F·I·N·A·L R·E·P·O·R·T

GRAHAM COUNTY
ALTERNATE ROUTE STUDY

TASK ASSIGNMENT TPD 09-08

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Prepared For

Arizona Department
of Transportation
Multimodal Planning Division

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0 EXECUTIVE SUMMARY

Graham County is located in southeastern Arizona and is serviced by 2 major Arizona Department of Transportation (ADOT) managed state routes: US 191 and US 70. This Graham County Alternate Route Study (GCARS) focuses in the area surrounding the municipalities of: Town of Pima, City of Thatcher and City of Safford. The junction of the two major state routes, US 191 and US 70 is located in the heart of these communities and serve as major arterials for local travelers. According to existing planning/traffic studies commissioned to examine the area, as well as analysis performed in this study, both of these state routes are expected to exceed their current capacity before the year 2040. This is mainly due to the projected growth in the area and a growing volume of regional traffic traveling "through" the study area. Parsons Brinckerhoff has been commissioned by ADOT to perform this preliminary assessment for the development of an alternate route through the Thatcher/Safford/Pima area.

Any impacts to the local community's future viability due to the potential development of an alternate route have been seriously considered. In order to ensure that local input and direction has been incorporated into the study process, the study has been conducted with guidance from a Technical Advisory Committee (TAC) composed of members representing the following agencies:

- Arizona Department of Transportation Planning Division
- Arizona Department of Transportation Safford District
- Arizona State Lands Department
- City of Safford
- Federal Highway Administration
- Graham County
- Town of Thatcher
- Town of Pima
- Southeastern Arizona Governmental Organization (SEAGO)
- Other Project Stakeholders:
    - Arizona Game and Fish
    - Bureau of Land Management

The study process was performed in three separate stages, all of which built on the results of the previous stage. The stage titles are as follows:

1. Study the current and future conditions of the area,
2. Determine the need and feasibility of a new alternate route corridor,
3. Identify the preferred alternate route corridor.

Each of these stages were studied and documented by producing working papers that were reviewed by the TAC and revised to address the input from all of the stakeholders. The finalized versions of the working papers are the major sections in this study (Sections 1, 2 and 3).

0.1 CURRENT AND FUTURE CONDITIONS

An evaluation and documentation of the existing street network capacity (current conditions) was performed. The proposed development information and planned arterial improvements were also researched and included in a traffic forecast model that was developed to project the future conditions in the study area. In addition, other land use characteristics were reviewed, such as, land use, socioeconomic data, employment, environmental justice, alternative modes of transportation, traffic accidents and proposed development.

All of these features were combined into the traffic forecast model for the study area originally developed for the 2009 Graham County Small Area Transportation Study (SATS). The forecast model was run for the following design years 2020, 2030, and 2040. The model results provided traffic volumes and level of service for each major roadway in the area. The traffic forecast model was based on the growth rate forecasts agreed upon by the TAC during the development of the GCARS and the 2009 SATS and also includes the additional capacity gained from the anticipated improvement projects in the current Transportation Improvement Plan and 1998 Graham County SATS recommended projects schedule.

There are currently a number of roadway segments within the study limits that are operating at or over capacity. By the year 2020, US 70 and US 191 will be over capacity for much of the city center area. By 2040, most segments on collector and minor arterial streets within Safford and Thatcher will be operating below the level of service goal of D. East of the Safford downtown area, US 70 between Bowie Ave and the US 70/US 191 Split will experience LOS E. LOS F is expected on US 191 almost the entire corridor within the study area.

0.2 DETERMINATION OF NEED AND FEASIBILITY

The second phase of the study evaluates and determines the need and feasibility for an alternate route corridor in the study area. The need for a connector corridor can be identified when a compilation of the characteristics evaluated identify benefits to the study area due to the alternate route corridor. The following characteristics were analyzed within the study area to determine the need for the new connector corridor:

- Capacity and level of service
- existing intersection capacity
- environmental concerns

- high truck percentages
- state highway access control management
- And safety

The future level of service analysis performed in Section 1: Current and Future Conditions, shows that the existing and currently planned infrastructure will be deficient for the expected traffic volumes and some form of relief like an alternate route should be studied. The intersection of US 70 and US 191 was analyzed for capacity and it shows to be deficient in capacity as well.

Other concerns such as increased air pollution and noise pollution generated because of the increased traffic volume and congestion can be mitigated by an alternate route. There are a number of historical properties that currently exist in downtown Safford that restrict the options to upgrade the current corridor, therefore, an alternate route corridor can be identified as an efficient, cost effective option. Typically there is a high percentage of truck traffic using US 191 that travels through the Safford/Thatcher city area delivering to copper mines in the area. An alternate route corridor further outside of the city would provide an opportunity to mitigate some of the risk of hazards associated with high truck traffic through the downtown area.

The current ADOT access management policies create a vision for developing controlled access facilities by development of Access Management Plans. This strategy allows ADOT to manage and maintain regionally significant highway facilities rather than portions of a local arterial street system. US 70 and US 191 currently act as significant arterial streets within the Safford-Thatcher city area, with minimal access control characteristics. The development of an alternate route corridor with controlled access policies will provide an access controlled facility serving regional and local traffic and allow ADOT to turn back portions of the US 70 and US 191 facilities to the local agencies. The addition of a new facility through undeveloped lands would provide new development opportunities at each of the potential traffic intersections and along crossroad connections. An alternate route would also dramatically help decrease the traffic delay in the study area caused by the common occurrence of a detour route being established through Safford when there is a dust storm closure of I-10 between Wilcox and the Arizona/New Mexico border.

After determining that an alternate route corridor is needed, the feasibility of the corridor and the potential alternate route corridor alternatives were developed using a Resistance Model. This model was developed using spatial analysis tools in a geographic information system (GIS). The Resistance Model evaluates the study area through a collective account of environmental characteristics. Inputs to the model include land ownership/property control, ground slope and hydrology. Model outputs provided conceptual corridors, which may be suitable for further study as a corridor alternative. Once these preliminary corridors were developed they were refined based on

input from the TAC and the public. The final iteration is shown in Figure 2-13 and contains multiple alternative routes (Alternatives A through E).

The alternate route corridor alternatives A through E were evaluated for feasibility using qualitative, as well as quantitative analysis based on the following factors and criteria developed by the TAC members and the public: Traffic Analysis (level of service), safety, access, environmental impacts, cost, implementation and support. The results of this analysis can be seen in Table 2-7(page 114): Evaluation Matrix. A preliminary cost analysis was also performed for each alternative.

Additional public involvement and coordination with federal, state, and local agencies was conducted to obtain information about the environmental resources in the general study area. Specific information was also obtained to define the existing social, economic, and environmental characteristics of the study area and assist the study team in identifying particular constraints to be considered in the development and preliminary analysis of alternatives. Future analyses will address environmental considerations in detail, and specific mitigation measures will be identified as part of those analyses and documentation. Section 2.4 Environmental Overview of the report summarizes current information for each environmental issue.

0.3 PREFERRED CORRIDOR

The final component of the study involved the identification of the preferred alternate route corridor. ADOT, with input from the public and the project's TAC, selected Alternative B as the Preferred Corridor Alternative. In selecting the preferred corridor, ADOT stipulated that this study presents a number of options for the improvement of an alternate route corridor that will be further analyzed and considered during the subsequent Design Concept Report, Environmental Analysis, and preliminary design phases of the project development. The Preferred Corridor Alternative represents an approximate mile wide corridor in which the final recommended roadway alignment may be developed.

The rationale and justification behind the selection of Alternative B as the preferred corridor are presented in the following paragraphs:

- Alternative B balances the needs of local and regional traffic within the study area. As shown in the various Alternate Route alternatives LOS results (Figures 2.2-1 through 2.2-8), you can see that Alternatives C1 & C2 have a greater impact on the US 191 LOS than Alternative A does. This is because of the proximity of the new routes to the trip generation locations and destinations. Alternatives C1 & C2 will operate more as a part of the local arterial street system providing an alternative or extension to the local street system. While Alternative A is far enough away from the city center that it would be used for regional trips rather than local trips to the

neighborhood businesses. Alternative B maximizes the opportunity to provide relief along US 191 by being close enough for local traffic to use, while still providing for regional traffic.

- Alternative B provides opportunity for in-fill development while minimizing the impact to the existing agricultural lands. By identifying the preferred corridor, the local agencies will be able to plan and develop arterial street extensions to connect to the new facility, thus providing access and opportunity for development. In addition, the proposed alignment is located in the undisturbed foothills/desert areas that exist generally to the south of the developed agricultural property. By avoiding the agricultural properties, the impacts to one of the major economic sources in the region will be minimized when compared to some of the other alternatives.

- There is support from the ADOT District, local agencies and public to pursue the development of an Alternate Route in the area. Based on the stakeholder interviews, Alternatives A & B were preferred. Alternative B was the most preferred of the two. The stakeholder input suggested that Alternative B is far enough away from town to provide for regional traffic, but close enough that it could still be used for local traffic and would provide development and in-fill opportunities.

The following findings and conclusions can be made as a function of this alternate route study:
The current and short term traffic issues for US 191 and US 70 within the City of Safford and Town of Thatcher can be addressed by the ongoing US 191 DCR study and currently programmed improvements along US 70. These ongoing improvements have been identified to reach capacity in 2025, at which time the Preferred Corridor Alternative should be implemented to relieve the congestion from the US 191 and US 70.

The final solution for the implementation of the alternate route corridor will be arrived at during the subsequent phases of the project development; the Design Concept Report and Environmental Document.

The improvements suggested as a function of this Alternate Route Study can be phased in over time in incremental component projects. This will allow ADOT, in cooperation with the City of Safford, Town of Thatcher, Town of Pima and Graham County, to plan, design and have constructed projects just ahead of warranted traffic volumes to avoid undue congestion.

Public involvement has been conducted throughout the course of this study in the form of public meetings and interviews with stakeholders. The general consensus was that the alternate route must be far enough away from the town center to provide higher speed facilities, but still be close enough to promote development and in-fill opportunities.

1 CURRENT AND FUTURE CONDITIONS

1.1 INTRODUCTION

1.1.1 DESCRIPTION OF STUDY

Graham County is expected to experience continued population and employment growth in the next few decades, primarily in the incorporated cities of Safford, Thatcher and Pima. The current roadway infrastructure in the heaviest utilized segments of the community need to be evaluated to determine if it will support future expected demand. Two studies were commissioned to evaluate transportation needs in the Graham County region. The Graham County Small Area Transportation Study (SATS), commissioned by Graham County, was taking place concurrently and was completed prior to the Graham County Alternate Route Study, commissioned by the Arizona Department of Transportation. The research and analysis completed for the 2009 Graham County SATS was incorporated into this study as the basis for the traffic modeling.

The City of Safford is at the junction of two major state routes, US 191 and US 70, both of which are expected to reach or exceed capacity as growth continues in the area. The Graham County Alternate Route Study is a preliminary assessment of the need for and feasibility of a new route connecting US 191 to US 70 that would provide an alternate route corridor around the City of Safford, Town of Thatcher and Town of Pima, particularly the Safford city center area and the intersection of US 191 and US 70. The route was studied to accommodate a growing volume of local traffic which will be dispersed over a larger geographic area while at the same time making provisions for a growing volume of regional “through“ traffic. The development of the alternate route corridor addresses the future traffic congestion concerns identified along US 191 and US 70 as the region continues to grow through the 2040 horizon year.

1.1.2 STUDY OBJECTIVES

The goal of the study was to evaluate the need for an alternate route corridor in the general geographic area of US 191 and US 70 by documenting current and future conditions, determining need and feasibility of a route, and providing recommended corridor alternatives that would enhance the viability of the community by accommodating traffic demands. Community viability and impacts due to the alternate routes were seriously considered. The study process was conducted with guidance from a Technical Advisory Committee (TAC) composed of members representing the following agencies:

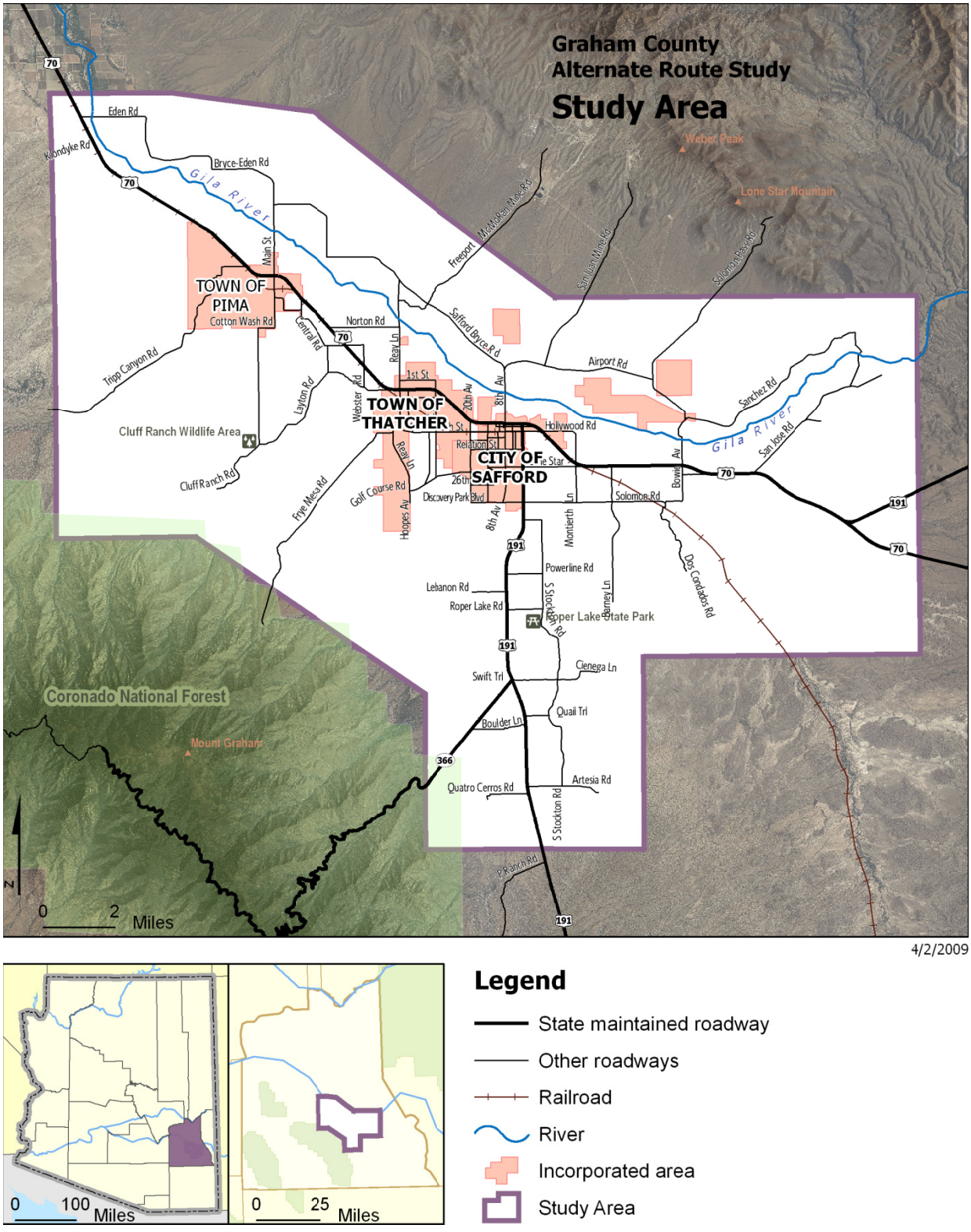
- Arizona Department of Transportation Planning Division

- Arizona Department of Transportation Safford District
- Arizona State Lands Department
- City of Safford
- Federal Highway Administration
- Graham County
- Town of Thatcher
- Town of Pima
- Southeastern Arizona Governmental Organization (SEAGO)
- Other Project Stakeholders:
    - Arizona Game and Fish
    - Bureau of Land Management

1.1.3 STUDY AREA

Graham County is composed of mostly high desert plains surrounded by the Gila, Pinaleno, Galiuro and Santa Teresa Mountains. The three incorporated communities of Safford, Thatcher, and Pima represent the principal center of population and economic activity in the County. While agriculture has traditionally been a mainstay of the region, it has evolved into a center for light industry as well as the retail and service hub in Southeastern Arizona. Recent population and economic growth can be associated with the expansion of Freeport-McMoRan mines and regional emergence as a shopping and services center. The study area for the Alternate Route Study is shown in Figure 1-1.

Figure 1-1: Study Area



1.2 STUDIES AND SOURCE DATA

Completed and on-going studies relevant to the region helped guide the process and provided background information for the development of the Alternate Route study.

1.2.1 COMPLETED STUDIES

- 1998 Graham County Regional Transportation Study (December 1998) – The purpose of this study was to update the 1992 transportation plan and to identify and prioritize the next set of projects to meet the growing demands.
- 2007 City of Safford Transportation Study (September 2007) – The purpose of this study was to establish a transportation baseline by which impact fees for future development can be established.
- Globe-New Mexico Multimodal Corridor Profile (November 2002) – The purpose of this study was to establish priorities and improvement strategies for the US 70 corridor from Globe to New Mexico.
- US 191 Design Concept Report, Traffic Projections and Growth Analysis (August 2007) – The purpose of this report was to evaluate the traffic requirements associated with the US 191 corridor from SR 366 to US 70.
- Graham County Transit Feasibility Review (2007) – The purpose of this study was to determine if there was sufficient need for the development of transit facilities in the area.
- City of Safford General Plan (2004) – This plan provides information for the land use and zoning characteristics of the city.
- Graham County Small Area Transportation Study (SATS) (2009) – This study identified the regional transportation needs for Graham County over the next 15 year time horizon.

1.2.2 ONGOING STUDIES

- US 191 Design Concept Report– The purpose of this report is to provide preliminary design recommendations for improvements to the US 191 corridor from SR 266 to US 70.

1.2.3 FUTURE STUDIES

- None currently identified.

1.3 EXISTING CONDITIONS

Existing conditions in the study area are documented to provide baseline comparisons of the Graham County region for the study. It provides a review of the current operational conditions and creates a basis for projecting future conditions. The measures of existing conditions that have been selected for documentation and analysis include:

- Land use
- Socioeconomic data
- Environmental justice considerations
- Street system inventory
- Other modes of transportation
- Traffic accident
- Existing traffic and operating conditions

Current conditions related to each measure are discussed in subsequent sections of this report.

1.3.1 LAND USE

An understanding of land use is important for determining and interpreting travel characteristics in an area. Land use information in conjunction with population and employment data is used to develop the travel modeling, which are discussed in Section 1.4.2. Land use classifications include:

- Residential
- Commercial
- Industrial
- Public

Located in the Gila Valley of southeastern Arizona, Graham County is a primarily rural county encompassing 4,630 square miles. Graham County land ownership is composed of:

- San Carlos Indian Reservation: 34%
- Individual and corporate ownership accounts: 10%
- U.S. Forest service and Bureau of Land Management: 38%
- State of Arizona 18%

1.3.2 SOCIOECONOMIC DATA

Population

Most recently, population growth in this area has been precipitated by high growth in the mining industry. According to "Area in Focus", a report by Wick Communications, it is predicted that 7,000 people will move into the Gila Valley by 2010 to support mine construction and peripheral services. A significant increase in the number of retirement communities is also anticipated. In the 2000 Census, the population of Graham County was reported to have increased 26% since 1990. At that time, the population growth was reported to be relatively flat. However, with the announcement of the Freeport-McMoRan Copper and Gold Inc. mine expansion, the area has experienced an influx of workers and their families. Table 1-1 provides the population of the three incorporated towns and the unincorporated area in Graham County.

Table 1-1: Graham County Population Growth

	1990	2000	2007 Estimate	% Increase (1990-2000)	% Increase (2000-2007)
Arizona	3,665,228	5,130,632	6,500,194	40%	27%
Graham County	26,554	33,498	37,338	26%	11%
Safford	7,359	9,232	9,460	25%	2%
Thatcher	3,763	4,022	5,235	7%	30%
Pima	1,725	1,989	2,233	15%	12%
Unincorporated	13,707	18,246	20,410	33%	12%

Source: US Census Bureau and Southeastern Arizona Governments Organization (SEAGO)

Historical growth rates can be an indication of future growth and, therefore, are important in developing traffic forecasts. Population and employment are direct inputs to the travel-forecasting model to determine the number of trips being made each day. Specifically, in the traffic model, population produces trips and employment attracts trips.

To tabulate existing and future population and employment data, a system of traffic analysis zones have been established for the area. Traffic Analysis Zones (TAZs) are geographic subdivisions of the study area that are used in the travel forecasting model. Similar land uses, physical barriers, or major transportation corridors define the zone boundaries. Based on the local information provided by the TAC and the study of land use pattern by the project team, the current total population of 34,270 within the study area was divided up and assigned to the 76 TAZs. The boundaries of the TAZ's are shown in Figure 1-2 and the tabulated population data is shown in Appendix 1A.

The highest population densities in the study area are at the junction of US 70 and US 191 within the City of Safford. Most of the populations in the study areas are clustered around the two major highways, and between the cities of Safford and Thatcher. Population density of the study area is shown in Figure 1-3.

Figure 1-2: Study Area Traffic Analysis Zones (TAZ)

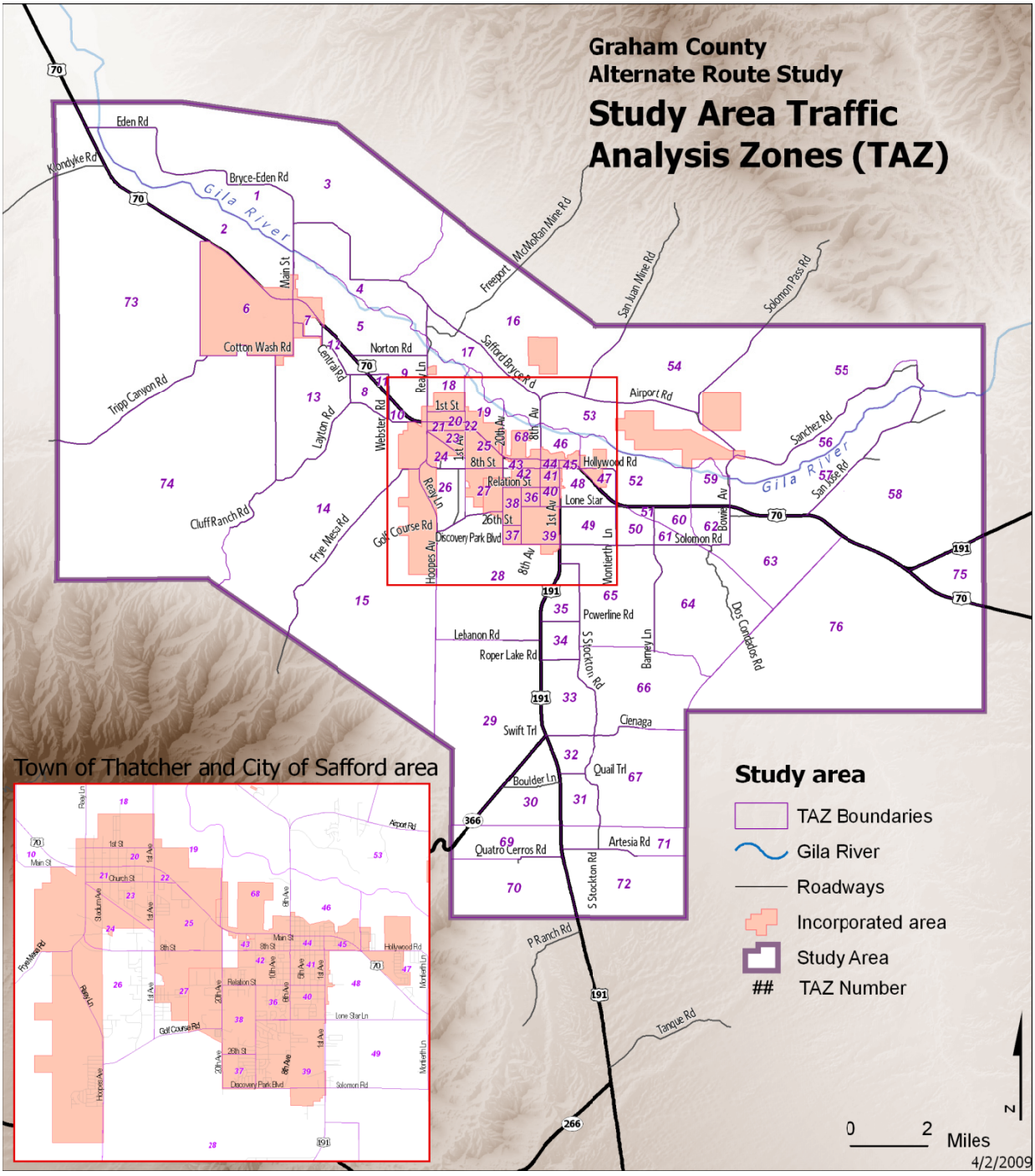
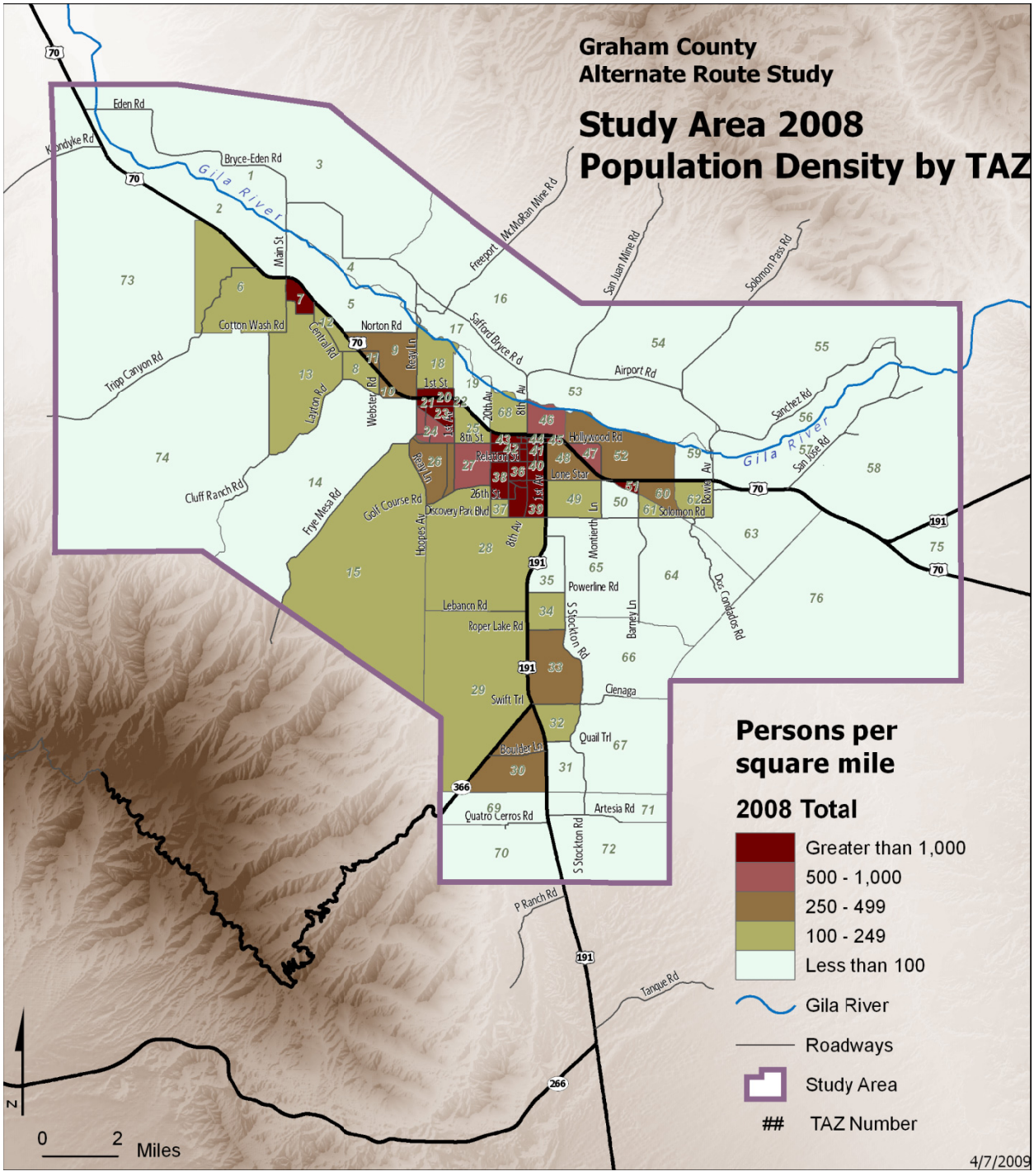


Figure 1-3: Study Area 2008 Population Density by TAZ



Employment

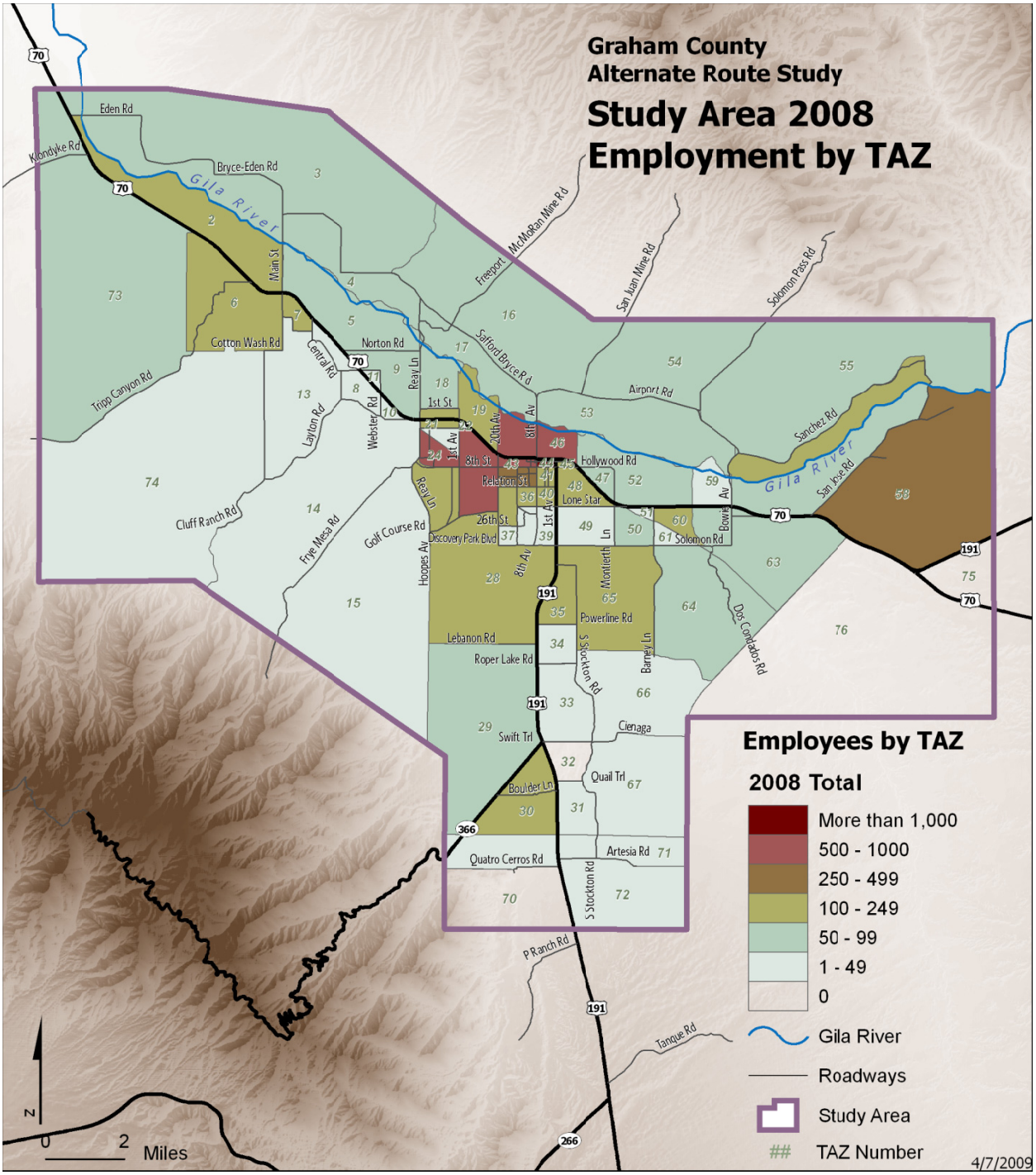
Currently, there are approximately 10,000 workers in the labor force in the study area. Most of the jobs are located within the jurisdictions of the three incorporated cities of Safford, Thatcher and Pima; mining, education, government and retail comprise the majority of the employment. Like the population distribution, the greatest concentrations of jobs are in the Safford and Thatcher area along US 70 and US 191. The number of jobs decreases as the TAZs are distributed away from the city center. The major employers in the area are listed in Table 1-2; the geographic distribution is presented in Figure 1-4. The Safford prison is located in TAZ 58, which accounts for its high employment count. The detailed employment distribution is shown in Appendix B.

Table 1-2: Major Employers

Employer	Community	Number of Employees	Employment Type
Freeport-McMoRan Copper & Gold	Safford	1081	Mining Companies
Eastern Arizona College	Thatcher	583	Schools
Mt Graham Regional Medical	Safford	520	Hospitals
Safford Prison	Safford	485	Government
Safford Unified School District	Safford	389	Schools
Wal-Mart	Safford	290	Retail
Graham County Government	Safford	270	Government
Safford City Government	Safford	198	Government
Arizona State Government	Safford	189	State Government
Impressive Labels	Safford	175	Manufacture
Federal Prison	Safford	150	Federal Government
Thatcher U.S.D.	Thatcher	150	Schools
Pima U.S.D.	Pima	136	Schools
Thriftee Food & Drug-IGA	Safford	120	Grocers-Retail
Infinia At Safford	Safford	105	Nursing & Convalescent
Home Depot	Thatcher	80	Home Centers
Haralson's Auto and Tire	Safford	70	Retail
Bashas'	Thatcher	65	Grocers-Retail
Bureau of Land Management	Safford	60	Federal Government
Safeway	Thatcher	57	Grocers-Retail
Az Dept Of Economic Security	Safford	50	State Government
Thatcher City Government	Thatcher	47	City Government
Graham County Electric	Pima	40	Utilities
US Forest Svc Warehouse	Safford	19	Government

Source: InfoUSA data and Freeport-McMoRan, 2008

Figure 1-4: Study Area 2008 Employment by TAZ



Environmental Justice

Title VI of the Civil Rights Act of 1964 and related statutes assure that individuals are not subjected to discrimination on the basis of race, color, national origin, age, sex, or disability. In February 1994, President Clinton signed Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Population and Low-Income Population." The purpose of the Executive Order was to focus attention on the "environmental and human health conditions in minority communities and low-income communities with the goal of achieving environmental justice." The Executive Order does not supersede existing laws or regulations; rather, it requires consideration and inclusion of these targeted populations as mandated in previous legislation, including:

- Title VI of the Civil Rights Act of 1964
- National Environmental Policy Act of 1969 (NEPA)
- Section 309 of the Clean Air Act
- Freedom of Information Act

The U.S. Department of Transportation issued its final order to implement the provisions of Executive Order 12898 on April 15, 1997. This final order requires that information be obtained concerning the race, color or national origin, and income level of populations served or affected by proposed programs, policies, and activities. It further requires that steps be taken to avoid disproportionately high and adverse impacts on these populations.

One of the first steps in assuring environmental justice is the identification of those populations specifically targeted by the Executive Order – minority and low-income populations.

According to the 2000 Census, the racial composition of the Graham County study area was predominantly white, with about 32.9 percent minorities. Racial demographics for the study area are shown in Table 1-3.

Table 1-3: Graham County 2000 Racial Demographics

Area	White	African American	Native American	Asian or Pacific Islander	Other Race Alone	Two or more races
Graham County	67.1%	1.9%	14.9%	0.6%	13.3%	2.1%
Safford	75.2%	1.4%	1.0%	1.0%	18.6%	2.9%
Thatcher	84.7%	0.8%	1.8%	0.6%	9.9%	2.2%
Pima	87.0%	0.2%	0.8%	0.1%	9.9%	2.1%

Source: U.S. Census Bureau, 2000 Census

The Executive Order also requires the consideration of persons older than 60 years of age as well as low income populations. According to the 2000 Census, approximately 16% of the population in Graham County is 60 years or older. Nearly 21% of Graham County residents live below the poverty level. Socioeconomic data for Graham County and the three incorporated cities are listed in Table 1-4.

Table 1-4: Graham County 2000 Socioeconomic Data

Category	Graham County	Safford	Thatcher	Pima
Female	47%	52%	53%	51%
Male	53%	48%	47%	49%
Persons with disability	30%	37%	23%	43%
Persons over age 60	16%	21%	16%	18%
Persons living below the	21%	17%	19%	20%

Source: U.S. Census Bureau, 2000 Census

1.3.3 EXISTING STREET SYSTEM

The existing street system is described in detail in the following sections. The study area is currently served by an arterial street system, collectors, and local streets. ADOT controls four highways in the study area: US 70, US 191, SR 366, and SR 266. These highways serve as the major roadways in the street network within the study area and distribute local and regional traffic. All of these highways are functionally operating as principal arterials.

US 70

US 70 is an east-west highway that connects the study area to New Mexico in the east and Globe to the west. It is the main route through the Graham County area and is used by visitors and recreational users to access Mt. Graham, San Carlos Lake, and other area attractions. There are approximately 29 miles of US 70 in the study area. According to the State Highway Log System, it is currently classified as a principal arterial in the Safford and Thatcher urbanized area, and as a rural minor arterial outside the urban area.

US 191

US 191 serves as the major regional vehicular link within the Safford region and connects Safford with I-10. According to the State Highway Log System, it is currently classified as a rural minor arterial south of Safford and as principal arterial within the Safford urbanized area. The highway is designated as a scenic route and provides access to the Graham County Park, fairgrounds, and Roper Lake State Park. Approximately 15 miles of the highway is within the study area.

SR 366

SR 366 departs from US 191 approximately eight miles south of Safford and heads westward to the top of Mount Graham. The roadway provides access to the Safford Federal Correctional Facility as well as the University of Arizona Binocular Telescope Facility. It is classified as a rural minor collector in the State Highway Log System.

SR 266

SR 266 heads west from US 191 to Bonita and Fort Grant, where it ends at the Fort Grant Correctional Institution. It is classified as a rural minor collector in the State Highway Log System.

Another important arterial in the network is 20th Ave, which is a north-south route that connects the Discovery Park Blvd to US 70.

The street system inventory for the roadways within the study area includes:

- Functional Classification
- Number of Through Lanes

Functional Classification

Functional classification, the grouping of roadways by the character of service they provide, was developed for transportation planning purposes. According to "Arizona Functional Classification Guidelines", urban and rural areas have fundamentally different characteristics as to density and types of land use, density of street and highway networks, nature of travel patterns, and the way in which all these elements are related in the definitions of highway function. An "urban area" is defined as an urban cluster and/or urbanized area. Within the study boundary, the urban area includes the Safford-Thatcher-Pima metropolitan area. The rural area of the study area consists of all territory outside of the urban boundaries. The following paragraphs describe the characteristics of the basic functional systems for both rural and urban areas as defined in the "Arizona Functional Classification Guidelines" published by the Arizona Department of Transportation.

Rural Principal Arterial Highways: Serve high volume, long distance trips; provide high speed travel and minimal interference to through movement.

Rural Minor Arterial Road: Serve most of the larger communities not served by the principal arterial system, provide trip length and travel density greater than those served by collector systems, and provide relatively high travel speeds, with minimum interference to-through movement.

Rural Collector System: Serve travel of intracounty and regional importance, rather than statewide importance. Serve shorter trips and provide more moderate speed than arterial routes. All rural state highways that are not arterial highways will be on the rural collector system as either major or minor rural collectors. Rural minor collectors tend to have lower traffic volume than rural major collectors, carry traffic over a shorter distance than a major collector, or carry traffic on trips to less important intracounty traffic generators.

Rural Local Roads: Serve primarily to provide access to land uses adjacent to collector and arterial roadways. Tend to have lower traffic speed limits and lower traffic volumes.

Urban Principal Arterials: Carry trips of longer length; provide the greatest mobility and highest speed for through movement. Serve the highest traffic volume generators and the major centers of activity of a metropolitan area.

Urban Minor Arterial: Provide trips of moderate length. Provide lower travel mobility and lower speed limit than urban principal arterials.

Urban Collectors: Distribute traffic from arterials and collect traffic from local streets into the arterial system.

Urban Local Streets: Provide direct access to the adjacent land. Provide the lowest travel mobility and lowest posted speed limits.

The current functional classification system for the Graham County study area is shown in Figure 1-5. A closer view of Safford/Thatcher area is shown in Figure 1-6. These two maps illustrate existing systems as currently designated and do not reflect changes which may take place in future years as land uses evolve and population increases. As illustrated on the map, the study area is primarily served by US 70 and US 191. These two routes generally serve as urban principal arterials within the Safford/Thatcher city limits and as Rural Minor Arterials outside of city limits.

Figure 1-5: Study Area Roadway Functional Classification Map

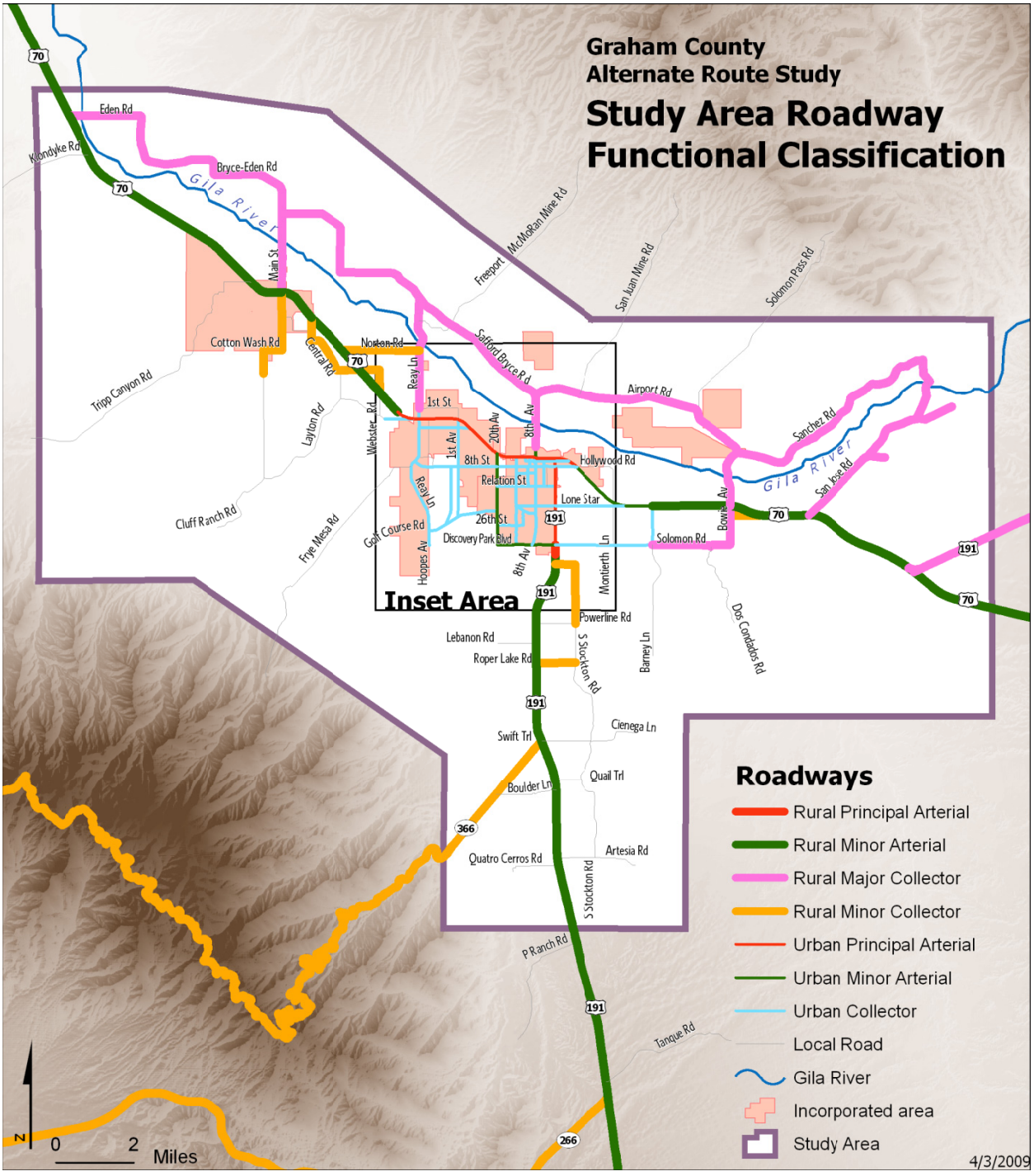
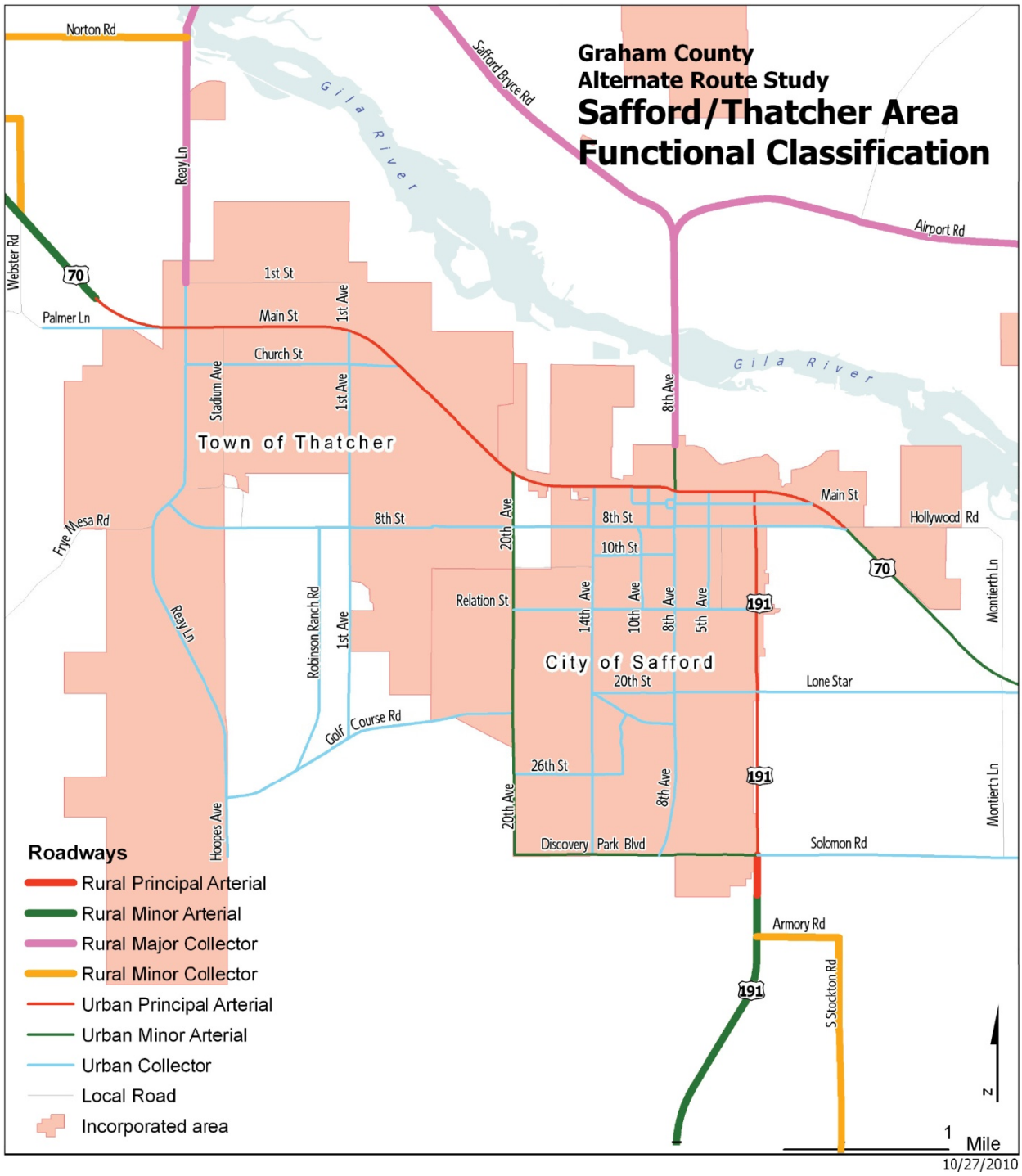


Figure 1-6: Safford/Thatcher Area Functional Classification Map



Number of Through Lanes

Although there are other factors such as access and traffic control devices, the number of through lanes is the most significant factor that affects the capacity of a street. The number of lanes for all of the arterials and collectors within the study area was inventoried for the capacity calculation. The existing number of through lanes is shown in Figure 1-7 and Figure 1-8 for the Safford/Thatcher study area, respectively. Most of the roads in the area have two through lanes with the exception of US 70 and US 191, which have five lanes from the eastern boundary of the City of Safford to the center of the Town of Pima. The US 191 DCR study is currently evaluating the need to expand US 191 south of Discovery Park Blvd from two to five lanes. It should be noted that five-lane roadways comprises four through lanes plus a continuous center left-turn lane. Similarly, three-lane roadways have two through lanes and a continuous center two-way left-turn lane.

