

TOOELE COUNTY

TRANSPORTATION MASTER PLAN

prepared by



Jones & DeMille Engineering



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DEFINITIONS

Access Management – The process of establishing restrictions, rules, and guidelines to roadway accesses – including intersections, driveways, and accesses for developments – in an effort to preserve the mobility of traffic flow within a roadway network.

Active Transportation – Any transportation pathways intended for pedestrian and bicycle use. This can include bicycle lanes, bicycle paths, widened roadway shoulders, and sidewalks.

Average Daily Traffic (ADT) – The average number of vehicles passing a specific point on a roadway in either direction over a 24-hour period. Total volumes are collected over a period of time – usually 7 to 10 days – and divided by the number of days to determine an average. Weighing factors may be used in determining the average.

Class B and C Funds – Funding distributed by the Utah Department of Transportation (UDOT) for Class B and Class C road maintenance and improvements.⁽¹⁾

Class B Road – County roads.

County roads comprise all public highways, roads, and streets within the state that:

- (a) are situated outside of incorporated municipalities and not designated as state highways;
- (b) have been designated as county roads; or
- (c) are located on property under the control of a federal agency and constructed or maintained by the county under agreement with the appropriate federal agency."⁽²⁾

Class C Road – City streets.

City streets comprise:

- (a) highways, roads, circulator alleys, and streets within the corporate limits of the municipalities that are not designated as class A state roads or as class B roads; and
- (b) those highways, roads, and streets located within a national forest and constructed or maintained by the municipality under agreement with the appropriate federal agency."⁽³⁾

Class D Road – “[Any] road, way, or other land surface route that has been or is established by use or constructed and has been maintained to provide for usage by the public for vehicles with four or more wheels that is not a class A, class B, or class C road.” Class D roads are not included in any way within this TMP for reference or analysis. Reference to this TMP may not be made for any legal action or analysis involving Class D roads. Any use of analysis, reference, or legal action based upon this TMP regarding Class D roads would require an amendment to the TMP.

Functional Classification of Roadways – The process of balancing roadway access and mobility needs for roadways within a transportation network. Classifying roadways is beneficial in determining maintenance and expansion needs of existing roadways, the location of necessary future roads, and roadway design parameters such as pavement design, roadway widths, and road right-of-way widths.

Geographic Information Systems (GIS) – GIS is the process of spatial databasing. A GIS database is a computerized database of spatially-related information. A GIS database may include maps and inventories of information related to those maps. For this TMP, data collected on roadway functional classification, traffic volumes, pavement conditions, etc. was gathered into one online story map database to assist in the organization and visualization of project spatial data.

¹Transportation Fund and Highway Finances, Utah Code §72-2-1, Enacted 1998, <https://le.utah.gov/xcode/Title72/Chapter2/72-2-S102.html>

²Highways in General, Utah Code §72-3-103, Enacted 2000, <https://le.utah.gov/xcode/Title72/Chapter3/72-3-S103.html>

³Highways in General, Utah Code §72-3-104, Amended 2020, <https://le.utah.gov/xcode/Title72/Chapter3/72-3-S104.html>

⁴Highways in General, Utah Code §72-3-105, Enacted 2000, <https://le.utah.gov/xcode/Title72/Chapter3/72-3-S105.html>



Land Use and Zoning – The process of establishing viable development locations (zones) based on type of development to ensure that all development is consistent with existing infrastructure, transportation networks, and community needs.

Level of Service (LOS) – A method of determining the quality of traffic flow based on volume and capacity. Level of Service is used in determining the need for roadway expansion, additional network redundancies, and/or additional traffic control devices.

Peak Hour Volume – The highest hourly volume of vehicles to drive across a road segment in either direction. For most roadways this peak hour volume occurs during the morning (7:00 A.M. to 9:00 A.M.), evening (4:00 P.M. to 6:00 P.M.), or Saturday peak hours.

Road Right-of-way – The transportation corridor width including pavement and appurtenant shoulders, curb and gutter, sidewalks, culverts, drains and turnarounds, etc., and any additional corridor width. Road right-of-way widths are determined based on roadway functional classification. Right-of-way can be obtained through several means that are described in detail in the Transportation Master Plan report.

Traffic Signal Needs Study – A study performed to determine the need for additional traffic signals. Needs for new signals are determined based on speed, stopping sight distances, and level of service.

Traffic Impact Study (TIS) – A study performed prior to construction of a new development or redevelopment to determine the potential impacts to the transportation network and community. Standards for traffic impact studies are included in the Transportation Master Plan report.

Transportation Corridor – A linear pathway that defines the footprint of an existing or future transportation facility, including road surface and rights-of-way. This can be vehicular, pedestrian, bicycle, rail, etc. Transportation corridor preservation techniques (right-of-way obtainment procedures) are described in the Transportation Master Plan report.

Vehicle Classification – Vehicles are classified based on axle distances and number of axles. Classifying vehicles is useful in determining roadway and pavement design.

Vehicle Miles Travelled (VMT) – All miles traveled by vehicles on a given roadway over a period of time. This can be used as a method of comparison between roadways to determine roadway classification.

1 INTRODUCTION

1.1 Background

Tooele County is located in northwestern Utah south of the Great Salt Lake. The county is home to over 70,000 people and just keeps growing. Most residents live in the Tooele Valley, which is home to Tooele County's largest cities including Tooele, Grantsville, Erda, and Lake Point. Residents of the county can enjoy the beautiful Great Salt Lake, the Bonneville Salt Flats, the Mountains, and more. It is approximately a 30-minute commute from Tooele City to downtown Salt Lake City, and many residents commute to the Salt Lake Valley daily. Tooele County has a rich history, and its ever expanding economy provides opportunities for housing and work to many people.

1.2 Need for a Study

The primary purpose of a transportation system is to keep people and goods moving to their destination in a safe and efficient manner. Without planning for future growth or establishing transportation corridors the County could experience significant transportation problems down the road. Expanding traffic demands must be met by a living transportation system and transportation planning document. Proper planning for the whole county ensures that all travel needs are assessed, including vehicles, bicycles, heavy truck traffic, pedestrians, and rail. This transportation study will ensure that the unique qualities of Tooele County are preserved while providing increased access to all facilities and expanding traffic demands.

Benefits of a Transportation Master Plan (TMP) include:

- Improving standards for corridor preservation and Traffic Impact Studies (TIS);
- Improving future planning to ensure that roadway maintenance and construction utilizes available monies efficiently and with limited waste; and
- Improving organization of the existing and future County roadway inventory including, pavement conditions, roadway function classification, Average Daily Traffic (ADT) data, vehicle crash data, etc.

1.3 Transportation Planning Purpose

The purpose of this study is to develop a TMP for Tooele County to be used as a roadmap for future planning and development in the county. The primary objectives of the TMP are as follows:

- Analyze existing traffic, intersection, and roadway conditions to determine likely growth patterns and future transportation-related needs,
- Plan for future transportation-related development, roadway maintenance and construction projects, and funding acquisition,
- Guide future development by establishing and compiling transportation-related development standards,

- Provide a framework for the preservation and establishment of transportation corridors and related access management facilities, and
- Create a publicly available Geographic Information System (GIS) Story Map that includes all planning data from the TMP as well as other relevant County GIS data.

These objectives will allow the County to establish a transportation plan that will ensure a continually functional transportation system adaptable to growth and change in the County.

1.3.1 Analysis of Existing Traffic and Roadway Conditions

The analysis of existing traffic and roadway conditions is included in Section 2 of this document, which includes the following information:

- Existing land use data and maps,
- Existing demographic and socioeconomic data,
- Future population growth estimates,
- Existing funding sources and opportunities, and
- An inventory of the existing roadway network, including:
 - Functional classification of vehicle roadways,
 - The active transportation network,
 - The rail network,
 - Vehicle crash data and patterns,
 - A safety action plan,
 - Roadway pavement conditions, and
 - Average Daily Traffic (ADT) values and associated speed and vehicle classification data.

By analyzing the existing conditions, a baseline can be established for projections of future development.

1.3.2 Plan for Future Development and Funding Acquisition

Future planning addresses the transportation needs of the County as determined by the analysis of existing traffic and roadway conditions. Planning for future growth in Tooele County is analyzed and described in Section 3. These needs include, but are not limited to:

- Traffic signal needs,
- Infrastructure maintenance needs, including bridges, sidewalks, bikeways, and roadways,
- Traffic safety concerns,
- Development and land use changes,
- Future potential county, city, and state roadway capital projects, and
- Funding opportunities.

Specified future planning projects are separated into short-range and long-range transportation plans. The short-range transportation plan is a low-level analysis that addresses the deficiencies in the existing system and the developments currently planned for the upcoming ten years. The long-term transportation plan is a high-level analysis and focuses primarily on general land-use allocation and zoning (ten to twenty years). In addition, any projects which require extensive advance planning and funding or are deemed necessary after 20-plus years will be part of the long-term plan. The Short-range Transportation Improvement Plan (SRTIP) is included in Section 6.2 and the Long-range Transportation Improvement Plan (LRTIP) is included in Section 6.3. Including projects in Transportation Improvement Plans (TIPs) is necessary for obtaining vital corridor rights-of-way and funding allocations.

1.3.3 Establishment of Transportation-Related Development Standards

As part of this Transportation Master Plan, the County seeks to establish new and compile existing development standards for both private and public development. These development standards include:

- Roadway typical section standards based on roadway purpose and functional classification,
- Right-of-way (ROW) width standards based on roadway functional classification,
- Driveway approach and access design guidelines and recommendations, and
- Traffic Impact Study (TIS) requirements and policies.

Establishment of these standards within the framework of the TMP document helps to ensure that development and future growth occur in a manner consistent with the desires of the County, its residents, and its culture. Section 5 outlines the TIS standards and policies.

1.3.4 Preservation of Corridors and Access Management

This document will outline the County's ability to establish transportation corridors as well as the restrictions involved in corridor preservation. Corridor preservation is essential in planning for future transportation network growth. Preserving corridors and planning for the preservation of corridors allows the County to have an established network before development occurs. This ensures that development occurs consistent with County desires and needs. When planned in this manner, developments will remain cohesive with existing and future transportation infrastructure. Corridor preservation techniques and other information are included in Section 8.

Access management principles are used to balance roadway access with mobility. Functional classification, described in

Section 2, is integral in determining access management needs and practices. Guidelines and recommendations for access management are included in Section 7.

1.3.5 GIS Story Map

GIS data is used by the County to accurately locate and inventory transportation-related infrastructure and information. Much of the information included in this study will be added to interactive maps which will visually present the study data and future planning. Many of these maps will be included in the TMP document (most are in the appendices). Some of these maps will also be added to the online story map available on the County's website. This online story map is intended to be a living story map, just like the TMP document. It will be susceptible to changes after adoption caused by disparities between projected and actual growth or funding availability. The online story map is interactive in nature and provides the user with the ability to access spatial data in an organized and visual medium. This story map provides an alternative method for private individuals, private organizations, and public entities to access County transportation-and development-related plans and standards.

1.3.6 Transportation Planning Purpose Summary

The transportation planning purpose has been described in this section. The items discussed may be found in the following sections of the document.

- Analysis of existing conditions (Section 2)
- Plan for future conditions (Section 3)
- Transportation Safety Action Plan (Section 4)
- Standards for Traffic Impact Studies (Section 5)
- Short-Term and Long-Term Transportation Improvement Plans (Section 6)
- Access management guidelines (Section 7)
- Corridor preservation techniques and guidelines (Section 8)
- Other Future Actions (Section 9)
- Closure (Section 10)

1.4 Study Goals

Establishment of a reliable, sustainable, and efficient transportation network provides many net positives for the county. Some of these benefits include improved mobility, citizen health, connectivity, and economy. The Utah Department of Transportation (UDOT) has established a quality of life framework for transportation planning and development. Tooele County seeks to adhere to this framework in its planning and development. UDOT's quality of life framework is built on four factors: Better Mobility, Good Health, Connected Communities, and Strong Economy.⁵ These factors, when prioritized, can provide the integral benefits a healthy transportation system seeks to supply. This section will explain how Tooele County seeks to integrate this quality of life framework into its transportation planning.

1.4.1 Better Mobility

Tooele County seeks to improve mobility within the county by prioritizing established corridor preservation techniques, access management principles, roadway ROW and functional classification standards, and other development standards. Mobility improves when roadways are designed by functional classification type. This ensures that mobility and access are balanced and applied according to specific roadway demands. Tooele County commits to finding the most cost-effective and efficient alternatives to future roadway design. Future planning ensures that roadways which will provide the most effective levels of mobility are the roads that get built. Tooele County seeks to address, where possible, mobility deficiencies in the existing roadway network caused by undermaintained roads, unpaved roads, under signalized roads, or network areas with a lack of redundancies.

1.4.2 Good Health

Tooele County seeks to improve citizen health by expanding its active transportation network. By coordinating with cities and towns throughout the county and with UDOT, it is desired that a cohesive and interconnected active transportation network can be established. This will provide residents of Tooele County as well as nonresidents the ability to enjoy the community, culture, and natural beauty of the county as well as nearby counties and municipalities. Tooele County also seeks to improve citizen health by seeking safety- and sustainability-focused alternatives in planning, construction, and maintenance of County transportation facilities. These alternatives will allow the County to lessen its environmental and safety impacts. Tooele County desires its residents to live with the benefits of safer roadways, cleaner air, and more expanded active transportation opportunities.

1.4.3 Connected Communities

Tooele County seeks to improve both its interconnectedness with other counties, states, and municipalities as well as intraconnectedness within the county itself. As mentioned in Section 1.4.1, the County seeks to balance mobility and access in

future roadway design. The County desires to maintain existing roadways that connect communities and plan new roadways which will expand the connectivity potential of the county. The County will do this through application of corridor preservation techniques, access management principles, and establishment of transportation improvement plans. The County will seek the input of transportation and roadway professionals, residents, and other County officials and professionals to ensure that the concerns and needs of every community are voiced.

1.4.4 Strong Economy

Tooele County recognizes the benefits to the economy of a functional and efficient transportation network. The County desires to address and conceive potential development concepts in its planning. Concepts included in the plan are those that provide the greatest economic benefits while remaining consistent with the culture and desires of the community. Future roadway planning should be consistent with planned development and growth already present within the county. The County also seeks to find transportation alternatives that can improve the transportation experience for local commuters, travelers, tourists, and freight.

1.5 Study Process

Each step of the study process for the Transportation Master Plan is outlined as follows:

1. Coordination between County officials, contractors, and other local and state entities (This coordination continues throughout the entire study process).
2. Analysis of existing conditions.
3. Analysis of future conditions.
4. Future project planning.
5. Establishment of development standards.
6. Public Input.
7. Final review by UDOT and by County officials.
8. Final changes to document based on public input, and review by UDOT and County officials.
9. Adoption by the County Commission.
10. Publishing the TMP planning document and the GIS Story Map to the County's website.

1.5.1 Coordination with the Public, and Local, State, and Federal Governments

Tooele County recognizes the need to coordinate with local and state governments throughout the planning process to ensure that cohesive and effective transportation networks are established throughout the county. Funding for many transportation projects comes from state and federal sources, and established coordination and cooperation with these entities is beneficial in ensuring successful future planning and infrastructure development. Several state and federal highways are also present throughout the county, and coordination with these entities ensures that these highways are maintained and the County's needs relative to these highways are addressed. The

⁵ Utah Department of Transportation, "2022 UDOT Strategic Direction," Utah Department of Transportation, 2022, <https://www.udot.utah.gov/strategic-direction/index.html#missionSection>

County owns roadways and highways that intersect with these state and federal highways, and coordination for maintenance, signalization, and other needs is essential in establishing fluidity between networks.

Tooele County consists of five cities, three towns, three census-designated places, and several unincorporated communities. Coordination between these entities ensures that the County's roadways are benefiting the needs of residents within these communities.

A public open house and online public comment period provide the opportunity for the public to add input, concerns, and recommendations throughout the planning process. Public comments from the open house and online public comment period are included in Appendix 7. Where possible and necessary, the County seeks to inform and be informed by the public, and local, state, and federal entities about transportation-related changes, plans, and standards.

2 EXISTING CONDITIONS AND FUTURE PROJECTIONS

An inventory of existing conditions was created to assist in determining future expansion, development, and maintenance needs.

2.1 Land Use

Tooele County's Land Use Ordinance can be found online at tooeleco.org. Coordination between roads and land use is essential in determining the most beneficial and efficient growth of new roadways and developments. Tooele County has established zoning districts for the entire county. Road development should exist to support established and future zoning and development. Tooele County's zoning map can be found at the County's GIS webpage. A link to this zoning map is also included in the Documents section of the GIS Story Map.

2.2 Demographic and Socioeconomic Data

Table 1 shows the 2020 census population and housing data for Tooele County. **Table 2** compares the population growth for Tooele County and the State of Utah from 1950 to 2020. This data was used to calculate an annual growth rate. This annual growth rate was used as a reference point in determining the growth rate for Average Daily Traffic (ADT) growth projections.

Table 1 - County Population and Housing Data⁶

Population	Housing Units	Area (sq mi)	Population Density (pop/sq mi)	Housing Density (HU/sq mi)
72,698	24,125	6,942	10.47	3.48

Table 2 - Population Growth Trends

Year	State of Utah ⁶	Tooele County ⁷
1950	688,862	14,636
1960	890,627	17,868
1970	1,059,273	21,545
1980	1,461,037	26,033
1990	1,722,850	26,601
2000	2,233,169	40,735
2010	2,763,885	58,218
Average Annual Growth (1950-2010)	2.4%	2.33%
2020	3,271,616	72,698
Average Annual Growth (2010-2020)	1.7%	2.25%

⁶ United States Census Bureau. "Historical Population Change Data (1910-2020)." United States Department of Commerce. <https://www.census.gov/data/tables/time-series/dec/popchange-data-text.html>

⁷ United States Census Bureau. "QuickFacts: Tooele County, Utah." United States Department of Commerce. [Tooele County, Utah - Census Bureau Search](https://data.census.gov/tables//US/dec/quickfacts/TooeleCountyUtah)

Table 3 shows a population growth estimate for the next 40 years by the University of Utah's Kem C. Gardner Policy Institute. It is anticipated that the County's population will more than double in the next 40 years. The average annual growth rate for the 40-year analysis is 1.8 percent. Based on existing and future estimates, a traffic growth rate of 2.0 percent was used for Level of Service (LOS) analysis (see Section 3).

Table 3 - Population Growth Estimates⁸

Year	Population
2020	72,698
2030	96,600
2040	115,253
2050	133,001
2060	148,890

2.2.1 Selected Demographic and Socioeconomic Data

All of the information in this section (unless otherwise specified) was gathered from the American Community Survey, which is a demographic survey program performed annually by the United States Census Bureau.⁹

In Tooele County, 7.3 percent of the population are under the age of 5, 31.5 percent are under the age of 18, and 9.2 percent are over the age of 65. 93.2 percent of the population is Caucasian or Hispanic and the other 6.8 percent are other races. As of 2021 there were 1,068 employer establishments in the County employing 13,691 employees. 71.2 percent of the population over the age of 16 was in the civilian labor force in 2021.

