

BAR NUNN SALT CREEK INTERSECTION & BAR NUNN SUBAREA PLANNING TRAFFIC STUDY

January 2012

Prepared for:



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**BAR NUNN SALT CREEK INTERSECTION &
BAR NUNN SUBAREA PLANNING TRAFFIC STUDY**

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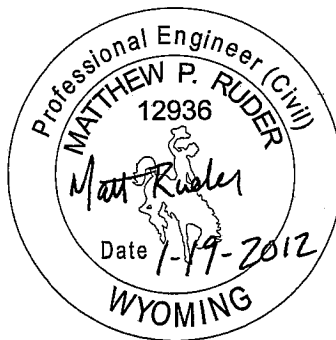
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1.0 Introduction



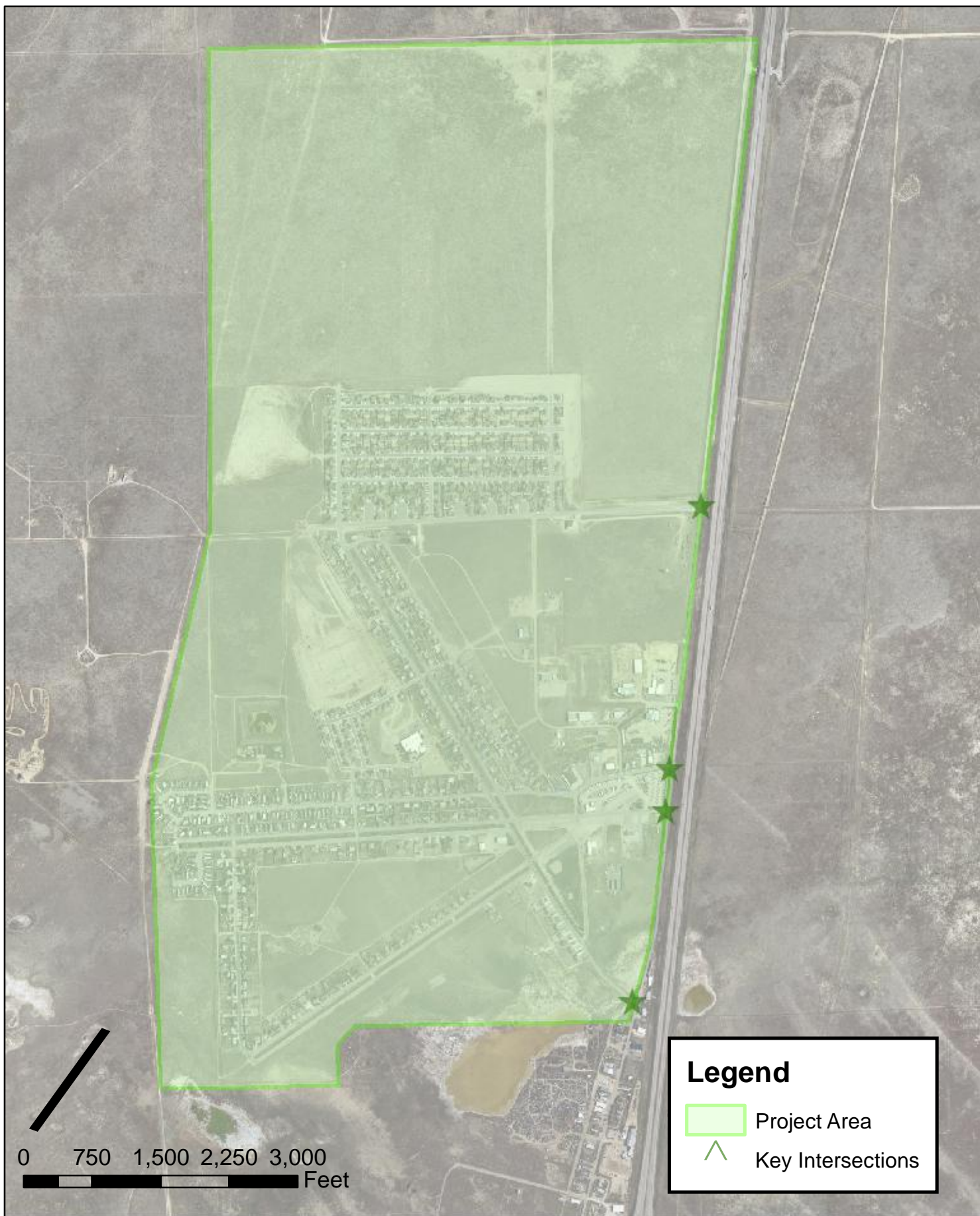
The town of Bar Nunn is located northwest of Casper, Wyoming, just west of the Interstate 25 corridor. The Casper area is currently experiencing significant growth due to energy development. As a quiet community with open land available for affordable housing development, Bar Nunn, in particular, is growing at an accelerated rate. Current platted development includes Vista Hills No. 1 Addition, The Ponderosa at Bar Nunn, Bar Nunn Industrial Center III, as well as residential and commercial infill along existing roads.

The Casper Area Metropolitan Planning Organization (MPO) retained DOWL HKM to study and recommend potential cost effective improvements to Salt Creek Highway from the intersection of Antelope Dr. to the intersection of McMurry Blvd. Also included in this study is development of interim and final street network configurations that will accommodate growth as it occurs. The study objectives included:

- Evaluate existing traffic conditions and address problem areas along Salt Creek Highway.
- Collaboration with developers, agencies, and public to gain a clear understanding of their visions and goals for the Town.
- Generate and distribute trips for projected growth.
- Develop a street network that will accommodate projected growth based on platted subdivisions and zoning.
- Prioritize proposed improvements.

Data from this Study will assist the MPO in making decisions regarding roadway and intersection improvements and/or defining areas that may need additional study and public input. The Study was conducted in collaboration with the Town of Bar Nunn, City of Casper, and Wyoming Department of Transportation (WYDOT) staff. The study was guided through interaction with local developers to receive information and provide input during this study. Stakeholders are listed in [Appendix A](#) to this report.

The findings of this study are documented in a single-volume report describing the analysis of relevant technical data, summarizing findings from the technical analyses, and providing recommendations for improvements to the transportation network around the Bar Nunn community. The detailed technical data are provided as a series of technical appendices at the end of this volume. Public comments gathered throughout the study are also included as appendices to the report.



2.0 Existing Conditions

2.1 Traffic Patterns



Currently, the town of Bar Nunn and the surrounding area depend solely on the Salt Creek Highway (Wyoming Highway 254) for access and mobility to the south. Salt Creek is tied to Interstate 25 by Howard Street and the Wardwell - Interstate 25 interchange, approximately 3/4 of a mile south of the Bar Nunn community. Salt Creek Highway is a striped two-lane (one lane each direction) rural arterial roadway with no shoulders, sidewalks, or curb and gutter. The highway passes through areas of heavy industrial and commercial land use mixed with pockets of residential housing. The highway is also used by Natrona County School busses and has several stops for loading and unloading students. Many closely spaced driveway accesses exist along Salt Creek Highway.

The primary traffic movement during the AM Peak Hour is south and during PM Peak Hour is north. Currently, the town of Bar Nunn provides a minimal amount of employment. For the most part, people live in Bar Nunn and work and go to school in Casper. Business and industrial development in Bar Nunn will generate trips opposing the primary traffic movements, causing more congestion. As residential development in Bar Nunn has escalated, residents and commercial users have experienced increased congestion along the highway, resulting in safety concerns for both motorists and pedestrians.



Truck traffic traveling to and from the commercial gravel operation north of Bar Nunn utilizes Salt Creek Highway to access I-25 through the Wardwell interchange. Traffic attempting to enter the Bar Nunn/Salt Creek area from I-25 northbound via Howard Street is periodically prevented from exiting the interstate at that location due to truck traffic turning from Howard Street onto Salt Creek Highway.

Salt Creek Highway is connected on the south to US Highway 20-26 by an interchange serving as the primary access to the Port of Entry. At peak hours trucks experience significant delays in exiting the Port of Entry due to traffic on Salt Creek

Highway.

Salt Creek Highway, in its existing form, cannot safely provide the required amount of access and mobility required for the growing town of Bar Nunn.

2.2 Additional Data Collected

On May 10, 2011 peak hour turning movement counts were collected at the Antelope, Sunset, Prairie, and McMurtry intersections along Salt Creek Highway. Mid-block traffic counts were also collected along Salt Creek Highway from May 10th to May 17th. These counts are the base traffic

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volumes used to analyze the existing population of Bar Nunn. A summary of the counts is displayed in [Figure 2-1](#) and the full count reports are included in [Appendix B](#).

Figure 2.1 – Traffic Count Summary

Average Weekday Peak Hour Counts		
	AM	PM
#11 On Salt Creek Hwy South of Antelope Dr	510	584
#22 On Salt Creek Hwy South of Sunset Blvd	240	303
#33 On Salt Creek Hwy South of Prairie Ln	222	258
#44 On Salt Creek Hwy South of McMurry Blvd	180	203

The existing plats for proposed development on file at Bar Nunn Town Hall were collected along with the 2010 Bar Nunn Zoning Plat. These plats were used to develop growth scenarios and generate trips to model future traffic volumes. These traffic volumes were used in a model and a proposed network was developed to handle future demand.

Previous studies and data collected include; the *Town of Bar Nunn Community Development Plan* (updated via resolution 2010-07), *Bar Nunn Traffic Study* (February 24, 2010), *Evaluation of Existing Roadway Geometrics of Salt Creek Highway and Preliminary Corridor Analysis of McMurry Boulevard* (July, 2008), *Salt Creek Highway Intersection Traffic Study* (September, 2003), *Connecting Casper 2030 Long Range Transportation Plan* (June 2007), *Casper Area Comprehensive Plan* (January 18, 2000), and the *Functional Classification Map* published by WYDOT (2004). These studies were reviewed and the recommendations concerning Bar Nunn were analyzed.

