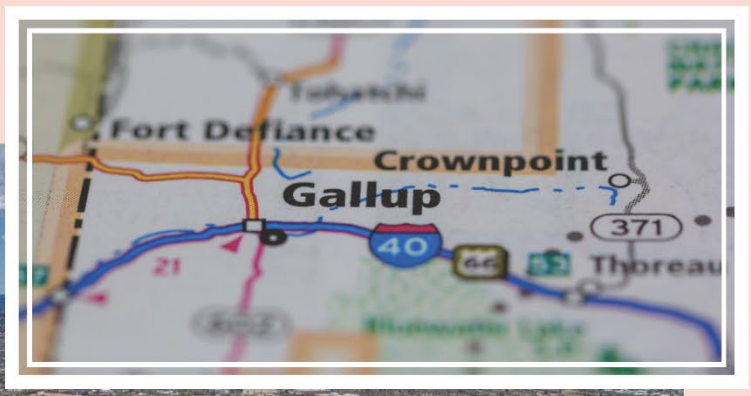

GALLUP, NEW MEXICO

TRANSPORTATION MASTER PLAN 2024

ADOPTED MARCH 2024

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Architecture in Progress

eRMSi
Eco Resource Management Systems Inc.

TRANSPORTATION MASTER PLAN

CITY OF GALLUP

CONTENTS

CHAPTER 1: INTRODUCTION

The purpose of the *Gallup Transportation Master Plan* (TMP) is to establish a comprehensive, multimodal approach to analyze and improve traffic and circulation within the City of Gallup. Specifically, the Plan seeks to provide alternative options beyond the automobile and allows the City to capitalize on the connection between transportation and economic development opportunities, and lead to quality of life improvements in Gallup and for area residents.

The contents of the plan include:

- A **Goals and Priorities** section which outlines the transportation-related goals established by the City.
- A **Community Engagement** section which summarizes the outreach efforts related to the TMP planning process.
- An **Existing Conditions** section which details the current demographics of Gallup residents, the existing transportation network, and the location and number of crashes that have occurred within the City.
- A **Travel Demand Modeling** section which explores future travel demand scenarios within Gallup.
- A **Project Prioritization** section which establishes the order of implementation for various transportation projects.
- A **Funding Sources** section which identifies various sources of available funding for transportation projects.
- A **Recommendations** section which details the typical sections and roadway design standards to be utilized in future transportation projects.

PLAN PRIORITIES AND FUTURE IMPROVEMENTS

Through community and stakeholder engagement (further detailed in Chapter 2 of this plan) the following set of priorities were developed based on the lived experience community and incorporate other general concerns with the roadway network.

PRIORITIES

1. Alleviate roadway congestion through phased roadway improvements.
2. Manage vehicular speed utilizing current/best practices in traffic calming techniques.
3. Consider roadway alternatives to manage train crossing delay.
4. Consider multimodal roadway improvements coupled with phased infrastructure redevelopment.
5. Consider all modes of transportation when designing roadway improvements moving forward.

FUTURE IMPROVEMENTS

1. Identify and implement additional roadway connections (alleviate congestion and delay)
2. Increase roadway maintenance
3. Develop and implement safer intersections for all roadway users (vehicle, bicycle, and pedestrian).

4. Ensure better roadway drainage accompanies future roadway improvements.
5. Increase public transportation connectivity.

STUDY AREA

Located along I-40, approximately halfway between the cities of Albuquerque, NM and Flagstaff, AZ, Gallup is situated as the primary hub for goods and services, and the only incorporated city in McKinley County, near the Four Corners region of northwest New Mexico. The city is surrounded by the Navajo Reservation and Zuni Pueblo and is a retail and employment center for residents of these communities.

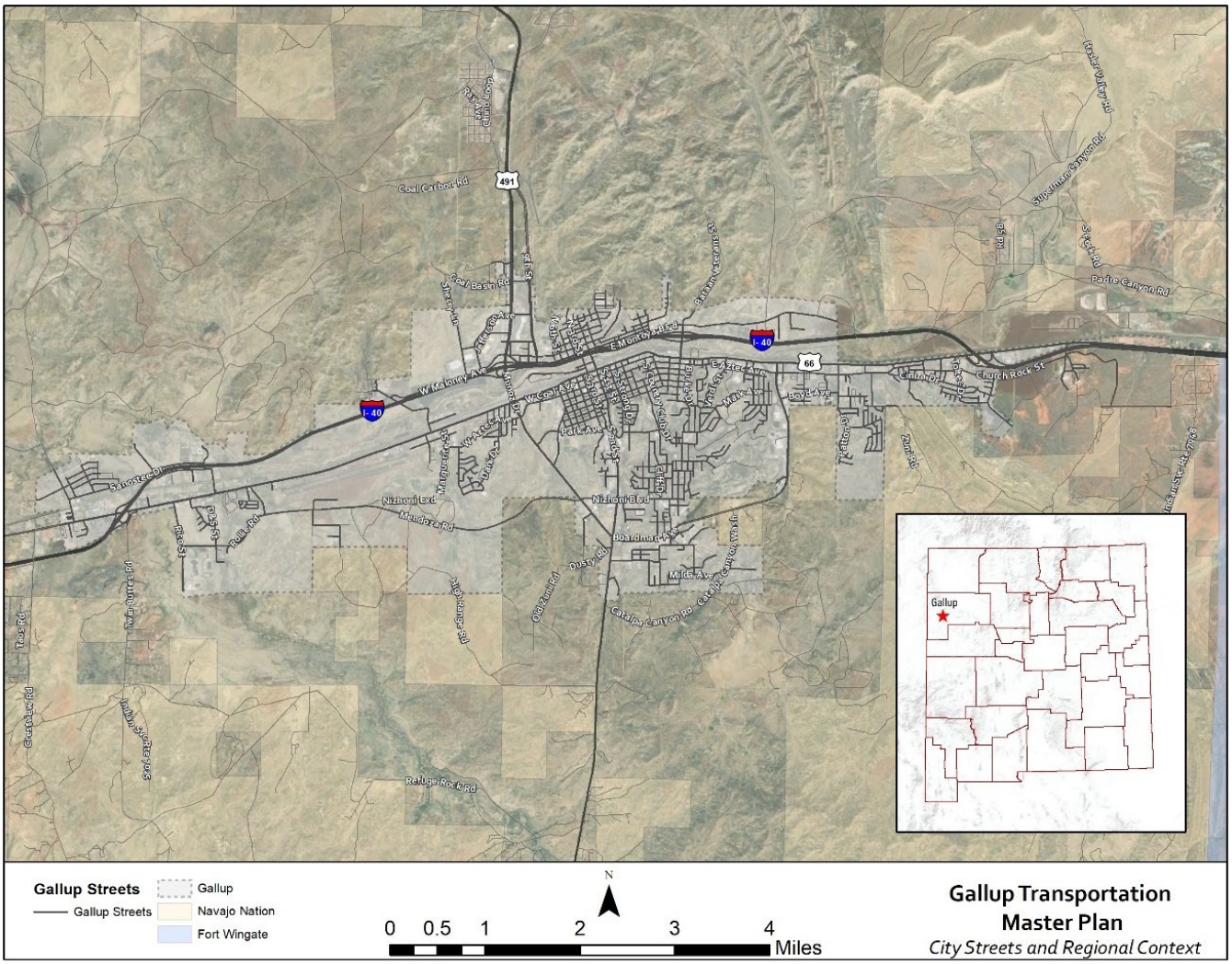


Figure 1: Gallup Road Network and Regional Context

PREVIOUS PLANNING EFFORTS

GALLUP DOWNTOWN REDEVELOPMENT PLAN (OCTOBER 2021)

Gallup's Redevelopment Plan highlights goals to enhance the City's downtown appeal and infrastructure through the incorporation of past, present, and future plans. The plan outlines revitalization recommendations, transportation recommendations, and funding sources that would improve the functionality of the downtown community.

***Revitalization Recommendations**:*

- Work with the Northwest New Mexico Council of Governments (NWNMCOG) and the New Mexico Department of Transportation (NMDOT) on implementing the transportation projects within the revitalization projects list. These include pedestrian improvements, multimodal infrastructure, and general street improvements.
- Utilize the City of Gallup's Transportation Master Plan to further highlight downtown transportation needs and ensure integration between plans.

Transportation Recommendations:

- Continuation of improvements to the NM 118 "Route 66" corridor to increase pedestrian safety and promote traffic calming through the downtown area.
- Implement the downtown specific recommendations outlined with the Gallup Transportation Safety Plan, consisting of congestion mitigation and bike and pedestrian improvements.

NORTHWEST NEW MEXICO REGIONAL TRANSPORTATION PLAN (JANUARY 2021)

This Regional Transportation Plan centralizes around the vision to create "A safe and sustainable multimodal transportation system that supports a robust economy, fosters healthy communities, and protects New Mexico's environment and unique cultural heritage." The development of a long-range transportation plan provides an opportunity for elected officials, organizations, and individual citizens to determine how the transportation system in their area should be structured to better serve future needs effectively and efficiently. This Regional Transportation Plan (RTP) for Northwest New Mexico is an integral part of the New Mexico Transportation Plan (NMTP), a federal requirement for the New Mexico Department of Transportation. The purpose of the RTP is to apply the State's vision, goals, objectives, and strategies at the regional level. Under federal law, long-range transportation plans must look ahead at least 20 years, although the State of New Mexico chose to look ahead 25 years for its transportation planning. This Northwest New Mexico RTP provides a framework for thinking about the region's transportation system over the period of 2020 to 2045.

The transportation-specific strategies are outlined below:

Strategy 1.1	**Employee Excellence and Customer Service**	Expand use of technology to communicate important messages about service delivery, transportation information, and performance.
Strategy 2.1	**Data Driven Process**	Reduce fatalities and serious injuries through data-driven, innovative, and proactive processes that include examination of safety hot spots and systematic safety concerns: Adopt transportation safety policies related to Complete Streets, pedestrian design, and access management.
Strategy 3.1	**Asset Management**	Implement Transportation Asset Management Plan (TAMP) that identifies appropriate treatments (maintenance, preservation, rehabilitation, reconstruction) to ensure that all NMDOT assets are brought to and remain in a state of good repair.
Strategy 4.1	**Operations and Demand Management First**	Develop a strategic plan with stakeholder input to identify and coordinate Traffic Demand Management (TDM) activities in New Mexico, including real-time traveler information and Intelligent Transportation Systems (ITS).
Strategy 4.2	**Strategic Investment in Key Corridors**	The Northwest RTPO supports the NMDOT goal of prioritizing projects, programs, and activities that help minimize transportation infrastructure and service costs through coordination of transportation and land use planning (including site selection for public facilities).
Strategy 4.3	**Land Use Transportation Coordination**	NWRTPO supports NMDOT's objective to make efficient use of both transportation and non-transportation resources to reduce costs and improve mobility of residents and visitors. With limited funding available, the Northwest RTPO understands NMDOT's strategy to prioritize projects, programs, and activities that help minimize transportation infrastructure and service costs through coordination of transportation and land use planning (including site selection for public facilities).
Strategy 4.4	**Changing Demographics**	The Northwest RTPO applauds NMDOT's objective to maintain a transportation system that allows mobility and access for all New Mexicans, regardless of age or ability, and its strategy to align the transportation system to be responsive to changing demographic trends.
Strategy 5.1	**Context Sensitive Solutions**	NWRTPO supports NMDOT's strategy when developing projects and programs to find a "best fit" transportation solution for the local and regional context that meets the expectations of both NMDOT and community stakeholders.
Strategy 5.2	**Require and Respect Local and Tribal Plans**	The Northwest RTPO supports NMDOT's strategy to target funds to support communities that develop local transportation plans that are consistent with the NMTP and that demonstrate the financial and administrative capacity to implement them successfully.
Strategy 5.3	**Climate Change and Environmental Practices**	NWRTPO supports NMDOT's objective to minimize or avoid negative impacts of facility development and operations on the natural environment, where possible; and provide guidance to RTPO's around recommended strategies to address climate change in a manner that helps preserve transportation infrastructure for the long term.
Strategy 5.5	**Designing Healthier Communities for Healthier New Mexicans**	The Northwest RTPO believes that active living by design leads to healthy communities. Health professionals should be included in public participation and input processes across all transportation projects and modes of travel. Based on input and projects submitted in the recent "Call for Transportation Projects", many of the communities in the Northwest region are prioritizing walkable communities, ADA compliance studies,

		community trail systems, and recreational trails for safe and local opportunities to improve fitness.

MCKINLEY COUNTY COMPREHENSIVE PLAN (2020)

The McKinley County Comprehensive Plan focuses on creating "a common platform for stakeholders and communities, as well as units of governments to integrate and weave together the region's many existing planning documents in a comprehensive and holistic guide for regional sustainable development." The transportation element highlights the goal to "Achieve the highest feasible adequacy, accessibility, safety, and inter-connectivity of transportation facilities and services on behalf of county residents and visitors."

The transportation section focuses on creating an effective transportation system that promotes multimodal access to move people and goods throughout the County, including a major focus on improving all major roads to all-weather.

CITY OF GALLUP ADA TRANSITION PLAN (FEBRUARY 2020)

The City of Gallup ADA Transition Plan is a result of a federal mandate to ensure that the rights of handicapped individuals in the United States are protected and preserved. The Plan is a response to Title II of the Americans with Disabilities Act, which requires the City to work towards eliminating barriers that may prevent persons with disabilities from enjoying access to city facilities or from utilizing the transportation network with independent mobility. In compliance with the ADA requirements, the City of Gallup contracted with Bohannan Huston, Inc. to conduct a self-evaluation of pedestrian facilities along City roadway infrastructure, including sidewalks, curb ramps, obstructions within public walkways, and crosswalks. For this evaluation, a desktop evaluation was performed using ArcMap GIS, Google Earth, and Google Street View to categorize and detail the unique characteristics of each sidewalk, curb ramp, and crosswalk within city limits. Ultimately, the City of Gallup ADA Transition Plan contains an overview of the ADA, a grievance procedure with form, ADA guidelines and standards, an evaluation methodology, summary findings, a cost analysis, an implementation plan, recommendations, and several maps which visualize the findings of the inventory.

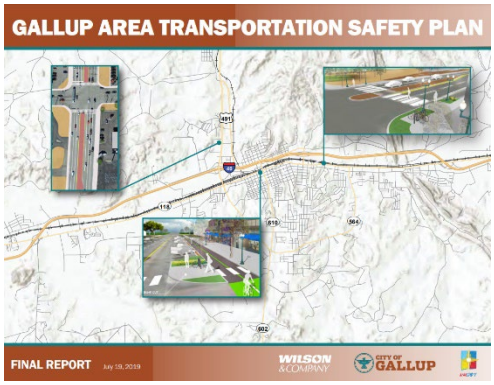
GALLUP LAND DEVELOPMENT STANDARDS (ADOPTED AUGUST 2018, LAST AMENDED JUNE 2023)

The Land Development Standards is the official zoning code of the City of Gallup for planning, zoning, subdivision, annexation, and related development procedures. The majority of transportation-related standards are listed and explained in Section 12-1-C: Roadway Design Standards and Section 13-1-C: General Criteria for Consideration of Annexation Requests.

GALLUP AREA TRANSPORTATION SAFETY PLAN (JULY 2019)

The overarching vision of this transportation safety plan is "To make Gallup a safer place for residents and visitors to walk, ride a bicycle, and drive." To achieve this statement, 4 goals were set:

- Reduce potential for vehicle/vehicle, vehicle/pedestrian, and vehicle/bicycle fatality and serious injury incidents
- Enhance the common understanding of need for roadway safety improvement in Gallup
- Partner with safety practitioners within and outside of the Gallup community to enhance roadway safety
- Evaluate opportunities to enhance roadway safety with all infrastructure projects



To support this vision and these goals for the City, the NM Strategic Highway Safety Plan (SHSP) (2021) was recommended to be included in the processes. This overarching transportation safety plan for NM, was updated in 2016, with the goal to "Reduce fatalities and serious injuries for all users on NM's roadways." This safety plan identifies emphasis areas based on the number and severity of crashes and stakeholder input. Each emphasis area has a series of safety strategies to draw from, and these strategies take a "4Es of roadway safety" approach:

- Engineering
- Education
- Enforcement
- EMS

NWNMCOG COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY PLAN (MARCH 2021)

This economic development strategy plan was put in place to guide growth and prosperity in the communities and counties of San Juan, McKinley, and Cibola. The plan focuses on how "the COVID-19 pandemic has exacerbated, accelerated, and under covered underlying economic trends, the interdependence of community and need for regional resiliency." La Ristra Northwest builds from a foundation of integrated and strategic economic planning and providing a guide to leaders and economic development practitioners

to advance their roles in facilitating and initiating economic development in their communities.

The transportation-related section of the plan, Transportation & Logistics, aims for these "economic initiatives to grow economic-based industry and employment through building on the strong asset-base of the region, including:"

- Major transportation facilities running east-west and northward to the San Juan Basin.
- 100+ years of history in energy-related industries.
- Continued natural resource availability, including renewables, for development and contribution to the national and regional energy portfolio.
- A workforce ready for retraining and deployment in new E-L-M employment opportunities.

CITY OF GALLUP GROWTH MANAGEMENT MASTER PLAN (GMMP) UPDATE (MARCH 2024)

The City's overarching goal through the GMMP, is to "develop a well-balanced transportation system that will provide for the safe and efficient movement of people and goods to, from, and within Gallup." The overarching transportation goal for the Master Plan is to "integrate transportation systems with road network, transit, bicycling, and pedestrian connectivity." Even more specific still, is the goal and purpose of the recommended Transportation Plan included within the Master Plan is to implement the "integration of roads serving development into regional transportation networks."

INTRODUCTION

The Growth Management Master Plan (GMMP) provides a vision for the City of Gallup's development over the next 20 years. It covers the topics of land use, housing, transportation, infrastructure, economic development, hazard mitigation, parks, recreation, and open space, community facilities, and community character. The plan provides goals and policies along with implementation actions that are needed to make the GMMP vision into a reality. The vision and priorities within the GMMP were developed through a robust public engagement process and reflect the community's values and desires for the future.

The City of Gallup is given the authority to adopt the GMMP through New Mexico State Statutes Section 3-19-9. Adoption of the GMMP allows the City to qualify for certain federal funding opportunities, including the Community Development Block Grant funds, as stated in the New Mexico Administrative Code.

GMMP GROWTH STRATEGY

The GMMP establishes a Future Development Framework Map, shown in Figure 2, which identifies the areas where growth is desired and the type of development patterns which support Gallup's desired future. The framework that establishes a range of development classifications across a rural-to-urban continuum which should be utilized to guide development decisions moving forward. The future development framework provides guidance and recommendations to coordinate development but is not a regulatory map.

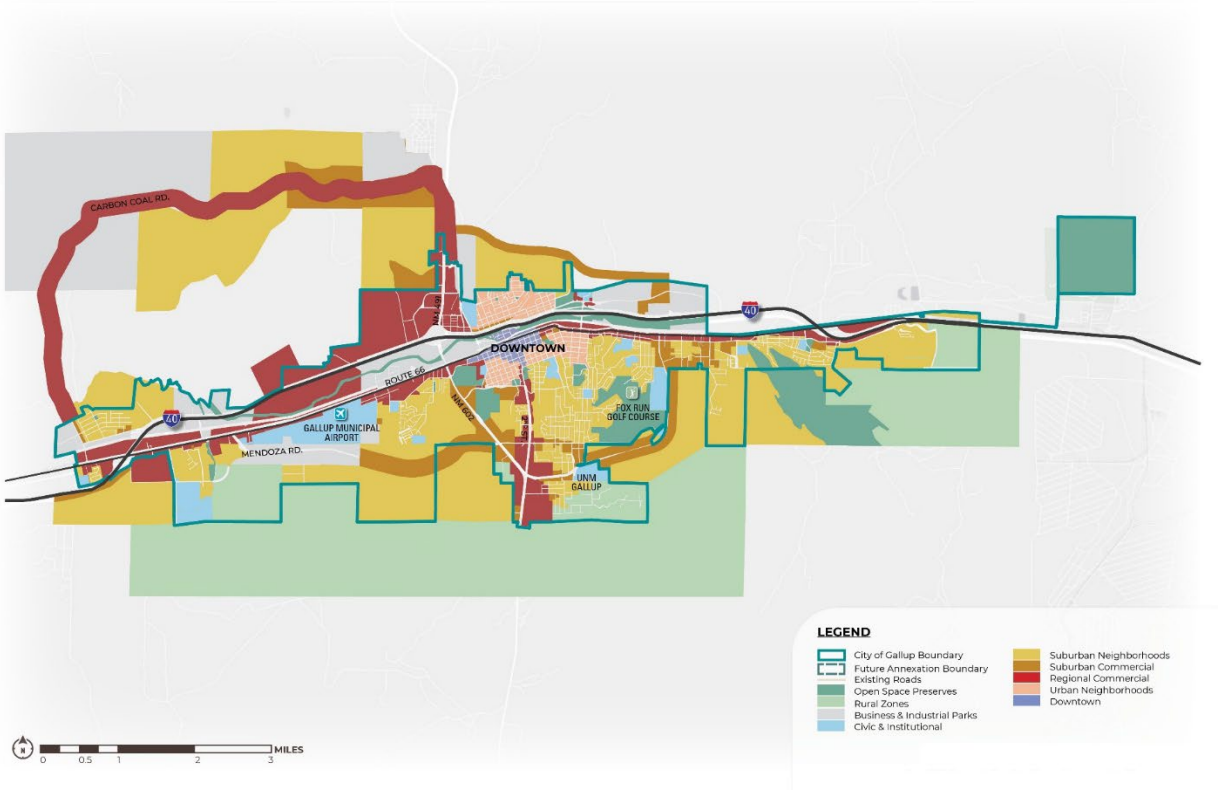


Figure 2: Future Development Framework

The Future Development Framework establishes a range of development classifications across a rural-to-urban continuum, as shown in Figure 3, used in urban design to organize the elements of the built environment — building, lot, land use, street, and all of the other physical aspects of the human habitat — in ways that preserve the integrity of different types of rural and urban environments. These environments vary along a continuum that ranges from less intensity (rural) to high intensity (urban).

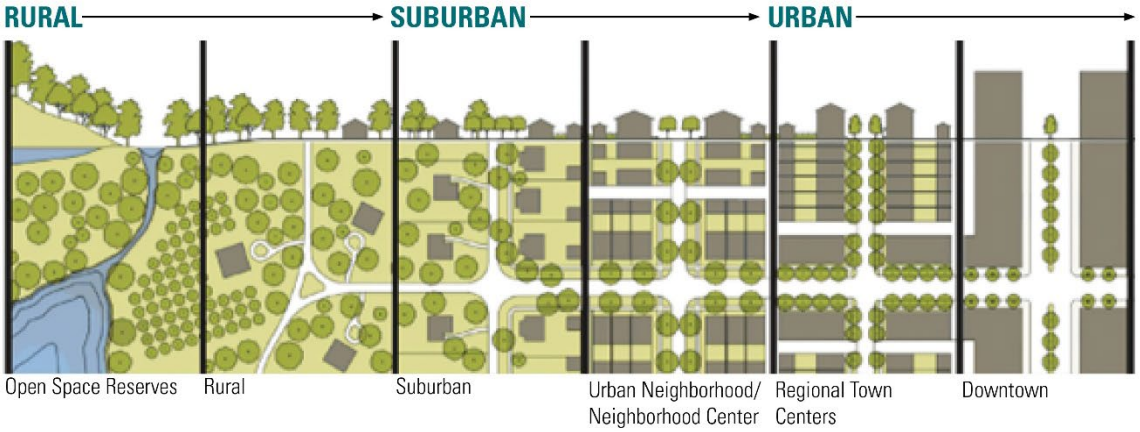


Figure 3: Continuum of Development Classifications

The framework establishes the following range of development classifications:

- **Open Space Reserves** are intended to remain open and undeveloped. These are designated for conservation and protection of natural and cultural resources, wildlife habitat, and viewsheds.
- **Rural** areas are characterized by scattered developments that include limited resource extraction, agricultural and commercial related activities, and low-density residential development characterized by large lots.
- **Suburban Neighborhoods** include detached and attached single-family residential uses on a variety of lot sizes and dimensions along with two-family dwellings, low-density apartments, and complementary uses.
- **Suburban Commercial** areas are intended to provide low intensity commercial, retail, and office uses that serve nearby residential suburban neighborhoods.
- **Regional Commercial** areas are designated for retail, commercial, and professional service uses that are of a scale to serve regional demand.
- **Business & Industrial Parks** are intended to host professional office, research and development, transportation-related uses, warehousing, and manufacturing uses in a concentrated area.
- **Civic & Institutional** areas are designated for educational facilities, community facilities, government-related uses, and religious institutions that may be either public or private facilities.
- **Urban Neighborhoods** are designated to include a variety of housing options within the City's historic residential neighborhoods near Downtown.
- **Downtown** is designated as a mixed-use destination that hosts a variety of high density residential, retail, entertainment, and civic and institutional uses.

The first two classifications -Open Space Reserves and Rural Zones- are on the rural side of the continuum where lands are largely designated for preservation or limited agricultural, commercial, or low-density residential development. Rural development patterns tend to be more auto-oriented as housing developments are clustered around ample open space reserves and limited commercial services are dispersed along major streets or intersections. The next three to four classifications - Suburban, Regional Commercial, and Business / Industrial Zones or Parks- are located in the middle of

the continuum and are designated as suburban areas that are primarily residential but with a slightly higher mix of housing types than rural areas. Suburban Development patterns tend to be more auto-oriented and linear with multi-tenant strip commercial developments along major streets such as arterials or collectors surrounded by low-density residential neighborhoods. Future developments within suburban areas should prioritize the creation of mixed-use neighborhoods that offer greater integration and variety of housing types and commercial developments that prioritize improved pedestrian connectivity to destinations, within developments, and to nearby neighborhoods. The last two classifications – Urban Neighborhood and Downtown- skew towards the urban end of the continuum and are generally associated with Downtown and the adjacent neighborhoods. Urban Development patterns tend to be more pedestrian-oriented with mixed-use buildings that contain commercial services on the ground floor, with office and/or housing above sited directly on the adjacent frontages of a well-connected, gridded street network that provides a variety of pedestrian and bicycle facilities and amenities.

The future development framework also establishes targeted growth areas where future development and redevelopment is encouraged and incentivized. These growth areas include five centers and corridors classifications where high density, mixed-use growth should be directed to create vibrant community destinations. The five growth areas classifications include the following:

- **Downtown** is the primary destination for recreation and entertainment. The center is mix of destination retail, civic and institutional uses, and high-density residential uses in a pedestrian friendly environment that preserves the historic land development character.
- **Route 66 Mixed-Use Corridor** supports both commercial land uses and medium to high multi-family residential uses along the historic Route 66 Highway. Transportation updates within the corridor should provide multimodal improvements.
- **Employment Centers** support non-residential commercial, and business uses in campus like environments.
- **Regional City Centers** support high-density multi-family residential uses, commercial, civic, and institutional land uses within activity centers.
- **Neighborhood Centers** support surrounding residential neighborhoods with a mix of neighborhood serving commercial uses and low to medium density multi-family residential uses.

The priority growth areas fall primarily on the suburban and urban ranges of the continuum. They are intended to promote mixed-use developments that range from more moderate intensity within more suburban neighborhood centers to higher intensity within the Downtown urban core. Development patterns in more suburban neighborhood centers will tend to consist of more auto-oriented commercial centers located along major arterials or at major street intersections. Future development or redevelopment within suburban centers should prioritize the creation of mixed-use nodes that incorporate medium-to-high density multi-family housing types and improved pedestrian connectivity to the center, within the center and to nearby commercial districts and neighborhoods. Development patterns in urban centers or corridors are envisioned to be the most walkable, pedestrian-oriented areas within Gallup consisting of mixed-use buildings that contain commercial services on the ground floor and office and/or housing above. Such mixed-use buildings should be sited directly on the

adjacent street frontages that are part of a well-connected, gridded network that provide a variety of pedestrian and bicycle facilities and amenities.

COORDINATION OF LAND USE, TRANSPORTATION, AND INFRASTRUCTURE

Land use patterns, density, and intensity influence travel patterns. For example, compact, mixed-use development can increase the accessibility and attractiveness of walking, biking and transit supporting more diverse and vibrant neighborhoods and districts that can reduce the vehicle miles traveled between destinations. Sprawling and segregated land uses on the other hand can increase the dependency on cars, creating more and longer trips that increase congestion within the system and generate more greenhouses gas emissions and air pollution. Coordinating land use patterns with transportation in a manner balances land use and transportation needs is therefore vital to achieve GMMP's vision of a vibrant, safe, healthy, and prosperous future. Land use development patterns should support a variety of transportation options. Transportation infrastructure design should be linked to the desired intensity and character throughout the City.