Tooele County's demographics are comparable to the State's in many categories. However, Tooele County's demographics differ from that of the state in a few key areas. The following information is per the 2020 U.S. Census. On a per capita basis, age, sex, and race statistics are within four percentage points for every census-included category between the County and the State. Key differences between the County and the State are present with education, income, and housing. Both the County and the State have greater than 90 percent of high school graduates above the age of 25, but the state has 35.4 percent of persons above the age of 25 with a bachelor's degree or higher, compared to the County's 23.0 percent. The median household income (2021 dollars) was \$87,557 in Tooele County and \$79,133 in the State. In contrast, the per capita income (2021 dollars) was \$29,948 in Tooele County, which is lower than the \$33,378 throughout the

⁸ Kem C. Gardner Policy Institute. "Utah Long-Term Planning Projections: A Baseline Scenario of Population and Employment Change in Utah and its Counties." The University of Utah, January 2022. <https://gardner.utah.edu/wp-content/uploads/LongTermProj-Jan2022.pdf?x71849&x71849>

⁹ United States Census Bureau. "Tooele County, Utah." United States Department of Commerce. <https://data.census.gov/all?q=Tooele:County:Utah>

state. 83.4 percent of Tooele County residents live in owner-occupied housing compared to the State's 70.5 percent.

The Kem C. Gardner Policy Institute from the University of Utah shows that 23,903 individuals were working in Tooele County in 2020, which comprised approximately 32.9% of the population. Tooele County is projected to create 17,773 more jobs by the year 2060.¹⁰

Figure 1 shows the 2021 estimates for job distribution by industry in Tooele County.

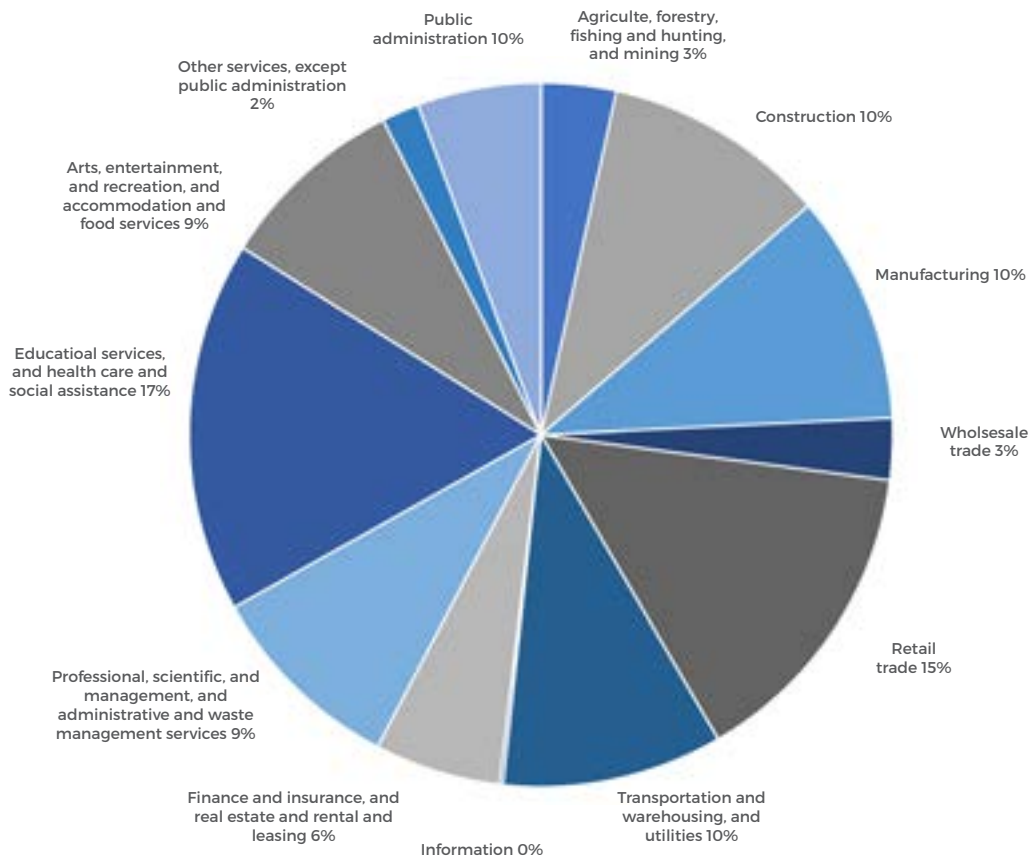


Figure 1 - Employment Data¹¹

¹⁰ Kem C. Gardner Policy Institute, "Utah Long-Term Planning Projections Summary," The University of Utah, February 2022. <https://gardner.utah.edu/wp-content/uploads/Tooele-Proj-Feb2022.pdf?x71849>.

¹¹ United States Census Bureau, "Selected Economic Characteristics," United States Department of Commerce. Accessed July 14, 2022. <https://data.census.gov/table?q=tooele-county+utah+employment>

2.3 Roadway Network Inventory

A roadway network inventory organizes all County roadways by functional classification and includes relevant data for selected roadways. A visual representation of various data for the roadway network inventory can be found in maps included in the online GIS story map and in the appendix.

The following information was gathered for the existing roadway network:

- Functional classification data;
- Daily traffic counts, speeds, and vehicle classifications on selected roadway segments;
- Planned and funded roadway improvement projects;
- Historical funding allocation;
- Pavement type of roadways;
- Bridge data; and
- Vehicle crash information.

The state highway system and county roadway network serve as the spine for the County's transportation network. All principal arterials and major collectors throughout the County not located within municipalities are state and county roads. Many arterials and major collectors within municipalities are also state and county roads.

Efficient and safe vehicular travel relies on a well-maintained and cohesive roadway network. The data gathered for the roadway network inventory is included in the following sections.

2.4 Functional Classification

Roadway functional classification is used by the United States Department of Transportation (USDOT) and UDOT to categorize highways and other roadways. This categorization assists planners and designers in creating roadways compatible with the intended needs of roadway networks. The American Association of State Highway and Transportation Officials (AASHTO) describes functional classification as the process of "[defining] the role of each roadway in serving motor-vehicle movements within the overall transportation system."¹² It is an organized system with established parameters.

Both existing and future functional classification maps are included in Appendix 1. These maps can also be viewed side-by-side on the online Story Map. The existing functional classification map matches the existing functional classification map standardized by UDOT. It is important that the County match its existing functional classification map with UDOT's to ensure that future county planning is congruent with state planning. Ensuring that the county functional classification map matches the state map, the County also improves its ability to procure funding from sources only available to roadways of specified functional classification types.

Roadway networks can be categorized into rural and urban. Tooele County's roadway network functions as a rural network throughout most of the county. The County is a growing urban network within areas of the Tooele Valley. Functional classification is defined in a hierarchical structure based upon factors including roadway design volume, speed, access, and

mobility. Functional classification categories are described in the following subsections for Tooele County's network. These functional classification definitions are listed in hierarchical order from highest mobility and lowest accessibility to lowest mobility and highest accessibility.

2.4.1 Freeways

The national interstate highway system is a network of federally controlled toll-free highways. President Dwight D. Eisenhower signed the Federal-Aid Highway Act of 1956 officially establishing the interstate system. These highways are designed with high speeds and limited access to maintain maximum mobility. Freeways utilize grade-separated interchanges to limit congestion and other access-related issues.

Interstate 80 (I-80) is the only freeway in Tooele County. It runs east-west and has two lanes in both directions for its entirety through the county. There are thirteen grade-separated interchanges in Tooele County for the interstate. These interchanges provide access for various municipalities throughout the County and connect state highways as well as local roadways to the interstate. Due to the topography of Tooele County I-80 functions as the only entrance into Tooele County from the Salt Lake Valley. This can create a bottleneck on I-80 and can cause severe congestion. Several alternatives are being explored for addressing this issue, including additional travel lanes, alternative interchanges, and additional highways. Since these alternatives would address state highways and federal freeways, they are not addressed within this report. More information regarding plans and studies related to this area can be found on UDOT's website.

2.4.2 State Highways

State highways are designed similar to freeways with emphasis on high mobility and high speed. These highways, however, are not generally grade-separated at intersections and can have traffic-control at intersections, particularly within municipalities. These are toll-free state-controlled highways. These are generally designed as arterials and major collectors throughout counties within the state.

State highways in Tooele County include:

- SR 36 – This highway runs north-south from the I-80 interchange in Lake Point through the county to Route 6 west of Eureka in Juab County. This highway passes through Lake Point, Mills Junction, Stansbury Park, Erda, Tooele, Stockton, Rush Valley, and Vernon.
- SR 112 – This highway runs east-west connecting Tooele and Grantsville. SR 112 is 8 miles long and intersects SR 138 and SR 36.
- SR 73 – This state highway crosses the border between Utah County and Tooele County. It runs east-west beginning in Eagle Mountain and intersecting SR 36 South of Stockton. Fairfield and Cedar Fort in Utah County are located along this highway.

¹² American Association of State Highway and Transportation Officials, A policy on Geometric Design of Highway and Streets, 7th Edition, 2018.

- SR 199 – This highway runs east-west with ends intersecting SR 196 near Dugway and SR-36 near Rush Valley. The highway is roughly 22 miles long and passes through the community of Terra.
- SR 196 – This highway connects the end of SR 199 to I-80 spanning the distance between Dugway and Rowley Junction. The highway runs north-south and passes through Iosepa.
- SR 138 – This highway begins at I-80 between Rowley Junction and Burmester and ends near the Tooele Valley Airport. This road travels through Grantsville and connects to SR 179.
- SR 179 – This highway is located west of Stansbury Park and spans the 3-mile stretch from the end of SR 138 to I-80.

2.4.3 Arterials

Principal arterials transport longer-distance traffic flow for regional, intercommunity, and commuting purposes. These streets typically have relatively high speeds and can carry sizeable traffic volumes for longer distances. Outside of municipalities, accesses and intersections are ideally spaced no less than one mile apart. Arterials should be designed with a primary focus on mobility and should be given priority at intersections with other roadways where applicable.

Principal arterials in Tooele County include:

- SR 36 from the I-80 interchange to the intersection with SR 73.
- SR 112 from SR 36 to SR 138.
- SR 73 from the county border to the intersection with SR 36.
- SR 138 from the I-80 interchange to the intersection with SR 112.

Minor arterials in Tooele County include:

- SR 138 from the intersection with SR 36 to the intersection with SR 112.
- Droubay Road from the intersection with 2400 North to the intersection with Vine Street.
- Vine Street from the intersection with Droubay Road to the intersection with SR 36.
- 1000 North from the intersection with Droubay Road to the intersection with SR 36.
- Utah Avenue from the intersection with SR 36 to the intersection with SR 112.
- Tooele Boulevard from the intersection with Utah Avenue to the intersection with Hanger Road.
- Wendover Boulevard from the state border to the I-80 interchange.

2.4.4 Major Collectors

Major collectors, like arterials, prioritize mobility and commuting traffic, however, they typically transport lower traffic volumes. These roadways connect minor collectors and local roads to arterials or highways. Access to residential developments and rural facilities is more common in major collectors than with arterials. Jeep Road and South Mormon Trail Road are examples of major collectors in Tooele County.

2.4.5 Minor Collectors

Minor collectors provide access by connecting communities and neighborhoods. These roads funnel traffic from major collectors or arterials to local roads. Many county roads that do not have the traffic volumes to be classified as major collectors are considered minor collectors. East Middle Canyon Road and Ophir Canyon Road are classified as minor collectors.

2.4.6 Local Roads

Local roads connect adjacent properties including residential buildings and commercial facilities. Local roads prioritize access over mobility. It is preferable that accesses be placed on local roads where possible, rather than arterials and collectors. Placing accesses on arterials and collectors requires frequent access points and intersections which leads to frequent stops and delays. Placing accesses on local roads can help to prevent these potential delays and stops. Local roads are designed to have lower speed limits and span shorter distances. They tend to have higher pedestrian traffic and are often built in a manner to discourage high amounts of through traffic. The majority of local roads fall within city and town limits throughout the county.

2.4.7 Vehicle Miles of Travel (VMT)

Vehicle Miles of Travel (VMT) is a method established federally to determine the amount of vehicular usage for a specified roadway. VMT is calculated as the total miles of vehicular travel for a specified roadway over a specified period of time. This characteristic and roadway mileage are useful in determining roadway functional classification. The Federal Highway Administration (FHWA) specifies the allowable percentages of roadway mileage and VMT per functional classification type. These limitations are specified to provide balance within the roadway network and ensure an appropriate number of arterials, collectors, and local roads throughout the system.

Federally established guidelines should be referenced in determining changes to classification of the roadway network.

The allowable percentages for each classification are shown in **Table 4**.

Table 4 - Allowable Percentage of Road Miles and VMT¹³

Functional Classification	Rural		Urban	
	Mileage	VMT	Mileage	VMT
Major Collectors	8%-19%	10%-23%	10%-17%	12%-24%
Minor Collectors	3%-15%	1%-8%	5%-13%	3%-10%
Local Roads	62%-74%	8%-23%	66%-74%	7%-20%

¹³ Federal Highway Administration, "Planning Processes: Statewide Transportation Planning," United States Department of Transportation, September 27, 2017. https://www.fhwa.dot.gov/planning%20processes/statewide/related/highway_functional_classifications/section03.cfm

2.5 Roadway Conditions

The current condition of each roadway is explained in this section. The condition of roadways serves as a basis for how well the transportation system functions and provides guidance for future roadway capital project planning and changes to future functional classification.

2.5.1 Travel Lanes

The majority of County-maintained roads within Tooele County consist of two travel lanes (one lane in either direction). Various roadway segments consist of more lanes, such as Pole Canyon Road. Almost all roadways with more than one travel lane in either direction are state highways. Many County roadways add left and right turn lanes at intersections, particularly collectors and arterials. The necessity of turn lanes can be determined by running a Level of Analysis (LOS) study or a Traffic Impact Study (TIS). LOS is explained in Section 2.6. TIS guidelines for the County are outlined in Section 5.

2.5.2 Surface Conditions

All states highways and arterials in Tooele County are paved. All roadways analyzed for traffic volume in this study are paved. Many of the rural and mountainous roads are unpaved with either dirt or gravel. A map is included in the online GIS Story Map showing the surface type of all roadways throughout the county. This map is also included in Appendix 2.

2.5.3 Traffic Volumes

Traffic volumes indicate the travel demand of existing roadways and their importance to the transportation network. Roadways with the highest traffic volumes generally have the greatest impact on the transportation network's functionality. How traffic volumes of a road compare to the road's designed capacity determine how well a road is functioning. The average daily traffic (ADT) is one of the most common metrics to analyze the amount of traffic a road experiences. ADT is calculated as the number of vehicles passing a certain point on a roadway on an average day in either direction. Traffic data is generally collected for 9 to 12 days and averaged to create an ADT. **Table 5** lists the ADTs for all of the roadways studied as part of the TMP analysis. Peak Hour Volume (PHV) is another characteristic used to assist in defining a road's functionality. The PHV represents the 60-minute period wherein a roadway received the highest volume of traffic. This will often be used instead of ADT in determining the LOS, as the PHV may be a better representation of whether or not a road is failing. Sometimes roadways receive high congestion for 1-2 hours of the day and lower traffic throughout the rest of the day. This high congestion period may not be represented by an ADT but will be represented by PHV. The PHV for each of the studied roadways is also included in **Table 5**. For the existing LOS analysis on these roadways, see Section 2.6. For the future LOS analysis on these roadways, see Section 3.2.

Table 5 - 2022 ADT for Selected Tooele County Roadways

Roadway	2023 ADT (Average Number of Vehicles per Day)	2023 PHV (Peak Vehicles per Hour)
2000 North	1,353	147
Bates Canyon Road	4,867	762
Bauer Road	550	94
Bermester Road	837	111
Castlerock Drive	1,347	199
Cochrane Lane	888	124
Copper St	306	50
Delle Interchange	1,262	183
Droubay Road	4,106	597
Ericson Road	486	58
Faust Road (East)	307	96
Ibapah Road	88	13
Mormon Trail Road (by Grantsville)	1,696	186
Mormon Trail Road (by Rush Valley)	608	70
Mormon Trail Road (South)	533	72
Ophir Canyon Road	277	68
Pole Canyon Road	2,241	255
Rowley Road	410	66
Silver Ave (West)	1,829	195
SR 138	3,415	595
SR 138 (Old Mill)	7,754	904
Stansbury Parkway	4,517	589
Village Boulevard (by SR 138)	4,932	671
Village Boulevard (by SR 36)	7,082	786

2.6 Level of Service

Traffic volumes, capacity, and other roadway characteristics are used to determine a level of service (LOS) rating. LOS measures the ability of a road to meet the traffic demand. LOS classifications are categorized with a letter rating "A", "B", "C", "D", "E", and "F". Free-flowing traffic is considered LOS "A", and maximum levels of vehicle congestion are considered LOS "F". A lower LOS rating (such as LOS "E" and LOS "F") indicates that the roadway is not functioning effectively and may cause mobility and safety concerns. A LOS "A" through "D" is considered acceptable for most applications. LOS "F" and LOS "E" roadways should be given highest priority for improvement. Some common roadway LOS improvement methods include:

- Adding turn lanes at congested intersections,
- Adding signalization at congested intersections,
- Adding extra travel lanes,

- Adjusting existing roadway geometrics such as lane width and roadway design,
- Adjusting speed limits,
- Establishing alternative roadways to function as redundancies, and
- Improving mobility at accesses by either removing accesses or adding slip or merge lanes.

Before any improvements are integrated, all safety concerns and relevant city, county, state, and federal standards should be addressed.

A visual representation of the LOS categories is included as **Figure 2**.

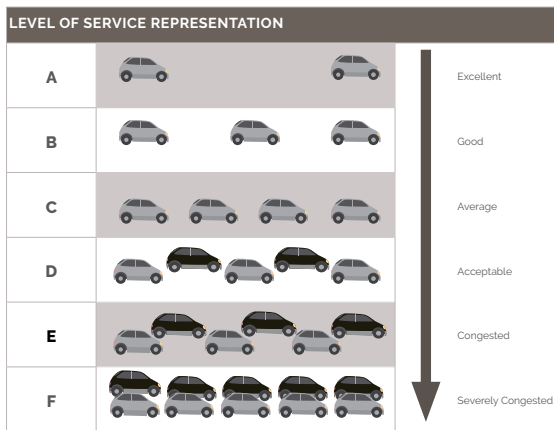


Figure 2 - Roadway Level of Service Representation

LOS is determined differently for highways and for intersections. Often on a rural road or freeway, the LOS will be determined based on highway travel. On local roads, which generally have more intersections and access points, intersection LOS will usually be the controlling LOS factor. Highway LOS is often measured in terms of volume to capacity (V/C) ratios, and intersection LOS is measured in terms of vehicle delay (in seconds/vehicle).

