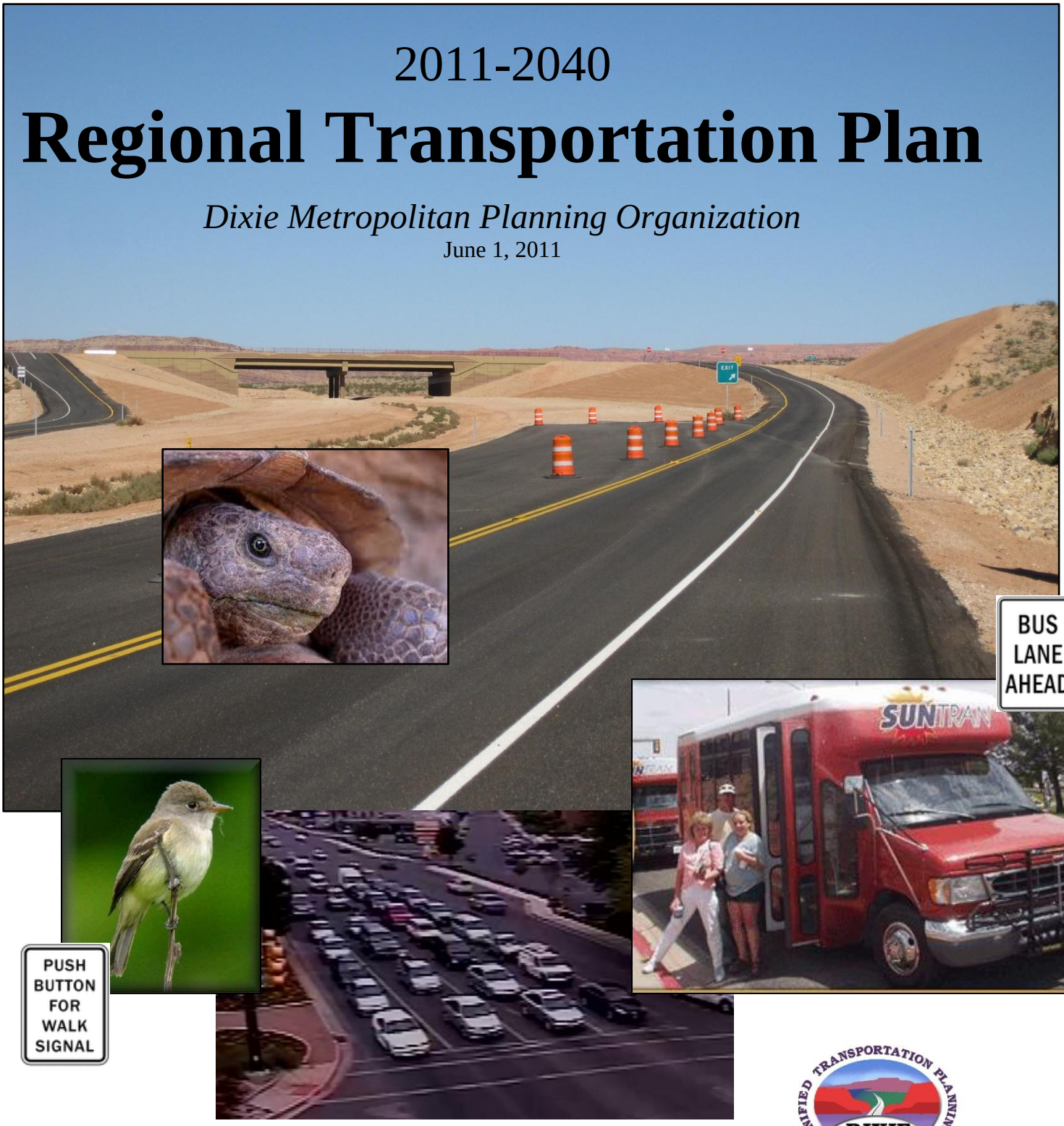
2011-2040

Regional Transportation Plan

Dixie Metropolitan Planning Organization

June 1, 2011



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Chapter 1 **– Executive Summary**

This Regional Transportation Plan is the culmination of efforts undertaken by Dixie Metropolitan Planning Organization (MPO) for the Census Bureaus' designated St. George Urbanized Area of Washington County, Utah. – covering areas of Ivins, Santa Clara, St. George, and Washington

The plan is updated every four years in coordination with the Utah Department of Transportation, three other MPOs in Utah, and the government entities of Washington County, Ivins, Santa Clara, St. George, and Washington City. Transportation planning in Washington County intends to follow local visioning goals in collaboration with other planning efforts such as Vision Dixie, the Utah Strategic Highway Safety Plan, Homeland Security plans, etc.

The cities of Hurricane, LaVerkin, and Toquerville anticipate an urban designation near 2022, and are therefore included in the planning boundary map on page 5.

This plan relies on principals defined in Vision Dixie, a visioning effort undertaken in 2006-08 to document the vision of Dixie's desired future development as defined by the public, elected officials, public service agencies, business interests, and other socioeconomic forces. From a transportation perspective, Vision Dixie calls for a variety of roads, transit, and pedestrian facilities, community connectivity and access to a greater variety of human services, businesses, and residential units.

Projected transportation demand in the St. George area was modeled using the best available computer programs and verifies the Vision Dixie call for a variety of future transportation facilities.

Limited amounts of federal, state, and local funds are available to accommodate these needs, and revenue streams will need to be incrementally increased and changed over time to generate sufficient resources and accommodate societal changes in fuel efficiencies and fuel type choices. The funding sources and future funding assumptions are explained in Chapter 5.

A summary of proposed transportation facilities, including a comprehensive list of road improvements over the next 30 years is noted and mapped out in Chapter 5. Exceptional evidence also points to the need for expanded regional transit systems throughout the Urbanized Area.

Special attention must be given to safety, congestion, corridor preservation, and pedestrian facilities over the next 30 years. And of utmost importance is affording appropriate environmental protections to the varied "threatened and endangered species" (plant and animal) present in southwestern Utah.

Chapter 2 **– Purpose and Need**

According to the 2010 U.S. Census, the Dixie MPO population is 104,414. According to the Utah Governor's Office of Planning and Budget (GOPB), the Dixie MPO population is expected to grow to over 170,000 by 2020; to over 250,000 by 2030; and to 400,000 by 2040.

This 2011-2040 Regional Long-Range Transportation Plan outlines how various jurisdictions within the MPO intend to meet the area's transportation demands and needs over the next 30 years. The area is also habitat to threatened and endangered plant and wildlife species and is governed by state and federal regulations.

The Dixie MPO, as defined by the U.S. Census Bureau, consists of the urbanized areas of Ivins, Santa Clara, St. George, and Washington cities and immediately adjacent sections of unincorporated Washington County in southwestern Utah. An adjacent Rural Planning Organization (RPO) services the transportation planning needs of Hurricane, La Verkin, Toquerville, and Leeds – in close coordination with the MPO. These RPO cities anticipate an urban designation within the 30-year window of this plan and are therefore included in the planning boundary map on the following page.

The Dixie MPO was designated by the Governor September 20, 2002, and is called the Dixie MPO. In compliance with federal guidelines the MPO develops and approves processes and procedures for conducting long range planning, identifying proposed transportation projects for consideration in the Transportation Improvement Program (TIP) and social, economic and environmental implications of the regional transportation system and the traffic growth being experienced and anticipated in the future.

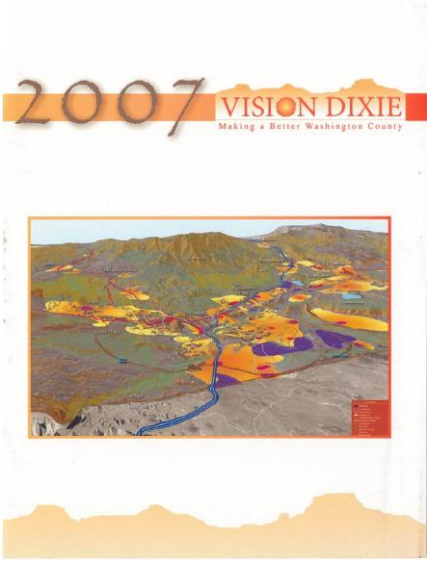
On August 10, 2005, the President of the United States signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) into law. The $286.4 billion law reauthorized federal surface transportation programs through 2009 – and persisted through 2011 through continuing resolutions. Reauthorization of a similar transportation bill is anticipated soon, but not in time for consideration in this plan.

SAFETEA-LU made a number of changes to the transportation planning process, including timetables for updates to transportation improvement programs and long-range transportation plans with a special focus on safety and security, and requirements for public participation. The law also includes important transit and environmental elements, created four transit programs and sets provisions for air quality and the protection of historic and natural resources.

Common to SAFETEA-LU and previous Acts, is the consideration in the planning process of broad based requirements or issues. SAFETEA-LU identifies the following eight:

1. Supporting the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.
2. Increasing the safety of the transportation system for motorized and non-motorized users.
3. Increasing the security of the transportation system for motorized and non-motorized users.
4. Increasing the accessibility and mobility options available to people and for freight.
5. Protecting and enhancing the environment, promoting energy conservation, and improving the quality of life.
6. Enhancing the integration and connectivity of the transportation system, across modes and between modes, for people and freight.
7. Promoting efficient system management and operation.
8. Emphasizing the preservation of the existing transportation system.

Chapter 3 **– Vision and Mission**



The mission of transportation planning in Washington County is to follow local visioning goals while collaborating with other planning efforts such as the statewide Strategic Highway Safety Plan as discussed in Chapter 7, and the Homeland Security plans noted in Chapter 8.

Through "Vision Dixie", over three thousand residents created a framework in which future development and transportation can work together to create communities, and a region that reserves Southern Utah's quality of life. The "Vision" looks forward to an affordable, sustainable, and livable future.

The public preferences are summarized in a series of Vision Dixie Principles and in a Vision scenario – a picture that illustrates one way growth might occur if cooperative efforts adopt the principles that were identified through the process. The Vision Dixie Principles provide a framework for voluntary implementation. Local officials have committed to work with residents to determine how these principles fit with local plans for the future.

The "Vision" process was kicked off on October 18, 2006 when nearly 400 residents joined the Washington County Commission in a county wide process of workshops, technical research and analysis.

Over 1,200 residents attended workshops in the fall of 2006 to voice their preferences for how the county should grow. This input coupled with technical guidance from local planners, led to the creation of four scenarios that were unveiled in May and June 2007 at nine "Dixie Dialogue" meetings. More than 500 residents attended these meetings to identify which ideas, contained in the scenarios, they favor. An additional 800 residents evaluated these scenarios on-line. Also in June 2007, an independent polling firm contacted 400 representative county residents to ask their opinions on growth issues and strategies.

Based on these citizen input initiatives, a steering committee made up of mayors from throughout the urbanizing area, established ten Vision Dixie Principles.

Principles 5-8 state:

> Principle 5 – Build balanced transportation that includes a system of public transportation, connected roads and meaningful opportunities to bike and walk.
> Principle 6 – Get "Centered" by focusing growth on walk-able, mixed-use centers.
> Principle 7 – Direct growth inward.
> Principle 8 – Provide a broad range of housing types to meet the needs of all income levels, family types, and stages of life.

Because of (unique) geography, roads in Dixie have to accommodate more traffic and are susceptible to congestion. Thus, while auto use will continue to be dominant, roads will not be able to meet all our mobility needs decades into the future. Public transportation is especially important to keep us from being overwhelmed by gridlock. Putting in place a transit backbone will help our downtowns, major centers, and Dixie College flourish, keep our air clean, and help reduce household expenses associated with day-to-day travel. (Vision Dixie 2035: Land-Use & Transportation Vision, p. 26)

A vibrant "center" includes multiple ingredients: a mix of uses, pedestrian-oriented buildings, focused density, connected streets, and context sensitive streets. (Vision Dixie 2035: Land-Use & Transportation Vision, p. 31)

Vision Dixie calls for corridor preservation for roads and transit, street connectivity, and the creation of community-friendly collector and arterial roads with the following long-term recommendations:

- Work together to identify and preserve transit corridors and potential station locations.
- Explore the creation of a transit district and a local option sales tax for transit.
- Adopt the road corridors of Utah Department of Transportation, DMPO, and Five County Association of Governments into general plan updates. Corridor preservation should address road needs, transit needs, utilities, bicycle facilities and trails. Formalize local government ordinances and negotiation procedures to preserve corridors as development happens.
- Revise street connectivity standards in updated subdivision ordinances.
- Coordinate local street plans in sub-area plans to assure optimum connectivity.
- Coordinate local street plans between jurisdictions.
- Amend local construction standards to comply with "complete streets" criteria (that include provision for pedestrians, bicycles and parking) consistent with street segments mapped in the general plan.

Vision Dixie principles 6-8 encourage "Walk-able, Mixed-Use Centers", "Directing Growth Inward," and "Enabling the Housing Market to Meet Housing Wants and Needs," with the following long-term recommendations:

1. Approximate areas for future mixed-use centers, remove zoning and subdivision barriers to mixed-use centers, and update community general plans to include these centers.
2. Include mapped priority land re-use areas in general plans to signify to developers and nearby land owners that development in those areas helps fulfill city-wide goals (of inward growth first).
3. Modify edge-of-town standards and annexation policies to encourage contiguous development and discourage leap-frog development through market-based mechanisms that charge leap-frog development consistent with its higher level of impacts (e.g., longer streets per home).
4. Amend the zoning map and ordinances to allow a greater range of (housing) densities.

These visions are supported by the 2011-2040 Regional Transportation Plan.

Chapter 4 **– Projected Transportation Demand**

Prior to the MPO designation, the City of St. George put in place a regional traffic model using the QRS II platform. In 2002, the MPO supported a contract to re-calibrate the model to Census 2000 data and subsequently in 2004 another MPO contract generated year 2015 and 2035 traffic projections based on updated population and employment data from the Governor's Office of Planning Budget. During 2005 and 2006, several corridor studies were undertaken using the model, including SR-9 in Hurricane where a new model was created.