The GMMP establishes the general street character typology distinctions to coordinate with the GMMP Growth Management Strategy with future transportation improvements:

- **Rural Streets**, associated with the rural development classifications of Open Space Reserves and Rural, should be designed for lower traffic volumes and faster moving traffic. The streets in these areas are used for short trips within the rural neighborhood, trips to nearby activity centers, or to provide connections to suburban and urban development areas. Generally, these streets have minimal pedestrian and bicycle infrastructure.
- **Suburban Streets**, within the development classifications of Suburban Neighborhood, Suburban Commercial, Regional Commercial, and Business & Industrial Parks, should balance the needs of motorized and nonmotorized users. The priority design consideration is efficient motor vehicle flow. Suburban streets accommodate greater levels of bicycle and pedestrian activity than rural streets.
- **Urban Streets**, within the urban development classifications of Urban Neighborhood and Downtown, should be complete streets, providing safe environments for all users. The priority design consideration is pedestrian activity to foster a walkable environment.

Improvements to the transportation network must also be coordinated with other utilities and infrastructure systems. Critical infrastructure such as water, wastewater, electrical, and telecommunications lines and equipment are often located within the street right-of-way. Historically, infrastructure improvements in Gallup were uncoordinated in their scheduling, resulting in the demolition of new streets to update deteriorating utilities located underneath the pavement. Increased coordination and scheduling of transportation and infrastructure improvements can reduce the frequency and duration of construction on rights of way, reduce traveler delays, and decrease costs. Coordination of transportation and infrastructure planning can provide leverage where funding is limited.

Asset management should be coordinated across transportation and infrastructure systems. Locations of existing and new utilities should be mapped. The existing utilities are not consistent in their location

within public rights-of-way and utility corridors. The locations of existing utilities have not been adequately documented. Documenting utility locations and coordinating asset management would ensure road and utility infrastructure can be more efficiently maintained.

GMMP TRANSPORTATION-RELATED GOALS AND POLICIES

The following goals have been identified by the City of Gallup within the *Growth Management Master Plan* as priorities for the transportation network going forward. Specifically, the Plan states that the City will work to "develop a well-balanced transportation system that will provide for the safe and efficient movement of people and goods to, from and within Gallup." [1] The following table contains the specific goals identified within the plan.

The GMMP includes the following transportation-related goals:

Land Use Goal 5: Coordinate land use, transportation, and infrastructure decisions and ensure that Gallup residents have convenient access to goods and services.

Community Character Goal 4: Promote context sensitive street design that supports varying levels of complete streets based on the intended built context of surrounding development.

Strategies listed under this Community Character goal include adhering to the recommendations for street design priorities and street elements which are listed in the Community Character section. These recommendations include designing streets within urban contexts with complete street concepts to serve as public gathering spaces and designing street within rural environments to prioritize vehicle traffic.

Infrastructure Goal 2: Enhance preventative maintenance to provide more reliable service.

Strategies and policies listed under this infrastructure goal include improving asset management to preserve and extend facilities' life cycles and coordinating improvements with expected growth, as defined in the Gallup Growth Management Strategy.

Infrastructure Goal 3: Allocate and identify sufficient resources to support current and future infrastructure needs.

Strategies and policies listed under this infrastructure goal include adopting an impact fee ordinance to ensure the provision of an adequate level of service for infrastructure and to allocate the costs of infrastructure extensions fairly to support new development. Evaluating the economic, social, and environmental costs and benefits of potential infrastructure projects is vital to ensure efficient use of public expenditures.

Infrastructure Goal 4: Ensure coordination among utility providers and agencies to maximize efficiencies and bridge service gaps.

[1] City of Gallup, *City of Gallup Growth Management Master Plan Update*, 2023.

Strategies and policies listed under this infrastructure goal include encouraging the joint use of rights-of-ways and easements and coordinating the scheduling of infrastructure improvements, replacement, or expansion across infrastructure systems and with NMDOT improvements. Ensuring infrastructure improvements are scheduled to occur concurrently and without disturbing newly improved systems will reduce inefficiencies and unnecessary infrastructure improvement costs.

RECOMMENDATIONS

Street improvements and future roadways should be designed based on the development classification context. The prioritization of street elements listed in the Community Character section of the GMMP should be implemented in future improvements. The TMP should further this coordination of land use and transportation in promoting context-sensitive design.

The coordination of planning, design, and improvements between the City of Gallup Public Works, NMDOT, and utility providers should be elevated to increase construction efficiency and reduce infrastructure costs.

For more detailed information included in the GMMP, please visit the City's website at: https://www.gallupnm.gov/

CHAPTER 2: COMMUNITY ENGAGEMENT

MEETINGS

During the development of the *Gallup Transportation Master Plan*, several meetings were coordinated to engage local stakeholders and community residents. Details on these meetings are provided below.

STAKEHOLDER MEETING 1 – FEBRUARY 1ST, 2023

The first stakeholder meeting for the Gallup TMP was held on February 1st 2023, at the El Morro Events Center. During the meeting, a presentation was held which detailed the contents and purpose of the TMP and allowed for local stakeholders to shape and influence the content of the plan. Several interactive boards were also made available which allowed for stakeholder input to be provided regarding bicycle and pedestrian facilities, dangerous driving and walking locations, areas of high congestion, and potential development opportunities in and around Gallup.

Figure 4: Stakeholder Meeting 1

In addition to the input boards, an interactive poll was provided to the various stakeholders following the overview presentation. When stakeholders were asked to prioritize the elements that would be included in the plan, participants indicated safety as their top priority, followed by efficiency, connectivity, maintenance, and multimodal/complete streets (Figure 5). When asked to identify their biggest frustration with the current transportation network in Gallup, participants identified issues such as

potholes, congestion, railroad crossings, drainage, North-South connectivity, [a lack of] bike lanes, and a lack of funding as current issues with the transportation network. Figure 6 shows a word cloud of the responses received during this poll. When asked what improvement they would like to see for the future transportation network in Gallup, stakeholders identified several different improvements, including better public transportation, a loop from US 491 to I-40, drainage improvements, safer intersections, and various other projects. The full list of responses is available in Figure 7.

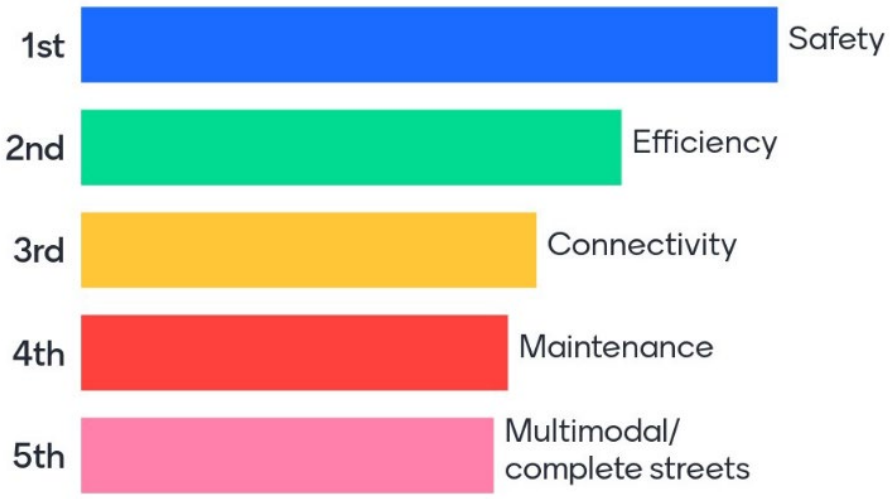


Figure 5: Stakeholder Meeting 1 - Plan Element Prioritization Rankings

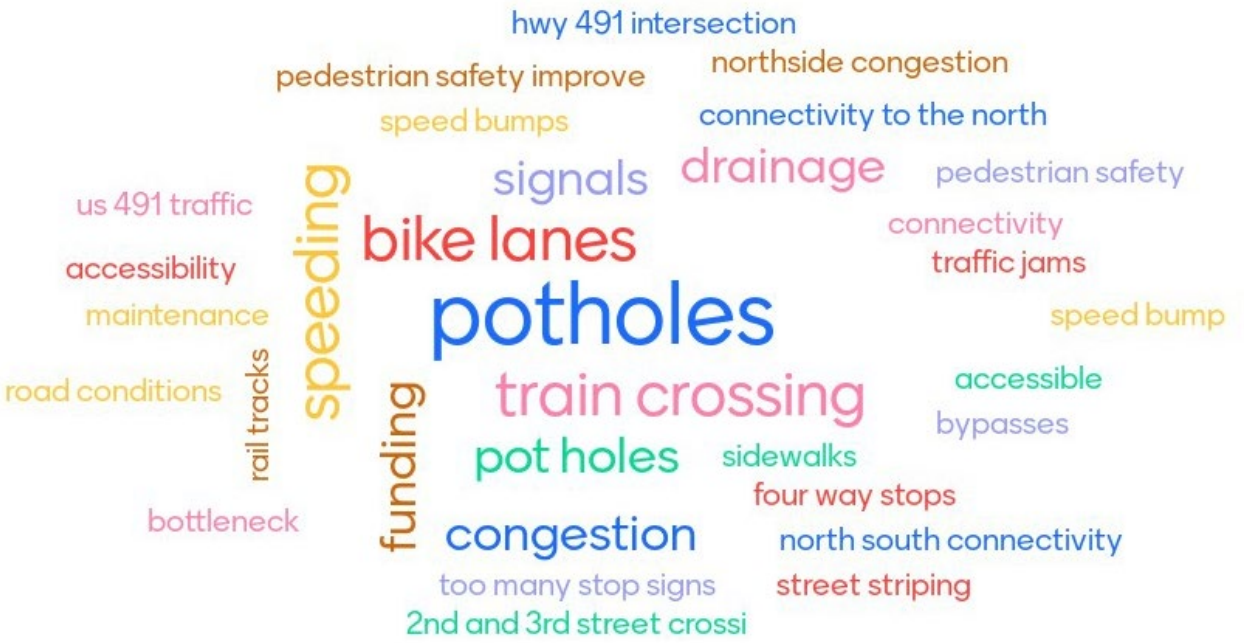


Figure 6: Stakeholder Meeting 1 - Current Transportation Frustrations Word Cloud

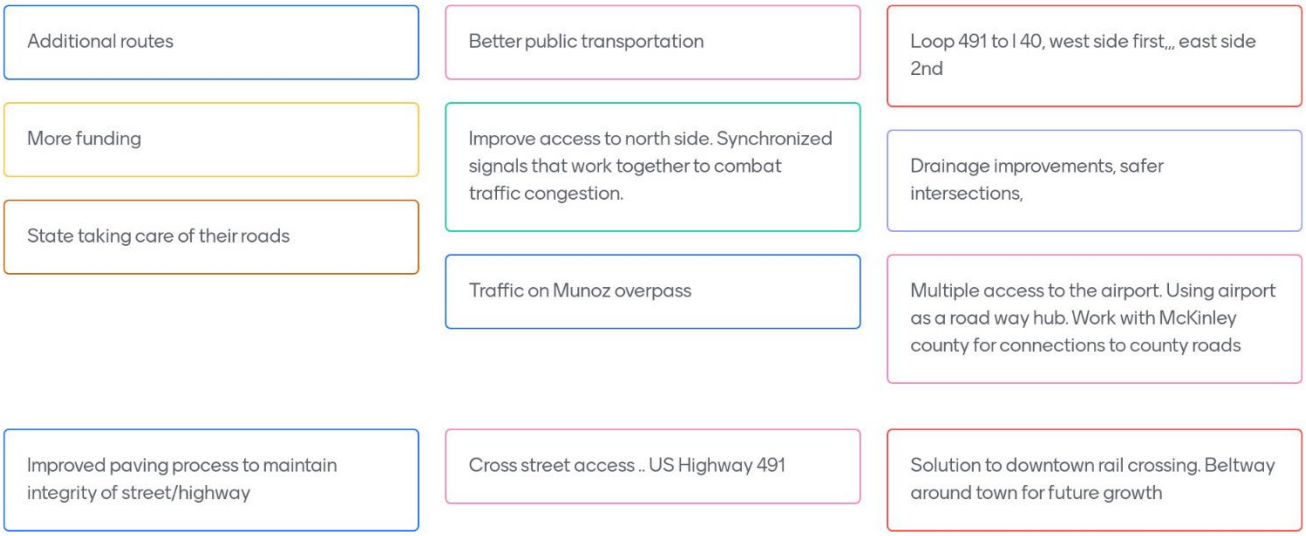


Figure 7: Stakeholder Meeting 1 - Desired Future Transportation Improvements

PUBLIC MEETING - MARCH 13TH, 2023

A public meeting was held on March 13th, 2023, at the El Morro Events Center to facilitate input from Gallup residents regarding the TMP. The meeting included a presentation by the project team which provided an overview for the TMP, along with interactive activities designed to obtain input on how to shape Gallup's transportation system going forward. The meeting also allowed for the opportunity for residents to talk directly with the project team and city staff about the TMP, and to share thoughts about Gallup's transportation future.

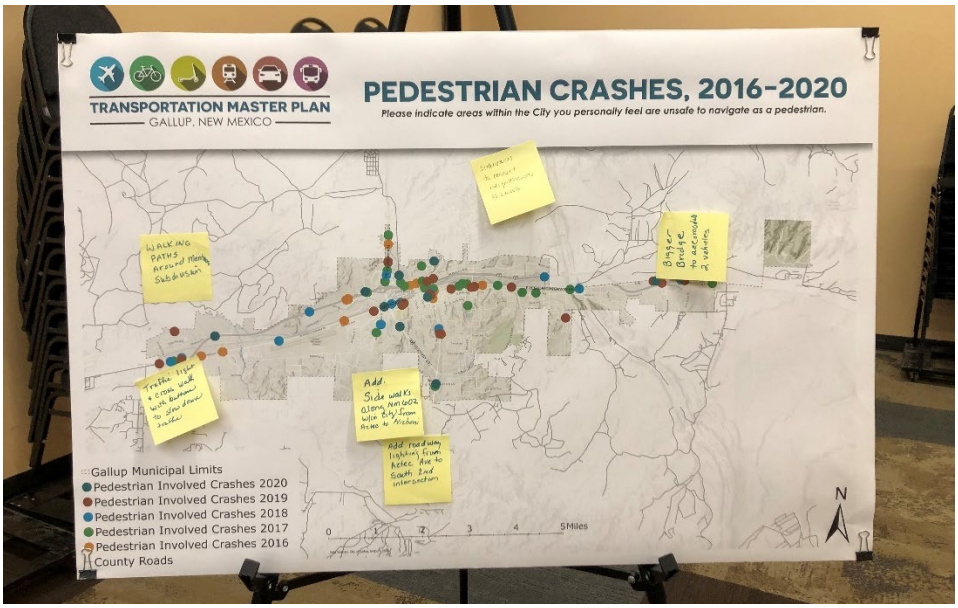


Figure 8: An Interactive Board with Public Comments

As with the stakeholder meeting, an interactive poll was provided to the attendees following the overview presentation. When asked to indicate their level of concern for different transportation elements (Figure 9), participants identified safety as their primary concern, followed closely by maintenance. Elements such as efficiency, multimodal infrastructure, and connectivity were identified as less concerning. When asked to rank their biggest frustration with the current transportation network in Gallup, participants identified road maintenance as the number one issue, followed by roadway congestion, speeding, delays caused by trains, signals, and lack of bike lanes as current issues with the transportation network (Figure 10). Participants were then asked to indicate the type of improvements they would like to see for the future transportation in Gallup, to which respondents indicated additional roadway improvements as the number one improvement, followed by increased roadway maintenance, safer intersections, better roadway drainage, and better public transportation connections (Figure 11).

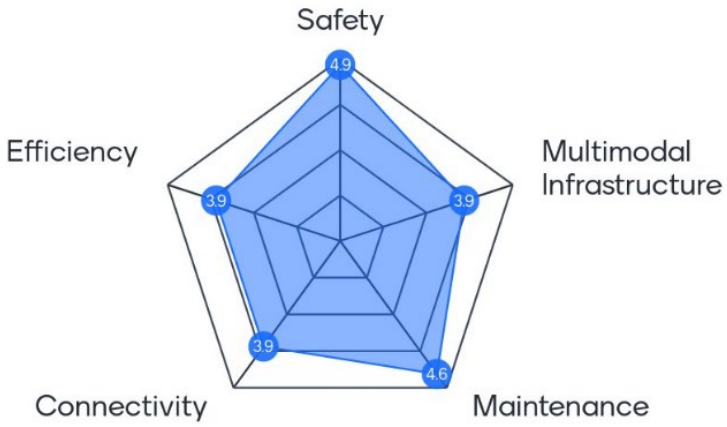


Figure 9: Public Meeting 1 - Level of Concern Spider Chart

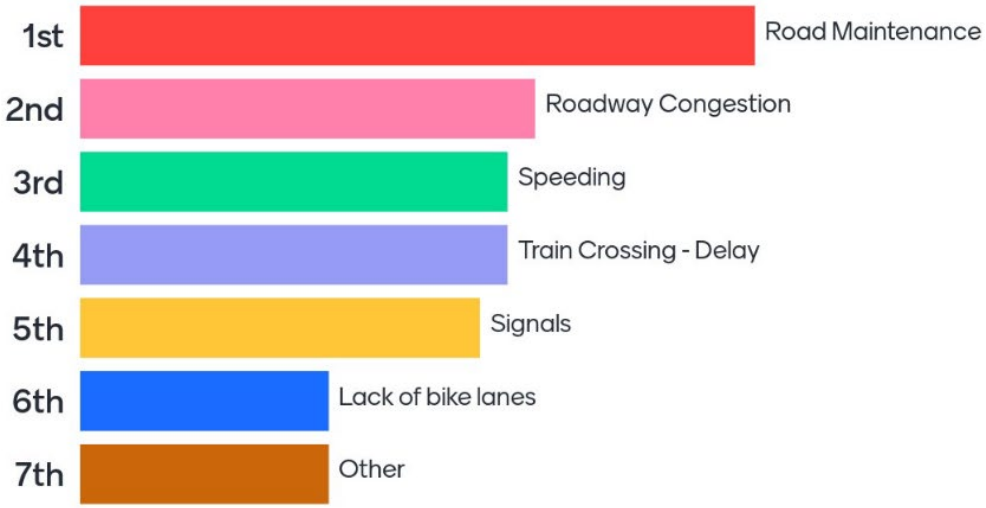


Figure 10: Public Meeting 1 – Current Transportation Frustrations Ranking

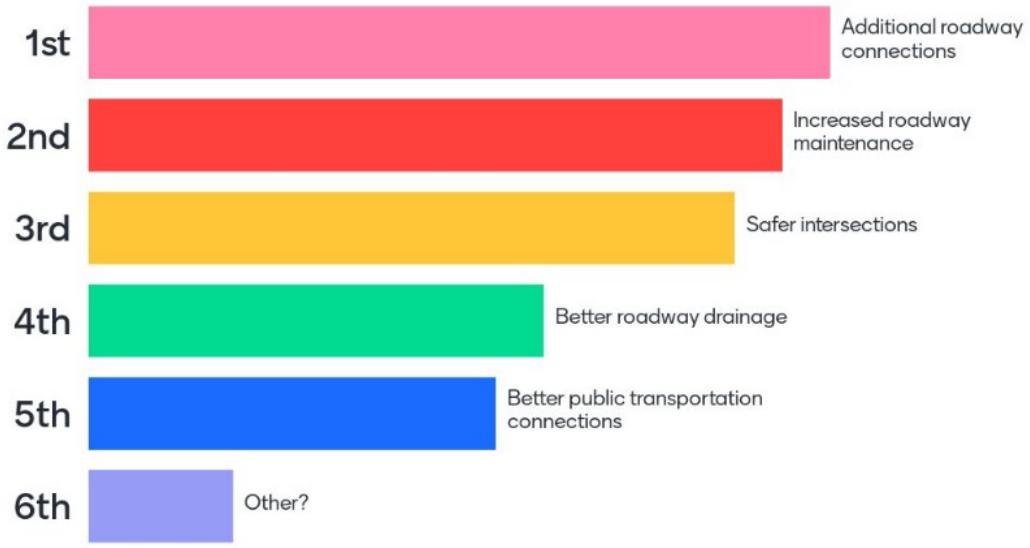


Figure 11: Public Meeting 1 - Future Transportation Improvements Ranking

STAKEHOLDER MEETING 2 – MAY 17TH, 2023

The second stakeholder meeting for the Gallup TMP was held virtually on May 17th, 2023, over Zoom. During the first meeting, stakeholders were asked what improvements they would like to see for the future transportation network in Gallup, where we received several suggestions. Enough so that BHI developed a separate interactive map specifically for these stakeholders to draw their suggested improvements in filling in some of the Gallup-area Road gaps. Stakeholder input helped to "finalize" a future roadway map to support current roadway improvements and future new road implementation. Prior to opening this interactive map for comment, the project team made sure that the stakeholders understood what the purpose of the activity was: 1) let us know about anything development-related as it relates to the Travel Demand Model and 2) vetting and adding to the future road network. The majority of pins dropped on this map were “Alternative Connection” pins, accompanied by a line drawn in to show where about a future new road would make sense to relieve traffic congestion, travel time, etc. The Future Roadway Network interactive map, with stakeholder comments, is shown below:

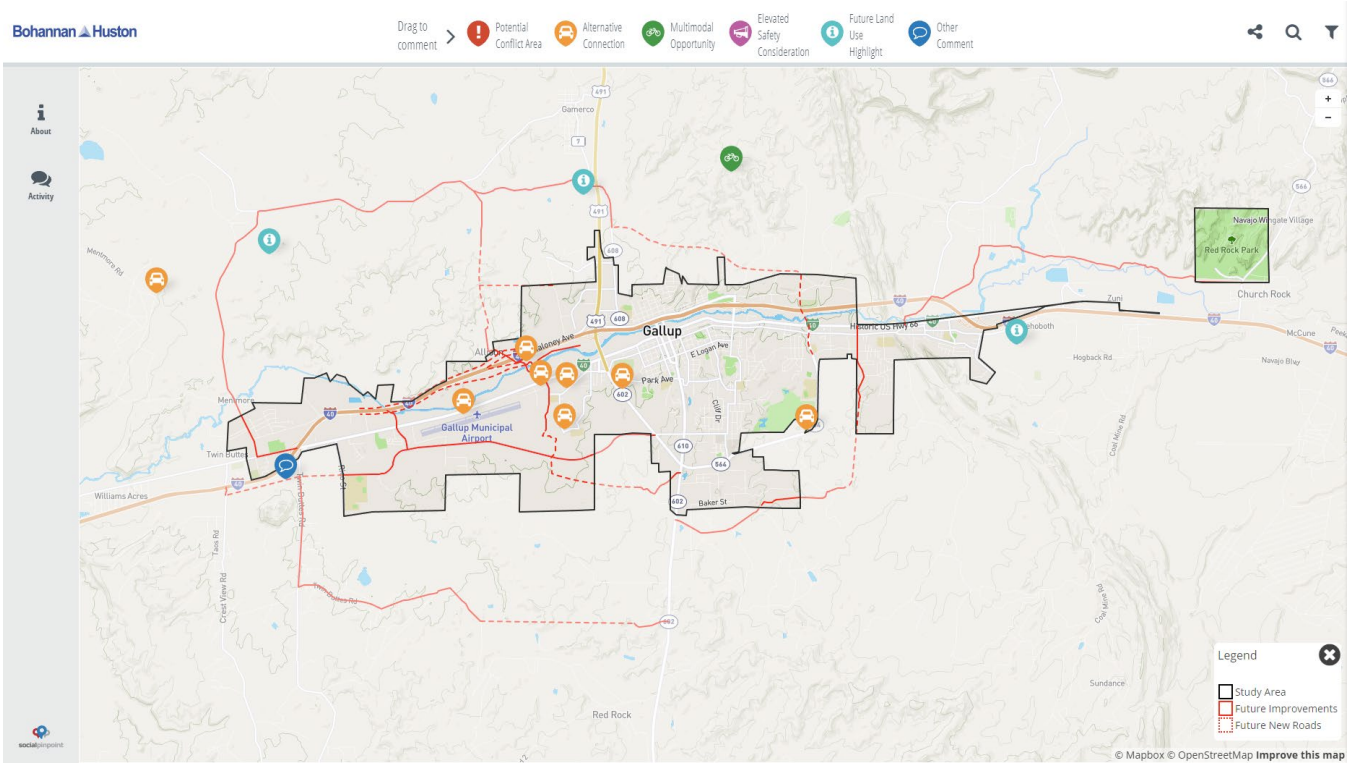
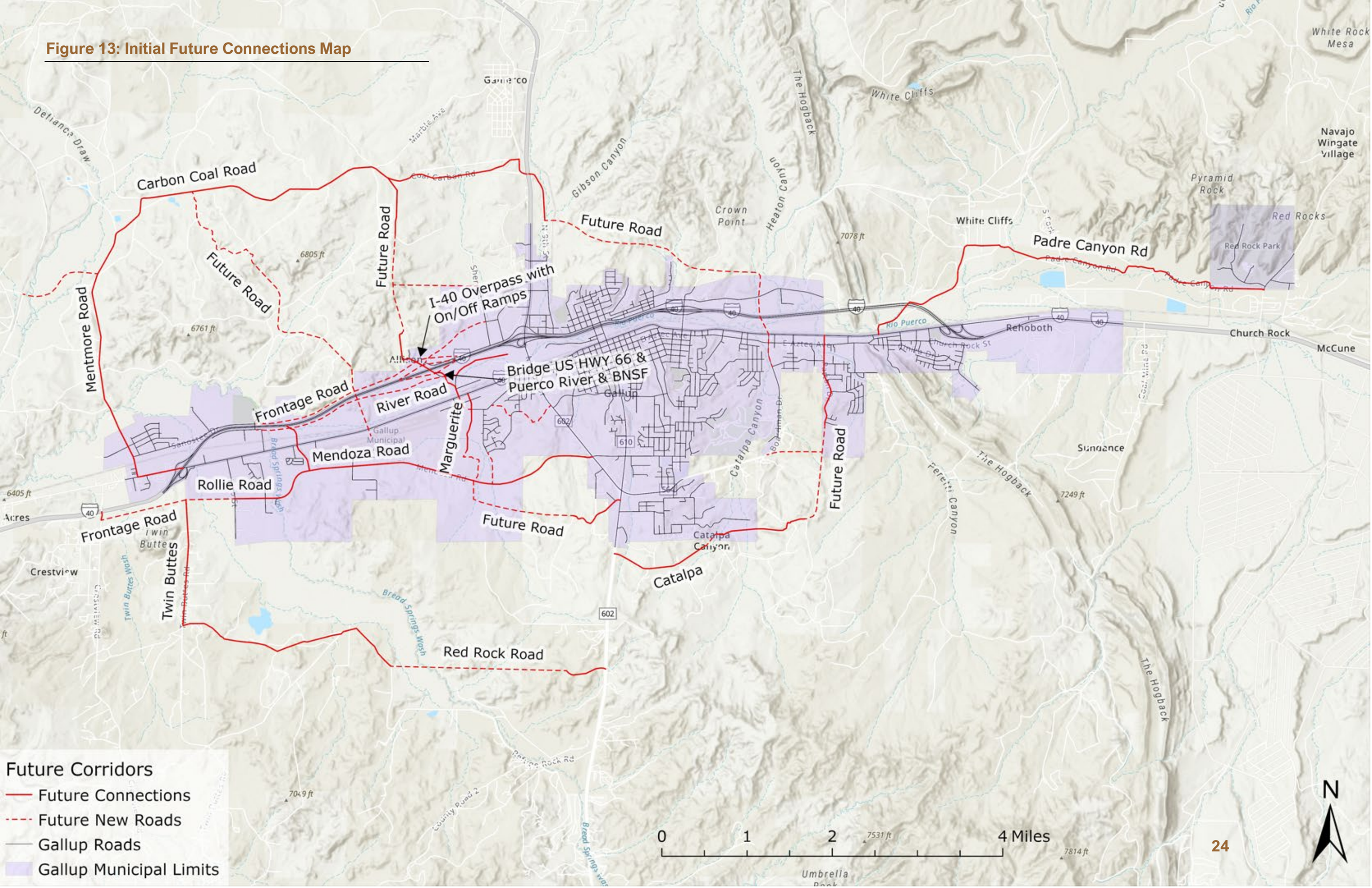


Figure 12: Future Connections Stakeholder Interactive Map

STAKEHOLDER MEETING 3 – SEPTEMBER 21, 2023

The third stakeholder meeting mostly revolved around the outcomes of the stakeholder-only interactive map and the results of the travel demand model. In between the second and third stakeholder meetings, with the help of the City, the stakeholder interactive map was vetted out based on the feasibility of the possible future road connections within Gallup. From this, a map was created showing all proposed roads (see below).

Figure 13: Initial Future Connections Map



These future new roads and connections were then analyzed through the Travel Demand Model to show their use and functionality. These results are shown and explained in the "Travel Demand Modeling" of this plan.

Preliminary recommendations were also shared with the stakeholders. These included bicycle and pedestrian safety recommendations based on crash analysis that was done prior to this meeting for this plan. Transportation network recommendations were also shared after identifying priority corridors and how new future roads would fit into the current network.