2.6.1 Volume to Capacity Ratios

The volume to capacity ratio (V/C) measures the traffic density of a road segment by comparing a road's traffic volume to the road's capacity. A V/C ratio of 1.0 signifies that the road is at its maximum capacity of traffic volume which leads to serious congestion and typically operates at a LOS F. The closer a roadway V/C is to 1.0, the more congested the roadway will be.

2.6.2 Existing LOS Analysis

The existing LOS for the studied roadways is included in **Table 6**.

Table 6 - 2022 LOS for Selected Tooele County Roadways

Roadway	2023 LOS
2000 North	A
Bates Canyon Road	B
Bauer Road	A
Bermester Road	A
Castlerock Drive	A
Cochrane Lane	A
Copper St	A
Delle Interchange	A
Droubay Road	A
Ericson Road	A
Faust Road (East)	A
Ibapah Road	A
Mormon Trail Road (by Grantsville)	A
Mormon Trail Road (by Rush Valley)	A
Mormon Trail Road (South)	A
Ophir Canyon Road	A
Pole Canyon Road	A
Rowley Road	A
Silver Ave (West)	A
SR 138	A
SR 138 (Old Mill)	C
Stansbury Parkway	A
Village Boulevard (by SR 138)	B
Village Boulevard (by SR 36)	C

2.6.3 Recommendations

All studied County roadways currently function in an acceptable LOS ("A" to "C"). The roadways that are nearest to approaching an unacceptable LOS are Village Boulevard (by SR 36) and SR 138 (by Old Mill). However, these roadways could still transition into a LOS "D" and be considered acceptable. Based on these and existing UDOT traffic counts, a traffic model was created by Wall Consultant Group addressing several scenarios. This model was created to assess "No Build" and "Build" scenarios for the 30-year horizon to determine necessary future road projects and future network functionality. A memo summarizing the study process is included in **Appendix 4**.

The results of the LOS study have been incorporated into this Transportation Master Plan. These results include mapping of existing and future networks, and LOS mapping for existing and future network scenarios. See Section 3.2.2 for a more detailed summary of the study. The LOS maps are included in **Appendix 4**.

2.7 Traffic Crash Data

A record of all vehicular crashes throughout the state is maintained by the Utah Department of Public Safety (UDPS). This data can be accessed on the UDPS's Numetric website. Information from the website has been organized into tables and figures included in the County's Transportation Safety Action Plan, included in this report. See Section 4 for the County's Safety Action Plan.

2.8 Revenue Sources

Funding for the maintenance and construction of existing transportation facilities comes primarily the Tooele County general fund, federal funds, and State Class B and C funds. Funding for local transportation projects consists of a combination of federal, state and local revenues. However, this funding total is not entirely available for transportation improvement projects because annual operating and maintenance costs must be deducted from the total revenue. In addition, the County is limited in its ability to subsidize the transportation budget from general fund revenues.

2.8.1 State Class B and C Program

The distribution of Class B and C Program monies is established by state legislation and is administered by UDOT. Revenues for the program are derived from state fuel taxes, registration fees, driver license fees, inspection fees, and transportation permits. Seventy-five percent of funds derived from the taxes and fees are kept by the Utah Department of Transportation for construction and maintenance programs. The remaining twenty-five percent is made available to counties and cities.

Class B and C funds are allocated to each County and City by a formula based on population and road mileage. Class B funds are given to counties, and Class C funds are given to cities and towns. **Table 7** identifies the method used to allocate class B and C road funds.

Table 7 - Apportionment Method of Class B and C Funds

Based on	Of
50%	Roadway Mileage
50%	Total Population

Class B and C funds can be used for maintenance and construction of roadways; however, thirty percent must be used for construction or maintenance projects that exceed \$40,000. Class B and C funds may also be used to match federal funds or to pay the principal, interest, premiums, and reserves for issued bonds. **Table 8** identifies funds allocated to Tooele County for the fiscal years 2018 to 2022.

Table 8 - Class B & C Roadway Funds Allocated by Fiscal Year¹⁴

Year	1st Payment	2nd Payment	3rd Payment	4th Payment	5th Payment	6th Payment	TOTAL
2018	\$413,271.94	\$545,433.58	\$442,300.09	\$494,104.48	\$562,657.68	\$537,530.42	\$2,995,298.19
2019	\$457,157.27	\$580,050.33	\$558,070.37	\$465,390.10	\$543,068.99	\$691,168.43	\$3,294,905.50
2020	\$410,828.77	\$661,580.03	\$555,347.57	\$486,630.23	\$597,902.28	\$564,729.56	\$3,277,018.44
2021	\$486,909.80	\$593,752.47	\$537,425.14	\$554,162.72	\$626,156.05	\$812,423.30	\$3,610,829.48
2022	\$469,823.19	\$610,802.84	\$629,326.35	\$592,914.55	\$571,317.36	\$798,781.97	\$3,672,966.26

2.8.1.1 Interagency Agreements

Some roadways that are maintained by a county or city may lie within the boundary of another entity. This occurs most commonly when a county-maintained road is within the municipal limits of a city within that county. There are several roadways that are within city/town limits throughout the county that are maintained by the County. The Utah Department of Transportation has recently started requiring an interagency agreement to be established between entities regarding such roadways in order for said roadways to be eligible for Class B & C Road funds. This is done to ensure that counties, cities, and towns are receiving the correct amount of funding based on the amount of road mileage they are responsible for maintaining.

2.8.2 Federal Funds

Federal funds are available to cities and counties through the federal aid program. These funds are administered by the Utah Department of Transportation. In order to be eligible, a project must be listed on the five-year Statewide Transportation Improvement Program (STIP).

The Surface Transportation Program (STP) provides funding for any road functionally classified as a collector street or higher. STP funds may be used for a range of projects, including rehabilitation and new construction. Fifty percent of the STP funds are allocated to urban and rural areas of the state based on population. Thirty percent can be used in any area of the State at the discretion of the State Transportation Commission. The remaining twenty percent must be spent on highway safety and enhancement projects. Transportation enhancements include ten categories, some of which are historic preservation, bicycle and pedestrian facilities, and water runoff mitigation.

Other federal funding opportunities such as the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grants and Safe Routes to Schools (SRTS) can be available to the County upon application.

Tooele County is in UDOT's Region Two. Money for specific projects in the study area varies depending on what is planned for UDOT's Region Two each year. Because federal funding is not necessarily allocated annually it is not listed here as part of the study area's transportation revenue.

2.8.3 Local Funds

Tooele County, like most counties, may use general fund revenues in its transportation program. It is also possible to improve the County's transportation facilities through some type of bonding arrangement, either through a redevelopment district or special improvement district. These districts are organized for the purpose of funding a single, specific project that benefits an identifiable group of properties. Bonding arrangements under general obligation are another source of financing for projects that are deemed to benefit the whole entity issuing the bond.

2.8.3.1 Special Service District

Tooele County has a Transportation Special Service District (TSSD) which receives revenue from several sources. The TSSD was certified by the Lieutenant Governor on October 6, 2009. The District was established to provide these services: "construction, repair, and maintenance of roads within the area included within its boundaries, through facilities or systems acquired or constructed for that purpose through construction, purchase, lease, contract, gift, or condemnation."¹⁵ The primary source of revenue for the TSSD is mineral leases. In 2022 the anticipated revenue was \$300,000 from mineral leases and a total revenue of \$380,000. This revenue was transferred to other funds including the Recreation Special Service District.¹⁶

2.8.4 Private Sources

Private interests often provide sources of funding for transportation improvements. Developers construct local streets within new subdivisions and commercial lots. They often dedicate right-of-way and participate in improvements to collector or arterial streets adjacent to their developments. For example, this may include paying partial or complete costs for a traffic signal, turn lane, or median. Due to the impacts of the development on the county, developers can also be considered as potential sources of funding for projects.

Tooele County requires that all new commercial, manufacturing, and industrial developments perform a Traffic Impact Study (TIS) to determine the necessity of additional roadway improvements and the impact of the development on the roadway network. Other new developments may be required to perform a TIS as well. TIS standards are included in this document in Section 5. These standards outline which developments will necessitate a TIS and the scope of the TIS, if required.

2.8.5 Bicycle Facilities

The Federal Highway Administration categorizes bicycle users by three types: Interested but Concerned, Somewhat Confident, and Highly Confident. Figure 3 illustrates the three types of cyclists as well as an estimated percentage of the population that falls into each category as described by the Federal Highway Administration (FHWA). Because of the variable nature of bicyclist comfort, several alternatives should be available to cyclists throughout the County.



Figure 3 - Bicyclist Design User Profiles¹⁷

Tooele County does not currently have an integrated bikeway network constructed but has established an Active Transportation Implementation Plan written in 2018.¹⁸ A map of the future Tooele County future active transportation system is included in Appendix 3 and in the online Story Map. Routes included in these maps are not officially planned, and the County is not required to construct the routes included in the map. This map serves as a guideline for future active transportation planning and development.

Additional 30-year (2021-2050) planning has also been performed by UDOT with the coordination of the County, and this planning is anticipated to continue.

A bikeway selection guide document created by the United States Department of Transportation identifies the benefits and weaknesses of each bikeway design type. In this document, the bike network in the Netherlands is referenced and described in detail, which may be beneficial when designing future bicycle networks. The Netherlands has built one of the safest transportation systems in the world with high levels of active transportation integration. Since the Netherlands switched to their Sustainable Safety program in the early 1970s transportation-related fatalities have decreased by more than 80 percent. Their Sustainable Safety program follows five key design principles:¹⁹

1. Functionality - Defining roadways by functional classification ensures that design balances accessibility, speed, and safety (see Section 2.4).
2. Homogeneity - Roadways with higher pedestrian access should be designed with slower speed limits and/or increased and clearly defined separation.
3. Predictability - Roadway design should encourage drivers to follow speed limits and other posted guidelines.
4. Forgiveness - Roadway design should account for and plan on human error. Design should be intended to mitigate severe crashes.
5. State Awareness - Individual drivers, cyclists, and pedestrians should be educated and aware of existing traffic rules.


¹⁵ Utah.gov, "Tooele County Transport SSD Creation 6-16-09.pdf". Accessed July 3, 2023. <https://municipal.utah.gov/Media/Default/Municipal%20Certifications/2009/Special%20Service%20Districts/tooele%20county%20transport%20ssd%20creation%206-16-09.pdf>.

¹⁶ Tooele County - Transportation Special Service District. "2022 Proposed Budget." Accessed July 3, 2023. <https://tooeleco.org/wp-content/uploads/2022/01/2022-tssd-approved-budget.pdf>.

¹⁷ Federal Highway Administration, "Bikeway Selection Guide". United States Department of Transportation, February 2019. https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasat8077.pdf.

¹⁸ Tooele County, "Tooele County Active Transportation Implementation Plan". Tooele County, November 2018. <https://tooeleco.org/wp-content/uploads/2019/07/tcaip-final.pdf> Tooele County Transportation Master Plan | 12

¹⁹ Ibid



Safety factors need to be considered in roadway design, especially with active transportation integrated design. As Tooele County seeks to integrate active transportation into the transportation network design precautions should be considered to ensure the safest and most efficient implementation of bikeways. The FHWA classifies six different bikeway types:²⁰

1. Shared Lanes
 - a. In this design approach bicyclists are provided a roadway lane concurrent to vehicular traffic. This is perhaps the most affordable solution, but if applied incorrectly can lead to increased traffic safety concerns.
2. Boulevards
 - a. In this design approach bicyclists are provided with roadway priority equal to vehicles. The travel lane is designated as a bicycle lane. This is most effective on local streets with low volumes and low speeds. This approach has increased safety over shared lanes but is not suggested for all contexts, especially when vehicles demand highest priority.
3. Advisory Bike Lanes
 - a. In this design approach bicyclists and motorists are expected to share the roadway with a marked separation line for bicyclists. This is most effective when availability of roadway width is limited. This requires public education and is not recommended for use in Tooele County at this time.
4. Shoulders
 - a. In this design approach widened roadway shoulders are paved with the intention of allowing sufficient roadway width for bike travel without requiring a designated bike lane or bike path. This is most practical out of city limits on highways (preferably with lower speed limits).
5. Bike Lanes
 - a. In this design approach bicyclists are afforded a lane adjacent to travel lanes. This design differs from shared lanes in that the bike lane is specifically delineated as a separate lane.
6. Separated Bike Lanes (Bike Path)
 - a. In this design approach the bike lane is separated from the roadway by a buffer, curb, parking, or some other separator. This is the safest design but tends to be the most expensive as well. This method also differs from the other five methods in that a bike path may be multidirectional on one side of the road.

Separated bike lanes and bike lanes should be given priority in design where possible. On rural roadways, shoulders should also be considered. Bike path options that require roadway lanes to be shared between motorists and bicyclists should be given lower priority and should only be considered when roadway widths and other constraints do not permit more established and well-known alternatives.

2.9 Rail System

Proposed rail lines in the County are shown in Appendix 1 on the Future Roadway Classification map. Currently, the only rail line proposed is a line connecting the rail by the Burmester 1-80 Interchange to the rail by the Utah Motorsports Campus west of Tooele City.

Rural railroad crossings are typically controlled by stop or yield signs and drivers are responsible to look down the track for oncoming trains. Train operators are also required to sound their horns when approaching these types of crossings. This is acceptable in undeveloped rural areas. As development – especially residential development – occurs around these crossings in the Tooele Valley, the County should coordinate with UDOT and the appropriate railroad company to establish railroad crossings that address functionality and safety.

²⁰ Federal Highway Administration, "Bikeway Selection Guide", United States Department of Transportation, February 2019, https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasat8077.pdf

3 FUTURE GROWTH

3.1 Land Use and Transportation

Land use and transportation work together to create a desirable and well-functioning community. Zoning, street classification, and new development will guide how Tooele County grows. Transportation planning must align with the goals of the County to provide improved access and mobility. The Tooele County General Plan includes a land use element and a transportation element. This document is beneficial in improving coordination between departments and should be referenced for future planning and zoning decisions, where necessary. Additional coordination between zoning, transportation, and other planning departments should occur frequently. A lack of coordination when planning can easily lead to ineffective use of land and an ineffective transportation network.

Tooele County has 28 zoning districts, as established in the County's Land Use Ordinance²¹. The Land Use Ordinance can be accessed on the County's website. An interactive online zoning map can be accessed on the County's website. A link to the Tooele County GIS page is included in the Documents section of the online Story Map.

Existing zoning was referenced in establishing the future roadway classification map. Zoning was also referenced in determining roadway functionality and LOS.

3.2 Future Tooele County Roadway System

Roadway projects are selected in part based on the analysis provided in this document. The recommended project list includes projects that were determined based on the following key factors:

- Improving roadways with geometric issues,
- Improving roadways with safety concerns,
- Improving roadways with additional capacity needs,
- Improving roadways that have fallen into a state of poor repair or disrepair,
- Constructing new roadways needed to add redundancies and provide alternatives to the transportation network,
- Incorporating new and existing roadways into other local, state, and federal networks, and
- Expanding the County's active transportation network.

Included in **Appendix 1** and the online Story Map is the future roadway classification map. This map shows the proposed future roadway system in the County. These figures are schematic in nature and do not represent actual road alignments or curves. The primary focus of the plan is on improving arterial, major collector and minor collector roadways. Little detail is given for residential standard and residential private roadways to allow flexibility as development occurs between the collectors.

In planning the future roadway network, the County seeks to address access management guidelines. Access management

ensures that future roadways are not constructed too close together or improperly placed. This ensures that all roadways are better suited to function at the design mobility. Traffic signal standards were also addressed in establishing the future network. The minimum acceptable traffic signal spacing on a minor arterial is typically one-quarter mile but varies based on the UDOT classification of the roadway. For more information on access management and spacing considerations, see Section 7. At some locations, additional right-of-way may be necessary on roadways above and beyond what is shown on the proposed future roadway system maps to accommodate for future travel and auxiliary lanes, such as acceleration, deceleration, and turn lanes.

Frontage roads (or access roads) are an important element of access control in areas with limited access right-of-way and plenty of open space. The frontage roads provide access from collector roadways coming off arterials. Providing commercial development frontage along an arterial while limiting direct access is the best approach.

UDOT was involved in the planning process to ensure that roadways and highways impacting its transportation network constructed throughout the County are congruous with UDOT's network. The establishment of new highways requires in-depth studies and long-term planning. UDOT's assistance in planning and funding is necessary for the construction of new highways. UDOT is responsible for all state highways.

3.2.1 UDOT's Statewide Transportation Improvement Program

UDOT's Statewide Transportation Improvement Program (STIP) is a five-year plan of highway and transit projects for the State of Utah. The STIP is maintained daily and includes transportation projects on the state, city, and county highway systems as well as projects in the national parks, national forests, and tribal lands. These projects use various federal and state funding programs.

UDOT has programmed funds in the Statewide Transportation Improvement Plan (STIP) for the following roadways in Tooele County (**Table 9**):

²¹Tooele County, Land Use Ordinance. Accessed July 5, 2023. <https://tooeleco.org/government/county-departments/community-development/land-use-ordinance-of-tooele-county/>

Table 9 - UDOT Statewide Transportation Improvement Plan

Project Name	Estimated Start Year	Estimated Project Value	Project Primary Concept	Project Start Location	Project End Location
SR-36 SB Sunset Ln to Stansbury Pkwy	2024	\$7,000,000	Widen Existing Facility	MP 61.28	MP 65.12
SR-138 Park & Ride	2022	\$1,506,986	UTA/Transit	Willow Band Circuit	Lamb Lane
SR-179 Midvalley Highway	2019	\$69,400,000	Transportation Alternatives	MP 0.00	MP 4.00
Knolls Interchange Bridge Rehabilitation	2021	\$2,700,000	Rehabilitation or Replacement	MP 0.00 MP 41.14	MP 0.30 MP 41.38
I-80 EB Auxiliary Lane	2024	\$27,500,000	Widen Existing Facility	MP 99.00 MP 61.06	MP 101.30 MP 65.80
Grantsville Sidewalk Project	2021	\$594,100	Transportation Alternatives	Durfee Street	Pear Street
Tom's Lane South Extension	2023	\$1,585,665	Roadway Extension	Church Road	Cochrane Lane
Burmester Road Improvement	2024	\$2,383,700	Non-Urban	Industrial	Riddle
33rd Parkway in Tooele County	2023	\$4,559,000	Small Urban	SR-36	Sheep Lane

For a complete list of planned county roadway capital project for the upcoming 20-year scope, see Section 6.

3.2.2 Future Level of Service Analysis

Roadways that received 2023 Traffic Counts also received a future LOS analysis. The LOS of each roadway for every five years within the twenty-year scope is included in Table 10.