WYDOT maintains a database of reportable crashes for roads across Wyoming. Reportable crashes include any crash with an injury or fatality and crashes that cause more than \$1000 in property damage. Crash data from 2001 to 2010 were collected for the project area and are included in [Appendix H](#). Crash characteristics were analyzed and problem areas identified. Crash data for the project area are summarized in [Figure 2.2](#).

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Figure 2.2 – 2001 to 2010 Bar Nunn Crash Data Summary

Roadway Name	PDO*	Injuries	Fatalities	Intersection	Driveway	Non-Junction
Absaroka Trail	1	0	0	0	1	0
Antelope Dr	11	3	0	6	3	5
Circle Drive North	2	0	0	0	0	2
Circle Drive South	2	0	0	0	0	2
Coyote Ave	1	0	0	0	0	1
Industrial Ave	1	0	0	0	0	1
Palomino Ave	4	0	0	3	0	1
Pawnee Circle	1	0	0	0	0	1
Omaha Trail	1	0	0	0	0	1
McMurry Blvd	4	0	0	1	0	3
Mandan Trail	3	0	0	0	2	1
Howard St/Wardwell Rd between I-25 & Salt Creek Hwy	18	5	0	16	2	5
Intersection of Salt Creek Hwy & Howard St/Wardwell Rd	12	2	0	14	0	0
Salt Creek Hwy from Howard St North to MP16	34	7	0	21	3	17
I-25 Wardwell Interchange	15	8	0	7	0	16
Trails End	1	0	0	1	0	0
Tonkawa Trail	1	0	0	1	0	0
Tipton	1	0	0	0	0	1
Sunset Blvd	6	1	0	2	1	4
Prairie Ln	6	2	1	4	1	4
Siebke Dr	0	1	0	1	0	0
Totals	125	29	1	77	13	65

*Property Damage Only; No Injuries; No Fatalities

The crash data was considered when developing the improvement scenarios described in section 6.

Based on the data collected and described above, improvements to the transportation network were identified.

3.0 Anticipated Growth

Bar Nunn was first developed for residential purposes in the early 1970's, when the Natrona County Airport was moved to its present location. Bar Nunn was incorporated as a municipality in 1982.

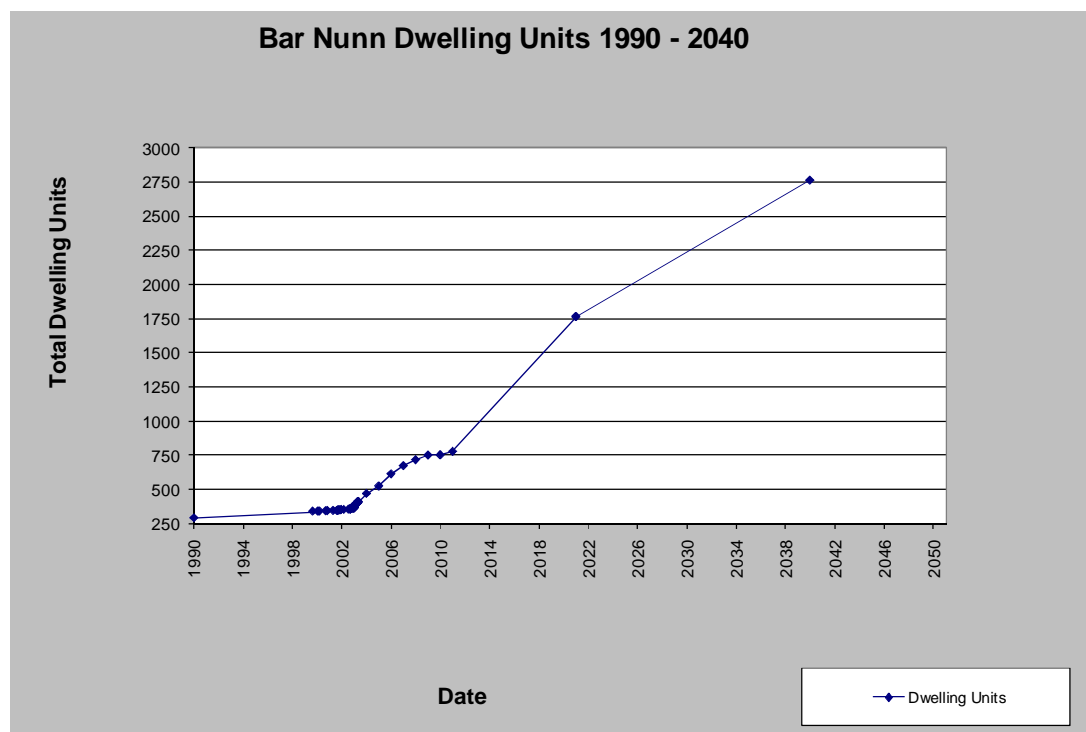
Figure 3-2 shows the 2010 Zoning Plat for the Town of Bar Nunn. Census 2010 data lists the population of Bar Nunn as 2,213, which is a 136% increase from the 2000 population of 936. This growth rate is astronomical when compared to the City of Casper (11.4%), Natrona County (13.4%), and the State of Wyoming (14.1%). Developers in the area anticipate this high growth rate will continue.

3.1 Dwelling Units 1990-2040



The Town of Bar Nunn reports 369 new building starts from 2003 to 2010. Meetings with developers in the Bar Nunn area during the course of this study revealed approximately 127 dwelling units currently planned for construction within the next one to three years. As currently zoned, the town of Bar Nunn has room for an additional 2,416 residential dwelling units within town limits at build-out. *Figure 3-1* below illustrates the historical and projected growth of Bar Nunn Dwelling Units. The historical data presented is from approved residential building permits. Projected data is based on platted subdivisions, the Bar Nunn Zoning Plat and discussions with developers. Location and additional information on growth projections used in this study for travel forecast modeling is located in Section 6 of this report.

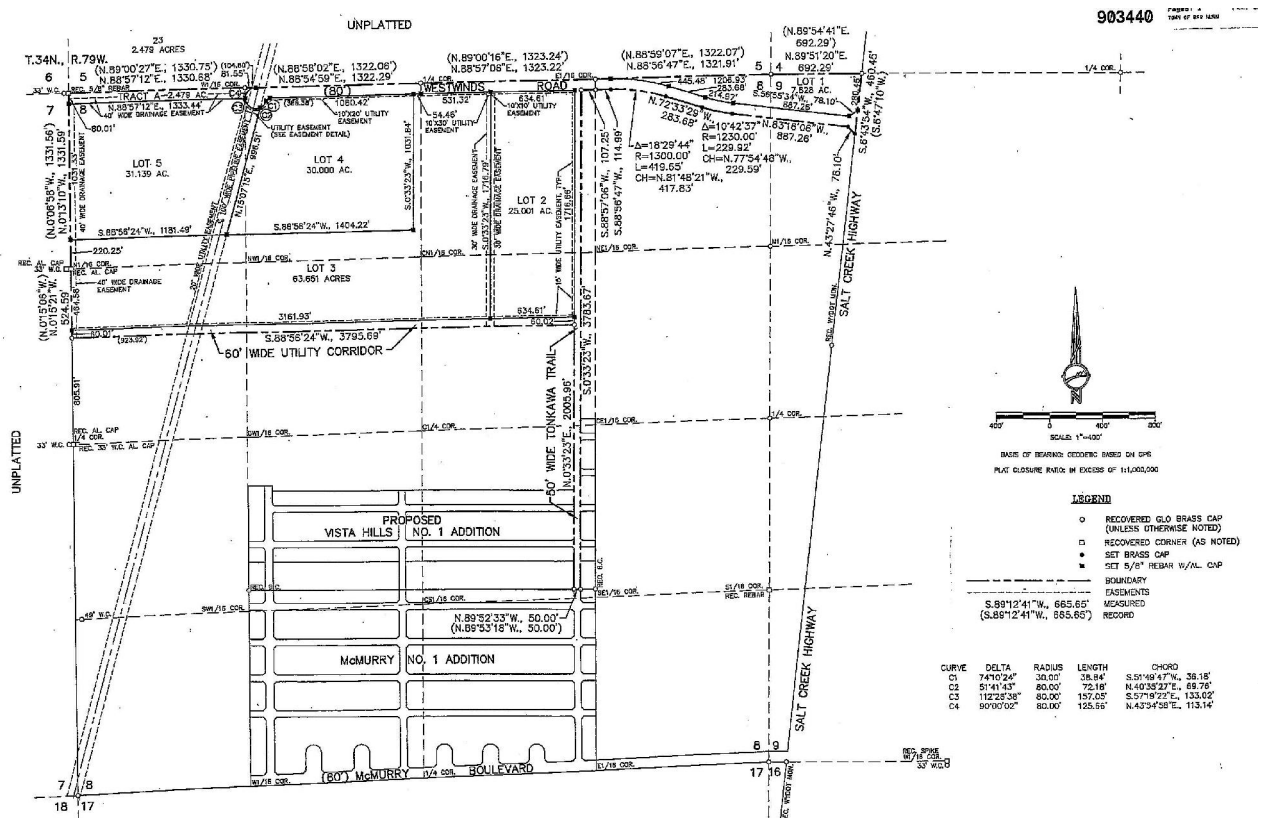
Figure 3-1 - Historical and Forecasted Number of Bar Nunn Dwelling Units

