corridor location) would be the City's Urban Containment Boundary and City services neither would be extended nor would new services be provided north of that line. Therefore, the housing and employment projections used for this Report include no housing in TAZs 1 through 8, through the long-range time period, and only limited employment growth beyond the SR 95 realignment. In addition, the previously discussed coordination with the ASLD (Annexation section, page 34) could lead to some changes in implementation. Finally, the long-range time period extends only through 2035-2040; buildout development in subsequent years could include rural development beyond the SR 95 realignment.

The Long-Range Plan suggests that the interchanges of SR 95 realignment be at Chenoweth Blvd, Bentley Blvd, Park Access Rd, and Bison Blvd. Acceptability of this interchange spacing would depend upon the interchange spacing requirements applicable to the realignment at the time of design and construction. Spacing similar to that depicted on Figure 4.10 might be acceptable if the realignment were considered an urban freeway at that time. The interchange locations are suggested because they would work best to serve the travel demand of the NHA and the additional travel in the remainder of the City.

The Long-Range Plan assumes that the MCC Regional Park would be developed by the City. The Park Access Road, primary access to the park, would connect to the SR 95 realignment roadway directly (as shown on Figure 4.10) or to a frontage road/or Bentley Boulevard connection, depending on the number of SR 95 realignment connections. Direct travel from the original City development to the SR 95 realignment through or around the Park would be discouraged.

The City's park plan for that site calls for roadways functionally classified as local roadways to provide the remainder of the access from the immediately adjacent areas. Since the locations of local roadways are not a part of this plan's future roadway network, that access is represented by arrows on Figure 4.10. Some possibilities are Desert Lake Drive (the westernmost roadway considered for a connection) and/or Turquoise Drive, Enduro Drive or Paso De Oro Drive, or combinations of some or all of these roadways. When rural development warranted another roadway in TAZ 6, Bentley Blvd would be extended due north from the realignment interchange to serve it.

Some State Trust Land disposition and planned development would also occur in TAZ 9, TAZ 12 and TAZ 49 in the long-range time period. Development would extend to the east into TAZ 12 and TAZ 49 and would intensify along the existing SR 95 corridor. Additional facilities to serve that development would include:

- Construction of the two-lane SR 95 Realignment frontage road from Bentley Blvd to Bison Blvd.
- Construction of the Park Access Rd.
- Construction of a two-lane road north from the Park Access Rd to serve recreational use and emergency access in the otherwise undeveloped TAZ 6 and TAZ 7.
- Completion of Lake Havasu Ave to Chenoweth Dr.
- Reconfiguration and extension of Chenoweth Dr, as needed, to provide an interchange at Chenoweth Dr that makes for suitable access to the industrial park, commercial areas, and any land uses east on Chenoweth Dr.
- Frontage Rd south of the Airport would be upgraded to a five-lane facility.
- Continued upgrading of London Bridge Rd as an Urban Roadway with five lanes between Chenoweth Dr and Centre Blvd.
- Access management controls would continue on existing SR 95.
- Continued preservation of London Bridge Rd as a Rural Roadway between Chenoweth Dr and the southern boundary of the NHA.

A combination of access management (especially on existing SR 95), upgrades to the Frontage Rd south of the Airport, upgrades to London Bridge Rd as an Urban Roadway, and upgrades to Chenoweth Dr would make for smooth urban-type circulation between Chenoweth Dr and Centre Blvd.

Infrastructure providers and the City would continue to locate power and cable infrastructure on roadway easements in the City and would phase new infrastructure construction in coordination with transportation improvements.

The intermodal connections at the airport would be important but would be largely within the airport boundary, managed by the Airport Master Plan update approved by City Council in January 2009.

The Long-Range Plan would also extend HAT routes across the clustered residential development in TAZs 9, 11, 10, 12, and 49.

The future the NHA trail system would include, at least, the Palm Tree Wash Trail the Recreational Beltway, the Powerline Trail, the SR 95 to Airport Trail, and the Lakeshore North Trail (Figure 4.10). An underpass would take hikers, equestrians, and bicyclists on the Palm Tree Wash Trail under the SR 95 realignment. Additional trail connections would be

made in conjunction with master planning of residential and commercial development on former ASLD lands. Recreation and landscape viewing on BLM lands would dovetail with the future NHA trail system and both would strengthen the City's appeal to tourists.

### **Beyond the Long-Range Future**

The Statewide Transportation Planning Framework 2050 Recommended Scenario (a product of the Building a Quality Arizona process) became available for public comment in November 2009. For the Lake Havasu City area, the 2050 Recommended Scenario includes the SR 95 realignment, upgrades to existing SR 95, and intercity bus connections to Bullhead City and Kingman.

In addition, the 2050 Recommended Scenario includes a minor regional transit center in Lake Havasu City. HAT is planning to add one or two transit centers to the local system over the long-range. One of those transit centers could be upgraded to a combined local and regional transit center.

The 2050 Recommended Scenario does not include any rail service to the City. The 2050 Recommended Scenario proposes large increases in rail service, some on existing rail lines and some on new rail links, elsewhere in the State. Passenger and freight rail are proposed to continue near I-40 and high-speed passenger rail is proposed along a wide corridor far to the east of Lake Havasu City that would connect Phoenix and Las Vegas.

While the 2050 Recommended Scenario is entirely consistent with this NHATS Long-Range Plan, the scenario does not suggest any extensions of the NHA transportation network beyond recommendations in the NHATS Long-Range Plan.

## **ENVIRONMENTAL JUSTICE CONSIDERATIONS**

This Report has analyzed the effects of the recommended transportation plan upon environmental justice populations, using procedures developed following Executive Order 12898 (1994), *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*. The Report also addresses the environmental justice protected classes including the elderly (Aged 65 and older), minority and low-income populations, and mobility-limited populations.

In summary, the NHA contains twice the density of elderly persons (Aged 65 and older) and a slightly higher concentration of mobility-limited populations than were present statewide. The area contained a much lower concentration of minority persons and a somewhat lower concentration of low-income populations than were present statewide.

As the NHA develops recommended projects would provide the major roadway system, consisting largely of new roadways. Residential development could potentially house a diverse

population. The City of Lake Havasu City aims to develop the NHATS in new urbanism form with higher density nodes of development. Such development can support different needs (such as housing for the physically challenged) and income levels, as it can be designed with various sizes and types of housing within the same City block. Meanwhile, the relatively small development footprint would allow for protection of open space, washes, and steep slopes. Planning would include limited commercial development meeting convenience shopping needs of neighborhood residents.

