Western Corridor-South Study

Prepared for the
Dixie Metropolitan Planning Organization
November 2006

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Prepared for UDOT and Dixie MPO

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Chapter 1

Executive Summary

The St. George urbanized area represented the fastest growing urban area in the United States from 1990 to 2000. With no sign of slowing growth, the St. George area must plan for a range of infrastructure needs including new and expanded roadways, utilities, and related facilities. The Dixie Metropolitan Planning Organization (Dixie MPO) is responsible for transportation planning in the area and has identified a number of major new transportation facilities. One facility has been identified as the Western Corridor which connects the cities of Ivins and Santa Clara to St. George through the presently undeveloped areas west of St. George City.

The purpose of this corridor study is to define an alignment that can be preserved by the associated parties so that future development does not preclude the construction of this Western Corridor.

The purpose of this corridor study is to define an alignment that can be preserved by the associated parties so that future development does not preclude the construction of this Western Corridor. At the same time, a decision to build a Western Corridor has not been made so the sole focus of this study is corridor preservation. The Western Corridor described in this study represents a southern extension of a Western Corridor planned for the Cities of Ivins and Santa Clara called the Western Corridor–North. The primary planning parameters of the Western Corridor described in this report are to connect at the north end to the planned intersection of the Western Corridor-North and Old Highway 91 and to connect with the proposed Southern Parkway at the planned I-15 Interchange at approximately milepost two.

The Western Corridor-South Study identifies and investigates possible alignments to be preserved by municipalities and resource agencies involved in land management. These alignments may serve as future transportation and utility corridors on the west side of the St. George region and connect Old Highway 91 between Ivins and Santa Clara to I-15 at the Southern Parkway Interchange. A single recommended corridor is identified for coordinated preservation as growth in Washington County, Utah expands along with applicable land planning guidelines which may optimize the selected corridor. Future construction of the Western Corridor is anticipated beyond approximately the year 2020 (15 years from now) and would be subject to the National Environmental Policy Act (NEPA) process and guidelines.

Most of these roads serve a mix of residential and commercial land accesses and are not designed for high speed travel.

Residential traffic in Santa Clara and Ivins is forced to travel via collector and minor arterial streets such as Old Highway 91, Santa Clara Drive, Sunset Boulevard, Snow Canyon Parkway, and Dixie Drive to access the employment and retail centers in downtown St. George and to access I-15. Most of these roads serve a mix of residential and commercial land accesses and are not designed for high speed travel. In the longer term, St. George City is expected to grow, leaving Ivins and Santa Clara without direct transportation access to I-15 other than through a series of lower functioning streets.

The Dixie MPO has planned for this growth by developing a system of streets to carry a range of local and regional traffic. The Western Corridor would provide a regional transportation facility connecting Ivins City and Santa Clara City with the southern city limits of St. George and the Southern Parkway. Population and housing growth is anticipated on the northern and southern segments of the Western Corridor and employment growth is projected in Ivins, Santa Clara, and St. George. Traffic in St. George is increasing and an alternative route to the southern city limits of St. George and I-15 would help to relieve traffic congestion on St. George's local collector streets.

Figure 1- 1 From Stucki Spring Trail looking north at Santa Clara City, Utah

Representatives from the Dixie MPO, Utah Department of Transportation (UDOT), Ivins City, Santa Clara City, St. George City, Washington County, and the Bureau of Land Management formed the Steering Committee which directed the consultant team, InterPlan Co., during the study process. The Steering Committee met monthly and was charged with forming a Stakeholders' Committee. The Stakeholders' Committee represented many interests including private property owners, developers, conservationists, resource agencies, recreational interests, and local and state governments. The Steering and Stakeholders' Committees provided expertise, leadership, and knowledge that proved essential in developing and evaluating criteria and analyzing the results.

The majority of the land within the Western Corridor-South study area is administered by the Bureau of Land Management (BLM), and the State of Utah (School and Institutional Trust Lands Administration, or SITLA). The largest land administration agency in the study area is the BLM. Within the study area, the BLM has designated the Santa Clara River Reserve to protect sensitive environmental and cultural resources while allowing for recreational opportunities. The BLM also provides for many recreational opportunities, such as biking and hiking, on lands in the study area. The overall study area is undisturbed desert except for the extreme southern portion, near the Virgin River, where the area consists of primarily residential development. A few dirt roads and recreational trails on BLM-administered land cross the study area. In addition, the area contains BLM-administered grazing allotments.

The study area provides habitat for diverse Mojave Desert and Great Basin Desert wildlife as well as a variety of migratory species.

Figure 1- 2 Central Segment of recommended corridor traverses this land

The study area is located in the Mojave Desert and is a transition zone between the Great Basin and the Colorado Plateau. The study area provides habitat for diverse Mojave Desert and Great Basin Desert wildlife as well as a variety of migratory species. Dominant vegetation communities vary with elevation and annual precipitation. Several federally listed threatened and endangered species have been found in this study area and critical habitat has been designated or is anticipated for other species. Stucki Spring, in the central part of the study area, provides an important source of water for wildlife.

WEIGHTING FACTORS

- Purpose and Need,
- Environmental Impacts, and
- Cost and Constructability

Alignments which connect the two defined endpoints and which minimize impacts were developed by the Steering Committee, Stakeholders' Committee, and the consultant team, InterPlan with assistance from HDR Engineering and Hoskins Engineering. The Steering Committee and InterPlan physically drew alignments on informational base maps that contained data in an attempt to minimize the potential impacts an alignment may have. The Stakeholders' Committee reviewed the alignments and provided feedback and suggestions.

Both the Steering and Stakeholders' Committees assisted in establishing corridor evaluation criteria for the purpose of determining which corridors provided the best alignment with the least impact. The weighting factors included Purpose and Need, Environmental Impacts and Cost and Constructability.

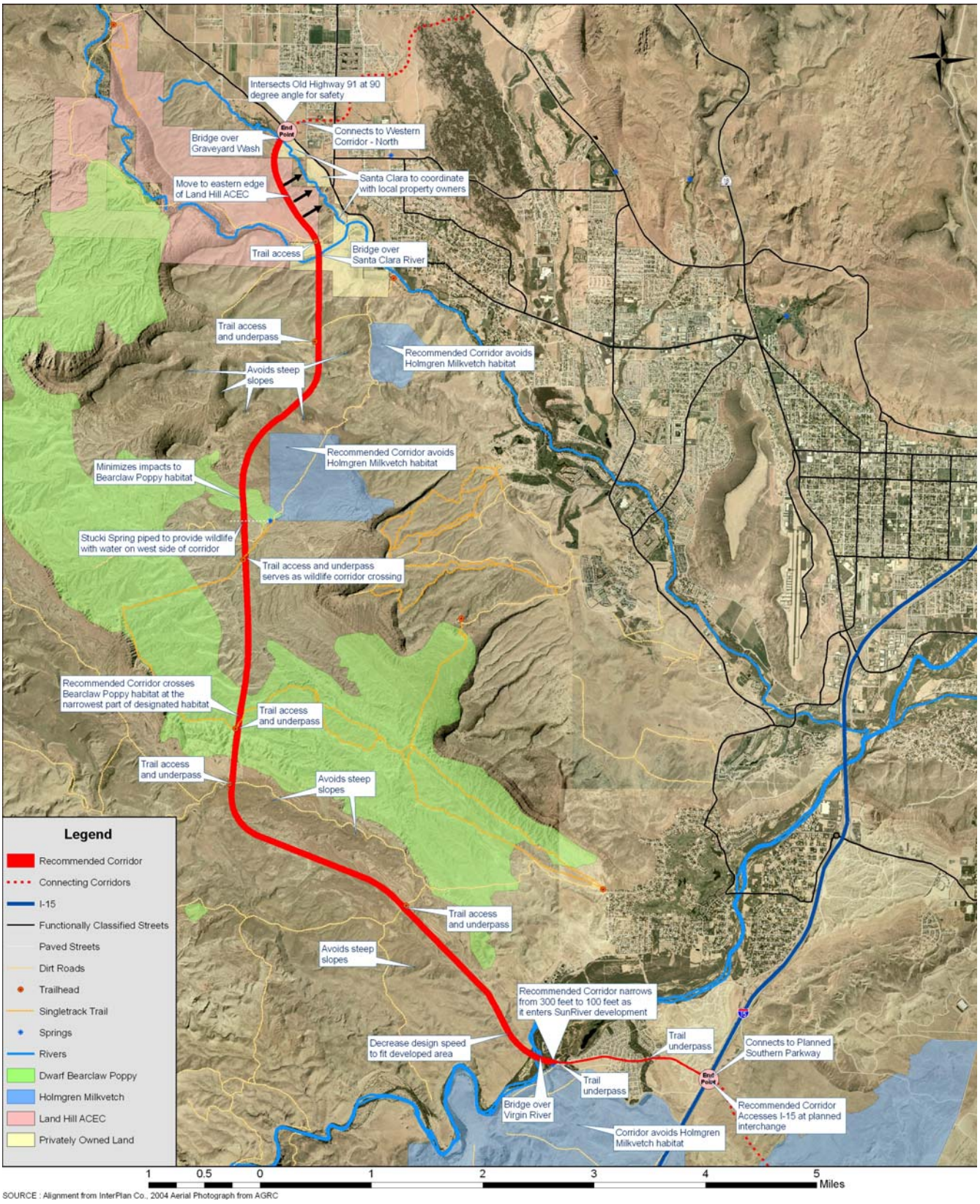
Each primary factor included several sub-factors that were used for secondary weighting, which resulted in a rating of the data. Once all of the criteria and weights were defined and a measure for each was determined, proposed alignments could be evaluated. All the corridors were evaluated quantitatively against the criteria and then were ranked. This narrowed the alignment options and produced the corridor configurations. From a review of detailed maps of the best corridors, the recommended corridor was selected. The recommended corridor is found in Figure 1.3 on the following page.

The affected cities and resource agencies are expected to adopt this corridor as part of their own Master Transportation Plan and resource plans so that they may eliminate the development of new residences, structures, or businesses within the corridor. Construction of a highway within the corridor may proceed from north to south, or south to north, on private lands and at the discretion of private land owners and/or developers. UDOT, local governments, and resource agencies may acquire portions of the corridor from private land owners in order to preserve the corridor for future highway construction. Highway construction using federal funds would be subject to NEPA. This corridor study may be used to initiate the NEPA process and evaluation, but actual NEPA results may vary from the recommendations of this study.

Table 1- 1 Recommended Corridor Statistics

Characteristic	Measure
Length of Roadway	11.73 miles
Floodplain impacted	22.72 acres
Dwarf Bearclaw Poppy habitat impacted	29.46 acres
Holmgren Milkvetch habitat impacted	0 acres
Number of Trail Crossings	10
Number of Steep Slopes Crossed	50

Figure 1- 3 Recommended Preserved Corridor



Chapter 2

Introduction

The Dixie MPO is responsible for transportation planning in the area and has identified a number of major new transportation facilities.

Previous studies have been completed and approved to plan for the Southern Corridor, now known as the Southern Parkway, shown in Figure 2-1. The Dixie MPO also completed a plan for the Western Corridor-North in April 2005.

2.1 Background

The planning jurisdiction for the Dixie MPO in Washington County is a rapidly growing area in southern Utah. It is located in the northeast corner of the Mojave Desert and is nestled between the Virgin and Santa Clara Rivers. The City of St. George, Utah, is located at the lowest elevation in the State of Utah and is home to Dixie State College of Utah. The 2000 U.S. Census recorded the population of the cities of Ivins, Santa Clara, St. George and Washington in excess of 50,000 people, thereby designating it an "urbanized area." In September, 2002, the Dixie MPO was formed. The Dixie MPO is a regional transportation planning organization with the goal of providing unified transportation planning under Federal metropolitan planning regulations. The Dixie MPO is made up of three recognized entities:

- Dixie Transportation Planning Office
- Dixie Transportation Executive Council
- Dixie Transportation Advisory Committee

Washington County's transportation needs are currently served at the highest level by an interstate highway, a commercial airport, and transit service. I-15 bisects Washington County and provides 14 interchange access points through the county. St. George City's Municipal Airport has one commercial carrier, SkyWest Airlines, which is a Delta connection service that offers daily commuter flights. SunTran Public Transit and the St. George Shuttle both offer scheduled bus service in Washington County. There are also other limited para-transit service providers serving on-demand para-transit service needs.

According to the U.S. Census Bureau, from 1990 to 2000 the St. George Urbanized Area was the fastest growing urban area in the United States. Washington County population grew 86 percent during that decade. Washington County continues to grow, particularly in the county's western region. St. George and the cities to the west, including Ivins and Santa Clara, have experienced incredible growth over the past 15 years. Table 2.1 details the growth by city in the western portion of Washington County, Utah, the study area of this report.

Table 2- 1 Population

City	1990	2000	2004	Growth 1990-2004
Ivins	1,630	4,450	6,640	307%
Santa Clara	2,322	4,630	5,889	154%
St. George	28,502	49,663	61,919	117%

Source: U.S. Census Bureau

As the area grows and population increases, more traffic is added to the roads. Simply put, more people mean more cars on the road, and if the street infrastructure does not keep up with the growth, roads become more congested. Table 2.2 details the growth of centerline roadway miles, by city, in the study area.

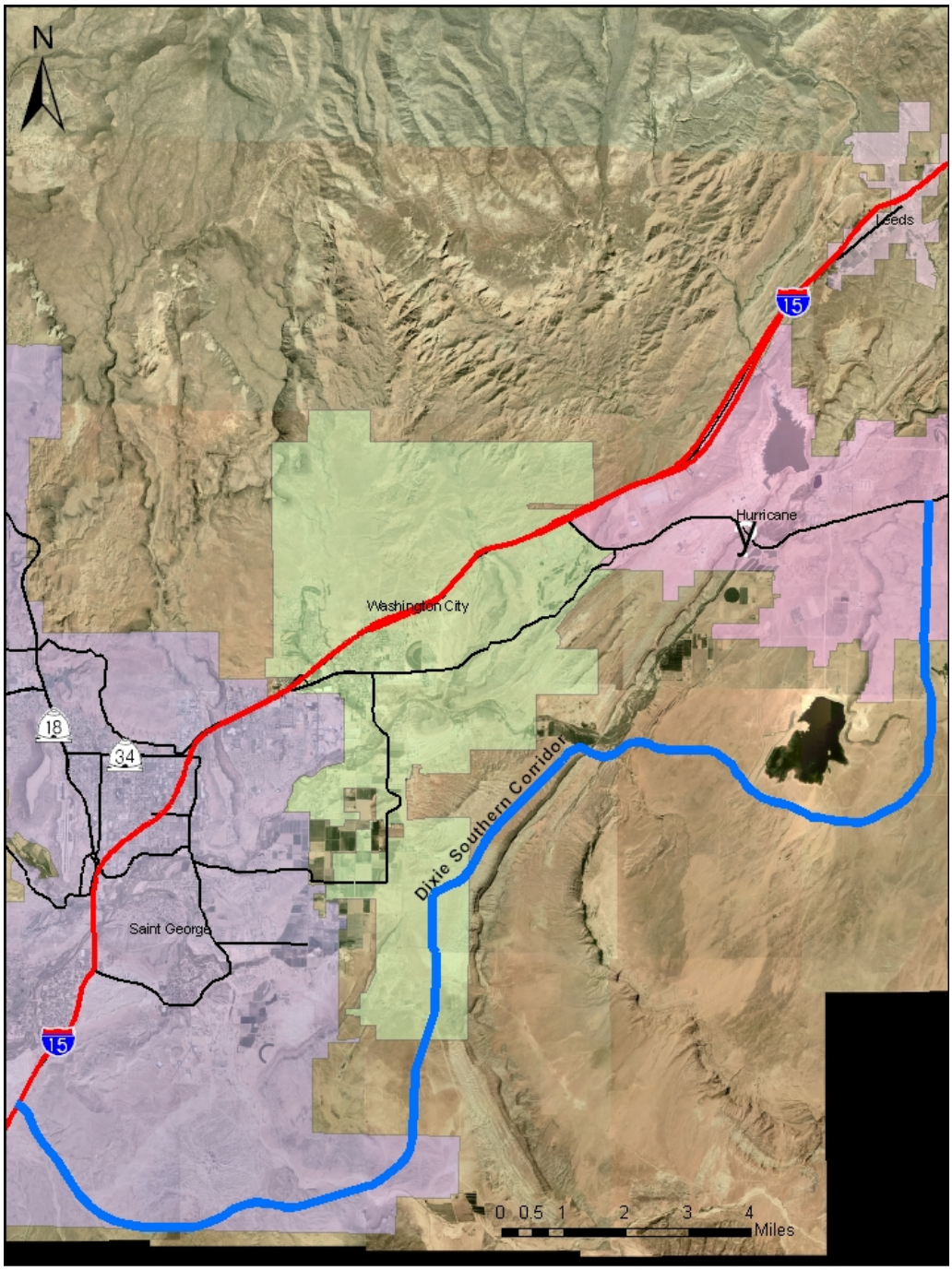
Table 2- 2 Centerline Road Miles

City	1990	2000	2004	Growth 1990-2004
Ivins	19	43	43	125%
Santa Clara	18	30	36	103%
St. George	157	235	271	72%

Source: UDOT Class B & C road mileage reports

Although St. George and the surrounding cities have expanded the transportation system substantially, like most growing communities they are slowly slipping behind in their ability to meet the future transportation needs.

Figure 2- 1 Alignment of Southern Parkway



SOURCE : Southern Parkway alignment from Southern Corridor Environmental Impact Statement's released Record of Decision. October 2005.

Since its inception, the Dixie MPO has been actively planning new and improved transportation facilities and services. For example, the Dixie MPO works in partnership with SunTran to provide transit service to the growing population. Recently, the Dixie MPO, assisted by UDOT, completed an Environmental Impact Statement (EIS) for a "Southern Corridor," now referred to as "Southern Parkway" – a proposed four-lane, high capacity, limited access roadway planned to extend east from the planned I-15 Interchange at milepost two and connecting with State Route 9 (SR-9) at about 2800 West, near Hurricane. The Federal Highway Administration (FHWA), in cooperation with UDOT, released on October 17, 2005 the Record of Decision (ROD) for the proposed Southern Corridor road project to connect Hurricane with I-15 south of St. George. This roadway would serve the anticipated growth both east and south of the area, and accommodates a planned relocation of the St. George Airport. Also, in April 2005, Ivins, Santa Clara and the Dixie MPO organized a 'Western Corridor Alternatives Study," to address possible alignments of the Western Corridor route from Snow Canyon Parkway to Old Highway 91. A separate consultant recommended an alignment which terminates at approximately 200 East in Ivins. This portion of the Western Corridor from Old Highway 91 to Snow Canyon Parkway is referred to in this study as the "Western Corridor-North."

Figure 2- 2 Alignment of Western Corridor-North

SOURCE : 2004 municipal boundaries from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID) and were developed through a collaboration of Governor's Office of Planning and Budget, the Utah Department of Transportation, the Utah State Tax Commission. and AGRC.

This study, titled the "Western Corridor-South," addresses the initial planning for the Dixie MPO for a corridor connecting the intersection of Old Highway 91 and the proposed Western Corridor-North with I-15 and its proposed interchange with the Southern Parkway. The Western Corridor-South is planned to serve growth in the western portion of Washington County including large areas of publicly held land as well as pockets of privately held land which is beginning to experience development pressures.

2.2 Project Purpose and Need

The Western Corridor-South is presently a concept of the Dixie Metropolitan Planning Organization to serve the western planning area as a high capacity, limited access roadway.

The Western Corridor-South is presently a concept of the Dixie MPO to serve the western planning area as a high capacity, limited access roadway. This proposed Western Corridor-South road would generally allow travel from the growing residential areas north and west of St. George City to the growing commercial areas of the city, generally to the south and east, while by-passing the presently most congested core of the city. No funding has been secured for the construction of this planned facility and no environmental studies have been initiated to move beyond the planning phase. A formal Purpose and Need for the project has not been established as per the National Environmental Policy Act (NEPA), but it is important to establish an overall project need as part of this early planning process. One of the initial NEPA steps will be to review the planning level Purpose and Need and make appropriate changes based on growth trends and other information which will be updated at the time of a NEPA analysis.

The general transportation need, mentioned above, will likely be the impetus for further NEPA analysis and planned roadway construction, but it is not the only need which can be defined at this planning stage. Generally, there are three elements which define the need for the Western Corridor-South. These three needs include the following:

1. Provide for traffic congestion relief on Santa Clara Drive and Dixie Drive for growth in the cities of Ivins and Santa Clara destined to downtown St. George.

- The Western Corridor-South reduces travel distance as compared to driving generally east on Dixie Drive or Santa Clara Drive and then driving generally south on I-15 into St. George for the residents in Ivins and Santa Clara accessing employment in St. George.

- The Western Corridor-South provides a direct connection to the Southern Parkway, proposed to connect at milepost two on I-15, in order to connect travel demand between the north and west areas of St. George (the cities of Ivins and Santa Clara) with the growth areas south and east of St. George.

- The Western Corridor-South route may take a greater need if other planned corridors at the north end of the St. George area are not constructed due to habitat (tortoise) concerns providing a belt route which serves as an outer ring for east-west access across the St. George region.

2. Provide non-invasive transportation access to cultural resources and recreational opportunities on the southwest side of the St. George area.

- The southwest area of the St. George region presently services a wide range of cultural and recreational opportunities. Access to these opportunities is restricted to low speed dirt roads that are impassable during certain times of the year.

- The area surrounding the Western Corridor-South includes a wide range of bike trails, ATV trails, petroglyphs, caves, and related resources. The Western Corridor-South should provide improved access for the people seeking these activities so that their recreation is a more positive experience without necessarily increasing the overall demand for these activities to the point where their value will diminish.

3. Provide for a transportation facility which respects the natural topography and landscape of the area, and to the extent possible, enhances natural features by defining limits of land development.

- Much of the land served by the Western Corridor-South is in public ownership. The corridor is not proposed to add pressures for private development onto public lands.

- Some sections of land served by the Western Corridor-South are also in private ownership, and development pressures will continue on this land and should be served by transportation facilities including the Western Corridor-South. A balance exists between providing access to land development in the corridor and restricting access, so that the corridor may function as a safe, high speed, roadway.

- The overall topography of the Western Corridor-South is served by rugged terrain which should be respected by the corridor, with the corridor possibly serving as a physical boundary between private and public lands to better designate areas to be preserved.

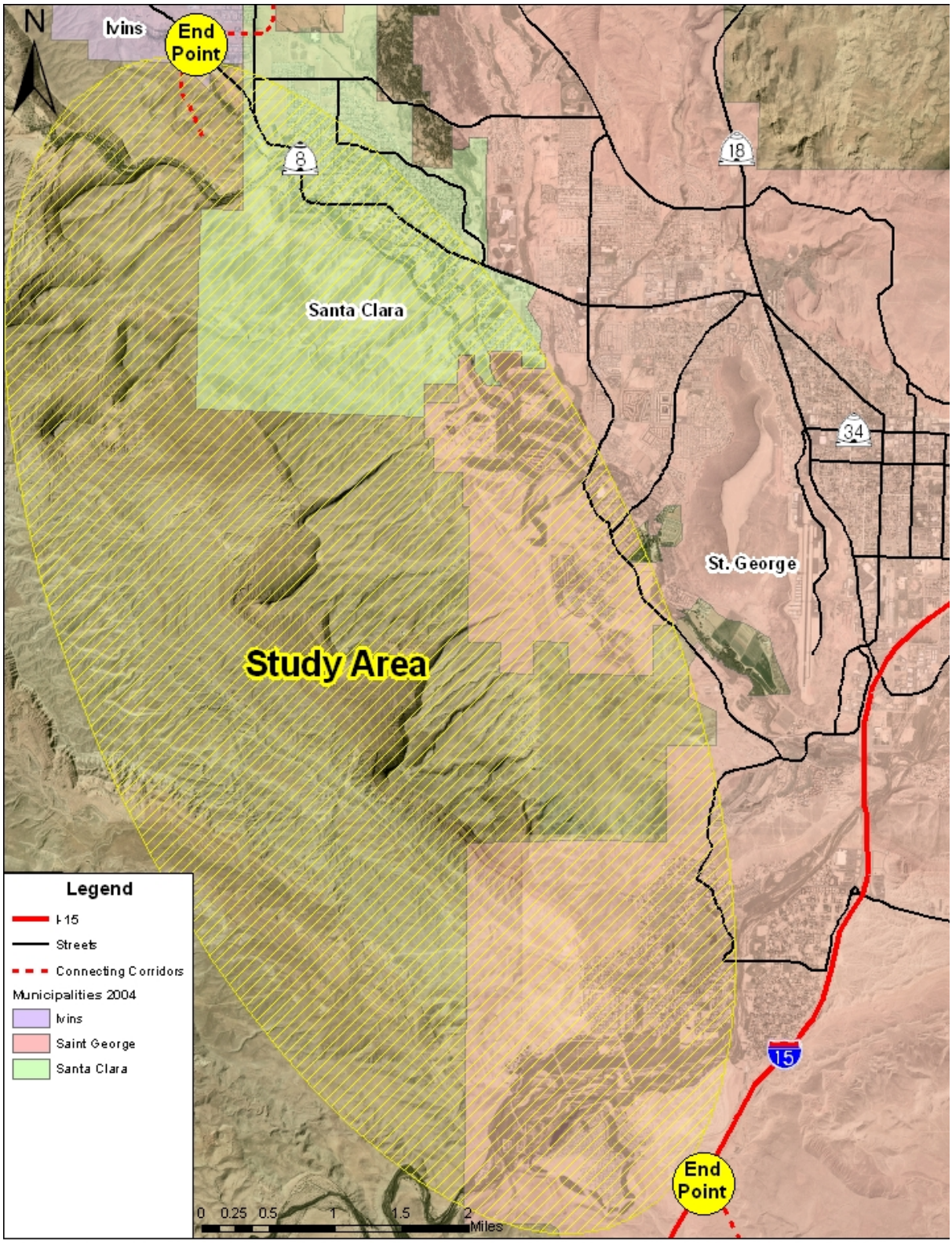
Figure 2- 3 Members of study team gaze out over the desert

2.3 Study Area

The study area for the Western Corridor-South Study consists of Washington County lands west of St. George. The corridor study has two defined end points. The route of the connection between these end points, however, has not been determined as of yet. Both the northern and the southern end points are designed to connect to other proposed corridors that also currently do not exist. The northern end point for this corridor is on Old Highway 91, also known as State Route 8 (SR-8), or Santa Clara Drive, between Ivins and Santa Clara at 200 East. The southern end point for the corridor is at the proposed I-15 Southern Parkway Interchange at mile post two. This I-15 interchange currently does not exist, but is due for construction in 2007. The Southern Parkway would also connect to I-15 at this end point. The corridor in the Western Corridor-South Study will follow a north and south route through undeveloped land west of St. George. Figure 2.4 is a map of the study area showing the end points and two connecting corridors.

Figure 2- 4 First Stakeholders' meeting May 10, 2006

Figure 2- 5 Map of Study Area



SOURCE : 2004 municipal boundaries from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID) and were developed through a collaboration of Governor's Office of Planning and Budget, the Utah Department of Transportation, the Utah State Tax Commission. and AGRC.

2.4 Study Objectives and Techniques

This Western Corridor-South Study has been initiated to identify a corridor which can be planned in advance of development and coordinated among all stakeholders. The need for the study is related to, but separate from, the need for the actual corridor. Development pressures have already manifested in areas planned for the Western Corridor, particularly near the two end points, so the need for corridor preservation must be punctuated regardless of whether the corridor is needed to be constructed. In effect, corridor preservation keeps the option open to construct a future corridor for utilities or transportation functions which may change in the future. This study will identify a range of possible alignments and define a single alignment which appears to best meet the objectives of the communities and the Dixie MPO. No construction is proposed as a result of this study, beyond what might happen through private investment. Any public investment in roadway or corridor construction would need to be preceded by the proper environmental analysis. Federal funding would likely necessitate an Environmental Impact Statement which meets the guidelines of NEPA.

Figure 2- 6 Preparation for study team to ride possible corridors

Although this Western Corridor-South Study has not been initiated under the NEPA process guidelines, it is consistent with planning level applications of NEPA and this study, or its results, may be used to initiate a full NEPA Environmental Impact Statement document. Further, this study will likely be used by the participating local governments and land agencies (such as the BLM) to define a logical corridor which would be preserved from future development and thereby result in reduced impacts to the natural and man-made environment if constructed in the future.

Figure 2- 7 District 74 Representative David Clark talks with citizens during September 13, 2006 Western Corridor-South Open House

Each community has initiated corridor preservation efforts for the Western Corridor. These efforts, in the past, have been fragmented in that they are not fully coordinated with other communities. Similarly, corridor preservation efforts have not necessarily been developed with comprehensive input from environmental resource agencies. This study aims to fully coordinate on-going corridor preservation by each local government and serves to provide a comprehensive point of coordination between varying interests in the corridor. No single action is proposed at the conclusion of this report. However, the identified corridor in this report may be adopted in each community's Master Transportation Plan to further define the proposed Western Corridor and to depict its intended alignment. In addition, this report serves to define needed design parameters which will preserve the corridor function and protect the environment such that new alignment options may be generated in the future which meet the alignment criteria. The following represent corridor preservation alignment criteria to be accomplished in this report:

ALIGNMENT CRITERIA
▪ Consistently planned between all municipalities and land owners;
▪ Located in an area which minimizes potential environmental impacts;
▪ Allows for the greatest possible transportation function;
▪ Minimizes future construction costs in both its location and ability to avoid right-of-way encroachment; and
▪ Anticipates new growth and development.

Chapter 3

Study Process

The study process for the Western Corridor-South Study included three important groups that were identified as essential contacts during the study. They included the Steering Committee, the Stakeholders' Committee, and the general public.

Many agencies and individuals came together to add insight to this study. There were also several opportunities for public involvement. All input was discussed and decided upon by consensus of the Steering Committee.

3.1 Steering Committee

A Steering Committee was formed, made up of a small group of technical people with land stewardship responsibility, which met monthly during the study preparation period. The Steering Committee consisted of representatives from the Bureau of Land Management, Dixie MPO; Ivins, Santa Clara, and St. George city governments; Utah Department of Transportation, and Washington County – all of which were identified to be a significant resource of information in assisting in the development of the study. The Steering Committee met a total of seven times - March 22, April 12, May 10, July 12, September 13, October 11, and November 8, 2006 (see Appendix for Steering Committee agendas and minutes). The project Steering Committee was responsible for the delivery of the project outputs and the attainment of project outcomes. The Steering Committee provided support, guidance, and executive oversight of the progress of the project by attending meetings, providing feedback, and approving the process and direction of the project. InterPlan prepared maps and gathered data to provide the Steering Committee with information about the project to facilitate a strong decision making process. This data was analyzed and the results submitted to the Steering Committee for review and approval. Steering Committee members included the following:

Table 3- 1 Steering Committee Members

Name	Title	Representing Organization
Aron Baker	City Traffic Engineer	St. George City
Jim Crisp	Field Manager	Bureau of Land Management
Lowell Elmer	Director	Dixie MPO
Dave Glenn	Public Works Director	Ivins City
Jack Taylor	Public Works Director	Santa Clara City
Ron Whitehead	Public Works Director	Washington County
Clayton Wilson	Planning Engineer	Utah Department of Transportation

3.2 Stakeholders' Committee

The Stakeholders' Committee consisted of 39 representatives from various interests. They were identified and invited as stakeholders because of their individual knowledge and experience in issues related to the study. The Stakeholders' Committee met a total of four times – May 10, July 12, September 13, and November 8, 2006 (see Appendix for Stakeholders' Committee agendas and minutes). At each meeting, issues associated with the project were presented and feedback was sought.