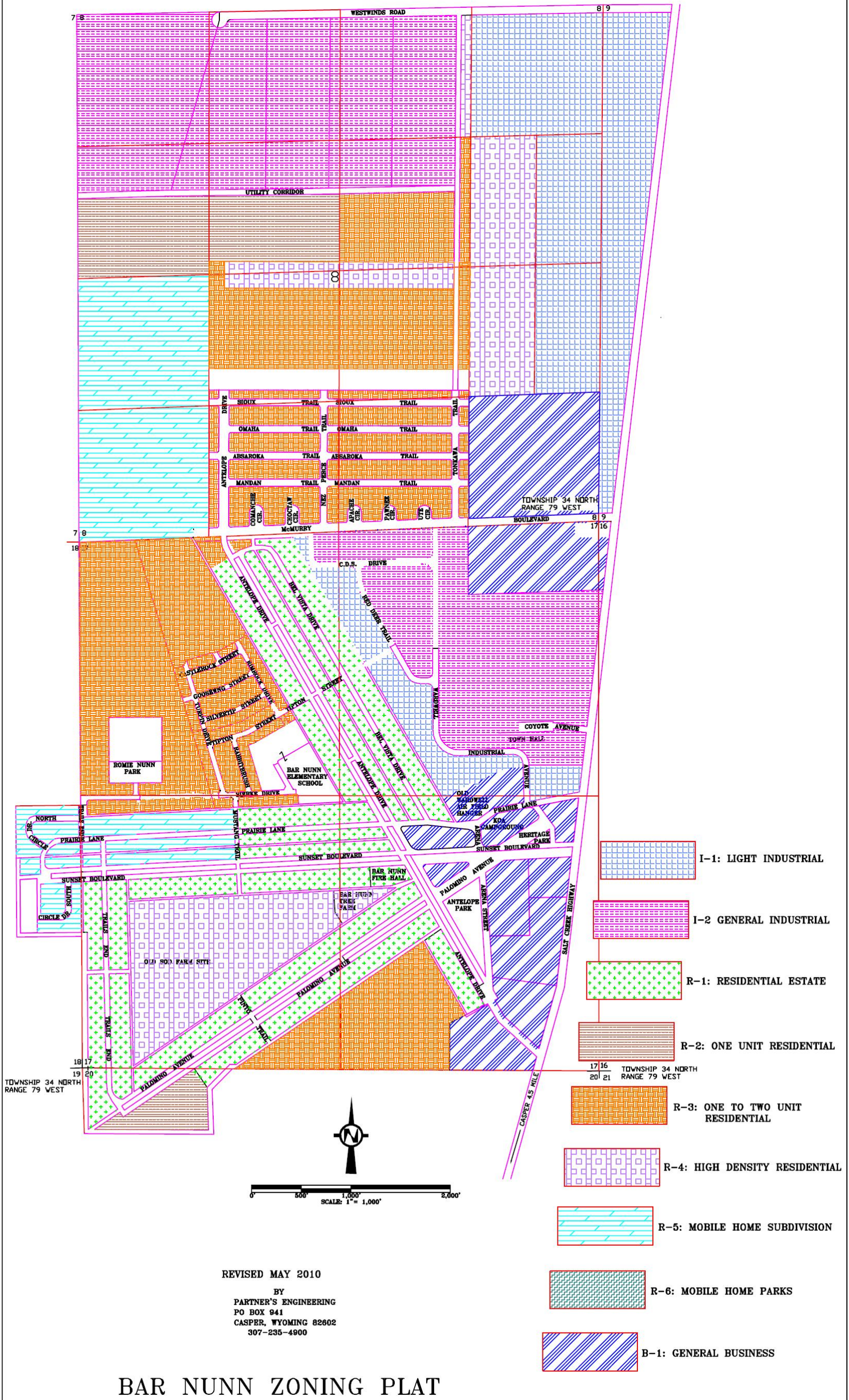


3.2 Other Growth

In 2011 Bar Nunn Industrial Center III was platted. This development includes 150 acres of general industrial development. Proposed development within the industrial center includes a concrete pipe manufacturing company, a redimix plant, and an oil service company. In addition to the platted industrial park the 2010 Zoning Plat shows over 500 acres reserved for business and industrial development within Bar Nunn town limits. This type of development will increase the number of truck trips generated by Bar Nunn. It will also generate opposing trips to the dominant traffic flow.

Figure 3-2 shows the 2010 Bar Nunn Zoning Plat.





4.0 Roadway Functional Classification

4.1 Roadway Evaluation

Roadways and streets are classified by the way they function and the service they provide. Low mobility streets with slower speeds to facilitate access to driveways, alleys, and curb cuts are classified as local streets, while high mobility streets with faster speeds and limited access are classified as arterial streets. Collector streets typically connect local streets to arterial streets and balance the functions of access and mobility.



The connectivity of a transportation network influences the ability of a street to function as an arterial or collector. Adequate connectivity in the network is as important as mobility or access in defining the function for individual streets. Without sufficient connections and parallel routes of similar functions, traffic of all types (local and regional) will be focused on the streets that connect across the network, regardless of function. For example, if sufficient arterials or collectors are not

available, traffic will utilize local roadways as necessary to connect across the network, often times resulting in an unsafe situation.

A scanned version of the 2004 Casper Urban Roadway Functional Classification map adopted by the Casper MPO and Natrona County officials and approved by WYDOT and the Federal Highway Administration can be found in [Appendix F](#). The adopted functional classification system categorizes existing and proposed roadways as arterials, collectors, or local streets based on the intended use for each roadway and distinguishes between new, existing, and substandard roadways. This system is used as a basis for the traffic forecasting model for the Casper area and to identify and prioritize transportation improvement projects.

In order to evaluate improvement alternatives for Bar Nunn that will bolster the future transportation network, street criteria were reviewed. One criterion focused on the functional role of the roadways in the transportation network looking at existing classification and design, while the other evaluated network connectivity.

4.2 Roadway Classification Criteria

Arterial/Minor Arterial – Arterials are intended to connect points of major destinations to provide for regional traffic movement; as such arterials typically move greater volumes of traffic at higher speeds. Limited access improves the arterial's mobility and safety. Target speeds are in the range of 35 to 50 mph with slower speeds appropriate in the urbanized core of the city and higher speeds appropriate to outlying areas and areas where access control has been established. Typically, arterials tend to be four-lane roadways, but can be wider or narrower as volumes dictate. Parking is

generally not allowed along arterials and access spacing is controlled appropriate with target speed. Rule of thumb criteria suggests providing arterials at $\frac{1}{4}$ to $\frac{1}{2}$ mile spacing in urban areas and at $\frac{1}{2}$ to 1 mile spacing in suburban and rural areas.

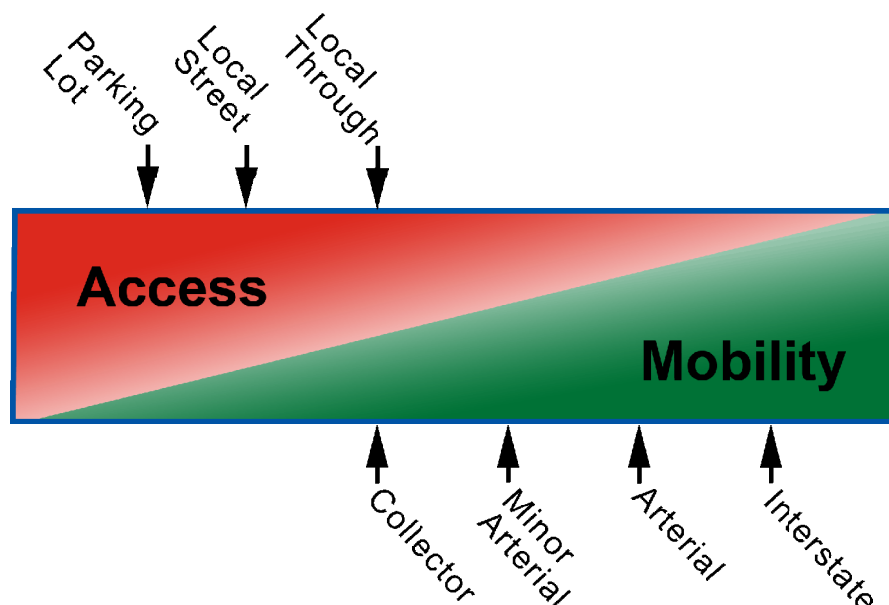
Collector – Collectors service neighborhoods and districts by connecting traffic movement between arterials and local streets. This function commonly provides for some limited direct access to abutting property. These are moderate speed streets, with target speeds in the range of 30 to 40 mph. Lower target speeds are appropriate in residential and mixed-use areas, while higher target speeds may be appropriate in commercial, industrial and rural areas. The frequency of access and the type of access design will be affected by higher target speeds. Parking may be allowed along collectors, particularly those with lower target speeds. Typically, collectors would be provided at a spacing to subdivide the arterial grid.

Local-through – These streets are local streets (see below) that provide limited connectivity between residential subdivisions. As such, they have a limited collector function, but are essentially residential in character. Target speeds on local-through streets are 25 to 30 mph and are dependent upon width and activity. Establishing local-through streets is beneficial for subdivisions as well as the overall transportation network. Subdivision standards should require collector streets to subdivide the arterial grid and provide local-through streets where necessary.

Local – A local street provides circulation, on street parking, and access to adjoining property and parking facilities. These streets provide the greatest degree of access, have lower speeds, and yield the right of way to all higher street classes. Street architecture and traffic calming on local streets may be used to discourage through traffic and higher speeds. Target speeds on local streets are typically 20 mph or less dependent on width and activity.

Figure 4-1 illustrates how each type of roadway is designed to function in terms of access and mobility.