PUBLIC MEETING 2 – OCTOBER 26, 2023

The final public meeting, held in person at the El Morro Events Center, focused on a presentation primarily discussing outcomes of the planning process and the connection between early public input and the development of recommendations included in this plan. The presentation guided participants through the outcomes of the technical analysis – travel demand modeling and safety analysis – and the ensuing recommendations.

PROJECT WEBSITE

As part of the engagement process, BHI developed a project website to allow for Gallup residents to contribute to the planning process without the need to attend public meetings. On the project website, visitors could view an overview of the project, a timeline of the planning process, as well as additional resources like links to previous planning efforts, notes from each public meeting and initial draft sections of this plan for public review. The project website also allowed for direct feedback through project contacts and an interactive map, which is descried below. Over the course of the project, the website attracted 541 unique visitors and 1488 total visits.

INTERACTIVE MAP

To encourage informal input from Gallup residents, an interactive map was made available online on the project website, which allowed for users to place various pins on the map to identify transportation-related issues and potential improvements. In total, 6 different icons were able to be placed on the map, which were:

- Traffic Issue
- Bicycle Improvement
- Pedestrian Improvement
- Safety Concern
- Major Destination
- Other Comment

Upon placing an icon, users can then describe the particular concern, improvement needed, destination, or other comment, which could then be liked or disliked by other users. In total, 35 comments were left utilizing the interactive map.

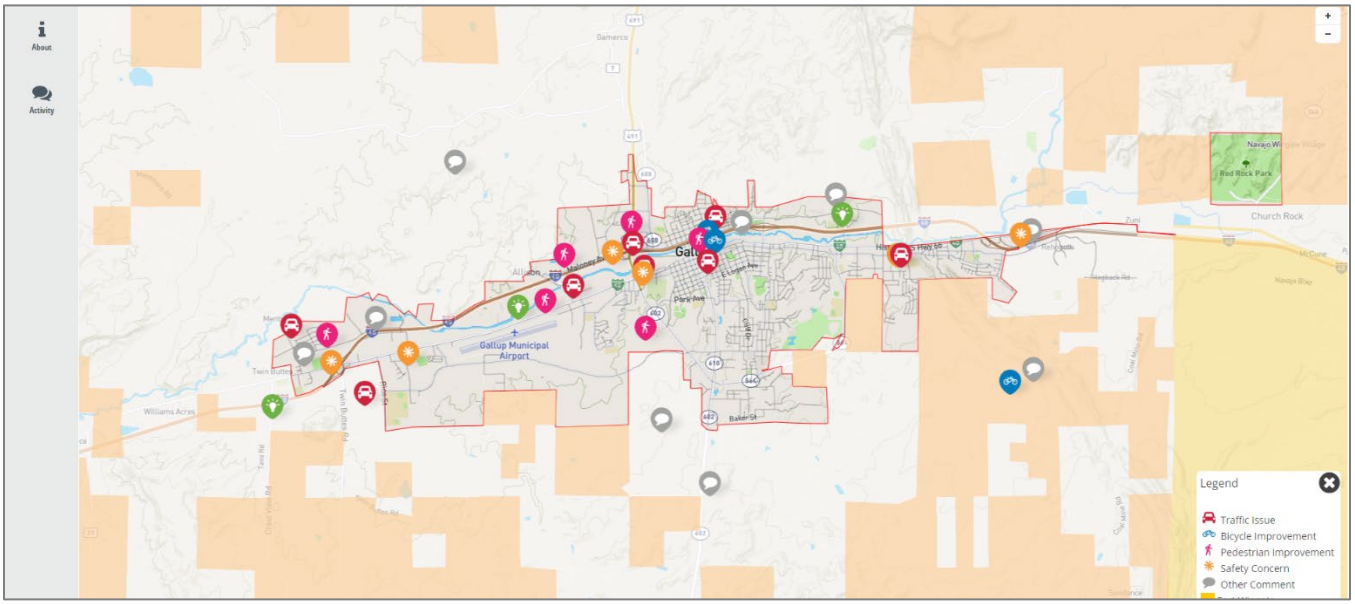


Figure 14: Gallup TMP Interactive Map

SOCIAL MEDIA

Throughout the Public and Stakeholder Engagement process of this project, many different Social Media Toolkits were created for the City of Gallup to support posts on their social media platforms in an attempt to spread awareness about the project as well as upcoming public meetings and input opportunities. These toolkits provided the City with draft text for Facebook including website links encouraging visitation to the project website and interactive map. These toolkits were updated for every public meeting.

CHAPTER 3: EXISTING CONDITIONS

DEMOGRAPHIC OVERVIEW

The following section contains selected demographic information from the 2020 Decennial Census and American Community Survey 5-Year Estimates.

POPULATION STATISTICS

According to annual population estimates provided by the US Census Bureau, Gallup maintained a total population of approximately 21,899 people in 2020, an increase of only 221 people (0.1%) from 2010. Of these residents, the racial composition of Gallup is 31.5% White, 1.4% Black or African American, 3.2% Asian, 47.7% Native American, and 6.5% Two or more races, while 30.6% identify as Hispanic or Latino. The median age of Gallup residents is 32.9, with 48.4% of residents being male, and 51.6% being female.

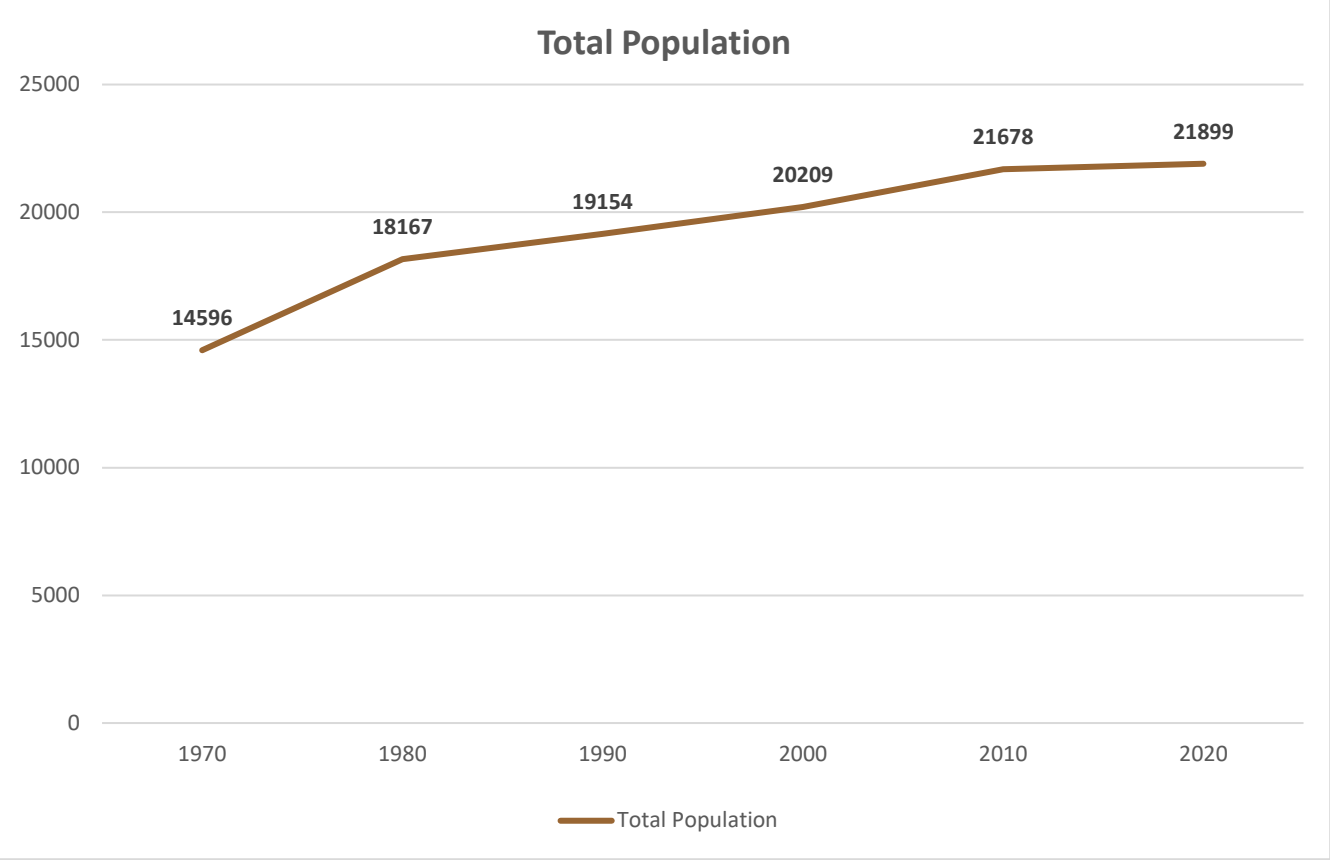


Figure 15: Gallup Historic Population 1970-2020, US Decennial Census

Table 1: Race and Hispanic Origin, 2020 Census, US Census Bureau[2]

Race	Gallup, NM	McKinley County
White	31.50%	16.30%
Black or African American	1.40%	0.70%
American Indian and Alaska Native	47.70%	79.60%
Asian	3.20%	1.10%
Native Hawaiian and Other Pacific Islander	0.40%	0.10%
Two or More Races	6.50%	2.30%
Hispanic or Latino	30.60%	14.20%
White alone, not Hispanic or Latino	18.90%	8.30%

WORKFORCE AND EMPLOYMENT STATISTICS

Gallup maintains a labor force of 8,304 people, with a median household income of $45,754, which is 10.7% below the state's median household income of $51,243. The per capita income of Gallup residents is $21,231. Gallup also has higher poverty and unemployment rates than the state average, with a 33.7% poverty rate and 7.3% unemployment rate compared to statewide rates of 18.6% and 6.6% respectively. The City also has a lower workforce participation rate (49.1%) compared to the state rate (53.2%).

Table 2: Gallup Economic Characteristics, ACS 5-Year Estimates (2020)

Employment Status	Estimate	Percent
Population 16 years and over	15,694	100%
In labor force	8,304	52.9%
Civilian labor force	8,304	52.9%
Employed	7,699	49.1%
Unemployed	605	3.9%
Not in labor force	7,390	47.1%
Civilian labor force	8,304	8,304
Unemployment Rate	(X)	7.3%

[2] https://www.census.gov/quickfacts/fact/table/NM,gallupcitynewmexico,mckinleycountynewmexico/PST045221

HOUSEHOLD STATISTICS

VEHICLE OWNERSHIP

According to 2020 ACS data, approximately 55 percent of Gallup households owned zero or one vehicle, while 25 percent owned 2 vehicles, and 19 percent owned 3 or more vehicles. Those residents with one car or less represent an opportunity for increased use of bicycling, pedestrian, and transit facilities.

Table 3: Gallup Vehicles Available Per Housing Unit, ACS 5-Year Estimates (2020)

Occupied Housing Units:	7,499	-
No Vehicle Available	568	7.6%
1 Vehicle Available	3,587	47.8%
2 Vehicles Available	1,903	25.4%
3 Vehicles Available	1,033	13.8%
4 Vehicles Available	344	4.6%
5 or More Vehicles Available	64	0.9%

COMMUTING PATTERNS

According to 2022 OnTheMap inflow-outflow statistics, which profiles the movement of employed individuals across jurisdictional boundaries, 8,160 workers are employed in Gallup, but live outside the City, 5,797 workers are employed and live in Gallup, while 3,984 workers live in Gallup but are employed elsewhere.[3] Of all Gallup workers, the primary mode of transportation to work was driving alone (76.7%), followed by carpooling (9.6%), walking (4.1%), and public transportation (3.6%). A number of Gallup residents also work at home (5.6% according to 2020 ACS data).

A large percentage of the employed residents in Gallup travel outside of the City and McKinley County in order to reach their place of work. Of all Gallup workers, 59.3% work within the City, with the remaining 40.7% traveling to destinations such as Albuquerque and Farmington for work (see table 3). Of all workers, the average commute time was 13 minutes.

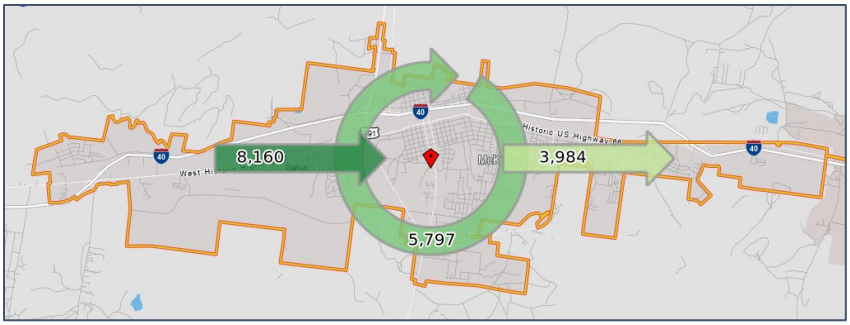


Figure 16: Inflow-Outflow Commuting Statistics, OnTheMap (2019)

[3] https://onthemap.ces.census.gov/

Table 4: Job Counts by Places, OnTheMap (2019)

Jobs Counts by Places (Cities, CDPs, etc.) Where Workers are Employed - All Jobs – 2019		
-	Count	Share
Gallup City, NM	5,797	59.3%
Albuquerque City, NM	543	5.6%
St. Michaels CDP, AZ	492	5.0%
Farmington City, NM	263	2.7%
Crownpoint CDP, NM	115	1.2%
Grants City, NM	112	1.1%
Santa Fe City, NM	77	0.8%
Black Rock CDP, NM	61	0.6%
Chinle CDP, AZ	53	0.5%
Las Cruces City, NM	50	0.5%
All Other Locations	2,218	22.7%

HOUSING & TRANSPORTATION (H+T) AFFORDABILITY INDEX

The Housing and Transportation (H+T) Affordability Index is a tool that presents information regarding household expenditures, along with the costs associated with driving and owning a vehicle or using public transportation. This information provides a clearer picture for how housing and transportation impact the overall affordability of a community. The H+T Index measure defines affordability as both housing and transportation costs totaling no more than 45 percent of household income.

On average, Gallup residents spend 32 percent of their household income on housing and 35 percent of their household income on transportation. The Center for Neighborhood Technology (CNT) currently sets the benchmark for what is considered affordable at no more than 45% of household income combined for housing and transportation costs, making the total H+T Index of Gallup (67%) 22 percent higher than what is considered affordable by the CNT.[4]

Owning a personal vehicle is the largest transportation cost factor for households, followed by insurance and repairs. The annual transportation cost for a Gallup resident is typically $11,949, according to the CNT.

TRANSPORTATION NETWORK

ROADWAYS

Automotive travel is currently the most-common mode of transportation in and around the Gallup area. The current roadway network is centered around two major roadways: U.S. Interstate 40 and the Historic Route 66. I-40 acts as one of the country's major transcontinental thoroughfares and bisects the city running East to West. Historic Route 66, which once acted as the country's primary automotive

[4] https://htaindex.cnt.org/fact-sheets/?lat=35.528351&lng=-108.743907&focus=place&gid=16478#fs

route, runs parallel to I-40 and goes through Downtown Gallup. U.S. Highway 491 (north) and N.M. Highway 602 (south) provide additional access to the Gallup area.

FUNCTIONAL CLASSIFICATION

Functional Classification refers to a framework for identifying the particular role of a roadway in moving vehicles through a greater roadway network. Over the years, functional classification has come to assume additional significance beyond its purpose within the greater network, and it now also establishes expectations about roadway design, including its speed, capacity, and relationship to existing and future land use development. The City of Gallup currently uses five separate classifications for its roadway network, which are:

- **Interstate** – provides connection to neighboring cities and states, featuring high speeds and traffic volumes.
- **Arterial** – major roadways and state highways intended to serve large amounts of traffic traveling relatively long distances at higher speeds.
- **Collector** – provides access to land uses and traffic circulation within residential, commercial, and industrial areas, and features moderate traffic volumes and speeds.
- **Local** – provides direct access to abutting land and to other streets, and features low traffic volumes and speeds.

The following functional classification definitions and characteristics have been established within the *New Mexico Department of Transportation Functional Classification Guidance Manual.*[5]

Interstate – Highest class of Arterials; abutting land uses are NOT directly served by them; also have higher speed limits, higher vehicle miles traveled (VMT), and more travel lanes (than Minor Arterials), which results in more mobility; are used for statewide travel, and typically represents the lowest percentage of mileage of the state's roadway network.

Principal Arterial - Other Freeways and Expressways – Very similar to Interstates, with travel lanes separated by some type of physical barrier, abutting land uses NOT directly served by them; also have higher speed limits, high VMT, and more travel lanes (than Minor Arterials).

Minor Arterial – Used for trips of moderate length and offer connectivity to the higher Arterial system (Principal Arterials). These roads may carry local bus routes. They offer less mobility (than Principal Arterials), but more accessibility.

Major Collector – Longer in length than Minor Collectors, connects larger traffic generators to the Arterial network; also have lower connecting driveway densities, higher speed limits, higher VMT, more travel lanes, and are spaced at greater intervals (than Minor Collectors); Major Collector mileage is less than Minor Collector mileage.

Minor Collector – Lower speed limits, located in under-served and clustered residential areas; have more connecting driveways, lower VMT than Major Collectors, fewer travel lanes, and are spaced at closer intervals than Major Collectors and includes more mileage than Major Collectors.

[5] https://www.arcgis.com/home/item.html?id=f2fc877d107b4e338deb789f70a8779e

Local – Account for the highest percentage of all roadways in terms of mileage. Local roads carry no through traffic movement and are used to provide access to adjacent land. Figure 17 and 17a below contains a map of Functional Classification within the City of Gallup.

Figure 17: Gallup Functional Classification (Current)

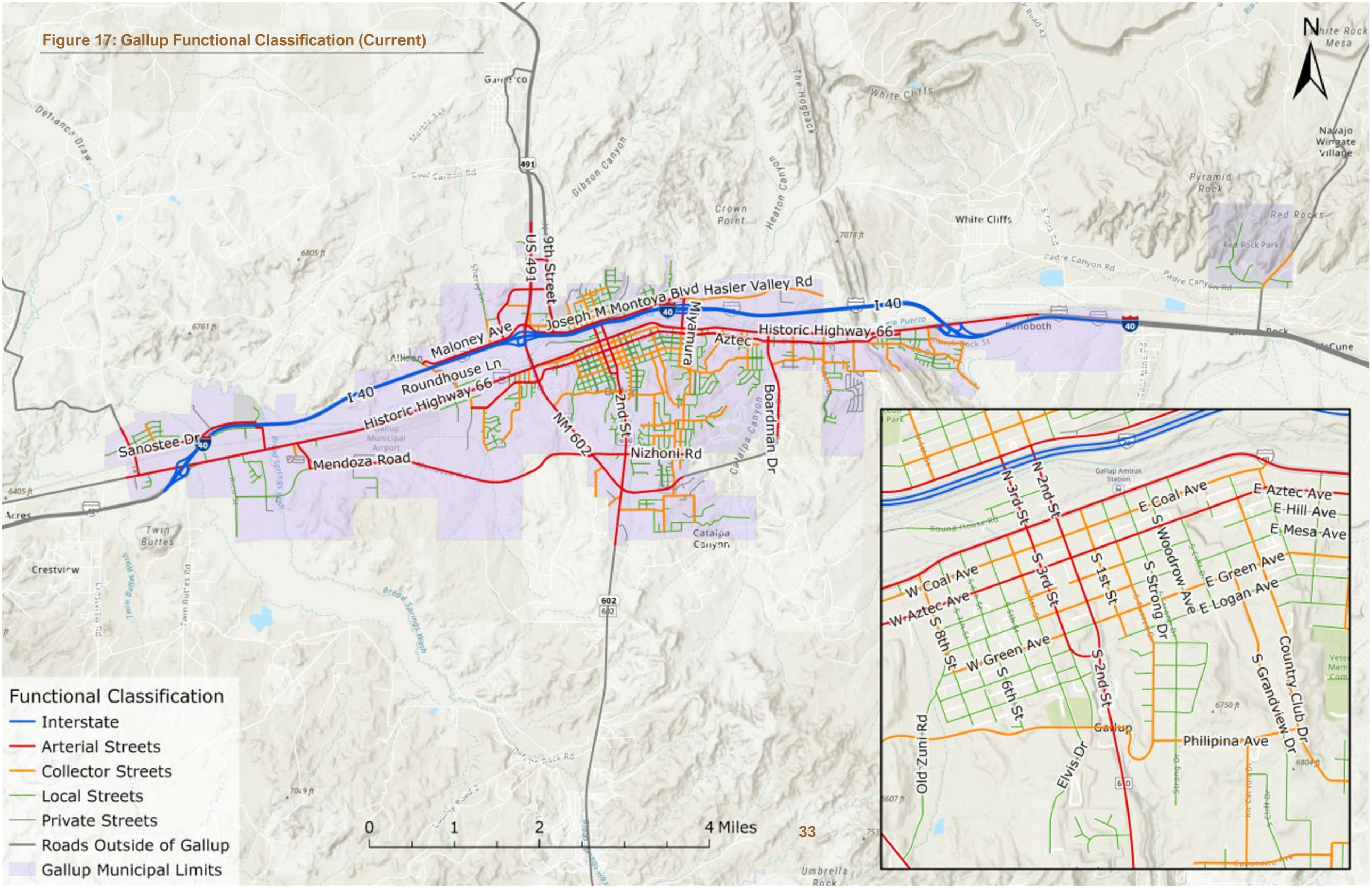
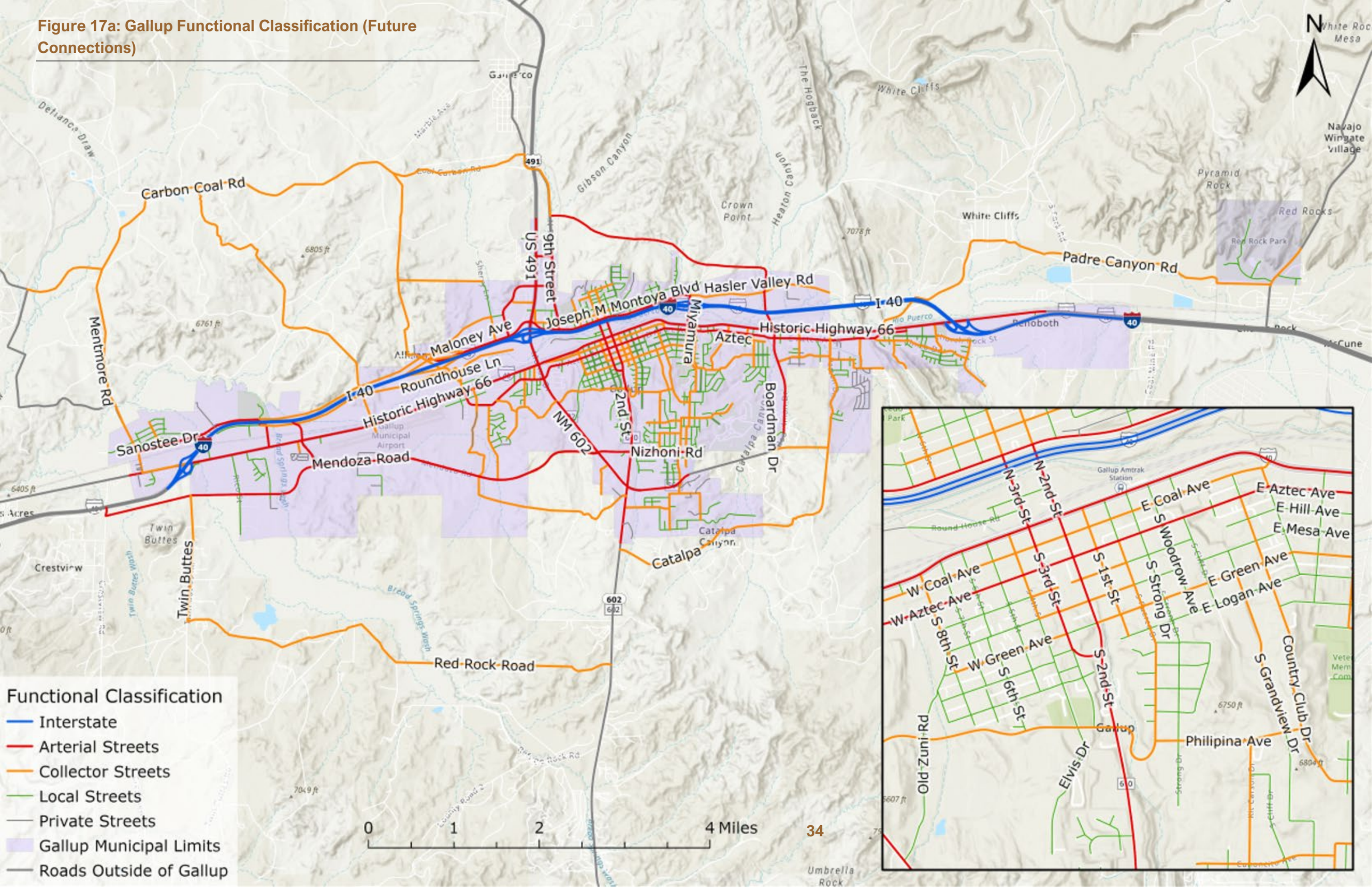


Figure 17a: Gallup Functional Classification (Future Connections)



Additionally, Figure 17a above shows the current Gallup functional classification with the addition of proposed future road connections with assigned functional classification of these. The functional classification process for these new road connections was based on a variety of information including, existing road way functional classification; future recommended functional classification and intended volume. As these connections are further evaluated in the future, functional classification should be reexamined based on updated information.

PEDESTRIAN FACILITIES

Pedestrian facilities are an essential component of a municipality's overall transportation system, providing the ability to travel for those who cannot, or choose not to, operate a car. In compliance with the Federal Americans with Disabilities Act requirements, the City of Gallup contracted with Bohannan Huston, Inc. in 2021 to conduct a self-evaluation of pedestrian facilities along City roadway infrastructure, including sidewalks, curb ramps, obstructions within public walkways, and crosswalks. The resulting *City of Gallup ADA Transition Plan* evaluated the city's curb ramps and sidewalks in order to assess and understand if ADA improvements are needed.

SIDEWALK GAPS

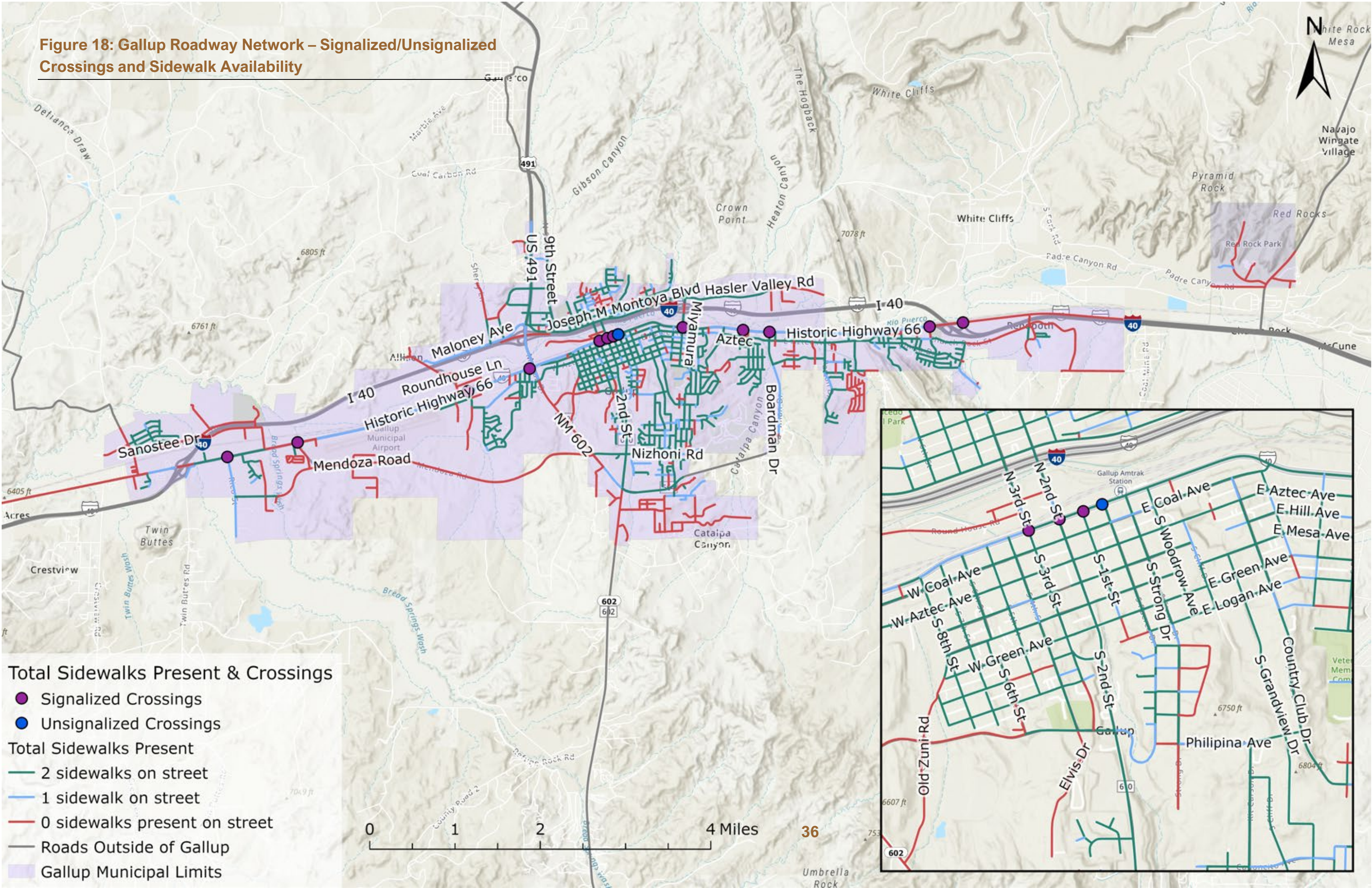
While sidewalks exist on most Gallup streets, there are some that do not meet current standards. Sidewalks in poor condition, or those with a gap or obstructions, can limit the overall mobility of pedestrians, including persons with disabilities.