While the net residential density of the NHA would be quite low overall, development is projected to be concentrated in the southwestern quarter of the NHA, and within that quarter, in compact development nodes described above. Such nodes are more conducive to alternate modes of transportation than are sprawling subdivisions. The City already boasts the Havasu Area Transit system that reaches from downtown to the Shops at Lake Havasu. This Report has recorded some of the options for the HAT system expansion that might serve the development nodes.

A more dispersed settlement pattern for the NHA was discussed before the compact nodal development was confirmed to be the City's goal. The compact pattern would likely serve environmental justice populations more readily than would a dispersed settlement pattern. Transportation plan recommendations are closely linked to the development goals. Therefore, vehicular and alternate mode recommendations would serve environmental justice populations just as the development goals would do so.

## 5. IMPLEMENTATION PLAN

The following key items in implementation are addressed in this Chapter:

- Appropriate roadway cross-sections.
- An access management program.
- An action plan.
- Potential funding sources.

### ROADWAY CROSS-SECTIONS

Roadways within the NHA are expected to be constructed to one of four basic cross-sections: Rural divided highway, boulevard, avenue, or drive. The first three are relevant to the NHATS, while the “drive” cross-section is used primarily for local roadways whose details were not included in this study.

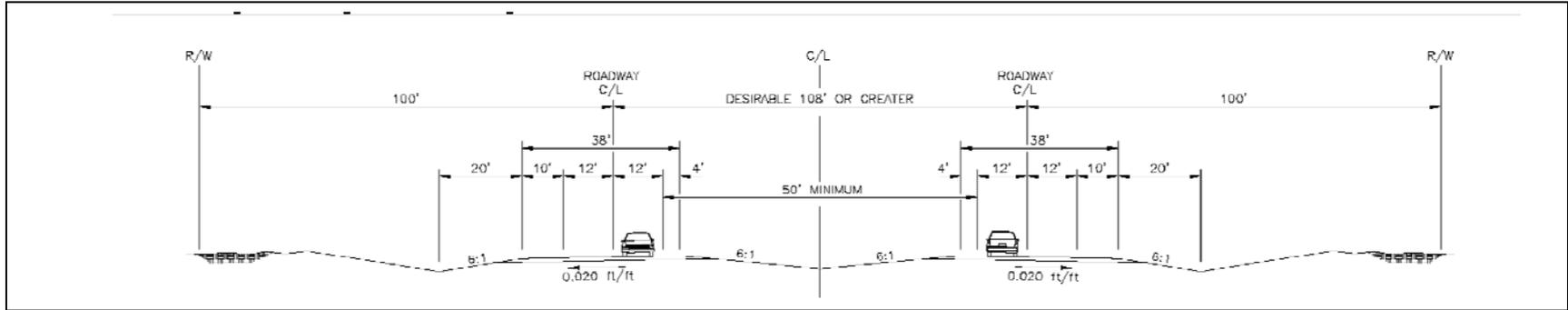
Recommended cross-sections were developed after review of the following documents:

- Lake Havasu City, *Lake Havasu City Transportation Study Update*, Parsons Brinkerhoff, March 2005.
- Lake Havasu City, *Offsite Improvement Requirements*, October, 2001.
- Lake Havasu City, *Code of Ordinances*, Title 11.04, Public Improvements, October 27, 2009.
- Arizona Department of Transportation, *Final Corridor Location Report & Environmental Overview, SR 95 Realignment, Lake Havasu Area*

The recommended Rural Divided Highway cross-section is depicted in Figure 5.1. This figure shows the cross-section proposed by ADOT for the segment of the SR 95 realignment planned to traverse the NHA. The facility would include two travel lanes in each direction and wide shoulders suitable for bicycle use.

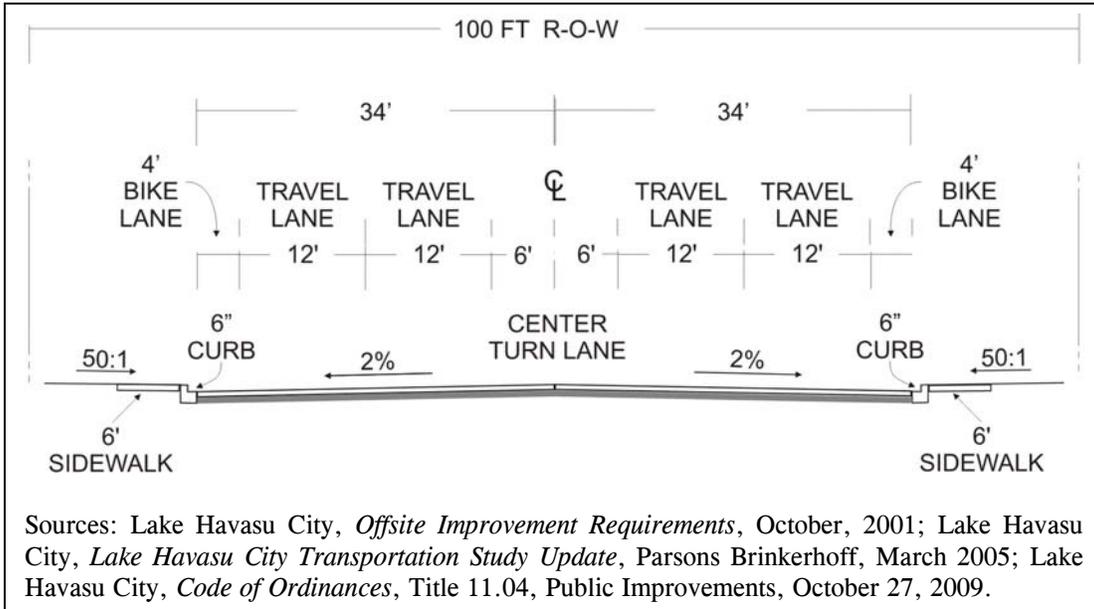
The three Lake Havasu studies were consulted in developing the boulevard and avenue cross-sections. Figure 5.2 presents a recommended boulevard cross-section. Lake Havasu City defines boulevards as five-lane roadways with two travel lanes in each direction and a center turn lane. Bike lanes and sidewalks are also present. Figure 5.3 depicts a recommended avenue cross-section. Avenues are three-lane roadways, with one travel lane in each direction and a center turn lane. Avenues also include bike lanes and sidewalks.