Figure 4-1 Roadway Function in terms of Access and Mobility

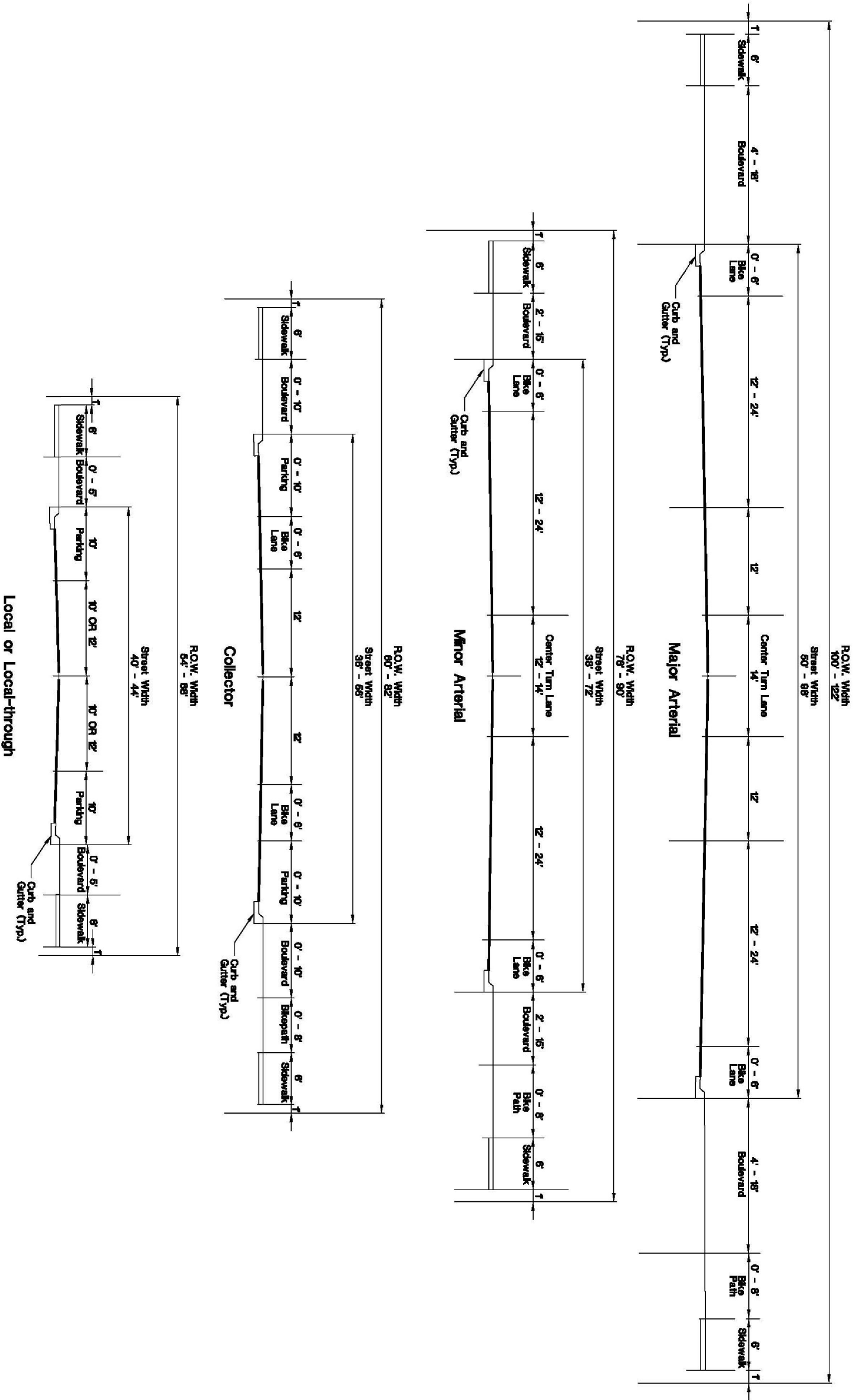


The function of local and collector roadways allows for more frequent and direct property access while arterials require more access control to maintain their mobility. It is important to create a balanced network of arterial, collector, and local streets to provide mobility, accommodate development, and allow property access. [Figure 4-2](#) below illustrates the roadway criteria based on classification.

Figure 4-2 - Design Criteria by Classification

Street Classification	Target Speed (mph)	Access Spacing (ft)	Parking	Street Width (ft)	Right of Way Width (ft)
Arterial	35-50	250-600	None	50-98	100-122
Minor Arterial	30-45	100-400	None	39-72	76-90
Collector	30-40	100-350	Parallel	36-56	60-82
Local-Through	25-30	50-100	Parallel	26-50	54-68
Local	20 or less	50	Diagonal or Parallel	34-50	54-68

The criteria in [Figure 4-2](#) represent a compilation of standard practice taken from the documents listed in the reference section at the end of this volume. [Figure 4-3](#) illustrates the basic design criteria for the above street types and shows the relationships with parking and edge of roadway treatment contained in the criteria. In addition to and supporting these criteria is the *2005 WYDOT Access Manual*, which provides further guidelines for WYDOT facilities.



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ROADWAY CLASSIFICATION DESIGN CRITERIA

5.0 Traffic Analysis Tools

5.1 ITE Trip Generation 8th Edition

The Institute of Transportation Engineers (ITE) Trip Generation manual presents a summary of trip generation data that have been voluntarily collected and submitted to ITE. It is used in estimating the number of trips generated by a specific land use. Evening peak hour trip generation rates and equations from the ITE manual were used to develop traffic loading for the Bar Nunn Salt Creek Intersection & Bar Nunn Subarea Planning Traffic Study.

5.2 TransCAD

TransCAD is a comprehensive travel demand modeling software. Travel forecasting models created in TransCAD are used to predict changes in travel patterns and the utilization of the transportation system in response to changes in regional development, demographics, and transportation supply. Traffic assignment tools in TransCAD were used to develop the proposed future network for Bar Nunn. The traffic assignment method used for this study was Stochastic User Equilibrium which takes into account travel time and roadway capacity for each link in the network.

5.3 Synchro Studio

Synchro is a macroscopic analysis and optimization software application. Synchro implements the Intersection Capacity Utilization (ICU) 2003 method for determining intersection capacity. The purpose of this software suite is to model, optimize and visualize traffic networks. This software was used to evaluate existing conditions as well as analyze capacity and simulate concept designs for the interim and final transportation networks developed in this study.

6.0 Growth Scenarios, Forecasted Traffic and Analysis

6.1 Growth Scenarios

Traffic conditions for three growth scenarios were evaluated in this study.

Scenario 1: Scenario 1 represents existing traffic and is based on turning movement and mid-block traffic counts collected in May 2011. Count locations and volumes are displayed in [Figure 6.1](#).



Scenario 2: Scenario 2 is a three year growth scenario. Build out of the approved subdivision plats on file at Bar Nunn Town Hall in May 2011 were used to generate vehicle trips for this scenario. PM peak hour trips for the platted subdivisions were distributed on the existing transportation network and added to traffic volumes from Scenario 1. Trip distribution and site traffic are displayed in [Figure 6.2](#) and [Figure 6.3](#). Traffic volumes used for Scenario 2 LOS analysis are displayed in [Figure 6.4](#).



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Scenario 3: Scenario 3 is a build out scenario for the entire town. The 2010 Bar Nunn Zoning Plat was used to determine future land use for undeveloped and property not platted to date within Bar Nunn Town limits. The area of each zoned plot of land was calculated and trips were generated based on acres of available land for industrial and business zoning, using trip generation rates from the 8th Edition of *ITE Trip Generation*. For residential zoning a dwelling unit density (dwelling units per acre) was assumed for each type of residential land use and is displayed in [Figure 6-5](#).