Figure 1-7: Study Area Roadways Existing Number of Through Lanes

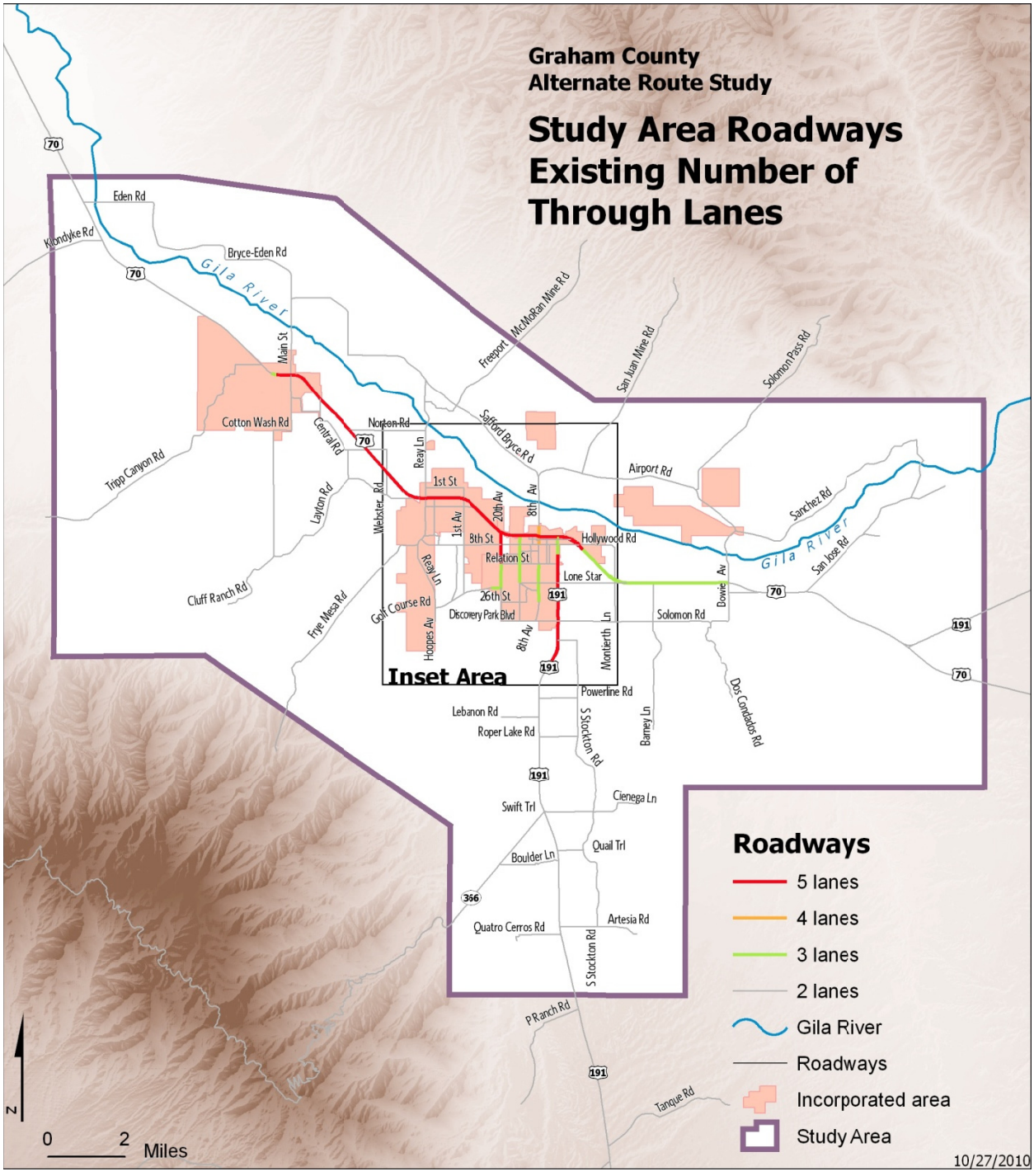
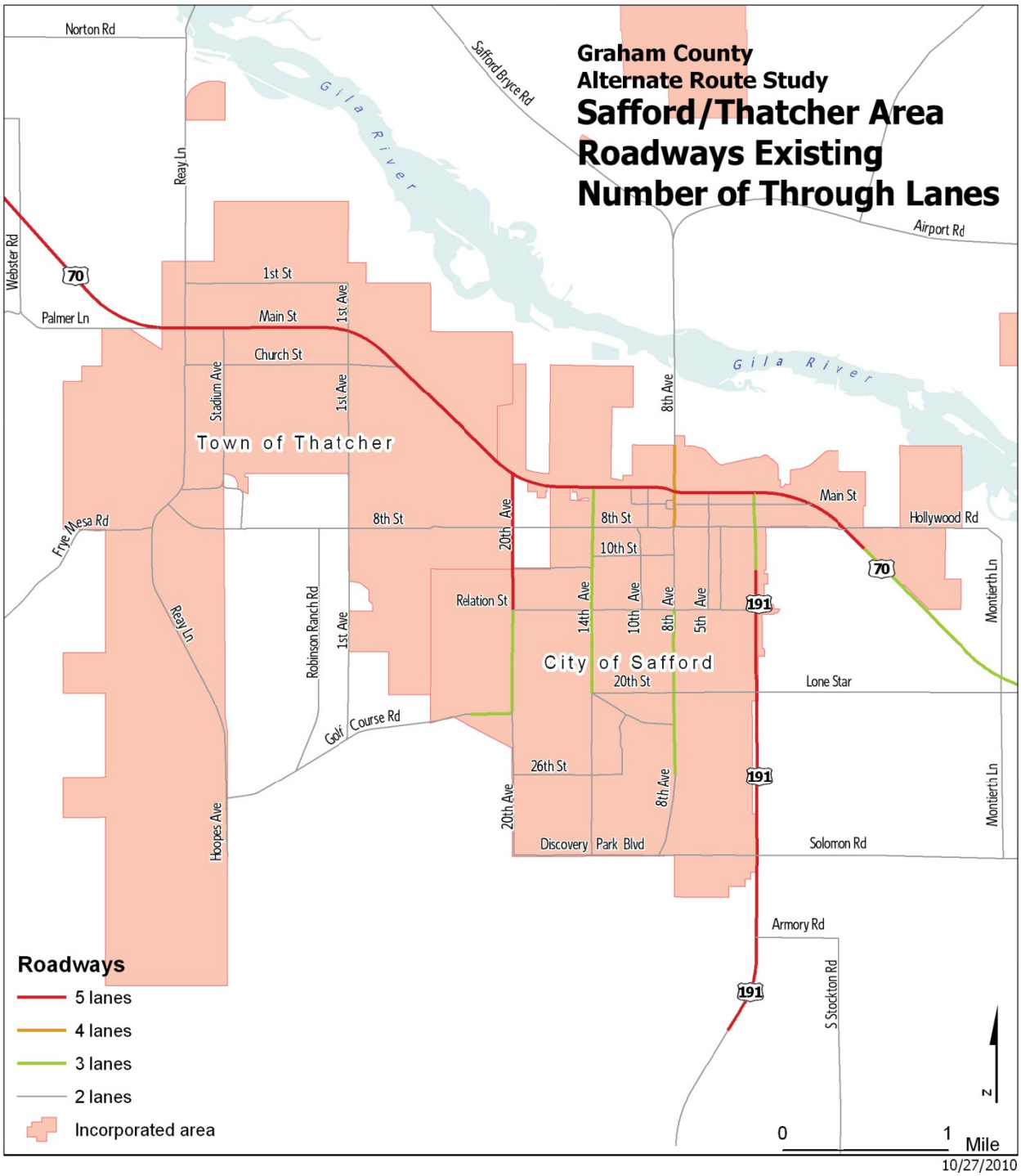


Figure 1-8: Safford/Thatcher Area Roadway Existing Number of Through Lanes



1.3.4 OTHER MODES OF TRANSPORTATION

Since the area is currently in a state of transition due to the expected influx of jobs and people in the next few decades, it is critical that land use design and infrastructure support multimodal alternatives to the street and highway system. While there may be little funding for these alternatives currently, roadways and new development designed to support both vehicular and alternative modes without compromising street capacity should be encouraged.

Transit

Currently, the only public transit service available in the Graham County study area is provided by SouthEastern Arizona Community Action Program, Inc. (SEACAP) using one vehicle. A feasibility study was conducted in 2007 to determine the transit needs of the community. This study's objectives were to identify transit dependent populations, the need for connections between major community activity centers, and funding alternatives. The results of the feasibility study indicated that there is substantial demand for public transit services and recommended operating various fixed routes. Investment in transit infrastructure and pedestrian access can be an alternative to roadways by alleviating congestion along high density employment and residential corridors. Community leaders continue to address the complexity of funding and management issues.

Bicycle System

Graham County, the City of Safford, and Town of Thatcher have completed a multi-use path and/or bicycle route system plans. These are included as reference in Appendix 1C. Opportunities to enhance, facilitate, or incorporate the community's bicycle and multiuse plans will be evaluated as part of the Alternate Route Study. All bike facilities in the area are divided into the following four categories:

- Shared-use Paths –a paved pathway designated for the exclusive use of pedestrians, bicycles and other non-motorized vehicles in scenic recreational areas.
- Bike Lanes – a bike lane located on the paved area of a roadway shoulder for preferential use by bicyclists.
- Bike Routes – a roadway identified as a bicycle facility by guide signage only without special lane markings. Bicycle traffic shares the roadway with motor vehicles.
- Wide Curb Lanes – not officially designated as bikeways with at least 14 feet wide to accommodate cyclists.

The bicycle, if adequately planned for and utilized, can play an important role in the transportation system to enhance mobility and recreational riding.

Pedestrian System

The two types of pedestrian facilities are sidewalks and multi-use paths. Sidewalks are an important element along urban roadways and near local activity centers such as schools, commercial centers and public recreation areas that attract significant pedestrian travel. In developing a pedestrian system, priority should be given to segments that would provide safe school routes or to enhance continuity of the system. Since the need to cross major streets often discourages walking, signalization or other protection of pedestrian crossings at these locations should be considered where warranted.

1.3.5 TRAFFIC ACCIDENTS

The historical traffic accident data (1998 to 2006) for Graham County as shown in Table 1-5, was obtained from the ADOT Motor Vehicle Department, which includes all city and county accident records. The three incorporated cities account for about 50 percent of total crashes in the county. The data also showed that State Rural Roads have more accidents than Other Rural Roads.

The highest concentration of traffic accidents were generally within the study area along US 191. This is not unexpected given the high traffic volume along this roadway segment. In 2006, there were no crashes with fatalities within the city, only outside and at the edge of city boundaries. Traffic crashes in the study area are shown in Figure 1-9 and Figure 1-10.

Alcohol-related crashes account for more than 10 percent of total crashes and about 50 percent of fatal crashes. Figure 1-11 shows the severity of crashes over the last five years.

The data identifies the areas of concern within the study area to be along the state highway system through Safford and Thatcher. By reviewing the data, we can determine the potential benefits that local improvements and/or an alternate route corridor may provide.

Figure 1-9: Study Area Roadway Traffic Crashes 2006

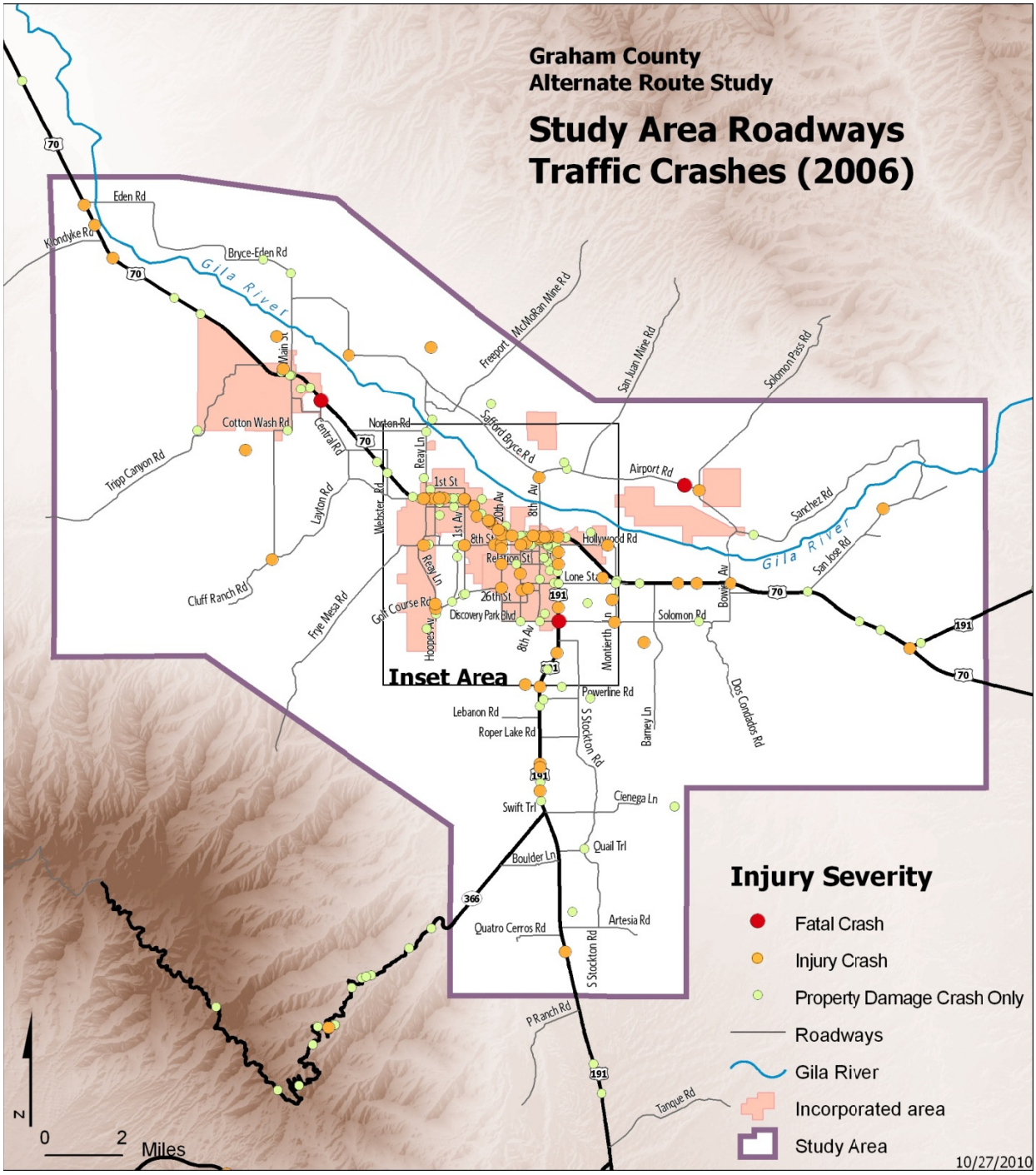


Figure 1-10: Safford/Thatcher Area Roadway Traffic Crashes 2006

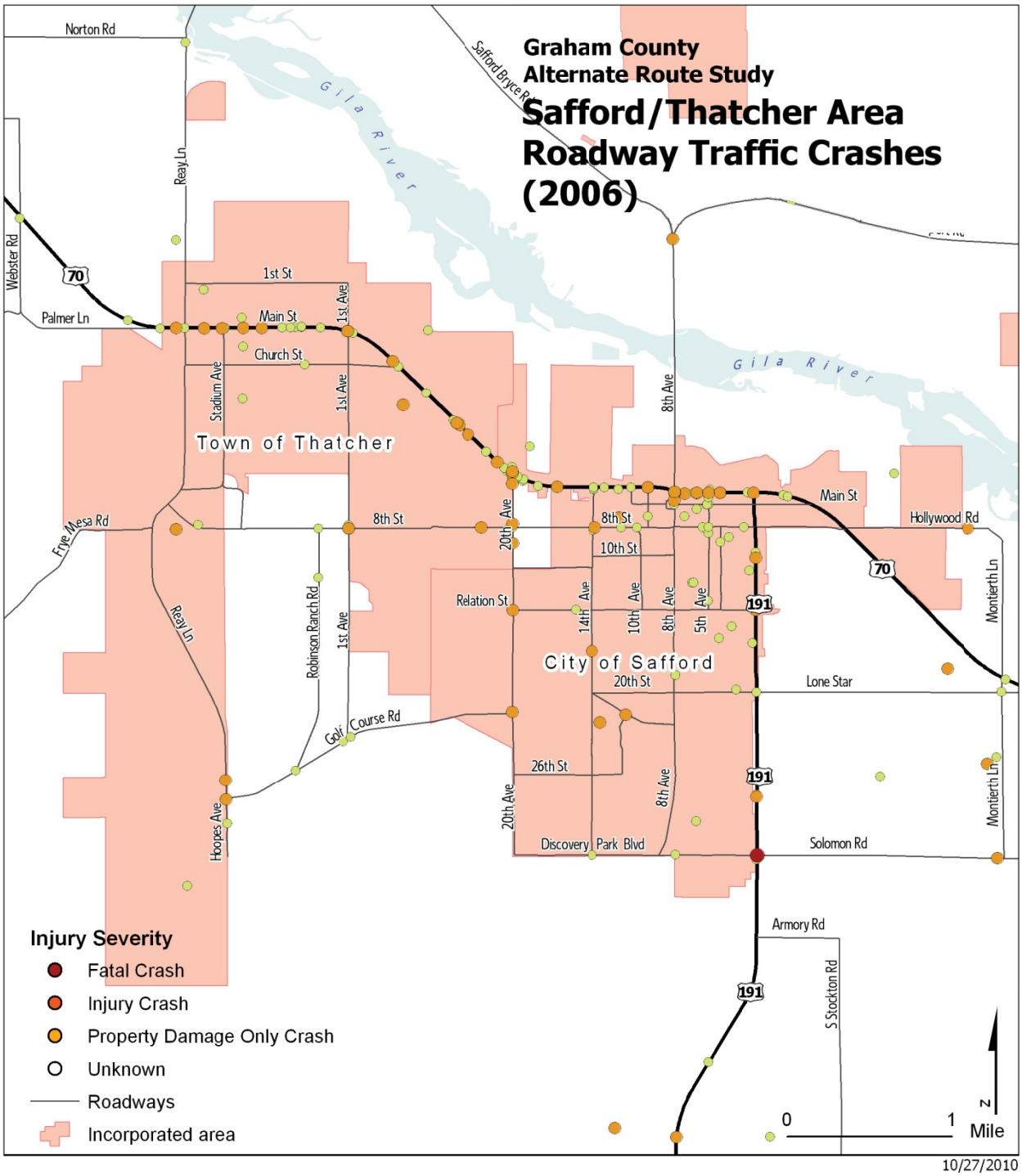
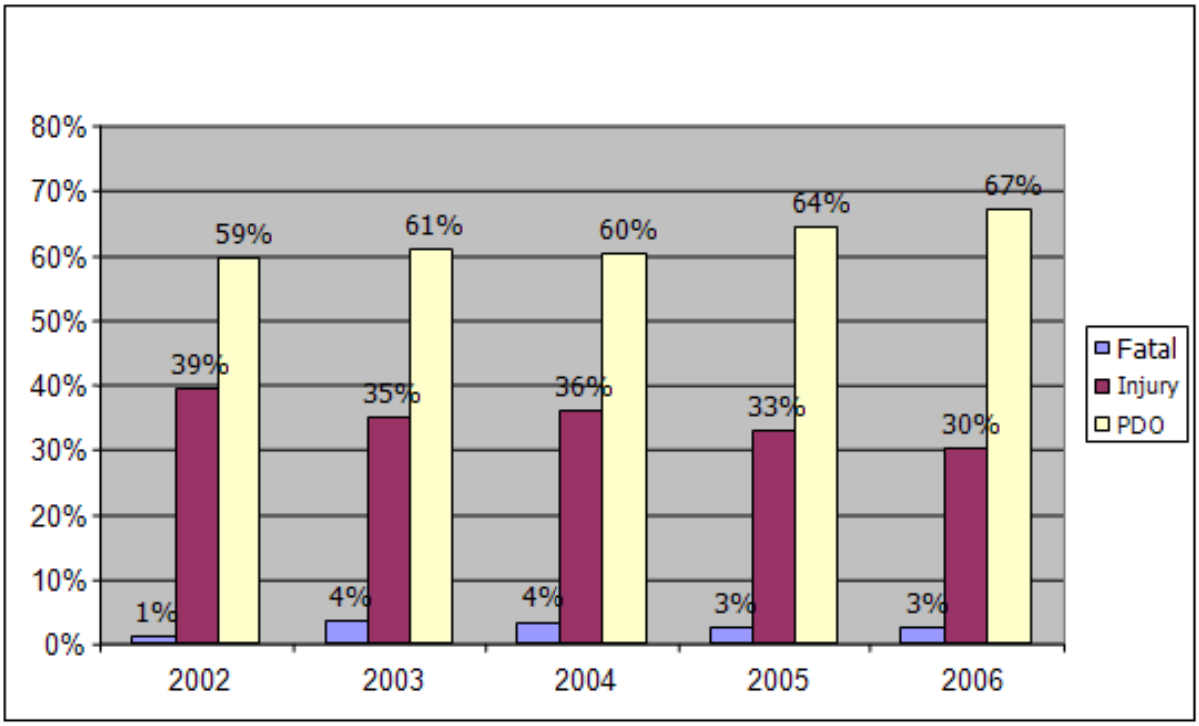


Table 1-5: Total Crashes in Graham County 1998-2006

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Graham County	395	356	376	336	318	340	285	300	310
Pima	23	12	14	3	0	3	3	4	9
Safford	103	85	113	70	80	115	93	111	90
Thatcher	55	51	48	50	70	64	63	63	58
State Rural Roads	135	106	117	131	102	98	67	77	93
Other Rural Roads	76	67	79	82	66	60	59	45	60

Source: Arizona Department of Motor Vehicles Crash Facts Summary 1998-2006

Figure 1-11: Crash Severity in Graham County



PDO – Property Damage Only

Source: Arizona Department of Motor Vehicles Crash Facts Summary 1998-2006

1.3.6 EXISTING TRAFFIC AND OPERATING CONDITIONS

This section presents the existing traffic and roadway characteristics and defines the methodologies utilized in the analysis of network performance. Included is a discussion of the existing operating conditions of the street system in the study area.

Speed Limits

The speed limits within the study area generally range from 25 miles per hour on the local streets, to 35 to 45 miles per hour on the collectors and arterials in the urban area. In the rural area, the speed limits on US 70 and US 191 increases to 55 or 65 miles per hour. Figure 1-12 shows the Graham County study area speed limits. A closer look at the Safford/Thatcher area is shown in Figure 1-13.

Figure 1-12: Study Area Roadway Speed Limits

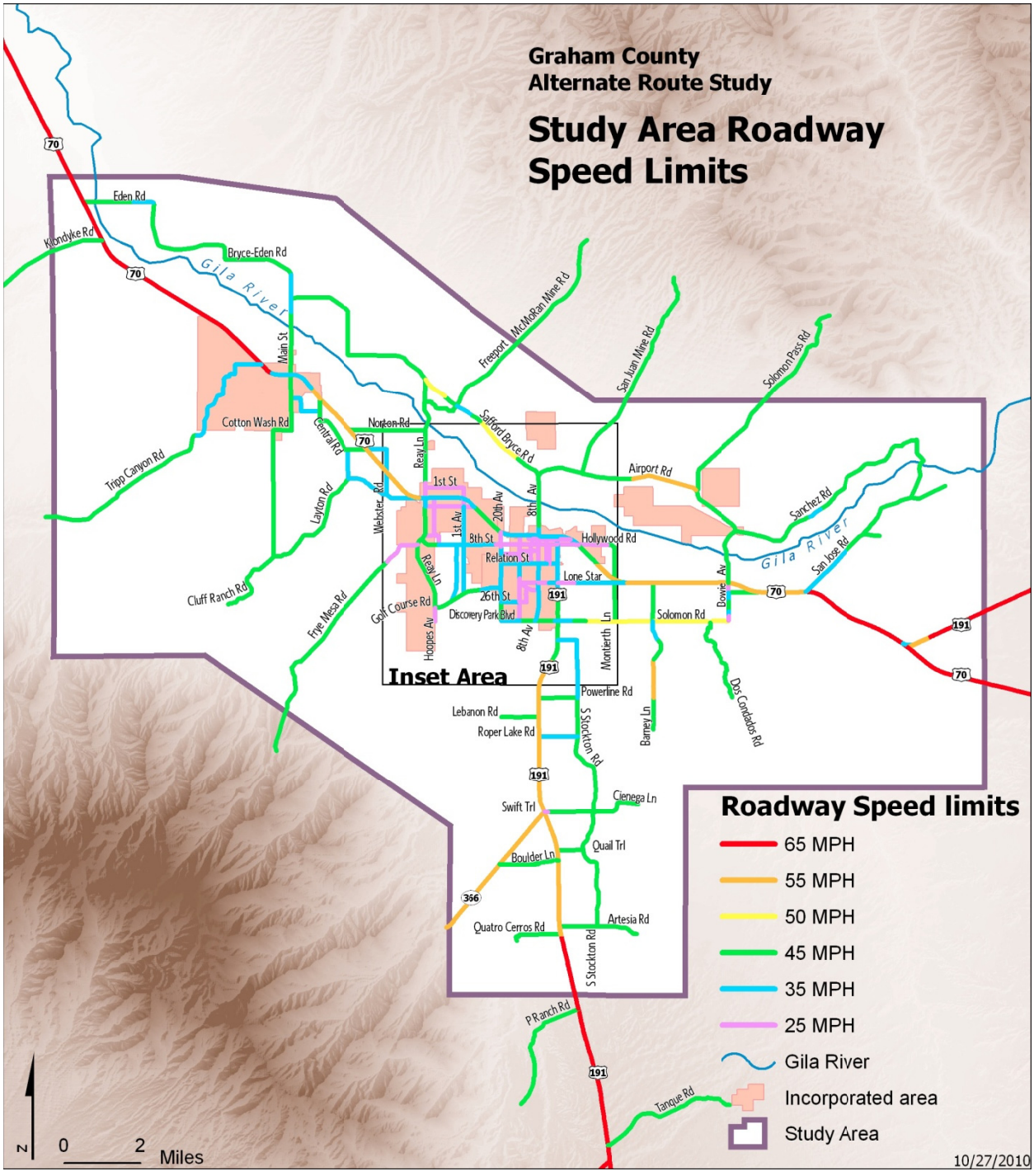
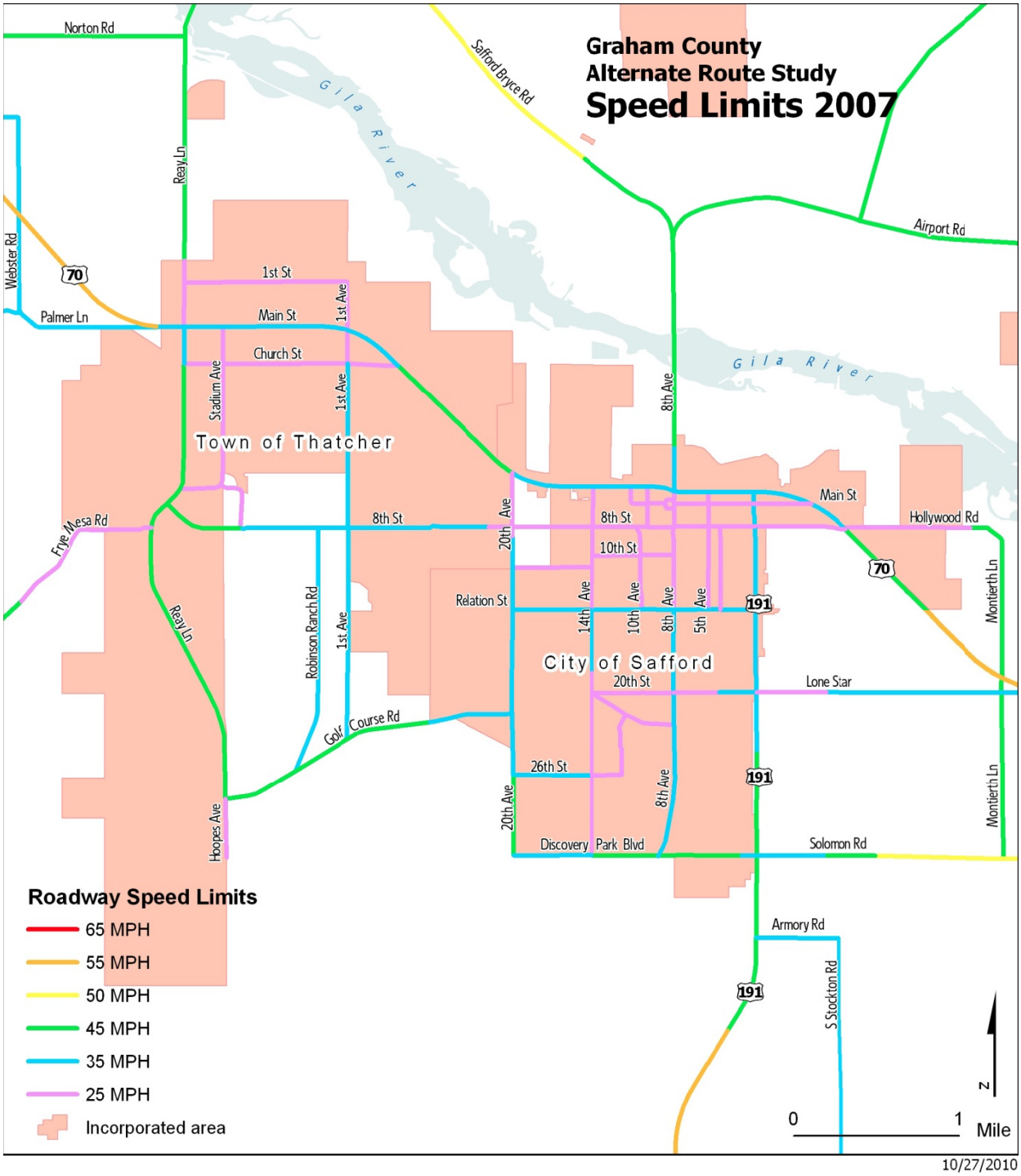


Figure 1-13: Safford/Thatcher Area Roadway Speed Limits 2007



Existing Traffic

Existing daily traffic volumes on the street system in the study area are shown in Figure 1-14 and Figure 1-15. The volumes on US 70 and US 191 were obtained from ADOT 2007 state highway traffic count. Others were obtained from HPMS annual average daily traffic counts (2006) and the 2007 City of Safford Transportation Study.

As shown in the figure, the highest daily traffic volumes are on the two principal arterials: US 70 and US 191. US 70 carries nearly 20,000 vehicles on an average daily basis inside the Safford city area. US 191 also has near 10,000 average daily traffic south of the Safford area. Other high volume locations include 20th Ave, 8th Ave and 8th St in the Safford city vicinity.

Figure 1-14: Study Area Roadways Existing Traffic Volume 2007

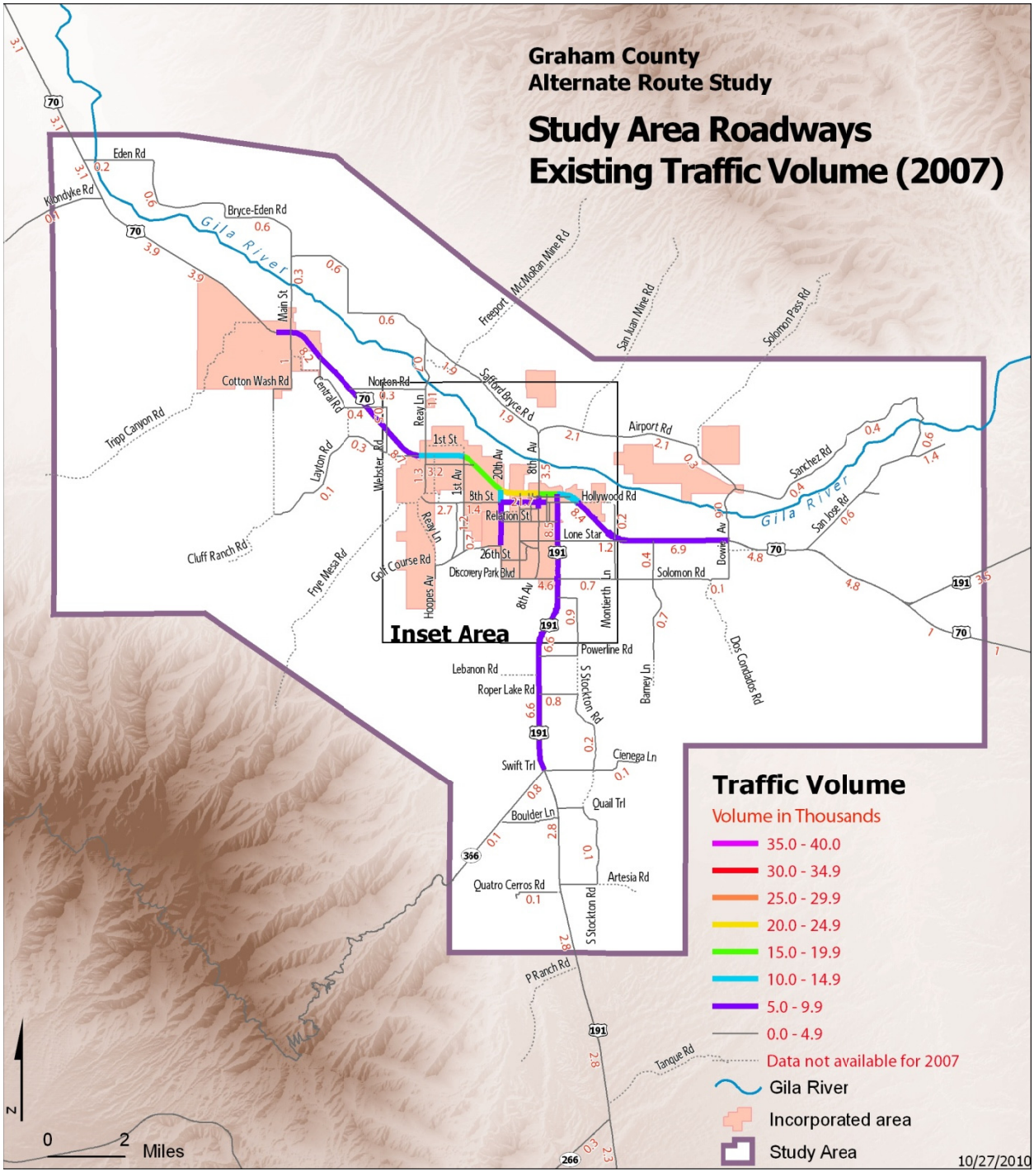
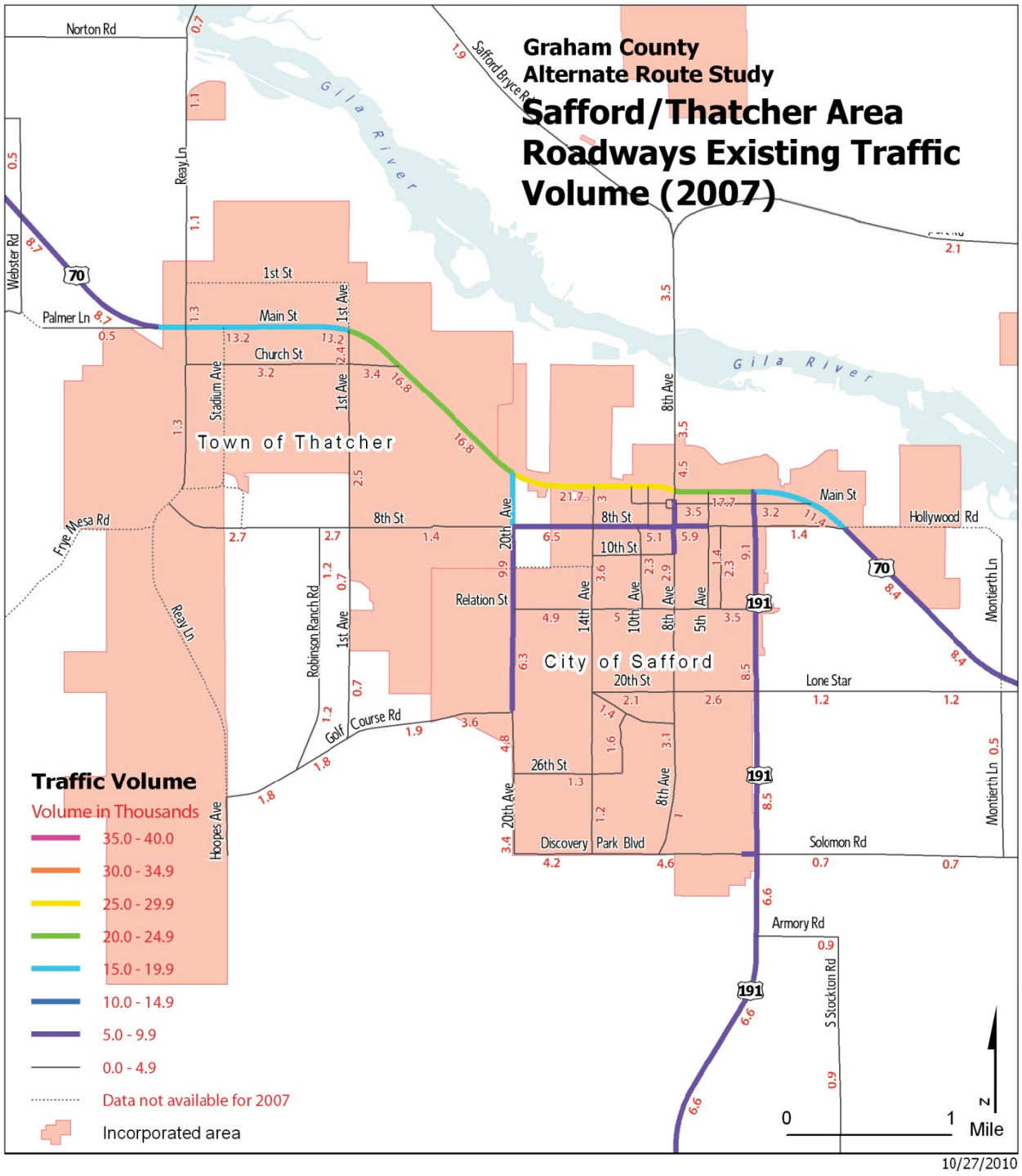


Figure 1-15: Safford/Thatcher Area Roadways Existing Traffic Volume 2007



Operating Conditions

A review of existing traffic conditions includes an analysis of road segment traffic operations. The results of the analysis are expressed in terms of Level of Service (LOS). Level of service is the term used to describe the degree of traffic congestion.

The various levels of service range from A to F, with A being the best operating conditions and F being the worst operating conditions. LOS is generally defined as follows:

- LOS A: Best, free flow operations (on uninterrupted flow facilities) and very low delay (on interrupted flow facilities). Freedom to select desired speeds and to maneuver within traffic is extremely high.
- LOS B: Flow is stable, but presence of other users is noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within traffic.
- LOS C: Flow is stable, but the operation of users is becoming affected by the presence of other users. Maneuvering within traffic requires substantial vigilance on the part of the user.
- LOS D: High density but stable flow. Speed and freedom to maneuver are severely restricted. The driver is experiencing a generally poor level of comfort and convenience.
- LOS E: Flow is at or near capacity. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within traffic is extremely difficult. Comfort and convenience levels are extremely poor.
- LOS F: Worst, facility has failed, or a breakdown has occurred.

Roadway segment level of service is based on the number of lanes, the functional classification of the roadway, maximum desired level of service capacity, roadway geometrics, and the existing or forecasted average daily traffic volume. Roadway LOS is used to describe the degree of traffic congestion. Roadways having a level of service in the D, E or F range are considered congested and warrant further review for possible improvements. In rural areas, LOS C is the general standard for acceptable roadway performance, and LOS D is generally considered acceptable for roadways in areas transitioning from rural to urban.

With the coordination of TAC members and ADOT Regional Traffic, the project team updated the Level of Service (LOS)/ Capacity lookup table. The updated lookup table was developed by using Highway Capacity Software+, HighPlan Module. The HighPlan Module takes into account local traffic parameters. It provides a more detailed LOS criterion for various types of rural and urban facilities.

The existing and future year forecasted traffic volumes were compared with the updated capacity threshold volumes shown in Table 1-6 to obtain the operating condition and LOS of the roadways.

Figures 1-16 and 1-17 present the updated LOS for the existing and future years for Graham County road system. Traffic projections are based on standard traffic projection techniques without origin-destination studies.

Table 1-6: Capacity/LOS Lookup Table

Roadway	Functional Code [1]	Speed Limit	Two Way # of Lanes	Capacity LOS A	Capacity LOS B	Capacity LOS C	Capacity LOS D	Capacity LOS E
Rural Principal Arterial	2	45 MPH	5 lanes	15,200	24,400	35,300	46,700	54,300
	2	45 MPH	7 lanes	22,800	36,600	52,900	70,000	81,400
Rural Minor Arterial	6	35 MPH	3 lanes [2]	-	3,100	7,600	12,200	22,200
	6	35 MPH	5 lanes [2]	13,400	22,200	32,000	42,300	51,600
	6	45 MPH	5 lanes [2]	15,200	24,400	35,300	46,700	54,300
	6	50 MPH	2 lanes	2,000	4,200	6,900	11,000	17,700
	6	55 MPH	2 lanes	2,000	4,200	6,900	11,000	17,700
	6	55 MPH	3 lanes [2]	2,500	5,200	8,600	13,700	22,200
	6	55 MPH	4 lane divided	15,200	24,800	35,400	45,500	50,500
	6	55 MPH	5 lanes [2]	18,000	29,400	42,000	54,000	60,000
	6	65 MPH	2 lanes	2,000	4,200	6,900	11,000	17,700
	6	65 MPH	3 lanes [2]	2,500	5,200	8,600	13,700	22,200
	6	65 MPH	4 lane divided	17,900	29,400	39,900	47,300	52,600
	6	65 MPH	5 lanes [2]	21,200	35,000	47,500	56,200	62,400
Rural Major Collector	7	25 MPH	2 lanes	-	3,100	7,700	10,500	13,200
	7	35 MPH	2 lanes	-	3,100	7,700	10,500	13,200
	7	45 MPH	2 lanes	2,300	5,900	9,700	13,100	16,500
	7	45 MPH	4 lanes	14,100	22,700	32,800	43,400	50,400
	7	50 MPH	2 lanes	2,300	6,400	10,700	14,400	18,100
	7	55 MPH	2 lanes	2,300	7,000	11,600	15,700	19,800
	7	55 MPH	3 lanes [2]	2,900	8,800	14,500	19,700	24,700
	7	65 MPH	2 lanes	2,200	4,700	7,800	12,400	20,000
Rural Minor Collector	8	25 MPH	2 lanes	-	2,000	4,900	6,700	8,500
	8	35 MPH	2 lanes	-	2,000	4,900	6,700	8,500
	8	45 MPH	2 lanes	-	1,800	4,400	7,000	12,900
	8	55 MPH	2 lanes	1,400	3,000	5,000	8,000	12,900
	8	65 MPH	2 lanes	1,400	3,000	5,000	8,000	12,900
Rural Local Street	9	45 MPH	2 lanes	-	2,800	6,900	10,900	19,900
	9	45 MPH	3 lanes	-	3,500	8,600	13,700	24,900
	9	45 MPH	4 lanes	15,900	26,000	37,100	47,700	53,000
Urban Principal Arterial	14	35 MPH	3 lanes [2]	-	1,800	6,900	11,000	14,400
	14	35 MPH	5 lanes [2]	13,400	22,200	32,000	42,300	51,600
	14	45 MPH	5 lanes [2]	15,200	24,400	35,300	46,700	54,300
	14	55 MPH	5 lanes [2]	17,900	29,300	41,800	53,700	59,700
Urban Minor Arterial	16	25 MPH	5 lanes [2]	13,400	22,200	32,000	42,300	51,600
	16	35 MPH	2 lanes	-	1,500	5,500	8,800	11,500
	16	35 MPH	3 lanes [2]	-	1,800	6,900	11,000	14,400
	16	35 MPH	4 lanes	10,600	17,500	25,200	33,400	40,700
	16	35 MPH	5 lanes [2]	13,400	22,200	32,000	42,300	51,600
	16	45 MPH	2 lanes	1,100	3,600	7,900	11,500	14,700
	16	45 MPH	3 lanes [2]	1,400	4,500	9,900	14,400	18,400
	16	45 MPH	5 lanes [2]	15,200	24,400	35,300	46,700	54,300
	16	55 MPH	2 lanes	1,300	5,300	10,100	14,000	17,900
	16	55 MPH	5 lanes	17,900	29,300	41,800	53,700	59,700
Urban Collector	17	25 MPH	2 lanes	-	1,800	6,400	10,300	13,500
	17	25 MPH	3 lanes	-	2,200	8,000	12,800	16,900
	17	25 MPH	4 lanes	10,600	17,500	25,200	33,400	40,700
	17	35 MPH	2 lanes	-	1,800	6,400	10,300	13,600
	17	35 MPH	3 lanes [2]	-	2,200	8,100	12,900	17,000
	17	45 MPH	2 Lanes	1,300	4,200	9,300	13,600	17,400
Urban Local Street	19	25 MPH	2 lanes	-	2,000	6,500	10,600	14,300
	19	35 MPH	2 lanes	-	2,000	6,500	10,600	14,300

Source: AADT based Level of Service Criteria from Highway Capacity Software (HCS+) Version 5.21, HIGHPLAN Module

1. Functional classification code from ADOT HPMS database
2. A five-lane segment and a three-lane segment include a two-way left-turn lane.
3. Assumptions: PHF 0.88 for rural area; 0.90 for urban area; 10% Heavy Vehicle percentage; 0.90 Local Adjustment Factor; K-factor and D-factors are generalized from ADOT HPMS database.

Figure 1-16: Study Area Existing Level of Service 2007

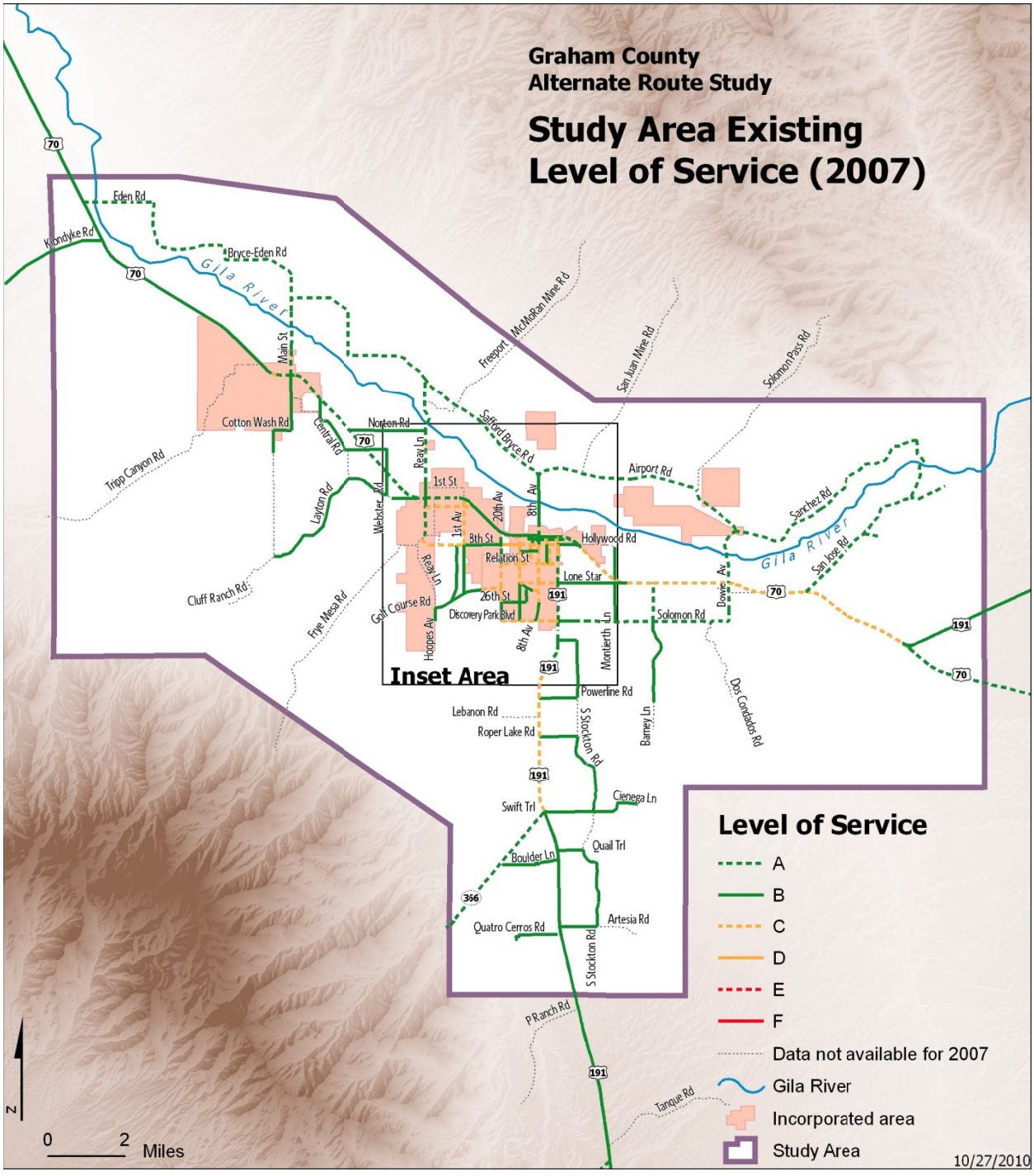
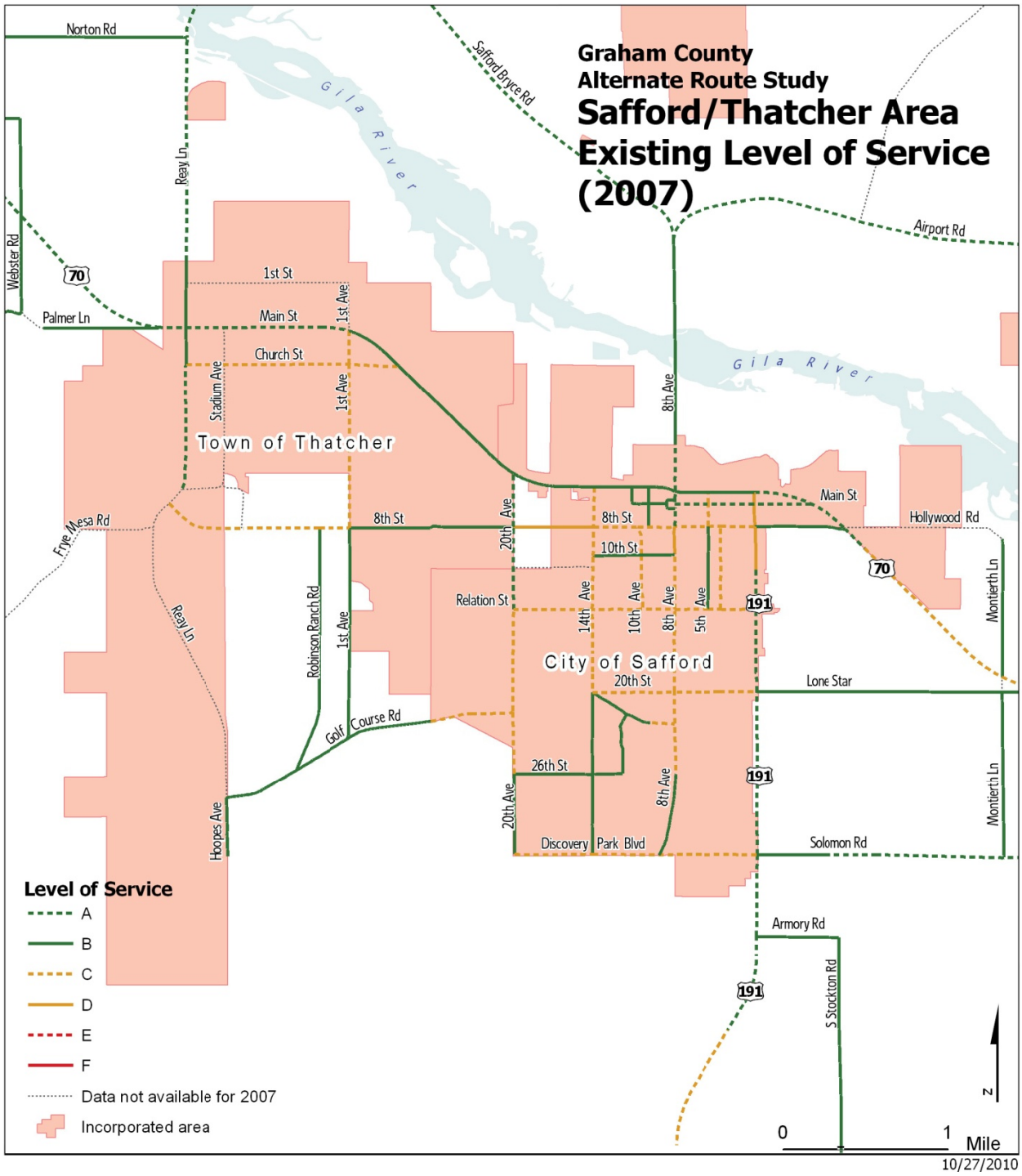


Figure 1-17: Safford/Thatcher Area Existing Level of Service 2007



1.4 FUTURE CONDITIONS

The Graham County area population and employment has steadily increased over the past ten years. The impact of this growth on the transportation system needs to be quantified so that necessary improvements can be identified and programmed for implementation. The future horizon years for this alternate route study are 2020, 2030, and 2040.