**FIGURE 5.1. RURAL DIVIDED HIGHWAY CROSS-SECTION**

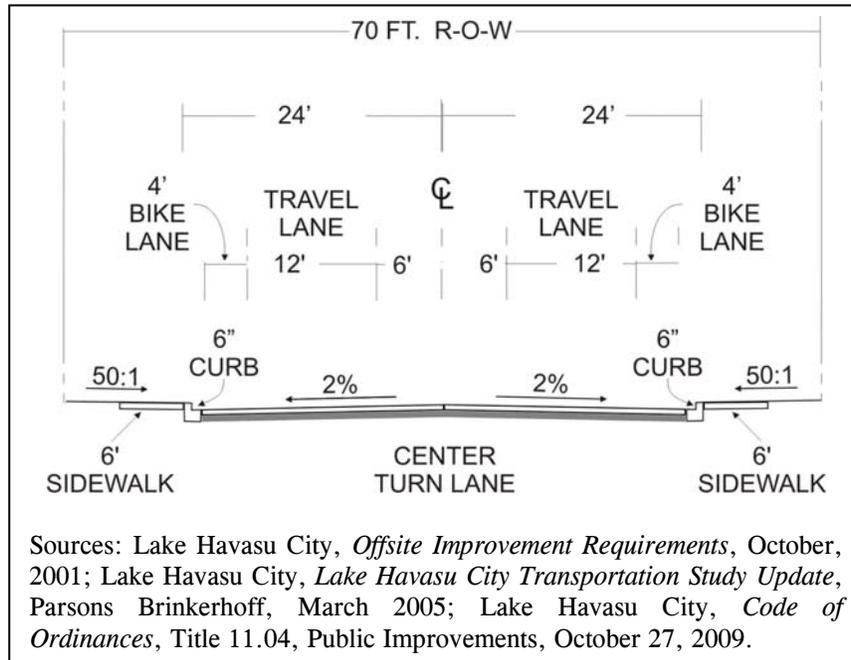


Source: Final Corridor Location Report & Environmental Overview, SR 95 Realignment, Lake Havasu Area, Figure 1-9, Typical Section

**FIGURE 5.2. BOULEVARD CROSS-SECTION**



**FIGURE 5.3. AVENUE CROSS-SECTION**



Note that a direct correlation does not exist between cross-section and functional class. For example, Lake Havasu Ave is a minor arterial, and many major collectors are boulevards. A design criteria table for the different roadways is included in the discussion on Access Management later in this chapter.

## **ACCESS MANAGEMENT**

Goals for arterial and collector street design in the NHA are:

- To provide for the safe and efficient movement of people and goods at a high level of service.
- To enhance the rural character of the area by controlling the number of intersections and driveways serving adjacent property.

### **Need for Access Management**

Safety and mobility will be maintained along arterial and collector streets where access is controlled. Access management is also critical on adjacent property. As property develops, if access is not controlled, additional signalized and unsignalized intersections and driveways would have an adverse effect on mobility and safety. Along arterial streets, the failure to control direct vehicle access would force more trips onto the arterial streets. Planned developments' internal access systems would be developed with insufficient capacity. Level of service would decrease as traffic congestion increased on the arterial streets. In addition, crashes would generally increase along such a street due to the large number of turning movements and other conflicts.

### **Definition of Access Management**

One way to minimize the adverse impact of increased access to adjacent property is to apply access management techniques along transportation corridors. According to the Federal Highway Administration, access management is: *The process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding system in terms of safety, capacity, and speed.* In practical terms, this process requires the regulation of vehicular access to public highways from adjoining property in order to limit the number of access points to a roadway, and, therefore, to reduce the number of potential conflict points among the users of the roadway. The primary principles of access management are:

- Prevention of traffic problems caused by unmanaged development.
- Addressing how land is accessed along arterials.
- Focusing on mitigating traffic problems arising from development and increased traffic volume traveling to new activity centers.
- Calling upon local planning and zoning to address overall patterns of growth and the aesthetic issues arising from development.

Access management involves the use of techniques by State and local governments to improve access to highways and local roads. The purpose of those techniques is to improve travel time and improve safety. Techniques include:

- Increasing spacing of intersections and interchanges to improve movement and traffic flow.
- Reducing the number of driveways to avoid conflict points and decrease the crash rate.
- Using left- and right-turn lanes to separate traffic movements, improving both traffic flow and safety.
- Applying median treatments including two-way left-turn lanes and raised medians that allow drivers to make safe left turns off the highway.
- Using frontage and backage roads that provide for safer and easier access to businesses and local roadways (A backage road functions like a frontage road but provides access to the rear of the properties being served).
- Implementing land use policies and regulations that assure appropriate connections between the various land uses and the transportation network.

### **Benefits of Access Management**

The primary benefits of access management are:

- Overall reduced travel time.
- Reduced vehicle crashes.
- Reduced travel time for customers to reach businesses.

Benefits of access management are well documented in professional literature including the TRB *Access Management Manual*, NCHRP Report 420, *Impacts of Access Management Techniques* and other reports. Some of the most important access management techniques relate to the frequency of driveways and intersections and the uniformity of traffic signal spacing. Travel time has been shown to decrease significantly as speed increases with the reduction in the number of driveway and intersection access points. The uniform and increased spacing of traffic signals will also increase travel speeds.

Many studies have shown that crash rates increase with greater frequency of driveways and intersections. More driveways and intersections mean more potential conflicts between vehicles and also between vehicles and pedestrians. Crashes can be reduced significantly with fewer driveways and intersections.

Complaints about access management typically come from businesses concerned about restricting access to their enterprises. However, studies have shown that the application of access management techniques reduces the travel time from residential areas to commercial areas and thereby increases the overall market area for businesses. The reduction in the

number of access points ensures safer access to businesses. The positive impact of access management on businesses is documented in the FHWA brochure and accompanying CD *Safe Access is Good for Business*. The brochure includes support from business owners who were in opposition before access management techniques were applied, but in support after the techniques were in effect.

### Access Management Methods

Access management methods can be grouped into two broad categories: land use techniques and technical tools. Individual methods within these categories are listed below.

#### Land use and Development Techniques:

- Acquisition of Access Rights
- Transit Oriented Design
- Transfer of Development Rights
- Cluster Zoning
- Subdivision Regulations and Site Plan Review
- Dedication and Exactions
- Purchase of Development Rights
- Land Development Regulation
- Overlay Zones
- Zoning Regulation

#### Technical Tools:

- Intersection and Driveway Spacing Standards
- Traffic Signal Spacing Standards
- Driveway Consolidation
- Right-in/Right-out Driveways
- Raised Medians
- Frontage and Backage Roads (located at rear of property)
- Driveway control
- Joint Driveway/Cross-Access
- Alternative Access Streets

### Road Design and Access Criteria

Recommended Access Management Principles include:

- **Primary Access.** For sites that have frontage on two streets, primary access should be onto the minor street.
- **Minimize Access Points.** Subdivisions and sites should be designed to minimize the number of access points. A maximum of two driveway entrances are permitted.
- **Cross Access.** Where new development adjoins other similarly zoned property or compatible land uses, a cross access easement may be required to permit vehicular movement between the parcels and reduce the number of access points onto the adjacent public street. The cross access easement may be required regardless of the

development status of the adjoining property, unless the cross access is determined to be infeasible.