Figure 6-5 Dwelling Units and Density for Build-out Scenario

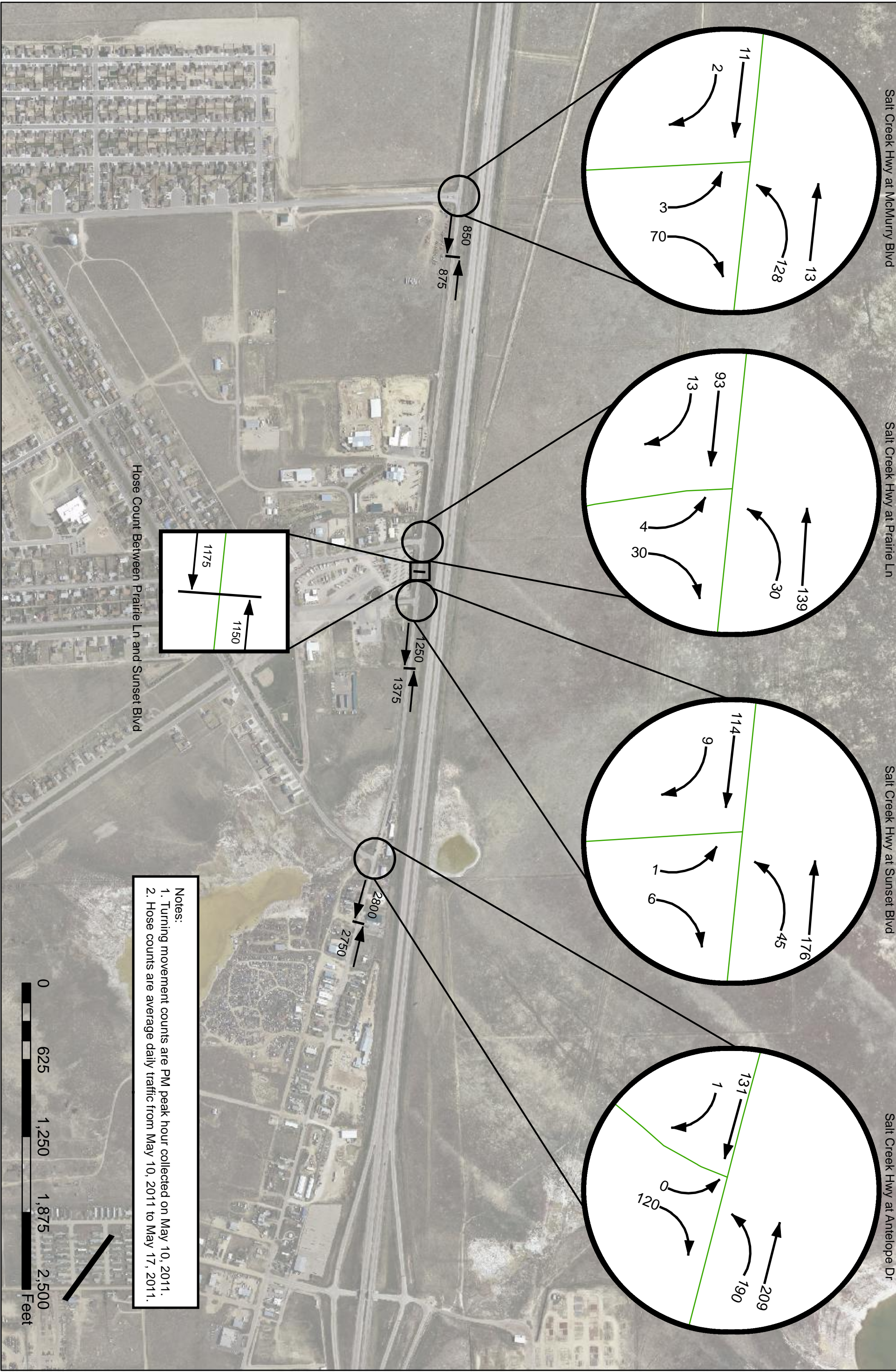
Code	Name	Dwelling Units	Total Acreage	Units/Acre
R-1	Residential Estate	43	22	2.0
R-2	One Unit Residential	110	42	2.6
R-3	One to Two Unit Residential	732	208	3.5
R-4	High Density Residential	711	108	6.6
R-5	Mobile Home Parks*	820	82	10.0
Totals		2416	462	

**Trips generated based on acres not dwelling units*

Trips from Scenario 2 were then added to the trips generated in this scenario, with the end result being build out PM peak hour trips generated by the Town of Bar Nunn. A TransCAD model was developed to assign the trips to the proposed future network. Traffic analysis zones (TAZ) were created in TransCAD for each TAZ and trips were assigned to links on the future network. For the TransCAD analysis, all trips produced by Bar Nunn were assumed to be attracted to Casper and all trips attracted to Bar Nunn were assumed to be produced by Casper. This approach provides a conservative estimate of future traffic volumes on the Bar Nunn transportation network. The TransCAD traffic analysis zones and future network are displayed in [Figure 6.6](#). The future network was loaded with generated trips for expected growth and the model used to predict the travel patterns and the network utilization. Build out traffic volumes on the future network are displayed in [Figure 6.7](#) (these volumes do not include pass through traffic).

Trip generation calculations for Scenarios 2 and 3 are included in [Appendix D](#).