The future conditions projections discussed in the following section have been determined and based on the model developed for the Graham County SATs. The SATs study included all planned residential and employment developments, as well as any currently identified roadway improvements, including the TIP, 1998 Graham County SATs and the US 191 DCR.

1.4.1 GROWTH FORECASTS

The primary measures of growth used in this study were population and employment. The current population in the study area is 34,270 and there are 10,132 employees. The population and employment in the study area is tabulated by 76 Traffic Analysis Zones (TAZs) for use in the travel forecast model.

Based on the Arizona Department of Economic Security Demographic Cohort-Component Population Model, the population for Graham County will grow at an average annual rate of 0.788% between year 2023 and year 2030; and 0.669% between year 2030 and year 2040. These rates were applied to the study area to form a baseline projection. Based on the future growth trends along the US 191 corridor, base population and land availability, the southern portion of the study area is expected to experience higher growth rates, with the highest in the areas where the Sierra Del Sol development is planned. The north-western boundaries of the study area, around Klondyke Road will also experience slightly higher than baseline growth projections due to the planned development of a new subdivision. Farm communities in the study region are projected to experience very little or no population growth in the future.

The employment projection assumes that the future employment growth will keep about the same ratio as the population growth in the majority of the study area. Therefore, the 0.788% and 0.669% growth rates were applied to get the baseline employment projection for all the TAZs. Based on the traffic projection done by the CK Group in 2007, the annual growth in most of Graham County is anticipated to be 2.3%, and slightly higher along the US 191 corridor where it is anticipated to be 3%. Further adjustments were made in areas where high developments are planned and have been approved. Higher growth rates are applied in the southern boundaries of the study area since the Sierra Del Sol development is expected to create high residential development east of US 191 and

commercial development west of US 191. Farm employment is expected to experience very little or no increase in the future.

Overall, as shown in Figure 1-18, population density is expected to be the highest in the southern sections of the incorporated City of Safford and Town of Thatcher. The highest density is expected in the city center areas in the TAZs adjacent to and south of US 70. Also, high population density is expected along US 191 at the south end of the study area; this is expected to be primarily driven by the Sierra Del Sol development.

High employment corridors are projected to be on the major highways along US 70 and US 191 as shown in Figure 1-19. The total employment by TAZ numbers decrease as the TAZs are distributed further away from the city center, with the exception of growth in the three major employment locations in the area. New mines will be located in TAZ 16 and TAZ 54 and the Safford Prison is located at TAZ 58.

Figure 1-18: Study Area 2040 Population Density by TAZ

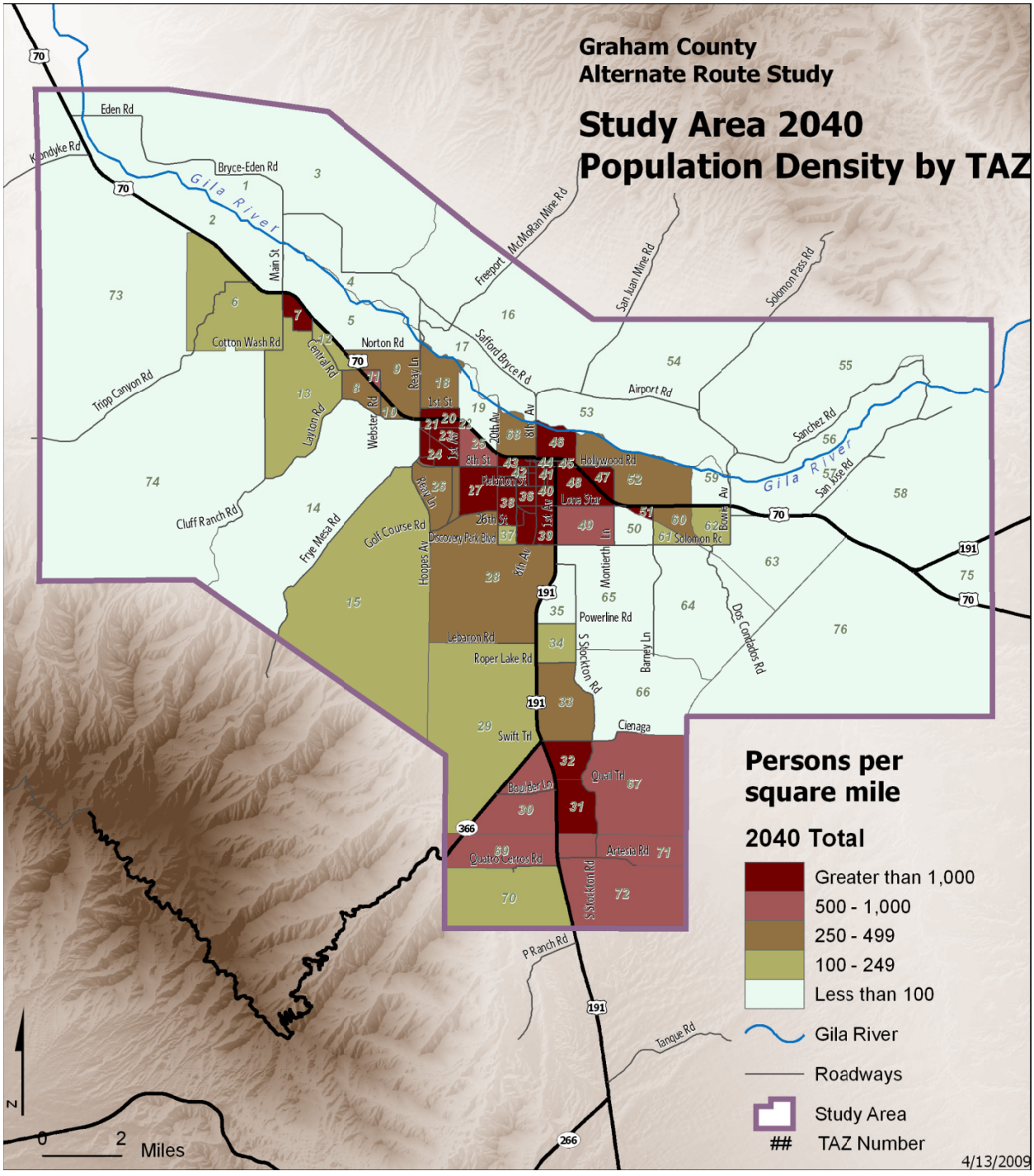
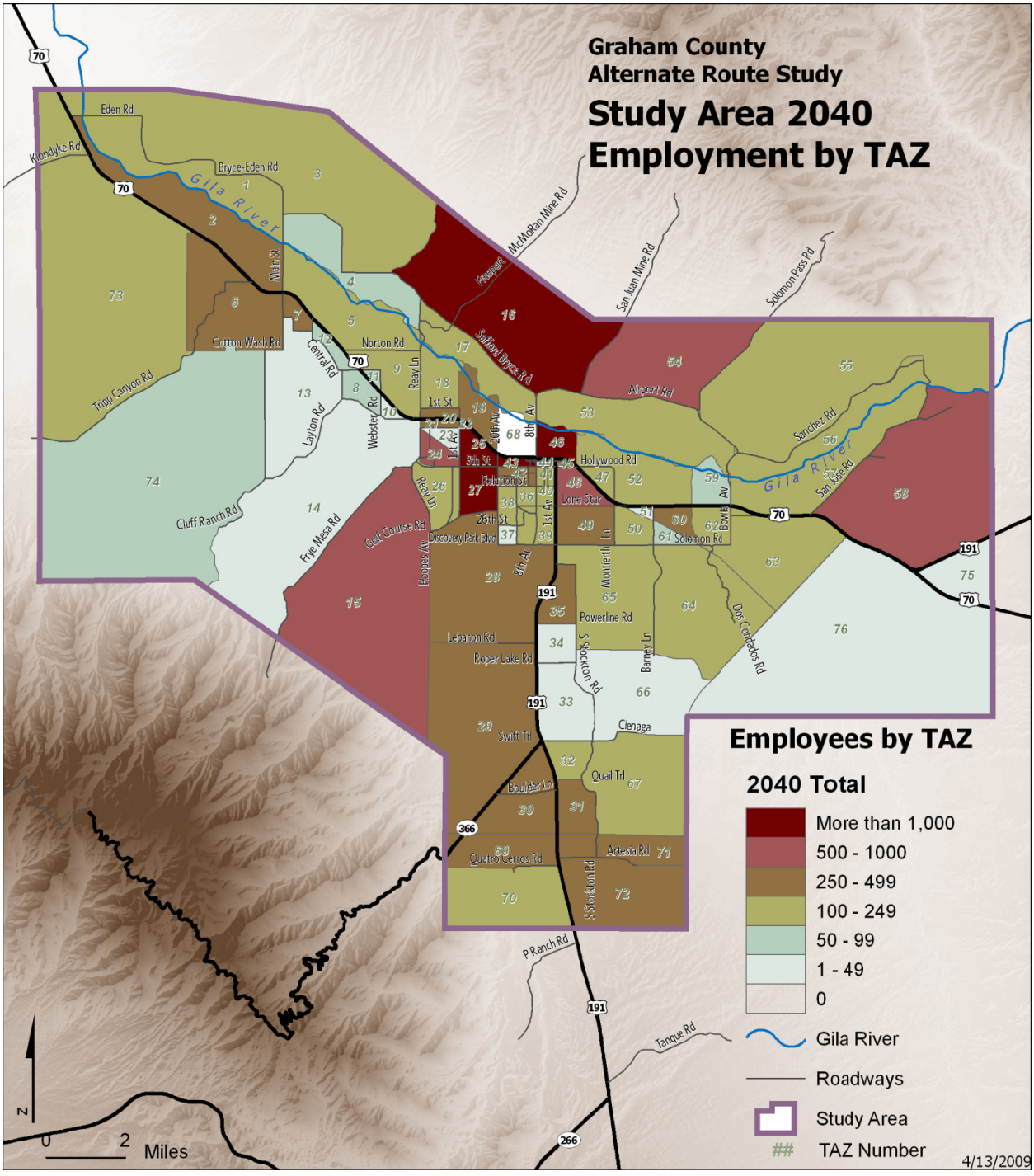


Figure 1-19: Study Area 2040 Employment by TAZ



Proposed Developments

According to an ADOT Traffic Projections and Growth Analysis report prepared by The CK Group in August 2007 and additional information from the cities in the study area, a list of existing and proposed land use development projects within the study area has been developed, shown in Table 1-7. Additional planned projects which were included in the existing and future population and employment figures are:

- Welker Farm in TAZ 48, 40 acre industrial and 760 acre residential
- The Safford Mall in TAZ 68, 200 acre commercial, to be completed by 2018
- Bear Creek Resort in TAZ 15, 700 room hotel, 20,000 sf commercial, 300 townhomes and 500 single family homes. To be completed by 2018.
- Holiday Inn Express in TAZ 68, 100 rooms
- Motel 6 in TAZ 68, 67 rooms.
- Hampton Inn Express in TAZ 46, 64 rooms.
- Napa Car Care in TAZ 43, 12,524 sq ft.
- Blasias Family Steak House in TAZ 47, 4,376 sq ft.

One of the major planned developments in the study area will be Sierra Del Sol located along US 191 between Quail Trail & P Ranch Road. This development is planned for build-out by year 2025 and is expected to contain 5,545 single family housing units.

Based on the size, status and locations of the proposed projects and additional discussion with the TAC, the population increase based on these development projects was projected for each TAZ for the future analysis years.

Table 1-7: Study Area Developments

TAZ	Name	Address	# of Units	Status
15	Bear Creek Resort		700	
47	Blasias Family Steak House	4,376 sq ft		
24	Casa Blanca Condos	Stadium Ave and the Highline Canal	192	Under Construction
25	Comfort Inn	Hwy 70 and Allred Ln	88	Completed
47	Copper Canyon	East of US 70 South of E Hollywood Dr	380	Completed
18	Cota Ranches	1st St & Porter Ln	129	Homes Under Construction
25	Diamond Springs	Church St & Allred Ln	14	Homes Under Construction
25	Double D Ranch	8th St & Railroad	24	Homes Under Construction
39	E & C homes (Cota Ranches)	23rd St between 8th Ave & 2nd Ave	81	Completed
24	EAC Cota Town Homes	Reay Ln and Ball Park Rd	175	Under Construction
23	Eagle Meadows	1st Ave & Eagle Dr	35	Homes Under Construction
11	Elmer Estates	Central Rd & Webster Rd	29	Homes Under Construction
3	Fred Web Park	Hot Springs Rd	92	
15	Frye Mesa			
27	Golf Course RV Park I	North of Golf Course Rd between 20th Ave & S 1st Ave	49	Final Plat Approved
28	Golf Course RV Park II	South of Golf Course Rd between 20th Ave & S 1st Ave	92	Completed
21	Goodman Apartments	College Ave & 4th St	40	Construction Completed
42	Greenberg I	Relation St between 14th Ave & 20th Ave	83	Final Plat Approved
27	Greenberg II	North of Golf Course Rd between 20th Ave & S 1st Ave	140	Final Plat Approved
46	Hampton Inn Express		64	
68	Holiday Inn Express		100	
20	Howard Apartments	High School Ave & 1st St	48	Under Construction
46	Kreigs Comfort Inn	450 Entertainment Ave	88	Complete

Table 1-7: Study Area Developments (continued)

TAZ	Name	Address	# of Units	Status
22	Marriot Hotel	Church St and Hwy 70	70	Completed
39	Mesa Vista Subdivision	West Discovery Park Blvd between 8th Ave & 14th Ave	70	Completed
49	Montana Vista Estates, Eldon Angle Subdivision	US 191 between 24th St & 26th St	220	Completed
68	Motel 6		67	
15	Mountain Vista estates	Valley View Dr & Pinaleno Mountain Rd	192	Final Plat Approved
43	Napa Car Care	12,524 sq ft		
42	Palomino Ranch	Relation St between 14th Ave & 20th Ave	40	Final Plat
54	Phelps Dodge Mining	Bowie to Miami Going Parallel to US 191 & US 70	0	Conceptual Phase
38	Pinaleno Foothills	26th St between 17th Ave & 20th Ave	62	Completed
27	Quail Ridge Phase II	First Ave & Quail Ridge Dr	120	Homes Under Construction
52	Ranch at River View LTD	East of US 70 North of E Hollywood Dr	227	Rezoning
46	River View Development	Sunflower Canal between 8th Ave & Graveyard wash	231	Conceptual Phase
27	Safford Hills Townhomes	20th Ave South of Hospital	104	Pending Approval of Plans
68	Safford Mall		200	
31	Sierra Del Sol Development	US 191 between Quail Trail & P Ranch Rd	2133	Conceptual Phase
25	Spring Canyon Estates	1st Ave & Union Canal	148	Final Plat Approved
42	Stone Willow	8th St between 20th Ave & 14th Ave	64	Under Construction
29	Swift Trail	US 191 & Swift Trail	90	Pre-Application Phase
8	Tempe View	Near southwest corner of Webster Rd & US 70	64	
27	The Village		11	Homes Under Construction
39	Tierra Bonita II	24th St between 8th Ave & 14th Ave	30	Under Construction
49	Township	S 1st Ave between 27th St & 24th St	150	Final Plat
48	Welker Farm		760	

Planned street system

In order to perform an analysis of future traffic operations for the final horizon year 2040, a future base street system must be established. The future base network was obtained by updating the existing street system with the schedule of all the confirmed projects listed in the current Transportation Improvement Program (TIP) and 1998 Graham County SATS recommended projects. The transportation improvement projects that were incorporated in the future based network are listed in Table 1-10.

Table 1-8: Transportation Improvement Projects

Route	Location	Fund Source	Type of Work	Program Year
Discovery Park	Safford	ENHNCMNT	Enhancements	2008
8th Ave Bridge	8th Ave – Gila River Bridge, Safford	HPP/BR	Bridge Construction	2008
8th Ave Bridge	8th Ave – Gila River Bridge, Safford	BR/SEC 115	Bridge Design	2008
Peterson Wash	Safford-Bryce Road	HES	Widen to 4 lanes	2008
20th Ave Sidewalks	20th Ave from US 70 to Relation St	TE	Sidewalk, Multiuse Path, and Street Lights Construction	2010
US 191	Ten Ranch to Owl Canyon (SEG III)	STP	Construct Parallel Roadway	2008
US 191	Dial Wash to Ten Ranch (SEG II)	STP	Construct Parallel Roadway	2011
US 191	I-10 to Jct US 70 (SEG IV – 8th St)	State	Widening to four-lane	NP
US 191	8th St – US 70	State	Upgrade to four lanes	NP
US 70	Hollywood Dr to Solomon	State	Widening to four-lanes with a continuous center left-turn lane	2011

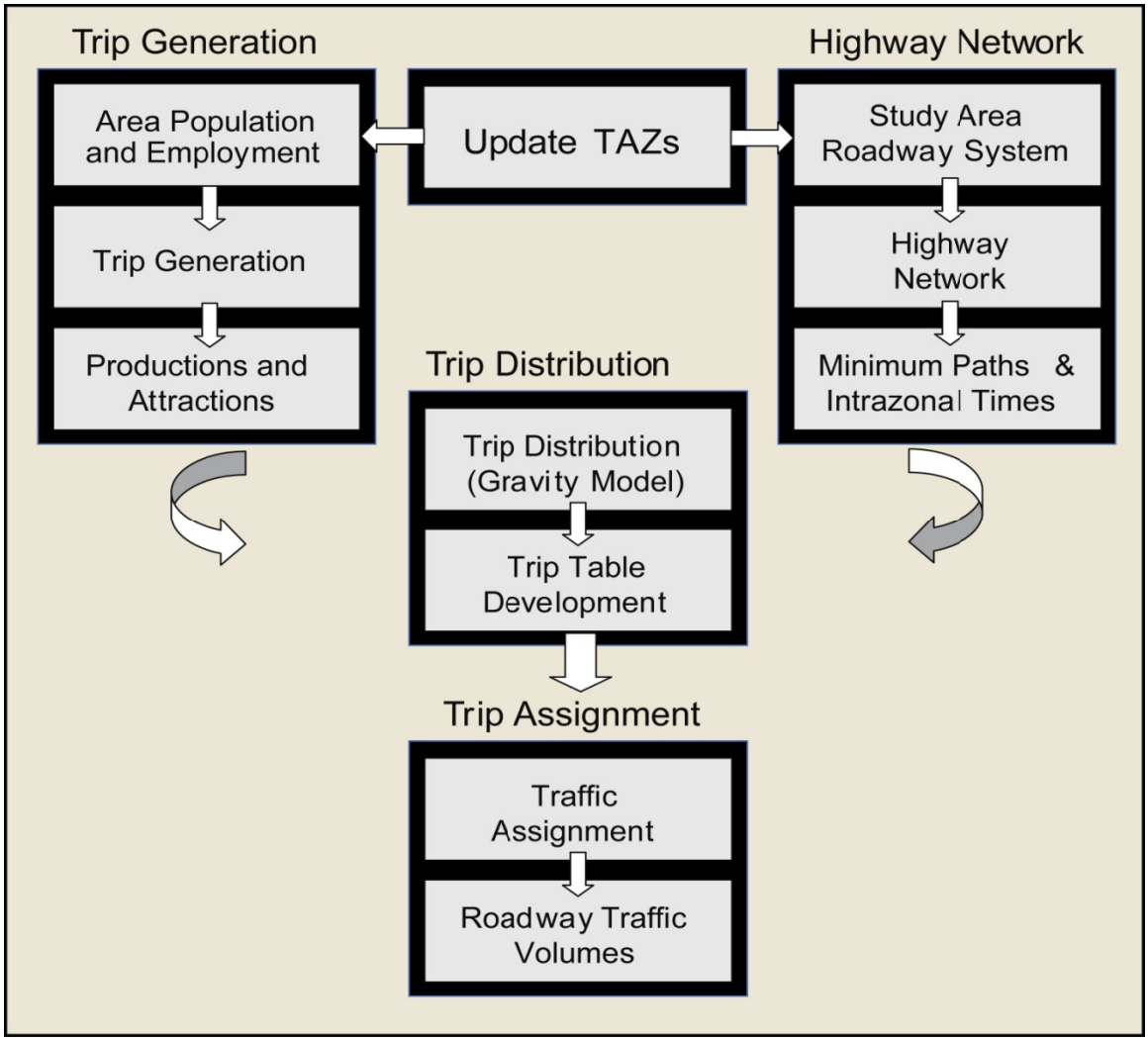
Source: ADOT and SouthEastern Arizona Governments Organization (SEAGO)

1.4.2 TRAVEL FORECASTING MODEL

The transportation modeling procedure involves a number of steps. Land use data and trip generation rates for the study area are complied and then used to calculate trip productions and attractions for each zone. Concurrently, the street system to be included in the model and the development of the highway network to represent the street system need to be identified. The network data includes the Traffic Analysis Zones (TAZs), street segment lengths, speed, and capacity. Using the street segment lengths and speeds in the network, the minimum time paths between zones are determined.

The productions and attractions for each zone and the minimum paths between zones are used as the inputs to the third set of tasks, the trip distribution and assignment process. Trip distribution is accomplished using a mathematical model. The most commonly used distribution model is the gravity model which assumes that the attraction of trips between zones is inversely proportional to the distance between zones. The result of the gravity model is a trip table matrix representing all trips distributed to/from each zone. These trips are then assigned to the street system, via the minimum paths (based on time) to produce traffic forecasts for the network. A graphical illustration of the modeling process is shown in Figure 1-20.

Figure 1-20: Travel Forecasting Modeling Process



Model Calibration

The demand models were created using Transportation Planning Plus (TP+) program, which is an integrated computer package for traffic forecasting process developed by Citilabs. TP+ provides a general framework for implementing a wide variety of travel demand forecasting processes encompassing simple 4-step models of trip generation, trip distribution, mode choice, and trip assignment for both highway and transit systems. In this study, the conventional four-step demand forecasting methodology was applied without the mode choice consideration.

Before the transportation model can be used to forecast traffic volumes, the model's representation of existing traffic conditions must be validated. The first step was to build the highway network into TP+ and to develop the existing land use data for each zone. Then, trip generation, distribution and assignment are performed using the modeling software. The result is a loaded highway network with computer-simulated volumes.

Trip generation rates developed for the study model, presented in Table 1-11, were initially derived from Graham County 1998 SATS with the adjustments made based on the small community characteristics and travel pattern as determined from the new model. Using those rates, the total number of trips generated in each internal zone calculated to identify the relative trip intensity of each of the zones.

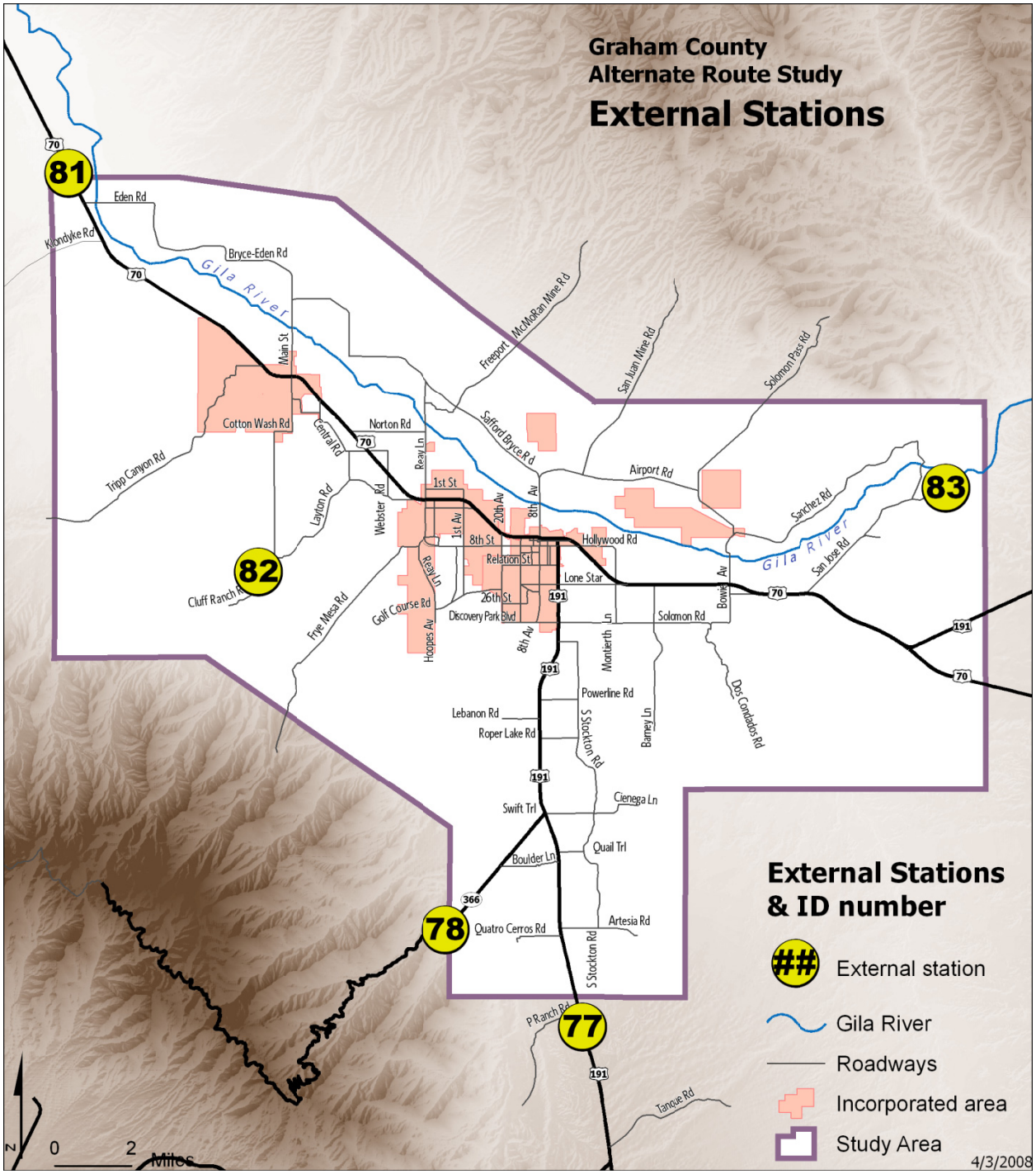
Table 1-9: Trip Generation Rates

Trip Rates	Home Based Work	Home Based Office	Non-Home Based
Dwelling Unit	1.48	3.85	1.09
Retail	5.2	16.12	4.68
Office	2.73	2.93	2.34
General	2.03	4.06	0.91

In addition to evaluating internal trips, trips generated by the external zones are estimated. External zones represent traffic entering and exiting the model area from outside the planning area. Traffic from external zones is distributed as through traffic to another external zone or as internal trips to an external TAZ. Based on the distribution of regional traffic, locations of major employment center (especially mining locations) around the area and previous studies, seven external zones were identified for this study. These external stations are located on west US 70, east US 70, US 191 south of Artesia Rd, US 191 east of the US 70/US191 split, SR 366 west of US 191, San Jose Sanchez Rd and Cluff Ranch Rd as shown in Figure 1-21.

The traffic assignment was accomplished using a capacity restrained process. The capacity restrained assignment is an effort to replicate the actual traffic condition based on the capacity of the streets. If the volume on a road reaches capacity, the path times are re-calculated and the traffic is then re-assigned to the shortest time path.

Figure 1-21: External Stations



Calibration Factors

The computer simulated volumes were compared to the existing traffic to determine how well the existing conditions were being simulated. A number of model parameters and factors can be adjusted to improve the simulation. This adjustment process is the calibration of the model. The factors which can be adjusted include the street segment speed and capacity, friction factors, and intrazonal trip times. The friction factors are used to define the effect that the distance between zones has on the relative attractiveness of trips between zones. The intrazonal trip times add time to the trip within a zone so that a certain percentage of trips must leave a zone to be satisfied.

Initially, coarse adjustments were made to the model to shift traffic and replicate travel patterns. An additional check was made of the overall traffic in the area using screenlines.

Screenlines

Another means of analyzing traffic movement in an area is by examining volumes across screenlines. A screenline is an imaginary line across which all the traffic flows can be counted and summed. This technique provides a convenient means for examining major travel trends and removes the discrepancies that are inherent in model generated volumes on individual street segments. The screenlines used for this analysis are shown in Figure 1-22.

In the calibration process, screenlines are used to verify the total amount of traffic on area streets. If the total simulated traffic volume across a screenline is lower (or higher) than the existing traffic volumes, then a percentage adjustment is made to the computer simulated volumes across the screenline. This percentage is then applied to adjust the individual forecasts. The comparison between existing and simulated volumes indicates that the model results are reasonable and that existing volumes are being replicated well. As shown in Table 1-12, the simulation volumes across all of the screenlines are within 10 percent of existing traffic counts.

Figure 1-22: Screen Lines

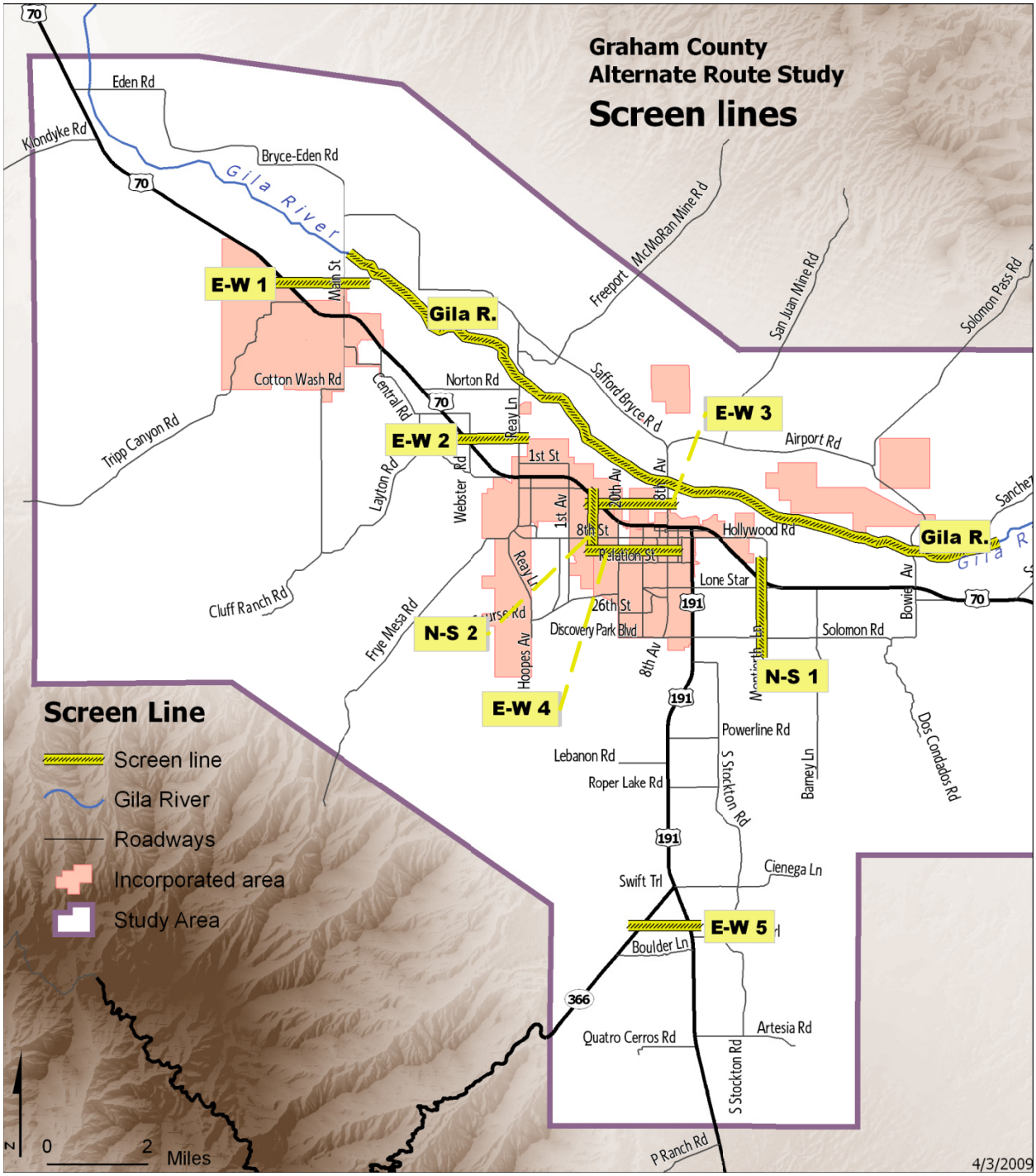


Table 1-10: Screenline Comparisons Existing Vs. Model

Screenline	Existing Daily Volumes	Model Daily Volumes	Model/Existing
Gila River	5,567	5,421	0.97
E-W 1	4,632	4,285	0.93
E-W 2	9,812	9,494	0.97
E-W 3	21,288	22,319	1.05
E-W 4	28,174	28,626	1.02
E-W 5	2,919	2,876	0.99
N-S 1	10,337	9,685	0.94
N-S 2	21,810	23,179	1.06

1.4.3 TRAVEL FORECASTS

With the travel forecasting model properly calibrated, traffic forecasts can be developed for the future horizon years to be analyzed. The early horizon year 2020 and final horizon year of 2040 were both modeled for this study, and the interim year 2030 was interpolated based on the results for the early and final horizon years. The model inputs for the future conditions were based on the projected population and employment data, and the planned street system as previously described. In addition, traffic at the external zones was increased to account for growth outside the study area. The volumes at the external zones were generally increased by 27% by the year 2020 and 88% by the year 2040 in accordance with the historical traffic growth from the Arizona Department of Transportation at those areas.

The daily forecast volumes for the horizon years of 2020, 2030, and 2040 are shown in Figure 1-25 through Figure 1-30. The forecasts were derived from the model outputs and adjusted where appropriate. The adjustments were made to account for known estimation errors in the model and remove discontinuities in model-generated numbers.

The most heavily utilized roadways in the study area are along US 70 within Safford and Thatcher, and along US 191 leading up to Safford. In the year 2020, daily traffic volume along US 70 and US 191 within incorporated areas will be near 30,000. By the year 2030, daily traffic volumes along US 191 will exceed 30,000 extending past SR 366 and 20,000 outside of city limits. While 2040 will not see growth as dramatic as the previous decade, the same high traffic volume segments will continue to see increases.

1.4.4 OPERATING CONDITIONS

A review of future traffic conditions involved the analysis of projected roadway segments traffic operations. The results of the analysis are expressed in terms of Level of Service (LOS) as previously described in Section 1.3.6.

To examine the operating conditions of arterial street segments, the daily traffic volumes are compared to LOS D threshold volumes for various types of roadway. The Level of Service is dependent on roadway classifications, with urban roads reaching capacity at lower volumes than rural roadways. Based on roadway classification standards, if capacity is exceeded on a roadway, travel speed will be greatly reduced and the ability to pass will be restricted. The current Level of Service standards are based on current classifications, which may become obsolete as the area becomes more developed and employment and population increases.

Figure 1-23: Expected Number of Lanes 2040

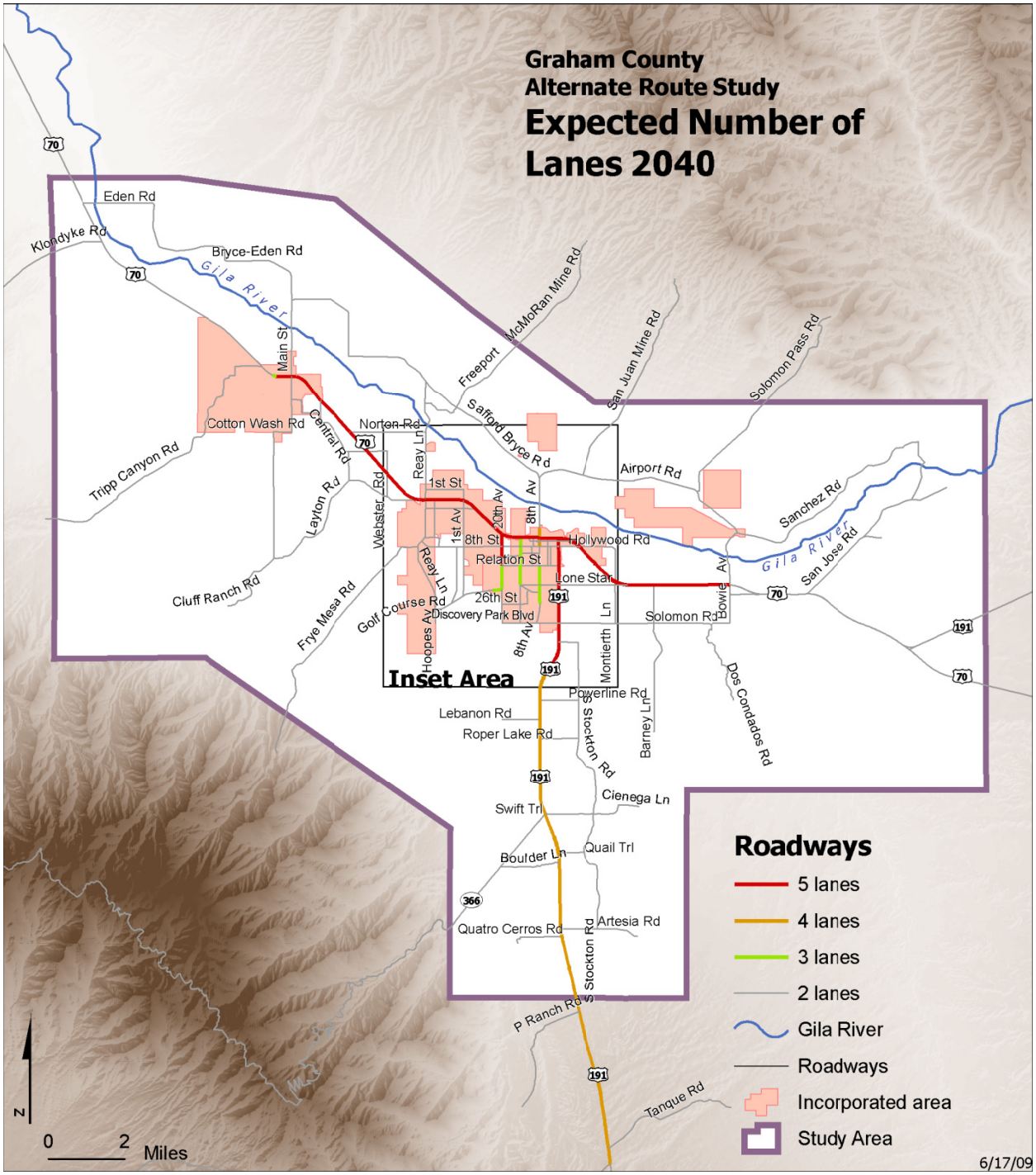


Figure 1-24: Safford/Thatcher Area Expected Number of Lanes 2040

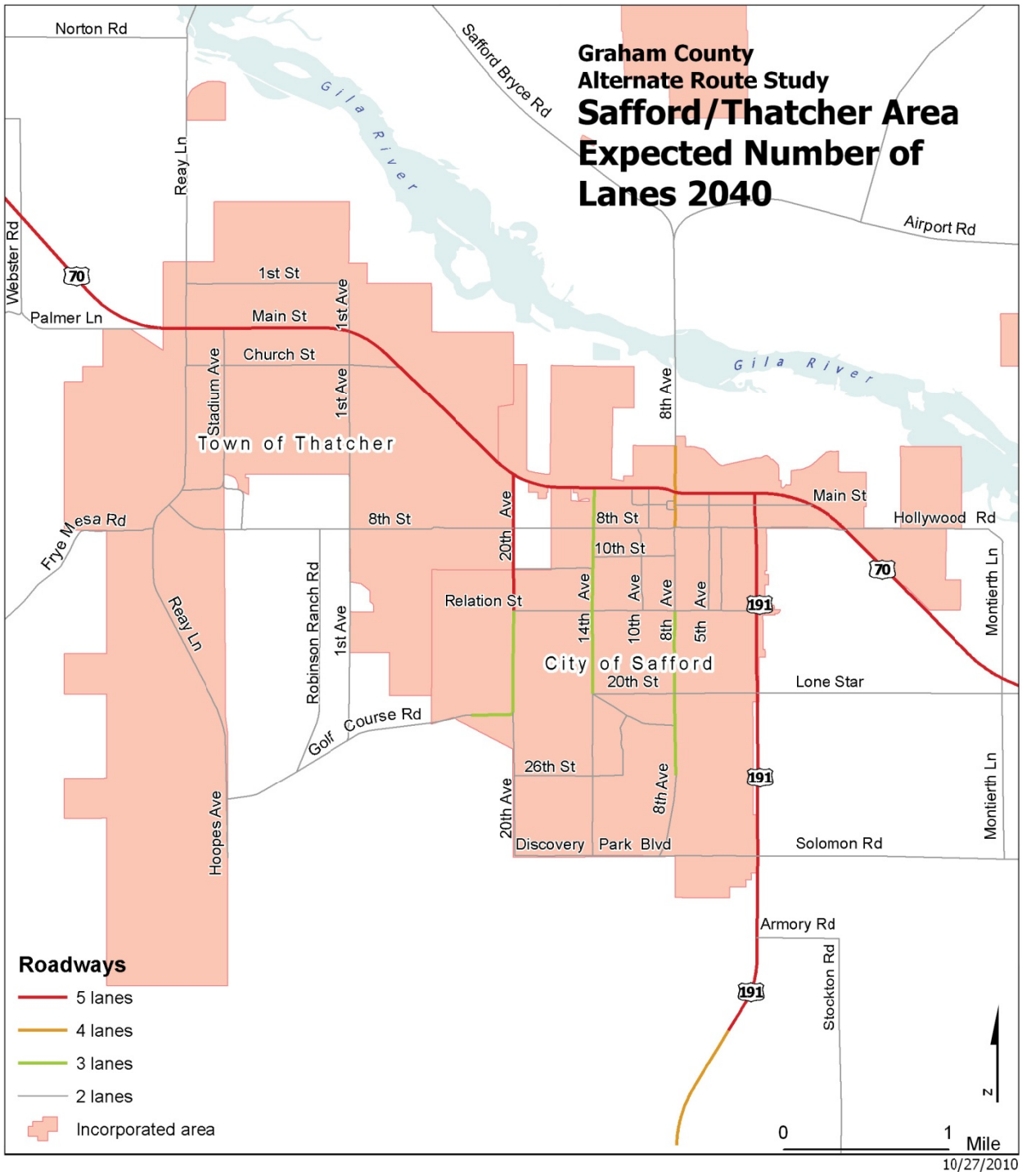


Figure 1-25 through Figure 1-30, illustrates the Level of Service on the planned street system for the future horizon years. The existing LOS results show that most of the study area roadways are operating at acceptable levels of services in the current year 2007. The following street segments are currently operating at or over capacity:

- 8th St between 20th Avenue and 14th Ave
- 8th Ave between 10th Street and 8th Street
- US Route 191 between 11th Street and US Route 70
- US Route 70 between Barney Lane and Bowie Avenue

Until 2014, the roadway number of lanes in the study area remains the same as the existing condition. In 2014 or 2015, it is anticipated by the traffic model that US Route 70 between Hollywood Road and Lone Star Road will be widened to a 4-lane roadway with a center left turn lane. By year 2020, it is anticipated by the traffic model that US Route 191 south of Armory Road to SR 266 will be widened to a four lane divided highway, although the actual northern terminus of improvements will not be determined until completion of the US 191 Design Concept Report and the Graham County Alternate Route Study.

By the year 2020, the principal arterial roads in Safford and Thatcher, which US 70 and US 191 operate as, will be over capacity in much of the city center area. US 191, at the intersection of US 70 will also be over capacity. The widened US191 on the south of Armory Road will provide additional capacity for the increased traffic. Other segments expected to be at capacity include Relations St, 20th Ave, and 8th St. With the almost fully completion of the Sierra Del Sol development, Artesia Road would experience LOS E.

In 2030, the segment of US 70 is anticipated to be at LOS E between Bowie Ave and San Jose Road. Although the model assumes that US 191 south of Armory Road to SR 266 has been widened to a 4-lane divided highway, the increased capacity seems inadequate for most segments north of Artesia Rd. More segments on the previous congested arterials and urban collectors would be at LOS E or F. Stockton Road will share the traffic from US191 to the south, which will expect LOS E or F between Quail Trail and Artesia Rd.

The assumed improvements that will be completed by 2040 are shown in the number of lanes as shown in Figure 1-23 & 1-24. By 2040, most segments on collector and minor arterial streets within Safford will be operating at LOS E or F. East of Safford downtown area, US 70 between Bowie Ave and US 70/US 191 Split will experience LOS E. LOS F is expected on US 191 almost the entire corridor within the study area.