Examples of sidewalk deficiencies include:

- Sidewalk Gaps
- Missing accessible curb ramps at street crossings
- Poor sidewalk condition
- Missing or inadequate crossings
- Narrow sidewalk widths
- Tripping hazards due to changes in elevation

Figure 18 contains a map of the number of sidewalks that correspond with the Gallup roadway network, as identified in the *City of Gallup ADA Transition Plan*. Of all roadways within Gallup, 59% have sidewalks present on both sides of the roadway, 16% have only one sidewalk present, and 25% have no sidewalk present.

Figure 18: Gallup Roadway Network – Signalized/Unsignalized Crossings and Sidewalk Availability



BICYCLE FACILITIES AND TRAILS

BICYCLE FACILITIES

Minimal on-street bicycle facilities currently exist within Gallup's roadway network. However, as new roadway projects are completed and the necessary right-of-way is available, bicycle facilities should be incorporated into the ultimate roadway designs to offer additional transportation options for cyclists. The *New Mexico Prioritized Statewide Bicycle Network Plan (NM Bike Plan)* establishes a statewide bicycle network and classifies each roadway segment by tier in order to show its level of benefit and the desired quality of bike infrastructure. Route 66/NM 118 is classified as a Tier 1 facility under the NM Bike Plan and is currently the focus of a NMDOT multimodal alternatives study.

While on-street bicycle travel is limited, there are currently several options for mountain biking in and around the city, as Gallup is home to over 30 miles of hiking and biking trails that are easily accessible off of Interstate 40 and Route 66. The city also recently acquired and renovated a brick quarry located just east of Downtown into a bike park equipped with freeride trails, skills trails, dirt jumps, a kids track, pump track and a multi-use trail going around the perimeter of the 7+ acre property.

TRAILS

As previously stated, Gallup is home to over 30 miles of hiking and biking trails that are easily accessible off of Interstate 40 and Route 66. There are a number of multi-use trails, hiking trails, and biking trails, as discussed in the previous paragraph.

There are three multi-use trails that are highly trafficked and therefore, the most popular:

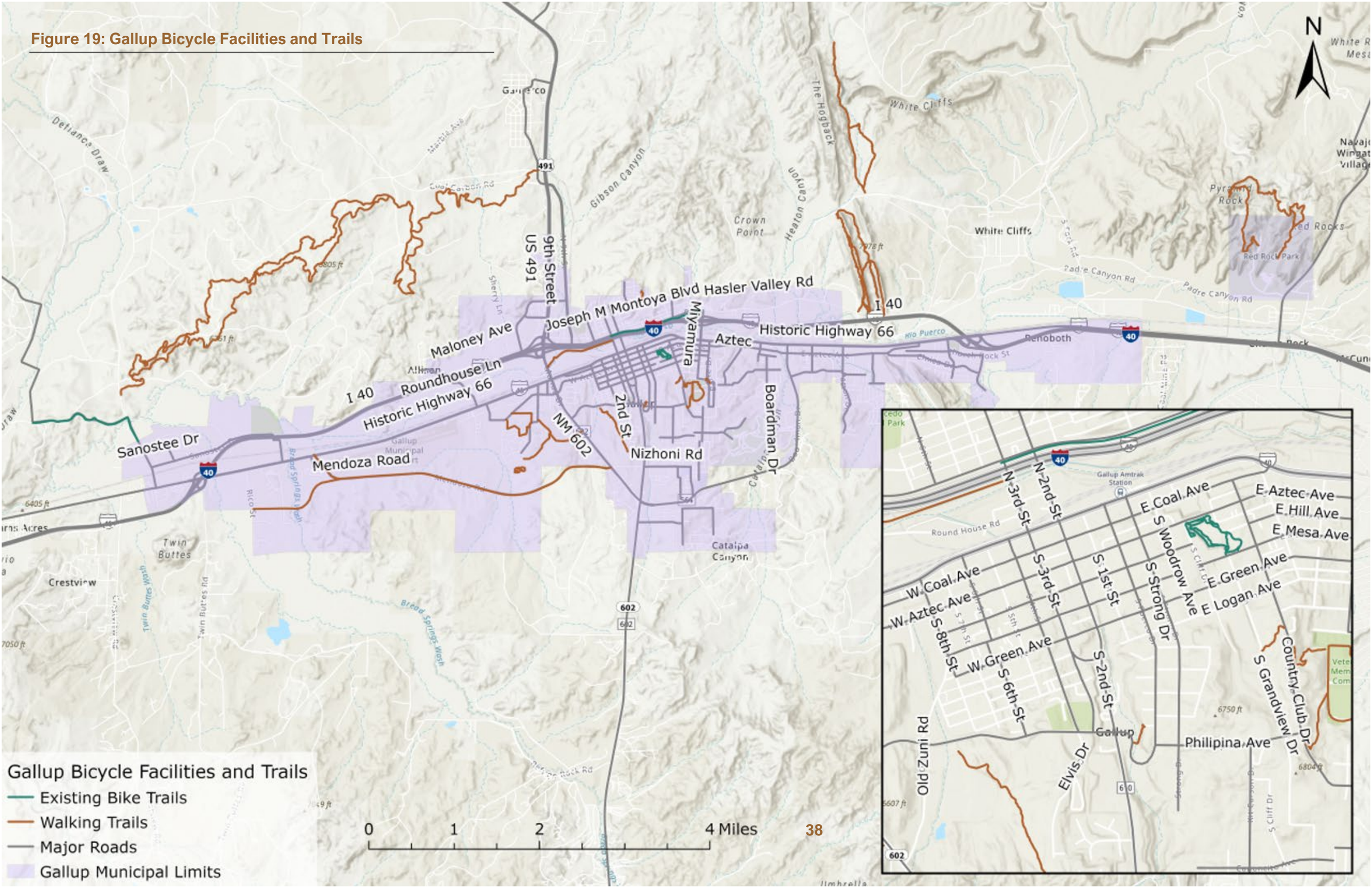
- The Gallup North Hogback Trail is just to the northwest of the Red Rock Motorsports area and is both bike and pedestrian-friendly.
- The High Desert Trail System is comprised of over 22 miles of trail and is suitable for an afternoon or an all-day hike or bike ride.
- The Zuni Mountains are nestled in the Cibola National Forest are 25+ miles of singletrack trail for mountain biking, running, and hiking.

The City of Gallup is also home to an extensive hiking trail system. The two most popular trails/systems are listed below:

- There are a number of hiking trails in Red Rocks Park, but perhaps the most highly trafficked is the Pyramid Rock Trail, leading you to spectacular views of the Church Rock sandstone spires.
- The UNM Gallup Campus Trail system is located on the south side of Gallup off of Boardman Avenue. These trails total 1.5 miles and offer outdoor athletic equipment alongside the trail.

Figure 19 below illustrates the current bicycle facilities and trails system in and around Gallup.

Figure 19: Gallup Bicycle Facilities and Trails



TRANSIT

Public transit within Gallup is currently available through both rail- and bus-based transportation. Local and regional bus transportation providers within the City of Gallup currently include the following:

- Gallup Express provides local transportation in Gallup and Zuni, as well as intercity service between the two Cities. There are 4 express routes: North, South, East, and West. Gallup Express provides route-deviation service up to ¼ mile off the route to pick up or drop off for an additional $1 charge.
- Navajo Transit provides regional transportation within the Navajo Nation. This bus service provides 18 routes in and around the City of Gallup.
- Greyhound provides intercity transportation. The local Greyhound station is located at Nk's Royal Truck Stop at 3405 W. Highway 66.

The City is also accessible by rail. Amtrak provides daily service from Gallup to the Grand Canyon, Los Angeles, Albuquerque, and other destinations via Amtrak's Southwest Chief. The station is located in the Gallup Cultural Center at 201 East Highway 66.

SAFETY

Roadway safety is characterized by the ability of a person to travel along a roadway network freely without risk of injury or death. It is typically assessed through a comprehensive evaluation of crash histories by mode of travel. This evaluation helps to identify crucial information such as locations with an abundance of crashes, different types of crash types, and crash severity issues.

TOTAL CRASHES

During the five-year period of 2016 through 2020, there were 3,600 crashes reported on streets and highways, including I-40, within the City of Gallup. Of these crashes, 862 involved a major injury or fatality. Crash distribution for the most recently reported and available data (2020) is available in the following Figures. The yearly distribution throughout the City can be viewed in the Appendix of this document.

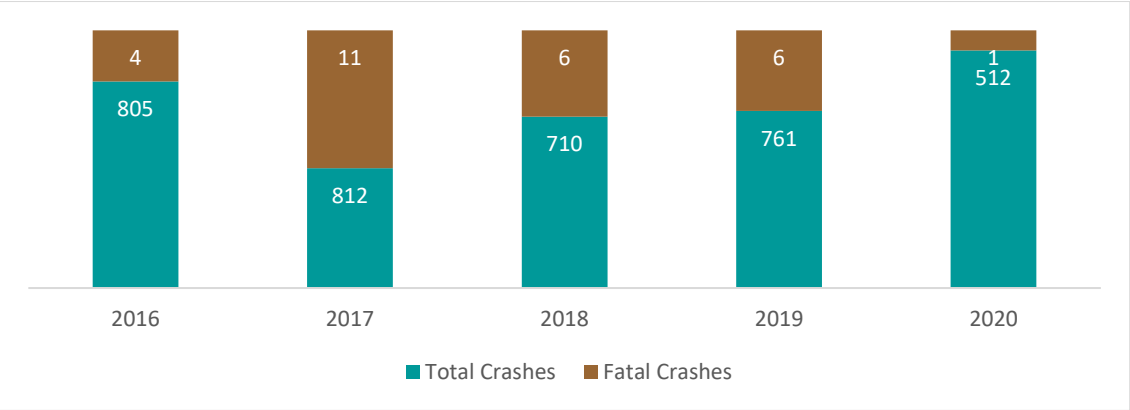


Figure 30: Gallup Total vs Fatal Crashes from 2016-2020, NMDOT

Figure 21: Total Crashes 2020, NMDOT

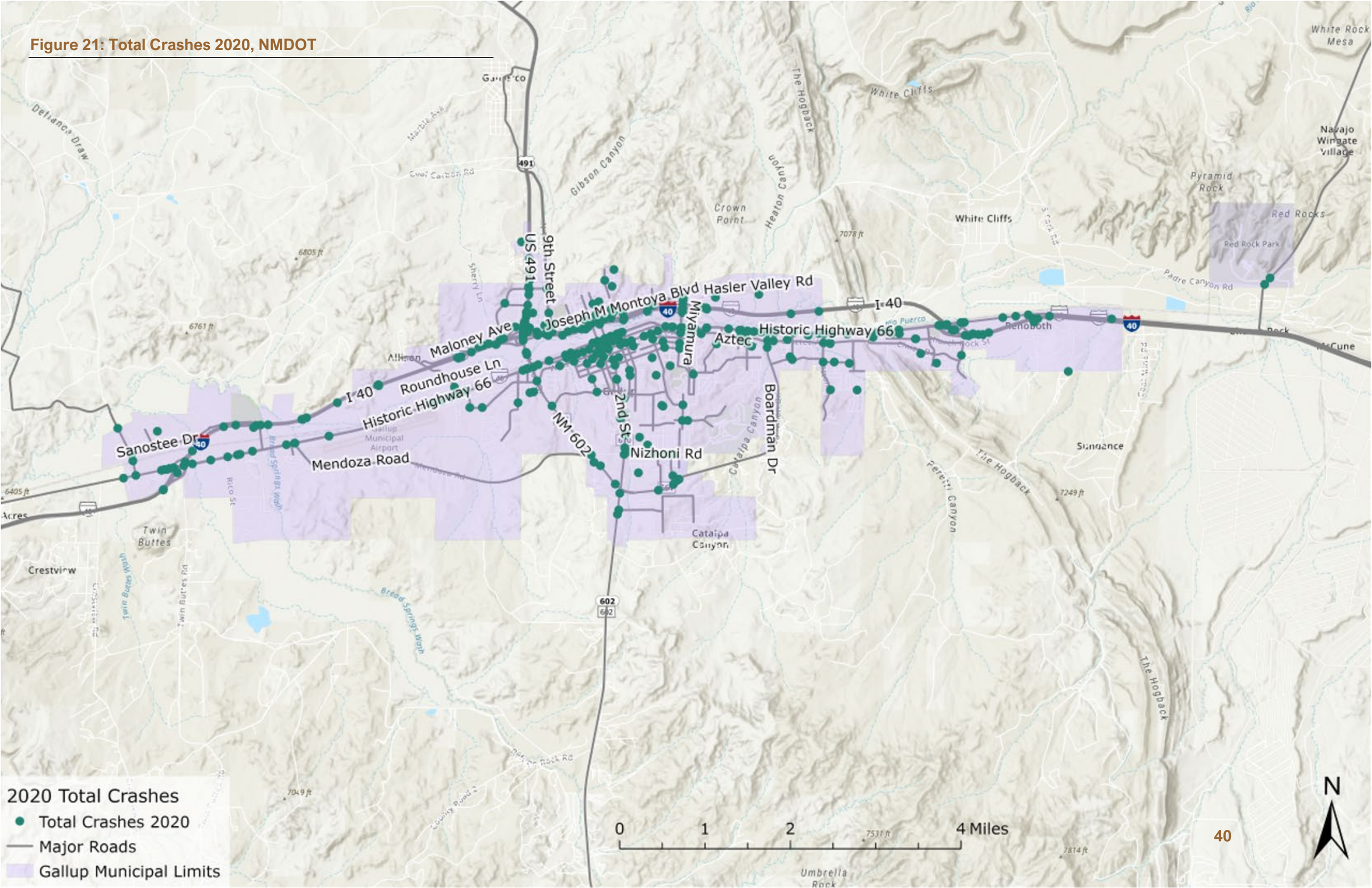


Figure 22: Downtown Total Crashes 2020, NMDOT

The majority of total crashes between 2016-2020 were located in Downtown Gallup, along the Route 66 corridor (specifically along the central segment through the City), and along the 491 corridor on the North side of the City. There are a multitude of negative design attributes that have likely led to this high number of crashes including, faded traffic paint, to blind right and left turns, to a lack of left turn signals. These “hotspots” are also high-density areas, with a high traffic rate due to many retail stores and access to residential neighborhoods. This increase in vehicular movement also increases the probability that an accident will occur in these areas.

FATAL CRASHES

There were 31 total fatal crashes recorded between 2016 and 2020 within the Gallup municipal limits. Most crashes occur along NM 602, U.S. Rt. 66, and I-40. There are two predominant crash hotspots; one along Route 66 off of I-40 exit 16 (5 fatal crashes) and the other off of exit 26 along I-40 (8 fatal crashes). Both are along a 4-lane highway and in a heavily congested area - multiple hotels, gas stations and rest stops.

Figure 23 contains identifies the total number of fatal crashes from 2016 to 2020 by year.

Figure 23: Fatal Crashes 2016 - 2020, NMDOT

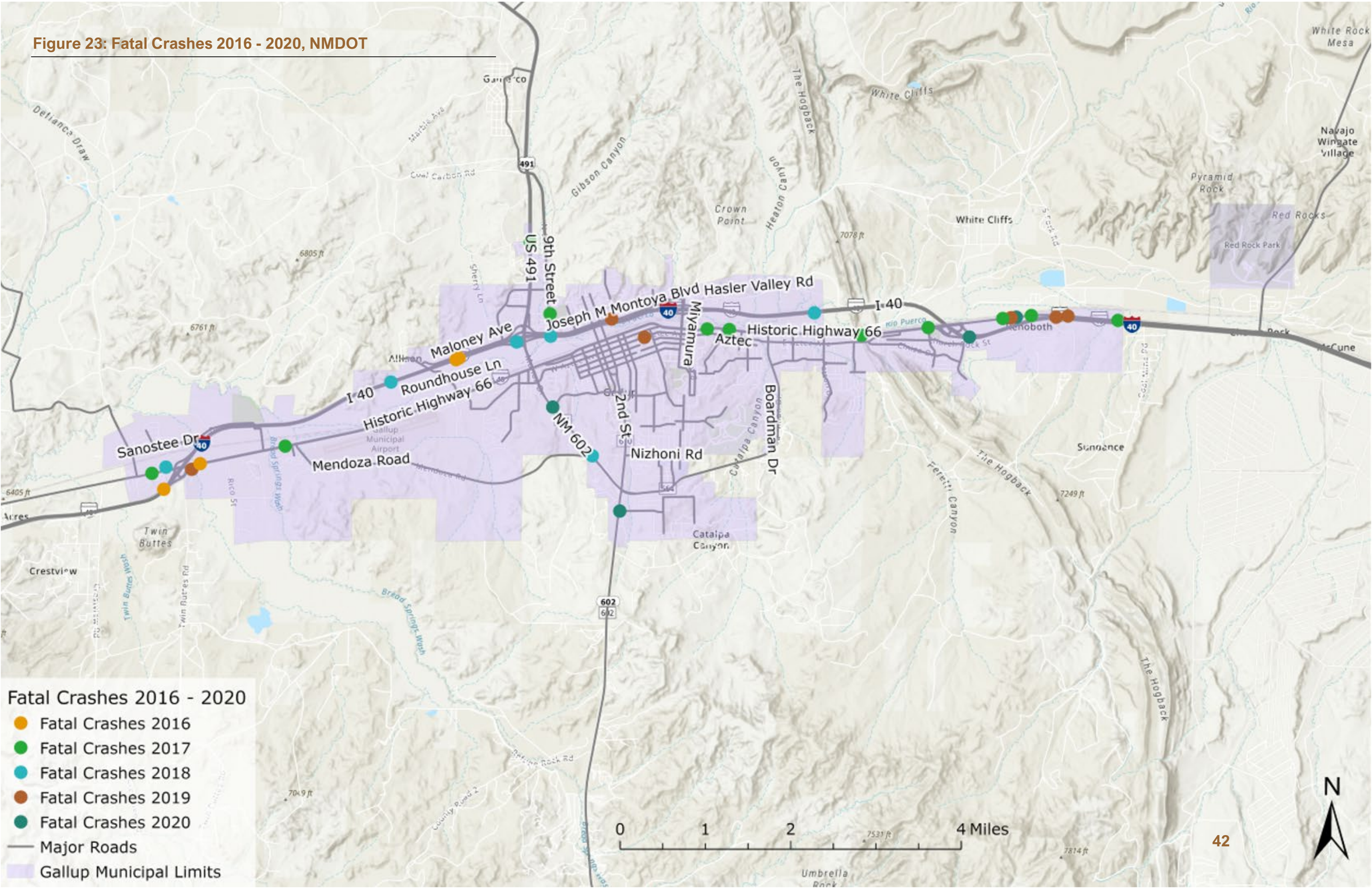
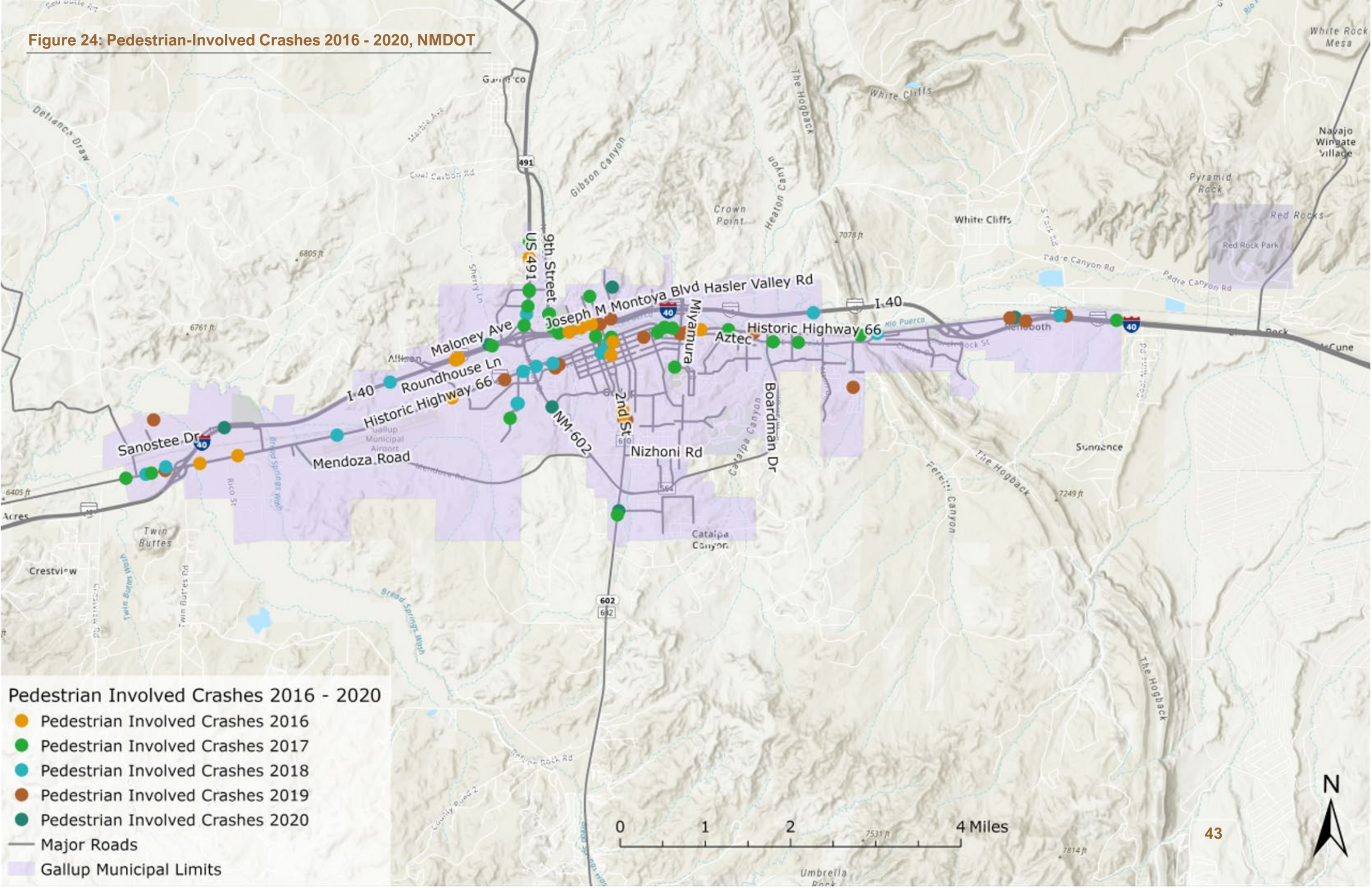


Figure 24: Pedestrian-Involved Crashes 2016 - 2020, NMDOT



The two noticeable fatal “hotspots” are along Route 66, on both the far West side (Love’s Truck Stop) and the far East side of Gallup. Further analysis indicates these locations are poorly lit during the nighttime, are void of pedestrian facilities, unsignalized intersections, and are heavily congested areas due to the associated land use. Implementing appropriate street lighting, signalized intersections and pedestrian safety improvements will be helpful in abating the issue.

PEDESTRIAN INVOLVED CRASHES

There were 81 crashes involving pedestrians between 2016 and 2020, of which 16 were fatal crashes. It should be noted that while pedestrians constitute only 0.02% percent of the total crashes within Gallup, they represent 57% percent of the fatalities in the city. As more people are expected to utilize active transportation options in the region within the coming years, pedestrian trips are expected to increase in general. This growth emphasizes the critical importance of assessing safety issues for these more-vulnerable users through crosswalk visibility, lighting, pedestrian refuge, reduced crossing distances (where possible) and reduced speeds in support of safe, comfortable, and connected facilities.

Figure 24 (above) illustrates the locations of pedestrian-involved crashes within Gallup.

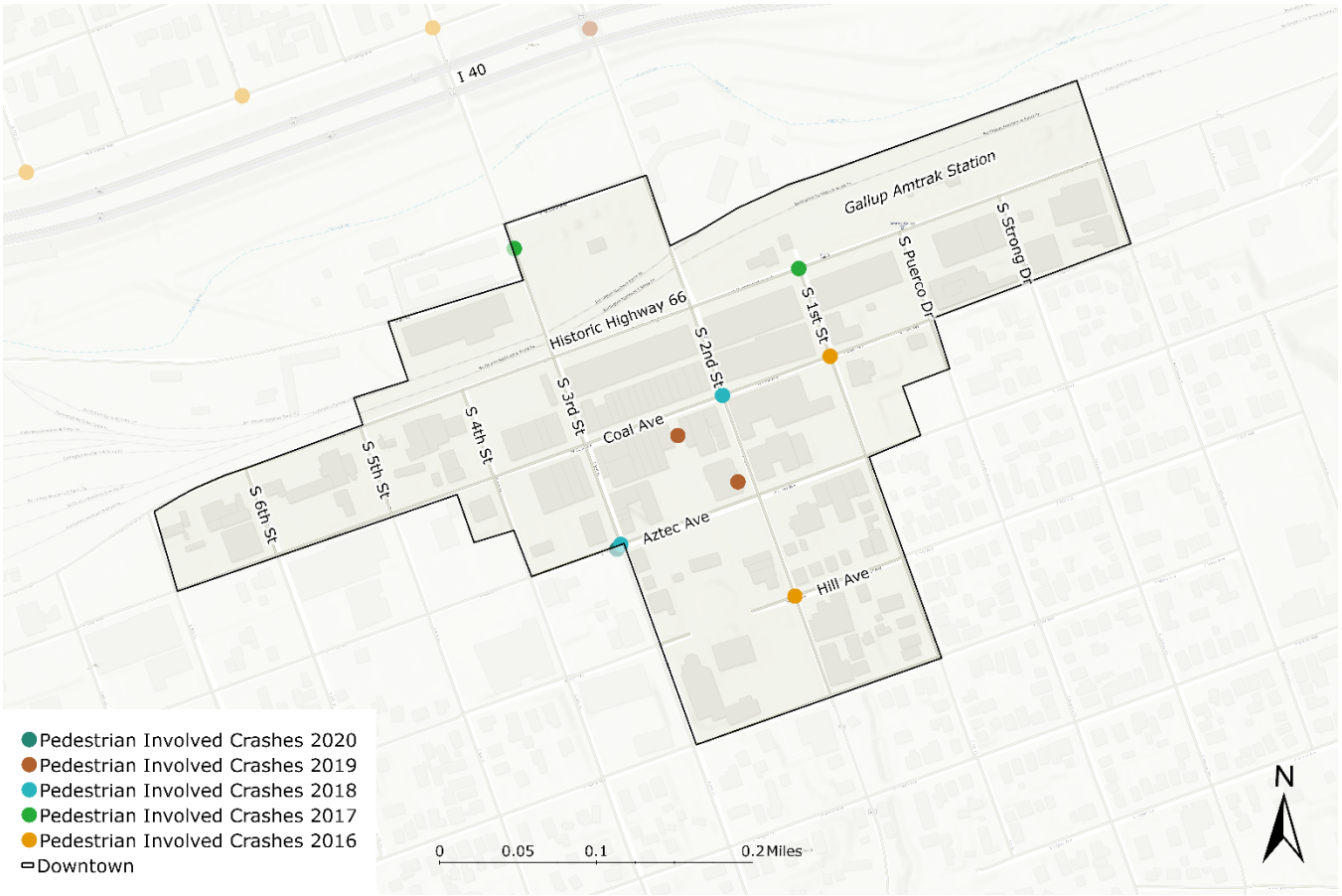


Figure 25: Downtown Pedestrian Involved Crashes 2016-2020, NMDOT

The majority of pedestrian-involved crashes from 2016-2020 were located in Downtown Gallup, along the Route 66 corridor (specifically along the central segment through the City), and along the 491 corridor on the North side of the City. Upon further analysis, the pedestrian facilities in these areas are incomplete and would benefit for a focused redesign effort – noted deficiencies include faded crosswalks, lack of crossing facilities, lack of/incomplete sidewalks. These “hotspots” are also high-density areas, with a high traffic rate due to the intensity of adjacent land use and access to residential neighborhoods. Although these areas are ideal distances for pedestrian-access, these conditions do not make it a safe space for pedestrians.

