

DUCHESNE COUNTY TRANSPORTATION MASTER PLAN

PREPARED FOR:



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1. INTRODUCTION

1.1. BACKGROUND

Utah's Duchesne County is located on the south slope and foothills of the longest east-west mountain range in the continental United States, known as the Uinta Mountains. Located between Denver and Salt Lake City; the scenic attractions in the County include: rivers, streams, and lakes that the Uintah Mountains provide; and which attract thousands of visitors. These amenities are located within short driving distances from County locations. Other amenities in the area include an 18-hole golf course in Roosevelt City and Starvation Reservoir State Park near the City of Duchesne which contains 3,500 acres of fishing and boating. The Uintah and Ouray Indian Reservation lies within and adjacent to the County boundaries and makes up 19.76 percent of the County's land area. Important employers include government, agriculture, trucking, utilities, telecommunications, and oil and natural gas drilling. Duchesne County residents and visitors enjoy a pleasant environment, abundant natural beauty, and access to numerous recreational opportunities.

1.2. NEED FOR A STUDY

The primary purpose of a transportation system is to move people and goods in a safe and efficient manner. A variety of different travel demands need to be considered to fulfill this purpose, including travel within the County, passing through the County, and between rural parts of the County and the County's cities. The movement of people and goods also involves various transportation modes, including vehicular, rail, pedestrian and bicycle, to provide for a high degree of mobility to all segments of the population. The County roadway system is currently the key element of the transportation system in that it accommodates the majority of the travel needs within the County limits. There is no rail service in the County at this time; however, the Uintah Basin Railway is in the planning stages and may be constructed within the time frame of this study. The County has a Trails Master Plan that includes planned pedestrian and bicycle projects.

The County's ability to construct and maintain roads is constrained due to the amount of funding being inadequate to meet the demands of road use. Most of the County's roads and bridges budget is currently used for maintenance and repair of existing roads. These maintenance costs are attributable to the high number of road miles serving a large geographic area with low population density and heavy truck traffic. As a result, a major purpose of this transportation plan is to coordinate existing community development regulations and proposed developments with the future transportation needs of the County.

Duchesne County's population continues to increase with no apparent slowdown in the future. The US Census Bureau found a population of 19,596 on April 1, 2020, and it is estimated that the 2024 population is 20,803. Along with the anticipated growth comes an increase in traffic. Ongoing growth and development in the County is creating an increase in traffic demands on the roadway network that is not easily accommodated. Transportation facilities not designed to accommodate the increase in traffic volumes can create safety problems, congestion, and delay for motorized and non- motorized travel. To preserve the unique character in Duchesne County and build a stronger economy, proactive planning of the transportation network is essential. Completing a transportation plan will be paramount to assessing the County's roadway needs and preserving those future corridors and rights-of-way to facilitate the anticipated traffic demand and growth. Transportation concerns identified in Duchesne County include:

- Safety
- Mobility
- Street Classification
- Access Management
- Future Land Use
- Energy Development

The study area for the plan is shown in Figure 1-1.



Figure 1-1. Duchesne County Transportation Master Plan Study Area

1.3. TRANSPORTATION PLANNING PURPOSE

The purpose of this study is to develop a transportation master plan (TMP) for Duchesne County that will be used as a guideline for future planning and development in the County. The primary objective of the study is to establish a reliable transportation network to guide future developments and ensure a functional transportation system. Most transportation plans are used to support an impact fee system to assess developers for roadway improvements necessary to accommodate the proposed development. However, impact fees are constrained by Utah law. The TMP includes several major components as outlined below:

- Analysis of existing conditions
- Analysis of future 20-year conditions
- Short range transportation plan
- Long range transportation plan
- Access management guidelines
- Corridor preservation guidelines

Analysis of existing conditions establishes a baseline that can be used as a gauge for future development. Short range improvements focus on specific projects to improve deficiencies in the existing transportation system and account for projects that are currently being planned. The short-range plan identifies improvements to accommodate immediate future growth and development. The long-range plan will identify those projects which require significant advance planning and funding to implement, and which are needed to accommodate future traffic demand. Access management principles introduced in this plan will balance the need for roadway access with the importance of maintaining safety and mobility on the roadways. The next section describes the planning process for developing the TMP.

1.3.1. COMMUNITY PLANNING

The planning process requires a target or goal. The community vision as outlined in the County's General Plan serves as this target and defines the planning process. This includes a master planning process that helps overall community planning and enhances the understanding of the relationship between individual community elements. The best example of this is the interrelationship between transportation and land use. An expensive cycle of incremental road improvements and land use changes will occur unless these two elements are planned in a coordinated fashion. Proper planning allows early implementation of the ultimate transportation facilities necessary to accommodate the ultimate land use adjacent to the roadway.

1.3.2. ECONOMIC VIABILITY

According to the Federal Highways Administration, Traffic congestion is detrimental for economic development. Raw material and product shipping costs increase proportionally with congestion. Customers and travelers will avoid stores and destinations that are difficult or dangerous to reach. The transportation system is the lifeline for economic viability; much like the human body's circulatory

system provides blood to organs and muscles. Arterial blood clots can be fatal to the body and roadway traffic congestion can be fatal to a County's economic health. For this reason, efficient transportation mobility is vital to a County's economic growth and sustainability. A study was recently conducted for the region to identify the economic impacts of energy development and the role of the transportation system in the Uintah Basin. The 2013 Uintah Basin Energy and Transportation study was conducted as a joint effort between Uintah and Duchesne Counties and UDOT to understand the relationship between transportation and energy production and to discuss solutions for shortfalls in the existing transportation system. This study is referenced in the TMP and was utilized to provide recommendations consistent with the findings of the study and the TMP.

1.3.3. SAFETY TO CITIZENS

Transportation safety for all transportation system users is a major goal of good planning. The integration of trucks, automobiles, agricultural equipment, bicyclists, equestrians, pedestrians, and wheelchairs must occur in a safe and equitable manner. According to the National Highway Traffic Safety Administration, traffic congestion leads to dangerous driving behavior and increased accident rates for vehicles and pedestrians. Approximately 40,000 people die every year in vehicular accidents in the United States, which makes traffic accidents the third leading cause of death in the country. It is the leading cause of death for people under the age of 30. Utah averages about one fatal car accident per day as reported by the Utah Highway Safety Office. Roadways that are planned and designed correctly can reduce the accident rate by as much as 30%. This plan considers areas of high accident frequency in Duchesne County and recommends projects to improve these areas.

1.3.4. HEALTH OF CITIZENS

Quality of life includes many factors. Some of the factors that are important to the citizens in Duchesne County include: work commute time, the preservation of rural environment and scenic views, air quality, safety, and access to recreational areas. A poorly planned transportation system diminishes all of these elements. There are three reasons why planning improvements to the roadway system should be made:

1. Mobility – Alleviate existing or anticipated traffic congestion
2. Safety – Improve safety for drivers and pedestrians
3. Access – Provide efficient access routes to agricultural, residential, commercial, industrial and recreation areas of the County

1.3.5. LEGAL BASIS FOR DEVELOPMENT EXACTIONS

Due to the decrease in funding available from Federal and State sources, local governments are forced to require developers to pay for the infrastructure necessary to support proposed development projects. A long-range plan and implementing ordinances are the legal basis for these exactions and impact fees. Legal challenges will be minimized if the estimated roadway construction costs are based on the County vision and system plans that support the vision.

The County recently adopted an ordinance (Ordinance #24-409) which requires a conditional use permit for oil and gas extraction locations and requires developers of new oil and gas wells to pay a fee established in the Transportation Master Plan or a separate ordinance. The County then passed Ordinance #25-416 to establish the fee, which references this study for the fee calculation as outlined in section 4.6.1.. However, Senate Bill 207 (approved in the 2025 Utah General Legislative Session) precludes counties from establishing such local impact fees for oil and gas development. While this bill remains in force, Duchesne County will not enact a fee for oil and gas wells based on Ordinance #25-416.

Other developments, including residential, commercial, and industrial developments, must also abide by the requirements of this study, including conducting site-specific studies or mitigation as described within this study.

1.3.6. UDOT COORDINATION

The Utah Department of Transportation (UDOT) is responsible for the safe and efficient operation of State roads. Duchesne County lies within the UDOT Region 3 jurisdiction. Coordination with UDOT is essential in obtaining Federal and State monies to construct transportation facilities. This coordination will also help the County put planned projects in the State Transportation Improvement Program (STIP). Lack of overall planning and coordination with UDOT may lead to haphazard results and poor circulation along transportation corridors supported by the State. This coordination will also ensure that improvement projects in the County that affect UDOT will be included in the STIP. The County should continue to coordinate with UDOT on all subdivision and development projects in the County that could possibly impact the State highway system. This is accomplished by continuing to include, in the current development process, a requirement for developers to contact UDOT and discuss the project with them to determine if any mitigation is necessary.

1.4. STUDY PROCESS

The study process used for the original creation of the Duchesne County Transportation Master Plan (TMP) is depicted in Figure 1-2. The goal of this procedure was to identify the needs, opportunities, and constraints for both establishing and implementing the TMP. This process involved the participation of the County and public for guidance, review, evaluation and recommendations in developing the TMP. This document represents a 2025 updated version of the TMP, which followed a similar process. New data including additional core samples, traffic counts, analysis, and recommendations have been included in this version. The user of this version of the TMP should take care to ensure that they reference the most up-to-date data for a given roadway, as some roadways were reevaluated during this update.

The first component of the study process is to evaluate the existing and future traffic conditions, roadway infrastructure, and population and employment conditions.

Nearly all paved Class B roadways within Duchesne County were assessed using Vialytics software in the spring and summer of 2024. Vialytics is an artificial intelligence-based software which uses a vehicle

mounted camera to collect thousands of photos and then evaluate those photos to determine the remaining service life of the evaluated roadways. Appendix H contains information regarding the existing conditions of the roadways.

Core samples were also taken on paved roadways to provide insight on the existing infrastructure and provide a baseline for future maintenance and replacement. Traffic counts were used to quantify truck and passenger car volumes and patterns.

In 2013, Duchesne County Sherriff, Fire, EMS, School District and Utah Highway Patrol representatives met to provide insight on problem areas and roadway safety issues in specific locations, and a technical review committee was established for each aspect of the evaluation. The public was invited to attend open house meetings to provide input. For the update version, GIS data collected by first responders was used to identify problem locations. The original comments from first responders have also been included in this version of the TMP for review along with the new GIS analysis.

The second component of the original TMP study process was obtaining public input and making revisions to the plan based on the comments received. This component was used to help identify problems being experienced by the public so the transportation system could be thoroughly evaluated. This input also helped to prioritize the transportation issues. Duchesne County citizens were informed of the plan through public meetings in an “open house” format that were held on two different occasions. Project information was displayed, and public comments were recorded for use and incorporation into the plan as necessary. Appendix C contains the attendees list and comments received from the public during these meetings. (In addition to these meetings, maps were available at the front counter of the County Offices and on the project website for review and comment by the public. The report was available for several weeks during the Planning Commission and County Commission’s review and approval).

The third component of the original TMP study process was to present and obtain approval from the Planning Commission and County Commissioners. The County Commissioners and the Planning Commission were heavily involved in providing feedback and steering for the TMP. Comments from these bodies and the public were incorporated into the final document. Transportation projects that were recommended for the short term and long-range needs were discussed and finalized. After which, the TMP was adopted by the County Commissioners on September 25, 2017, by Resolution #17-14 and implemented.

For the TMP update, at least 10 public meetings and hearings were held, to discuss the portions of the TMP pertaining to oil and gas production. These meetings were hosted by the Duchesne County Board of Commissioners. These meetings were a mix of combined working and regular meetings, and public hearings. These meetings were attended by many representatives from the oil and gas industry and members of the public. Attendance lists, meeting minutes, and meeting audio recordings for these meetings are available at the Utah Public Notice Website under the Duchesne County Board of Commissioners. The meeting dates for these meetings were as follows (all meetings were held in 2024): July 8, July 15, July 22, July 29, August 19, September 16, September 30, October 7, October 21, and November 18. Other private meetings were held between Jones and DeMille Engineering and oil and gas

producers. One of which was held on October 15, 2024, to discuss section 4.6.1 of this document and Appendix F of this document.

The study process solicited input from the public on several different occasions. This public participation element has been included in the study process to ensure that any decisions made regarding this study are acceptable to the County. In addition, the Planning Commission held a public hearing to take input on the plan and make a recommendation before it was considered by the County Commissioners.

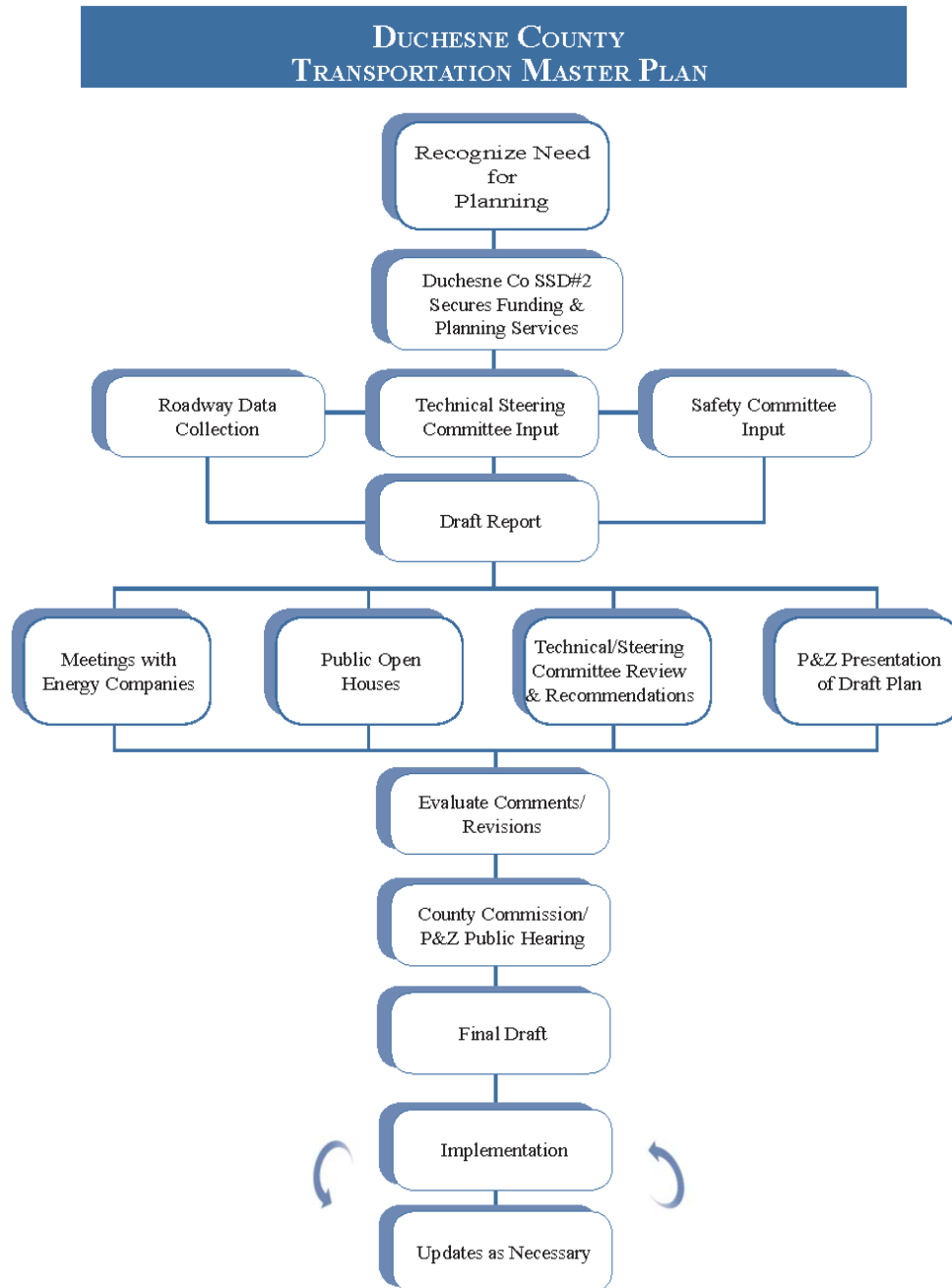


Figure 1-2. Transportation Master Plan Study Process

1.5. STUDY GOALS

Duchesne County's transportation policy recommendations and TMP Study Goals are described below:

- A balanced transportation system which appropriately serves the cultural, economic, mobility, recreational and social interests of County residents and visitors
- A reliable transportation system
- A transportation system that promotes orderly growth, travel and tourism
- Duchesne County shall seek effective access management
- Maintain acceptable levels of roadway efficiencies, protect County and community culture and promote aesthetic and functional design features
- Coordinate provisions of the General plan with County, federal and state transportation managers in assuring that interrelated transportation systems serve residents in the County efficiently and safely
- Ensure that access management principles are implemented and that landscaping and parking provide aesthetic and accessible transportation and mobility features
- Encourage on-going input from citizens and collaboration between affected local and state entities
- Recognize the importance of access to public lands and base access to public lands and road management policy decisions on input from local citizens
- Through regular coordination meetings, maintain appropriate access to and through Tribal properties
- Maintain the historical and continuing use of trail ways, byways, highways, roadways and rights-of-way established by agriculturalists, herders, livestock owners and recreationists in the County
- Achieve flexibility through conditional use permits, variances, and waivers, provided that they are consistent with rural design principles and sound land use planning
- Implement and equitably administer transportation design and access standards through County Road, zoning and subdivision ordinances
- Work cooperatively with community leaders and citizens to encourage optimal design, landscape, and gateway features that identify commercial, recreational, industrial and residential developments in Duchesne County
- Work cooperatively and proactively with energy development companies and public utilities to promote and maintain quality infrastructure.
- Expand the County's transportation and trails systems
- Emphasize the preservation of air quality, open spaces and freedom of movement that is characteristic of living in or visiting Duchesne County
- Encourage the adoption and enforcement of ordinances that maintain prudent and reasonable noise levels throughout Duchesne County

This Transportation Master Plan update has addressed and upheld these goals.

2. EXISTING CONDITIONS

An inventory and evaluation of existing conditions was conducted to identify current transportation infrastructure and land use problems and uses which influence the local and area wide transportation system. This information was then used as a baseline to identify and measure improvements.

2.1. LAND USE

It is essential to analyze and forecast traffic volumes with an understanding of the land uses within the study area. Land along transportation corridors develops and typically follows future land use plans and zoning maps identified and adopted by the County.

2.2. DEMOGRAPHIC & SOCIOECONOMIC DATA

Table 2-1 shows the 2020 census population and housing data for Duchesne County.

Table 2-1. Duchesne County Population and Housing Density

Population	Housing Units	Area (sq. mi)	Population Density (pop/sq. mi)	Housing Density (HU/sq. mi)
19,596	8,725	3,238	6.05	2.69

Table 2-2: compares the population growth for the State of Utah and Duchesne County. The table shows a slight decline in population in Duchesne County from 1980 to 1990 then an increase in population from 1990 to 2010. That increase continued through 2020. Duchesne County has averaged 2.32% growth per year from 1970 to 2010 and a 2.58% growth rate from 2010 to 2020. The annual growth rates from the year 2010 to the year 2020 are higher than the statewide average growth rate of 1.71% per year.

Table 2-2. Population Growth Trends

Year	State of Utah	Duchesne County
1970	1,059,273	7,414
1980	1,461,037	12,660
1990	1,722,850	12,608
2000	2,233,169	14,449
2010	2,772,667	18,616
Average Annual Growth (1970 – 2010)	2.86%	2.32%
2020	3,284,823	19,596
Average Annual Growth (2010-2020)	1.71%	2.58%

Duchesne County has similar demographic characteristics when compared with the State of Utah. In the 20 to 24 year old category, the State is at 8.9% and the County is at 5.0%. In the 25 to 44 year old category, the State is at 28.2% and the County is at 26.9%. In the 45 to 64 year old category, the State is at 20.2% and the County is at 20.1%. For the 65+ year old category, the State is at 11.8% and the County is at 11.9%. The median age for the population in the State of Utah and for Duchesne County is 29.2 years and 29.7 years old respectively. The race demographics show a trend that is different from the state. The State has a smaller Non-Hispanic, White population at 78.7%, compared to the County's 85.4%. Duchesne County is more typical of the rural parts of the State, which tend to have a smaller minority population.

The 2020 median income in Duchesne County is \$70,821 compared to the State median household income of \$89,168. The unemployment rate in the State was 1.9% and in Duchesne County it was 2.6% in 2012. Figure 2-1 shows the 2022 job distribution by industry in Duchesne County.

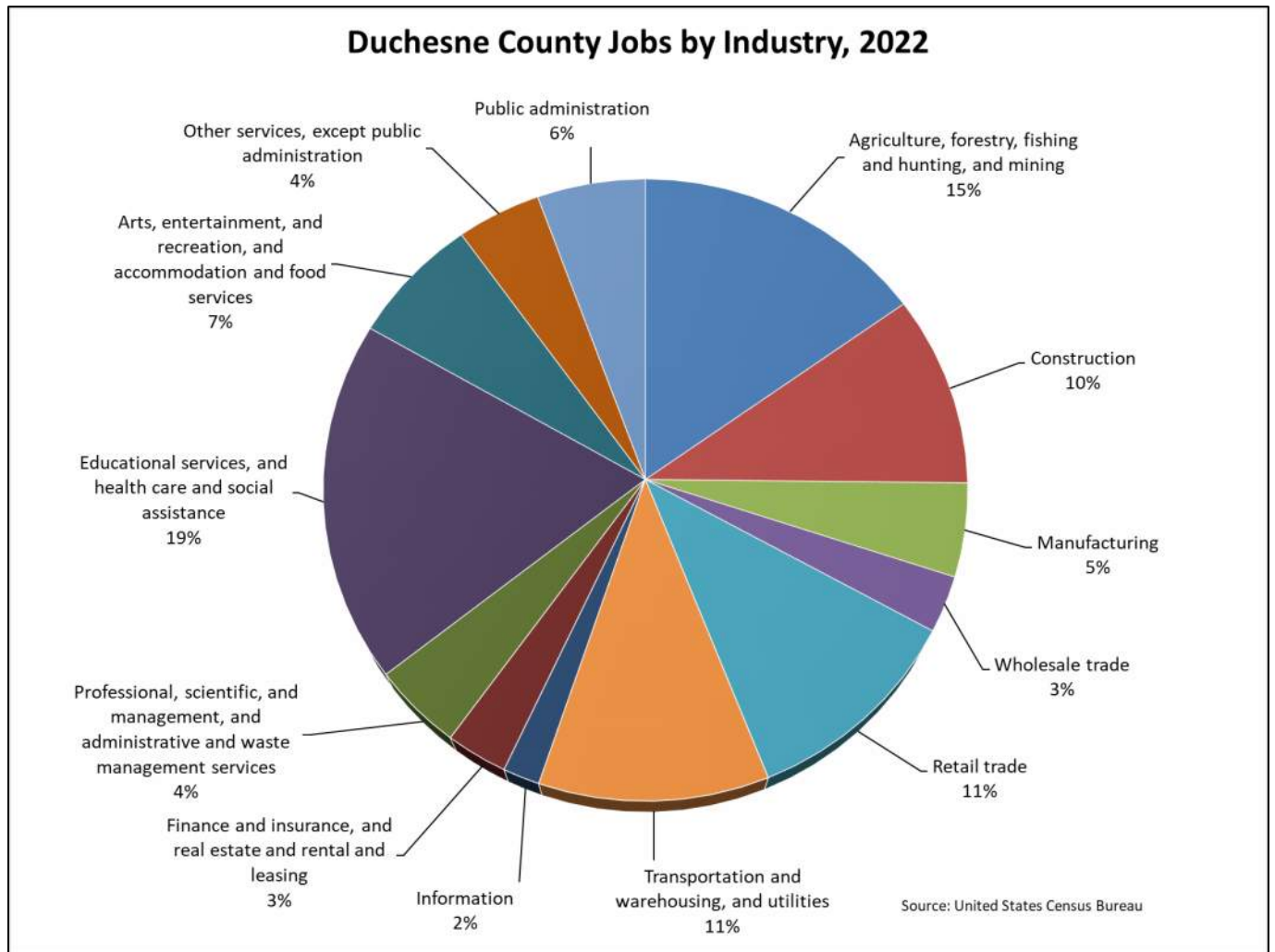


Figure 2-1. 2022 Duchesne County Employment Data

2.3. ROADWAY NETWORK INVENTORY

A wide variety of traffic and roadway data was collected in order to develop the TMP. This data was used to analyze the existing conditions and to help forecast the future conditions.

The following information was gathered for the existing roadway network:

- Number of lanes
- Roadway segment lengths
- Daily traffic counts, speeds, and classifications on selected roadway segments
- Planned and funded roadway improvement projects
- Vehicle accident information and roadway safety concern areas
- Pavement surveys for a majority of paved roadway segments

- Core samples of most paved roadway segments (asphalt depths, base course, and subgrade materials)
- County and State tracked bridge structure inventories

The County roadway network provides the dominant means of transportation for this area, with the State highway system serving as the backbone for this network.

2.4. COUNTY ROADWAYS THROUGH UINTAH & OURAY INDIAN RESERVATION LANDS

Duchesne County has approximately 213 miles of roadway adjacent to or crossing tribal trust lands. Many of these roadways are important corridors for recreational use and access to Forest Service, BLM, and other public lands. Several of these access corridors have been found deficient in safety and pavement conditions and coordination will be required for repair and maintenance of these roadways. See Appendix A for maps showing roadways and land ownership, including tribal trust lands in the County. A working relationship between these entities is desirable to maintain these corridors and provide adequate safety, functionality, and protection to both roadway users and infrastructure.

It is recommended that agreements and maintenance policies be upheld and sought to benefit both county residents and tribal interests. The Ute Tribe is currently working on a Long-Range Transportation plan and will be required by the BIA to create and finalize agreements and maintenance policies. This requirement creates a fantastic opportunity for collaboration between Duchesne County and the Ute Tribe, which can benefit all parties. Possible cost sharing opportunities should also be investigated and open communication between Tribal leaders, the Bureau of Indian Affairs, and County leaders can facilitate these opportunities.

2.5. FUNCTIONAL CLASSIFICATION

A roadway network is comprised of a hierarchy of roadways whose functional classifications are defined by their usage. In general, streets serve two functions; they provide access and mobility. The relative degree to which a road serves these functions defines its functional classification. In descending order of their ability to provide mobility, the roadway functional types are more thoroughly described as follows:

2.5.1. STATE AND U.S. HIGHWAY SYSTEM

Duchesne County is not served by the federal interstate highway system. Much of the primary regional roadway system in Duchesne County consists of roads that are maintained by the Utah Department of Transportation (UDOT):

- US-40 is the primary federal highway within the County. This highway functions as the primary East-West regional corridor through the County.
- US-191 is the second federal highway within the County. This highway functions as the primary North-South regional corridor through the County.
- State Highways in the County include segments of SR-150, SR-35, SR-208, SR-87, SR-311 and SR-121. These roads generally serve collector and minor arterial roadway functions.

2.5.2. ARTERIALS

Arterials carry longer-distance traffic flow for regional, intercommunity and major commuting purposes. Arterials have a limited number of at-grade intersections and, only when other alternatives do not exist, do they provide direct property access. Arterials can carry significant traffic volumes at higher speeds for longer distances, and accesses are seldom spaced at closer than 660-foot intervals (See Section 7 for Access Management standards).

2.5.3. MAJOR COLLECTORS

Major collectors are the next highest roadway classification and are higher speed roadways where mobility still takes precedence over access. This designation is also used for rural primary facilities where the arterial classification is not warranted by lanes or traffic volumes.

2.5.4. MINOR COLLECTORS

Minor collectors serve as main connectors between communities and neighborhoods. They distribute traffic between arterials/major collectors and local roads. Most of the traffic on minor collectors has an origin or a destination within the community. Also known as rural secondary facilities, this roadway classification includes most County roads that are numbered and are not classified as major collectors or arterials.

2.5.5. LOCAL ROADS

The primary function of local roads is to provide access to adjacent land uses, whether it is residences, businesses, or community facilities. Local streets generally are internal to or serve an access function for a single neighborhood or development. Traffic using local roads should have a close-by origin or destination. Typically, County numbered roadways with a local classification are limited in length and continuity. This study primarily focuses on arterial and collector roadways and local roads are left to developers to define and construct in their respective developments.

2.5.6. VEHICLE MILES OF TRAVEL (VMT)

The VMT for each roadway was calculated from two different sources. The first source was traffic counts that were conducted on each of the listed roadways as part of this study. The second source was traffic counts that were obtained from UDOT as part of their on-going counting procedures. The VMT was calculated by taking the daily traffic for each specific roadway and multiplying that by the length of that segment of roadway. The VMT was then used in determining the functional classification of each roadway in the study area. Federal Highway Administration guidelines limit the percentage of road miles and VMT on functionally classified highways. The allowable percentages for each classification are shown below in Table 2-3. Allowable Percentage of Road Miles and VMT.

Table 2-3. Allowable Percentage of Road Miles and VMT

Functional Classification	Rural		Urban	
	Mileage	VMT	Mileage	VMT
Principal Arterial	2%-4%	30%-55%	5%-10%	40%-65%
All Arterials	6%-12%	45%-75%	15%-25%	65%-80%
Collectors	10%-25%	20%-35%	5%-10%	5%-10%
Local Roads	65%-75%	5%-20%	65%-80%	10%-30%

2.6. ROADWAY CONDITIONS

The current condition of each roadway is explained in this section. The condition of each roadway in the County serves as a basis for how well the transportation system functions.

2.6.1. TRAVEL LANES

Most of the roads that fall under Duchesne County jurisdiction consist of two travel lanes. Various roadway segments, particularly in the mountainous portion of the County consist of three lanes, with the third lane acting as a climbing or passing lane. Several unpaved roads in the mountainous areas consist of a single travel lane.

2.6.2. SURFACE CONDITIONS

All State Highways in the County are paved. The study roadway segments for the County are paved. Many of the rural and mountainous roads are unpaved. Appendix A includes a map showing the surface condition of all the roadways that were included in the study (Appendix A –Figure A-2: Existing Roadway Assessments).

2.6.3. TRAFFIC VOLUME

Traffic volumes are an indicator of the relative importance of a roadway in an area. When compared to roadway capacity estimates, traffic volumes also reveal generally how a road is functioning (level of service) and if improvements to increase capacity are necessary.

The most commonly used measurement of traffic volume is Average Daily Traffic (ADT). ADT is defined as the total number of vehicles passing a certain point in both directions in a 24-hour period. Figure A-2: Existing Roadway Assessments in Appendix B shows the existing ADT on the major roadways in the County. These ADTs were not adjusted for the average day of the week and month of the year because there is limited data available to use for adjustment.

A complete list of traffic volumes on the study roadway segments is included in Appendix B.

2.7. ROADWAY CAPACITIES

A roadway's capacity can be defined as the maximum traffic volume that can be accommodated at desired levels of service (LOS). LOS is commonly used to define the quality of traffic flow on various roadway types based on a comparison of traffic volumes with roadway characteristics. A LOS scale ranging from A to F is used to define the quality of flow, with LOS A representing an essentially free-flow situation and LOS F representing the highest levels of congestion, with traffic volumes exceeding the intended capacity of the roadway. It is standard engineering practice to assume that a facility with LOS A through LOS D is within an acceptable range for most users. For the purpose of this study, LOS guidelines for the study roadways are LOS C or better. Table 2-4 provides the resulting daily capacities for LOS C based on number of lanes.

Table 2-4. Rural LOS "C" Daily Traffic Capacity Estimates

Travel Lanes	Highway	Arterial	Collector
2	NA	12,000	7,500
3	NA	13,000	8,500
4	50,000	20,500	16,000
5	NA	22,000	18,000
6	72,000	30,500	NA
7	NA	33,000	NA
8	NA	NA	NA

Source: Horrocks Engineers

The 2012-2013 analysis indicates that all of the study roadway segments are operating at LOS A. A Table showing the 2013 LOS for the study roadway segments is found in Appendix B.7. During the 2025 update, further analysis was done to update the LOS for previously analyzed roads and to analyze new roads. This data is also shown in Appendix B.7.

2.8. VOLUME TO CAPACITY RATIOS

One operational measure that is used to define operational characteristics is volume to capacity ratio (V/C). This is the daily traffic volume on a given roadway divided by the daily capacity of that roadway. LOS analysis was performed on the study roadway segments. The traffic growth projection produces daily traffic volumes (V) for roadway segments and each segment has a maximum capacity (C), which is assumed to be the LOS "C" threshold. The volume to capacity ratio (V/C) is used to measure traffic density on any given road segment. A V/C equal to 1 or more means that the road is carrying as many vehicles as possible so it is very crowded and there isn't much room to maneuver or change speeds. This typically is classified as LOS "F" conditions. A V/C ratio less than 0.6 means that the road is carrying very few vehicles so it is not crowded and there is plenty of room to maneuver or change speeds. This is typically classified as LOS "A" conditions. V/C ratios between 0.6 and 1.0 generally fall within the LOS ratings from "B" to "E".

The LOS analysis is based on roadway segments excluding the intersections. On a typical roadway, the intersections are the limiting factor to the operation of the roadway segment. Hence, the LOS of the intersection is the controlling factor in determining the overall LOS for the roadway. The results produced for the roadway LOS analysis are included in Table 2-5. The table shows that all V/C ratios fall below 0.6, which means that all roads studied in 2012-2013 met LOS A conditions.

Updated LOS information for Duchesne County roads is available in Appendix B.7.