Figure 1-25: Study Area 2020 Operating Conditions

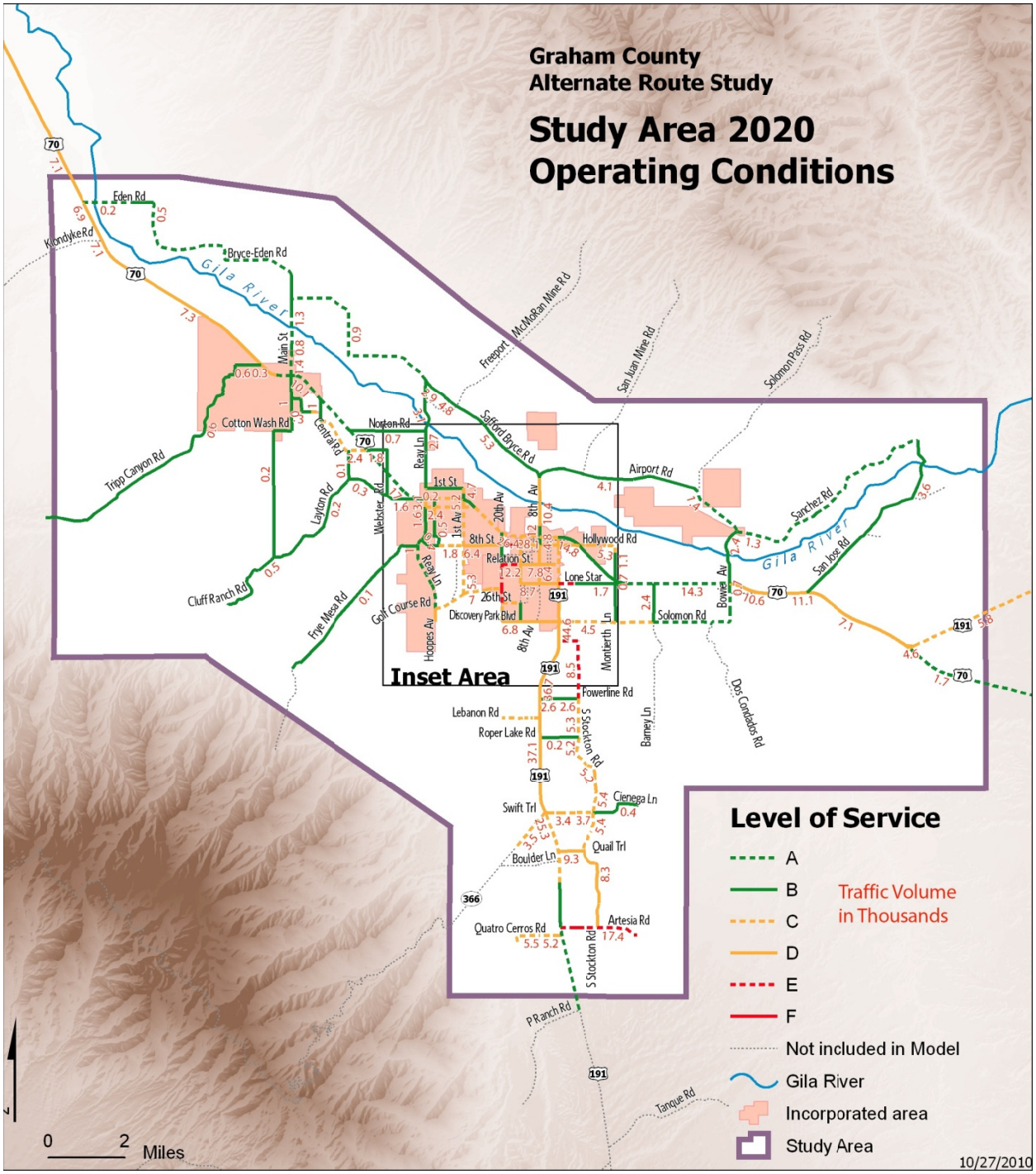


Figure 1-26: Safford/Thatcher Area 2020 Operating Conditions

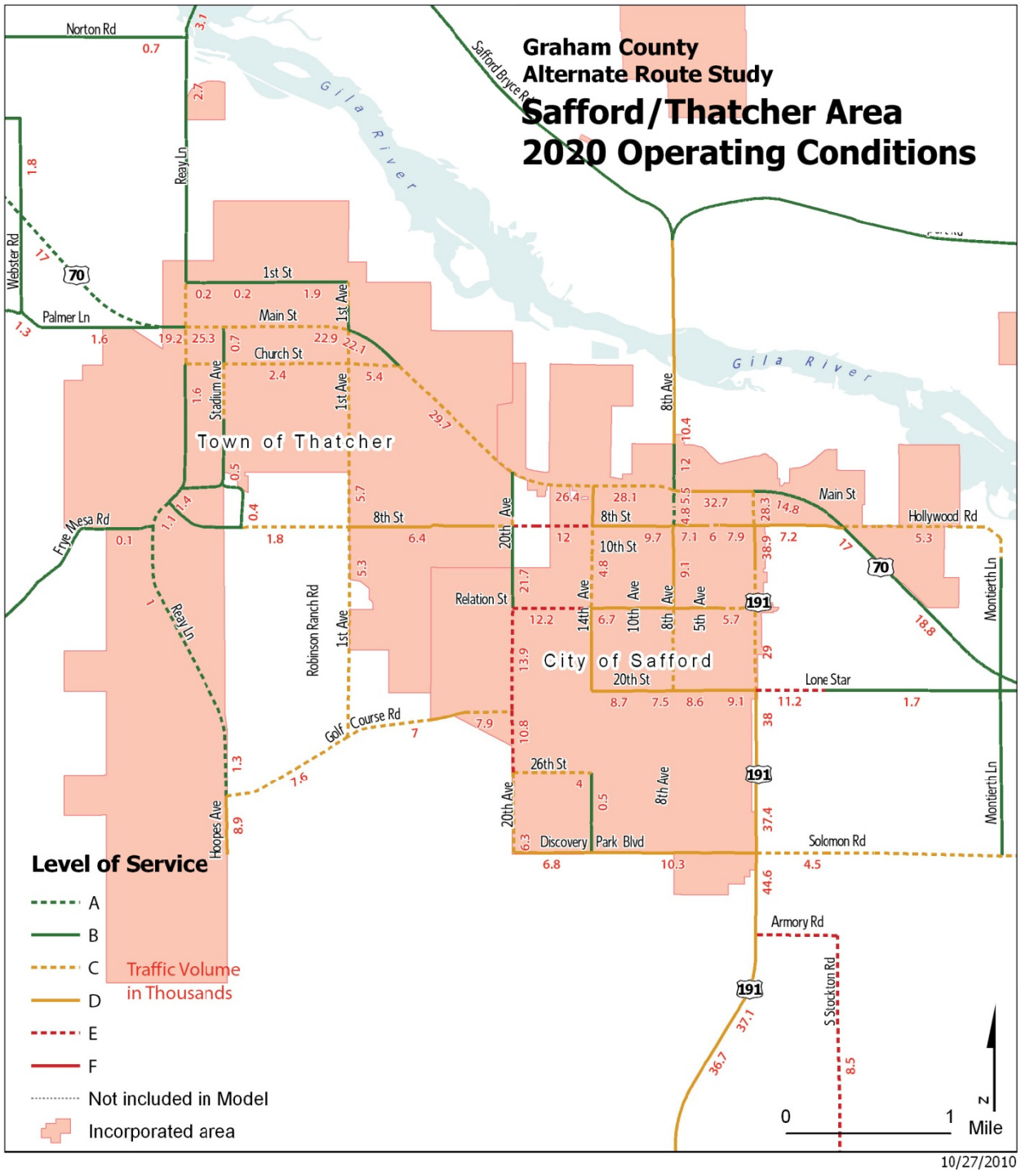


Figure 1-27: Study Area 2030 Operating Conditions

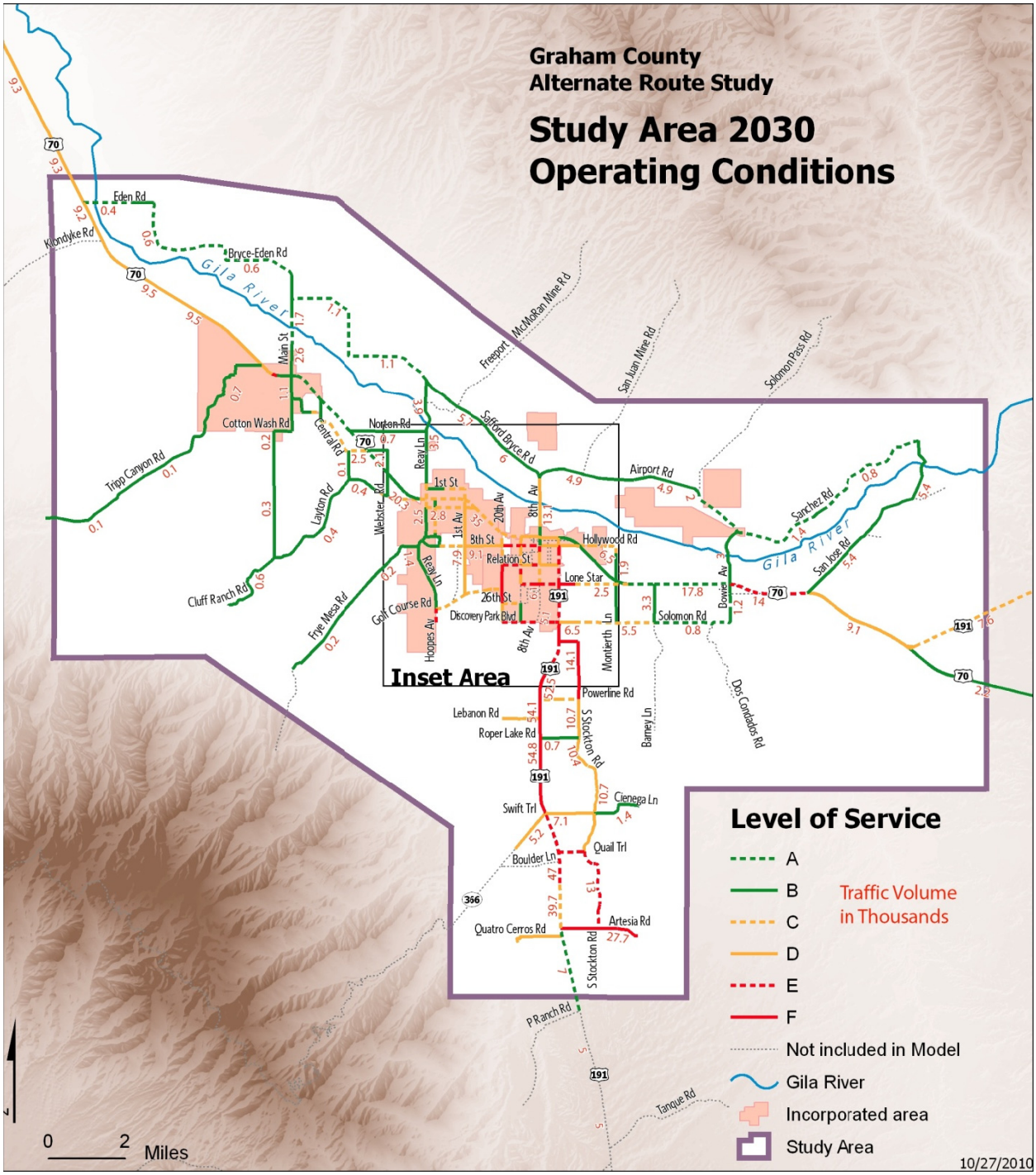


Figure 1-28: Safford/Thatcher Area 2030 Operating Conditions

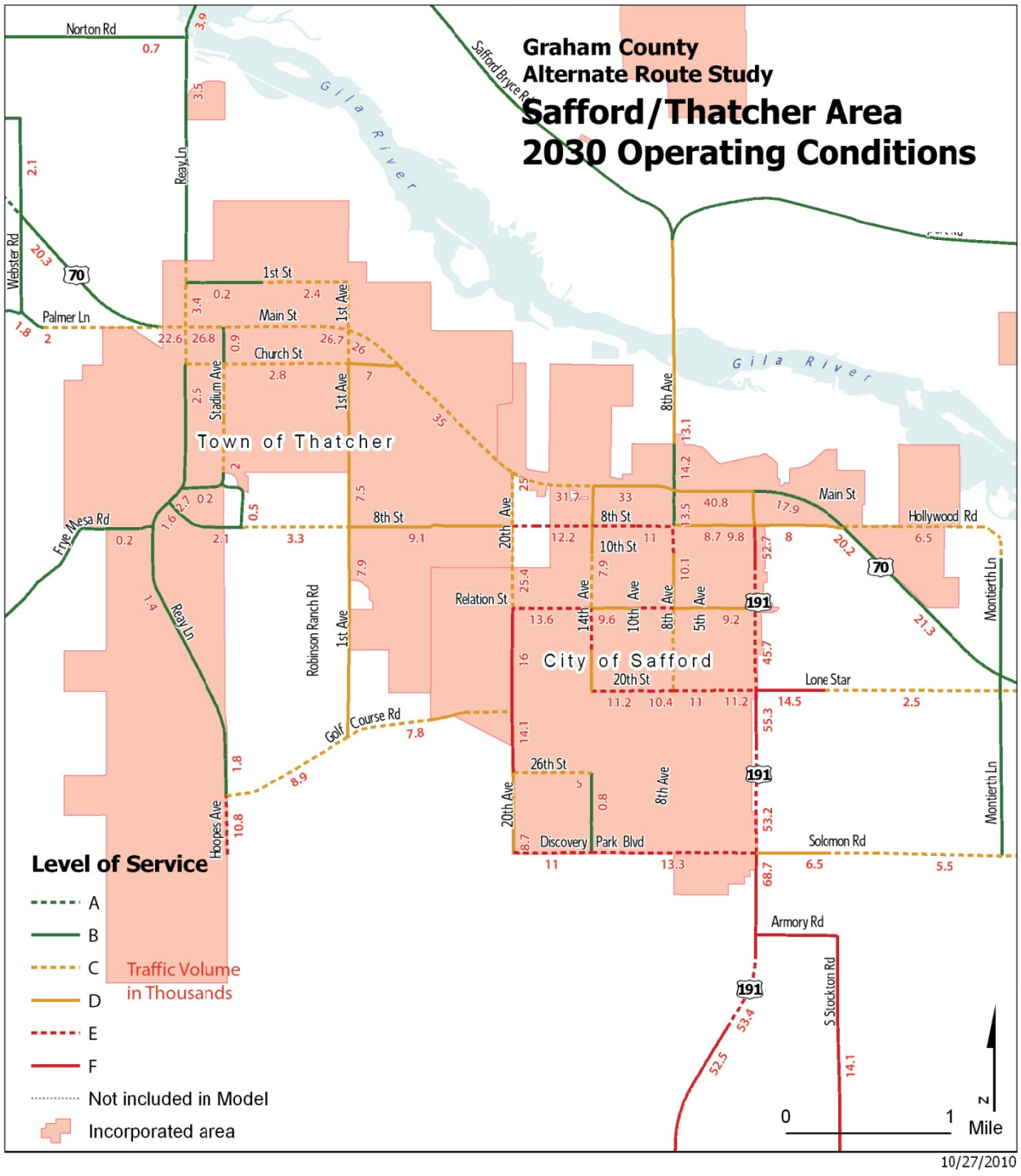


Figure 1-29: Study Area 2040 Operating Conditions

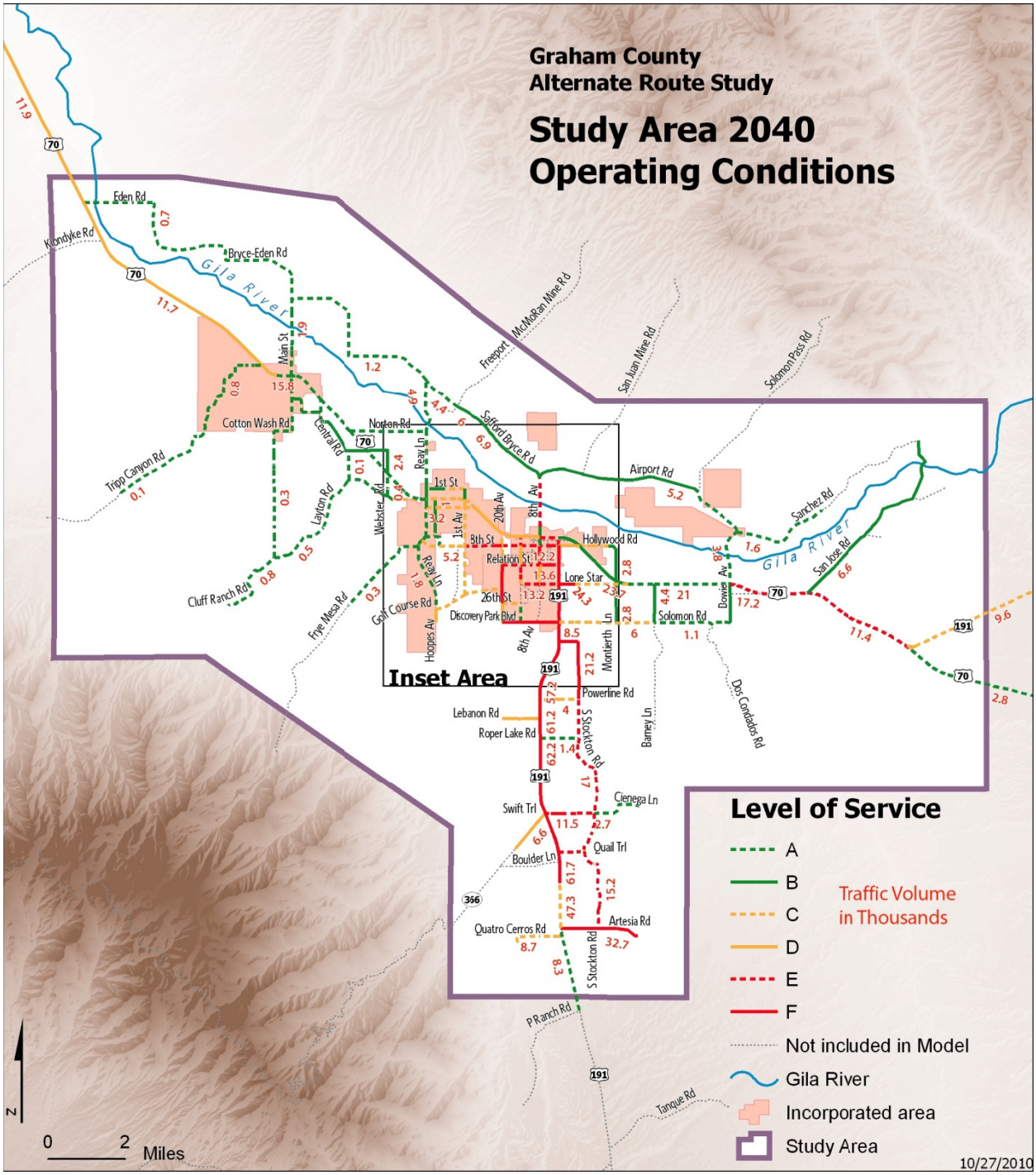
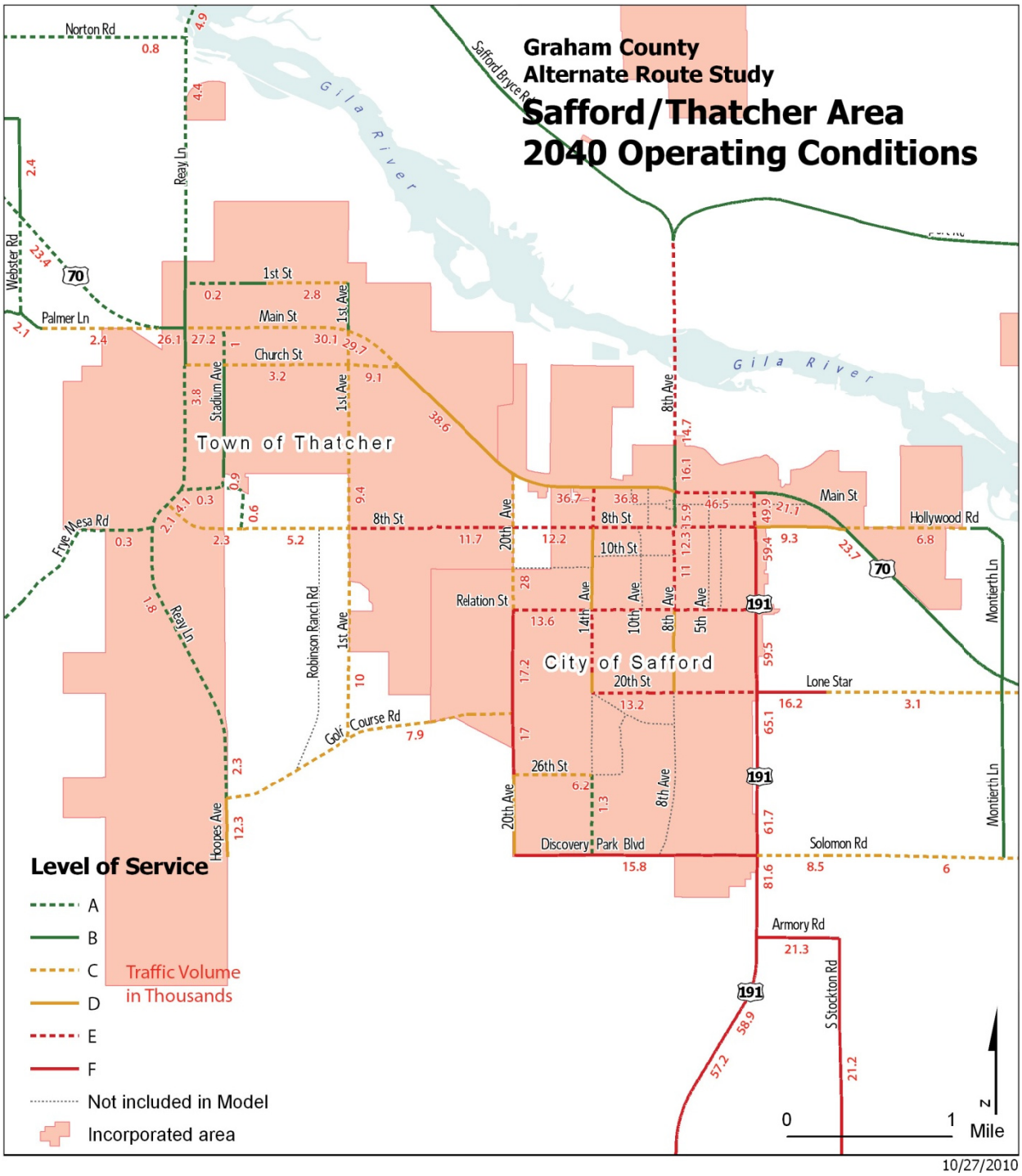


Figure 1-30: Safford/Thatcher Area 2040 Operating Conditions



2 DETERMINATION OF NEED AND FEASIBILITY

2.1 DETERMINATION OF NEED FOR A NEW ALTERNATE ROUTE CORRIDOR

2.1.1 NEED CRITERIA

In order to determine the need for a new alternate route corridor within the project study area, a number of criteria must be evaluated for current and future conditions. The need for a connector corridor can be identified when a compilation of the characteristics evaluated identify benefits to the study area due to the corridor. The following characteristics have been analyzed within the study area to determine the need for the new connector corridor: capacity and level of service, existing intersection capacity, environmental concerns, high truck percentages, state highway access control management, and safety. Each of these characteristics are generally described and evaluated in the following sections.

Capacity and Level of Service

The existing and future level of service analysis completed in Section 1 identified segments of US 70 and US 191 operating at a LOS of E, which is worse than the LOS D goal. The development of this analysis was for the No Build condition, assuming that an alternate route corridor was not developed within the study area. Based on standard engineering practices a LOS of E or F is considered deficient. This creates a need for providing congestion relief for several segments of US 70 and US 191, possibly in the form of an alternate route corridor.

Existing Intersection Capacity

Using the future traffic model and turning movement counts previously collected, the existing US 70/US 191 intersection level of service was analyzed for capacity. It was determined that this intersection in Safford is a constriction point for traffic flow along US 70 and US 191 due to inadequate capacity available to handle future traffic volumes. Capacity analysis for this intersection with future traffic volumes has identified the need for diverting the high northbound to eastbound traffic and the eastbound to southbound traffic.

Environmental Concerns

Within the city limits there are several properties and characteristics that can be related as environmental concerns. Increasing traffic volume creates environmental concerns, such as noise

and air pollution. Other concerns are related to the proximity of historical properties and the constraints they place on the existing roadway facilities. These historical properties are located near the US 70/US 191 intersection in downtown Safford. By developing an alternate route corridor, some of these concerns can be mitigated.

High Truck Percentages

There is a large portion of truck traffic that travels through the Safford-Thatcher area servicing the copper mines in the area. This traffic can be considered inconsistent with downtown characteristics of the area and is hazardous in nature due to the size of vehicles and types of loads they carry. The development of an alternate route corridor would generally provide a bypass opportunity for the truck traffic, and particularly for the truck traffic continuing to the Clifton/Morenci area from I-10.

State Highway Access Management

The ADOT access management policies create a vision for developing controlled access facilities by development of Access Management Plans. This strategy allows ADOT to manage and maintain regionally significant highway facilities rather than portions of a local arterial street system. US 70 and US 191 currently act as significant arterial streets within the Safford-Thatcher city area, with minimal access control characteristics. The development of an alternate route corridor with controlled access policies will provide an access controlled facility serving regional traffic and allow ADOT to turn back portions of the US 70 and US 191 facilities to the local agencies.

Provide Development Opportunity

The addition of a new facility through the currently undeveloped lands will provide new development opportunities at each of the potential traffic intersections or interchanges along the proposed corridor. There will also be an opportunity to develop along the crossroad connections as the existing local street system is extended to the new alternate route corridor.

Detour Route for I-10

Historically once or twice a year, a significant dust storm forces the closure of I-10 between Willcox and the Stateline. When these closures occur, the interstate traffic is detoured through Safford along US 191 and US 70. By developing the alternate route corridor as a controlled access facility, the interstate traffic would not have to affect the Safford and Thatcher downtown areas, as well as decrease the travel time through the study area.

Safety

Currently, there are numerous intersections, driveways and conflict points existing along the US 70 and US 191. These conflict points increase the potential for accidents and by developing an alternate route corridor with controlled access characteristics, the general safety of the region can be improved.

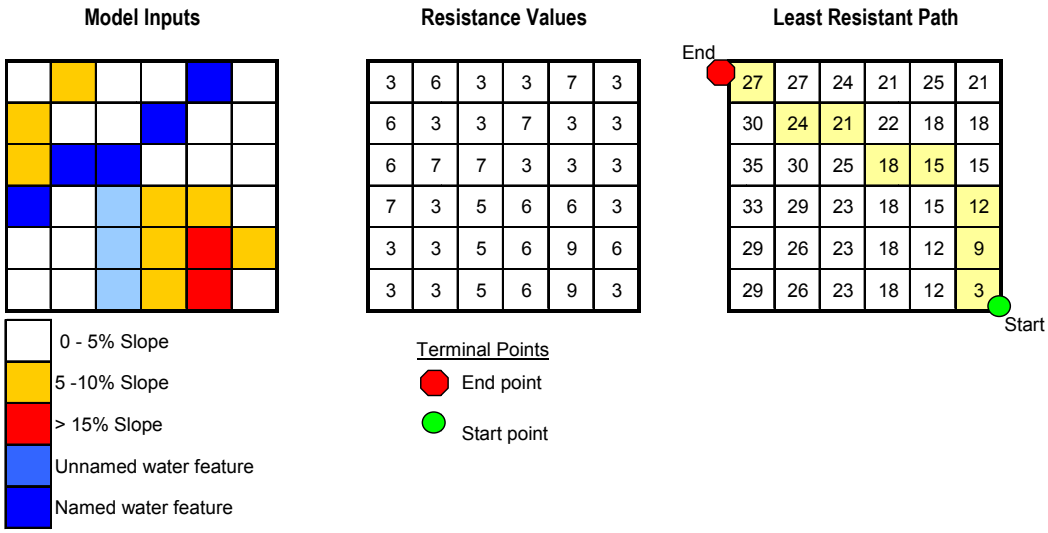
2.2 IDENTIFY POTENTIAL CORRIDOR ALTERNATIVES

2.2.1 DESCRIPTION OF RESISTANCE MODEL

Potential corridor alternatives have been developed using a resistance model developed using spatial analysis tools in a geographic information system (GIS). The resistance model evaluates the study area through a collective account of environmental characteristics. Inputs to the model include land ownership/property control, ground slope and hydrology. Model outputs provide conceptual corridors, which may be suitable for further study as a corridor alternative.

The specifics of how the resistance model works can best be described by assuming that the study area is split into thousands of pixels. For each criteria selected the pixels are assigned a weight. For instance, pixels in a steep slope area can be given a higher weighting (on a scale of 1 to 10) than pixels in flat areas. The weighting process is repeated for all of the criteria discussed in Section 2.2.2.

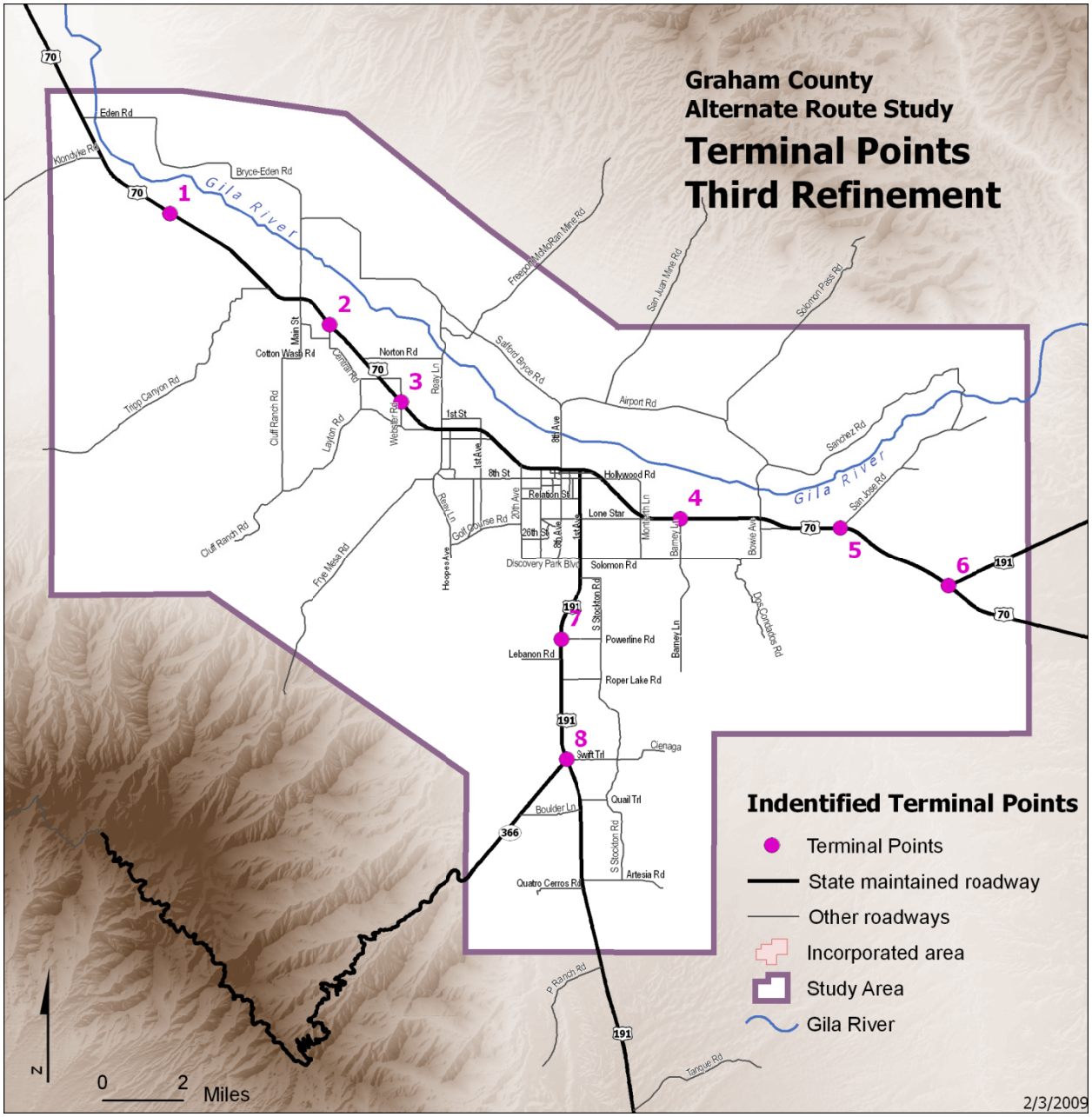
Figure 2-1: Resistance Model Graphic



In addition to weighting the pixels, the terminal points for the corridor alternative must be identified along the existing state routes. These points represent locations along the existing roads that may be conducive for connecting the corridor alternatives to the existing system. The terminal points selected are shown in Figure 2-2.

Once all of the pixels are weighted and the terminal points are identified, total points are calculated as the corridor alternative traverses from one terminal point to another terminal point. The model software connects the terminal points selected by linking the pixels with the lowest values, or least resistance.

Figure 2-2: Terminal Points



2.2.2 CRITERIA FOR RESISTANCE MODEL

Three primary criteria have been selected to be included in the Resistance Model evaluation; they are Land Ownership/Property Control, Ground Slope and Hydrology. Primary criteria impose the greatest constraints to constructability. A scale factor on a scale of 1 to 10 with 1 being low resistance (minimal conflict/cost) and 10 being high resistance (high conflict/cost) has been preliminarily selected for the initial runs of the model. Secondary criteria included in the model include earthen dams and existing bridges. These secondary criteria allow the model to consider avoiding conflicts with dams and selecting existing Gila River crossings when optimal.

Input from the TAC members has been solicited to confirm and/or adjust the weighting of the criteria currently selected, as well as the addition of any other criteria that may be considered important to the study team.

Ground Slope

The existing topography within the study area ranges from the steep slopes of the Mount Graham foothills, to the flat agricultural areas of the valley floor.

As shown in the Source Values exhibit on Figure 2-3, the existing slopes vary from flat at 0% to steep at 26%. As a function of the Resistance Model development, the following ranges and weightings have been assumed:

- Greater than 10% slope = 9 points
- 5% to 10% slope = 6 points
- Less than 5% slope = 3 points

The graphical representation of these points is shown in the Analysis Values exhibit on Figure 2-4.

By evaluating the ground slope criteria, the corridor alternatives can be developed to avoid the extreme slopes, which increase construction costs and decrease the development potential alongside the corridor. The criteria will also help to preserve public interest by preserving natural foothills and character within the study area.

Hydrology

The existing water and hydrology features within the study area consist of rivers, streams, creeks, washes, canals, water bodies and wetland areas.

As shown in the Source Values exhibit on Figure 2-5, the existing hydrologic features can be categorized into wetland areas, lakes and reservoirs, and named and unnamed rivers, streams, washes, canals, ditches, and pipelines. As a function of the Resistance Model development, the following ranges and weightings have been assumed:

- Water body protection = 5 points – this category has been subdivided by the size of the water body in an attempt to create a variable buffer and protection area.
    - Less than 2 acres = 100 ft buffer dimension
    - 2-5 acres = 200 ft buffer dimension
    - Greater than 5 acres = 500 ft buffer dimension
- Wetlands area protection = 5 points
- Named River/Stream/Wash/Canal/Ditch/Pipeline = 4 points
- Unnamed River/Stream/Wash/Canal/Ditch/Pipeline = 2 points

The graphical representation of these points is shown in the Analysis Values exhibit on Figure 2-6.

By evaluating the hydrology criteria, the corridor alternatives can be developed to avoid the water bodies and riparian areas, as well as minimize the number of river, stream, creek, wash, canal, and ditch crossings along a corridor. The criteria will help to minimize environmental concerns by avoiding areas commonly known as areas of concern, as well as providing an opportunity for cost savings by minimizing drainage crossings.

Land Ownership/Property Control

The type of existing land ownership and agencies responsible for the property control varies throughout the study area. Significant property is managed by agencies, such as State Trust Land, Bureau of Land Management, Coronado National Forest, Arizona Game and Fish, and Military Reservation, with the remaining lands being privately owned. As a note, the military reservation shown on the exhibits has been provided by the State Lands, based on Executive Order 4786 from President Calvin Coolidge on December 17, 1927 declaring the property for use of the National Guard of Arizona as a rifle range.

As shown in the Source Values exhibit on Figure 2-7, the existing land ownership and property control limits are shown. As a function of the Resistance Model development, the following ranges and weightings have been assumed:

- Arizona Game and Fish Areas = 10 points
- Military Reservation = 10 points
- Coronado National Forest Property = 10 points

- Currently Developed Private Lands = 10 points
- Planned Development of Private Lands = 5 points
- Undeveloped Private Lands = 1 points
- State Trust Land = 1 points
- Bureau of Land Management Land = 1 points

The graphical representation of these points is shown in the Analysis Values exhibit on Figure 2-8.

By evaluating the land ownership and property control, the corridor alternatives can be developed to seek the more cost effective right-of-way corridors when evaluating the cost of purchasing the right-of-way. The evaluation of this ownership information will also help to identify areas along the corridor alternatives, which can provide the best opportunities for future development of the agency lands without dramatically affecting the existing development areas.

Figure 2-3: Ground Slope Analysis- Source Values

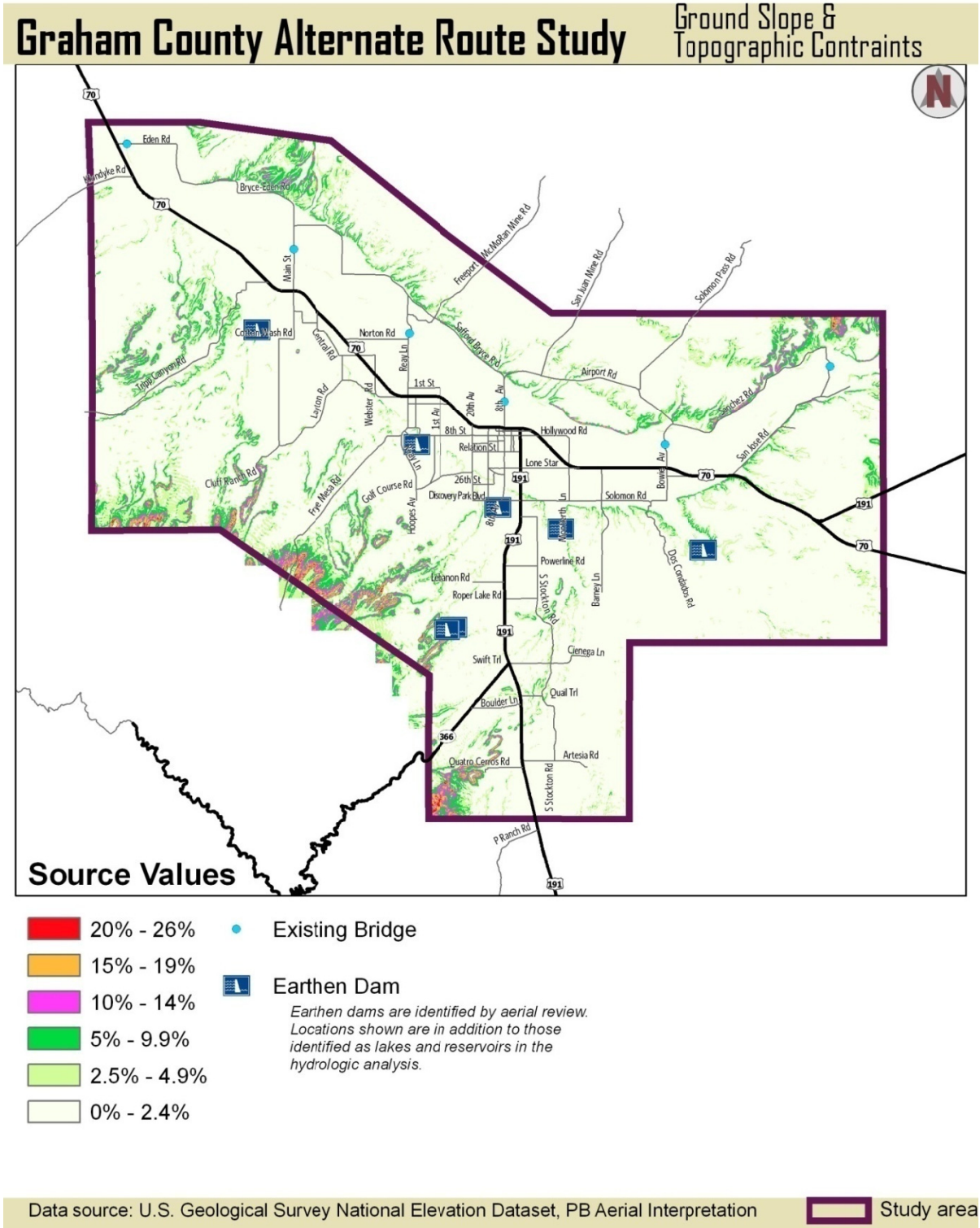


Figure 2-4: Ground Slope Analysis- Values Used In Model

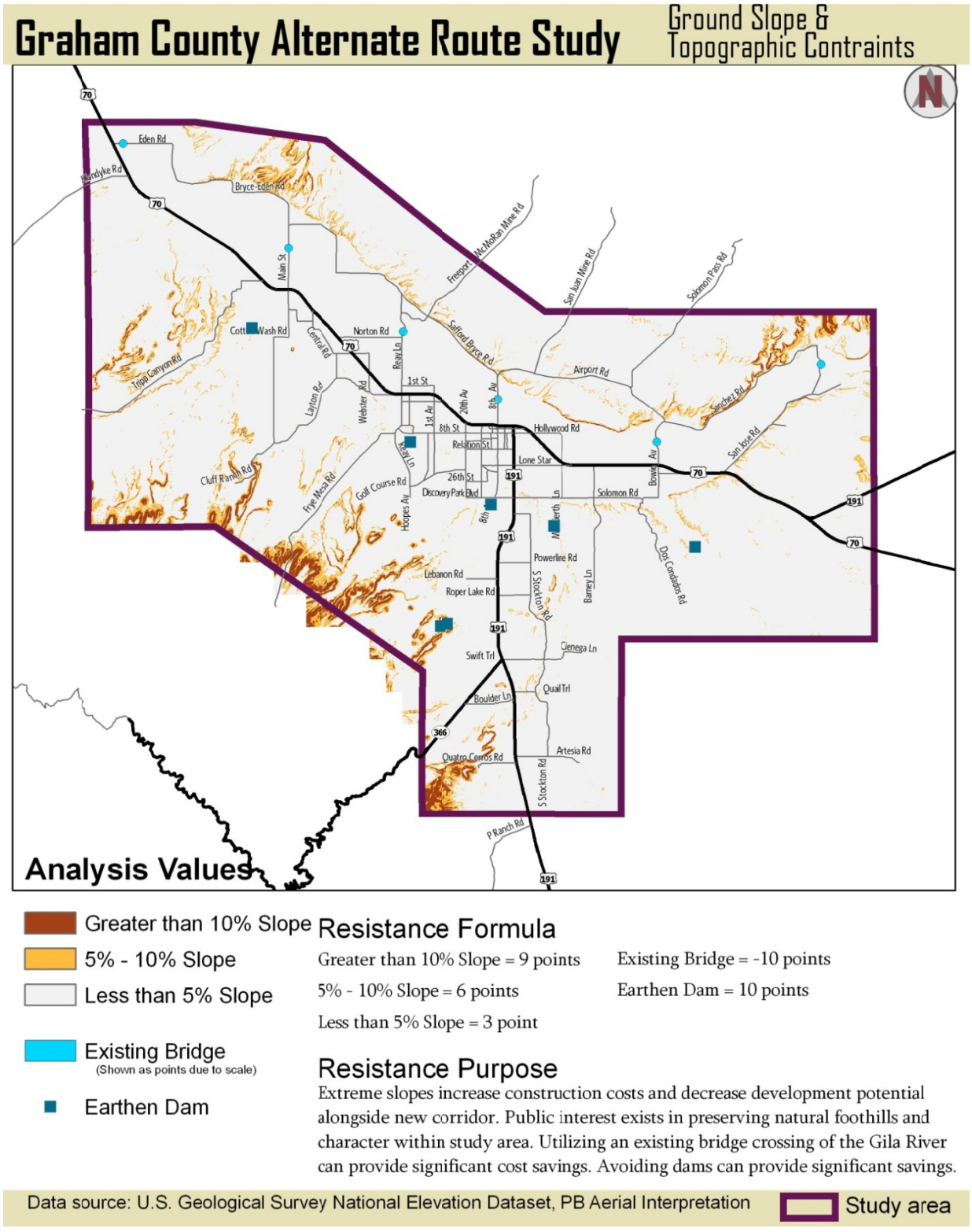


Figure 2-5: Hydrology Analysis- Source Values

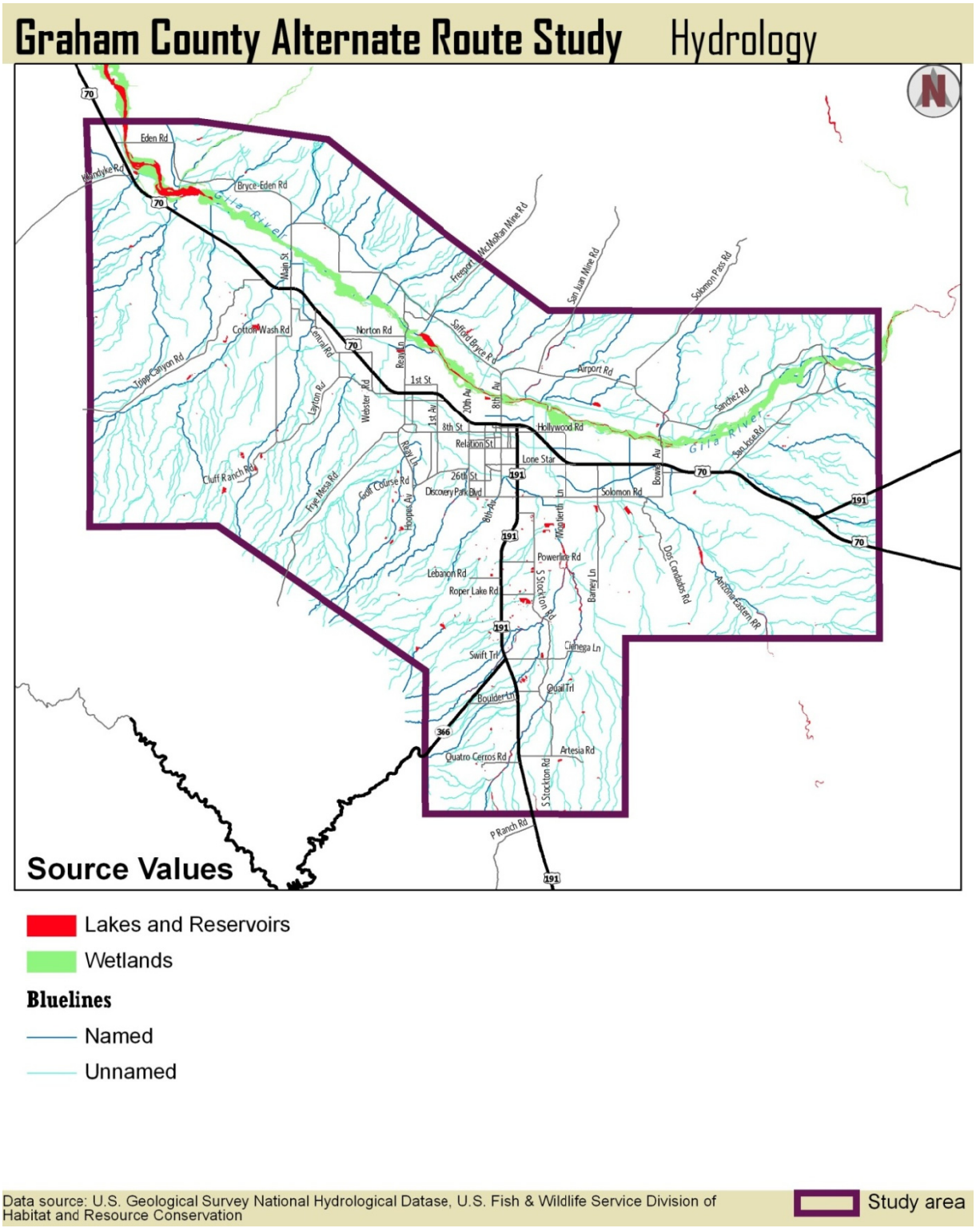


Figure 2-6: Hydrology Analysis- Values Used In Model

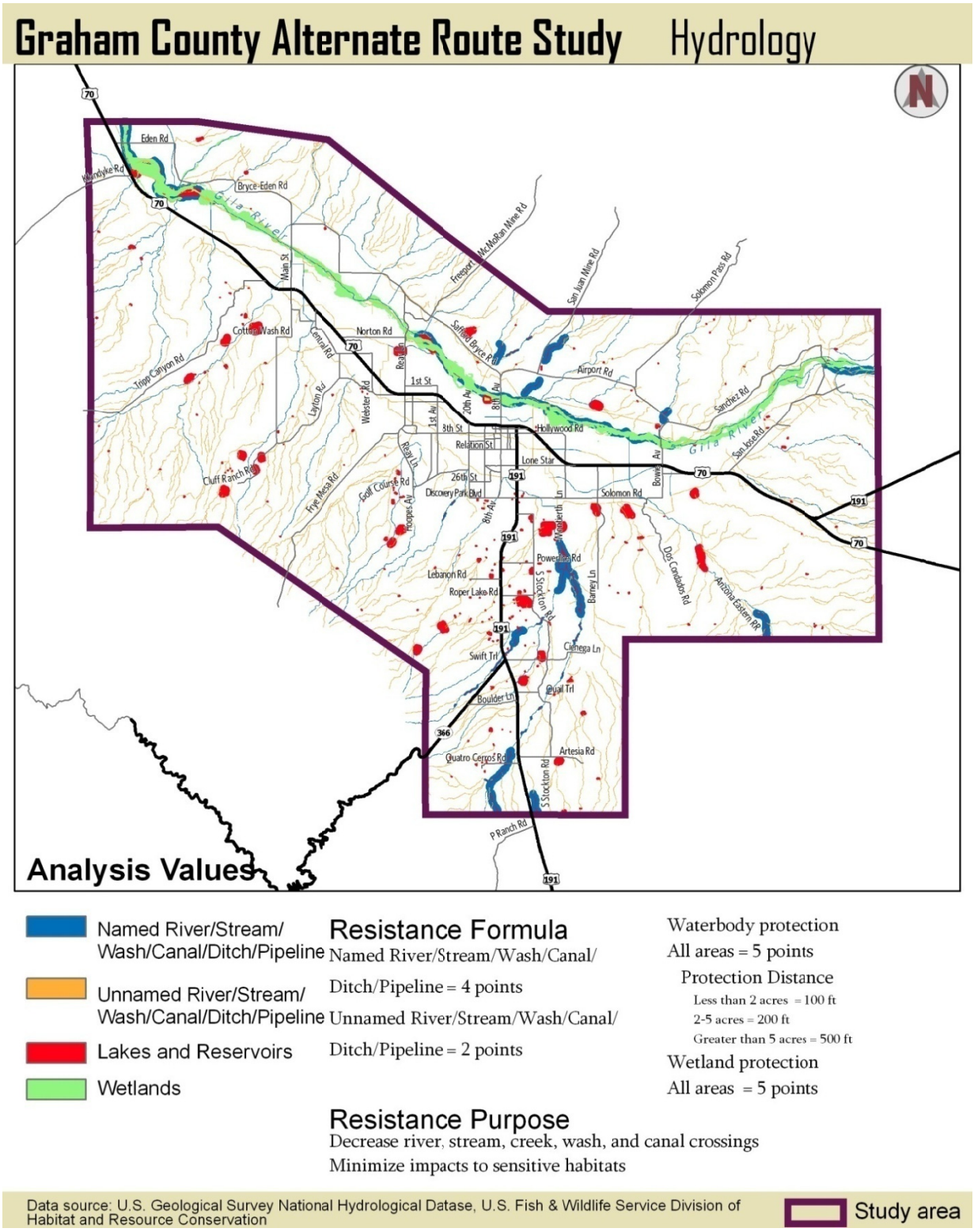


Figure 2-7: Land Ownership Analysis- Source Values

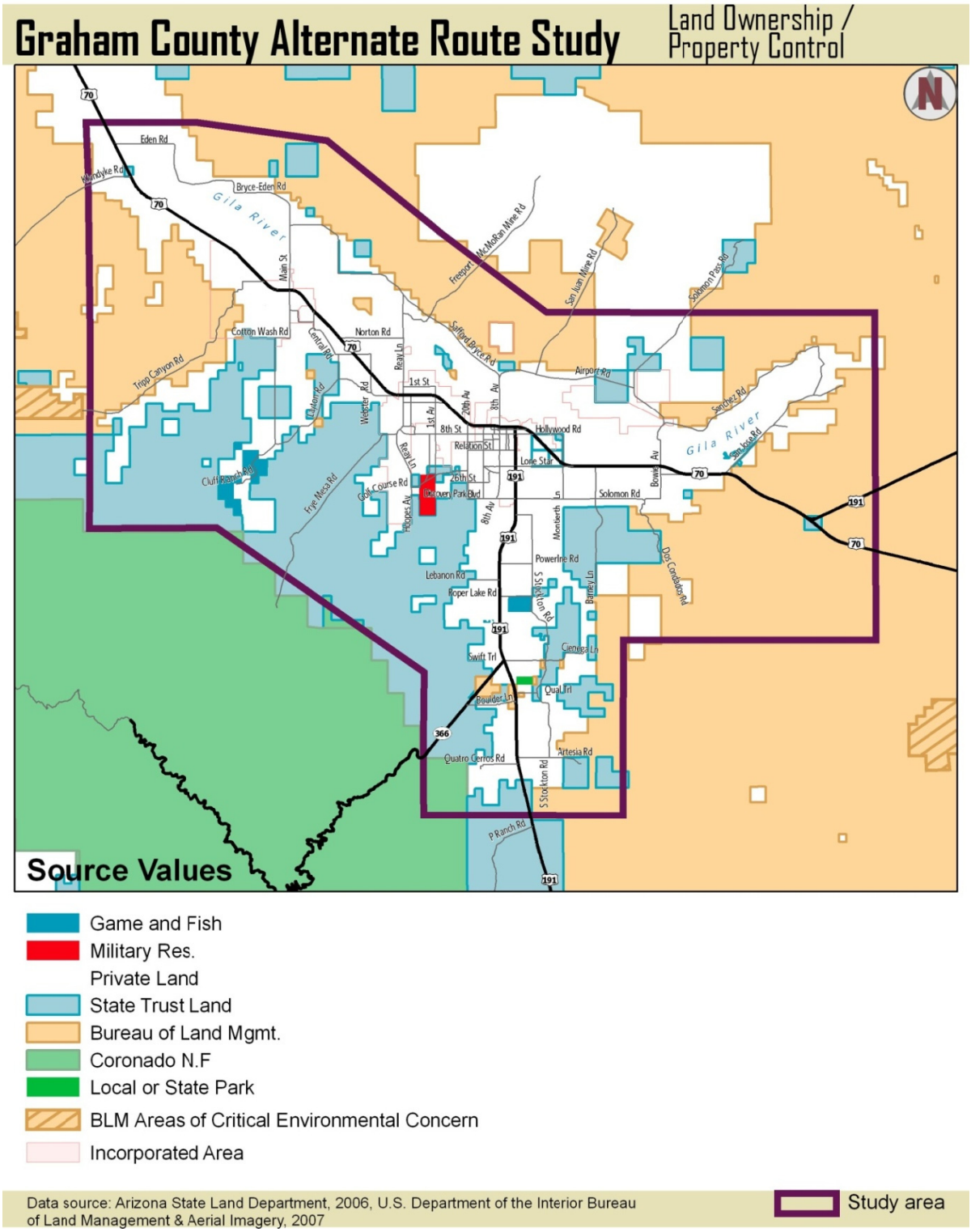
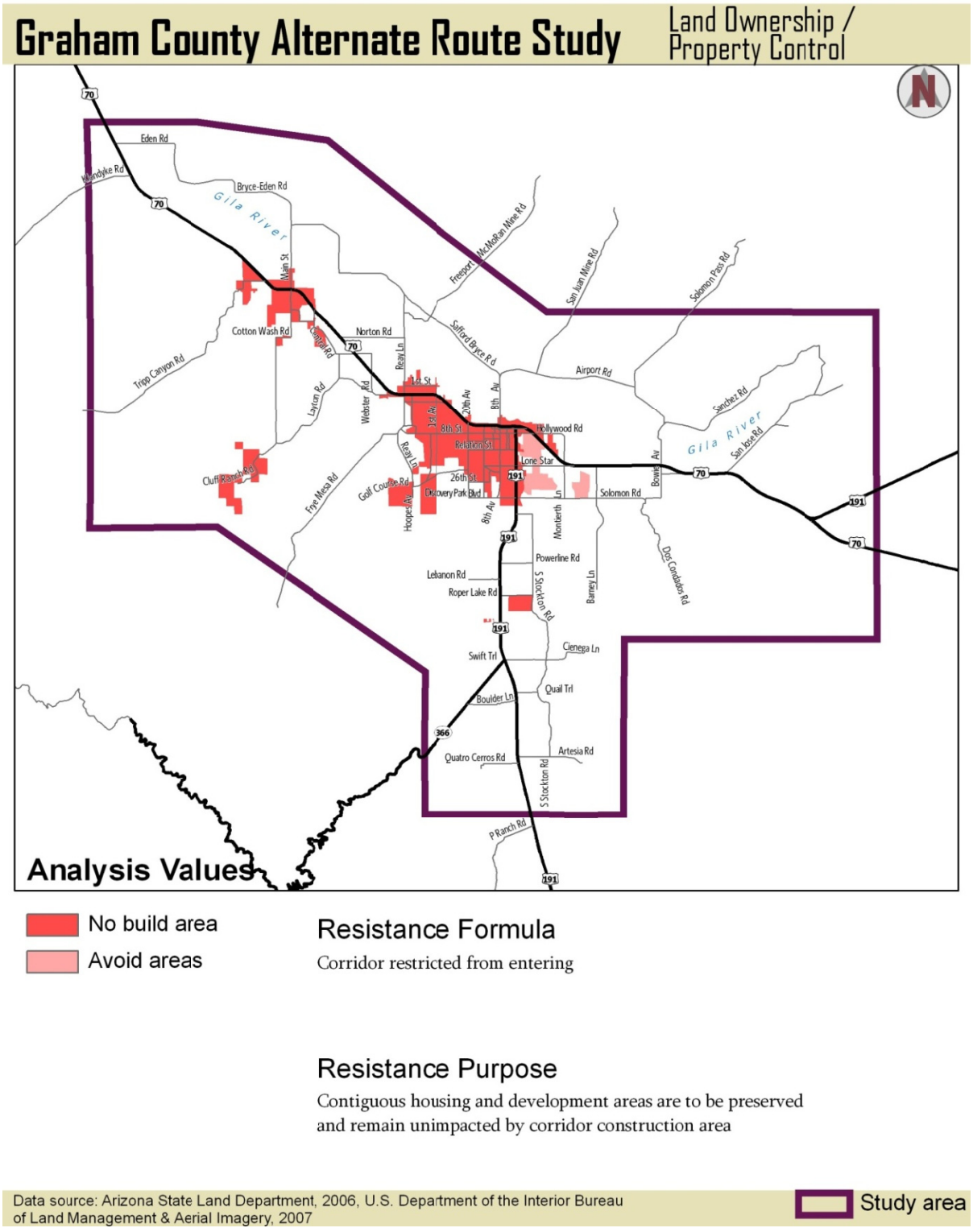


Figure 2-8: Land Ownership Analysis- Values Used In Model



2.2.3 EVALUATION OF RESISTANCE MODEL

Based on the terminal points and point criteria discussed above, the Resistance Model was run on the computer and provided the results shown in Figure 2-9. Computer generated results provided general guidance for potential corridors that warranted further evaluation.