Additionally, the low vehicle-to-person rate within Gallup shows how high pedestrian activity is and that the City must try to accommodate this as much as possible. The updating of pedestrian facilities would be a great place to start, as well as the addition of new facilities in these high-density areas. Making these pedestrian facilities ADA-accessible should also be considered.

CHAPTER 4: TECHNICAL ANALYSIS

TRAVEL DEMAND MODELING OVERVIEW

Travel demand modeling is a process of predicting the travel behavior of people. It explains where the trips come from, where they go, what mode they choose, and which routes they choose. It uses a system of zones to establish the spatial distribution of travel. For the purposes of the Gallup Transportation Master Plan, a travel demand forecasting model was utilized to assist in the determination of future infrastructure priorities and investments.

The primary objective of travel demand modeling is to understand and forecast the interactions between transportation systems and human travel choices. It considers various factors such as population demographics, land use patterns, economic conditions, transportation infrastructure, and travel costs to generate insights into how residents and visitors may travel.

Travel demand models utilize a combination of data sources, including surveys, census data, and existing transportation data to capture the characteristics and preferences of the population being studied. These models help transportation planners and policymakers evaluate the impacts of different scenarios, such as new roads, public transit systems, or changes in land use, on travel patterns, congestion levels, and environmental sustainability.

Traditionally, an approach known as the “four-step process” is used for regional transportation planning analysis. As its name implies, this process has four basic phases:

1. Trip generation – the number of trips to be made
2. Trip distribution – where those trips go
3. *Mode choice – how the trips will be divided among the available modes of travel
4. Trip assignment – predicting the route trips will take

Note: mode choice was not utilized for the purposes of the Gallup travel demand model.

By looking at these four areas, we can answer the following questions:

- How many trips will people make?
- Where will jobs and people locate?
- What routes will people take?
- How do we know the model predicts reasonable trips?
- What can the model tell us?

TRAVEL DEMAND MODEL CALIBRATION

In order to accurately calibrate a Travel Demand Model for the Gallup-area, the initial focus began with developing and adapting a current estimate of households, population, and employment within the previously delineated Gallup Transportation Analysis Zones (TAZs). The project team was able to

leverage the previously developed travel demand model that was used to develop the 2010 transportation master plan.

In most travel models, the geographic area being analyzed is separated into many smaller spatial units or zones called transportation analysis zones. These TAZs can serve several uses, but the specific New Mexico Statewide TDM model TAZs and the 2010 Gallup TDM TAZs predominantly contain information about the people and places in each zone including: total households, total population, number of retail stores, number of hospitals, etc. This data supports the travel modelling process by allowing the project team to estimate increases in population growth and assign that growth with spatial locations throughout the community. In turn, this data helps the model forecast changes in trip generation associated with changes to the number of households and employment within each TAZ.

COORDINATION BETWEEN THE NEW MEXICO STATEWIDE MODEL AND THE 2010 CITY OF GALLUP MODEL

The information shown in Figure 24 illustrates the overlapping differences between the TAZs associated with the Statewide model and those developed for the City of Gallup. Given the area associated with the statewide TAZs, the project team could not easily extrapolate forecasted data from the Statewide model for the Gallup model update and thus, needed to ensure a robust calibration effort was completed to accurately account for spatial differences between the two.

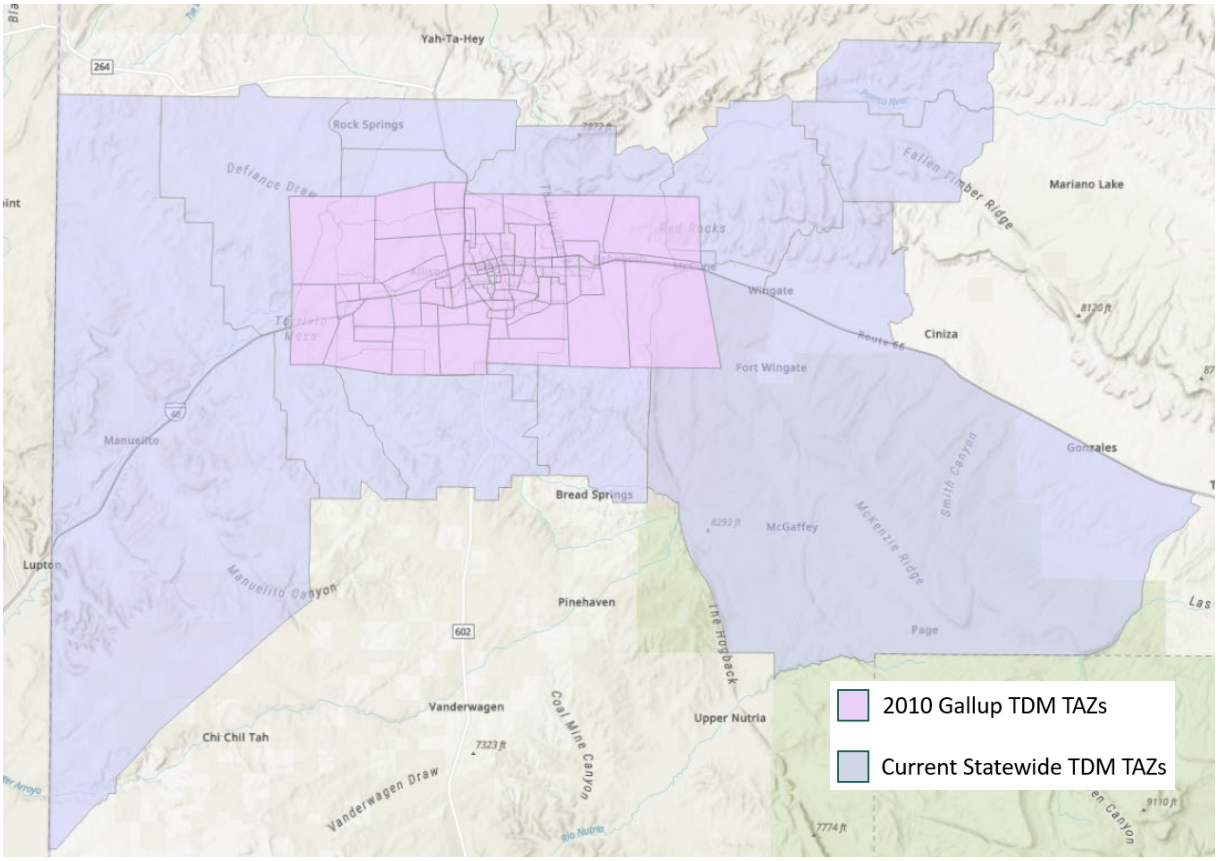


Figure 26: 2010 Gallup TDM TAZs – Travel Model Calibration

To ensure the accuracy of the TAZs, a set of aerial household reviews were conducted using Google Earth to complete a baseline confirmation of the number of households within each TAZ. Figure 25 depicts the process and prioritization of TAZ boundaries for this effort.

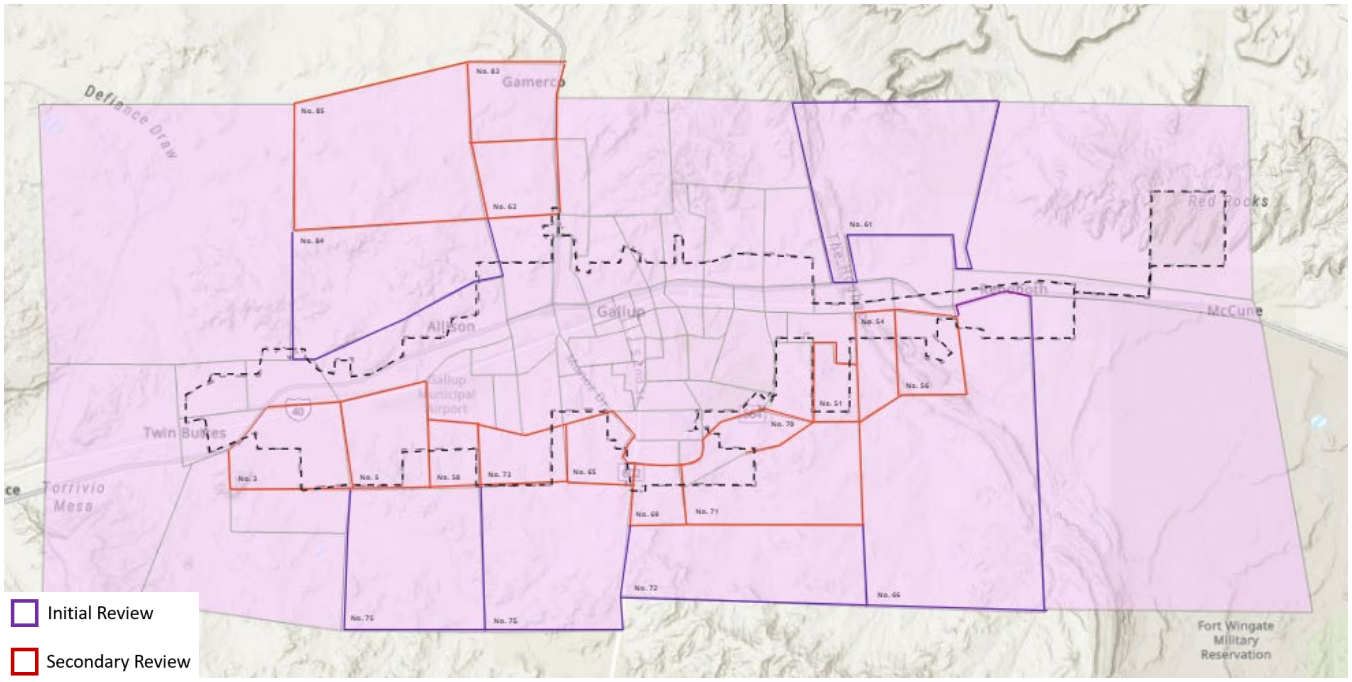


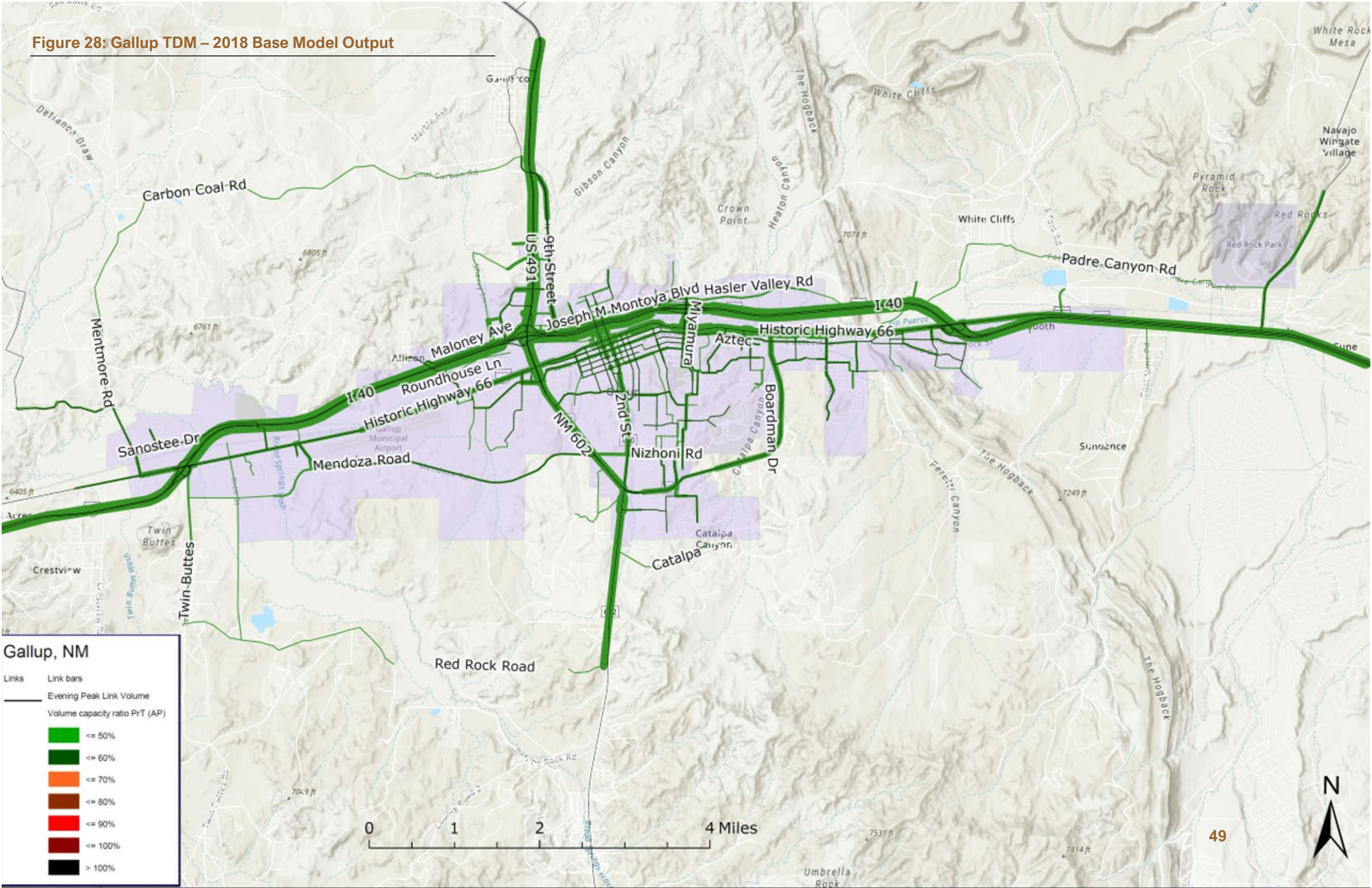
Figure 27: 2010 Gallup TDM TAZs – Travel Model Calibration

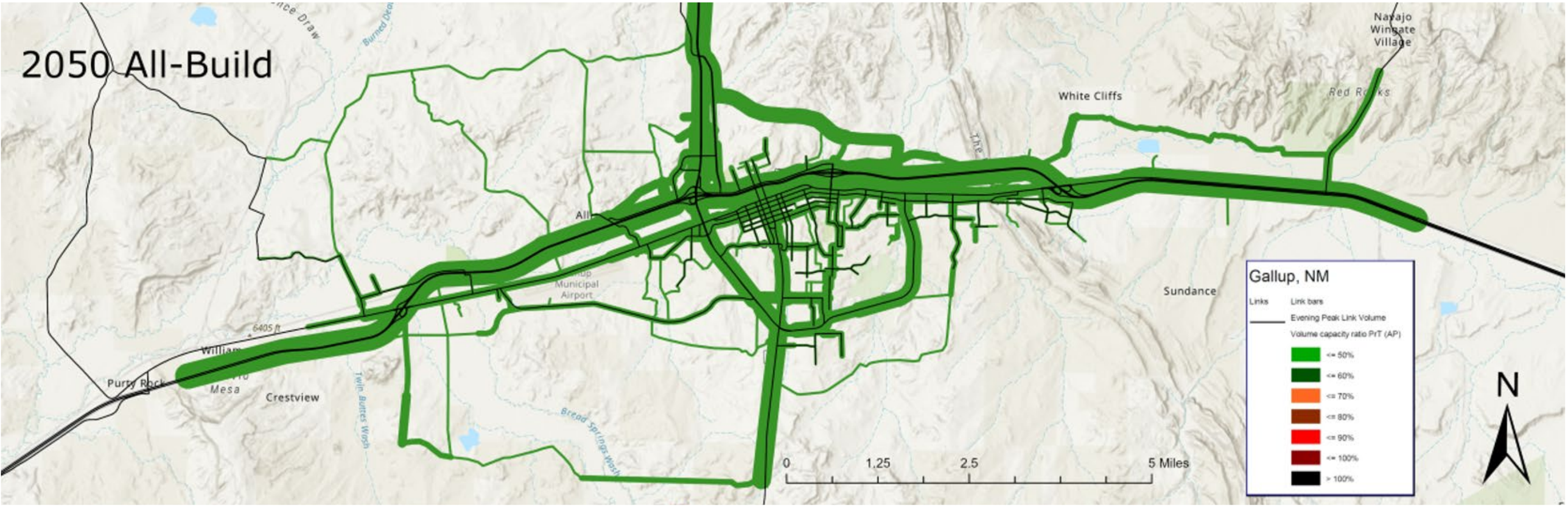
During both reviews, the project team reviewed updated satellite imagery within these designated zones to provide an updated household count.

TRAVEL DEMAND MODEL RESULTS

The first TDM model serves as a base and comparison for the other future road network models. The 2018 Base model (Figure 28) illustrates the current Gallup transportation network with the PM peak volume capacity of all roads. The results of the base year model run illustrate that under normal operating conditions, The City's roadway network performs as expected and no roadway segments currently exceed an appropriate volume to capacity measurement.

Figure 28: Gallup TDM – 2018 Base Model Output




2050 All-Build
White Cliffs
Navajo Wingate Village
Red Rocks
Sundance
Municipal Airport
6405 ft
Purty Rock
Mesa
Crestview
Twin Buttes Wash
Bread Springs Wash
0
1.25
2.5
5 Miles
Gallup, NM
Links
Link bars
Evening Peak Link Volume
Volume capacity ratio PrT (AP)
<= 50%
<= 60%
<= 70%
<= 80%
<= 90%
<= 100%
> 100%
N

2050 No-Build
White Cliffs
Navajo Wingate Village
Red Rocks
Sundance
Municipal Airport
6405 ft
Purty Rock
Mesa
Crestview
Twin Buttes Wash
Bread Springs Wash
0
1.25
2.5
5 Miles
Gallup, NM
Links
Link bars
Evening Peak Link Volume
Volume capacity ratio PrT (AP)
<= 50%
<= 60%
<= 70%
<= 80%
<= 90%
<= 100%
> 100%
N

The 2050 All Build scenario output incorporates new connections identified over the course of discussions with City staff and associated plan stakeholders. Travel model results including these new connections indicate overall utilization throughout the system, however the most notable change in vehicular dispersion was on the future new road proposed connecting 602 to NM118 via Catalpa Wash and Patton Drive (Southeast) as well as the new (unnamed connection) in the northeast connecting the northern terminus of Boardman Avenue at NM 118 to US 491 in the north. This new connection would relieve congestion around the I-40/US 491 interchange and would alleviate congestion issues south of I-40 along US 602.

Hasler Valley Road is another connection that shows a decent growth in the vehicle peak volume. This road begins at Miyamura Overpass and runs east up to White Cliffs. The potential future connection along Hassler Valley Road would connect White Cliffs to Red Rock Park and County Road 566.

The 2050 No Build model illustrates Gallup's transportation network if no future improvements are made to the network – roadway improvements or new connections. Based on estimates in associated growth within households and employment throughout the municipal limits, the model anticipates dramatic growth in several key corridors – US 491, I-40, US 602, and Route 66. Areas where volume to capacity measurements become problematic include areas along US 602 to the south of the City as well as the interchange at I-40 and US 491.

CHAPTER 5: IDENTIFIED IMPROVEMENTS

SAFETY SPECIFIC RECOMMENDATIONS

In order to prevent further vehicular, pedestrian, and bicycle injuries and fatalities, the project team developed a number of applicable safety countermeasures. These countermeasures are detailed below and indicate where the greatest safety improvements can be achieved in different applications or scenarios. Restricting the available turning movements not only reduces potential conflict points but also creates a more delineated path for drivers, therefore reducing confusion and the potential for human error.

Throughout the public involvement process, participants identified better lighting for both vehicles and pedestrians as needed along Gallup's key corridors. Pedestrian-focused lighting at pedestrian crossings would make pedestrians more visible and increase visual awareness of a crossing location.

An additional key input into the identified safety recommendations included below, is the Gallup Area Transportation Safety Plan (completed in 2019). While the 2019 plan identifies potential safety countermeasures and identifies potential locations for the implementation of such, this plans focus was to build on this information and not only provide specific examples but also prioritized areas for an elevated implementation effort.

Lastly, it may be helpful to pair the safety-related implementation recommendations outlined below with traffic calming strategies as appropriate in key locations in the City. A full traffic calming toolkit is included in the Appendix of this plan. In addition to the consideration of these specific design-related countermeasures, it is important to note that the City is also considering the implementation of speed cameras to deter excessive vehicular speed throughout the community.

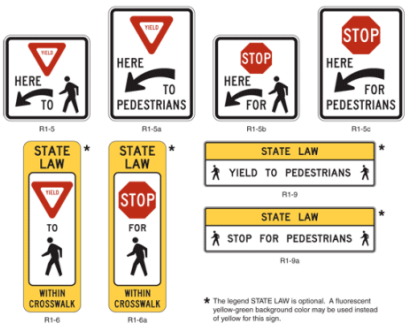
Note: Images, and examples included in this section are sourced from the National Association of City Transportation Officials. Please visit https://nacto.org/ design guide publications on the following topics.

PEDESTRIAN-RELATED RECOMMENDATIONS

INSTALL HIGH-VISIBILITY CROSSWALKS

When crosswalks are hard to see, the pedestrian may be unsure where to safely cross the road, resulting in jaywalking or crossing at unsafe locations. This creates an unsafe environment for the pedestrian and confusion among drivers about where to anticipate pedestrians. The solution to this problem is to increase crosswalk visibility by:

- Implementing signing and striping in accordance with the NMDOT Signing and Striping Manual
- Adding a "State Law: Yield to Pedestrians within Crosswalk" advisory signage on roadway centerline



- Enforce pedestrian crossing laws

To accomplish these solutions, it is recommended that the City install and maintain appropriate crosswalk markings and signing. Additionally, an education campaign may be conducted to enhance the awareness of pedestrian crossing laws.

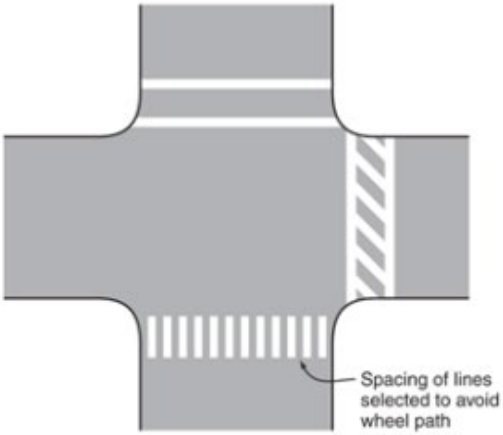


Figure 31: (clockwise from top) Transverse lines, diagonal (zebra) markings, and continental markings

Figure 32: A triple-four crosswalk pattern. This pattern is highly-visible, has a center channel that is less slippery, and has bars spaced to reduce maintenance costs

Source: *An Overview and Recommendations of High-Visibility Crosswalk Marking Styles*. Pedestrian and Bicycle Information Center. 2013. https://nacto.org/docs/usdg/overview_and_recommendations_high_visibility_crosswalk_marking_styles_mcgrane.pdf

INSTALL PEDESTRIAN COUNTDOWN TIMERS

Providing feedback to pedestrians crossing a street is one of several critical elements to ensure pedestrian safety throughout the roadway network. While pedestrian actuated push-buttons help ensure the flow of traffic and only coordinate pedestrian crossing when a pedestrian is present, a countdown timer provides the necessary feedback to a pedestrian to understand the amount of time remaining to cross the street. It is recommended that the City:

- Install pedestrian countdown timers, either pedestrian actuated push-buttons or fixed (automatic), as appropriate
- Use Manual on Uniform Traffic Control Devices (MUTCD) minimum pedestrian speed of 3.5 feet per second so that the crossing conforms to ADA standards and allows adequate crossing time based on the street width.

Further, while it is generally recommended that all signalized intersections include pedestrian countdown timers, priority should also be given to locations in the downtown and along arterial corridors at key locations identified in the safety analysis included in the previous section of this plan. Table 5 at the end of this section outlines the listing of prioritized intersections identified through the development of this plan.

Figure 33 Example Pedestrian Infrastructure

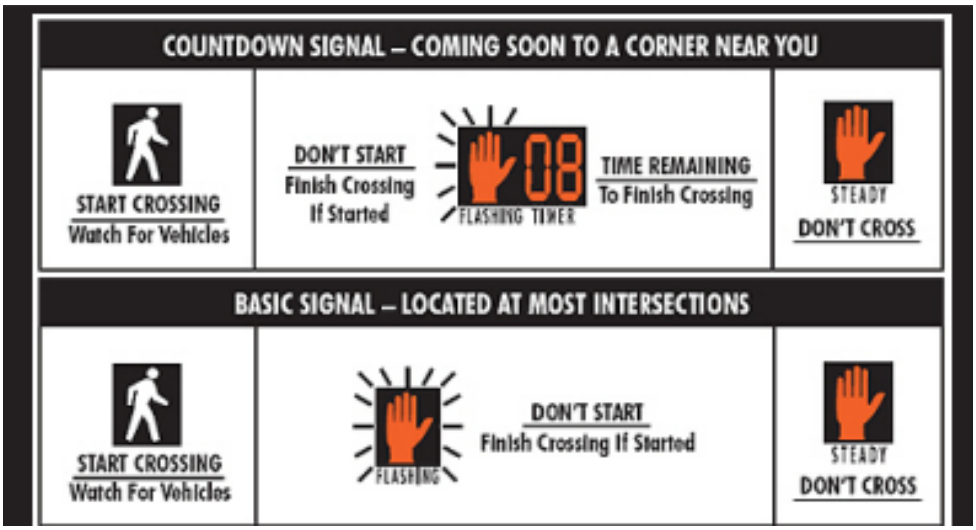


Figure 34: Pedestrian Signals

INSTALL PEDESTRIAN REFUGES

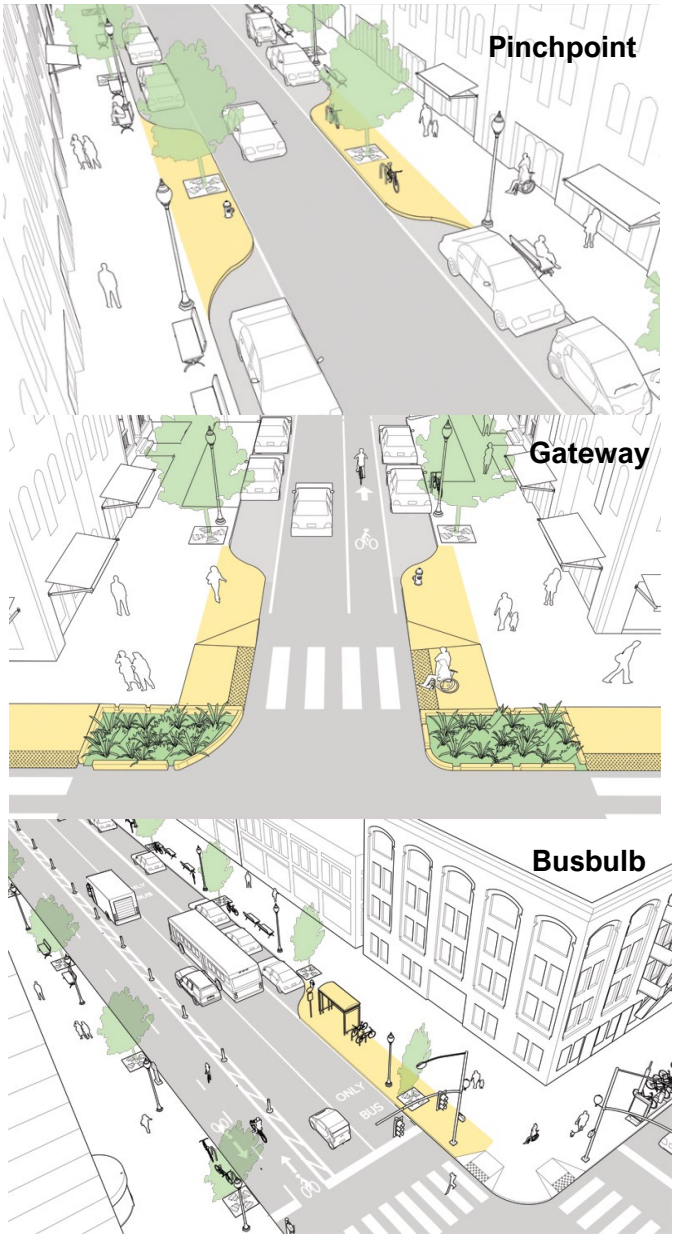
The City of Gallup also has many roadways with substantial right-of-way, which can be intimidating for some pedestrians to navigate in one light cycle. A pedestrian safety island or refuge reduces the exposure time experienced by a pedestrian crossing the intersection. While safety islands may be used on both wide and narrow streets, they are generally applied at locations where speeds and volumes make crossings prohibitive, or where three or more lanes of traffic make pedestrians feel exposed or unsafe in the intersection.

Figure 35 Pedestrian Refuge Example

As such, the City should consider implementing pedestrian refuges along key corridors where added pedestrian safety may be warranted. Pedestrian safety islands should be at least 6 feet wide but have a preferred width of 8-10 feet. Where a 6-foot wide median cannot be attained, a narrower median is still preferred to nothing.