Because of new land use information and population assumption changes identified, these corridor "models' influenced the need to expand the regional model and to re-calibrate. The model structure added the cities of Hurricane/LaVerkin Urban Cluster, Toquerville, Leeds Town, and the four cities in the Dixie MPO Planning Boundary, Ivins, Santa Clara, St. George and Washington along with Washington County areas adjacent to the cities/towns.

A change in model platform (software) was undertaken in 2010. This change came about as a result of discussions addressing the effectiveness of the expanded QRS II Dixie Model beginning as far back as 2007-2008. The QRS II model was migrated to the CUBE model in late 2010. The change also included all of Washington County to better predict traffic movements on a county-wide basis. A rigorous effort to update socio-economic data was completed as a part of the process with input from Washington County and each of the cities/towns in the County.

Model Structure

Travel demand models are computer-based mathematical models that use socioeconomic and roadway network data to forecast traffic under various scenarios. To forecast traffic the Dixie Travel Demand Model uses the traditional 4-step process. The four basic phases are:

1. Trip Generation – Trip generation determines how many trips are made in a region. To simplify the process, large geographical areas are broken up into smaller areas called traffic analysis zones (TAZ). Using information from sources like the Census Bureau and city land use plans, each TAZ is given certain attributes such as the number of households, employees, and average income levels. These attributes are then used to calculate the number of trip productions and attractions for each TAZ.

2. Trip Distribution –Trip distribution determines where the trips are going. Trip productions and attractions from different TAZ's are linked together using a gravity model to form origin-destination patterns. The gravity model states that the trip attraction between two zones is proportional to the size of the zones (number of households/employees) and the distance between them.

3. Mode Choice –What modal method of reaching a trip's destination is determined in step 3. Looking at factors such as cost, convenience and travel time it is determined if the trip will be made by walking, transit or vehicle.

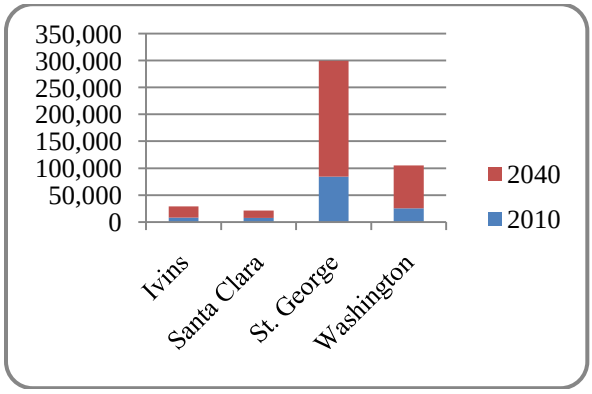
4. Trip Assignment – The route the trip will take to reach its destination is then determined. Link attributes contained in the highway network such as capacity and travel speed are used to determine the shortest travel path to a destination. The trips are then assigned to the roadway network.

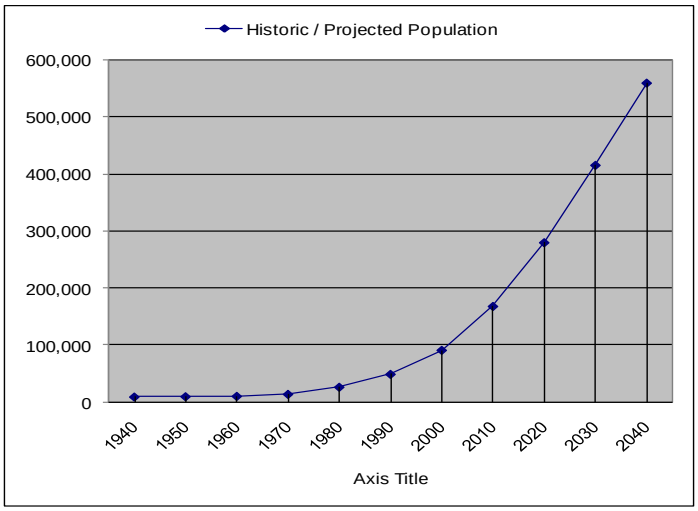
Each step of the process is calibrated to observed travel behavior. Base model forecasts are checked against observed traffic counts to ensure reasonable accuracy. Once the model is developed so that it replicates existing travel behavior, it is then used to evaluate future scenarios and alternatives.

Socio-Economic Characteristics

The characteristics of population distribution in the MPO area is vital to the development and degree of transportation infrastructure that should be planned for over the life of the plan. Information gained from work done over the last few years helps us to paint a picture of current and projected population growth. Table ** includes population figures for towns/cities within the planning boundaries of the DMPO. The unincorporated County-wide population is expected to increase from 7,673 to 60,438. The distribution of the current population and projected growth are illustrated on the population change map following. The mapping includes a 2010 population distribution as well as identifies projected areas of growth out to 2040 2010. Detailed information can be found in the appendix.

*Table ** - Population Growth*





Employment and Commuting

According to the Utah Department of Workforce Services there were approximately 4,316 employment establishments operating in Washington County in 2010 (see Appendix for table of major employers). It should be realized that companies come and go. In 2009, the number of employment centers in Washington County with more than 100 employees was 51. As is the case with many businesses, there are seasonal peaks in employment, such as the Christmas holiday season at retail establishments. The largest employer in the urbanized area is the Washington County School District. Their employees, however, and their work destinations, are spread throughout the urbanized area.

Chapter 5 **– Financial Plan**

Current Funding Sources, Gas Taxes, Fees

Currently in the Washington County area, federal, state, and local governments as well as private developers provide funds to pay for improvements.

Federal Funds:

The current federal highway and transit bill SAFETEA-LU (Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users) continues to fund federal transportation programs under continuing resolutions. And a new federal highway bill is anticipated within the next several months.

State Funds:

The Utah Department of Transportation receives state highway user revenues as well as state general funds for highway construction and maintenance projects. The highway user revenues sources include motor fuel taxes, special fuel taxes, vehicle registration fees, driver license fees, and other fees. General funds include sales taxes and other taxes. In addition, the state has the authority to issue bonds for specific highway projects.

A portion of the state highway user funds are made available to local governments for highway construction. Seventy-five percent of these funds are kept by the UDOT for their construction and maintenance program. The remaining 25 percent are made available to the cities and counties in the state through the Class B and C Program.

Class B and C funds are allocated to each city and county by a formula based on population and road mileage. These funds can be used for either maintenance or construction of highways, although at least 30 percent of the funds must be used for construction projects or for maintenance projects that cost over $40,000.

Safe Sidewalks Program has also been established by the legislature to fund the construction of sidewalks on roads on the state system. The money is distributed through a formula based partially on miles of state road in each UDOT Region. Each city and county located in the region submits projects to the UDOT Region office, which then prioritizes them. A statewide committee then makes the final project selection.

Local Funds:

Local government agencies have a variety of funding sources available to them for transportation improvements. The primary source is from the general fund of the cities and counties. These general funds can be used for construction of new roads or the upgrading or maintenance of existing ones. Transportation projects, however, must compete with the other needs of the city or county for the use of these funds.

Local governments have several other options for improving their transportation systems. Most of these options involve some kind of bonding arrangement, either through the creation of a redevelopment district, a more traditional special improvement district organized for a specific project benefiting an identifiable group of properties, or through general obligation bonding arrangements for projects felt to be beneficial to the entire entity issuing the bonds.

The Local Corridor Preservation Fund allows the Washington County AOG to collect vehicle registration fees of $10 per vehicle for transportation corridor preservation. The Utah Department of Transportation has responsibility for seeing that the major requirements of the legislation are met, such as compliance with federal property acquisition procedures, and a locally adopted access management plan, or ordinance.

Private Sources

Private interests often provide sources of funding for transportation improvements. Developers construct the local streets within subdivisions and often dedicate right-of-way for and participate in the construction of collector and arterial streets adjacent to their developments. Developers should also be considered as a possible source of funds for projects needed because of the impacts of the development, such as the need for traffic signals or arterial street widening.

Private sources also need to be considered for transit improvements which will provide benefits to them. For example, businesses or developers may be willing to support either capital expenses or operating costs for transit services which provide them with special benefits, such as a reduced need for parking or increased accessibility to their development.

Following is a brief list of programs used to fund transportation projects within the Dixie MPO:

FEDERAL HIGHWAY ADMINISTRATION

- Surface Transportation Program (STP)
    - Dixie MPO cities
- Congestion Mitigation / Air Quality (CMAQ) (Available only after DMPO reaches non-attainment status)
- Interstate Maintenance (IM)
- National Highway System (NHS)
- Surface Transportation Program
- Urbanized Area
- Small Urban
- Flexible (Any-Area)
- Transportation Enhancements
- Highway Safety Improvement Program (HSIP)
- Hazard Elimination
- Railroad Crossings
- Safe Routes to School (SR2S)
- Bridge Replacement
- Off System - Local
- Off System - Optional
- Federal Lands Programs
- High Priority Projects (HPP)
- Transportation Improvement Projects (TI)
- Recreational Trails

FEDERAL TRANSIT ADMINISTRATION

- **(**5307) Block Grant Funds
- (5309) Discretionary Funds
- (5310) Services for elderly and disabled
- (5311) Grants for Outside Urban Area
- (5340) High Density States Program
- (5316) Job Access and Reverse Commute
- (5317) New Freedom Program

STATE OF UTAH

- State Construction
- State General Funds
- State Traffic
- Corridor Preservation Funds

LOCAL

- County (B Funds)
- City (C Funds)
- General Funds
- Transit Sales Tax
- Corridor Preservation Fund

PRIVATE

- Donations / User Fee
- Developer Funded Projects
- Public/Private Partnerships

Unified Plan Process

To fiscally constrain the long range transportation plan, Dixie MPO joined with the Utah Department of Transportation, Utah Transit Authority and Utah's other MPOs to make common financial assumptions. This effort was accomplished by the Unified Plan Financial Working Group. It included developing assumptions for projected revenues, inflation rates, estimated construction costs, and right-of-way costs. The Dixie MPO Executive Committee also examined local funding options and passed a series of additional future funding assumptions associated with transportation. Below is a discussion of these assumptions, an outline of current funding sources, and a policy document supporting acquisition of future federal funding.

State (Future) Funding Assumptions

The Unified Plan Financial Working Group agreed on the following *state wide* revenue assumptions for the future:

- 100% Auto Related Sales Tax- 16.6% total by FY 2017
- 75% Auto Related Sales Tax- 12.5% total by FY 2015
- $0.05 SW Fuel Tax or Equivalent, every 10 yrs starting in FY 2014 (30% to B & C Fund)
- State Wide Vehicle Registration Fee- $10 increase in FY 2018

Local (Future) Funding Assumptions

The Dixie MPO Executive Committee agreed on the following *local* revenue assumptions:

- ¼ Cent Local Option Sales Tax by 2014
- New $0.05 Local Option Fuel Tax or equivalent every 7 years starting in 2016*
- New $5 Local Option Vehicle Registration Fee every 10 years starting in 2018*

**NOTE: Local revenue enhancements after 2020 require further analysis and comparison to needs list.*

Fiscal constraints through 30-year planning phases

These "future funding" assumptions, taken together with existing funding sources were calculated and documented in a "Regional Transportation Plan Financial Report" as agreed upon through the Unified Plan Financial Working Group and endorsed by the Dixie MPO Transportation Executive Council.

The group projected a 4 percent annual inflation rate (a conservatively high estimate based on past experience) on all cost projections. A conservatively low 1.96 percent inflation rate was projected on revenue sources. Utah's shifting population was also figured into these assumptions based on projections by the Governors' Office of Planning and Budget. Currently the Dixie MPO is home to 6.67 percent of the state's population. GOPB projects the Dixie MPO population will reach 8.6 percent of state population by 2021 and 10.2 percent in 2030.

Federal formula funds, which represent only a small portion of an MPOs annual budget, assist MPO planning, environmental assessments and construction seed money for projects that move from the Plan to the Transportation Improvement Program. These federal dollars come from FHWA's Surface Transportation Program and FTA's Transit Programs with an approved 2% inflation rate.

Projected Transportation Revenues

The following table shows the total revenues assumed for projects in each of the three phases of the long range plan. Total expenditures are detailed in the "Project & Phasing List" in Chapter 6.

Total Funding Assumptions	
Phase 1 (2011-2020)	$467,195,792
Phase 2 (2021-2030)	$1,180,778,353
Phase 3 (2031-2040)	$2,376,650,476
Total Assumptions	$4,024,624,621

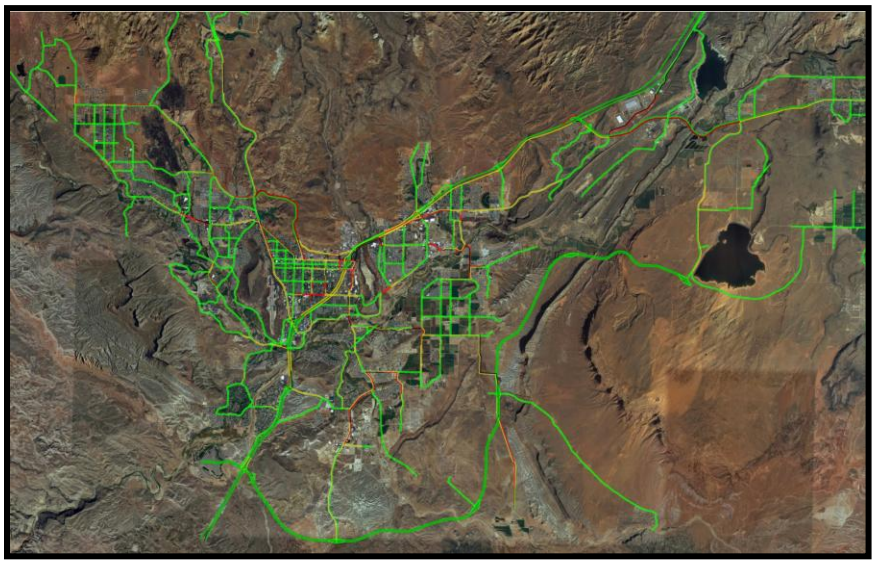
When compared with the needs list and anticipated costs in Chapter 6, these funding assumptions seem adequate in Phase 1 of the RTP. However, a re-evaluation of revenue needs may be appropriate in Phases II and III – beyond year 2020.