Figure 3- 1 Stakeholders' meeting held in St. George

At the first meeting, the stakeholders were presented with primary and secondary evaluation categories which were prioritized and approved. At the second meeting, stakeholders received primary and secondary weighting factors, which were approved. These weighting factors were used to calculate the impacts of several corridors. The stakeholders reviewed the corridor and provided additional comments to consider when determining the best performing corridors. At the third meeting, stakeholders were presented the preferred alternative and input was solicited and provided. The stakeholders provided local and focused information that might not have been communicated to the Steering Committee and consultant team. The Stakeholders' Committee members included the following:

Table 3- 2 Stakeholders' Committee Members

Kathy Abbott, Bureau of Land Management

Susanne Allen, St. George City Council

Donald Auer, Division of Wildlife Resources

Aron Baker, St. George City

Willie Billings, Tri-State ATV

Jerry Blair, Ivins City

Matt Brower, Santa Clara City

Jim Crisp, Bureau of Land Management

Robert Douglas, Bureau of Land Management

Lowell Elmer, Dixie MPO

Gary Esplin, St. George City

Dawna Ferris, Bureau of Land Management

Chuck Gillette, Ivins City

Dave Glenn, Ivins City

Judy Gubler, Ivins City

Shan Gubler, Developer

Drake Howell, School and Institutional Trust Lands

Lawson LeGate, Sierra Club

Matt Loo, St. George City

(continues next page)

Figure 3- 2 Informational Maps for Steering and Stakeholders' Committees

Kelly Lund , Federal Highway Administration

Tamerha Maxwell, Utah Department of Transportation

Jeff Morby, Developer/Realtor of Holiday Resort Realty

Scott Munson, Utah Department of Transportation

Bob Nicholson, St. George City

Kathleen Nielson, Santa Clara River Reserve

Lucy Ormond, Southwestern Utah Bicycle Touring Association

Glenn Rogers, Shivwits Band of the Paiutes

Laura Romin, U.S. Fish and Wildlife Service

Rick Rosenberg, Santa Clara City

Jimmie Rosenbruch, Property Owner

Chaitna Sinha, Southern Utah Wilderness Alliance

Lynne Scott, Bureau of Land Management and Three Rivers Trails

Darcy Stewart, SunRiver Development

Jack Taylor, Santa Clara City

Randy Taylor, Department of Environmental Quality

Renee Van Buren, Utah Valley State College

Mark Wade, SunRiver Homeowners' Association

Clayton Wilson, Utah Department of Transportation

Elaine York, The Nature Conservancy

Figure 3- 3 Examining topography maps on bike trip undertaken by Study Team

3.3 Agency Coordination

As part of the study, InterPlan worked with several different agencies and organizations. Many of the agencies involved have members who participated on the Steering Committee and/or the Stakeholders' Committee. Agencies involved in the study included the following:

AGENCIES ASSISTING

- Bureau of Land Management
- Dixie MPO
- Federal Highway Administration
- Five County Association of Governments (Beaver, Garfield, Iron, Kane, Washington)
- Ivins City
- Santa Clara City
- St. George City
- Washington County
- Washington County Water Conservancy District
- US Fish and Wildlife Service
- Utah Department of Transportation
- Utah Division of Wildlife Resources
- Utah Department of Environmental Quality

Much of the coordination between these organizations involved sharing information. Sharing information was an ongoing process from the initial data collection to updates during project development to the final report. Whether it was sitting down and meeting together, mailing CDs of maps, field visits, or emailing datasets; data collection was a big part of sharing information. InterPlan collected data for the study area from various sources, including the organizations listed herein. The following is a list of some of the data that was collected or created for the study area. Most of the data obtained was dated 2004 or newer and is noted as a source at the footer of each figure in this report. Some of this data was available from the State of Utah's Automated Geographic Reference Center. However, most of the data was collected from participating agencies.

Figure 3- 4 Habitat Reserve Sign

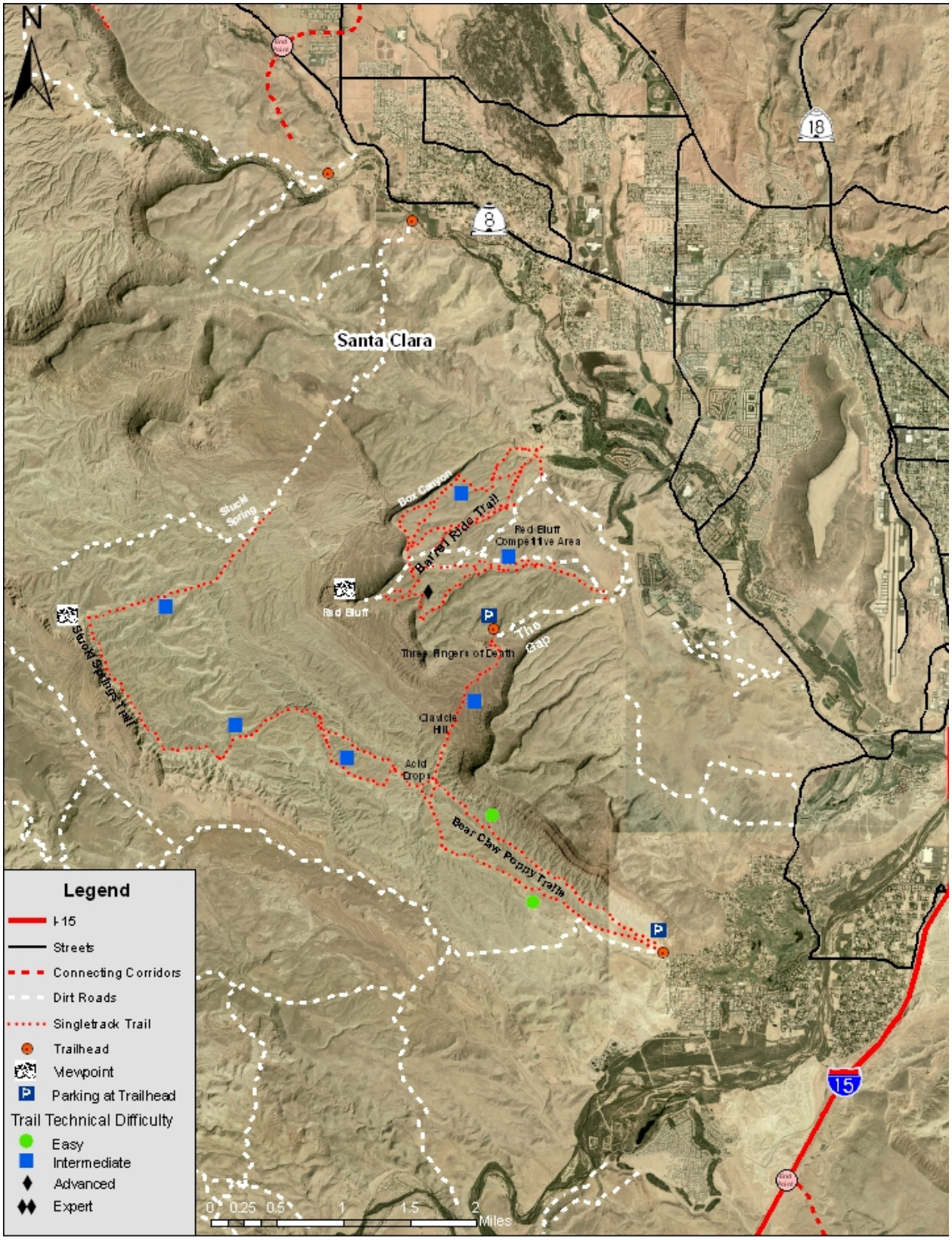
Types of Data Collected

Aerial Photography	Functional Classification	Slope
Annexation Plans	Hill Shading	Springs
Areas of Critical Environmental Concern	Holmgren Milkvetch Habitat	Streams and Washes
Connecting Corridors	Land Parcels	Street Network
Contour Lines	Municipal Boundaries	Traffic Counts
Desert Tortoise Habitat	Photography of Study Area	Trails
Dwarf Bearclaw Poppy Habitat	Rivers	Trail Difficulty
Elevation	Santa Clara River Reserve Open Space Management Plan	View Sheds
FEMA Flood Plain	Shivwits Milkvetch Habitat	

Additional data was collected during several visits to the study area. Observations were made at different times of the day and during different seasons of the year. Visits included driving through the southern end of the corridor where the Southern Parkway I-15 Interchange is planned and visiting the SunRiver development; hiking through the northern end of the corridor in the Santa Clara River Reserve, and mountain biking and driving four-wheel drive vehicles through much of the middle portion of the study area. Many times Steering or Stakeholders' Committee members were also present and/or served as hosts.

Agency coordination and information sharing facilitated the informational gathering process. Several joint meetings were held throughout the course of the study with the Steering and Stakeholders' Committees. During these meetings, committees were updated on data collected, evaluation criteria, traffic analysis, roadway cross-sections, possible alignments, and recommendations. Much of the data collected was presented at the meetings in the form of meaningful maps. Figure 3.5 is an example of such a map. It is a map of trails and recreation in the study area. This map and others were presented to both the Steering and Stakeholders' Committees to convey data collected and to discuss issues affecting the transportation corridor.

Figure 3- 5 Trails and Recreation Map



SOURCE : Trails from Adventure Map Inc., compiled from USGS, BLM, USFS, and NPS GIS data as well as extensive field surveys.

3.4 Public Involvement

The first public involvement meeting was held as part of the larger Dixie Transportation Expo 2006 on February 7, 2006 at the Dixie Center of St. George. InterPlan represented the Western Corridor-South Study by having an informational booth about the study and asking for written and verbal input. Comments, questions, and suggestions from the general public attending the Dixie Transportation Expo 2006 were recorded. Approximately 800 people were in attendance, of which 60 visited the Western Corridor-South Study booth. Comment cards and map notations were recorded and are available in the Appendix.

Figure 3- 6 Dixie Transportation Expo 2006

The second public involvement meeting was held on September 13, 2006 at the Dixie Center of St. George. At this meeting, information and recommendations were presented to the public about the Western Corridor-South Study. Public input was sought through one-on-one conversations, questions and answers after the presentation, and through written comment. Approximately 95 comments were received at the open house with another 30 comments submitted within a few days – totaling 125 comments received. Approximately 92 percent of the comments were from residents of the SunRiver development. An additional meeting was held on October 24, 2006 at the SunRiver Community Center to respond to specific questions and concerns raised by members of the SunRiver community. The public open house, along with the public comments, were then reviewed and discussed by the Steering Committee.

Chapter 4

Conditions and Forecasts

The study conditions include both existing and future conditions for population, dwelling units, employment, and traffic volumes; and existing conditions for land ownership and the environment.

The St. George Urbanized area represented the fastest growing metropolitan area in the United States in 1990s. With no sign of slowing growth, the St. George area must plan for a range of infrastructure needs including new and expanded roadways, utilities, and related facilities. Quantifying current conditions is the necessary first step to forecasting and planning for the future.

4.1 Population, Dwelling Units and Employment

The Dixie MPO planning region is a fast growing area. Projections indicate continual growth in St. George and other areas of Washington County. Washington County had a population of 90,354 in the year 2000 and the population is projected to grow more than 410,000 by the year 2035 (Utah Governor's Office of Planning and Budget). Employment is also projected to grow significantly over the next 30 years. Employment in Washington County was recorded at 37,740 jobs in 2000 and is expected to grow to more than 170,000 by the year 2035, a growth of over 450 percent. Subsequently, St. George City, Santa Clara, and Ivins are also expected to grow in the number of jobs over the next 30 years. Table 4.1 shows the 2000 population, employment, and dwelling unit numbers for different areas in Washington County.

Table 4- 1 2000 Population, Employment and Dwelling Units

Municipality	Population	Employment	Dwelling Units
Ivins	4,450	1,946	1,435
Santa Clara	4,630	1,985	1,225
St. George City	49,663	21,436	17,367
Washington County	90,354	37,740	29,939

Source: 2000 U.S. Census Summary File 3

Table 4- 2 2035 Forecasted Population, Employment and Dwelling Units

Municipality	Population	Employment	Dwelling Units
Ivins	23,236	10,161	7,493
Santa Clara	20,616	8,839	5,455
St. George City	216,756	93,558	75,799
Washington County	410,840	171,604	136,133

Source: data prorated from Utah Governor's Office of Planning and Budget (GOPB) population projections

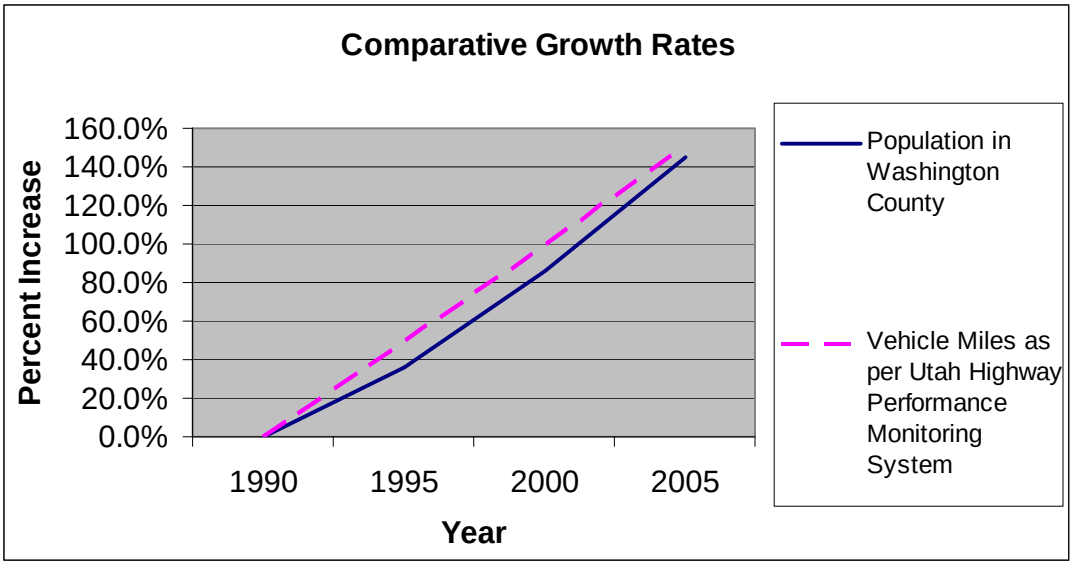
Connecting communities to the north, south, and east of the study area presents a higher priority for the corridor than accommodating new growth in the area.

With this predicted growth in people, jobs and housing, traffic congestion is also expected to increase. In the western side of St. George, where this study area is located, over 90 percent of the land is in the public domain, possibly inhibiting further expansive growth in the study area itself. Thus, connecting communities to the north, south and east of the study area presents a higher priority for the corridor than accommodating new growth in the area.

4.2 Traffic Volumes

Despite the strength of population growth, the growth in traffic has been even stronger. Traffic volumes on I-15 through St. George have approximately tripled in the twenty year period from 1985 to 2005. UDOT's Annual Average Daily Traffic (AADT), has been recorded for several decades. As shown in Figure 4.1 the population in Washington County has increased by approximately 145 percent from 1990 to 2005. Yet, during this same period, vehicles' miles of travel has surpassed population growth every year, and has grown by over 150 percent since 1990.

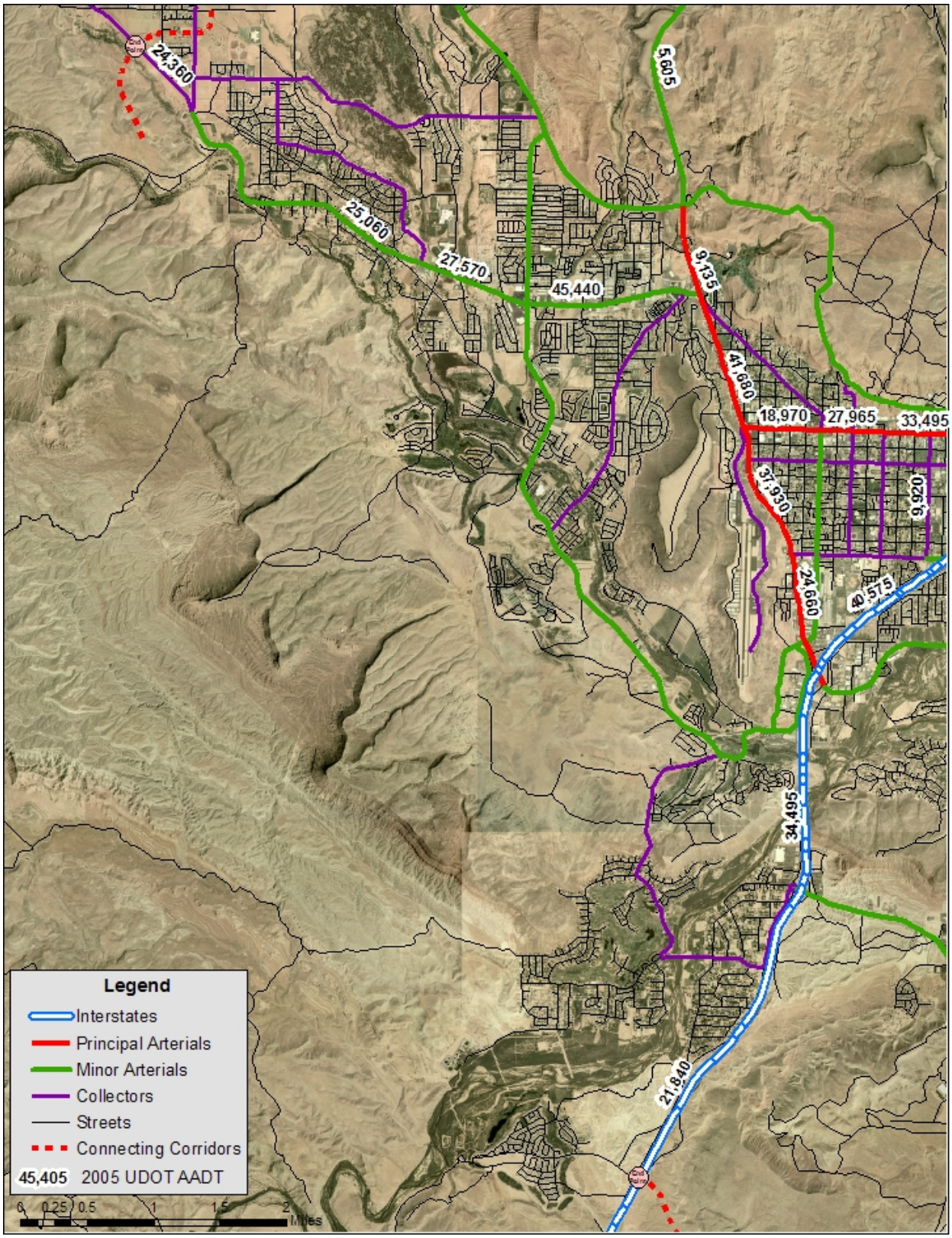
Figure 4- 1 Traffic Volume in St. George over time



The Dixie MPO has planned for this growth by developing a system of streets to carry the range of local and regional traffic. The Dixie MPO, in cooperation with UDOT, has defined a functional classification of streets, where local streets are planned and designed for low speed, short distance travel, and access to many individual properties; while freeways and principal arterial streets are planned for high speed, long distance travel, and with restrictions on land access. Collector and minor arterial streets are also defined, and serve travel speeds, trip lengths, and land access in the middle range between local streets and freeways.

Periodically, UDOT in cooperation with the Dixie MPO and local government, is required to submit a functional classification plan to the Federal Highway Administration. Figure 4-2 displays the most recently adopted functional classification system in the Dixie MPO planning boundary, adopted February 2005. According to this system, the significant residential traffic growth in Santa Clara and Ivins is limited to travel on collector and minor arterial streets such as Old Highway 91, Santa Clara Drive, Sunset Boulevard, and Dixie Drive to access the job centers in downtown St. George. Most of these roads serve a mix of residential and commercial land accesses and are not designed for high speed travel. In the longer term, St. George City is expected to grow, leaving Ivins and Santa Clara without direct transportation access to I-15 other than through a series of lower functioning streets. Another factor to consider is increased traffic when I-15 is closed down in the Virgin River Gorge due to accidents. All truck traffic is rerouted up Bluff Street to busy Sunset Boulevard., and through the small towns of Ivins and Santa Clara. The Western Corridor could alleviate congestion and public safety issues under these conditions.

Figure 4- 2 Functional Classification, Dixie MPO 2005



SOURCE : Utah Department of Transportation 2005 Traffic on Utah Highway Counts and Functional Classification System St. George urbanized area approved February 2005.

Traffic volumes today are not significant problems on the minor arterial and collector streets which connect St. George to Ivins and Santa Clara. These lower functioning roads are designed to allow generous commercial land access and a high frequency of traffic signals. Due to the numerous access points and signalized intersections, lower functioning streets generally have higher accident rates than higher speed freeways or arterial streets. According to UDOT 2004 statewide average accident data, accidents on collector streets occur in the range of six to seven accidents per million vehicle miles, while accident rates on freeways are typically below two accidents per million vehicle miles.

Table 4- 3 Selected AADT in region

		2005 AADT
Old Highway 91	Minor Arterial	27,570
SR-18 100 North SR-34	Principal Arterial	41,680
SR-34 St. George Blvd.	Principal Arterial	27,965
I-15 Bloomington Interchange	Interstate	34,495

Source: UDOT *Traffic on Utah Highways*

Figure 4- 3 Dirt road in west desert

The volume of traffic on these roads will continue to grow significantly and people can expect traffic congestion to be a growing problem. The Western Corridor-South will be designed as a principal arterial street, with limits on traffic signals and access points, to serve as a more direct route from Ivins and Santa Clara to the Southern Parkway Interchange on I-15. As an arterial street, the Western Corridor will help relieve traffic congestion on Santa Clara Dive, Sunset Boulevard, and Dixie Drive as well as reduce overall traffic accidents in the area. The Western Corridorr will also allow public street access points and traffic signals limited to approximately one mile spacing while minimizing private driveway access. Table 4.4 shows 2035 projected traffic volumes for the north, central, and south segments of the corridor.

Table 4- 4 Projected AADT

2035 Western Corridor-South Projected Annual Average Daily Traffic (AADT) *Assumes 60 MPH Speed Limit			
	North	Central	South
Volume*	18,560	18,980	39,820

Source: QRSII model applied to InterPlan adjusted employment and dwelling unit projections see Table 5.1.

4.3 Existing Land Administration

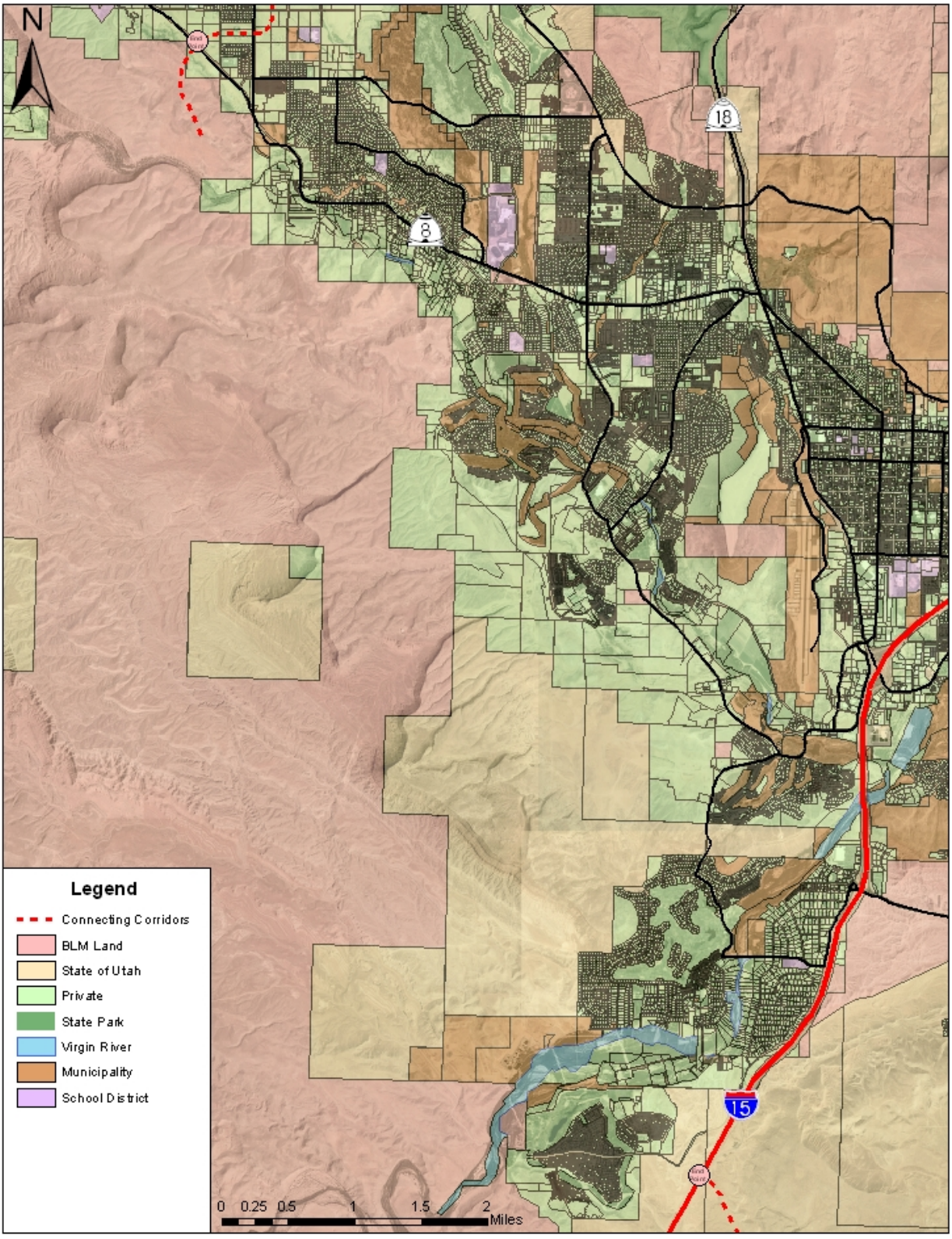
Approximately 80 percent of the land within the Western Corridor-South study area is administered by the BLM, and 12 percent administered by the State of Utah (SITLA). There are also acres of private land, 1600 acres or six percent; and land administered by local cities, 400 acres or two percent. The largest land administration agency in the study area is BLM (see Figure 4.4, Land Administration). The Federal Land Policy and Management Act of 1976 (Public Law 94-579, 90 Statute 2743) requires BLM to coordinate, to the extent possible and in compliance with federal laws, regulations, and policies; its land use plans with plans of local communities, counties, and Native American tribes.

Within the study area, BLM has designated the Santa Clara River Reserve to protect sensitive environmental and cultural resources while allowing for recreational opportunities. BLM also provides for many recreational opportunities, such as biking and hiking, on administered lands in the study area which could be considered historic or Section 4(f) properties by the NEPA process. In addition, the area contains BLM-administered grazing allotments.

In March 1999, the BLM St. George Field Office approved a Record of Decision for the Resource Management Plan, which is the land use plan for BLM-administered public land in Washington County.

In March 1999, the BLM St. George Field Office approved a Record of Decision for the Resource Management Plan, which is the land use plan for BLM-administered public land in Washington County. The Resource Management Plan sets forth the vision and land use policies for the management of BLM-administered public land. All future resource management authorizations and actions will conform to or, at a minimum, not conflict with, the decisions made by BLM in the planning documents. Transportation direction in the Resource Management Plan notes that BLM will work with project sponsors, such as the Dixie MPO, to identify a suitable alignment for an extension of a route from I-15 to Old Highway 91 between Santa Clara and Ivins (our study area). When a corridor study, such as this study, is completed, and a project proposal is submitted, BLM will analyze the route for conformance with the Resource Management Plan. If found to be in compliance, an evaluation for the Western Corridor-South study will be conducted, as part of a NEPA process, to document environmental impacts, assess a reasonable range of alternatives, and provide for public notice and participation. The BLM St. George Field Office, in cooperation with the Federal Highway Administration, would prepare a Record of Decision for the project proposal.

Figure 4- 4 Land Administration



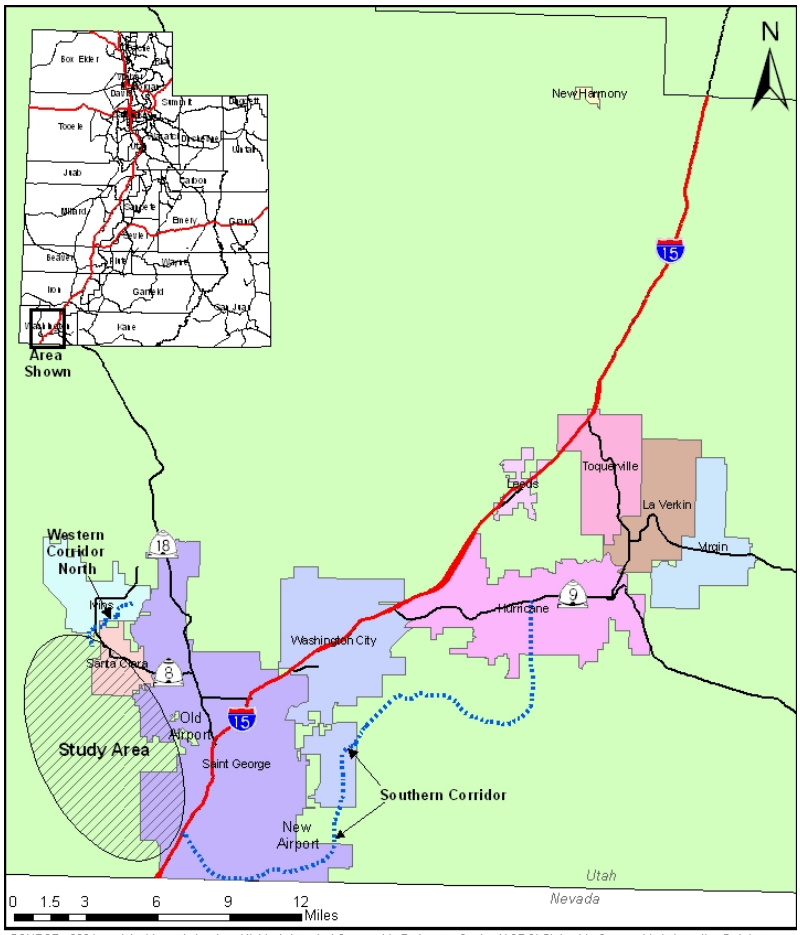
SOURCE : Land ownership parcel data from Washington County GIS database

4.4 Existing Environmental

4.4.1 Study Area Overview

The study area is located in the southwestern portion of Washington County, Utah, and is in a physiographic transition zone between the Mojave Desert, the Great Basin Desert, and the Colorado Plateau. In this transition zone, sagebrush communities of the Great Basin to the north merge with desert scrub and blackbrush-dominated communities that typify the Mojave Desert to the south. These two ecological zones are interspersed with the grasslands of the Colorado Plateau typical of lands to the east. Each zone is dominant in different areas depending, primarily, on the elevation and precipitation. The elevation in the area ranges from 2,500 feet at the Virgin River to 3,500 feet in the middle portion of the study area. The highest point is Boomer Hill at 3,825 feet in the central west portion. The study area includes the Santa Clara River on the north and the Virgin River to the south. Stucki Spring is an important water source for wildlife in the central part of the study area.

Figure 4- 5 Study area location in Utah



SOURCE : 2004 municipal boundaries from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID) and were developed through a collaboration of Governor's Office of Planning and Budget, the Utah Department of Transportation, the Utah State Tax Commission. and AGRC.

A few dirt roads and recreational trails on BLM administered land cross the study area. However, the overall study area is undisturbed desert. One exception is found in the extreme southern portion near the Virgin River where the area consists primarily of residential development.

4.4.2 Wildlife Resources

4.4.2.1 Regulations

Regulations for wildlife will need to be considered during any NEPA process for the Western Corridor-South project. The following Federal Regulations apply: the Migratory Bird Treaty Act (16 U.S.C. 703-712), the Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d, 54 Stat. 250), and Executive Order 13186, Responsibilities of Federal Agencies To Protect Migratory Birds.

FEDERAL REGULATIONS

- The Migratory Bird Treaty Act (16 U.S.C. 703-712),
- The Bald and Golden Eagle Protection Act (16 U.S.C. 668–668d, 54 Stat. 250), and
- Executive Order 13186, Responsibilities of Federal Agencies To Protect Migratory Birds.

4.4.2.2 Wildlife Habitat

The study area's average rainfall is eight inches per year, and, as a result, a variety of transitional species can be found. Creosote bush (*Larrea tridentata*), blackbrush (*Coleogyne ramosissima*), shadscale (*Atriplex confertifolia*), big sagebrush (*Artemisia tridentata*), and white bursage (*Ambrosia dumosa*) are representative flora species of southwestern Utah. Upland vegetation consists mostly of low-growing shrubs representative of the Mojave Desert such as creosote bush, Mormon tea (*Ephedra* spp.), and blackbrush.