Table 2-5. Existing 2012-2013 ADT & V/C Ratio

Road	Count CV#	Description	2012 ADT Combined	Total % Trucks	Total # Trucks	V/C Ratio 45 mi/h
2000 W	CV1	2000 West North of Neola	725.5	6.50%	47	0.007
3000 W	CV2	3000 West Just North of 4000 North	725.5	6.63%	157	0.007
4000 N	CV3	4000 North	795.3	9.75%	77	0.008
6250 S	CV4	6250 South-NW of Myton	860.5	23.00%	196	0.008
6450 S	CV5	6450 South-NW of Myton	299	29.91%	88	0.003
9000 N	CV6	9000 North-West of Neola	496.3	10.03%	49	0.005
12000 W	CV7	12000 West #1-Bluebell	490.6	7.96%	39	0.005
12000 W	CV8	12000 West #2-Bluebell	277	6.80%	19	0.003
12000 W	CV9	12000 West #1-Bridgeland	753.9	18.14%	136	0.007
16000 W	CV10	16000 West-North of Altamont	364.3	4.28%	16	0.004
21000 W	CV11	21000 West	323.4	6.30%	20	0.003
Antelope Canyon Rd	CV12	Antelope Canyon Road	594.9	23.24%	137	0.006
Bluebell Rd	CV13	Bluebell Road-071712	1210.7	6.44%	77	0.012
Bluebell Rd	CV14	Bluebell Road-061212	1659.3	9.93%	164	0.016
Bluebell Rd	CV15	Bluebell Road-Silver Counter	1190.8	6.35%	75	0.012
Bluebell Rd	CV16	Bluebell Road-Yellow Counter	1242.1	5.96%	74	0.012
CR-33	CV17	CR-33-Pariette Rd South	2122.5	23.66%	501	0.021
East River Rd	CV18	East River Road	602.1	8.61%	51	0.006
Hancock Cove Road	CV19	Hancock Cove Road	940	3.16%	29	0.009
Lake Boreham Rd	CV20	Lake Boreham Road-080712	288.8	22.26%	60	0.003
Moon Lake Rd	CV21	Moon Lake Road #1	33.2	0.00%	1	0.000
Ostler Corner	CV22	Ostler Corner - 200 North	1694.2	4.50%	76	0.016
Ostler Corner	CV23	Ostler Corner - 3000 West	1393.6	13.96%	187	0.014
Strawberry River Road	CV24	Strawberry River Road	330.1	31.19%	101	0.003
Uintah Canyon Road	CV25	Uintah Canyon Road	64	1.43%	1	0.001
CR-33	CV26	CR-33	2621.5	21.92%	570	0.025
CR-33	CV27	CR-33	2251.7	23.89%	531	0.022
Lake Boreham Rd	CV28	Lake Boreham Road-082112	182.4	16.57%	30	0.002
Lake Boreham #1	CV29	Lake Boreham #1 040513	183.3	13.41%	24	0.002
Lake Boreham #2	CV30	Lake Boreham #2 040513	144.4	9.39%	14	0.001
6000 West	CV31	6000 West	202.9	10.38%	21	0.002
Red Creek Road	CV32	Red Creek Road #1	54	3.41%	2	0.001

2.9. TRAFFIC ACCIDENT DATA

During the years of 2010 to 2022 a significant amount of GPS accident data was collected by law enforcement officers. This data is summarized in Appendix C. Between the years of 2010 and 2022 there were 5,489 traffic accidents within Duchesne County. Of these 5,489 accidents, 51 were fatal, and 141 were suspected to have resulted in serious injury. Most accidents occurred on state highways where traffic volume and speeds are highest. Most major accidents have occurred on the eastern side of Duchesne County along the US-40 corridor between Duchesne City and Roosevelt City.

While most of these accidents have occurred on US-40, many of them occurred in close proximity to intersections with county roads. Improvements that may reduce the occurrence of these accidents will require close coordination between Duchesne County and UDOT. Some of these intersections are listed in Table D-4 inside Appendix D.

2.10. REVENUE SOURCES

Funding for the maintenance of the existing transportation facilities comes primarily from revenue sources that include the Duchesne County general fund, federal funds, transportation impact fees, and State Class B and C funds. Funding for local transportation projects consists of a combination of federal, state and local revenues. However, this total is not entirely available for transportation improvement projects since annual operating and maintenance costs must be deducted from the total revenue. In addition, the County is limited in the ability to subsidize the transportation budget from general fund revenues. The County has access to mineral lease monies that are administered through the Special Service District #2 and come from the Community Impact Board. These funds have enabled the County to successfully complete several road projects, however, this source has experienced a downward trend and is no longer able to provide the funding that it once did.

Transportation infrastructure in Duchesne County is largely handled by Duchesne County Special Service District #2. This Special Service District is funded almost entirely by mineral lease monies. Recent increases in oil and gas extraction in Duchesne County on private lands have greatly increased the demands on the County's road infrastructure. Simultaneously, because mineral lease monies are only collected by the State of Utah on facilities on public lands, funds from mineral leases have greatly decreased over the same period. Figure 2-2 shows the current trends in oil production in Duchesne County and mineral lease monies.

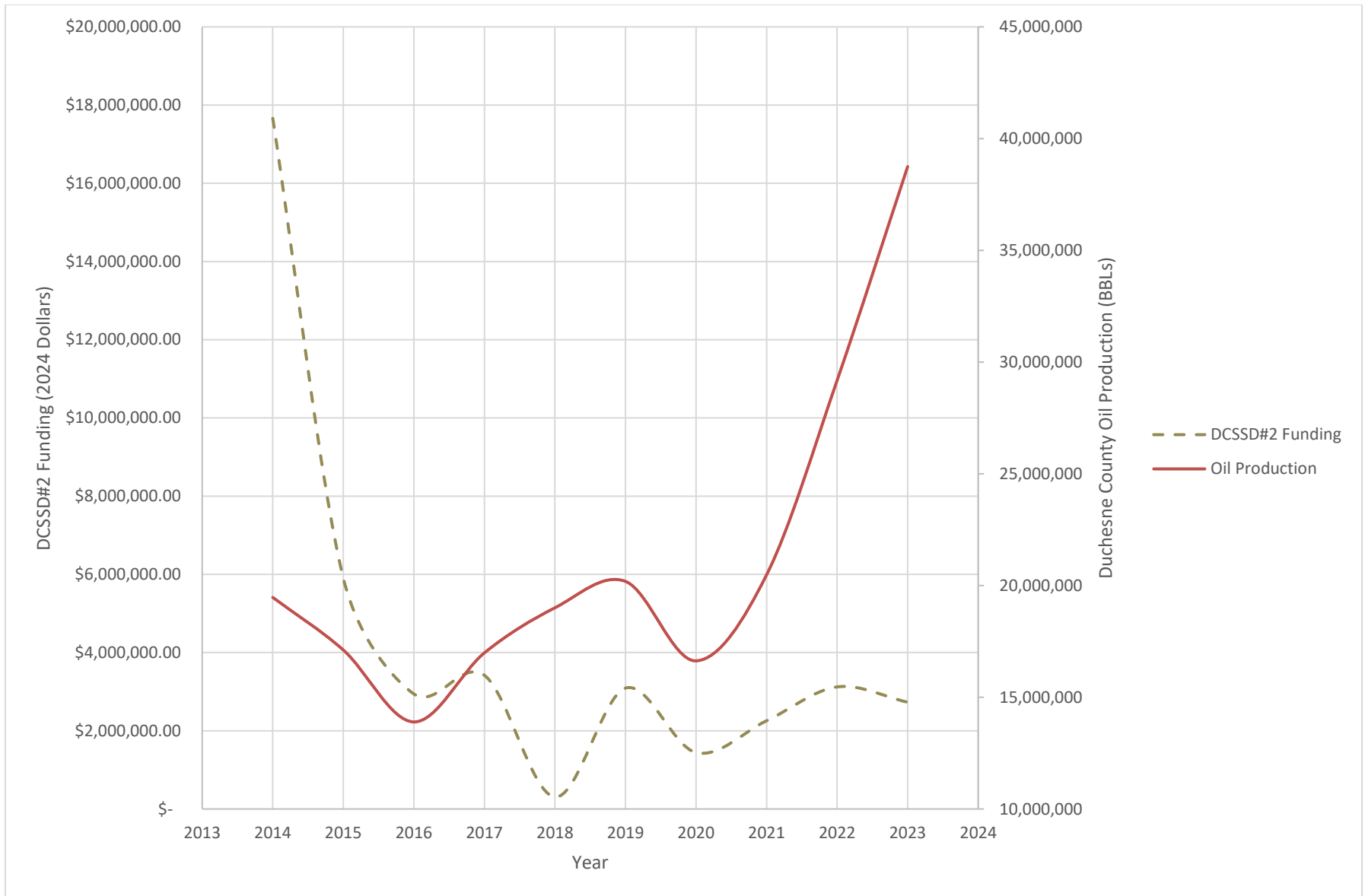


Figure 2-2. Oil Production vs. Mineral Lease Contribution to DCSSD#2 Funding.

2.10.1. STATE CLASS B AND C PROGRAM

The distribution of Class B and C Program monies is established by state legislation and is administered by the Utah Department of Transportation (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 the funds derived from the taxes and fees are kept by UDOT for their 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, road mileage, and land area (see Table 2-6 below). Class B funds are given to counties, and Class C funds are given to cities and towns.

Table 2-6. Apportionment Method of Class B and C Road Funds

Based on	Of
50%	Roadway Mileage
50%	Total Population

Class B and C funds can be used for maintenance and construction of highways; however, thirty percent of the funds must be used for construction or maintenance projects that exceed \$40,000. Class B and C funds can also be used for matching federal funds or to pay the principal, interest, premiums, and reserves for issued bonds.

2.10.2. FEDERAL FUNDS

Federal funds are available to cities and counties through the federal aid program. The funds are administered by the Utah Department of Transportation (UDOT). 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 that is functionally classified as a collector street or higher. STP funds can 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.

The amount of money available for projects specifically in the study area varies each year depending on the planned projects in UDOT's Region Three. As a result, federal aid program money is not listed as part of the study area's transportation revenue.

2.10.3. LOCAL FUNDS

Duchesne County, like most counties, has used general fund revenues in its transportation program. Other options available to improve the County's transportation facilities could involve some type of bonding arrangement, either through the creation of a redevelopment district or a special improvement district. These districts are organized for the purpose of funding a single, specific project that benefits an identifiable property or group of properties. Another funding source is through general obligation bonding arrangements for projects felt to be beneficial to the entire entity issuing the bond. In November 2015, Duchesne County passed a proposition which raised the local sales tax \$0.01 for every \$4 dollars spent. Other counties around the state had the proposition on the ballot. Some counties passed it while others did not. Duchesne County's allotment of the local option tax is distributed as follows:

- 40% distributed to municipalities in the County
- 20% distributed to the County
- 40% distributed to the local transit authority (BTA)

These funds can be used for transportation projects in the municipalities and throughout Duchesne County.

2.10.4. PRIVATE FUNDING SOURCES

Private interests often provide sources of funding for transportation improvements. Developers construct the local streets within subdivisions and often dedicate right-of-way and participate in the construction of collector or arterial streets adjacent to their developments. Developers can also be considered as a possible source of funds for projects because of the impacts of the development on the County. Some of these projects include the addition of traffic signals and/or street widening.

2.10.5. ENERGY DEVELOPMENT SOURCES

Energy development makes up a large portion of the economy and the impacts to the transportation system in Duchesne County. In the past, energy development companies have contributed to varying degrees with improvements to existing roadway and bridge infrastructure. Duchesne County has recently made an attempt to quantify impacts from energy development. This was done in an effort to partner with energy producers to preserve and repair roadways which are impacted by oil and gas extraction. Duchesne County has also recently adopted Ordinance #24-409 which requires energy producers to pay a fee which offsets roadway costs from industry traffic as a prerequisite to obtaining a conditional use fee for new locations. The ability to collect such funding was preempted by the passage of SB 207 in the 2025 Utah General Legislative Session.

SB 207 passed in the 2025 Utah General Legislative Session instituted a tax of 5 cents per barrel of crude oil and 0.25 cents per MCF of gas produced in Duchesne County to be returned to the county of origin for use on roads impacted by oil and gas production. It is still unclear at this point what revenue Duchesne County can expect from this source.

In 2013, the Uintah Basin Energy and Transportation study was completed to address questions on constraints and limitations to the economy and oil and gas production due to the capacity of the transportation infrastructure. The findings point to material limitations in the capacity of the transportation system with demand exceeding capacity if no corrective actions are taken. The capacity limitations could result in a loss of up to 12% of potential production in the next 30 years. Finding ways for cooperation and funding support will benefit both the transportation system in the County as well as the gas and oil production companies.

2.11. BICYCLE FACILITIES

The Federal Highway Administration uses three general categories of bicycle user types to help determine what type of facility may be appropriate for a specific plan. Advanced riders are typically using a facility for convenience and speed in getting to specific destinations and are comfortable operating their bicycles as they would a motor vehicle. Basic riders also desire convenience and speed but lack the confidence and experience to comfortably ride on busy arterials. They tend to stick to lower volume roadways with wide shoulders. Children may ride with or without an adult, but also need connections to school, friends, convenience stores and parks. They tend to ride on low volume residential roads.

Along with these three types of riders there are three types of bicycle facilities that can be used to accommodate them. These bicycle facilities are sometimes referred to as Type 1, 2, or 3.

A Type 1 bicycle facility is one in which the bicycle rider uses a designated shared use path or trail that is completely separated from the roadway. A shared use path generally serves as a recreational opportunity that is integrated into an area wide system of trails. Common applications are along rivers, canals, utility rights-of-way and former railroad rights-of-way. Type 1 facilities serve all three types of riders, but primarily Basic Riders and Children.

Type 2 bicycle facilities refer to designated bicycle lanes. Bike lanes are delineated by appropriate pavement markings and signs along roads where there is sufficient pavement width to accommodate a safe four- to five-foot-wide lane for bicyclists only. Type 2 facilities typically serve Advanced Riders. Basic Riders and sometimes children will use them if they are on low volume roads.

Type 3 bicycle facilities are also referred to as shared roadway bike routes. These are bike routes that may be designated in an overall bicycle facility plan, but do not provide any physical separation between bicycles and motorized vehicles. In rural areas unsigned Type 3 facilities serve mostly Advanced Riders and are used to connect major destinations. Signed Type 3 facilities indicate to motorists that they should be aware of bicycles in the roadway and should treat them as they would another motorized vehicle.

Duchesne County adopted a Trails Master Plan in August of 2020. The Duchesne County Trails Master Plan works alongside this Transportation Master Plan to establish bicycle and pedestrian facilities and corridors throughout the County. Some of these facilities are already in place but a majority of them are not. As new corridors are planned and existing corridors upgraded, the bicycle and pedestrian facilities described by this plan and the Trails Master Plan may be accommodated as part of the improvements to

the facilities. The type of facility will depend upon the availability of right-of-way to house the facility, amount of funding available to construct the facility, potential users that will use the facility, and roadway characteristics such as speed, shoulder width, and availability of additional asphalt width, etc. If high speeds are present with little shoulder separation to adjacent vehicles, a Type 1 facility is recommended. The hierarchy for deciding which type of facility should be constructed for a given roadway should start with a Type 1 facility as being the preferred with a Type 3 being used only if a Type 1 and Type 2 cannot be accomplished.

3. FUTURE GROWTH

3.1. LAND USE AND TRANSPORTATION

Coordination between land use and transportation is critical for the future development of Duchesne County. Street classification and development can guide both desirable and undesirable land uses. The same holds true for land use development. Land use development without transportation planning may result in roadways being classified in opposition to the overall goals of the transportation plan. Therefore, it is imperative that the goals of land use and of transportation are coordinated with each other to support and augment rather than oppose each other.

The Duchesne County future land use plan identifies areas for growth and non-growth. The new developing residential and commercial areas will have the greatest impact on the transportation system because of daily trip traffic. The projected growth for Duchesne County will be a combination of residential, commercial, industrial, and energy development related growth. Areas of energy development are not always identified by location or time frame, but efforts to coordinate between the energy companies and the County (such as the conditional use permit requirements of Ordinance #24-409) are necessary for implementation of transportation improvements in those areas.

Traffic data from selected roadway segments on SR-35, US-40, US-191, SR-87, SR-208, and SR-121, gathered by UDOT from the 2010-2012 Annual Average Daily Traffic (AADT) History published by UDOT, were used to calculate a traffic growth rate for each roadway section. The average of all the growth rates was calculated and a growth rate of 3.75% was used to forecast the future traffic volumes for the study roadways. The data for calculating the traffic growth rates and AADT for State highways is found in Appendix B.

This process was repeated during the 2025 update. An AADT growth rate of 2.62% was calculated in 2025.

3.2. ROADWAY NETWORK AND TRAFFIC FORECAST

Existing traffic volumes shown in Table 3-1 were applied a growth rate of 3.75% for five, ten and twenty years to determine the anticipated future traffic volumes on Duchesne County roadways. This factor was determined from UDOT traffic count records and growth between 2010 and 2012 on highways in Duchesne County (Appendix B.4 Traffic Count Data – UDOT Roadways). Table 3-1 below shows the 2033 forecast ADT and future Functional Classification for the study roadways with traffic count data.

During the 2025 Transportation Master Plan update, a growth rate of 2.62% was used to forecast the future ADT for all the roads shown. This growth rate came from UDOT traffic count records and growth between 2013 and 2023. Table 3-2 shows the 2044 forecast ADT and future Functional Classification.

Spreadsheets showing the VMT, LOS, and Roadway Functional Classification are found in Appendix B. The 2024 LOS analysis found that all roadways remained at an acceptable LOS for the 20-year period with assumed growth rates. Intersection LOS may be affected by increased traffic and truck activity.

Table 3-1. Duchesne County Roadway Traffic Forecast and Future Classification

County Road #	Location Description	2012-2013 ADT Combined	Total % Trucks	2018 ADT	2023 ADT	2033 ADT	2033 Roadway Functional Classification
CR 331	2000 West North of Neola	725.5	6.5%	872	1048	1515	Minor Collector
CR 152	3000 West North of 4000 North	725.5	6.6%	872	1048	1515	Minor Collector
CR 158	4000 North Cedarview	795.3	9.7%	956	1149	1661	Major Collector
CR 64	6250 South Arcadia	860.5	23.0%	1034	1243	1797	Minor Collector
CR 64	6450 South Arcadia	299	29.9%	359	432	624	Minor Collector
CR 158	9000 North West of Neola	496.3	10.0%	597	717	1036	Major Collector
CR 80	12000 West #1 Bluebell	490.6	8.0%	590	709	1024	Major Collector
CR 80	12000 West #2 Bluebell	277	6.8%	333	400	578	Major Collector
CR 80	12000 West #1 Bridgeland	753.9	18.1%	906	1089	1574	Major Collector
CR 121	16000 West North of Altamont	364.3	4.3%	438	526	761	Minor Collector
CR 113	21000 West	323.4	6.3%	389	467	675	Minor Collector
CR 27	Antelope Canyon Road	594.9	23.2%	715	860	1242	Minor Collector
CR 142	Bluebell Road - Jenkins Draw	1210.7	6.4%	1455	1750	2528	Major Collector
CR 142	Bluebell Road - Cove	1659.3	9.9%	1995	2398	3465	Major Collector
CR 142	Bluebell Road - Altamont	1242.1	6.0%	1493	1795	2594	Major Collector
CR 79	East River Road	602.1	8.6%	724	870	1257	Minor Collector
CR 156	North Hancock Cove Road	940	3.2%	1130	1358	1963	Minor Collector
CR 65	Lake Boreham Road	288.8	22.3%	347	417	603	Minor Collector
CR 113	Moon Lake Road	33.2	0.0%	40	48	69	Minor Collector
CR 154	South Cove Road	1694.2	4.5%	2037	2448	3538	Major Collector
CR 152	3000 West	1393.6	14.0%	1675	2014	2910	Major Collector
CR 14	Strawberry River Road	330.1	31.2%	397	477	689	Minor Collector
CR 331	Uintah Canyon Road	64	1.4%	77	92	134	Minor Collector
CR 33	CR-33 North of Wells Draw Rd	2621.5	21.9%	3151	3788	5474	Major Collector
CR 33	CR-33 South of Wells Draw Rd	2251.7	23.9%	2707	3254	4702	Major Collector
CR 158	6000 West	202.9	10.4%	244	293	424	Minor Collector
CR 15	Red Creek Road	54	3.4%	65	78	113	Minor Collector

Table 3-2. Updated Duchesne County Roadway Traffic Forecast and Future Classification.

County Road #	Location Description	2022-2024 ADT	Total % Trucks	2029 ADT	2034 ADT	2044 ADT	2044 Roadway Functional Classification
CR 120	15000 West North of Altamont	141	11.7	160	183	237	Minor Collector
CR 44	3000 West Near 8000 South	78	3.2	89	101	131	Minor Collector
CR 163	3000 West North of 4000 North	416	7.1	473	539	698	Minor Collector
CR 154	3000 West North of Bluebell Road	1005	10.0	1144	1302	1686	Minor Collector
CR 152	3000 West North of Roosevelt Airport	1661	13.9	1890	2151	2786	Major Collector
CR 154	3000 West North of S Cove Road	2475	6.1	2817	3205	4152	Major Collector
CR 152	3000 West Near Roosevelt Airport	1894	13.6	2155	2453	3177	Major Collector
CR 152	3000 West South of S Cove Road	1777	13.6	2022	2301	2981	Major Collector
CR 343	5000 South Near SR-87	270	10.6	307	350	453	Minor Collector
CR 49	5000 South South of Roosevelt	218	9.5	248	282	366	Minor Collector
CR 158	6000 West Monarch	241	14.6	274	312	404	Minor Collector
CR 158	4000 North Near 3000 West	1014	6.2	1154	1313	1701	Minor Collector
CR 115	7000 North West of Altonah	347	7.9	395	449	582	Minor Collector
CR 80	12000 West Near SR-87	1185	16.8	1349	1535	1988	Minor Collector
CR 80	12000 West Arcadia	905	25.3	1030	1172	1518	Minor Collector
CR 137	12000 West North of Upalco	672	14.7	765	870	1127	Minor Collector
CR 137	12000 West South of Bluebell	426	9.6	485	552	715	Minor Collector
CR 142	Bluebell Road Near 3000 West	1100	8.5	1252	1425	1845	Minor Collector
CR 142	Bluebell Road West of Bluebell	1139	5.9	1296	1475	1911	Minor Collector
CR 55	Cobble Hollow Drive	344	15.4	391	446	577	Minor Collector
CR 79	E River Road	625	3.5	711	809	1048	Minor Collector
CR 52	Mortensen Lane	205	5.9	233	266	344	Minor Collector
CR 176	N Crescent Road	937	3.3	1066	1214	1572	Minor Collector

CR 43	S Myton Road	378	8.7	430	490	634	Minor Collector
CR 54	State Street South of Roosevelt	1228	6.4	1398	1590	2060	Major Collector
CR 56W	W Pole Line Road South of Airport	1031	13.4	1173	1335	1729	Minor Collector
CR 152	3000 West East of Airport	2664	15.6	3032	3450	4469	Major Collector
CR 57	4000 West Near Dry Gulch Creek	284	13.3	323	368	476	Minor Collector
CR 64	6250 South North of Myton	551	30.6	627	714	924	Minor Collector
CR 158	9000 North West of Neola	377	19.9	429	488	632	Minor Collector
CR 37	10000 South West of 3000 West	258	15.2	294	334	433	Minor Collector
CR 27	Antelope Canyon Road	284	17.8	323	368	476	Minor Collector
CR 46	Indian Highway Near County Line	399	19.7	454	517	669	Minor Collector
CR 33	Pariette Road Near FourPoint Resources Field Office	850	14.3	967	1101	1426	Minor Collector
CR 32	Wells Draw Road South of 10000 South	323	15.7	368	418h	542	Minor Collector

3.2.1. OPERATIONAL CHARACTERISTICS

A 2013 LOS analysis of the future roadway network was conducted for each of the horizon years in order to evaluate future operational needs. The analyses indicate that all of the study roadways will operate at LOS A for the 2013 through 2033 conditions, based on the assumed growth.

During the 2025 transportation master plan update, the level of service was calculated using an updated method from the *Highway Capacity Manual 6th Edition* from the National Academy of Sciences. This method takes into account the peak hour traffic, number of heavy vehicles, lane and shoulder widths, and the availability of passing zones. The level of service for these roads was forecasted 5, 10, 15, and 20 years into the future (see Appendix B) All roads were projected to operate at a level of service of C or higher through the year 2044, which is considered acceptable.

3.3. FUTURE DUCHESNE COUNTY ROADWAY SYSTEM

Roadway projects are selected based on the analysis provided in the previous sections. The recommended system includes projects to address geometric issues, safety issues, or the need for additional capacity. The recommendations are shown in terms of functional classifications.

- Arterial
- Collector
- Minor Collector

Appendix A Figure A-3 contains maps that show the proposed future roadway system in the County. The focus of the plan is arterial, major collector and minor collector roadways. Little to no detail is shown for local roadways to allow flexibility as development occurs between the collectors. It is the intention of the plan for collectors to be spaced no closer than one-quarter mile apart. 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. 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 auxiliary lanes, such as acceleration, deceleration, and turn lanes.

Frontage roads are an important element of access control in areas with limited access right of way and plenty of open space. Frontage roads provide access from collector roadways coming off arterials. This is the best way to allow commercial development frontage on the arterial roadways while limiting access directly on the arterial.

3.3.1. 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, Federal, and County highway systems as well as projects in the national parks, national forests and Indian reservations. These projects use various Federal and State funding programs. UDOT has programmed funds in the Statewide Transportation Improvement Plan (STIP) for roadways in Duchesne County contained in Appendix D.4. Projects identified in the Duchesne TMP meetings with steering committee and safety officials dealing with intersections of County roads and UDOT roads are also listed in Table D-4.

3.3.2. TRAFFIC SIGNAL NEEDS

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

3.3.2.1. 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.

3.3.2.2. IMPROVEMENT ANALYSIS

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

Where the roadway 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. Mitigation to LOS D on other streets may be acceptable with the concurrence of the County and/or UDOT.

3.3.3. SCHEDULE OF INTERSECTION SIGNALIZATION

There are currently nine signalized intersections in the County, one in Duchesne City on US-40 at SR-87 one at the intersection of US-40 and SR-87 near Roosevelt City, seven in Roosevelt City on US-40 at 2000 West, State Street, Lagoon Avenue, 200 North [Highway 121] and 600 East), and on Highway 121 at 300 West, and at State Street. New signals are being planned at Us 40 and 200 South in Roosevelt and at the intersection of US-40 and US 191 in Duchesne. Based on the development plan, it is anticipated that there will be a few additional intersections that will need to be signalized in the next 20 years. Because the majority of the highest ADT roadways in the County are owned by UDOT, more than likely the potential signalized intersections will be on the state highways. These locations are governed by UDOT, and the timing and construction of these improvements will be handled by UDOT, however, recommendations and proposed intersection signalization warrant studies can be brought forward during quarterly UDOT coordination meetings.

Two ways exist to improve operations at intersections with two-way stop control. First, four-way stop control is used to improve operations at a two-way stop control intersection with equal traffic volumes on all approaches, given the traffic volumes are within the County. Second, signalization is used to improve operations of intersections where two legs have the majority of traffic, but traffic is high on the opposing two legs. Table D-4: UDOT Intersection Proposed Improvements in, Appendix D, contains recommendations from County safety and steering committees for intersections on State and Federal highways.

4. TRANSPORTATION GUIDELINES AND POLICIES

Duchesne County may require a Traffic Impact Study (TIS) for any new development, including, but not limited to, commercial, residential, public facility, and industrial developments, when the following guidelines indicate that a TIS is needed. The following sections are to be used to establish uniform guidelines for 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).

A 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”. The term “new development” also includes properties that are being redeveloped.

4.1. TIS REQUIREMENTS

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

- All new developments, including residential, public facility, commercial, and industrial developments, or additions to existing developments, which are expected to generate more than 100 new peak hour vehicle trips

- In some cases, a development that generates less than 100 new peak hour trips should require a TIS if it affects local “problem” areas. These would include high accident locations, currently congested areas, or areas of critical local concern
- All applications for rezoning when there is a potentially significant increase in traffic volume of 15 percent, or 100 new peak hour vehicles, or if rezoning affects local “problem” areas.
- Any change in the land use or density that will change the site traffic generation by more than 15 percent, where at least 100 new peak hour trips are involved.
- 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 are more than 2 years old, access decisions are still outstanding, and changes in development have occurred in the site environs.
- When development agreements are necessary to determine “fair share” contributions to major roadway improvements.

The specific analysis requirements and level of detail are set forth in the following sections.

4.1.1. CATEGORY I

A Category I TIS should be required for all developments, including residential, public facility, commercial, and industrial developments, which generate one hundred (100) or more new peak hour trips, but less than five hundred (500) 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 Road Department Supervisor for any specific traffic problems or concerns such as:

- Proposed or existing offset intersections,
- Situation with a high number of traffic accidents,
- 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 of 15 percent, 100 peak hour trips, or if rezones affect local “problem” areas, 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.

4.1.2. CATEGORY II

A Category II TIS should be required for all developments, including residential, public facility, commercial, and industrial developments, which generate from five hundred (500) to one thousand (1,000) peak hour trips during the morning, afternoon or Saturday peak hour. The study horizon should include the opening year of the development, 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.

4.1.3. CATEGORY III

A Category III TIS should be required for all developments, including residential, public facility, commercial, and industrial developments, which generate above one thousand (1,000) peak hour trips during the morning, afternoon or Saturday peak hour. The study horizon shall be for 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-half mile of the development.

4.1.4. INITIAL WORK ACTIVITY

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 and if so, to determine the applicable category. The Road Department Supervisor must give concurrence on the number of trips to be generated by the proposed development. The developer may, if desired, request that the County Road Department Supervisor assist in estimating the number of trips for the purpose of determining whether a TIS is required for the proposed development.

The Road Department Supervisor or designated representative (or UDOT if a state highway is affected) 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 Road Department Supervisor and/or UDOT, the developer shall hire an engineer approved by the Road Department Supervisor, and/or UDOT for the creation and review and approval of a draft table of contents for the TIS. The fees for the services of the consulting Engineer must be paid by the Developer. The table of contents will 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 and/or UDOT, the actual TIS work activities may begin.

The Traffic Impact Study Scope of Work agreement between the developer and the consulting 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.

4.1.5. QUALIFICATIONS FOR PREPARING TIS DOCUMENTS

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

4.2. ANALYSIS APPROACH AND METHODS

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

4.2.1. 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 and/or UDOT. The study horizon years should be determined by project type and size, in accordance with the criteria outlined in Sections 4.1.1 – 4.1.3.

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 and/or UDOT.

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.

4.2.2. SEASONAL ADJUSTMENTS

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

4.2.3. 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 and/or UDOT.

4.2.3.1. 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 and/or UDOT. Turning movement counts may be extrapolated from existing turning movement counts, no more than two years old, with the concurrence of the County and/or UDOT.

4.2.3.2. 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 and/or UDOT. Where daily count data is not available, mechanical counts will be required at locations agreed upon by the County and/or UDOT.

4.2.3.3. 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, location of nearby driveways, and lane configuration at intersections.

4.2.3.4. TRAFFIC CONTROL DEVICES

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

4.2.4. 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 and/or UDOT 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, 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 and/or UDOT. 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.

4.2.5. 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 and/or UDOT. 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 and/or UDOT must give prior approval to the growth rate used. In addition, any nearby proposed development projects currently under review by the County ("on-line") should be taken into consideration when forecasting future traffic volumes. The increase in traffic from proposed "on-line" projects should be compared to the increase in traffic by applying an annual growth rate.

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.

4.2.6. 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 should include LOS results for AM, PM and Saturday peak periods, if applicable. The table shall 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 shall be provided for each approach and the intersection as a whole. If the new development is scheduled to be completed in phases, the TIS will, if directed by the County and/or UDOT, 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.

4.3. TIS REPORT FORMAT

This section provides the format requirements for the general text arrangement of a TIS. Deviations from this format must receive prior approval of the County and /or UDOT.

- I. INTRODUCTION AND SUMMARY
 1. Purpose of Report and Study Objectives
 - a. Executive Summary
 - b. Site Location and Study Area
 - c. Development Description
 - d. Principal Findings
 - e. Conclusions
 - f. Recommendations
- II. PROPOSED DEVELOPMENT
 1. Off-Site Development
 2. Description of On-Site Development
 - a. Land Use and Intensity
 - b. Location
 - c. Site Plan
 - d. Zoning

- e. Development Phasing and Timing
- III. STUDY AREA CONDITIONS
 - 1. Study Area
 - a. Area of Significant Traffic Impact
 - b. Influence Area
 - 2. Land Use
 - a. Existing Land Use and Zoning
 - b. Anticipated Future Development
 - 3. Site Accessibility
 - a. Existing and Future Area Roadway System
 - b. Traffic Volumes and Conditions
 - c. Access Geometrics
 - d. Other as applicable
- IV. ANALYSIS OF EXISTING CONDITIONS
 - 1. Physical Characteristics
 - a. Roadway Characteristics
 - b. Traffic Control Devices
 - c. Pedestrian/Bicycle Facilities
 - 2. Traffic Volumes
 - a. Daily, Morning, Afternoon and Saturday Peak Periods (as applicable)
 - 3. Level of Service
 - a. Morning, Afternoon and Saturday Peak Hour (as applicable)
 - 4. Safety
- V. PROJECTED TRAFFIC
 - 1. Site Traffic Forecasts (each horizon year)
 - a. Trip Generation
 - b. Mode Split
 - c. Pass-by Traffic (if applicable)
 - d. Trip Distribution
 - e. Trip Assignment
 - 2. Non-Site Traffic Forecasting (each horizon year)
 - a. 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
 - a. Without Project (for each horizon year including any programmed improvements)
 - b. With Project (for each horizon year, including any programmed improvements)
 - 3. Roadway Improvements
 - a. Improvements Programmed to Accommodate Non-site (Background) Traffic
 - b. Additional Alternative Improvements to Accommodate Site Traffic
 - 4. Traffic Safety

- a. Sight Distance
 - b. Acceleration/Deceleration Lanes, Left-Turn Lanes
 - c. 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
 - a. On-Site
 - b. Off-Site
 - c. 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
 - 5. Accident Data and Summaries
- X. FIGURES AND TABLES
 - 1. The following items shall be documented in the text or Appendices
 - a. Site Location
 - b. Site Plan
 - c. Existing Transportation System
 - d. Existing Peak Hour Turning Volumes
 - e. Estimated Site Traffic Generation
 - f. Directional Distribution of Site Traffic
 - g. Site Traffic
 - h. Non-Site Traffic
 - i. Total Future Traffic
 - j. Projected Levels of Service
 - k. 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 that are legible.)
- XI. DESIGN STANDARD REFERENCE

1. Design in accordance with current AASHTO standards.
2. Conduct capacity analysis in accordance with the latest edition of the Highway Capacity Manual.

4.4. ROADWAY STANDARDS

All roadways shall be designed to conform to the Engineering standards and technical design requirements adopted by Duchesne County or UDOT if under their jurisdiction. These standards can be supplemented by this master plan, and include current edition of the AASHTO (American Association of State Highways Transportation Officials), A Policy on Geometric Design of Highways and Streets, and the current Utah edition of the MUTCD (Manual on Uniform Traffic Control Devices). In cases of conflict, a determination shall be made by the County and/or UDOT, whose determinations shall be final.

Duchesne County has adopted these design standards for roadways to ensure that the facilities provide the necessary safety and capacity elements. The requirements for the roadway cross-section configurations are shown in Table 4-1. These requirements are based on traffic capacity, design speed, projected traffic, system continuity and overall safety. All new developments shall use roadway cross-sections with fifty-foot (50') or more of right-of-way. Access to multi-family, commercial, or industrial development shall use roadway cross-sections with sixty six feet (66') or more of right-of-way. Appendix A contains an existing conditions map that shows the surface type for all roadways in the County. Appendix E includes the standard typical sections by functional classification for roadways in the County. The local roads are left to developers and the arterial roadways are under UDOT jurisdiction.