INSTALL CURB EXTENSIONS

Curb extensions visually and physically narrow the roadway, creating safer and shorter crossings for pedestrians at intersections. These conventional extensions can also be paired with on-street parking to accommodate for a multimodal transportation network. The City should prioritize the implementation of curb extensions on the prioritized intersections identified in Table 5 first, and as additional roadway improvements are identified, curb extensions should be one of the many countermeasures considered for implementation as roadway improvements are designed and constructed. The variety of curb extension opportunities are defined and illustrated below.



Pinchpoints: Pinchpoints are mid-block curb extensions that protrude into the roadway reducing the width available for vehicles to pass through forcing drivers to make more deliberate turns and navigate narrower spaces which reduces their speed and increases visibility for pedestrians.

Gateways: Gateways, also known as neckdowns, are curb extensions at the entrance or transition into a minor street from higher-classified roadway. Similar to *pinchpoints*, *neckdowns* extend the sidewalk into the road, creating a constriction that forces vehicles to slow down when navigating the narrower passage. This safety technique also shortens pedestrian crossing distances, increases their visibility, and reduces their exposure to traffic.

Busbulbs: Installing *busbulbs* at transit stops is another option to promote pedestrian safety. *Busbulbs* extend the sidewalk at bus stops into the roadway, allowing buses to pick up and drop off passengers without leaving the flow of traffic. This design reduces the need for buses to merge in and out of traffic, which can cause delays and safety concerns, and creates a more predictable and orderly environment for both pedestrian and transit users. Additionally, they discourage the

illegal passing of buses and promote smoother traffic flow, making public transportation more attractive and reliable.

BICYCLE-RELATED RECOMMENDATIONS

INSTALL BICYCLE FACILITIES

The concept of bicycle facilities was discussed multiple times throughout the development of this plan, both with stakeholders and residents of the community. While bicycle-related comments did not necessarily rise to the level of immediate concern/needs, it is clear that the City lacks a network of bicycle facilities throughout the community. In order to elevate this mode of transportation and consider safety needs of bicyclists, it is recommended that dedicated bicycle facilities are implemented through thoughtful consideration and coordinated with planned roadway infrastructure improvements in the future. Moving forward, the City should consider the development of a bicycle network that provides safe connectivity between key activity locations to ensure residents can get to locations that support every day life. The bicycle facility types chosen should be based on the level of traffic stress (the stress or discomfort that a cyclist experiences while riding), and roadway characteristics, including the amount of traffic, access, speed, and truck traffic.

Figure 37: Buffered/Marked Bike Lane

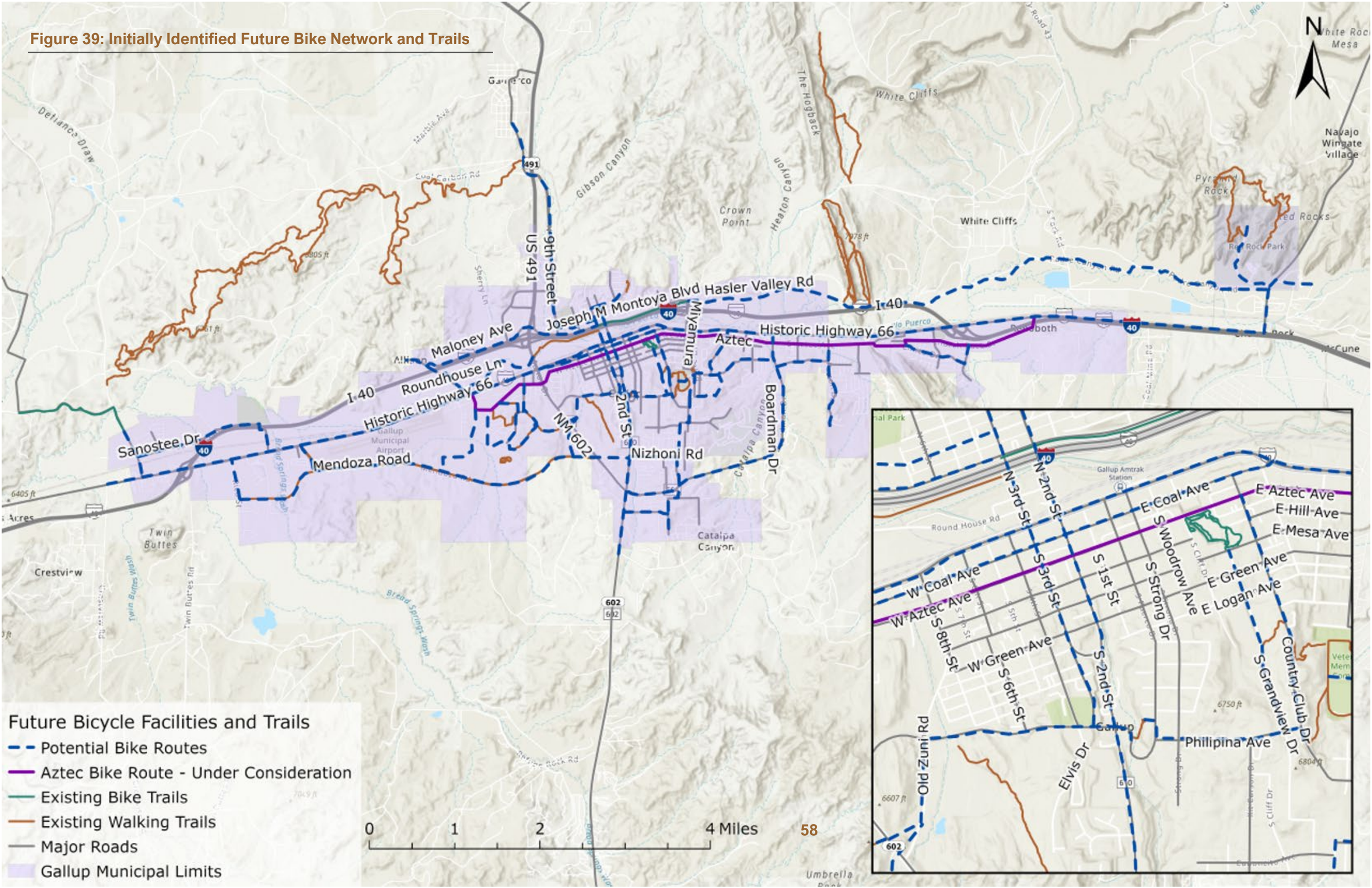
Figure 38: Buffered Bike Lane

BIKE LANES

It is recommended that both conventional and buffered bike lanes be implemented throughout the City of Gallup. Conventional bike lanes provide a marked space for cyclists alongside motor vehicles. This separation reduces the risk of conflict between bicycles and motor vehicles, improves visibility, and increases predictability for both bicyclists and drivers making both safer and cycling more appealing as a mode of transportation. Buffered bike lanes provide an extra layer of protection and comfort for cyclists compared to conventional bike lanes. These bike lanes feature additional space, often marked with paint or physical barriers, such as bollards or planting boxes, between the bike lane and the adjacent motor vehicle lanes. This buffer zone serves several purposes:

- Increased Safety: The buffer provides a safety zone that reduces the risk of conflicts between cyclists and motor vehicles and offers a cushion of space, reducing the chance of side-swiping or dooring incidents.
- Improved Comfort: Cyclists often feel more comfortable and secure with a buffer, as it provides a psychological barrier between them and motor traffic.
- Enhanced Visibility: The buffer zone can include pavement markings or colored paint, making cyclists more visible to drivers and vice versa.
- Space for Cyclist Maneuvers: The extra space allows for cyclists to safely pass one another or navigate around obstacles without entering the motor vehicle lane.

Figure 39: Initially Identified Future Bike Network and Trails



The map included in Figure 39 on the previous page should be viewed as the starting point for conversations and considerations of what the bicycling network could look like in the City and how to pair this implementation with other roadway improvements identified in the short and long term.

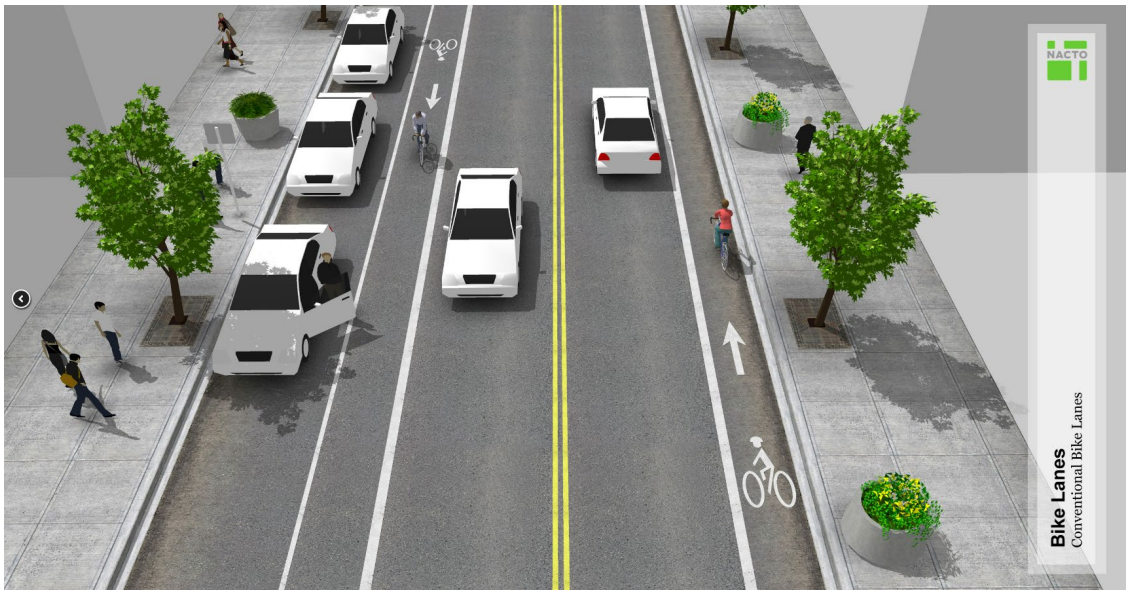


Figure 40: Conventional Bike Lanes

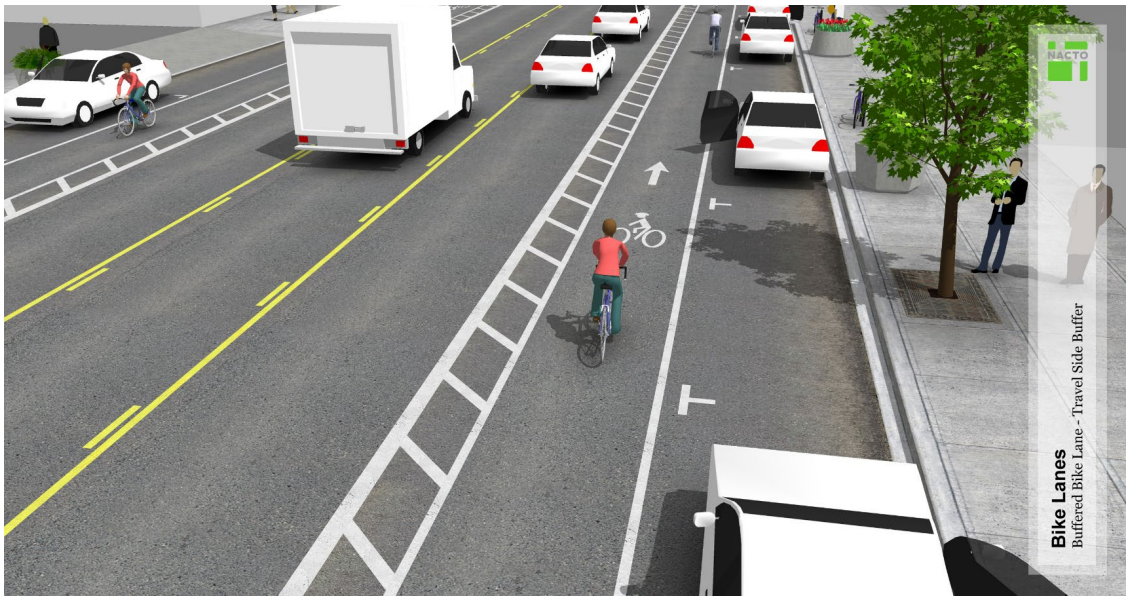


Figure 41: Buffered Bike Lanes

Source: National Association of City Transportation Officials. *Urban Bikeway Design Guide.* https://nacto.org/publication/urban-bikeway-design-guide/

CYCLE TRACK

Cycle tracks are another great way to improve bicycle safety through the City. Both One-Way Protected and Raised with Mountable Curb are viable options to implement throughout Gallup. The purpose of a cycle track is to provide a dedicated and physically separated pathway for cyclists traveling in one direction. Cycle tracks are typically separated from motor vehicle traffic by physical barriers such as curbs, bollards, or parked cars.

Figure 42: One-Way Protected Bike Lane

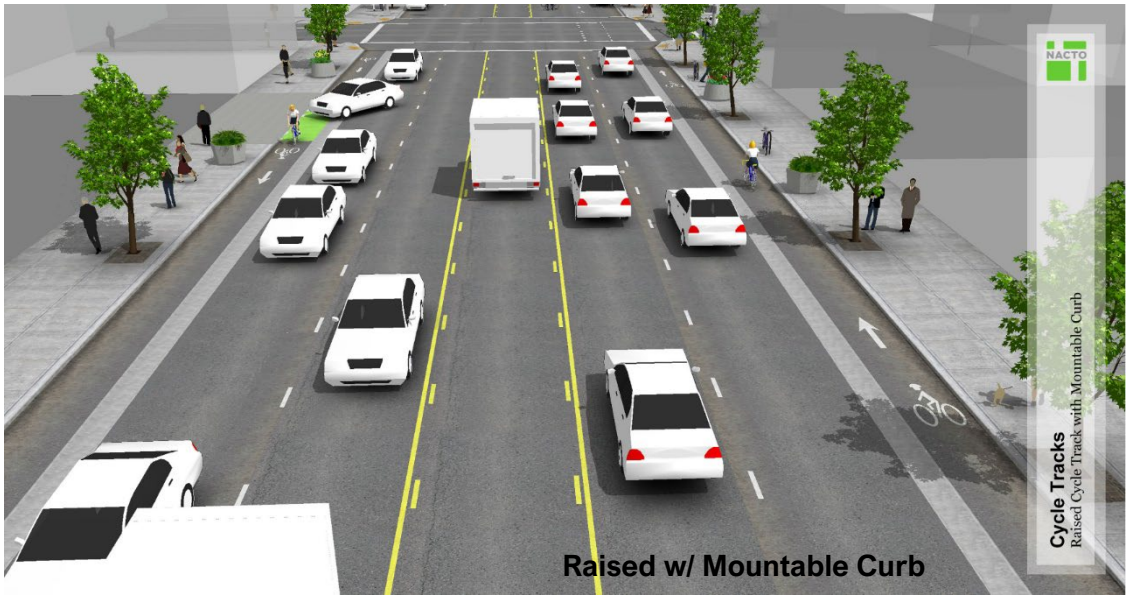


Figure 43: Raised Bike Lanes with Mountable Curbs

Source: National Association of City Transportation Officials. *Urban Bikeway Design Guide.* https://nacto.org/publication/urban-bikeway-design-guide/

SIGNING AND MARKING

Signing and marking such as colored bike lanes, shared lane markings, confirmation signs, turn signs and decision signs, are suggested to be implemented in/on bike facilities throughout the City as implementation occurs. Signage and marking implementation in line with bicycle infrastructure will improve visibility, guidance, and awareness of and for cyclists. Some of the key purposes of this recommendation are as follows:

- **Directional Guidance**: Signs and pavement markings help cyclists navigate routes, indicating directions, bike lanes and paths, reducing the likelihood of getting lost.
- **Traffic Rules Awareness:** These elements remind cyclists of traffic rules and regulations, such as stop signs, yield signs, and other important instructions, promoting safe and responsible cycling behavior.
- **Visibility and Awareness:** Brightly colored markings and reflective materials on signs increase the visibility of cyclists, making them more noticeable to motorists and pedestrians, especially in low-light conditions.
- **Intersection Safety:** Proper signage and markings at intersections and crossings improve the predictability of cyclist movements and reduce the risk of collisions with other road users.

Figure 44: Colored Bike Lanes

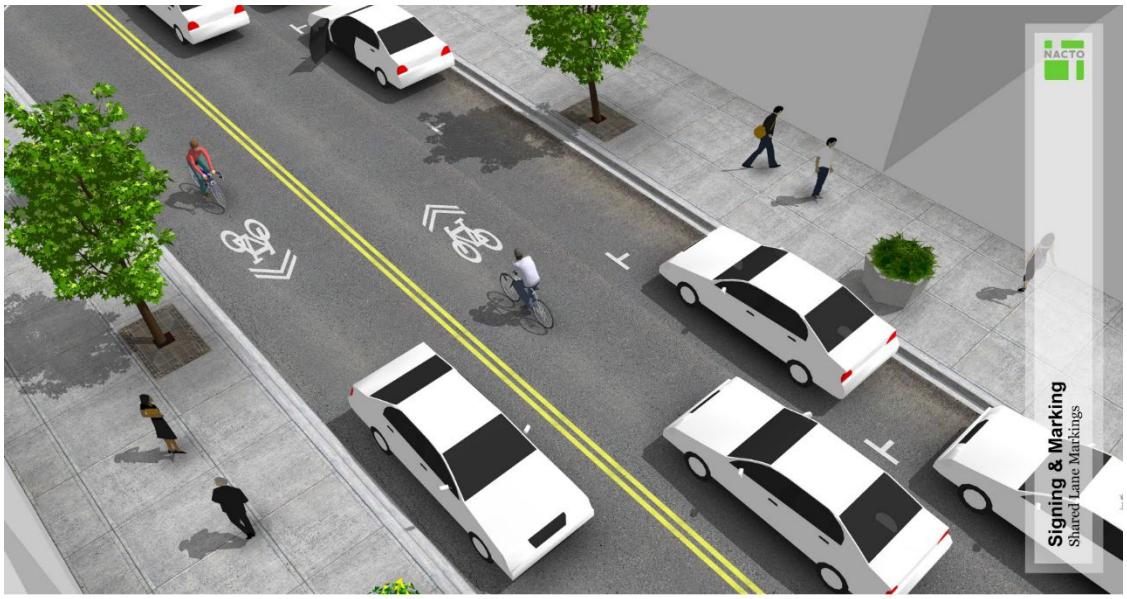


Figure 45: Shared Bike Lane Marking

Source: National Association of City Transportation Officials. *Urban Bikeway Design Guide.* https://nacto.org/publication/urban-bikeway-design-guide/

Figure 46: Confirmation Signs

Figure 47: Turn Signs

Figure 48: Decision Signs

Source: National Association of City Transportation Officials. *Urban Bikeway Design Guide.* https://nacto.org/publication/urban-bikeway-design-guide/

POST AND PAINT

A concerted effort to implement a city-wide bicycle network is not a small task – it is both an opportunity and a challenging endeavor. It is also possible that specific implementation of bicycle facilities may be difficult to fully understand at the design phase. Given such, it is recommended that the City start with a less permanent implementation to test adoption, roadway user acceptance and impact before full design and construction of a more permanent (and costly) effort. This approach offers several benefits:

- **Cost-Effective:** It is relatively inexpensive to test/pilot bicycle facility improvements compared to permanent changes, making it feasible for testing multiple design options.
- **Flexibility:** City staff can more quickly adjust and fine-tune the design based on real-world observations and user feedback.
- **Low Commitment:** Given the low-cost, and impermanence of this approach, there is no long-term commitment to a specific design. If changes prove ineffective or problematic, they can be easily reverted or adjusted to test alternative ideas.
- **Real-World Testing:** Post and paint allows for testing in real traffic conditions, providing valuable data and insights that can inform more permanent decisions.

Figure 49: Post and Paint

Table 5 below outlines the locations of prioritized intersections slated for evaluation by the City for immediate implementation consideration. These intersections are prioritized for enhanced infrastructure to accommodate bicycle and pedestrian safety needs.

Table 5: Priority Intersections

A Street	B Street
Route 66	S. 1st Street
W. Coal Avenue	S. 2nd Street
W. Coal Avenue	S. 1st Street
W. Aztec Avenue	S. 3rd Street
W. Hill Avenue	S. 2nd Street
W. Lincoln Avenue	N. 9th Street
W. Wilson Avenue	N. 9th Street
W. Maloney Avenue	N. 7th Street
W. Maloney Avenue	N. 5th Street
W. Maloney Avenue	N. 3rd Street
Joseph M Montoya Boulevard	E. Maloney Avenue
E. Aztec Avenue	S. McKinley Drive
Route 66	S. Navajo Drive
E. Aztec Avenue	Ford Drive
Route 66	We Street
Route 66	Bradley Street
Route 66	W. Coal Avenue
W. Coal Avenue	S. 11th Street
W. Aztec Avenue	S. 11th Street
US 491	Coal Basin Road
US 491	W. Jefferson Avenue
US 491	Metro Avenue
US 491	W. Lincoln Avenue
US 491	W. Maloney Avenue
Rt. 66 (Potential for mid-block crossing treatments to manage conflicts in area around Love's Truck Stop)	

TRANSPORTATION NETWORK RECOMMENDATIONS

This section highlights the overarching transportation network recommendations identified throughout the planning process. Noted in the Technical Analysis section of this plan, the City's roadway network overall functions well, however at key times throughout the month and at certain locations during AM and PM peak-hour considerations need to be made to ensure efficiency in the network as the community grows.

Overarching Transportation Network Recommendations

- Elevate planning, design, and construction coordination with NMDOT and McKinley County to increase efficiency and safety along priority corridors (outlined in Figure 50).
- Plan for new roadways and connections that support the efficiency of the roadway network into the future (Figure 51).
- Continue coordination with Gallup Land Partners as development within the Gallup Energy Logistics Park area continues to take shape.
- Coordinate multimodal improvements with roadway reconstruction projects.
- Coordinate roadway marking and striping implementation with planned roadway maintenance operations.
- Coordinate roadway improvements to support the realization of land use aspirations in the Growth Management Master Plan.

The map below highlights existing roads where infrastructure improvements should be prioritized due to the high volume of traffic along these corridors.

Figure 50: Priority Corridors

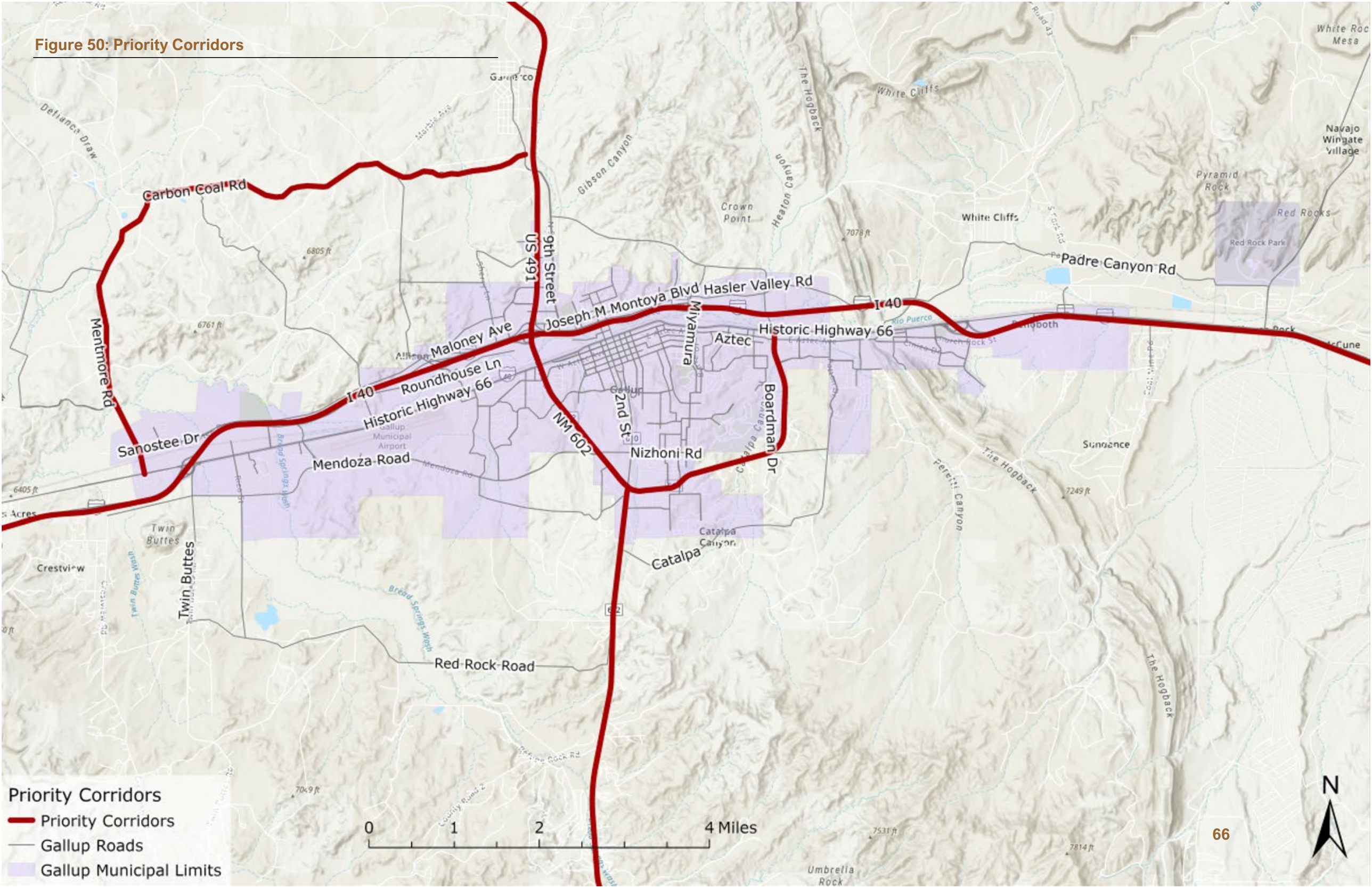
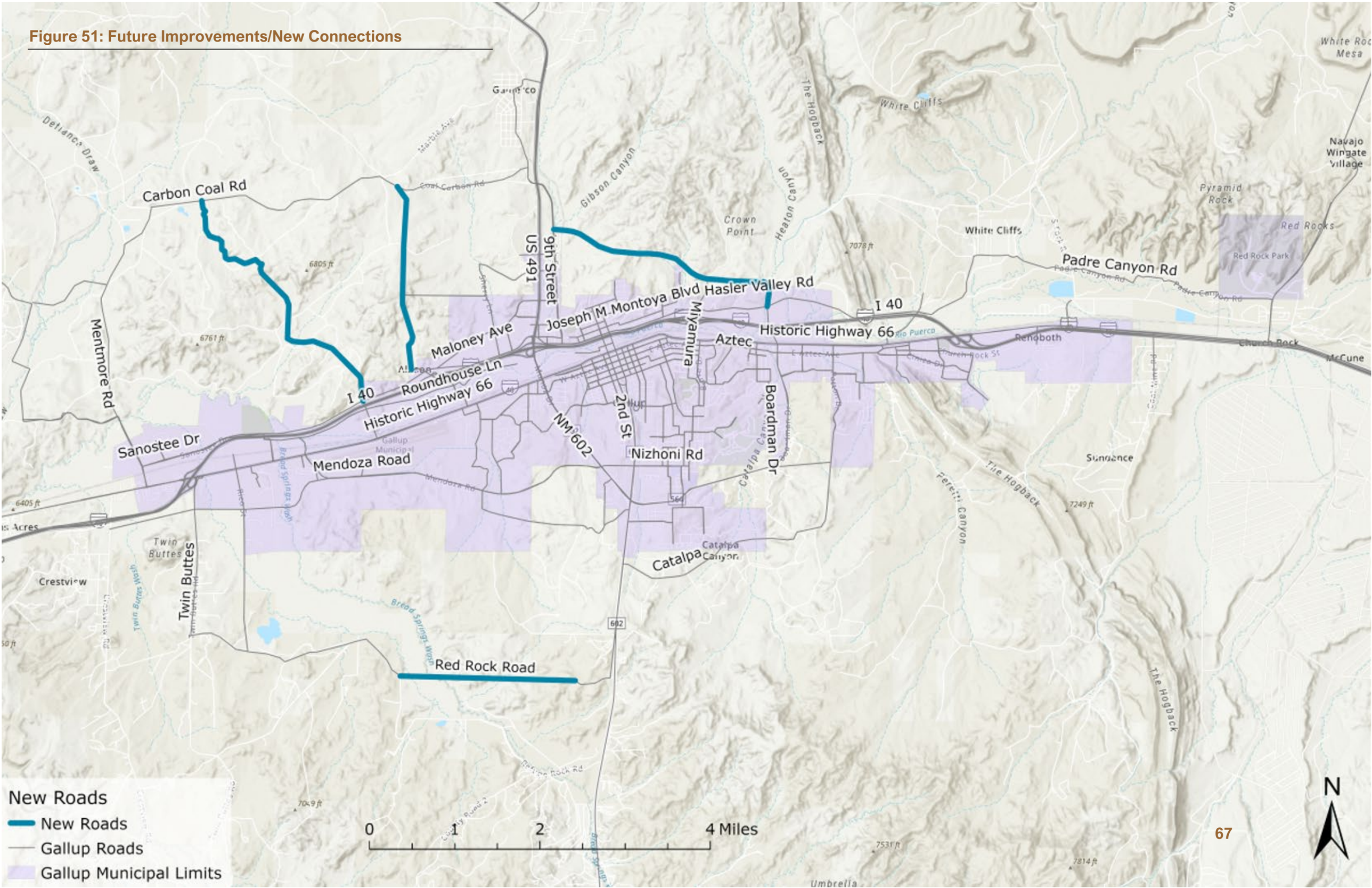


Figure 51: Future Improvements/New Connections



CHAPTER 6: FUTURE ROADWAY DESIGN CONSIDERATIONS

BASIC ROADWAY DESIGN STANDARDS – CONSIDERATIONS FOR FUTURE IMPLEMENTATION

Roadways are critical facilities that are integral to people's daily lives. Because people rarely live, work, shop, and play in the same place, roadways connect people to jobs, important services like healthcare, social networks, and recreational opportunities. Whether someone is walking, bicycling, riding transit, or driving, roads are what take people from their origin to their destination. In addition to their role establishing connections, roadways can define the character of a place and contribute to a sense of community identity. Roadway design must also address the safety needs of all individuals and ensure that road users of all modes, ages, and abilities can reach their destination conveniently and safely.