The scarcity of precipitation in the study area increases the wildlife habitat importance of the two rivers and one major spring. Common vegetation in the riparian area along the Santa Clara and Virgin Rivers includes Fremont cottonwood (*Populus fremontii*), honey mesquite, screwbean mesquite (*Prosopis pubescens*), bullrush (*Scirpus* spp.), Baltic rush (*Juncus balticus*), and common reed (*Phragmites australis*). Cattails (*Typha* spp.), tamarisk, willow (*Salix* spp.), Fremont cottonwood, and several grass species are also present. The dominant overstory species are Fremont cottonwood and Goodding's willow (*Salix gooddingii*). The vegetation along the rivers has been disturbed by human activity and livestock grazing. The habitat around Stucki Spring has been disturbed by livestock grazing and off-road vehicles.

4.4.2.3 Wildlife

The study area provides habitat for diverse Mojave Desert and Great Basin Desert wildlife as well as a variety of migratory species. Small mammals, lizards, and songbirds are most frequently observed here, particularly along the Santa Clara and Virgin Rivers. Gambel's quail (*Lophortyx gambelii),* mourning dove (*Zenaida macroura*), and mule deer (*Odocoileus hemionus*) are also seen in the upland zones of the study area. Other species include mountain lion, bobcat, wild turkey, golden eagle, red-tailed hawk, peregrine falcon, and mountain bluebird. The Santa Clara and Virgin Rivers also serve as a migration corridor for neotropical songbirds, waterfowl, and shorebirds. Migrating shorebirds such as Canada goose, green-winged teal, ring-necked duck, canvasback, redhead, American avocet, blacknecked stilt, mallard, and great blue heron use these river habitats during spring and fall stopovers. Stucki Spring, in the central part of the study area, provides an important source of water for wildlife as it is the only water source within a two mile radius.

4.4.2.4 Mitigation Process

Figure 4- 6 Stucki Spring

Mitigation for wildlife resources including the loss and fragmentation of habitat will be developed in consultation with the Utah Division of Wildlife Resources (UDWR) and United States Fish and Wildlife Service (USFWS). Measures could include providing wildlife crossings and fencing, limiting construction to specific times of year, and rehabilitating wildlife habitat in the project vicinity where project impacts occur.

4.4.3 Threatened and Endangered Species

4.4.3.1 Regulations

Section 7(a)(2) of the Endangered Species Act states that each federal agency shall, in consultation with the Secretary of the Interior, ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. In fulfilling these requirements, agencies such as BLM, U.S. Forest Service, USFWS, must use the best scientific and commercial data available. Because threatened and endangered species are likely to be effected in this corridor, a biological assessment must be prepared as part of the NEPA and the Section 7 of the Endangered Species Act processes. This analysis produces a USFWS biological opinion, which will establish conservation and mitigation measures for affected species. Processing the Section 7 could take between 12 and 18 months to complete.

Table 4.5 provides a list of federally listed threatened and endangered, and Utah state sensitive species, that are known to occur or which might occur in the study area. (The Endangered classification is more severe than the Threatened.) The species shown in the table have the potential to occur, as identified by BLM and the USFWS, in the study area. Since the area has not been completely inventoried there is the possibility that, if surveyed, the species could be found. Habitats exist in the study area that can support these listed species.

Table 4- 5 Species with suitable habitat in Study Area

Federal Threatened and Endangered Species, State Sensitive Species With Suitable Habitat in Study Area			
Common Name	**Scientific Name**	**Sensitive Status Federal**	**Sensitive Status State**
Plants			
Dwarf Bearclaw poppy	*Arctomecon humilis*	Endangered	_
Holmgren milkvetch	*Astragalus holmgreniorum*	Endangered	_
Shivwits milkvetch	*Astragalus ampullariodes*	Endangered	_
Siler Pincushion cactus	*Pediocactus sileri*	Threatened	_
Birds			
Southwestern willow flycatcher	*Empidonax trailii extimus*	Endangered	_
California condor	*Gymnogyps californianus*	Endangered	_
Bald eagle	*Haliaeetus leucocephalus*	Threatened	_
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	_
Yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Candidate	_
Greater sage grouse	*Centrocercus urophasianus*	Candidate	Species of Concern
Reptiles/Amphibians/Fish			
Desert tortoise	*Gopherus agassizii*	Threatened	_
Woundfin	*Plagopterus argentissimus*	Endangered	_
Virgin River chub	*Gila seminuda*	Endangered	_
Gila monster	*Heloderma suspectum*	_	Species of Concern
Arizona toad	*Bufo microscaphus microscaphus*	_	Species of Concern
Western banded gecko	*Coleonyx variegatus*	_	Species of Concern
Mammals			
Kit fox	*Vulpes macrotis*	_	Species of Concern
Spotted bat	*Euderma maculatum*	_	Species of Concern

Source: BLM, Special Status Species Washington County, Utah, prepared by St. George Field Office, October 4, 2005. Letter from Utah Department of Natural Resources, Division of Wildlife Resources, May 16, 2006.

4.4.3.2 Plants

Figure 4.7 provides an overview of the known plant habitat regions for the four plant species and the desert tortoise habitat in the Western Corridor-South study area. A brief introduction to these mapped species follows.

Dwarf Bearclaw Poppy (*Arctomecon humilis*), which is native to Washington County, is listed as federally endangered. Geologically speaking, it occurs primarily on the Shnabkaib Member of the Moenkopi Formation and is sometimes found on the Upper Red and Lower Red Members of the Moenkopi Formation found at elevations from 2,460 feet to 3,510 feet. It is often associated with other plants such as shadscale, indigo bush (*Psorothamnus fremontii*), Mormon tea, and cliffrose (*Cowania mexicana*). Dwarf Bearclaw poppy flowers April through May (Nelson and Harper 1991). Figure 4.7 shows the location of known Dwarf Bearclaw poppy habitat in the study area. Key issues for this species include direct loss of habitat and habitat fragmentation. Besides impact directly on poppy plants, construction of the project could have direct and indirect impacts to ground-nesting bees that are pollinators for this species. A reduction in pollinators could reduce gene flow between plant populations and consequently affect the poppy's reproductive success. Dwarf Bearclaw poppy was identified in 2006 by BLM near Stucki Spring.

Holmgren Milkvetch (*Astragalus holmgreniorum*) is listed as federally endangered and is located on the Virgin Limestone Member of the Moenkopi Formation. Plants are often found below yellowish-brown marine limestone ledges on red, fine-textured soils in small washes. Holmgren milkvetch grows with a mixture of warm and cold desert shrubs. It is found at elevations from 2,690 feet to 2,780 feet, and it flowers late March through April. The habitat shown on Figure 4.7 is proposed for listing as critical habitat with a final determination expected in December 2006. Construction of the project could have direct and indirect impacts to ground-nesting bees that may be pollinators for this species. A reduction in pollinators could reduce gene flow between plant populations and consequently affect the milkvetch's reproductive success. Holmgren milkvetch was recently identified by BLM near Stucki Spring.

Shivwits Milkvetch (*Astragalus ampullaroides*) is listed as federally endangered and grows on gypsiferous soils on the Chinle Formation. It is commonly associated with scattered juniper and warm desert shrub communities. It is found at elevations from 3,440 feet to 3,770 feet, and it flowers April through May. Although no habitat is known within the Western Corridor-South study area, surveys would need to be conducted as part of the NEPA process.

Siler Pincushion Cactus (*Pediocactus silerí*) is listed as federally threatened and is found on the Shnabkaib Member of the Moenkopi Formation. Some plants also may be found on the Middle Red Member of the Moenkopi Formation, which lies immediately below the Shnabkaib Member (Gierisch 1989). This species is found at elevations between 2,800 feet and 5,400 feet and on slopes that range from 0 to 80 degrees. Siler cactus is found in the warm desert, in the salt desert shrub and pinyon-juniper zone. Although no habitat is known within the Western Corridor-South study area, surveys would need to be conducted before construction as part of the NEPA process.

4.4.3.3 Birds

Southwestern Willow Flycatcher (*Empidonax traillii extimus*) is listed as federally endangered. Listing was considered necessary because of dramatic declines in its breeding populations in the American Southwest. The flycatcher inhabits areas along rivers, streams, and wetlands that provide dense, shrubby cover. USFWS listed critical habitat for the flycatcher along the Virgin River within the study area.

Annual surveys for the flycatcher have been performed by Utah Division of Wildlife Resources (UDWR) along the Virgin River since 1995, and several nesting pairs have been documented (UDWR 1999). Breeding pairs have not been sighted in the Santa Clara River system; however, potential habitat may occur along some areas of the river. Site visits in 2005 and 2006 along the Santa Clara River have shown that the floods of 2005 have stripped away much of the riparian vegetation, and it will be many years before the vegetation re-establishes.

USFWS has released a Draft Recovery Plan for the flycatcher (66 Federal Register 30477) that contains specific management guidelines for activities conducted in occupied and unoccupied flycatcher habitats. These guidelines focus on preventing degradation of suitable flycatcher habitat by restricting activities such as motorized vehicle travel and other recreation uses.

Bald Eagle (*Haliaeetus leucocephalus*) is listed as federally threatened and has been observed as a winter visitor along the Santa Clara and Virgin Rivers (November to April). Bald eagles may occasionally be found foraging in the study area, but they are not expected to be found nesting.

Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis)* is a federally listed candidate species. No yellow-billed cuckoos have been observed along the Santa Clara and Virgin Rivers, although the riparian habitat would provide opportunities for nesting birds.

California Condor (*Gymnogyps californianus*) is a federally listed endangered species that may occasionally forage in the study area. Suitable habitat, such as old growth forest, caves, high cliffs, grasslands, and oak savanna, are not present in the study area; therefore, California Condors are not expected to occur, except as rare visitors.

Mexican Spotted Owl (*Strix occidentalis lucida*) is federally listed as threatened. In the northern part of its range, which includes southern Utah, owls occur primarily in rocky canyons. In southern Utah, most nests are in caves or on cliff ledges in rocky canyons. Specific prey groups identified from spotted owl pellets include woodrats, mice, voles, rabbits, gophers, bats, birds, reptiles, and arthropods and thus construction may be direct and indirect impacts on this species. Although critical habitat has been designated for this species, none occurs in the study area.

Greater Sage Grouse (*Centrocercus urophasianus*) is a federal candidate species and a Utah species of concern. These birds inhabit sagebrush plains, foothills, and mountain valleys. Sagebrush is the predominant plant in quality sage grouse habitat. A good understory of grasses and forbs, and associated wet meadow areas, are essential for optimum habitat. No birds are known to inhabit lands within the study area.

4.4.3.4 Reptiles/Amphibians/Fish

Desert Tortoise (*Gopherus agassizii*) is a federally threatened reptile species that is found throughout portions of Washington County, with most animals being concentrated in the Red Cliffs Desert Reserve north of St. George, Utah. The Reserve was established as part of the Washington County Habitat Conservation Plan, which provides a framework for protecting the desert tortoise and other sensitive plant and wildlife species from the direct and indirect impacts of human activity. This tortoise occupies desert washes, dunes, and rocky slopes in creosote and Joshua tree communities. Surveys conducted by BLM and others (SWCA Environmental Consultants, 2002) have produced very little conclusive evidence of tortoise populations in this study area, however, surveys will likely be required as part of the NEPA process.

Woundfin (*Plagopterus argentissimus*) is listed as a federally endangered fish species and occurs in the Virgin River above Lake Mead in Nevada, upstream of the confluence of Ash and La Verkin Creeks. Suitable habitat to support additional Woundfin populations exists in the Western Corridor-South Study Area.

Virgin River Chub (*Gila seminuda*) is listed as a federally endangered fish species and occurs in an approximately 50-mile stretch of the Virgin River between Mesquite, Nevada, and the La Verkin Creek confluence near Hurricane, Utah. Suitable habitat to support additional chub populations exists in the Western Corridor-South Study Area.

Gila Monster (*Heloderma suspectum*) is a Utah species of concern. UDWR has historical records of occurrences for this species in the study area.

Arizona Toad (*Bufo microscaphus microscaphus*) is a Utah species of concern that is found in moist, shaded canyons. UDWR has historical records of occurrences of this species in the study area.

Western Banded Gecko (*Coleonyx variegatus*) is a Utah species of concern. UDWR has recent records of occurrences of this species in the study area.

4.4.3.5 Mammals

Kit Fox (*Vulpes macrotis*) is a Utah species of concern. This species occupies upland habitat but may be found in riparian habitat along the Santa Clara and Virgin Rivers. UDWR has recent records of occurrences of this species in the study area.

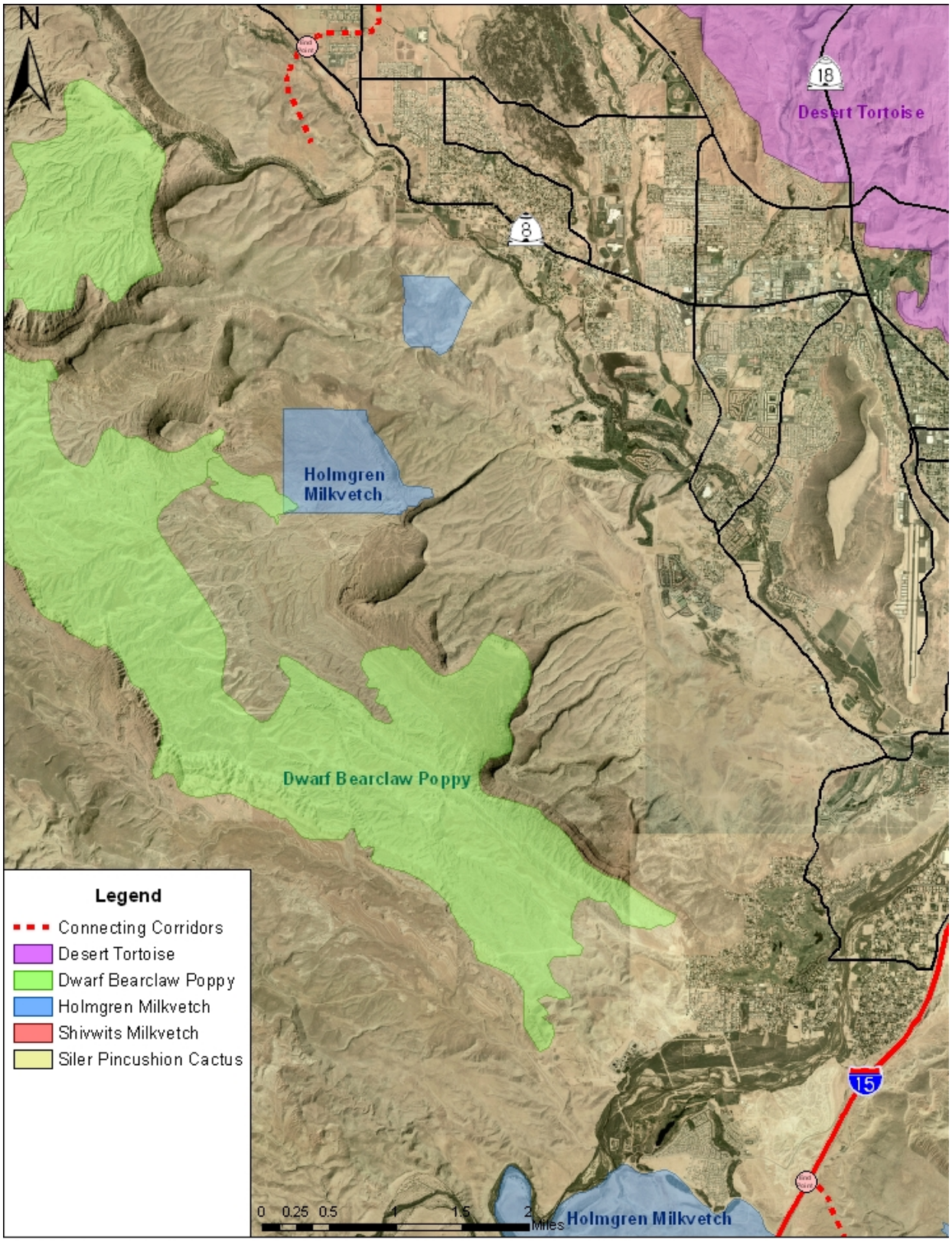
Spotted Bat (*Euderma maculatum*) is a Utah species of concern. This species is declining throughout the West and would be found in caves and in upland habitat. The species might forage in the area during summer and could be found in riparian areas such as the Santa Clara and Virgin Rivers. UDWR has recent records of occurrences of this species in the study area.

4.4.3.6 Mitigation Process

Mitigation for impacts to threatened and endangered species will be developed through consultation with USFWS as part of the Section 7 process of the Endangered Species Act.

Mitigation for impacts to threatened and endangered species will be developed through consultation with USFWS as part of the Section 7 process of the Endangered Species Act. Although complete avoidance of impacts is preferred, there are times when avoidance is not possible so that impacts must be mitigated. USFWS will issue a biological opinion which will list conservation and mitigation measures. For other recent projects, such as the Southern Corridor, USFWS required the purchase of habitat preserves to mitigate impacts to Holmgren milkvetch and Dwarf Bearclaw poppy habitat. Because the project would cross critical habitat for the Southwestern Willow Flycatcher, it is possible that mitigation for this habitat will also be required. Conservation measures could also be required for wildlife species, such as the Desert Tortoise, that occur in the study area. These measures could include use of special fencing, providing wildlife crossings, restricting construction to specific times of year, and designating special construction methods.

Figure 4- 7 Known Endangered or Threatened Species Habitat



SOURCE : Bureau of Land Management and Washington County GIS databases. US Fish and Wildlife Service

4.4.4 Cultural Resources

4.4.4.1 Regulations

The National Historic Preservation Act was enacted in 1966 to evaluate impacts to historic and archaeological resources that could be affected by undertakings involving federal agencies. Paleontological resources are also given consideration under this Act. The Act requires federal agencies that fund, permit, or are otherwise involved in a project (for example, as a landowner) to consider the impacts that the undertaking would have on cultural resources. The Act mandates that agencies perform the following actions:

- Identify historic properties that could be affected by a project, including historic and archaeological sites (and significant paleontological localities) that either are listed on the National Register of Historic Places (NRHP) or have been determined through a consensus process to be eligible for listing on the NRHP.

- Assess the nature and extent of the expected impacts on the qualities of the resource that resulted in its listing on the NRHP or the determination that it was eligible for listing on the NRHP.

- Consider measures to avoid, minimize, or mitigate those impacts.

Section 106 of the National Historic Preservation Act outlines the process through which the above actions are carried out. This process includes steps for consulting with state or tribal historic preservation officers, the Advisory Council on Historic Preservation, Native American tribes, and other interested parties. State-level antiquities laws give similar considerations to historic, archaeological, and paleontological resources in Utah.

Figure 4- 8 Looking southwest at Stucki Spring Trail

4.4.4.2 Archaeological

Evidence of very early human uses of the study area, during either the Paleo-Indian Stage (prior to 15,000 years ago) or the Archaic Stage (about 7000 BC to about 300 BC), has not yet been documented in the study area. Most previously recorded sites date to the Formative Stage (about 700 BC to about AD 1200), a period when indigenous hunting and collecting groups gradually became small-scale corn (maize) farmers, settled in permanent villages, and began to produce fine-quality ceramics.

Although the Western Corridor-South study area has not been completely surveyed for archaeological resources, the area is likely to contain numerous archaeological sites.

Although the Western Corridor-South study area has not been completely surveyed for archaeological resources, the area is likely to contain numerous archaeological sites. For example, more than 125 archaeological sites have been recorded on the public lands along a 2.5-mile reach of the Santa Clara River near the study area (Dalley 1984). The habitation and village sites include architectural remains, ceramics, grinding stones (*manos* and *metates*), and lithic debris (*debitage*) from the preparation of chipped stone tools. Similar site types are found on private lands in Anasazi Valley, which is on the west stream terrace of the Santa Clara River (Allison 1989), and elsewhere along the river. Another category of sites found includes many examples of rock art (petroglyphs) incised or pecked into the dark desert varnish-coated surface of Shinarump Conglomerate.

The ancestral Southern Paiute are believed to have moved into this region sometime between AD 1000 and 1300. They were hunters and gatherers who practiced a seasonal round of resource collection and processing over a broad and diverse landscape. In southern Utah, however, some Southern Paiute groups became small-scale farmers and diverted water from the Virgin and Santa Clara Rivers and other smaller streams to cultivate garden plots. Euro-American explorers to this region, including Dominquez and Escalante in 1776 and Jedidah Smith in the 1820s, reported seeing irrigation ditches and small check dams constructed by the Southern Paiute to divert water from the rivers and streams onto their fields of corn, beans, and squash. A Southern Paiute site, located on private land near the study area, was excavated by archaeologists from Brigham Young University in the 1980s. This site contained evidence of maize cultivation that dated to AD 1700 and 1830 (Allison 1988).

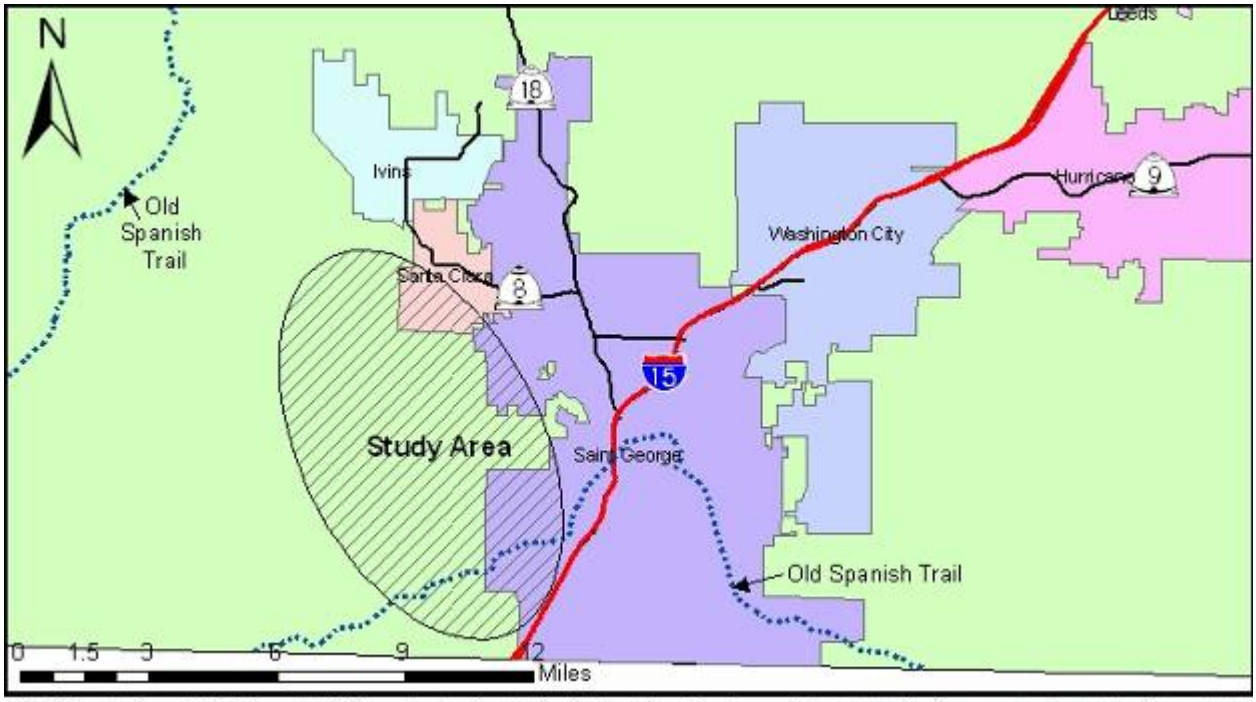
4.4.4.3 Tribal Consultation

As part of the NEPA process, consultation will be required with Native American tribes that may have an interest in the study area. Final determination of tribes to include in the consultation process will be made during the NEPA process. The tribes with interest in the study area include the Hopi Tribe; the Navajo Nation; the Paiute Indian Tribe of Utah and its Shivwits, Cedar, Indian Peak, and Kanosh Bands; the Uintah/Ouray Ute; the Las Vegas Paiute; the Moapa Paiute; and the Kaibab Paiute.

4.4.4.4 Historic

Few surveys of historic resources have occurred within the study area. Historic resources in the study area relate to the 18th and 19th century Euro-American explorations. In 1776, two Franciscan priests from New Mexico, Dominquez and Escalante, traveled through southern Utah looking for an overland route to the Spanish colonies in California. This travel route came to be known as the Old Spanish Trail. The main branch of the Old Spanish Trail followed the Santa Clara River south from Mountain Meadows and then veered to the west over the low pass of Utah Hill (old Highway 91). In 2001, the Old Spanish Trail was designated as a National Historic Trail.

Figure 4- 9 Two sections of Old Spanish Trail



SOURCE : Old Spanish Trail from the US Department of the Interior, National Park Service available at http://imgis.nps.gov/national_historic_trails.html

By the early 1850s, the first colonies were being established by members of the Church of Jesus Christ of Latter-day Saints (Mormons) in southern Utah. Some of the structures built by these colonies may be found in the study area; these structures include irrigation systems along the Santa Clara and Virgin Rivers and sites associated with stock animals.

4.4.4.5 Paleontological

During the NEPA process, consultation regarding paleontological resources will take place with the Utah Geological Survey and other institutions with expertise. Given that numerous paleontological sites have been found near the study area, a survey will likely be required as part of the NEPA process.

4.4.4.6 Mitigation Process

Mitigation for cultural resources, such as archeological, tribal, historic and paleontological, will be developed in coordination with the Utah State Historic Preservation Office (SHPO) and in consultation with Native American tribes through Federal Highway Administration (FHWA) and UDOT.

Affected archaeological sites could be subject to archaeological testing and/or full data recovery. Impacts to historic sites could include mitigation such as documentation. All affected cultural resource sites eligible for the National Register will have to go through a 4(f) evaluation process. Given the project scope and likelihood of impacts, adverse effects to properties eligible for the National Register will be taken into account through the execution of a Memorandum of Agreement developed with the SHPO, Advisory Council of Historic Preservation, affected agencies, and consulting parties identified under historic or Section 106 (NEPA process).

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4.4.5 Water Resources and Wetlands

Table 4.6 provides an overview of some of the water resources and wetland regulations that would apply during development of the Western Corridor-South project.

Table 4- 6 Water Resources and Wetland Regulation

Regulation	Regulatory Agency and Requirement	Applicability
CWA Section 401 State Water Quality Certification	The Environmental Protection Agency (EPA) requires the Utah Department of Environmental Quality (UDEQ) to certify that the project would not cause Utah water quality standards to be exceeded.	**Water Quality Certification:** UDEQ provides this certification to the U.S. Army Corps of Engineers. Required for the Virgin and Santa Clara Rivers.
CWA Section 402 (UAC R317-8) NPDES Permit (UPDES in Utah) (Limits discharges)	EPA delegated authority for the National Pollutant Discharge Elimination System (NPDES) program in Utah to UDEQ. Construction projects that disturb more than 1 acre of land must obtain a Utah Pollutant Discharge Elimination System (UPDES) permit to minimize impacts to water quality.	**UPDES Permit:** A UPDES permit would be required for roadway construction.
CWA Section 303(d) Total Maximum Daily Load (TMDL) for Impaired Waters (Limits discharges)	EPA requires the Utah Division of Water Quality to identify water bodies that do not meet state water quality standards and therefore do not support their designated beneficial use. The Division submits a 303(d) list of these impaired waters to EPA biannually. The Division conducts a TMDL analysis on the impaired waters to determine the maximum contaminant load that the water body can accept and still meet the standards. The Division then assigns point-source dischargers (UPDES permit holders) a numerical limit for discharge of particular pollutants based on the TMDL analysis.	**TMDL Evaluation:** A TMDL evaluation would be required for the Santa Clara and Virgin Rivers.
UAC R317-2-7.2 Narrative Water Quality Standards (Limits discharges)	This regulation states that it is unlawful to discharge substances that could cause undesirable effects on human health or aquatic life into surface waters.	**Narrative Standards:** All surface waters near the water quality impact analysis area must meet the narrative standards.
UAC R317-2-14 Numeric Criteria (In-stream standard)	Numeric standards for water quality are based on the beneficial use, such as drinking water, supporting game fish, or swimming. Projects cannot cause water quality standards to be exceeded. If a standard is already being exceeded, a TMDL limit may be applied to the project.	**Numeric Standards:** Discharges may not exceed the current numeric standard.
CWA Section 404 Permit	Projects that would place dredged or fill material in waters of the U.S. require a Section 404 permit.	**Permit:** A 404 permit may be required for crossing the Santa Clara and Virgin Rivers. Stucki Spring will need to be evaluated as a potential jurisdictional wetland. Dry washes in the study area could also be considered waters of the U.S.
CWA Section 402 (UAC R317-8) NPDES Permit (UPDES in Utah) (Limits discharges)	EPA delegated authority for the National Pollutant Discharge Elimination System (NPDES) program in Utah to UDEQ. Construction projects that disturb more than 1 acre of land must obtain a Utah Pollutant Discharge Elimination System (UPDES) permit to minimize impacts to water quality.	**UPDES Permit:** A UPDES permit would be required for roadway construction.

Source: HDR Engineers

4.4.5.1 Water Resources

Figure 4.6 provides an overview of the water resources in the study area. The main surface waters in the Western Corridor-South study area are the Santa Clara and Virgin Rivers. Both rivers would be crossed by the proposed project. The rivers contain important riparian areas for wildlife and also support endangered fish species. Large floodplain areas are associated with each river, with the most recent flooding occurring in the winter of 2005.

The study area also contains numerous dry washes including Hollow Wash, Box Canyon Wash, Cottonwood Wash, Gap Wash, Curly Hollow Wash, and Cove Wash. Numerous springs are also found throughout the study area. Stucki Spring has been developed to provide water for livestock that graze in the study area.

4.4.5.2 Wetlands

No formal wetland delineations have occurred in the Western Corridor-South study area. Wetlands are likely to be associated with the Santa Clara and Virgin Rivers. Wetland delineation would need to be performed during the NEPA process. Stucki Spring, in the central portion of the study area, could also be a jurisdictional wetland. This spring provides an important source of water to wildlife and livestock in the study area.

4.4.5.3 Mitigation Process

Mitigation of wetlands will be developed in coordination with the United States Army Corps of Engineers. Wetland delineation for any Preferred Alternative will need to be conducted to determine the number of acres of wetland that will be affected. A formal delineation report will be required for the project and will need to be approved by the Army Corps of Engineers. If wetlands are affected, the project sponsor, such as UDOT or Dixie MPO, will need to submit a 404 permit to the Army Corps of Engineers. This permit will detail the mitigation required for the project.

Chapter 5

Corridor Development

The Western Corridor would provide a regional transportation facility connecting Ivins City and Santa Clara City with the southern city limits of St. George and the Southern Parkway Interchange.

Alignments which connected the two defined endpoints and which minimized impacts were developed by the Steering Committee, Stakeholders' Committee, and the consultant team, InterPlan, HDR Engineering, and Hoskins Engineering. This corridor will connect a northern endpoint, the intersection of Old Highway 91 and the proposed Western Corridor-North, with a southern endpoint located at I-15 and its proposed interchange with the Southern Parkway.