Table 4-1. Roadway Cross-Section Configurations

Classification	Minimum ADT or [D.U.'s]	Traffic Index	Right-of- Way (ft.)	Pavement Width (ft.)	
Minor Collector	1,260 to 2,000 [126 to 200]	5.5	60	30	
Major Collector ²	2,010 to 6,000 [201 to 600]	6	66	30	
Arterial ²	6,000 to 20,000 [600 to 2000]	7	80	40	
NOTES:					
1. Pavement width measured from lip of curb to lip of curb.					
2. Configuration of major collector and higher classifications may be adjusted with proper justification and approval of County.					
3. The minimum right-of-way and pavement width is shown. Each may be increased when required by a traffic impact study.					

4.5. SAFE TRANSPORTATION SYSTEM

A goal of Duchesne County is to maintain a safe transportation system. This is a high priority and the County will work diligently to meet applicable safety standards. This can be best accomplished by the following recommendations:

- Require all developments to provide adequate access for emergency vehicles.
- Provide safe pedestrian street crossings, particularly near schools and recreation areas.

- Encourage development of school routing and recreation plans that minimize vehicle/pedestrian conflicts.
- Establish speed limits based on traffic engineering analysis. Enforce speed limits, especially near schools, in residential areas and commercial areas.
- Provide guidance for vehicles on roadways through striping, raised medians and islands, reduction of roadside obstructions, and other traffic engineering solutions.
- Require all roadway features to meet minimum design standards established by the American Association of State Highway and Transportation Officials (AASHTO). All signs, pavement markings and traffic signals must meet standards established by the current Utah edition of the Manual of Uniform Traffic Control Devices (MUTCD). Exceptions can be granted by the County on a case-by-case basis for those designs that demonstrate innovative superiority over the existing standards.
- Maintain optimal walkway conditions for walking, wheelchairs and strollers by:
 - a. Repairing cracks and bumps
 - b. Minimizing slopes
 - c. Maintaining visibility at corners
 - d. Avoiding abruptly ending walkways
 - e. Reducing speed and traffic
 - f. Keeping walkways clear of poles and other objects
 - g. Avoiding poor drainage and standing water on or adjacent to roadway
 - h. Providing curb cuts and ramps that comply with the Americans with Disabilities Act (ADA)
 - i. Provide adequate emergency access and/or turnarounds on all dead-end streets or cul-de-sacs

4.5.1. 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 roadways should be designed in a curvilinear method in order to reduce or eliminate long straight stretches of residential roadways, which encourage speeding and cut-through traffic. Substantial increases in average daily traffic due to development on adjacent property on established roadways 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 in order 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, 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. Table 2-4 shows the LOS thresholds for various roadway types.

4.5.2. IMPROVEMENT REQUIREMENTS

All improvements, including but not limited to the following, shall be constructed in accordance with AASHTO standards and as approved by the Road Department Supervisor:

- Required curb, gutter and sidewalk shall be constructed in certain zones as specified in the County Subdivision Ordinance (except in areas where gravel road are allowed by the ordinance)
- Driveways shall be constructed in locations approved by the Road Department Supervisor or UDOT.
- Except in areas where gravel roads are allowed, all roadways, public or private, shall be surfaced to grade, with asphalt concrete pavement to the required minimum width and thickness as required by the County Subdivision Ordinance or Road Department.
- When new construction occurs in areas where curb and sidewalk are required, handicap ramps shall be constructed at all roadway intersections, unless otherwise approved, in accordance with the AASHTO standards and as approved by Road Department Supervisor. In addition, when a project occurs where existing improvements are in place, handicap ramps shall be upgraded to meet current standards
- Raised medians on public roadways shall be approved by the County and/or UDOT. Design and construction shall be in accordance with applicable standards
- Developers 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

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 and/or UDOT.

4.6. ENERGY/COMMERCIAL DEVELOPMENT IMPACT AND MITIGATION

Developments within Duchesne County and their associated impact fees and/or impact mitigation measures shall be addressed as per the recommendations in this section.

Several models can be adopted to mitigate impacts to infrastructure from development traffic loadings. They are:

1. Proactive, performance based (Prepare infrastructure for projected impact prior to development. “Armor up” the pavement structure).
2. Reactive, performance based (impact fees for damage to infrastructure)
3. Reactive, not performance based (impact fee not associated with infrastructure impacts from a development)

4.6.1. ENERGY DEVELOPMENT AND IMPACT MITIGATION

Energy Development has been a major source of heavy industrial traffic within Duchesne County. Due to a recent shift in energy production locations and extraction practices, Duchesne County has seen a large increase in heavy industrial traffic in areas which historically have had little to no industrial traffic.

This shift in production locations and practices has led to increased impact on county transportation infrastructure. This impact has led Duchesne County to reevaluate how it assesses the impact of energy development. The previous Transportation Master plan recommended a proactive, performance based approach to mitigating impacts from energy production. This approach requires a significant amount of planning and coordination between energy producers and Duchesne County, which both Duchesne County and energy producers found to be difficult to achieve effectively.

When consulted, energy industry representatives stated that advanced planning and coordination can be difficult or even impossible due to the rapidly evolving nature of the energy industry. These representatives preferred a modified reactive, performance based approach to mitigation, with the understanding that such a means of assessing impacts and mitigation may lead to increased costs to energy producers compared to a proactive, performance based approach.

Energy industry representatives had a number of other preferences for impact mitigation which include the following:

- A one-time fee, offered up at the time that an extraction location is constructed.
- A fee which is either fixed or can be easily calculated by energy producers before it is assessed.
- A fee that is based on engineering analysis of energy industry impacts on county infrastructure.

4.6.1.1. TRANSPORTATION SERVICE FEE

In response to the needs of Duchesne County and the preferences of energy producers, the following formulas for a transportation service fee, as referred to by County Ordinance #25-416, were created, see Formula 1 and Formula 2. Appendix F describes the process by which this formula was created.

Collection of the fee as described in County Ordinance #25-416 was preempted by the passage of SB 207 in the 2025 Utah General Legislative Session.

$$C_p = L_p * N * \$14,250 * (1.041)^{(Y-2024+1.5)} \qquad \text{Formula 1}$$

Where:

C_p = Roadway service fee from industry traffic on paved roads (dollars)

L_P = Sum length of all paved county road utilized as haul routes to access location (miles)
 N = Number of wells at production location
 Y = Year in which the conditional use permit for a location is issued.

$$C_G = L_G * N * \$3,500 * (1.041)^{(Y-2024+1.5)} \quad \text{Formula 2}$$

Where:

C_G = Roadway service fee from industry traffic on gravel roads (dollars)
 L_G = Sum length of all gravel county road utilized as haul routes to access location (miles)
 N = Number of wells at production location
 Y = Year in which the conditional use permit for a location is issued.

If a location utilizes both paved and gravel roads, utilize Formula 1 for the length paved roads used, and Formula 2 for the length of gravel roads used. The total fee for a location that utilizes both paved and gravel roads would be the sum of the fees calculated using Formulas 1 and 2.

This fee is to be assessed before the issuance of a conditional use permit to an energy producer. The funds generated by this fee should be dedicated to projects which maintain, repair, or reconstruct roadways which are impacted by energy extraction whether directly or indirectly. For new energy industry related developments which are not directly associated with an extraction location, see section 4.6.2.

4.6.2. COMMERCIAL/INDUSTRIAL DEVELOPMENT AND IMPACT MITIAGTION

Mitigation of commercial and industrial development traffic should be done using a proactive, performance based approach. This approach should follow the following process:

- Make a determination as to the traffic impact of the development.
 - o For example, a new aggregate mine may be expected to generate 25 trucks trips a day on average.
- If the development will increase total traffic by more than 25% of normal operating volume, or increase the number of FHWA Class 5 through Class 13 vehicles by 10% then it will be deemed "Extraordinary Use" and mitigation measures must be taken to improve insufficient transportation infrastructure prior to the development. Traffic counts in this study may be used for such determinations, however, the Road Department Supervisor may require the developer to provide a new traffic count report for roads not included in this study, for roads with data older than 5 years, or for roads with significant traffic changes since the most recent traffic count. The developer may elect to conduct a traffic count, in which case, a traffic count report completed and stamped by an Engineer licensed in the State of Utah must be submitted to the Road Department Supervisor.
- The mitigation measures pursued should be site specific. The following criteria should be considered when making this determination. It is not implied that this list is "all inclusive" and contains all elements to be considered when determining appropriate mitigation measures.
 - o The length, width, etc. of county infrastructure impacted by the development.

- o The current condition of the pavement.
- o The current depth of pavement and underlying base material.
- o The classification and associated estimated strength of the native soil. An estimated California Bearing Ratio (CBR) based on the native soil classification would likely be sufficient unless further analysis is deemed necessary.
- o Any existing geometric deficiencies or other concerns which could have a detrimental impact on the safety of the traveling public with the increased traffic from the development.
- o The projected equivalent single axle loads (ESALs) created by the development.
- o The required pavement structure to handle the increased traffic loading from the development.
- o Any deficiencies in drainage infrastructure that could be impacted by the development.
- Once the site specific impacts to the existing infrastructure are determined and associated probable costs of required improvements are calculated by the Road Department Supervisor, it is optimal for all parties for Duchesne County to partner with the developer to make the improvements prior to the development impact occurring. In this scenario the developer would be required to fund, the improvements required due to the increased traffic load of their development. These improvements may include, but are not limited to the following:
 - o Increased right-of-way width
 - o Environmental impact mitigation
 - o Utility relocation
 - o Roadside hazard relocation or mitigation
 - o Improved pavement structure
 - o Geometric improvements including vertical, horizontal, or cross-sectional geometric improvements, including shoulder or lane widening
 - o Added turn, acceleration, or deceleration lanes and painted, delineated, or raised medians
 - o Improved drainage structures
 - o Updated signage, striping, and other traffic control devices
 - o New or updated roadside traffic barriers

Duchesne County would fund any additional improvements beyond what is deemed necessary by the Road Department Supervisor for the development.
- Impact fees may be imposed only after Duchesne County complies with the requirements of Title 11, chapter 36a of the Utah Code (see section 8.2.9 below)

5. SHORT RANGE TRANSPORTATION IMPROVEMENT PLAN (1 - 5 YEAR TIP)

The 2017 proposed short range TIP combines projects already identified by the County Public Works Department with findings and recommendations from the TMP study. The following general recommendations from that TIP include the following:

- Develop an impact fees system for roadways to assess necessary roadway improvements on future development, in accordance with the Title 11, Chapter 36a of the Utah Code
- Track accidents in the County on a GIS database to help identify problem areas
- Update the TMP every 5 years

- Continue a routine chip seal maintenance program for asphalted roads to keep them in good working condition, with overlays as necessary
- Continue the existing process to include UDOT in subdivision and other development approvals that affect state highways
- Work with each of the cities in the County to monitor their transportation plans and update this plan as a working document
- Construct as many roadway improvements as possible as shown on the attached study area maps in Appendix A and tables in Appendix D

Of the original 6 proposed short range TIP recommendations from the 2017 TMP, 5 recommendations have been started or completed by Duchesne County in some form. Duchesne County has also completed 2 of the 10 projects that were originally suggested in the 2017 TIP. Following review in 2025, the following recommendations are made:

- Finalize system to partner with energy producers to protect county transportation infrastructure (This will be completed on adoption of this Transportation Master Plan update)
- Continue updates of the TMP on a 5-year cycle
- Adopt a set of standard specifications and drawings to ensure consistent infrastructure development standards throughout Duchesne County.
- Continue a routine maintenance program for asphalted roads to keep them in good working condition
- Continue the existing process to include UDOT in subdivision and other development approvals that affect state highways
- Begin working with each city or town in Duchesne County to monitor their transportation plans. Consider partnering with these entities for maintenance projects to take advantage of economy of scale.
- Construct as many roadway improvements as possible as shown on the attached study area maps in Appendix A and tables in Appendix D.

6. LONG RANGE TRANSPORTATION IMPROVEMENT PLAN (5-10 AND 10 - 20 YEAR TIP)

- Most of the new proposed corridors and realigned roadways on the study area maps will fall in this category. Specific projects that are more relevant to quickly developing areas need to be addressed first after which the remainder can be done
- Target specific projects at longer range horizons that the County can focus its resources on as shown on Appendix A maps

7. ACCESS MANAGEMENT

This section will define and describe some of the aspects of Access Management for roadways and why it is so important. Uncoordinated growth along some of the region's major travel corridors has resulted in strip development and a proliferation of access points. A good example is Highway 40 west of Roosevelt. In most instances, each individual development along the corridor has its own access driveway. Numerous access points along the corridor create conflicts between turning and through traffic which causes delays and accidents. Access to state highways is regulated by UDOT Region 3.

A good access management program will accomplish the following:

- Limit the number of conflict points at driveway locations;
- Separate conflict areas;

- Reduce the interference of through traffic;
- Provide sufficient spacing for at-grade, signalized intersections;
- Provide adequate onsite circulation and storage.

Though Access Management is generally used on roads that are larger and have more volume, it can have impacts on those roads that are defined as residential as well.

Access management shall be used on all roadways within Duchesne County. Roadway access management strategies extend the useful life and capacity of roads at little or no cost to taxpayers. Access management can be used as an inexpensive way to improve performance on a major roadway that is increasing in volume. Access management should be used on new roadways and roadways that are to be improved so as to prolong the usefulness of the roadway.

7.1. DEFINITION

Access management involves providing (or managing) access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. (Source: Policy on the geometric Design of highways and Streets, AASHTO, 2001).

7.2. ACCESS MANAGEMENT TECHNIQUES

There are many techniques that can be used in access management. The most common techniques are signal spacing, street spacing, access spacing, and interchange to crossroad access spacing. There are various distances for each different spacing, dependent upon the roadway type being accessed and the accessing roadway. The Utah Department of Transportation has developed an access management program. More information can be gathered from the UDOT website and from the Access Management Program Coordinator.

7.2.1. ACCESS MANAGEMENT

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 roadway connections. In addition, auxiliary lanes (turn lanes or by-pass lanes) are also used to divert traffic out of the through traffic stream to improve the traffic flow and improve safety.

Roadways are classified for access control based upon their importance to local and regional mobility. No facility can move traffic well and provide unlimited access at the same time. Figure 7.1 below shows the relationship between mobility, access and the functional classification of streets. For example, the strictest access control is applied to roadways that serve through traffic or regional trips. The least access control is given to local streets that serve local traffic and short trips. In many cases, accidents and congestion are the result of streets trying to serve both mobility and access needs at the same time.

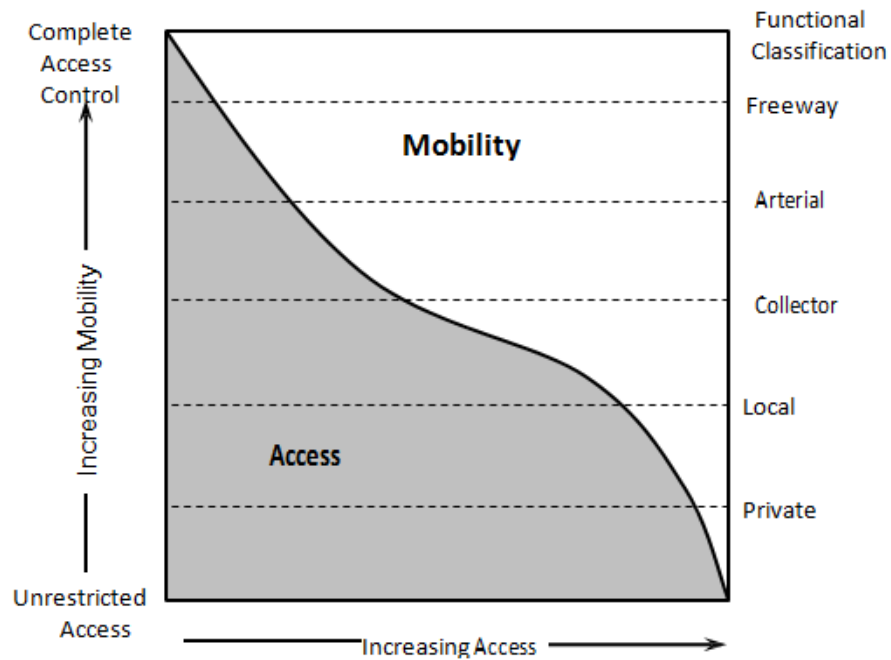


Figure 7-1. Access vs. Mobility

7.2.2. BENEFITS OF ACCESS MANAGEMENT

The American Association of State Highway and Transportation Officials (AASHTO) states “the number of accidents is disproportionately higher at driveways than at other intersections... thus their design and location merits special consideration.” Fewer direct accesses, greater separation of driveways, and better driveway design and location are the basic elements of access management. With good access management, the following are some of the recognizable benefits:

- Improving overall roadway safety;
- Reducing the total number of vehicle trips;
- Decreasing interruptions in traffic flow;
- Minimizing traffic delays and congestion;
- Maintaining roadway capacity;
- Extending the useful life of roads;
- Avoiding costly highway projects;
- Improving air quality;
- Encouraging compact development patterns;
- Improving access to adjacent land uses;
- Enhancing pedestrian and bicycle facilities;

7.2.3. GENERAL ACCESS MANAGEMENT PRINCIPLES

The following access management guidelines and policies shall be adhered to within Duchesne County:

- Conflicts at intersections and driveways should be separated and the number reduced as much as possible
- A “time-space” perspective should guide (a) the location, timing, and coordination of traffic signals; (b) the placement of access; and (c) the design and operation of intersections. Optimum progressive travel speeds along arterial roadways should be determined and maintained.
- Signal cycles should be as short as possible but consistent with capacity, pedestrian clearance, and coordination requirements.
- 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, or less dense, traffic flows.
- Interference between through traffic and site traffic should be addressed by incorporating additional traffic 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. In all cases, the integrity of mainline traffic operations must not be compromised.

7.2.4. NUMBER OF ACCESS POINTS

Controlling the number of access points or driveways from a site to a roadway reduces potential conflicts between vehicles, pedestrian, and bicycles. Each parcel should normally be allowed one access point, and shared accesses are preferred where possible.

7.2.5. SIGNALIZED INTERSECTIONS

Uniform or near uniform spacing of signals is essential for efficient traffic flow. As a minimum, signals should be spaced no closer than one-quarter mile (1,320 feet) (see Table 7-1).

7.2.6. UNSIGNALIZED INTERSECTIONS

Unsignalized intersections are much more common than signalized intersections. Minimum separation standards are included in Table 7-1.

7.2.7. RIGHT-IN/RIGHT-OUT ACCESSES

Restricted access movement can provide for additional access to promote economic development with minimal impact to the facility. This type of access should be spaced to allow for a minimum of traffic conflicts and provide distance for deceleration and acceleration of traffic in and out of the access (See Table 7-1 for intersections and Table 7-2 for driveways).

7.2.8. RESIDENTIAL LOTS

The number of accesses on residential lots shall be based on the following:

- Number of Driveways: residential lots shall not have more than one driveway, unless approved by the Road Department Supervisor.

- Distance, width: No driveway shall be planned right next to another driveway nor be more than 32 feet in width, unless approved by the Road Department Supervisor. In no event shall the combined width of such driveways exceed 46 feet or 50% of the entire lot frontage, whichever is less.
- Corner Lots: In no event shall a driveway be placed on any corner lot within the distance of 25 feet from the point of the intersection of property lines nearest the intersection or the point of intersection of the two rights-of-way, whichever is further from the intersection.

7.2.9. COMMERCIAL LOTS

Commercial lots or developments are not limited to a certain number of county road accesses per lot and should be addressed on a case-by-case basis. Additional accesses (beyond one) must be approved by the Road Department Supervisor upon completion of a circulation plan or Traffic Impact Study provided to the Road Department Supervisor indicating that more than one access is required to adequately handle the developments traffic volumes and further indicating that the additional access will not be detrimental to traffic flow on the adjacent street network.

7.2.10. INDUSTRIAL LOTS

Industrial lots or developments are not limited to a certain number of county road accesses per lot and should be addressed on a case-by-case basis. Additional accesses (beyond one) must be approved by the Road Department Supervisor upon completion of a circulation plan or Traffic Impact Study provided to the Road Department Supervisor indicating that more than one access is required to adequately handle the developments traffic volumes and further indicating that the additional access will not be detrimental to traffic flow on the adjacent street network.

Accesses to industrial lots must conform to the access details provided in Appendix G. Modifications to these details may be allowed with approval from the Road Department Supervisor.

Table 7-1 shows the spacing requirements, based on functional class, for roadway intersection spacing. Table 7-2 shows the requirements based on the functional class of the roadway facility for driveway access spacing.

Table 7-1. Roadway Intersection Separation Distances Based on Functional Class

Functional Class	Minimum Signal Spacing (ft.)	Minimum Unsignalized Full Movement (ft.)	Minimum Right- In/ Right-Out (ft.)
Private	1320	150	-
Residential Local	1320	150	-
Minor Collector	1320	250	150
Major Collector	1320	250	250
Arterial	1320	500	250
Commercial Local	1320	400	200
Industrial Local	2640	500	250

Table 7-2. Driveway Access Separation Distances Based on Functional Class

Functional Class	Minimum Full Movement (ft.)	Minimum Right-In/Right-Out (ft.)
Private	75	-
Residential Local	75	-
Minor Collector	125	-
Major Collector	250	125
Arterial	660	330
Commercial Local	400	200
Industrial Local	500	250

Note: Access spacing shall be measured from center of access to center of access.

Note: If the roadway is a state highway, access is regulated by UDOT.

Collector and Arterial roadways will have limited access. Where multiple parcels are consolidated, accesses shall 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.

7.2.10. 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 the values set in Table 7-3 Minimum Offset Distance between Driveways on Opposite Sides of Road below (See also Table 7-2).

Table 7-3. Minimum Offset Distance between Driveways on Opposite Sides of Road

Functional Class	Minimum Offset* (feet)
Private	None
Residential Local	None
Minor Collector	150
Major Collector	200
Arterial	600 ft. for speed of 45 or greater, 300 ft. for speeds under 45
Commercial Local	100 (25 mph); 300' (26-40 mph); 500' (40 mph)
Industrial Local	100 (25 mph); 300' (26-40 mph); 500' (40 mph)

* Distance in table is measured from center to center of driveway

7.2.11. CORNER SPACING

Providing adequate corner spacing improves traffic flow and roadway safety by ensuring that the traffic turning into a driveway does not interfere with the function of an intersection. Access to corner lots

should be from the lesser-classified road at the greatest distance possible from the intersection and should not be less than the distances shown in Table 7-4. This distance is measured from the PC (point of curve) of the corner curve (See Figure 7-2 below). A 25-foot radius is considered the minimum where the existing radius is less than 25 feet.

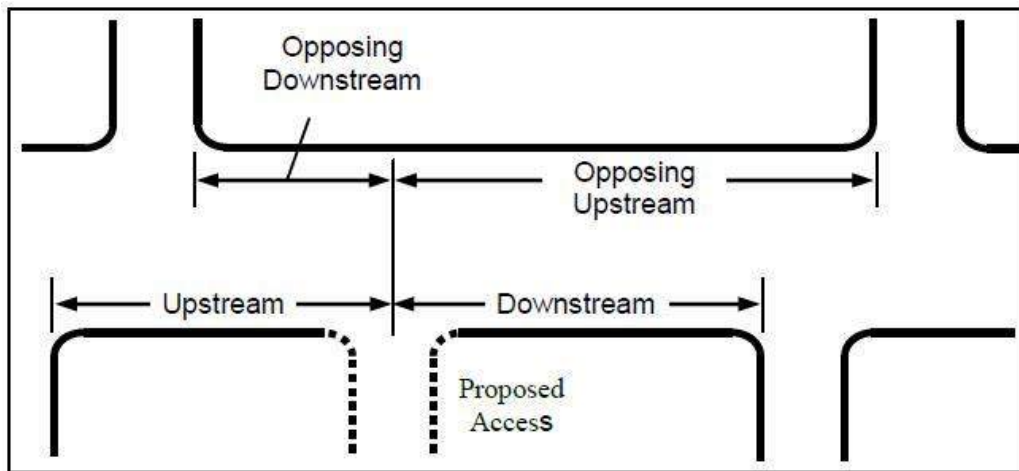


Figure 7-2. Access Distance from Corner

Table 7-4. Access Distance from Corner According to Facility Type

Facility Type	Upstream Distance on Major Roadway (feet)	Downstream Distance on Major Roadway (feet)
Residential Private	50	50
Residential Local	50	50
Minor Collector	100	75
Major Collector	175	150
Arterial	200	185
Commercial Local	100	-
Industrial Local	100	-

NOTES: a. All access points shall be approved by the County and/or UDOT. Distances shown may be adjusted by the County and/or UDOT on a case- by-case basis. Exceptions can only be approved by the County and/or UDOT upon submittal of proper traffic justification.
 b. Distances shown are the minimum.

7.2.12. MEDIANS

Medians are used to control and manage left turns and crossing movements as well as separating traffic moving in opposite directions. Restricting left turning movements reduces the conflicts between through and turning traffic, resulting in improved safety. Studies have shown that the installation of a non-traversable median will reduce crashes by 30% over that of a two way left turn lane (TWLTL). A 14-foot wide median is desirable in order to provide for an adequate left turn lane at intersections.

The need for a median can be identified through an engineering review (a traffic study assessing the impact of a proposed project) and should be considered on any roadway that has a speed limit greater than 40 mph. Medians can improve pedestrian safety by providing a refuge area for the pedestrian.

Medians can also add to the overall aesthetics 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. Only ground cover plantings should be planted within 350 feet of an intersection/access opening. Care should be taken to select landscape material that will not intrude into the roadway and to locate materials such that they will not cause a safety problem. Trees should be selected that will not be larger than 4 inches in diameter when mature. Availability of irrigation water and access for maintenance must be considered.

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 a raised median with appropriately spaced median openings. Table 7-5 shows typical guidelines for spacing of unsignalized restricted median openings.

Table 7-5. 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 7.4-1

7.2.13. WIDTH OF ACCESS POINTS

In addition to limiting the number of access points, the width of the access point should be restricted based on the use of the site. Residential lot driveways should be limited to a maximum throat width of 32 feet at the back of the drive approach. The maximum width for a commercial or industrial site entrance with two-way traffic should be limited to 44 feet unless wider entrances are deemed necessary by the Road Department Supervisor or UDOT to serve large vehicles. The width includes 12 feet for right out, 12 feet for left out, 16 feet for an ingress lane, and two-2 foot shoulders. The width of the entrance should be determined based on the type of use for the site, the type of traffic (cars vs. 18 wheel trucks), and the projected volume of traffic.

7.2.14. TURNING RADIUS

The turning radius of a driveway or access road affects both the flow and safety of through traffic as well as vehicles entering and exiting the roadway. The size of the turning radius affects the speed at which vehicles can exit the flow of traffic and enter a driveway. The larger the turning radius, the greater the speed at which a vehicle can turn into a site. The speed of the roadway, the anticipated type and volume

of the traffic, pedestrian safety, and the type of use proposed for the site should be considered when evaluating the turning radius. Table 7-6 below shows the turning radii for accesses based on vehicle type.

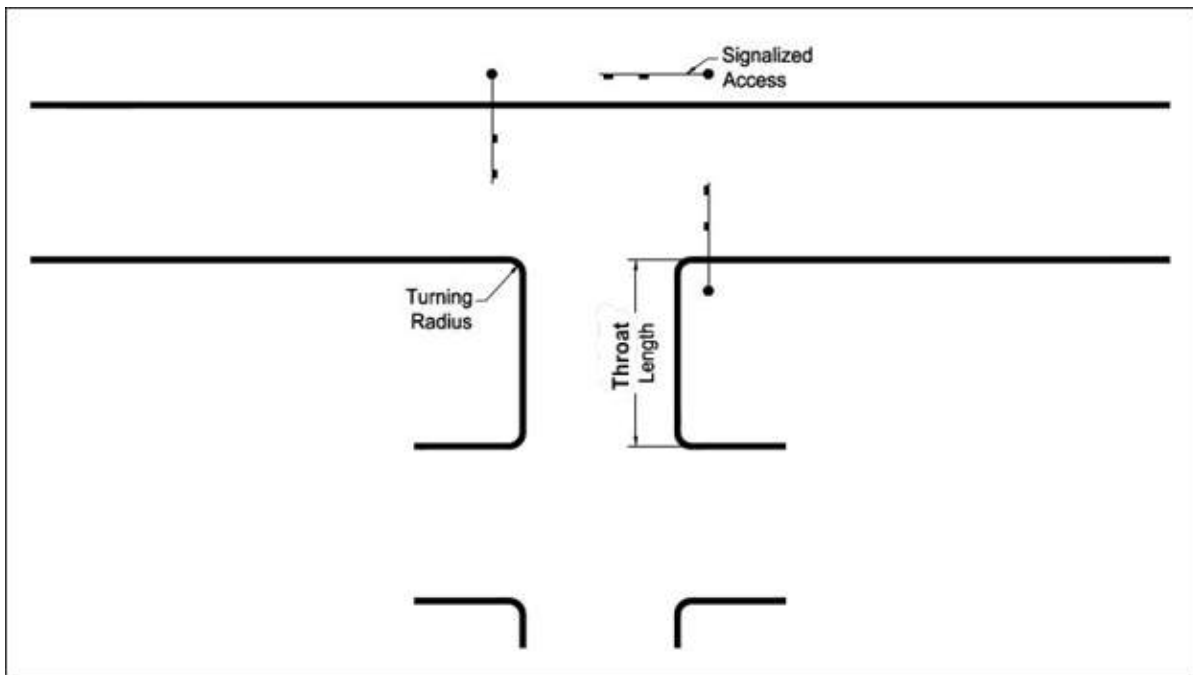


Figure 7-3. Turning Radius and Access Throat Length

Table 7-6. Turning Radius at Access Locations

Vehicle Type	Turning Radius
Passenger Cars	15 to 30 feet
18 Wheel Trucks	30 to 50 feet

7.2.15. THROAT LENGTH

Throat length is the length of the driveway that is controlled internally from turning traffic, measured from the intersection with the road. Driveways should be designed with adequate throat length to accommodate queuing of the maximum number of vehicles as defined by the peak period of operation in the traffic study. This will prevent potential conflicts between traffic entering the site and internal traffic flow. Table 7-7 shows the minimum driveway throat length at signalized accesses.

Table 7-7. Minimum Driveway Throat Length at signalized Accesses

Number of Egress Lanes	Minimum Throat Length
2	75 feet
3	200 feet
4	300 feet

7.2.16. SHARED ACCESS

Access points shall be shared between adjacent parcels to minimize the potential for conflict between turning and through traffic. Interconnections between sites can eliminate the need for additional curb cuts, thereby preserving the capacity of the roadway. This is particularly important for commercial/industrial sites and shall be used to encourage the development of interconnectivity between parcels. Future roadway rights-of-way should also be preserved to promote interconnected access to vacant parcels.

7.2.17. ALIGNMENT OF ACCESS POINTS

Accesses represent points of conflict for vehicles, bicycles, and pedestrians. To minimize the potential conflicts and improve safety, intersections and driveways shall be aligned opposite each other wherever possible and roadways shall intersect at a 90 degree angle.

7.2.18. SIGHT DISTANCE

Sight distance is the length of the road that is visible to the driver. A minimum safe sight distance should be required for access points based on the roadway classification. It is essential to provide sufficient intersection sight distance at the driveway point for vehicles using a driveway to see oncoming traffic and judge the gap to safely make their movement. Intersection sight distance varies depending on the design speed of the roadway to be entered and assumes a passenger car can turn right or left into a two-lane highway and attain 85 percent of the design speed without being overtaken by an approaching vehicle that reduces speed to 85 percent of the design speed. Table 7-8 gives intersection sight distance requirements for passenger cars.

Table 7-8. Intersection/ Driveway Sight Distance

Posted Speed Limit	Sight Distance Required * (feet)					
	Left Turn			Through and Right Turn		
MPH	2 lanes	3 lanes	5 lanes	2 lanes	3 lanes	5 lanes
30	335	355	375	290	310	335
35	390	415	440	335	365	390
40	445	475	500	385	415	445
45	500	530	565	430	465	500
50	555	590	625	480	515	555
55	610	650	690	530	570	610
60	665	710	750	575	620	665
65	720	765	815	625	670	720

*Driver eye is 15 feet measured from the traveled way

7.2.19. TURNING LANES

Turning lanes remove the turning traffic from the through travel lanes. Left turn lanes are used to separate the left turning traffic from the through traffic. Right turn lanes reduce traffic delays caused by the slowing of turning vehicles. These lanes are generally used in high traffic areas on arterial and

collector roadways. A traffic impact study will determine the need for turning lanes or tapers. Table 7-9 shows the minimum guidelines for storage length of turning lanes based on speed.

Table 7-9. Turning Lanes Storage Length (100 Feet Minimum)

Intersection	Length
Unsignalized Intersection	2 times the number of cars likely to arrive in a 2 minute period during peak hour*
Signalized Intersection	10% of the peak hour design year volume expressed in feet*

- * Assumes 25 feet per vehicle
- * 2004 AASHTO Geometric Design of Highways and Streets

Turning lanes shall normally be a minimum of 12 feet in width. Any exception will require approval from the County and/or UDOT. Right turn lanes require an additional 12 feet of pavement to accommodate the lane.

The provision for left turn lanes is important from both the capacity and safety perspectives, 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 helps to reduce 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 7-10 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. If a two lane turn lane is to be provided, it is recommended that 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 7-10. Guidelines for 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	Left Turn Lane	Right Turn Lane	Right Turn Acceleration Lane	Left Turn Acceleration Lane
40 mph and less	25 vph	50 vph	-	-
45 mph and greater	10 vph	25 vph	50 vph	*

- * Optional for 50 mph and less; required for 55 mph or greater
- vph = vehicles per hour in any one hour period in passenger car equivalents

7.2.20. PEDESTRIAN AND BICYCLE ACCESS

All new development and redevelopment of existing sites should address pedestrian and bicycle access to and within the site.

7.2.21. ROUNDABOUTS

A roundabout is an intersection control measure used extensively in Europe for many years. A roundabout is composed of a circular, raised, center island with deflecting islands on the intersecting streets to direct traffic movement around the circle. Traffic circulates in a counter-clockwise direction making right turns onto the intersecting streets. There are no traffic signals; rather, entering traffic yields to vehicles already in the roundabout.

Roundabouts can reduce delays because the stop signal phase (when vehicles entering the intersection are unable to move) is eliminated. Roundabouts can also improve safety by reducing number of potential impact points from the number of conflict points at a four-way intersection.

Development of a roundabout should occur as a result of an intersection study by a qualified Traffic Engineer and 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.

8. TRANSPORTATION CORRIDOR PRESERVATION

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

8.1. INTRODUCTION

Several 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 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 Duchesne County. A bibliography of the relevant publications is included in Section 10.