Chapter 6 **– Existing and Proposed Transportation Facilities**

Methodology

As discussed in Chapter 4, the Dixie MPO's new computer-based transportation modeling tool was used to analyze future traffic demand. The CUBE Model applied mathematical forecasting formulas to population, land use, socio-economic, trip generation, trip distribution, and mode choice data.

These forecasts were then imposed on the existing transportation networks. Then projects were conceptualized to relieve traffic congestion "hotspots" in each ten-year phase of the 30-year plan. Phase One includes the years 2011-2020. The associated project list was created to relieve the traffic demands of 2020. Phase Two includes 2021-2030 with a similar project list to relieve congestion under 2030 forecasts, and Phase Three includes the projects needed in 2031-2040.



Current Network

An inventory of the current MPO road network is best noted through use of the following map. The roads noted in red and black indicate areas of concern or traffic congestion in 2020 if no additional projects are built.

Projects and Phasing

The next several pages list a variety of transportation projects identified using the methodology outlined in chapters 3, 4 and above. Projects range from highway widening to bridge and overpass construction, as well as proposed new corridors. Additionally listed are UDOT and Eastern Washington County Rural Planning Organization projects of interest that may lie outside the MPO boundaries, but are vital connections in serving the overall traffic demand.

Project phasing maps also follow:

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Projects & Phasing

2011- 2040

Route	Length	Project Description	Project Concept	Estimated Cost + 4% annual inflation
Phase One (2011-2020)				
SR-8	1.5	Sunset Blvd (SG), widen to 6 lanes	Minor Widen/Reconstru	$110,000
	0.5	Brigham Road Interchange (MP4) Phase II (SG)	Minor Reconstruction	$128,000
		Northern Washington Parkway (SG) corridor study from MP 13 to SR-18	Study	$200,000
	1.3	Center Street (I) Streetscape Improvements	New Construction	$577,000
	0.2	4200 South (W) from 20 East to West Airport Road	New Construction	$1,241,000
	0.3	Airport Road (SG) from old airport to Blackridge Drive	New Construction	$1,551,250
	0.3	1000 East (SG) from Red Hills Parkway to Industrial Road	Widen/Reconstruct	$1,861,500
	0.2	1575 North Bridge (SG) over Sand Hollow Wash	New Construction	$2,171,750
	1.5	200 East (I), Old Highway 91 to Center Street	Reconstruction	$2,300,000
	0.5	400 South Trail & Underpass (SG), DSC 700 East to DSC Health Science Building	New Construction	$2,500,000
	0.4	Center Street (I) and Snow Canyon Drive intersection improvements	Reconstruction	$2,928,760
	0.6	840 South (W) from 859 North (SG) to 300 East	New Construction	$3,723,000
	0.8	1450 South (SG), widen and improve to 5-lane section	Widen/Reconstruct	$5,491,425
	1.6	Washington Dam Road (W), 1900 East to So. Parkway Interchange	New Construction	$5,700,000
	1.0	Santa Clara Drive (SC), Swiss Village to 200 E (I)	Reconstruction	$7,321,900
	1.0	Traffic Control Center (SG) ITS	New Construction	$7,446,000
		Buena Vista/Red Hills Pkwy (W), Realign Buena Vista near Green Springs interchange	Realignment/Reconstru	$7,630,000
	1.3	River Road (SG), widen to 5-lane section from Painted Desert to Brigham Road	Widen/Reconstruct	$9,152,375
	0.2	Red Hills Parkway & Red Cliffs Drive connection (SG)	New Construction	$14,197,040
	2.0	Dixie Drive (SG), new bridge to Mathis Bridge	Widen/Reconstruct	$14,643,800
	2.0	3000 East (SG) from 900 South to 2450 South	Widen/Reconstruct	$14,790,238
	9.0	Washington Fields Road (W), 3650 South to Airport Access	New Construction	$17,600,000
SR-18	2.0	SR-18 (SG), St. George Blvd. to Red Hills Parkway Intersection	Widen/Reconstruct	$17,870,400
	2.0	Washington Fields Road (W), Lost Ridge Dr. to 3650 South	Widen/Reconstruct	$17,870,400
	2.5	Riverside Drive (SG), Convention Center Drive to 3050 East	Widen/Reconstruct	$18,304,750
I-15	1.0	I-15 (SG), Interchange reconstruction at MP 8	Reconstruction	$18,615,000
SR-18	1.0	SR-18 (SG), grade separated interchange w/Red Hills Parkway	New Interchange	$18,615,000
	1.0	Mall Drive (SG), bridge & legs	New Construction	$23,423,875
SR-18	1.0	SR-18 (SG), Southbound Flyover at Sunset Blvd.	New Construction	$24,820,000
SR-9	2.0	So. Parkway Segment VI (H), I-15 to Telegraph	2 Interchanges @	$37,230,000
SR-7	4.0	So. Parkway Segment IIIb, Warner Valley Road to Washington Dam Road (1st Barrel)	New Construction	$48,647,200
I-15	13.0	I-15 Corridor (W), MP 0 to MP 13	Widen/Reconstruct	$58,078,800
	8.0	Northern Washington Parkway Corridor (SG), Red Hills Parkway to MP 13	New Construction	$97,294,400
Phase One (2011 to 2020)			**Total Funding Neec**	**$504,034,863**
			Funding Assumptions	**$467,195,792**
			Remainder / **(Overage)**	**($36,839,071)**

Route	Length	Project Description	Project Concept	Estimated Cost + 4% inflation
Phase Two (2021-2030)				
I-15	3.0	I-15 Corridor (W), MP 13 to MP 16	Widen/Reconstruct	$135,075,000
SR-7	1.0	So. Parkway Segment II (SG), Interchange 6 to Airport Access (2nd barrel)	New Construction	$17,649,800
SR-7	4.0	So. Parkway Segment IIIa (SG & W), Airport to Warner Valley Road (2nd Barrel)	New Construction	$70,599,200
SR-7	4.0	So. Parkway Segment IIIb, Warner Valley Rd. to Washington Dam Rd. (2nd Barrel)	New Construction	$70,599,200
	3.0	Western Corridor North (I), Old Highway 91 to Snow Canyon Parkway	New Construction	$52,949,400
	0.5	Red Hills Parkway (SG), Green Springs to St George City limits	Widen/Reconstruct	$6,483,600
3184	3.0	Old Highway 91 (I), 200 E to Shiwits Reservation	Reconstruction	$38,901,600
	2.0	1450 South (SG), River Road to 3000 East	Widen/Reconstruct	$25,934,404
SR-18	6.0	SR-18 (SG), Red Hills Parkway to Winchester Hills	Widen/Reconstruct	$105,898,800
I-15	1.0	I-15 (SG), Brigham Road eastbound flyover, MP 4 Interchange	New Construction	$63,035,000
	1.0	400 East (SG) under/overpass at approx 1000 South & I-15	New Construction	$18,010,000
	1.6	2000 South (W) from Washington Fields Road to Western City Limits	Widen/Reconstruct	$14,227,900
	2.3	Indian Hills Drive (SG) widen to 3 lanes	Widen/Reconstruct	$20,351,300
	2.3	3650 South (W) from Western City Limit to Southern Corridor	New Construction	$24,439,570
	1.1	Washington Fields Road (W) from Warner Valley Road to the Southern Corridor & Airport	New Construction	$14,263,920
	0.7	Extend Main Street (W) to 100 East, south of 400 South	New Construction	$6,483,600
	0.6	Main Street (W) from I-15 Frontage Road to Northern Belt Route	New Construction	$6,269,281
	1.1	West Airport Road (W) from Western City Limit to Washington Fields Road	New Construction	$14,134,248
	0.9	Airport Drive Loop (W) from Washington Fields Road to Southern Corridor	New Construction	$9,244,533
	0.5	1450 South (SG) Extension	New Construction	$23,322,950
	2.2	2450 South (SG) - extend &	New Construction	$23,802,016
	0.5	Temple Trail Drive (SG)	New Construction	$4,862,700
	2.7	Hidden Valley Drive	New Construction	$35,011,440
	2.7	Price City Hills Road Phase	New Construction	$35,011,440
	1.7	Horseman Park Road (SG)-	Widen/Reconstruct	$22,173,912
	2.2	1630 East (SG) - construct	New Construction	$28,268,496
	0.6	Commerce Drive (SG) -	New Construction	$7,520,976
	8.0	White Dome Frontage Road	New Construction	$103,737,600
	0.2	1800 North Bridge (SG) over Sand Hollow Wash	New Construction	$3,782,100
SR-18	2.0	SR-18 (SG), St. George Blvd. to Main Street	Widen/Reconstruct	$30,256,800
	1.1	Temple Trail Drive, Phase I (SG) from Airport Road to Indian Hills Drive	New Construction	$9,455,250
	3.0	Plantations Drive (SG), construct from Sunbrook Drive to Dixie Drive	New Construction	$31,877,700
	1.8	Little Valley Road (SG), extend road to Price City Hills Road and widen	New Construction	$16,299,050

Phase Two (2021-2030)				
			Funding Needs:	**$1,089,932,786**
			Funding Assumptions	**$1,180,778,353**
			Remainder	**$90,845,567**

Route	Length	Project Description	Project Concept	Estimated Cost + 4% inflation
Phase Three (2031-2040)				
SR-9	7.5	So. Parkway Segment VI (H), Telegraph to I-15	Widen/Reconstruct	$170,814,000
I-15	1.0	So. Parkway (SG) eastbound flyover at MP 2	New Construction	$116,200,000
	10.0	Western Corridor (SG), MP 2 to Old Highway 91 (1st Barrel)	New Construction	$227,752,000
	10.0	Western Corridor (SG), MP 2 to Old Highway 91 (2nd Barrel)	Widen/Reconstruct	$227,752,000
	1.5	Pioneer Parkway (SC), Lava Flow Drive to Red Mountain Drive	Widen/Reconstruct	$25,099,200
SR-18	4.0	SR-18 (SG), Red Hills Parkway to 4 miles North	Widen/Reconstruct	$91,100,800
	19.0	Bus Rapid Transit Corridor (SG to H)	New Construction	$176,624,000
	1.1	Kwavasa Drive (I) in Kayenta	New Construction	$14,534,296
	1.7	Warner Valley Road (W) from Washington Fields Road to the road through Warner Valley	New Construction	$23,309,720
	2.9	Long Valley Road (W)	New Construction	$33,465,600
	4.3	Roadway through Warner Valley from Warner Valley Road to Southern Corridor (W)	New Construction	$71,616,384
	5.5	Fairgrounds Road / Eastern Virgin River Crossing (W)	New Construction	$74,728,220
	1.0	Sandia Farms Road (W) from Western City Limit to West Airport Road	New Construction	$11,620,000
	1.4	Washington Parkway Extension (W) from Telegraph Road to Washington Dam Road	New Construction	$74,368,000
	1.5	Plantation Drive (SG) - Sunbrook to Western Corridor	New Construction	$25,433,856
	2.6	Green Valley Drive (SG) - extend road to Western Corridor	New Construction	$43,505,280
	1.9	Navajo Drive (SG) - extend road to Western Corridor	New Construction	$21,961,800
	0.6	Bloomington Hills/Riverside Drive Connection (SG) - new road from Bloomington Hills to Riverside	New Construction	$30,212,000
	1.2	Red Hills Parkway (SG) - Increase capacity between SR-18 and Northern Corridor	Widen/Reconstruct	$23,425,920
	1.6	Brigham Rd (SG) - Increase capacity from River Rd to I-15	Widen/Reconstruct	$31,234,560
	17.5	River Rd/Red Cliffs/Telegraph (SG,W) - Increase capacity from SR-9 to So Pkwy	Widen/Reconstruct	$341,628,000
SR-7	4.0	So. Parkway Segment IIIb - Increase capacity between Warner Valley Rd. to Washington Dam Rd.	Widen/Reconstruct	$91,100,800
	1.1	Washington Pkwy (W) - Increase capacity between I-15 to Telegraph.	Widen/Reconstruct	$21,473,760
	2.0	Washington Fields Rd (W) - Increase capacity between West Airport Rd to 3650 S	Widen/Reconstruct	$39,043,200

Phase Three (2031-2040)	**Funding Needs:**	**$2,008,003,396**
	Funding Assumptions:	**$2,376,650,476**
	Remainder	**$368,647,080**

Route	Length	Project Description	Project Concept	Estimated Cost + 4% inflation
Funded				
SR-7	3.5	So. Parkway Segment IVa (H), Washington Dam Road to 4300 West (1st Barrel)	New Construction	$28,406,490
SR-7	4.0	So. Parkway Segment IIIa (SG & W), Airport Access to Warner Valley Road (1st barrel)	New Construction	$62,818,880
SR-7	4.0	So. Parkway Segment II (SG), River Road to Airport Access (1st barrel)	New Construction	$62,818,880
	2.0	Buena Vista (W), Main Street to MP 13 (I-15)	Widen/Reconstruct	$13,626,180
SR-212	1.0	Telegraph Road (W), 500 West to 300 East	Widen rd & bridge	$6,813,000
	0.5	300 East (W), Telegraph to Virgin River bridge	Reconstruction	$3,406,000
	2.0	Airport Terminal Road (SG), Airport to So. Parkway	New Construction	$13,626,000
SR-7	4.0	So. Parkway (SG), River Road to Airport Interchange	New Construction	$27,252,360
I-15	1.0	I-15 (SG), Dixie Drive Split Interchange	New Construction	$45,000,000
I-15	1.0	I-15 (SG), Dixie Drive Split Interchange-C&D roads & Dixie Drive ext.	New Construction	$30,000,000
	2.0	Brigham Road (SG), River Road to MP 4	Widen/Reconstruct	$13,500,000
	1.5	Snow Canyon Parkway (SG), Tuweap to SR-18	Widen/Reconstruct	$15,000,000
	4.0	Red Hills Parkway (SG), SR-18 to Industrial Road	Widen/Reconstruct	$39,500,000
			Total Funded	**$361,767,790**