Table 10 - Roadway Level of Service for Selected Roadways - No Build

Project Name	2023 LOS	2028 LOS	2033 LOS	2038 LOS	2043 LOS
2000 North	A	A	A	A	A
Bates Canyon Road	B	B	B	C	C
Bauer Road	A	A	A	A	A
Burmester Road	A	A	A	A	A
Castlerock Drive	A	A	A	A	A
Cochrane Lane	A	A	A	A	A
Copper St	A	A	A	A	A
Delle Interchange	A	A	A	A	A
Droubay Road	A	B	C	D	E
Ericson Road	A	A	A	A	A
Faust Road (East)	A	A	A	A	A
Ibapah Road	A	A	A	A	A
Mormon Trail Road (by Grantsville)	A	A	A	A	A
Mormon Trail Road (by Rush Valley)	A	A	A	A	A
Mormon Trail Road (South)	A	A	A	A	A
Ophir Canyon Road	A	A	A	A	A
Pole Canyon Road	A	A	A	A	A
Rowley Road	A	A	A	A	A
Silver Ave (West)	A	A	A	A	A
SR 138	A	A	A	A	B
SR 138 (Old Mill)	B	B	B	C	C
Stansbury Parkway	A	B	B	B	C
Village Boulevard (by SR 138)	B	B	B	C	C
Village Boulevard (by SR 36)	C	C	D	E	E

All roadways functioning at LOS "D" have been bolded. It is recommended that these roadways receive an additional in-depth study within five years of becoming LOS "D" to determine necessary alterations. All roadways functioning at LOS "E" have been bolded with red font. LOS "E" is considered unacceptable and should be avoided where possible.

County roadways at greatest risk of falling into an unacceptable LOS are Village Boulevard, SR 138, and Droubay Road. Village Boulevard and SR 138 are anticipated to take greater traffic volumes as development expands because of their proximity to I-80 and SR 36. The County has included in its Transportation Improvement Plan (TIP) an extension of Village Boulevard to connect it to the Midvalley Highway. This along with other improvements will help maintain adequate mobility on these roadways. Droubay Road is anticipated to take greater traffic volumes because it is currently the only major north/southbound redundancy roadway connecting Tooele City to I-80 and the Salt Lake Valley. Improvements should be made to better suit Droubay Road for these increased volumes. Additional redundancy corridors such as the Oquirrh Expressway are also recommended to prevent an unacceptable LOS on Droubay Road.

If a further in-depth analysis determines that additional alterations are necessary, steps should be taken to ensure that roadways do not fall into an unacceptable LOS category.

3.2.2.1 Travel Demand Modeling

Included in this section is a summary of the work completed by Wall Consultant Group (WCG). A memo from WCG including greater detail on the modeling is included in Appendix 4. The travel demand modeling used existing traffic volumes and patterns to determine future build out and provide recommendations for preventing unacceptable congestion across the county. A key emphasis of the model was addressing the limited number of connections between Tooele County and Salt Lake County. Several alternatives and proposals were addressed in the future modeling and more detail can be found in the memo included in Appendix 4.

Data used in the travel modeling included:

- UDOT 2019 Average Annual Daily Traffic (AADT) Count Data
- UDOT Automated Traffic Signal Performance Measures (ATSPM)
- Continuous Count Station (CCS) Data at the SR-36 Ramps with I-80

Several scenarios were studied in the travel model. These scenarios were selected to assist the County in determining which road improvements are necessary and when they will be most effective. The scenarios are as follows:

- 2023 (Base-year model)
- 2033 No Build
- 2033 Build
- 2050 No Build
- 2050 Build
- "Build Out" No Build
- "Build Out" Build

Population and traffic growth throughout the county were based on refined UDOT planning figures. Base year (2023) household and employment estimates were developed by Utah Department of Transportation (UDOT) for the Utah Long-Range Transportation Plan (2023 – 2050) then refined for this transportation master plan. UDOT's projected growth of population/households and jobs were refined based on a review of recent development, future development plans, and input from stakeholders. The "Possible Build-out" scenario was estimated on based all available developable land in the Tooele valley developing to modest densities. This scenario was developed to understand possible long-term roadway cross sections needed.

The following table (Table 11) was used in determining the LOS of roadways.

Table 11 - LOS Capacity Criteria

Lanes	LOS A-C	LOS D	LOS E	LOS F
2	< 9,375	9,375 to 10,625	10,625 to 12,500	> 12,500
3	< 13,350	13,350 to 15,130	15,130 to 17,800	> 17,800
5	< 28,500	28,500 to 32,300	32,300 to 38,000	> 38,000
7	< 43,500	43,500 to 49,300	49,300 to 58,000	> 58,000

All travel modeling results for each scenario listed can be seen in maps included in Appendix 4.

3.2.3 Speed Analysis

Speed data was collected from traffic counts performed with this study. Included in Table 12 is the average speed, high speed, 85th percentile speed, and speed limit for each roadway studied. Generally, in transportation planning and design the 85th percentile speed is used as a key factor in determining roadway speed limit. Other important factors in roadway speed limit determination include traffic patterns, ADT data, vehicle crash history, access management and spacing, intersection controls, and existing safety concerns such as clear zone obstructions, limited sight triangle distances, and bridge and culvert crossings. It is recommended that the County assess the speed data to assist in determining any potential speed limits alterations. All required geometric design, safety, and other standards by both the County and AASHTO must be followed when adjusting roadway speed limits. In Table 12, all 85th percentile speeds 5 miles per hour greater than the existing speed limit have been italicized. Roadways with an 85th percentile speed 10 miles per hour greater than the existing speed limit have also been bolded.



Table 12 - Roadway Speed Analysis for Selected Roadways

Roadway	Speed Avg	Speed High	85th Percentile Speed	Speed Limit
2000 North	30	64	34	35
Bates Canyon Road	34	87	40	35
Bauer Road	33	50	40	35
Bermester Road	56	114	65	40
Castlerock Drive	12	45	15	25
Copper St	32	50	38	25
Delle Interchange	14	43	18	25
Droubay Road	45	100	50	45
Ericson Road	27	68	33	25
Faust Road (East)	53	85	65	55
Ibapah Road	60	88	69	60
Mormon Trail Road (by Grantsville)	40	81	56	55
Mormon Trail Road (by Rush Valley)	65	83	82	55
Mormon Trail Road (South)	49	85	66	55
Ophir Canyon Road	39	53	47	25
Pole Canyon Road	26	69	33	35
Rowley Road	72	121	84	60
Silver Ave (West)	42	62	48	40
SR 138	64	120	70	65
SR 138 (Old Mill)	46	91	51	45
Stansbury Parkway	20	59	30	35
Village Boulevard (by SR 138)	27	65	31	35
Village Boulevard (by SR 36)	31	64	35	35

3.2.4 Schedule of Intersection Signalization

There is currently one signalized intersection that is under the jurisdiction of the County. All other signalized intersections are located on state highways or entirely within municipal boundaries. Based on the level of service modeling, it is anticipated that there will be additional intersections within the County which will need signalization before 2050. Since UDOT owns most of the high-ADT roadways located within the county, most of the potential signalized intersections will be on state highways. These locations are governed by UDOT, and timing and construction of these improvements will be handled by UDOT. However, there may be signals on county roadways that will require signalization.

As the need for intersection signalization throughout the county increases, it is recommended that the county establish standards for traffic signal needs studies.

The County has established standards for Traffic Impact Studies in Section 5 of this TMP. These standards may require certain developments to construct traffic signals, depending on the development's proposed changes to the transportation network.

Recommendations for items to require in a traffic signal needs study are included in Section 3.2.4.1

3.2.4.1 Traffic Signal Needs Studies

A traffic signal needs study should be conducted for all new proposed signals for the base year. If warrants are not met for the base year, they should be evaluated for each year in the five-year horizon. Studying traffic signal needs should be conducted by a method pre-approved by the County and address the following:

- Speed Considerations

Vehicle speed is used to estimate safe stopping and cross corner sight distances. In general, the posted speed limit represents the 85th percentile speed. The design speed of the roadway should be used to calculate safe stopping and cross corner sight distances.

- Improvement Analysis

The roadways and intersections within the study area should be analyzed, with and without the proposed development, to identify any projected impacts in regard to LOS and safety.

Where the highway will operate at LOS C or better without the development, the traffic impact of the development on the roadways and intersections within the study area should be mitigated to LOS D for arterial and collector streets and LOS C on all other streets during peak hours of travel.

3.3 Proposed Future Road Phasing

As cities and towns develop and expand, land throughout the county will be annexed. As part of the annexation process, county roadways may be adopted by municipalities. However, the County wishes to maintain control of some of these roadways. The County already maintains control of some roadways existing within municipal boundaries. A proposed future road phasing map outlines which existing and future roads are recommended to maintain under control of the County. This map includes all roadways from the future functional classification map. This map also outlines when these roadways are phased to be constructed. This map can be found in **Appendix 8**. An interactive version of the map is also available on the online Story Map.

3.4 Tooele Valley - Salt Lake Valley Connectivity

One of the leading transportation concerns faced by Tooele County is connectivity between the Tooele and Salt Lake valleys. I-80 is currently the only paved connection between the two valleys. This presents serious concerns for congestion and safety, particularly with the unprecedented growth experienced by the county in recent years. As part of this plan, several alternatives were studied and considered to address this problem.

There are two corridors that could be considered as potential options for alternative highway connections.

Oquirrh Expressway – The Oquirrh Expressway is a proposed highway that could be constructed from 2800 North in Tooele to SR 201 at the northeast county border. SR 201 ends at the county border, merging onto I-80. The proposed Oquirrh Expressway alternative would connect to SR 201 at this interchange, allowing SR 201 to continue into Tooele County. Currently, if I-80 is delayed from traffic, a crash, construction, or any other cause, there is no alternative route for vehicles to take. This highway would act as a critical redundancy road for I-80, allowing vehicles to diverge from I-80 and enter the valley through an alternative route. This option has been included in the future network analysis (see Section 3.2.2.1). It is also included in the “Build” scenario travel demand modeling. The Oquirrh Expressway is included in the Short-range Transportation Improvement Plan (See Section 6.2) and in future functional class and phasing mapping in the online GIS Story Map. Public opinion on this proposed corridor has been mixed.

Butterfield Canyon Highway – The Butterfield Canyon Highway is another alternative route which directly connects Tooele City to Herriman City in the Salt Lake Valley through the Butterfield Canyon. This option has been explored by UDOT but has not been a part of any of the studies included in this planning document.

4 TRANSPORTATION SAFETY ACTION PLAN

4.1 Study Purpose

Tooele County seeks to establish an improved safety and quality of life framework that magnifies the efficacy of its transportation network. Through this process, the County ultimately seeks to implement a strategy to accomplish net-zero transportation-related fatalities. This is accomplished through the following framework:

- Analyzing existing County roadways, planning documents, and traffic inventory data (i.e., traffic crash occurrence, roadway ADT, and socioeconomic and demographic data) to guide safety planning;
- Establishing a quality of life framework that guides transportation planning and development standards within the County;
- Establishing a "living" transportation master planning document that can be updated to fit the evolving transportation and safety demands of the County; and
- Establishing specific and measurable safety goals that will influence maintenance, design, and planning of County roadways as well as education and enforcement procedure.

4.2 Existing Roadway Inventory

4.2.1 Demographic and Socioeconomic Inventory

An existing roadway inventory included in the Transportation Master Plan (TMP) establishes the existing and future socioeconomic characteristics of the County. These socioeconomic factors play a key role in determining the demands placed upon the existing and future roadway network. This can be found in Section 2.2.

4.2.2 Roadway Functional Classification Maps

An existing roadway functional classification map has also been developed in the TMP as well as a future functional classification map. This map corresponds to the Utah Department of Transportation's (UDOT) existing functional classification map. This has been done to improve coordination and reliability of transportation planning throughout the County and the State. Establishing both existing and future functional classification maps improve the planning capabilities of the County. It provides the County with a framework for the location of future developments. These factors improve the safety of future design and development by ensuring that poorly placed, unneeded, or ineffectively designed developments are avoided and preference is provided to safer, more efficient, better organized development. Roadway functional classification maps can be found on the online story map or in **Appendix 1** of the TMP.

4.2.3 Roadway Traffic Volume and Level of Service

Roadway Average Daily Traffic (ADT) and Level of Service (LOS) for integral County roadways were analyzed as part of the creation of the Tooele County TMP. This data is critical in

determining the safety of future roadways. Roadways with higher traffic volumes, particularly those which intersect with other roadways having higher traffic volumes, are generally at greater risk of vehicle crashes than those with lower traffic volumes. This data in conjunction with existing and historical traffic and crash occurrence patterns aids the County in determining those roadways and intersections with the greatest demand for improvement and modification. ADT and LOS data can be found in maps on the online Story Map, in **Appendix 2** and **Appendix 4** of the TMP, respectively, and in Sections 2.5, 2.6, and 3.2 of the TMP. Traffic count reports, including ADT, speed data, and vehicle classification data are included in **Appendix 9**.

4.2.4 Traffic Crash History

Numeric, sponsored by the Utah Department of Public Safety's Highway Safety Office collects all police-reported traffic crashes throughout the state of Utah. Data collected from Numeric from 2011 to 2023 is included in **Table 13** and **Figure 4**. Both **Table 13** and **Figure 4** represent the same dataset, just in alternative formats. A heat map of traffic crash locations and intensities and a Numeric report on key traffic crash statistics is included in **Appendix 5**. The heat map is also included in the online GIS Story Map.

Table 13 - Traffic Crash Data²²

Year	Total Accidents	Total Injuries	Total Fatalities
2011	842	265	9
2012	948	257	17
2013	1,100	263	8
2014	1,016	271	11
2015	1,164	307	15
2016	1,231	331	18
2017	1,142	363	9
2018	1,106	316	9
2019	1,225	348	4
2020	1,101	362	10
2021	1,246	440	15
2022	1,237	422	13
2023*	693	179	5
Average	372	105	4

*Data from 2023 does not represent the entire year and is accurate from January 1 to June 30.

²² Utah Department of Public Safety's Highway Safety Office, Utah Crash Summary, Utah Department of Public Safety, Accessed July 14, 2022. <https://urtps.numeric.net/utah-crash-summary/#/>.

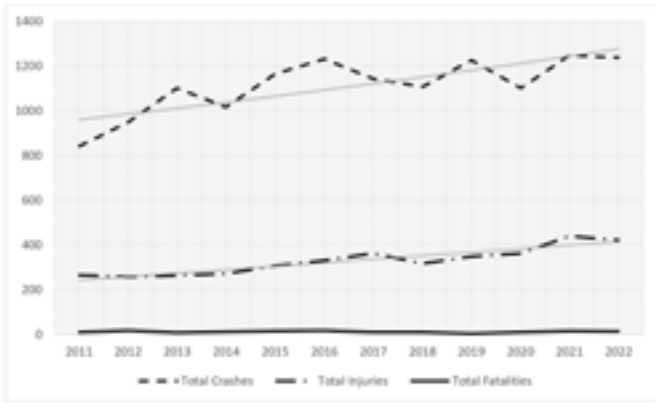


Figure 4 - Traffic Crash Data²²

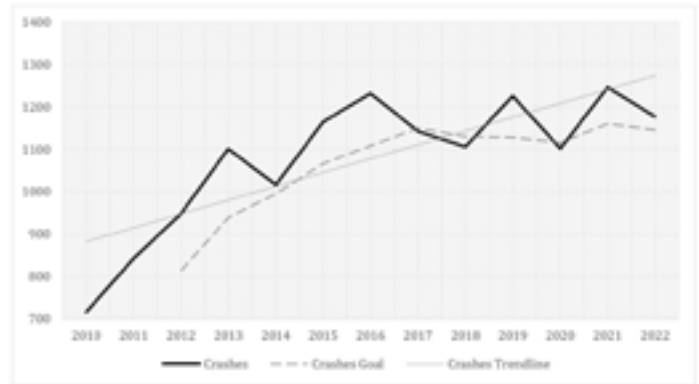


Figure 5 - Tooele County Vehicle Crash History (2010-2022)

4.2.5 Safety Performance Measures

Tooele County seeks to follow UDOT's fatality, injury, and crash prevention goals. The target for Tooele County matches that of UDOT: to reduce fatalities, injuries, and crashes by 2.5 percent below the three-year average every year. Tooele County's goal is to achieve zero fatalities by the year 2062. The 2022 three-year average for traffic fatalities was 12.35 which is slightly higher than the decade average (2013-2022) of 11.20. The 2022 three-year average was the highest fatality average in the past five years. Tooele County's goal is for this to be the highest three-year fatalities average moving forward. By reducing the fatality rate by 2.5 percent each year, the County plans to reduce the fatality rate to zero per year by 2062, forty years from the creation of this transportation master plan. In order to accomplish this, the County would need to reduce the average fatalities by approximately one every four years.

Figure 5 shows the County's vehicle crash history from 2010 to 2022 and what that 2.5% crash reduction goal would have looked like based on historic values. **Figure 6** and **Figure 7** show the same, but for serious crash injuries and fatalities, respectively.

Based on a linear growth trend, the average year-over-year increase in traffic crashes is 2.8 percent. The average year-over-year increase in traffic injuries is 4.3 percent. The average year-over-year increase in traffic fatalities is 0.2 percent.

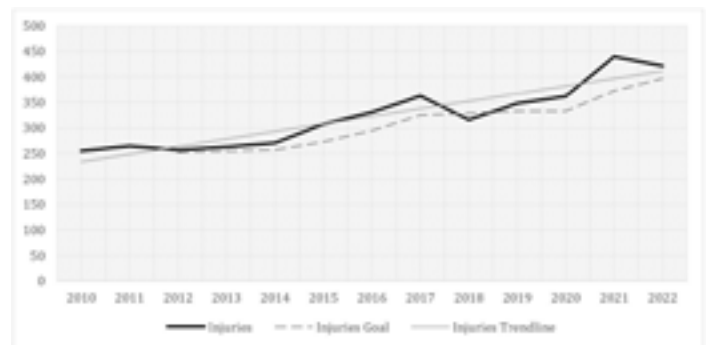


Figure 6 - Tooele County Vehicle Crash Injury History (2010-2022)

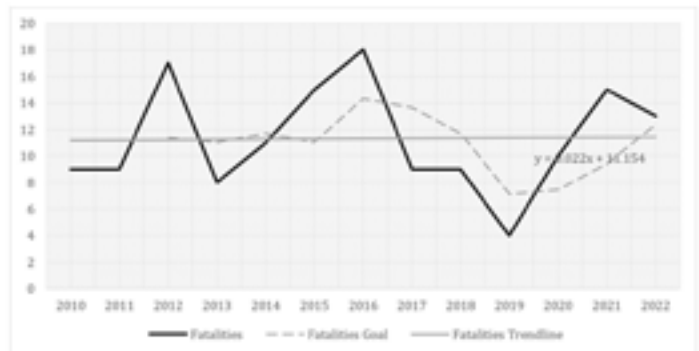


Figure 7 - Tooele County Vehicle Crash Fatality History (2010 to 2022)

Figure 8 shows the County's 2.5% crash and serious injury crash reduction goal moving forward. Figure 9 shows the 2.5% reduction in fatalities goal.