8.1.1. DEFINITIONS

For purposes of this discussion, a “corridor” is defined as “the path of a transportation facility that already exists or may be built in the future”. 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 three major categories: (1) acquisition, (2) exercise of police powers, and (3) voluntary agreements and governmental inducements. The various issues associated with each corridor 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. 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 or local funds where a project would be implemented without federal participation. The use of state or local 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. 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 of property will commence within a reasonable time, and (d) fair compensation is paid. Fair value must be paid for interests taken and damages which accrue to the remainder of adjacent property not taken (Utah Code Annotated §78-34-1).

Before property may be taken for a corridor the acquiring agency must identify the corridor location, general route and termini. If the acquiring agency, without reasonable justification, does not commence or complete construction and use of a roadway within the corridor within the time specified, additional damages might be payable to a property owner (Utah Code Annotated §27-12-96).

8.2.3. HARDSHIP ACQUISITION

Property is acquired to alleviate a particular hardship to a property owner. The hardship must occur as a result of an inability to sell the property due to public awareness of the pending project. Applies only to limited parcel-by-parcel actions in extraordinary or emergency situations (Utah Code Annotated §72-15-113).

8.2.4. PURCHASE OPTIONS

A conditional contract or option is executed that gives the public agency the right but not the obligation to buy the property at a future date. The contract would specify the terms and conditions of the future purchase (Utah Code Annotated §72-5-111). A related concept involves the use of rights of first refusal under which the government entity obtains the first right to purchase the property when a landowner determines to sell the property.

8.2.5. DEVELOPMENT EASEMENTS

The government agency purchases development rights or a development easement. The agreement would specify the uses that would be allowed on the land. The public agency would purchase the property owner's right to develop the land, leaving the owner with all other rights of ownership. Thus, intensification of land use or development would be precluded.

Existing Utah law provides for conservation easements to maintain land or water areas predominantly in a natural scenic, or open condition, or for recreational, agricultural, cultural, wildlife habitat or other use or condition consistent with the protection of open land. Such easements must be granted to a tax-exempt organization or government agency and cannot be obtained by eminent domain. The easement may be terminated pursuant to conditions set forth in the easement document (Utah Code Annotated §57-18).

8.2.6. PUBLIC LAND EXCHANGES

Surplus government land is exchanged as compensation for private property needed for right-of-way.

8.2.7. PRIVATE LAND TRUSTS

Private land trusts play an increasingly important role in land conservation where public objectives are aligned with private trust objectives. Where government budgets are insufficient to acquire critical tracts in a given time frame, private land trusts may acquire the tracts and hold them for future acquisition by the government.

8.2.8. EXERCISE OF POLICE POWERS

Regulatory controls under the police power can be used to control the development of private property in order to preserve the transportation corridor. These measures impose requirements with no

compensation to the landowner. Land use and development controls are typically administered by local governments (36 A.L.R.3d 751).

8.2.9. IMPACT FEES AND EXACTIONS

This method involves a mandatory property or monetary contribution by a developer to the local jurisdiction as a condition of a land use approval or permit. These approvals or permits could be associated with a contract zoning, site plan approval, proposed subdivision, conditional use permit, or other development permission. In most cases, impact fees and exactions can be assessed only after a jurisdiction makes an individualized determination that the required dedication is “roughly proportional in both nature and extent to the impact of the proposed development. Impact fees and exactions include the following variations” (Utah Code Annotated §11a-36-201).

- In-kind contributions – Land owners and developers construct improvements or dedicate land for public facilities or right-of-way within or abutting the development site. Monetary payments in lieu of contributions – Developers pay money in lieu of or in addition to in-kind contributions. This method may be used where the pooled contributions of numerous small developments is more effective than individual dedications of small parcels of land. The money is then used to acquire right-of way or make other improvements.
- Impact fees – This method applies to a broader range of improvements whose need is generated by a new development. The affected jurisdiction charges developers for a pro rata share of capital funding for the improvements based on relative contributions to the impacts of the development by newly developed property and existing developments.

Constitutional standards of reasonableness govern the validity and amount of impact fees and exactions. To be constitutional, an impact fee or exaction must be a fair contribution in relation to contributions by others. Thus, an impact fee or exaction must not require newly developed properties to bear more than their equitable share of the capital costs in relation to the benefits conferred.

Seven factors must be considered in analyzing the fairness of an impact fee or exaction (Utah Code Annotated §11a-36-201):

- The cost of existing facilities;
- The manner of financing existing capital facilities (such as user charges, special assignments, bonded indebtedness, general taxes, or federal grants);
- The relative extent to which the newly developed properties and other properties in the jurisdiction have already contributed to the cost of existing capital facilities (by such means as user charges, special assignments, or payment from the proceeds of general taxes);
- The relative extent to which the newly developed properties in the jurisdiction will contribute to the cost of existing capital facilities in the future;
- The extent to which the newly developed properties are entitled to a credit because the jurisdiction is requiring their developers or owners (by contractual arrangement or otherwise) to provide common facilities (inside or outside the proposed development) that have been provided by the jurisdiction and financed through general taxation or other means (apart from user fees) in other parts of the jurisdiction;

- Extraordinary costs, if any, in servicing the newly developed properties; and
- The time-price differential inherent in fair comparisons of amounts paid at different times.

In addition to constitutional limitations, in 1995 the Utah legislature in special session adopted stringent controls on the ability of local government to adopt impact fees to finance development growth. The act requires that prior to the imposition of an impact fee, a government entity must do the following (Branberry Development Corporation v South Jordan City).

- Prepare a capital facilities plan that establishes that impact fees are necessary to achieve an equitable allocation to the costs borne in the past and to be borne in the future in comparison to the benefits already received and yet to be received.
- Prepare a written analysis of the impact fee identifying the impact on the system caused by the development activity, demonstrate how those impacts are reasonably related to the development activity, estimate the proportionate share of the impact cost that are reasonably related to the new development activity, and identify how the impact fee was calculated.
- Find that an impact fee is reasonably related to the new development based on analysis of specific factors.
- Calculate the impact fee based on a list of defined criteria.
- Hold public hearings on the adoption of the impact fee ordinance.
- Establish a service area within which the jurisdiction calculates and imposes impact fees for various land use categories and either adopts a schedule of such fees by use category or establishes the formula for calculating such fees by use category.

The act contains other requirements relating to environmental mitigation fees, definitions of public facilities and in some cases detailed standards governing the adoption and administration of impact fees.

8.2.10. SETBACK ORDINANCES

A local ordinance establishes a certain distance from a curb, right-of-way, property line, or structure within which construction is prohibited. These requirements may be contained within subdivision ordinances, zoning ordinances or building codes.

Setback requirements do not constitute a compensable taking (Hargraves vs. Young). But if setbacks or minimum lot sizes have the effect of prohibiting all economic use of property for otherwise permitted uses, a taking may occur unless a variance is granted.

8.2.11. OFFICIAL MAPS OR MAPS OF RESERVATION

Development is prohibited within a proposed right-of-way in areas covered by an official master street plan adopted by the jurisdiction. The official map may be used to plat future as well as existing streets. Generally, prohibition of development must not exceed a reasonable period after the implementing agency is advised of proposed development.

Prior to 1992, Utah law permitted the adoption of an official street map by municipalities and counties. Under prior law, the official street map had the legal effect of prohibiting development within the

boundaries of the proposed street unless approved by the legislative body. Beginning in July of 1992, counties and municipalities were specifically prohibited from adopting an official map. Moreover, current law provides that an official map adopted under prior law does not require the municipality or County to acquire the property designated for eventual use as a public street. Utah law also expressly provides that an official map may not be used to unconstitutionally prohibit development of property (Utah Code Annotated §§17-27a-407, 10-9a-406).

Some courts have held that statutes permitting government to impose a development moratorium on property, located in a proposed transportation corridor during a period of preacquisition planning, unconstitutionally permits the taking of property without just compensation. Other courts have held that where the purpose of the government action is the prevention of development of land, that would increase the cost of planned future acquisition of such land by government, is unconstitutional. Some courts have found official maps unconstitutional if they also include compensation for the property owner for the period of temporary deprivation of the right to develop. Other statutory schemes have been validated when they allow development to proceed to avoid substantial damage to a property owner (Utah Code Annotated §§17-27a-504, 10-9a-504).

8.2.12. ADEQUATE PUBLIC FACILITIES AND CONCURRENCY REQUIREMENTS

Some communities address infrastructure needs by adopting ordinances that require a concurrency program intended to ensure that public facilities such as transportation systems are either in place, planned for, or provided as impacts occur from new development. Tools for implementation include carrying capacity limits, development caps, phasing systems, growth rate control, and other similar tools. This concept does not necessarily require developers pay for improvements, but does require that such improvements be made when development occurs.

9. OTHER FUTURE ACTIONS

In addition to the long and short-term action items, the following actions should also be considered.

9.1. INTERAGENCY AGREEMENT WITH UDOT

After adoption, it will be necessary to complete an agreement with UDOT regarding access to the state highways. This will help the County by providing a framework for future access permit applications related to private development. It also helps UDOT by providing enough overall County information so that individual access points can be reviewed with an understanding of future adjacent needs.

It is important that the County understand UDOT's requirements for traffic signals and the access points within the operational sphere of a signalized intersection. An understanding of UDOT's access permitting requirements is important also and should be a part of the County's subdivision and development process. It is recommended that the County continue to coordinate with UDOT on every new development that could impact the state highway system. This will ensure that the new development will share its burden of impact on that system.

9.2. LAND USE PLANNING INTEGRATION

The County's current General Plan calls for growth to occur within incorporated cities and towns and town sites to maintain an agricultural lifestyle. This is similar to the development pattern in other rural communities. Traffic studies in such rural communities indicate that this centralized commercial development land use pattern has negative traffic impacts as the County grows. Residents from the outskirts of town must travel downtown or to the central corridor to go shopping, which creates a lot of traffic from the outlying areas into the communities. These communities have considered placing small commercial clusters around the outside of town to create convenient locations for people to purchase goods and services, while minimizing travel distances. This could be accomplished in Duchesne County with simple rezoning, conditional use permits, or through planned unit developments. It is recommended that the County consult with cities within the County to discuss this concept in more detail.

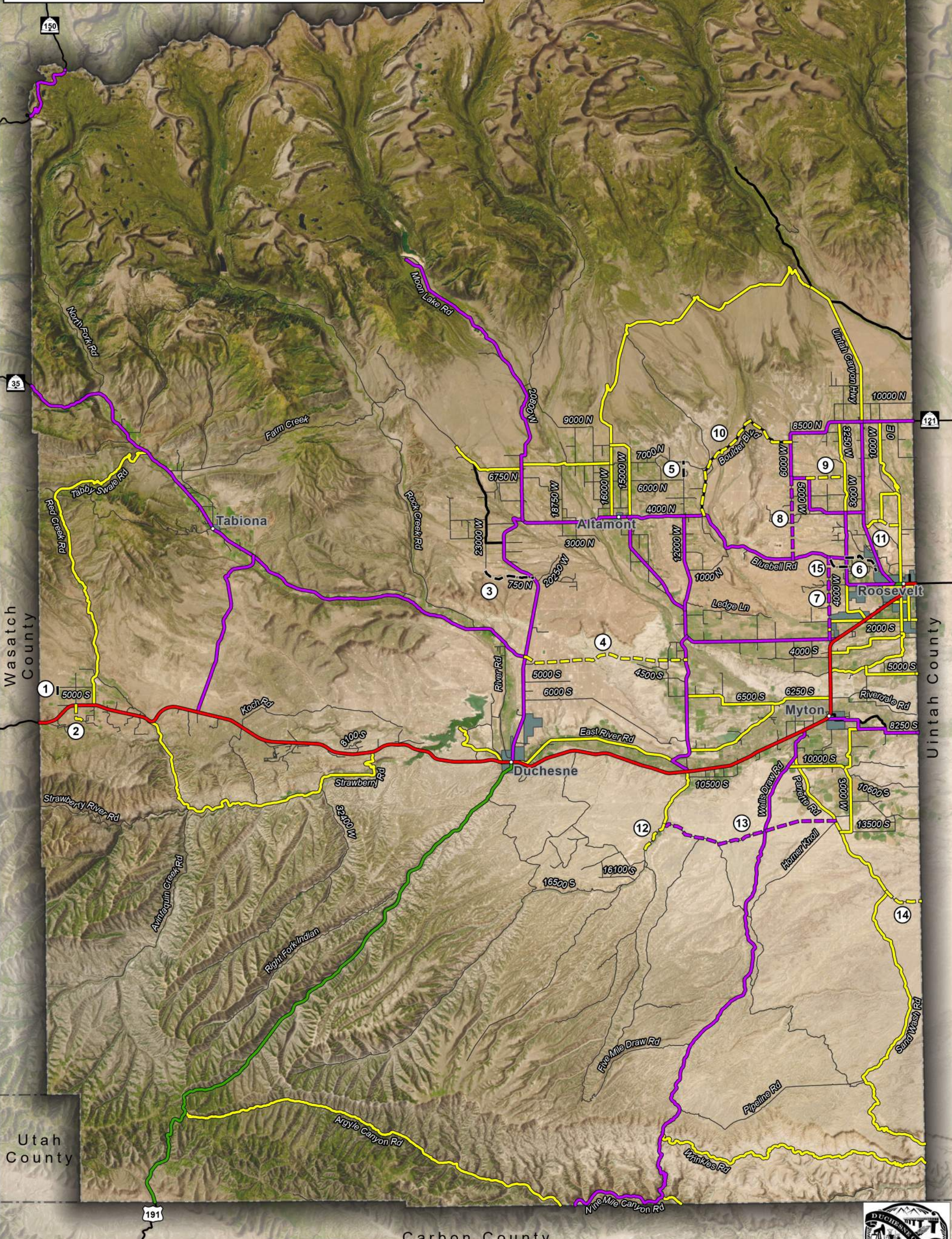
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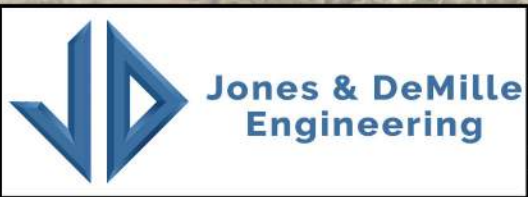
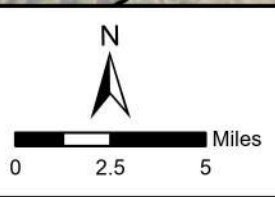
APPENDIX A. DUCHESNE TRANSPORTATION MASTER PLAN MAPS

A.1. MAP A-1: FUNCTIONAL CLASSIFICATION AND FUTURE ROUTES

Functional Classification	Future Corridors	County Roads
Other Principal Arterial	Proposed Major Collector	State Highways
Minor Arterial	Proposed Minor Collector	U.S. Highways
Major Collector	Proposed Local	Municipal Boundaries
Minor Collector		County Boundaries
Local		



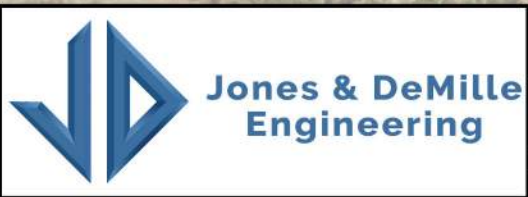
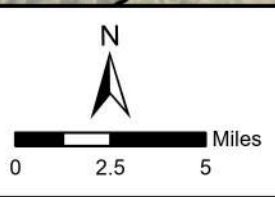
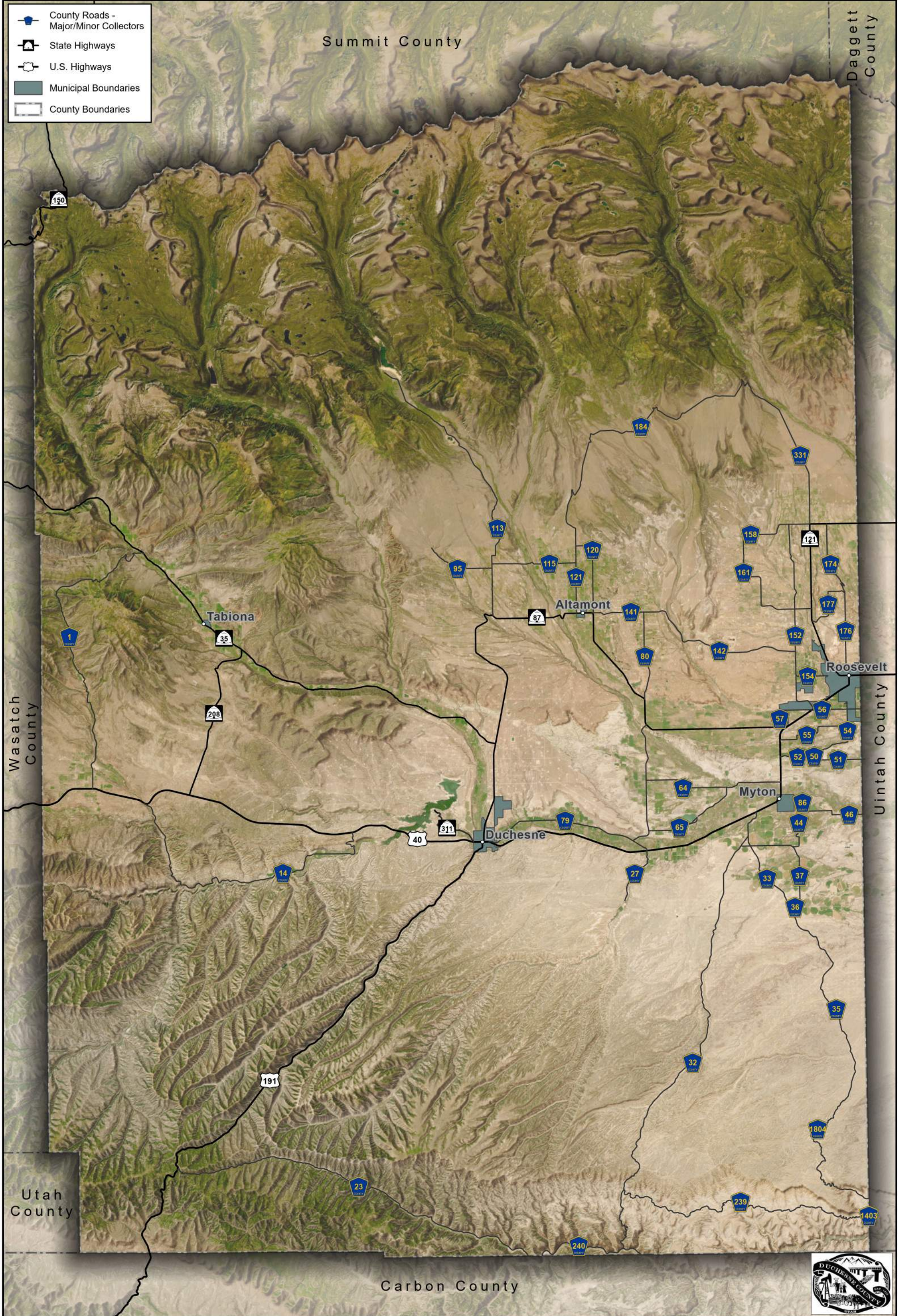
NOTE: FOR FUTURE CORRIDOR PLAN DETAILS SEE APPENDIX D, TABLE D-5



Duchesne County		Duchesne County, Utah
2024 Transportation Master Plan Functional Classification Overview		Scale: 1" = 5 miles
Map Name: H:\JD\Proj\2311-030\GIS\Projects\2311-030_Design\2311-030_Design.aprx - Duchesne County - TMP - Current Conditions - Functional Classification 11x17P Project Number: 2311-030		1
Drawn by: JEM 10-24	Last Edit: 02/04/2025	

A.2. MAP A-2: COUNTY ROAD NUMBERS

-  County Roads - Major/Minor Collectors
-  State Highways
-  U.S. Highways
-  Municipal Boundaries
-  County Boundaries



Duchesne County		
2024 Transportation Master Plan County Road Number Overview		
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Project Number: 2311-030	Drawn by: JEM 10-24	Last Edit: 02/04/2025

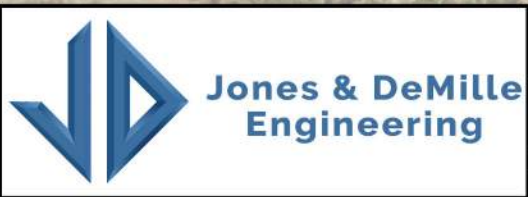
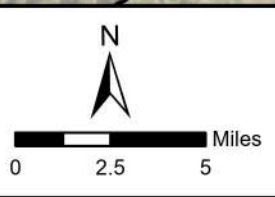
Duchesne County, Utah
Scale: 1" = 5 miles
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APPENDIX B. CURRENT PAVEMENT CONDITION DATA AND ANALYSIS

B.1. BORING LOG DATA

Test holes were taken to determine the existing thickness, layers, and classification of pavements, tar sands, base course, and subgrade material on selected roadways. This information was useful to identify roadways with thin asphalt that likely will not stand up to heavy truck traffic should energy development increase in the respective area. The AASHTO Soil Classification and the Unified Soil Classification was determined, as well as the California Bearing Ratio (CBR) of the sub-base. Map B-1 below shows a map of existing conditions with symbology displaying the bituminous surface course (asphalt or tar sand) depths of roadways cored. Table B-1 below contains the bore log/test hole summary, with test hole #, Bituminous Surface Course (BSC) depths, which includes hot mix asphalt, chip seal, tar sands and other asphalt layer thicknesses. Also, the depth of the untreated base course (UBC) depth, sub-base soil classifications in both AASHTO and USCS systems is given. The plasticity index (PI) and California Bearing Ratio (CBR) data is given. Recently reconstructed roads with known thicknesses are shown on Table B-2 below.

B.2. MAP B-1 BORING LOG DATA



Duchesne County

2024 Transportation Master Plan
Test Bore Hole Results Overview

Map Name: H:\JD\Proj\2311-030\GIS\Projects\2311-030_Design\2311-030_Design.aprx - Duchesne County - TMP - Current Conditions - Test Bore Hole Results 11x17P
 Project Number: 2311-030 Drawn by: JEM 09-24 Last Edit: 02/04/2025

Duchesne County, Utah

Scale: 1" = 5 miles

1

Table B-1. Boring Log Summary

Test Hole ID	BSC Depth	Tar Sands Depth	Total BSC Depth	UBC Depth	SubBase Type	SubBase AASHTO Class	SubBase USCS Class	SubBase PI	SubBase CBR	SubBase CBR2	Comments
100	3		3	7.5	Silty sand with Gravel	A-2-4(0)	SM	3	25	27	
101	4		4	8	Sandy Silty Clay	A-4(1)	CL-ML	7	5	15	
102	4		4	8.5	Silty Sand	A-2-4(0)	SM	NP	25	27	BSC (old)
103	6		6	3	Sandy Lean Clay	A-4(2)	CL	9	5	15	
104	3		3	8	Poorly Graded Gravel With Clay and Sand	A-2-4(0)	GP-GC	9	25	65	
105		3.5	3.5		Silty Sand With Gravel	A-2-4(0)	SM	NP	25	27	
106		3	3	2.5	Silty Clayey Gravel with Sand	A-2-4(0)	GC-GM	4	27	40	Fine UBC
107		3	3	2.5	Silty Clayey Gravel with Sand	A-1-b	GC-GM	5	20	65	
108		4.5	4.5	5	Silty sand with Gravel	A-2-6(0)	SC	11	10	20	
109	4	2	6	7.5	Silty sand	A-4(0)	SM	NP	10	25	
110	6		6	3	Silty Gravel with Sand	A-1-b	GM	NP	20	65	
111		3	3	4.5	Silty sand with Gravel	A-2-4(0)	SM	NP	25	27	
112	3.5		3.5	5	Poorly Graded Gravel With Silt and Sand	A-1-a	GP- GM	NP3	37	85	
113	3	3.5	6.5	6.5	Clayey Sand With Gravel	A-2-6(1)	SC	20	10	20	Old BSC or Cold Mix, Very Brittle
114	5		5	7	Clayey Sand	A-2-6(0)	SC	11	10	20	
115	4.5		4.5	8	Sandy Fat Clay	A-7-6(19)	CH	29	3	5	Old BSC or Cold Mix, Very Brittle
116		2.5	2.5	5	Silty sand with Gravel	A-2-4(0)	SM	NP	25	27	
117	5		5	4	Silty, Clayey Sand with Gravel	A-4(0)	SC-SM	5	10	20	
118	4		4	7.5	Silty Sand	A-2-4(0)	SM	NP	25	27	
119	6.5		6.5	8.5	Silty Sand	A-2-4(0)	SM	NP	25	27	Brittle Cold Mix
120	9		9	5	Silty Sand With Gravel	A-1-b	SM	NP	20	25	
121	3	3	6	8	Silty sand with Gravel	A-2-4(0)	SM	NP	25	27	
122	8		8		Clayey Sand	A-2-4(0)	SC	8	20	27	No UBC Under BSC
123	4.5		4.5	3.5	Silty Gavel With Sand						

Test Hole ID	BSC Depth	Tar Sands Depth	Total BSC Depth	UBC Depth	SubBase Type	SubBase AASHTO Class	SubBase USCS Class	SubBase PI	SubBase CBR	SubBase CBR2	Comments
124	4		4	4.5	Poorly Graded Gavel With Silty clay and Sand	A-1-b	GP- GC	6	20	65	
125	5		5	3.5	Silty Gravel with Sand	A-1-b	GM	6	20	65	
126	5		5	8	Silty sand with Gravel	A-1-b	SM	NP	20	25	
127	4.5		4.5	3.5	Silty Sand With Gravel	A-1-b	SM	2	20	25	
128		3	3	7.5	Silty, Clayey Sand	A-4(0)	SC-SM	4	10	25	
129	3	2.5	5.5	3	Silty Sand With Gravel	A-2-4(0)	SM	NP	25	27	
130	2.5	2.5	5	4.5	Silty Sand	A-2-4(0)	SM	NP	25	27	
131	3.5		3.5	2.5	Clayey Sand	A-7-6(11)	SC	40	10	13	
132	7		7	7	Clayey Sand With Gravel	A-2-4(0)	SC	10	20	27	
133	3		3	6	Silty Sand With Gravel	A-1-b	SM	NP	20	25	
134	4		4	8	Silty Sand With Gravel	A-2-4(0)	SM	NP	25	27	
135	3	2.5	5.5	4.5	Clayey Sand With Gravel	A-6(0)	SC	13	10	13	
136		4	4	7	Silty Sand	A-2-4(0)	SM	NP	25	27	
137	3		3	4	Silty Sand With Gravel	A-2-4(0)	SM	NP	25	27	
138	8		8	4.5	Poorly Graded Gravel with silty clay and sand	A-1-b	GP-GC	6	20	40	
139	2.5	3	5.5	5	Sandy Silty Clay	A-4(0)	CL-ML	6	5	15	
140		2.5	2.5	8	Silty Sand With Gravel	A-2-4	SM	NP	25	27	
141	5		5	8.5	Silty Sand With Gravel	A-2-4	SM	NP	25	27	
142	4		4	8.5	Silty Sand With Gravel	A-2-4	SM	NP	25	27	
143	2.5	3	5.5	5.5	Clayey Sand With Gravel	A-6(1)	SC	12	10	13	
144	3	4	7	5	Silty Sand	A-2-4(0)	SM	NP	25	27	
145	4		4	5.5	Sandy Silty Clay	A-4(1)	CL-ML	7	5	15	
146	3	4.5	7.5	5	Silty Sand With Gravel	A-2-4	SM		25	27	
147	5.5		5.5	5.5	Sandy Lean Clay	A-4(3)	CL	10	5	15	
148	6.5		6.5	5.5	Silty Sand	A-2-4	SM	NP	25	27	
149	9		9	3.5	Sandy Silt	A-4(0)	ML	NP	5	15	Cold Mix AspahlT (old)

Test Hole ID	BSC Depth	Tar Sands Depth	Total BSC Depth	UBC Depth	SubBase Type	SubBase AASHTO Class	SubBase USCS Class	SubBase PI	SubBase CBR	SubBase CBR2	Comments
150	7		7	5	Sandy Lean clay	A-6(9)	CL	17	5	13	Uncompacted, Heavy voided BSC
151	5		5	5	Silty Sand	A-2-4	SM	NP	25	27	
152	8.5		8.5	1	Silty Sand	A-2-4	SM		25	27	
153	5		5	3	Clayey Sand	A-2-6(2)	SC	19	10	20	
154	2.5		2.5	5.5	Sandy Lean Clay	A-7-6(9)	CL	23	5	15	
155	3		3	2	Clayey Sand	A-6(1)	SC	13	10	15	
156	2.5	3	5.5	4.5	Sandy Lean Clay	A-7-6(10)	CL	24	3	5	
157	7		7	8.5	Sandy Lean Clay	A-6(6)	CL	16	5	13	
158	9		9		Clayey Sand	A-6(2)	SC	16	10	13	Loose Gravel, OIL coated, but Loose
159	2.5		2.5	5.5	Clayey Sand	A-6(3)	SC	14	3	13	
160		2.5	2.5	2	Clayey Sand	A-6(5)	SC	18	10	13	
161	3		3	2.5	Silt with Sand	A-4(5)	ML	8	5	15	
162	5		5	2	Poorly Graded Sand with Silty Clay	A-2-4(0)	SP-SC	7	20	40	Cold MIX Very Brittle
163	3		3	6	Silty , Clayey Sand With Gravel	A-2-4(0)	SC-SM	7	10	25	
164	7		7	5	Clayey Sand	A-4(1)	SC	LL 26/ PI 9	10	25	Cold Mix (falling Apart)
165	4.5		4.5	7.5	Clayey Sand with Gravel	A-2-6(0)	SC	LL 28 / PI 12	10	20	
166	6		6	6.5	Sandy Lean Clay	A-6(5)	CL	LL 33 / PI 14	5	15	
167	4.5	1.5	6	5	Silty, Clayey Sand	A-2-4(0)	SC-SM	LL 21 / PI 4	10	25	
168		3	3	2.5	Silty Sand	A-2-4(0)	SM	NP	20	27	
169		2	2	4	Silty Gravel With Sand	A-1-b	GM	NP	20	70	
170	8		8	4	Silty, Clayey Sand With Gravel	A-2-4(0)	SC-SM	5	20	27	
171	6		6	5	Silty Gravel With Sand	A-1-b	GM	NP	20	70	
172	5		5	6.5	Clayey Sand with Gravel	A-2-4(0)	SC	9	10	20	
173	5		5	5.5	Poorly Graded Sand With Silt and Gravel	A-1-b	SP-SM	NP	10	40	

Test Hole ID	BSC Depth	Tar Sands Depth	Total BSC Depth	UBC Depth	SubBase Type	SubBase AASHTO Class	SubBase USCS Class	SubBase PI	SubBase CBR	SubBase CBR2	Comments
174	5.5		5.5	5.5	Silty Clayey Gravel With Sand	A-1-b	GC-GM	6	20	45	
RR#1	3	2.5	5.5	7	GB 16, Silty Sand	A-2-4(0)	SM	NP			
RR#2	3	4.5	7.5	6.5	GB 12, Silty Clay with Sand	A-4-(2)	CL-ML	5			
RR#3	3	2	5	10	GB 10, Sandy Lean Clay	A-7-6(12)	CL	25			Cold Mix Asphalt
RR#4	3		3	10.5	GB 14.5, Sandy Lean Clay	A-6(7)	CL	17			
RR#5	3		3	6	GB 21, Poorly Graded Gravel with Sand with Boulders to 12"	A-2-6(0)	GP	14			
RR#6	3		3	27	GB was combined with UBC, Silty Clayey Gravel with Sand	A-1-b	GC-GM	6			
RR#7	3		3	6	GB 21, Clayey Sand	A-6-(1)	SC	11			
RR#8	22		22		Lean Clay with Sand	A-6(13)	CL	18			
RR#9	3		3	9	GB 18, Sandy Silt	A-4(0)	ML	NP			
RR#10	4		4	8	GB 17, Silty Sand	A-2-4(0)	SM	NP			
RR#11	5.5		5.5	13.5	GB 14, Sandy Silt	A-4(0)	ML	3			
RR#12	4.5		4.5	15.5	GB 12, Silty Sand	A-2-4(0)	SM	NP			
RR#13	3		3	25	UBC/ Granular Fill , 25 Clayey Sand	A-6(2)	SC	11			
175	2.75	2.5		6.25	3" GB						
176		2.5	2.5	5	3" GB						
177			6	4.5	3" GB						
178	6.75		6.75	4.25	3" GB						
179			5.75	4.25	3" GB						
180	3	1	4	6.25	UBC						
181	5.25			7.5	UBC						
182	2.25	2	4.25	3	UBC						
183	3	2.75	5.75	6.25							
184	5.75		5.75	3.75	UBC						

Test Hole ID	BSC Depth	Tar Sands Depth	Total BSC Depth	UBC Depth	SubBase Type	SubBase AASHTO Class	SubBase USCS Class	SubBase PI	SubBase CBR	SubBase CBR2	Comments
185	3.25	5.25	8.5	4	UBC						
186	4.75	0	4.75	5	UBC						
187	4	5.5	9.5	3.25							
188	6	0	6	4.5	Native Sand						
189	4	0	4	8.5							
190	2.5	1.5	4	8							

Table B-2. Pavement layer of recently reconstructed roads.

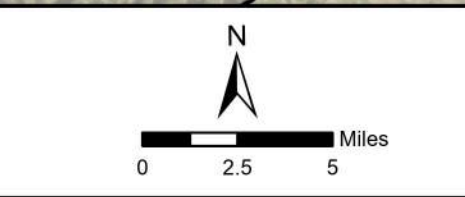
Road	Description	HMA Thickness	UBC Thickness
Pariette Road	From US-40 to Upper Pleasant Valley Canal	3"	6"
Wells Draw	From Pariette Road to End of Pavement	5"	7"
Lake Boreham Road	From East of Burdick Clayburn Pit to 6250 S	5"	6"
6250 S	From US-40 to Lake Boreham Intersection	5"	6"
Bluebell Road	From SR-87 to 12000 W	3"	6"
Bluebell Road	From 12000 W to East of Jenkins Draw	4.5"	6"
12000 W	From Bluebell Road to 6000 North	5"	6"
Moon Lake Road	From Tribal Line to Moon Lake Campground	3"	3"
Rock Creek Dugway	From Tribal Line to bottom of Dugway	4"	None
North Crescent	5000 N to top of Dye Dugway	4.5"	6"
3275 W	7500 N to 9000 N	3"	Cement Treated Base
1000 W	Dye Dugway to SR-121	3"	Cement Treated Base

B.3. TRAFFIC COUNT DATA – COUNTY ROADWAYS

Traffic counts were taken on selected roadways to identify traffic patterns, existing roadway use, classification of vehicles using the roadway, and calculation of the average daily traffic (ADT) values. Table B-3 Traffic Count Data for County Roadways (2012-2013) below contains a summary of the counts completed during the study period. Table B-3 contains the same data for the period from 2022 to 2025.