Table 5.1 presents the proposed design and access criteria for the roadway classifications. Note that the criteria presented in the table are minimum spacing needs and that it is recommended that longer spacing intervals be provided between intersections and between driveways.

**TABLE 5.1. MINIMUM ROAD DESIGN AND ACCESS CRITERIA**

	<b>SR 95 Realignment</b>	<b>Major Arterial (Boulevard)</b>	<b>Collector (Avenue)</b>
<b>Functional Classification</b>			
Road Purpose	Mobility	Mobility	Access/Mobility
<b>Design Criteria</b>			
Right-of-Way Width	300' or more	100'	70'
Median	Divided	Divided or TWLT	TWLT
Number of Lanes	4	4-5	3
Left-turn Lanes	N/A	At all locations where permitted	At all locations where permitted
Right-turn Lanes	N/A	At all locations where permitted and warranted	At all locations where permitted and warranted
<b>Access Management Guidelines</b>			
Public Access	Grade-Separated Interchanges Only	1/4-1/2mile	1/8-1/4 mile
Property Access	None	Right in/Right out. Full access where approved	Full access where approved
Traffic Signal Spacing	N/A	Mile and 1/2 mile locations, Fully coordinated and progressed where warranted	1/2 mile locations. 1/4 mile locations where warranted
Typical Traffic Control	N/A	Signalized, two-way stop	Signalized, two-way stop
<b>Alternative Modes</b>			
Transit		Bus pull-outs and queue jumpers where warranted	N/A
Bike Lanes	None	4'	4'
Sidewalk (both sides)	None	6'	6'

TWLT - Two-way Turning Lanes

## ACTION PLAN

The action plan for implementation of transportation improvements within The NHA is presented in Table 5.2. The table identifies implementation actions and names the agency(ies) responsible for carrying out each action. Some details regarding the action plan follow in turn.

**TABLE 5.2. NORTH HAVASU AREA TRANSPORTATION ACTION PLAN**

<b>Action</b>	<b>Responsibility</b>
<b>Short-Range</b>	
Adopt North Havasu Area Transportation Study	LHC
Form North Havasu Development Partnership	LHC, ASLD, Mohave County, BLM
Develop vision and concepts for development within North Havasu	LHC, ASLD
Conduct SR 95 Realignment Design Concept Study. Determine realignment right-of-way.	ADOT
<b>Mid-Range</b>	
Preserve SR 95 realignment right-of-way	LHC, private developers
Extend HAT facilities as NHA development occurs	HAT
Extend Lake Havasu Ave	LHC, private developers
Reconstruct existing Chenoweth Rd.	LHC, private developers
Construct two-lane SR 95 Realignment and interchanges	ADOT
Construct Bentley Blvd to two lanes	LHC, private developers
Construct two-lane SR 95 Realignment frontage road from Chenoweth to Bentley	ADOT, private developers
Implement access management techniques on existing SR 95 in the Study Area recommended in the report <i>Access Management Study State Route 95 I-40 to Bill Williams Bridge</i> , July 2004.	ADOT
<b>Long-Range</b>	
Extend HAT facilities to full NHA development.	HAT
Construct four-lane SR 95 Realignment and interchanges.	ADOT
Construct two-lane SR 95 Realignment frontage road.	ADOT, private developers
Extend Lake Havasu Ave to Chenoweth.	LHC, private developers
Construct Bentley Blvd to two lanes.	LHC, private developers
Extend and Construct Chenoweth Rd to SR 95 realignment.	LHC, private developers
Widen London Bridge Rd to 5 lanes.	LHC, private developers

## SR 95 Realignment Design Concept Study

The Corridor Location Study and Environmental Overview for a potential State Route (SR) 95 realignment through Lake Havasu City are complete. The second step in the highway development process is a Design Concept Study, conducted to further refine the recommendations made from the earlier Corridor Location Study. The Design Concept Study would have two components, a Location/Design Concept Report and an associated environmental report under the National Environmental Policy Act. The type of NEPA report is yet to be determined; it would likely be either an Environmental Assessment or an Environmental Impact Statement.

### Right-of-way

The acquisition of right-of-way will probably be predominately through exactions placed on rezoning. Since ASLD is the land-owner most directly affected by this decision, close coordination with ASLD should begin now and continue through the development of State Trust Lands.

### **COSTS**

Table 5.3 summarizes the road mileage for the recommended networks within the NHA, categorized by number of lanes. The estimated construction cost for building out the long-range road network excluding the cost of constructing the SR 95 realignment is approximately \$46.7 million (2009 dollars).

**TABLE 5.3. ROAD MILEAGE FOR RECOMMENDED NETWORKS  
(EXCLUDING SR 95 REALIGNMENT)**

<b>Number of Lanes</b>	<b>Miles</b>
<b>Mid-Range Network</b>	
2	9.5
3	1.2
4	3.5
5	0.7
Total Mid-Range	14.9
<b>Long-Range Network</b>	
2	7.8
4	4.2
5	8.2
Total-Long Range	20.2

Note: Excludes SR 95 realignment costs  
Excludes right-of-way costs

## **FUNDING SOURCES**

This section summarizes multimodal revenue sources and estimates that are applicable to Lake Havasu City, together with financial constraints and opportunities pertaining to needed roadway improvements. A number of funding mechanisms exist that could be used to fund multimodal improvements in the NHA. Key federal, state, regional, and local sources are shown in Table 5.4. Funding options include both traditional and innovative sources. Traditional sources are the Arizona Highways User Revenue Fund (HURF); the Local Transportation Assistance Fund (LTAF); Federal-aid funds (Surface Transportation, Bridge, Safety, and Transportation Enhancement Funds); and local general funds, such as general obligation bonds and revenue bonds. Alternative sources of funding include special assessment districts, developer dedications, and exactions such as impact fees.

### **Federal Funds**

The Federal government funds a variety of transportation programs: Most applicable to the NHA are the Surface Transportation Program (STP) funds. Arizona receives about \$155 million in STP funds per year. These funds can be used on State Routes or for bridge rehabilitation, transportation enhancements, and safety projects. The City works through ADOT and WACOG to utilize STP funds. In addition, FHWA STP “Flex” funds can also be used for transit capital projects. The State also administers Federal Transit Administration FTA Section 5304, Statewide Transportation Planning Funds, Section 5310, Elderly & Persons with Disabilities Transportation Program Funds, and Section 5311, Rural Public Transportation Program Funds.