This chapter presents recommended features for roadways in the City of Gallup based on their anticipated traffic volumes and general purpose. The roadway type definitions and design considerations included in the document will ensure that all new or improved roads have consistent dimensions and elements and can safely accommodate travel by road users of all travel modes, ages, and abilities. Because the purpose of a given roadway is influenced by adjacent land uses, this document also defines different land use types and provides guidance about desired or necessary roadway elements based on the land uses adjacent to the roadway. Finally, this document contains guidance on factors that affect roadway operations, including access management and potential traffic calming options based on roadway type and land use context.

Intended Users

The design guidance presented below is intended to be used both by City staff during the design of new roadways and publicly funded improvements to existing roadways, and by private developers to guide roadway design during the land development process.

Terminology

This document contains both standards, which refer to required roadway elements and are generally indicated by the word "should", and guidance, which refers to desired components generally indicated by the word "should." Engineering judgment will be required during the roadway design process, particularly where right-of-way is constrained. For this reason, many roadway elements are recommended and strongly encouraged, but are not required in all situations. Where a roadway is to be built using private funds as part of a land development effort, the developer must demonstrate to City staff why a recommended roadway element should be considered impractical and not included in the final design.

City of Gallup Land Development Standards

It should be noted that where necessary, the City of Gallup Land Development Standards (LDS) should be referenced as roadway planning and design takes place. Table 12-1-1 of the LDS outlines Street Elements and Design Considerations to be included in roadway design and infrastructure reconstruction projects. The roadway section images provided below are intended to provide an illustrative example of what future roadways may look like. Consultation with City staff and a transportation engineer will be required to ensure implementation that meets both the design criteria of the City and the context of the roadway implementation placement (for example, available right-of-way and other constraints).

ROADWAY TYPES

Principal Arterial

Definition: Principal arterials typically serve longer-distance local and regional trips and are intended to carry the largest volumes of non-Interstate roadways at generally higher speeds (i.e. design speed of 45-55 MPH). These roadways generally prioritize vehicle throughput over providing access to adjacent parcels.

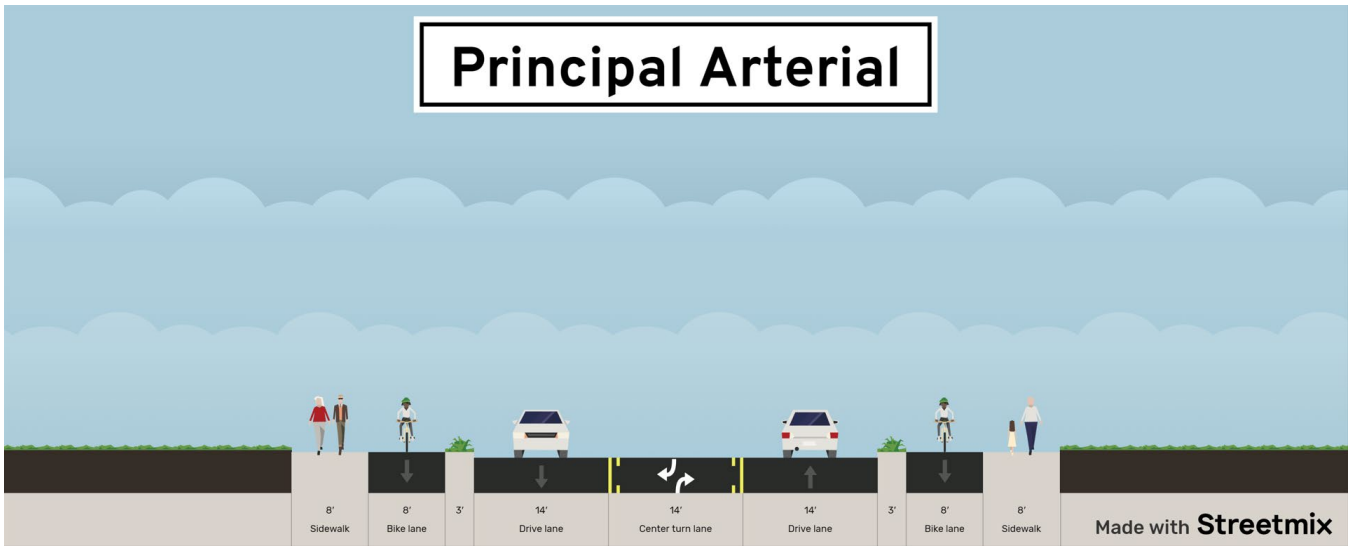


Figure Principal Arterial with Center Turn Lane and Buffered Bike Lanes

Design Considerations: Principal arterials should feature curb and gutter and should include either a continuous turn lane or raised landscaped median, depending on implementation context. Principal arterials may have as many as four travel lanes (two lanes in each direction) with turning lanes at appropriate intersections. Within the City of Gallup, principal arterials should not include bicycle amenities, however, should include considerations for a detached sidewalk and multi-use trail separated from vehicle traffic by a landscaped buffer.

Minor Arterial

Definition: Minor arterials are intended to carry large volumes of traffic at a design speed of 45 MPH. These roadways generally provide more access to adjacent parcels than principal arterials but still prioritize vehicle throughput over access.

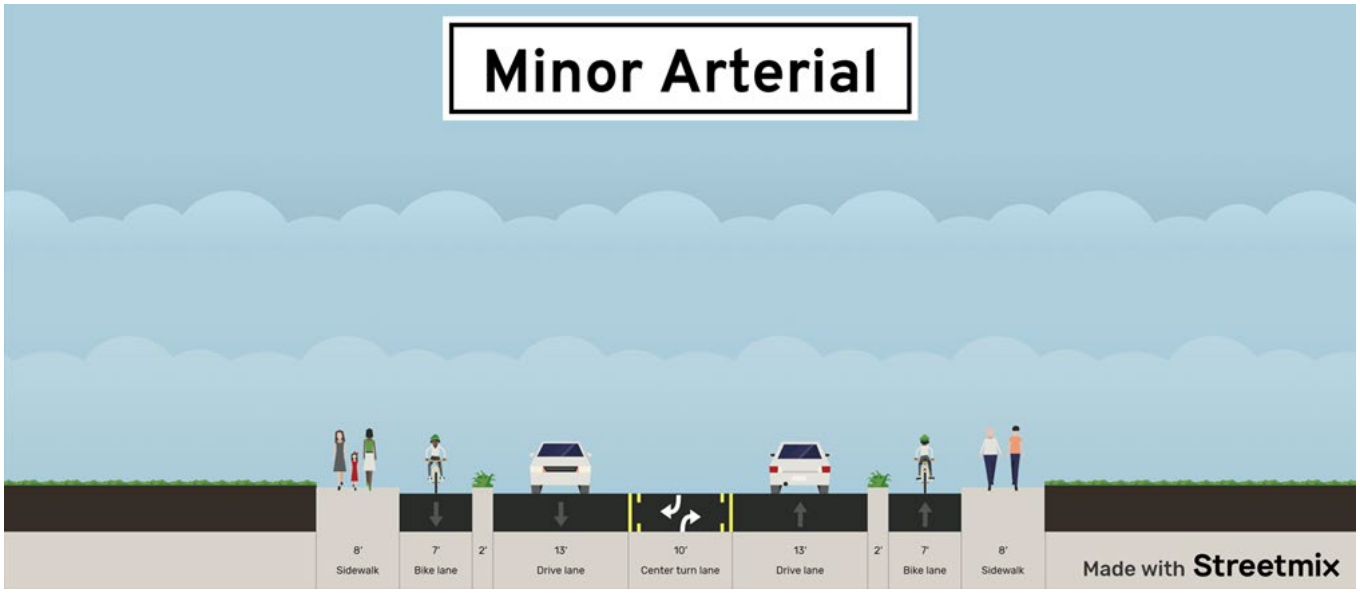


Figure 2 Minor Arterial with Center Turn Lane and Buffered Bike Lanes

Design Considerations: Minor arterials should feature curb and gutter and should include a center turn lane at minimum (a raised median is also acceptable given locational design needs). They may have as many as four travel lanes (two lanes in each direction) with turning lanes at appropriate intersections. Minor arterials should also have protected on-street bike lanes in each direction of travel that are separated from vehicle traffic by a protected buffer zone. Minor arterials should have detached a detached sidewalk and multi-use trail separated from vehicle traffic by a landscaped buffer.

Major Collector

Definition: Major collectors in the City of Gallup are intended to carry between 300 and 2,600 vehicles per day at a design speed of 35 MPH. Major collectors generally carry more vehicles per day than other collectors and may be located in commercial and residential areas. Because their role is to connect local roads and arterials, major collectors must balance between vehicle throughput and providing access to adjacent parcels.

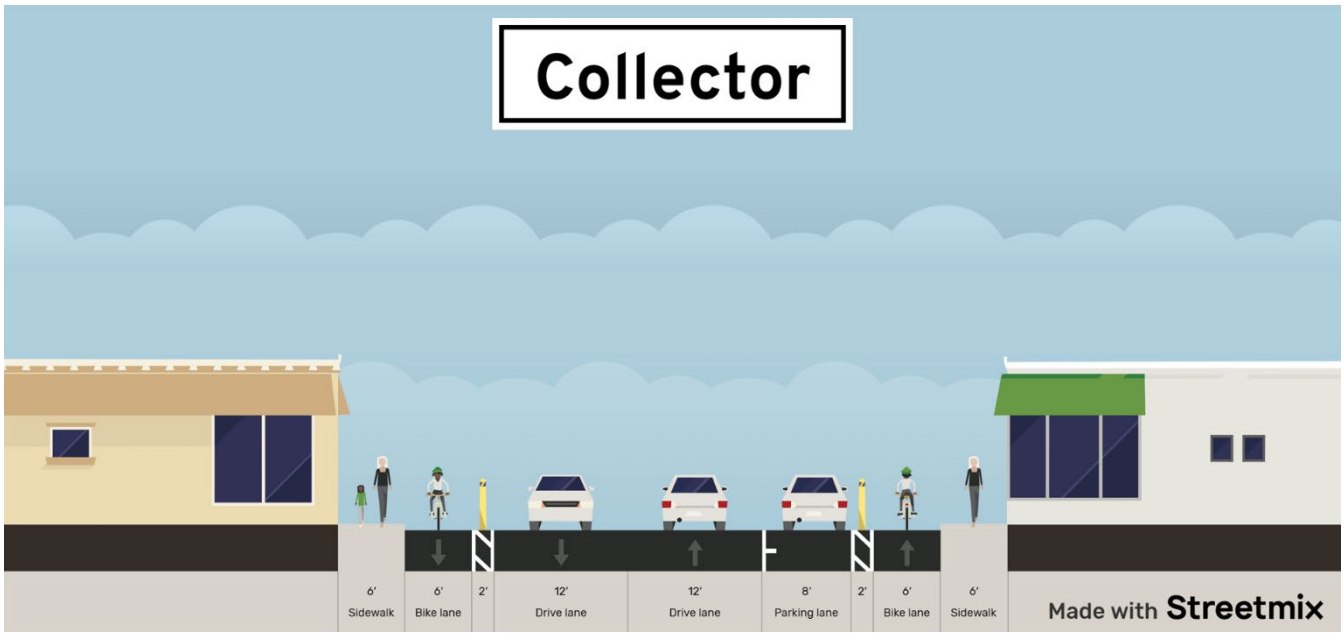


Figure 3 Major Collector with Protected Bike Lanes

Design Considerations: Major collectors should feature curb and gutter and should include a center turn lane – raised center medians are optional and should consider contextual needs. They have two travel lanes in each direction with turning lanes at appropriate intersections. Major collectors should also have protected on-street bike lanes in each direction of travel that are separated from vehicle traffic by a protected buffer zone. Major collectors should also have a detached sidewalk and multi-use trail separated from vehicle traffic by a landscaped buffer.

Minor Collector

Definition: Minor collectors in the City of Gallup are intended to carry between 150 and 1,110 vehicles per day at a design speed of 35 MPH. Minor collectors generally carry less vehicles per day than other collectors and may be located in commercial and residential areas. Minor collectors in the City will have a greater role in connecting local and arterial roadways, however an increased frequency of adjacent parcel access may be present.

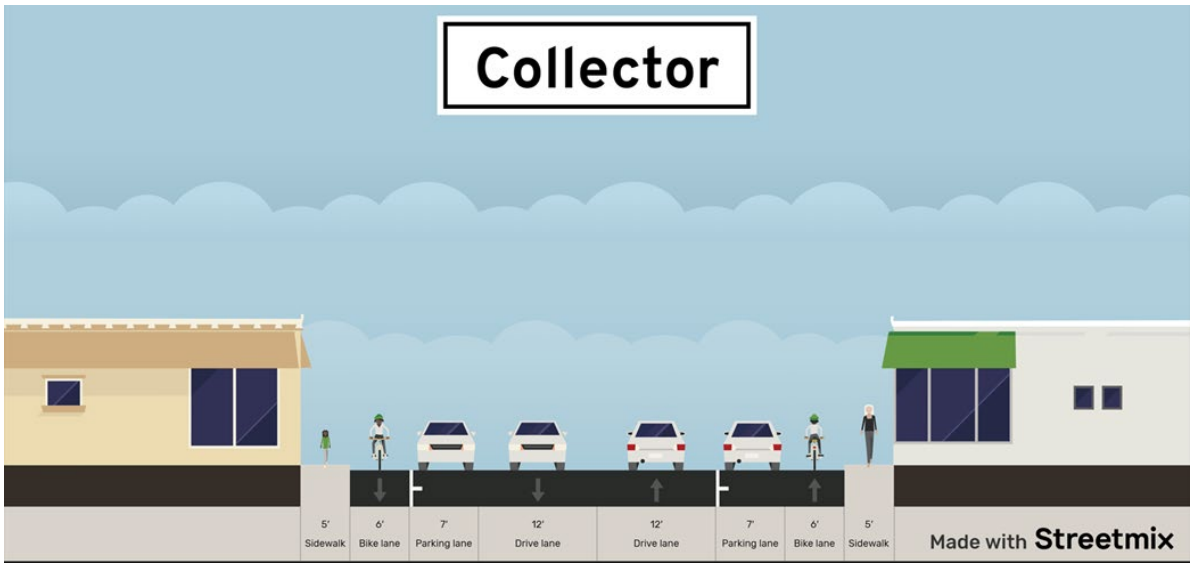


Figure 4 Minor Collector with Parking Buffered Bike Lanes

Design Considerations: Minor collectors should feature curb and gutter and should include a center turn lane – raised center medians are optional and should consider contextual needs. They have two travel lanes in each direction with turning lanes at appropriate intersections. Minor collectors should also have on-street bike lanes in each direction of travel that are separated from vehicle traffic by a buffer zone. Parking is allowed on minor collectors within the City. A detached sidewalk and multi-use trail separated from vehicle traffic by a landscaped buffer should also be included in implementation.

Local Street

Definition: Local streets are intended to carry low volumes of traffic at low speeds. These roads prioritize access to adjacent parcels over vehicle throughput.

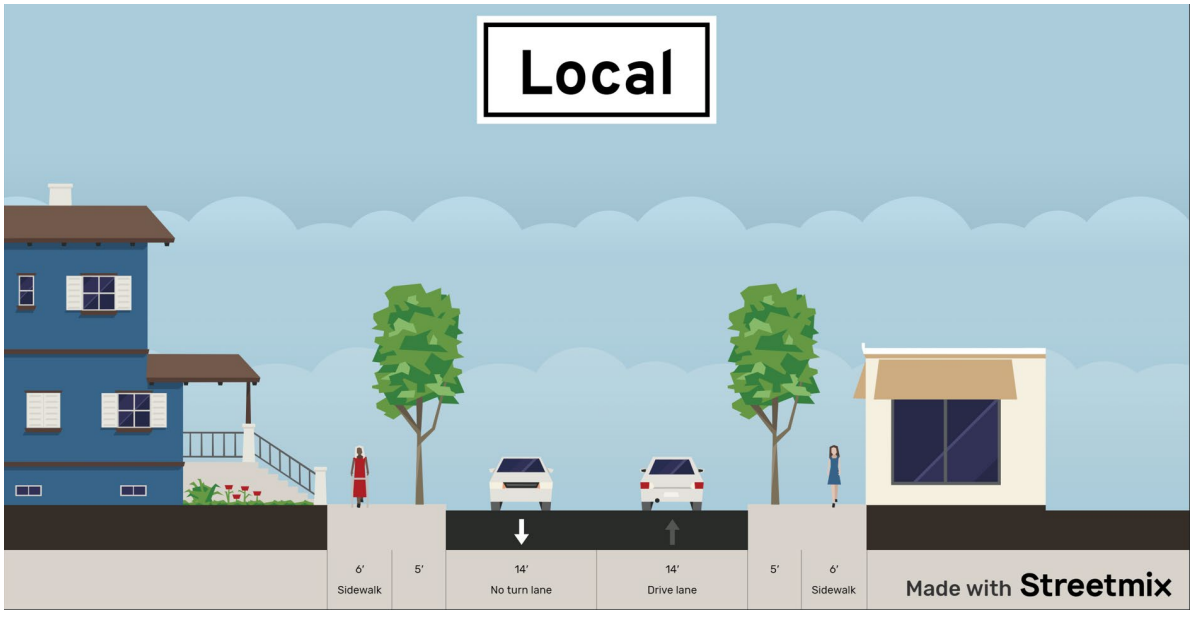


Figure 5 Local with Sidewalks

Design Considerations: Local roads at minimum should feature curb and gutter and a minimum right-of-way of 50 feet. Sidewalks may be attached or detached, and the consideration of an included multi-use trail may be applied on one side of the roadway. Sharrows for bicycles should be included on roadways, however, because residents of all ages and abilities will frequently travel on local roads using a variety of modes, local roads may also benefit from traffic calming devices (see Appendix).

CHAPTER 7: FUNDING SOURCES

ACCESS TO FEDERAL FUNDING

The City of Gallup staff should continue to coordinate with the Northwest New Mexico Council of Governments (NWNMCOG) and participate in technical committees on available funding opportunities. Funding will be critical for the Implementation of improvements along priority corridors and identified potential connections outlined in this plan. It is important for these projects (identified herein) to be included in regional conversations. It is also equally important for Gallup staff to be directly involved in all discussions related to the allocation of federal funding within McKinley County where coordination of improvements is required.

As per the New Mexico Department of Finance and Administration, the following funding sources are available for the City of Gallup:

Table 6: New Mexico Funding Sources

Funding Sources	Description
Community Development Block Grant	Community Development Block Grants (CDBG). Small Cities (administered by Local Government Division) https://www.nmdfa.state.nm.us/local-government/community-development-bureau/cdbg-information/
Federal Grants	Federal grants such as those from USDA-Rural Utilities Service (RUS), Economic Development Assistance Program (EDA), Environmental Protection Agency (EPA), or U.S. Department of Housing and Urban Development (HUD), grants.gov, etc http://www.grants.gov/
Federal Loans	Federal loans such as Transportation Infrastructure Finance and Innovation Act (TIFIA); U.S. Department Housing and Urban Development (HUD); RUS, EDA
Local Funds	Local general funds including taxes, user fees, and miscellaneous other funds
Local Bonds	Local bonds such as revenue or general obligation
NMED Grant	NM Environmental Department (NMED) http://www.nmenv.state.nm.us/
DFA Grant	Department of Finance Administration (DFA) https://www.nmdfa.state.nm.us/
NMFA Grant	NM Finance Authority (NMFA) http://www.nmfa.net/
DOT Grant	State Highway Department (NMSHTD) http://dot.state.nm.us/en.html
ALTSD	NM Aging & Long-term Services (ALTSD) http://www.nmaging.state.nm.us/
IAD	Indian Affairs Department (IAD) http://www.iad.state.nm.us/
NMEDD Grant	NM Economic Development (NMEDD)

	http://www.gonm.biz/
State Grants	State grants including NM Mortgage Finance Authority (MFA) and Tribal Infrastructure Fund (TIF)
NMED Loan	NM Economic Development (NMED) http://www.gonm.biz/
NMFA Loan	NM Finance Authority (NMFA) http://www.nmfa.net/
NMEDD Loan	NM Economic Development (NMEDD) http://www.gonm.biz/
Capital Outlay	Capital outlay funds are used to build, improve, or equip physical property that will be used by the public. Roads, computers, museums, playgrounds, schools, irrigation ditches, hospitals, lands, and furniture can all be capital outlay projects. In New Mexico, state capital outlay is authorized by the Legislature and generally in nonrecurring-one-time-money. Because of provisions in the New Mexico Constitution, capital outlay can only be sued for government-owned facilities.
General Obligation Bonds	Legislative appropriations either state general funds, state general obligation bonds for severance tax bonds.

Source: New Mexico Department of Finance and Administration, *Funding Source Table*
Infrastructure Capital Improvement Plan (ICIP) | New Mexico Department of Finance and Administration (state.nm.us)

INFRASTRUCTURE CAPITAL IMPROVEMENT PLAN (ICIP)

The local government infrastructure capital improvement plan (ICIP) is a planning tool which establishes priorities for anticipated infrastructure projects for counties, municipalities, tribal governments, special districts, and senior citizen facilities. The ICIP is administered through the Department of Finance and Administration, Local Government Division. The ICIP planning tool encourages entities to develop and update their five-year plan annually which is submitted to the State. It provides an opportunity for communities to assist and assess any critical needs. Although the ICIP is not a funding source, it does include information in each project for state and federal funding opportunities. As the City of Gallup updates their ICIP list in coming years, it will be important to consider the inclusion of many of the infrastructure projects identified within this plan.

The New Mexico Department of Finance and Administration maintains the current (Fiscal Years 2025-2029) ICIP list statewide. The FY 2025-2029 ICIP publication consists of three reports:

1. Entity information that includes Project Priority Process, Capital Improvement Goals, and Factors/Trends Considered
2. Project Summary of all projects submitted by each entity
3. The Top 3 Project Detail Reports of each entity's top five FY 2025 projects

As per the ICIP, McKinley County listed 33 total projects to be addressed during FY 2025-2029. The below table lists the subtotals for funding by year. A more detailed list can be found in the Appendix.

Table 7: McKinley County ICIP Project Funding

Funded to Date ($)	2025 ($)	2026 ($)	2027 ($)	2028 ($)	2029 ($)	Total Project Cost ($)	Amount Not Yet Funded ($)
73,767,322	72,569,786	52,000,000	221,950,000	31,278,500	75,736,310	527,301,918	453,534,596

Source: New Mexico Department of Finance and Administration, *FY2025-2029 Project Summary Counties*
ICIP Publication | New Mexico Department of Finance and Administration (state.nm.us)

In addition to these County-wide projects, there are also 5 projects specific to the City of Gallup outlined for FY 2025-2029 – centered around water/wastewater improvement projects.

REGIONAL TRANSPORTATION PLANNING ORGANIZATION (RTPO)

Equally important for regional coordination is a focus to continue communication and coordination with the Northwest Regional Transportation Planning Organization (NWRTPO). The NWRTPO functions to:

- serve as a forum and to elicit informed recommendations for multimodal transportation and enhancement projects
- submit projects under certain funding categories to the New Mexico Department of Transportation (NMDOT) after prioritization
- promote the implementation of an efficient transportation network in the three-county region of Northwest New Mexico

NMDOT is the designated State agency that receives and administers federal transportation funds and State transportation funds. In order to manage transportation programs more efficiently, the State Transportation Commission created seven regional transportation planning organizations to work closely with NMDOT. The NMDOT has contracted with the regional planning organization, Northwest New Mexico Council of Governments (NWNMCOG), to administer the NWRTPO which includes San Juan County, McKinley County, and Cibola County.

TRANSPORTATION AND PROJECT FUNDING

While various transportation programs are available through federal and state funding, the NWRTPO focuses on federal programs included in the NMDOT's Statewide Transportation Improvement Program (STIP).

The NWRTPO assists local and county governments to submit applications yearly. Roadway Improvement, Enhancement, Bridge, Scenic Byways, and Transit projects are rated and ranked by the designated Policy and Technical Advisory Committee local government representatives of the NWRTPO. Recommendations are combined regionally by NMDOT district and are then forwarded to NMDOT for possible inclusion in the State Transportation Improvement Program (STIP).

As with most federal programs, funding availability is limited. Once the review process has been completed (usually September), funding awards are announced.

APPENDIX: TRAFFIC CALMING

As Gallup continues to grow, there will be an increased need for managing the vehicle speeds and traffic that comes with additional numbers of drivers on the City's roadway network. To achieve this task, the City should consider implementing traffic calming measures in prioritized locations throughout the community. According to the FHWA and ITE, the primary purpose of traffic calming is to "support the livability and vitality of residential and commercial areas through improvements in non-motorist safety, mobility, and comfort. These objectives are typically achieved by reducing vehicle speeds or volumes on a single street or a street network."

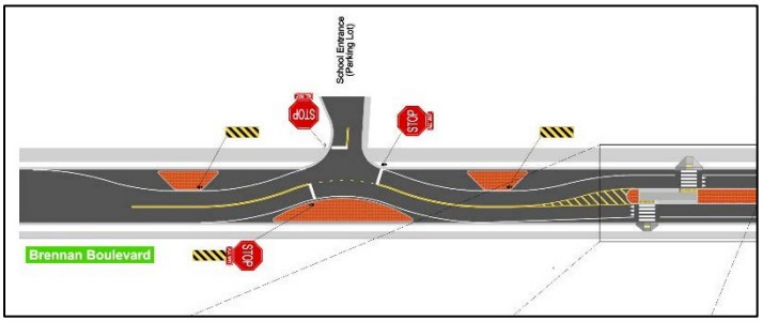
To achieve traffic calming, four main techniques are utilized: vertical treatments, horizontal shifts, and roadway narrowing are intended to reduce vehicle speeds and enhance the street environment for non-motorists, while roadway closures are intended to reduce cut-through traffic by preventing vehicular travel in one or more directions. It is important to note that any of the traffic calming techniques described within this section may be used in combination with other treatments to achieve greater speed and traffic reductions.

To determine the most-appropriate traffic calming technique for a given situation, the cost of a specific treatment must also be considered, especially when deciding between an infrastructure-based or paint-based treatment. Infrastructure improvements are typically more expensive to install, but they last longer and require less maintenance than paint-based techniques. Conversely, paint-based treatments are cheaper to install than additional infrastructure, but they require regular reapplication of paint to maintain their effectiveness.

The following treatments are described within this section according to ITE and FHWA best practices:

- Chicane
- Choker
- Closure
- Curb Extensions/Bulb-Out
- Lateral Shift
- Median Island
- Mini Roundabout
- On-Street Parking
- Road Diet
- Roundabout
- Speed Cushions
- Speed Tables/Raised Crosswalks
- Traffic Circle

CHICANE



Description

A chicane is a series of alternating curves or lane shifts that force a motorist to steer back and forth instead of traveling a straight path. The curvilinear path is intended to reduce the speed at which a motorist is comfortable traveling through the chicane, and the lower speed can in turn result in a traffic volume reduction. A chicane-like effect can also be achieved through curved striping, or by alternating on-street parking from one side of the street to the other. This method is also called deviations, serpentines, reversing curves, or twist.