With the resistance model results, preliminary corridor alternatives have been identified with the results shown in Figure 2-10. Then based on input from the TAC and public, the corridor alternatives have continued to be refined as shown in Figure 2-11 through Figure 2-13.

Figure 2-9: Preliminary Resistance Model Results

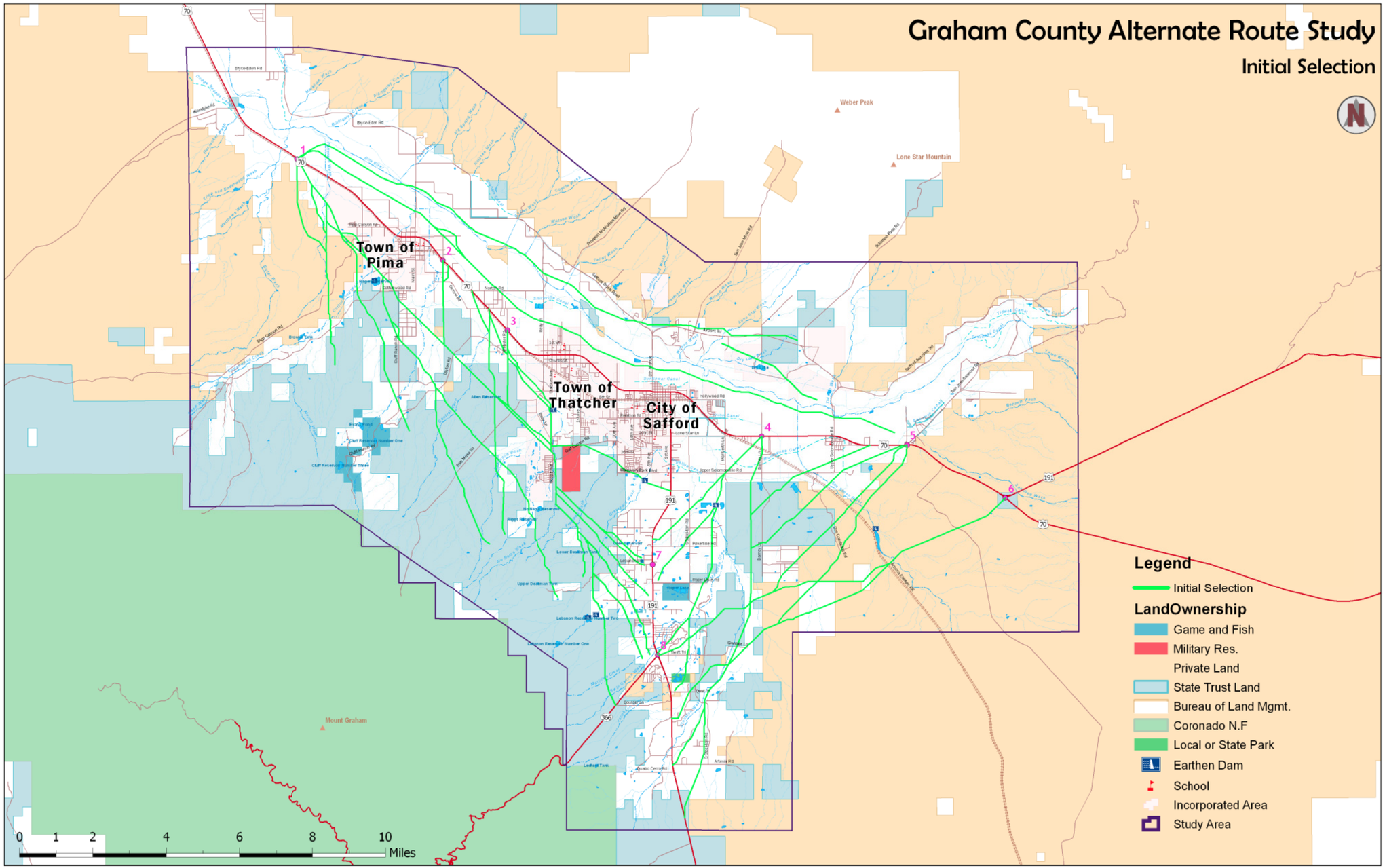


Figure 2-10: Preliminary Proposed Corridor Alternatives - Second Refinement

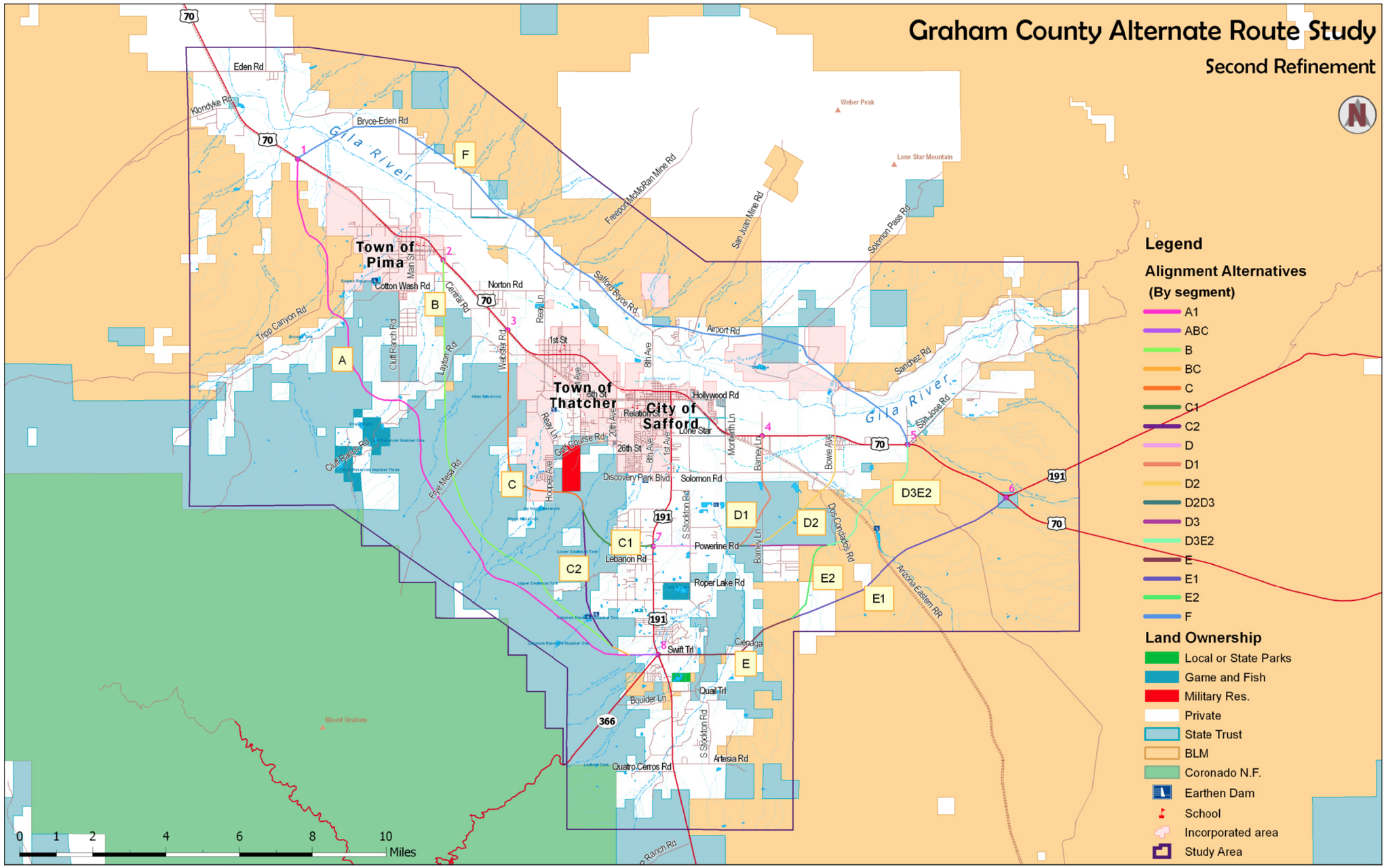


Figure 2-11: Preliminary Proposed Corridor Alternatives - Third Refinement

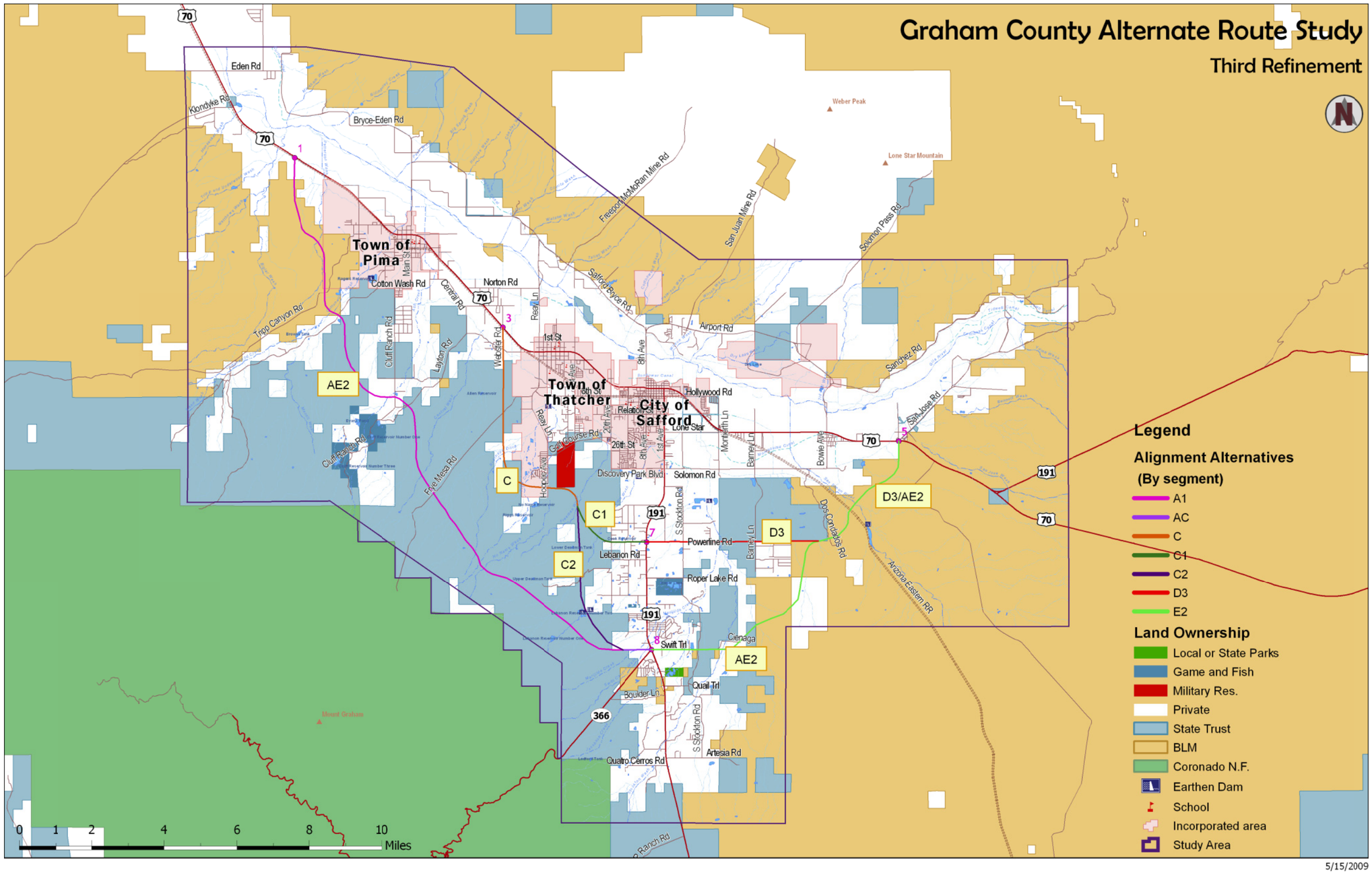


Figure 2-12: Preliminary Proposed Corridor Alternatives – Fourth Refinement

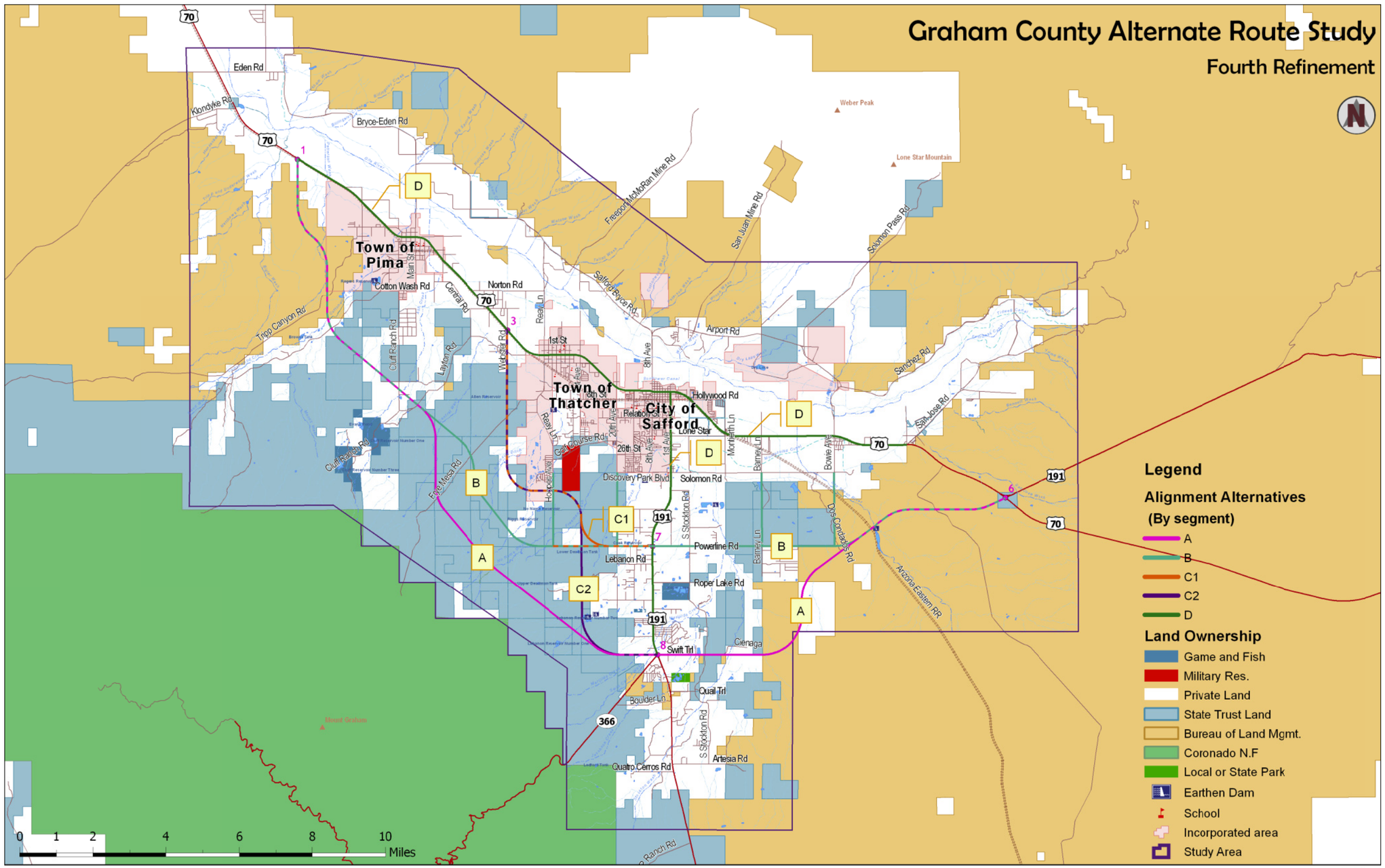
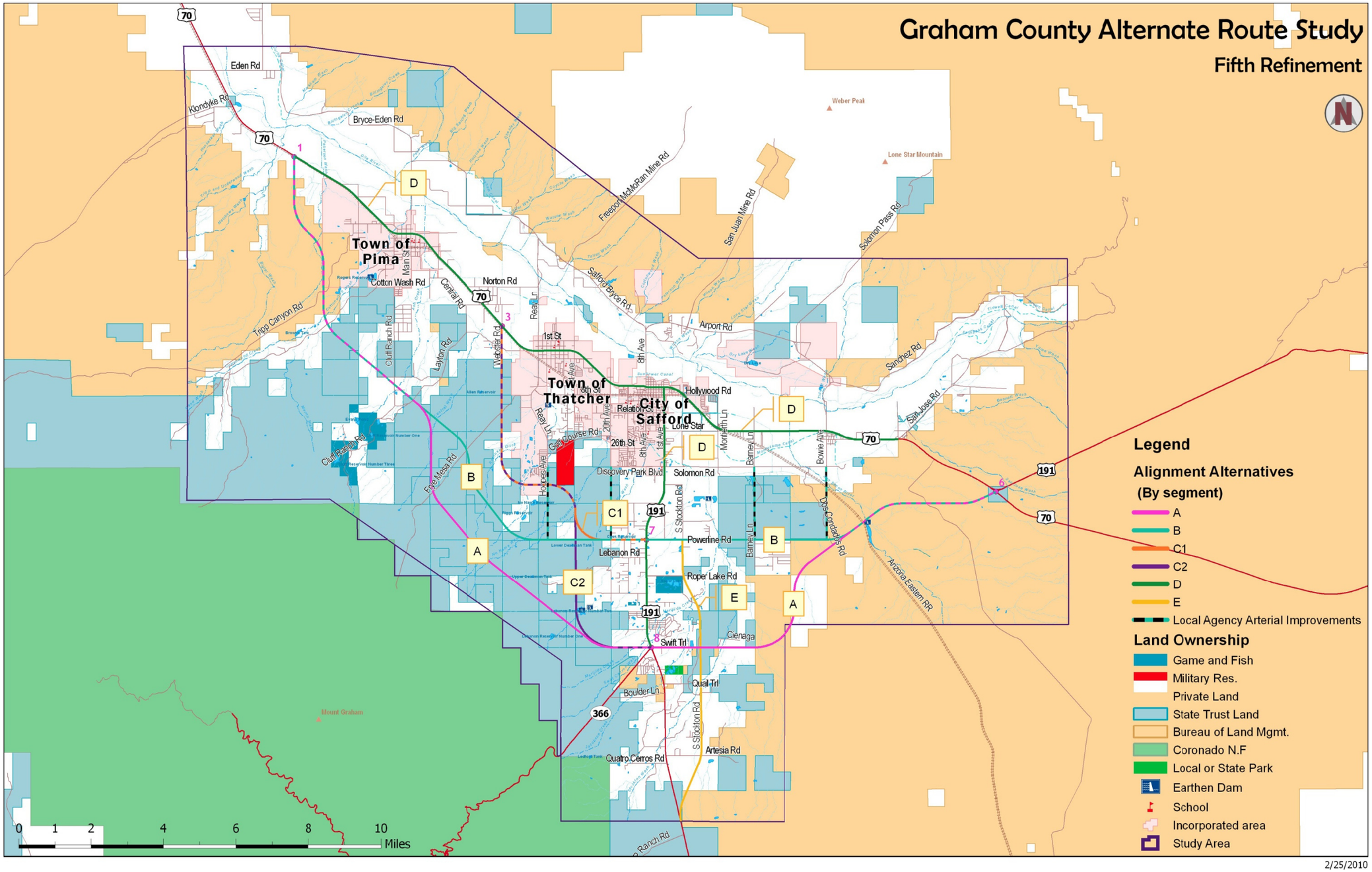


Figure 2-13: Preliminary Proposed Corridor Alternatives- Fifth Refinement



2.2.4 PROPOSED CORRIDOR ALTERNATIVES

Figure 2-13 shows the final refinements of the preliminary alternate route corridors and connection points to US Route 70 and US Route 191.

Alternative A: This alternative connects US Route 191 with US Route 70, west of the Town of Pima and east of the City of Safford. It navigates to the west from Swift Trail (8) and runs along the edge of Mount Graham and then north where it connects to US Route 70 (1). To the east, the corridor travels along Swift Trail, then crosses BLM property to connect at the existing US 70 / US 191 interchange (6).

Alternative B: This alternative connects US Route 191 with US Route 70, west of the Town of Pima and east of the City of Safford. It navigates to the west from Powerline Road (7) and runs along the edge of Mount Graham and then north where it connects to US Route 70 (1). To the east the corridor runs along Powerline Road turning northeast as it crosses the Arizona Eastern Railroad and San Simon River, connecting to US Route 70 at the US 70 / US 191 interchange (6).

Alternative C: This alternative has two roadway components that can be built separately. The C1 alternative connects US Route 191 from Powerline Road (7) travels to the west, and then traverses to the north and west to connect with US Route 70 at Webster Road (3). The C2 alternative connects with US Route 191 further south at Swift Trail (8) and connects with the C1 alternative.

Alternative D: Rather than developing a new alternate route corridor, this alternative involves making significant improvements to existing US Route 191, US Route 70 and local street system within the communities of Safford, Thatcher and Graham County, in addition to increasing the speed limits in various sections. The local street improvements include:

- Construction of the roadway and intersection recommendations provided in the 2009 Graham County Small Area Transportation Study (SATs);
- Extend Stockton Road as a 4 lane roadway to Solomon Road;
- Widen Relation Street to 4 lanes between US 191 and 14th Ave;
- Extend and widen 20th Ave as a 2 lane roadway between Discovery Park Blvd and Artesia Road.

Alternative E: This alternative involves the realignment of US 191 to the existing Stockton Road alignment from south of Artesia Road to Powerline Road, where it will reconnect with US 191. SR 366 will be extended along Swift Trail to connect to the new US 191.

With the implementation of any of Alternatives A, B, C1, C2 or E, there is an opportunity to turn the existing US 70 and US191 roadways back to the local agencies to be used as city streets. With the highway traffic removed from the existing roadways, a 'Complete Streets' approach can be used to enhance the multi-modal characteristics and circulation through and around the downtown areas.

The 'Complete Streets' movement is a context sensitive design, which focuses on creating multi-modal transportation conditions through the inclusion of facilities for bicyclist and pedestrians. 'Complete Streets' integrates infrastructure improvements and provides bicycle- and pedestrian-scaled environments. Typically, these street improvements offer physical separation to minimize conflicts. 'Complete Streets' also offer community benefits such as traffic calming through street design, and minimizing environmental impacts through more comprehensive design processes.

Retrofitting existing streets into 'Complete Streets' can improve conditions for existing business and can also attract new businesses within the corridor. Often property values increase, since land owners are willing to pay a premium to live in 'walkable' communities. Communities throughout the nation are finding that creating human-scaled environments allows people to safely connect and can lead to revitalization of a community.

2.3 EVALUATE PROPOSED CORRIDOR ALTERNATIVES

2.3.1 EVALUATION CRITERIA

The listing below sets forth the criteria used to evaluate alternatives and to fairly compare and contrast the choices. The objective of the alternatives analysis is to develop sufficient information so that the TAC, ADOT and the project team can determine a recommended solution. That solution may be a hybrid of the alternatives presented in this paper.

- Traffic analysis (Level of Service)
- Safety
- Access
- Environmental Impacts
- Cost
- Implementation
- Support

2.3.2 ALTERNATIVE EVALUATION

The alternatives developed and shown in Figure 2-9 through 2-13 were evaluated based on the evaluation criteria presented above. The evaluation process to identify the preferred alternative was based on qualitative, as well as quantitative analysis of the alternatives based on the above criteria by the TAC members as well as the public.

Traffic analysis (Level of Service)

Each of the alternatives were first evaluated based on the traffic analysis criteria and development opportunities to identify alternatives that provided greatest improvements to level of service, intersection operation, and development opportunity. The highest Average Daily Traffic (ADT) projections on the roadway segments for each alternative were compared in Table 2-1 to ascertain which alternatives yield the greatest reduction in traffic on US 70 and US 191 through the developed areas, and which alternatives yield the highest ADT on the alternate route roadway. Decreased traffic on the existing routes inside the alternate route area is taken to represent improvement in level of service and intersection operation. Higher traffic projections on the alternative route are taken to represent greater opportunities for development along the new route.

To evaluate the impacts of the alternate route corridor on the existing US 191 and US 70 corridors, 2 of the highest ADT segments along these two existing corridors were identified for the No-Build condition. These segments were on US 191 between Discovery Park Blvd and Armory Road (No-Build = 80,700 vpd) and on US 70 between 8th Ave and US 191(No-Build = 46, 500 vpd). By isolating and evaluating the segments with the highest ADT on the existing roadways, the amount of relief provided by the alternate route was tabulated. For example, as shown in Table 2-1, the Alternative A has a maximum volume of 5,500 vpd along its length while only decreasing the volumes on US 70 and US191 only slightly (over segments identified 'above). In contrast, for Alternative C2, the alternate route has a maximum volume of 31,400 vpd while significantly decreasing the volumes on the US 70 and US 191 segments.

Based on information in the table, Alternatives A, B, C1, C2, D and E are found to reduce significant traffic on US 191 and US 70. Alternatives A, B, C1, C2 and E are found to attract the highest traffic volume to the new route. Four alternatives (A, B, C1, and C2) are identified as satisfying both traffic and development criteria.

Table 2-1: Alternative ADT

Year 2040 Highest ADT on Roadway Segment							
Alt. Routes	EXISTING ROUTES		ALTERNATIVE ROUTES				
	US191	US70	A	B	C1	C2	E
A	75,900	46,400	5,500				
B	67,000	45,200		13,500			
C1	53,500	40,700			27,100		
C2	49,200	39,000				31,400	
D	71,600	N/A					
E	67,700	45,300					24,200
No-Build	80,700	46,500					

* Note: The existing routes ADT are at: US191 – Discovery Park to Armory Road & US70 – 8th Ave to US191

The LOS maps showing the impacts each alternate route corridor alternative has on the existing street system within the study area for the design year 2040 are shown in the following Figures 2-14 through 2-21. As you can see in the figures, the US 191 corridor is projected to experience the greatest congestion particularly when compared to the No Build graphics shown in Section 1, Figures 1-29 and 1-30. A significant increase in US 191 traffic is based on the completion of the Sierra del Sol development south of town.

As you review the LOS for the various Alternate route corridor alternatives, you can see that Alternatives C1 & C2 have a greater impact on the US 191 LOS than Alternative A does. This is because of the proximity of the new routes to the trip generation locations and destinations. Alternatives C1 & C2 will operate more as a part of the local arterial street system providing an alternative to the local street system. While Alternative A is far enough away from the city center that it would be used for regional trips rather than local trips to the neighborhood businesses. Alternative B maximizes the opportunity to provide relief along US 191 by being close enough for local traffic to use, while still providing for regional traffic.