In 2005, the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was enacted by the federal government, providing funding for highways, highway safety, and public transportation totaling \$244.1 billion. Table 5.5 lists the amount of federal SAFETEA-LU funds by major funding category allocated to Arizona for Fiscal Year (FY) 2008. The federal transportation funding bill for the next five-year period has been delayed. The emphasis of the next bill and the amount of funding available to the State of Arizona are uncertain at this time.

### **State Funds**

The HURF is the primary source for state highway funding and HURF funds are limited to highway use by the Arizona Constitution. Monies from the HURF are intended for the improvement of the State’s highways and bridges. Once collected, the HURF revenues are distributed to ADOT, and in turn distributed as an entitlement share to cities, towns, and counties in proportion to population and to the Economic Strength Project Fund (described later in this chapter). HURF distributions may be used as debt service for revenue bond projects.

**TABLE 5.4. MATRIX OF KEY FUNDING SOURCES**

<b>Fund Name</b>	<b>Description</b>	<b>Eligible Uses</b>	<b>Application Process</b>
<b>Federal</b>			
Surface Transportation Program (STP)	Federal funds, administered by FHWA and ADOT	Variety of capital projects including highways, bridges, and enhancement projects	Programmed by WACOG and ADOT District
High Risk Rural Roads	Federal funds, administered by FHWA and ADOT	Correct safety problems on roadways classified as rural major collectors, rural minor collectors and rural local roads	Programmed through ADOT
Safe Routes to School Program	Federal funds, administered by FHWA and ADOT focused on enabling and encouraging children to safely walk and bicycle to school.	Projects can include sidewalk, traffic calming and speed reduction improvements, pedestrian and bicycle crossing improvements, traffic diversion improvements near schools. State must use between 10-30 percent of the funds for non-infrastructure related activities, such as public awareness and education and traffic law enforcement near schools.	Programmed through ADOT.
Highway Safety Improvement Program (HSIP)	Federal funds administered by FHWA and ADOT	Funds can be used on safety improvement projects to reduce the number and severity of highway-related crashes .As a part of the HSIP, there are specific set asides for High Risk Rural Roads and for Railway-Highway Grade Crossings.	Local and state officials supply safety data to Arizona’s federally-required Strategic Highway Safety Plan (SHSP), a collaborative and data driven approach to highway safety.
Federal Transit Administration	Federal Transit Funds administered by ADOT Multimodal Transportation Division.	<ul style="list-style-type: none"> <li>• Section 5310: Formula Grants for Special Needs of Elderly Individuals and Individuals with Disabilities</li> <li>• Section 5311: Formula Grants for rural and small urban public transportation</li> <li>• Section 5313: State Planning and Research Programs</li> </ul>	Application to ADOT Multimodal transportation Division
Community Development Block Grants	Funds provided by the Federal Office of Housing and Urban Development.	A transportation improvement project must benefit and be located in a census tract or block group with at least 51 percent of the population in low and moderate-income groups. Projects that alleviate slums or address an urgent need such as natural disaster relief may be eligible.	Application submitted to Federal Office of Housing and Urban Development.
<b>State</b>			
Highway User Revenue Fund (HURF)	State funds, derived from fuel tax and VLT, administered by ADOT	Nearly any capital project related to roadway improvements	Funds allocated to jurisdiction as proportion of population
LTAF	State funds derived from lottery sales	General transportation improvements	Funds allocated to jurisdiction as proportion of population

**TABLE 5.4. MATRIX OF KEY FUNDING SOURCES (Continued)**

<b>Fund Name</b>	<b>Description</b>	<b>Eligible Uses</b>	<b>Application Process</b>
<b>State, continued</b>			
Off-Highway Vehicle Recreation Fund	State funds as a portion of total license tax on motor fuel.	Designation, construction, and maintenance of OHV recreational facilities, OHV use areas, and OHV trails, enforcement of off-highway vehicle laws, and mitigation of damages to land.	Funds distributed to the State Parks Department, and Game and Fish Department.
Arizona State Parks Law Enforcement and Boating Safety Fund (LEBSF)	State funds granted to County Boards of Supervisors	Funds enforcement of boating laws to ensure safety.	Application to Arizona State Parks Department.
Economic Strength Projects Fund	State funds administered by Arizona Department of Commerce and funded by HURF.	Selected road projects that support economic development objectives.	Application to Arizona Department of Commerce.
Governor's Office of Highway Safety	Federal funds are allocated by the Governor's Office of Highway Safety	To finance state and local government highway safety projects. Projects are selected according to safety priorities.	Application to Governor's Office of Highway Safety.
<b>City/Regional</b>			
Regional Area Road Fund (RARF)	State law provides for the enacting of transportation excise taxes, which are subject to voter approval.	Funds eligible for road construction improvements	Fund is submitted to County voters for adoption of an excise tax.
Sales tax	Funds provided by an allocation of a portion of a City's sales tax.	Funds eligible for transportation improvements	Locally administered
Impact Fees	Fee imposed by local jurisdiction on development on per unit basis	Used to fund a variety of infrastructure needs including transportation	Locally administered, at discretion of locality
Development Stipulations	Requirements that developers dedicate right-of-way and build adjacent streets	Benefits are derived by offsetting cost of acquiring right-of-way and building infrastructure	Locally administered, at discretion of locality
Community Benefits	Developer forms an agreement with local government to provide certain community benefits.	Benefits are derived through commitments to local hiring and living wage jobs, construction of affordable housing off site, and traffic mitigation/traffic calming measures.	Locally administered

Source: Lima & Associates, Inc., in consultation with Technical Advisory Committee

Notes: State budgetary concerns resulting from the 2008 recession caused the Arizona State Parks Department to cancel the LEBSF programs and other grant programs in 2009.

ADOT has recently adopted a policy providing that, on a case-by-case basis, a private sector non-profit agency may be the recipient of Section 5311 funds.

Lake Havasu City has an impact fee for transportation but it was suspended in August 2009.

**TABLE 5.5. FY 2008 FEDERAL FUNDING SOURCES FOR ARIZONA  
(IN MILLIONS OF DOLLARS)**

<b>Description</b>	<b>Amount</b>
Surface Transportation	\$138.8
Enhancement (TEA)	\$16.5
National Highway System	\$174.1
Interstate Maintenance	\$128.0
Highway Safety Improvement Program (HISP)	\$33.8
Bridge Replacement and Rehabilitation	\$22.9
Congestion Mitigation & Air Quality	\$35.2
Recreational Trails	\$4.9
Planning and Research	\$12.6
Metropolitan Planning	\$5.3
Border Infrastructure Program	\$8.9
Safe Routes to School	52.8
Equity Bonus	\$74.4
Indian Reservation	\$0.6
FTA, Section 5310	\$2.3
FTA, Section 5311	\$9.1
<b>Total</b>	<b>\$607.2</b>

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

Lake Havasu City received \$4.5 million of HURF funds in Fiscal 2009, and a total of \$25.1 million for fiscal years 2004 through 2008 (Source: Arizona Department of Transportation, Financial Management Services, September 2009).