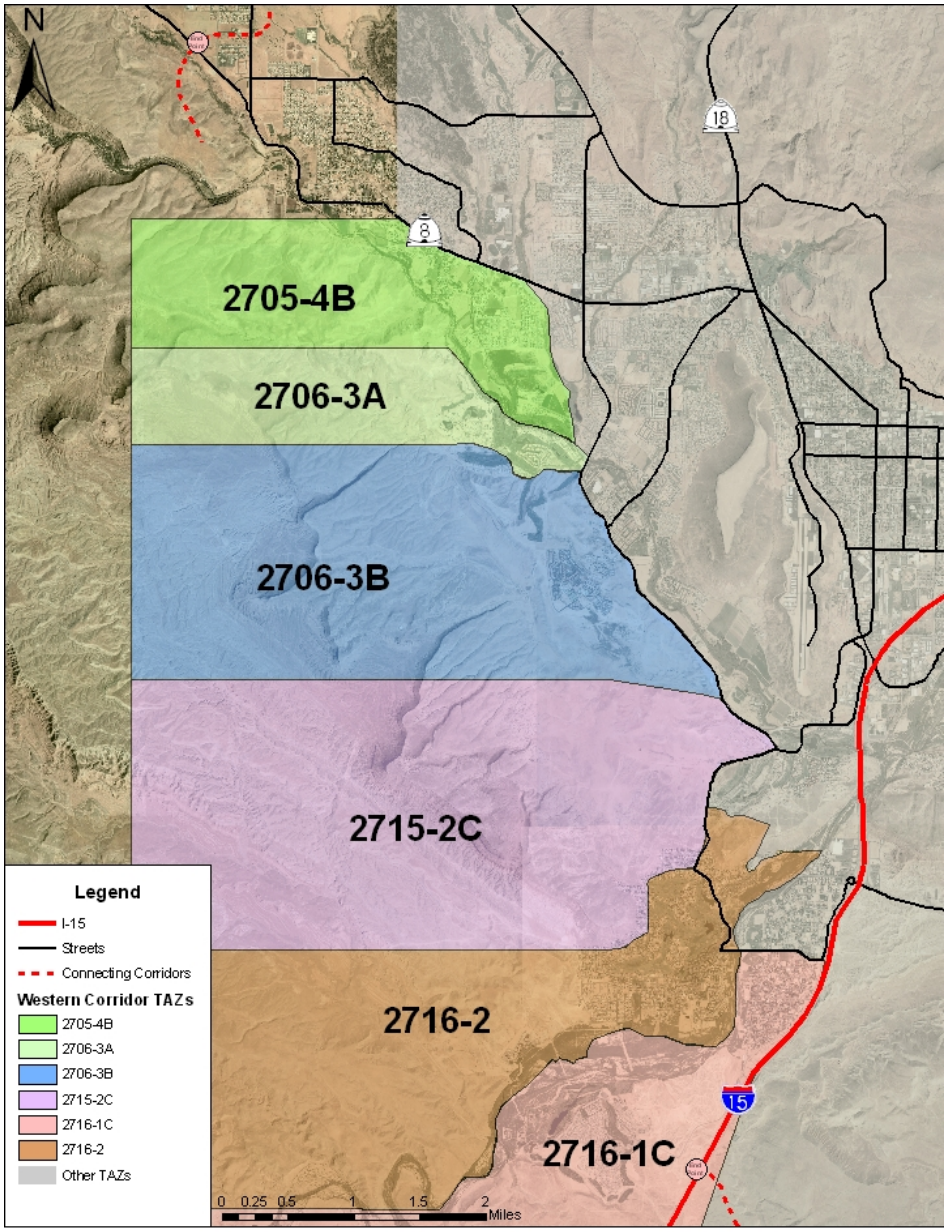
5.1 Standards

By definition, the Western Corridor-South is proposed to serve as a principal arterial street along the western edge of the St. George Urbanized Area. Within this broad definition, there are a wide range of options related to corridor width, design considerations of the corridor, access points, and actual alignment. At the planning level, many of these options remain conceptual. Despite the fact that these conceptual considerations will only clarify over time, a variety of assumptions can be made to allow for corridor preservation. These assumptions allow for a high speed, large right-of-way corridor, recognizing that lower speeds or smaller widths could still be accommodated in this corridor. This section defines the suggestions made by the Steering Committee related to design speed, corridor width, volume and level of service, and alignment.

5.1.1 Forecasts in Study Area and Models applied

Several entities have forecasted growth for various regions in Washington County. These forecasts are used in travel demand models used to assist in planning transportation solutions. For this study, InterPlan examined the Dixie MPO model and predictions which were based on Census Block Groups, which are not an exact match to Traffic Analysis Zones (TAZ). Horrocks Engineers is presently working with St. George City to develop a master transportation plan and has examined the relative growth patterns included in the Dixie MPO Long Range Transportation Plan.

Figure 5- 1 Traffic Analysis Zones



SOURCE : Traffic Analysis Zones from the St. George/DMPO travel demand model developed by Horrocks Engineering

In the recent study performed by Horrocks Engineering, more growth is allocated to the northern TAZs than was allocated in the 2001 Dixie MPO model. Also, in the Dixie MPO model, some of the land held publicly was designated as developable. Note that land development options are beyond the scope of this study, but that the projected employment growth in the western portion of Washington County included in the Dixie MPO's long range travel forecasts is higher than predicted in this study. Both the Dixie MPO forecasts and the Horrocks (draft) employment and dwelling unit forecasts are displayed in Table 5.1.

Table 5- 1 2000 and 2035 Population, Employment and Dwelling Units in Study Area

	2000			2035		
Model	**Population**	**Employment**	**Dwelling Units**	**Population**	**Employment**	**Dwelling Units**
2001 Dixie MPO[1]	14,374	2,934	5,026*	68,289	24,666	22,993
2005 Horrocks Engineering[2]	14,374	2,934	5,026*	26,543	4,984	8,937
InterPlan Adjusted	14,374	2,934	5,026*		4,500	10,000

1 2000 Data based on Census Block Groups, not an exact match with Traffic Analysis Zones (TAZ)
2 2035 Data from travel demand model, population calculated based on people per household
*** Data from Washington County Parcels**

Estimates for growth in the study area must account for the unique land ownership distribution west of St. George. In this area, 80 percent of the land is BLM, covering approximately 20,000 acres. Twelve percent is School and Institutional Trust Lands Administration, six percent is in private ownership and the remaining two percent is under city jurisdiction. As a conservative estimate, InterPlan used 4,500 employment and 10,000 dwelling unit 2035 forecasts based on this further definition of land ownership in this study area.

5.1.2 Design Speed

The general description of the Western Corridor-South includes a facility which offers a relaxed drive and pristine views. Growth is anticipated near the northern and southern segments of the proposed roadway, but little or no development is anticipated in the central segment unless public lands are transferred to private ownership. The proposed road, therefore, will serve relatively long distance trips between the north and south segments, and must offer a travel speed which provides some travel time savings over lower functioning streets; which may be more direct but are interrupted by traffic signals and access conflicts.

The Dixie MPO Quick Response System II (QRSII) travel demand model was used to determine the sensitivity of travel speeds to various volume levels on the corridor. As the travel speed decreases, it can be expected that fewer and fewer trips would use an alternative, potentially longer distance, travel option. Although it is beyond the scope of this study to determine design level travel volumes, it is appropriate to examine the interaction between volume and speed to ensure that proper planning and corridor

preservation can be accomplished to both serve and meet the anticipated travel demands.

Table 5.2 displays a comparison of the anticipated traffic volume levels using the QRSII model. Calculated volumes estimate the 2035 number of vehicles which would use each section based on various employment and dwelling unit predictions and speeds. The free flow speed included in the travel demand model is used to calculate the volume in two segments of the road. Note that the travel speeds in the model are most accurate relative to other modeled speeds, so actual design speed will vary.

According to Table 5.2, free flow speeds on the Western Corridor-South can greatly determine the volume, or travel demand, on the corridor. Reducing the speed by one third reduces predicted volumes by half in the Northern segment and by almost half in the Southern segment. Given present socio-economic forecasts in the area from the Dixie MPO or Horrocks, which are rough at present, free flow travel speeds need to be at the higher end of those for which arterial streets are designed. A street with a low design speed, or with frequent traffic signals and access points which slow travel progression below approximately 50 mph, would result in volumes which may be insufficient to be worth the cost and overall benefit of the corridor.

Table 5- 2 Model Speed-Volume Sensitivity Analysis 2035 Forecasts

	Western St. George			AADT for Corridor Segment		
Model	**Employ-ment**	**Dwel-ling Units**	**Travel Speed (mph)**	**North**	**Central**	**South**
2001 Dixie MPO	24,666	22,993	60	53,000	53,000	106,000
2005 Horrocks Engineering	4,984	8,937	60	25,000	25,000	29,000
InterPlan Adjusted	4,500	10,000	60	19,000	19,000	32,000
InterPlan Adjusted	4,500	10,000	50	14,000	14,000	27,000
InterPlan Adjusted	4,500	10,000	40	8,000	8,000	18,000

Given this information, the Steering Committee suggested that planning should allow for at least a 55 mph design speed. A minimum horizontal curve radius of 1,900 feet was identified, for planning purposes, to support this design speed. Access points should be allowed but limited to public roads which can be signalized. Future traffic signals should be spaced in excess of one mile separation. Private driveways should generally not be allowed to access the corridor.

5.1.3 Corridor Width

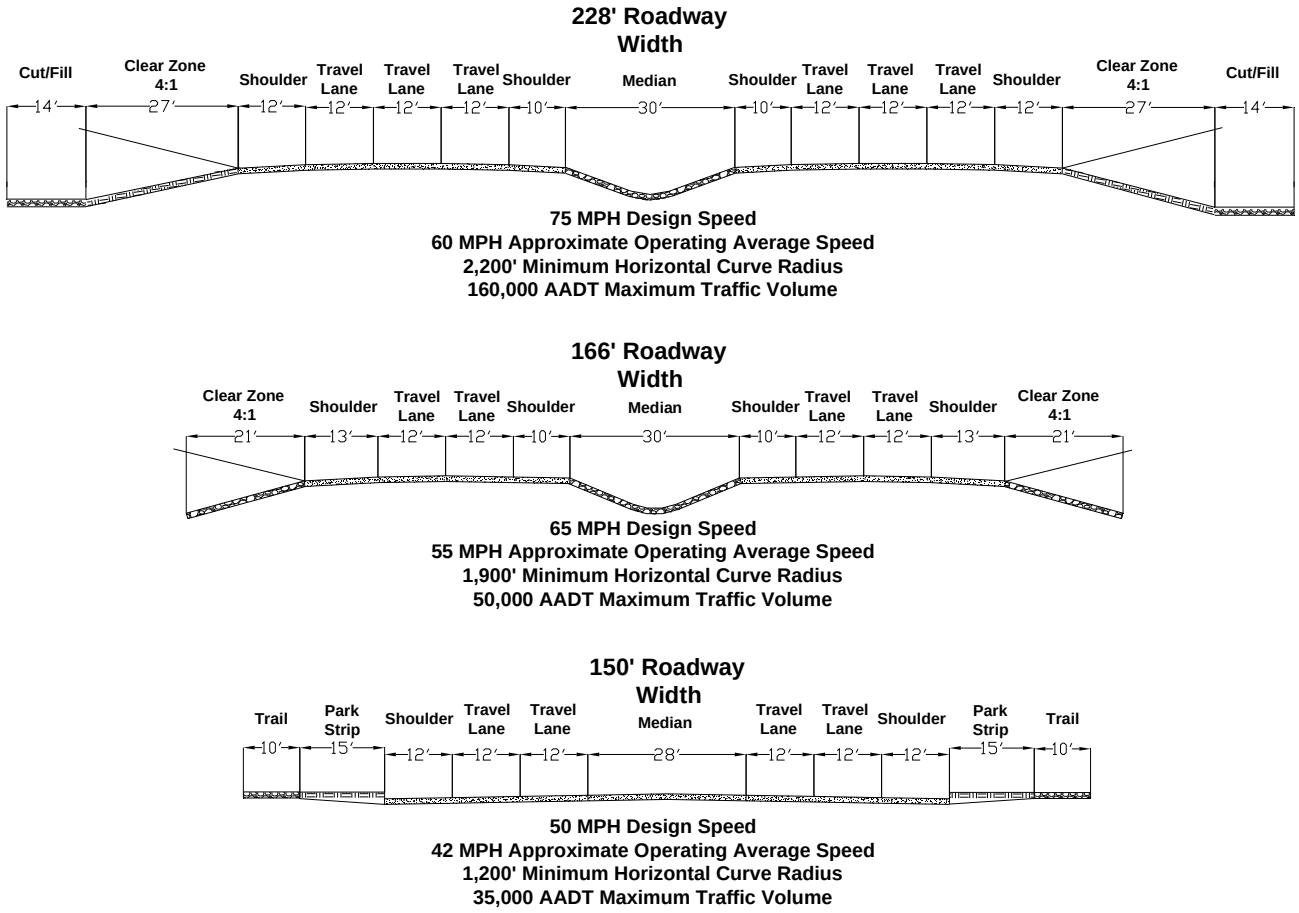
FUNCTIONS OF CORRIDOR

- Allow for a future principal arterial roadway;
- Allow for a future utility (power, gas, water, etc.) corridor; and
- Allow for a multi-use pathway.

Through discussions with the project Steering Committee, the Western Corridor-South corridor width must be planned to provide three functions: allow for a future principal arterial roadway, allow for a future utility (power, gas, water, etc.) corridor, and allow for a multi-use pathway.

(Note: For planning purposes, the corridor width is planned to be wider than the roadway or pavement width.) Various roadway cross-sections were identified for consideration. Potential roadway widths ranging from a minimum of 150 feet to a maximum of 230 feet were examined. Figure 5.2 provides conceptual cross-sections of the Western Corridor-South roadway element.

Figure 5- 2 Roadway widths considered for corridor



The Steering Committee suggested a 300 foot corridor be planned and preserved, to the extent possible, based on the following concerns:

- The uncertainty of utility corridor needs,
- The desire to provide sufficient space to allow for a broad range of planning concepts,
- To promote safety through adequately separating motorized and non-motorized uses,
- The desire to maintain an open feel of the area and the corridor, and
- Given the general availability of undeveloped land for planning purposes.

5.1.4 Corridor Volume and Level of Service

Traffic engineers refer to a "Level of Service" which corresponds to a letter grade, A through F, similar to grades in school. A level of service A corresponds to free flow operation of roads and intersections, while a level of service F operates with extremely slow speeds and/or intersection failures. A level of service C corresponds to the maximum traffic volume prior to traffic congestion. The facility should be designed to minimize traffic congestion and serve a design hourly volume at a level of service C or better. Under this general design criterion, traffic volumes on the Western Corridor-South could approach 35,000 vehicles per day (AADT), utilizing the 150 foot corridor, and exceed 100,000 vehicles per day if the corridor were 230 feet wide. These options and the appropriate design volume are subject to future study but are referenced here to support ongoing planning.

Figure 5- 3 Vegetation along a current trail

5.2 Alignments

With the end points known, and the corridor width defined, alignment options were developed. The Steering Committee and the consultants worked together to identify all possible alignment options. An activity was prepared for this purpose and was completed on May 10, 2006 with the Steering Committee.

5.2.1 Alignment Drawing Exercise

InterPlan organized an exercise to draw possible alignment options. The exercise included a map of the area with the end points and minimum impact regions marked. Maps were prepared for each member of the Steering Committee to work on individually. The instructions were simple. Members of the Steering Committee were asked to draw all alignments that they thought had merit or that they would like to see analyzed as a possible corridor. Participants were not limited to drawing a single alignment, in most cases multiple alignments were drawn on each map. After compilation, the consultants added alignments that they thought were left out or provided different options to analyze.

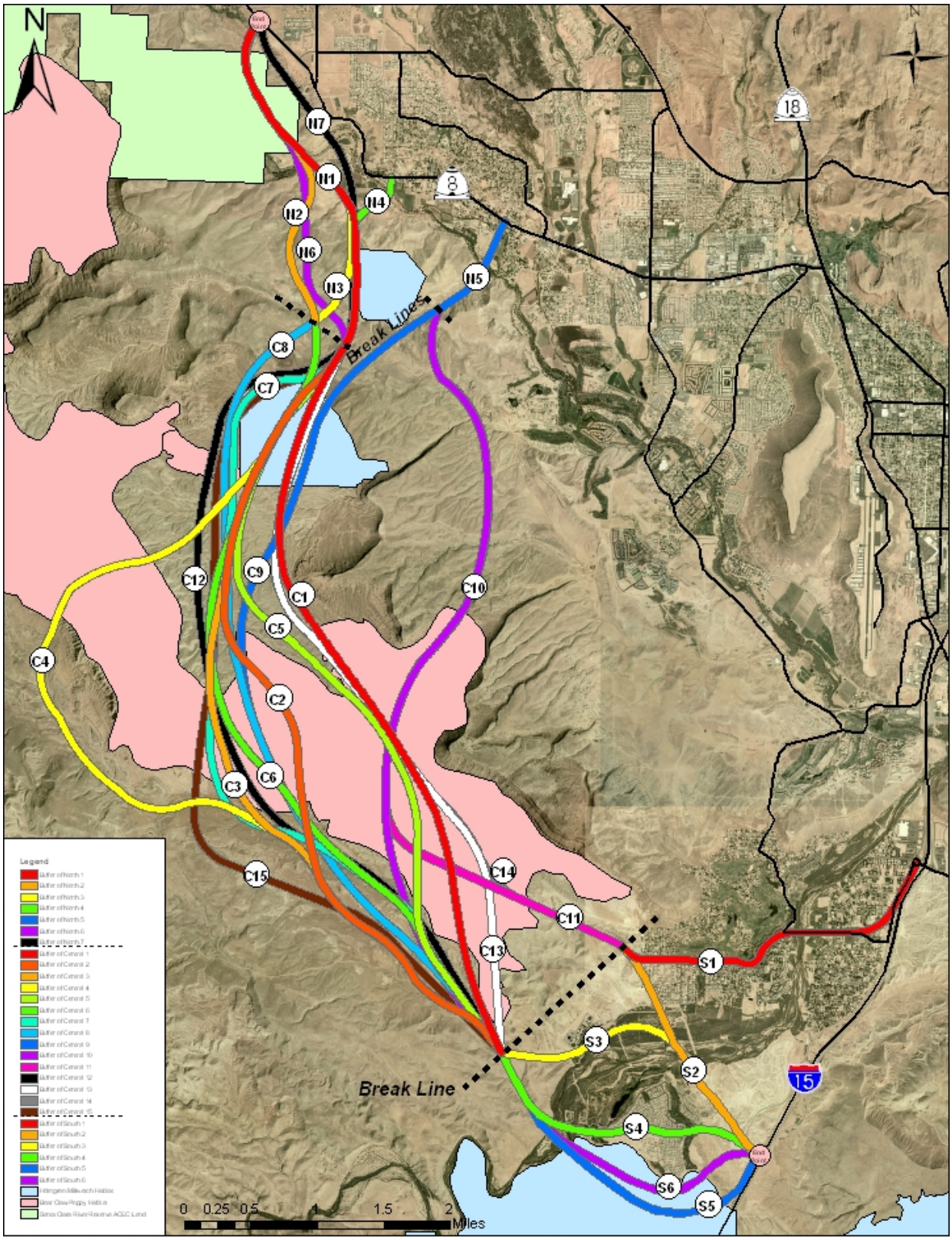
Results of the exercise varied widely as did the suggested alignments throughout the area west of St. George. Several alignments were similar to others and demonstrated recurring reasons for the placement of the alignments. Some alignments almost directly overlapped each other and they were combined into one alignment. Other alignments were completely different. The alignments were then converted to GIS shapefiles.

Figure 5- 4 Small group exercise

When looking closely at all of the possible alignments there were some natural break points that divided the alignments into north, central, and south segments. Using these segments allowed for the creation of additional alignments created by combining different segments or different original alignments, thus multiplying the number of total possibilities for alignments from an original 15 to more than 600. Not every alignment in the north can connect to every alignment in the central, nor can every central alignment connect to every south alignment.

Figure 5.5 below displays possible alignments and break lines for the Western Corridor-South.

Figure 5- 5 Combined Drawings of Alignments with Segment Break Lines



SOURCE : Alignments from InterPlan Co., Habitats from Bureau of Land Management, 2004 Aerial Photograph from AGRC

Chapter 6

Corridor Evaluation

Both the Steering and Stakeholders' Committees assisted in establishing corridor evaluation criteria for the purpose of determining which corridors provided the best alignment with the least impact.

The primary weighting factors included 1) Purpose and Need, 2) Environmental Impacts, and 3) Cost and Constructability. Each primary factor included several sub-factors that were used for secondary weighting, which resulted in a rating of the data. Once all of the criteria and weights were defined and a measure for each was determined, proposed alignments could be evaluated.

6.1 Selection Criteria

In order to determine the best alignment, evaluation criteria were developed. These criteria were developed in conjunction with the Steering and Stakeholders' Committees. Developing these criteria was the main focus of the first Stakeholders' Committee meeting held on May 10, 2006. The Steering Committee and the consultants identified many of the criteria by which the alignments should be evaluated, and each criterion was then organized into a primary category. The three primary categories include: Purpose and Need, Environmental Impacts and Cost and Constructability.

Each of the criteria was discussed with the consultants and Steering Committee and was placed into a category. At the May 10, 2006 Stakeholders' Committee meeting, there was an activity where the Stakeholders broke into groups of eight to ten people and discussed the evaluation categories and criteria. The Stakeholders' Committee commented on which criteria they thought were missing, which criteria could be dropped, and in which category each of the criteria should be. The end result was the following refined list of criteria by category.

Table 6- 1 Evaluation Criteria by Category

Purpose and Need
Provide Recreational Opportunities
Provide Most Direct Route
Congestion Relief between Ivins, Santa Clara, and St. George
Support Planned Growth
Environmental Impacts
Minimize Flood Plain Impacts
Minimize Dwarf Bearclaw Poppy Habitat Impacts
Minimize Holmgren Milkvetch Habitat Impacts
Minimize Impacts to Other Protected/Endangered/Critical Species Habitat
Minimize Visual Impacts
Minimize Wetlands Impacts
Minimize Bisecting Neighborhoods/Communities
Minimize Bisecting Existing or Planned Trails
Minimize Disruptions to Cultural/Archeological Resources
Minimize Residential/Commercial Structures Relocations
Minimize Private Land Purchases
Minimize Impacts to Springs
Minimize Grazing Impacts
Cost and Constructability
Minimize Total Cost
Minimize Number of Bridges/Structures
Minimize Steep Slopes (> 15%)

A weighting system was also developed for categories and criteria to insure there is a process by which categories and criteria can be prioritized and ranked. For the three categories, Purpose and Need, Environmental Impacts, and Cost and Constructability, it was difficult to come to a clear consensus of what the relative weightings should be. The three category weightings totaled 100; however three combinations of category weighting were developed and evaluated because there was not one category weighting that had full consensus of the Stakeholders' Committee.

Table 6- 2 Category Weighting Combinations

	Purpose and Need	Environ-mental Impacts	Cost and Construct-ability
Cost and Constructability De-emphasis Combination	35%	45%	20%
Environmental Emphasis Combination	30%	60%	10%
Parity Combination	35%	35%	30%

Within the categories, each of the criteria items was given a secondary weighting, for which there was consensus on the relative weightings. For example, the Stakeholders' Committee felt that it was more important to minimize the impacts to the Dwarf Bearclaw Poppy habitat than to minimize impacts to the flood plain. Therefore, the poppy criteria received a higher criteria weighting than the flood plain criteria, within the Environmental Impacts category. The sum of the criteria's weighting totaled 100 within its category. Table 6.3 displays the final evaluation criteria with the accompanying weighting values.

Figure 6- 1 Santa Clara River Valley in Land Hill ACEC Land

Table 6- 3 Criteria and Weighting

Western Corridor-South Evaluation Criteria Worksheet			
Category	**Criteria**	**Weighting**	**Unit of Measure**
Purpose and Need	Provide Recreational Opportunities	20	Number
	Provide Most Direct Route	30	Length
	Congestion Relief between Ivins/Santa Clara and St. George	40	Subjective
	Support Planned Growth	10	Subjective
		100	
Environmental Impacts	Minimize Flood Plain Impacts	5	Acres
	Minimize Bearclaw Poppy Habitat Impacts	25	Acres
	Minimize Holmgren Milkvetch Habitat Impacts	25	Acres
	Minimize Impacts to Other Protected/Endangered/Critical Species Habitat	0	Acres
	Minimize Visual Impacts	10	Length
	Minimize Wetlands Impacts	0	Acres
	Minimize Bisecting Neighborhoods/Communities	10	Number
	Minimize Bisecting Existing or Planned Trails	5	Number
	Minimize Disruptions to Cultural/Archeological Resources	10	Acres
	Minimize Residential/Commercial Structures Relocations	2	Number
	Minimize Private Land Purchases	2	Acres
	Minimize Impacts to Springs	5	Number
	Minimize Grazing Impacts	1	Number
		100	
Cost and Constructability	Minimize Total Cost	60	Cost
	Minimize Number of Bridges/Structures	20	Number
	Minimize Steep Slopes (> 15%)	20	Number
		100	
Total Score		300	

For each criterion, a unit of measure was defined by which each of the criteria could be compared and evaluated for all the possible alignments. Measurements were taken using Geographic Information Systems (GIS) data available and other electronic calculations. These measurements represent planning level data collection; no surveying was done. Once data was collected for each unit of measure, a score of zero to five was provided for each section of the alignment to indicate the relative impact of that alignment. A score of five represented a smaller impact while a score of zero represented the greatest impact. From this analysis, alignments with the smallest impact could be mathematically calculated.

6.1.1 Purpose and Need Category

Four criteria were identified for the Purpose and Need category.

- Provide recreational opportunities: measured by how many existing or planned trails or trailheads each alignment crossed. The idea was that if the new roadway crossed a trail, then that was an opportunity to offer another access to that trail.

- Provide most direct route: measured in the length of each alignment. The shorter the road the more the direct route is taken.

- Congestion relief between Ivins, Santa Clara, and St. George: does not have a definite measurable number. Rather the value that each alignment received was determined subjectively based on where the alignment was located and how long the alignment was.

- Support planned growth: also determined subjectively. The value was based on whether the end points of the alignment connected with Old Highway 91 in the north and the Southern Parkway Interchange in the south. The alignment's location through existing or planned residential communities was also examined.

6.1.2 Environmental Impacts Category

The thirteen criteria identified for the Environmental Impacts category included minimizing:

Flood Plain Impacts

Dwarf Bearclaw Poppy Habitat Impacts

Holmgren Milkvetch Habitat Impacts

Impacts to Other Protected/ Endangered/Critical Species Habitat

Visual Impacts

Wetlands Impacts

Bisecting Neighborhoods/Communities

Bisecting Existing or Planned Trails

Disruptions to Cultural/Archeological Resources

Residential/Commercial Structure Relocations

Private Land Purchases

Impacts to Springs

Grazing Impacts

Minimize flood plain impacts: measured in acres of land. Using GIS data provided by the Washington County Water Conservancy District for FEMA flood plains, and assuming a 300 foot corridor width, alignments overlapping flood plain areas were measured in acres.

Minimize Bearclaw Poppy and Holmgren Milkvetch habitat impacts: measured similarly to the flood plain impacts. The GIS data for the Dwarf Bearclaw Poppy and the Holmgren Milkvetch habitats was provided by the Bureau of Land Management. Again, the measurement used was acres of land.

Minimize impacts to other protected/endangered/critical species habitats: measured in acres. In areas of Washington County outside the study area, there are threatened or endangered plant and wildlife species in habitats similar to those found inside our study area. While habitat exists, a biological assessment of the actual presence of species other than the poppy and milkvetch has not yet been performed. Therefore, for this category, every alignment has zero acres of impacts.

Figure 6- 2 Trails beyond Navajo Drive in Central Segment

Minimize visual impacts: measured by creating three view-sheds of the study area and then determining the length of each alignment which was visible in that viewshed. The three viewsheds were: the parking lot of the St. George Municipal Airport, the Snow Canyon High School in Santa Clara, and the tip of the runway at the St. George Municipal Airport. Again, the shorter the length of an alignment that was visible from these locations, the better the alignment scored.

Minimize wetland impacts: not measured. It would have been measured in acres, but no wetland data could be identified in the study area. The National Wetland Inventory maps show no data for the western side of St. George and no local, state, or federal agency could provide the needed data. For this reason, every alignment had zero acres impact. The consultants and Steering Committee agreed that omitting wetlands was not a big loss because flood plain and spring impacts were used as criteria for hydrology impacts in the study area.

Minimize bisecting neighborhoods/communities: measured in the number of neighborhoods each alignment would bisect. Aerial photographs were used to compare alignments to groups of homes. Most alignments did not bisect any neighborhoods, but some did. For example, there were some alignments that utilized an existing public street, SunRiver Parkway in the SunRiver development.

Minimize bisecting existing or planned trails: measured similarly to the Provide Recreational Opportunities criteria in the Purpose and Need category. It most cases, the alignment scored the same as the Recreational Opportunities criteria, but in some cases there were trail heads close to the alignment where the alignment did not actually bisect the trail.

Minimize disruptions to cultural/archeological resources: includes valuable resources such as dinosaur tracks and petroglyphs. In order to protect and preserve these sites, their locations are not available to the public. However, in the Santa Clara River Reserve, because of sites of cultural resources, an Area of Critical Environmental Concern (ACEC) has been identified. Each alignment was overlaid over the ACEC land and the acres of overlap were measured. While this measurement does not tell us how many possible cultural resources could be impacted, it does give us an idea of which alignment had the best possibility to avoid these defined sites.

Minimize residential/commercial structures relocations: measured, using aerial photographs, by counting the number of buildings that would need to be removed to build each alignment.

Minimize private land purchases: measured in acres of land. Washington County's GIS department provided land parcel data for the county broken down by ownership. The private land was segregated and compared to the locations of the alignments.

Minimize impacts to springs: measured by the number of springs each alignment impacted. There are two springs in the study area. It was assumed that any alignment that came within 500 feet of the spring impacted it. Most alignments impacted neither of the springs, some impacted only one.

Minimize grazing impacts: measured in the number of grazing allotments that each alignment bisected. The data for grazing allotments was provided by the BLM. The Curly Hollow grazing allotment covers the vast majority of the study area and was therefore impacted by every alignment option. Four other grazing allotments are found in the study area, and no alignment impacted more than two grazing allotments.

6.1.3 Cost and Constructability Category

Three criteria were identified for the Cost and Constructability category: Minimize Total Cost, Minimize Number of Bridges/Structures and Minimize Steep Slopes.

Minimize total cost: measured in 2006 U.S. dollars. The cost for each alignment was calculated using several factors, including:

- construction of the 166 foot roadway cross-section times the length of the segment,
- number of bridges over rivers,
- number of underpasses for bisecting trails,
- amount of earth movement necessary for steep slopes,
- right-of-way acquisition and private land purchases of the 300 foot corridor, and
- impact on existing structures and homes.

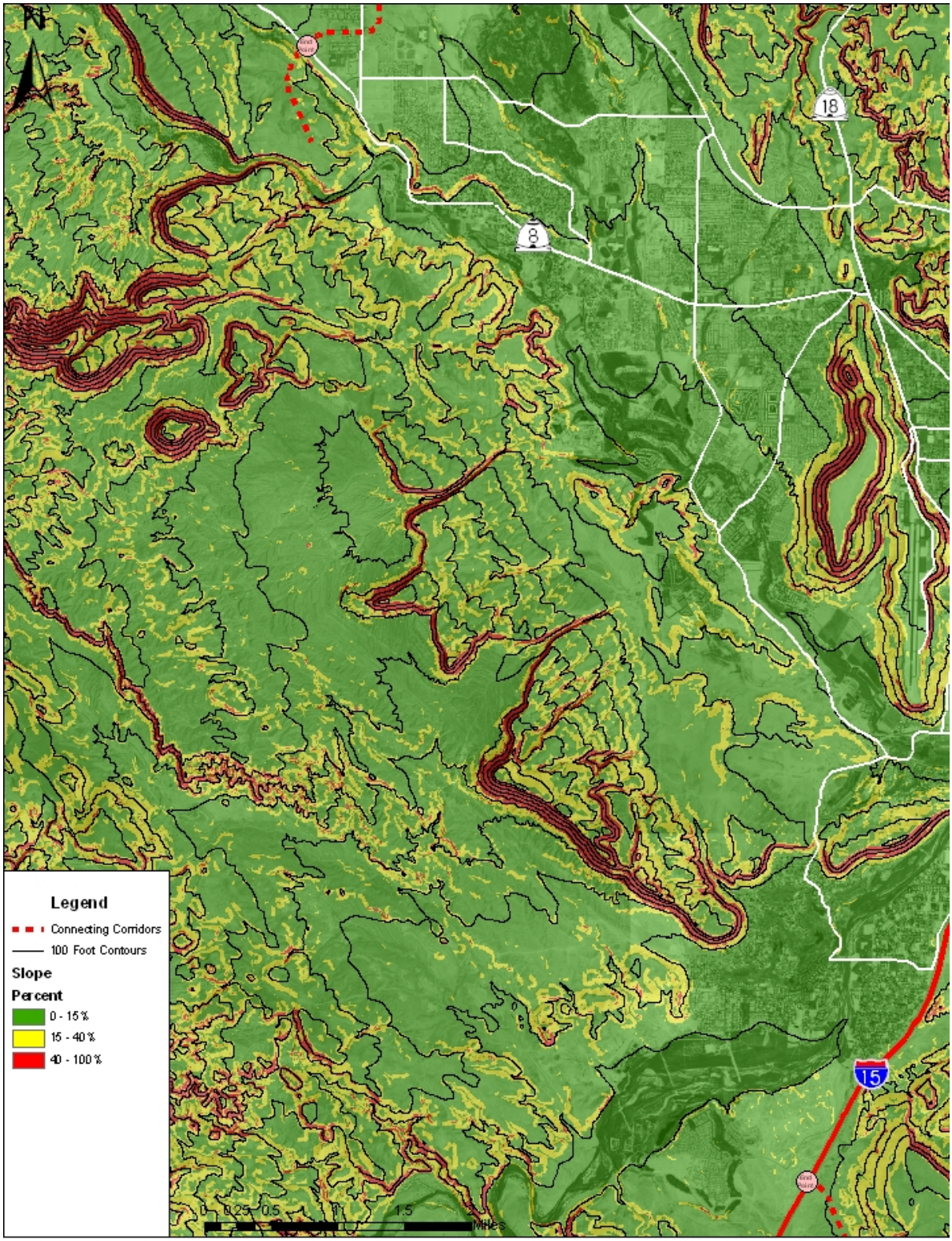
Each of these factors had costs associated with them and their sum is the total cost of the alignment. The 166 foot roadway cross-section was selected because it supported the medium and high speed travel selected by the Steering Committee but didn't provide unnecessary capacity.