B.4. MAP B-2 TRAFFIC COUNT DATA

County Roads - Paved	Traffic Count Locations	Land Ownership	State Wildlife Reserve/Management Area
County Roads - Non-paved	2024	Bureau of Land Management	Other State
State Highways	2023	Bureau of Reclamation	Tribal Lands
U.S. Highways	2022	National Recreation Area	Private
Municipal Boundary	2013	National Forest	
County Boundary	2012	National Wilderness Area	
		State Trust Lands	
		State Parks and Recreation	



**Jones & DeMille
Engineering**

Duchesne County

**2024 Transportation Master Plan
Traffic Conditions Overview**

Map Name: H:\JD\Proj\2311-030\GIS\Projects\2311-030_Design\2311-030_Design.aprx - Duchesne County - TMP - Current Conditions - Traffic Count 11x17P
 Project Number: 2311-030 Drawn by: JEM 09-24 Last Edit: 02/04/2025

Duchesne County,
Utah

Scale: 1" = 5 miles

1

Table B-3. Traffic Count Data for County Roadways (2012-2013)

Road	Count CV#	Description	Start Date	ADT South	ADT North	ADT West	ADT East	ADT Combined	Total % Trucks	Total # Trucks
2000 W	CV1	2000 West North of Neola	Wednesday, 9/26/2012, 1:13:43 PM -	364.6	360.8			725.5	6.5%	47
3000 W	CV2	3000 West Just North of 4000 North	Tuesday, 10/9/2012, 8:04:27 AM -	364.6	360.8			725.5	6.6%	157
4000 N	CV3	4000 North	Tuesday, 11/27/2012, 2:05:24 PM -			385.1	410.2	795.3	9.7%	77
6250 S	CV4	6250 South-NW of Myton	Monday, 10/22/2012, 4:20:43 PM -			428.3	432.2	860.5	23.0%	196
6450 S	CV5	6450 South-NW of Myton	Monday, 10/22/2012, 4:49:49 PM -			149.7	149.3	299	29.9%	88
9000 N	CV6	9000 North-West of Neola	Wednesday, 9/26/2012, 7:42:32 AM -			247.2	249.1	496.3	10.0%	49
12000 W	CV7	12000 West #1-Bluebell	Tuesday, 11/27/2012, 2:38:33 PM -	240.9	249.7			490.6	8.0%	39
12000 W	CV8	12000 West #2-Bluebell	Monday, 12/3/2012, 12:41:54 PM -	143.5	133.5			277	6.8%	19
12000 W	CV9	12000 West #1-Bridgeland	Monday, 10/29/2012, 6:38:15 PM -			384.8	369	753.9	18.1%	136
16000 W	CV10	16000 West-North of Altamont	Monday, 12/3/2012, 1:25:05 PM -	180.5	183.8			364.3	4.3%	16
21000 W	CV11	21000 West	Tuesday, 11/20/2012, 4:08:02 PM -	163.6	159.8			323.4	6.3%	20
Antelope Canyon Rd	CV12	Antelope Canyon Road	Tuesday, 11/13/2012, 6:12:13 PM -	322.8	272			594.9	23.2%	137
Bluebell Rd	CV13	Bluebell Road-071712	Tuesday, 7/17/2012, 10:57:16 AM -			563	647.7	1210.7	6.4%	77
Bluebell Rd	CV14	Bluebell Road-061212	Tuesday, 6/12/2012, 11:29:49 AM -			797.7	861.6	1659.3	9.9%	164
Bluebell Rd	CV15	Bluebell Road-Silver Counter	Wednesday, 3/7/2012, 3:22:14 PM -			604.6	586.2	1190.8	6.4%	75

Road	Count CV#	Description	Start Date	ADT South	ADT North	ADT West	ADT East	ADT Combined	Total % Trucks	Total # Trucks
Bluebell Rd	CV16	Bluebell Road-Yellow Counter	Wednesday, 3/7/2012, 3:05:56 PM -			627.6	614.5	1242.1	6.0%	74
CR-33	CV17	CR-33-Pariette Rd South	Thursday, 4/5/2012, 11:22:58 AM	1085.1	1037.5			2122.5	23.7%	501
East River Rd	CV18	East River Road	Tuesday, 11/6/2012, 9:42:01 AM -			316.3	285.8	602.1	8.6%	51
Hancock Cove Road	CV19	Hancock Cove Road	Thursday, 12/13/2012, 5:14:51 PM -			503.6	436.4	940	3.2%	29
Lake Boreham Rd	CV20	Lake Boreham Road-080712	Tuesday, 8/7/2012, 2:44:41 PM -			133.1	155.7	288.8	22.3%	60
Moon Lake Rd	CV21	Moon Lake Road #1	Tuesday, 11/13/2012, 7:09:23 PM -	15.9	17.3			33.2	0.0%	1
Ostler Corner	CV22	Ostler Corner - 200 North	Tuesday, 12/11/2012, 3:06:42 PM -			800.5	893.7	1694.2	4.5%	76
Ostler Corner	CV23	Ostler Corner - 3000 West	Tuesday, 12/11/2012, 3:24:07 PM -	672.2	721.4			1393.6	14.0%	187
Strawberry River Road	CV24	Strawberry River Road	Tuesday, 11/6/2012, 8:57:33 AM	166	164.2			330.1	31.2%	101
Uintah Canyon Road	CV25	Uintah Canyon Road	Tuesday, 11/20/2012, 5:46:10 PM	41.8	22.2			64	1.4%	1
CR-33	CV26	CR-33	Tuesday, 10/16/2012, 2:22:42 PM -	1295.6	1325.9			2621.5	21.9%	570
CR-33	CV27	CR-33	Tuesday, 10/16/2012, 2:40:57 PM -	1097.6	1154.1			2251.7	23.9%	531
Lake Boreham Rd	CV28	Lake Boreham Road 082112	Tuesday, 8/21/2012, 12:46:36 PM -			89.9	92.6	182.4	16.6%	30
Lake Boreham #1	CV29	Lake Boreham #1 040513	Friday, 4/5/2013, 1:48:12 PM -			88.3	95	183.3	13.4%	24
Lake Boreham #2	CV30	Lake Boreham #2 040513	Friday, 4/5/2013, 2:02:20 PM -			68.2	76.2	144.4	9.4%	14
6000 West	CV31	6000 West	Tuesday, 3/12/2013, 2:31:20 PM -	105.1	97.8			202.9	10.4%	21
Red Creek Road	CV32	Red Creek Road #1	Thursday, 2/28/2013, 1:59:58 PM -			26.4	27.6	54	3.4%	2

Table B-4. Traffic Count Data for County Roadways (2022-2025)

Road	Count CV#	Location Description	Start Date	ADT South	ADT North	ADT West	ADT East	ADT Combined	Total % Trucks	Total # Trucks
15000 West	CV33	15000 West North of Altamont	5/29/2024	41	100			141	11.7%	16
3000 West	CV34	3000 West Near 8000 South	7/8/2024	39	39			78	3.2%	2
3000 West	CV35	3000 West North of 4000 North	7/12/2024	206	210			416	7.1%	30
3000 West	CV36	3000 West North of Bluebell Road	7/12/2024	495	510			1005	10.0%	101
3000 West	CV37	3000 West North of Roosevelt Airport	7/9/2024			774	887	1661	13.9%	231
3000 West	CV38	3000 West North of S Cove Road	7/10/2024	1246	1229			2475	6.1%	151
3000 West	CV39	3000 West Near Roosevelt Airport	9/26/2023			953	941	1894	13.6%	258
3000 West	CV40	3000 West South of S Cove Road	7/10/2024	879	898			1777	13.6%	242
5000 South	CV41	5000 South Near SR 87	5/17/2024			135	135	270	10.6%	29
5000 South	CV42	5000 South South of Roosevelt	5/31/2024			112	106	218	9.5%	21
6000 West	CV43	6000 West Monarch	7/16/2024	125	116			241	14.6%	35
4000 North	CV44	4000 North Near 3000 West	7/12/2024			507	507	1014	6.2%	63
7000 North	CV45	7000 North West of Altonah	5/17/2024			172	175	347	7.9%	27
12000 West	CV46	12000 West Near SR 87	5/28/2024	617	568			1185	16.8%	199
12000 West	CV47	12000 West Arcadia	5/28/2024	428	477			905	25.3%	229
12000 West	CV48	12000 West North of Upalco	5/10/2024	333	339			672	14.7%	99
12000 West	CV49	12000 West South of Bluebell	5/10/2024	214	212			426	9.6%	41
Bluebell Road	CV50	Bluebell Road Near 3000 West	7/11/2024			550	550	1100	8.5%	94
Bluebell Road	CV51	Bluebell Road West of Bluebell	5/9/2024			568	571	1139	5.9%	67

Road	Count CV#	Location Description	Start Date	ADT South	ADT North	ADT West	ADT East	ADT Combined	Total % Trucks	Total # Trucks
Cobble Hollow Drive	CV52	Cobble Hollow Drive	7/7/2024			177	167	344	15.4%	53
E River Road	CV53	E River Road	5/28/2024			334	291	625	3.5%	22
Mortensen Lane	CV54	Mortensen Lane	5/31/2024			97	108	205	5.9%	12
N Crescent Road	CV55	N Crescent Road	7/10/2024	471	466			937	3.3%	31
S Myton Road	CV56	S Myton Road	7/8/2024	187	191			378	8.7%	33
State Street	CV57	State Street South of Roosevelt	5/31/2024	630	598			1228	6.4%	79
Pole Line Road	CV58	W Pole Line Road South of Airport	9/26/2023			493	538	1031	13.4%	138
3000 West	CV59	3000 West East of Airport	9/26/2023	1391	1273			2664	15.6%	416
4000 West	CV60	4000 West Near Dry Gulch Creek	10/6/2023	136	148			284	13.3%	38
6250 South	CV61	6250 South North of Myton	9/26/2023			288	263	551	30.6%	169
9000 North	CV62	9000 North West of Neola	9/26/2023					377	19.9%	75
10000 South	CV63	10000 South West of 3000 West	11/4/2022					258	15.2%	39
Antelope Canyon Road	CV64	Antelope Canyon Road	11/4/2022	140	144			284	17.8%	51
Indian Highway	CV65	Indian Highway Near County Line	11/4/2022			225	174	399	19.7%	79
Pariette Road	CV66	Pariette Road Near FourPoint Resources Field Office	11/4/2022	412	438			850	14.3%	122
Wells Draw Road	CV67	Wells Draw Road South of 10000 South	11/4/2022	162	161			323	15.7%	51
Nine Mile Canyon	CV68	Nine Mile Canyon Road West of Gate Canyon	1/2/2025			25	24	49	11.4	6

Road	Count CV#	Location Description	Start Date	ADT South	ADT North	ADT West	ADT East	ADT Combined	Total % Trucks	Total # Trucks
Wells Draw	CV69	Wells Draw South of Five Mile Draw	1/2/2025	39	19			58	6.9	4
Wells Draw	CV70	Wells Draw North of Five Mile Draw	1/2/2025	29	27			56	8.8	5
Wells Draw	CV71	Wells Draw at Nine Mile Canyon	1/2/2025	25	21			46	12.2	6
Antelope Crossing	CV72	Antelope Crossing North of BLM Fence Road	2/26/2024	114	114			228	14.3	33
Antelope Crossing	CV73	Antelope Crossing at Gray Mountain Canal	2/26/2024	123	125			248	14.6	36
6500 S at Pahcease	CV74	6500 S at Pahcease Canal	1/26/2024	327	327			653	57.1	373
8000 W	CV75	S 8000 W North of Ioka Lane	1/4/2024	112	111			223	9.7	22
S Cove Road	CV76	S Cove Road East of 3000 W	1/4/2024			716	809	1525	3.2	49

B.5. TRAFFIC COUNT DATA – UDOT ROADWAYS

Average Annual Daily Traffic (AADT) for 2010 through 2012 and for 2013 through 2023 was used to calculate an average growth rate for each year, with a total average of 3.75% for 2010-2012 and 2.61% for 2013-2023. Percentages above or below 25% or 0% were not used in the average calculation, as data accuracy and collection methods were unknown (shaded cells).

Table B-5. Traffic Count Data and AADT Growth Rate - UDOT Roadways (2010-2012)

ROUTE NAME	BEG. MILEPOST	END MILEPOST	LOCATION DESCRIPTION	2012 AADT	2011 AADT	2010 AADT	2011-12 Growth	2010-11 Growth
SR-35	028.651	035.671	Road Right To West Fork Duchesne	385	365	335	5.5%	9.0%
SR-35	035.671	042.143	Tabby Lane (41824 West)	475	450	600	5.6%	-25.0%
SR-35	042.143	044.939	3750 North Tabiona	715	535	1,075	33.6%	-50.2%
SR-35	044.939	062.012	SR 208 - SR 87	515	490	445	5.1%	10.1%
US-40	057.959	062.007	Currant Creek Rd (Rt 3100)	3,745	3,780	3,615	-0.9%	4.6%
US-40	062.007	068.247	45000 West Fruitland	4,755	4,395	4,205	8.2%	4.5%
US-40	068.247	085.931	SR 208 39225 West	5,155	5,200	4,975	-0.9%	4.5%
US-40	085.931	086.524	SR 311 22220 West Duchesne	5,845	5,900	5,615	-0.9%	5.1%
US-40	086.524	086.894	SR 87 Center Street Duchesne	8,965	7,770	7,340	15.4%	5.9%
US-40	086.894	096.579	East River Road Duchesne	7,780	5,435	5,140	43.1%	5.7%
US-40	096.579	104.909	12000 West Road to Bridgeland	6,765	5,865	5,785	15.3%	1.4%
US-40	104.909	105.204	Main Street Myton	10,135	7,545	6,760	34.3%	11.6%
US-40	105.204	109.538	B Street (300 North) Myton	9,600	8,320	7,865	15.4%	5.8%
US-40	109.538	111.355	SR 87 (3000 South) Roosevelt	11,410	8,340	9,315	36.8%	-10.5%
US-40	111.355	114.576	2000 South Roosevelt	12,930	11,210	10,590	15.3%	5.9%
US-40	114.576	115.216	SR 121 SR 40 turns Right onto 200 North Roosevelt	18,565	16,090	15,205	15.4%	5.8%
US-40	115.216	117.415	Union Street Roosevelt	14,140	12,250	10,225	15.4%	19.8%
SR-87	000.000	000.660	US 40 Duchesne	4,110	4,190	4,205	-1.9%	-0.4%
SR-87	000.660	005.947	8750 South	2,835	2,890	2,900	-1.9%	-0.3%
SR-87	005.947	015.618	SR 35	1,530	710	715	115.5%	-0.7%
SR-87	015.618	018.635	3940 North Left to Mountain Home Route 1566	985	1,005	1,010	-2.0%	-0.5%
SR-87	018.635	020.946	18000 West Left to Boneta	1,345	1,370	1,405	-1.8%	-2.5%
SR-87	020.946	021.372	16000 West Left to Altonah	2,410	1,720	1,725	40.1%	-0.3%
SR-87	021.372	028.529	Center Street Altamont	1,245	1,270	1,275	-2.0%	-0.4%
SR-87	028.529	038.159	Upalco Center Street- SR 40 Southwest of Roosevelt	1,160	1,185	955	-2.1%	24.1%
SR-121	000.000	000.557	SR 40 200 North 200 East Roosevelt	7,320	7,460	7,485	-1.9%	-0.3%
SR-121	000.557	004.970	200 North RT turns North Roosevelt	4,590	4,550	2,760	0.9%	64.9%
SR-121	004.970	010.016	Road left to Cedarview (4000 North)	1,455	1,530	1,535	-4.9%	-0.3%
SR-121	010.016	013.013	Neola SR 121 turns East	1,315	1,340	1,345	-1.9%	-0.4%
US-191	259.076	294.537	Emma Park Road	530	540	545	-1.9%	-0.9%
US-191	294.537	294.847	400 South Duchesne - SR 40	2,710	900	900	201.1%	0.0%
SR-208	000.000	010.205	SR 40 - SR 35 Tabiona	335	345	345	-2.9%	0.0%
AVERAGE AADT GROWTH RATE:							3.6%	3.9%

Table B-6. Traffic Count Data and AADT Growth Rate - UDOT Roadways (2013-2023)

ROUTE NAME	BEG. MILEPOST	END MILEPOST	LOCATION DESCRIPTION	2023 AADT	2013 AADT	AVERAGE YEARLY GROWTH RATE
US-40	58.067	62.128	Currant Creek Rd via US 40 - 45000 W Fruitland	16000	3800	15.46%
US-40	62.128	68.384	45000 W Fruitland via US 40 - SR 208 to Tabiona	7000	4800	3.85%
US-40	68.384	86.119	SR 208 to Tabiona via US 40 - SR 311 Starvation Reservoir	7600	5200	3.87%
US-40	86.119	86.716	SR 311 Starvation Res via US 40 (Main St) - SR 87 Duchesne	12000	5900	7.36%
US-40	86.716	87.087	SR 87 (Center St) via US 40 (Main St) - East River Rd Duchesne	7600	9000	-1.68%
US-40	87.087	96.800	East River Rd Duchesne via US 40 - Bridgeland	6500	7900	-1.93%
US-40	96.800	105.150	Bridgeland via US 40 - Main St Myton	5600	6800	-1.92%
US-40	105.150	105.444	"Main St via US 40 - "B" St 300 N Myton"	8400	10000	-1.73%
US-40	105.444	109.712	"B" St (300 N) Myton via US 40 - SR 87 (3000 S) Roosevelt"	8000	9700	-1.91%
US-40	109.712	111.612	SR 87 (3000 S) via US 40 - 2000 S Roosevelt	9500	12000	-2.31%
US-40	111.612	114.829	2000 S via US 40 - SR 121 (200 N) Roosevelt *ATR* 425	11000	13000	-1.66%
US-40	114.829	115.470	SR 121 via US 40 (200 N) - Union St Roosevelt	15000	19000	-2.34%
SR-87	0.000	0.668	US 40 via SR 87 (Center St) - 8750 S (Hillside Ave) Duchesne	5700	4300	2.86%
SR-87	0.668	5.943	8750 S (Hillside Ave) via SR 87 (21615 W) - SR 35 to Tabiona	2600	2900	-1.09%
SR-87	5.943	15.601	SR 35 Tabiona via SR 87 - 21000 W to Mountain Home	2100	1600	2.76%
SR-87	15.601	18.614	21000 W to Mountain Home via SR 87 - 18000 W to Boneta	1400	1000	3.42%
SR-87	18.614	20.922	18000 W to Boneta via SR 87 - 16000 W Altamont	2200	1400	4.62%
SR-87	20.922	21.349	16000 W via SR 87 - 1st E Altamont	2900	2500	1.50%
SR-87	21.349	28.502	1st St Altamont via SR 87 - 1480 S (Center St) Upalco	1700	1300	2.72%
SR-87	28.502	38.087	Upalco 1480 S (Center St) via SR 87 - US 40	3000	1200	9.60%
SR-121	0.000	0.560	US 40 (200 E) via SR121 (200 N) – approx.. 450 W Roosevelt	10000	7600	2.78%
SR-121	4.957	9.987	Cedarview (4000 N) via SR 121 (2000 W) - 9000 N Neola	1800	1500	1.84%
SR-121	9.987	12.984	2000 W Neola via SR 121 (9000 N) - 1500 E	1800	1400	2.54%
US-191	259.156	294.746	Emma Park Rd via SR 191 - 400 S Fairgrounds Duchesne	2500	550	16.35%
US-191	294.746	295.065	400 S via SR 191 - SR 40 (Main St) Duchesne	2800	2800	0.00%
AVERAGE YEARLY AADT GROWTH RATE						2.62%

B.6. BRIDGE DATA & RATINGS

The TMP study did not include bridge evaluations; however, data was incorporated into the mapping, GIS, and project TIP list considerations. For reference, the data available for State tracked bridges as well as County bridges is included.

A map of the State tracked bridges is available at the following link:

<https://app.powerbigov.us/view?r=eyJrjoiNTliNzM1NDMtNDNFINS00NW11LWlxZTctOGJlZTZhYjE3YmZiliwidCI6ImFkZjY2ZWlyLWZjY2YtNDE3My1iZjQ0LTNmNzY3MzBhYTg5ZSJ9>

Table B-7. National-State Tracked Bridge Inventory

Structure Number	Location	County	Bridge Owner Category	Year Built	Scour Critical	Deck Width (FT)	Length (FT)	Condition
013001F	0.5 MILE SE. OF HANNA	Duchesne	County Hwy Agency	1965	No	12	62	Fair High
0V1695	4 MILES SW.of ROOSEVELT	Duchesne	State Highway Agency	2001	No	0	29.45	Fair High
0F 876	1.7 Mi NW of Duchesne	Duchesne	State Highway Agency	2019	No	37	83.3	Good
0F 690	10.7MI.EAST of DUCHESNE	Duchesne	State Highway Agency	2004	No	47.17	65	Fair High
0F 650	10 MILES NW. OF TABONIA	Duchesne	State Highway Agency	1998	No	34.83	83	Good
0F 382	SOUTH EDGE OF DUCHESNE	Duchesne	State Highway Agency	1976	No	38.5	90.19	Fair Low
0F 369	2 MILES WEST OF ALTAMONT	Duchesne	State Highway Agency	1974	No	36	83.83	Fair High
0F 265	WEST SIDE OF DUCHESNE	Duchesne	State Highway Agency	1971	No	51.29	158.02	Good
0F 209	7 MI.SOUTHEAST OF TABIONA	Duchesne	State Highway Agency	1967	No	30	82.69	Fair Low
0F 62	EAST SIDE OF DUCHESNE	Duchesne	State Highway Agency	1963	No	41.6	75.7	Fair High
0E2630	200 No. Main in Roosevelt	Duchesne	State Highway Agency	2011	No	0	25.45	Fair High
0E1293	10.0 MI EAST OF DUCHESNE	Duchesne	State Highway Agency	1963	No	0	31.12	Fair High
0E1140	1.7 MILES EAST OF NEOLA	Duchesne	State Highway Agency	1959	No	37	60.18	Fair High
0E1096	1.4 MILE NORTH OF MYTON	Duchesne	State Highway Agency	1958	No	0	28.02	Fair High
0E 966	13.8 MI.EAST OF DUCHESNE	Duchesne	State Highway Agency	1954	No	0	22.33	Good
0E 902	9.2 MI.NO.OF JCT. US-40	Duchesne	State Highway Agency	1951	No	0	22	Fair High
0D 592	4.5 MI.EAST of FRUITLAND	Duchesne	State Highway Agency	1959	No	38.17	67	Fair Low
0D 595	3.1 MI.EAST of FRUITLAND	Duchesne	State Highway Agency	1959	No	38.17	77.37	Fair Low
0D 588	NORTH SIDE OF DUCHESNE	Duchesne	State Highway Agency	1959	No	29	137.2	Fair High
0D 569	9.7 MI.NORTH OF JCT.US-40	Duchesne	State Highway Agency	1959	No	31.67	85	Fair Low
0D 561	16.2 MILES SE.OF TABIONA	Duchesne	State Highway Agency	1958	No	29	131.81	Fair Low
0D 525	1.6 MILE NO. OF ROOSEVELT	Duchesne	State Highway Agency	1950	No	32.17	46.75	Fair High
0C 794	NORTH SIDE OF MYTON	Duchesne	State Highway Agency	1996	No	65.18	163.49	Fair High
0C 560	5 MILES WEST OF DUCHESNE	Duchesne	State Highway Agency	1969	No	43.5	1,641.30	Fair Low

Structure Number	Location	County	Bridge Owner Category	Year Built	Scour Critical	Deck Width (FT)	Length (FT)	Condition
0C 259	1.8 MILE WEST OF ALTAMONT	Duchesne	State Highway Agency	1949	No	30.67	44.17	Fair Low
013078C	7 MILES SW. OF TALMAGE	Duchesne	County Hwy Agency	1952	No	22	60.8	Good
013077C	18 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	2016	No	24	55	Fair High
013076C	1.5 MI. SE. OF BRIDGELAND	Duchesne	County Hwy Agency	1985	No	26	35.67	Fair High
013075E	300 N over Cottonwood Crk	Duchesne	City/Municipal Hwy Agency	2016	No	0	24.17	Good
013073C	Over Duchesne River	Duchesne	County Hwy Agency	2017	No	28.83	124	Good
013072F	38250 W over Duchesne Riv	Duchesne	County Hwy Agency	2017	No	28.83	72.51	Good
013069C	1500 N. 14300 W.	Duchesne	County Hwy Agency	2010	No	22.25	50.5	Fair High
013068F	12 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	2008	No	32.5	75.85	Fair High
013067A	IN HANNA	Duchesne	County Hwy Agency	1952	No	16.08	48	Poor
013065C	1 MILE NW. OF ALTAMONT	Duchesne	County Hwy Agency	1986	No	25.17	23.65	Fair Low
013063C	RED CREEK CYN.1 MI.S.SR40	Duchesne	County Hwy Agency	1977	No	24.4	25.17	Fair Low
013058F	IN BRIDGELAND	Duchesne	County Hwy Agency	2006	No	37.16	123.33	Fair High
013055F	4 MILES NW. OF MYTON	Duchesne	County Hwy Agency	2007	No	37.5	108.9	Fair High
013054F	7 MILES NO. OF BRIDGELAND	Duchesne	County Hwy Agency	2008	No	37.16	236.56	Fair High
013053F	5 MILES NORTH OF DUCHESNE	Duchesne	County Hwy Agency	1966	No	24	81	Fair Low
013052C	EAST END OF MAIN ST	Duchesne	City/Municipal Hwy Agency	1985	No	35	126.83	Fair High
013051F	SO. SIDE OF DUCHESNE CITY	Duchesne	City/Municipal Hwy Agency	2008	No	37.16	60.19	Good
013047F	8 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	1972	No	22.7	133.7	Fair Low

Structure Number	Location	County	Bridge Owner Category	Year Built	Scour Critical	Deck Width (FT)	Length (FT)	Condition
013046F	9 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	1998	No	30.7	85	Good
013045F	9.5 MILE WEST OF DUCHESNE	Duchesne	County Hwy Agency	1998	No	30.7	85	Good
013044F	10.5 MILES W. OF DUCHESNE	Duchesne	County Hwy Agency	1998	No	30.7	85	Good
013043F	13 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	2002	No	30.7	73	Good
013042F	14 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	2002	No	30.7	108	Good
013041F	15 Mi. W, of Duchesne	Duchesne	County Hwy Agency	2002	No	30.6	73.5	Good
013036F	24.6 MI. WEST OF DUCHESNE	Duchesne	County Hwy Agency	1981	Yes	31.98	42.33	Good
013040F	16 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	2002	No	30.7	81	Good
013035V	24 MILES WEST OF DUCHESNE	Duchesne	County Hwy Agency	1981	Yes	0	28.58	Fair High
013030C	2 MILES NW. OF NEOLA	Duchesne	County Hwy Agency	1945	No	24	24.5	Fair Low
013031C	3 MILES SW. OF FRUITLAND	Duchesne	County Hwy Agency	1999	No	24	77	Fair Low
013023C	3.5 MILES NW. OF UPALCO	Duchesne	County Hwy Agency	1999	No	24.17	45	Fair Low
013021C	2 MILES NW. OF ALTAMONT	Duchesne	County Hwy Agency	1995	No	19.3	26.5	Fair Low
013022C	2050 N. 15000 W., UPALCO	Duchesne	County Hwy Agency	2002	No	25.67	48	Fair Low
013020C	1.5 MILES NW. OF ALTONAH	Duchesne	County Hwy Agency	1989	No	23	25	Fair Low
013019F	2.5 MILES WEST OF ALTONAH	Duchesne	County Hwy Agency	1992	Yes	20	61	Fair High
013018C	3 MILES SW. OF ALTONAH	Duchesne	County Hwy Agency	1999	Yes	24	25.6	Poor
013017E	1 MILE NO. OF BRIDGELAND	Duchesne	County Hwy Agency	1993	No	0	24.16	Fair High
013016F	3.5 MI. NE. MOUNTAIN HOME	Duchesne	County Hwy Agency	1985	Yes	22	60.92	Fair Low
013015C	4.5 MI.N.OF MOUNTAIN HOME	Duchesne	County Hwy Agency	1955	No	14.2	72	Fair High
013014D	3 MILES WEST OF ALTONAH	Duchesne	County Hwy Agency	1999	Yes	29.33	23.6	Fair Low
013007C	1 MILE SE. OF TABIONA	Duchesne	County Hwy Agency	1942	Yes	18	50	Poor
013006F	WEST OF TABIONA	Duchesne	County Hwy Agency	1968	No	18.16	62	Fair Low
013002F	1.5 MILE SE. OF HANNA	Duchesne	County Hwy Agency	1965	Yes	12	62	Fair Low
013003F	3 MILES NW. OF TABIONA	Duchesne	County Hwy Agency	1978	No	30	42	Fair High

Table B-8. County Tracked Bridge Inventory

County Road #	Location	L x W [ft]	Year Built	Footers	Beams	Deck	Cost	Notes	Latitude	Longitude
12	38730 W 5580 N, Tabiona	19 x 16		Concrete	Wood	Wood	\$ 14,250		40.382482	-110.729160
115	.2 Miles W of 18000 W 7000 N, Altonah	13 x 32			Precast		\$ 30,000		40.401994	-110.335552
118	S of 18000 W 7000 N, Altonah	19 x 19		Concrete	Steel	Steel	\$ 19,000		40.401632	-110.331889
129	.2 Miles S of 17000 W 7000 N, Altonah	19 x 17		Concrete	Wood	Wood	\$ 14,250		40.39904	-110.312984
310	.1 Miles S of 16500 W 8000 N, Altonah	18 x 17		Wood	Wood	Wood	\$ 13,500		40.41464	-110.303395
184	2 Miles N of 16000 W 8000 N, Altonah	20 x 16		Concrete	Steel	Steel	\$ 15,000	Replaced deck in 2011	40.442384	-110.304364
121	S of 16000 W 8000 N, Altonah	18 x 21		Concrete	Steel	Steel	\$ 18,000		40.415944	-110.29389
120	.1 Miles E of 16000 W 8000 N, Altonah			Concrete Arch Culvert			\$ 16,000	Replaced bridge	40.417102	-110.29102
123	15000 W 6000 N, Altonah	17 x 24		Concrete	Steel	Steel	\$ 17,000		40.388439	-110.2751
131	S of 15480 W 3000 N, Upalco	26 x 17		Steel	Steel	Steel	\$ 26,000		40.344134	-110.284572
132	W of 15480 W 3000 N, Mt Emmons	19 x 14		Concrete	Wood	Wood	\$ 14,250	Decking replaced Fall 07	40.344818	-110.285285
311	.4 Miles S of 10000 W 1740 S, Upalco	18 x 22	2004	Concrete	Steel	Steel	\$ 18,000		40.276732	-110.180795
33	1 Mile S of 5400 W 11350 S, Pleasant Valley	18 x 34			Precast		\$ 35,000		40.125437	-110.080386
72	.2 Miles S of 5000 W 7000 S, Myton	18 x 18		Concrete	Steel	Steel	\$ 18,000		40.197847	-110.085921
92	S of Guy Taylor residence, Utahn 4785 S River Road	18 x 32	2004		Precast		\$ 34,712		40.230182	-110.408218
44	Hunky Dugway, 3000 W 9000 S	17 x 24	2005	Concrete	Steel	Steel	\$ 18,000		40.171855	-110.048023
68	Arcadia, Stan Keller, 9000 W 6230 S	18 x 20	2005	Concrete	Steel	Steel	\$ 18,000		40.210845	-110.161644

B.7. LEVEL OF SERVICE ANALYSIS

The 2017 Transportation master plan calculated the Level of Service (LOS) for Duchesne County roadways by comparing the traffic count data for each roadway counted and comparing the volume with the capacity based on the “Principles of Highway Engineering and Traffic Analysis” manual for passenger cars per hour per lane. The table below shows the relationship between free flow speed and capacity.

Table B-9. Free-Flow Speed Capacity for Roadways

Free Flow Speed	Capacity/hr	Capacity/day
45 mi/h	2150	51,600
50 mi/h	2200	52,800
55 mi/h	2250	54,000

Using the capacity ratios above and a growth rate of 4% to year 2033, all of the Volume/Capacity (V/C) ratios were in the “A” LOS rating (see Table B-10 below). While local congestion and lower levels of service may be experienced at local and State highway intersections, the volumes on Duchesne County roads are under capacity in regards to LOS.

Table B-10. Level of Service Analysis of Duchesne County Roadways

Road Segment	Count CV#	2013 ADT	V/C Ratio [45 mi/h]	2033 ADT	2033 V/C Ratio	LOS
2000 W	CV1	726	0.70%	1590	1.54%	A
3000 W	CV2	726	0.70%	1590	1.54%	A
4000 N	CV3	795	0.77%	1743	1.69%	A
6250 S	CV4	861	0.83%	1885	1.83%	A
6450 S	CV5	299	0.29%	655	0.63%	A
9000 N	CV6	496	0.48%	1087	1.05%	A
12000 W #1	CV7	491	0.48%	1075	1.04%	A
12000 W #2	CV8	277	0.27%	607	0.59%	A
12000 W #3	CV9	754	0.73%	1652	1.60%	A
16000 W	CV10	364	0.35%	798	0.77%	A
21000 W	CV11	323	0.31%	709	0.69%	A
Antelope Canyon Rd	CV12	595	0.58%	1303	1.26%	A
Bluebell Rd - 1	CV13	1,211	1.17%	2653	2.57%	A
Bluebell Rd - 2	CV14	1,659	1.61%	3636	3.52%	A
Bluebell Rd - 3	CV15	1,191	1.15%	2609	2.53%	A
Bluebell Rd - 4	CV16	1,242	1.20%	2722	2.64%	A
East River Rd	CV18	602	0.58%	1319	1.28%	A
Hancock Cove Road	CV19	940	0.91%	2060	2.00%	A
Lake Boreham Rd	CV20	289	0.28%	633	0.61%	A
Moon Lake Rd	CV21	33	0.03%	73	0.07%	A
South Cove Road	CV22	1,694	1.64%	3712	3.60%	A
3000 West	CV23	1,394	1.35%	3054	2.96%	A
Strawberry River Road	CV24	330	0.32%	723	0.70%	A
Uintah Canyon Road	CV25	64	0.06%	140	0.14%	A
CR-33 - 2	CV26	2,622	2.54%	5744	5.57%	A
Lake Boreham #1	CV29	183	0.18%	402	0.39%	A
6000 West	CV31	203	0.20%	445	0.43%	A
Red Creek Road	CV32	54	0.05%	118	0.11%	A

During the 2024 transportation master plan update, the level of service was calculated using an updated method from the *Highway Capacity Manual 6th Edition* from the National Academy of Sciences. This method takes into account the peak hour traffic, number of heavy vehicles, lane and shoulder widths, and the availability of passing zones. The level of service for these roads was forecasted 5, 10, 15, and 20 years into the future (see Table B-11). All roads were projected to operate at a level of service of C or higher through the year 2044, which is considered acceptable.