### **Public Transit Funds**

**Local Transportation Assistance Funds (LTAF I and LTAF II).** Local Transportation Assistance Funds include LTAF I, which is funded by Arizona Lottery receipts other than Powerball, and LTAF II, which is funded by Powerball receipts. Both of these funds are distributed based on population. Each requesting municipality is guaranteed a minimum of ten thousand dollars of LTAF1 funds. Currently, \$23 million may be deposited in the LTAF from the state lottery fund each fiscal year. Cities and towns with a population of more than 300,000 persons must use LTAF funds for public transportation. Smaller communities may use the funds for other transportation projects. In addition, up to 10 percent of funds may be used for the arts or for disabled and handicapped assistance. LTAF II monies must be used for transit by nearly all jurisdictions. Since the implementation of LTAF II, the legislature has provided that when Powerball receipts reach a certain threshold amount in any fiscal year, the balance flows to the LTAF II program for apportioned distribution to councils of governments, county governments, and local governments. The fiscal year 2010 LTAF II distribution for Lake Havasu City is \$76.9 thousand.

**Surface Transportation Program Flexible Funding.** Since 2000, the State Transportation Board has made available 6.5 million annually in STP “flexible funds” statewide for qualified transit capital projects such as vehicles and transit facilities. These funds, created within the federal TEA-21 program and continued under SAFETEA-LU, are regarded as “flexible” in that the monies may be used for either highway or transit purposes. Funding originates with the Federal Highway Administration and is administered by ADOT.

Additional sources of revenue available for transit services include the following: 1) Welfare to Work Act; 2) Older American Act Title III funds, Department of Economic Security; 3) Division of Developmental Disability funds; 4) Transportation funding through Medicaid administered through the Arizona Health Care Cost Containment System; 5) Head Start, Behavioral Health Funding; and 6) Transit fares.

### **Pedestrian/Bicycle Facilities Funding**

Revenue sources for bicycle facilities primarily for transportation purposes include:

- Federal funds to construct bicycle transportation facilities and pedestrian walkways on land adjacent to any highway on the National Highway System.
- Federal Lands Highway Funds to construct bicycle facilities and pedestrian walkways in connection with roads, highways, and parkways.
- Surface Transportation Program Funds to construct pedestrian walkways and bicycle transportation facilities, and modifications to make existing sidewalks accessible for mobility-limited persons.

Other funds for bicycle and pedestrian facilities include:

- National Recreational Trails Fund, which provides funds for recreational programs for bicyclists and pedestrians.
- Scenic Byways Program can fund bicycle facilities along highways.
- Federal Transit Funds can be used to provide bicycle and pedestrian access to transit facilities including shelters and bicycle parking facilities.
- Additional funding is available through the Safe Routes to School program (Table 5.4).

Another potential funding source for trails is the Heritage Fund. The Arizona State Parks Board Heritage Fund legislation stipulated the use of Arizona Lottery Fund revenues for trails. Eligible projects are trail land acquisition, design, engineering, development and renovation activities, and trail support facilities. The Heritage Fund FY 2010 grant application cycle has been cancelled due to current state financial conditions.

## REVENUE ESTIMATES

In 2008, ADOT adopted a new Statewide Transportation Investment Strategy (STIS), based on the findings and recommendations of regional transportation framework studies that have been conducted throughout the state. The recommended goals of the strategy are:

- Achieving multimodal balance (e.g. an appropriate balance among modes of transportation).
- Supporting smart growth and sustainable land use.
- Tribal community involvement.
- Supporting economic development and business community involvement.
- Environmental and conservation community involvement.
- Statewide collaboration with Councils of Governments (COGs), Metropolitan Planning Organizations (MPOs) and tribal governments.

Table 5.6 summarizes the STIS projects that may be conducted or implemented within or near Lake Havasu City.

**TABLE 5.6. TRANSPORTATION INVESTMENT STRATEGY IN LAKE HAVASU CITY AREA**

<b>Project/ Program and Description</b>	<b>Estimated Cost</b>
<b>Strategic Highway Projects</b>	
SR 95: Widen to four-lane from I-40 to Lake Havasu City	\$130,000,000
<b>Strategic Highway Projects Total</b>	<b>\$130,000,000</b>
<b>Strategic Rail and Transit Projects and Programs</b>	
<b>Public Transit Projects and Programs**</b>	
Connecting Communities Bus Transit Program	\$15,000,000
Enhancing Public Transportation Programs	31,112,525
Transit Serving Elderly, Persons with Disabilities and Tribal Populations in Rural Areas	8,812,285
Statewide Vanpool and Rideshare Programs	12,521,897
Transit/Rail Planning, Marketing and Other Related Programs	1,001,752
<b>Strategic Rail and Transit Projects and Program Total</b>	<b>\$68,448,459</b>
<b>Local Mobility Projects and Programs</b>	
City of Lake Havasu City	\$ 60,847,599
Mohave County	\$144,776,890
<b>Local Mobility Projects and Programs Total</b>	<b>\$205,624,489</b>
<b>Transportation Enhancement and Walkable/Bikeable Communities</b>	
City of Lake Havasu City	14,911,990
Mohave County	17,898,016
<b>Transportation Enhancement and Walkable/Bikeable Communities Total</b>	<b>\$32,810,006</b>

Source: Arizona Department of Transportation, Statewide Transportation Investment Strategy, Mohave County Transportation Investment Strategy, June 2008.

\*\*Strategic Rail and Transit Projects and Programs figures are Countywide.

**APPENDIX A. 2015, 2020, AND 2030 POPULATION, HOUSEHOLDS,  
AND EMPLOYMENT DETAILS**

Tables A-1 and A-2 at the end of this Appendix are a summary of the Household and Employment Projections for modeling purposes. Detailed data appear for the traffic analysis zones (TAZs) defined for the NHA. The remainder of the data is for reference and is aggregated, by location, into two areas, the “Area Surrounding the NHA,” and “Remainder of Havasu Area.” Those areas added to the NHA represent the entire Lake Havasu City 2005 SATS modeling area. The table permits rough comparison of NHATS data with the 2005 SATS data.

The 2005 SATS projections were done to represent buildout occurring by 2030. In 2030, the total population of the area was to be 103,803, and the total number of jobs was to be 42,760, a ratio of .41 jobs per person. The 2008 modeling for the *SR 95 Realignment Study* used the same population and employment figures.