Total All Phases	
Total Assumptions	**$4,024,624,621**
Total Needs	**$3,601,971,045**
Total Difference	**$422,653,576**

UDOT / RPO Projects of Interest

Route	Length	Project Description	Project Concept	Estimated Cost + 4% inflation
Phase One (2011-2020)				
SR-18	10.6	SR-18 MP 9.5 to 20.1, from Winchester Dr. to Veyo	Widening/Safety	$32,000,000
SR-9	6.5	SR-9 MP 0.0 to 6.5, from I-15 to Southern Parkway	Corridor Improvements	$21,000,000
SR-9	NA	SR-9 at MP 1.1, Telegraph (5300 West)	New Interchange	$10,000,000
SR-9	NA	SR-9 at MP 4.9, 3700/3400 West	New Interchange	$10,000,000
	4.5	Purgatory Road (H and W) Washington Dam Road to SR-9	New Construction	$32,948,550
Phase Two (2021-2030)				
SR-9	3.5	So. Parkway Segment VI (H), 5300 West to Intersection with So. Parkway	3.5 New Interchanges	$157,587,500
SR-7	3.5	So. Parkway Segment V (H), SR-9 to 3000 South (1st Barrel)	New Construction	$61,774,306
SR-17	6.1	SR-17 MP 0.0 to MP 6.1, from La Verkin to I-15	Widening	$36,000,000
SR-18	10.6	SR-18 MP 9.5 to MP 20.1, from Winchester Dr to Veyo	Widening/safety	$30,000,000
SR-9	6.5	SR-9 MP 0.0 to 6.5, from I-15 to Southern Corridor	Corridor Improvements	$60,000,000
SR-9		So. Parkway Segment VI (H), Telegraph to 5300 West	New Interchange	$30,000,000
SR-9		SR-9 at MP 4.9 3700/3400 West	New Interchange	$30,000,000
Phase Three (2031-2040)				
SR-7	3.5	So. Parkway Segment IVa (W & H), Washington Dam Rd. to 4300 West (2nd Barrel)	New Construction	$79,713,200
SR-7	4.0	So. Parkway Segment IVb (H), 4300 West to 3000 South (1st Barrel)	New Construction	$91,100,800
SR-9	7.5	So. Parkway Segment VI (H), 2800 West to Telegraph	Widen/Reconstruct	$170,814,000
SR-7	3.5	So. Parkway Segment V (H), SR-9 to 3000 South (2nd Barrel)	New Construction	$79,713,200
SR-7	4.0	So. Parkway Segment IVb (H), 4300 West to 3000 South (2nd Barrel)	New Construction	$91,100,800
SR-59	1.1	from MP 20.9 to 22.10, from Big Plain Junction to SR-9	Widening	$4,000,000
SR-9	22.7	MP 9.9 to MP 32.6, from Hurricane to Zion National Park	Widening/bike	$136,000,000
I-15	11.4	MP 15.9 to MP 27.3, from Hurricane (exit 16) to Toquerville (exit 27)	Widening	$100,000,000
SR-7	24.0	Southern Corridor, Hurricane	New Construction	$275,000,000
I-15	NA	at MP 23.7 (Leeds)	Interchange upgrade	$25,000,000

Chapter 7 **– Safety Management (Security)**

Introduction

The Dixie MPO is committed to excellence in transportation planning. One area of planning which has, is, and will be given a lot of attention is 'Safety Management'. On the pages to follow, data and information will be presented that illustrates issues related to 'Safety and Security' as well as 'Traffic Safety'. Some ways those issues can be mitigated through objective identification and specific strategies or projects intended to lessen their impact are also presented.

The UDOT has put significant efforts into safety related data and campaigns. That information is used as a part of the Dixie MPO planning effort. For more information on the UDOT campaign, please refer to the UDOT web site at http://www.udot.utah.gov/main/f?p=100:pg:0::::T,V:2956,

State Safety Leadership Team

UDOT's Office of Traffic and Safety is facilitating an on-going safety plan and strategy in cooperation with many local, regional, state, and federal partners. Each MPO in Utah is a member of this leadership team. This year the most visible project has been the "ZERO Fatalities: A Goal We Can All Live With" program.

The primary program goals and objectives endorsed by the team and MPO boards will rely on education, outreach, and multi- agency partnering to accomplish them. Current Emphasis Areas include increasing use of safety restraints, improving intersection safety, and reducing aggressive driving, distracted driving, drowsy driving, and impaired driving.

Continuing Safety Areas include enhancement of child safety, railroad crossing safety, older driver safety and transit system safety. Ongoing planning to improve pedestrian safety, motorcycle safety, younger driver safety, and rural road safety will be coincided with increasing work zone safety and promoting safer truck travel. Special areas that may be visited and promoted periodically include enhancement of safety management systems, crash data systems, and emergency services capabilities.

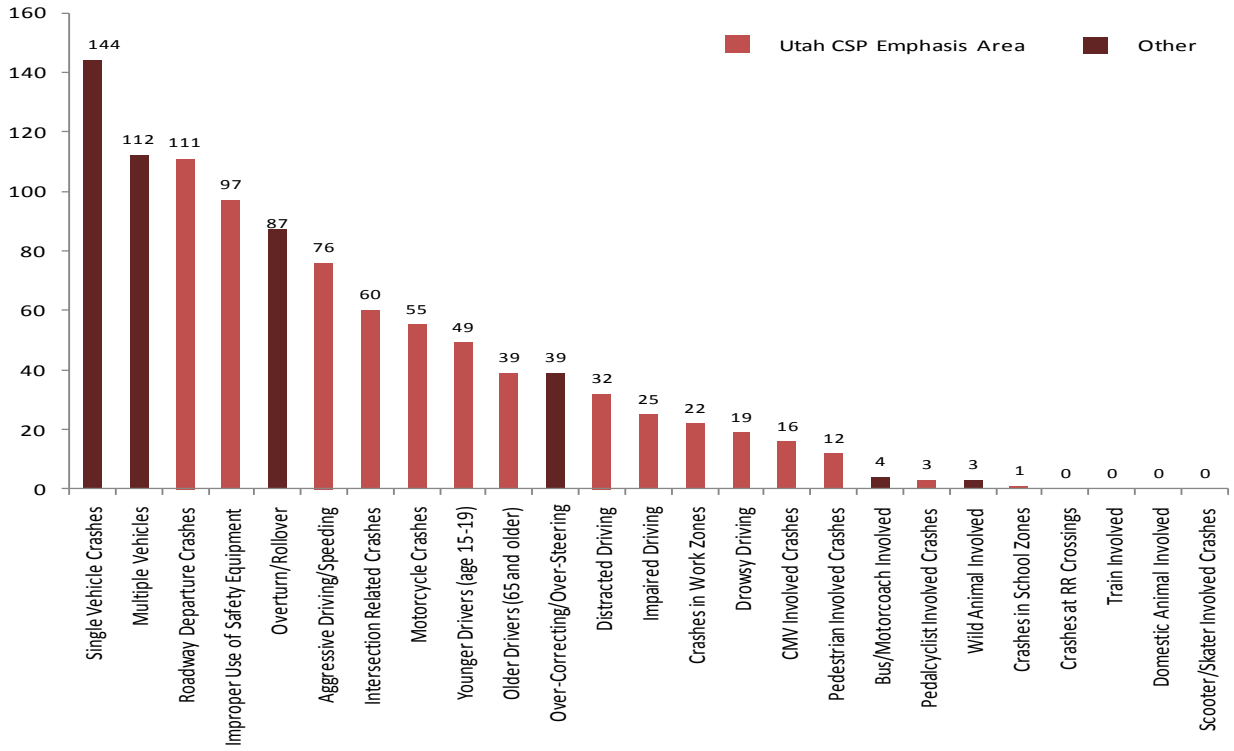
MPO's dependency on road functionality and the continuity of the trucking industry to connect MPO residents with life sources of freight, food, products, and services through Arizona and Northern Utah

Traffic Safety

As the fast growing area in and around the Dixie MPO develops, the frequency of traffic accidents will likely increase. Information available to the MPO identifies location and the major contributing factor to the accident as well as the severity of the accident and what injury resulted. Information is displayed in the map and chart on pages below with additional information included in appendix **.

The UDOT has provided crash data by county which includes severity and contributing characteristics of the crashes. The chart below illustrates the incidence of severe injury or fatal crashes in Washington County between 2006 and 2008. Additionally all crashes and severe crash/fatalities locations are included in the map on the following page.

Washington County – Serious Injury and Fatal Crashes by Contributing Factor, 2006-2008



An analysis completed by Cambridge Systematics shows several contributing factors to crashes in Washington County. Common crash factors for our area include: multiple vehicles, intersection related crashes, aggressive driving/speeding, young drivers, single vehicle crashes, older drivers, roadway departure crashes, improper use of safety equipment, distracted driving, CMV involved crashes, overturn/rollover, crashes in work zones, and impaired driving.

From that analysis several possible focus areas were identified. The following are areas that will be given greater review:

Roadway Departures

The 1999 statistics from the Fatality Analysis Reporting System (FARS) show that nearly 39 percent of the 37,043 fatal crashes were single-vehicle ROR crashes on various road types.

For two-lane, undivided, noninterchange, nonjunction roadways exclusively, there were 8,901 (24 percent) single-vehicle ROR crashes. There are more than twice as many ROR fatal crashes on rural roads than on urban roads, partly due to the higher speeds on rural roads and to the greater mileage.

Some of the most prevalent contributing factors are listed below with a brief explanation of the problem. Objectives and strategies to address these factors are also following.

Intersection Accidents

Un-signalized

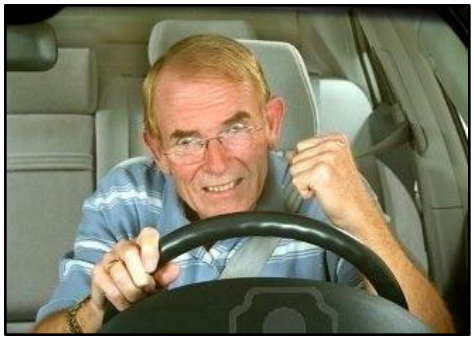
Intersections constitute only a small part of the overall highway system, yet intersection-related crashes constitute more than 50 percent of all crashes within urban areas and over 30 percent in rural areas (Kuciemba and Cirillo, 1992). Fatal intersection crashes are a smaller portion of the total picture, suggesting that severity of crashes at intersections is lower than elsewhere.

It is not unusual that crashes are concentrated at intersections, because intersections are the point on the roadway system where traffic movements most frequently conflict with one another. Good geometric design combined with good traffic control can result in an efficient and safe intersection.

Signalized

Intersections constitute only a small part of the overall highway system, yet intersection related crashes constitute more than 20 percent of fatal crashes. It is not unusual that crashes are concentrated at intersections, because intersections are the point on the roadway system where traffic movements most frequently conflict with one another. Good geometric design combined with good traffic control can result in an intersection that operates efficiently and safely.

Aggressive Driving



While estimates of the problem vary, perceptions among both law enforcement and drivers are that aggressive driving is becoming more prevalent. According to a National Highway Transportation Safety Administration (NHTSA) survey about aggressive driving attitudes and behaviors, more than 60 percent of drivers see unsafe driving by others, including speeding, as a major personal threat to themselves and their families. More than half admitted to driving aggressively on occasion. The Surface Transportation Policy Project estimated that aggressive actions contributed to 56 percent of all fatal crashes. However, without a clear definition of aggressive driving, these broad assertions are difficult to support.

Older Drivers

The number of older drivers in the United States will double over the next 30 years (Exhibit I-1). By 2030, one in five Americans will be age 65 or older. As people age, a decline in sensory, cognitive, or physical functioning can make them less safe drivers, as well as more vulnerable to injury once in a crash. Yet older Americans depend on automobiles for meeting their transportation needs.

The real safety concern for the older driver arises when one also takes into consideration their increased likelihood of being injured or killed in a crash. Compared with an overall fatality rate of 2 per 1,000 crashes, persons ages 65–74 have a fatality rate of 3.2.