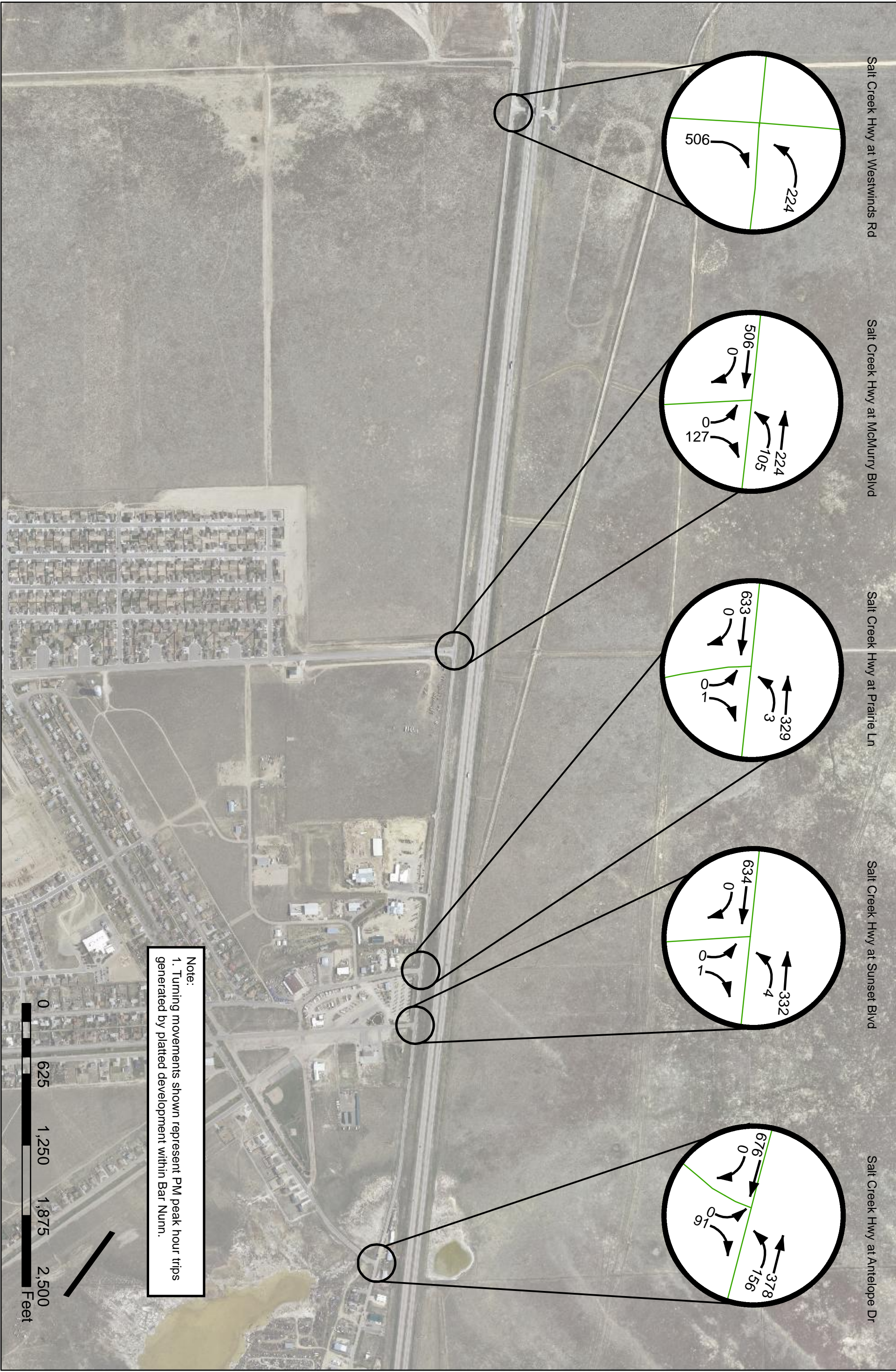




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MAY 2011 TRAFFIC COUNTS

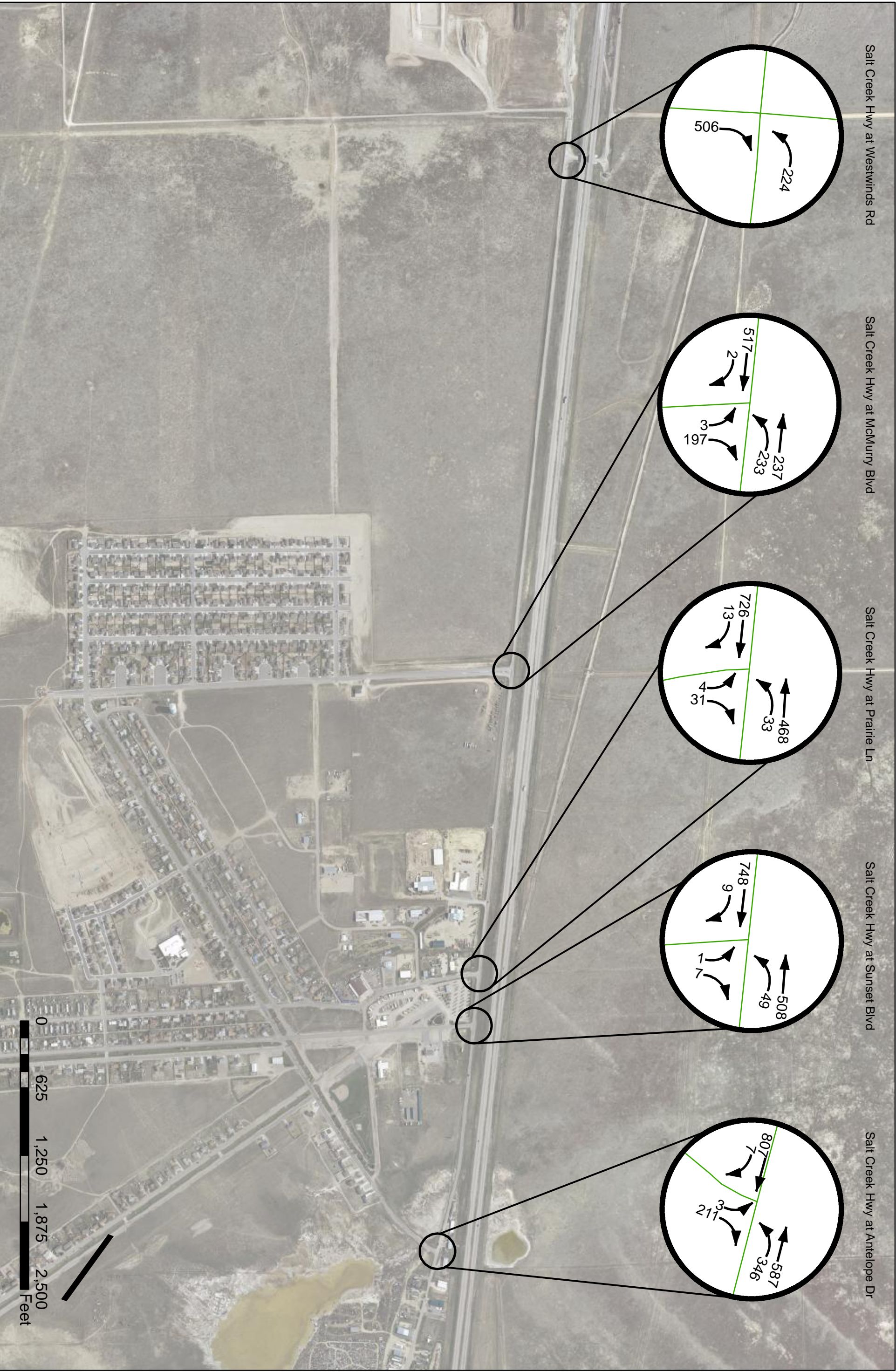


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PLATTED DEVELOPMENT TRIP DISTRIBUTION

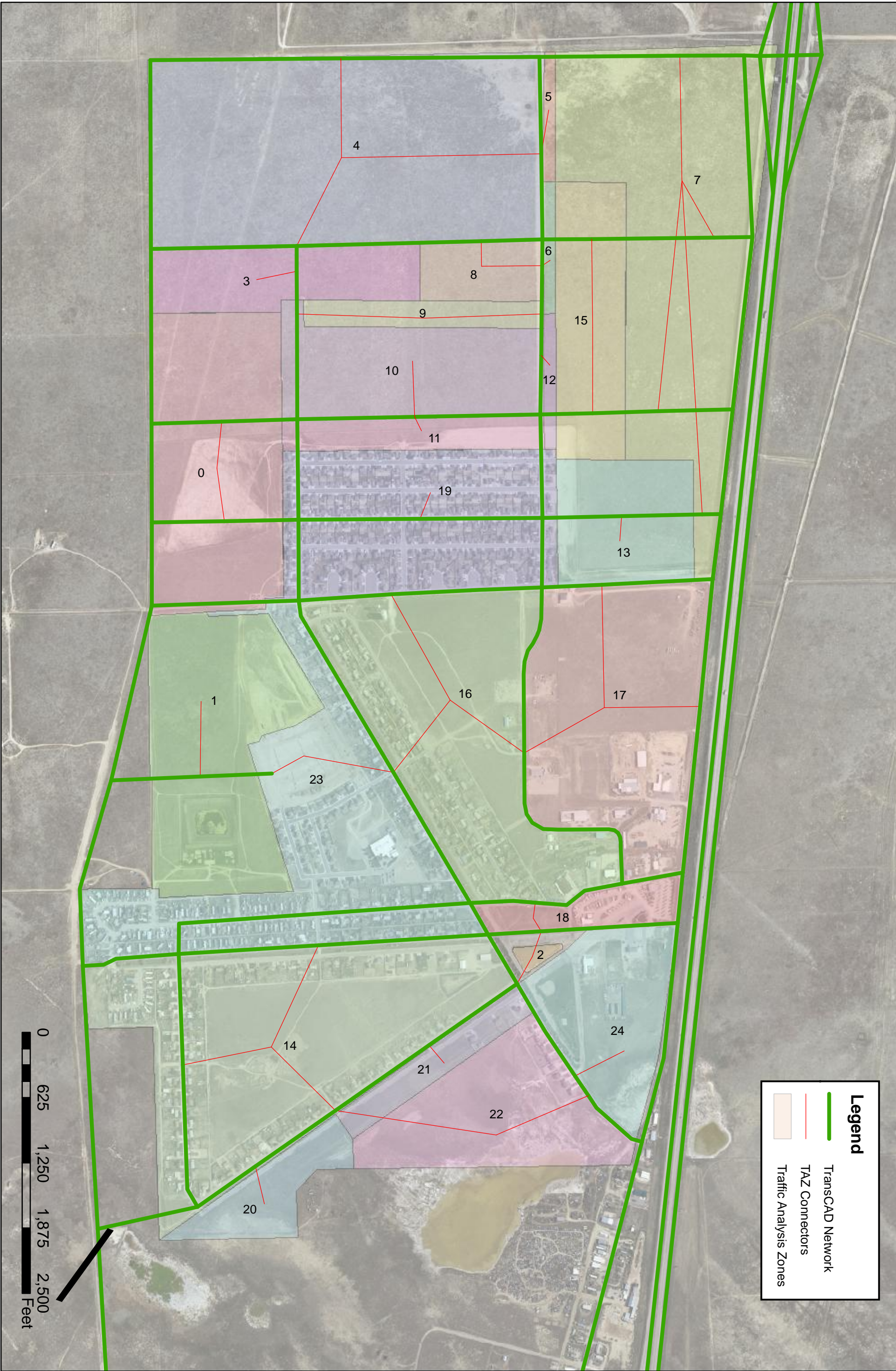


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PM PEAK HOUR SITE TRAFFIC

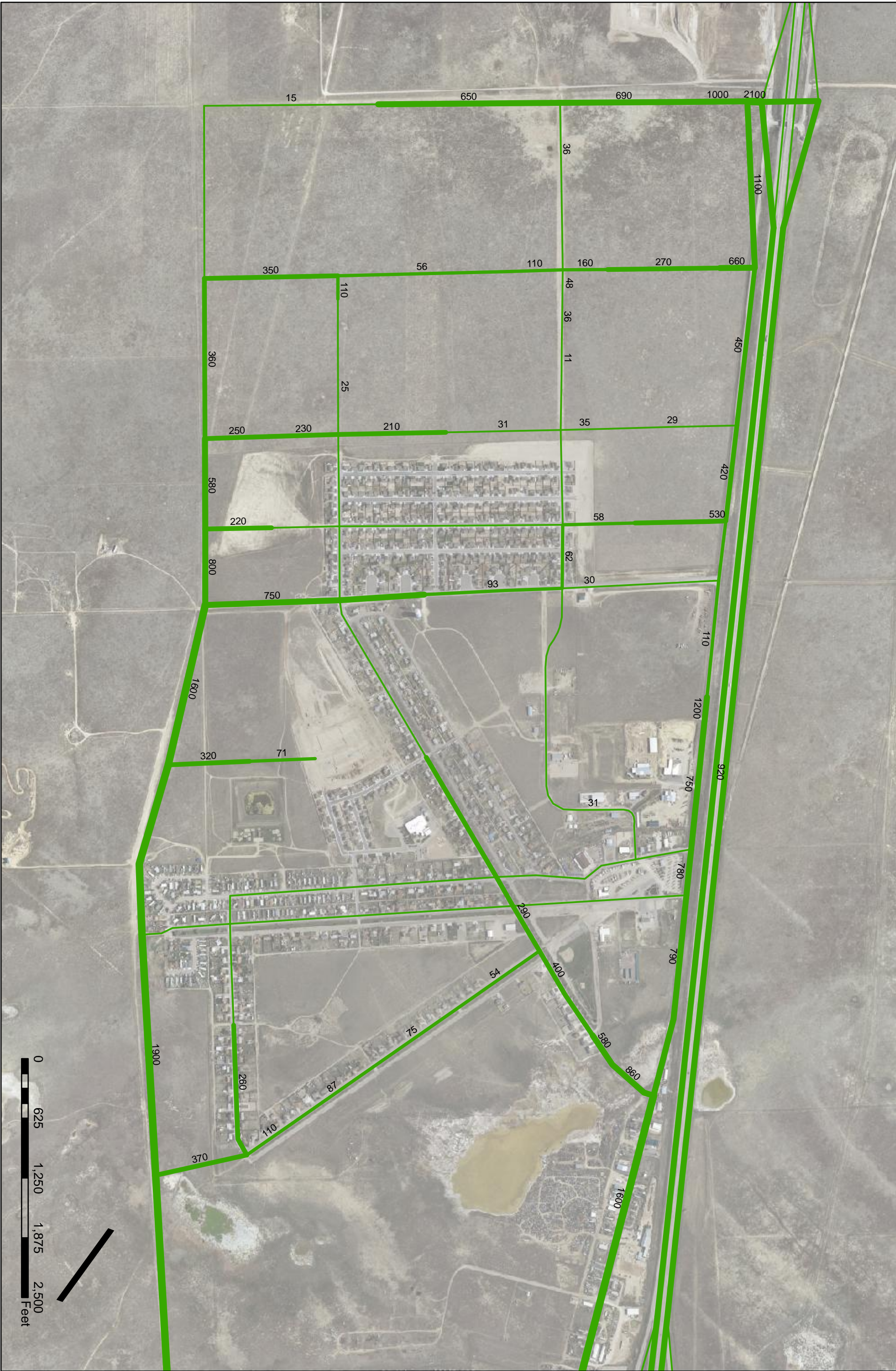




BAR NUNN SALT CREEK INTERSECTION &
BAR NUNN SUBAREA PLANNING TRAFFIC STUDY
PM PEAK HOUR SITE AND BACKGROUND TRAFFIC



BAR NUNN SALT CREEK INTERSECTION &
BAR NUNN SUBAREA PLANNING TRAFFIC STUDY
TransCAD Model



BAR NUNN SALT CREEK INTERSECTION &
BAR NUNN SUBAREA PLANNING TRAFFIC STUDY
PM Peak Hour TransCAD Model Results
Scenario 3



6.2 Modeling and LOS Analysis

A level of service analysis was performed for the purpose of evaluating concept designs. Level of service (LOS) is a quality measure describing operational conditions within a traffic stream or at an intersection with LOS "A" being the best conditions and free flowing traffic and LOS "F" being the worst condition. Operational conditions affecting the LOS include delay, speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. For roadway segments LOS is determined by the ratio of a roadway's volume to its capacity. For intersections LOS is determined by delay. During this analysis the effects concept designs had on the intersection delay and roadway capacity were compared, ranked for effectiveness and prioritized.