Table B-11. Updated LOS Information

Road	County Road #	Description	2024 ADT	Total % Trucks	LOS 2024	LOS 2029	LOS 2034	LOS 2039	LOS 2044
15000 West	CR 120	15000 West North of Altamont	141	11.7	A	A	A	A	A
3000 West	CR 44	3000 West Near 8000 South	78	3.2	A	A	A	A	A
3000 West	CR 163	3000 West North of 4000 North	416	7.1	A	A	A	A	A
3000 West	CR 154	3000 West North of Bluebell Road	1005	10	A	A	A	A	A
3000 West	CR 152	3000 West North of Roosevelt Airport	1661	13.9	A	A	B	B	B
3000 West	CR 154	3000 West North of S Cove Road	2475	6.1	A	B	B	B	B
3000 West	CR 152	3000 West Near Roosevelt Airport	1894	13.6	A	A	A	B	B
3000 West	CR 152	3000 West South of S Cove Road	1777	13.6	A	A	A	B	B
5000 South	-	5000 South Near SR 87	270	10.6	A	A	A	A	A
5000 South	CR 49	5000 South South of Roosevelt	218	9.5	A	A	A	A	A
6000 West	CR 158	6000 West Monarch	241	14.6	A	A	A	A	A
4000 North	CR 158	4000 North Near 3000 West	1014	6.2	A	A	B	B	B
7000 North	CR 115	7000 North West of Altonah	347	7.9	A	A	A	A	A
12000 West	CR 80	12000 West Near SR 87	1185	16.8	A	A	A	A	A
12000 West	CR 80	12000 West Arcadia	905	25.3	A	A	A	A	A
12000 West	CR 137	12000 West North of Upalco	672	14.7	A	A	A	A	A
12000 West	CR 137	12000 West South of Bluebell	426	9.6	A	A	A	A	A
Bluebell Road	CR 142	Bluebell Road Near 3000 West	1100	8.5	B	B	B	B	C
Bluebell Road	CR 142	Bluebell Road East of Bluebell	1139	5.9	A	A	B	B	B
Cobble Hollow	CR 55	Cobble Hollow Drive	344	15.4	A	A	A	A	A
E River Road	CR 79	E River Road	625	3.5	A	A	A	A	A
Mortensen	CR 52	Mortensen Lane	205	5.9	A	A	A	A	A
N Crescent	CR 176	N Crescent Road	937	3.3	A	A	A	A	A
S Myton Road	CR 43	S Myton Road	378	8.7	A	A	A	A	A
State Street	CR 54	State Street South of Roosevelt	1228	6.4	A	A	A	A	A
W Pole Line	CR 56W	W Pole Line Road South of Airport	1031	13.4	A	A	A	A	A
3000 West	CR 152	3000 West East of Airport	2664	15.6	A	B	B	B	C
4000 West	CR 57	4000 West Near Dry Gulch Creek	284	13.3	A	A	A	A	A
6250 South	CR 64	6250 South North of Myton	551	30.6	A	A	A	A	A
9000 North	CR 158	9000 North West of Neola	377	19.9	A	A	A	A	A
10000 South	CR 37	10000 South West of 3000 West	258	15.2	A	A	A	A	A
Antelope Canyon Road	CR 27	Antelope Canyon Road	284	17.8	A	A	A	A	A
Indian Highway	CR 46	Indian Highway Near County Line	399	19.7	A	A	A	A	A
Pariette Road	CR 33	Pariette Road Near Four Point Resources Field Office	850	14.3	A	A	A	A	B
Wells Draw Road	CR 32	Wells Draw Road South of 10000 South	323	15.7	A	A	A	A	A
Nine Mile Canyon	CR 240	Nine Mile Canyon Road West of Gate Canyon	49	11.4	A	A	A	A	A
Wells Draw	CR 32	Wells Draw South of Five Mile Draw	58	6.9	A	A	A	A	A
Wells Draw	CR 32	Wells Draw North of Five Mile Draw	56	8.8	A	A	A	A	A
Wells Draw	CR 32	Wells Draw at Nine Mile Canyon	46	12.2	A	A	A	A	A

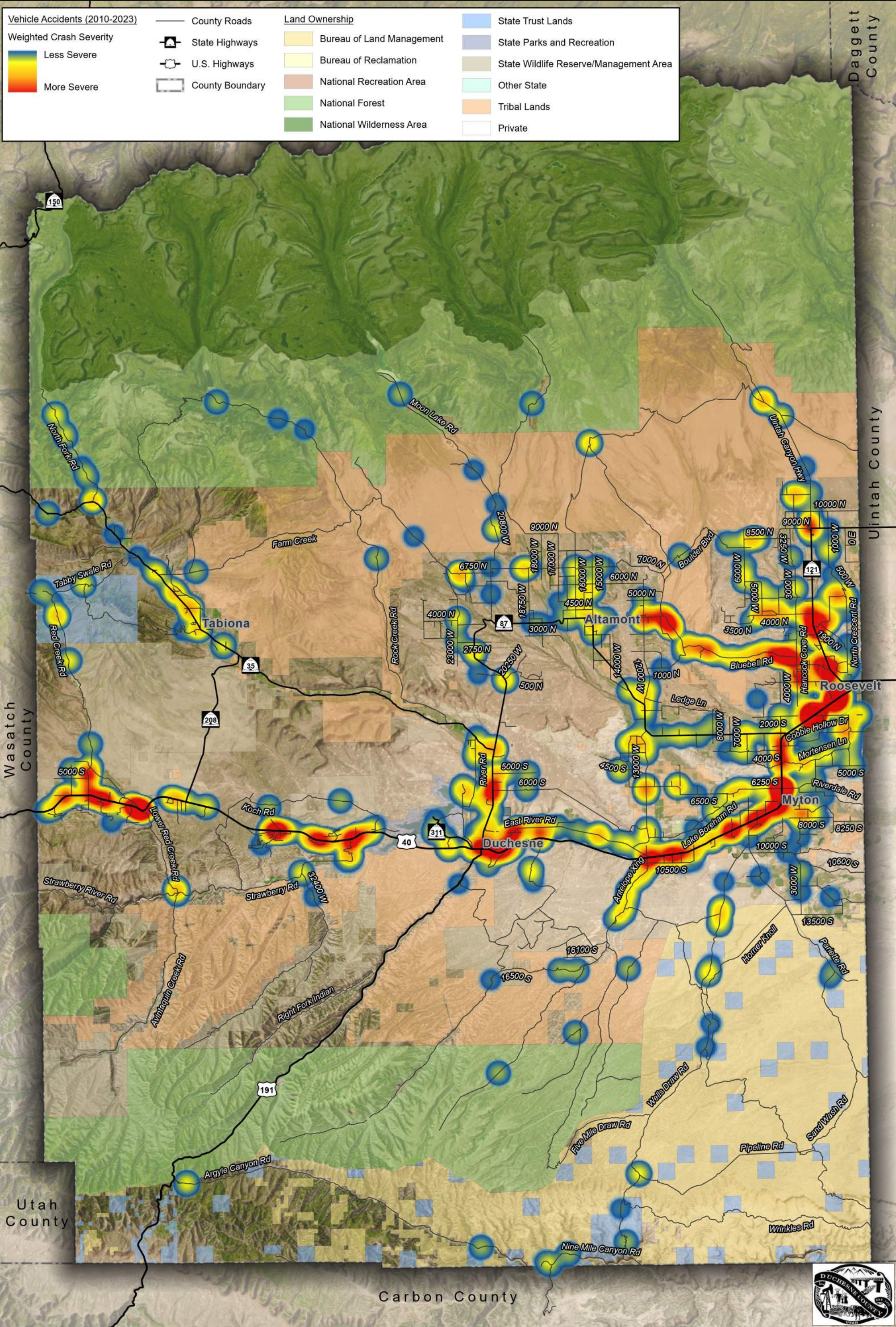
Road	County Road #	Description	ADT	Total % Trucks	LOS 2024	LOS 2029	LOS 2034	LOS 2039	LOS 2044
Antelope Crossing	CR 27	Antelope Crossing North of BLM Fence Road	228	14.3	A	A	A	A	A
Antelope Crossing	CR 27	Antelope Crossing at Gray Mountain Canal	248	14.6	A	A	A	A	A
6500 S	CR 64	6500 S at Pahcease Canal	653	57.1	A	A	A	A	A
8000 W	CR 148	S 8000 W North of Ioka Lane	223	9.7	A	A	A	A	A
S Cove Road	CR 154	S Cove Road East of 3000 W	1525	3.2	A	A	A	A	B
N Cove Road	CR 156	N Cove Road East of 3000 W	1370	3.8	A	A	A	A	A

APPENDIX C. ACCIDENT REPORTS, SAFETY CONCERNS, AND FEEDBACK

C.1. ACCIDENT DATA

Due to the large amount of accident data that has been collected by first responders, a process was created and used to reduce the number of accidents included in the analysis. Accidents within the boundaries of Duchesne City, Roosevelt City, and other smaller towns in Duchesne County were removed from the analysis, as were accidents on state highways that were more than 1000 feet from the nearest county road. Maps C-1 and C-2 showcase this data. Map C-1 is a classic heat map which shows accident density within the county. For the creation of this map, fatal accidents were weighted at 4 times the value of an accident with a possible injury. A major injury was weighted at 3 times the value of an accident with a possible injury and a minor injury was weighted at 2 times the value of a possible injury. Accidents which led to no injury were removed from the analysis. Map C-2 shows the locations of all accidents which resulted or possibly resulted in some level of injury.

C.2. MAP C-1 ACCIDENT DATA HEAT MAP



Vehicle Accidents (2010-2023)	— County Roads	Land Ownership	State Trust Lands
Weighted Crash Severity	State Highways	Bureau of Land Management	State Parks and Recreation
Less Severe	U.S. Highways	Bureau of Reclamation	State Wildlife Reserve/Management Area
More Severe	County Boundary	National Recreation Area	Other State
		National Forest	Tribal Lands
		National Wilderness Area	Private

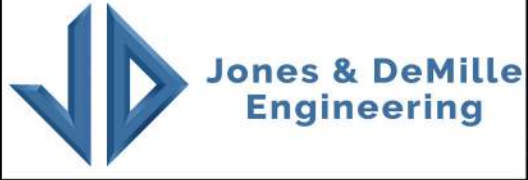
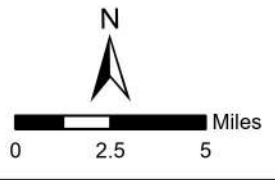
Wasatch County

Daggett County

Uintah County

Utah County

Carbon County



Duchesne County

2024 Transportation Master Plan
Vehicle Accident Overview - Weighted Crash Severity

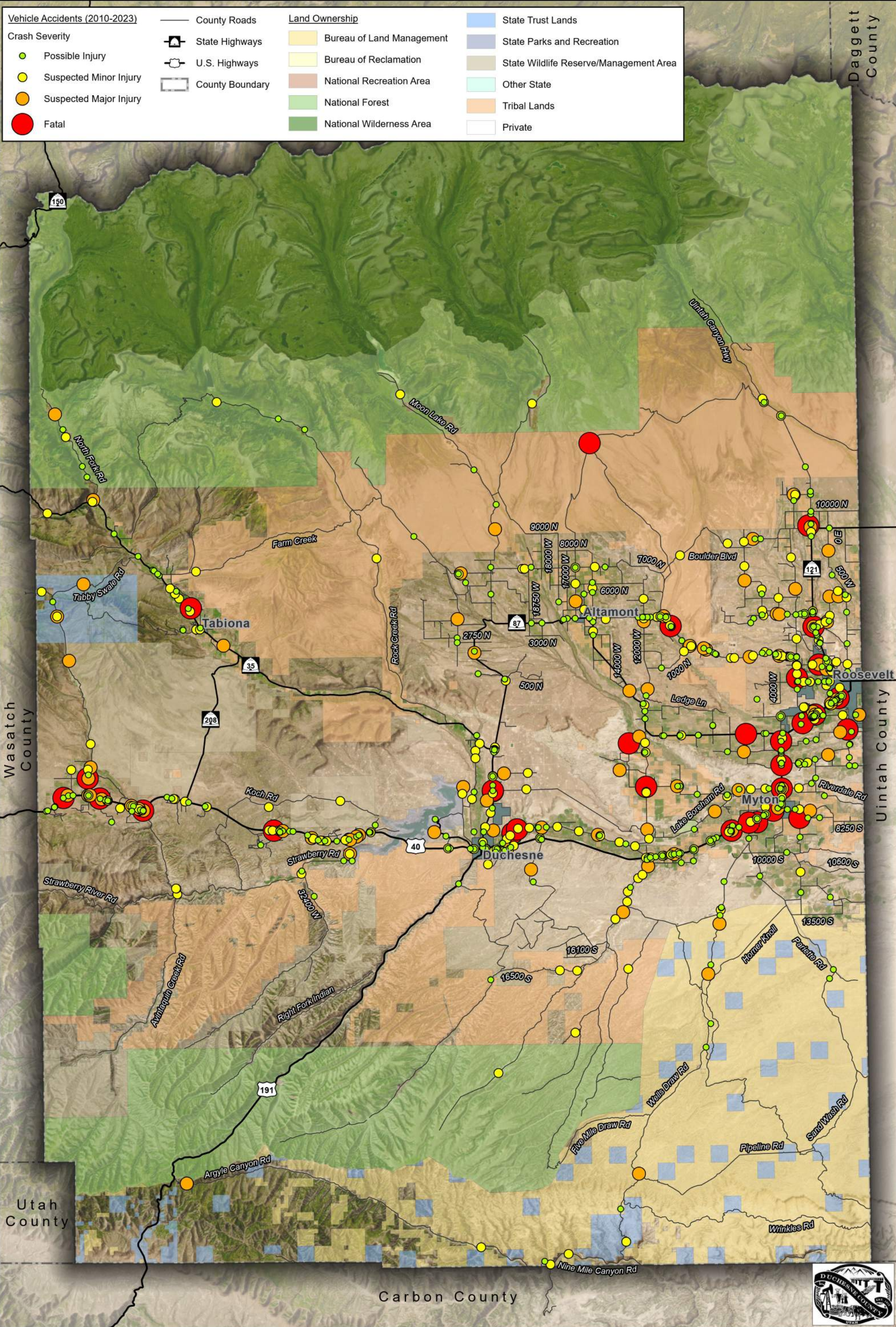
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 Project Number: 2311-030 Drawn by: JEM 10-24 Last Edit: 02/04/2025

Duchesne County, Utah

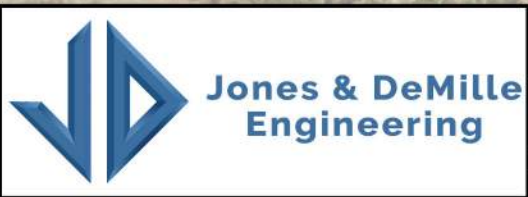
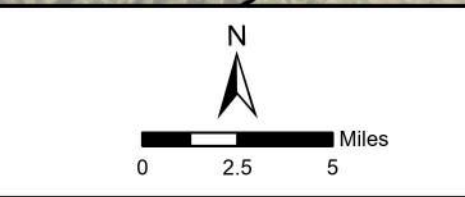
Scale: 1" = 5 miles

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C.3. MAP C-2 ACCIDENT LOCATIONS



Vehicle Accidents (2010-2023)		Land Ownership	
Crash Severity		County Roads	State Trust Lands
● Possible Injury	State Highways	Bureau of Land Management	State Parks and Recreation
● Suspected Minor Injury	U.S. Highways	Bureau of Reclamation	State Wildlife Reserve/Management Area
● Suspected Major Injury	County Boundary	National Recreation Area	Other State
● Fatal		National Forest	Tribal Lands
		National Wilderness Area	Private



Duchesne County

2024 Transportation Master Plan
Vehicle Accident Overview - Crash Severity

Map Name: H:\JD\Proj\2311-030\GIS\Projects\2311-030_Design\2311-030_Design.aprx - Duchesne County - TMP - Current Conditions - Vehicle Accidents - Crash Severity 11x17P
 Project Number: 2311-030 Drawn by: JEM 10-24 Last Edit: 02/04/2025

Duchesne County, Utah

Scale: 1" = 5 miles

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C.4. ROADWAY SAFETY CONCERNS

The following areas (see Table C-1) were pinpointed with safety concerns during meetings with safety committee members, with minutes included below. These meetings were held in 2013. Areas that were discussed which have been addressed include an asterisk (*) after the name of the location. Many of the areas discussed still pose some threat to the safety of the residents of Duchesne County and the traveling public.

Table C-1. Roadway Safety Concern Areas

County Road #	Safety Concern Area	Safety Concern	Proposed Action	Associated County Project
CR 27	Antelope Canyon Road	Canal crossing area and bends have problems	Realignment, geometry	Antelope Canyon Road
CR 64; CR 49	Arcadia Dump Road*	Trucks on narrow road and junction	Intersection, widen	6250 South Arcadia Road; 6250 South US 40 to 2000 West
CR 64	Arcadia Road	Drivers leaving road	Realignment, geometry	Arcadia Road 12000 West to Lake Boreham Road
CR 104	Big Hollow	Trees and poor sight on curve by intersection	Realignment, tree removal	N/A
CR 142	Bluebell Road - Bluebell and Roosevelt	Potholes, flat turn, crashes west of houses	Reconstruction, repair	Bluebell Connector Phase III (Jenkins Draw to Hancock Cove)
CR 176	Dye Dugway - North Crescent Road*	Alternate emergency route	Completed 2013	Old Dye Dugway Road
CR 32	Gate Canyon*	Geometry issues and roadway condition	Reconstruction	Wells Draw Road
CR 142	Jenkins Draw - Bluebell Road	Weather issues, close guardrail	Widen and increase radius bend	Bluebell Connector Phase II (Bluebell Store to Jenkins Draw)
CR 156	North Cove Road	Hard to enforce speed, steep shoulder	Shoulder, speed	N/A
CR 95	Rock Creek Road/Tommy Hollow*	Potholes, poor condition, losing camp trailers	Reconstruction	Towanta Flat Road
CR 14	Strawberry River Road*	Curves need realignment	Completed 2013	Strawberry River Road

C.4.1. ROADWAY SAFETY INVENTORY MEETING MINUTES

February 7, 2013 at Duchesne County Administration Building – Conference Room

In Attendance:

- Mike Lefler – Duchesne County Emergency Management
- Sherriff Travis Mitchell - Duchesne County Sheriff's Dept.
- Von Johnson – EMS Coordinator – Uintah Basin Medical Center
- Lt. Jeff Chugg - Utah Highway Patrol
- Michael Hawley & Eric Major - Jones & DeMille Engineering

Meeting Goals:

- Identify locations and roadways with historical accidents
 - Highlight areas on maps of concern
 - Incorporate discussion and findings in Master Plan
-

Summary of Findings:

Discussion began on areas of accidents and access problems with comments noted on maps and minutes.

Dye Dugway to Neola from North Crescent Road discussed as a route for emergency vehicles to homes in that area. Alternate route if Highway 121 was blocked would likely be to the west of SR 121 and not Dye Dugway unless improvement project occurs. **(Alternate Route Constructed 2013)**

Bluebell Road – Jenkins Draw area a problem area, with bend and wintertime conditions, close guardrail and shaded areas.

Bluebell Road – Flat turn has caused crashes and problems, geometry issues and cross slope/super elevation

Bluebell Road – Pothole areas going downhill and turn at bottom of grade also a problem area

North Cove Road – Roadway is narrow, very steep shoulder in some areas, and very hard to patrol, speed enforcement is a problem

Pariette Road (CR #33) – Turning lanes from Highway 40 and onto Highway 40, will be addressed with UDOT and SSD#2 project **(completed Summer 2013)**

Antelope Canyon Road Intersection with HWY 40 – needs turn lanes and/or widening onto highway as trucks need to swing wide and go into travel lane

Antelope Canyon Road – canal area crossings and bends there have had some problems

Pariette Road (CR33) – Blind hill by canal, **(addressed in CR33 Reconstruction Project in 2013)**

Arcadia dump road – 4 way junction, trucks coming onto very narrow road

Arcadia road sharp bends, drunk driver catcher and many accidents there

Gate canyon – conditions, to be addressed in future project

Strawberry River Road – old concave guardrail along S curve area, bends and turns near Highway have historic problems, straighten **(completed 2013)**

Roads near Lower Red Creek – Berry Petroleum looking at increased development of the area and road conditions are poor, turnouts are narrow. Concern with gravel roads coming onto the highway, Mike Lefler to meet with Berry Petroleum and discuss areas of development and routes

Indian Canyon – Sowers Canyon Road – No turn lane on SR-191, increased traffic will hold up highway traffic

Big Hollow – intersection of 3750 North onto SR87, need for improved sight distance, either re-alignment of intersection, cutting slope and removing trees to see oncoming traffic

SR35 – Wolf Creek curves coming down and majority of crashes in this area are a concern

SR35-SR208 intersection – Cannot see to the east from SR208 looking onto SR35

Rock Creek Road – Tommy Hollow area on Tribal Ground, hill is starting to sink and camp trailers have been lost there, will continue to increase in accidents without geometry and surfacing improvements. Cattle guard on this road on tribal boundary needs attention

Fruitland Area – Oil growth there and blind corners on road going South (Sundowner Ridge)

Mike Lefler expressed need for HAZMAT purposes to identify areas of waterways near to travelled areas with industrial hauling. Increased chances of spills may warrant onsite deployment booms for cleanup, as utilized in Duchesne River and Strawberry River.

C.4.2. DEPUTY HARRISON FEEDBACK ON COUNTY ROADWAYS

County Road Truck Route Information

For the month of February, I was given the task of checking for county roads that commercial vehicles should not have access to or should not use or travel on. In the month I was able to locate several county roads especially on the East side of the county that commercial vehicles should not have access without special permission or a reason to use the road. There are so many roads in the county that I tried to limit the time I spent on these roads and which ones I should look at and see if there currently is any commercial traffic on these roads. I started with the most common roads. There are a lot of roads not covered in this report. I tried to limit which roads I checked; roads that I knew need assessing and roads that can be limited or closed. Some of the roads will have to have complete access and can't be limited to one direction or another. These roads were not listed on this report. I am also sure that I have

some roads I have missed. I will continue to track roads as I work and try to build upon this report. But for purposes of this report I listed the main roads or roads I have received complaints on or information.

1. North Cove Road or 1000 North in Hancock Cove
 - a. From SR 121 to 3000 West there is only one oil location that I see that was in use. It is my proposal that no commercial vehicles be allowed on this road except to access this site. Further suggestion that all commercial traffic that needs to access this location should access it from 3000 West only and leave the same way it was accessed. The reason for this suggestion is that there are numerous commercial vehicles using 3000 west and South Cove Road going to Bluebell highway and the Cedar View area. There is no reason for traffic to access this location from two separate directions. I also have not observed many vehicles going in and out of the oil well location on this road. Most of the traffic I observed was traveling through to 3000 West from 121. It is my suggestion that 1000 North in the cove be limited access only. This road is too small and unsafe to allow commercial vehicles on it.
2. North Crescent Road
 - a. There is a water disposal facility on the Hwy-121 side of North Crescent Road and two oil well locations on the 0 East sides of North Crescent Road. This is a much harder road to determine what way it should be accessed. Due to the fact that there are two locations, on the main side of the road. I believe that the use of this road is going to be hard to contain to one way in and one way out. I believe that it would be good if no commercial vehicles travel on 3000 North to access North Crescent. They should either access from State Street or SR-121. Try to limit how they access may contain some damages to at least a smaller area.
3. 2750 North or Sharmel Acres
 - a. I have received several complaints about this road and commercial vehicle use. There is one location located on this road and it is just off of 3000 West. This road is small and being damaged severely by the commercial traffic on the road. The corner at the end could be dangerous for a vehicle and a commercial vehicle at the same time.
 - b. This road is a smaller two lane with not enough room for both a commercial vehicle and a private vehicle to pass on it. It is suggested that this road be closed completely to commercial vehicles from 121 to approximately 2800 West. The access should be from 3000 West to limit the damage to one side of the road. If at all possible this road should be closed completely to commercial vehicles without permit.
4. Cobble Hollow Drive or North Myton Bench Road
 - a. I checked this road and could not see a reason that all truck traffic could not access it from Highway 40. I was able to locate at least one oil location on this road in operation. This location is located a mile from Highway 40. Access at a minimum should be limited to from Highway 40 only.
5. Mortensen Lane onto South State Street or 0 East
 - a. From Highway 40 to South State Street this area is mainly housing and it is a small narrow road. Trucks should not be allowed on this road from Highway 40 sides to State Street. The trucks should access anything from 6250 South or the old dump road. This road is small but the private traffic is a lot lighter than on Mortensen Lane. There are fewer homes on this section of the road. All locations in this area can be accessed from the old dump road. It also is unsafe

for trucks to be turning off of Highway 40 onto this road there is no turning lane and it may cause an accident.

6. 4000 West from SR 87 to 2000 South

- a. This road has no reason for trucks to be on it. I have found on this road that trucks are using it to avoid the main roads.

7. 4000 South west of Highway 40 (Lemon Bench Road)

- a. Trucks will need to access this road. But they should only do so from Highway 40 and not from SR 87. This includes three roads that should not have trucks on them and they are, 5000 West, 6000 West, and 7000 West. The main access should be from Highway 40.

8. Lake Boreham Road

- a. Trucks will need access to this road there are several locations on this road from Highway 40 to the Dam of the lake. But from 6500 South and 7000 West approximately, the trucks should be limited to access. The road is too small for large vehicles and has many small turns that could present a problem to the public and commercial vehicle alike. I did find a location that was in use in the 7000 West to 12000 West areas. It is proposed that the trucks access this location from 12000 West. This area may be difficult to manage due to the fact that there are so many locations in it. But it will help in keeping damages down when vehicles access the locations from one direction.

9. South Myton Road

- a. This road is basically Center Street in Myton, it goes south to the Pleasant Valley road. I drove the road and found that I could not find an oil location on this road from Myton to the Pleasant Valley road or 10000 South. The problem with this road is it again is small and narrow, also there is a dug way on this road that could present a problem in the winter and for two commercial vehicles passing at the same time. I believe that this road should be shut down completely to commercial vehicles. If any access is needed they can access from 10000 South to the north.

10. Hunky Dugway

- a. Myton City has already put a no "commercial vehicles allowed" sign on this road. I agree with this idea. This road is too small for the access of commercial vehicles and there is no reason that they should not access the gravel pit from 10000 South. There are no locations on this road as far as I could find. All the commercial traffic on this road is trying to access the gravel pit located at 10000 South and this road. All vehicles should access this gravel pit from 10000 South. This road also has a dug way and it is too narrow for two vehicles to pass if one is a commercial vehicle. The corners on it are blind and it is too unsafe to allow traffic on it. This road I have had several complaints on as well.

11. Old River Road Duchesne City to SR 35

- a. There are no oil locations on this road. Due to that fact this road should be closed to commercial traffic.

12. East River Road

- a. This road is a larger road and can accommodate commercial traffic. I know of

only one oil location. It is a populated road and I believe that this road should be closed in most part, to commercial traffic. Most traffic using this road can use Highway 40, a road more capable of handling the traffic that will be using the road. A lot of the traffic on this road, use it to avoid the major traffic but, with Highway 40 so close to this road and taking the same route, it should be closed to through commercial traffic. The traffic on this road can access the shop for certain companies that are based on this road, but they can access this road from the Duchesne City side of the road and limit their access to that side only.

13. Strawberry River Road

- a. This road is a road that needs access to it for Oilfield traffic. The only drawback to this road is the dugway leading to the road. The dugway is narrow and unsafe.

This report includes most of the roads that can be high traffic commercial roads. There are a few that are not listed and still need to be looked at. This will be an ongoing investigation and report. For this point in time this report covers the major roads that are complained about and used.

Deputy J. Harrison

SCHOOL BUS DRIVER FEEBACK

Glen Simkins, the Transportation Coordinator for the Duchesne County School District had the following concerns during a meeting in February 2013:

- Major problem of access by Kings Peak Elementary in Roosevelt (Roosevelt City Jurisdiction)
- Expressed need for more bus turnouts, with room for parents to park as routes consolidate and more students required to come to the main road that the bus will take
- Hwy 40 and Poleline Road/Airport road dangerous and difficult intersections to pull in and out.
- Hwy 40 near Myton at bottom of hill has an area with no left turn lane, and students are getting dropped off on the side of the Highway, with bus stopping Hwy 40 traffic.

Glen distributed surveys to get locations of problems for bus routes and bus drivers. Table C-2 below summarizes their comments:

Table C-2. School Bus Driver Feedback

Roadway/Address	Proposed Action/Comment
Sandhill road	None - General Maintenance
Fruitland Bus Garage Road	Needs pavement, or at least gravel by doorways
45000 West 5000 South Fruitland	Pave Road
Old Hwy 40 Through Pinon Ridge	Potholes
Access to and roads inside Vonsville Sub	Road graded, Potholes filled, Repaved
6000 West Hwy 40	Potholes
7500 South	Potholes
6500 West Hwy 40	Extreme Heavy Truck damage
7000 West Hwy 40	Potholes
6250 S Hwy 40 to 6250 S 6400 W	Road is falling apart due to heavy oilfield traffic
3000 W 1500 N	Intersection-remove cement barriers/fix bottle neck
3000 W 2500 N	Straighten 2500 N to move intersection away from blind hill
Bluebell Hwy	Fix rough road from wash-out by (Denver's-Skip's House)
Pole Line Road @ 5000 W	Fix Large dip caused by new water line (dip is getting larger)
2750 W (Sharmel Acres) Neola Hwy-3000 W	Narrow, rough road, Huge potholes - needs widened to pass
10000 W off 3000 S -North/Vonsville Sub	Grading due to washboard, needs paved. Subdivision Road failing
10000 W off 3000 S -North/Vonsville Sub	Signs block view coming out of subdivision looking west
10000 W off 3000 S -North/Vonsville Sub	Large hole turning east onto HWY 40 from Vonsville
Mortensen Lane Road	Road needs to be done
3200 W between 8000 N & 9000 N	Fix potholes
Hwy 35 about Mile marker 45	A new sign to replace older one so it is noticeable
1000 N 3/4 Miles east	Tree needs to be cut down
Oilfield road	Turn around after Bart Miller's house-on oilfield road

APPENDIX D. TRANSPORTATION IMPROVEMENT PLANS & COST ESTIMATES

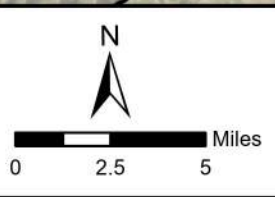
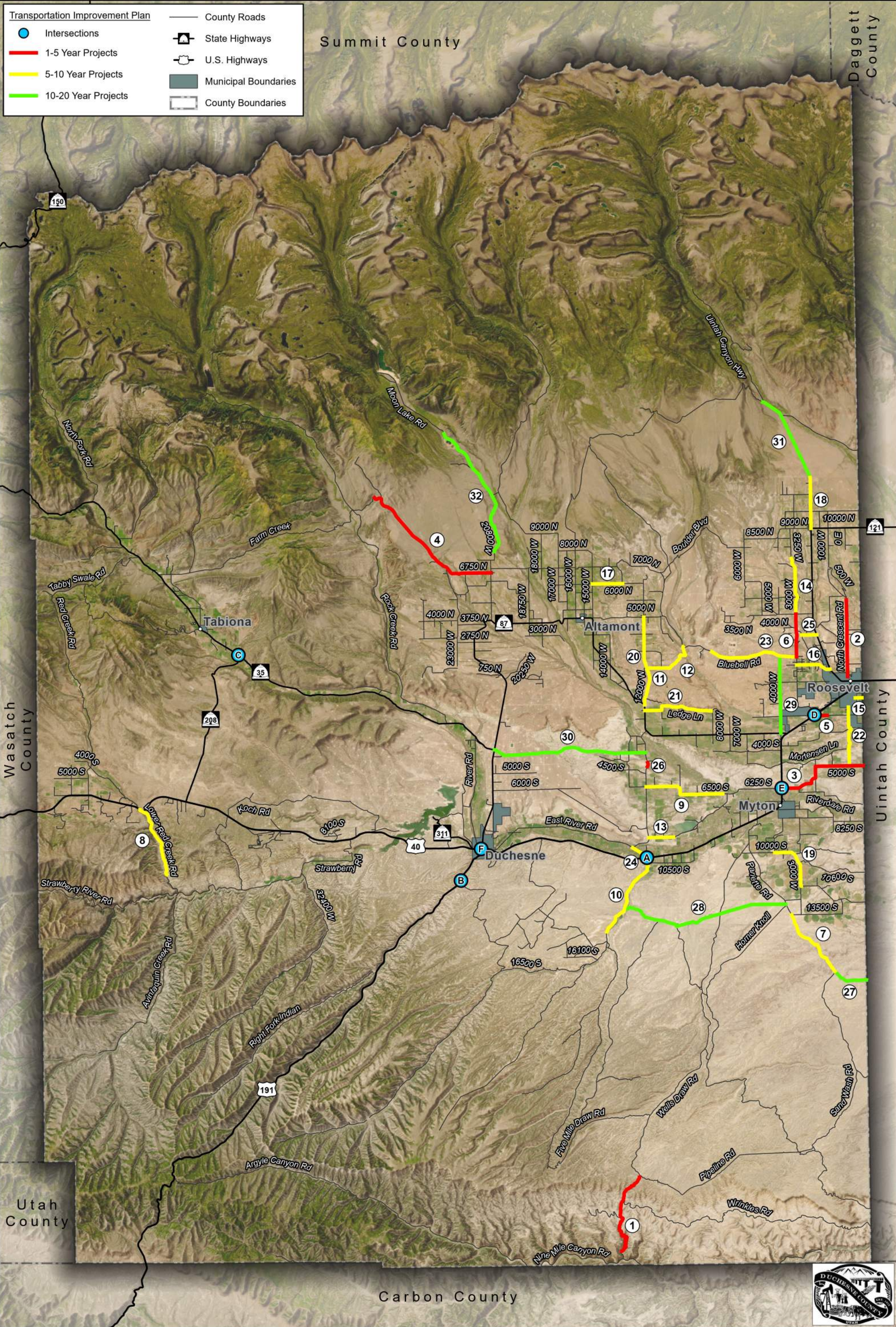
D.1. 1 TO 5 YEAR TIP

The following projects are recommended within the next five years, as funding allows. The proposed actions and estimated costs will determine the order or grouping of projects. See associated maps of proposed projects in Appendix A. Note that County Road Department maintenance type projects are not included in the TIP, however, a separate list maintained by the County contains projects smaller in scale and it is recommended that a maintenance plan is continued and implemented based on findings in the TMP study.