Objectives & Strategies

The Dixie MPO is focusing on the above contributing factors because of the impacts they pose in our area. Although these factors pose significant concerns it is possible to help alleviate those concerns through the adoption and implementation of objectives and strategies addressing each area. The listing below includes strategies which if implemented will help the Dixie MPO to address each focus area:

Roadway Departures

RD1 Keep vehicles from encroaching on the roadside
- Install shoulder, edge-line, or mid-lane rumble strips where needed
- Provide improved highway geometry for horizontal curves
- Provide enhanced pavement markings
- Provide skid-resistant pavement surfaces
- Apply shoulder treatments
- Eliminate shoulder drop-offs
- Widen and/or pave shoulders

RD2 Minimize the likelihood of crashing into an object or overturning if the vehicle travels off the shoulder
- Design safer slopes and ditches to prevent rollovers
- Remove/relocate objects in hazardous locations
- Delineate trees or utility poles with retro-reflective tape

RD3 Reduce the severity of the crash
- Improve design of roadside hardware
- Improve design and application of barrier and attenuation

Intersections

Un-signalized

I.1 Management of access near un-signalized intersections
Implement driveway closures/relocations
Implement driveway turn restrictions

I.2 Reduce the frequency and severity of intersection conflicts through geometric design improvements
Provide left-turn lanes at intersections
Provide bypass lanes on shoulders at T-intersections
Provide right-turn lanes at intersections
Provide right-turn acceleration lanes at intersections
Provide full-width paved shoulders in intersection areas
Restrict or eliminate turning maneuvers by signing
Restrict or eliminate turning maneuvers by providing channelization or closing median openings
Close or relocate "high-risk" intersections
Convert four-legged intersections to two T-intersections
Improve pedestrian and bicycle facilities to reduce conflicts between motorists and non-motorists

I.2 Improve sight distance at un-signalized intersections
Clear sight triangles on stop- or yield-controlled approaches to intersections
Clear sight triangles in the medians of divided highways near intersections
Eliminate parking that restricts sight distance

I.3 Improve driver awareness of intersections as viewed from the intersection approach
Improve visibility of intersections by providing enhanced signing and delineation
Improve visibility of the intersection by providing lighting

Provide a stop bar on minor road approaches
Install larger regulatory and warning signs at intersections

I.4 Choose appropriate intersection traffic control to minimize crash frequency and severity
Provide all-way stop-control at appropriate intersections
Provide roundabouts at appropriate locations

I.5 Improve driver compliance with traffic control devices and traffic laws at intersections
Provide targeted public information and education on safety problems at specific intersections

I.6 Reduce operating speeds on specific intersection approaches
Post appropriate speed limit on intersection approaches

I.7 Guide motorists more effectively through complex intersections
Provide turn path markings
Provide lane assignment signing or marking at complex intersections

Signalized intersection

I.8 Reduce frequency and severity of intersection conflicts through traffic control and operational improvements
Restrict or eliminate turning maneuvers
Employ signal coordination
Improve operation of pedestrian and bicycle facilities at signalized intersections
Remove unwarranted signal

I.9 Reduce frequency and severity of intersection conflicts through geometric improvements
Provide/improve left-turn channelization
Provide/improve right-turn channelization
Improve geometry of pedestrian and bicycle facilities

I.10 Improve sight distance at signalized intersections
Clear sight triangles

Aggressive Driving

AD.1 Deter aggressive driving in specific populations, including those with a history of such behavior, and at specific locations
Conduct educational and public information campaigns

AD.2 Improve the driving environment to eliminate or minimize the external triggers of aggressive drivers
Change or mitigate the effects of identified elements in the environment
Reduce nonrecurring delays and provide better information about these delays

Older Drivers

OD.1 Plan for an aging population
- Establish a broad-based coalition to plan to address older adults' transportation needs

OD.2 Improve the roadway and driving environment to better accommodate the special needs of older drivers
- Provide advance warning signs
- Provide advance-guide and street name signs
- Provide all-red clearance intervals at signalized intersections

- Provide more protected left turn signal phases at high-volume intersections
- Provide offset left-turn lanes at intersections
- Improve lighting at intersections, horizontal curves, and railroad grade crossings
- Improve roadway delineation
- Replace painted channelization with raised channelization
- Reduce intersection skew angle
- Improve traffic control at work zones

OD.3 Reduce the risk of injury and death to older drivers and passengers involved in crashes
Increase seatbelt use by older drivers and passengers through public education campaigns

Chapter 8 **– Security**

Washington County Emergency Management

The Washington County Emergency Management Office has developed an Emergency Management Plan and is currently working on an update of that plan. The plan includes a County response to a variety of emergency situations which may occur in and around our communities. An evacuation Annex portion of the plan identifies procedures to coordinate evacuation needs during times of a natural, man-made, technological, Homeland Security emergencies or disaster.

System Management (ITS)

Consideration of strategies to address Homeland Security for Utah's Dixie is limited for a relatively new small-urbanized Metropolitan Planning area, but the benefits will provide a legacy and direction for future RTP updates and system security. The Dixie Regional ITS Architectural Study and its implementation strategies provide the foundation of policy and communications needs. The existence of the Washington County Emergency Management Office for dealing with short and long-term events provides a central place for coordination with local state and federal partners in the event of security, criminal or terrorist acts or emergency events and natural or manmade catastrophes.

Regional ITS Architecture is required for the orderly and consistent deployment of ITS throughout the Region. A plan was prepared by ITERIS, Inc. with a final draft submitted in April 2006. The Plan serves as a master plan for ITS deployment for ten years and beyond. It defines roles and responsibilities of the various ITS Stakeholders throughout the Region and establishes other technical goals to avoid duplication of investments in infrastructure, provides the ability to share data among agencies, and brings the Dixie Region into compliance with nationally established ITS Architecture standards.

A product of the ITS Architecture Plan was a listing of proposed projects based on short-tern, mid-term and long-term timeframes. A brief listing of the projects is included below. A more detailed table with description and progress is kept and updated by the City of St. George.

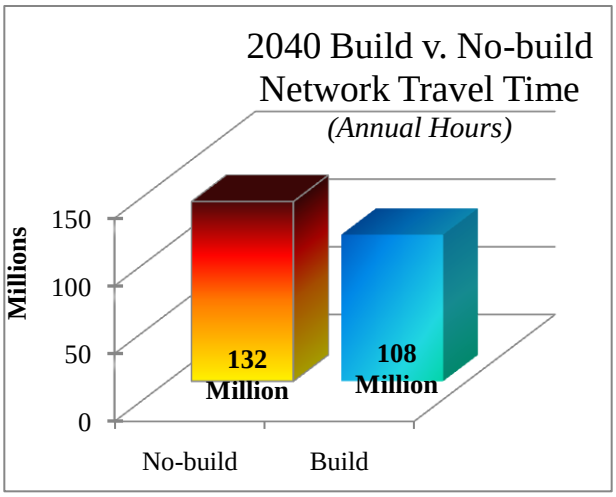
Projects recommended by the plan are listed below:

Short-Term	Mid-Term	Long-Term
Dixie Regional Traffic Control Center (TCC)	CommuterLink Marketing	Weather Warning System
Communications Plan	Computer Aided Dispatch Integration with CommuterLink	Northern Parkway Corridor –Phase 2
Emergency Automated Vehicle Location	Dixie Regional Emergency Operations Center (EOC)	Regional Traveler Information
Emergency Vehicle Preemption	Incident Management Strategies	Telegraph Street Corridor
Trailblazers	Incident Response Vehicles	Transit Operations Upgrade
100 South Corridor	ITS Architecture Update	
Bluff Street Corridor - Phase 1	Maintenance Coordination	
Bluff Street Corridor - Phase 2	700 South Corridor	
Southern Parkway Corridor - Phase 1	I-15 ITS – Phase 1	
Southern Parkway Corridor – Phase 2	I-15 ITS – Phase 2	
State Route 9 Corridor	Northern Parkway Corridor – Phase 1	
Sunset Boulevard Corridor	Red Hills Parkway	
	Red Cliffs Drive Corridor	
	River Road Corridor	
	Snow Canyon Parkway Corridor	
	Western Parkway Corridor – Phase 1	
	Western Parkway Corridor – Phase 2	

Chapter 9 **– Congestion Management**

As a small-urbanized area, the Dixie Metropolitan Planning Organization is not required to develop a Congestion Management Plan. However, the DMPO recognizes the value in understanding how project development impacts congestion/delay time. This brief analysis identifies some of the impacts associated with congestion.

There are many ways to describe congestion on a transportation network. For this plan, the total vehicle hours were compared on the entire transportation system in the model year 2040 in both the build and no-build scenarios. A reduction in congestion is realized by building the projects shown in the 'Projects & Phasing list' as illustrated in the "Network Travel Time" chart below.



The "Network Travel Time" chart compares total network travel time in year 2040 for the build *v.* no-build alternatives. The red bar represents 132.6 million vehicle hours traveled in the no-build scenario where current capacities are maintained but not expanded. The blue bar represents 108.2 million vehicle hours traveled if all the projects are built. Thus the build scenario represents a total savings of 24.4 million vehicle hours per year leading up to and beyond 2040.

The "2040 Daily Travel Times 'A'" table assumes a snapshot in time in 2040. It shows a No Build scenario resulting in 363,249 daily network travel time hours, or a 23% increase in delay above the Build scenario of 296,380 hours of daily travel time.

The "2030 Daily Travel Times 'B'" table compares the No Build scenario, separately with 4 individual projects taken from the phased list: Interstate 15 widening, the Dixie Drive Split Interchange between Bluff and Dixie Drive, the Southern Parkway, and the Western Corridor. Of the four projects selected, the I-15 project reduces the most delay (D) on the network by 76,000 hours, the Western Corridor 43,000 hours, the least, but each has a significant impact on delay reduction on the network.

The "Travel Time Results 'A'" chart compares one additional project to the mix the Southern Parkway to SR-9 in Hurricane, showing the build no build comparison and the cumulative delay per day in hours from 2005 to 2025.

The "Cost Benefit Analysis" table shows the time saved in hours of the build scenario, (building all projects in the long range plan) assuming two scenarios, hourly delay cost of $5 and of $10, both showing a positive ratio over 1.0: 1.69 at $5 and 3.37 at $10

In summary, managing congestion on a network with limited capacity growth due to topography constraints puts heavy pressure on decision makers to make every attempt to implement the projects in this plan to serve the population and travel demand expected in year 2030. The mix of highway, public and private transit, and bicycle pedestrian facilities will help maintain the quality of life and economic growth of Utah's Dixie.

Table 9 - Daily Travel Times 'A'

2040 Daily Network	
Condition	*Travel Time (hours)*
No Build	363,249
Build	296,380

Chart 2 - Travel Time Results 'A'

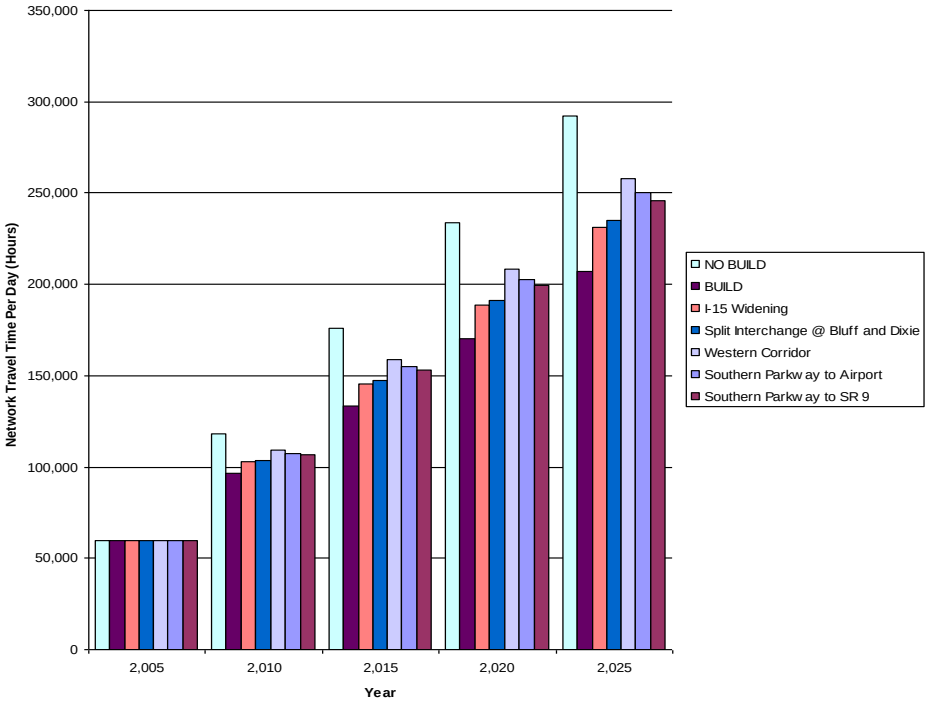


Table 11 - Cost Benefit Analysis

Time Saved (hrs)	Cost Benefit ($5/Hr)	Cost Benefit ($10/Hr)	Total Estimated Roadway Improvement Cost	Cost to Benefit Ratio ($5/hr)	Cost to Benefit Ratio ($10/hr)
483,625,000	$2,418,125,000	$4,836,250,000	$1,434,000,000	1.69	3.37

With these factors in mind, the Dixie MPO encourages the reduction and management of congestion through the implementation of several transportation tools including ITS Message Boards, TOC, Traffic Management, Ramp Metering, Reversible Lanes, Cross-over left turn lanes, and transit projects including the implementation of a Bus Rapid Transit line. These congestion reducing tools are further recommended for consideration in each new project.

Chapter 10 **– Corridor Preservation**

The preservation of transportation corridors is important to consider in any community in order to manage possible future congestion and to purchase needed right of way as inexpensively as possible. The degree of importance increases in areas with high historical and projected population growth. Washington County and the DMPO area have and will, according to projections, experience high growth. Some estimates indicate that early purchase of transportation corridors can result in costs at one-fifth or one-sixth of the amount needed if the purchase is put off. Of course it is difficult to tie down exact costs especially in an unsure economy.

Because of the above factors and after much discussion, the Washington County Board of Commissioners formed a county-wide Council of Governments (COG) to consider, among other things, projects which may benefit from corridor preservation. The COG developed a list of projects and is collecting revenues from vehicle registration fees to fund projects into the future.

The current list of prioritized projects is below.

Combined RANK	Name of Roadway
1	Bluff Street - from SG Blvd to Sunset Blvd
2	The Southern Parkway
3	Indian Hills Drive
4	Snow Canyon Parkway / Snow Canyon Drive Roundabout
5	Extension of Washington Dam Road to Southern Parkway
6	Western Corridor (100' corridor from Ivins to Santa Clara)
7	Purgatory Road - from SR-9 to Washington Dam Rd
8	Western Corridor @ Sun River
9	400 South 200 East Roundabout
10	3000 South (between 1150 W & Sand Hollow Rd)
11	Toquerville to Leeds connection
12	Kolob Rd relocation / reconstruction at SR-9
13	1400 West (between 1300 S & 600 N)
14	Shoulder widening along SR-9 in various locations
15	Toquerville SR-17 Bypass
16	SR-9 to SR-59 connection thru Sheep Bridge or Rockville / Smithsonian Butte
17	900 East - Virgin River Crossing
18	SR-59 to SR-9 or Southern Parkway
19	Hurricane Valley to Leeds Connection

Chapter 11 **– Environmental Mitigation**

The Dixie MPO recognizes that transit, road, and trail projects all bring positive and negative impacts on physical and societal environments. Therefore the MPO strives to establish steering and stakeholder committees to guide early corridor planning studies. Committees are comprised of resource agencies, land managers, environmental groups, developers, and others who consider impacts to air quality, farmland, fish and wildlife, historical/archeological resources, geologic hazards, floodplains, water quality, and wetlands.