Minimize the number of bridges/structures: measured by the number of rivers crossed. Bridges carry significant costs, and, therefore, fewer bridges needed lowers the cost of the project. Three bridges were assumed to be needed: over the Santa Clara River, Graveyard Wash, and Virgin River.

Figure 6- 3 Hill beyond Navajo Drive in Central Segment

Minimize steep slopes: measured by counting the number of steep slope terrain through which the corridor passes. The number of locations over 15 percent was recorded and those over 40 percent were double counted. This method was a bit subjective, but it was consistent between alignment options. Figure 6.4 is a map of the elevation and slope in the study area.

Figure 6- 4 Map of Elevation and Slope



SOURCE : Slope and contour lines were created using ESRI's Spatial Analysis from 10 meter National Elevation Dataset (NED) available from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID).

6.2 Evaluation of Alignments

Once all of the alignments were created, the criteria and weights were defined and a measure for each was determined, the different alignments could be evaluated.

6.2.1 Weight, Rate, and Calculate

Once the data collection was completed, the criteria were rated on a one to five scale against criteria within the same category. Alignments with negative impacts on the criteria received lower ratings, while those benefiting the alignment received higher ratings. These ratings were presented to both the Steering and Stakeholders' Committees for review. The ratings for the criteria are shown in Table 6.4.

Table 6- 4 Ratings within North segment (no weighting applied)

Corridor Option	Recreation	Most Direct Route	Congestion Relief	Support Planned Growth	Flood Plain	Poppy	Milkvetch	Other Critical Species	View shed (Length)	Wetlands	Neighborhoods	Trails	Cultural / Archeological	Structures	Private Land Purchases	Springs	Grazing	Cost	Bridges	Steep Slopes (>15%)
North 1	5	3	5	5	3	5	4	5	5	5	5	3	3	5	2	5	3	3	3	4
North 2	5	3	5	5	3	5	5	5	3	5	3	3	3	5	4	5	3	3	3	3
North 3	5	3	5	5	3	5	5	5	3	5	5	3	3	5	2	5	3	3	3	4
North 4	4	4	1	1	5	5	5	5	3	5	3	4	5	5	4	5	4	4	4	5
North 5	2	5	0	1	4	5	5	5	4	5	3	5	5	3	5	5	4	5	4	5
North 6	5	3	5	5	3	5	5	5	2	5	5	3	3	5	4	5	2	3	2	3
North 7	5	3	5	5	3	5	5	5	4	5	5	3	5	5	1	5	3	3	3	4

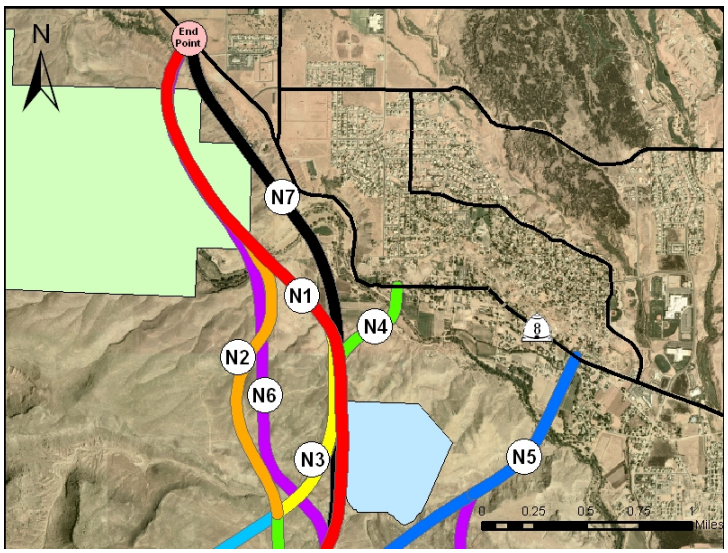


Table 6- 5 Ratings within Central segment (no weighting applied)

Corridor Option	Recreation	Most Direct Route	Congestion Relief	Support Planned Growth	Flood Plain	Poppy	Milkvetch	Other Critical Species	View shed (Length)	Wetlands	Neighborhoods	Trails	Cultural / Archeological	Structures	Private Land Purchases	Springs	Grazing	Cost	Bridges	Steep Slopes (>15%)
Central 1	3	5	5	5	5	1	3	5	5	5	5	3	5	5	5	5	3	4	5	3
Central 2	3	3	5	5	5	3	2	5	5	5	5	3	5	5	5	3	3	3	5	2
Central 3	3	3	5	5	5	5	2	5	5	5	5	3	5	5	5	3	3	4	5	3
Central 4	4	1	3	3	5	4	2	5	4	5	5	2	5	5	5	3	3	2	5	2
Central 5	3	4	5	5	5	2	2	5	5	5	5	3	5	5	5	3	3	4	5	3
Central 6	3	3	5	5	5	4	2	5	4	5	5	3	5	5	5	3	3	4	5	3
Central 7	3	3	5	5	5	4	4	5	5	5	5	3	5	5	5	3	3	3	5	3
Central 8	3	4	5	5	5	3	5	5	5	5	5	3	5	5	5	5	3	4	5	2
Central 9	3	3	5	3	5	3	3	5	3	5	5	3	5	5	5	5	4	3	5	2
Central 10	5	4	5	3	5	2	5	5	0	5	5	1	5	4	2	5	3	3	5	1
Central 11	5	5	4	2	5	0	5	5	0	5	5	1	5	4	2	5	3	3	5	1
Central 12	3	3	5	5	5	3	4	5	5	5	5	3	5	5	5	5	3	3	5	1
Central 13	3	4	5	5	5	0	3	5	4	5	5	3	5	5	5	5	3	4	5	3
Central 14	3	5	4	5	5	1	3	5	4	5	5	3	5	5	5	5	3	4	5	3
Central 15	4	2	4	5	5	4	4	5	5	5	5	2	5	5	5	5	3	3	5	3

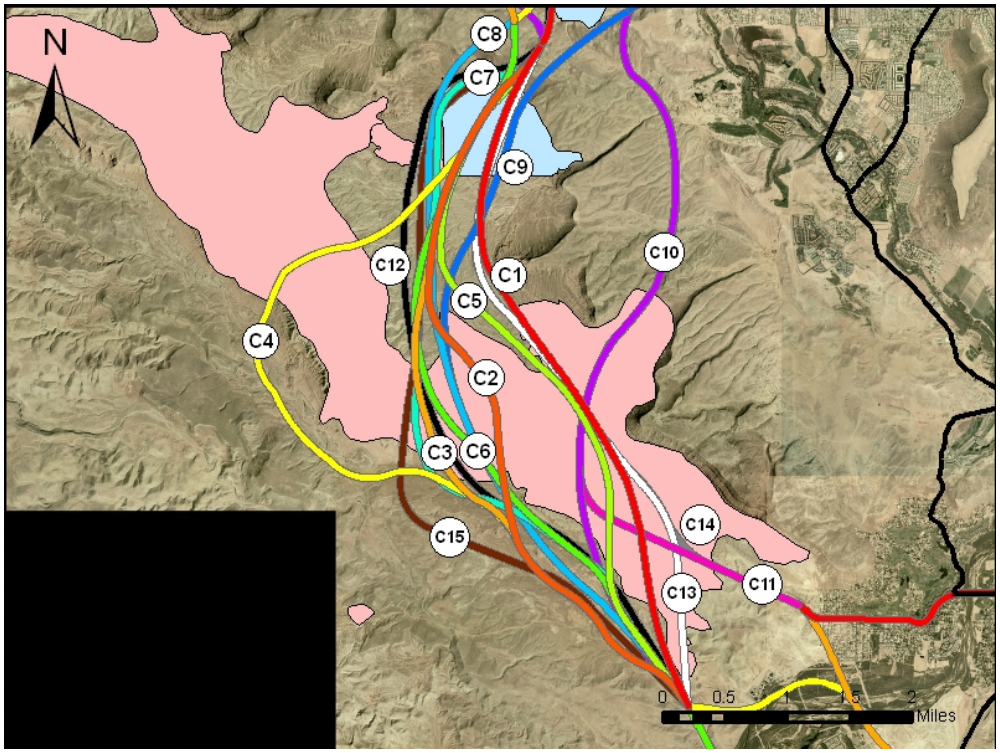
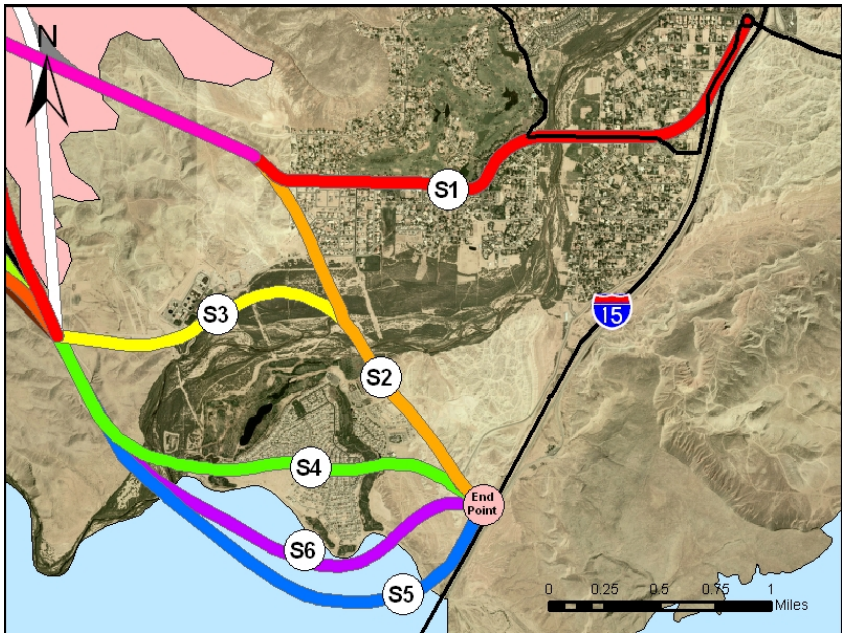


Table 6- 6 Ratings within South segment (no weighting applied)

Corridor Option	Recreation	Most Direct Route	Congestion Relief	Support Planned Growth	Flood Plain	Poppy	Milkvetch	Other Critical Species	View shed (Length)	Wetlands	Neighborhoods	Trails	Cultural / Archeological	Structures	Private Land Purchases	Springs	Grazing	Cost	Bridges	Steep Slopes (>15%)
South 1	5	3	0	0	1	5	5	5	5	5	1	5	5	0	0	5	4	1	4	5
South 2	5	4	4	1	4	5	5	5	5	5	4	4	5	3	1	5	4	4	4	4
South 3	3	4	4	4	4	5	5	5	4	5	5	5	5	4	2	5	4	4	4	5
South 4	3	4	4	4	3	5	5	5	3	5	3	5	5	1	3	4	4	3	4	5
South 5	3	4	4	4	3	5	1	5	3	5	5	5	5	5	3	5	4	4	4	4
South 6	3	4	4	4	2	5	1	5	3	5	5	5	5	5	1	4	4	4	4	4



The criteria ratings listed above in Tables 6.4, 6.5 and 6.6 were then multiplied times the weighting in Table 6.3 for every criteria and alignment. This process created a 0-100 scale for the result of each of the categories, shown in Table 6.7.

In order to determine which alignments performed the best under the three category weighting options in Table 6.2, an overall rating was calculated by multiplying their value times their weighting factor, creating three varying results. Tables 6.7 and 6.8 below display the results of our weight, rate, and calculate exercise. In Table 6.8, the primary weighting for each alignment is on the left and the three options for the overall rating are displayed on the right.

Table 6- 7 Category Score (Rating and weighting within criteria applied)

	Purpose and Need		Environmental Impacts		Cost and Constructability	
	Number	Grade	Number	Grade	Number	Grade
North Segment						
North 1	88	B	85.4	B	64	D
North 2	88	B	83.2	B	60	D
North 3	88	B	86.4	B	64	D
North 4	50	E	90.4	A	84	B
North 5	40	F	92	A	96	A
North 6	88	B	85	B	56	E
North 7	88	B	92	A	64	D
Central Segment						
Central 1	92	A	67.6	D	80	B
Central 2	80	B	70.6	C	64	D
Central 3	80	B	80.6	B	80	B
Central 4	52	E	72.6	C	52	E
Central 5	86	B	65.6	D	80	B
Central 6	80	B	73.6	C	80	B
Central 7	80	B	85.6	B	68	D
Central 8	86	B	87.6	B	76	C
Central 9	76	C	73.8	C	64	D
Central 10	90	A	69	D	60	D
Central 11	86	B	59	E	60	D
Central 12	80	B	82.6	B	60	D
Central 13	86	B	60.6	D	80	B
Central 14	84	B	65.6	D	80	B
Central 15	70	C	86.6	B	68	D
South Segment						
South 1	38	F	83.8	B	48	F
South 2	78	C	93.4	A	80	B
South 3	76	C	95.2	A	84	B
South 4	76	C	86.4	B	72	C
South 5	76	C	73	C	80	B
South 6	76	C	70.2	C	80	B

With these results, the best performing alignments can be determined. For each segment of the corridor, the red highlighted alignments are the highest ranking options. In general, the category weighting highest ranking options are North 7, Central 8, and South 3. The second best performing alignments are highlighted in yellow. North 1 and 3, Central 3 and 7, and South 2 and 4 are the other top three high performing alignments in each of the corridor segments. Figure 6.5 is a map of all of the alignments with the best and better corridors highlighted.

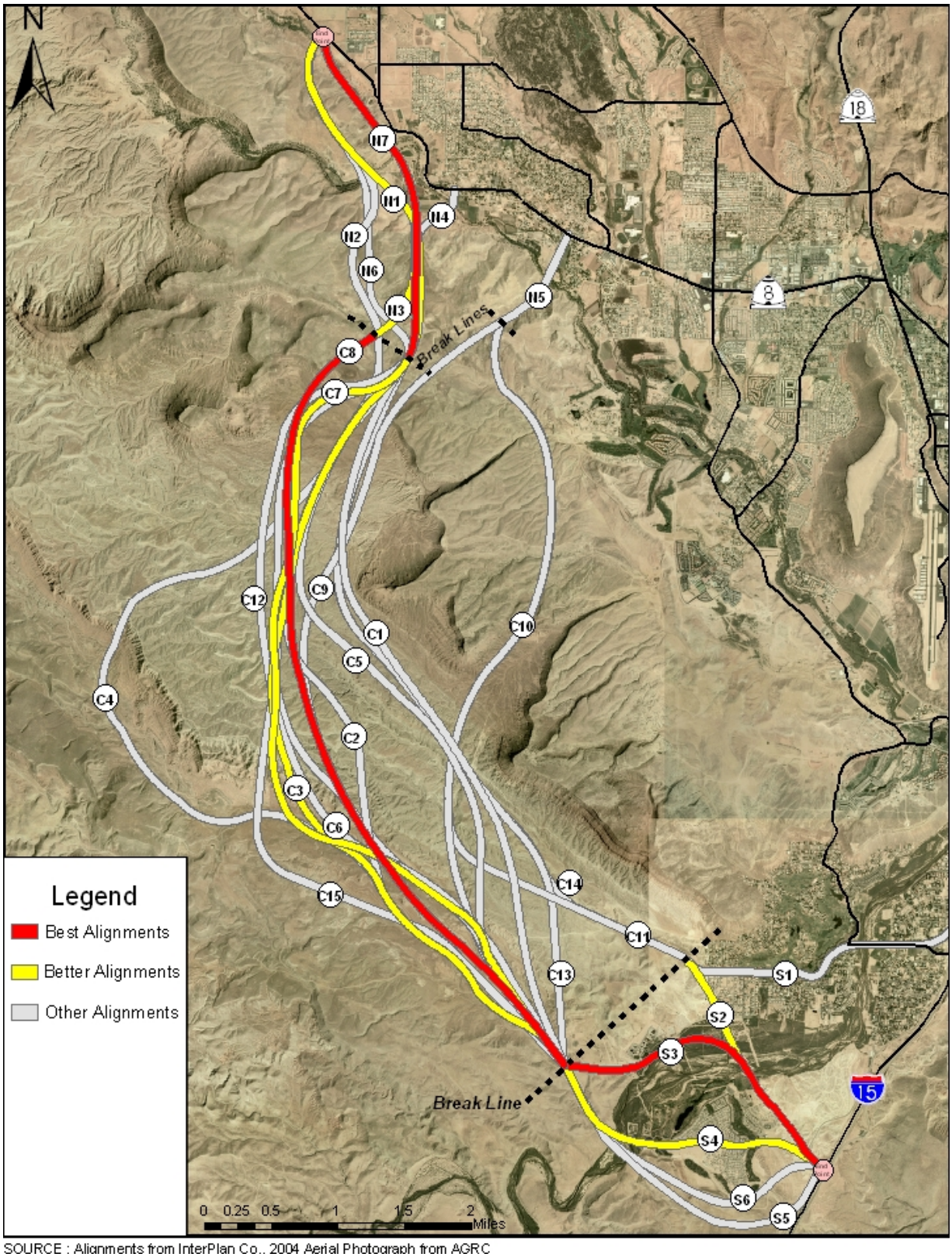
Table 6- 8 Best performing options within segment

Purpose & Need Environmental Cost & Constructability		North Segment						
		1	2	3	4	5	6	7
35 / 45 / 20	Number	82.0	80.2	82.5	75.0	74.6	80.3	85.0
	Grade	B	B	B	C	C	B	B
30 / 60 / 10	Number	84.0	82.3	84.6	77.6	76.8	83.0	88.0
	Grade	B	B	B	C	C	B	B
35 / 35 / 30	Number	79.9	77.9	80.2	74.3	75.0	77.4	82.2
	Grade	C	C	B	C	C	C	B

Purpose & Need Environmental Cost & Constructability		Central Segment														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
35 / 45 / 20	Number	78.6	72.6	80.3	61.3	75.6	77.1	80.1	84.7	72.6	74.6	68.7	77.2	73.4	74.9	77.1
	Grade	C	C	B	D	C	C	B	B	C	C	D	C	C	C	C
30 / 60 / 10	Number	76.2	72.8	80.4	64.4	73.2	76.2	82.2	86.0	73.5	74.4	67.2	79.6	70.2	72.6	79.8
	Grade	C	C	B	D	C	C	B	B	C	C	D	C	C	C	C
35 / 35 / 30	Number	79.9	71.9	80.2	59.2	77.1	77.8	78.4	83.6	71.6	73.7	68.8	74.9	75.3	76.4	75.2
	Grade	C	C	B	E	C	C	C	B	C	C	D	C	C	C	C

Purpose & Need Environmental Cost & Constructability		South Segment					
		1	2	3	4	5	6
35 / 45 / 20	Number	60.6	85.3	86.2	79.9	75.5	74.2
	Grade	D	B	B	C	C	C
30 / 60 / 10	Number	66.5	87.4	88.3	81.8	74.6	72.9
	Grade	D	B	B	B	C	C
35 / 35 / 30	Number	57.0	84.0	85.1	78.4	76.2	75.2
	Grade	E	B	B	C	C	C

Figure 6- 5 Map of Alignments Compared



SOURCE : Alignments from InterPlan Co., 2004 Aerial Photograph from AGRC

6.2.2 Local Expertise

The evaluation criterion in the above section is only the first calculation in a two-level analysis. The second level incorporated the knowledge and experience of local people. All of the highlighted alignments were presented to the Steering and Stakeholders' Committees for their review and comments. This activity, held at the July 12, 2006 Stakeholders' Committee meeting, presented all of the initial results and calculations. The consultants prepared detailed maps in sections of the alignments for further review and to bring local knowledge into the alignment analysis. This allowed those present to look at specific places along the alignments where improvements could be made or minor adjustments to the alignments might enhance the future road. Finally, this venue gave the local participants the chance to share local views and voice their opinions on the different alignment options.

The participants were also able to enhance the various segments of the corridor through experience and professional judgment. For example, the best performing alignments in the north segment were North 7, 3, and 1. However, input from the Steering and Stakeholders' Committees suggested that the north corridor connect to Old Highway 91 at a 90 degree angle, stay on the eastern side of the Land Hill Area of Critical Environmental Concern (ACEC), and stay west of a proposed residential development. Therefore, the recommended north alignment more closely resembles North 6.

In another example, the best performing central alignments are 3, 7 and 8. For the central segment, local input recommended that the corridor avoid the Holmgren Milkvetch habitat, the trail along the habitat, steep slopes, Stucki Spring, and avoid excessive habitat impacts by crossing the narrowest part of the Dwarf Bearclaw Poppy habitat. The committees also requested the alignment provide trail access, wildlife underpass access, and water to the west side of the corridor. Therefore this study's recommended central alignment resembles a combination of Central 7, 8, and 15.

For the south segment, the Steering and Stakeholders' Committees suggested that the corridor be narrowed to 100 feet to utilize the existing public road, SunRiver Parkway, lower the design speed to utilize SunRiver Parkway, avoid Holmgren Milkvetch habitat, and provide pedestrian, bicycle, and golf cart access under SunRiver Parkway. While the best performing alignments in the south are 2, 3 and 4, due to local expertise the preferred alignment most closely resembles South 4. The existing SunRiver Parkway allows for the use of an existing facility such that the impacts measured from a 300 foot right-of-way would not be accurate. This process of adjusting alignments based on people's knowledge helped to determine the final recommended corridor which is discussed in more detail in the following sections.

The Appendix contains an example of one of the maps that the Stakeholders' Committee critiqued. It is very colorful because it includes many of the criteria data overlaying each other, so that the Stakeholders' Committee could make informed decisions.

Chapter 7

Corridor Recommendation

All the corridors were evaluated quantitatively against the criteria and then were ranked. The quantitative ranking narrowed the alignment options and produced the corridor configurations. The knowledge of the Stakeholders' Committee was used to define the recommended corridor.

From a review of detailed maps of the best corridors, the recommended corridor was selected. The affected cities and resource agencies are expected to adopt this corridor as part of their own Master Transportation Plan and resource plans so that they may eliminate the development of new residences, structures, or businesses within the corridor.

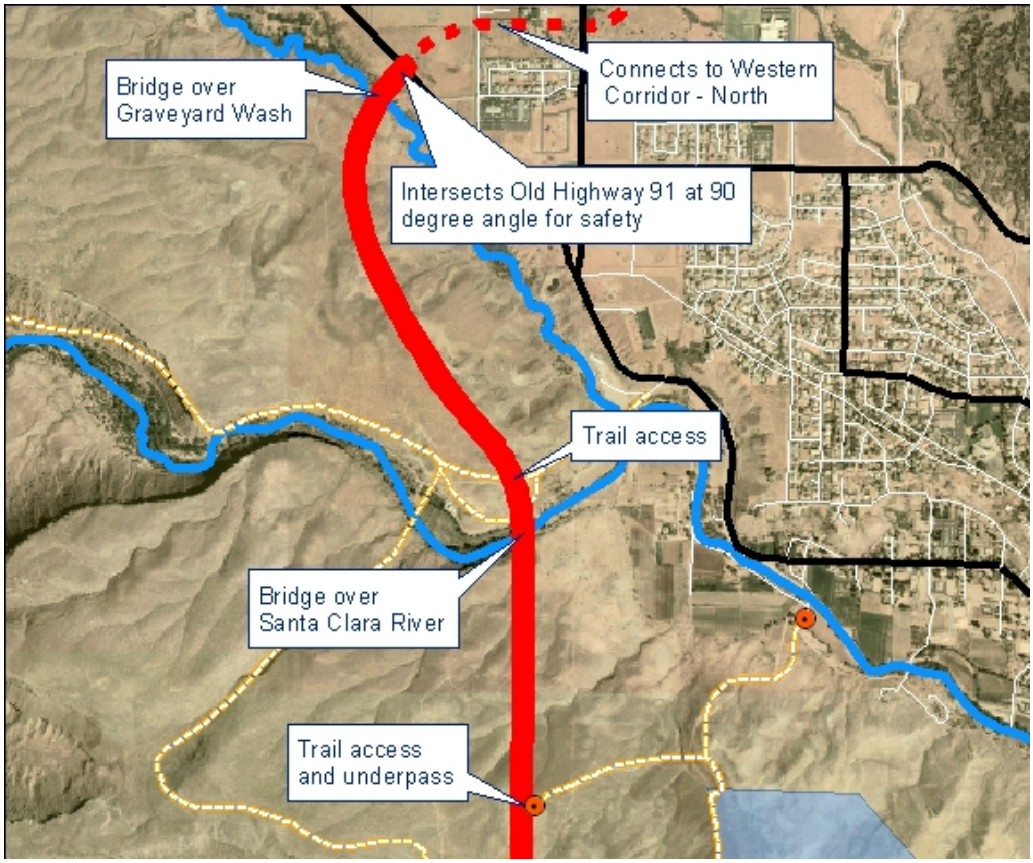
7.1 Alignment Adjustments

The recommended preserved corridor's final alignment is not an exact selection of north, central, and south alignments. Nor is it the selection of the best performing alignments. It is a combination of several sections of alignments, with adjustments in specific locations as recommended by the Steering and Stakeholders' Committees. The definition of various alignments in the three segments was created to facilitate qualitative ranking and more detailed analysis. With local expertise, advantage was gained from "cutting and splicing" portions of alignments to obtain a corridor with minimal impacts. In some cases minor adjustments gained significant improvements such as avoiding difficult terrain, preserving defined habitat and enhancing trail access.

7.1.1 Northern Most Section

This section of the recommended corridor extends from Old Highway 91 in Ivins, south approximately two miles. The recommended corridor most closely resembles the North 6 alignment through this area.

Figure 7- 1 Map of Northern Section



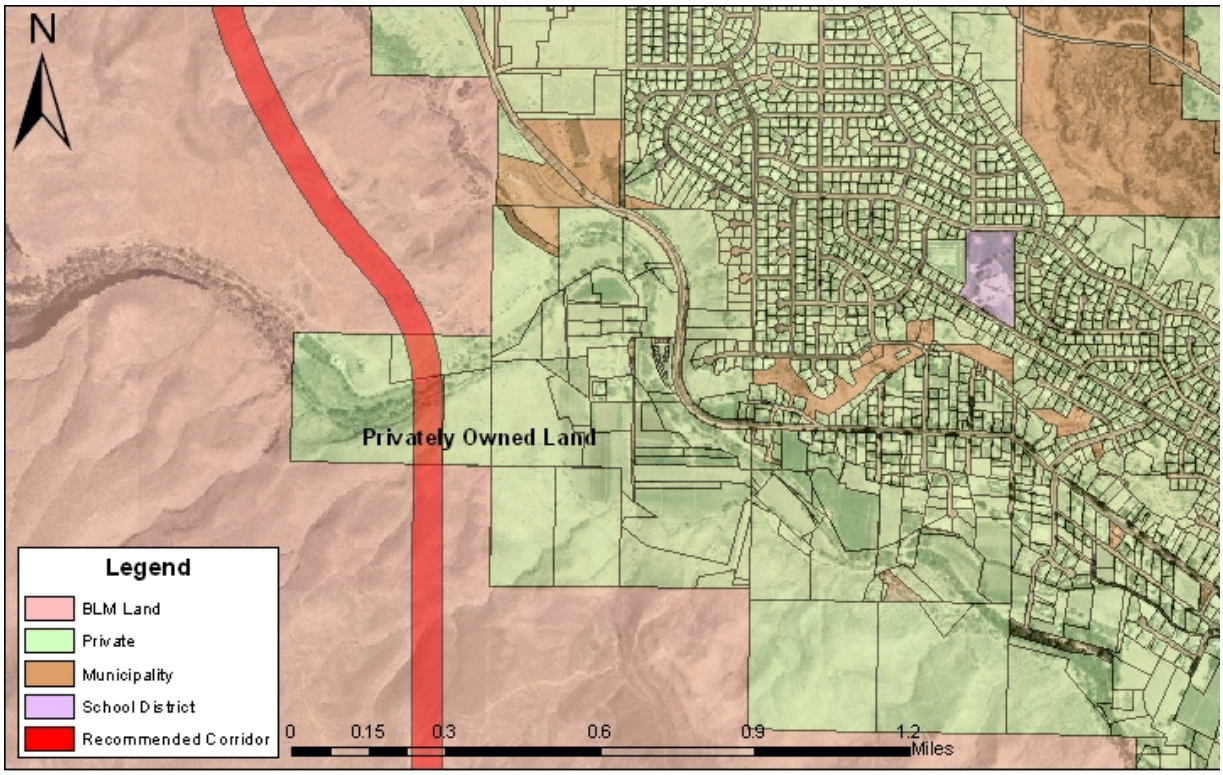
As established earlier, the northern end point of the Western Corridor-South is Old Highway 91, where it connects to the Western Corridor-North in town of Ivins. The recommended corridor intersects Old Highway 91 at a 90 degree angle. The angle is important to the intersection geometry, and helps determine the sight distance at the intersection. Thus, intersecting at a 90 degree angle makes it a safer intersection.

In order to maintain higher speeds on the recommended corridor, the alignment was created with a minimum turning radius of 1,900 Feet. It is recommended that the northern section of the recommended corridor, through the ACEC land stay as far east as possible while still maintaining the 90 degree intersection angle and respecting the 1,900 foot turn radius. This section of the corridor impacts the eastern area of Land Hill Area of Critical Environmental Concern land and while it is acceptable to build on this land, staying further east can minimize the impacts to this area of critical environmental concern.

The recommended corridor crosses two waterways requiring bridges, the Santa Clara River and the Graveyard Wash. The Santa Clara River has very steep banks. The Graveyard Wash carries very little water, but has steeply sloped banks and therefore would require a bridge.

It is very important for Santa Clara City to work with private land owners in this area to preserve the recommended corridor and minimize, to the extent possible, impact to property owners. In Santa Clara the recommended alignment impacts some privately owned land. It is possible to move the recommended alignment so that it only affects one property owner. However, that property owner does not want the alignment to run through his property. After much analysis and discussion, and after looking at several changes in the alignment, the final recommendation was that the recommended alignment should run through the property in question, but should be constructed to avoid all buildings and structures on that property. The City should continue to work with all the property owners and work to preserve an alignment which provides critical transportation access and thereby maximizes the value of all development.

Figure 7- 2 Private property in Santa Clara



SOURCE : Land ownership parcel data from Washington County GIS database

7.1.2 Stucki Spring Section

This section of the recommended corridor extends from the north section to just beyond Stucki Spring. The recommended corridor most closely resembles the North 6 and Central 7 alignments through this area.

This section of the recommended corridor was adjusted based on comments from the Steering and Stakeholders' Committees. In this section, the alignment was adjusted to avoid steep slopes and thus reduce construction costs. Also, the alignment was moved further west to minimize impact to the habitat in this area and to avoid bisecting the Stucki Spring Trail.