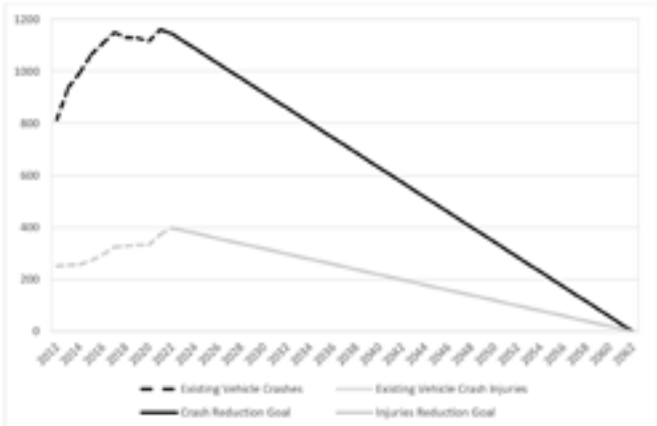


Figure 8 - Tooele County Vehicle Crash & Injury Reduction Goal

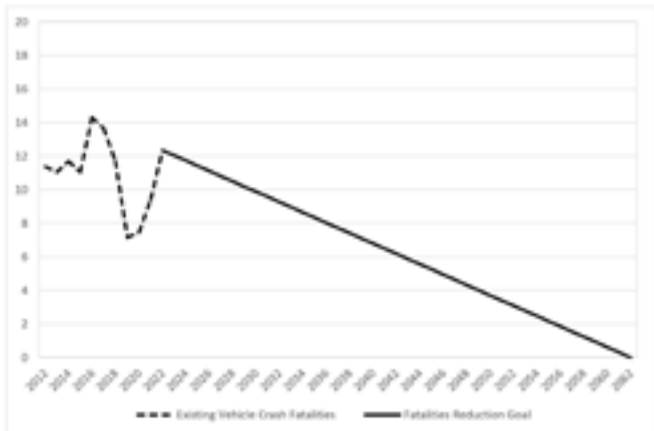


Figure 9 - Tooele County Vehicle Crash Fatality Reduction Goal

Tooele County seeks to analyze existing traffic crash patterns and address areas of concern with targeted solutions. Figure 10 shows the leading types of vehicular crashes. Roadway departure, rear-end, and left turn at intersection are all leading causes of crashes.

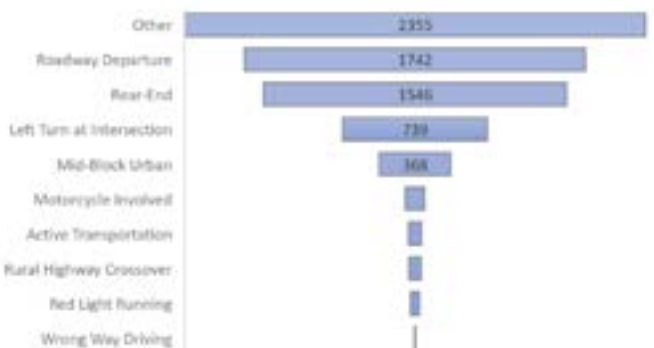


Figure 10 - Tooele County Vehicle Crash Type Funnel Chart

Figure 11 and Figure 12 show the total percentage of serious injury crashes and fatality crashes based on crash type, respectively. Figure 13 and Figure 14 show the total percentage of serious injury crashes and fatality crashes based on certain crash characteristics, respectively.

Some of the key characteristics of traffic crashes, particularly traffic fatality crashes are now mentioned. **Of all reported crashes, there were 373 reported (5.3 percent) involving a DUI. Of those DUI-involved crashes, 28 were fatal (50.0 percent of all fatal crashes). Of those 28 fatal crashes, 10 (35.7 percent) involved another vehicle.** Of all reported crashes, there were 1,742 reported (24.8 percent) involving a roadway departure. Of those roadway departure crashes, 23 were fatal (41.8 percent of all fatal crashes). Of all reported crashes, there were 332 reported (4.7 percent) involving an unrestrained person. Of those unrestrained person crashes, 18 were fatal (32.1 percent of all fatal crashes). Of all reported crashes, there were 69 reported (1.0 percent) involving a pedestrian. Of those pedestrian-involved crashes, 8 were fatal (14.3 percent of all fatal crashes).

Leading causes of traffic fatalities in the County from 2017 to 2022 included DUIs, roadway departures, unrestrained drivers, speeding, and crashes involving pedestrians. The County's plan to limit these factors is addressed in the Strategic Direction (Section 4.4) and the Four Goal Action and Progress Plan (Section 4.6).

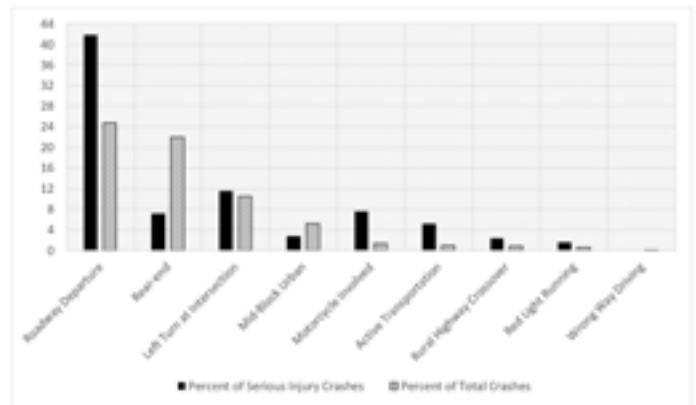


Figure 11 - Tooele County Vehicle Injury Crash Type as a Percentage

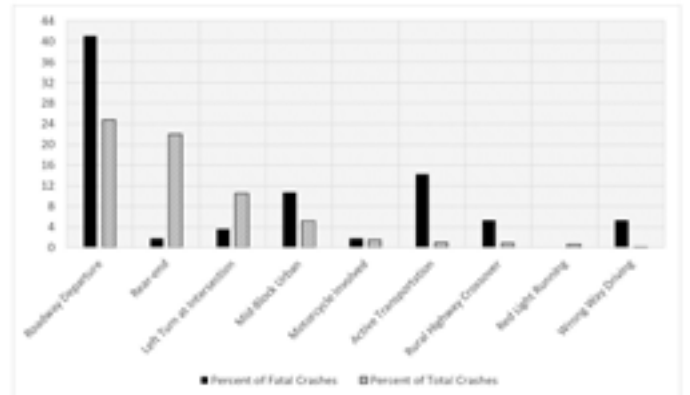


Figure 12 - Tooele County Vehicle Fatality Crash Type as a Percentage

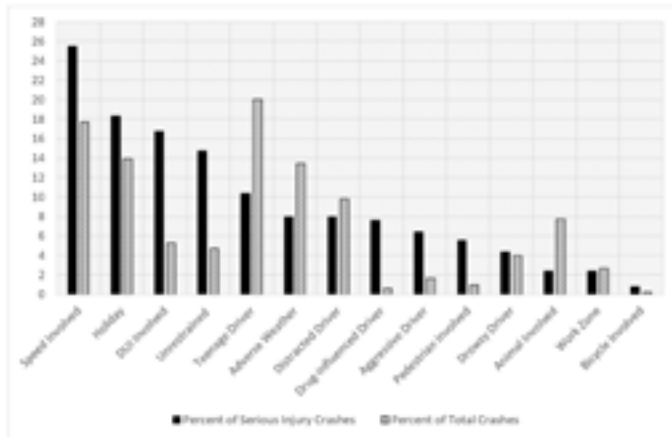


Figure 13 - Tooele County Vehicle Injury Crash Factors as a Percentage

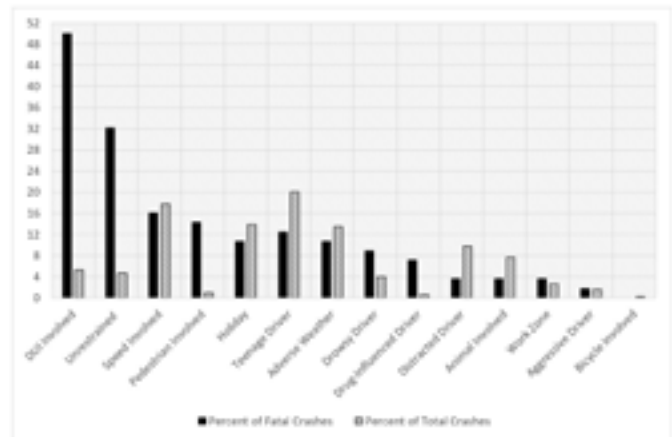


Figure 14 - Tooele County Vehicle Fatality Crash Factors as a Percentage

The most crashes occurred between the hours of 2 PM and 7 PM (35 percent of all crashes). The peak hour was between 5 PM to 6 PM which is during PM peak traffic (4 PM to 6 PM). The age group with the highest number of crashes was 13-20 with 23 percent of the crashes. 15-19 year olds account for an estimated 8.5 percent of the population, and 10-24 year olds account for 24 percent of the population. 13-24 year olds account for 37 percent of traffic crashes, however, meaning that this age group is involved in a substantially higher crash rate than their population percentage.

4.2.6 Systemic and Specific Safety Concerns

In analyzing the most recent crash data from the previous five years, traffic fatalities and serious injuries have been mostly sporadic in nature. However, they occur much more frequently at municipal centers, freeways, and state highways, and particularly at intersections which possess two or more of these characteristics. Most of these high crash centers are on the highest ADT roadways and are not under the control of the County. However, intersections of consideration include SR-36 and 1000 North in Tooele City, SR-36 and SR-138, SR-36 and 1280 North in Tooele City, SR-36 and Erda Way, SR-36 and Bates Canyon Road, SR-36 and Village Boulevard. These listed

intersections do not appear to have any specific safety concerns related to design or traffic control, but do have the highest number of traffic crashes throughout the County due to the high traffic volumes intersecting at traffic lights.


Because these are the areas with the highest number of traffic crashes and fatalities, the County seeks to create alternative corridors to reduce congestion. Congestion leads to impatient drivers who make reckless decisions. The County has established a Transportation Improvement Plan that has mapped out these future corridors and set an estimated cost and date of construction. More details on these proposed corridors can be found in the online Story Map and in Section 4.6 of this Traffic Safety Plan where detailed safety goals are outlined.

A geospatial representation of higher risk locations has also been included with this plan. A heat map showing high crash areas is included in **Appendix 5**. As mentioned previously, the areas that create the greatest amount of heat on the map include municipal centers, freeways, and state highways.

4.2.7 Policy and Safety Process Improvement

Tooele County consistently strives to follow industry safety and design standards. Tooele County has included roadway typical sections in its most recent Transportation Master Plan. These include pavement design standards, road right-of-way widths standards, and sidewalk and drainage standards for all county roadways based on roadway functional classification. These standards unify the roadway network and ensure consistency throughout the county. The County has also established access management standards included in the County Code to ensure that all driveway, intersection, and other accesses are designed, constructed, and maintained to function at the highest levels of safety. A large percentage of vehicle-related crashes occur at intersections where vehicles are crossing roadways in perpendicular directions. The County has established these standards to prevent to the extent possible vehicular crashes that would occur at intersections. For future design, Tooele County adheres to UDOT's access management standards where not specified in the County Code.

With the adoption of this Transportation Master Plan, Tooele County has assessed existing polices, plans and standards to address areas needing improvement or revision. As part of this Transportation Master Plan, Tooele has expanded its existing library of transportation planning and design standards with the adoption of Traffic Impact Study (TIS) standards. These standards ensure that new developments are addressing all traffic-related needs associated with their development.



The TIS standards require all new commercial, manufacturing, and industrial developments as well as specified new residential developments (see Section 5.1 of this TMP) to perform a TIS before development. This has been done for several important reasons, including the following:

- Ensure that all constructed accesses will not be placed at locations where they will increase traffic safety risks;
- Ensure that all constructed accesses will not be placed at locations where they will increase congestion or bottlenecks;
- Ensure that all traffic signals will be sufficient for traffic patterns and growth within the timeframe of the described scope;
- Ensure that development occurs consistent with the framework of County development, zoning, and transportation planning; and
- Ensure that all developments are constructed only in locations suitable for said type of development.

Tooele County states their dedication to continually seeking for safer and more effective roadways through adoption and revision of construction and planning standards and guidelines.

4.3 Quality of Life Framework

As part of Tooele County's transportation master planning effort, the County seeks to improve coordination and collaboration with UDOT. Providing a Transportation Master Plan that seeks to advance similar goals to UDOT's ensures that the established and future transportation networks function with as few design and development discontinuities as possible. This removal of discontinuity improves safety, mobility, connectivity, the economy, and citizen health. UDOT has established a quality of life framework with which Tooele County seeks to comply. UDOT's quality of life framework is built on four factors: Better Mobility, Good Health, Connected Communities, and Strong Economy.²³ These factors, when prioritized, can provide the integral benefits a healthy transportation system seeks to supply. This section will explain how Tooele County seeks to integrate this quality of life framework into its transportation planning. This quality of life framework is also included in Section 1.4 of the TMP.

4.3.1 Better Mobility

Tooele County seeks to improve mobility within the county by prioritizing the adoption of established corridor preservation techniques, access management principles, roadway ROW and functional classification standards, transportation impact study standards, and other development standards. Adopting these standards and improving on existing standards ensures that future mobility remains uninhibited by advancing County growth and development. Mobility also improves when roadways are designed based upon adopted County functional classification type standards. County roadway design standards by functional classification type can be found on the County's website (see the footnote).²⁴ Access management standards ensure that mobility and access are balanced and applied

according to specific roadway demands while roadway design standards ensure that roadways are constructed to survive an anticipated life expectancy. Tooele County commits to finding the most cost-effective and efficient alternatives to future roadway design. Future planning ensures that roadways which will provide the most effective levels of mobility are the roads that get built. Tooele County seeks to address, where possible, mobility deficiencies in the existing roadway network caused by undermaintained roads, unpaved roads, under signalized roads, or network areas with a lack of redundancies. Improving mobility throughout the County improves other aspects of resident life, including citizen health, environmental health, better connected communities, and a stronger economy.

4.3.2 Good Health

Tooele County seeks to improve citizen health through various means, including expanding its active transportation network, seeking safety- and sustainability-focused design alternatives, and improving existing roadway safety concerns and deficiencies. By coordinating with County municipalities and UDOT, the County hopes to establish a cohesive and interconnected active transportation network. This will provide Tooele County residents and nonresidents with the ability to enjoy, through active modes of transportation, the community, culture, and natural beauty of the County and neighboring counties and municipalities. Tooele County also seeks to improve citizen health by seeking safety- and sustainability-focused alternatives in planning, construction, and maintenance of County transportation facilities. Tooele County commits to coordinate, where necessary, with State and Federal entities in finding safer and more sustainable construction methods. By combining safe and sustainable construction methods with safety- and sustainability-focused designs, the County to lessen its environmental impacts and improve the safety and health of its residents and its infrastructure. Tooele County desires its residents to live with the benefits of safer roadways, cleaner air, and more expanded active transportation opportunities.

4.3.2.1 Connected Communities

Tooele County seeks to improve both its interconnectedness with other counties, states, and municipalities as well as intraconnectedness within the county itself. As mentioned in Section 4.3.1, the County seeks to balance mobility and access in future roadway design. The County desires to maintain existing roadways that connect communities and plan new roadways which will expand the connectivity potential of the county. The County will do this through application of corridor preservation techniques, access management principles, and requiring standardized transportation improvement plans. The County will seek the input of transportation and roadway professionals, residents, and other County officials and professionals to ensure that the concerns and needs of every community are voiced.

²³ Utah Department of Transportation, "2022 UDOT Strategic Direction," Utah Department of Transportation, 2022. <https://www.udot.utah.gov/strategic-direction/index.html#missionSection>.

²⁴ Tooele County, "Pavement Section Standards," July 15, 2021. <https://tooeleco.org/wp-content/uploads/2021/09/1c-road-cros-sections.pdf>.

4.3.2.2 Strong Economy

Tooele County recognizes benefits to the economy create by a functional and efficient transportation network. The County desires to address and conceive potential development concepts in its planning which will provide the greatest economic benefits while remaining consistent with the culture and desires of the community. Future roadway planning should be consistent with planned development and growth already present within the county. Creating development opportunities that maintain mobility and safety throughout the county ensures that all future development bolsters rather than stagnates future development and economic growth. The County also seeks to find transportation alternatives that can improve the transportation experience for local commuters, travelers, tourists, and freight. This is done by establishing redundancies in the transportation network, applying established zoning and land use principles, and following access management standards.

4.4 Strategic Direction

Traffic safety requires all citizens, private and public investors, and government bodies to seek improvement and coordinate. In addition to the traffic safety goals outlined in Section 4.6 of this Traffic Safety Plan, the County seeks to adopt a strategic direction to guide the actions and planning of safety experts, County officials and planners, and law enforcement within Tooele County. As part of Tooele County's improvement efforts, the County is searching for public involvement opportunities and UDOT coordination. Tooele County aligns itself with UDOT's Strategic Highway Safety Plan and incorporates UDOT's zero fatalities framework. Tooele County adopts with this Safety Plan, the "Five E's": Engineering, Education, Enforcement, Emergency Medical Services, and Everyone. These efforts are performed to improve traffic safety throughout the county and help the county to reach a goal of zero fatalities.

4.4.1 The Five E's

Engineering

Safety improves when engineering planning, designing, building, and maintenance utilize established and reliable design principles and standards. Tooele County seeks to apply relevant national and state design standards where possible and create established county design standards from licensed professionals under the direction of governing officials. This safety plan seeks to address areas of safety concern and make an action plan to improve those location that may have high crash history, geometric design deficiencies, lack of pedestrian facilities, or insufficient maintenance.

Education

Ninety-four percent of all transportation crashes are influenced in some way by human error. Because of this factor, education plays a critical role in guiding the public to improve driving practices and avoid unsafe driving habits. Numerous safety issues have been identified within the County. Some of the deadliest contributors to crash fatalities and serious injuries are intoxicated drivers, persons not wearing safety restraints, and

speeding. All of these factors can be reduced with increased education. Tooele County's education plan is now outlined:

Enforcement

As mentioned above, some of the deadliest contributors to crash fatalities are factors including intoxicated drivers, persons not wearing safety restraints, and speeding. Each of these aspects, among others such as distracted driving and drivers ignoring traffic control devices, can be limited and prevented with enforcement. Of the 56 traffic fatalities within Tooele County from 2017 to 2022, 44 (79 percent) involved a crash with at least one enforceable violation. Of the 251 crashes in Tooele County from 2017 to 202 that caused serious injury, 117 (47 percent) involved enforceable violations. For all fatal and serious injury-related crashes that involved an enforceable violation there were an average of 1.5 enforceable violations per crash. Thus, on average, approximately 50 percent of all enforceable crashes involved multiple enforceable violations. Enforcement is a powerful tool that can be used to improve traffic safety and decrease roadway fatalities and serious injuries.

Emergency Medical Services

Emergency response teams swift action can make the difference in preventing fatalities associated with traffic crashes. Emergency response teams, public safety teams, and law enforcement officers coordinate to arrive quickly at crash sites, provide care for wounded, and clear roadways of debris. Tooele County seeks to improve coordination between emergency responders and provide a mobile transportation network that assists these responders in arriving quickly at crash sites. Tooele County seeks additionally to require emergency vehicle accessibility to all new developments as specified in relevant County Code.

Everyone

Tooele County seeks the insight and assistance of everyone in ensuring that roadways throughout the County remain safe. The County relies on all citizens to drive responsibly, assertively and cautiously, to notify emergency responders of incidents and violations, and to be involved in public affairs to ensure that the road network remains safe, reliable, and efficient.

4.4.2 Crash Reduction Plan

This section includes the County's action plan for addressing the five highest factors of vehicular crashes. These factors include impaired driving, driving without proper restraints, speeding, pedestrian-involved, and teenage driver crashes.

4.4.2.1 Impaired Driving

Impaired driving accounts for at least 50 percent of roadway fatalities throughout the County. This is by far the leading cause of traffic fatalities throughout the county. The County supports programs that seek to prevent DUIs, spread awareness, and rehabilitate and educate offenders. Tooele County supports data driven enforcement efforts and encourages all people to be aware. Tooele County emphasizes the importance of everyone playing a part in preventing impaired driving, from reporting drunk drivers to preventing and protecting family and friends

from driving under the influence. Tooele County will continue its law enforcement efforts and encourages all people to call 911 to report a reckless driver.

4.4.2.2 Driving without Proper Restraints

Persons driving without proper restraints was the second leading factor in roadway fatalities. Over the past five years throughout the state approximately one in three people killed in traffic crashes were not properly wearing safety restraints. This can be prevented through increased education and enforcement. Not wearing proper safety restraints is enforceable. This kind of enforcement can make a big difference in preventing crash fatalities and serious injuries. Tooele County supports UDOT safety education efforts aimed at promoting proper seat belt use. less driver.

4.4.2.3 Speeding

Tooele County strives to promote safe driving practices, including following posted speed limits. Tooele County also seeks to implement safety focused design principles that adhere to AASHTO and other County standards. Tooele County seeks to design future roadways in a manner that discourages speeding and focuses on vehicular and pedestrian safety. AASHTO standards outline roadway design widths, sight triangles, and other factors suitable for specified speed limits. By following these standards, the road can direct drivers to follow speed limits even without realizing it. For example, lane striping can be used as a tool to make thinner lanes direct drivers to slow down. Sufficient signage and flashing signage are more tools capable of helping drivers be more aware of their surroundings.

4.4.3 Pedestrian Involved

Tooele County's established design standards are aimed at separating vehicular and pedestrian traffic. County roadway design standards include separated bike paths and sidewalks to promote safer roadway design. The implementation of TIS ensures that development will occur in a manner consistent with safe growth principles to prevent unnecessary and unsafe pedestrian access and crossings on roadways. The County seeks to continue its planning and construction of bikeways to establish an active transportation network separate from the existing roadway network. The County recognizes that separation, where possible, is key in preventing pedestrian-related traffic crashes.

4.4.4 Teenage Drivers

Education is integral in ensuring that teenage drivers are just as safe as more experienced drivers. Tooele County strives to partner with and promote UDOT and DPS zero fatalities allies in educating teenage and other young drivers. Tooele County relies on parents, guardians, and other responsible adults to ensure that teenage drivers are thoroughly educated on their responsibilities as citizens and drivers. Tooele County encourages parents, guardians, and other responsible adults to require safe and legal driving practices for their children and other minors, and to act as the example of being an educated and safe driver.

4.5 Public Involvement

See **Appendix 7** for information on public comments.

4.6 Four Goal Action and Progress Plan

Tooele County recognizes the need to remain vigilant in preventing traffic crashes, injuries, and fatalities in transportation planning, standards, and design. Four key measurable and comprehensive goals have been established to address concerns and improve safety processes. These goals address areas of concern throughout the County, create an action plan, and designate an accountability (progress) plan to ensure that each goal is met.

4.6.1 Goal 1

- A. **Areas of Concern** - Existing development standards and guidelines that are insufficient to address all safety concerns.
- B. **Solution** - Adopt Traffic Impact Study standards and access management guidelines that will greatly improve the safety of new developments.
- C. **Action Plan** -
 - a. Included in this Transportation Master Plan, the County has added expanded guidelines for access management to ensure that any future updates to access management standards abide by safety- and mobility-focused access management principles. The County commits to enforce access management standards for all new developments per County Code and State standards.
 - b. The County also commits to require Traffic Impact Studies (TIS) for all new relevant developments as outlined in the TIS standards adopted with this Transportation Master Plan. The County recognized that it was of great importance to identify standards and guidelines that could be adopted which would help improve the safety of its roadways, particularly for pedestrians. By requiring TIS for developments, as outlined in this TMP, the County is focused on improving the safety in all future developments. These standards will require developers, if necessary, to construct improved traffic safety features such as traffic lights, cross walks, and turn lanes.
 - c. The County further commits to enforce recently adopted roadway typical section standards for all new developments. The County has established roadway typical section standards that require all new local and collector roads to have a minimum 7' clear zone between pedestrian walkways and travel lanes. These standards require curb and gutter or borrow ditch for all local and collector roads.

- d. **Follow-up** - The County will update the Transportation Master Plan in five years and readdress any areas of concern related to adopted development policies and guidelines.

4.6.2 Goal 2

- A. **Areas of Concern** - Edestrian traffic on busy roadway corridors.
- B. **Solution** - Incorporate a County Active Transportation Improvement Plan into the TMP and plan for future bikeway and pedestrian construction projects that will separate pedestrians from busy roadway corridors.
- C. **Action Plan** -
 - a. Included in this Transportation Master Plan is an Active Transportation Improvement map that will be adopted with the rest of the plan. This map includes all future bikeways planned in the Tooele Valley for the upcoming twenty years. It specifies the years in which these bikeways and sidewalks are planned to be constructed. Tooele County will seek to allocate monies and apply for funding opportunities that will allow them to construct these bikeways.
- D. **Follow-up** - The County will update the Transportation Master Plan in five years and readdress any areas of concern related to bikeways. If bikeways are not constructed or other challenges arise, the County will address the reasonings why and seek to correct it.

4.6.3 Goal 3

- A. **Areas of Concern** - There is no inventory of traffic crash data in existing County planning documents.
- B. **Solution** - Incorporate a Safety Action Plan into the Transportation Master Plan.
- C. **Action Plan** -
 - a. As part of this Transportation Master Plan, the County committed to incorporating a safety action plan that would compile existing crash history data into one easily accessible location. This inventory of data can now be used by the county to address specified areas of concern. Types of vehicle crashes, factors involved in vehicle crashes, and locations of vehicle crashes were all studied. This information can now be used by law enforcement, educators, and private entities seeking to improve public awareness.
 - b. The County will use the information gathered in this Safety Action Plan to review and address design standards that need to be updated and locations that are in need of maintenance or alteration.
- D. **Follow-up** - The County will update the Safety Action Plan in five years with the Transportation Master Plan. At this time the County will assess its progress towards achieving its zero fatalities goal by 2062.

4.6.4 Goal 4

- A. **Areas of Concern** - Roadways and corridors with existing safety concerns.
- B. **Solution** - Include projects in the Transportation Improvement Plan (TIP) adopted with the Transportation Master Plan that address these areas of concern.
- C. **Action Plan** -
 - a. To determine the road projects that would be necessary for construction, the County completed a detailed Level of Service (LOS) analysis of its entire transportation network in conjunction with this Transportation Master Plan. This LOS analysis determined the roadways which needed improvement, expansion, and redundancies. It also determined when improvements to these roadways would need to be completed.
 - b. The County has included these road projects into the TIP to address existing and future safety concerns and network efficiency issues. As mentioned previously, the majority of vehicular crashes throughout the County occur in the roadway corridors with the most traffic. By reducing congestion on these corridors and creating alternative highways and roadways, the County is focused on improving vehicle safety.
 - c. A large portion of vehicular crashes occur around SR-26 and SR-138. The County has planned several roadway corridors into the TIP that will add redundancies to the network and reduce congestion. Some of these projects include extending Cochrane Lane to connect to Stansbury Park, extending Droubay Road to connect to Lake Point, extending Village Boulevard to connect to the Midvalley Highway, and creating the Oquirrh Expressway. More details and the locations of these projects can be found in the online Story Map and in Appendix 8.
 - d. All of the projects included in the Story Map have cost estimates, year of completion, scope, and location. This comprehensive map provides the County with all of the knowledge necessary to begin work on these projects.
- D. **Follow-up** - The County plans to update the Short-range and Long-range TIPs every five years to ensure that the County is always planning for at least 25 years into the future.



4.7 Conclusion

The County declares its commitment to safety-focused transportation planning and design. The County expresses its continual desire for the safety of all its residents and visitors. Below is a conclusion of all the objectives included within the framework of this Safety Action Plan.

- Create an inventory of existing traffic safety statistics.
- Analyze existing traffic data and address areas of concern.
- Establish a quality of life framework.
- Establish a strategic direction.
- Establish goals within the framework of an action and progress plan.
- Incorporate those goals and plans into planning documents, development standards, enforcement, education, funding acquisition, and capital projects.
- Update and assess as defined within the framework of the action and progress plan.

5 TRAFFIC IMPACT STUDY GUIDELINES AND POLICIES

A Traffic Impact Study (TIS) is a specialized study of the impacts that a certain type and size of development will have on the surrounding transportation system. It is specifically concerned with the generation, distribution, and assignment of traffic to and from the "new development". For reference throughout these guidelines, the term "new development" also includes properties that are being redeveloped.

Tooele County or UDOT may require a TIS for any new development adjacent to or near local roads or UDOT roads, respectively, when the following guidelines (Section 5.1) indicate that a TIS is needed. The following sections are to be used to establish uniform guidelines determining when a TIS is required and how the study is to be conducted, based on suggested guidelines established by the Institute of Transportation Engineers (ITE).

The following TIS requirements will apply for Tooele County along local roads. For UDOT roads, refer to Utah Administrative Code R930-6.

5.1 Traffic Impact Study (TIS) Requirements

A complete TIS shall be performed if any of the following situations are proposed:

- The new development is commercial, manufacturing, or industrial.
- All new developments or additions to existing developments which are expected to generate at least 25 new peak hour vehicle trips. (Peak hours from 7 AM to 9 AM and 4 PM to 6 PM on weekdays)
- In some cases, a development that generates less than 25 new peak hour trips should require a TIS if it affects an area of concern such as high crash locations or highly congested roadways.
- All applications for rezoning when there is a significant increase in traffic volume.
- Any change in land use density that results in an increase of more than 15 percent in site traffic with at least 1000 new peak-hour trips.
- Any change in the land use that will cause the directional distribution of site traffic to change by more than 20 percent.
- When the original TIS is more than two years old, access decisions are still outstanding, and changes in development have occurred in the site environs.
- When a development directly affects a UDOT roadway in any way, a TIS is required. If this situation is proposed, the TIS required must meet UDOT standards and be completed by a consultant that is approved by UDOT.
- The County or designated representative requires a study to be conducted.

The specific analysis requirements and level of detail are set forth in the following sections. Different categories of a TIS are determined by the number of peak hour trips a development will produce. Table 14 may be helpful in determining which category of TIS would be required by a new development.

Table 14 - Tooele County Requirements for Traffic Impact Studies*

TIS Category	Land Use Intensity Thresholds (ITE Trip Generation)
Category 1	Single Family: 25 to 100 Dwelling Units Apartment: 50 to 200 Dwelling Units Lodging: 40 to 170 Rooms General Office: 10,000 to 55,000 Sq. Ft. Retail: 2,000 to 15,000 Restaurant: 2,000 to 6,000 Sq. Ft.
Category 2	Single Family: 100 to 525 Dwelling Units Apartment: 200 to 1,000 Dwelling Units Lodging: 170 to 720 Rooms General Office: 55,000 to 350,000 Sq. Ft. Retail: 15,000 to 50,000 Restaurant: 6,000 to 30,000 Sq. Ft.
Category 3	Single Family: > 525 Dwelling Units Apartment: > 1,000 Dwelling Units Lodging: > 720 Rooms General Office: > 350,000 Sq. Ft. Retail: > 50,000 Sq. Ft. Restaurant: > 30,000 Sq. Ft.

* All commercial, manufacturing, and industrial developments require a traffic impact study. Trip generation values based on square footage are to be used as a guideline in determining which category of TIS is required.

5.1.1 Category I

A Category I TIS should be required for all developments which generate twenty-five (25) or more new peak hour trips, but less than one hundred (100) trips, during the morning, afternoon, or Saturday peak hour. Peak hour trips will be determined by the latest edition ITE Trip Generation Manual. In addition to the above threshold requirements, a Category I TIS may also be required by the County for any specific traffic problems or concerns such as:

- Proposed or existing offset intersections,
- Location(s) with a high amount of traffic crashes,
- Driveway conflicts with adjacent developments,
- Nearby intersections that have reached their capacity,
- Proposed property rezones when there is a significant potential increase in traffic volumes, and
- When the original TIS is more than two years old, or where the proposed traffic volumes in the original TIS increase by more than twenty percent.

For a Category I TIS, the study horizon should include the opening year of the development, and build-out of the entire development, if applicable. The minimum study area should include site access drives, affected signalized intersections and

major unsignalized street intersections.

5.1.2 Category II

A Category II TIS should be required for all developments, which generate between five hundred (100) to five hundred (500) peak hour trips during the morning, afternoon, or Saturday peak hour. The study horizon should include the opening year of the development, the year of completion for each phase of the development, if applicable, and five years after the development's completion. The minimum study area should include the site access drives and all signalized intersections and major unsignalized street intersections within one-half mile of the development.

5.1.3 Category III

A Category III TIS should be required for all developments, which generate above one thousand (1000) peak hour trips during the morning, afternoon, or Saturday peak hour. The study horizon should include the opening year of the development, the year of completion for each phase of the development, the year of its completion, five years after the development's completion, and ten years after the development's completion. The minimum study area shall include the site access drives and all signalized intersections and major unsignalized street intersections within one mile of the development.

5.1.4 Initial Work Activity

Any development of land, be it commercial, residential, or industrial, requires an estimate of vehicle trips generated by the proposed new development. A developer, or their agent, should first estimate the number of vehicular trips to be generated by the proposed development to determine if a TIS may be required. If the estimate determines that a TIS is required the developer or their agent should determine the applicable category. The method of estimation must be approved by the County. The County must give concurrence on the number of trips to be generated by the proposed development. The developer may, if desired, request that the County assist in estimating the number of trips for the purpose of determining whether a TIS is required for the proposed development. This does not require the County to assist in the estimation.

Based on the developer's estimation, the County or designated representative shall make the final decision on requiring a TIS and determining whether the study falls within Category I, II or III.

If a study is determined to be required by the County, the developer should submit a draft table of contents for the TIS to the County for review and approval. The table of contents should be sufficiently detailed to explain the proposed area of influence for the study, intersections and roadways to be analyzed, and level of detail for gathering of traffic volume information and preparation of level of service analyses. There should also be included in the draft a proposed trip distribution for site traffic. After approval of the draft table of contents and trip distribution by the County, the actual TIS work activities may begin.

The Traffic Impact Study Scope of Work agreement between the

developer and his/her traffic engineer should conform to the pre-approved draft table of contents. The findings, conclusions, and recommendations contained within the TIS document should be prepared in accordance with appropriate professional Civil Engineering Canons.

5.1.5 Qualifications for Preparing TIS Documents

The TIS must be conducted and prepared under the direction of a Professional Engineer (Civil) licensed to practice in the State of Utah. The subject engineer should have special training and experience in traffic engineering and be a member of the Institute of Transportation Engineers (ITE).

The final report shall be sealed, signed, and dated.

5.2 Analysis Approach and Methods

The traffic study approach and methods should be guided by the following criteria.

5.2.1 Study Area, Horizon, and Time Period

The minimum study area should be determined by project type and size in accordance with the criteria previously outlined. The extent of the study area may be either enlarged or decreased, depending on special conditions as determined by the County. The study horizon years and size should be determined by project type and size, in accordance with the criteria outlined in Sections 5.1.

Both the morning and afternoon weekday peak hours should be analyzed, unless the proposed project is expected to generate no trips, or a very low number of trips, during either the morning or evening peak periods. If this is the case, the requirement to analyze one or both of these periods may be waived by the County.

Where the peak traffic hour in the study area occurs during a different time period than the normal morning or afternoon peak travel periods (for example mid-day), or occurs on a weekend, or if the proposed project has unusual peaking characteristics, these additional peak hours should also be analyzed.

5.2.2 Seasonal Adjustments

When directed by the County, traffic volumes for the analysis hours should be adjusted for the peak season in cases where seasonal traffic data is available.

5.2.3 Data Collection Requirements

All data should be collected in accordance with the latest edition of the ITE Manual of Traffic Engineering Studies, or as directed by the County.

Turning Movement Counts: Manual turning movement counts should be obtained for all existing cross-street intersections to be analyzed during the morning, afternoon, and Saturday peak periods (as applicable). Turning movement counts may be required during other periods as directed by the County. Turning movement counts may be extrapolated from existing turning movement counts, no more than two years old, with the concurrence of the County.

Daily Traffic Volumes: The current and projected daily traffic volumes should be presented in the report. If available, daily count data from the local agencies may be extrapolated to a maximum of two years with the concurrence of the County. Where daily count data is not available, mechanical counts will be required at locations agreed upon by the County.

Roadway and Intersection Geometrics: Roadway geometric information should be obtained. This includes, but is not limited to, roadway width, number of lanes, turning lanes, vertical grade and cross slope, location of nearby driveways, and lane configuration at intersections.

Traffic Control Devices: The location and type of traffic controls should be identified at all locations to be analyzed.

5.2.4 Trip Generation

The latest edition of ITE's Trip Generation Manual should be used for selecting trip generation rates. Other rates may be used with the approval of the County in cases where Trip Generation does not include trip rates for a specific land use category, or includes only limited data, or where local trip rates have been shown to differ from the ITE rates. Site traffic should be generated for daily AM, daily PM, and Saturday peak hour periods (as applicable). Adjustments made for "pass-by", "diverted-link" or "mixed-use" traffic volumes shall follow the methodology outlined in the latest edition of the ITE Trip Generation Manual or the ITE Trip Generation Handbook. A "pass-by" traffic volume discount for commercial centers should not exceed twenty-five percent unless approved by the County. A trip generation table should be prepared by phase showing proposed land use, trip rates, and vehicle trips for daily and peak hour periods and appropriate traffic volume adjustments, if applicable.

5.2.5 Trip Distribution and Assignment

Projected trips should be distributed and added to the projected non-site traffic on the roadways and intersections under study. The specific assumptions and data sources used in deriving trip distribution and assignment should be documented in the report and reviewed with the County. Future traffic volumes should be estimated using information from transportation models or applying an annual growth rate to the base-line traffic volumes. The future traffic volumes should be representative of the horizon year for project development. If the annual growth rate method is used, the County must give prior approval to the growth rate used. Future traffic volumes should include, where applicable, the existing volumes projected as well as volumes created by nearby proposed development projects currently under review or approved by the County.

If modeling information is unavailable, the greatest traffic increase from either the "on-line" developments, the application of an annual growth rate or a combination of an annual growth rate and "on-line" developments, should be used to forecast the future traffic volumes.

The site-generated traffic should be assigned to the street network in the study area based on the approved trip distribution percentages. The site traffic should be combined with the

forecasted traffic volumes to show the total traffic conditions estimated at development completion. A figure should be prepared showing daily and peak period turning movement volumes for each traffic study intersection. In addition, a figure should be prepared showing the base-line volumes with site-generated traffic added to the street network. This figure should be prepared showing the base-line volumes with site-generated traffic added to the street network. This figure will represent site specific traffic impacts to existing conditions.

5.2.6 Capacity Analysis

Level of service (LOS) shall be computed for signalized and unsignalized intersections in accordance with the latest edition of the Highway Capacity Manual. The intersection LOS should be calculated for each of the following conditions (if applicable):

- Existing peak hour traffic volumes (figure required)
- Existing peak hour traffic volumes including site-generated traffic (figure required)
- Future traffic volumes not including site traffic (figure required)
- Future traffic volumes including site traffic (figure required)
- LOS results for each traffic volume scenario (table required)

The LOS table must include LOS results for AM, PM and Saturday peak periods, if applicable. The table must show LOS conditions with corresponding vehicle delays for signalized intersections, and LOS conditions for the critical movements at unsignalized intersections. For signalized intersections, the LOS conditions and average vehicle delay must be provided for each approach and the intersection as a whole. If the new development is scheduled to be completed in phases, the TIS must, if directed by the County, include an LOS analysis for each separate development phase in addition to the TIS for each horizon year. The incremental increases in site traffic from each phase should be included in the LOS analysis for each preceding year of development completion. A figure will be required for each horizon year of phased development.

5.3 TIS Report Format

The purpose of this section is to provide information on the general formatting requirements for a TIS. Any deviation from this format must be approved by the County in advance.

- I. INTRODUCTION AND SUMMARY
 1. Purpose of Report and Study Objectives
 2. Executive Summary
 - Site Location and Study Area
 - Development Description
 - Principal Findings
 - Conclusions
 - Recommendations



- II. PROPOSED DEVELOPMENT
 - 1. Off-Site Development
 - 2. Description of On-Site Development
 - Land Use and Intensity
 - Location
 - Site Plan
 - Zoning
 - Development Phasing and Timing
- III. STUDY AREA CONDITIONS
 - 1. Study Area
 - Area of Significant Traffic Impact
 - Influence Area
 - 2. Land Use
 - Existing Land Use and Zoning
 - Anticipated Future Development
 - 3. Site Accessibility
 - Existing and Future Area Roadway System
 - Traffic Volumes and Conditions
 - Access Geometrics
 - Other as applicable
- IV. ANALYSIS OF EXISTING CONDITIONS
 - 1. Physical Characteristics
 - Roadway Characteristics
 - Traffic Control Devices
 - Pedestrian/Bicycle Facilities
 - 2. Traffic Volumes
 - Morning, Afternoon and Saturday Peak Hour Periods (as applicable)
 - 3. Level of Service
 - Morning, Afternoon and Saturday Peak Hour Periods (as applicable)
 - 4. Safety
- V. PROJECTED TRAFFIC
 - 1. Site Traffic Forecasts (each horizon year)
 - Trip Generation
 - Mode Split
 - Pass-by Traffic (if applicable)
 - Trip Distribution
 - Trip Assignment
 - 2. Non-Site Traffic Forecasting (each horizon year)
 - Projections of Non-site (Background) Traffic (methodology for the projections shall receive prior approval of County)
 - 3. Total Traffic (each horizon year)
- VI. TRAFFIC AND IMPROVEMENT ANALYSIS
 - 1. Site Access
 - 2. Capacity and Level of Service Analysis
 - Without Project (for each horizon year including any programmed improvements)
 - With Project (for each horizon year, including any programmed improvements)
 - 3. Roadway Improvements
 - Improvements Programmed to Accommodate Non-site (Background) Traffic
 - Additional Alternative Improvements to Accommodate Site Traffic
 - 4. Traffic Safety
 - Sight Distance
 - Acceleration/Deceleration Lanes, Left-Turn Lanes
 - Adequacy of Location and Design of Driveway Access
 - 5. Pedestrian Considerations
 - 6. Speed Considerations
 - 7. Traffic Control Needs
 - 8. Traffic Signal Needs (base plus each year, in five-year horizon)
 - 9. Site Circulation and Parking
- VII. FINDINGS
 - 1. Site Accessibility
 - 2. Traffic Impacts
 - 3. Need for Improvements
 - 4. Compliance with Applicable Local Codes
- VIII. RECOMMENDATIONS/CONCLUSIONS
 - 1. Site Access/Circulation Plan
 - 2. Roadway Improvements
 - On-Site
 - Off-Site
 - Phasing (as applicable)
 - 3. Transportation System Management Actions (as applicable)
 - 4. Other
- IX. APPENDICES
 - 1. Existing Traffic Volume Summary
 - 2. Trip Generation/Trip Distribution Analysis

3. Capacity Analyses Worksheets
4. Traffic Signal Needs Studies

FIGURES AND TABLES

1. The following items shall be documented in the text or Appendices
 - Site Location
 - Site Plan
 - Existing Transportation System
 - Existing Peak Hour Turning Volumes
 - Estimated Site Traffic Generation
 - Directional Distribution of Site Traffic
 - Site Traffic
 - Non-Site Traffic
 - Total Future Traffic
 - Projected Levels of Service
 - Recommended Improvements

(For Category 1, many of the items may be documented within the text. For other categories the items shall be included in figures and/or tables which are legible.)

X. DESIGN STANDARD REFERENCE

1. Design in accordance with current Tooele County Engineering Standards.
2. Conduct capacity analysis in accordance with the latest edition of the Highway Capacity Manual.

5.4 Roadway Standards

All streets shall be designed to conform to the engineering standards and technical design requirements adopted by Tooele County. These standards can be supplemented by this master plan and AASHTO's (American Association of State Highways Transportation Officials), A Policy on Geometric Design of Highways and Streets, and the USDOT's MUTCD (Manual on Uniform Traffic Control Devices). In cases of conflict, a determination shall be made by the County, whose determinations shall be final.

Tooele County has adopted these design standards for roadways to ensure that the facilities provide the necessary safety and capacity elements. The requirements for the street typical cross-section configurations are shown in Appendix 6. These requirements are based on traffic capacity design speed, projected traffic, system continuity and overall safety. All new developments shall use typical sections in accordance with those found in the appendix. Right-of-way width shall be determined by County personnel based on County standards. All depths of materials shown on typical sections are subject to change based on engineered pavement design. Pavement designs within the County shall be submitted to the County Road Department for review by County staff. Developers retain ownership of local roads that are not subject to County

standards, but it is imperative to note all private roads will not be maintained by the County.

5.5 Safe Transportation System

Maintaining a safe transportation system is one of Tooele County's primary transportation objectives. Tooele County follows UDOT's "Zero Fatalities" framework in roadway design and encourages developer to do the same. To meet applicable safety standards, safe roadway design should be given highest priority by developers. The County has the following safety requirements in roadway design for new developers:

- All major developments are to provide adequate access for emergency vehicles. This includes but is not limited to Fire, Paramedic, Law enforcement, and other entities.
- All signs, pavement markings and traffic signals must meet standards established by the Manual of Uniform Traffic Control Devices (MUTCD).
- All roadway features must meet minimum design standards established by the American Association of State Highway and Transportation Officials (AASHTO).
- Speed limits must satisfy all clear zone, stopping sight distance, and other requirements as established by the County.

The following recommendations of the County, while not requirements, can help developers in achieving safe roadway design and satisfying safety goals:

- Provide innovative and safe pedestrian street crossings, particularly near schools and recreation areas.
- Encourage development of school routing and recreation plans that minimize vehicle/pedestrian conflicts.
- Analyze traffic engineering data to determine speed limits. Speed limits should be enforced in residential and commercial areas, especially near schools. Implement traffic engineering solutions such as striping, raised medians, traffic islands, reducing roadside obstructions, and traffic signage to guide vehicles on streets.
- Maintain optimal conditions for walking, wheelchairs, and strollers by:
 - Repairing cracks and bumps,
 - Minimizing slopes,
 - Maintaining visibility at corners,
 - Avoiding abruptly ending walkways,
 - Reducing speed and traffic,
 - Keeping walkways clear of poles and other objects,
 - Avoiding poor drainage and standing water on sidewalks, and
 - Providing curb cuts and ramps that comply with the Americans with Disabilities Act (ADA) where applicable.

5.5.1 Roadway Network Design

New roadway networks shall be designed in accordance with the general planning concepts, guidelines, and objectives provided in this section. The "Quality of Life" for residents should be a primary concern when designing a residential roadway network with safety as the overriding factor in design. An emphasis on proper street hierarchy should be adhered to, namely, local streets should access collectors; collectors should access arterials; etc. An emphasis on access management should provide careful control of the location, design, and operation of all driveways, median openings, and street connections to a roadway. For more information on access management, refer to the Access Management section of this document (Section 7).

Residential streets should be designed, where possible, in a curvilinear method to reduce or eliminate long straight stretches of residential roadways, which encourage speeding and cut-through traffic. Development which creates substantial increases in average daily traffic on adjacent established streets not originally designed to accommodate such increases should be avoided. Drainage methods should concentrate on meeting the drainage needs while not impeding the movement of traffic. Roads should be designed to lie within existing topographic features without causing unnecessary cuts and fills.

A reduction in the use of cul-de-sacs should be emphasized to provide greater traffic circulation. Cul-de-sacs should only be allowed where topography and/or natural barriers prohibit the design of through streets. Circulation is of the utmost importance; long blocks and excessive dead-end streets should be avoided. Stopping sight distance must be considered at all intersections and curves to ensure the safety of the public and must be in accordance with AASHTO standards. Pedestrian and bicycle traffic should be considered in the planning and design of all developed streets.

Roadways should be planned to accommodate the traffic demand associated with adjoining developments and commercial areas. The capacity of these roadways can be established by following LOS criteria that has been established by various governmental agencies across the country.

5.5.2 Improvement Requirements

All improvements, including but not limited to the following, shall be constructed as specified below.

- Required curb, gutter and sidewalk shall be constructed according to County standards.
- Driveways shall be constructed in approved locations only in accordance with County access management standards.
- All streets, public or private, shall be surfaced to grade with current asphalt concrete pavement standards to the required minimum width and thickness.
- Cross gutters may be used for drainage purposes, as approved by County.

- When new construction occurs, ADA compliant ramps shall be constructed at all street intersections, unless otherwise approved by the County in a manner consistent with County standard drawings. In addition, when a project occurs where existing improvements are in place, ramps shall be upgraded to meet current standards.
- Raised medians on public roadways require the approval of the County. Design and construction shall be in accordance with applicable standards.
- Developments shall construct the minimum number of accesses needed to adequately address the needs of the development and only at approved locations.
- Adequate drainage facilities shall be installed to properly control runoff from the roadway. Sub-drains and surface drainage facilities shall be designed in accordance with the approved drainage study. Drainage study for developments shall be submitted to County for review. All developments must prove that drainage infrastructure is in compliance with County standards prior to approval for construction.

The above required improvements are not all inclusive. Other improvements needed to complete the development in accordance with current engineering and planning standard practice may be required by the County.

6 TRANSPORTATION IMPROVEMENT PLANS

6.1 Introduction

The Short-Range Transportation Improvement Plan (SRTIP) encompasses improvements to be completed within the next 10 years. The Long-Range Transportation Improvement Plan (LRTIP) consists of transportation projects that are to be completed within 10 to 30 years. County personnel will work with UDOT and other relevant agencies to ensure compatibility between transportation networks. The SRTIP and LRTIP are to be updated periodically to reflect the County's transportation goals and the changing demands of the County's road network. To utilize the SRTIP and LRTIP effectively, the County should:

- Update the TMP every 5 years.
- Continue a routine chip seal maintenance program for old, asphalted roads to ensure they remain in maintainable condition.
- Complete sections of the pedestrian and bicycle plan to establish a countywide system for bicyclists.
- Work with each of the cities and towns in the County to monitor their transportation plans and update this plan as needed in accordance with mapping included in the appendix and Story Map.
- Seek and allocate funding necessary to establish the outlined transportation network.

6.2 Short-Range Transportation Improvement Plan

A scope, projected costs, and estimated completion dates are provided for projects included in the SRTIP. A map of the SRTIP project is included in Appendix 8. An interactive map of the SRTIP is included in the online Story Map. The following projects are included in the SRTIP:

Table 15 - Short-Range TIP Project Scope and Cost Estimates

Project	Scope	Cost
Pavement Preservation	General pavement maintenance across county roads in need of upkeep. Funding shall be allocated in two-year periods. Estimated allocation years: 2023, 2025, 2027, 2029, 2031.	\$7,860,000
Mormon Trail Road	Reconstruction of Mormon Trail Road from SR-199 four miles north and from SR-138 four miles south. Construction anticipated between 2025 and 2027.	\$8,000,000
Ibapah Road	Reconstruction of Ibapah Road from the Utah-Nevada border to the end of the roadway.	\$6,600,000
SR-138 Extension (Center)	New construction of 84' collector from SR-36 to Droubay Road Extension.	\$6,344,400
SR-138 Extension (Droubay Road)	New construction of 84' collector from Droubay Road Extension to I-80.	\$20,989,390
400 West Improvement	New construction of 84' collector from 33rd Parkway to Village Boulevard. Project will be in coordination with Tooele City.	\$24,743,160
33rd Parkway	New construction of 84' collector from Sheep Lane to SR-36.	\$28,450,000
Oquirrh Expressway	New construction of 84' collector from SR-138 Extension to Droubay Road. Project will be in coordination with Erda City.	\$33,043,750
Depot Boundary Road	New construction of 84' collector from SR-112 to West Street.	\$34,524,110
South Mountain Road	New construction of 84' collector from SR-36 to Mormon Trail Road.	\$47,909,800
Burmester Road Improvements	Reconstruction of 100' collector from I-80 to Main Street.	\$39,467,550

6.3 Long-Range Transportation Improvement Plan

A scope, projected costs, and estimated completion dates are provided for projects included in the LRTIP. A map of the LRTIP project is included in Appendix 8. An interactive map of the LRTIP is included in the online Story Map. The following projects are included in the LRTIP:

Table 16 - Long-Range TIP Project Scope and Cost Estimates

Project	Scope	Cost
Saddleback Boulevard	New construction of 84' collector from I-80 to SR-138 extension. Project will be in coordination with Lake Point City.	\$7,226,300
New Dugway Road	New construction of 84' collector from SR-36 to the intersection of SR-196 and SR-199.	\$50,000,000
Village Boulevard Extension	New construction of 84' collector from 400 W to Midvalley Highway.	\$8,136,700
Salt Pointe Access: Canyon Road Extension, Beaman	New construction of 84' collector from SR-36 to Hardy Road. Project will be in coordination with Lake Point City.	\$10,256,780
Center Street Extension	New construction of 84' collector from Bates Canyon Road to SR-138.	\$11,835,200
Bates Canyon Road Extension	New construction of 84' collector from Tom's Lane to SR-138. Project will be in coordination with Erda City.	\$12,062,800
Saddleback Boulevard/Droubay Road Extension	New construction of 84' collector from SR-138 to Bates Canyon Road. Project will be in coordination with the cities of Lake Point and Erda.	\$11,472,790
Hardy Road Extension/Improvement	New construction of 84' collector from Beaman Way to I-80. Project will be in coordination with Lake Point City.	\$13,006,020
1200 West Improvements and Extension	New construction of 84' collector from 1000 North to 3700 West. Project will be in coordination with the cities of Tooele and Erda.	\$32,546,800
Bates Canyon Road Improvements	Reconstruction of 84' collector from 400 West to Droubay Road. Project will be in coordination with Erda City.	\$11,380,000
Droubay Road Improvements	Reconstruction of 100' collector from Bates Canyon Road to 1000 North. Project will be in coordination with Erda City.	\$17,410,000

7 ACCESS MANAGEMENT

The balance of access and mobility is integral to the operability of a transportation network. Managing the level of access across a transportation network helps to ensure improved functionality of the system. Access management for roadways will be described in this section and guidelines will be included. Reference to County access management standards is included where relevant.

Previous growth along some of the region's major travel corridors has resulted in strip development and a proliferation of access points. Individual developments along a corridor typically have their own access driveways. Numerous closely situated access points along corridors create conflicts between turning and through traffic which can cause delays and crashes. An effective access management program will achieve the following objectives:

- Limit the number of conflict points at driveway locations,
- Separate conflict areas,
- Reduce the interference of through traffic,
- Reduce offset distances at intersections,
- Provide sufficient spacing for at-grade, signalized intersections, and
- Provide adequate onsite circulation and storage.

Although access management has the greatest impact on roads with greater volumes covering larger areas, it is also applicable to roads that are considered residential or rural.

7.1 Definition

Access management is the process of establishing restrictions, rules, and guidelines to intersections accesses for developments in an effort to preserve the mobility of traffic flow within a roadway network. The American Association of State Highway and Transportation Officials (AASHTO) defines and provides guidance on access management in A Policy on Geometric Design of Highways and Streets 7th Edition.²⁵

7.2 Access Management Techniques

Access management can be accomplished using many different techniques. Signal spacing, street spacing, access spacing, and interchange to crossroad access spacing are the most common techniques. Depending on the type of roadway being accessed, the distances for each spacing vary. The Utah Department of Transportation has developed an access management program, and more information can be gathered from the UDOT website and from the Access Management Program Coordinator.

Common access management techniques include:

- Increasing spacing between traffic signals and interchanges,
- Increasing spacing of driveways,

- Improving design and location of driveways,
- Adding exclusive turning lanes,
- Adding raised medians,
- Adding two-way-left-turn lanes (TWLTL),
- Correcting sight distance limitations and speed issues,
- Implementing greater use of frontage and service roads, and
- Creating land use policies that limit access to highways.

7.3 Benefits of Access Management

Some benefits of access management include, but are not limited to:

- Reducing traffic conflicts and crashes,
- Reducing traffic congestion,
- Preserving traffic capacity and level of service,
- Improving economic benefits for businesses and service agencies,
- Improving economic benefits for the County by reducing the need for expensive roadway and intersection improvements,
- Discouraging poor site design,
- Improving roadway appearance and aesthetic,
- Reducing air pollution emissions from vehicle exhausts, and
- Improving overall cohesiveness of the transportation network.

7.4 Access Management Principles

Any location where a road, driveway, or other form of access intersects with another road, driveway, or form of access is considered an access point. All access points in a transportation network should be designed and maintained to adhere to the principles listed below.

- Conflicts at intersections and driveways should be separated and the number of conflicts should be reduced as much as possible.
- Optimum traffic speeds should be maintained, particularly on arterials and highways where mobility is given preference to access.
- A "time-space" perspective – meaning the balance between vehicular speed and roadway distance – should guide (a) the location, timing, and coordination of traffic signals; (b) the placement of access; and (c) the design and operation of intersections.