While corridor planning requires only a broad consideration of potential environmental impacts – a more detailed analysis is required as each project advances into the Environmental Assessment (EA) or Environmental Impact Statement (EIS) phase prior to project construction. Following is a discussion of potential environmental issues that require analysis of impact, concern, avoidance, or mitigation remedies:

Impacts

Farmland Impacts

Preservation of farmland is increasingly difficult in the Dixie Region. The shrinking availability of land, incentives to sell and give way to development, and the area's harsh desert environment are combining to reduce the supply of farmable land in Dixie. Incentives for jurisdictions to protect and preserve farm environments may not be strong enough to overcome these market forces that are driving a growth in population and consuming once farmable land for commercial and residential use.

Fish and Wildlife Impacts

The following table presents federally threatened and endangered species, State sensitive species found throughout the Dixie Region. Although these species are identified for long range planning purposes and early corridor preservation studies, a more detailed investigation of impacts, avoidance, or mitigation is required at the Environmental Assessment or Environmental Impact Statement stages of environmental analysis.

Washington County List of Utah's Federally Listed

Threatened(T), Endangered(E), and Candidate(C) Species

This list was compiled using known species occurrences and species observations from the Utah Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS); other federally listed species likely occur in Utah Counties. This list includes both current and historic records. (Last updated on November 9, 2010)**.

Common Name	Scientific Name	Status
Plants		
Siler Pincushion Cactus	Pediocactus sileri	Threatened
Shivwits or Shem Milkvetch	Astragalus ampullarioides	Endangered
Holmgren Milkvetch	Astragalus holmgreniorum	Endangered
Gierisch Mallow	Sphaeralcea gierischii	Species of Concern
Dwarf Bearclaw-poppy	Arctomecon humilis	Endangered
Reptiles/Amphibians/Fish		
Virgin Chub	Gila seminuda	Endangered
Woundfin	Plagopterus argentissimus	Endangered
Relict Leopard Frog	Rana onca	Species of Concern
Desert Tortoise	Gopherus agassizii	Threatened
Birds		
Greater Sage-grouse	Centrocercus urophasianus	Species of Concern
Yellow-billed Cuckoo	Coccyzus americanus	Species of Concern
Mexican Spotted Owl	Strix occidentalis lucida	Threatened
Southwestern Willow Flycatcher	Empidonax traillii extimus	Endangered
Mammals		
Utah Prairie-dog	Cynomys parvidens	Threatened
Gray Wolf	Canis lupus	Endangered
Brown (Grizzly) Bear	Ursus arctos	Extirpated

** Created by the Utah Division of Wildlife Resources - November 9, 2010

Note: Please contact the U.S. Fish and Wildlife Service (801-975-3330) for the purpose of consultation under the Endangered Species Act.

Historical/Archeological Impacts

Historical and archeological sites are another component that is hard to measure, but adds to the character and quality of life in the Dixie Region. Avoidance, mitigation, and restorations are options to consider as planned solutions reach the environmental analysis phase.

Although the Dixie Region has not been completely surveyed for archaeological resources, the MPO boundary areas are likely to contain numerous archaeological sites.

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 Jedidiah 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).

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.

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.

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.

Geologic Hazards

The geologic diversity within the State of Utah is well known and much of that diversity and topographical constraint exists in Dixie. The region is not immune to earthquakes, landslides or volcanoes. The MPO encourages transportation solutions to take in to account the known geologic hazards in plans, designs, and construction to prevent, avoid, or mitigate as much as possible current, ongoing, and future geologic events.

Water-body and Floodplain Modification

Washington County in cooperation with FEMA and other agencies has produced an updated floodplain plan to deal with the aftermath of the January 2005 Flood in Dixie and to prevent and control floodwaters in future significant storm events. This plan is referenced in the Appendix of this document and is available at the offices of Washington County. Transportation needs solutions/projects must be planned designed and built with these requirements and conditions in mind.

Water Quality Impacts

Water quality can be greatly impacted by the amount of hard surfaces (including roadways) in a region. Hard surfaces lead to polluted runoff instead of the water table's natural percolation cycle.

Wetland Impacts

Wetlands provide an invaluable resource to our ecosystem. Section 404 of the Clean Water Act protects wetlands from development without a permit from the Army Corps of Engineers. Designing the roadways to protect the wetlands in the Dixie Region is in accordance with the requirements of the Clean Water Act and leads to a more sustainable community.

Climate Change

Local discussions of climate change effects are minimal within the Dixie MPO. However, MPO executives and planners regularly discuss flood control plans and recognize the need to construct roads and bridges to accommodate heavy runoff volumes. Flooding events in 2005 and 2011 stimulated local awareness of potential hydrology concerns in a changing environment and validated the need to over-plan bridge facilities and other flood treatments within the flood plains and waterways of Southwestern Utah.

Air Quality

Washington County, Utah, is currently considered an attainment area as defined by the Clean Air Act and therefore is not regulated by the EPA or the Utah Division of Air Quality. However, proper planning will be required if the region reaches non-attainment status in the coming years or if EPA regulations are tightened. In non-attainment status, plans to reduce personal automobile dependency would become vital. In the interim "attainment" years, the MPO has outlined the following proactive principles.

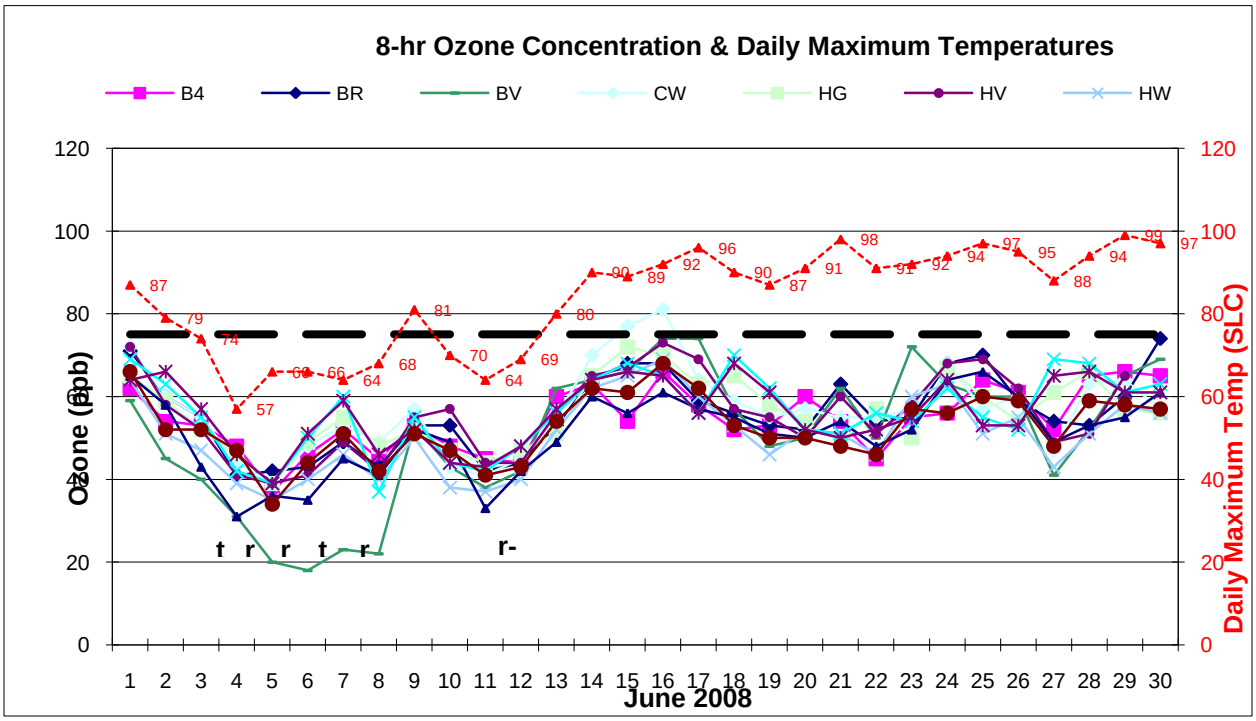
Although there are many sources of air pollution, including ambient air moving in from other parts of the region, auto emissions, vapor gases, and dust are common contributors to air pollution locally. Mode/trip decisions, reducing single occupancy vehicles, improving traffic flow and recovering gaseous vapors are some of the ways to protect the quality of air. These and other strategies will be looked at and recommended to local governments for their consideration and adoption. The Dixie area has been growing rapidly for many years and will continue to grow to build out conditions, and should look seriously at protecting its air shed quality.

The MPO anticipates continued growth in vehicle miles of travel, and the associated congestion and traffic delays. Some societal tendencies are catching hold toward the use of energy efficient vehicles, but the potential for air quality problems, especially for Ozone, is real for Utah's Dixie.

The consequences of allowing air quality to deteriorate to the point of exceeding pollutant standards, is costly. Besides the human health impacts and costs that are well documented, once an area is labeled a `non attainment' area for pollutants, meaning it cannot maintain air quality to acceptable standards, capacity improvements to transportation pavement systems are restricted, additional state regulatory actions are then placed over an area increasing the cost to do business, to plan, and to implement projects. Needed federal funding may also be curtailed or withheld.

The Division of Air Quality and the Department of Environmental Quality have offered to help the Dixie area avoid this situation, or postpone it for as long as feasible, and will encourage Congress to deal more fairly with areas that are experiencing ambient Ozone from outside sources. DAQ strongly recommends that the Dixie area do all that it possibly can on a voluntary basis in taking reasonable and cost effective measures to protect the air shed.

The State Division of Air Quality (DAQ) reports the status of local air quality. DAQ staff reported that an air quality monitoring station was in place in St. George from July of 1995, through the end of 1997. According to data gathered during that period, although no pollutants exceeded the current standards at that time, new Ozone standards currently being implemented by the EPA were approached during April/May of 1996 and 1997. In 2008, another air quality monitoring station was established in Santa Clara with similar results as illustrated in the graph below.



DAQ staff made recommendations to the DTAC to consider developing a voluntary action plan to protect the air shed. Air shed protection is managed at the county level by DAQ.

To be proactive, the DTAC agreed to begin drafting a protection plan, and to conduct a locally funded short term Ozone study. SECOR, an air quality-engineering firm was chosen from a number of submitted proposals and began monitoring from a station placed on Washington County Annex property near the location of the original DAQ monitoring site. Data from this six-month study, conducted from May 2002, through October 2002, also did not exceed current Ozone standards but Ozone levels were slightly higher

when compared to the 1995 97 DAQ data. Also, data available from a permanent monitoring site in Mesquite, Nevada shows very similar Ozone concentrations to St. George, according to SECOR. These studies, together with other data from the southwestern region of the US, show that Ozone levels approaching .08 ppm are prevalent regardless of urbanized status. The results of the SECOR study is available for review at the Dixie Transportation Planning Office, Five County Association of Governments, 1070 W. 1600 S., St. George, UT 84770.

Ozone standards were changed in 2010, but subsequently stayed on appeal of a law suit:

> "In January 2010 EPA proposed stricter standards for smog. As part of EPA's extensive review of the science, Administrator Jackson will ask the Clean Air Scientific Advisory Committee (CASAC) for further interpretation of the epidemiological and clinical studies they used to make their recommendation. To ensure EPA's decision is grounded in the best science, EPA will review the input CASAC provides before the new standard is selected. Given this ongoing scientific review, EPA intends to set a final standard in the range recommended by the CASAC by the end of July, 2011."

The standard levels of acceptable Ozone were .075 ppm prior to the 2010 proposal. The proposed change would bring that level down to .065 ppm to .070 ppm. According to DAQ information, regional Ozone levels close to the new standard are being seen at monitoring sites throughout the southern Utah region, from Four Corners, into the Grand Canyon, Zion National Park, Dixie and southern Nevada. DAQ also suggests that a local condition is occurring in springtime such that when vegetation begins to green up and temperatures are rising, the combination of emissions of nitrogen oxides (N Ox) and volatile organic compounds (VOC) contribute to ozone formation, and should be included in the scope of emissions inventory and non regulatory monitoring efforts.

Action Plan

A multi agency team is being established to develop a scope of work for DAQ non regulatory air pollution monitoring in Dixie with the intent of determining local pollution levels for several pollutants, but to especially focus on Ozone. The geographic scope will be the entire County of Washington.

This plan describes existing conditions, with various options/solutions followed by some recommendations.

More stringent guidelines are available under EPA's new Ozone Flex Program for areas concerned about potential future non attainment of either the 1 hour or 8 hour ozone standards, to achieve emission reductions, secure public health benefits, and accrue possible credits to future planning efforts, to the extent allowed by the Clean Air Act and EPA guidance or rules (See Attachment A).

Existing Conditions

Prevailing Winds in Dixie tend to move from the southwest in a northeasterly direction, almost on a daily basis. This air movement helps to change the air, to `refresh it', in a word, on a regular basis. However, the same prevailing winds are likely to carry contaminated air from nearby urban areas like, Las Vegas, or even from the Los Angeles Basin, into and through; Dixie. Truckers who drive the 1 15 Corridor on a regular basis are convinced of this relationship. Of course, anyone may have an opinion, but empirical results would be needed to determine the relationship and to affect public policy. Postponing empirical results may compromise community health standards, would be unprofessional, and against the operating values agreed to by DMPO partners.