Figure 2-14: Study Area Level of Service 2040 – Alternative A

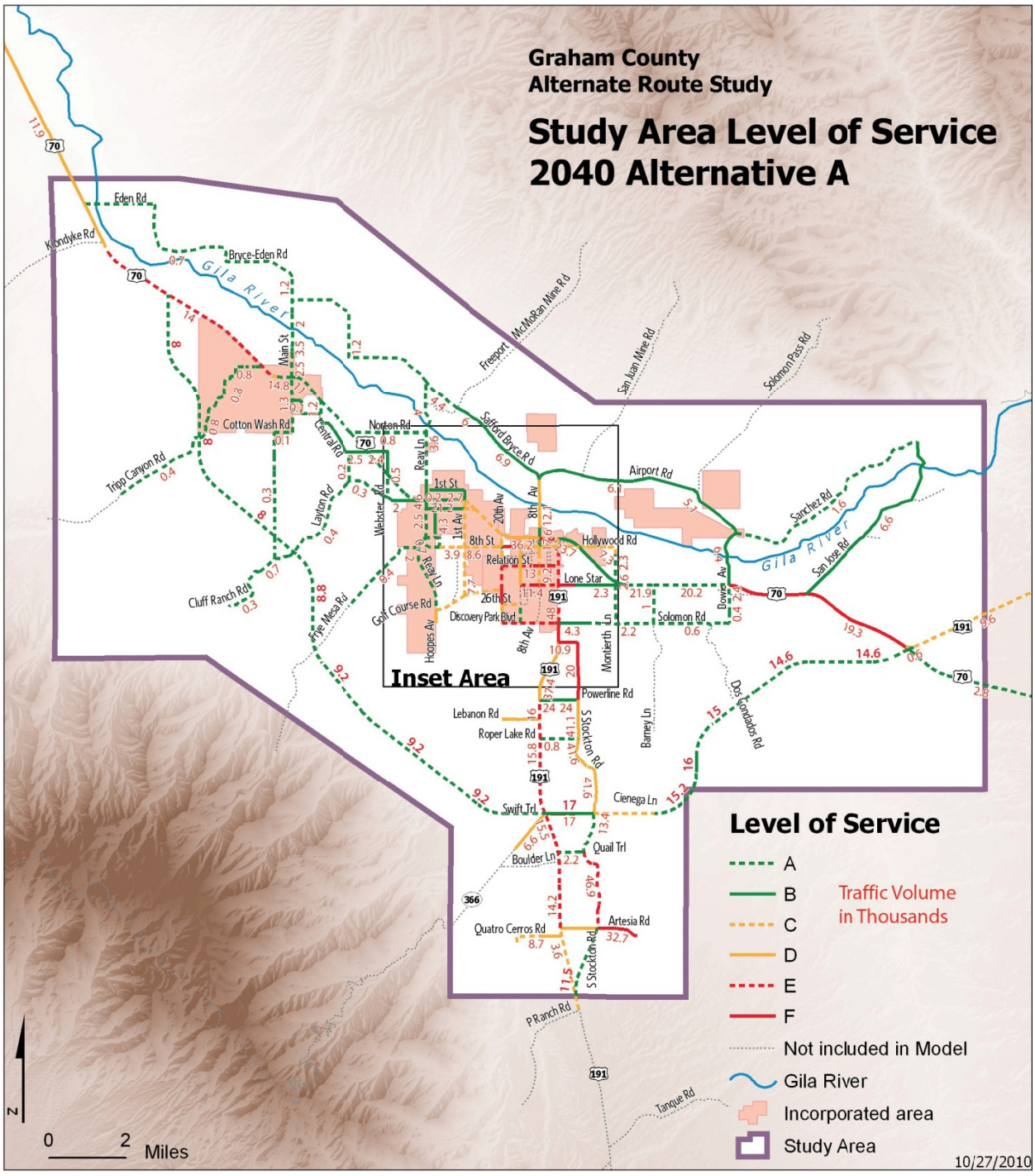


Figure 2-15: Safford/Thatcher Area Level of Service 2040 – Alternative A

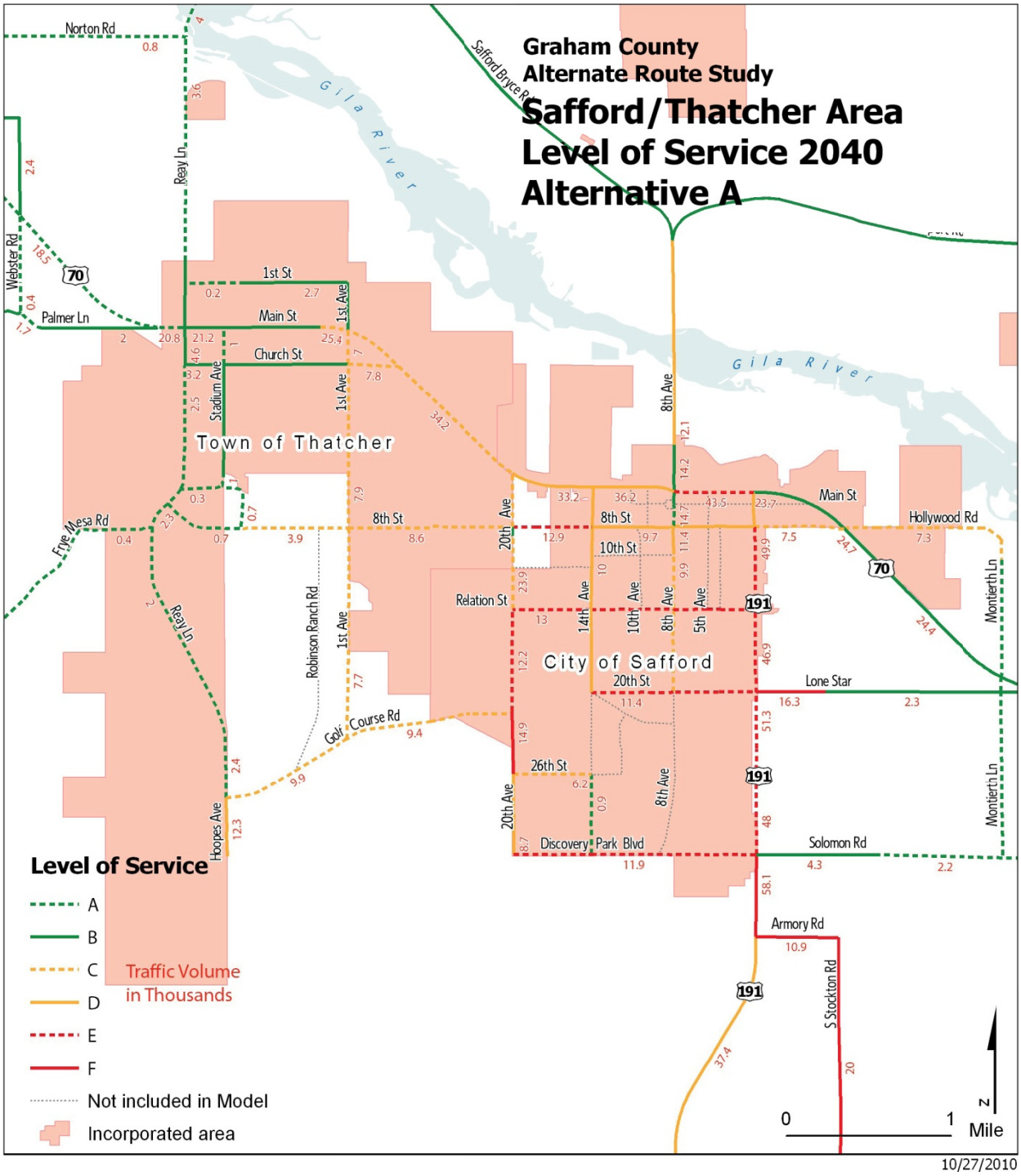


Figure 2-16: Study Area Level of Service 2040 – Alternative B

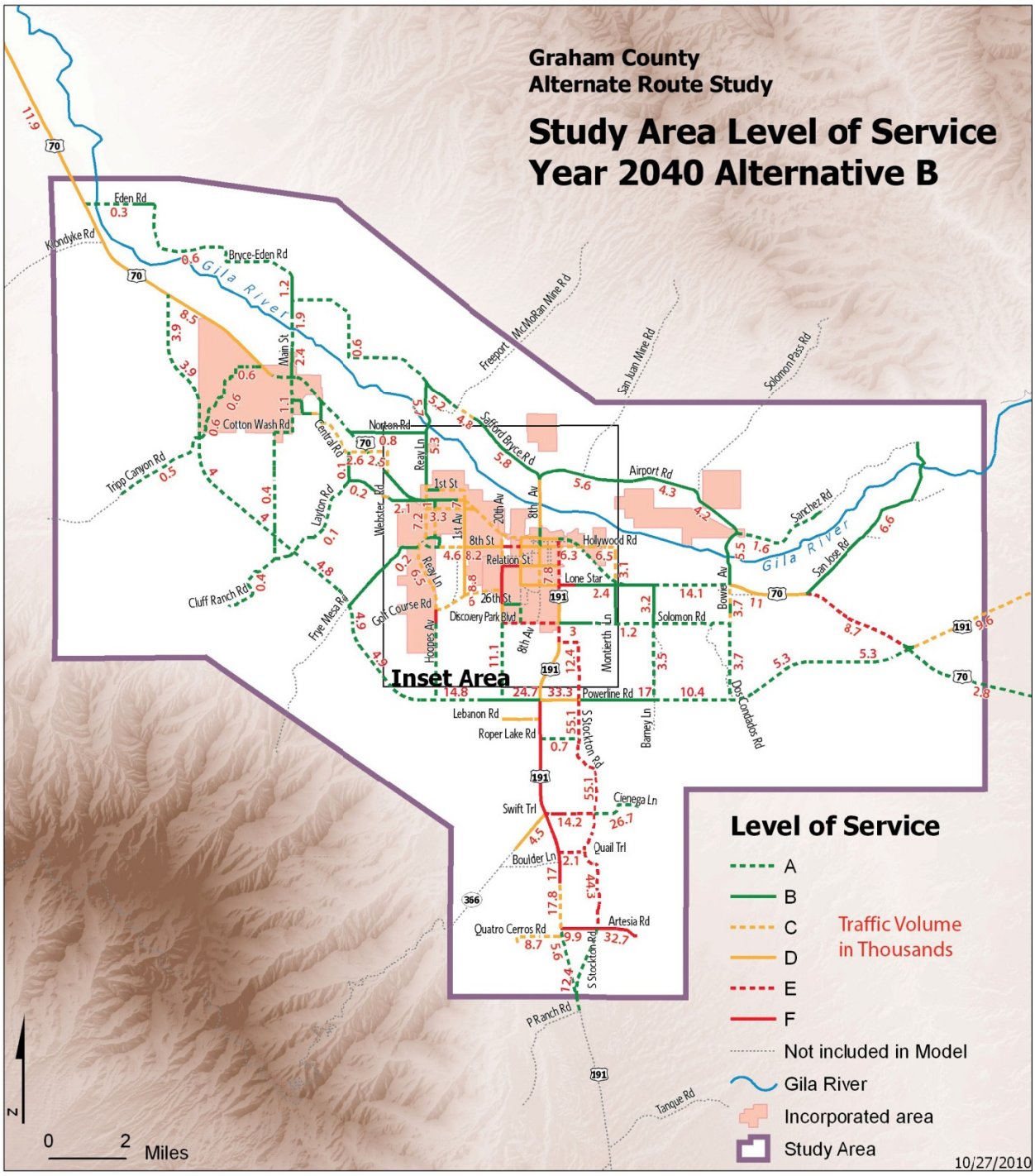


Figure 2-17: Safford/Thatcher Area Level of Service 2040 – Alternative B

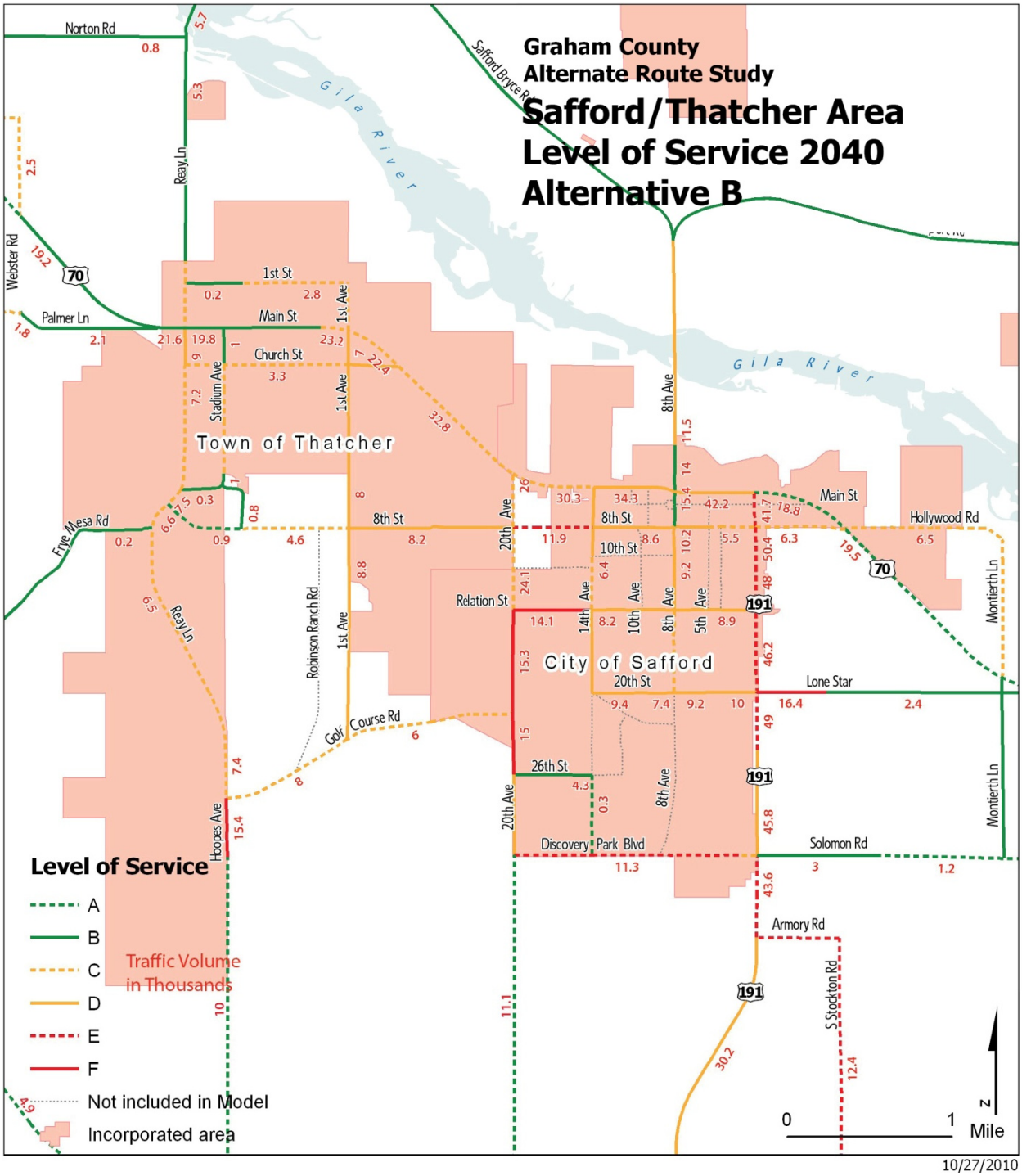


Figure 2-18: Study Area Level of Service 2040 – Alternative C1

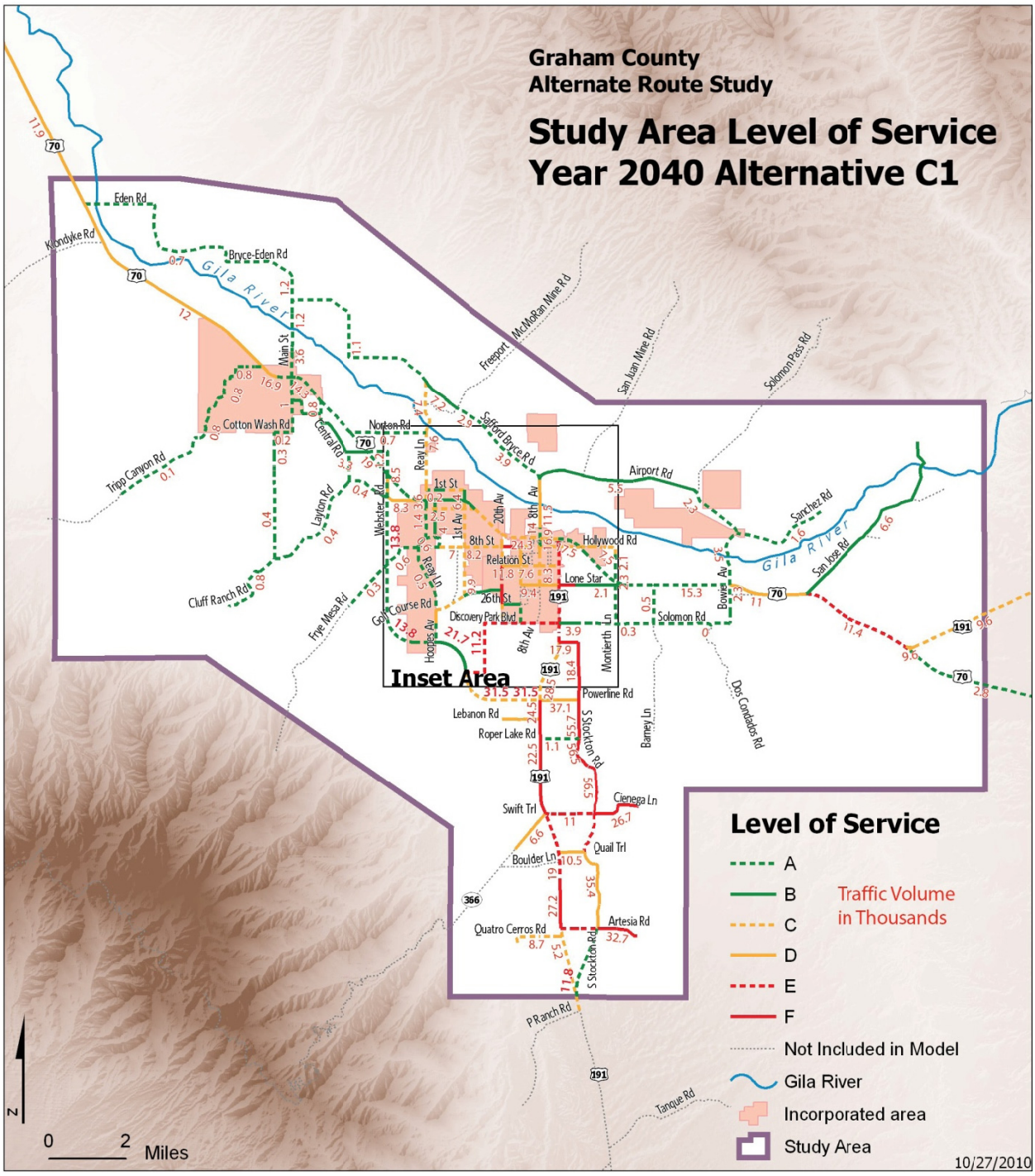


Figure 2-19: Safford/Thatcher Area Level of Service 2040 – Alternative C1

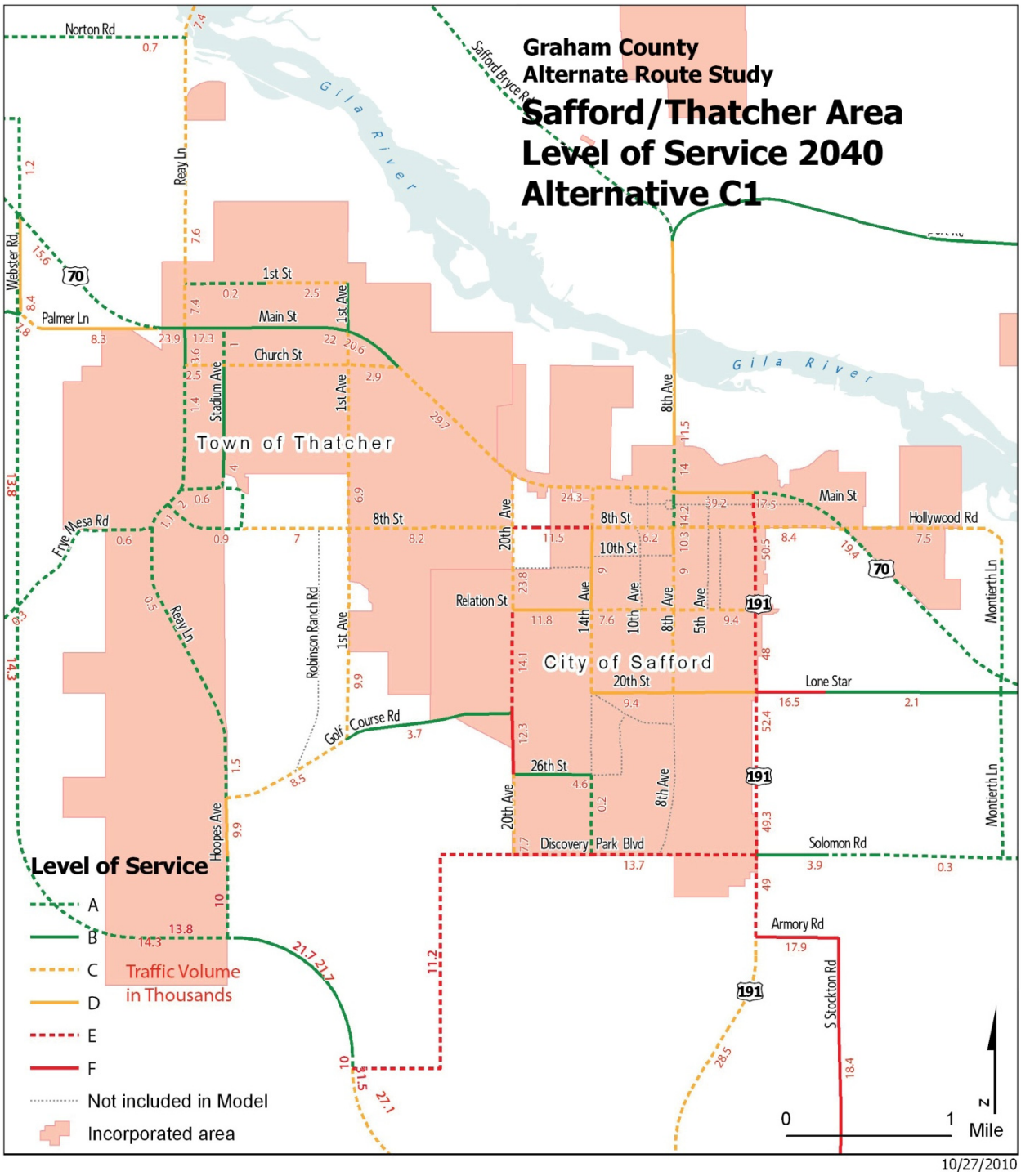


Figure 2-20: Study Area Level of Service 2040 – Alternative C2

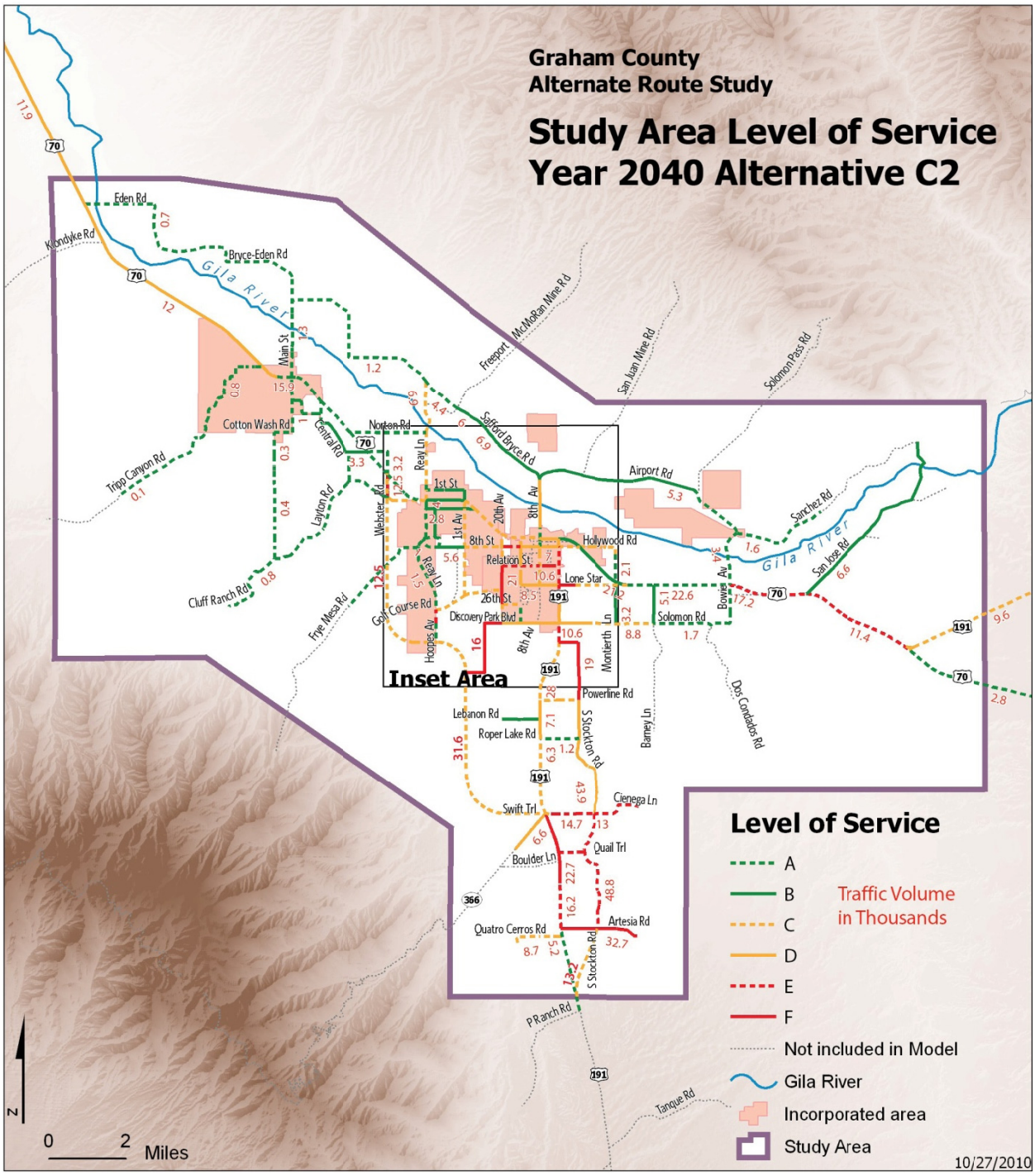
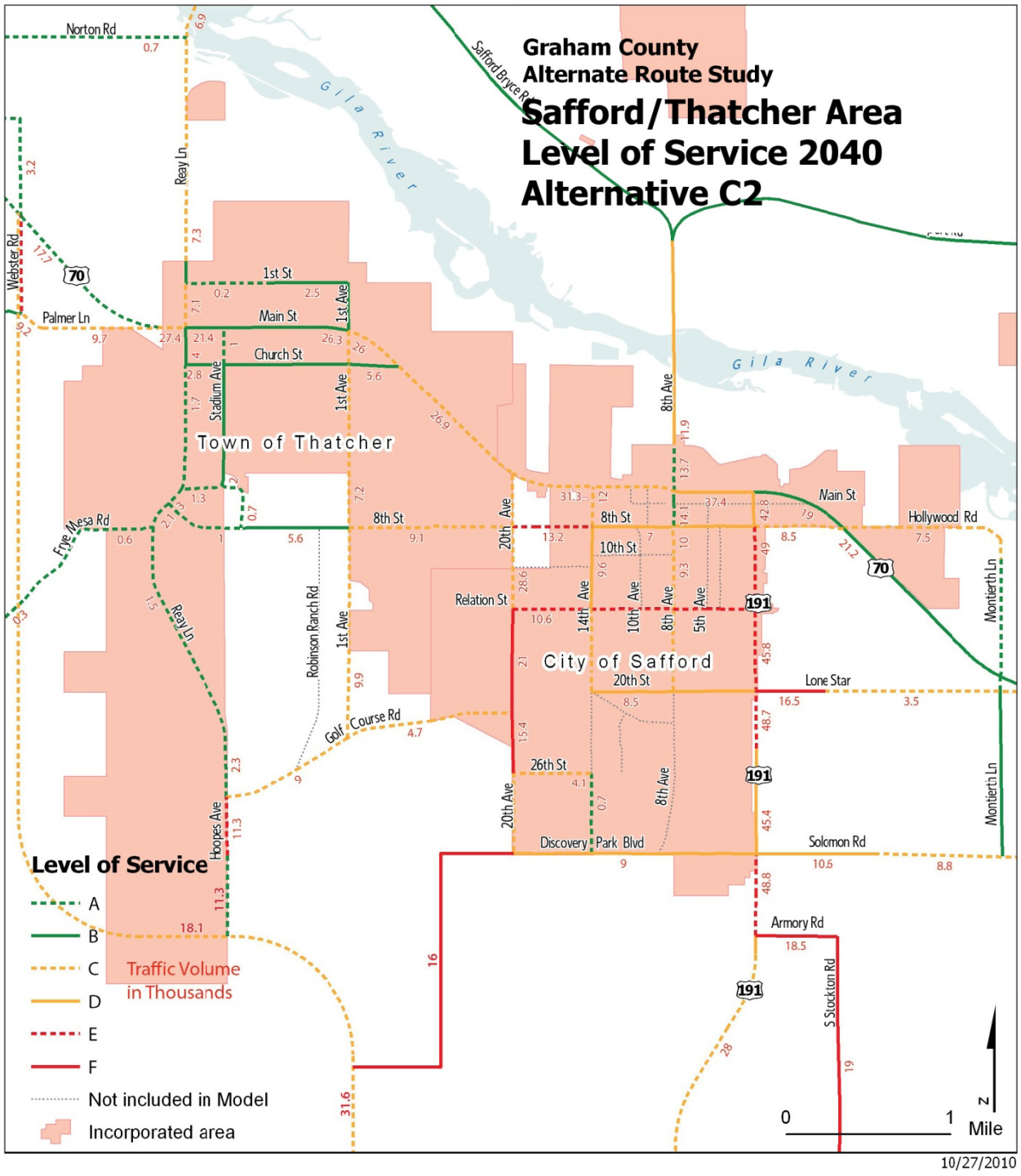


Figure 2-21: Safford/Thatcher Area Level of Service 2040 – Alternative C2



The following Tables 2-2, a-d, show the LOS associated with the Alternative D improvements to US 191. The improvements are based on adjacent arterial and intersection improvements, then increasing the number of lanes and speed limit, as shown in the highlighted portions of the tables, along the US 191 corridor until the LOS rating along the segment reaches a LOS of D. The analysis was done purely from a traffic analysis stand point. The practicality of implementing the suggested widenings may or may not be feasible.

Table 2-2, A-D: Alternative D LOS Analysis (with proposed improvements to reach LOS D)

NO BUILD US 191 (2040)						
From	To	ADT	Functional Classification	Speed Limit	# lanes	LOS
US 70	8th St	45,700	Urban Principal Arterial	35	5	E
8th St	Relation St	58,500	Urban Principal Arterial	35	5	F
Relation St	20th St	59,500	Urban Principal Arterial	35	5	F
20th St	Discovery Park Blvd	63,400	Urban Principal Arterial	35/45	5	F
Discovery Park Blvd	Armory Rd	80,700	Rural Principal Arterial	45	5	F
Armory Rd	Powerline Rd	58,300	Rural Minor Arterial	45/55	5/2	E/F
Powerline Rd	Swift Trail	61,600	Rural Minor Arterial	55	2	F
Swift Trail	Artesia Rd	56,600	Rural Minor Arterial	55/65	2	F/F
Artesia Rd	Study Limit	10,500	Rural Minor Arterial	65	2	D

US 191 (2040) WITH MAJOR SATS IMPROVEMENTS							
From	To	ADT	Functional Classification	Speed Limit	# lanes	LOS	US191 Improvements to meet LOS D
US 70	8th St	38,000	Urban Principal Arterial	35	5	D	
8th St	Relation St	47,600	Urban Principal Arterial	35	5	E	Increase speed limit to 45 mph + widen to 7 lanes
Relation St	20th St	39,600	Urban Principal Arterial	35	5	D	
20th St	Discovery Park Blvd	42,100	Urban Principal Arterial	35/45	5	D	
Discovery Park Blvd	Armory Rd	79,400	Rural Principal Arterial	45	5	F	Increase speed limit to 55 mph + widen to 7 lanes
Armory Rd	Powerline Rd	33,450	Rural Minor Arterial	45/55	5/2	C/F	Widen to 4 lanes
Powerline Rd	Swift Trail	21,600	Rural Minor Arterial	55	2	F	Widen to 4 lanes
Swift Trail	Artesia Rd	18,600	Rural Minor Arterial	55/65	2	F	Widen to 4 lanes
Artesia Rd	Study Limit	7,400	Rural Minor Arterial	65	2	D	

US 191 (2040) WITH MAJOR SATS IMPROVEMENTS + EXTEND STOCKTON RD AS 4 LANES TO SOLOMON RD							
From	To	ADT	Functional Classification	Speed Limit	# lanes	LOS	US191 Improvements to meet LOS D
US 70	8th St	38,800	Urban Principal Arterial	35	5	D	
8th St	Relation St	48,300	Urban Principal Arterial	35	5	E	Increase speed limit to 45 mph + widen to 7 lanes
Relation St	20th St	40,700	Urban Principal Arterial	35	5	D	
20th St	Discovery Park Blvd	42,000	Urban Principal Arterial	35/45	5	D	
Discovery Park Blvd	Armory Rd	53,400	Rural Principal Arterial	45	5	E	Increase speed limit to 55 mph
Armory Rd	Powerline Rd	30,200	Rural Minor Arterial	45/55	5/2	C/F	Widen to 4 lanes
Powerline Rd	Swift Trail	21,400	Rural Minor Arterial	55	2	F	Widen to 4 lanes
Swift Trail	Artesia Rd	17,900	Rural Minor Arterial	55/65	2	E	Widen to 4 lanes
Artesia Rd	Study Limit	7,400	Rural Minor Arterial	65	2	D	

US 191 (2040) WITH MAJOR SATS IMPROVEMENTS + EXTEND STOCKTON RD AS 4 LANES TO SOLOMON RD + WIDEN RELATION ST TO 4 LANE BETWEEN US 191 AND 14TH AVE + EXTEND 20TH AVE AS 2 LANES BETWEEN DISCOVERY PARK BLVD AND ARTESIA							
From	To	ADT	Functional Classification	Speed Limit	# lanes	LOS	US191 Improvements to meet LOS D
US 70	8th St	35,400	Urban Principal Arterial	35	5	D	
8th St	Relation St	45,000	Urban Principal Arterial	35	5	E	Increase speed limit to 45 mph
Relation St	20th St	34,800	Urban Principal Arterial	35	5	D	
20th St	Discovery Park Blvd	34,700	Urban Principal Arterial	35/45	5	D	
Discovery Park Blvd	Armory Rd	47,600	Rural Principal Arterial	45	5	E	Increase speed limit to 55 mph
Armory Rd	Powerline Rd	26,400	Rural Minor Arterial	45/55	5/2	C/F	Widen to 4 lanes
Powerline Rd	Swift Trail	25,000	Rural Minor Arterial	55	2	F	Widen to 4 lanes
Swift Trail	Artesia Rd	16,400	Rural Minor Arterial	55/65	2	E	Widen to 4 lanes
Artesia Rd	Study Limit	7,400	Rural Minor Arterial	65	2	D	

The Alternative D improvements suggested above can be developed to address some of the local traffic LOS concerns along the existing US 191 roadway. But with concerns about the feasibility of implementing the improvements, as well as the lack of addressing regional traffic, Alternative D was removed from the discussion.

The Alternative E improvements have a significant impact on the existing US 191 alignment. As shown in the following table 2-3, the realignment to the Stockton Road alignment along with constructing a controlled access 4-lane divided facility decreases the traffic volume remaining on the old US 191 alignment. With the construction of the new US 191 alignment, the old US191 alignment can be turned back to the local agencies for use as an arterial street.

Table 2-3: Alternative E Traffic Volumes

Segment Terminals		2040 Projected Traffic Volumes			
		Old US 191 (improved to 4-lane divided)	Old US 191 (with US 191 Realigned to Stockton Road)	Stockton Road (No US 191 realignment)	New US 191 (Stockton Road Alignment)
P Ranch Road	Artesia Road	8,300	5,600	N/A	12,400
Artesia Road	Quail Trail	47,300	17,800	15,200	44,300
Quail Trail	Swift Trail	61,700	17,000	16,000	44,200
Swift Trail	Roper Lake Road	39,300	23,500	17,000	55,100
Roper Lake Road	Powerline Road	49,000	30,200	17,100	55,100

The corridor lengths for each alternative are shown in Table 2-4. Shorter corridor lengths typically equate to shorter travel time, but other advantages of longer length such as increases in potential for economic development should be considered. A useful comparison to evaluate these alternatives in this type of situation is to look at the corridor length compared to the length traversed on existing routes to reach the same points, as shown in Table 2-4.

Table 2-4: Corridor Lengths

	No Build	Alt A	Alt B	Alt C1	Alt C2	Alt E
Corridor Length (miles)	**22.7**	**30.2**				
	22.7		**26.5**			
	9.4			**9.0**		
	12.4				**11.3**	
	8.5					**9.2**

Safety

In general, the safety increases as the number of conflict points, such as intersection and driveways, decrease. By identifying the alternate route corridor to be a 4 lane divided facility with controlled access and intersections spaced at a minimum of 2 miles, alternatives A, B, C1, C2 & E will all be developed as a safer facility. In addition to the increase in safety along the new alignment, existing US 191 and US 70 roadways will experience an increase in safety because of a decrease in traffic volumes. By combining the turn back of existing US 191 and US 70 to the local agencies and developing a 'Complete Street' approach to its redevelopment, the downtown area streets can become a safer roadway for all of its users, including bicycle and pedestrians.

Access

The Alternate route corridor typical section has been identified to be a 4 lane divided highway with controlled access and intersections/interchanges spaced at a minimum of 2 miles. By controlling the access points along the corridor, the potential development opportunities will be focused at the major intersection points. Criteria for selecting potential interchange locations include adjacent ground slope for development potential, existing roadways in the vicinity, and spacing of at least two miles between interchanges.

Alternative A offers limited opportunities for interchange locations because of a substantial portion of the alignment crossing BLM lands and limited development of the existing roadway network. Potential interchange locations for Alternative A include:

- US 70 (northwest origin)
- Tripp Canyon Road
- Cluff Ranch Road
- Frye Mesa Road
- US 191 at Swift Trail Junction

- Stockton Road
- US 70 (northeast terminus)

Potential interchange locations for Alternative B include:

- US 70 (northwest origin)
- Tripp Canyon Road
- Cluff Ranch Road
- Frye Mesa Road
- Hoopes Ave (extended)
- 20th Ave (extended)
- US 191 at Powerline Road
- Stockton Road
- Barney Lane
- Dos Condados Road
- US 70 (northeast terminus)

Potential interchange locations for Alternative C1 include:

- US 70 (northwest origin)
- Frye Mesa Road
- Hoopes Avenue (extended)
- 20th Ave (extended)
- US 191 (southern terminus)

Potential interchange locations for Alternative C2 include:

- US 70 (northwest origin)
- Frye Mesa Road
- Hoopes Avenue (extended)
- 20th Ave (extended)
- Lebanon Road (extended)
- US 191 (southern terminus)

Alternative D offers no opportunity for new interchange locations.

Potential interchange locations for Alternative E include:

- US 191 (southern Terminus)
- Artesia Road
- Swift Trail (SR 366 extension)
- Roper Lake Road
- US 191 (northern terminus)

Once the intersection/interchange locations are identified, then the local agencies can begin to plan for the extension of the local street system to tie into these locations. The extension of the local streets to the new alternate route corridor will provide an opportunity for development at the intersections, as well as promote in-fill development along the arterial extensions. Alternatives A & B provide the best opportunity to create the in-fill development, but depending on the magnitude of the economic growth in the area over the horizon, Alternative A may be too far away from the city center to completely in-fill.

Environmental Impacts

A preliminary review of environmental documentation available within the study area has been completed and is included in Section 2.4. Thus far, there is an absence of highly sensitive areas identified to potentially be in conflict with the possible corridor alternatives.

Cost

Costs estimates for each of the alternatives are based on planning-level cost estimating techniques. Tabulated data from similar projects and pre-established budgetary cost ranges for roadway classification types provided by ADOT were used for pricing. This level of estimate lacks the benefit of detailed design information. The alternatives were broken down into line items that could be unit priced. They were then adjusted for local site conditions based on agency discussions and site visits. While this is a suitable approach to use for comparing alternatives at this stage of a planning study, the costs are based on a number of assumptions and, by nature, may not reflect current market conditions. The right-of-way costs are the most speculative and should be considered as preliminary numbers that have a large margin of uncertainty related to them. The preliminary cost estimates are shown in Table 2-6 thru 2-10.

For cost estimating purposes, the roadway configuration is based on a two-lane section constructed with at-grade intersections with existing roadways along with appropriate turn lanes at the intersections. Costs are based on construction of a railroad grade separation at the Arizona Eastern Railway (AZER) for Alternative A and B, with the highway carried over the rail line.

The drainage estimate has been developed based on USGS topographic mapping. The estimated number and type of drainage structures needed for each alternative is presented in Table 2-5. Detailed hydrologic analysis will be needed to size waterway structures during design development. One of the bridges for Alternative A and B are needed for a grade separation with the Arizona Eastern Railway (AZER).

Table 2-5: Drainage Structures

ALTERNATIVE	PIPE CULVERTS	CONCRETE BOX CULVERTS	BRIDGES
A	35	1	2
B	31	1	1
C1	16	0	0
C2	22	0	0
E	14	2	0

The Right of way needs are based on acquisition of sufficient right of way for a future four lane limited access facility with grade separated interchanges at major intersecting roadways. For cost estimating purposes, the right of way corridor is assumed to be 310’ wide with an additional 45 acres per interchange.

Table 2-6: Preliminary Cost Estimates

ALTERNATIVE A						
Roadway Construction		Quantity	Unit	Unit Price	Current $ (2009)	Future $ (based on 2040 @ 3%)
Roadway Construction (4 lane divided)	Length	30.2	Miles	$3,500,000	$105,700,000	$256,560,000
Bridges	# of Bridges	2				
	Area (based on 2-40'wide* 300'long)	48,000	SF	$120	$5,760,000	$13,980,000
Construction Subtotal					$111,460,000	$270,540,000
Design & Construction Engineering				20%	$22,292,000	$54,108,000
Construction Total					$133,752,000	$324,648,000
Right-of-way						
	Area (based on 310' wide corridor)	1,135				
	# of intersections	7				
	Additional 45 acres per intersection	315				
	Subtotal	1,450	ACRE	$30,000	$43,500,000	$105,590,000
Project Subtotal					$177,252,000	$430,238,000
Project Contigency				20%	$35,450,400	$86,047,600
PROJECT TOTAL					**$212,702,400**	**$516,285,600**

Table 2-7: Preliminary Cost Estimates (Continued)

ALTERNATIVE B						
Roadway Construction		Quantity	Unit	Unit Price	Current $ (2009)	Future $ (based on 2040 @ 3%)
Roadway Construction (4 lane divided)	Length	26.5	Miles	$3,500,000	$92,750,000	$225,130,000
Bridges	# of Bridges	1				
	Area (based on 2-40'wide* 300'long)	24,000	SF	$120	$2,880,000	$6,990,000
Construction Subtotal					$95,630,000	$232,120,000
Design & Construction Engineering				20%	$19,126,000	$46,424,000
Construction Total					$114,756,000	$278,544,000
Right-of-way						
	Area (based on 310' wide corridor)	996				
	# of intersections	11				
	Additional 45 acres per intersection	495				
	Subtotal	1,491	ACRE	$30,000	$44,730,000	$108,570,000
Project Subtotal					$159,486,000	$387,114,000
Project Contigency				20%	$31,897,200	$77,422,800
PROJECT TOTAL					**$191,383,200**	**$464,536,800**

Table 2-8: Preliminary Cost Estimates (Continued)

ALTERNATIVE C1						
Roadway Construction		Quantity	Unit	Unit Price	Current $ (2009)	Future $ (based on 2040 @ 3%)
Roadway Construction (4 lane divided)	Length	9	Miles	$3,500,000	$31,500,000	$76,460,000
Bridges	# of Bridges	0				
	Area (based on 2-40'wide* 300'long)	0	SF	$120	$0	$0
Construction Subtotal					$31,500,000	$76,460,000
Design & Construction Engineering				20%	$6,300,000	$15,292,000
Construction Total					$37,800,000	$91,752,000
Right-of-way						
	Area (based on 310' wide corridor)	338				
	# of intersections	5				
	Additional 45 acres per intersection	225				
	Subtotal	563	ACRE	$30,000	$16,890,000	$41,000,000
Project Subtotal					$54,690,000	$132,752,000
Project Contigency				20%	$10,938,000	$26,550,400
PROJECT TOTAL					**$65,628,000**	**$159,302,400**

Table 2-9: Preliminary Cost Estimates (Continued)

ALTERNATIVE C2						
Roadway Construction		Quantity	Unit	Unit Price	Current $ (2009)	Future $ (based on 2040 @ 3%)
Roadway Construction (4 lane divided)	Length	11.3	Miles	$3,500,000	$39,550,000	$96,000,000
Bridges	# of Bridges	0				
	Area (based on 2-40'wide* 300'long)	0	SF	$120	$0	$0
Construction Subtotal					$39,550,000	$96,000,000
Design & Construction Engineering				20%	$7,910,000	$19,200,000
Construction Total					$47,460,000	$115,200,000
Right-of-way						
	Area (based on 310' wide corridor)	425				
	# of intersections	6				
	Additional 45 acres per intersection	270				
	Subtotal	695	ACRE	$30,000	$20,850,000	$50,610,000
Project Subtotal					$68,310,000	$165,810,000
Project Contigency				20%	$13,662,000	$33,162,000
PROJECT TOTAL					**$81,972,000**	**$198,972,000**

Table 2-10: Preliminary Cost Estimates (Continued)

ALTERNATIVE E						
Roadway Construction		Quantity	Unit	Unit Price	Current $ (2009)	Future $ (based on 2040 @ 3%)
Roadway Construction (4 lane divided)	Length	9.2	Miles	$3,500,000	$32,200,000	$78,160,000
Bridges	# of Bridges	0				
	Area (based on 2-40'wide* 300'long)	0	SF	$120	$0	$0
Construction Subtotal					$32,200,000	$78,160,000
Design & Construction Engineering				20%	$6,440,000	$15,632,000
Construction Total					$38,640,000	$93,792,000
Right-of-way						
	Area (based on 310' wide corridor)	346				
	# of intersections	6				
	Additional 45 acres per intersection	270				
	Subtotal	616	ACRE	$30,000	$18,480,000	$44,860,000
Project Subtotal					$57,120,000	$138,652,000
Project Contigency				20%	$11,424,000	$27,730,400
PROJECT TOTAL					**$68,544,000**	**$166,382,400**

Implementation

The first strategy for implementing the selected alternate route corridor is to develop the alignment enough to be able to begin the right-of-way acquisition process. Based on a stakeholder interview with BLM, the preferred corridor alignment should be provided so that it can be included in their updated land management plan, which is expected to be completed in the next 5 to 10 years.

Once the right-of-way acquisition process is underway, then a construction implementation plan should be developed to divide the corridor into feasible segments. To begin with, half of the ultimate 4 lane divided facility should be constructed. The initial roadway would therefore be 1 lane in each direction constructed offset within a right of way width that is sufficient for a future four-lane controlled access facility.

The phasing of the segments should begin with a focus on implementing the US 191 improvements first, and then begin the extensions to the west and finally, the extensions to the east. It would be

beneficial to have the route extend far enough so that it ties in with an arterial temporarily to maximize the use of the route and minimize the dead end situations. The preferred direction could be adjusted based on the timing of the right-of-way acquisition process.

The construction of the alternate route will occur mostly offline of any existing facilities. There will be some traffic impacts in the locations where the corridor ties into the existing US 70 and US 191 alignments and the arterials.

Support

There is support from the ADOT District, local agencies and public to pursue the development of an Alternate route corridor in the area. Based on the stakeholder interviews, Alternatives A & B were preferred. Alternative B was the most preferred of the two. The stakeholder input suggested that Alternative B is far enough away from town to provide for regional traffic, but close enough that it could still be used for local traffic and would provide development and in-fill opportunities.

2.3.3 ALTERNATIVE EVALUATION MATRIX

Based on the criteria described above, the following matrix, Table 2-7, has been developed to summarize the topics.

Table 2-11: Evaluation Matrix

EVALUATION CRITERIA	NO BUILD	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C1	ALTERNATIVE C2	ALTERNATIVE D	ALTERNATIVE E
Traffic Analysis (Level of Service) (* - ADT along US 191 from Discovery Park to Armory Rd & US 70 from 8th Ave to US 191)	• Travel Time: N/A minutes • Distance: N/A miles • Lowest Projected LOS (on US70): E (on US191): F • Greatest Volume on Alternate Route: N/A AADT • Greatest Volume on US70*: 46,500 AADT US191*: 81,600 AADT	• Travel Time: 26 minutes • Distance:30.2 miles • Lowest Projected LOS (on US70): F (on US191): F • Greatest Volume on Alternate Route: 16,200 AADT • Greatest Volume on US70*: 43,500 AADT US191*: 61,200 AADT	• Travel Time: 23 minutes • Distance: 26.5 miles • Lowest Projected LOS (on US70): E (on US191): F • Greatest Volume on Alternate Route: 22,700 AADT • Greatest Volume on US70*: 42,200 AADT US191*: 48,000 AADT	• Travel Time: 8 minutes • Distance: 9.0 miles • Lowest Projected LOS (on US70): E (on US191): F • Greatest Volume on Alternate Route: 27,100 AADT • Greatest Volume on US70*: 39,000 AADT US191*: 54,500 AADT	• Travel Time: 10 minutes • Distance: 11.3 miles • Lowest Projected LOS (on US70): E (on US191): F • Greatest Volume on Alternate Route: 31,400 AADT • Greatest Volume on US70*: 37,400 AADT US191*: 50,100 AADT	• Travel Time: N/A minutes • Distance: N/A miles • Lowest Projected LOS (on US70): E (on US191): D • Greatest Volume on Alternate Route: 22,700 AADT • Greatest Volume on US70*: N/A US191*: 53,800 AADT	• Travel Time: 9 minutes • Distance: 9.2 miles • Lowest Projected LOS (on US70): N/A (on US191): F • Greatest Volume on Alternate Route: 55,100 AADT
Safety	• Maintains high regional and local traffic volumes in city center • Driveway and intersection conflicts remain • Conflicts with multi-modal traffic	• Access control policy eliminates driveways and intersection conflicts like on the existing US70 and US191 • Minimizes conflicts with pedestrians by moving out of city center • Decreases traffic volume traveling through the US 70 / US 191 traffic signal	• Access control policy eliminates driveways and intersection conflicts like on the existing US70 and US191 • Minimizes conflicts with pedestrians by moving out of city center • Decreases traffic volume traveling through the US 70 / US 191 traffic signal	• Access control policy eliminates driveways and intersection conflicts like on the existing US70 and US191 • Decreases traffic volume traveling through the US 70 / US 191 traffic signal	• Access control policy eliminates driveways and intersection conflicts like on the existing US70 and US191 • Decreases traffic volume traveling through the US 70 / US 191 traffic signal	• Poor: Requires an increase in speed limit along segments • Maintains high regional and local traffic volumes in city center • Driveway and intersection conflicts remain • Conflicts with multi-modal traffic	• Access control policy eliminates driveways and intersection conflicts like on the existing US70 and US191 • Minimizes conflicts with pedestrians by moving out of city center • In combination with Alternative B, there is a decrease in traffic volume traveling through the US 70 / US 191 traffic signal

Access	• No change in existing access policy	• Access controlled with intersections identified at minimum 2 mile spacing • Opportunity for future property development at intersection locations • Greater distance from city center may minimize in-fill development opportunities along arterial extensions	• Access controlled with intersections identified at minimum 2 mile spacing • Opportunity for future property development at intersection locations • Reasonable distance from city center to promote in-fill development opportunities along arterial extensions	• Access controlled with intersections identified at minimum 2 mile spacing • Opportunity for future property development at intersection locations • Closest distance from city center to promote in-fill development opportunities along arterial extensions	• Access controlled with intersections identified at minimum 2 mile spacing • Opportunity for future property development at intersection locations • Closest distance from city center to promote in-fill development opportunities along arterial extensions	• No change in existing access policy	• Access controlled with intersections identified at minimum 2 mile spacing • Opportunity for future property development at intersection locations • Reasonable distance from city center to promote in-fill development opportunities along arterial extensions
Environmental Impacts	• None	• Moderate: New roadway across previously undeveloped land • Native American cultural sites in the area • 2-bridges, 1-concrete box culvert & 35-pipe culverts construction across existing washes	• Moderate: New roadway across previously undeveloped land • Native American cultural sites in the area • 1-bridges, 1-concrete box culvert & 31-pipe culverts construction across existing washes	• Minimal: New roadway across agricultural property • 0-bridges, 0-concrete box culvert & 16-pipe culverts construction across existing washes	• Minimal: New roadway across agricultural property • 0-bridges, 0-concrete box culvert & 22-pipe culverts construction across existing washes	• Moderate: Improvements could conflict with historic properties • Increased air/noise impacts by maintaining regional traffic through city center	• Moderate: New roadway across previously undeveloped land • Native American cultural sites in the area • 0-bridges, 2-concrete box culvert & 14-pipe culverts construction across existing washes
Cost (Assumed annual inflation rate of 3%)	• Current: $ 0 • Future (2040): $ 0	• Current: $ 212 M • Future (2040): $ 516 M	• Current: $ 191 M • Future (2040): $ 465 M	• Current: $ 66 M • Future (2040): $ 159 M	• Current: $ 82 M • Future (2040): $ 199 M	• Current: $ N/A • Future (2040): $ N/A	• Current: $ 69 M • Future (2040): $ 166 M

Implementation	• None	• Right-of-way acquisition can start • Roadway can be built in phases to the west, then east • Can build in segments with temporary terminal points at existing arterials • Would be longest distance for arterial street extension to new alignment	• Right-of-way acquisition can start • Roadway can be built in phases to the west, then east • Can build in segments with temporary terminal points at existing arterials • Would be moderate distance for arterial street extension to new alignment	• Right-of-way acquisition can start • May be too close to city center, thus conflicting with local agency arterial improvements • Can build in segments with temporary terminal points at existing arterials • Would be shortest distance for arterial street extension to new alignment	• Right-of-way acquisition can start • Roadway can be built in phases to the west, then east • Can build in segments with temporary terminal points at existing arterials • Would be shortest distance for arterial street extension to new alignment	• Improvements can be done in segments • Required increase in speed limits may be fatal flaw • Residential right-of-way acquisition needed	• Right-of-way acquisition can start • Can build in segments with temporary terminal points at existing arterials • Would be moderate distance for arterial street extension to new alignment
Support	• Maintains status quo	• Provides most regional traffic benefit, by avoiding city center • Avoids US 70 / US 191 intersection capacity issues • Avoids the most agricultural property, using the foothills instead	• Provides good regional traffic benefit, by avoiding city center • Provides some local traffic benefit by being closer to city center • Avoids US 70 / US 191 intersection capacity issues • Avoids some agricultural property, using the foothills instead	• Provides good local traffic benefit, by being closer to city center • Provides less regional traffic benefit by being close to city center • Avoids US 70 / US 191 intersection capacity issues • May effect already developed property and residents	• Provides good local traffic benefit, by being closer to city center • Provides less regional traffic benefit by being close to city center • Avoids US 70 / US 191 intersection capacity issues • May effect already developed property and residents	• Changes the size and speed of the existing US 70 & US 191, conflicting with city center feel • Provides little regional traffic benefit by remaining in the city center • Fails to avoid US 70 / US 191 intersection capacity issues • Effects already developed property and residents	• Provides good opportunity to secure access control • Provides some local traffic benefit by being closer to city center • Avoids US 70 / US 191 intersection capacity issues

2.3.4 FATAL FLAW ANALYSIS

A fatal flaw analysis has been completed on the identified alternatives prior to the final selection of the preferred alternative. The design team is not currently aware of fatal flaws for the advanced alternatives.

2.4 ENVIRONMENTAL OVERVIEW

2.4.1 INTRODUCTION

The Graham County Alternate Route Study is a preliminary assessment of the need for and feasibility of a new route connecting US 191 to US 70 that would provide an alternate route corridor around the City of Safford and Town of Thatcher, particularly the Safford city center area and the intersection of US 191 and US 70.

Coordination with federal, state, and local agencies and the public was conducted to obtain information about the environmental resources in the general study area. Specific information was also obtained to define the existing social, economic, and environmental characteristics of the study area and assist the study team in identifying particular constraints to be considered in the development and preliminary analysis of alternatives. Future analyses will address environmental considerations in detail, and specific mitigation measures will be identified as part of those analyses and documentation. The following sections of this Environmental Overview summarize current information for each environmental issue.

2.4.2 PHYSICAL AND NATURAL ENVIRONMENT TOPOGRAPHY/PHYSIOLOGY

The Graham County Alternate Route study area is located in the north portion of the Safford District, which encompasses all of Graham, Greenlee, and Cochise counties and portions of Pinal, Pima and Gila Counties. The public lands managed by the District lie within the Basin and Range Physiographic Province south of the Colorado Plateau. The area's northwesterly trending mountain ranges reach elevations of almost 11,000 feet. Separating these mountain ranges are broad, flat or gently sloping basins. Public lands range in elevation from about 1,900 feet to 7,500 feet. The study area is mostly in 0 to 5 percent slope and thus erosion is less likely to be a problem. However, some soils may cause poor drainage, which leads to erosion; therefore, specific soil characteristics should also be taken into consideration.

The study area crosses numerous drainages including Ash Creek, Big Spring Wash, Bigler Wash, Cottonwood Creek, Gila River, Graham Canal, Highline Canal, Holyoke Wash, Hunsacker Wash, Marijilda Creek, Markham Wash, Patterson Wash, San Jose Wash, Stockton Wash, Sunflower Canal, Swift Canyon Wash, and Yuma Wash.

Following are the slope types that are commonly found in the study area:

Escarpment, non-bedrock – A relatively continuous and steep slope or cliff, which generally is produced by erosion but can be produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is non-soil or very shallow soil.

Gully – A small channel with steep sides cut by running water through which water ordinarily runs only after a rain, or after ice or snow melts. It generally is an obstacle to wheeled vehicles and is too deep to be obliterated by ordinary tillage.

Short, steep slope – Narrow soil area that has slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Table 2-8 presents the soils that are commonly found in the study area.

Table 2-12: Soil in Study Area

Soil on Flood Plains and Alluvial Fans	
Guest-Gila-Glendale	Deep, well drained, nearly level to gently sloping, clayey, silty, and loamy soils; on flood plains and alluvial fans
Soils on Fan Terraces and Hillsides	
Haplargids-Calciorthids-Torriorthents	Deep, well drained, moderately sloping to very steep, loamy to clayey soils; on highly dissected hills
Tres Hermanos-Pinaleno-Whitlock	Deep, well drained, gently sloping to moderately steep, very gravelly and loamy soils; on fan terraces and hillsides
Peloncillo-Tapco-Artesia	Very shallow to moderately deep, well drained, gently sloping to moderately steep, loamy, very gravelly, and clayey soils; on fan terraces
Warm Soils on Mountains	
Limpia-Graham-Atascosa	Very shallow and deep, well drained, moderately sloping to very steep, clayey, loamy, and very gravelly soils; on mountains

Source: U.S. Department of Agriculture Soil Conservation Service

Vegetation

Much of the study area lies within the Arizona Upland division Sonoran desertscrub characterized by leguminous trees such as foothills paloverde (Parkinsonia microphylla), ironwood (Olneya tesota), and mesquites (Prosopis spp.). Cacti are abundant and include the saguaro cactus (Carnegia gigantea), cholla (Cylindropuntia spp.), barrel cactus (Ferocactus spp.), and pincushion cactus (Mammillaria spp.). Annual precipitation generally ranges between 12 and 17 inches, with summer rainfall accounting for 30 to 60 percent of the annual total. Elevations range from approximately 980 to above 3,280 feet (Brown 1994).

Biology

Threatened, endangered and sensitive species

The US Fish and Wildlife Service (USFWS) list of federally endangered, threatened, proposed, and candidate species for Graham County (USFWS 2008) is presented in Table 2-9. Table 2-9 includes the USFWS list of federally listed species for Graham County that may occur in the study area and also includes their potential habitat requirements.

Table 2-13: USFWS Federally Listed Species

Name	Scientific Name	Status	Habitat
Apache (Arizona) trout	Oncorhynchus apache	Threatened	Presently restricted to cold mountain streams with many low gradient meadow reaches. Elevation >5,000 ft
Arizona cliffrose	Purshia subintegra	Endangered	White limestone soils derived from teritiary lakebed deposits Elevation < 4,000 ft
Bald eagle	Haliaeetus leucocephalus	Threatened	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey. Elevation Varies
California Brown Pelican	Pelecanus occidentalis californicus	Proposed Delisted	Coastal land and islands; species found around many Arizona lakes and rivers. Elevation Varies
Chiricahua leopard frog	Lithobates [Rana] chiricahuensis	Threatened	Streams, rivers, backwaters, ponds, and stock tanks that are mostly free from introduced fish, crayfish, and bullfrogs. Elevation 3,300-8,900 ft
Desert pupfish	Cyprinodon macularius	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water. Elevation < 5,000 ft
Gila chub	Gila intermedia	Endangered	Pools, springs, cienegas, and streams. Elevation 2,000 - 5,500 ft
Gila topminnow	Poeciliopsis occidentalis occidentalis	Endangered	Small streams, springs, and cienegas vegetated shallows. Elevation < 4,500 ft
Lesser long-nosed Bat	Leptonycteris curasoae yerbabuenae	Endangered	Desert scrub habitat with agave and columnar cacti present as food plants. Elevation < 6,000 ft
Loach minnow	Tiaroga cobitis	Threatened	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important. Elevation <8,000 ft
Mexican gray wolf	Canis lupus baileyi	Endangered	Chapparal, woodland, and forested areas. May cross desert areas. Elevation 4,000 -12,000 ft
Mexican spotted owl	Strix occidentalis lucida	Threatened	Nests in canyons and dense forests with multilayered foliage structure. Elevation 4,100-9,000 ft
Mount Graham red Squirrel	Tamiasciurus hudsonicus grahamensis	Endangered	Montane upper elevation matures to old-growth conifer forest. Elevation > 8,000 ft

Razorback sucker	Xyrauchen texanus	Endangered	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters. Elevation < 6,000 ft
Southwestern willow flycatcher	Empidonax traillii extimus	Endangered	Cottonwood/willow and tamarisk vegetation communities along rivers and streams. Elevation <8,500 ft
Spikedace	Meda fulgida	Threatened	Moderate to large perennial streams with gravel cobble substrates and moderate to swift velocities over sand and gravel substrates. Recurrent flooding and natural hydrograph important. Elevation < 6,000 ft
Headwater chub	Gila nigra	Candidate	Small to medium-sized streams, often associated with deep pools and cover such as boulders or vegetation. Elevation 3,000 - 6,700 ft
Yellow-billed cuckoo	Coccyzus americanus	Candidate	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries). Elevation < 6,500 ft
Wet Canyon talussnail	Sonorella macrophallus	Conservation Agreement	Talus slopes in heavily vegetated area of Wet Canyon (Pinaleno Mountains). Elevation 6,050

Source: USFWS 2008

Arizona Wildlife of Special Concern

Within the state, the Arizona Game and Fish Department (AGFD) recognize many species as sensitive and designated them as Wildlife of Special Concern (WSC) in Arizona. WSC species are suspected to occur in the study area are shown in Table 2-10.

Table 2-14: Arizona Wildlife Special Concern

Common Name	Scientific Name
Lowland Leopard Frog	*Lithobates yavapaiensis*
Common Black-Hawk	*Buteogallus anthracinus*
Western yellow-billed Cuckoo	*Coccyzus americanus occidentalis*
Southwestern Willow Flycatcher	*Empidonax traillii extimus*
American Peregrine Falcon	*Falco peregrinus anatum*
Mexican Spotted Owl	*Strix occidentalis lucida*
Desert Pupfish	*Cyprinodon macularius*
Gila Chub	*Gila intermedia*
Gila Topminnow	*Poeciliopsis occidentalis occidentalis*
Loach Minnow	*Tiaroga cobitis*
California Leaf-nosed Bat	*Macrotus californicus*
Pima Indian Mallow	*Abutilon parishii (salvage restricted)*
Narrow-headed Garter Snake	*Thamnophis rufipunctatus*
Yuma Myotis	*Myotis yumanensis*
Greater Western Mastiff Bat	*Eumops perotis californicus*

Forest Service Sensitive Species

The USDA Forest Service (USDA FS) recognizes many species as sensitive and designates them as Forest Sensitive Species. Several of these species are known or are suspected to occur within the study area, shown in Table 2-11.

Table 2-15: USDA FS Forest Sensitive Species

Common Name	Scientific Name
Lowland Leopard Frog	*Lithobates yavapaiensis*
Common Black-Hawk	*Buteogallus anthracinus*
Western yellow-billed Cuckoo	*Coccyzus americanus occidentalis*
Southwestern Willow Flycatcher	*Empidonax traillii extimus*
American Peregrine Falcon	*Falco peregrinus anatum*
Mexican Spotted Owl	*Strix occidentalis lucida*
Gila Chub	*Gila intermedia*
Loach Minnow	*Tiaroga cobitis*
California Leaf-nosed Bat	*Macrotus californicus*
Obsolete Viceroy Butterfly	*Limenitis archippus obsoleta*
Pima Indian Mallow	*Abutilon parishii*
A Sedge	*Carex chihuahuensis*
Arizona Alum Root	*Heuchera glomerulata*
Branching Penstemon	*Penstemon ramosus*
Superb Beardtongue	*Penstemon superbus*
Giant Spotted Whiptail	*Aspidoscelis burti stictogrammus*
Narrow-headed Garter Snake	*Thamnophis rufipunctatus*
Western Burrowing Owl	*Athene cunicularia hypugaea*
Gila Longfin Dace	*Agosia chrysogaster chrysogaster*
Sonora Sucker	*Catostomus "Pantosteus" insignis*
Speckled Dace	*Rhinichthys osculus*
Desert Sucker	*Catostomus "Pantosteus" clarki*
Cave Myotis	*Myotis velifer*

Source: USDA FS, 2008

Wildlife movement corridors

Arizona's wildlife linkages assessment project conducted by the Arizona Department of Transportation (ADOT) identified wildlife linkage zones that are important to maintaining wildlife habitat connectivity and biodiversity in the state. The study area belongs to a fracture zone that are areas of reduced permeability between habitat blocks. Most fracture zones need significant restoration to function as reliable linkages. Portions of the fracture zone are designated as potential linkage zones (PLZ) i.e. an area critical to wildlife movement. None of the fracture zones in the study area are designated as PLZ.

Hydrology

Floodplains

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for the study area indicated that several floodplains are in the study area; Cottonwood Wash, Cactus Flat, Marijilda Wash, and Foote Draw. The floodplains in the study area are designated under Zone X, defined as "Areas of 0.2% annual chance flood; areas of 1% annual flood with average depths of less than 1 foot or with drainage area less than 1 square mile; and areas protected by levees from 1% annual chance flood". The following FEMA maps cover the study area:

04009CIND0A	04009C1550D	04009C1503D
04009C1501D	04009CIND0A	04009C1515D
04009C1503D	04009C1483D	04009CIND0A
04009C1504D	04009C1484D	04009C1239D
04009C1508D	04009C1491D	04009C1250D
04009C1509D	04009C1492D	04009C1500D
04009C1510D	04009C1500D	
04009C1515D	04009C1501D	

Impacts to floodplains will need to be addressed in the environmental document for this study.

Water Quality

A preliminary evaluation for the presence of potential jurisdictional waters (as defined under the Clean Water Act of 1977) was conducted in the project in the study area limits through a review of USGS topography maps. Named washes in the project area include Talley Wash, Cottonwood Wash, Peterson

Wash, Wilson Wash, Lone Star Wash, Tidwell Wash, Bennett Wash, Central Wash, Freeman Wash, Graveyard Wash, Cactus Flat, Marijilda Wash, and Foote Draw. These drainages typically exhibit the characteristics of jurisdictional Waters of the United States, as regulated by the U.S. Army Corps of Engineers (Corps). A jurisdictional determination of Waters will need to be conducted in conjunction with the preparation of the study's environmental document. In addition to a Clean Water Act Section 401 of the Clean Water Act and an Arizona Pollutant Discharge Elimination System permit per Section 402(p) of the Clean Water act will be required during final design from the Arizona Department of Environmental Quality.

Wetlands

Under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas". Additional investigations will need to occur to identify wetlands in the study area during development of the environmental document for this study.

Noise

Since the proposed project involves the construction of new through traffic lanes, the project will need to be evaluated in accordance with ADOT's Noise Abatement Policy, December 5, 2005. The policy was written to conform to the federal policy and guidelines as stated in Title 23 of the Code of Federal Regulations (CFR) Part 772. Construction noise will be controlled in accordance to the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction.