Using the described growth information, the increase in traffic on the existing network and corresponding decrease in levels of service were projected as shown in [Figure 6-8](#). Synchro traffic analysis software and Highway Capacity Manual procedures were used to determine LOS. The LOS analysis reports are provided in [Appendix E](#).

Figure 6-8 – Scenario 1 and Scenario 2 Level of Service on Existing Network

Node	Intersection	Traffic Volume Condition	Existing Network PM Peak Hour		
			EB Delay (sec)	Average intersection Delay (sec)	Control LOS ¹
1	Salt Creek Highway and Antelope Drive	Scenario 1	9.6	4.5	A
		Scenario 2	33.4	9.4	D
2	Salt Creek Highway and Sunset Boulevard	Scenario 1	9.3	1.3	A
		Scenario 2	17.2	0.8	C
3	Salt Creek Highway and Prairie Lane	Scenario 1	9.2	1.8	A
		Scenario 2	17.3	0.9	C
4	Salt Creek Highway and McMurry Boulevard	Scenario 1	8.8	7.1	A
		Scenario 2	17.5	5.4	C
5	Salt Creek Highway and Westwinds Road	Scenario 1	0	0	A
		Scenario 2	11.7	10.4	B

¹ Highway Capacity Manual Unsignalized Intersection Capacity Analysis

EB = East Bound

[Figure 6-9](#) shows delay for the concept designs considered at the Antelope Drive and Salt Creek Highway intersection.

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Figure 6-9 – Scenario 2 Interim Concepts at Antelope Drive

Scenario 2 - Antelope PM Peak Hour LOS Results			
Alternative (Max Delay Approach)	Maximum Approach Delay (sec)	Average Intersection Delay (sec)	Control LOS ¹
Existing Lane Configuration (EB)	33.4	9.4	D
Interim without Signal (EB)	33.4	6.1	D
Interim without EBR and NBL Lanes (NB)	155.7	77.1	E
Interim Concept Design (NB)	24.7	8.7	A

*Interim Concept Design includes a NBL turn lane, EBL turn lane and Traffic Signal at Antelope and Salt Creek Highway

¹ Highway Capacity Manual Unsignalized Intersection Capacity Analysis

EB = East Bound, EBL = East Bound Left, NB = North Bound, NBL = North Bound Left

7.0 Concept Designs

Proposed improvements to Salt Creek Highway are based on the LOS analysis. Bar Nunn road network recommendations are based on evaluation of roadway classification and spacing criteria. Cost estimates for the recommended improvements are included in [Appendix I](#). The improvements are summarized in two categories; interim concept designs and final concept designs.

7.1 Interim Concept Designs

The existing road network in the Bar Nunn area was evaluated with respect to existing and future traffic and the standard roadway functional classification criteria presented in [Section 4](#). Interim concepts presented in this section include improvements to enhance safety and efficiency of the existing network as well as the future network. Interim improvements to the road network and Salt Creek Highway Intersections were considered and evaluated as discussed in this section.

With Salt Creek Highway being the only existing roadway serving the Bar Nunn area, all traffic will be required to use Salt Creek Highway until an alternative route is built. As can be seen in the forecasted traffic analysis, the Salt Creek Highway cannot safely and effectively accommodate projected increases in traffic without improvements to the roadway and network. Safety is also a major issue. The roadways functional classification will not efficiently accommodate the heavy truck traffic produced by the existing gravel pit and proposed industrial development on the north end of Bar Nunn in combination with residential traffic and access spacing in the area. The minimal shoulders along the highway further add to safety concerns.

Previous studies have looked at new roads and an I-25 Interchange to provide additional access to Bar Nunn. The network improvements identified in previous studies provided a starting point for the development of the future network identified and evaluated in this study. Previous

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recommended improvements include Westside Boulevard, from Westwinds to Howard, Howard extension from Salt Creek to West Side, and I-25 interchange at Westwinds.

This study focuses on concept designs for the following:

- Improvements to increase capacity and safety of existing Salt Creek Highway intersections.
- Additional roads to accommodate growth and improve network connectivity within Bar Nunn.

The following sections prioritize the recommended interim roadway improvements that will benefit the existing and future roadway networks.

7.1.1 Antelope Drive and Salt Creek Highway – Priority 1



A signal warrant study was completed for the intersection of Antelope Drive and Salt Creek Highway. A signal warrants study evaluates traffic conditions at an intersection to determine if a traffic control signal is justified. Based on counts and data collected during this study, the existing conditions at the intersection of Antelope and Salt Creek Highway do not justify installing a signal.

A signal warrant was also completed for forecasted traffic volumes for the platted development (Scenario 2). Based on the trip generation, distribution and assignment shown in [Figures 6-2, 6-3 and 6-4](#) a signal will likely be warranted at this intersection before the platted development is constructed and occupied.

In conjunction with the signal a north bound left turn lane should also be constructed. Existing traffic counts indicate more delay is created at this intersection by the north bound left movement than all other movements combined. Industrial and commercial development north of this intersection will generate more south bound traffic during the PM peak hour. This will cause more delay for the dominant north bound through movement because the through traffic can't get by the left turning traffic waiting for a gap in the south bound traffic stream. The proposed lane configuration is shown in [Figure 7-1](#).

An EBL turn lane will also be beneficial to allow left turning traffic to get out of the way of right turning vehicles. This will reduce delay by allowing more right on red time.

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Traffic at this intersection should be monitored periodically to determine the appropriate time to install these improvements. Based on Discussions with developers, these improvements will be required by year 2015.





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**PRIORITY 1 - IMPROVEMENTS TO INTERSECTION OF
ANTELOPE DRIVE AND SALT CREEK HIGHWAY**

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7.1.2 Signal Warrant Study at Howard and Salt Creek Highway – Priority 2

A signal at this intersection will help create platooning of north bound traffic and will decrease delay along the Salt Creek Highway corridor north of Howard. Count data collected during this study was and turning movement counts from 2003 were used to estimate 2011 traffic conditions at this intersection. Estimated 2011 volumes show a signal is warranted at this intersection. However, an actual turning movement count and warrant study should be completed to verify the estimation made in this study.

In addition to a traffic signal, several improvements at the intersection of Howard Street and Salt Creek Highway would enhance the safety and operation of this intersection. As recommended by the 2003 Salt Creek Highway Intersection Study, the improvements are:

- Add protected left turn bays on both north and southbound legs of the Salt Creek Highway.
- Incorporate through and right turn shared lanes for the north and southbound legs of the Salt Creek Highway. The northbound leg would be tapered (radius increased) to allow right turn truck traffic.
- Provide a yield controlled free right turn lane with a right turn lane on Howard Street and an acceleration lane on Salt Creek Highway.
- Include a shared through/left turn lane on the Howard Street westbound lane.
- Evaluate removal of sight distance issue by lowering the crest vertical curve to the south.
- Install buried electrical conduits for future signal installation.
- Use concrete pavement for intersection and aprons, and asphalt pavement for the remainder of intersection legs.
- Install curb and gutter to delineate the entire intersection and keep vehicles from parking on the intersection shoulders.
- Install signs, delineation, and pavement markings and intersection lighting.

The majority of the recommendations made in 2003 above still apply to the intersection today. Final recommendations on improving this intersection need to be coordinated with the Howard Street extension to the proposed Westside Blvd.

7.1.3 Sunset, Prairie and McMurry

Counts show Sunset, Prairie, and McMurry are well under capacity. Based on platted development no modifications will be cost beneficial to these intersections. In the future a signal will be beneficial at McMurry and possibly at Sunset, but neither should be installed until warranted.

7.2 Final Concept Designs

The proposed final network for the town of Bar Nunn is displayed in [Figure 7.2](#). Proposed road locations are based on the existing roadway configuration and rule of thumb spacing for arterials and collectors.

Access management is important to insure roadways function safely and as intended. Guidelines for access management are detailed in [Figure 4-2](#) and the 2005 WYDOT Access Manual. These access guidelines should be enforced on all new and existing roadways within Bar Nunn. Classification of roads in the future roadway network should be based on the functional classification map included in this study. Based on the spacing and classification criteria and the future traffic volumes, the following roadways are proposed:

7.2.1 Westside Boulevard and Connecting Streets – Priority 1

A new arterial road parallel to Salt Creek Highway is recommended due to the forecasted traffic volumes and major improvements needed to Salt Creek Highway to safely accommodate future traffic.