- Cooperate and coordinate with DAQ and other local stakeholders in developing and Implementing a regional scope of work for non regulatory monitoring in Utah's Dixie
- Encourage use of mobile monitoring equipment to help determine local and regional Ambient source contributions
- Participate in pollutant source inventorying and sharing other data, as needed
  (See Appendix B for typical pollution source list)

Traffic Congestion is a contributing factor to level of air quality due to increase in pollutants, as vehicles are queued up at intersections. Vehicles that are idling emit more pollutants than when operating at optimum speed, which is around 30mph. Delay time at specific intersections may be an indicator of Congestion. Another indicator may be average road link speeds that fall below 15 mph. If feasible, speed data may be available or determined that will be useful in making traffic flow impact decisions. The Dixie MPO and its partners recommend the following strategies for local government consideration and action:

- Encourage Intersection Flow improvements & Traffic Signal synchronization
- Consider one way streets where feasible (cost of signage/stripping)
- Maintain capacity, speed, and function of arterial /collector roads & corridors
- Encourage business and industry to establish Flexible employee work hours
- Encourage placement of fiber conduit in all new construction or rehabilitation projects for future ITS strategies
- Encourage municipal purchase of unused buried conduit

Municipal Corporation Policy varies throughout Dixie as to visible efforts to improve air quality. St. George City for example, has executed resolutions such as tree planting, especially in parking lots, which reduces vapor emissions from automobile gas tanks; encourages non polluting industry; supports and operates public transit; and has had a goal of having a bicycle/pedestrian trail within 15 minutes of every home. Communities in the region are all actively supporting paths and trails and their connectivity The Dixie MPO encourages the following strategies for local government support and action:

- Landscaping/tree planting strategies, especially for parking lots
- Fleet Vehicle fueling in cool hours of the day
- Covering all solvent tanks or open storage of vaporous gases/liquid
- Encourage non polluting industry
- Encourage any polluting industry to apply modern emissions technology
- Encourage Volatile Organic Compounds (VOC) recovery at all fueling stations
- Encourage fleet vehicle preventive care as recommended by manufacturers
- Support van and car-pooling of employees (no interest loans available)
- Support regional Public Transit when and feasible
- Encourage fleets that use alternative fuels (incentives available)
- Support Walk-able Communities and neighborhoods (land use, zoning, codes)
- Support MPO Long Range Plans, Policy, and Standards in local development decisions

Private/Public Partnerships can go a long way in encouraging business and citizen contributions to air quality protection. Encourage the Chambers of Commerce to partner with local business, colleges, and industry to support similar protection measures as listed above.

Dixie MPO Work Plan:

1. Participate with DAQ and local partners in non regulatory monitoring
2. Create Public/Private Education Program

Distribute information to and through:

- Chamber of Commerce members
- Municipalities, County
- Public Agencies
- Schools, College
- Neighborhood organizations
- Coverage in local newspapers
- Newsletters

3. Include Air Quality Protection strategies in the Long Range Transportation Plan
4. ITS technology should be reviewed and appropriate and effective tools implemented when feasible and affordable.
5. Assist DAQ in conduct of emissions inventory of sources of potential pollutants
6. Seek voluntary action consistent with prevention or control of related emissions
7. Seek funding for local action planning from the Environmental Protection Agency

Integration of NEPA into the Planning Process

While the above elements are important components of the natural and built environment in the Dixie Region, and each deserves their own thoughtful and comprehensive analysis. This plan does not attempt to perform a comprehensive Environmental Analysis or Environmental Impact Statement as regulated by National Environmental Policy Act (NEPA). At this point, projects included in this plan are for planning and modeling purposes only. Some projects amount to little more than a proposed line on a map. It is not intended to identify specific alignments for planned corridors. When a formal proposal is made, the NEPA process will follow.

Unified and Cooperative Planning Processes

In 2009, public and private planners throughout Utah began creating the unified planning tool "U-Plan" – a web-based information platform designed to allow road and utility planners to jointly access information on rights-of-way, infrastructure lines, environmental concern areas, habitat areas, and other built and natural resources. The Dixie MPO views U-Plan as an integral tool within the transportation planning process and encourages outside agencies to participate.

Chapter 12 **– Pedestrian/Bicycle Facilities**

As stated in the "Vision" chapter above, pedestrian and bicycle facilities are an integral part of the area's transportation system. Vision Dixie calls for the implementation of "complete streets" criteria to ensure streets and roads work for drivers, transit riders, pedestrians, and bicyclists, as well as for older people, children, and people with disabilities. Complete Street designs are also intended to improve motorist attitude and behavior toward other street users.

Previous MPO plans quote the efforts of the *Dixie Bicycle and Pedestrian Committee* involved in recommending trail plans in 2007 through a document titled "Bicycle and Pedestrian Facilities, A Guide for Meeting the Needs of Bicyclists and Pedestrians." The document was created for the Washington County area. Although the original committee disbanded, a newly formed *Washington County Bicycle Advocacy Committee* (WCBAC) subscribes to the ideals asserted in the original plan:

> "Vision: The Dixie region will become a place where people can walk or bike as a part of their everyday lives. Residents and visitors will be able to walk or ride with confidence, safety, and security in every community. New and improved facilities and services will make bicycle and pedestrian trips more pleasant, more convenient, without conflict with motorized vehicles, and

with minimal barriers to the mobility impaired. Bicyclists and pedestrians will become an ordinary and accepted part of the transportation system." *(Bicycle and Pedestrian Facilities, A Guide for Meeting the Needs of Bicyclists and Pedestrians, 2007)*

"Goals and Objectives:

- Goal 1. Facilitate the appropriate design, construction, and maintenance of bicycle and pedestrian facilities.
- Goal 2. Support a multimodal transportation system for all new construction and reconstruction projects.
- Goal 3. Encourage education programs that improve bicycle and pedestrian safety.
- Goal 4. Promote bicycling and walking."

The 2007 document also lists goals, design guidelines, amenity lists, maintenance standards, and implementation strategies to enhance bicycle and pedestrian facilities. The newly formed *Washington County Bicycle Advocacy Committee* subscribes to these guidelines, some of which have already become official city standards. The WCBAC has also produced a map of hoped-for bicycle facilities throughout the MPO area. The map and standards were presented to the Dixie MPO Technical Advisory Council on February 2, 2011 and were received with interest. Members of the Advisory Council noted that official adoption of WCBAC principles and plans is the individual responsibility of their respective city policy boards and agreed to facilitate dialog between their policy boards and the WCBAC. However, the Council stressed that city policy boards must be involved in the process of officially amending bike/ped plans.

The "official" trails map, as formally adopted by city policy makers, is attached below as the "MPO Trails Map." Also attached is the "WCBAC Trail Request Map." Moving forward, the MPO will promote open dialog among bicycle advocacy groups and the MPO cities to further develop plans and policies amenable to all stakeholders including the Eastern Washington County Trails Work Group, UDOT, etc.

Of interest, bicycle transportation advocates have identified the following needs within the MPO in regards to this form of transportation:

- Concurrent inclusion of cycling facilities in the planning and design efforts of vehicle facilities
- Increased funding and priority to bike/ped facilities
- Increased facilities to provide a comprehensive connected transportation network
- Enhanced facility maintenance
- Public education
- Increased partnerships
- Increased coordination between public agencies
- Increased encouragement to walk or cycle.

Chapter 13 **– Transit Activities**

SunTran provides transit service for the City of St. George and currently operates fixed bus routes and paratransit (ADA) service between 6:00 AM and 8:00 PM Monday through Friday and from 8:00 AM to 6:00 PM on Saturday. There is no service on Sundays or major holidays. The system consists of four fixed bus routes currently carrying a total of 375,000 passengers per year. SunTran has experienced significant growth, including 35 percent annual growth since 2003. The existing routes operate on 40-minute headways and provide transit service to downtown St. George, Red Cliffs Mall, Dixie State College, the Dixie Center, and several other commercial and residential areas within the St. George city limits. The map on a following page shows the four existing fixed SunTran routes.

Yearly ridership figures by month and daily transit ridership (2010) for the four fixed routes as well as corresponding population and person trips for the areas which are currently being served by transit are presented in the two tables following.

YEARLY RIDERSHIP TALLY

Month	2003	2004	2005	2006	2007	2008	2009	2010	Total
Jan	5404	6107	11031	16541	16756	17284	26721	25303	125147
Feb	5264	6136	11400	15815	15866	20778	24743	27931	127933
Mar	5735	7596	14386	18440	19267	24483	26790	31637	148334
April	5383	7300	12226	16983	17797	26220	27231	30456	143596
May	5493	8166	12076	17692	19219	24901	25496	29000	142043
June	6109	9372	13139	17343	19138	27516	27100	31315	151032
July	5866	9223	12283	15384	17560	28416	26616	29458	144806
Aug	5310	10408	14295	18079	20212	30735	28979	32721	160739
Sept	5067	11816	14282	18259	17182	29311	28324	35566	159807
Oct	5695	11736	15002	17078	21004	30580	29609	35851	166555
Nov	4700	11223	14125	16413	18436	25224	26403	34679	151203
Dec	5909	11920	15127	15288	16761	25180	26281	30981	147447
Total	65935	111003	159372	203315	219198	310628	324293	374898	1768642

The table also summarizes mode split estimates, which describe the share of total person trips captured by transit (daily transit ridership/total number of person trips calculated by the model), for the existing SunTran system.

Transit and Bus Rapid Transit (BRT)

Two studies, dealing with transit and BRT feasibility, have been completed in the recent past that indicate the viability of increased transit services in the Washington County area. The studies are the 'Dixie Bus Rapid Transit feasibility Study' (including addendum) and the 'Hurricane to Zion Canyon Transit Study'.

The 'Dixie Bus Rapid Transit feasibility Study 'evaluated rapid transit service between the City of St. George, Hurricane City, and the new St. George Airport. BRT service from St. George to Hurricane and to the airport is a viable option for the future that should be preceded by conventional bus services along the corridors. Transit ridership forecasts for this study were calculated based on population, employment, and trip demand projections estimated by the most recent available version of the Dixie MPO regional travel demand model. See table following.

Table 6.9: Daily Ridership Forecast – Combined BRT System

	Daily Ridership Forecast		
	Short-Range	Mid-Range	Long-Range
Region 1	1,789	1,992	3,105
Region 2	1,435	1,591	2,238
Region 3	1,425	1,909	3,504
Region 4	772	1,474	3,188
Total Daily Ridership	5,421	6,966	12,036

Table 6.10: Peak Hour Ridership Forecast – Combined BRT System

	Peak Hour Ridership Forecast		
	Short-Range	Mid-Range	Long-Range
Region 1	213	237	359
Region 2	143	157	218
Region 3	134	180	327
Region 4	62	132	305
Total Peak Hour Ridership	552	705	1,210

The travel demand model, and consequently the transit ridership projections, provides expected growth for long-range planning scenarios (year 2035 forecasts). Although BRT service to Hurricane and the airport is not a viable transit service option in 2010, long-range growth projections for the Washington County urban and urbanizing areas are expected to accommodate a viable BRT system that runs in mixed-traffic when area populations and employment meet short-range growth levels. See tables following

Table 6.1: Population Projections by Region

		Population		
	Acres	Short-Range	Mid-Range	Long-Range
Region 1	29,472	146,143	171,434	217,179
Region 2	10,070	37,682	67,722	98,750
Region 3	28,691	38,750	65,084	98,055
Region 4	20,392	29,078	51,378	77,252
Total	88,625	251,653	355,617	491,236

Table 6.2: Employment Projections by Region

		Employment		
	Acres	Short-Range	Mid-Range	Long-Range
Region 1	29,472	64,382	78,362	94,738
Region 2	10,070	38,128	49,575	63,742
Region 3	28,691	21,812	33,113	43,662
Region 4	20,392	18,578	42,933	77,952
Total	88,625	142,900	203,983	280,094

Information gathered from operating transit lines associated with National Parks was utilized to determine the feasibility of a transit line extending to Zion National Park. The range of local ridership information is quite large, ranging from about 6,000 to about 75, 000. The annual local ridership in the market area of the Hurricane to Zion Park line is about 47,000. The Hurricane to Zion Canyon Study also notes that the

viability of a transit line extending to Zion Park is dependent on a transit link from St. George City to Hurricane City. The following table includes ridership estimates and forecasts for local and visitor (Zion Park).

Table 3-5: Annual Combined Ridership Forecast

Transit Market	2010	2035
Local	47,190	132,380
Visitor	114,520	137,450
Total	161,710	269,830

The implementation of conventional bus service to Hurricane and the airport is a very logical step toward the future development of BRT service. Lower level transit investments can be gradually improved, allowing BRT to be phased into operation as population and transit demand increase. BRT ridership forecasts were presented in terms of future planning years as well as socio-economic growth conditions. This allows forecasts to evaluate opportunities to phase in BRT service even if there are some changes to the timing of growth projections assumed by the regional travel demand model. When a transit link is completed to Hurricane, a line to Zion National Park should be considered. See the Transit Services Map at the back of this document.

Chapter 14 **– Public Involvement**

Types of Public Involvement

The International Association of Public Participation defines five levels of public involvement in the IAP2 Spectrum of Public Participation. These five levels are 1) Inform, 2) Consult, 3) Involve, 4) Collaborate, and 5) Empower.

Public involvement at each of these levels is vital as the Dixie MPO strives to plan facilities to meet the transportation needs through 2040. The MPO uses a web site, legal notices of meetings, news releases and a variety of news letters to **inform** constituents of meetings, studies, plans, and opportunities to become involved in the planning process. The web site typically experiences ____ hits per month, and news releases are disseminated throughout the metropolitan area through a variety of news outlets to meet the goal of informing the public of current and planned projects.

The MPO sponsors an annual "Dixie Transportation Expo" to gather public comments and respond to inquiries, consult with citizen groups, and collaborate with them to realize potential solutions. An estimated 700 to 900 people attend the "Expo" annually where they are asked to comment on individual projects, plans, studies, environmental issues, future initiatives, etc. as transportation plans are laid and as projects move forward through the process from concept to construction and maintenance. The 2011 "Expo" is planned for March 8.

In some areas, the MPO has also found ways to empower citizen committees to directly influence plans for the future. The Vision Dixie process discussed earlier in this document was based on citizen input and attempts to capture the public's vision for the metropolitan area of the future – and then plan to that vision. The bicycle/pedestrian trail section of this plan was also reviewed and expanded through the efforts of a citizen's bicycle committee. That committee not only reviewed individual master plans from the respective cities of the MPO, but also recommended various changes and improvements to those plans and is committed to work with various local governments to refine and implement them.

Moving forward, the MPO is committed to include public involvement initiatives its decision-making efforts, to communicate public concerns to MPO voting members, and to educate the public on MPO deliberation, options, strategies, and plans of regional significance.