Air Quality

The federal Clean Air Act of 1970 established National Ambient Air Quality Standards (NAAQS) for six pollutants. These pollutants, referred to as the "Criteria Pollutants", include carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), particulate matter (PM), sulfur dioxide (SO2), and lead (Pb). The State of Arizona standards are identical to the NAAQS.

An air quality assessment will be needed to determine if this project will have any notable impact to air quality in the area. Some temporary deterioration of air quality may be expected due to the operation of construction zone. However, this will be a localized condition that will be discontinued when the project is completed. Fugitive dust generated from construction activities must be controlled in accordance with the Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, special provisions, and local rules or ordinances.

Hazardous Materials

The primary hazardous material concerns for the project area involve former and ongoing mining activities throughout the project vicinity. No specific mining related hazardous materials concerns were identified within the study area; however, all alternatives under consideration may intersect unidentified tunnels associated with former mines or mineral explorations. Such tunnels could potentially create a construction hazard or contain contaminated waters.

The Hazardous Waste Inspections and Enforcement Report, 2002 prepared by the Arizona Department of Environmental Quality listed Impressive Labels Inc facility in Safford; however reported no violation. The nature of contamination associated with this facility was high arsenic level in the soil. The facility is closed and is unlikely to affect construction activities in the study area.

4(f) (cultural resources, parks, recreation, refuges)

Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303) stipulates that the Federal Highway Administration (FHWA) may not approve the use of land from a significant publicly-owned part, recreation area, or wildlife and waterfowl refuge, or any significant historic site that is either listed, or eligible for listing, in the National Register of Historic Places (NRHP) under Criteria A, B, or C. Public schools are designated as Section 4 (f) resources if public access to and/or use of sports facilities (e.g. baseball diamonds, tracks) is permitted.

There are no wildlife or waterfowl refuge areas within the study area. There are multiple historic sites that are listed, or eligible for listing, in the NRHP under Criteria A, B, or C. There are several public schools in the study area that would be protected by Section 4(f) because they have sports facilities open to the public when school is not in session. Thus, a Section 4(f) analysis will be included in the development of the environmental document.

Socioeconomic Environment

Land Use

Jurisdiction and Ownership

Within the study area much of the land is privately owned in the City of Safford, Thatcher, and Pima. The adjacent lands are administered by the State Trust, US Forest Service, and Bureau of Land Management land (BLM).

Socioeconomic/Title VI

Title VI of the Civil Rights Act of 1964 and related statutes ensure that individuals are not excluded from participating in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, and disability. Executive Order 12890 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations directs that programs, policies, and activities identify and address as appropriate, disproportionately high and adverse human health and environmental effects on minority and low-income populations.

The data used for the environmental justice analysis were taken from Summary File 3 of the 2000 Census. Consideration was given in this analysis to the City of Safford, Thatcher, and Pima and to the county as a whole. Table 1-3 and 1-4 summarize the demographic data obtained from the 2000 Census for the cities. Demographic data for racial and ethnic groups, persons age 60 and older, disabled persons, persons living below the poverty level, and the number of households with a female head of the households with children under the age of 18 are included. The Department of Transportation Order on Environmental Justice defines low income as a median household income at or below the UD Department of Health and Human Services poverty guideline, which was $16.700 for a family of four in 1999.

According to the 2000 Census, the racial composition of the Graham County study area was predominantly white, with about 32.9 percent minorities. Racial and socioeconomic demographics for the study area are shown in Table 1-3 and 1-4.

There is no general clustering of Hispanic population in the study area, with some exception in the areas on the east and west boundaries of the study area. These are generally low density census blocks with population densities of fewer than 100 persons per square mile. There is a general clustering of non-white population in the city centers along US 70; however, the percentage generally does not exceed 25 percent. The percentage of female head of household is generally below county average with no discernable clustering. The percentage of population over 65 years of age is around county average, and with no discernable clustering. There is no general geographic clustering of environmental justice population based on Census 2000 information for this study area.

3 PREFERRED CORRIDOR

3.1 IDENTIFICATION OF PREFERRED ALTERNATIVE

3.1.1 SELECTION OF PREFERRED CORRIDOR ALTERNATIVE

ADOT, with input from the public and the project's TAC, has selected Alternative B as the Preferred Corridor Alternative. In selecting the preferred corridor, ADOT stipulated that this study presents a number of options for the improvement of an alternate route corridor that will be further analyzed and considered during the subsequent Design Concept Report, Environmental Analysis, and preliminary design phases of the project development. The Preferred Corridor Alternative represents an approximate mile wide corridor in which the final recommended roadway alignment may be developed.

The rationale and justification behind the selection of Alternative B as the preferred corridor are presented in the following paragraphs:

- Alternative B balances the needs of local and regional traffic within the study area. As shown in the various alternate route corridor alternatives LOS results (Figures 2-14 through 2-21), you can see that Alternatives C1 & C2 have a greater impact on the US 191 LOS than Alternative A does. This is because of the proximity of the new routes to the trip generation locations and destinations. Alternatives C1 & C2 will operate more as a part of the local arterial street system providing an alternative or extension to the local street system. While Alternative A is far enough away from the city center that it would be used for regional trips rather than local trips to the neighborhood businesses. Alternative B compromises to provide relief along US 191 by being close enough for local traffic to use, while still providing for regional traffic.

- Alternative B provides opportunity for in-fill development while minimizing the impact to the existing agricultural lands. By identifying the preferred corridor, the local agencies will be able to plan and develop arterial street extensions to connect to the new facility, thus providing access and opportunity for development. In addition, the proposed alignment is located in the undisturbed foothills/desert areas that exist generally to the south of the developed agricultural property. By avoiding the agricultural properties, the impacts to one of the major economic sources in the region will be minimized when compared to some of the other alternatives.

- There is support from the ADOT District, local agencies and public to pursue the development of an Alternate route corridor in the area. Based on the stakeholder interviews, Alternatives A & B were preferred. Alternative B was the most preferred of the two. The stakeholder input suggested that Alternative B is far enough away from town to provide for regional traffic, but close enough that it could still be used for local traffic and would provide development and in-fill opportunities.

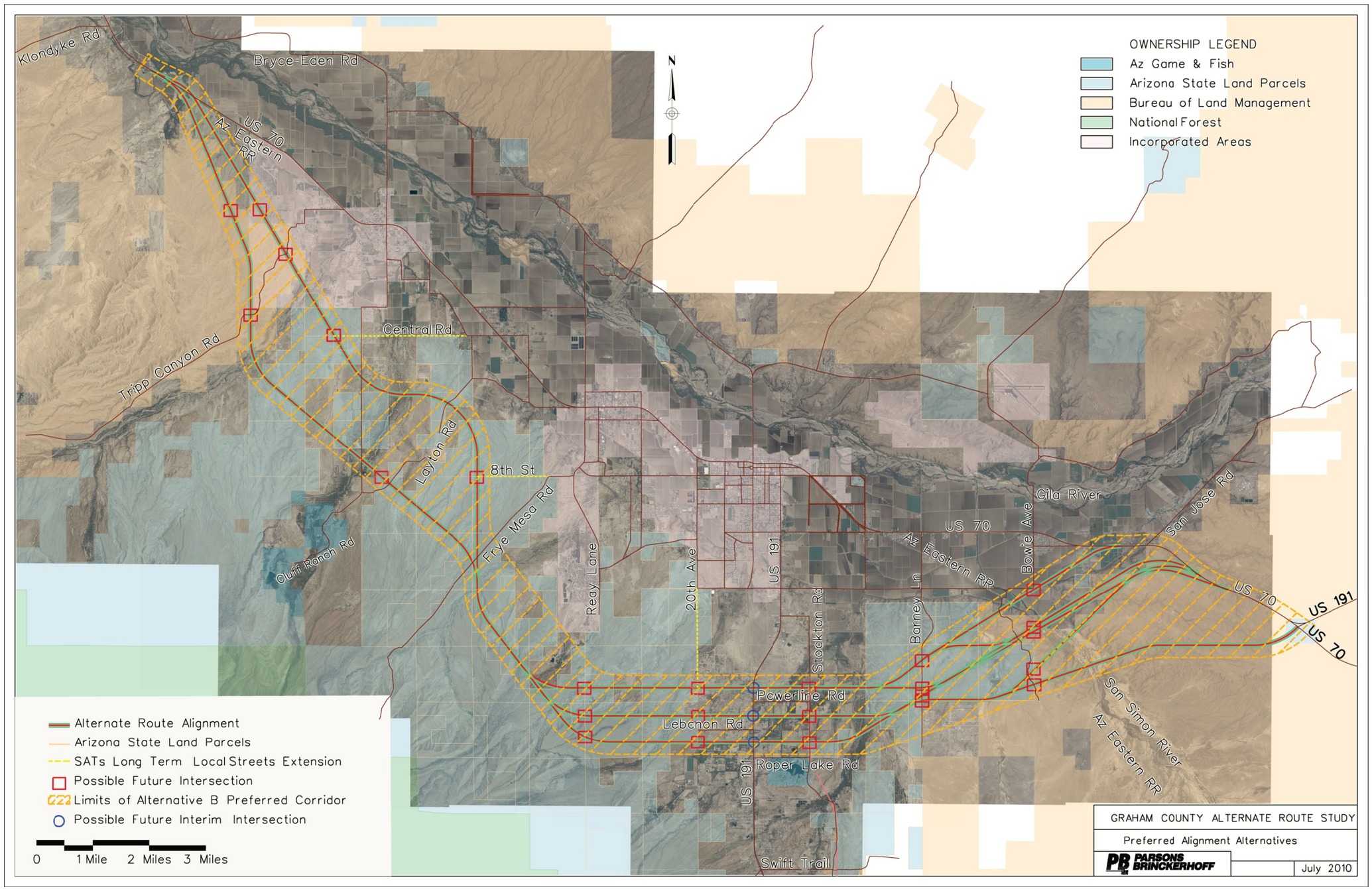
3.1.2 CHARACTERISTICS OF PREFERRED CORRIDOR

Alternative B focuses on the development of a corridor containing a new 4 lane divided highway facility within a 310' wide controlled access right-of-way corridor. Intersections/interchanges will be spaced a minimum of 2 miles apart. Figure 3-1 shows the Alternative B corridor limits (approximately 1 mile wide) as well as a few of the potential alignment alternatives that can be studied in a Design Concept Report.

The Preferred Corridor alternative connects US Route 191 with US Route 70, west of the Town of Pima and east of the City of Safford. It navigates to the west from Powerline Road and runs along the edge of Mount Graham foothills and then north where it connects to US Route 70. To the east the corridor runs along Powerline Road turning northeast as it crosses the Arizona Eastern Railroad and San Simon River, connecting to US Route 70 to the east of the San Jose Road.

The goal for this alternative is to provide for maximum traffic volumes as a reliever to US 70 and US 191 through the downtown areas, while providing a safe, high speed facility for regional traffic. This corridor is anticipated to carry between 3,900 and 33,300 vehicles per day by the year 2040, while removing between 8,200 and 38,000 vehicles from the US 191 segment from Powerline Road to the US 191/US 70 intersection and between 2,500 and 7,400 vehicles from the US 70 segment from Reay Lane to the US 191/US 70 intersection.

Figure 3-1: Preferred Corridor Alternative



3.1.3 OPTIONS AVAILABLE WITHIN THE PREFERRED CORRIDOR

West Tie-in

As shown in Figure 3-2, the Alternative B corridor tie-in to the US 70 is anticipated to occur between the Town of Pima and Klondyke Road. The Alternative B alignment will become the continuation of the US 70 mainline alignment and the access to the Old US 70 can be provided by developing a new tee intersection. Additional consideration will need to be made to create horizontal space between the new alignment and the existing Arizona Eastern RailRoad. It is assumed that the tie-in should accommodate a grade separated crossing of the railroad, with the highway going over.

US Route 191 Connection

As shown in Figure 3-3, the Alternative B corridor tie-in with US 191 is anticipated to occur in the area between Roper Lake Road and ~1/2 mile north of Powerline Road. Special consideration should be taken to evaluate the feasibility of maintaining access control when placing the alignment on existing sectional arterials (Powerline Road or Lebanon Road). The number of homes and utilities impacted should be studied. The preferred alignments may be a ¼ mile north or south of the existing arterials. Also in this area, the US 191 DCR project is currently evaluating the possibility of shifting the US 191 alignment to either the Stockton Road or 20th Ave alignments. The final intersection location of the Alternative B alignment and the relocated US 191 alignment will be determined preliminarily as a function of the US 191 DCR, then finalized as a part of a future Alternate Route DCR. The ultimate concept will be for the US 191 alignment to tee into the new Alternative B alignment, with US 191 and US 70 using the same alignment from this intersection to the US 70 / US 191 intersection east of the study area.

East Tie-in

As shown in Figure 3-4, the Alternative B corridor tie-in to the US 70 is anticipated to occur in the area of San Jose Road. The Alternative B alignment will become the continuation of the US 70 mainline alignment and the access to the Old US 70 can be provided by developing a new tee intersection. Additional consideration will need to be made to tie-in to the existing vertical grade, as the US 70 rises from the valley floor up onto the mesa as it continues to the east.

Figure 3-2: West Tie In

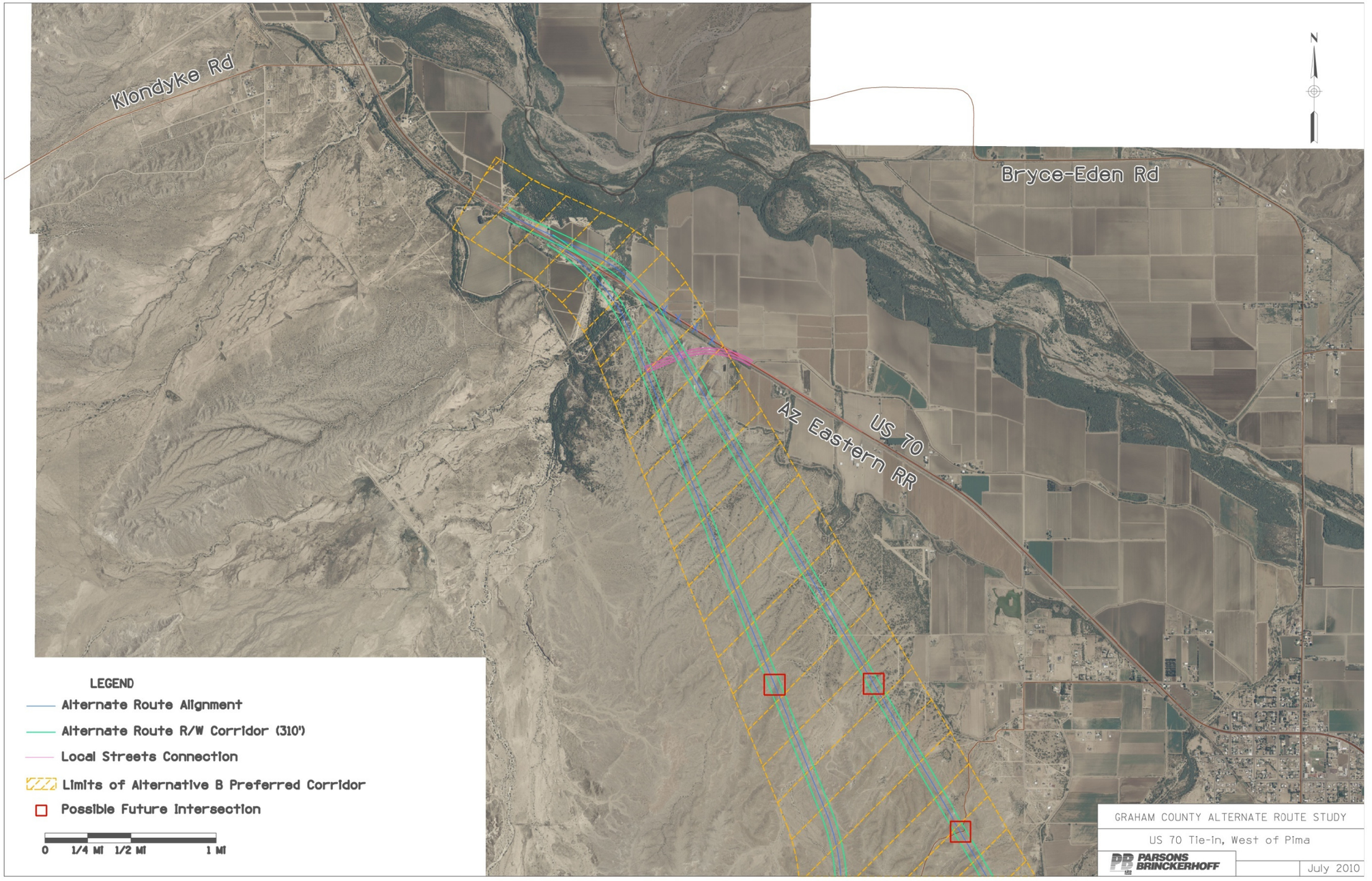


Figure 3-3: US Route 191 Connection

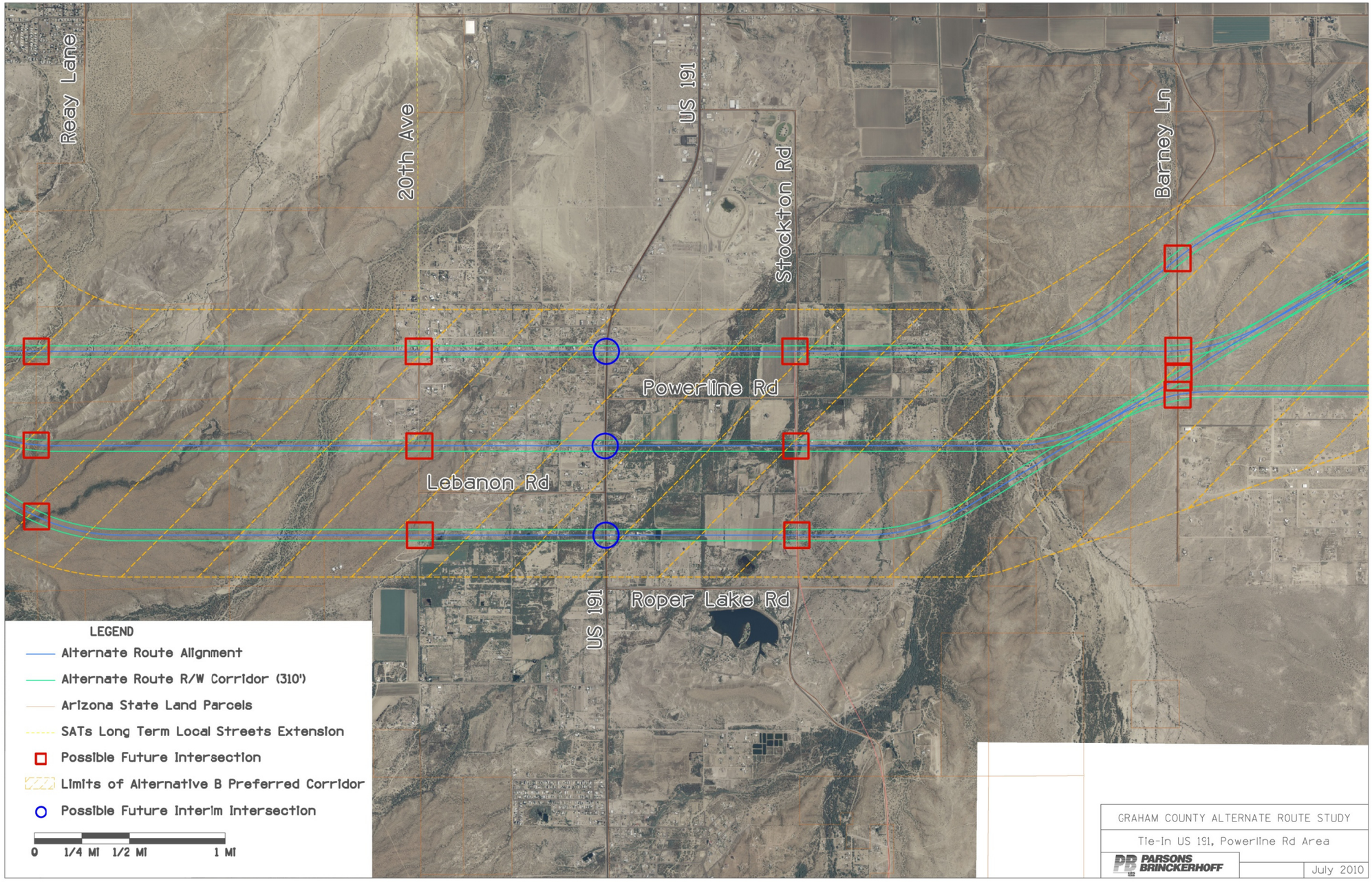
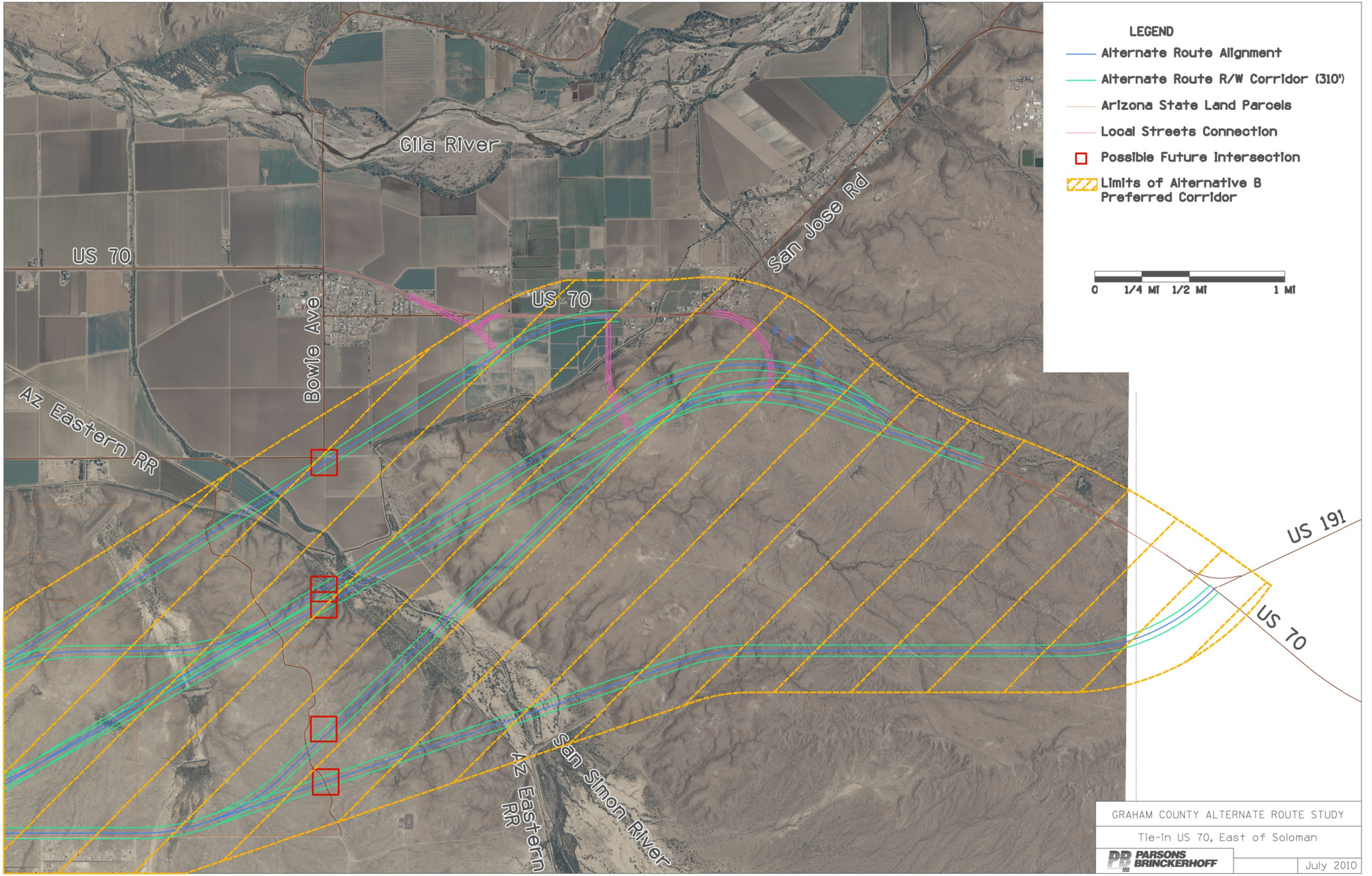


Figure 3-4: East Tie In



3.2 PREFERRED CORRIDOR ANALYSIS FINDINGS

3.2.1 COST TABLE

Table 3-1: Summary of Estimated Costs

PREFERRED CORRIDOR ALTERNATIVE: ALTERNATIVE B						
East Leg (Powerline Road/ existing US 191 to San Jose Road/US 70)						
Roadway Construction		Quantity	Unit	Unit Price	Current $ (2009)	Future $ (based on 2040 @ 3%)
Roadway Construction (4 lane divided)	Length	5.6	Miles	$3,500,000	$19,600,000	$47,570,000
Bridges	# of Bridges	1				
	Area (based on 2-40'wide* 500'long)	40,000	SF	$175	$7,000,000	$16,990,000
Construction Subtotal					$26,600,000	$64,560,000
Design & Construction Engineering				20%	$5,320,000	$12,912,000
Construction Total					$31,920,000	$77,472,000
Right-of-way						
	Area (based on 310' wide corridor)	210				
	# of intersections	4				
	Additional 45 acres per intersection	180				
	Subtotal	390	ACRE			
	BLM	135		$20,000	$2,700,000	
	State Land	107		$30,000	$3,210,000	
	Private	148		$40,000	$5,920,000	
	Total				$11,830,000	$28,710,000
Project Subtotal					$43,750,000	$106,182,000
Project Contigency				25%	$10,937,500	$26,545,500
EAST LEG TOTAL					**$54,687,500**	**$132,727,500**

Table 3-2: Summary of Estimated Costs (Continued)

West Leg (Powerline Road/ existing US 191 to US70/West of Pima)						
Roadway Construction		Quantity	Unit	Unit Price	Current $ (2009)	Future $ (based on 2040 @ 3%)
Roadway Construction (4 lane divided)	Length	16.5	Miles	$3,500,000	$57,750,000	$140,170,000
Bridges	# of Bridges	1				
	Area (based on 2-40'wide* 300'long)	24,000	SF	$175	$4,200,000	$10,190,000
Construction Subtotal					$61,950,000	$150,360,000
Design & Construction Engineering				20%	$12,390,000	$30,072,000
Construction Total					$74,340,000	$180,432,000
Right-of-way						
	Area (based on 310' wide corridor)	620				
	# of intersections	5				
	Additional 45 acres per intersection	225				
	Subtotal	845	ACRE			
	BLM	300		$20,000	$6,000,000	
	State Land	500		$30,000	$15,000,000	
	Private	200		$40,000	$8,000,000	
	Total				$29,000,000	$70,390,000
Project Subtotal					$103,340,000	$250,822,000
Project Contigency				25%	$25,835,000	$62,705,500
WEST LEG TOTAL					**$129,175,000**	**$313,527,500**
					Current $ (2009)	Future $ (based on 2040 @ 3%)
PREFERRED CORRIDOR ALTERNATIVE TOTAL					**$183,862,500**	**$446,255,000**

Basis of Cost Estimate

The 'conceptual level' costs given in this report were compiled from typical similar project costs and pre-established budgetary cost ranges for roadway classification types provided by ADOT. Unit prices were adjusted for local site conditions based on insight gained through site visits. The right-of-way costs are the most speculative and should be considered to have the widest variability because of the varying land ownerships such as BLM, Az State Trust Land and Private. The intention of the right-of-way acquisition process is to limit access to approximately 2 mile intervals which will be accomplished by purchase of access rights from underlying property owners allowing

for the development of a controlled access facility. The cost data should be considered very preliminary and understood to have a large margin of uncertainty. As the concepts and designs are refined in future project phases, the cost data will be improved and refined accordingly.

3.2.2 FINDINGS AND CONCLUSIONS

The following findings and conclusions can be made as a function of this Alternate Route Study:

1. The current and short term traffic issues for US 191 and US 70 within the City of Safford and Town of Thatcher can be addressed by the ongoing US 191 DCR study and currently programmed improvements along US 70. These ongoing improvements have been identified to reach capacity in 2025, at which time the Preferred Corridor Alternative should be implemented to relieve the congestion from the US 191 and US 70.
2. There are a number of different and viable alternatives that can be implemented to address the projected regional and local traffic volumes anticipated for this area.
3. The final solution will be arrived at during the subsequent phases of the project development; the Design Concept Report and Environmental Document.

3.2.3 PROJECT PHASING AND FUNDING

The improvements suggested as a function of this Alternate Route Study can be phased in over time in incremental component projects. This will allow ADOT, in cooperation with the City of Safford, Town of Thatcher, Town of Pima and Graham County, to plan, design and have constructed projects just ahead of warranted traffic volumes to avoid undue congestion.

The following list identifies a way to phase in the corridor:

1. With significant portions of the preferred corridor being on BLM or Arizona State Land property, an early approach to right-of-way acquisition will help to avoid conflict with proposed development in the area and possibly secure dedicated right-of-way at a discounted price. As soon as the DCR and environmental process identifies the preferred alignment then right-of-way should be acquired.
2. The proposed 4 lane divided improvements can be implemented in phases, beginning with the construction of 2 lanes (1 lane in each direction) with simple stop controlled intersections at the key crossroads. Then as traffic volumes warrant the other 2 lanes can be constructed with possible signal controlled intersections, and then finally grade separated traffic interchanges.
3. In order to develop segments that can be used as the corridor is completed; the improved arterial crossroads can be used as detours, avoiding temporary dead end situations. Currently, the corridor construction will be most effective beginning at the US 191 / Powerline Road area

moving to the west to the 20th Ave arterial extension and to the east to the US 70 east tie-in. After the completion of the eastern leg, then completion of the western leg should be the priority.

This project has not been programmed yet, therefore it is not on a priority funding program. As the congestion increases as projected along the US 70 and US 191, this corridor will become a significant priority for the region as future capacity improvements to the US 70 and US 191 alignments through town will not be economically or environmentally feasible.

There should be consideration to advancing some of the proposed improvements of the preferred corridor in the US 191 tie-in area near Powerline Road where the ultimate US 191 alignment will tee in to the preferred corridor alignment. For continuance of the state highway system, the ultimate US 191 alignment will need to be reconnected to the existing US 191 alignment until the rest of the preferred corridor alignment can be completed.

There can be some consideration to making the new corridor a tolled facility or managed lane facility. Possibly a public-private partnership could be used to finance the infrastructure. However, due to the destinations, routes to the destinations, and the distribution of regional and local traffic, this option does not appear to be feasible. There is not a significant travel time and expense savings with any of the alternatives to attract users to pay a toll and provide a revenue stream to retire the bonds needed to build the improvements.

Because the need is not immediate, traditional programming and funding will be required for the proposed facility. The funding sources will be revisited and examined more closely during the DCR/EA phase of the project. One such source may be local development fees collected in association with the planned developments in the study area.

3.2.4 PUBLIC INPUT

An initial open house was held for the Alternate Route Study on August 7th, 2008, to present an overview of the study and summary of the existing and future roads level of service. Alternate route focus area, future work tasks and the project schedule were also presented. The meeting was intended to be informative while gathering public input on issues and opportunities to be considered during the study. The comments from the meeting suggested the alternate route for the state routes US 70 and US 191 be located in mainly three specific areas i.e. to the north along Gila River, to the east of Artesia Road, or to the west on Bureau of Land management (BLM) land.

A second public open house was held April 29th, 2009 to present the determination of need for the alternate route corridor and show the preliminary corridor alternatives. The meeting was intended to be informative while gathering public input on issues and opportunities to be considered during the

study. The comments from the meeting suggested the alternate route corridor for US 70 and US 191 follow either the alternative AE2 or C1D3 alignment as shown on Figure 2.1.8 Preliminary Corridor Alternatives – 3rd Refinement. This would provide an opportunity to decrease the traffic on US 70 and US 191 while providing an opportunity to develop in the infill area.

The final public input solicitation was a series of individual stakeholder interviews with the local community members and local agency managers, exclusive of the Technical Advisory Committee (TAC) members, held on June 9 & 10, 2009. The format of the interviews was introductions, followed by a brief presentation of the project and the current alternate route corridor alternatives, then a series of 8 questions were discussed with each interview group. The general consensus of the interviews were that the alternate route corridor must be far enough away from the town center to provide higher speed facilities, but still be close enough to promote development and in-fill opportunities.

4 APPENDIX

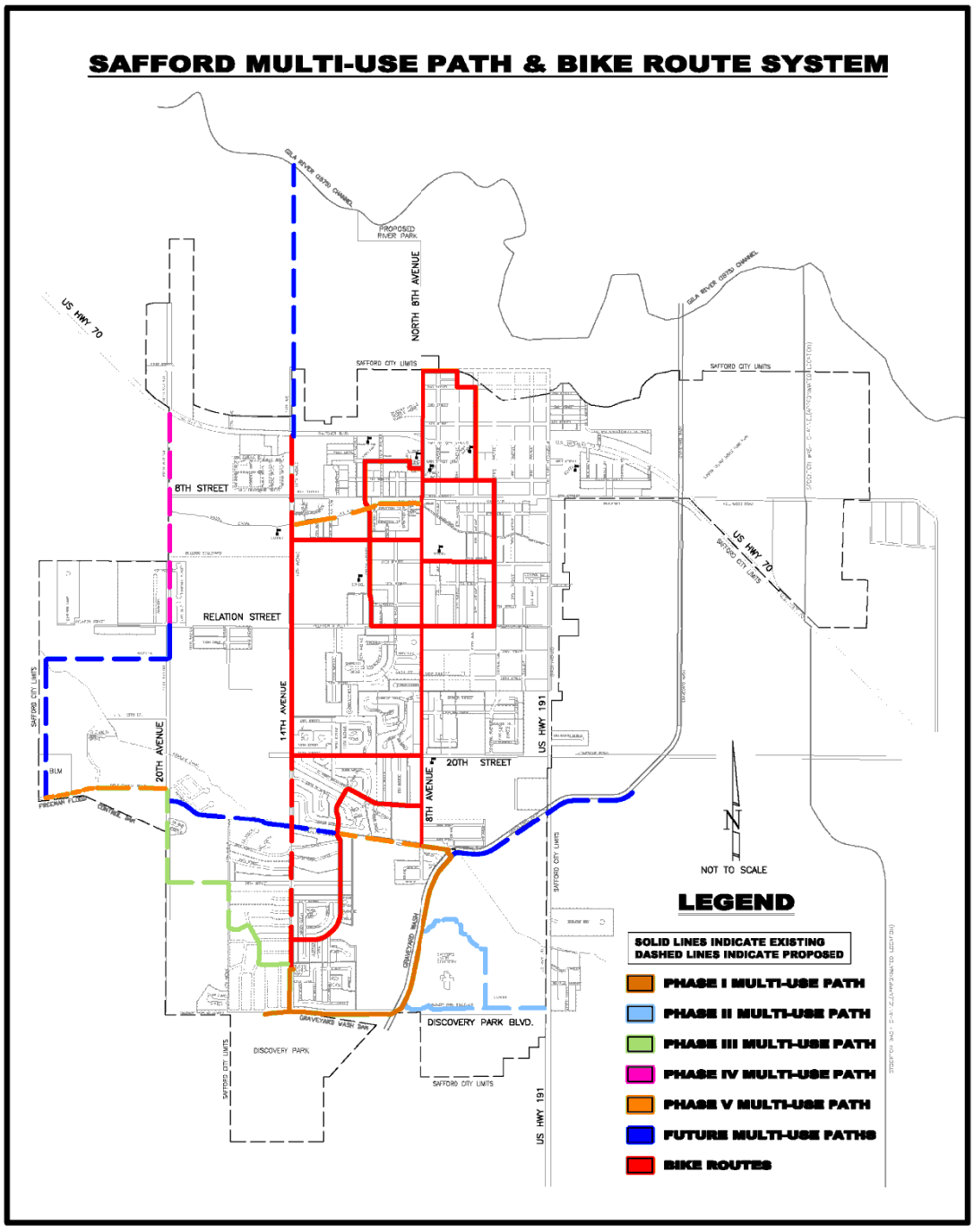
4.1 APPENDIX 1A: EXISTING POPULATION

TAZ	Existing Population	TAZ	Existing Population
1	112	40	1,057
2	462	41	1,094
3	132	42	942
4	125	43	1,024
5	299	44	210
6	1,258	45	334
7	526	46	785
8	133	47	392
9	548	48	281
10	57	49	316
11	55	50	32
12	69	51	286
13	713	52	882
14	285	53	385
15	2,527	54	8
16	309	55	68
17	247	56	95
18	205	57	429
19	95	58	1,250
20	814	59	8
21	913	60	234
22	60	61	39
23	906	62	115
24	528	63	432
25	181	64	71
26	683	65	275
27	738	66	42
28	1,846	67	44
29	1,232	68	127
30	1,225	69	50
31	112	70	0
32	111	71	0
33	796	72	0
34	131	73	20
35	60	74	155
36	961	75	0
37	30	76	25
38	850	**Total**	**34,270**
39	2,429		

4.2 APPENDIX 1B: EXISTING EMPLOYMENT

TAZ	Existing Employment	TAZ	Existing Employment
1	58	40	129
2	158	41	113
3	72	42	250
4	59	43	762
5	93	44	1,110
6	167	45	155
7	161	46	586
8	19	47	62
9	56	48	134
10	16	49	33
11	16	50	55
12	45	51	26
13	17	52	72
14	22	53	61
15	9	54	50
16	94	55	55
17	74	56	144
18	70	57	50
19	182	58	490
20	149	59	45
21	246	60	160
22	49	61	31
23	24	62	72
24	612	63	72
25	891	64	58
26	107	65	120
27	629	66	2
28	182	67	3
29	57	68	528
30	13	69	4
31	8	70	0
32	0	71	4
33	15	72	1
34	15	73	71
35	160	74	11
36	107	75	0
37	5	76	0
38	149	**Total**	**10,132**
39	44		

4.3 APPENDIX 1C: AREA BICYCLE AND MULTIUSE PLANS



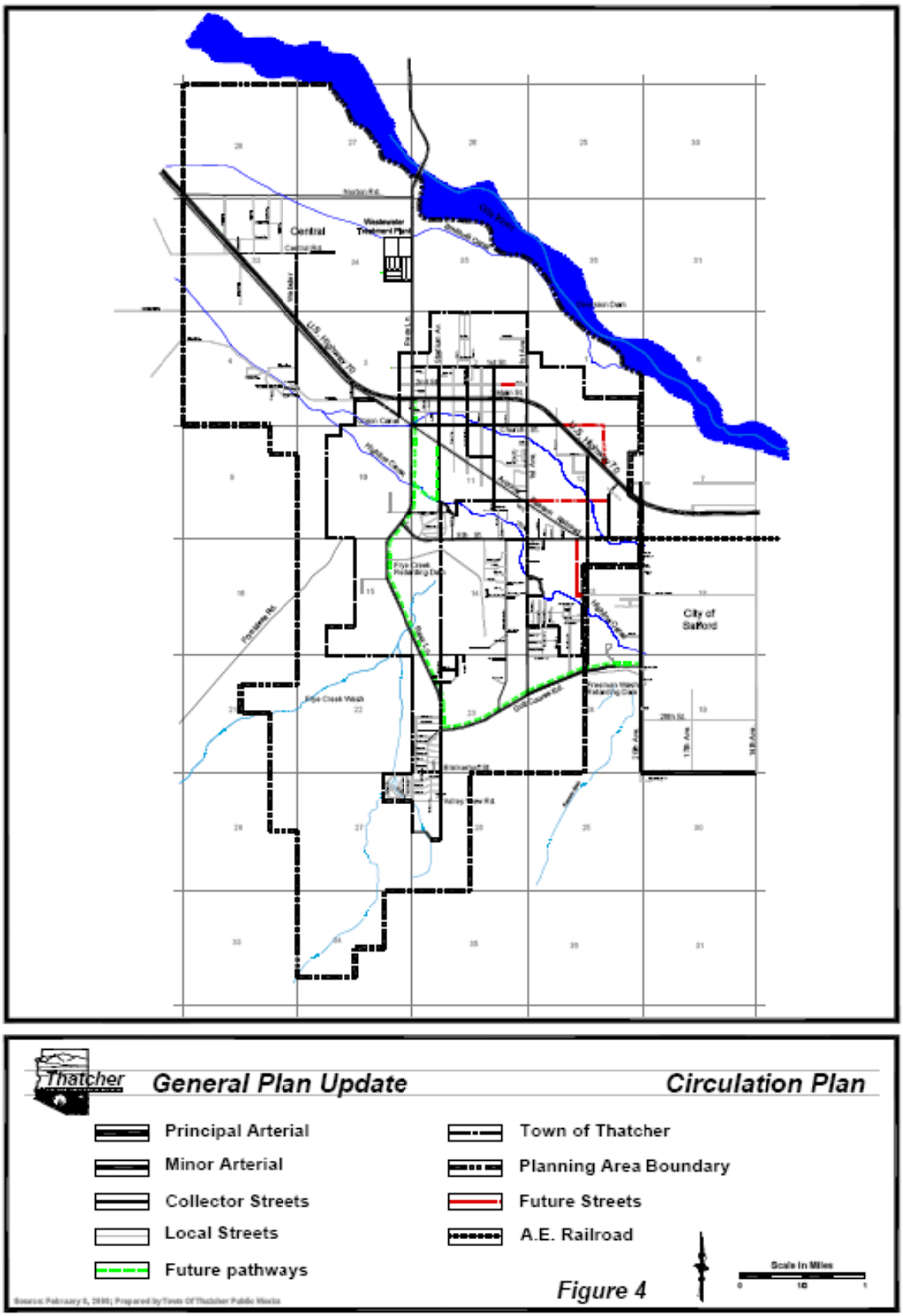

Thatcher
General Plan Update
Circulation Plan
Principal Arterial
Minor Arterial
Collector Streets
Local Streets
Future pathways
Town of Thatcher
Planning Area Boundary
Future Streets
A.E. Railroad
Scale in Miles
Central
City of Safford

Figure 4

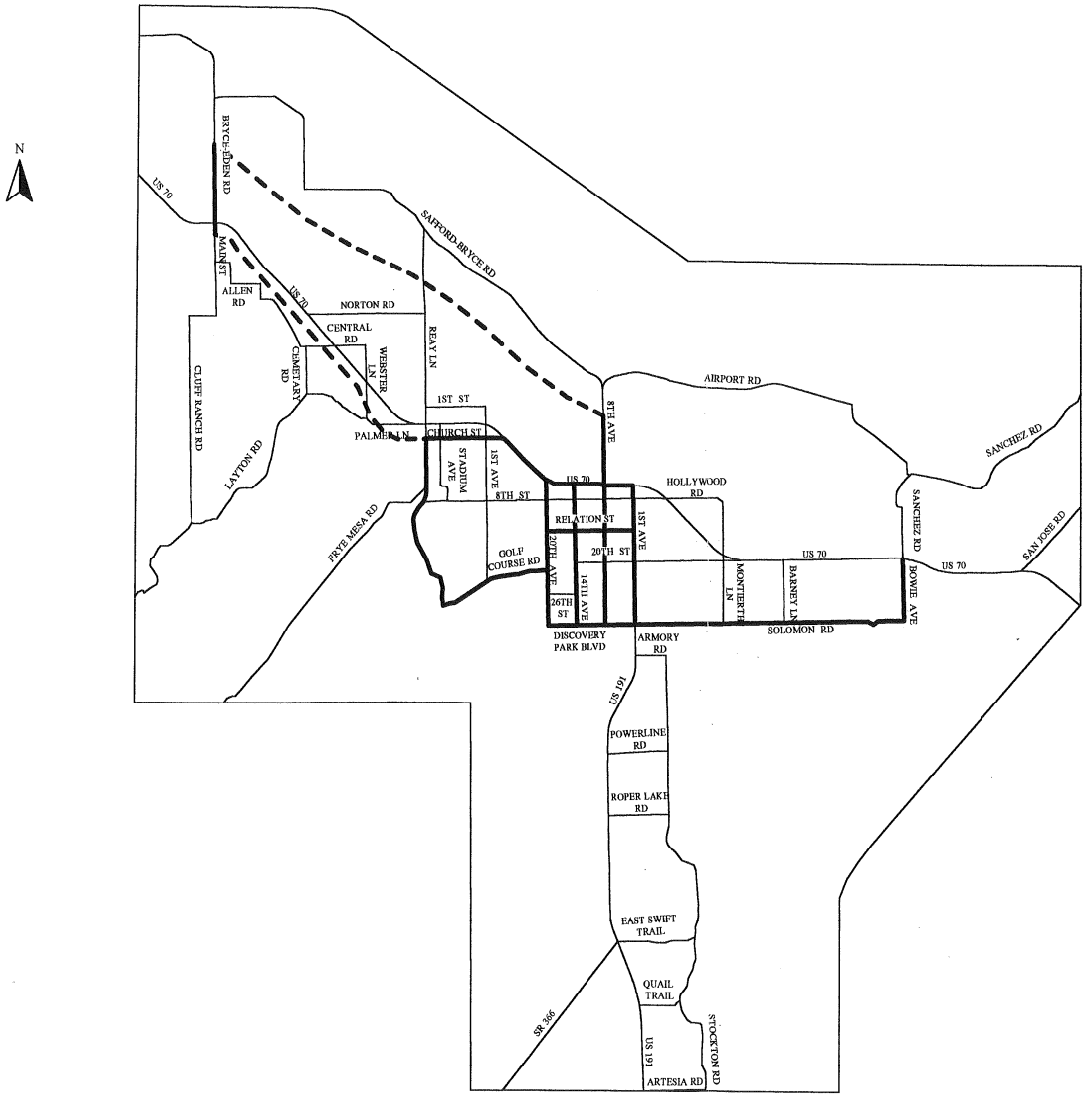


FIGURE 8-3
BICYCLE ELEMENT

Lima & Associates

1998 Graham County Transportation Plan – Page 81

4.4 APPENDIX 2A: PREVIOUSLY IDENTIFIED STUDY CORRIDORS

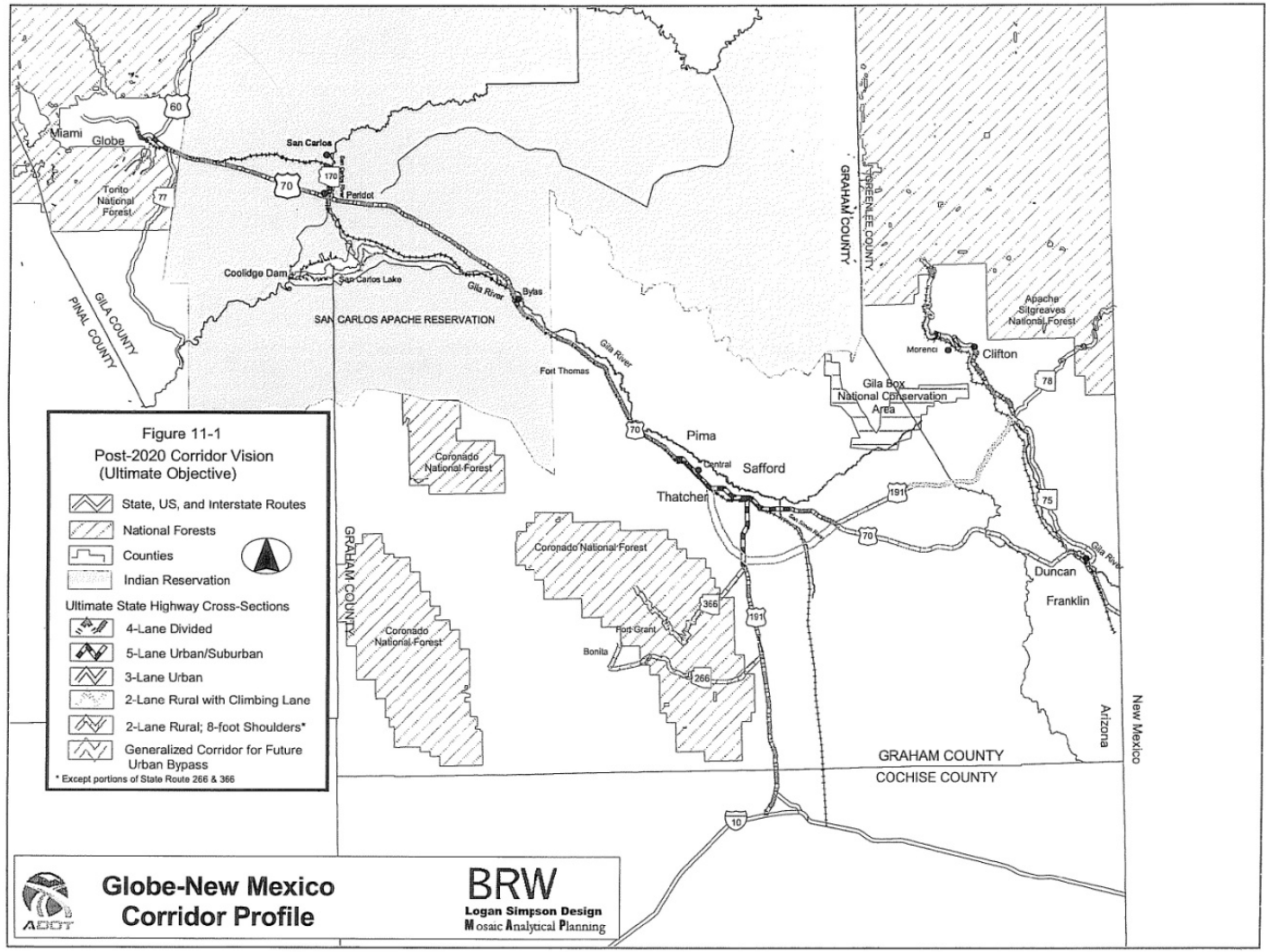
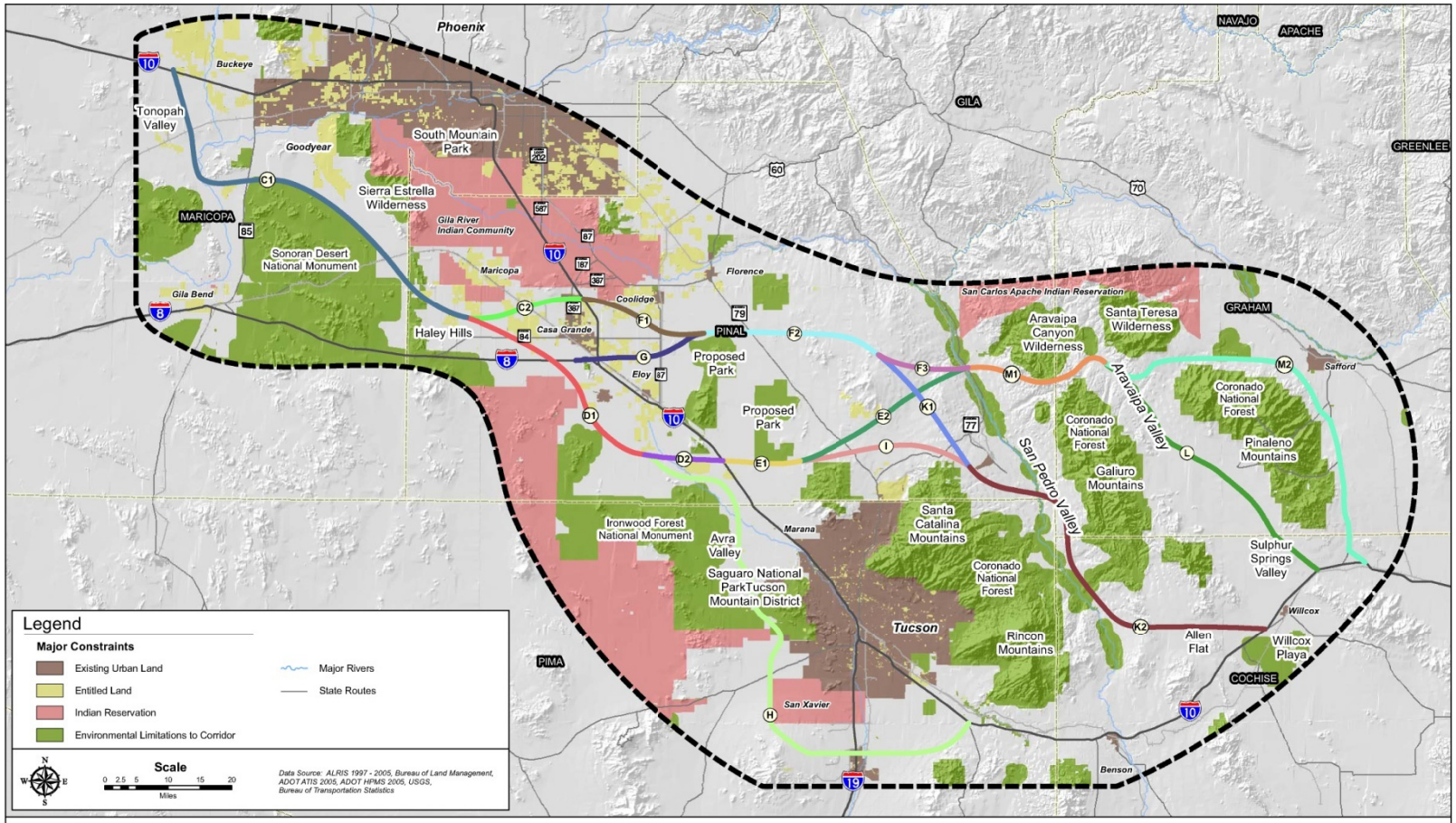


Figure 11-1
Post-2020 Corridor Vision
(Ultimate Objective)
State, US, and Interstate Routes
National Forests
Counties
Indian Reservation
Ultimate State Highway Cross-Sections
4-Lane Divided
5-Lane Urban/Suburban
3-Lane Urban
2-Lane Rural with Climbing Lane
2-Lane Rural; 8-foot Shoulders*
Generalized Corridor for Future Urban Bypass
* Except portions of State Route 266 & 366
Globe-New Mexico
Corridor Profile
BRW
Logan Simpson Design
Mosaic Analytical Planning
Miami
Globe
San Carlos
Peridot
Coolidge Dam
San Carlos Lake
Gila River
Bylas
SAN CARLOS APACHE RESERVATION
Fort Thomas
Pima
Central
Safford
Thatcher
Morenci
Clifton
Gila Box
National Conservation
Area
Apache
Silgreaves
National Forest
Coronado
National Forest
Fort Grant
Bonita
Duncan
Franklin
GILA COUNTY
PINAL COUNTY
GRAHAM COUNTY
GREENLEE COUNTY
COCHISE COUNTY
Arizona
New Mexico
Torito
National
Forest
60
70
77
170
78
75
191
366
266
10



I-10 Phoenix-Tucson Bypass Study

URS DRAFT: 12-12-07

Disclaimer:
While every effort has been made to ensure the accuracy of this information, the Arizona Department of Transportation makes no warranty, expressed or implied as to its accuracy and expressly disclaims liability for the accuracy thereof.

Corridor locations are conceptual. Alignments would be determined following the completion of appropriate design and environmental studies.

Figure E.1
Corridor Alternatives and Major Constraints

P:\TRANSPORTATION\ADOT_TPD\23445042_I-10_Phx_Tucson_Bypass_Study\Docs\Final Reports\Figures\FigE.1_Refined Corridor Alternatives.pdf (rs)

4.5 APPENDIX 3: PUBLIC INVOLVEMENT SUMMARY REPORTS

4.5.1 NOVEMBER 2008 MEETING 1

Graham County Alternate Route Study
Public Involvement Summary – Meeting 1

1 OVERVIEW

ADOT and Graham County hosted an open house for Alternate Route Study on August 7th, 2008 in the Graham County General Services building in Safford. The purpose of the meeting was to present an overview of the study and summary of the existing and future roads level of service. Alternate route focus area, future work tasks and the project schedule were also presented. The meeting was intended to be informative while gathering public input on issues and opportunities to be considered during the study. Study team members were present during the meeting to answer questions and to collect comment letters.

2 NOTIFICATION

Meeting advertisement was published in Eastern Arizona Courier newspaper both on Sunday, August 3rd, 2008 and Wednesday, August 6th, 2008. The advertisement outlined the purpose of the meeting and also provided contact information for the project management team.

3 MEETING DETAILS

There were 23 attendees at the public meeting, many of whom contributed comments. The concerns expressed were focused on traffic safety, street connectivity, and creating a livable community. Attendees were encouraged to leave comments either during the meeting or later within two weeks from the meeting either through mail, email or fax. The comments are summarized below and included verbatim in the Appendix.

4 COMMENT SUMMARY

The comments from the meeting suggested the alternate route for the state routes US 70 and US 191 bypass mainly in three specific areas i.e. to the north along Gila River, to the east of Artesia Road, or to the west on Bureau of Land management (BLM) land.

About one third of the comments indicated that alternate route should go to the north of the City of Safford and Town of Thatcher, north or south of the Gila River. Specifically, one of the comments states that the alternate route should “Start at 191 and 70 intersection go north across the Gila River then turn west to the Gila River Bridge”.

One of the comments suggested alternate route to veer east of Artesia Road. As pointed out, this would help specifically to take some traffic load off Artesia area and to meet future traffic demand as new developments are expected in this area. Another comment identified BLM land south of Safford as an opportunity to be used for bypass to shorten the distance to Tucson. As indicated, this would also help in the development of the area between Mt. graham and the farming land. If the alternate route goes to Pima, as mentioned by one of the attendees, it should connect to Highway 70 west of the Pima.

APPENDIX A: COMMENTS

- Please, please, please, consider re-routing the I-10 bypass into the 191 right-of-way. Make both I-10 and the by-pass 8 lane (4 each way). You will assist in solving traffic and economic problems for everyone but the developers.
- As an overall view, consider building a beltway (or several linked beltways) around the Pima-Thatcher-Safford metro area (don't worry it will be before long) to avoid the Phoenix-Tucson problems.
- Consider connecting some of our small roads i.e. Stockton to Montierth – Powerline to 20th – to Stadium Way; this will begin the process of beltway thinking. There are others that will also be beneficial (366 to Barney or Montierth)
- Alternate route should veer east approx 3 miles of Artesia Road – take pressure off Artesia area where Prina plans to develop.
- Create a 70 bypass north of Safford on south side of river or north side of river.
- The route should connect to Highway 70 west of Pima if route goes to Pima.
- Start at 191 and 70 Clifton intersection go north across the Gila river then turn west to the Gila River Bridge @ bypass
- At the point of 191 and 266 make a bypass to the intersection of 191 and 70.
- I would like to see the BLM land south of Safford used as a road to leave Highway 191 and connect with US 70 about where Klondyke Road turns off the US 70. This could shorten the distance to Tucson for everyone in the Valley except Safford and open up the area between Mt. Graham and the farming area to development.
- Don't need on the graham side. Put on the other side of river.

Arizona Department of Transportation
Graham County

PUBLIC OPEN HOUSE

Graham County Small Area Transportation Study (SATS) & Graham County Alternate Route Study

A public open house will be held on Thursday, August 7, 2008 at the following location:

Graham County
General Services Building
921 Thatcher Boulevard
Safford, Arizona 85546
6:00 p.m. - 8:00 p.m.

The Arizona Department of Transportation (ADOT) and Graham County, in coordination with Safford, Thatcher and Pima, have initiated two transportation studies in Graham County, a Small Area Transportation Study (SATS) to examine regional travel and an Alternate Route Study to examine potential new corridors in the region.

The SATS examines current and projected travel demand to provided recommendations for future transportation improvements. The purpose of this meeting will be to inform the public of the existing and future population, employment and travel characteristics of the region and to gather public input on issues and opportunities to be considered during the study.

The Alternate Route Study examines regional travel and will propose a new alternate route for traffic traveling through the region. In this meeting, existing and long term conditions in the area will be presented as information for the public. Input will be collected through public comment to understand concerns and potential improvements for this specific corridor.

Study team members will be present to answer your questions and address your concerns. Maps of the project area and informational exhibits will be available for viewing at the meeting.

Written comments may be submitted by August 21st, 2008, to:

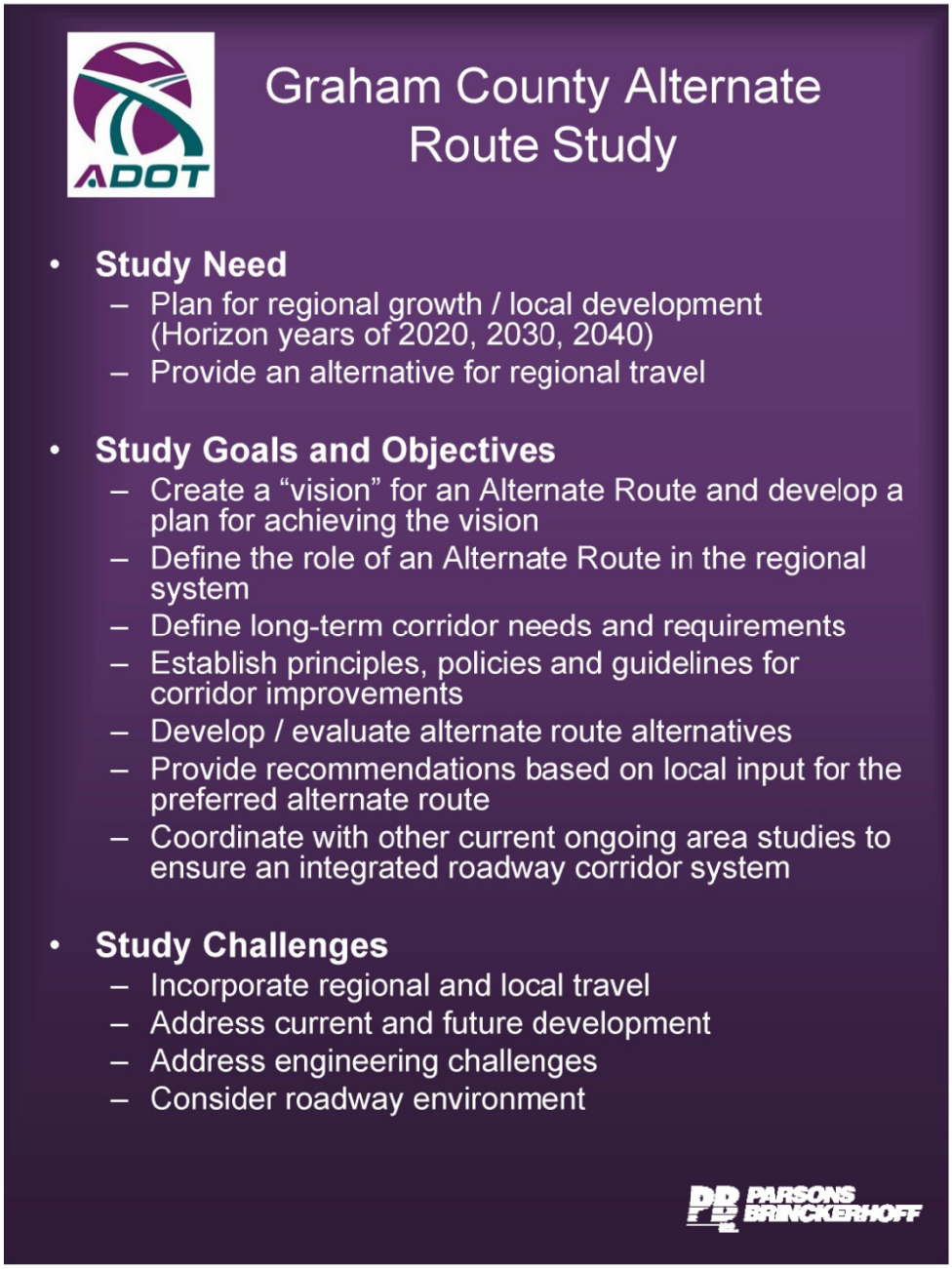
Graham County SATS
Graham County c/o Will Wright
921 Thatcher Blvd
Safford, Az 85546
Phone: (928) 428-0410
Fax: (928) 428-8825
Email: wwright@graham.az.gov

Graham County Alternate Route Study
ADOT c/o Charlene FitzGerald,
206 S. 17th Ave 310B
Phoenix, AZ 85007
Phone: (602) 712-6196
Fax: (602) 712-3046
Email: cfitzgerald@azdot.gov

GRAHAM COUNTY
ALTERNATE ROUTE STUDY
8/7/2008
Graham County General Services, 921 Thatcher Blvd., Safford

Please let us know if you have any comments or concerns regarding the Alternate Route Study in Graham County.

Please return at meeting or to
Becky Fly, flyb@pbworld.com or
480-966-9234 (FAX) no later than Aug. 15th


Graham County Alternate Route Study
• Study Need
– Plan for regional growth / local development (Horizon years of 2020, 2030, 2040)
– Provide an alternative for regional travel
• Study Goals and Objectives
– Create a "vision" for an Alternate Route and develop a plan for achieving the vision
– Define the role of an Alternate Route in the regional system
– Define long-term corridor needs and requirements
– Establish principles, policies and guidelines for corridor improvements
– Develop / evaluate alternate route alternatives
– Provide recommendations based on local input for the preferred alternate route
– Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system
• Study Challenges
– Incorporate regional and local travel
– Address current and future development
– Address engineering challenges
– Consider roadway environment
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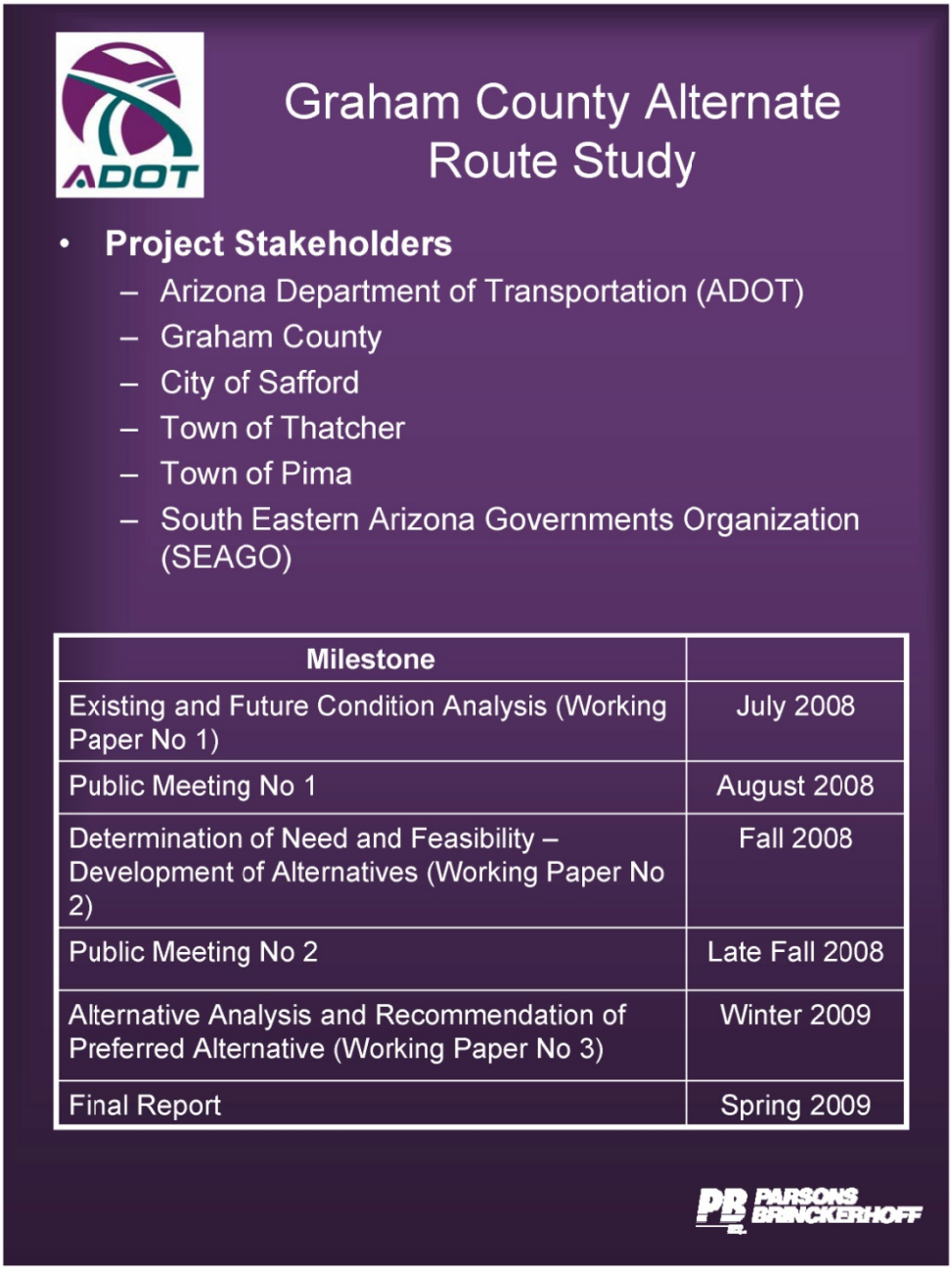
Graham County Alternate Route Study
• Project Stakeholders
– Arizona Department of Transportation (ADOT)
– Graham County
– City of Safford
– Town of Thatcher
– Town of Pima
– South Eastern Arizona Governments Organization (SEAGO)
Milestone
Existing and Future Condition Analysis (Working Paper No 1)
July 2008
Public Meeting No 1
August 2008
Determination of Need and Feasibility – Development of Alternatives (Working Paper No 2)
Fall 2008
Public Meeting No 2
Late Fall 2008
Alternative Analysis and Recommendation of Preferred Alternative (Working Paper No 3)
Winter 2009
Final Report
Spring 2009
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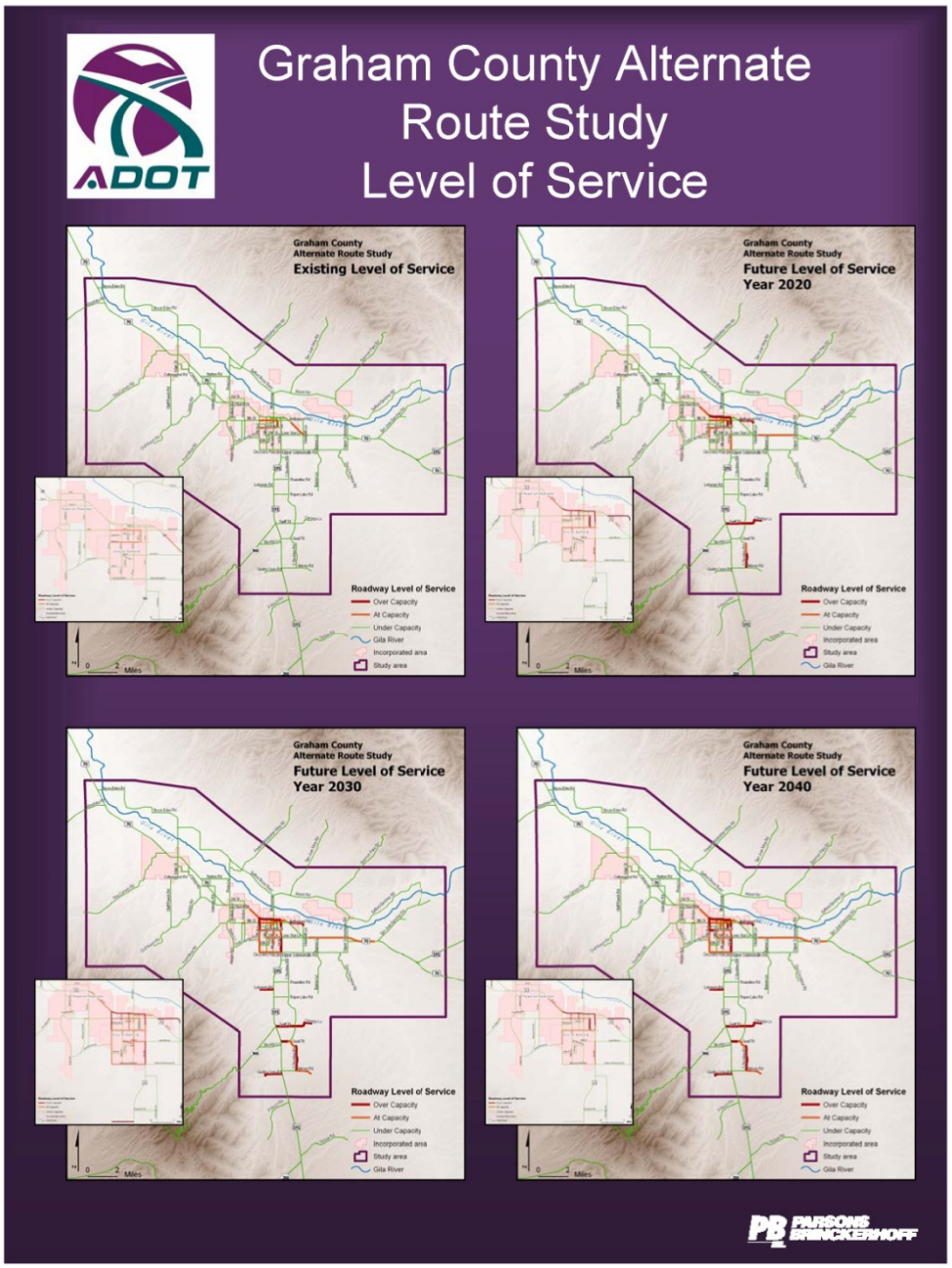
Graham County Alternate Route Study
Level of Service
Graham County
Alternate Route Study
Existing Level of Service
Future Level of Service
Year 2020
Future Level of Service
Year 2030
Future Level of Service
Year 2040
Roadway Level of Service
Over Capacity
At Capacity
Under Capacity
Incorporated area
Study area
Gila River
Miles
PB PARSONS BRINCKERHOFF

4.5.2 APRIL 2009 MEETING 2

Graham County Alternate Route Study
Public Involvement Summary – Meeting 2

1 OVERVIEW

ADOT and Graham County hosted an open house for Alternate Route Study on April 29th, 2009 in the Graham County General Services building in Safford. The purpose of the meeting was to present the determination of need for the alternate route and show the preliminary corridor alternatives. Alternate route focus area, future work tasks and the project schedule were also presented. The meeting was intended to be informative while gathering public input on issues and opportunities to be considered during the study. Study team members were present during the meeting to answer questions and to collect comment letters.

2 NOTIFICATION

Meeting advertisement was published in Eastern Arizona Courier newspaper both on Sunday, April 26th, 2009 and Wednesday, April 29th, 2009. The advertisement outlined the purpose of the meeting and also provided contact information for the project management team.

3 MEETING DETAILS

There were 3 attendees at the public meeting. The concerns expressed were focused on improving traffic safety and impacts to existing residences. Attendees were encouraged to leave comments either during the meeting or later within two weeks from the meeting either through mail, email or fax. The comments are summarized below.

4 COMMENT SUMMARY

The comments from the meeting suggested the alternate route for the state routes US 70 and US 191 follow either the alternative AE2 or C1D3 alignment. This would provide an opportunity to decrease the traffic on US 70 and US 191 while providing an opportunity to develop in the infill area.

Arizona Department of Transportation
Graham County

PUBLIC OPEN HOUSE

Graham County Small Area Transportation Study (SATS) & Graham County Alternate Route Study

A public open house will be held on Wednesday, April 29, 2009 at the following location:

Graham County
General Services Building
921 Thatcher Boulevard
Safford, Arizona 85546
5:00 p.m. - 7:00 p.m.

The Arizona Department of Transportation (ADOT) and Graham County, in coordination with Safford, Thatcher and Pima, have initiated two transportation studies in Graham County, a Small Area Transportation Study (SATS) to examine regional travel and an Alternate Route Study to examine potential new corridors in the region.

The SATS examines current and projected travel demand to provided recommendations for future transportation improvements. The purpose of this meeting will be to inform the public of the existing and future population, employment and travel characteristics of the region and to gather public input on issues and opportunities to be considered during the study.

The Alternate Route Study examines regional travel and will propose a new alternate route for traffic traveling through the region. In this meeting, the determination of need and preliminary alternatives will be presented as information for the public. Input will be collected through public comment to understand concerns and potential improvements associated with the identified alternatives.

This will be the second open house meeting held for the projects. Study team members will be present to answer your questions and address your concerns. Maps of the project area and informational exhibits will be available for viewing at the meeting.

Written comments may be submitted by May 8th, 2009, to:

Graham County SATS
Graham County c/o Will Wright
921 Thatcher Blvd
Safford, Az 85546
Phone: (928) 428-0410
Fax: (928) 428-8825
Email: wwright@graham.az.gov

Graham County Alternate Route Study
ADOT c/o Charlene FitzGerald,
206 S. 17th Ave 310B
Phoenix, AZ 85007
Phone: (602) 712-6196
Fax: (602) 712-3046
Email: cfitzgerald@azdot.gov

Graham County Alternate Route Study

- **Study Need**
  - Plan for regional growth / local development (Horizon years of 2020, 2030, 2040)
  - Provide an alternative for regional travel
- **Study Goals and Objectives**
  - Create a "vision" for an Alternate Route and develop a plan for achieving the vision
  - Define the role of an Alternate Route in the regional system
  - Define long-term corridor needs and requirements
  - Establish principles, policies and guidelines for corridor improvements
  - Develop / evaluate alternate route alternatives
  - Provide recommendations based on local input for the preferred alternate route
  - Coordinate with other current ongoing area studies to ensure an integrated roadway corridor system
- **Study Challenges**
  - Incorporate regional and local travel
  - Address current and future development
  - Address engineering challenges
  - Consider roadway environment

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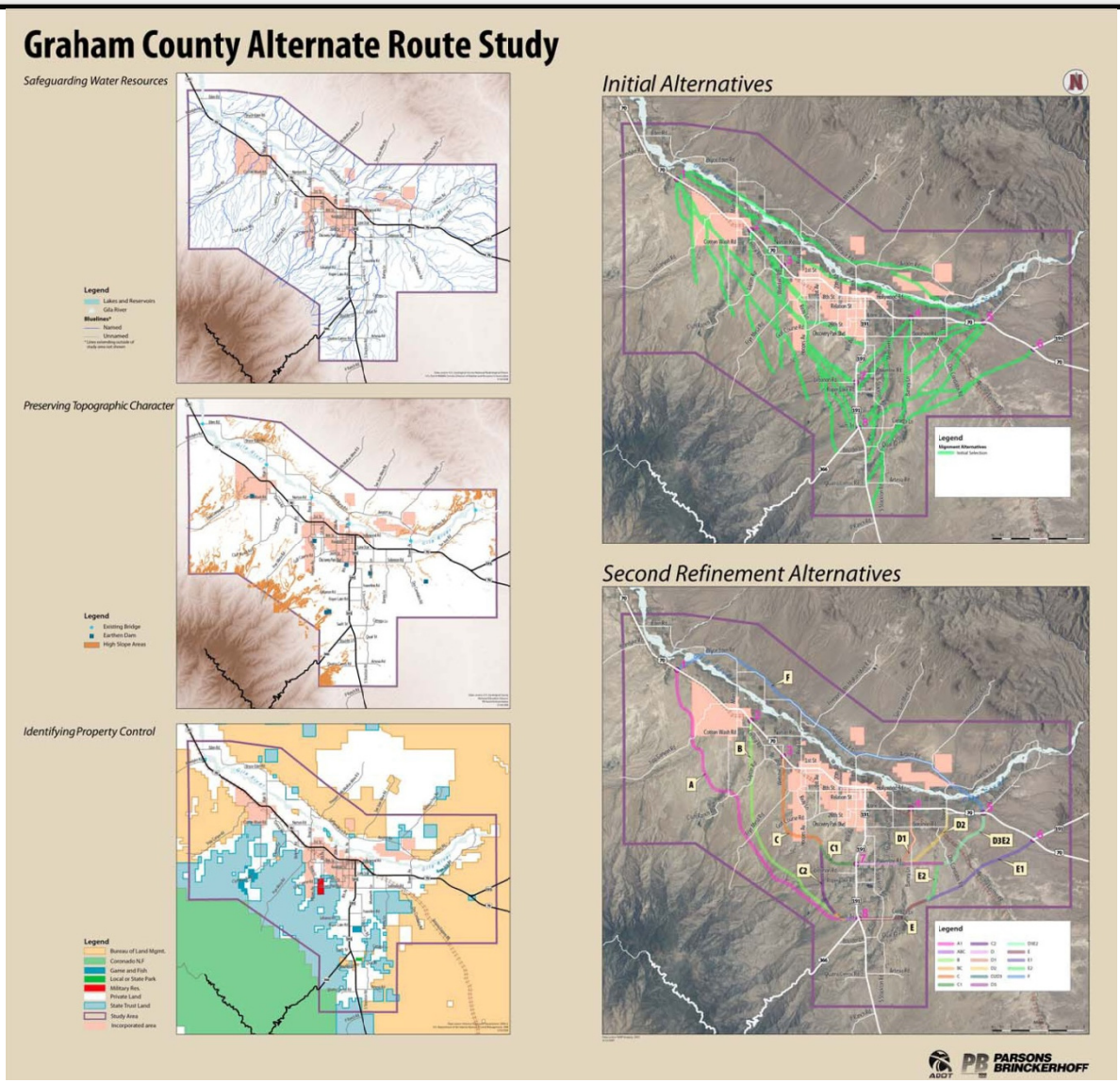
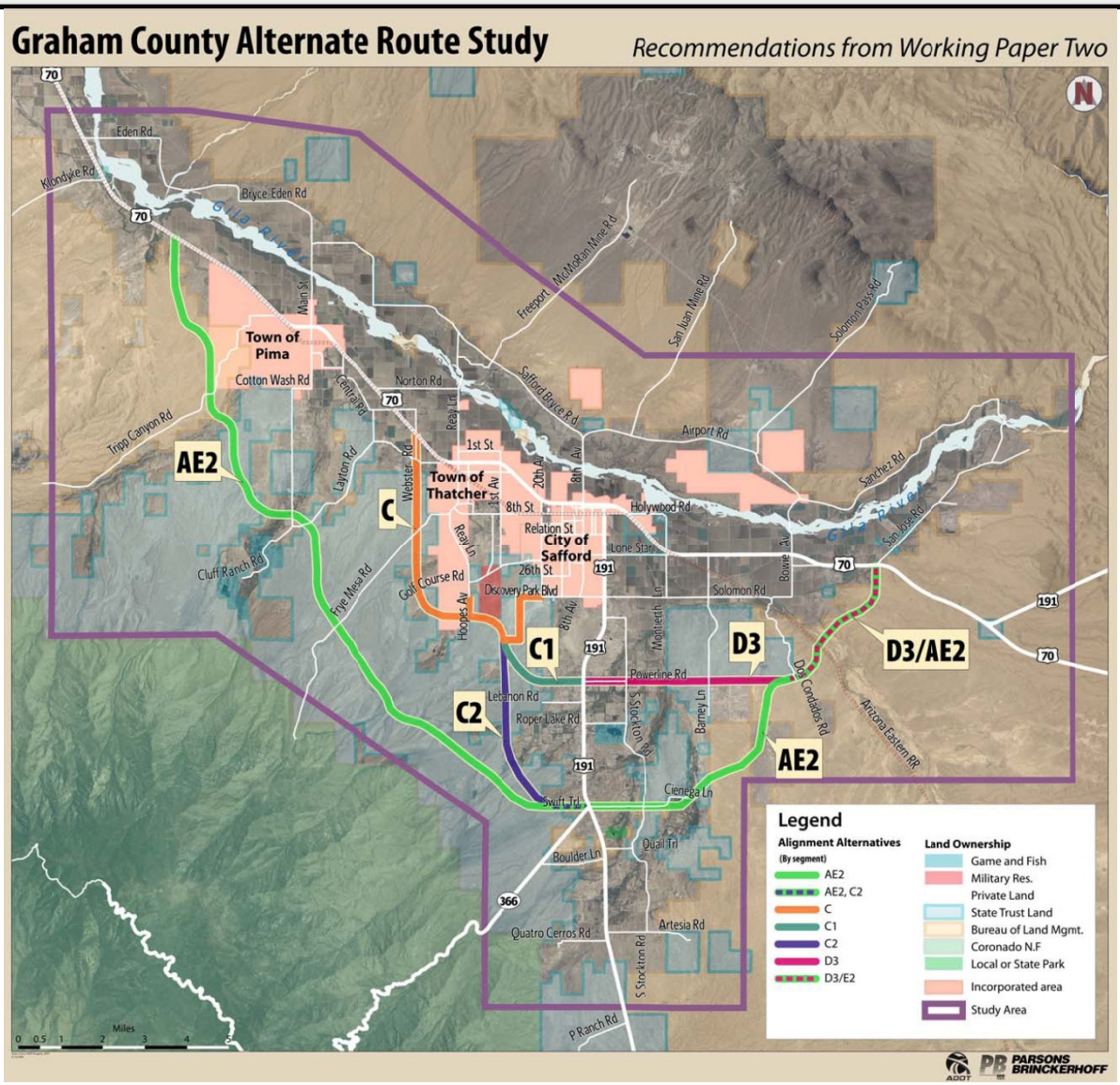

Graham County Alternate Route Study
Safeguarding Water Resources
Legend
Lakes and Reservoirs
Gila River
Bluelines*
Named
Unnamed
Preserving Topographic Character
Legend
Existing Bridge
Earthen Dam
High Slope Areas
Identifying Property Control
Legend
Bureau of Land Mgmt.
Coronado N.F.
Game and Fish
Local or State Park
Military Res.
Private Land
State Trust Land
Study Area
Incorporated area
Initial Alternatives
N
Legend
Second Refinement Alternatives
A
B
C
C1
C2
D1
D2
D3E2
E1
E2
E
F
Legend
PB PARSONS BRINCKERHOFF


Graham County Alternate Route Study
Recommendations from Working Paper Two
Town of Pima
Town of Thatcher
City of Safford
AE2
C
C1
C2
D3
D3/AE2
AE2
Legend
Alignment Alternatives
(By segment)
AE2
AE2, C2
C
C1
C2
D3
D3/E2
Land Ownership
Game and Fish
Military Res.
Private Land
State Trust Land
Bureau of Land Mgmt.
Coronado N.F
Local or State Park
Incorporated area
Study Area
Miles
PARSONS BRINCKERHOFF

Graham County Alternate Route Study

- **Project Stakeholders**
  - Arizona Department of Transportation (ADOT)
  - Graham County
  - City of Safford
  - Town of Thatcher
  - Town of Pima
  - South Eastern Arizona Governments Organization (SEAGO)

Milestone	
Existing and Future Condition Analysis (Working Paper No 1)	July 2008
Public Meeting No 1	August 2008
Determination of Need and Feasibility – Development of Alternatives (Working Paper No 2)	Spring 2009
Public Meeting No 2	April 2009
Alternative Analysis and Recommendation of Preferred Alternative (Working Paper No 3)	Summer 2009
Final Report	Fall 2009

4.5.3 JUNE 2009 STAKEHOLDER INTERVIEWS

Arizona Department of Transportation

Graham County Alternate Route Study

ADOT Contract T0849AE001;
PO No. PG KG3277

Summary of Stakeholder Interviews
Held June 9th & 10th, 2009
at the ADOT Safford District Offices

Purpose of Stakeholder Interviews:

The purpose of the Stakeholder Interview process is to solicit the input from local community members and agency members, which, to date, have not been directly involved with the study's development.

Advertisement process:

The intended audience for the Stakeholder Interviews is the local community members and local agency managers, exclusive of the Technical Advisory Committee (TAC) members, which have been directly involved in the study's development. A list of local community members and local agency members was obtained from ADOT MPD, which was then updated. The list was composed of 122 contacts. In order to have comprehensive interviews, the contacts were divided into the following subgroups:

- City of Safford
- Education
- Medical
- Emergency/Prisons
- Graham County
- San Carlos Apache Tribe
- Historical Society/ Chamber of Commerce/ Political Partys
- Local Ag Associations
- Town of Pima
- Job Development Associations
- Utilities
- Land Managers
- Mining
- Town of Thatcher
- Local Business
- Observatory
- Local Social Associations

The following letter was sent to each of the contacts via email or mail May 28, 2009. Then during the week of June 1-4, 2009, each of the contacts were contacted directly via phone or email to notify them of their scheduled interview time on June 9-10, 2009.

Arizona Department of Transportation
Multimodal Planning Division
206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

Janice K. Brewer
Governor

John S. Halikowski
Director

John McGee
Acting Division Director

June 16, 2009

Re: Arizona Department of Transportation (ADOT)
Graham County Alternate Route Study
ADOT Contract T0849AE001; PO No. PG KG3277

To Whom It May Concern:

ADOT is in the process of studying the feasibility of an Alternate Route in Safford-Thatcher-Pima area. The study has focused on identifying potential new corridors in the region. The new corridors will provide relief for the projected increase in traffic volumes along US191 and US70 in the study design years of 2020, 2030 and 2040.

As a member of the local community, and/or an agency representative, you have been identified to be interviewed as a project stakeholder. By collecting your input and any concerns, the project team will be able evaluate and adjust the corridor locations to maximize the benefit of the Alternate Route to the local communities. The interview topics would focus on the following questions:

1. What are some regional issues this project must address in your opinion?
2. What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?
3. What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?
4. Are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?
5. Are there environmental concerns you would like to express?
6. How would you like to be involved as this study unfolds?
7. Are there others that should be involved in this study?
8. Are there any other issues you would like to express?

During the week of June 1st, a project representative will be contacting you to schedule your specific interview time. The interviews will be held June 9-11, 2009 at the ADOT Safford District Offices. We will also be prepared to take your comments over the phone if you are prepared to discuss the interview questions. If you have any immediate concerns or questions about this project or the stakeholder interview process, please contact Becky Fly at (480) 449-7748 (flyb@pbworld.com) or Charlene Fitzgerald at (602) 712-6196 (CFitzgerald@azdot.gov).

Sincerely,

Charlene Fitzgerald
Arizona Department of Transportation
Multimodal Planning Department - Project Manager

Cc: Bill Harmon, ADOT Safford District Engineer
Project TAC Members

Interview Format:

In general the format of the interviews was introductions, followed by a brief presentation of the project and the current alternate route alternatives, then the following questions were discussed:

1. What are some regional issues this project must address in your opinion?
2. What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?
3. What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?
4. Are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?
5. Are there environmental concerns you would like to express?
6. How would you like to be involved as this study unfolds?
7. Are there others that should be involved in this study?
8. Are there any other issues you would like to express?

Interview Results:

June 9, 9am – City of Safford

Attendees: John W. Lines, Eastern Arizona College Board, Raymond Brunner, GIS Administrator, City of Safford

Question 1: What are some regional issues this project must address in your opinion?

- Destruction and congestion on the existing roadway/highway system from 'heavy' traffic
- Timing of 2040 is a long ways away – need to look at starting sooner
- 'Heavy' truck traffic along US70 may warrant an additional alternative to the north side of the river along Safford-Bryce-Eden Road
- Does the regional traffic come into the study area then go back out the same direction, or does it proceed through the study area?

Question 2: What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?

- The alternate route can be developed to facilitate 'smart' growth by providing new development and in-fill opportunities
- Promote the Gila River Valley as a tourist destination
- Provide access to destinations, such as the airport, golf course, etc

Question 3: What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?

- Promote the Gila River Valley as a tourist destination
- Transitioning of Eastern Arizona College to a 4 year institution

Question 4: are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?

- Avoid the planned resort development south of town

Question 5: Are there environmental concerns you would like to express?

- Archeological and cultural sites throughout the foothills areas

Question 6: How would you like to be involved as this study unfolds?

- Safford would like to exchange the GIS files for the potential alternate route corridors for further review

Question 7: Are there others that should be involved in this study?

- Not discussed

Question 8: Are there any other issues you would like to address?

- Some preference to the development of an alternate route to the north of the river (as a truck route) to alleviate the highest heavy truck traffic (possible completion of an origin/destination survey to confirm the need)

June 9, 9am – Education

Attendees: Bill Brandau, County Director, University of Arizona; Jeanne Bryce, Provost, Eastern Arizona College

Question 1: What are some regional issues this project must address in your opinion?

- Congestion along US 70 and US 191
- Increase in truck traffic because of I-10 in Tucson – Lack of decision on I-10 Bypass study
- If you bypass Safford and Thatcher, you might as well bypass Pima as well

Question 2: What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?

- Growth moves towards the Alternate Route
- 'Smart Growth' - Promote in-fill back into town
- Alternate Route could promote growth by enticing new businesses that would not have previously been interested because of the transportation improvements.

Question 3: What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?

- Focus of the economic development would shift from the main street area
- No major direct conflicts with the Eastern Arizona College development opportunities
- Concern for existing development along US 70 & US 191 (hotels, etc)

Question 4: are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?

- Archeological and cultural sites throughout the foothills areas

- Shift the Alternate Route connection to US70 east of town from San Jose Rd to the US 70 / US 191 intersection because to terrain

Question 5: Are there environmental concerns you would like to express?

- Archeological and cultural sites throughout the foothills areas

Question 6: How would you like to be involved as this study unfolds?

- Interested in general information, but not really an active role in the project
- Could be identified as the EAC contact

Question 7: Are there others that should be involved in this study?

- Contact BLM to get alternate route in the BLM long term plan
- Mike Fox, with EAC Small Business development

Question 8: Are there any other issues you would like to address?

- Preferred alternative is Alternative B and possibly moved closer to town (combine with C1)

June 9, 1pm – Emergency/Prisons

Attendees: John Griffin, Chief, Safford Police

Question 1: What are some regional issues this project must address in your opinion?

- Need to continue to improve US 70 / US 191
- Alternative A may be too far south to promote in-fill
- Closer in alternatives form a bypass feeling, losing the old town feel
- Lack of water may stunt projected growth
- Economic stability and maintenance of the heritage and culture of the area

Question 2: What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?

- Pushes commercial growth to the south
- Opens growth corridors
- Affects farming, but current trends show farming as a declining industry
- By 2040, there may be new technology in vehicles, which would increase volumes and capacity by minimizing conflicts

Question 3: What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?

- Unsure of what the future growth will be, what will the new industry be? Copper is iffy and variable
- Current development focus is ranching, farming, education and prisons

Question 4: are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?

- Right-of-way acquisition challenges

Question 5: Are there environmental concerns you would like to express?

- None discussed

Question 6: How would you like to be involved as this study unfolds?

- No significant involvement desired

Question 7: Are there others that should be involved in this study?

- Contact Jay Howe, Safford Public Works, to obtain information regarding the amount of water projected to be available for future development

Question 8: Are there any other issues you would like to address?

- Preferred alternative is Alternative B and possibly moved closer to town (combine with C1) – concerned about a lack of growth to justify the Alternative A
- Shift the Alternate Route connection to US70 east of town from San Jose Rd to the US 70 / US 191 intersection because to terrain
- Short-term desires:
  - Complete the US 70 / US 191 planned improvements
  - Evaluate roundabouts at any newly warranted signal intersections

June 9, 4pm – Historical Society/Chamber of Commerce/Political Parties

Attendees: Mel Jones, President, Graham County Historical Society

Question 1: What are some regional issues this project must address in your opinion?

- Museum Tourism – need to balance leisurely routes and faster traffic routes
- Where to put new facilities like museum to capture tourists – prefer between Reay Lan and First Ave on US 70.

Question 2: What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?

- Amenities like museum facilitate growth for community/county
- Growth = economic power, but how to harness?
- Graham county museum patronage about 5000/year; catches a lot of visitors passing thru
- Guest book indicates 45% from out of town because of internet presence

Question 3: What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?

- Hope that cotton and cattle can maintain
- Hope that copper can also hold its own in future

- Expand community into small industry, energetic marketing
- College as a 4-year institution
- Hospital/medical service growing and becoming a regional facility
- Need good access to hospital and college
- Need to diversify and expand Discovery Park campus

Question 4: are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?

- Not sure, needs study
- Pre-historic finds at 1-11 Ranch east of Stockton Rd, north of Artesia Rd
- Historic section of downtown Safford, other areas too in Thatcher and Pima

Question 5: Are there environmental concerns you would like to express?

- Need to find light industry to bring in to compliment cycles in copper mining

Question 6: How would you like to be involved as this study unfolds?

- Can be involved

Question 7: Are there others that should be involved in this study?

- No

Question 8: Are there any other issues you would like to address?

- No

June 10, 8am – Observatory

Attendees: John Ratje, Site Manager, UA – MGIO (observatory)

Question 1: What are some regional issues this project must address in your opinion?

- Lordsburg to Phoenix – The alternate route as an I-10 reliever (dirt storms detour traffic from Lordsburg to US 191 south
- Development potential is to the south
- Move terminal point of Alt A&B to the US 70 / US 191 intersection rather than San Jose Road
- Alternative A would be good for bringing in crews, etc to the observatory office on SR 366
- Keep a broad view of the future – I-10 traffic and improvements to I-10

Question 2: What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?

- Decrease in downtown business areas – promotes less congestion in town
- Interchange development along the alternate route
- Tie the 3 communities – Safford, Thatcher, & Pima
- Future transit opportunities, including Pima (Salsa Trail)

Question 3: What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?

- Residential growth areas:
  - 1st - between Thatcher and Pima – because of the church
  - 2nd – Artesia
- Industrial growth areas:
  - 4 more telescopes on Mt Graham (3 exisitng)
  - Mines could grow
  - Solar power plant
  - Railroad
- Likely growth is light industrial and education

Question 4: are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?

- Archeological and cultural sites throughout the foothills areas
- The battle between growth and non-growth parties

Question 5: Are there environmental concerns you would like to express?

- Hopi and Zuni tribes were involved in the environmental clearance for the observatory development

Question 6: How would you like to be involved as this study unfolds?

- No significant involvement desired

Question 7: Are there others that should be involved in this study?

- None discussed

Question 8: Are there any other issues you would like to address?

- Pave the rest of SR 366 to Columbine Lake (on Mt. Graham)

June 10, 1pm – Land Managers

Attendees: Tom Schnell, Asst. Field Manager, BLM; Toni Strauss, Safford District Ranger, USDA Forest Service; Scott Cooke, Field Manager, BLM

Question 1: What are some regional issues this project must address in your opinion?

- Environmental concerns
- Rights of way – as the BLM resource management plan for the area is updated, then the preferred alignment alternative could be incorporated into the plan and thus identify remnant parcels for disposal
- Frye Mesa Rd, OHV use along road – safety concerns for accessing forest by crossing the new alternative alignment

Question 2: What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?

- Heckle Road access would provide some additional recreational access

Question 3: What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?

- Solar development south of town
- San Simon valley has been identified as the best area in the southwest region of BLM for renewable energy development opportunities
- A public meeting is scheduled for June 24th to present information about a project which is studying future corridors for a transmission line through the BLM property

Question 4: are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?

- Archeological and cultural sites throughout the foothills areas
- Public use area – Cluff Ranch
- Highly erodable soils in the area on the east side

Question 5: Are there environmental concerns you would like to express?

- No additional concerns discussed

Question 6: How would you like to be involved as this study unfolds?

- Requested GIS files showing the preferred alternate route corridor for the development of the BLM resource management plan

Question 7: Are there others that should be involved in this study?

- None discussed

Question 8: Are there any other issues you would like to address?

- None discussed

June 10, 4pm – Local Business

Attendees: Tami Evans & Roger Evans, National Bank of Arizona;

Question 1: What are some regional issues this project must address in your opinion?

- North route would leave local community intact not promoting growth-although private land.
- Runoff in state lands from mountain, ergonomics makes more sense for the North route.
- Move Alternate route A on East side out to US 191/70 intersection rather than San Jose Environmental concerns

Question 2: What can the transportation facilities under discussion mean to the area other than improved mobility? (e.g. urban growth, economic development)?

- Need more E/W and N/S connectors in the Safford/Thatcher/Pima area so everyone doesn't have to drive US191 and 70.
- Need to fix map on North side to show RR spur on edge of the private land.

Question 3: What urban growth/developments and socio-economic changes do you see occurring over the next 20 years in your particular locality or region?

- Growth along US 70 E/W not N/S or in State lands
- Pima growing west eventually one large city

Question 4: are there any "fatal flaws" such as economic, physical, environmental constraints or community concerns that would be an obstacle to the development of the transportation facilities under discussion?

- Drainage south side in State lands floods out Thatcher
- Used to flood except now they built dams from Discovery Park almost to Pima
- Further south you go on state lands you are going to get into canyons like US 60

Question 5: Are there environmental concerns you would like to express?

- Wildlife issues, tremendous amount of people who don't want intrusion to wildlife and to ancient dwellings
- Floods, power lines go down over by golf course and behind it.
- Least resistance from public and issues with wetlands using A/B (west side) to Powerline Road and straight shot with B over to A (eastside) the intersection of US191\70.

Question 6: How would you like to be involved as this study unfolds?

- Would like to receive information as a stakeholder

Question 7: Are there others that should be involved in this study?

- None discussed

Question 8: Are there any other issues you would like to address?

- Keep ugly up by ugly-mines are raping the landscape and land in the north and beat up the roads and drive Reay Lane and Norton, causing congestion on Safford Bryce Road/Bryce Eden road.
- Make the route there on the north side and leave the beautiful view of the mountain and the town to grow infill instead of out to the alternatives.