At the TAC meeting June 2, 2009, the TAC members indicated that it is very unlikely that the population in the Lake Havasu area will be at buildout in 2030. The population is likely to be significantly smaller in 2030 than either the 103,803 indicated in the SATS or a similar figure of 106,505 projected by the Arizona Department of Economic Security (now the responsibility of the Arizona Department of Commerce). The Lima & Associates consultants were advised to reduce the population projections to generally represent growth of 1 percent per year for 2009 through 2011, increasing to 2 percent per year for 2012 through 2030. Using those calculations, the area including Lake Havasu City and Desert Hills would have a year 2030 population of about 88,000.

To determine lower employment projections, the consultant settled on a ratio of .45 jobs per person for the Lake Havasu City area after reviewing the .41 ratio in the SATS projections, a .50 ratio stated in the Lake Havasu City General Plan, and considering stakeholder input regarding economic development prospects in the NHA.

The following are specific comments about the three portions of the Lake Havasu area and how the socioeconomic data relate to the TransCAD planning model.

**1. NHA Study Boundaries:** Detailed data was used to establish TAZs and to project the socioeconomic data to 2030 in the NHA. The Lake Havasu City Planning Commission stated its interest in having the SR 95 realignment serve as an Urban Containment Boundary (letter, planning commission to Jacobs Engineering, April 22, 2009). The other background data considered were all of the following: 2005 SATS, 2008 modeling done for the *SR 95 Realignment Study*, location of State trust lands, the current land use, the Lake Havasu City General Plan as amended through 2008 (including land uses, Circulation Plan, and mountain preservation areas), the current zoning map, terrain, and floodplains. The 2030 projection (population of 6,500 in 2,813 households) resulted after considering all of the above. While the NHA is likely to grow relatively rapidly, there are many areas in the remainder of the Lake Havasu/Desert Hills area that will grow as well.

The Lake Havasu City General Plan, zoning, and stakeholder interviews information (especially the airport, industrial park, and retail) together supported the conclusion that employment growth will be rapid in the NHA through 2030. Therefore, a projection of 5,000 jobs and a ratio of .77 jobs per resident in the NHA is reasonable. The NHA would have many workers who commute from outside.

The TAZ socioeconomic data on households and jobs in three employment categories were direct inputs to the travel demand model. Trip generation rates were applied to the data and trip productions and attractions were calculated for each TAZ.

**2. Area Surrounding the NHA:** While the NHA is the Study Area for this project, the NHA is closely connected to nearby portions of the Lake Havasu City area. The 2005 SATS has good recent buildout projections for specific TAZs surrounding the NHA. The consultant scaled down those projections, in accordance with the guidance received indicating that the area would not be built out in 2030, and the results are summarized in Tables A-1 and A-2. The “Area Surrounding the NHA” (the additional ‘Modeled Area’) in Figure 2.1, is projected to have a population of 35,289 (in 15,473 households), and employment of 14,502. The trip productions and attractions matrix from the 2005 SATS, with entries for each of the TAZs that are in the “Area Surrounding the NHA,” were used in the planning model. The entries in the matrix were scaled to assure consistency with the scaled-down projections as the model was refined.

**3. Remainder of Havasu Area (Externals):** External areas are represented in travel demand models by numbers of vehicle trips entering and leaving the model area at particular points. Often there are as few as five externals designated for a model area. In the NHA planning model, because the traffic is distributed among several roadways as it enters and leaves the model area, and because various information is available from the 2005 SATS, there were eleven externals (see Figure 2.1) that assisted in distributing model trips.

Scaled-down socioeconomic projection results marked “Remainder of Havasu Area” are in Tables A-1 and A-2. A large portion of the external trips come from the “Remainder of Havasu Area,” rather than more distant places such as Bullhead City or La Paz County. The external projections were also adjusted somewhat as the model was refined.

**TABLE A-1. 2015, 2020, AND 2030 POPULATION AND HOUSEHOLDS**

TAZ	Population			Households		
	2015	2020	2030	2015	2020	2030
<b>North Havasu Area</b>						
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	0	412	1,236	0	178	535
10	750	1,500	3,000	325	649	1,299
11	0	133	400	0	58	173
12	0	0	700	0	0	302
49	0	0	1,164	0	0	504
Subtotal	750	2,045	6,500	325	885	2,813
<b>Area Surrounding the NHA</b>						
Subtotal	25,323	28,210	35,289	11,001	12,292	15,473
<b>Remainder of Havasu Area</b>						
Subtotal	38,530	41,341	46,232	16,680	17,897	20,014
<b>Grand Total</b>	<b>64,603</b>	<b>71,596</b>	<b>88,021</b>	<b>28,006</b>	<b>31,074</b>	<b>38,300</b>

**TABLE A-2. 2015, 2020, AND 2030 EMPLOYMENT**

TAZ	2015				2020				2030			
	Commercial	Industrial	Other	Total	Commercial	Industrial	Other	Total	Commercial	Industrial	Other	Total
<b>North Havasu Area</b>												
1	0	0	0	<b>0</b>	30	0	0	<b>30</b>	50	0	0	<b>50</b>
2	2,200	0	100	<b>2,300</b>	2,275	25	125	<b>2,425</b>	2,350	100	250	<b>2,700</b>
3	50	50	150	<b>250</b>	50	50	160	<b>260</b>	50	50	160	<b>260</b>
4	0	0	0	<b>0</b>	0	0	50	<b>50</b>	0	0	100	<b>100</b>
5	45	90	15	<b>150</b>	100	200	50	<b>350</b>	200	325	125	<b>650</b>
6	0	0	10	<b>10</b>	0	0	15	<b>15</b>	0	0	20	<b>20</b>
7	0	0	0	<b>0</b>	0	0	5	<b>5</b>	0	0	10	<b>10</b>
8	0	0	0	<b>0</b>	0	0	0	<b>0</b>	0	0	0	<b>0</b>
9	0	0	0	<b>0</b>	35	0	25	<b>60</b>	60	0	50	<b>110</b>
10	225	0	175	<b>400</b>	250	0	200	<b>450</b>	300	0	200	<b>500</b>
11	175	0	175	<b>350</b>	190	0	185	<b>375</b>	200	0	200	<b>400</b>
12	0	0	0	<b>0</b>	25	0	25	<b>50</b>	50	0	50	<b>100</b>
49	0	0	0	<b>0</b>	0	0	0	<b>0</b>	50	0	50	<b>100</b>
<b>Subtotal</b>	<b>2,695</b>	<b>140</b>	<b>625</b>	<b>3,460</b>	<b>2,955</b>	<b>275</b>	<b>840</b>	<b>4,070</b>	<b>3,310</b>	<b>475</b>	<b>1,215</b>	<b>5,000</b>

**TABLE A-2. 2015, 2020, AND 2030 EMPLOYMENT (Continued)**

TAZ	2015				2020				2030			
	Retail	General	Office	Total	Retail	General	Office	Total	Retail	General	Office	Total
<b>Area Surrounding the NHA</b>												
<b>Subtotal</b>	3,549	5,125	1,671	<b>10,345</b>	4,247	5,616	1,869	<b>11,732</b>	5,642	6,599	2,262	<b>14,502</b>
<b>Remainder of Havasu Area</b>												
<b>Subtotal</b>	7,287	5,660	2,915	<b>15,862</b>	8,023	6,071	3,181	<b>17,275</b>	9,497	6,892	3,711	<b>20,100</b>
<b>Grand Total</b>	13,531	10,925	5,211	<b>29,667</b>	15,225	11,962	5,889	<b>33,076</b>	18,448	13,966	7,188	<b>39,602</b>

## **APPENDIX B. POTENTIAL ROADWAYS IN THE NHA**

The following roadways exist just south of the NHA and their previous configuration and construction made it possible that they could be extended into the NHA. In every case, the roadway alignment has not been selected and could vary considerably to the east or west.

Those roadways listed as a part of the recommended network would definitely be constructed when the demand warranted it. Some, but not likely all, of the remaining projects would be constructed as developers and the City work together on development plans. Many of the remaining projects would be local roadways and only a few, as yet unspecified, would be collector roadways.

**Roadways in NHA Recommended Network**

- Lake Havasu Ave - Extension (Required)
- Bentley Blvd. (main) Bentley Blvd. – Must be Extended to Future SR 95 Parkway/Realignment
- Bison Blvd. – Must be Extended to Future SR 95 Parkway/ Realignment

**Possible Roadway Connections in the NHA**

- Gold Dust Dr – Limited Residential Access
- Lantern Dr (North & West) – Limited Residential Access
- Firefly Dr – Limited Residential Access
- Park Terrace Ave – May be extended to include residential and commercial access.
- Mandarin Dr – Limited Residential Access
- Catamaran Dr – Limited Residential Access
- Russell Road (Dr) – Limited Residential Access
- Oakridge Dr – Limited Residential Access
- Norris Dr – Limited Residential Access
- Appletree Dr – Limited Residential Access
- Hardrock Dr – Limited Residential Access
- Madera Dr – Limited Residential Access
- Macaw Dr – Limited Residential Access
- Desert Cove Dr – Limited Residential Access
- Desert Lake Dr – Limited Residential Access
- Horizon Dr – Limited Residential Access
- Turquoise Dr – Limited Residential Access
- Enduro Dr – Limited Residential Access
- Paseo Del Oro Dr – Limited Residential Access

## REFERENCES

- Arizona Department of Commerce, *Economy of Lake Havasu City*, January 2008
- Arizona Department of Economic Security, *2008 Commerce Population Estimates*, 2008
- Arizona Department of Transportation, *2003 Arizona Climbing Lanes and Passing Lane Prioritization*, Lima & Associates, Inc, May 2004
- Arizona Department of Transportation, *Access Management Study State Route 95, I-40 to Bill William Bridge*, Lima & Associates with DMJM Harris, July 2004
- Arizona Department of Transportation, Accident System Identification Surveillance System (ALISS) Database. January 2003-December 2007.
- Arizona Department of Transportation, *Arizona Access Management Study*, temporarily suspended in 2009.
- Arizona Department of Transportation, *Arizona Five-Year Transportation Facilities Construction Program, FY 2009-FY 2013*, available at [http://www.azdot.gov/MPD/priority\\_Programming/Five\\_Year\\_Programs.asp](http://www.azdot.gov/MPD/priority_Programming/Five_Year_Programs.asp).
- Arizona Department of Transportation, *Arizona Framework Study*, on-going
- Arizona Department of Transportation, *Arizona Rural Transit Needs Study*, Cambridge Systematics, Inc with TranSystems Corporation, May 2008.
- Arizona Department of Transportation, *Arizona Statewide Bicycle and Pedestrian Plan*, Kimley-Horn and Associates with Alta Planning and Design
- Arizona Department of Transportation, Highway Performance Monitoring System, 2007.
- Arizona Department of Transportation, Kingman District Projects and Studies (various)
- Arizona Department of Transportation, *Multimodal Freight Analysis Study*, Wilbur Smith Associates, November 2007
- Arizona Department of Transportation, Pavement Management System
- Arizona Department of Transportation, *Roadway Design Guidelines*, Roadway Engineering Group, January, 2007
- Arizona Department of Transportation, *Final Corridor Location Report & Environmental Overview, SR 95 Realignment, Lake Havasu Area*, prepared for ADOT; by EPS Group. Inc, Engineers, Planners & Surveyors, August 2009.

## REFERENCES (Continued)

- Arizona Department of Transportation, *State Transportation Board Policies*, Rev. 2003
- Arizona Department of Transportation, Traffic Count Database System, available at <http://mpd.azdot.gov/data/aadt.php>.
- Arizona Department of Transportation, *Western Regional Framework Study. Working Paper: Existing and Future Conditions*, Parsons Brinkerhoff, April 2008
- Arizona Game and Fish Department, *Arizona's Comprehensive Wildlife Conservation Strategy: 2005-2015, Special Status Species*, May 2006.
- Bureau of Land Management Lake Havasu Field Office, *Approved Resource Management Plan and Final Environmental Impact Statement*, 2007
- CANAMEX Corridor Arizona Taskforce Meeting Summary, January 2006, CANAMEX Corridor Coalition.
- Lake Havasu City Community Investment (CIP) Program, information available at <http://www.lhcaz.gov/publicWorks/communityInvestmentProgram/cipAdministration.html>
- Lake Havasu City, *Lake Havasu City Annexation Policy Plan*, May 2008
- Lake Havasu City, *Lake Havasu City Municipal Airport, Airport Master Plan, Phase One*, Coffman Associates, April 2009
- Lake Havasu City, *Lake Havasu City Pedestrian & Bicycle Plan*, Lima & Associates with Matthew J. Zoll, 1998
- Lake Havasu City, *MCC Regional Park Site Preliminary Master Plan*, Logan Simpson Design, 1998
- Lake Havasu City, *Lake Havasu City Small Area Transportation Study Update*, Parsons Brinkerhoff, March 2005
- Lake Havasu City, *Lake Havasu City Trails Plan*, Parsons Brinkerhoff, May 2006.
- Transportation Research Board, *Highway Capacity Manual*, 2000.
- U.S. Census Bureau, *Census 2000 Summary File 1 (SF 1)*, 2000.
- U.S. Census Bureau, *Census 2000 Summary File 3 (SF 3)*, 2000.