²⁵ American Association of State Highway and Transportation Officials. A Policy on Geometric Design of Highways and Streets 7th Edition. 2018.



- Signal cycles should be as short as possible but consistent with capacity, pedestrian clearance, and coordination requirements. A cycle length range of 60 to 120 seconds is appropriate. Cycle lengths shall not exceed 150 seconds.
- Unsignalized access should be located so as not to interfere with queues or maneuvering areas of signalized intersections and positioned to take advantage of gaps in traffic flows.
- Interference between through traffic and site traffic should be addressed by incorporating additional traffic lanes and turn lanes to accommodate turning vehicles and through vehicles.
- Adequate on-site storage and driveway dimensions should be designed to accommodate the traffic demand entering and exiting the site. Fewer, properly placed, and adequately designed driveways are preferable to a larger number of inadequately designed driveways, especially when spaced at least 500 feet apart. In all cases, the integrity of mainline traffic operations must not be compromised.
- All driveways and accesses must adhere to sight distance and clear zone requirements as specified by A Policy on Geometric Design of Highways and Streets 7th Edition and the County.
- Establish a basic requirement limiting one driveway per parcel, excepting necessary exemptions where a second driveway is necessary for the handling of traffic flow and can increase safety,
- Locate driveways away from intersections following standards for access spacing,
- Connect parking lots and consolidate driveways,
- Provide residential access through neighborhood streets,
- Increase minimum lot frontage on major roads,
- Promote a connected street system,
- Encourage internal access to parcels,
- Regulate the location, spacing, and design of driveways, and
- Coordinate with other municipalities and state agencies.

7.4.1 Application of Access Management Principles

Safety, capacity, and speed are determining factors on how land development is accessed by a roadway. Managing access is achieved by controlling the location, design, and operation of driveways, median openings, and street connections. In addition, auxiliary lanes (turn lanes or bypass lanes) are also used to divert traffic out of the through stream to improve the flow and improve safety.

Roadways are classified for access control based upon importance to local and regional mobility. No facility can move traffic well and provide unlimited access at the same time. For example, the strictest access control is applied to roadways that serve through traffic or regional trips such as freeways and state highways. The least access control is given to local streets and residential areas that serve local traffic and short trips. In many cases, crashes and congestion are the result of streets trying to serve both mobility and access at the same time.

Access Management principles can be implemented and adhered to in the following ways:

- Ensure roadways are managed properly by having a comprehensive plan to address key issues; include goals, objective, and policies related to access management,
- Ensure that roads are classified per the functional classification plan of the County and provide for a wide variety of street types with varying design standards,

Access Management shall be used on all roadways with the County. Corridor access management strategies extend the useful life of roads at little or no cost to taxpayers. Access management is an inexpensive way to improve performance and maintain integrity of roadways with increasing traffic volume. Access management principles should be applied wherever possible to extend roadway life and performance.

7.5 Controlling Accesses

The County may control access through several methods.

Regulation – The County may exercise its statutory authority to pass ordinances that instigate and improve access management. Regulation cannot remove access rights but can deny direct access if alternative and reasonable access is provided.

Land-use Ordinances – The County may create zoning ordinances and requirements for subdivision design that ensure uniformity in site design, setback distances, access types, and parking restrictions.

Geometric Design – County policies and standards ensure that geometric design of roadways are constructed to allow for reasonable, safe, and effective access.

7.5.1 Spacing Guidelines

Substantial spacing between access points reduces the number of potential conflicts and improves the mobility of roadways. Signalized intersections and driveways should remain no closer than one-quarter mile to ensure efficiency of traffic flow. Unsignalized intersections should be at minimum 500 feet apart for full movement intersections. Access points should not compromise mainline traffic. All accesses to be placed on state highways should be in accordance with UDOT standards as specified in Transportation Preconstruction Tools R930-6.

Collector and arterial roadways should have limited access. Where possible, all accesses should access local roads; collectors and arterials may be accessed if no other alternative is possible and it is approved by the County. Where multiple

parcels are consolidated, accesses should also be consolidated according to County design and spacing standards. Temporary access may be granted to undeveloped property prior to completion of a final development plan if access is needed for construction or preliminary site access. Temporary accesses are subject to removal, relocation, or redesign after final development plan approval.

7.5.2 Offset Distance

Offset distance is the distance from the center of an access to the center of the next access on the opposite side of the road. On undivided roadways, access on opposite sides of the road should be aligned. Where alignment is not possible, driveways should be offset based on relevant County standards.

7.5.3 Corner Spacing

Access to corner lots should be from the lesser-classified road at the greatest distance possible from the intersection. **Table 17** is included for reference in determining desirable access distances from intersection corners. These values do not represent standards, and placement of all access points must be approved by the County. This distance is measured from the point of curvature (PC) of the corner radius. A 25' radius is considered the minimum where the existing radius is less than 25'. Accesses should not be located within the functional boundaries of intersections as outlined in **Table 17**. Driveways should follow offset distance standards where possible. Figure 15 illustrates major road access spacing.

Table 17 - Access Distance from Corner According to Facility Type

Facility Type	Upstream Distance (ft)	Downstream Distance (ft)
Residential Access	-	-
Local Residential	-	-
Residential Standard	-	-
Residential Collector	100	75
Major Collector	175	150
Minor Arterial ¹	200	185
Major Arterial	250	230

NOTES:

- All access points shall be approved by the County. Distances shown may be adjusted by the County on a case-by-case basis. Exceptions can only be approved by the County upon submittal of proper traffic justification.

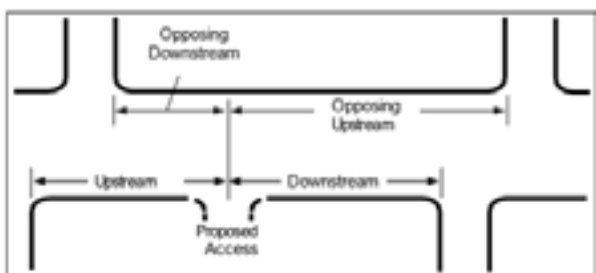


Figure 15 - Major Road Access Spacing

7.5.4 Geometric Design

Several methods of roadway geometric design may be used to improve accessibility while maintaining roadway mobility. Some of these methods are now described.

Right-in/Right-out Accesses – This access type guides traffic entering a driveway or parking lot to only enter and exit using right-turn movements. This access type is often accompanied by a median on the main road to further ensure that traffic is required to adhere to the desired access design. Figure 16 illustrates differing right-in/right-out access designs.

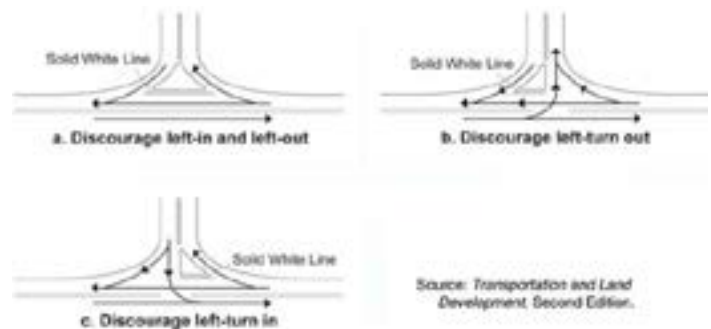


Figure 16 - Right-in/Right-out Accesses²⁶

Medians – Medians are placed to control left-turn movements between intersections. Reducing potential left-turn movements is beneficial in improving traffic mobility and increasing traffic safety. Medians are especially important on high use roads with speed limits greater than 40 mph.

Medians can also add to the overall aesthetic of a roadway corridor or a development by incorporating landscaping or other items of visual interest. However, care should be taken to maintain sight distance around the intersection/access locations. Ground cover plantings should be planted according to County standards. It is important to select landscape material that will not intrude onto the roadway and to locate it in such a way that it will not create a safety issue. Trees should be selected that will not be larger than 4 inches in diameter when mature.

Two way left turn lanes should only be used to retrofit areas of existing development and should be limited to roadways with less than 18,000 ADT. In areas with greater than 18,000 ADT, consideration should be given to raised medians with appropriately spaced median openings. **Table 18** shows UDOT guidelines for spacing of unsignalized restricted median openings.

²⁶ Stover, Vergil G.; Koepke, Frank J., Transportation and Land Development: second Edition, January 1, 1988

Table 18 - Guidelines for Spacing of Unsignalized Restricted Median Openings

Functional Classification	Spacing of Median Openings (ft)*		
	Urban	Suburban	Rural
Collector	330	500	660
Arterial	500	660	800

*Values are for estimating, exact values shall be based on an engineering study

*Values based on UDOT State Highway Access Management Standards. Table 74-1

A 14-foot median is desirable to provide for an adequate left turn lane at intersections.

Shared Accesses – Where possible, access can be shared to mitigate potential conflict points between oncoming and left-turning traffic. Shared accesses are especially beneficial on roadways with many commercial/industrial developments where connected parking lots are possible and reasonable.

Access Alignment – Accesses should be aligned directly opposite each other and intersect roadways at a 90-degree angle. This decreases the number of potential conflict points and driver confusion.

Sight Distance – Providing minimum stopping sight distances and intersection sight distances ensures that all vehicles following the speed limit have sufficient visibility to avoid potential conflicts that may arise. Design varies based on roadway speed. **Table 19** illustrates the minimum sight distances based on speed limit as found in AASHTO's A Policy on Geometric Design of Highways and Streets.

Table 19 - Intersection/Driveway Sight Distance²⁷

Speed Limit (mph)	Stopping Sight Distance (ft)	Design Intersection Sight Distance for Left Turn (ft)	Design Intersection Sight Distance for Through and Right Turn (ft)
25	155	280	240
30	200	335	290
35	250	390	335
40	305	445	385
45	360	500	430
50	425	555	480
55	495	610	530
60	570	665	575
65	645	720	625

²⁷Driver eye is 15 feet measured from the traveled way

Turning Lanes – Turning lanes improve mobility of travel lanes and decrease congestion by separating turning vehicles from through vehicles. These lanes are beneficial on highways and roadways with high speed limits and roadways with greater emphasis on mobility such as arterials and major collectors. They can also be beneficial on side roads intersecting with

²⁷ A Policy on Geometric Design of Highway and Streets, 7th Edition, American Association of State Highway and Transportation Officials (AASHTO), 2018.

²⁸ A Policy on Geometric Design of Highway and Streets, 5th Edition, American Association of State Highway and Transportation Officials (AASHTO), 2004.

arterials and collectors where accessing the major roadway can be difficult due to higher traffic volumes on the major road. Adding turning lanes at such intersections can improve the level of service with or without the addition of signalization. Turning lanes should generally be designed with a minimum width of 12 feet. Left-turn lanes, and two-way left-turn lanes (TW/LTLs) should be designed with a width of 14 feet where possible.

AASHTO's A Policy on Geometric Design of Highways and Streets recommends the following guidelines for storage length of left-turn lanes (**Table 20**):

Table 20 - Turning Lanes Storage Length (100 feet minimum)²⁸

Intersection	Length
High-speed Roads	100 feet
Rural roads	100 feet
Left-turn Lanes Approaching Arterial Roads	250 feet
Left-turn Lanes Approaching Collector Roads	150 feet

The provision for left turn lanes is important from both a capacity and a safety perspective, where left turns would otherwise share the use of a through lane. Shared use of a through lane will dramatically reduce capacity, especially when opposing traffic is heavy. Left turn lanes shall be provided at signalized intersections.

Right turn lanes remove the speed differences in the main travel lanes. This reduces the number and severity of rear-end collisions. Right turn lanes also increase capacity of signalized intersections and may allow more efficient traffic signal phasing. Table 19 provides typical warrants, based on posted speed and traffic volumes for when auxiliary lanes are to be installed.

A separate turning lane consists of a taper plus a full width auxiliary lane. Taper length will vary based on speed. A length of 90 feet for speeds below 45 mph, 140 feet for speeds of 45 and 50 mph, and 180 feet for speeds over 50 mph should be considered adequate. If a two-turn lane is to be provided, it is recommended a 10:1 taper be used to develop the dual lanes. The taper will allow for additional storage during short duration surges in traffic volumes.

Table 21 includes recommendations for when a left- or right-turn lane should be considered on two-lane highways. The County may require a developer to construct the turn lane if a TIS determines that it is necessary. For more information about TIS requirements, see Section 5.

Table 21 - Guidelines for Requiring Left Turn and Right Turn Lanes on Two Lane Highways

Minimum levels for installation auxiliary lanes on rural two-lane roads (farm access excluded)				
Speed Limit	Left Turn Lane	Right Turn Lane	Right Turn Acceleration Lane	Left Turn Acceleration Lane
40 mph or less	25 veh	50 veh	-	-
45 mph or greater	10 veh	25 veh	50 veh	*

Pedestrian and Bicycle Access – When designing roadway accesses, all transportation types should be considered. For design of pedestrian and bicycle facilities, see Section 2.8.5.

Roundabouts – Roundabouts function as an alternative to the traditional four-way intersection. They function as a four-way yield intersection which allows traffic movement to maintain mobility in all four directions by removing the stop signal phase of a four-way stop or signalized intersection. Roundabouts are also beneficial in that they remove potential conflict points, particularly left-turning conflict points. This means that roundabouts can be much safer than four-way intersections if built properly. Traffic studies should be performed to determine the effectiveness and relevance of a roundabout. Development of a roundabout must be guided by an intersection study from a qualified Traffic Engineer to determine when the minimum capacity and design criteria can be met. The Federal Highway Administration (FHWA) has prepared a design guide for modern roundabouts in the United States. A single-lane roundabout can accommodate up to 1,800 vehicles per hour.

Signalized Intersection and Street Spacing – Uniform or near uniform spacing of signals is helpful in providing for efficient and predictable traffic flow. UDOT requires that signals should be spaced no closer than one-quarter mile (1,320 feet), depending on functional class of road. **Table 22** shows the spacing requirements used by UDOT. These requirements are based on the functional class of the roadway facility for street spacing and signalized intersection spacing.

Table 22 - State Highway Access Management Spacing Standards²⁹

Functional Class	Minimum Signal Spacing (feet)	Minimum Street Spacing (feet)
Interstate	N/A	N/A
Arterial Rural	5280	1000
Arterial Urban	2640	N/A
Major Collector Rural	2640	660
Major Collector Urban	2640	660
Minor Collector Rural	1320	300
Minor Collector Urban	1320	300
Other	1320	300
One-way Frontage Road	1320	660

7.6 Number of Accesses per Parcel

Accesses to parcels should be consistent with the overall functionality of the transportation network. Collector and Arterial roadways should have limited access points with accesses being given preference to local roads and minor collectors where possible. Where multiple parcels are consolidated, accesses shall also be consolidated according to County design and spacing standards. Where possible, it is recommended to avoid allowing multiple accesses to residential parcels, especially if those accesses are onto multiple roadways or arterial or collector roads. Traffic impact studies are beneficial in determining the necessary number of accesses required for a parcel.

Design of accesses and intersection shall be in conformance to County standards where applicable.

²⁹ UDOT, Transportation Preconstruction Rules Rg30, Rg30-6 Access Management

8 TRANSPORTATION CORRIDOR PRESERVATION

This section identifies and evaluates techniques that can be used to preserve defined corridors for future transportation facilities.

8.1 Introduction

Several recent research efforts have addressed the issue of corridor preservation. The 1990 Report of the American Association of State Highway and Transportation Officials (AASHTO) Task Force on Corridor Preservation provided an identification and evaluation of various techniques. Subsequent efforts of the Federal Highway Administration (FHWA) and Transportation Research Board (TRB) have been added to the literature. Drawing from these documents and a brief review of relevant Utah law, this chapter provides a discussion of potential techniques that may have applicability to Tooele County. A bibliography of the relevant publications is included.

8.1.1 Definitions

For purposes of this discussion, a "corridor" is defined as "the existing or planned path of a transportation facility that already exists or may be built, expanded and/or upgraded and improved in the future;" and a "transportation facility" is defined as a county, city or state highway, to which, and along which, the public has a perpetual right of access and use for purposes of motorized travel subject to prevailing traffic laws and regulations. The AASHTO report defines corridor preservation as "a concept utilizing the coordinated application of various measures to obtain control of or otherwise protect the right-of-way for a planned transportation facility". The AASHTO report further defines the objectives of corridor preservation as follows:

- Prevent inconsistent development.
- Minimize or avoid environmental, social, and economic impacts.
- Reduce displacement.
- Prevent the foreclosure of desirable location options.
- Allow for the orderly assessment of impacts.
- Permit orderly project development.
- Reduce costs.

8.2 Corridor Preservation Techniques

Techniques for corridor preservation fall into the following four major categories:

For existing corridors:

1. Documentation and recordation to prove record fee ownership or vested right-of-way interest as a public road right-of-way.

For future corridors:

2. Acquisition,
3. Exercise of planning and zoning authority, and
4. Voluntary agreements and governmental inducements.

The various issues associated with each of the foregoing

techniques are unique. Therefore, one preservation technique cannot be recommended as the best for all situations. The purpose of this chapter is to provide a "toolbox" of techniques available. A brief summary of each is provided below.

8.2.1 Documentation and Recordation

(a) The objective is to gather and preserve enough evidence to clearly and convincingly show that the County has either fee ownership of, or a vested right-of-way interest through, the existing corridor. Evidence of ownership should be recorded in the County Recorder's office. Evidence of a vested right-of-way interest through continuous public use or public construction, such as affidavits, witness statements, depositions, and other documentation including maps and photographs, do not necessarily have to be recorded in the County Recorder's Office as such is often not feasible or practical. But such information should be kept and preserved by the County Road Department in case the right-of-way interest is ever challenged. Efforts should be pursued in right-of-way cases to obtain from the servient owner(s) any necessary deeds quitclaiming the right-of-way interest in favor of the County as an added measure of security, and such quitclaim deeds should be recorded in the County Recorder's office. Existing corridors should be professionally surveyed when feasible.

(b) Moreover, any subdivision development that may occur adjacent to or connecting with an existing corridor, should require obtaining a quitclaim deed in favor of the County pertaining to any part of the Corridor that developers, or the landowners whom they represent, are able to sign over to the County, as a condition for obtaining a subdivision permit and/or encroachment permit. Such a conveyance should be noted on all relevant plats that are to be recorded in the County Recorder's Office.

8.2.2 Acquisition

This technique involves the purchase of fee simple or lesser interests in property to bank or preserve it for the corridor location. This could be accomplished using federal funds, or by using state funds where a project would be implemented without federal participation. The use of state funds could generally be accomplished with more flexibility and fewer requirements. If federal funds are used or expected to be used for future elements of the project, certain federally required procedures must be followed. Acquisition can be accomplished in the following ways.

8.2.2.1 Advance Purchase and Eminent Domain

Undeveloped property is acquired, either by direct purchase or eminent domain, and "banked" until needed for construction. Such a method may systematically acquire the entire right-of-way, or it may strategically acquire only selected parcels.

Under Utah statutes, acquisition of property by eminent domain is authorized if (a) the use is authorized by law, (b) the taking is necessary for such use, (c) the construction and use