Applications

- Appropriate for mid-block locations but can be an entire block if it is relatively short
- Most effective with equivalent low volumes on both approaches
- Appropriate speed limit is typically 35 mph or less
- Typically, a series of at least three landscaped curb extensions
- Can use alternating on-street parking from one side of a street to the other
- Applicable on one-lane one-way and two-lane two-way roadways
- Can be used with either open or closed (i.e. curb and gutter) cross-section
- Can be used with or without a bicycle facility

Implementation

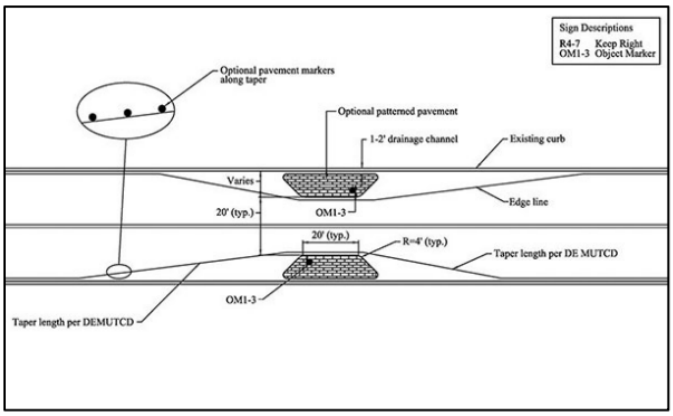
- Chicanes may still permit speeding by drivers cutting straight paths across the center line
- Minimize relocation of drainage features
- May force bicyclists to share travel lanes with motor vehicles
- Maintain sufficient width for ease of emergency vehicles and truck throughout

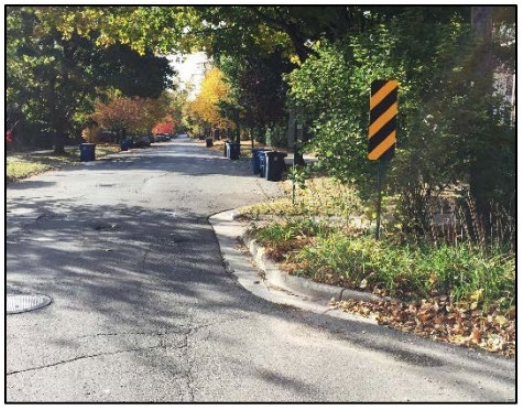
Potential Impacts

- No effect on access, although heavy trucks may experience challenges when negotiating
- Limited data available on impacts to speed and crash risk
- Street sweeping may need to be done manually
- Minimal anticipated volume diversion from street
- May require removal of some on-street parking
- Provides opportunity for landscaping
- Unlikely to require utility relocation

- Special attention should be paid to avoid the need to relocate drainage features such as catch basins, concrete channels, valley gutters, inlets, and trench drains
- Not a preferred crosswalk location
- Bus passengers may experience discomfort due to quick successive lateral movement

CHOKER





Description

A choker is a horizontal, midblock extension of the curb into the street which results in a narrower roadway section. The placement of chokers results in a narrower travel lane and encourages reduced travel speeds as drivers perceive a reduced margin of error to operate within. Chokers can also provide opportunity for landscaping, which results in increased attractiveness and visibility for motorists.

Applications

- Can be located at any spacing desired
- May be suitable for a mid-block crosswalk
- Appropriate for arterials, collectors, or local streets with a speed limit of 40 mph or less

Implementation

- Only applicable for mid-block locations
- Can be used on a one-lane one-way and two-lane two-way street
- Most easily installed on a closed-section road (i.e. curb and gutter)
- Applicable with or without dedicated bicycle facilities
- Applicable on streets with, and can protect, on-street parking
- Appropriate for any speed limit
- Appropriate along bus routes
- Typical width of 6 to 8 feet; offset from through traffic by approximately 1.5 feet
- Locations near streetlights are preferable
- Length of choker island should be at least 20 feet

Potential Impacts

- Encourages lower speeds by funneling it through the pinch point
- Can result in shorter pedestrian crossing distances if a mid-block crossing is provided

- May force bicyclists and motor vehicles to share the travel lane
- May require some parking removal
- May require relocation of drainage features and utilities
- Retains sufficient width for ease of use for emergency vehicles

CLOSURE

Description

Closures refer to the prevention of travel on a street in one of two ways. Half closures are barriers that block travel in only one direction (creates a one-way street) for a short distance on otherwise two-way streets and are sometimes referred to as partial closures or one-way closures. Full-street closures are barriers placed across a street to completely close the street to through traffic, while usually leaving open space for pedestrians and bicyclists.

Applications

- Appropriate for local streets (half and full), at intersection (half and full), or mid-block (full closure only)
- Typically applied only after other cut-through traffic reduction measures have failed or are deemed inappropriate or ineffective
- Typically found on roadways with curb and gutter
- Can be applied with and without dedicated bicycle facilities and on roads with on-street parking
- Often used in sets to make travel through neighborhoods more circuitous
- Not appropriate along bus transit routes
- Can be used to assist crime prevention

Implementation

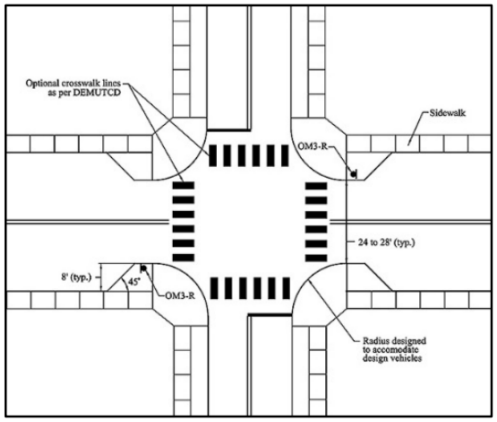
- Barriers may consist of landscaped islands, walls, gates, bollards, or other obstructions
- Appropriate signing needed at entrances to full-closure street blocks
- May require modifications to maintain surface drainage capacity
- Should consider traffic diversion patterns and associated impacts
- Possible to make diverters passable for pedestrians and bicyclists

Potential Impacts

- May negatively impact street network connectivity and capacity

- May unintentionally result in traffic diverting to other local streets
- No significant impact on vehicle speeds beyond the closed block
- Can improve pedestrian crossing safety
- Potential legal issues associated with blocking a public street (e.g., business or emergency access)
- Barriers may consist of landscaped islands, mountable facilities, walls, gates, side-by-side bollards, or any other obstruction that leave an opening smaller than the width of a passenger car
- Can be placed mid-block or on the approach to an intersection
- Typically installed on a closed-section roadway (i.e. curb and gutter)
- Full or half closures can increase response times and should not be used on roads/streets that provide access to hospitals or emergency medical services; half closures allow for a higher degree of emergency vehicle access than full closures
- Both closure types can be designed to allow emergency vehicle access with removable, or breakaway delineators or bollards, gates, mountable curbs, etc

CURB EXTENSIONS/BULB OUT



Description

Curb extensions, or bump-outs/bulb-outs, are horizontal extensions of the sidewalk into the street, resulting in a narrower roadway section. If located at a mid-block location, it is typically called a choker.

Applications

- When combined with on-street parking, a corner extension can create protected parking bays
- Effective method for narrowing pedestrian crossing distances and increase pedestrian visibility
- Appropriate for arterials, collectors, or local streets
- Can be used on one-way and two-way streets
- Installed only on closed-section roads (i.e. curb and gutter)
- Appropriate for any speed, provided an adequate shy distance is provided between the extension and the travel lane
- Adequate turning radii must be provided to use on bus route

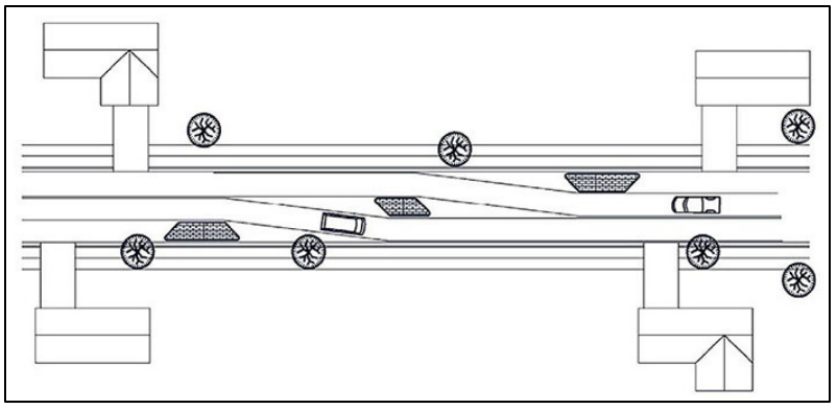
Implementation

- Effects on vehicle speeds are limited due to lack of deflection
- Must check drainage due to possible gutter realignment
- Major utility relocation may be required, especially drainage inlets
- Typical width between 6 and 8 feet
- Typical offset from travel lane at least 1.5 feet
- Should not extend into bicycle lane

Potential Impacts

- Effects on vehicle speeds are limited due to lack of deflection
- Can achieve greater speed reduction if combined with vertical deflection
- Smaller curb radii can slow turning vehicles
- Shorter pedestrian crossing distances can improve pedestrian safety
- More pedestrian waiting areas may become available
- May require some parking removal adjacent to intersections

LATERAL SHIFT



Description

Similar to a chicane, a Lateral Shift is the realignment of an otherwise straight street that causes travel lanes to shift in at least one direction. A typical lateral shift separates opposing traffic through the shift with the aid of a median island. Without this island, motorists can cross the centerline in order to drive the straightest path possible, thereby reducing the speed reduction effectiveness of the lateral shift. Additionally, a median island reduces the likelihood a motorist will veer into the path of opposing traffic, further improving the safety of the roadway for motorists.

Applications

- Appropriate for local, collector, or arterial roadways
- Appropriate for one-lane one-way and two-lane two-way streets
- Appropriate on roads with or without dedicated bicycle facilities
- Maximum appropriate speed limit is typically 35 mph
- Appropriate along bus transit routes

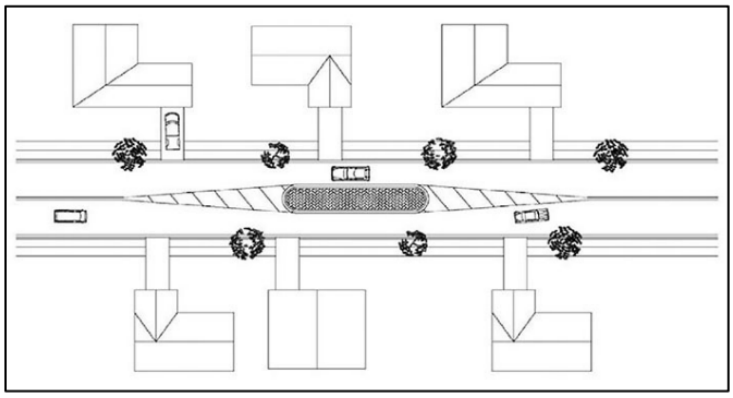
Implementation

- Typically separates opposing traffic through the shift with the aid of a raised median
- Applicable only to mid-block locations
- Can be installed on either open- or closed-section (i.e. curb and gutter) roads
- Location near streetlights preferred
- May require drainage feature relocation
- Should not require utility relocation

Potential Impacts

- Without islands, motorists could cross the centerline to drive the straightest path possible
- No impact on access
- May require removal of some on-street parking
- Limited data available on impacts on speed, volume diversions, and crash risk
- Provides opportunities for landscaping
- Can provide locations for pedestrian crosswalk
- Appropriate along primary emergency vehicle routes or on a street that provides access to a hospital or emergency medical services, as low narrow medians can be straddled by emergency vehicles, if needed

MEDIAN ISLANDS



Description

Median Islands are raised islands located along the street centerline that narrows the travel lanes at that location and has the option to implement a pedestrian crosswalk and refuge within the island. The separation of travel lanes also allows pedestrians to focus on one lane at a time when crossing the street. Where there is an existing midblock crosswalk, it is desirable to locate the median island at the crosswalk. While medians are generally located at mid-block, they can also serve as a gateway to a community. This traffic calming method is also called a median diverter, intersection barrier, intersection diverter, and island diverter.

Applications

- For use on arterial, collector, or local roads with a speed of 45 mph or less

- Can often double as a pedestrian/bicycle refuge islands if a cut in the island is provided along a marked crosswalk, bike facility, or shared-use trail crossing
- If placed through an intersection, considered a median barrier

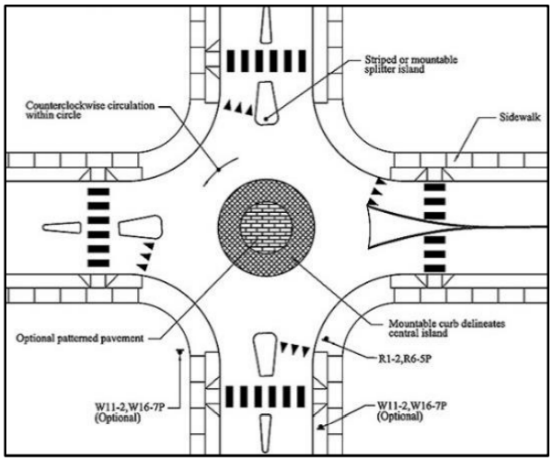
Implementation

- Can be applied on roads with or without sidewalks and/or dedicated bicycle facilities
- Typically not appropriate near sites that attract large combination trucks

Potential Impacts

- May impact access to properties adjacent to islands
- No significant impact on vehicle speeds beyond the island
- Little impact on traffic volume diversion
- Safety can be improved without substantially increasing delay
- Shortens pedestrian crossing distances
- Bicyclists may have to share vehicular travel lanes near the island
- May require removal of some on-street parking
- May require relocation of drainage features and utilities
- May complicate snow plowing efforts

MINI ROUNDABOUTS



Description

Mini roundabouts consist of raised islands, placed in unsignalized intersections, around which traffic circulates where motorists must yield to motorists already in the intersection. These roundabouts require drivers to slow to a speed that allows them to comfortably maneuver around them. The center island of a mini roundabout is fully traversable, and splitter islands may be fully traversable as well.

Applications

- Intersections of local and/or collector streets
- One lane each direction entering intersection
- Not typically used at intersections with high volume of large trucks/buses turning left
- Appropriate for low-speed settings

Implementation

- Typically circular in shape, but may be an oval shape
- Controlled by YIELD signs on all approaches with pedestrian crosswalks, if included one car-length upstream of YIELD bar
- Preferable for roadway to have urban cross section (i.e., curb and gutter)
- Can be applied to road with on-street parking
- Can be applied to roads both with and without a bicycle facility. Bicycle facilities, if provided, must be separated from the circulatory roadway with physical barriers; cyclists using the circulatory roadway must merge with vehicles. Bicycle facilities are prohibited in the circulatory roadway to prevent right-hook crashes
- Key design features are the fastest paths and path alignment

Potential Impacts

- Slight speed reduction
- Little diversion of traffic
- Bicycle and motorist will share lanes at intersections because of narrowed roadway
- Large vehicles/buses usually drive over the center island for left turns

ON-STREET PARKING

Description

By allocated paved space to parking, parked cars encourage reduced travel speeds as drivers perceive a reduced margin of error to operate within. Parking can be utilized on one or both sides of roadway, and can be either parallel or angled. However, parallel is generally preferred for maximized speed reduction.

Application

- More appropriate in urban or suburban settings
- Can apply alternating sides of street for chicane effect
- Can combine with curb extensions for protected parking, which can also include landscaping or other beautification treatments
- Can apply using time-of-day restrictions to maximize throughput during peak periods
- Can be used on one-way or two-way streets
- Preferable on roads with curb and gutter
- Appropriate along bus transit routes

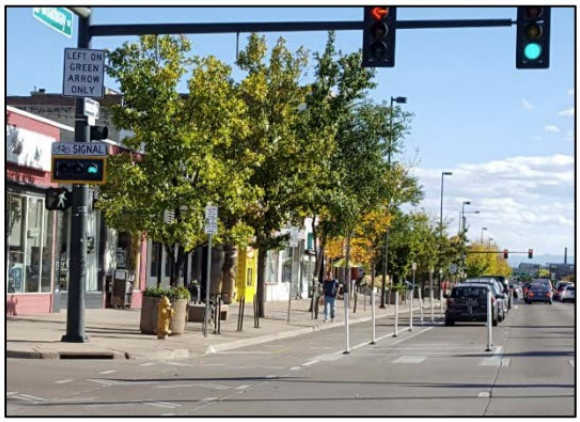
Implementation

- Appropriate distance needed between travel lanes and parking lanes
- Impact is directly affected by demand, and parked vehicles must be present to be effective
- If used for chicane effect, must verify parking demand to ensure that majority of spaces are occupied when effect is desired most during the day
- Should not be considered near traffic circles nor roundabouts
- Should not be applied along median island curbs
- For lower-demand locations, can counteract negligible impact with curb extensions or other road narrowing features

Potential Impacts

- Can be blocked in by snow during plowing operations
- May limit road user visibility and sight distance at driveways/alleys/intersections
- Can put bicyclists at risk of colliding with car doors if road features bike lanes
- May be impacted if other traffic calming measures are considered or implemented
- Provides buffer between moving vehicles and pedestrian facilities
- Requires consideration of design of parking lanes near hydrants and other emergency features

ROAD DIET



Description

Road diets refer to the revision of lane use or widths to result in one travel lane per direction with minimum practical width, with the overall goal of reducing cross-section. Common road diets involve conversion of a four-lane road to a three-lane road featuring two through lanes and center two-way left-turn lane. Road diets can also involve narrowing of existing travel lanes, and converting travel lanes to dedicated bicycle facilities, left-turn lanes, on-street parking, raised medians, pedestrian refuge islands, sidewalks, etc.

Application

- Applicable for nearly all roadway functional classifications
- Can be applied in urban, suburban, or rural settings
- Appropriate for most common urban speed limits
- Can be applied at/near intersections or along road segments
- Appropriate along bus routes
- Must consider transitions from adjacent roadway sections and through intersections

Potential Impacts

- Impacts demand that can be accommodated by the roadway
- Reduction of through lanes tends to reduce speeds
- Can improve pedestrian crossing ease and safety
- Can improve bicycle accessibility if travel lanes can be used for shoulders/bike lanes instead

ROUNDABOUT

Description

A roundabout is a circular intersection, without traffic signals or stop signs, where drivers travel counterclockwise around a center island. Drivers must yield at entry to traffic already in the roundabout, then enter the intersection and exit at their desired street. By reducing the number and severity of conflict points, and because of the lower speeds of vehicles moving through the intersection, roundabouts are a significantly safer type of intersection than compared to typical intersections.

Application

- Suitable for intersections of arterial and/or collector streets with one or more entering lanes
- Can be used at intersections with high volumes of large trucks and buses, depending on design

Implementation

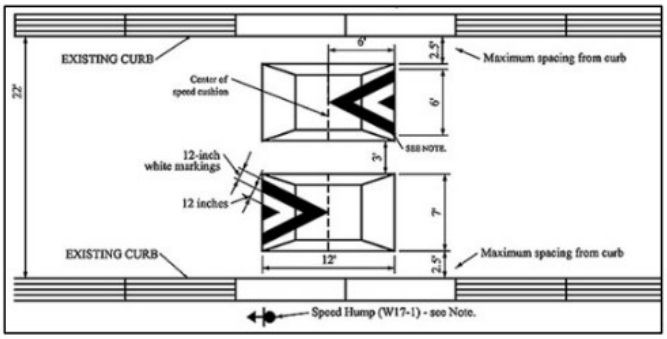
- See NCHRP Report 672 for design details
- Design vehicle is determined specifically for each site
- Typically circular in shape but may be an oval shape
- Key physical elements are center islands, truck aprons, and splitter islands
- Controlled by YIELD signs on all approaches with pedestrian crosswalks, if included, one car length upstream of YIELD bar
- Key design features include: fastest paths, swept paths, and path alignment
- Large vehicles circulating around the center island for all movements may traverse the apron
- Landscaping needs to be designed to allow adequate sight distance per NCHRP 672
- Preferable on roads with curb and gutter
- Bicycle facilities, if provided, must be separate from the circulatory roadway with physical barriers; cyclists using the circulatory roadway must merge with vehicles. Bicycle facilities are prohibited in the circulatory roadway to prevent right-hook crashes.

Potential Impacts

- Limited impact on access, except for access points immediately adjacent to intersection
- Limited impact on roadways with on-street parking
- May draw additional traffic but with reduced delays and queues

- Appropriate for emergency vehicle routes or streets that provide access to hospitals
- Emergency vehicles may traverse the apron

SPEED CUSHION



Description

Speed cushions are modular units that are either pre-manufactured or constructed with asphalt. They are applied to a road surface and designed to be uncomfortable for motorists to negotiate at high operating speeds. The height and length of the raised areas are comparable to the dimensions of a speed hump. However, a speed cushion has gaps (often referred to as “cutouts”) between the raised areas to enable a vehicle with a wide track (e.g., emergency vehicles, trucks, buses, etc.) to pass though the feature without any vertical deflection. Speed cushions are effective but generally achieve lower levels of speed reduction than speed tables.

Application

- Appropriate on local and collector streets
- Appropriate at mid-block locations only
- Appropriate for collectors and local residential streets of 30 mph or less
- Not appropriate on grades greater than 8 percent

Implementation

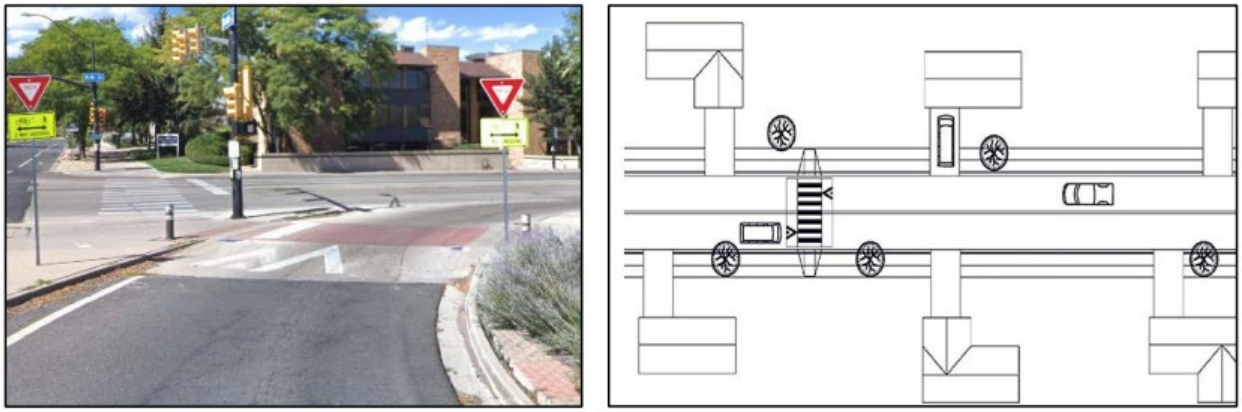
- Two or more cushions required at each location
- Typically 12 to 14 feet in length and 7 feet in width
- Cushion heights range between 3 and 4 inches, with trend toward 3 - 3 ½ inches maximum
- Speed cushion shapes include parabolic, circular, and sinusoidal
- Material can be asphalt or rubber
- Often have associated signing (advance-warning sign before first cushion at each cushion)
- Typically have pavement markings (zigzag, shark's tooth, chevron, zebra)
- Some have speed advisories

Potential Impacts

- Limited-to-no impact on non-emergency access

- Speeds determined by height and spacing; speed reductions between cushions have been observed averaging 20 and 25 percent
- Speeds typically increase by 0.5 mph midway between cushions for each 100 feet of separation
- Studies indicate that average traffic volumes have reduced by 20 percent depending on alternative routes available
- Average collision rates have been reduced by 13 percent on treated streets
- Speed cushions have minimal impact on emergency response times, with less than a 1 second delay experienced by most emergency vehicles

SPEED TABLE/RAISED CROSSWALKS



Description

Speed tables are flat-topped speed humps that cover the entire width of a roadway to raise the wheelbase of a vehicle in order to reduce its travel speed. When outfitted with crosswalk markings and signage, the speed table can become a raised crosswalk. If placed only in one direction on a road, it is called an offset speed table.

Application

- Appropriate for local and collector streets; mid-block or at intersections, with/without crosswalks
- Can be used on a one-lane one-way or two-lane two-way street
- Not appropriate for roads with speeds of 45 mph or more
- Typically long enough for the entire wheelbase of a passenger car to rest on top or within limits of ramps
- Work well in combination with textured crosswalks, curb extensions, and curb radius reductions
- Can be applied both with and without sidewalks or dedicated bicycle facilities
- Typically installed along roads with curb and gutter, but are feasible on roads without C&G

Implementation

- ITE recommended practice – “Guidelines for the Design and Application of Speed Humps”
- Most common height is between 3 and 4 inches (reported as high as 6 inches)
- Ramps are typically 6 feet long (reported up to 10 feet long) and are either parabolic or linear

- Careful design is needed for drainage

Potential Impacts

- No impact on non-emergency access
- Speeds reductions typically less than for speed humps
- Speeds typically decline approximately 0.5 to 1 mph midway between tables for each 100 feet beyond the 200-foot approach and exit points of consecutive speed tables
- Average traffic volumes diversions of 20 percent when a series of speed tables are implemented
- Average crash rate reduction of 45 percent on treated streets
- Increase pedestrian visibility and likelihood of driver yield compliance
- Generally not appropriate for BRT bus routes
- Typically preferred by fire departments over speed humps, but not appropriate for primary emergency vehicle routes; typically less than 3 seconds of delay per table for fire trucks

TRAFFIC CIRCLE

Description

A traffic circle is a raised island, placed within an unsignalized intersection, around which traffic circulates. Traffic circles force motorists to reduce their speeds regardless of whether the vehicle is travelling straight through the intersection or making a turn. A traffic circle can take the place of an existing 4-way stop and can operate exclusively with yield signs. Semi-permanent barriers can also be utilized to create traffic circles.

Application

- Appropriate at intersections of local streets with one lane each direction entering the intersection
- Not typically used at intersections with high volumes of large trucks or buses turning left
- Appropriate for both one-way and two-way streets in urban and suburban settings

Implementation

- Typically, circular in shape but may be an oval shape

- Frequently have landscaped center islands
- Recommend YIELD signs on all approaches
- Preferable for roadways with curb and gutter
- Can be applied to roads with on-street parking
- Can be applied to roads both with and without dedicated bicycle facilities
- Key design features include: offset distance (distance between projection of street curb and center island), lane width of circulatory roadway, circle diameter, and height of mountable apron for large vehicles

Potential Impacts

- Minimal anticipated traffic diversion
- Bicyclist and motorists will share lanes at intersections because of narrowed roadway
- Large vehicles/buses are usually not able to circulate around center island for left turns
- Landscaping needs to be designed to allow adequate sight distance, per AASHTO
- Minimize routing of vehicles through unmarked crosswalks on side-streets
- May require additional street lighting
- Emergency vehicles maneuver intersections at slow speeds
- Constrained turning radii typically necessitates a left turn in front of the circle for large vehicles

COMPLIMENTARY TRAFFIC CALMING ELEMENTS

The following elements can be used in conjunction with the aforementioned traffic calming techniques to increase the effect of the individual technique(s) utilized at a given location.

Speed Feedback Signs

Speed feedback signs consist of a static “Your Speed” sign and an electronic display of the approaching vehicle speed measured by radar. Speeding vehicles can trigger a warning message such as “Too Fast” or “Slow Down.” Signs can be paired with software to capture data on driver speeds and document the times of day that speeding occurs. This data can be used to coordinate with police for increased enforcement during peak speeding times, which has been shown to increase effectiveness.

Speed Feedback Trailers

Portable speed display trailers can be used as a temporary treatment in areas where speeding problems arise. As with speed feedback signs, speed feedback trailers consist of a speed limit sign, a static “Your Speed” sign, and an electronic display of the approaching vehicle speed measured by radar. Speeding vehicles can trigger a warning message such as “Too Fast” or “Slow Down.” Some trailers can be paired with software to capture data on driver speeds and document the time of day that speeding occurs for increased enforcement. Due to their mobility, speed feedback trailers can be used dynamically to respond to speeding throughout the city. Coordination with police is necessary for deployment and enforcement, and may be limited by police resources.

Transverse Markings

Transverse markings are a series of white bars, either flat or raised, which are painted across the center of the lane and spaced progressively closer together to create the illusion that driver speed is increasing. Transverse markings by themselves have proven to be only moderately effective, but adding "speed bars" to both sides of the transverse marking provides additional visual contrast for drivers and encourages drivers to place their vehicles between the bars. Transverse bars can also be placed so that the bars become closer together and thinner to create the perception that the driver is traveling faster than they actually are.

Pavement Marking Messages

Pavement markings provide messaging to remind drivers of lawful speeds utilizing messages like "SLOW" and "SPEED LIMIT 25 MPH." Pavement marking messages have been shown to be ineffective in isolation, and other traffic calming measures must be used in combination with messages to achieve any significant reduction in travel speeds. One of the most effective methods is based on European entrance treatments in which a large red rectangle (9.5 ft by 12 ft) is used to frame on-pavement speed limit markings.

Converging Chevrons

A series of converging chevron markings are placed in advance of, and terminated at, a speed limit sign which establishes the speed within a given area. The distance between chevrons gradually decreases, which gives the perception of increasing speed. This technique has been shown to be especially effective when applied to curves in a roadway. A pavement marking legend "xx MPH" can also be installed at the end of a chevron series to further reinforce the posted roadway speed.

Rumble Strips

Rumble strips are patterned sections of rough pavement or topical applications of raised material, which when driven over cause vibration and noise in a vehicle. This treatment is intended to direct the attention of the motorist back to the roadway. Rumble strips may be used to heighten motorists' awareness of certain conditions like a stop sign, curve or speed limit change.