D.2. MAP D-1 TRANSPORTATION IMPROVEMENT PLAN

Transportation Improvement Plan

- Intersections
- 1-5 Year Projects
- 5-10 Year Projects
- 10-20 Year Projects
- County Roads
- State Highways
- U.S. Highways
- Municipal Boundaries
- County Boundaries



**Jones & DeMille
Engineering**

Duchesne County

**2024 Transportation Master Plan
Transportation Improvement Plan Overview**

Map Name: H:\JD\Proj\2311-030\GIS\Projects\2311-030_Design\2311-030_Design.aprx - Duchesne County - TMP - Current Conditions - TIP 11x17P
 Project Number: 2311-030 Drawn by: JEM 10-24 Last Edit: 02/04/2025



Duchesne County,
Utah

Scale: 1" = 5 miles

1

Table D-1. 1 to 5 Year TIP

TIP ID	Classification	Location/Name	Reconstruction Action	Potential Funding Source	Mileage	Estimated Reconstruction Cost (2024 Dollars)	
1	Major Collector	Gate Canyon Road (Nine Mile Road to Wells Draw)	Construct Major Collector	CIB/Mineral Lease	6.1	\$	15,664,800
2	Minor Collector	N Crescent Road (Roosevelt City Limits to Dye Dugway)	Reconstruct Minor Collector	CIB/Mineral Lease	4.52	\$	8,606,080
3	Minor Collector	6250 S/2000 W/5000 S (US-40 to County Line)	Reconstruct Minor Collector	CIB/Mineral Lease	5.8	\$	11,043,200
4	Minor Collector	Rock Creek Road (Mountain Home Road to Rock Creek Dugway)	Reconstruct Minor Collector	CIB/Mineral Lease	9	\$	17,136,000
5	Minor Collector	Pole Line Road Realignment	Reconstruct Minor Collector	JHC/CIB/Mineral Lease	0.74	\$	1,408,960
6	Major Collector	3000 W Phase I (Bluebell Highway to 4000 North)2.25	Reconstruct Major Collector	JHC	2.53	\$	6,497,040
26	Major Collector	12000 W Dunsmore Corner	Geometric Improvements	JHC/CIB/Mineral Lease	0.24	\$	616,320.00
					28.93		\$ 60,972,000

D.3. 5 TO 10 YEAR TIP

Table D-2. 5 to 10 Year TIP

TIP ID	Classification	Location/Name	Reconstruction Action	Potential Funding Source	Mileage	Estimated Reconstruction Cost (2024 Dollars)
7	Minor Collector	Pariette Road (Tower Road to End of Pavement)	Reconstruct Minor Collector	CIB/Mineral Lease	4.48	\$ 8,529,920.00
8	Minor Collector	Lower Red Creek Road (US-40 to End of Pavement)	Reconstruct Minor Collector	FLAP	4.48	\$ 8,529,920.00
9	Minor Collector	6250 South (12000 W to Lake Boreham Road)	Geometric Improvements, Reconstruct Minor Collector	CIB/Mineral Lease	4.91	\$ 9,348,640.00
10	Minor Collector	Antelope Canyon Road (US-40 to End of Pavement)	Reconstruct Minor Collector	CIB/Mineral Lease	5.4	\$ 10,281,600.00
11	Minor Collector	1000 N Phase I (12000 W to 10500 W)	Geometric Improvements, Drainage Improvements, Reconstruct Minor Collector	CIB/Mineral Lease	1.33	\$ 2,532,320.00
12	Minor Collector	1000 N Phase II (10500 W to Bluebell Highway)	Geometric Improvements, Reconstruct Minor Collector	CIB/Mineral Lease	1.9	\$ 3,617,600.00
13	Minor Collector	Lake Boreham Road Phase III (12000 W to End Phase II)	Reconstruct Minor Collector	CIB/Mineral Lease	1.46	\$ 2,779,840.00
14	Minor Collector	3000 W Phase II (4000 North to 2020 Improvements)	Reconstruct Minor Collector	JHC	3.42	\$ 6,511,680.00
15	Minor Collector	800 S Cottonwood Creek Wash Crossing (500 E to County Line)	Construct Minor Collector	JHC/CIB/Mineral Lease	0.39	\$ 1,500,000.00
16	Minor Collector	North Cove Road (3000 W to SR-121)	Reconstruct Minor Collector	JHC	2	\$ 3,808,000.00
17	Minor Collector	6000 N (15000 W to 13250 W)	Reconstruct Minor Collector	FLAP/CIB/Mineral Lease	1.79	\$ 3,408,160.00
18	Minor Collector	Uinta Canyon Road Phase I (SR-121 to Tribal Boundary)	Reconstruct Minor Collector	FLAP	2.99	\$ 5,692,960.00
19	Minor Collector	10000 S/3000 W (4500 W to 11970 S)	Reconstruct Minor Collector	CIB/Mineral Lease	3.18	\$ 6,054,720.00
20	Major Collector	12000 W (Upalco to Bluebell)	Widening, Shoulder Work, Drainage Work, 2" Mill and Overlay	CIB/Mineral Lease/JHC	5.26	\$ 13,507,680.00
21	Minor Collector	Ledge Lane	Reconstruct Minor Collector	CIB/Mineral Lease	4.28	\$ 8,149,120.00
22	Minor Collector	State Street (Roosevelt City Limits to 5000 S)	Shoulder Work, 3" Mill and Overlay, Geometric Improvements	CIB/Mineral Lease/JHC	3.71	\$ 7,063,840.00
23	Major Collector	Bluebell Road (3000 W to Jenkins Draw)	3" Mill and Overlay, 2" Mill and Overlay, Shoulder Work	CIB/Mineral Lease/JHC	5.19	\$ 13,327,920.00
24	Major Collector	East River Road (12000 W to US-40)	2" Mill and Overlay	CIB/Mineral Lease/JHC	1.1	\$ 2,824,800.00
25	Minor Collector	2750 North (SR-121 to 2800 W)	Reconstruct Minor Collector	FLAP	0.88	\$ 1,675,520.00
					58.15	\$119,145,000

D.4. 10 TO 20 YEAR TIP

Table D-3. 10 to 20 Year TIP

TIP ID	Classification	Location/Name	Reconstruction Action	Potential Funding Source	Mileage	Estimated Reconstruction Cost (2024 Dollars)
27	Future Minor Collector	Pariette Road (End of Pavement to Uintah County Line)	Construct Minor Collector	CIB/Mineral Lease	2.27	\$ 5,187,000.00
28	Future Major Collector	BLM Fence Road	Construct Major Collector	CIB/Mineral Lease/JHC	10.2	\$ 31,432,320.00
29	Future Major Collector	SR-87 to Bluebell Road	Construct Major Collector	CIB/Mineral Lease/JHC	4.54	\$ 13,990,464.00
30	Future Minor Collector	Arcadia - Blue Bench Corridor	Construct Minor Collector	CIB/Mineral Lease	9.17	\$ 20,951,616.00
31	Minor Collector	Uinta Canyon Road Phase II (Tribal Boundary to End of Pavement)	Reconstruct Minor Collector	FLAP	5.4	\$ 10,281,600.00
32	Minor Collector	Moon Lake Road (South Tribal Boundary to North Tribal Boundary)	Reconstruct Minor Collector	FLAP	8.47	\$ 16,126,880.00
					40.05	\$97,970,000

D.5. UDOT STIP

These projects use various Federal and State funding programs. UDOT has programmed funds in the Statewide Transportation Improvement Plan (STIP) for several projects within Duchesne County over the next several years. See the link below for a complete listing of all currently planned projects on the UDOT STIP.

<https://stip.udot.utah.gov/all/all/all>

Projects identified in the Duchesne TMP meetings with steering committee and safety officials dealing with intersections of County roads and UDOT roads are listed below in Table D-4.

Table D-4. UDOT Intersection Proposed Improvements

Intersection	Location	Improvement	Comment
A	Antelope Canyon (US-40)	Turn lanes and widen	Trucks swing wide and leave travel lane
B	Sowers Canyon Road (US-191)	Turn lanes	Trucks stopping traffic to turn, blind (scheduled by UDOT for 2025)
C	SR-208 onto SR-35	Intersection Sight Improvements	Poor sight lines East from SR-208
D	Poleline Road/Airport Road (US-40)	Intersection Geometry	Trucks/School Buses difficult to get on US-40. All improvements aside from turn lane funded and construction planned for 2025
E	6250 South (US-40)	Pavement Repairs/ Traffic Signal/Intersection Geometry	Difficult turning onto US-40 from the East, poor pavement condition inside UDOT ROW
F	US-191 onto US-40	Traffic Signal	Large volume of turning trucks (scheduled by UDOT for 2025)
G	12000 West onto SR-87 (Upalco)	Intersection Geometry	Large volume of trucks, poor sight lines

D.6. FUTURE CORRIDOR PLAN

The following projects have been identified for future corridors or alternative routes for connectivity, development, and corridor preservation. Cost estimates based on functional classification are included. See Map A-1: Functional Classification and Future Routes in Appendix A for locations and extents. These projects are at various levels of need and feasibility. Further design and alignment analysis are required for future projects.

Table D-5. Future Corridor Plan

Future Corridor Number	Classification	Location/Name	Purpose	Mileage	Estimated Reconstruction Cost
1	Local	47000 W to 5000 S	Improves north-south routes within Fruitland area	0.5	\$ 886,800.00
2	Minor Collector	Extension 46000 W to Hidden Meadow Subdivision	Allows for second access to Hidden Meadows area	1.5	\$ 3,427,200.00
3	Local	CR 253 Connection Alt	Allows for second access to south side of Talmage area	3.0	\$ 5,320,800.00
4	Minor Collector	Arcadia - Blue Bench Corridor	Improves east-west continuity for long range travel within Duchesne County	9.2	\$ 20,951,616.00
5	Local	12000 West Clay Basin Extension	Significantly shortens north-south route in the area	1.0	\$ 1,773,600.00
6	Local	Bluebell to Neola Hwy	Improves east-west continuity for long range travel within Duchesne County	0.5	\$ 886,800.00
7	Major Collector	SR-87 to Bluebell Road	Creates truck route that reduces truck traffic through Hancock Cove area and west of Roosevelt City.	4.5	\$ 13,990,464.00
8	Major Collector	6000 West	Improves north-south routes within Cedarview area	4.5	\$ 13,867,200.00
9	Minor Collector	6000 North	Improves east-west continuity within Cedarview area	2.0	\$ 4,569,600.00
10	Major Collector	Boulder Boulevard to Bluebell	Improves east-west continuity for long range travel within Duchesne County	10.0	\$ 30,816,000.00
11	Minor Collector	North Crescent E-W corridor	Improves east-west continuity for travel within North Crescent area	1.0	\$ 2,284,800.00
12	Minor Collector	Antelope Canyon Road	Creates truck route to bypass intersection and accident heavy portion of US-40	5.4	\$ 12,337,920.00
13	Major Collector	BLM Fence Road	Creates truck route to bypass intersection and accident heavy portion of US-40	10.2	\$ 31,432,320.00
14	Minor Collector	Pariette Road	Improves access to southern portions of County	2.3	\$ 5,186,496.00
15	Local	Bluebell Highway Realignment Alt	Streamlines route from upper country areas to Roosevelt City	1.3	\$ 2,341,152.00

D.7. COST ESTIMATES

D.7.1. COST ESTIMATES PER MILE OF ROADWAY

Table D-6. Cost Estimates Per Mile of Roadway Reconstruction, Overlay, & Chip Seal

Major Collector Reconstruction	30	6	6	6	\$2,568,000
Minor Collector Reconstruction	30	4.5	6	-	\$1,904,000
Local/Residential Reconstruction	30	3	6	-	\$1,478,000
3" Overlay	30	3	-	-	\$565,000
6" Overlay	30	6	-	-	\$1,123,000
Chip Seal	30	-	-	-	\$85,000

*See Section D.6.2 for details and unit cost estimates

D.7.2. COST ESTIMATE BREAKDOWN AND ASSUMPTIONS BY PROJECT TYPE

Table D-7. Cost Estimate Breakdown and Assumptions for 1 Mile of Major Collector Roadway Reconstruction

MAJOR COLLECTOR ASSUMPTIONS	WIDTH [ft]	DEPTH [in]
GEOGRID - SUBGRADE AND BASE REINFORCEMENT	30	1
GRANULAR BORROW (PLAN QUANTITY)	45	6
UNTREATED BASE COURSE (PLAN QUANTITY)	39	6
HOT MIX ASPHALT, 1/2" MAX.	33	6

Item No.	Description	Unit	Estimated Quantity/Mile	Estimated Unit Price	Estimated Total Price
1	MOBILIZATION	MILE	1	\$64,200	\$64,200
2	TRAFFIC CONTROL	MILE	1	\$64,200	\$64,200
3	DUST CONTROL AND WATERING	MILE	1	\$21,400	\$21,400
4	RELOCATIONS & REMOVALS	MILE	1	\$5,700	\$5,700
5	SIGNAGE & PAINT STRIPING	MILE	1	\$7,000	\$7,000
6	RIGHT-OF-WAY FENCING	MILE	1	\$87,120	\$87,120
7	GUARDRAIL	L.F.	528	\$35	\$18,480
8	ROADWAY EXCAVATION (PLAN QUANTITY)	CU. YD.	11,440	\$12	\$137,280
9	GEOGRID - SUBGRADE AND BASE REINFORCEMENT	SQ. YD.	17,600	\$4	\$70,400
10	PAVEMENT PULVERIZATION - 12" (PLAN QUANTITY)	SQ. YD.	17,600	\$4	\$70,400
11	GRANULAR BORROW (PLAN QUANTITY)	CU. YD.	4,400	\$35	\$154,000
12	UNTREATED BASE COURSE (PLAN QUANTITY)	CU. YD.	3,813	\$50	\$190,667
13	HOT MIX ASPHALT, 1/2" MAX	TON	6,752	\$160	\$1,080,288
14	ASPHALT CONCRETE DRIVEWAY	EACH	12	\$1,500	\$18,000
15	DRAINAGE CULVERTS	L.F.	300	\$500	\$150,000
CONSTRUCTION COST PER MILE					\$2,140,000
ENGINEERING, CM, & CONTINGENCY (20%)					\$428,000
TOTAL COST PER MILE OF ROADWAY RECONSTRUCTION					\$2,568,000

Table D-8. Cost Estimate Breakdown and Assumptions for 1 Mile of Minor Collector Roadway Reconstruction

MINOR COLLECTOR ASSUMPTIONS	WIDTH [ft]	DEPTH [in]
ROADWAY EXCAVATION (PLAN QUANTITY)		
GEOGRID - SUBGRADE AND BASE REINFORCEMENT	30	1
UNTREATED BASE COURSE (PLAN QUANTITY)	37.5	6
HOT MIX ASPHALT, 1/2" MAX.	32.25	4.5

Item No.	Description	Unit	Estimated Quantity/Mile	Estimated Unit Price	Estimated Total Price
1	MOBILIZATION	MILE	1	\$47,580	\$47,580
2	TRAFFIC CONTROL	MILE	1	\$47,580	\$47,580
3	DUST CONTROL AND WATERING	MILE	1	\$15,860	\$15,860
4	RELOCATIONS & REMOVALS	MILE	1	\$5,700	\$5,700
5	SIGNAGE & PAINT STRIPING	MILE	1	\$7,000	\$7,000
6	RIGHT-OF-WAY FENCING	MILE	1	\$87,120	\$87,120
7	GUARDRAIL	L.F.	528	\$35	\$18,480
8	ROADWAY EXCAVATION (PLAN QUANTITY)	CU. YD.	6,032	\$12	\$72,380
9	GEOGRID - SUBGRADE AND BASE REINFORCEMENT	SQ. YD.	17,600	\$4	\$70,400
10	PAVEMENT PULVERIZATION - 12" (PLAN QUANTITY)	SQ. YD.	17,600	\$4	\$70,400
11	UNTREATED BASE COURSE (PLAN QUANTITY)	CU. YD.	3,667	\$50	\$183,333
12	HOT MIX ASPHALT, 1/2" MAX.	TON	4,949	\$160	\$791,802
13	ASPHALT CONCRETE DRIVEWAY	EACH	12	\$1,500	\$18,000
14	DRAINAGE CULVERTS	L.F.	300	\$500	\$150,000
CONSTRUCTION COST PER MILE					\$1,586,000
ENGINEERING, CM, & CONTINGENCY (20%)					\$318,000
TOTAL COST PER MILE OF ROADWAY RECONSTRUCTION					\$1,904,000

Table D-9. Cost Estimate Breakdown and Assumptions for 1 Mile of Local/Residential Roadway Reconstruction

RESIDENTIAL ROADWAY ASSUMPTIONS	WIDTH [ft]	DEPTH [in]
ROADWAY EXCAVATION (PLAN QUANTITY)		
GEOGRID - SUBGRADE AND BASE REINFORCEMENT	30	1
GRANULAR BORROW (PLAN QUANTITY)	0	0
UNTREATED BASE COURSE (PLAN QUANTITY)	36	6
HOT MIX ASPHALT, 1/2" MAX.	31.5	3

Item No.	Description	Unit	Estimated Quantity/Mile	Estimated Unit Price	Estimated Total Price
1	MOBILIZATION	MILE	1	\$36,930	\$36,930
2	TRAFFIC CONTROL	MILE	1	\$36,930	\$36,930
3	DUST CONTROL AND WATERING	MILE	1	\$12,310	\$12,310
4	RELOCATIONS & REMOVALS	MILE	1	\$5,700	\$5,700
5	SIGNAGE & PAINT STRIPING	MILE	1	\$7,000	\$7,000
6	RIGHT-OF-WAY FENCING	MILE	1	\$87,120	\$87,120
7	GUARDRAIL	L.F.	528	\$35	\$18,480
8	ROADWAY EXCAVATION (PLAN QUANTITY)	CU. YD.	5,060	\$12	\$60,720
9	GEOGRID - SUBGRADE AND BASE REINFORCEMENT	SQ. YD.	17,600	\$2	\$35,200
10	PAVEMENT PULVERIZATION - 12" (PLAN QUANTITY)	SQ. YD.	17,600	\$4	\$70,400
11	UNTREATED BASE COURSE (PLAN QUANTITY)	CU. YD.	3,520	\$50	\$176,000
12	HOT MIX ASPHALT, 1/2" MAX.	TON	3,222	\$160	\$515,592
13	ASPHALT CONCRETE DRIVEWAY	EACH	12	\$1,500	\$18,000
14	DRAINAGE CULVERTS	L.F.	300	\$500	\$150,000
CONSTRUCTION COST PER MILE					\$1,231,000
ENGINEERING, CM, & CONTINGENCY (20%)					\$247,000
TOTAL COST PER MILE OF ROADWAY RECONSTRUCTION					\$1,478,000

Table D-10. Cost Estimate Breakdown and Assumptions for 1 Mile of 3" Overlay Project

3" OVERLAY ASSUMPTIONS	WIDTH [ft]	DEPTH [in]
HOT MIX ASPHALT, 1/2" MAX. [UNIT WEIGHT 155 LB/FT3]	30	3
POTHOLE REPAIR, SAWCUTTING, LEVELING 0.25% OF TOTAL ASPHALT		
MOBILIZATION	6%	
TRAFFIC CONTROL	6%	

Item No.	Description	Unit	Estimated Quantity/Mile	Estimated Unit Price	Estimated Total Price
1	MOBILIZATION	MILE	1	\$33,900	\$33,900
2	TRAFFIC CONTROL	MILE	1	\$33,900	\$33,900
3	POTHOLE REPAIR, SAWCUTTING, LEVELING	TON	12	\$200	\$2,400
4	PAINT STRIPING	MILE	1	\$3,000	\$3,000
5	HOT MIX ASPHALT, 1/2" MAX.	TON	3,069	\$160	\$491,040
TOTAL COST PER MILE OF ROADWAY OVERLAY (3")					\$565,000

Table D-11. Cost Estimate Breakdown and Assumptions for 1 Mile of 6" Overlay Project

6" OVERLAY ASSUMPTIONS	WIDTH [ft]	DEPTH [in]
HOT MIX ASPHALT, 1/2" MAX. [UNIT WEIGHT 155 LB/CUBIC FOOT]	30	6
POTHOLE REPAIR, SAWCUTTING, LEVELING 0.25% OF TOTAL ASPHALT		
MOBILIZATION	6%	
TRAFFIC CONTROL	6%	

Item No.	Description	Unit	Estimated Quantity/Mile	Estimated Unit Price	Estimated Total Price
1	MOBILIZATION	MILE	1	\$67,380	\$67,380
2	TRAFFIC CONTROL	MILE	1	\$67,380	\$67,380
3	POTHOLE REPAIR, SAWCUTTING, LEVELING	TON	15	\$200	\$3,000
4	PAINT STRIPING	MILE	1	\$3,000	\$3,000
5	HOT MIX ASPHALT, 1/2" MAX	TON	6,138	\$160	\$982,080
TOTAL COST PER MILE OF ROADWAY OVERLAY (6")					\$1,123,000

Table D-12. Cost Estimate Breakdown and Assumptions for 1 Mile of Chip Seal Project

CHIP SEAL ASSUMPTIONS

TYPE II CHIP WITH FLUSH COAT	30	FT IN WIDTH
EMULSIFIED ASPHALT	\$ 1,200	TON
APPLICATION RATE WITH 240 GALLONS/TON	0.45	GALLONS/SY
POTHOLE REPAIR, PATCHING, LEVELING 0.25% OF TOTAL ASPHALT		
MOBILIZATION	3%	
TRAFFIC CONTROL	3%	

Item No.	Description	Unit	Estimated Quantity/Mile	Estimated Unit Price	Estimated Total Price
1	MOBILIZATION	MILE	1	\$2,550	\$2,550
2	TRAFFIC CONTROL	MILE	1	\$2,550	\$2,550
3	POTHOLE REPAIR AND LEVELING	TON	6	\$200	\$1,200
4	PAINT STRIPING	MILE	1	\$3,000	\$3,000
5	TYPE II CHIP	SY	17,600	\$2.00	\$35,200
6	EMULSIFIED ASPHALT	TON	33	\$1,200	\$39,600
TOTAL COST PER MILE OF ROADWAY CHIP SEAL					\$85,000

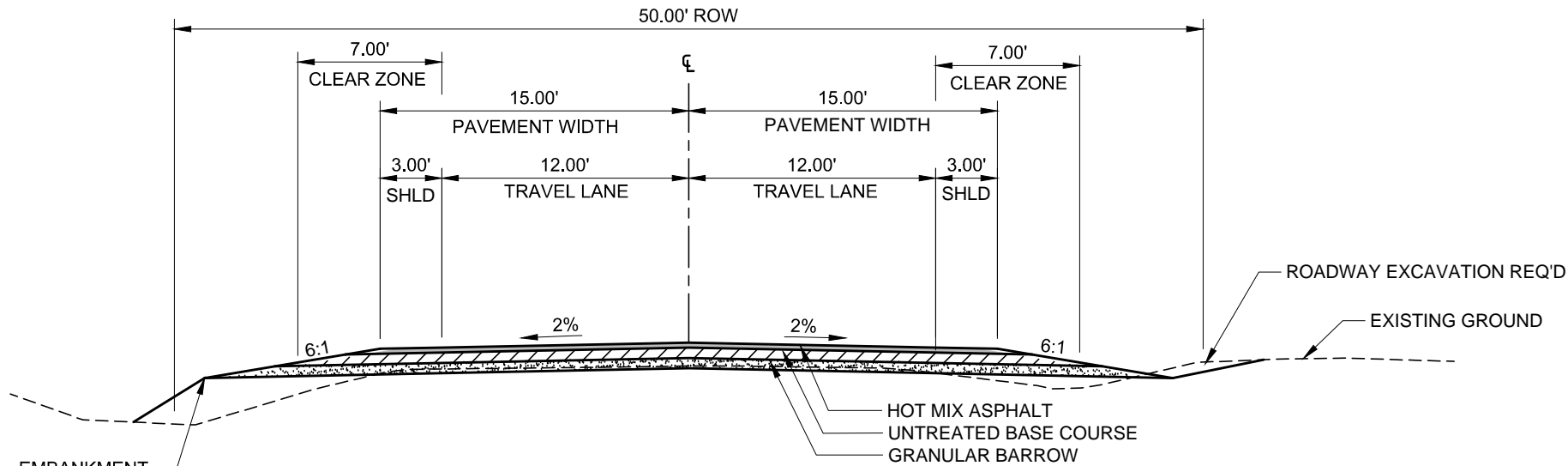
APPENDIX E. STANDARD ROADWAY SECTIONS BY FUNCTIONAL CLASSIFICATION

E.1. TYPICAL SECTION - 01

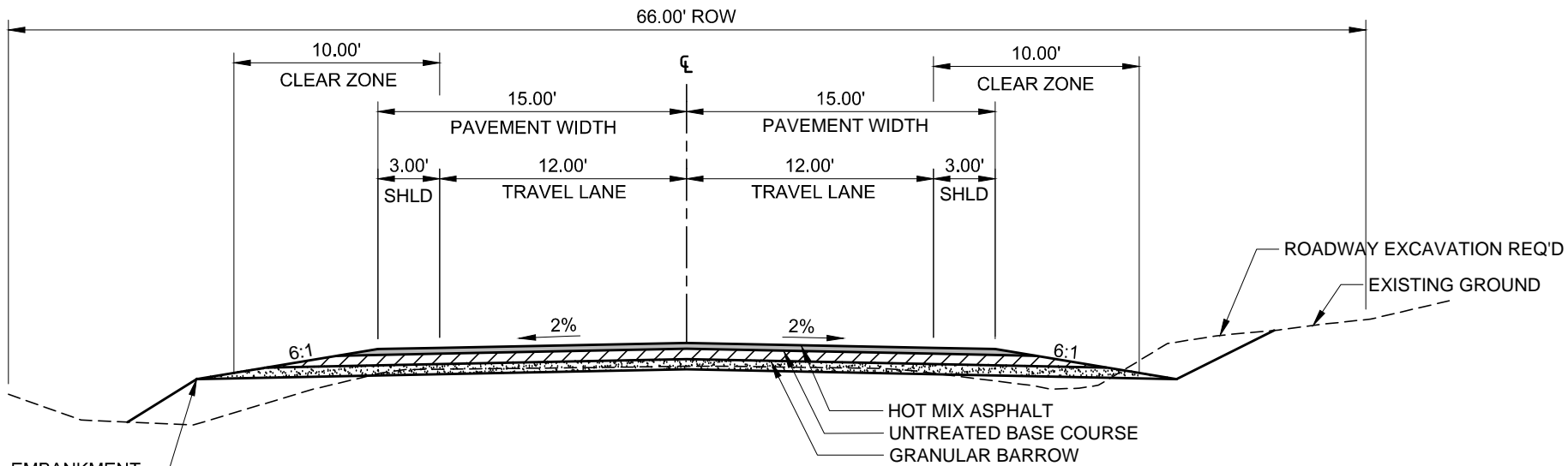
PUD, R-1, R-1/2 ZONES STREETS (<40 MPH) (ADT<750)

CLASS B: RESIDENTIAL/LOCAL STREET (<40 MPH) (ADT<750)

DUCHESNE COUNTY TYPICAL STREET CROSS SECTION STANDARDS



PUD, R-1, R-1/2 ZONES STREETS (<40 MPH) (ADT < 750)



CLASS B: RESIDENTIAL/LOCAL STREET (<40 MPH) (ADT < 750)

- NOTES:**
1. ASPHALT, BASE, AND SUB-BASE DEPTHS TO BE DETERMINED BY PAVEMENT DESIGN, NATIVE SUBGRADE BEARING CAPACITY, AND EXPECTED TRAFFIC.
 2. SEE DUCHESNE COUNTY CODE TITLE 9.6 FOR DESIGN STANDARDS.
 3. ROADWAY DESIGN TO CONFORM W/AASHTO AND MUTCD STANDARDS.

Jones & DeMille Engineering, Inc. CIVIL ENGINEERING - SURVEYING - TESTING GIS - ENVIRONMENTAL 1.800.748.5275 www.jonesanddemic.com		DWG NAME: TS-01 SHT SET: 1112-021	DWG CREATED: CR_DATE PEN TEL: 1112-021	LAST UPDATED: 6/20/2013
DESIGN: LWG DATE: 6/13	CHECK: . DATE: .	REVIEW: . DATE: .	ORIGINAL SUBMISSION FOR AUTHORIZATION	
PROJECT DESIGN ENGINEER: . DATE: .		REVISIONS		SCALE: NTS
APPROVAL RECOMM: . DATE: .		REQUEST BY: . PARCELS AFFECTED: .		REMARKS
APPROVED: . DATE: .		DESIGN REV. BY: . CORR. BY: .		NO. DATE
PROJECT NUMBER: 1112-021		COUNTY: DUCHESNE		SHEET NO. TS-01

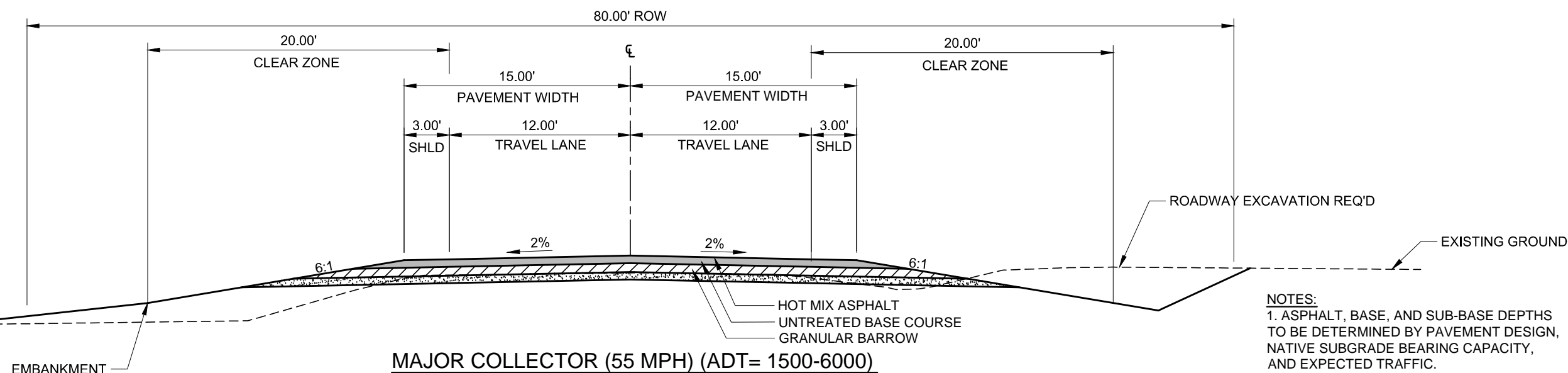
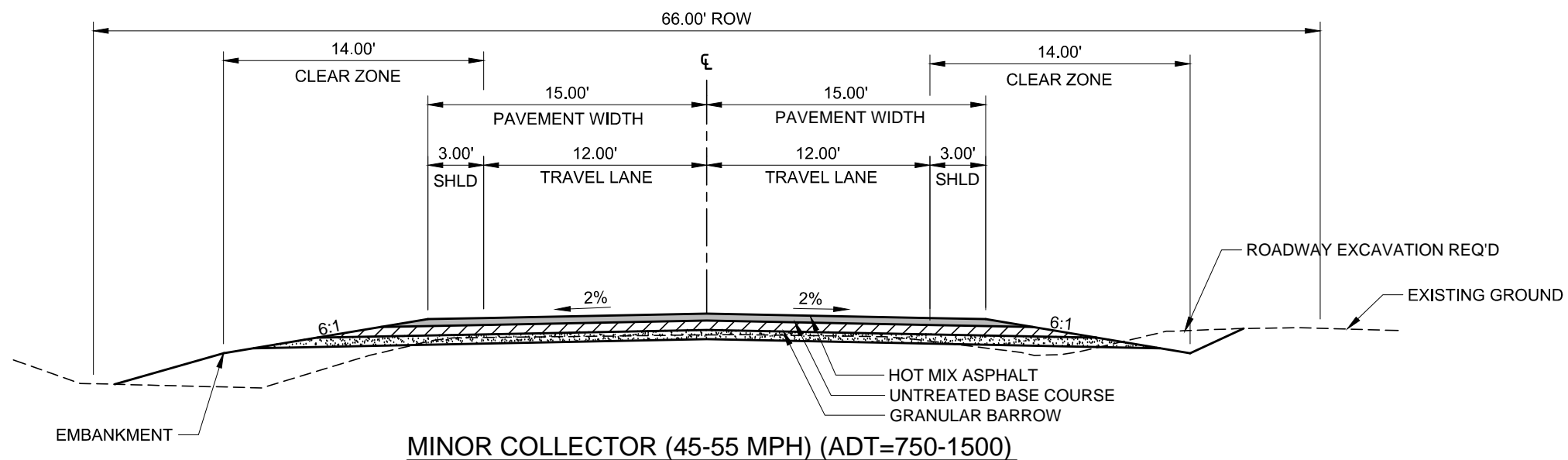
DUCHESNE COUNTY SSD#2
 TRANSPORTATION MASTER PLAN
 TYPICAL SECTION
 PROJECT NUMBER: 1112-021

E.2. TYPICAL SECTION - 02

MINOR COLLECTOR (45-55 MPH) (ADT = 750-1500)

MAJOR COLLECTOR (55 MPH) (ADT = 1500-6000)

DUCHESNE COUNTY TYPICAL STREET CROSS SECTION STANDARDS



- NOTES:**
1. ASPHALT, BASE, AND SUB-BASE DEPTHS TO BE DETERMINED BY PAVEMENT DESIGN, NATIVE SUBGRADE BEARING CAPACITY, AND EXPECTED TRAFFIC.
 2. SEE DUCHESNE COUNTY CODE TITLE 9.6 FOR DESIGN STANDARDS.
 3. ROADWAY DESIGN TO CONFORM W/AASHTO AND MUTCD STANDARDS.

Jones & DeMille Engineering, Inc. CIVIL ENGINEERING - SURVEYING - TESTING GIS - ENVIRONMENTAL 1.800.748.5275 www.jonesanddemic.com		DESIGN: DRAWN: LWG 6/13 QUANT:	CHECK: CHECK: CHECK:	REVIEW DATE: BY:	ORIGINAL SUBMISSION FOR AUTHORIZATION NO. DATE DESIGN REV. BY PARCELS CORR. BY REQUEST BY REMARKS	REVISIONS DWG NAME: TS-01 SHT SET: 1112-021 DWG CREATED: CR_DATE PEN TEL: _1112021021
DUCHESNE COUNTY SSD#2 TRANSPORTATION MASTER PLAN TYPICAL SECTION PROJECT NUMBER: 1112-021		SCALE: NTS				SHEET NO. TS-02

E.3. TYPICAL SECTION - 03

MAJOR COLLECTOR WITH AUXILLARY LANE (55 MPH) (ADT = 1500-6000)

APPENDIX F. ROAD USER IMPACT FEE DOCUMENTATION

Over the course of the development of the 2025 Transportation Master Plan update, discussions were held between Duchesne County, the public, and energy producers regarding Road User Impact Fees. The remainder of Appendix F, beginning with Section F.1., has been taken from a summary of these efforts and discussions compiled by Jones and DeMille Engineering before the finalization of the fee. In the time between the writing of the following material, and the publication of the current version of the master plan, Duchesne County and energy producers agreed on the fee as calculated by the formulas in Section F.8. below. However, the passage of SB 207 in the 2025 Utah Legislative Session prohibits counties from establishing local oil and gas mitigation fees.