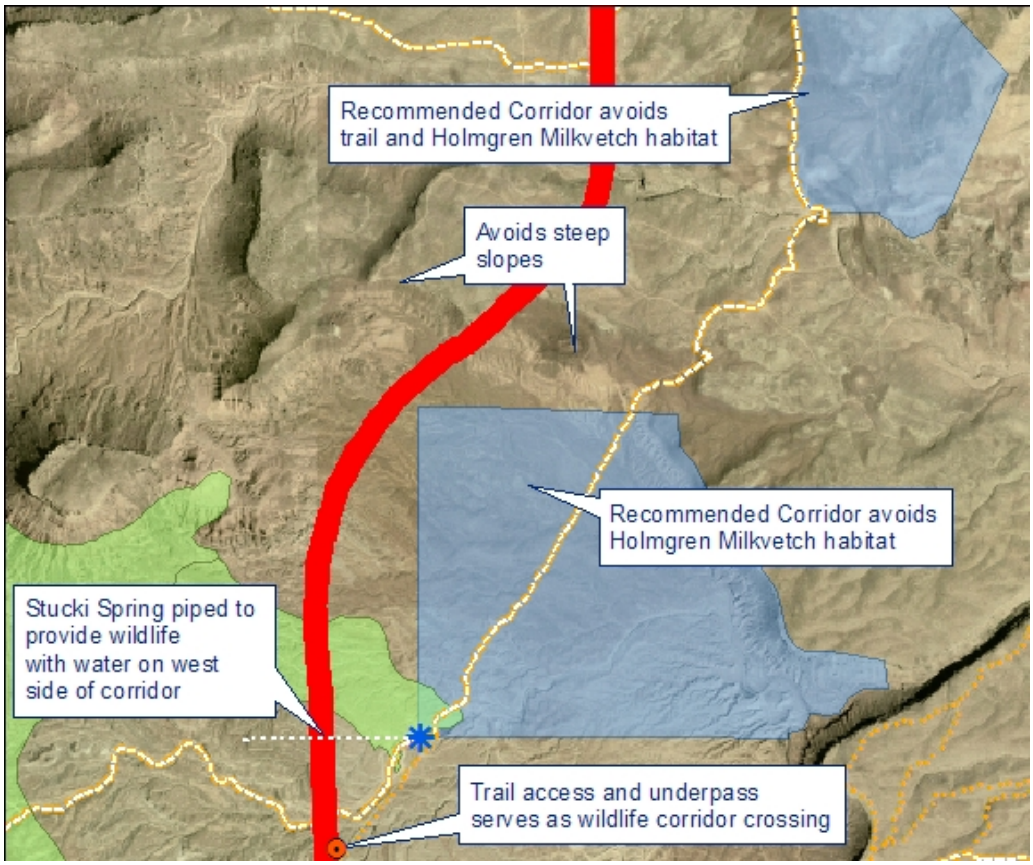
The Stucki Spring is a vital source of water in this area. With the preserved corridor disrupting access to the spring from the west, it is recommended that some water from the spring be piped. Constructing a pipe to move some of the water to the west of the roadway will provide a second source for wildlife and livestock on the west while maintaining water east of the road.

A new trail access point and trail underpass are recommended in this area. The trail access should provide a parking lot and the underpass would provide safe passage to both sides of the corridor to bicyclists, pedestrians, and wildlife.

Figure 7- 3 Trail Underpass on I-215 in Murray, Utah

Figure 7- 4 Trail Access with parking lot on 7800 South in Midvale, Utah

Figure 7- 5 Stucki Spring Section Map



7.1.3 Central Section

Figure 7- 6 Wall of wash in Central Section

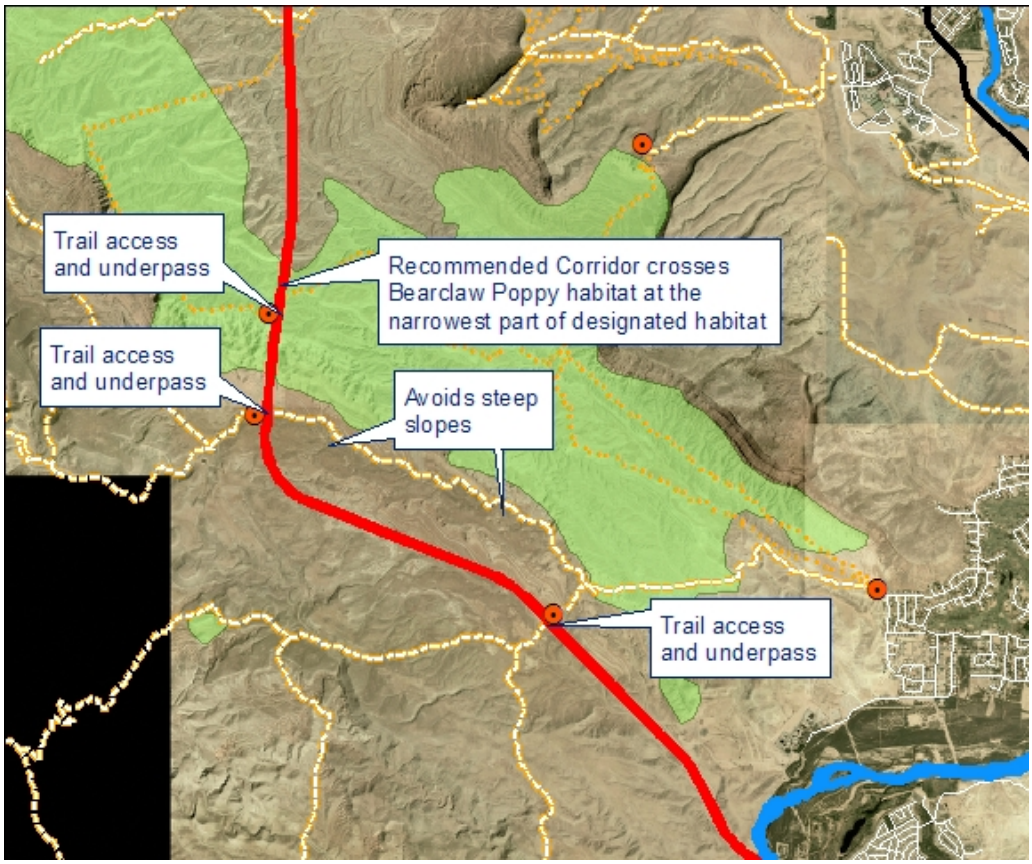
This section of the recommended corridor extends from the Stucki Spring to the Virgin River. The recommended corridor most closely resembles the Central 15 alignment through this area. In the Stucki Spring portion of the Central Segment, north of this Central Section, Central 7 and Central 8 actually scored better than Central 15 for the segment overall. Local knowledge dictates that adjusting to the Central 7 in the northern part of the Central segment allows the corridor to connect to the southern portion of Central 15. Central 15 is a better alignment than Central 7 or Central 8 in this southern Central Section.

In this section, the alignment was adjusted to avoid steep slopes based on comments from the Steering and Stakeholders' Committees. This area is riddled with hills and ravines which are impossible to avoid, especially through the Dwarf Bearclaw Poppy habitat. The recommended corridor minimizes crossing steep slopes through the area.

Trails and trail access are important through this section too. Three trail accesses and underpasses are recommended. In this section, the recommended alignment passes through the narrowest part of the Dwarf Bearclaw Poppy habitat to minimize the impact to this endangered species.

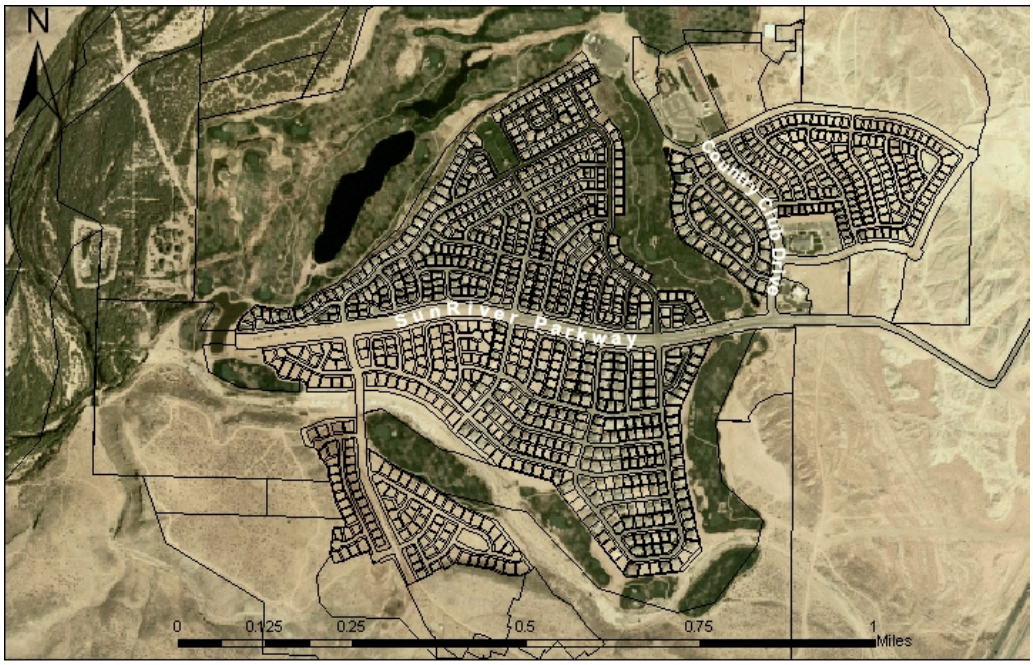
Figure 7- 7 Slope in Western Desert through which Central Section must pass

Figure 7- 8 Map of Central Section



7.1.4 Southern Section

Figure 7- 9 SunRiver Parkway

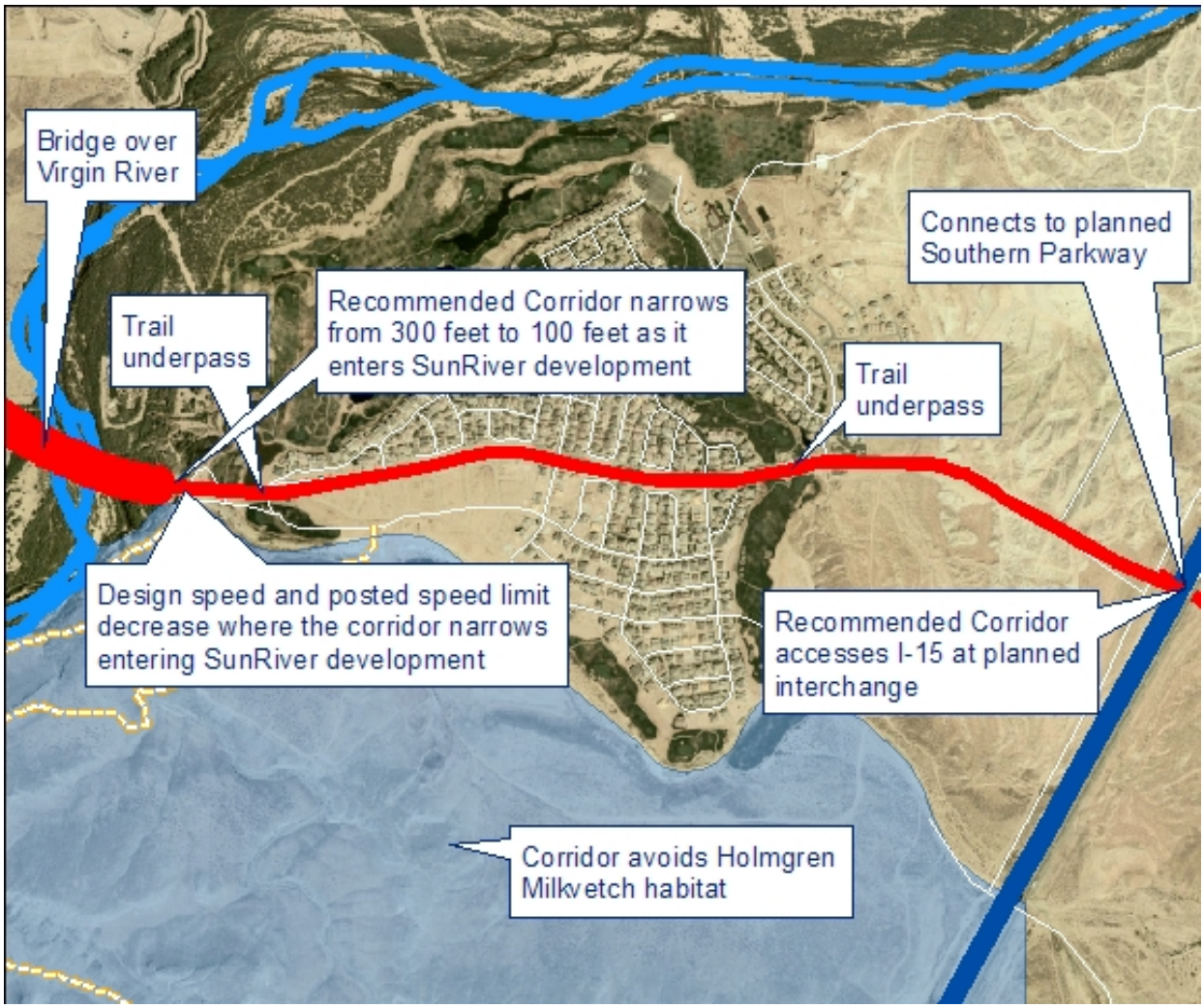


SOURCE : ESRI, Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID) and Washington County GIS database.

This section of the recommended corridor extends from the Virgin River to I-15. The recommended corridor most closely resembles the Central 15 and South 4 alignments through this area. The section starts with a bridge crossing over the Virgin River and then uses the SunRiver Parkway alignment. The corridor has planned underpasses for pedestrians, bicycles, and golf carts.

The SunRiver development is an adult lifestyle community where residents must be at least 55 years old. This residential community is located at the southern segment of the corridor and currently has a five lane public road called SunRiver Parkway bisecting the development. Most of the southern segment alignment options had significant impacts, because of the existing and platted development. The Steering Committee recommended that the alignment should utilize the existing public street, SunRiver Parkway. Widening would be discouraged so as not to affect existing homes. Also, a slower speed roadway should be designed through this area because of the residential neighborhoods. Finally, enhancements to the road, for those in the community, were discussed, including items such as traffic signals at key intersections and underpasses for pedestrians, bicycles, and golf carts. Residents of SunRiver were concerned that a major transportation facility would bisect their community. With a five lane facility already in place along SunRiver Parkway, it is difficult to suggest that a new facility be planned just because existing residents did not support the facility already in place.

Figure 7- 10 Map of South Section



In this section, the recommended corridor bisects an established community. There was also a lot of concern and discussion about the alignments in the southern section options. Discussion arose whether it was possible to connect the corridor to the Black Rock Interchange on I-15 in Arizona. This option, however, does not meet the Purpose and Need to connect to the planned Southern Parkway alignment and the approved and funded Southern Parkway Interchange. It was also mentioned that St. George City has planned for the Western Corridor to follow SunRiver Parkway as a five lane road as it currently exists. The 100 foot right-of-way of SunRiver Parkway is much smaller than the 300 foot wide corridor to be preserved elsewhere for the Western Corridor-South. The committees suggested that the Western Corridor-South could be accommodated in the existing right-of-way. The recommended corridor, therefore, would narrow to 100 feet as it enters the SunRiver development and continue to the Southern Parkway interchange as a 100 foot corridor. Along with narrowing the corridor, the design speed and posted speed limit would decrease as the road enters SunRiver at this location.

The corridor will connect to I-15 at the new Southern Parkway interchange at mile post two. This connection will not only provide access to northbound and southbound I-15 but will connect the Western Corridor-South to the Southern Parkway thereby connecting western St. George, Santa Clara, and Ivins to eastern St. George, Washington, and Hurricane.

Figure 7- 11 Existing SunRiver golf cart underpass

7.2 Recommended Preserved Corridor

The final recommended corridor was adjusted from possible alignments by the Steering and Stakeholders' Committees to enhance the corridor. Some of the features of this recommended corridor include: 90 degree angle intersection with Old Highway 91, little or no impacts to Holmgren Milkvetch habitat, enhanced trail accesses and underpasses, minimized impacts to Dwarf Bearclaw Poppy habitat, uses existing SunRiver Parkway in the south segment, I-15 access, and connects to the Southern Parkway.

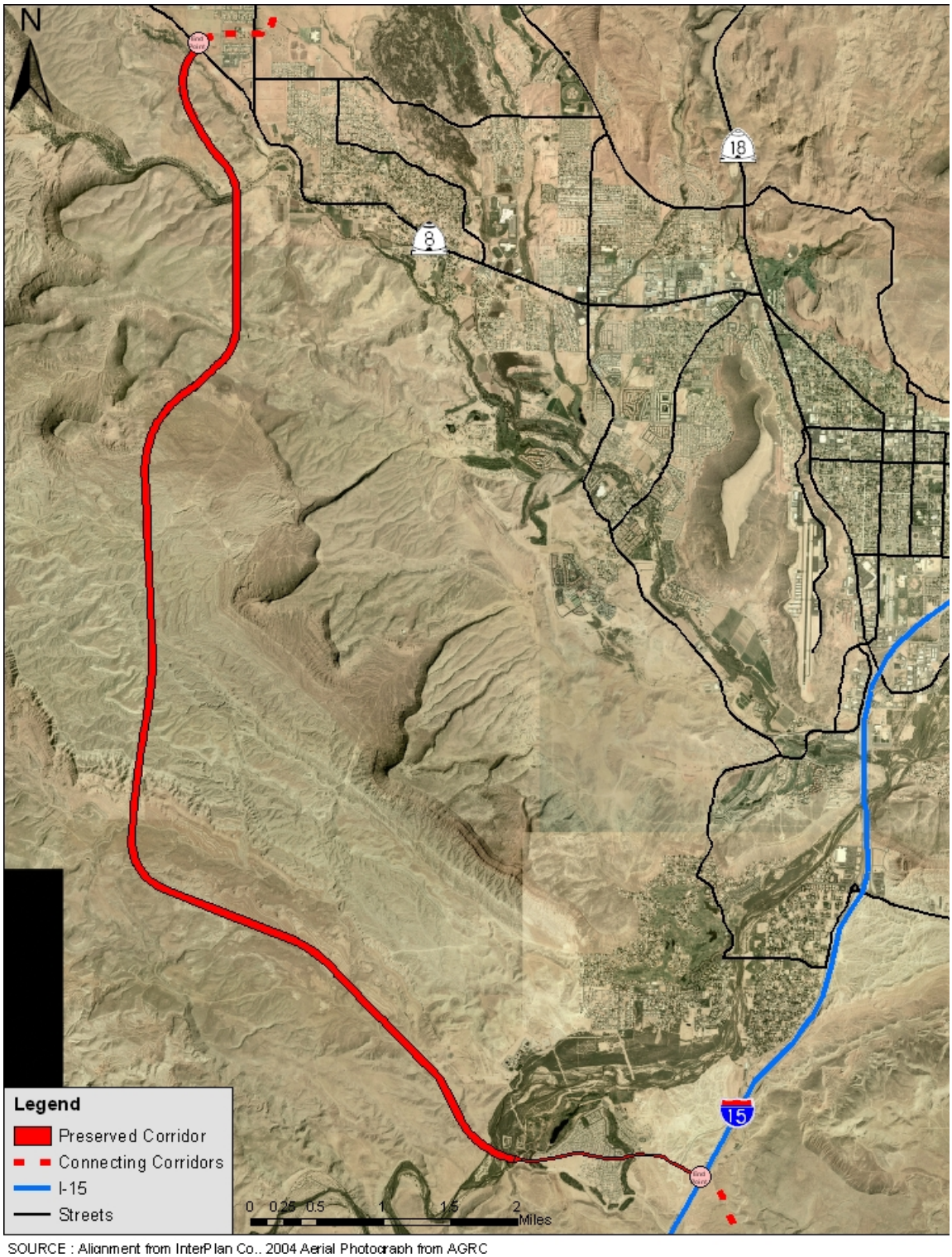
Figure 7- 12 I-15 looking east from SunRiver Parkway

After the September 13, 2006 public open house, public comments received were reviewed and evaluated. The preferred corridor alignment was revised based upon total project analysis, input from the Steering and Stakeholders' Committees, and public comment. The combined alignment ties the North 6, Central 7, 8, 15, and South 4 segments, with minor adjustments. Many of the committees' comments regarded the positioning and relative impacts of the final alignment, and thus minor adjustments were accommodated. Other comments centered on the "look and feel" of the road and specific locations for trailheads and underpasses.

Figure 7- 13 Recommended Preserved Corridor

FEATURES

- 90 degree angle intersection with Old Highway 91
- Little or no impacts to Holmgren Milkvetch habitat
- Enhanced trail accesses and underpasses
- Minimized impacts to Dwarf Bearclaw Poppy habitat
- Uses existing SunRiver Parkway in the south segment
- I-15 access
- Connects to the Southern Parkway



SOURCE : Alignment from InterPlan Co., 2004 Aerial Photograph from AGRC

7.3 Alignment Estimated Costs

The alignment estimated cost is a combination of five cost related factors: Private land purchases, Roadway construction, Roadway bridges, Cut and fill of steep slopes, and Trail underpasses.

With the recommended preserved alignment defined, an estimated cost could be calculated. The alignment estimated cost is a combination of five cost related factors: private land purchases, roadway construction, roadway bridges, cut and fill of steep slopes, and trail underpasses. All costs mentioned are in 2006 U.S. dollars and are planning level costs only. They are planning level estimates and are subject to vary during actual design and construction. Cost estimates refine several of the cost criteria detailed in Chapter Six, Cost and Constructability category, and also address land purchase and additional underpass structures for trails.

Land acquisition for right-of-way can sometimes be the largest part of a project's cost. In this case it is the smallest factor because most of the land along the preserved alignment is federally owned. In the northern segment there are 20 acres of private land that would need to be purchased to maintain a 300 right-of-way through Santa Clara. This alignment traverses public land throughout its central segment. In the southern segment, no private land would need to be purchased since the alignment would use the existing public right-of-way at SunRiver Parkway through the SunRiver development. The cost for private land purchases was estimated at $100,000 per acre. Thus, the alignment estimated cost for private land purchases is $2.0 million dollars.

Roadway construction costs are categorized into many factors, including clearing and grubbing, sub-grade finishing, untreated base course, pavement paint, traffic signals, and more.

Roadway construction is the largest part of the estimated cost. Roadway construction costs are categorized into many factors, including clearing and grubbing, sub-grade finishing, untreated base course, pavement paint, traffic signals, and more. In the Appendix of this report, tables list each of the factors used in determining the roadway construction cost per mile. It details the costs for the planned 166 foot roadway cross-section at $4.4 million dollars per mile. The alignment roadway is 11.73 miles long. Utilizing approximately 0.85 miles of SunRiver Parkway shortens the new construction length to 10.88 miles which yields a total roadway construction cost of $47.9 million dollars.

Roadway Bridges, as stated in Section 6.1.3, carry significant cost in any project. The preserved corridor crosses two rivers and a deep wash. It crosses the Santa Clara River in the north, the Virgin River in the south, and the Graveyard Wash at the north endpoint of the alignment. At each of these crossings a bridge will be needed. An assumed cost of $10 million dollars was estimated for each bridge. This is a planning level cost and no attempt at exact specifications was made. Figure 7.14 is a picture taken of the Santa Clara River in the northern area of the recommended corridor.

Cut and fill of steep slopes was another cost factor. Chapter Six – Corridor Evaluation explains how the number of steep slopes was measured. The estimated cost of cut and fill of steep slopes was $150,000 dollars per occurrence. This number was based on an average steep slope of 20 percent, an average length per steep slope of 150 feet, and average cost of earth moved at $10 per cubic meter. Again, this is a planning level cost estimate and represents a reasonable number, but not all steep slopes will fit into this averaged assumption.

Finally, along the preserved corridor several trail underpasses are planned. These underpasses are planned to be grade-separated structures at locations where trail access across the road is needed. Ten of these underpasses are planned along the alignment. An assumed cost of $1 million dollars each was used for the underpasses. Again, this is a planning level cost and is to be used for planning trail underpasses.

Figure 7- 14 Santa Clara River (northern segment of corridor)

Photo taken by InterPlan Co. during a site visit on April 11, 2006

These five cost factors were measured and the total cost for the preserved corridor was calculated. Table 7.1 lists the five factors and the cost assumption for each. The estimated total construction cost for the Western Corridor-South is $97.4 million dollars.

Table 7- 1 Estimated Total Cost Breakdown

Cost Factor	Number	Value	Total Cost
Private Land Purchases	20 Acres	$100,000	**$2,000,000**
Roadway Construction (new)	10.88 miles	$4,400,000	**$47,872,000**
Roadway Bridges	3	$10,000,000	**$30,000,000**
Cut and Fill of Steep Slopes	50	$150,000	**$7,500,000**
Trail Underpasses	10	$1,000,000	**$10,000,000**
Total Cost			**$97,372,000**

Source: InterPlan Co., 2006

7.4 Action Items

This corridor study was prepared for the Dixie MPO to identify a preserved corridor. Despite all the information included in the Western Corridor-South Study, further information is needed and preserving the recommended corridor requires further action. The Dixie MPO, Ivins City, Santa Clara City, St. George City, Washington County, the BLM, and UDOT need to take the appropriate steps to ensure that the corridor is uniformly adopted and preserved.

The **Dixie MPO** should update their Long Range Transportation Plan using the results of this corridor study. They should evaluate phasing and funding options for this corridor and prepare the corridor for state and federal programmed funding by working with UDOT. They also need to continue to coordinate with Ivins, Santa Clara, St. George, Washington County, and the BLM regarding this project. The Dixie MPO is the communication center for all involved in this project.

Ivins City should update their Master Transportation Plan with the preserved corridor alignment. While the Western Corridor-South roadway does not occupy much land in Ivins City, this preservation is critical because it provides the connection to the Western Corridor-North. Ivins City should also coordinate with the Dixie MPO, Santa Clara, St. George, Washington County, UDOT, and the BLM.

Santa Clara City should update their Master Transportation Plan with the preserved corridor alignment and identify any potential connections to the corridor. They should be planning for the preservation of the corridor and actively inform citizens and developers about its location. Santa Clara City should also coordinate with the Dixie MPO, Ivins, St. George, Washington County, UDOT, and the BLM for trail connection and private land transactions and development.

St. George City should be active in preserving the appropriate right-of-way for this corridor through its city boundary. This preserved corridor should be added to the city's Master Transportation Plan along with any potential connections to the corridor. St. George City should continue to coordinate with UDOT and the Dixie MPO with plans for connecting the project to the Southern Parkway at the Southern Parkway Interchange.

Washington County should be active in preserving the appropriate right-of-way for this corridor through the unincorporated area. This preserved corridor should be added to the county's Master Transportation Plan along with any potential connections to the corridor. Washington County should coordinate with the Dixie MPO, Ivins, Santa Clara, St. George, UDOT and the BLM for trail connections and private land transactions and development.

Figure 7- 15 Trail Underpass under I-215 in Murray, Utah

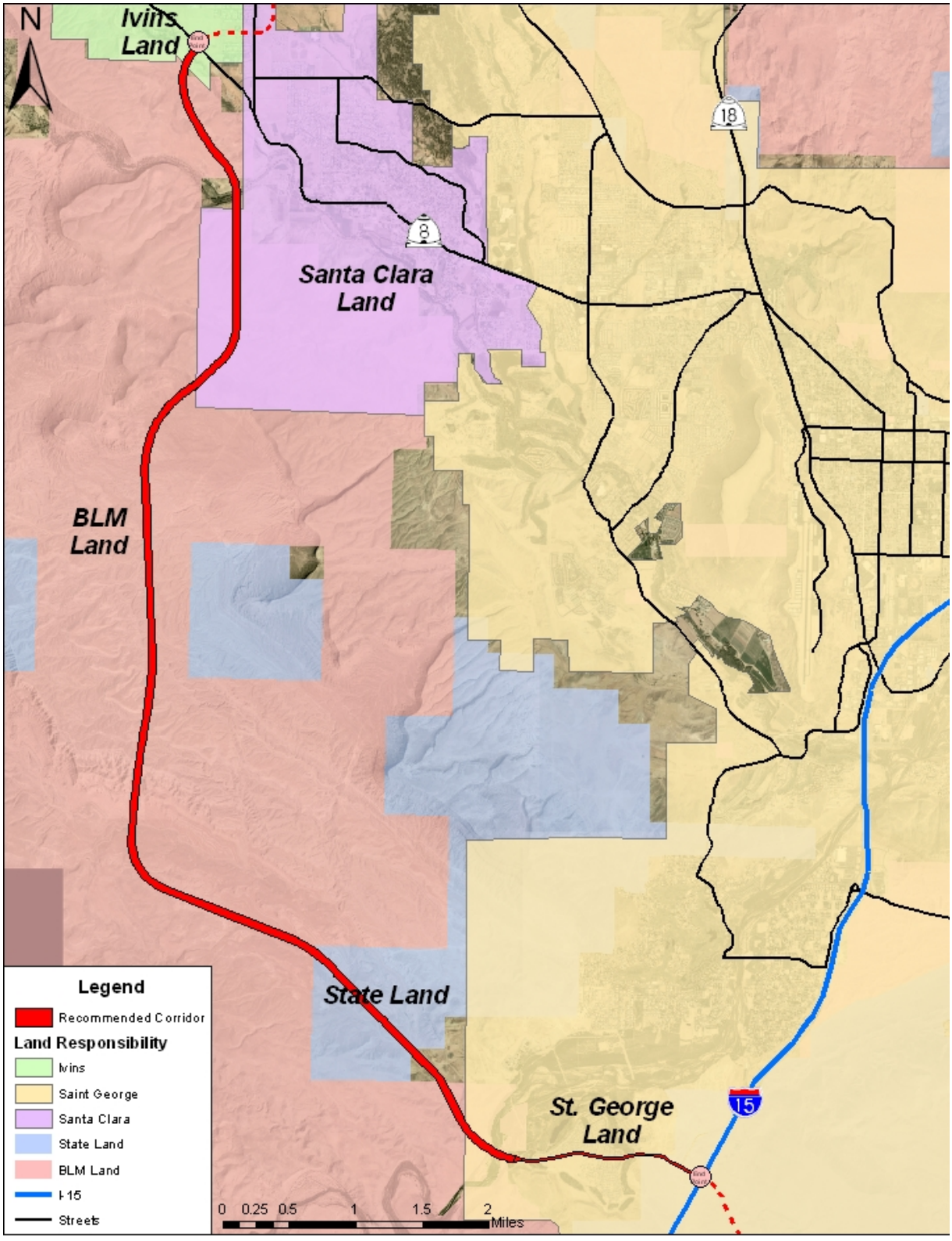
The Utah Department of Transportation should also take a coordination role by communicating with the Dixie MPO, Ivins, Santa Clara, St. George, Washington County, and the BLM about the best management practices in corridor preservation. UDOT should also provide communication and recommendations on future funding sources and project programming.

The Bureau of Land Management should assist with the preservation of the recommended corridor alignment by preserving the land for a transportation corridor. They should also assist in identifying any potential connections to the corridor from Santa Clara and St. George. They should coordinate with UDOT and the Dixie MPO on the acquisition of right-of-way needed for the recommended corridor. Even if public land is transferred to private ownership, the right-of-way for the recommended corridor should be retained. Also, the BLM should notify the Dixie MPO, Ivins, Santa Clara, St. George, Washington County, and UDOT of any potential land ownership transfers and endangered or threatened species habitat designations.

Now that a corridor study has been completed, some residents or even jurisdictions may wonder what happens next. The first thing that should occur is corridor preservation. Each agency should do their part in preserving the recommended corridor. However, there may be instances where the recommended corridor, due to future or unforeseen events, needs to be adjusted to accommodate special circumstances. A new corridor study does not need to be completed. Rather, each agency should communicate with the Dixie MPO their requests for amending the recommended corridor. The Dixie MPO will serve as the lead agency and communicate with all other agencies concerning any requests for amending the recommended corridor.

When the proposed corridor reaches the point where there is an identified need, the NEPA process will need to be initiated. The NEPA process will likely be initiated by UDOT at the request of the Dixie MPO, St. George City, or Washington County. Identified funds will need to be determined, which may require several years of financial planning before starting the NEPA process. UDOT will most likely initiate the NEPA process based on cooperative programming of corridor funding.

Figure 7- 16 Responsibilities



SOURCE : Land Resposibility data from Land ownership parcel data and Municipality data from Washington County GIS database

Appendix

1. Steering Committee Agendas
    - Minutes
2. Stakeholders' Committee Agendas
    - Minutes
3. Resource Maps
    - Aerial Map
    - Municipalities Map
    - Viewsheds Map
    - Elevation and Slope Map
    - Cultural Resources Map
    - Grazing Allotments Map
    - Water and Hydrology Map
    - Entrance and Exit Points of Cities Map
    - Sample Detailed Map of Partial Segments 1 & 7 North
4. Tables of alignment data
    - North Purpose & Need
    - Central Purpose & Need
    - South Purpose & Need
    - Environmental Impacts
    - Cost & Constructability
5. Construction Cost Breakdown

Western Corridor-South Study
Steering Committee Meeting
Dixie Transportation Planning Office
1070 West 1600 South, Building B, St. George, Utah
9:00 a.m., Wednesday, March 22, 2006

Agenda

1. Introductions
2. Meeting Dates and Times
3. Project Schedule
4. Stakeholders' Committee
    - Recommended Participants – Federal Highway Administration, Bureau of Land Management, Schools and Institutional Trust Lands Administration, Sierra Club, Southern Utah Wilderness Alliance, SunRiver Home Owners Association, Realtor, Department of Environmental Quality, Fish and Wildlife, Division of Wildlife Resources, Utah Department of Transportation, Property Owners
    - Additional Participants –
    - Invitation Letter – To be handed out at the meeting
5. Data Collection
6. Steering Committee's Project Expectations

Meeting Minutes

Agenda

1. Introductions – Introduction of those present included:
    - Lowell Elmer, DMPO
    - Aron Baker, St. George City
    - Dave Glenn, Invins City
    - Jack Taylor, Santa Clara City
    - Clayton Wilson, UDOT
    - Matt Riffkin, InterPlan
    - Vern Keeslar, InterPlan

    Not present included:
    - Jim Crisp, BLM
    - Ron Whitehead, Washington County.
2. Meeting Dates and Times – Steering Committee meeting will be held at 9:00 am on the second Wednesdays of the month that meetings are held. See revised schedule.
3. Project Schedule – Committee members reviewed the project schedule and recommended some minor changes. See revised schedule.
4. Stakeholders' Committee – Committee members identified additional stakeholders. See additional participants.
    - Recommended Participants – Federal Highway Administration, Bureau of Land Management, Schools and Institutional Trust Lands Administration, Sierra Club, Southern Utah Wilderness Alliance, SunRiver Home Owners Association, Realtor, Department of Environmental Quality, Fish and Wildlife, Division of Wildlife Resources, Utah Department of Transportation, Property Owners
    - Additional Participants – Additional representatives from St. George City, Ivins City, Santa Clara City, BLM, and UDOT were identified. Also, additional organizations include: Southwestern Utah Bicycle Association, Three Rivers Trails, Tri-State ATV, Property owner Jimmy Rosenbrook, SunRiver developer, MPO Executive Council member, Shivwits Native American Tribe, Botanist Renee VanBuren, and The Natures Conservancy.
    - Invitation Letter – Location of the stakeholders' meetings to be on neutral location.

5. Data Collection – Additional data collection includes: Flood plain, cultural resources, recreational plans, land use plans, additional habitat, and the QRSII model information.

6. Steering Committee's Project Expectations – Expectations include: Corridor options, recommended corridor, recreational access, road cross section, controlled access or access spacing, and identifying issues for future studies.

Western Corridor-South Study
Steering Committee Meeting
Dixie Transportation Planning Office
1070 West 1600 South, Building B, St. George, Utah
9:00 a.m., Wednesday, April 12, 2006

Agenda

1. Introductions

2. Final Project Schedule
   - Schedule handout

3. Final Stakeholders' Committee List
   - List handout
   - Letter handout
   - Activity for first Stakeholders' Committee Meeting

4. Ongoing Data Collection
   - Verbal report

5. Travel Demand Forecasting
   - Handout

6. Facility Type
   - Right-of-way width
   - Cross-sections

7. Corridor Evaluation Criteria
   - Handout

Meeting Minutes

Agenda

1. Introductions – Introduction of those present included:
   - Lowell Elmer, DMPO
   - Aron Baker, St. George City
   - Dave Glenn, Ivins City
   - Jack Taylor, Santa Clara City
   - Jim Crisp, BLM
   - Ron Whitehead, Washington County
   - Tyler Hoskins, Hoskins Engineering Development
   - Matt Riffkin, InterPlan
   - Thomas McMurtry
   - Vern Keeslar, InterPlan

   Not present included:
   - Clayton Wilson, UDOT

2. Final Project Schedule – A final project schedule was handed out. No changes were required.
   - Schedule handout

3. Final Stakeholders' Committee List – The Stakeholders' Committee list was handed out and additional information was provided and corrections were made. The Dixie Conference Center is the preferred location for the Stakeholders' Committee Meeting. The Santa Clara Library is the backup location.
    - List handout
    - Letter handout
    - Activity for first Stakeholders' Committee Meeting

4. Ongoing Data Collection – Thomas McMurtry showed a map with updated data collection.
    - Verbal report

5. Travel Demand Forecasting – Matt Riffkin provided a handout that showed population, dwelling units, and employment for 2000 and 2035. Model runs of various speeds for the proposed road with volume was also distributed.
    - Handout

6. Facility Type – A handout with three cross-sections was discussed. It was agreed upon that a 300 foot right-of-way would be the width used during the analysis.
    - Right-of-way width
    - Cross-sections

7. Corridor Evaluation Criteria – Matt Riffkin handed out a weight, rate, and calculate criteria worksheet. Input was provided and a revised draft will be email out next week.
    - Handout

Western Corridor-South Study
Steering Committee
Dixie Transportation Planning Office
1070 West 1600 South, Building B, St. George, Utah
9:00 a.m., Wednesday, May 10, 2006

Agenda

1. Welcome and Introductions

2. Corridor Options

3. Ongoing Data Collection
    - Verbal Report
    - Maps for Stakeholders' Committee Meeting

4. Stakeholders' Committee Meeting
    - Agenda
    - Process

Meeting Minutes

Agenda

1. Welcome – Those present included:
    - Lowell Elmer, DMPO
    - Dave Glenn, Ivins City
    - Jim Crisp, BLM
    - Tyler Hoskins, Hoskins Engineering
    - Matt Riffkin, InterPlan
    - Thomas McMurtry, InterPlan
    - Vern Keeslar, InterPlan
    - Aron Baker, St. George City
    - Clayton Wilson, UDOT

- Jack Taylor, Santa Clara City
- Vince Izzo, HDR

Not Present included:

- Ron Whitehead, Washington County

2. Corridor Options
   - InterPlan presented criteria to evaluate corridor options. The committee expressed that the criteria was worth having the Stakeholders' Committee review for input too.

3. Ongoing Data Collection
   - Verbal Report – Thomas is continuing to work with agencies to obtain data.
   - Maps for Stakeholders' Committee Meeting – InterPlan presented several maps for review.

4. Stakeholders' Committee Meeting
   - Agenda – InterPlan presented the Stakeholders' Committee agenda.
   - Process – InterPlan presented the process of the Stakeholders' Committee meeting.

Western Corridor-South Study
Steering Committee
Dixie Transportation Planning Office
1070 West 1600 South, Building B, St. George, Utah
9:00 a.m., Wednesday, July 12, 2006

Agenda

1. Welcome

2. Review of Schedule

3. Discussion on Alignment Options

4. Discussion of Alignment Evaluation

5. Briefing of Stakeholder Committee Meeting

6. Next Steps and Other Business

Meeting Minutes

Agenda

1. Welcome –Introduction of those present included:
   - Lowell Elmer, DMPO
   - Dave Glenn, Ivins City
   - Jim Crisp, BLM
   - Bob Douglas, BLM
   - Bob Nicholson, St. George City
   - Vince Izzo, HDR
   - Tyler Hoskins, Hoskins Engineering
   - Matt Riffkin, InterPlan
   - Thomas McMurtry, InterPlan

   Not Present included:
   - Aron Baker, St. George City

- Jack Taylor, Santa Clara City
- Ron Whitehead, Washington County
- Clayton Wilson, UDOT
- Vern Keeslar, InterPlan

2. Review of Schedule – a brief check of where we are in the schedule and what we have left, currently about a month ahead of schedule
   - Schedule handout

3. Discussion on Alignment Options – InterPlan passed out packets with all of the alignment options with criteria rating and evaluation. Matt Riffkin went through a 15 slide powerpoint presentation discussing the 600 possible alignments and methodology behind the process of evaluation.
   - 6-page handout
   - Powerpoint presentation

4. Discussion of Alignment Evaluation – The powerpoint presentation went through the alignment options and evaluation to identify the top or best performing alignment options. The ratings of these alignments were discussed and a spreadsheet showing all of the alignments and how each performed was presented in the packet handout.

5. Briefing of Stakeholder Committee Meeting – InterPlan explained how the stakeholder meeting in the afternoon would go. InterPlan brought copies of the boards prepared for the stakeholders meeting and Matt went through each of the maps.

6. Next Steps and Other Business – The next steering committee meeting was scheduled for September 13, 2006 at 9:00 am in the DMPO conference room.

Western Corridor-South Study
Steering Committee Meeting
Dixie Center
1835 Convention Center Drive, St. George, Utah
3:00 p.m., Wednesday, September 13, 2006

Agenda

1. Welcome

2. Show Presentation for September 13, 2006 Open House

3. Discuss September 13, 2006 Open House Format

4. Discuss Draft Report

5. Next Steps and Other Business

Meeting Minutes

Agenda

1. Welcome – Those present included:
   - Lowell Elmer, DMPO
   - Dave Glenn, Ivins City
   - Jim Crisp, BLM
   - Tyler Hoskins, Hoskins Engineering
   - Matt Riffkin, InterPlan
   - Thomas McMurtry, InterPlan
   - Vern Keeslar, InterPlan
   - Aron Baker, St. George City

- Clayton Wilson, UDOT

Not Present included:
- Ron Whitehead, Washington County
- Jack Taylor, Santa Clara City
- Vince Izzo, HDR

2. Show Presentation for September 13, 2006 Open House
   - InterPlan showed the PowerPoint slide show to the committee.

3. Discuss September 13, 2006 Open House Format
   - The committee discussed the public open house format and what to expect for the evening.

4. Discuss Draft Report
   - The draft report was submitted the previous week. Preliminary comments were received.

5. Next Steps and Other Business
   - Next meeting is October 11, 2006.

Western Corridor-South Study
Steering Committee Meeting
Dixie Transportation Planning Office
1070 West 1600 South, Building B, St. George, Utah
9:00 a.m., Wednesday, October 11, 2006

Agenda

1. Welcome

2. Review of September 13, 2006 Open House

3. Discussion on Alignment Amendments to the North

4. Discuss Need for Last Stakeholders' Committee Meeting

5. Study Report Comments

6. Discussion about October 24, 2006 Open House

7. Next Steps and Other Business

Meeting Minutes

Agenda

1. Welcome – Those present included:
   - Lowell Elmer, DMPO
   - Dave Glenn, Ivins City
   - Vern Keeslar, InterPlan
   - Aron Baker, St. George City
   - Ron Whitehead, Washington County

Not Present included:
- Jack Taylor, Santa Clara City
- Jim Crisp, BLM
- Tyler Hoskins, Hoskins Engineering

- Clayton Wilson, UDOT
- Matt Riffkin, InterPlan
- Thomas McMurtry, InterPlan
- Vince Izzo, HDR

2. Review of September 13, 2006 Open House
   - Work with Gary at the DMPO to place the open house slide show on the DMPO website. Also, contact Scott McCall for placement of the slide show on the SunRiver website.

3. Discussion on Alignment Amendments to the North
   - InterPlan handed out a new map showing Santa Clara's desired location for the corridor. There was no opposition on the committee for that corridor amendment.

4. Discuss Need for Last Stakeholders' Committee Meeting
   - The Steering Committee felt that it would be beneficial for one last Stakeholders' Committee meeting to hand out an executive summary and a map of the recommended corridor.

5. Study Report Comments
   - All have provided comments except for Jack and Ron.

6. Discussion about October 24, 2006 Open House
   - Simplify two slides on the presentation.
7. Next Steps and Other Business
   - Write letter to DMPO regarding the SunRiver request to move the corridor south away from the Southern Parkway Interchange.

Western Corridor-South Study
Steering Committee Meeting
Dixie Transportation Planning Office
1070 West 1600 South, Building B, St. George, Utah
9:00 a.m., Wednesday, November 8, 2006

Agenda

1. Welcome

2. Discussion about October 24, 2006 SunRiver Open House

3. Study Report Comments
   - Submit final comments

4. Stakeholders' Committee Meeting
   - Slideshow

5. Next Steps and Other Business
   - Submit final report

Meeting Minutes

Agenda

1. Welcome - Those present included:
   - Lowell Elmer, DMPO
   - Dave Glenn, Ivins City
   - Vern Keeslar, InterPlan
   - Aron Baker, St. George City
   - Ron Whitehead, Washington County
   - Jim Crisp, BLM
   - Clayton Wilson, UDOT

- Thomas McMurtry, InterPlan

Not Present included:

- Jack Taylor, Santa Clara City
- Tyler Hoskins, Hoskins Engineering
- Matt Riffkin, InterPlan
- Vince Izzo, HDR

2. Discussion about October 24, 2006 SunRiver Open House – The Steering Committee discussed their thoughts about the open house at SunRiver. They thought that the meeting went very well.

3. Study Report Comments – Vern Keeslar requested that final comments be submitted by Friday, November 17, 2006 so that corrections can be completed and the final report ready before Thanksgiving.

4. Stakeholders' Committee Meeting – Vern Keeslar showed the Steering Committee the presentation prepared for the Stakeholders' Committee.

5. Next Steps and Other Business – Vern Keeslar asked the Steering Committee for feedback regarding the study process and the consultant team. The comments were favorable and the Steering Committee was please with the study process and the consultant team.

Western Corridor-South Study
Stakeholders' Committee Meeting
Dixie Center of St. George
1835 Convention Center Drive, St. George, Utah
2:00 p.m., Wednesday, May 10, 2006

Agenda

1. Stakeholder Briefing – Welcome and introductions performed by Lowell Elmer. Vern Keeslar introduced the project purpose and limits of the study. Matt Riffkin told the Stakeholders why they were here and what value they added to the project. Vince Izzo gave the layout of the process and meeting for the day.

	(45 Minutes)	
• Welcome and Introductions	(5 minutes)	*Lowell/Clayton*
• Purpose and Limits of Western Corridor Study	(10 minutes)	*Vern*
• Purpose of Stakeholder Committee	(10 minutes)	*Matt*
• Plan for Today's Stakeholder Meeting	(10 minutes)	*Vince*
• Break	(10 minutes)	

2. Breakout Sessions – The Stakeholders' Committee members divided into three groups of six to seven people and discussed the items below.

	(60 Minutes)
• ID Issues by Category using "Comment Cards"	(20 minutes)
• Prioritize Issues by Category	(20 minutes)
• Assign Weights to Categories and Issues	(20 minutes)

3. Summary and Wrap Up – Each group gave a presentation on the outcome of their discussion. Matt Riffkin and Vern Keeslar thanked the Stakeholders' Committee and informed them of the next meeting on July 12, 2006.

	(20 Minutes)	
• Group Presentations	(15 minutes)	*Group Representative*
• Wrap-up and Summary	(5 minutes)	*Vern/Lowell*

Meeting Minutes

Agenda

1.	Stakeholder Briefing	(45 Minutes)	
	• Welcome and Introductions	(5 minutes)	*Lowell/Clayton*
	• Purpose and Limits of Western Corridor Study	(10 minutes)	*Vern*
	• Purpose of Stakeholder Committee	(10 minutes)	*Matt*
	• Plan for Today's Stakeholder Meeting	(10 minutes)	*Vince*
	• Break	(10 minutes)	
2.	Breakout Sessions	(60 Minutes)	
	• ID Issues by Category using "Comment Cards"	(20 minutes)	
	• Prioritize Issues by Category	(20 minutes)	
	• Assign Weights to Categories and Issues	(20 minutes)	
3.	Summary and Wrap Up	(20 Minutes)	
	• Group Presentations	(15 minutes)	*Group Representative*
	• Wrap-up and Summary	(5 minutes)	*Vern/Lowell*

Western Corridor-South Study
Stakeholders' Committee Meeting
Dixie Center of St. George
1835 Convention Center Drive, St. George, Utah
2:00 p.m., Wednesday, July 12, 2006

Agenda

1. Welcome

2. Review of Schedule

3. Discussion on Alignment Evaluation

4. Discussion of Alignment Options

5. Next Steps and Other Business

Meeting Minutes

Agenda

1. Welcome – Matt Riffkin and Lowell Elmer welcomed the Stakeholders' Committee members.

2. Review of Schedule – The project scheduled was reviewed and input was sought.

3. Discussion on Alignment Evaluation – Evaluation criterion was discussed. A review of the first Stakeholders' Committee exercise was reviewed.

4. Discussion of Alignment Options – The Stakeholders' Committee was divided into small groups of four to five members for discussion of alignment options.

5. Next Steps and Other Business – The next meeting is schedule for the public open house on September 13, 2006. The Stakeholders' Committee is requested to attend to visit with the general public.

Western Corridor-South Study
Stakeholders' Committee Meeting
Dixie Center of St. George
1835 Convention Center Drive, St. George, Utah
4:30 p.m., Wednesday, September 13, 2006

Agenda

1. Public Open House

Meeting Minutes

Agenda

1. Public Open House – The Stakeholders' Committee members assisted with the public open house by visiting with member so the general public.

Western Corridor-South Study
Stakeholders' Committee Meeting
Dixie Transportation Planning Office
1070 West 1600 South, Building B, St. George, Utah
10:00 a.m., Wednesday, November 8, 2006

Agenda
1. Welcome

2. Slideshow

3. Handout of Executive Summary

4. Next Steps and Other Business
    - Submit Final Report

Meeting Minutes

Agenda

6. Welcome – Lowell Elmer welcomed the 13 members of the Stakeholders' Committee. Vern Keeslar did introductions and the meeting began.

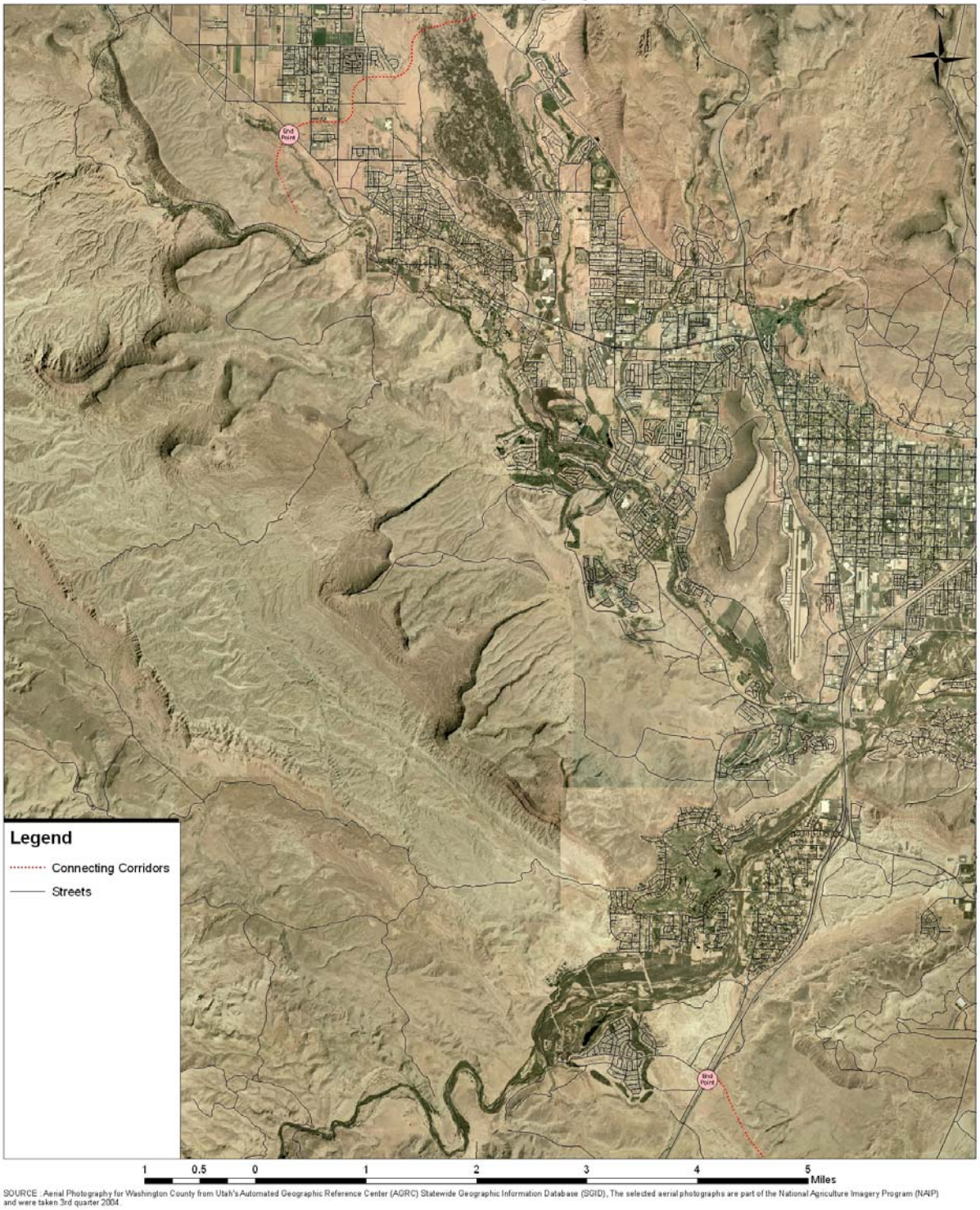
7. Slideshow – Vern Keeslar showed a presentation summarizing the study process and presented the consultant recommendations.

8. Handout of Executive Summary – Vern Keeslar handed out the executive summary and a map of the recommended corridor to the Stakeholders' Committee.

9. Next Steps and Other Business – Vern Keeslar stated the final report would be available before Thanksgiving.

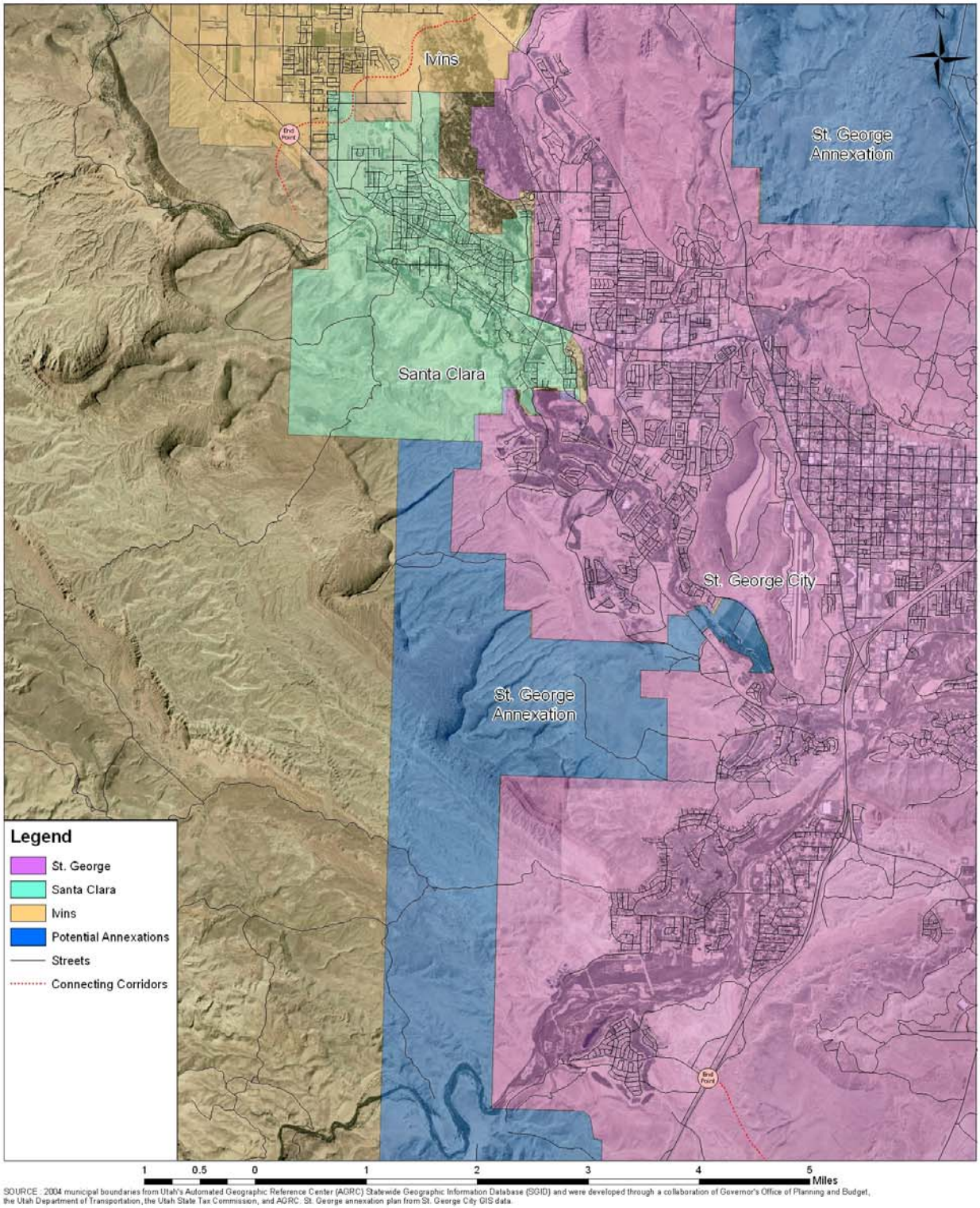
Dixie Western Corridor - South

Aerial Photograph



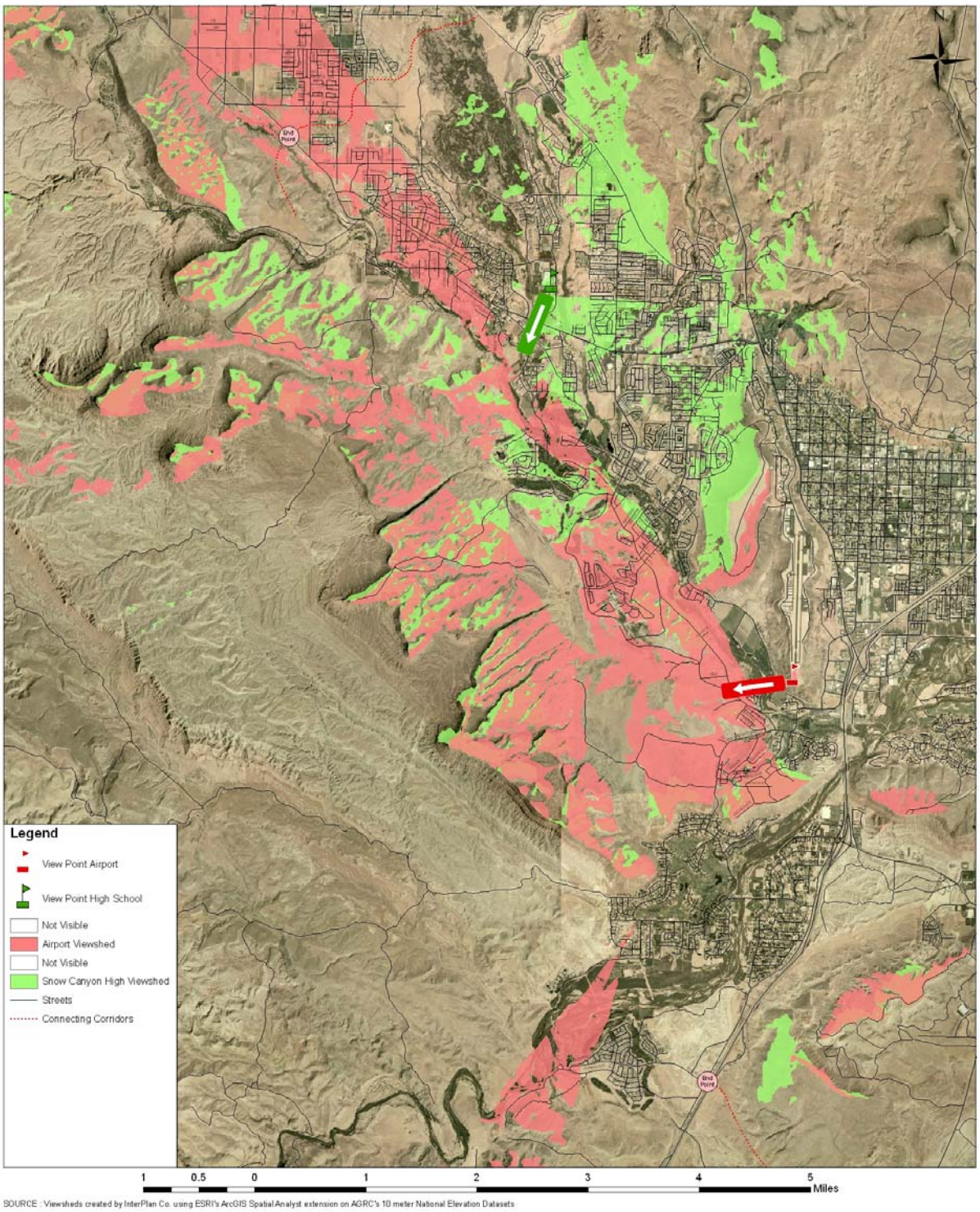
SOURCE : Aerial Photography for Washington County from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID), The selected aerial photographs are part of the National Agriculture Imagery Program (NAIP) and were taken 3rd quarter 2004.

Dixie Western Corridor - South
Municipalities



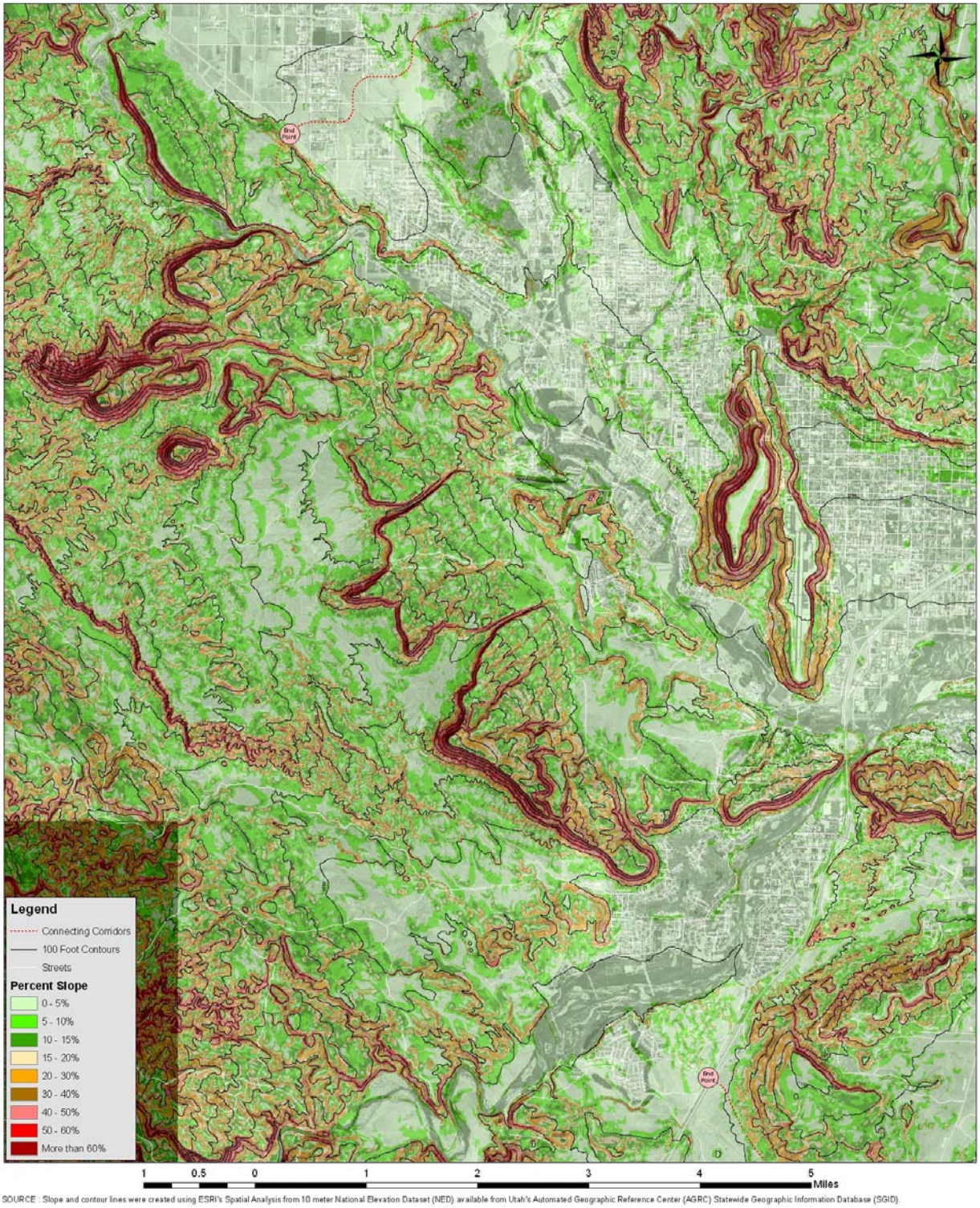
SOURCE : 2004 municipal boundaries from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID) and were developed through a collaboration of Governor's Office of Planning and Budget, the Utah Department of Transportation, the Utah State Tax Commission, and AGRC. St. George annexation plan from St. George City GIS data.

Dixie Western Corridor - South
Viewsheds



Dixie Western Corridor - South

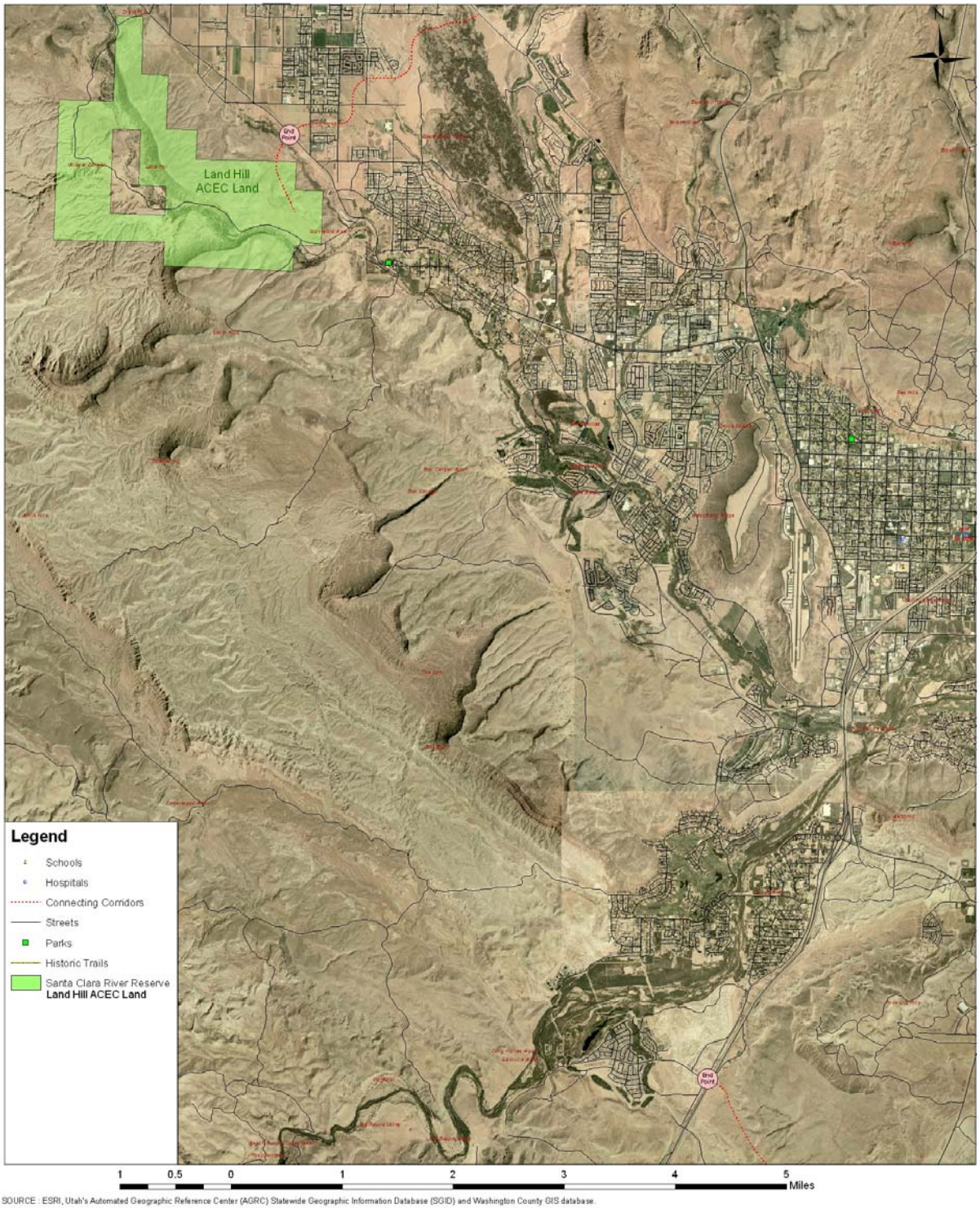
Elevation and Slope



SOURCE : Slope and contour lines were created using ESRI's Spatial Analysis from 10 meter National Elevation Dataset (NED) available from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID).

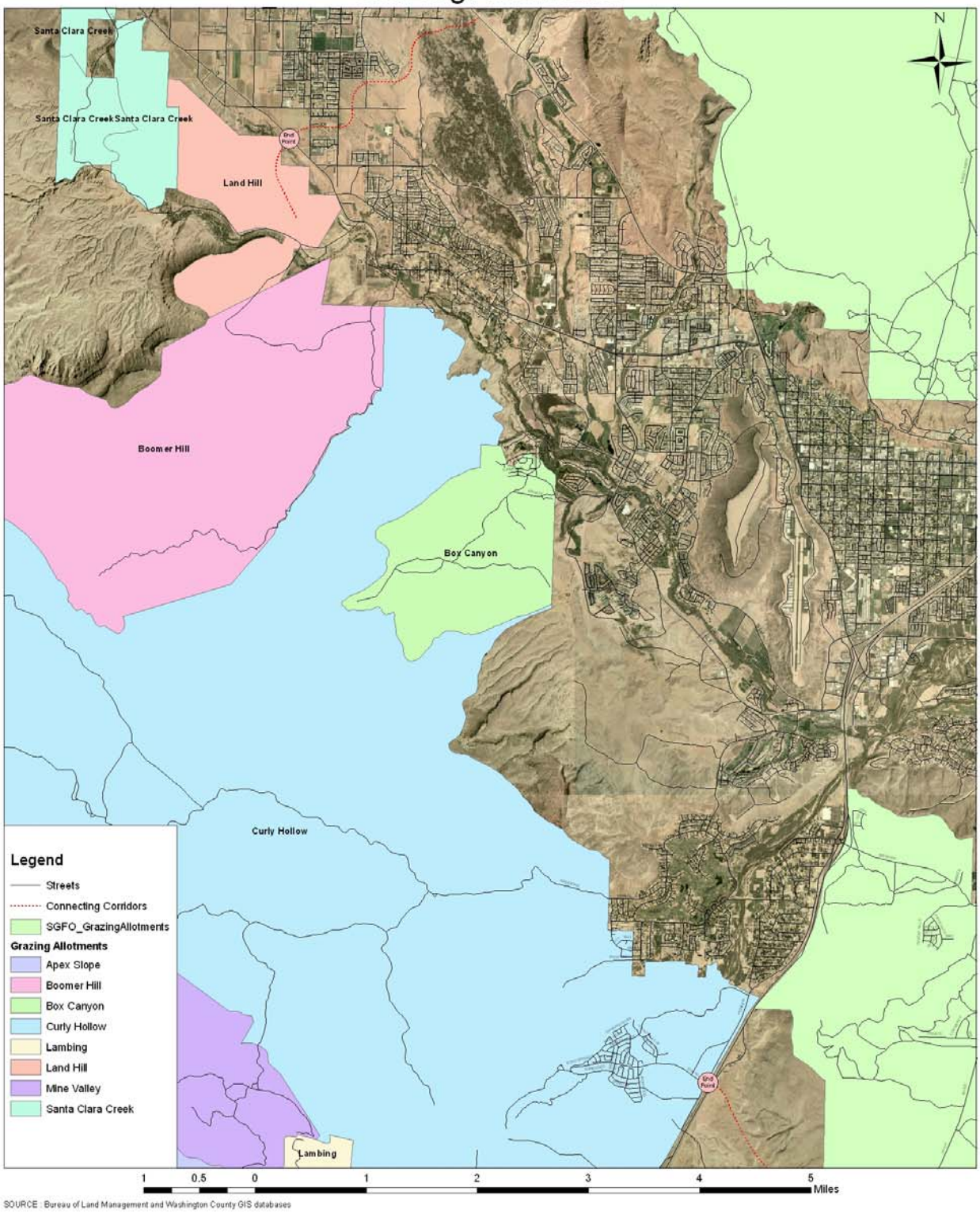
Dixie Western Corridor - South

Cultural Resources



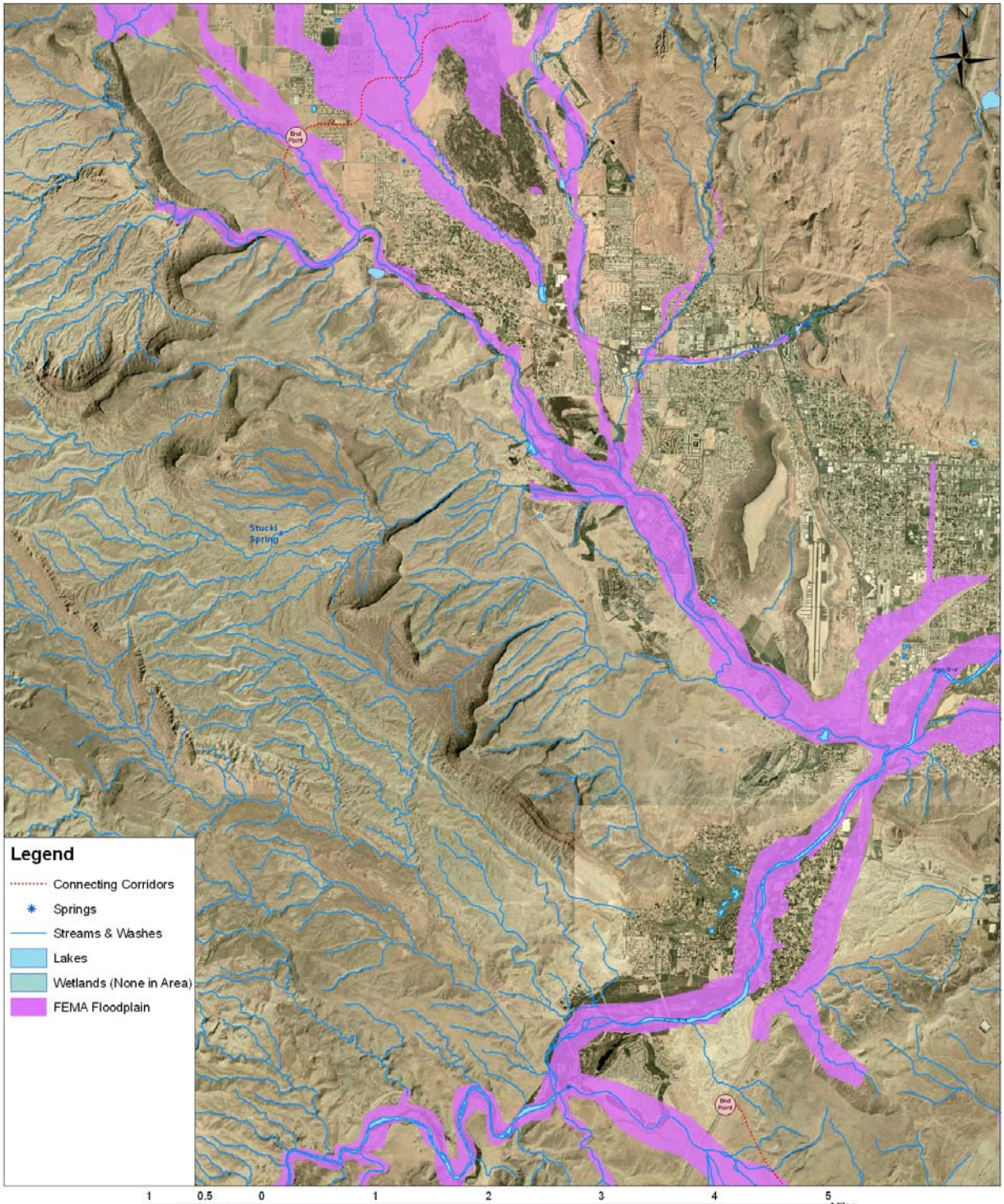
SOURCE : ESRI, Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID) and Washington County GIS database.

Dixie Western Corridor - South
Grazing Allotments



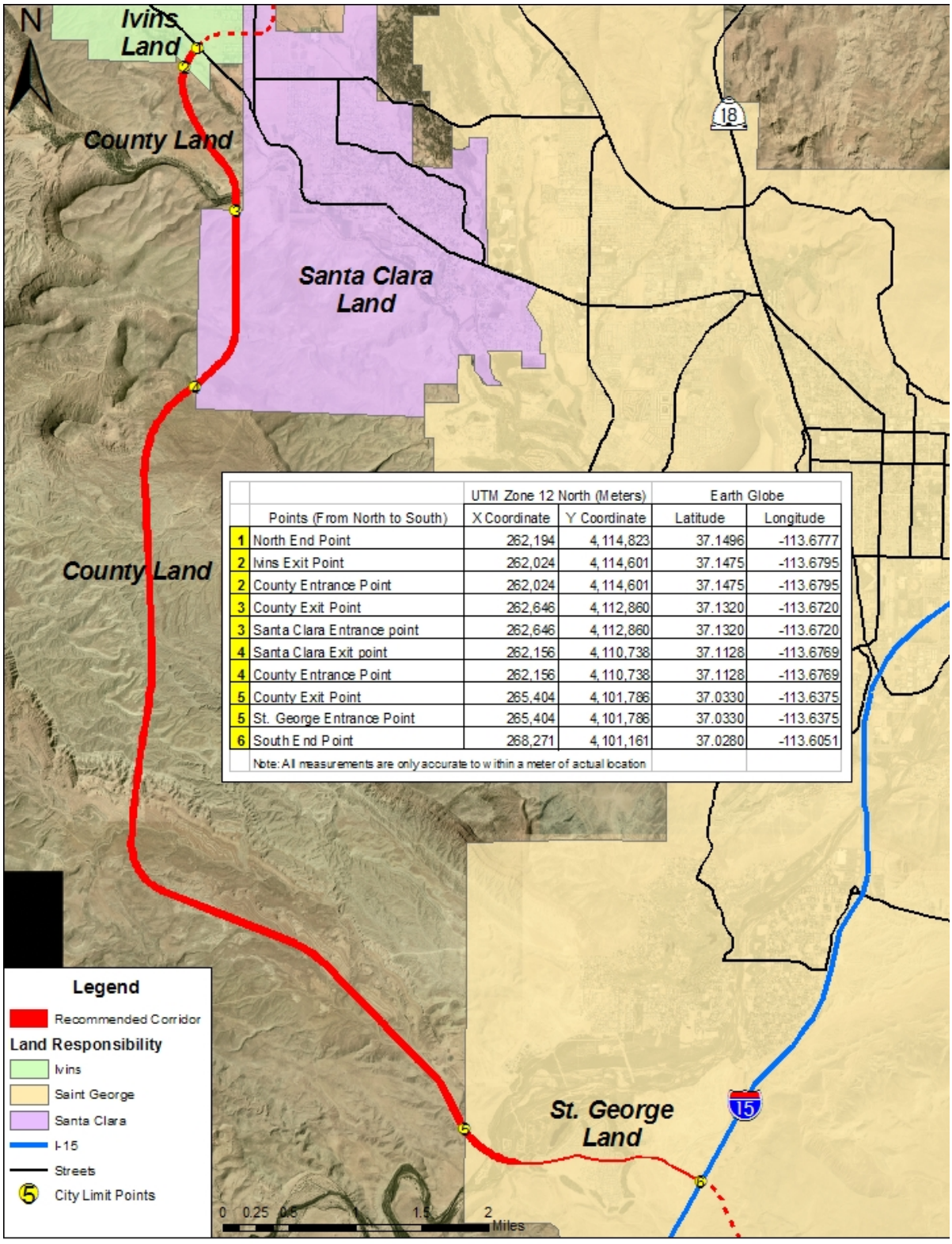
SOURCE : Bureau of Land Management and Washington County GIS databases

Dixie Western Corridor
Water and Hydrology



SOURCE: Hydrology data from Utah's Automated Geographic Reference Center (AGRC) Statewide Geographic Information Database (SGID) that was prepared from 1:100,000 scale topographical map series from the U. S. Geological Survey available at http://agrc.its.state.ut.us/. Floodplain data from Washington County Water Conservancy District

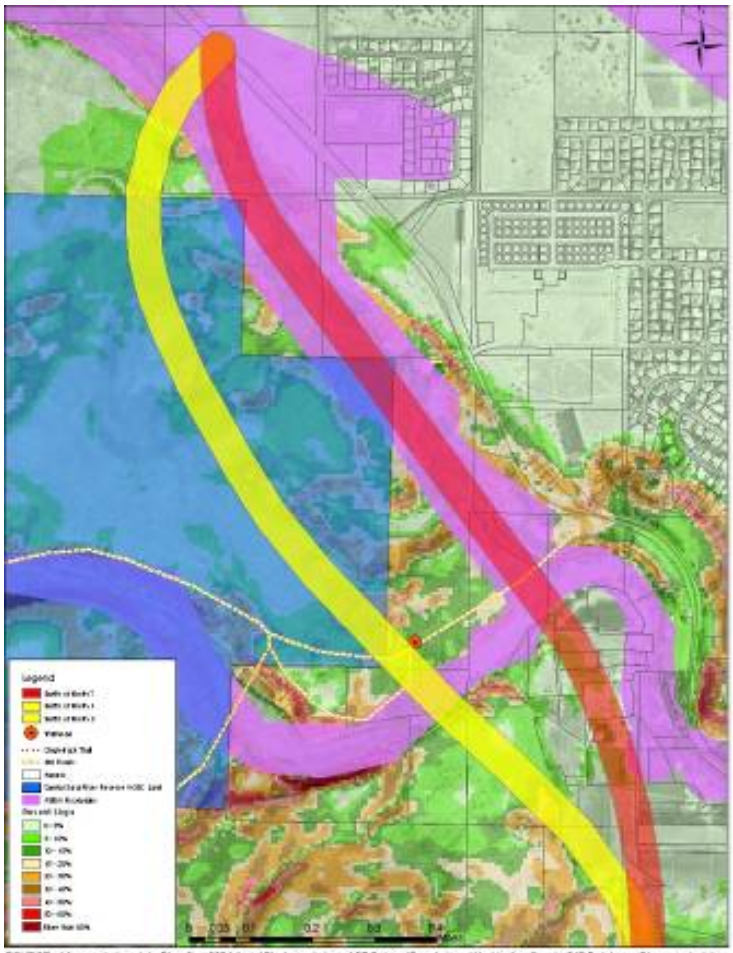
Entrance and Exit points of cities



		UTM Zone 12 North (Meters)		Earth Globe	
	Points (From North to South)	X Coordinate	Y Coordinate	Latitude	Longitude
1	North End Point	262,194	4,114,823	37.1496	-113.6777
2	Ivins Exit Point	262,024	4,114,601	37.1475	-113.6795
2	County Entrance Point	262,024	4,114,601	37.1475	-113.6795
3	County Exit Point	262,646	4,112,860	37.1320	-113.6720
3	Santa Clara Entrance point	262,646	4,112,860	37.1320	-113.6720
4	Santa Clara Exit point	262,156	4,110,738	37.1128	-113.6769
4	County Entrance Point	262,156	4,110,738	37.1128	-113.6769
5	County Exit Point	265,404	4,101,786	37.0330	-113.6375
5	St. George Entrance Point	265,404	4,101,786	37.0330	-113.6375
6	South End Point	268,271	4,101,161	37.0280	-113.6051
	Note: All measurements are only accurate to within a meter of actual location				

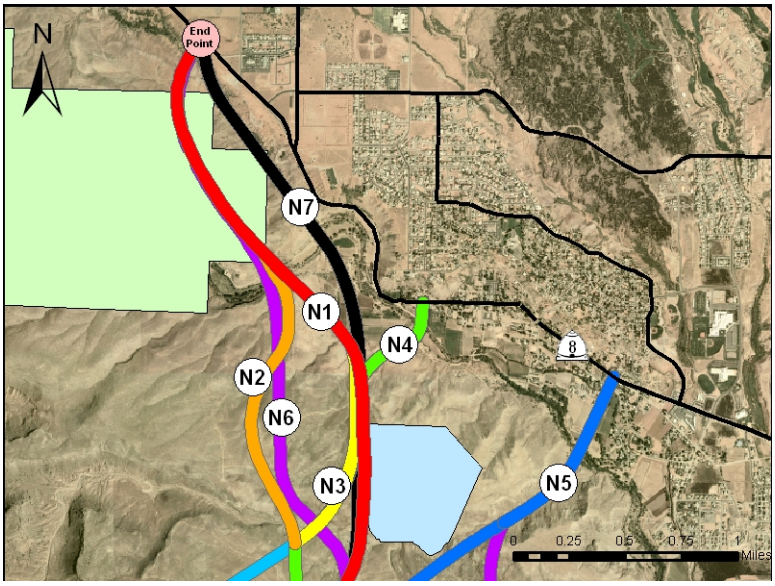
SOURCE : Land Resposibility data from Land ownership parcel data and Municipality data from Washington County GIS database, location coordinates from InterPlan Co. 2006

Sample Detail Map of Partial Segments 1 & 7 North



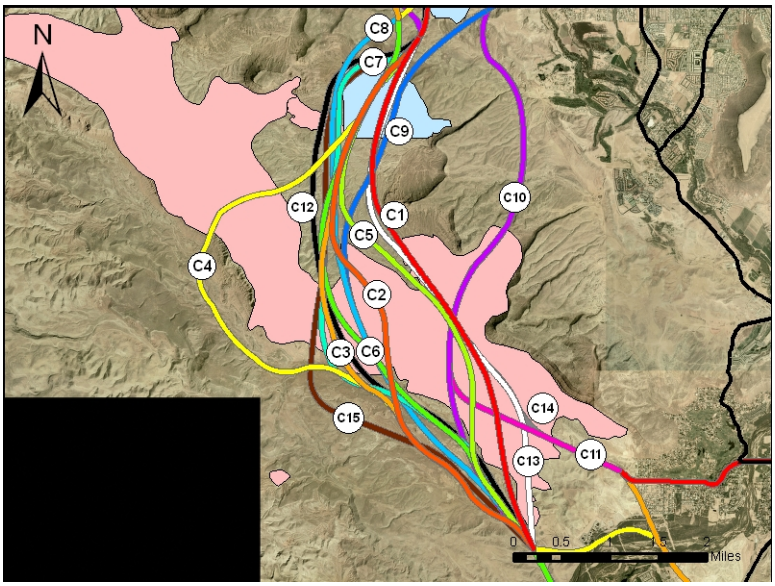
North Segment: Criteria Data Value for Purpose and Need Category

Corridor Option	Provide Recreation Opportunities	Provide Most Direct Route (Length)	Congestion Relief between Ivins/Santa Clara and St. George	Support Planned Growth
	(Number)	(Miles)	(Subjective)	(Subjective)
North 1	4	2.76	Helps	Connects to northern endpoint
North 2	4	2.52	Helps	Connects to northern endpoint
North 3	4	2.67	Helps	Connects to northern endpoint
North 4	3	1.31	Connects through local street	Does not connect to northern endpoint
North 5	1	0.84	Connects through local street	Does not connect to northern endpoint
North 6	4	2.68	Helps	Connects to northern endpoint
North 7	4	2.64	Helps	Connects to northern endpoint



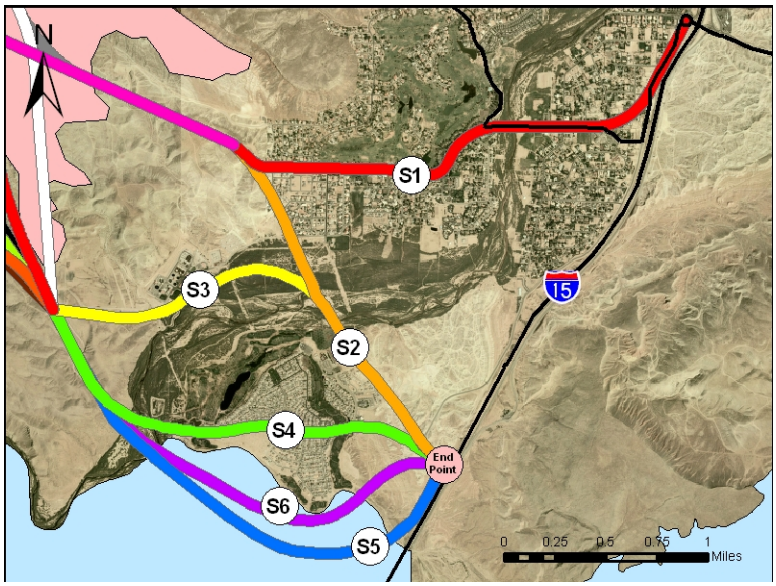
Central Segment: Criteria Data Value for Purpose and Need Category

Corridor Option	Provide Recreation Opportu-nites	Provide Most Direct Route (Length)	Congestion Relief between Ivins/Santa Clara and St. George	Support Planned Growth
	(Number)	(Miles)	(Subjective)	(Subjective)
Central 1	5	5.84	Helps	Yes
Central 2	7	6.39	Helps	Yes
Central 3	6	6.51	Helps	Yes
Central 4	9	8.33	Longer Route takes longer	Yes
Central 5	6	6.24	Helps	Yes
Central 6	6	6.46	Helps	Yes
Central 7	6	6.89	Helps	Yes
Central 8	6	6.44	Helps	Yes
Central 9	4	6.77	Different Starting point	Yes
Central 10	11	6.16	Different Starting point	Impacts private land
Central 11	10	6.17	Different Ending point	Impacts private land
Central 12	6	6.81	Helps	Yes
Central 13	5	5.95	Helps	Yes
Central 14	5	5.71	Helps	Yes
Central 15	7	7.05	Helps	Yes



South Segment: Criteria Data Value for Purpose and Need Category

Corridor Option	Provide Recreation Opportu-nites	Provide Most Direct Route (Length)	Congestion Relief between Ivins/Santa Clara and St. George	Support Planned Growth
	(Number)	(Miles)	(Subjective)	(Subjective)
South 1	2	2.58	Thru neighborhood	Does not connect to Southern Parkway Interchange
South 2	2	1.95	Helps	Connects to Southern Parkway Interchange
South 3	0	2.44	Helps	Connects to Southern Parkway Interchange
South 4	0	2.28	Thru SunRiver	Connects to Southern Parkway Interchange
South 5	0	2.68	Helps	Connects to Southern Parkway Interchange
South 6	0	2.46	Helps	Connects to Southern Parkway Interchange



Criteria Data Value for Environmental Impacts Category

Corridor Option	Flood Plain	Poppy	Milkvetch	View shed (Length)		Neighborhoods	Trails	Cultural / Archeological	Structures	Private Land Purchases	Springs	Grazing
	Ac	Ac	Ac	(Feet)		#	#	Ac	#	Ac	#	#
	North Segment											
North 1	8.5	0	2.4	0	1,440	0	0	4	30.7	0	28.9	0	2
North 2	8.7	0	0	0	2,279	1,217	0	4	30.8	0	15.8	0	2
North 3	8.5	0	0	0	2,363	1,073	0	4	30.7	0	28.7	0	2
North 4	0.6	0	0	0	1,961	1,109	1	3	0	0	11.7	0	1
North 5	3.9	0	0	0	242	164	1	0	0	6	6.4	0	1
North 6	8.7	0	0	0	2,433	1,749	0	4	31.2	0	15.9	0	3
North 7	8.8	0	0	0	1,549	425	0	4	2.4	0	39.3	0	2
	Central Segment											
Central 1	0	97.34	29.3	0	1,081	0	0	5	0	0	0.0	0	2
Central 2	0	45.00	33.4	0	1,053	0	0	6	0	0	0.0	1	2
Central 3	0	29.35	33.3	92	1,049	0	0	5	0	0	0.0	1	2
Central 4	0	34.63	34.1	0	1,038	272	0	7	0	0	0.0	1	2
Central 5	0	62.67	33.4	0	1,049	0	0	5	0	0	0.0	1	2
Central 6	0	39.20	31.4	58	1,102	138	0	4	0	0	0.0	1	2
Central 7	0	24.45	12.9	91	1,062	0	0	6	0	0	0.0	1	2
Central 8	0	41.60	3.5	0	1,235	0	0	6	0	0	0.0	0	2
Central 9	0	47.41	24.4	0	1,797	1,280	0	4	0	0	0.0	0	1
Central 10	0	75.19	0.0	0	4,290	4,078	0	11	0	1	27.9	0	2
Central 11	0	106.29	0.0	0	4,290	4,078	0	10	0	1	27.8	0	2
Central 12	0	36.44	5.1	28	1,329	0	0	6	0	0	0.0	0	2
Central 13	0	116.16	27.5	0	1,175	102	0	4	0	0	0.0	0	2
Central 14	0	88.02	27.6	0	1,214	102	0	4	0	0	0.0	0	2
Central 15	0	22.29	15.8	29	1,094	0	0	7	0	0	0.0	0	2
	South Segment											
South 1	38.8	0	0	0	0	0	3	0	0	133	53.1	0	1
South 2	10.6	0	0	0	0	0	1	0	0	29	38.3	0	1
South 3	14.2	0	0	0	585	0	0	0	0	7	31.5	0	1
South 4	21.7	0	0	0	2,277	0	1	0	0	77	24.5	1	1
South 5	26.9	0	49.6	0	2,136	0	0	0	0	0	21.9	0	1
South 6	34.5	0	41.3	0	2,547	0	0	0	0	0	39.9	1	1

Other Critical Species and Wetlands impact were defined as zero for all options.

Criteria Data Value for Cost and Constructability Category

Corridor Option	Minimize Total Cost	Minimize Number of Bridges/Structures	Minimize Steep Slopes (>15%)
	(Millions)	(Number)	(Number)
	North Segment		
North 1	$41.28	2	15
North 2	$40.27	2	24
North 3	$41.45	2	19
North 4	$21.29	1	9
North 5	$15.38	1	3
North 6	$40.83	2	23
North 7	$42.09	2	17
	Central Segment		
Central 1	$33.85	0	21
Central 2	$39.22	0	34
Central 3	$37.54	0	26
Central 4	$48.60	0	33
Central 5	$35.91	0	23
Central 6	$36.47	0	27
Central 7	$39.62	0	22
Central 8	$38.83	0	30
Central 9	$39.64	0	39
Central 10	$47.74	0	45
Central 11	$47.23	0	48
Central 12	$42.11	0	41
Central 13	$33.63	0	23
Central 14	$32.12	0	20
Central 15	$41.47	0	23
	South Segment		
South 1	$40.26	1	2
South 2	$26.21	1	6
South 3	$24.89	1	2
South 4	$30.63	1	3
South 5	$25.03	1	7
South 6	$25.71	1	6

Construction Cost Breakdown

New 300 Foot Right-of-way
New 166' Roadway Construction

Item	Cost	Unit	Quantity	Dollar cost per linear foot of roadway
Clearing and Grubbing	$1,036.00	Acres	=(166' x 1')/ 43,560	3.95
Excavation (Roadway)	$0.16	Ft^3	(166' x (3"+ 8"+ 6")/12 x 1') = 45.33 C. FT.	37.27
Subgrade Finishing	$0.09	Ft^2	(166' x 1') = 32 SQ. FT.	15.42
Untreated Base Course (10" thick)	$0.60	Ft^3	(94' x 10"/12 x 1') = 21.33 C. FT.	46.91
Bituminous Surface Course (8" thick)	$3.25	Ft^3	(94' x 8"/12 x 1') = 8 C. FT.	203.87
Pavement Marking Paint	$1.31	Ft	1 Lines x 1' = 1 L.F.	1.31
Fire Hydrant	$2,500.00	Each	1/500' = .002	5.00
Traffic Signal	$160,000.00	Each	1 per mile	30.30
Landscaping & Grading	$0.56	Ft^2	2- 9' x 1' = 18 SQ. FT.	10.03
			Subtotal 1	354.06
New and Reconstructed Lighting	calculated @ 1.5% of Subtotal 1			5.31
Signs (New)	calculated @ 1.5% of Subtotal 1			5.31
Drainage (Inc. Structures)	calculated @ 20% of Subtotal 1			70.81
Environmental & Design	calculated @ 15% of Subtotal 1			53.11
			Subtotal 2	488.61
Mobilization and Temp. Traffic Control	calculated @ 15% of Subtotal 2			73.29
Contingency	calculated @ 20% of Subtotal 2			97.72
			Subtotal 3	659.62
Contingency for Price Increases	calculated @ 25% of Subtotal 3			164.90
TOTAL COST PER LINEAR FOOT				**$824.52**
Total Cost Per Mile				**$4,400,000**

Source: InterPlan Co. cost assumptions

End of study