This new arterial roadway (hereinafter referred to as “Westside Boulevard”) would utilize the existing interchange at the 20-26 bypass, but instead of turning east along the current Salt Creek Highway, would continue due north near Revenue Boulevard on the west side of Andy Road and Bar Nunn. This arterial roadway would then intersect with a new east-west arterial north of McMurry Boulevard called Westwinds Road. (Plans for Westwinds Road include an extension west to the airport.) There would be two collector connections and five arterial connections to Salt Creek Highway along the 5-mile stretch of new road. Some of the benefits of an alternative arterial between Bar Nunn and Casper include:

- Less heavy truck traffic in the residential areas along Salt Creek Highway
- Less congestion on Salt Creek Highway
- Establishing an arterial grid to allow access and mobility for development between I-25 and the Airport.
- Allow Salt Creek Highway to function as a collector/minor arterial consistent with its existing cross section and access spacing.
- Minimize improvements needed to the Salt Creek Highway.

As mentioned above, the design of the improvements to the Salt Creek Highway/Howard Street intersection and signalization should anticipate connection to the new Westside Boulevard. With Howard Street extended to the new Westside Boulevard, it is anticipated much of the traffic currently turning from Howard Street to Salt Creek Highway would continue west and use Westside Boulevard. This would reduce traffic on Salt Creek Highway, and improve operations at this intersection and others along Salt Creek Highway.

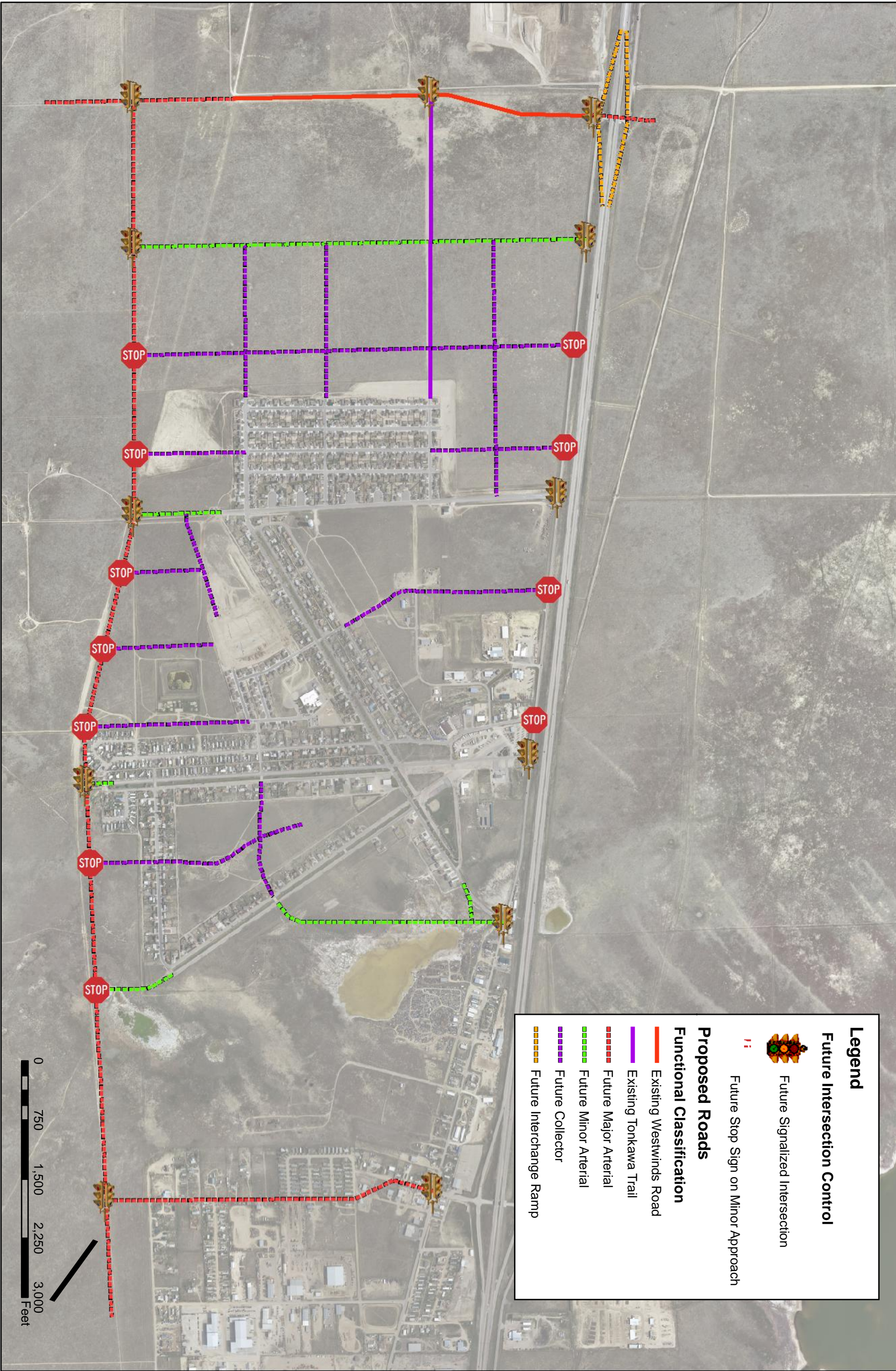
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7.2.2 I-25 Interchange – Priority 2

As development occurs in the area, a new interchange on I-25 near Bar Nunn will be needed to provide an alternate access to the Interstate. The ideal location for the new interchange would be at Westwinds Boulevard, 2.7 miles north of the Wardwell interchange. This allows adequate spacing between interchanges along I-25 and minimizes weaving conflicts. Developers in the area have expressed interest in connecting Westwinds Boulevard to Six Mile Road north east of the airport. The proposed interchange will allow more direct access to I-25 for airport traffic, east-west through traffic and truck traffic from the train-truck transfer station when Westwinds is extended. This also enables trucks to avoid the residential areas of Bar Nunn.

The interchange should be constructed in conjunction with the Bar Nunn Industrial Center III development. This will improve the safety of Salt Creek Highway by allowing through truck traffic to avoid residential areas of Town. This will also provide alternate access to Bar Nunn for emergency vehicles. A phased interchange construction utilizing the existing bridge under I-25 at Westwinds Boulevard may provide accelerated (and initially less expensive) access to the interstate.





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AND INTERSECTION CONTROL**

7.3 Corridor Preservation

As the Casper MPO and Town of Bar Nunn evaluate options for improving traffic flow, a process should be considered for preserving the transportation corridors identified in this report. The following summarizes the requirements for corridor preservation in Wyoming.

According to a white paper prepared by the Wyoming Department of Transportation, "Wyoming municipalities have more flexibility in managing their transportation infrastructure needs. State statute allows municipalities to file official maps delineating planned transportation corridors. These maps are very strict corridor alignments that control access, subdivision development, setback and zoning ordinances. They are not restricted to the corporate city limits if there is a need for preservation of the corridor outside these boundaries."

Wyoming State Statute, Title 15, Article 5 provides a mechanism for corridor preservation (included in Appendix C). Each city/town may establish a master plan for areas both inside and outside its City limits provided that action on such master plan, including a major street plan, occurs with concurrence from the Board of County Commissioners. Additionally, the governing body adopts an Official Map of public streets (*in whole or in part*) via ordinance that shall be recorded in the County Clerk's office. After Official Map adoption, the governing body may pass an ordinance that prohibits permits to be issued for a building or structure which encroaches into the land within the lines of any street as shown on the official map. The ordinance shall allow the issue to be brought before the Board of Adjustments for public hearing as an appeal process.

Having a roadway shown on the Official Map allows municipalities, during review of the development or building permit process, to require developments to incorporate these future roadways into their subdivision or site development plans.

In a 2003 opinion, the Wyoming Attorney General (AG) ruled on what constitutes an adequate survey relating to preserving new street right-of-way with the Official Map. The AG opinion states that "locating a proposed route on a street plan is accomplished through accurate surveys as well as a process which includes the opportunity for input and scrutiny from several sources."

8.0 Public Involvement

Public outreach efforts were coordinated by Jovi Plans and DOWL HKM. The study team used best management practices for outreach techniques to guide the public involvement process. The public involvement approach that was used is attached to this report as [Appendix G](#).

A public open house meeting was held on June 14, 2011 and drew 20 participants, including area residents, business owners, developers, elected officials, community leaders, Casper Area Metropolitan Planning Organization staff and committee members. The purpose of this open house was to introduce participants to the study, establish the purpose and need for the study, and gather public comment about specific aspects of the Study. Comments collected at this meeting are attached to this report as [Appendix G](#).

Following the initial open house gathering, a draft study report was prepared providing detailed information on data gathered throughout the study, analysis of that data, and preliminary recommendations for transportation improvements in the Bar Nunn area. The draft study report was made available to the community at the Bar Nunn Town Hall.

The second open house was held on October 5, 2011. Participants included area residents, elected officials, and planning committee members. The purpose of this open house was to present the draft study report, describe the data, analysis, and preliminary recommendations of the study. Open house participants were asked to provide feedback regarding the recommendations in the draft report. Comments collected at this meeting are also attached to this report as [Appendix G](#).

Advertisement of both open house meetings and of the publication of the draft report was published in the Casper Star-Tribune and in the Bar Nunn community newsletter. Stakeholders were also notified of the open house meetings via the aforementioned project fact sheet mailer. In addition, the project team met with the Bar Nunn Town Council to discuss the project on May 17, 2011 and October 5, 2011.

9.0 References

A Policy on Geometric Design of Highways and Streets, 2004. Published by American Association of State Highway and Transportation Officials, Washington, D.C., 2005.

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Evaluation of Existing Roadway Geometrics of Salt Creek Highway and Preliminary Corridor Analysis of McMurry Boulevard. Prepared by HKM Engineering and PB Consulting. July 2008

Connecting Casper, 2030 Long Range Transportation Plan. Prepared by URS Corporation, June 2007

WYDOT Access Manual, Rules and Regulations and Policy for Access to Wyoming State Highways, Prepared by WYDOT Traffic Program, March 2005

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