F.1. INTRODUCTION

Jones & DeMille Engineering (JDE) was contracted by Duchesne County Special Service District #2 to update the Duchesne County Transportation Master Plan. As part of that plan update, the County requested that JDE quantify the effect of industry traffic from oil well development and production on County roadway infrastructure. This document summarizes the process and findings of that effort.

F.2. EXISTING ROADWAY STRUCTURE AND CONDITIONS ASSESSMENT

The first step in quantifying the effect of oil and gas industry traffic on roadway infrastructure in the County was for JDE to assess the existing condition and structure of the roadways in question. JDE approached this in two ways. First, an AI driven tool to measure existing condition of the roadways was used to analyze over four hundred miles of paved roadways in the County. These roadways include the most heavily impacted by industry. JDE was then able to estimate a remaining service life (RSL) of the roadways in question. This data will be used to help guide future maintenance efforts in the County in a cost-effective manner. Figure F-1 below shows the roadways analyzed in this way.

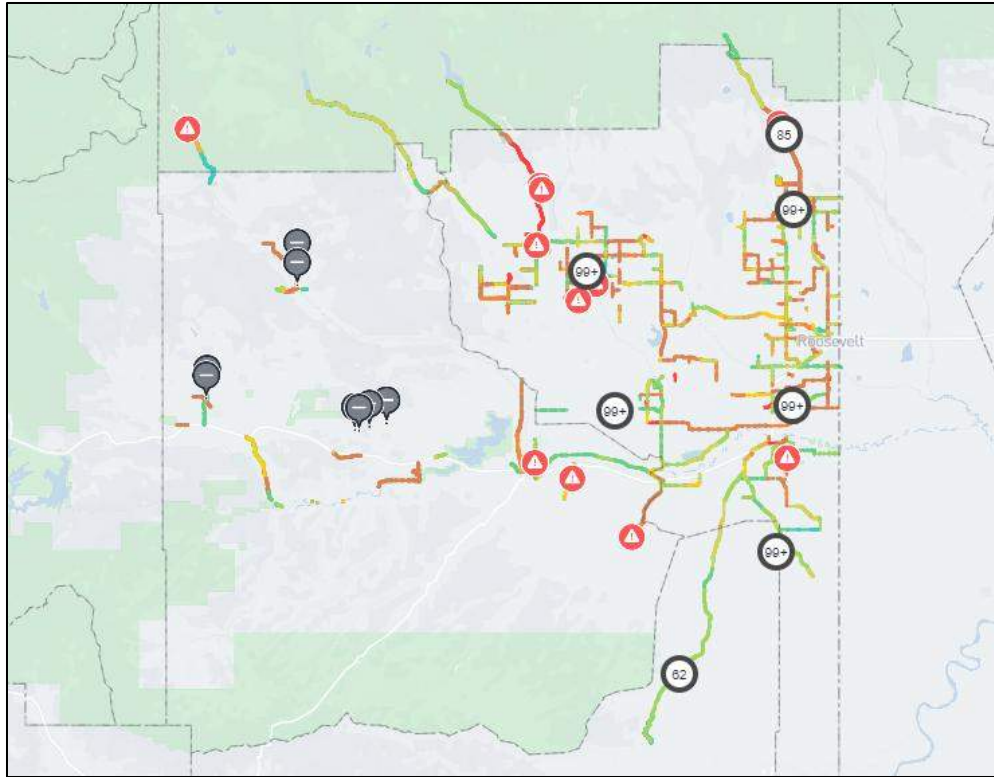


Figure F-1- Roadways Analyzed using Artificial Intelligence

In addition to the current conditions assessment, the existing structure and widths of the paved roadways were quantified by taking cores and measurements throughout the County. A total of 45 cores were used to verify the depths of the existing pavement, base and subbase layers. Existing widths were measured using aerial imagery at various locations along the paved corridors throughout the County.

F.3. CHARACTERISTICS OF THE TYPICAL AFFECTED COUNTY ROAD

With the existing structure of the paved roadways measured, JDE was able to identify the average characteristics of the typical affected county road. Table F-1 below shows the core data utilized to calculate the average pavement and subbase depths for the typical affected roadway.

Table F-1-Typical Affected Road Core Data

Road Name	BSC Depth (inches)	UBC Depth (inches)	SubBase Type
Uintah Canyon Road	6	3	Silty Gravel with Sand
9000 North	3	6.5	Clayey Sand With Gravel
4000 West	5	7	Clayey Sand
8500 North	4.5	8	Sandy Fat Clay
8000 North	0	5	Silty sand with Gravel
6000 West	5	4	Silty, Clayey Sand with Gravel

6000 North	4	7.5	Silty Sand
5000 West	6.5	8.5	Silty Sand
3000 West	0	8	Silty Sand With Gravel
1000 West	2.5	5.5	Clayey Sand With Gravel
5000 North	3	5	Silty Sand
1000 West	4	5.5	Sandy Silty Clay
North Crescent Road	3	5	Silty Sand With Gravel
North Crescent Road	5.5	5.5	Sandy Lean Clay
Hancock Cove Road	9	3.5	Sandy Silt
Bluebell Road	7	5	Sandy Lean clay
12000 West	8.5	1	Silty Sand
12000 West	5	3	Clayey Sand
6250 South	2.5	5.5	Sandy Lean Clay
2000 West	3	2	Clayey Sand
5000 South	2.5	4.5	Sandy Lean Clay
State Street	7	8.5	Sandy Lean Clay
State Street	9	0	Clayey Sand
3000 South	2.5	5.5	Clayey Sand
7500 South	3	2.5	Silt with Sand
8000 South	5	2	Poorly Graded Sand with Silty Clay
12000 West	4.5	7.5	Clayey Sand with Gravel
6500 South	6	6.5	Sandy Lean Clay
13000 West	4.5	5	Silty, Clayey Sand
River Road	3	6	Poorly Graded Gravel with Sand with Boulders to 12"
River Road	3	27	Silty Clayey Gravel with Sand
Mortensen Lane	6.75	4.25	3 inch GB
Cobble Hollow Drive 1	3	6.25	UBC
Cobble Hollow Drive 2	5.25	7.5	UBC
Cobble Hollow Drive 3	2.25	3	UBC
12000 West 1	3.25	4	UBC
0 East	4	8.5	
0 East	6	4.5	Native sand
1000 North	4.75	5	UBC
1000 North 1	4	3.25	
Mortensen Lane		4.25	3" GB
Mortensen Lane #3		4.5	3 GB
Pole Line Road	5.75	3.75	UBC
Pole Line Road	3	6.25	
3000 West	2.5	8	
Average	4.4	5.6	

The existing subbase layer is harder to quantify using core data. Some roadways have a clear distinction between subbase and subgrade layers. Others do not, and the subbase layer either is not there or is blended into subgrade layers below making it difficult to measure through a 4- or 6-inch core. Based on previous experience throughout the County, an average subbase layer thickness of 8 inches was assumed for purposes of quantifying the typical affected County roadway pavement structure. Table F-2 below summarizes the average pavement structure of the typical affected roadway based on the data collected and the assumption made. The hot mix asphalt (HMA) and untreated base course (UBC) layers were rounded to the nearest half inch to simplify the results and to reflect more realistic depths for a new roadway pavement section which are often designed and constructed in half-inch increments.

Table F-2-Typical Affected Roadway Pavement Structure

HMA	UBC	Subbase	Average Top Width
Inches	Inches	Inches	Feet
4.5	5.5	8	28.6

An engineer’s opinion of probable cost was developed to determine the cost per mile, in today’s dollars, to construct the typical affected road. Recent local bid prices were utilized to calibrate estimated bid prices utilized in the probable cost. An additional 20% was added to the estimate to cover “items not estimated” as is UDOT’s recommendation for a concept estimate at this level of detail. Items not estimated can includes items like signage, drainage infrastructure, erosion control measures, sub-grade soft spot repair, dust control, ROW acquisition, fencing, environmental permitting / mitigation, and other items. Preconstruction design engineering, construction engineering & QA testing are also included in the probable cost. In addition, an assumed top width of 30 feet was utilized in the estimate as the measured 28.6-foot average top width would not meet current geometric standards. Table F-3 below contains the Opinion of Probable Cost for one mile of a typical affected road.

Table F-3-Opinion of Probable Cost for the Typical Affected Road

Opinion of Probable Cost					
Typical Affected County Road					
Item	Quantity	Units	Price	Cost	Remarks
Mobilization	1	Lump	\$64,000.00	\$64,000.00	Usually 7-10% of construction
Traffic Control	1	Lump	\$30,000.00	\$30,000.00	Usually 3-5% of construction
Granular Borrow (Plan Quantity) - 8 inches	5,250	Cu Yd	\$35.00	\$183,750.00	
Roadway Excavation (Plan Quantity)	2,689	Cu Yd	\$12.00	\$32,268.00	
Untreated Base Course (Plan Quantity) - 5.5 inches	3,166	Cu Yd	\$50.00	\$158,300.00	
HMA - 1/2 Inch - 4.5 inches	4,701	Ton	\$170.00	\$799,170.00	
Rotomilling - 4 Inch	17,600	sq yd	\$1.75	\$30,800.00	
Pavement Marking Paint	126	gal	\$35.00	\$4,410.00	
** Items Not Estimated - 20%	1	Lump	\$261,000.00	\$261,000.00	
Design Engineering	1	Lump	\$86,000.00	\$86,000.00	
Construction Engineering & QA Testing	1	Lump	\$117,000.00	\$117,000.00	
			Total	\$1,766,698	

** Items Not Estimated at concept level includes signage, drainage infrastructure, erosion control measures, sub-grade soft spot repair, dust control, ROW acquisition, fencing, environmental permitting / mitigation, and other items.

F.4. TRAFFIC VOLUME CAPACITY OF THE TYPICAL AFFECTED COUNTY ROAD

With the pavement structure of the typical affected roadway quantified, JDE used that data to calculate the total structural number (SN) of the pavement section and to calculate the original load capacity or traffic volume that a new roadway could handle if it were constructed to those specifications. The first step to do this was to calculate SN. This was done utilizing standard structural coefficients for each layer in the pavement section, as per Utah Department of Transportation’s (UDOT) recommendations, multiplying those coefficients by the depth of each layer in inches, and adding the individual SNs for each layer together to derive the total SN for the pavement section as shown in this formula:

$$SN = a_1D_1 + a_2D_2 + a_3D_3$$

Where:

a_1, a_2, a_3 = structural layer coefficients of HMA, UBC, and Subbase layers,
 D_1, D_2, D_3 = thicknesses in inches of HMA, UBC, and Subbase layers, respectively.

Table F-4 below shows the results of the SN calculation.

Table F-4- Structural Number Calculation for Pavement Section

Layer	Coefficient	Depth	Structural Number (SN)
HMA coefficient	0.4	4.5	1.8
UBC coefficient	0.1	5.5	0.55
Subbase coefficient	0.08	8	0.64
		Total SN	2.99

JDE then utilized the results and processes outlined in the American Association of State Highway and Transportation Officials’ (AASHTO) 1993 road test to quantify the traffic carrying capacity of the typical affected road. In this process traffic volume is converted to equivalent single axle loads (ESALs). An ESAL is defined as the number of 18,000-pound single axle loads that would cause the same amount of damage as the actual traffic load over the pavement’s life. Figure F-2 below shows the equation for flexible pavements (i.e., asphalt pavements) that resulted from the 1993 AASHTO road test. Solving this equation determines the potential load capacity of a given pavement section in ESALs.

$$\log_{10} W_{18} = Z_R \times S_0 + 9.36 \times \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left(\frac{\Delta PSI}{4.2-1.5}\right)}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 \times \log_{10} M_R - 8.07$$

Figure F-2-Equation from AASHTO 1993 Road Test for Flexible Pavements

Where:

- W18 = Equivalent Single Axle Loads (ESALs)
- M_R = Soil Resilient Modulus (derived from the bearing capacity of the existing soil, a California Bearing Ratio of 3.5 was assumed in this case which equates to an M_R of 5,250)
- S₀ = Overall Standard Deviation (0.45 was used to reflect UDOT standard)
- Z_R = Standard Normal Deviate for the desired level of reliability (-1.645 was used for 95% reliability)
- ΔPSI = Design Serviceability Loss (1.7 was used to reflect UDOT standard)
- SN = The Total Structural Number of the Pavement Section (calculated above)

Solving this equation for total ESALs (W18) yielded an estimated total pavement ESAL capacity of 120,922 for the typical affected roadway pavement section.

F.5. THE EFFECT OF INDUSTRY TRAFFIC

The next step in this process was to determine the potential effect of industry traffic on county road infrastructure. This was done by converting the estimated traffic projections per well received from industry partners to ESALs and comparing that with the original traffic capacity of the typical affected roadway. Table F-5 below summarizes the first 5 years of projected truck traffic per well based on data

received from industry partners. The truck traffic estimate was limited to the first 5 years of projected traffic because the number of trucks per well drops off significantly after the first 5 years.

Table F-5- Project Truck Traffic per Well

Year	# of Trucks
Pad Construction, Drilling, Finishing	940
Year 1 Production	750
Year 2 Production	585
Year 3 Production	300
Year 4 Production	90
Year 5 Production	90
Total Truck Traffic per Well	2755

It was assumed that the trucks utilized for development and production of each well are mostly axle class 8, 9 and 10 trucks, which are single-trailer tractor trailer units with 4 to 6 axles. In their pavement design manual updated in 2008 UDOT utilizes an estimated ESAL factor per truck of 1.0079 for these classes of truck. This factor applies to legally loaded trucks. Overweight trucks can have an exponentially higher impact on roadway infrastructure. Utilizing that ESAL factor a per lane ESAL loading per well was calculated by taking the total truck traffic per well and multiplying by the estimated ESALs per truck which equated to 2,777 ESALs per well. The per-well ESAL estimate was then divided by the total road capacity of the typical affected road calculated previously. This calculation showed that an estimated 2.3% of the ESAL capacity of the typical affected road is used up for each new well developed along that road over a 5-year period with most of that impact occurring in the first 3 years. The typical pavement design for flexible pavements is intended to be a 20-year design. If ten wells per year are developed along a roadway, at 2.3% ESAL cost per well, a 20-year pavement lifespan would be reduced to less than 5 years just from the truck traffic associated with those wells.

Utilizing the opinion of probable cost calculated previously, it was determined that the replacement cost of the county road infrastructure is \$1.767M per mile on average. To determine the dollar cost per mile to the roadway infrastructure from the development of one well, the ESAL cost percentage per well was multiplied by the replacement cost per mile of typical affected road. The results of this showed that a single well development inflicts \$40,600 worth of damage per mile of roadway utilized to develop that well. It is worth noting here that this number is \$800 less per mile than what has been presented in presentations in the past. This discrepancy is due to rounding with the 2.30% ESAL cost per well factor. \$40,600 is more accurate. Table F-6 below summarizes the findings.

Table F-6- Dollar Cost per Mile per well on Affected Paved Roadways

Trucks per Well	ESALs per Truck	ESALs per Well (ESALs)	Typical Affected Road Capacity (ESALs)	% of Road Capacity per Well	Probable Cost per mile of Typical Affected County Road	Dollar Cost Inflicted per Mile per Well
2,755	1.0079	2,777	120,922	2.30%	\$ 1,767,000	\$ 40,600.00

F.6. THE EFFECT ON GRAVEL ROADS

Gravel roads, in addition to paved roads, require maintenance and upkeep. There is also an associated capital cost to construct or replace a gravel road. The effect of industry traffic on gravel roads was calculated by preparing an opinion of probable cost for a typical gravel road. The replacement cost per mile of gravel road was calculated to be \$152,000. That number assumes a very simple gravel road with only UBC and some minor drainage infrastructure Table F-7 below contains the opinion of probable cost for one mile of gravel road.

Table F-7- Opinion of Probable Cost for Gravel Roadways

Opinion of Probable Cost Gravel Roads					
Item	Quantity	Units	Price	Cost	Remarks
Mobilization	1	Lump	\$6,000.00	\$6,000.00	Usually 7-10% of construction
Traffic Control	1	Lump	\$3,000.00	\$3,000.00	Usually 3-5% of construction
Untreated Base Course (Plan Quantity) - 5 inches	2,863	Cu Yd	\$43.00	\$123,109.00	
Drainage Infrastructure	1	Lump	\$13,000.00	\$13,000.00	
Design Engineering	1	Lump	\$0.00	\$0.00	
Construction Engineering & QA Testing	1	Lump	\$7,000.00	\$7,000.00	
			Total	\$152,109	

For the purposes of this analysis, it was assumed that the associated ESAL capacity of a gravel road is similar to the typical affected paved roadway. This assumption results in the same 2.3% ESAL cost per well on a gravel road that was calculated for the typical affected paved road. It is acknowledged that the total traffic capacity of the gravel road estimated above is likely much less than that of its paved road counterparts. However, a gravel road is easier and quicker to maintain with common construction equipment and materials. Soft spots can be addressed by maintenance crews easier and/or avoided by traffic. New UBC can be installed as the roadway deteriorates from traffic. Also, deterioration of gravel road infrastructure does not result in the failure of more expensive materials, such as HMA in the case of a paved roadway.

To calculate the dollar cost per well per mile of gravel road 2.3% was multiplied by the replacement cost per mile of gravel road resulting in a cost per mile per well of \$3,500. Table F-8 below summarizes these results.

Table F-8- Dollar Cost per Mile per Well on Gravel Roads

% of Road Capacity per Well	Probable Cost per mile of Gravel Road	Dollar Cost Inflicted per Mile per Well
2.30%	\$ 152,000	\$ 3,500.00

While the initial capital cost is much less for a gravel road than for a paved road, the ongoing maintenance of gravel road infrastructure is actually more costly than that of properly constructed paved roadways. When the discrepancy in B&C road money receipts between paved and gravel roads is accounted for and the continual maintenance costs required to keep gravel roads in decent operating condition are factored in, the ongoing maintenance cost of gravel roads surpasses that of paved roadways in many situations. Because the dollar cost per mile per well calculations in this document are based solely on the initial capital cost of a gravel road and ignore the continual maintenance required for such a facility, the calculated \$3,500 per mile per well is most likely artificially low. However, to remain consistent with the calculation for paved roadway infrastructure, the implementation of \$3,500 per mile per well is suggested.

F.7. NEGOTIATED COST ADJUSTMENTS

Throughout the process of developing the formulas to calculate the potential effect of industry traffic on County roads opportunities for potential adjustment to the calculation have been identified. Those potential adjustments have been discussed in public hearings and work sessions with the County Commission, County personnel and industry partners. Depending on which potential adjustments are considered, the ultimate cost per well per mile for paved roads ranges from \$40,600 to \$14,250. The potential adjustments are outlined in this section.

F.7.1. DECREASE THE LEVEL OF RELIABILITY

In the AASHTO 1993 Road Test Formula for calculating the ESAL capacity of a flexible pavement section there is a factor for reliability. The reliability factor is a function of the standard normal deviate (Z_R), which establishes a confidence level that a certain design will perform as intended, and the standard deviation (S_0), which accounts for standard variation in materials and construction. JDE used a 95% confidence level for its analysis which equates to a Z_R value of -1.645. UDOT typically uses a 95% confidence level only for interstates and 90% on all other roadways. For the types of County roadways in this analysis UDOT standard would be to use a 90% confidence level, or a Z_R value of -1.282. UDOT also uses a standard deviation value (S_0) of 0.45 for flexible pavements with the caveat that the selected standard deviation must be representative of local conditions. In the analysis of Duchesne County roadways, the materials and construction of the roads varies significantly, and the standard deviation is likely higher than that of state highways. On County roadways it is common to find significant variation in asphalt types, the presence of tar sand pavements, variation in base gradations and hardness, significant differences in subbase type and depth, and other variations. Construction on Utah State Highways, on the other hand, has been controlled for many decades with rigorous Standard

Specifications governing materials and processes utilized on those roadways. Because of these factors the UDOT standard S_0 of 0.45 could be lower than the actual variation seen throughout the County. Where the actual standard deviation of materials and construction could be difficult to quantify, the use of a Z_R value of -1.645 for a 95% confidence level makes up for some of that uncertainty because the two factors Z_R and S_0 are multiplied together in the AASHTO 1993 equation.

However, because UDOT would typically utilize a 90% confidence level for the types of roadways considered in this analysis the Z_R factor could be changed to -1.282 and it would still conform with industry norms in the region. This change would have the following effect on the calculations in this report:

- The original estimated ESAL capacity of the typical affected County Road would increase from 120,922 to 176,139.
- The per well percentage of ESAL capacity used up by industry traffic would decrease from 2.3% to 1.58%.
- The cost per well per mile associated with industry traffic would decrease from \$40,600 to \$27,900.

F.7.2. COUNTY CONTRIBUTION TO INFRASTRUCTURE REPLACEMENT COST

In the opinion of probable cost for the replacement value of the typical affected County Road found in this report there is an item for “items not estimated.” Items not estimated at this level of analysis include signage, drainage infrastructure, erosion control measures, sub-grade soft spot repair, dust control, ROW acquisition, fencing, environmental permitting / mitigation, and other items. The value of these items is set at 20% of the total construction cost, which is UDOT standard for this level of analysis. In work meetings with the County Commissioners, County personnel, and industry partners it has been discussed that the County could potentially cover some of the costs of the replacement value of the typical affected County Road. If the County covered all the “items not estimated” costs it would have the following effect on the calculations in this report:

- It would decrease the remaining replacement value of the typical affected County Road by \$314K from \$1,767,000 to \$1,453,000. Table F-9 below shows this change.

Table F-9- Revised Opinion of Probable Cost from County Contribution

Opinion of Probable Cost					
Typical Affected County Road					
Item	Quantity	Units	Price	Cost	Remarks
Mobilization	1	Lump	\$53,000.00	\$53,000.00	Usually 7-10% of construction
Traffic Control	1	Lump	\$24,000.00	\$24,000.00	Usually 3-5% of construction
Granular Borrow (Plan Quantity) - 8 inches	5,250	Cu Yd	\$35.00	\$183,750.00	
Roadway Excavation (Plan Quantity)	2,689	Cu Yd	\$12.00	\$32,268.00	
Untreated Base Course (Plan Quantity) - 5.5 inches	3,166	Cu Yd	\$50.00	\$158,300.00	
HMA - 1/2 Inch - 4.5 inches	4,701	Ton	\$170.00	\$799,170.00	
Rotomilling - 4 Inch	17,600	sq yd	\$1.75	\$30,800.00	
Pavement Marking Paint	126	gal	\$35.00	\$4,410.00	
** Items Not Estimated - 20%	1	Lump	\$0.00	\$0.00	
Design Engineering	1	Lump	\$71,000.00	\$71,000.00	
Construction Engineering & QA Testing	1	Lump	\$96,000.00	\$96,000.00	
			Total	\$1,452,698	

** Items Not Estimated at concept level includes signage, drainage infrastructure, erosion control measures, sub-grade soft spot repair, dust control, ROW acquisition, fencing, environmental permitting / mitigation, and other items.

- This adjustment, by itself, would reduce the cost per well per mile from \$40,600 to \$33,400.
- If this adjustment is made in addition to the decreased level of reliability adjustment outlined previously, it would have the total effect of changing the cost per well per mile from \$40,600 to \$23,000 per well per mile.

F.7.3. BASE INDUSTRY EFFECTS ON LESS THAN INFRASTRUCTURE REPLACEMENT COST

The process undertaken in this report quantifies the effect, or dollar cost of industry traffic, on the typical affected County Road based on the replacement value of the infrastructure. One suggestion that has been presented in work meetings with the County Commissioners, County personnel, and industry partners in the past has been to base the cost calculation on less than full replacement cost of the infrastructure. An opinion of probable cost was created for a 2-inch rotomill with a 2-inch HMA overlay. On the typical affected County Road. Table F-10 below shows the Opinion of Probable Cost for the mill-overlay scenario.

Table F-10 - Mill & Overlay Opinion of Probable Cost

Opinion of Probable Cost Typical Affected County Road					
Item	Quantity	Units	Price	Cost	Remarks
Mobilization	1	Lump	\$16,000.00	\$16,000.00	Usually 7-10% of construction
Traffic Control	1	Lump	\$7,000.00	\$7,000.00	Usually 3-5% of construction
Granular Borrow (Plan Quantity) - 8 inches	0	Cu Yd	\$35.00	\$0.00	
Roadway Excavation (Plan Quantity)	0	Cu Yd	\$12.00	\$0.00	
Untreated Base Course (Plan Quantity) - 5.5 inches	0	Cu Yd	\$50.00	\$0.00	
HMA - 1/2 Inch - 2 inches	2,029	Ton	\$170.00	\$344,930.00	
Rotomilling - 2 Inch	17,600	sq yd	\$1.00	\$17,600.00	
Pavement Marking Paint	126	gal	\$35.00	\$4,410.00	
** Items Not Estimated - 20%	1	Lump	\$0.00	\$0.00	
Design Engineering	1	Lump	\$21,000.00	\$21,000.00	
Construction Engineering & QA Testing	1	Lump	\$29,000.00	\$29,000.00	
			Total	\$439,940	

While it wouldn't be feasible in every situation, if this type of work is completed on roadways with adequate remaining service life, it could be a viable option to prepare a corridor for future well-associated traffic demands. The cost for this scenario assumes no widening. Therefore, the existing roadway would need to be wide enough for the potential traffic demands. Additionally, if the County covered the cost of all items shown in the cost estimate except for the HMA then it would leave a remaining cost for industry of \$350,000 per well per mile. If a weighted average cost based on 50% replacement cost and 50% the HMA cost of the overlay is used in the dollar cost per well per mile calculation it would have the following effects:

- The weighted average cost would be 50% x \$1.767M + 50% x \$350K = \$1,006,000 per mile
- This adjustment, by itself, would reduce the cost per well per mile from \$40,600 to 2.3% x \$1,322,500 = \$24,350 per well per mile.
- If this adjustment is made along with the other adjustments previously outlined in this report, it would change the weighted average cost to 50% x \$1.453M + 50% \$350K = \$901,500 per mile.
- The cost per well per mile would be reduced from \$40,600 to 1.58% x \$901,500 = \$14,250 per well per mile.

F.8. CALCULATING THE EFFECT OF WELL DEVELOPMENT ON ROADWAY INFRASTRUCTURE

The formulas below have been developed to calculate the total dollar cost to roadway infrastructure from a proposed well development.

For paved roads:

$$C_p = L_p * N * \$14,250 * 1.041^{(Y-2024+1.5)}$$

C_p = Roadway cost from industry traffic on paved roads (dollars)

L_p = Sum length of all paved county roads utilized as haul routes to access location (miles)

N = Number of wells at production location
Y = Year in which the condition use permit for a location is issued.

For gravel roads:

$$C_G = L_G * N * \$3,500 * 1.041^{(Y-2024+1.5)}$$

C_G = Roadway cost from industry traffic on gravel roads (dollars)
 L_G = Sum length of gravel county roads utilized as haul routes to access location (miles)
N = Number of wells at production location
Y = Year in which the conditional use permit for a location is issued.

In the formulas above 1.041 is an inflationary factor based upon construction cost inflation rates. It is anticipated that these formulas and associated cost estimates would need to be revisited periodically to set new baseline formulas due to discrepancies in actual and anticipated inflation rates. In addition, the formulas calculate the roadway cost from industry traffic with 1.5 years of inflation included in the calculation. This is because the weighted average year of the 5 years of traffic effects included in the analysis is about 1.5 years.

F.9. CONCLUSION

The above summary represents a significant effort by JDE to quantify the effect of industry traffic on County roadway infrastructure. Industry best practices and engineering judgement, based on experience throughout the County, were utilized in the calculations contained in this document. Further analysis can be completed to quantify the effects and associated costs of specific well developments if desired.

APPENDIX G. INDUSTRIAL ACCESS DETAILS

G.1. MINOR COLLECTOR ACCESS DETAIL

G.2. MAJOR COLLECTOR ACCESS DETAIL

Left and right turn auxiliary lanes must be constructed in accordance with Table G-1 and may only be omitted following a traffic study by a professional engineer licensed in the state of Utah and acceptance from the county Road Department Supervisor.

Table G-1. Minimum Levels for Installation of Turn and Acceleration Lanes

Minimum Levels for Installation of Turn and Acceleration Lanes on Two-Lane Roads				
Design Speed (mph)	Left-Turn Lane	Right-Turn Lane	Left-Turn Acceleration Lane	Right-Turn Acceleration Lane
40 and less	25 VPH	50 VPH	*	*
45 to 55	10 VPH	25 VPH	*	50 VPH
60 and greater	5 VPH	10 VPH	**	25 VPH

*Optional for 50 mph and less. For 55 mph as directed by Road Department Supervisor.

** As directed by Road Department Supervisor.

VPH = vehicles per hour in any 1-hour period in passenger car equivalents.

See AASHTO GB Section 9.7.1 for more details.

APPENDIX H. VIALYTICS CURRENT CONDITION ANALYSIS

Vialytics is an Artificial Intelligence based program which uses thousands of photos from a vehicle mounted camera to evaluate the current condition of roadways. For this study, Vialytics was used in place of the traditional visual road inspection. The largest advantage of Vialytics is that the AI based program is incredibly consistent when scoring the condition of roads. That kind of consistency is very difficult to achieve manually. Vialytics records the number and severity of several different types of roadway defects including potholes, cracks, joints and longitudinal cracks, and patching.

The outputs from Vialytics are shown using the PCI scale, which is a 0-100 scale with 100 being a perfect score and 0 meaning complete failure of a road.

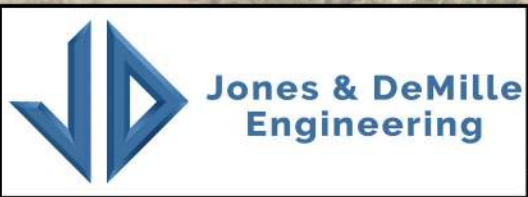
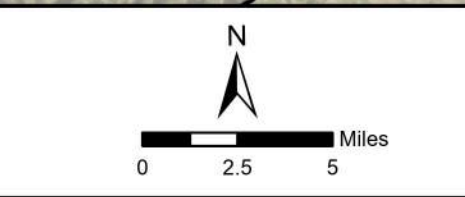
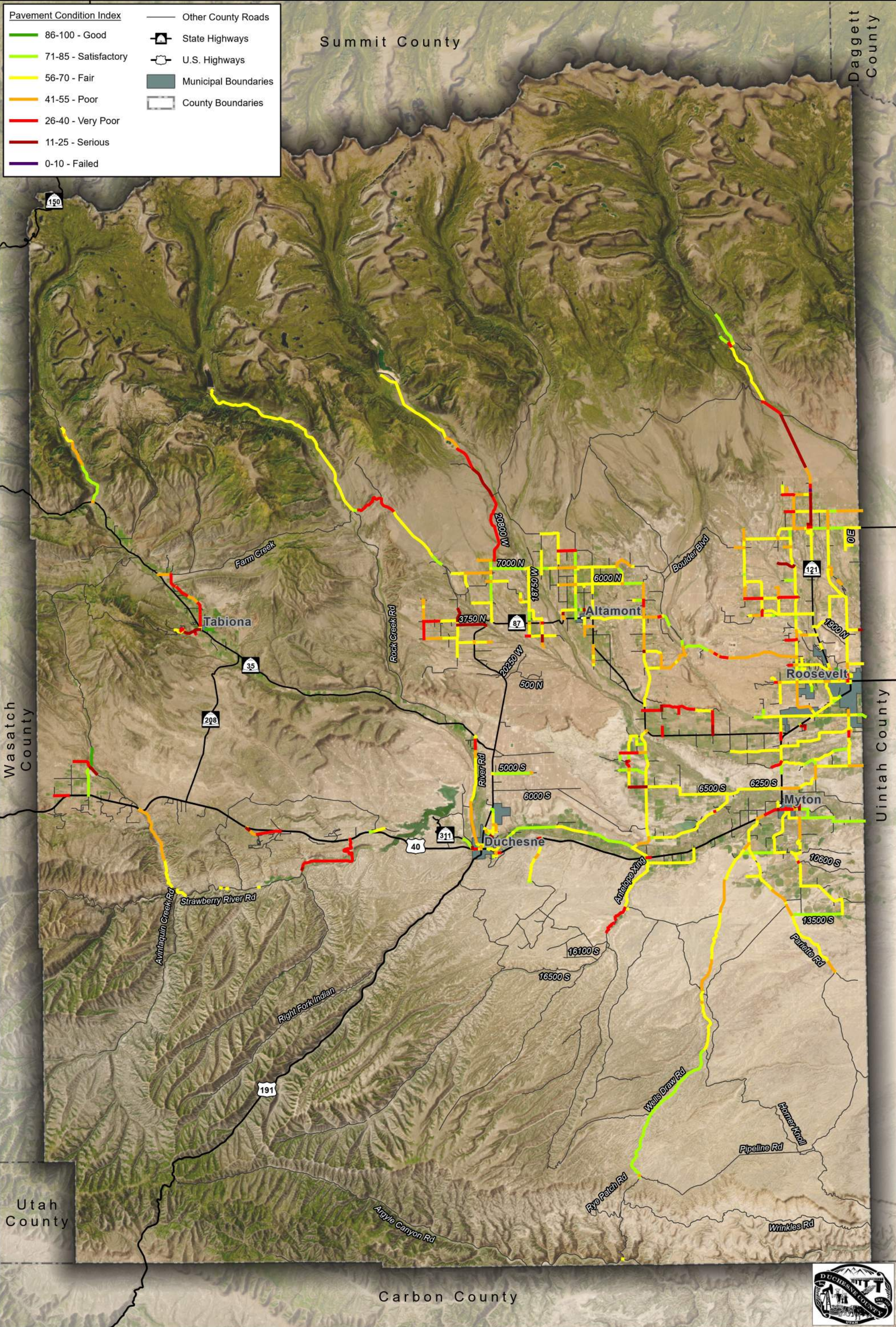
H.1. MAP H-1, EXISTING CONDITION ASSESSMENT

Pavement Condition Index

- 86-100 - Good
- 71-85 - Satisfactory
- 56-70 - Fair
- 41-55 - Poor
- 26-40 - Very Poor
- 11-25 - Serious
- 0-10 - Failed

Other County Roads

- State Highways
- U.S. Highways
- Municipal Boundaries
- County Boundaries



Duchesne County

2024 Transportation Master Plan
Existing Roadway Assessment Overview

Map Name: H:\JD\Proj\2311-030\GIS\Projects\2311-030_Design\2311-030_Design.aprx - Duchesne County - TMP - Current Conditions - Existing Roadway Assessment 11x17P
 Project Number: 2311-030 Drawn by: JEM 10-24 Last Edit: 02/04/2025

Duchesne County, Utah

Scale: 1" = 5 miles

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