Public Comments:

Public comments from the 2011 Transportation Expo and in the advertised public comment phase of this plan are noted below with an MPO RESPONSE IN ALL CAPS:

- Very well done and informative.
- Nice to see each community addressing pending matters.
- Nice to see biking and walking paths planned for pending projects.
- Red Hills Desert Preserve Road – I am very much against this project. It is unnecessary, extremely wasteful of limited federal, state & local funds and extremely damaging environmentally. People don't need to get somewhere all the time within five minutes. Preserve that area north of St. George City.
- **RESPONSE –** THE PURPOSE OF THE LONG-RANGE PLAN IS TO USE A SCIENTIFICALLY CONSTRUCTED TRAVEL DEMAND MODEL TO IDENTIFY POTENTIAL TRANSPORTATION CORRIDORS AND ANTICIPATE THE NEED FOR PROJECTS. ANY FUTURE ROAD PROJECTS THAT MOVE FROM THE LONG-RANGE-PLAN TO CONSTRUCTION WILL NEED TO MEET NEPA REGULATIONS ON A PROJECT BY PROJECT BASIS AND DEAL WITH ANY NATURAL RESOURCE OR OTHER IMPACTS AT THE ENVIRONMENTAL STUDY PHASE OF PROJECT DESIGN.

  THE TRAFFIC DEMAND MODEL, POPULATION GROWTH FORECASTS AND MEASURED TRAFFIC TRENDS IDENTIFY A NEED FOR A NORTHERN TRANSPORTATION CORRIDOR, IN CONJUNCTION WITH TRANSIT SERVICES, TO AVOID UNACCEPTABLE LEVELS OF CONGESTION, AIR POLUTION, AND SAFETY HAZARDS ON THE REGIONAL ROADWAY NETWORK.

- It's about time someone had enough courage to put a road through the Red Hills Desert Preserve. We have needed that for a very long time.
- I have lived here for 20 years and am amazed at the foresight and planning of all these projects.
- I am especially impressed with the Southern Parkway and new Dixie Drive Interchange.
- We want trails for ATV's (motorized)
- My residence is approximately one mile north of I-15 and Green Springs. The noise in the evening hours is very loud. Have sound barriers in the future been thought of?
- **RESPONSE –** NOISE IMPACTS ARE CONSIDERED ON A PROJECT BY PROJECT BASIS AT THE INDIVIDUAL PROJECT DESIGN PHASE.

- We would like to see Mall Drive Bridge as soon as possible. The sooner the better.
- Please email a map of the long-range plan and schedule for countywide trails meetings.
- Don't want parkway to go north of Green Springs and ruin our equestrian trails.
- I commend you for moving forward with a parkway north of the City. That road should have gone in years ago.
- It is my understanding that Bluff Street is planned to be widened from 85 feet to 117 feet with an additional lane being added in each direction.

  What will it cost to acquire this additional 32 feet from adjacent business property owners? If the land taken for the right-of-way removes their parking areas, will the business buildings be

purchased as well? Will any of these businesses be able to remain in business during construction?

I understand that the 2030 traffic volume along Bluff Street between Sunset and the Boulevard is anticipated to be 160% of the present 45,000 ADT. Is this correct?

That would mean that more than 70,000 ADT would be carried on Bluff Street. In reviewing the 2009 ADT volumes published by UDOT for the Salt Lake Urbanized Area, I cannot find any surface streets with adjacent commercial land uses carrying 70,000 ADT. Only freeways carry 70,000 ADT.

Is it the Dixie MPO's intent to construct a freeway in this location?

- **RESPONSE –** ACCORDING TO THE TRAVEL DEMAND MODEL, 2040 TRAFFIC VOLUMES ON BLUFF STREET COULD BE REDUCED FROM 72,000 AADT TO 63,500 AADT WITH THE ADDITION OF A NORTH TRANSPORTATION FACILITY LIKE THE WASHINGTON PARKWAY SHOWN IN THE LONG-RANGE-LAN.

- We have reviewed the Dixie Metropolitan Planning Organization's (Dixie MPO) Draft Regional Transportation Plan 2011 - 2040 (Plan), including the proposed phasing of future highway and transit projects. Under recent transportation planning legislation (SAFETEA- LU), the resource agencies and the Metropolitan Planning Organizations (MPO) are directed to coordinate on long-range planning efforts; we believe that both transportation planning and Utah's natural resources can benefit from these efforts. We attended the meeting of October 26, 2010, at which time the MPOs, including the Dixie MPO, presented their preliminary draft long-range plans to State and Federal resource agencies. We appreciate this opportunity to comment on your proposed Plan, and also to comment more generally on landscape-scale planning opportunities.

  General Comments

  We support the Dixie MPO's involvement and leadership in the Vision Dixie process, a landscape-scale effort intended to manage and direct urban growth in Washington County. We encourage the Dixie MPO to incorporate "green infrastructure" concepts within such landscape-scale planning efforts, to identify priorities for land uses, opportunities for preservation and restoration, and strategies for maintaining viable natural places and corridors within the landscape. We believe the MPOs have a critical role in promoting landscape-scale green infrastructure planning and encourage the Dixie MPO to take an active leadership role in this area. We note that EPA and the Federal Highways Administration provide grants to support such efforts, and believe numerous other State and Federal partners, including the Fish and Wildlife Service, will be available to offer assistance.

  At the October 26, 2010, meeting the Utah Department of Transportation (UDOT) provided an introduction to uPlan, their recently-developed G1S-based transportation planning tool. UDOT developed this tool to provide environmental data to inform the transportation planning process, including the development of long-range plans. We support the use of a geographic mapping tool that identifies environmentally-sensitive areas enabling transportation planners to avoid red flag issues, use landscape-scale analysis for long-range planning, streamline project development, and identify mitigation opportunities. The time is right to establish a GIS-based application like uPlan; however, at this point we believe the ecological components of this tool should be improved before its use. Improved ecological spatial data (e.g., high resolution wetland and riparian data; sensitive fish and wildlife habitats; and priority areas for preservation,

restoration, and mitigation) are needed to make this a viable tool for planning, relative to ecological resources. We believe sustained support and funding can translate into an improved uPlan tool in the future. We encourage UDOT, MAG, and the other MPOs to support uPlan, recognizing its current limitations as well as its future potential.

Specific Comments on the Draft Regional Transportation Plan 2011 - 2040

We provide the comments below to give the Dixie MPO and UDOT early feedback on the proposed corridors. The comments include initial concerns relative to fish and wildlife resources, including species listed under the Endangered Species Act (ESA). Because the corridors are conceptual in nature, our comments are broad in scope and are not inclusive of all potential concerns that could arise from a project-level analysis.

1. Great Northern – This corridor proposes to pass through the Red Cliffs Desert Reserve (Reserve). The Reserve was established for the purpose of mitigating other development impacts to the endangered desert tortoise in Washington County, in accordance with Section 10 of the ESA. The land in the Reserve is designated Critical Habitat for desert tortoise and is conserved in perpetuity under the Washington County Habitat Conservation Plan. Any transportation corridor through the Reserve would greatly increase the risk to the desert tortoise population and accelerate its decline by increasing fire frequency, noise disturbance, human access, and direct mortality along the corridor. Construction of a new road through the Reserve conflicts the desert tortoise recovery plan and is inconsistent with the terms of the County's Habitat Conservation Plan. We highly recommend that this corridor be removed from the regional transportation plan.

2. Western Corridor – This corridor and its associated spurs could have potential impacts to plants listed under the Endangered Species Act, including dwarf bear poppy and Holmgren milkvetch. Some of the land within the area of the corridors is designated Critical Habitat. The extensive induced urban growth accompanying these roads would substantially fragment habitat for these endangered plants.

3. Virgin River Crossings – The "Projects and Phasing" map and table in the draft Plan do not identify each project by number making it difficult to determine where new crossings are proposed. Any bridges over the Virgin River would impact designated Critical Habitat for federally-listed fish and the Southwestern willow flycatcher. We recommend the number of crossings over the Virgin River be minimized, and impacts to the river, floodplain, and riparian habitats be avoided to the maximum extent possible.

We appreciate the opportunity to provide these comments.

- **RESPONSE –** THE PURPOSE OF THE LONG-RANGE PLAN IS TO USE A SCIENTIFICALLY CONSTRUCTED TRAVEL DEMAND MODEL TO IDENTIFY POTENTIAL TRANSPORTATION CORRIDORS AND ANTICIPATE THE NEED FOR PROJECTS. ANY FUTURE ROAD PROJECTS THAT MOVE FROM THE LONG-RANGE-PLAN TO CONSTRUCTION WILL NEED TO MEET NEPA REGULATIONS ON A PROJECT BY PROJECT BASIS AND DEAL WITH ANY NATURAL RESOURCE OR OTHER IMPACTS AT THE ENVIRONMENTAL STUDY PHASE OF PROJECT DESIGN.

Appendix A –

POTENTIAL FUNDING SOURCES

Funding sources for transportation improvement projects are needed if the recommended projects of the Transportation Plan are to be built. In the Washington County area, federal, state, and local governments as well as private developers provide funds to pay for improvements.

Federal Funds:

The prior federal highway and transit bill SAFETEA-LU (Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users) continues to fund federal transportation programs under continuing resolutions. And a new federal highway bill is anticipated within the next several months.

State Funds:

The Utah Department of Transportation receives state highway user revenues as well as state general funds for highway construction and maintenance projects. The highway user revenues sources include motor fuel taxes, special fuel taxes, vehicle registration fees, driver license fees, and other fees. General funds include sales taxes and other taxes. In addition, the state has the authority to issue bonds for specific highway projects.

A portion of the state highway user funds are made available to local governments for highway construction. Seventy-five percent of these funds are kept by the UDOT for their construction and maintenance program. The remaining 25 percent are made available to the cities and counties in the state through the Class B and C Program.

Class B and C funds are allocated to each city and county by a formula based on population and road mileage. These funds can be used for either maintenance or construction of highways, although at least 30 percent of the funds must be used for construction projects or for maintenance projects that cost over $40,000.

Safe Sidewalks Program has also been established by the legislature to fund the construction of sidewalks on roads on the state system. The money is distributed through a formula based partially on miles of state road in each UDOT Region. Each city and county located in the region submits projects to the UDOT Region office, which then prioritizes them. A statewide committee then makes the final project selection.

Local Funds:

Local government agencies have a variety of funding sources available to them for transportation improvements. The primary source is from the general fund of the cities and counties. These general funds can be used for construction of new roads or the upgrading or maintenance of existing ones. Transportation projects, however, must compete with the other needs of the city or county for the use of these funds.

Local governments have several other options for improving their transportation systems. Most of these options involve some kind of bonding arrangement, either through the creation of a redevelopment district, a more traditional special improvement district organized for a specific

project benefiting an identifiable group of properties, or through general obligation bonding arrangements for projects felt to be beneficial to the entire entity issuing the bonds.

The Local Corridor Preservation Fund allows the Washington County AOG to collect vehicle registration fees of $10 per vehicle for transportation corridor preservation. The Utah Department of Transportation has responsibility for seeing that the major requirements of the legislation are met, such as compliance with federal property acquisition procedures, and a locally adopted access management plan, or ordinance.

Private Sources

Private interests often provide sources of funding for transportation improvements. Developers construct the local streets within subdivisions and often dedicate right-of-way for and participate in the construction of collector and arterial streets adjacent to their developments. Developers should also be considered as a possible source of funds for projects needed because of the impacts of the development, such as the need for traffic signals or arterial street widening.

Private sources also need to be considered for transit improvements which will provide benefits to them. For example, businesses or developers may be willing to support either capital expenses or operating costs for transit services which provide them with special benefits, such as a reduced need for parking or increased accessibility to their development.

Following is a brief list of programs used to fund transportation projects within the Dixie MPO:

FEDERAL HIGHWAY ADMINISTRATION

- Surface Transportation Program (STP)
    - Dixie MPO cities
- Congestion Mitigation / Air Quality (CMAQ)
- Available only after DMPO reaches non-attainment status
- Interstate Maintenance (IM)
- National Highway System (NHS)
- Surface Transportation Program
- Urbanized Area
- Small Urban
- Flexible (Any-Area)
- Transportation Enhancements
- Highway Safety Improvement Program (HSIP)
- Hazard Elimination
- Railroad Crossings
- Safe Routes to School (SR2S)
- Bridge Replacement
- Off System - Local
- Off System - Optional
- Federal Lands Programs
- High Priority Projects (HPP)
- Transportation Improvement Projects (TI)
- Recreational Trails

FEDERAL TRANSIT ADMINISTRATION

- **(5307)** Block Grant Funds
- **(5309)** Discretionary Funds
- **(5310)** Services for elderly and disabled
- **(5311)** Grants for Outside Urban Area
- **(5340)** High Density States Program
- **(5316)** Job Access and Reverse Commute
- **(5317)** New Freedom Program

STATE OF UTAH

- State Construction
- State General Funds
- State Traffic
- Corridor Preservation Funds

LOCAL

- County (B Funds)
- City (C Funds)
- General Funds
- Transit Sales Tax
- Corridor Preservation Fund

PRIVATE

- Donations / User Fee
- Developer Funded Projects
- Public/Private Partnerships

Appendix B

Typical Sources of N Ox and VOC:

Aircraft Purge Systems
Chemical Milling
Cold Solvents
Construction Equipment
Boiler Systems
Dip Tanks
Fueled Engines, mobile and stationary
Engine Test Facilities
Fueling Stations
Fueling Equipment
Fuel Tanks, mobile and stationary
Generators
Landscaping Equipment, engines
Paint Strippers

Painting Operations
Wastewater Treatment Plants

Sources of Air Quality Programs, Regulations, and Information:

Department of Environmental Quality, State of Utah
Division of Air Quality, DEQ, State of Utah
Environmental Protection Agency
The Ozone Flex Program: Voluntary Strategies to Reduce Smog (June 21, 2001)

Maps

The maps referenced throughout this document follow: