Town of Bar Nunn
Antelope Drive and Salt Creek Highway
Access Study and Plan
FINAL Report

March 2021

Prepared For:

CASPER AREA
METROPOLITAN PLANNING ORGANIZATION
Casper - Mills - Evansville - Bar Nunn - Natrona County

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BAR NUNN WYOMING

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1. Introduction

Project Purpose

The Casper Area MPO, to forward the goals and projects outlined in the latest version of their Long-Range Transportation Plan *Connecting Crossroads*, sought to draft a traffic study and plan for the Town of Bar Nunn that would examine the feasibility and long-term effects of abandoning a costly section of Antelope Drive. The Town of Bar Nunn continues to experience residential and industrial growth. Since the opening of the new I-25 interchange at Westwinds Road, travel patterns to and from Bar Nunn have changed. Most of Salt Creek Highway, particularly the section directly adjacent to its intersection with Antelope Drive in Bar Nunn, was not designed to safely and sustainably handle current or future traffic volumes or truck traffic, nor is the corridor or the surrounding area designed to accommodate pedestrians or bicycles.

A pavement study has determined that the section of Antelope Drive near Salt Creek Highway, due to the poor alkali soils, has significant structural and pavement deficiencies that necessitates a complete reconstruction. The Bar Nunn Town Council wanted to evaluate the effects of funding improvements to the other access points into the town and permanently closing and abandoning the damaged section of Antelope Drive, should they choose to do that.

The Town and the Casper Area MPO have commissioned the *Town of Bar Nunn Antelope Drive and Salt Creek Highway Access Study and Plan* to assess traffic and safety conditions, examine access to/from Bar Nunn, and identify short and mid-term improvements to Salt Creek Highway. The study evaluated:

- Effects of potentially abandoning and removing a costly section of Antelope Drive (currently the most heavily utilized access point into the town of Bar Nunn) due to failing subsurface conditions and excessive maintenance costs.
- Modifying traffic control devices (e.g. all-way stop control or roundabout control) at one or more existing intersections along Salt Creek Highway, providing enhanced access to the Town as well as traffic calming, traffic safety improvements and enhanced aesthetics. The ability to provide a "town gateway" could be included in these alternatives.
- Reimagining Sunset Boulevard as a possible "Main Street" and foster the creation of an enhanced streetscape and civic atmosphere around Sunset Boulevard, directly adjacent to the plot of land selected for the construction of a new Bar Nunn Town Hall.
- Re-directing and encouraging residential and commercial traffic currently utilizing Antelope Drive to the new interchange at Westwinds Road and alternative access points into town to reduce truck impacts on Salt Creek Highway and residential streets.
- Feasibility of an additional access to Salt Creek Highway from Wardwell Industrial Avenue to reduce or eliminate truck traffic in residential areas.
- Potential road improvements along Salt Creek Highway, including pedestrian, bicycle and bus facilities. Possible pedestrian and bicycle connections into Bar Nunn were also considered.

This report documents current traffic volumes, evaluates safety and operations within the study corridor, develops land use and traffic forecasts, evaluates future traffic conditions, identifies improvements for Salt Creek Highway and local roadways to provide acceptable traffic operations, and develops conceptual designs and cost estimates. Lastly, the report presents a recommendation and timeline for implementing roadway improvements, and identifies next steps (e.g., lead actors, funding and permitting) to finalize a Corridor Plan that serves all stakeholders. Overall, this plan will serve as a policy, management, and planning guide for future corridor management, access changes, improvement of multi-modal transportation infrastructure, and the development of adjacent land along Salt Creek from Howard Street to Westwinds Road.

History

Study Name	Year	Key Findings
Casper Area MPO Wayfinding Master Plan	2020	This document has been prepared to provide guidance for the implementation of wayfinding directional signage within the Casper Metropolitan Region. The report provides strategic, logical, and aesthetical approaches to orient and direct visitors and residents to and around key area destinations. The wayfinding signage will contribute to an overall “sense of place,” serving as an extension of the community’s brand and embellishing the key places that residents hold in high regard.
Town of Bar Nunn – Comprehensive Plan	2018	“Building Bar Nunn” identified areas within the transportation network that offer challenges to transportation in Bar Nunn plus opportunities to improve transportation and quality of life. As the population of Bar Nunn grows and with a high percentage of residents traveling to adjacent communities to go to work, it is increasingly important that roadway, pedestrian and bicycle connections between communities be improved and expanded. As adjacent communities update their Major Street Plans to address future growth and congestion, Bar Nunn has the opportunity to connect and expand on those proposed systems in an effort to craft and define the character and development of Bar Nunn over the next 10 years.
Town of Bar Nunn – Transportation Plan	2017	This document laid out a long-term transportation plan to guide citizens and government officials of Bar Nunn and help them to identify and evaluate existing barriers to transportation, travel patterns as well as street and bike/pedestrian networks. Further, the plan outlines opportunities and the relevant strategies to achieve improvements in connectivity, functional classification, land use, urban form, block configuration, roadway spacing, block size, access management, and transit.
Polaris Drive/ Westside Blvd. Planning and Environmental Linkages Study	2014	This study identified transportation needs and developed alternative solutions, with a focus on construction of a new Polaris Drive arterial road as a bypass to Salt Creek Highway. It developed a Purpose and Needs Statement, analyzed traffic and safety conditions, determined existing and future needs, developed and evaluated alternatives, performed alternative screening, evaluated possible environmental impacts, conducted agency and public involvement, and prepared the final report.

Casper Area Trails, Path and Bikeway Plan	2013	The Plan builds upon previous planning and ongoing infrastructure implementation efforts to identify gaps and barriers to walking and biking in the Casper Area, and recommends both infrastructural improvements, as well as policies, programs, and practices that support these modes. The Bar Nunn area was included in this plan.
Bar Nunn I-25 Interchange Feasibility Study	2013	Prepared for WYDOT, this study assessed the applicability of a new interchange located somewhere along I-25 between Westwinds Road and McMurry Blvd. An interchange at Westwinds Road was identified as the preferred alternative.
Bar Nunn Salt Creek Intersection and Subarea Planning Traffic Study	2012	Study to identify needs 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. This Study assisted the MPO in making decisions regarding roadway and intersection improvements and/or defining areas that may need additional study and public input
Bar Nunn Traffic Study	2010	Initial study to examine the effects of new development due to energy production ramping up. The study developed a list of transportation needs and recommended possible solutions.
Salt Creek Highway/ McMurry Boulevard Corridor Study	2008	This study examined existing and future transportation needs along Salt Creek Highway in Bar Nunn. Future planned development was taken into account. This study laid the foundation for the new I-25 Westwinds interchange.
Bar Nunn Community Development Plan	2008	This plan guides future land development in Bar Nunn.

Goals and Objectives

The **goals** of the project include:

- Improve quality of life for Bar Nunn residents
- Improve road and intersection safety
- Make Bar Nunn more attractive for future development by improving Town access, visibility, and aesthetics
- Minimize heavy truck impacts to roads and town residents
- Make Bar Nunn accessible for all modes of transportation

The project **objectives** are:

- Provide opportunities for the residents, business owners and key stakeholders to give input to inform the study
- Develop a list of possible existing and future transportation needs in the study area
- Develop and evaluate road, intersection and traffic control improvement alternatives
- Examine possible multi-modal improvements and connections to Bar Nunn
- Develop an improvement plan for roads and intersections in and around Bar Nunn, that can be implemented with identified available funding
- Develop a final report that summarizes study data, procedures and recommendations

2. Existing Conditions

Study Area

The study area (Figure 1) includes Salt Creek Highway from Westwinds Road to Howard Street, including the intersections of McMurray Blvd, Prairie Lane, Sunset Blvd, Antelope Drive and Howard Street. As part of the construction of the new Westwinds Road interchange, the northern end of Salt Creek Highway was realigned and improved to tie into Westwinds Road further west of the new I-25 ramps. Roads leading into Bar Nunn were also evaluated in this study.

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FIGURE 1 -- STUDY AREA MAP

Existing Infrastructure

Roadway Geometry and Drainage: Salt Creek Highway is a two-lane undivided roadway with a posted speed limit of 40 MPH that ranges from 22 feet to 46 feet wide. There are no existing paved shoulders, sidewalks or bicycle facilities. Within the study area, Salt Creek Highway is an open-section roadway, with runoff directed into shallow ditches on both sides of the pavement. The exception is the approximately 4,550-foot-long segment between Westwinds Road and a point approximately 450 feet north of McMurry Boulevard, where the roadway has been improved to provide three lanes (one lane in each direction and a center turn lane), plus concrete curb and gutter to convey storm runoff. All side streets that intersect Salt Creek Highway within the study area are open section roadways as well. Currently, the Wyoming Department of Transportation (WYDOT) owns and maintains Salt Creek. However, both Bar Nunn and the MPO anticipated that WYDOT will transfer ownership of the road to the Town of Bar Nunn in 2021 as is without any further improvements.

Intersection and Traffic Controls: Salt Creek Highway originates at an orthogonal "T" intersection at Westwinds Road, then proceeds south to intersect McMurry Boulevard, Coyote Avenue, Prairie Lane, Sunset Boulevard, and Antelope Drive at "T" intersections, with the side streets at angles of approximately 80, 90, 75, 80, and 75 degrees, respectively. Finally, the Salt Creek Drive/Howard Street intersection is a four-way orthogonal intersection. Intersection lighting is provided on utility poles at most study intersections. Six of the seven intersections (Westwinds Road, McMurry Blvd., Coyote Avenue, Prairie Lane, Sunset Blvd., and Antelope Drive) are controlled by stop signs on the minor street, while an all-way stop now controls the Salt Creek Highway/Howard Street intersection.

Pavement Condition: Of note is the ongoing deterioration of Antelope Drive just west of Salt Creek. Severe spring heaving and fall settling, water seepage and rutting of the roadway are evident.

FIGURE 2 -- PAVEMENT DETERIORATION ON ANTELOPE DRIVE

Directional/ Wayfinding Signage: Westwinds Road provides all access into the study area from the north, collecting traffic from both I-25 and points north along Salt Creek Highway, which continues in a separate segment east of I-25, connected to the study area segment by Westwinds Road.

South of Bar Nunn, Howard Street provides access from I-25, while Salt Creek Highway continues as Highway 254 into Mills. The exit 191 guide sign identifies the destination as “Wardwell Road/Bar Nunn” and specific services signs identifying the Loaf ‘n Jug convenience store and the KOA campground. Directional signs at the I-25 northbound and southbound ramps, as well as at the Howard Street/Salt Creek Highway intersection, guide motorists to Bar Nunn.

Within Bar Nunn, monument signs identify the entrances to Antelope Drive, Sunset Boulevard, and McMurry Boulevard as gateways to Bar Nunn.

FIGURE 3 -- BAR NUNN MONUMENT SIGN AT MCMURRY BLVD

Utilities and Environmental Features: Water lines extend along both sides of Salt Creek Highway between Howard Street and Antelope Drive, and along the western side of the roadway between Antelope Drive and Prairie Lane, and a short segment of sanitary sewer extends along the east side of Salt Creek Highway for about 870 feet south of Antelope Drive. There are utility poles carrying electric, telephone, and cable television on both sides of Salt Creek between Howard Street and Antelope Drive and along the west side of the roadway between Antelope Drive and the relocated segment north of McMurry Boulevard. Where Salt Creek has been relocated west to accommodate the Westwinds Road interchange, the utility poles have maintained their previous alignment.

Two study roadways (Antelope Drive and Salt Creek Highway) are bisected by a salt flat that consists of alkali soils, with a shallow water table and upward gradient from a confined aquifer. The soft, saturated and expansive clay and low sulfate levels do not allow for natural drainage of water during storm or melt events. This leads to severe spring heaving and fall settling of pavement, water seeping up through the roadway, and rutting and pavement damaged due to the soft subgrade. These signs of pavement deterioration have been visible for the past few years on Antelope Drive but have not yet occurred along Salt Creek Highway in the vicinity of the salt flat. Stabilizing the roadway would require expensive retrofits (estimated at $500,000 for Antelope Drive and $4,000,000 for Salt Creek Highway) to install underdrains and parallel French drains, along with reconstruction of surface, base, subbase and subgrade with lime.

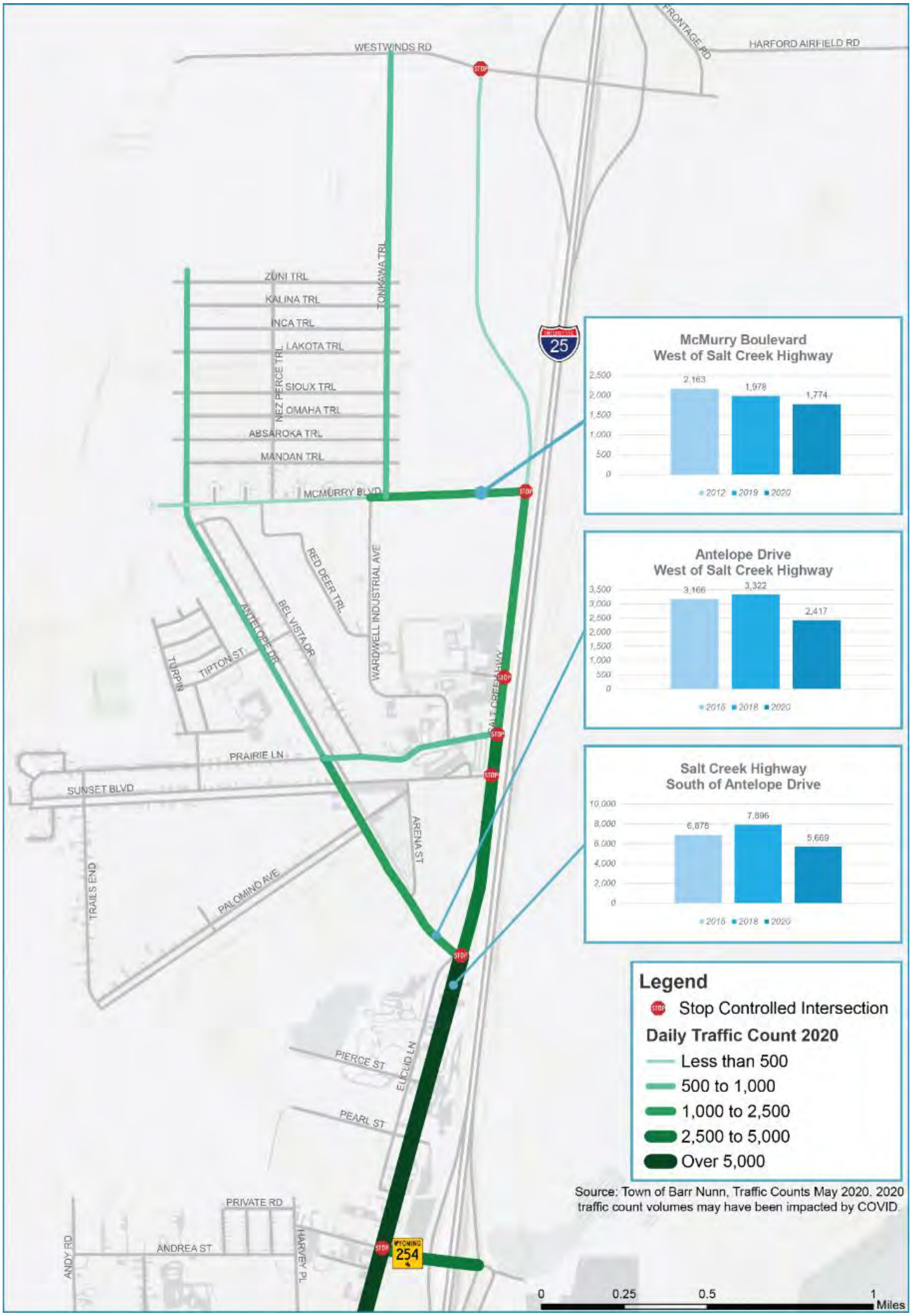
Salt Creek Highway through Bar Nunn does not intersect any floodplains, steep slopes, critical habitats, or other environmentally sensitive areas.

Traffic Volumes

Current and historical traffic volume data was obtained from the Casper Area MPO's traffic count database and traffic monitoring program. Map 1 displays typical daily traffic volumes throughout the study area. The highest-volume road segment in the study area is Salt Creek Highway between Howard Street and Antelope Drive, with volumes fluctuating between approximately 5,600 and 7,900 vehicles per day over the last five years. Traffic volumes gradually decrease northwards within the study area, dropping by about 2,500 at Antelope Drive, about 500 at Sunset Boulevard, about a further 500 at Prairie Lane, and a further 2,000 at McMurry Boulevard, to average under 500 north of McMurry Boulevard. Other than Salt Creek Highway, Antelope Drive is the highest-volume roadway within Bar Nunn, serving approximately 2,400 trips per day, followed by McMurry Boulevard, which serves just under 1,800 trips per day.

In the Casper region, as across the nation, traffic volumes dipped significantly in Spring 2020 due to COVID-19; monthly traffic volumes in the area were approximately 30 percent lower in April than at the same time in previous years. Traffic volumes rapidly rebounded, however, and by August were less than ten percent lower in the region than in August of previous years. Therefore, while the pandemic temporarily altered travel patterns and has introduced greater uncertainty in future travel demand, it has not fundamentally changed how many people travel by car in the Casper area.

The most significant change in most recent years that has affected traffic volumes in Bar Nunn has been the opening of the Westwinds Road interchange with I-25 (Exit 194). 24-hour counts collected in 2020, after the opening of the interchange in 2018, suggest that traffic volumes on Salt Creek Highway, Antelope Drive, and McMurry Boulevard have declined modestly since the opening of the Westwinds interchange, as shown in Map 1. In contrast, traffic volumes—especially of heavy vehicles—have increased on Westwinds Road, illustrating that some freight traffic has adapted and is now using the new interchange to access the industrial areas north of the Town. Because traffic counts for the study were collected during the Fall of 2020 and were not adjusted for seasonal factors, the variability in traffic patterns may be attributed to both the COVID pandemic impact on remote work and school conditions as well as from the typical variability in seasonal traffic volumes. The modest decline in daily traffic volumes along portions of Salt Creek, Antelope and McMurray also indicate that some traffic from the Howard Street interchange has shifted to the Westwinds interchange.



MAP 1 — DAILY TRAFFIC VOLUMES

Crash Assessment

Historical crash data from 2004-2014 and 2018-2019 was obtained from the Casper Area MPO and analyzed for this report. Most crashes occurred at the intersections of Salt Creek Highway at Howard Street, and Salt Creek Highway at Antelope Drive, as shown in Map 2. The Howard Street intersection averages approximately two to three reported crashes per year, while the Antelope Drive intersection averages approximately one reported crash per year and a further one reported crash per year takes place along Salt Creek Highway between Howard and Antelope. There are no crash clusters along Salt Creek Highway north of Antelope Drive.

At Howard Street (see Table 14 in Appendix A), a majority of the 26 reported collisions were angle crashes with smaller numbers of rear-end and sideswipe collisions, and a majority took place during daylight in clear conditions. Since the intersection was converted to all-way stop control in 2015, no crashes were reported in 2018 or 2019.

At Antelope Drive (see Table 14 in Appendix A), angle crashes constitute at least half of 15 reported collisions (30 percent of Antelope/Salt Creek crash reports did not indicate a crash type), and a majority took place during clear and dry conditions. Only two crashes since 2004 at the Salt Creek/Antelope intersection have resulted in any injury, and one crash resulted in a fatality.

Elsewhere in the study area (see Table 15 in Appendix A.), the largest proportion of crashes were single-vehicle crashes (about 30 percent of crashes) and rear-end collisions (about 20 percent). Notable distinctions between the crash patterns at Antelope Drive, Howard Street, and elsewhere include the following:

- A larger proportion of collisions took place during snow or when the road was ice-covered at Antelope (40 percent of all crashes) than at Howard (10 percent) or elsewhere in the study area (33 percent of all crashes).
- A larger proportion of collisions resulted in possible injury or worse outside Antelope and Howard Street intersections (33 percent) than at Antelope (20 percent) or Howard (23 percent)
- Unlike at the Antelope, Sunset, Prairie, and McMurry intersections, there is no lighting in the vicinity of the Howard Street intersection. Accordingly, five crashes were reported to have taken place in dark, unlighted conditions there and no crashes were reported to have taken place at any other intersection in dark, unlighted conditions. 13 crashes did take place in dark, unlighted conditions at non-intersection locations within the study area.

Detailed crash information may be found in Appendix A.

MAP 2 — STUDY AREA CRASH LOCATIONS

Travel Times

Map 3 shows estimated peak hour travel times for selected routes within the study area. These travel times are based on *TomTom* traffic data validated by field-measured travel time runs conducted in October 2020 during peak commuting hours. The travel time analysis assessed three origin-destination pairs: the McMurry/Antelope intersection and I-25 south of Howard Street, the Trails End/Sunset intersection and I-25 south of Howard, and the Sunset/Antelope intersection and the Salt Creek/Antelope intersection. Table 1, below, summarizes the results.

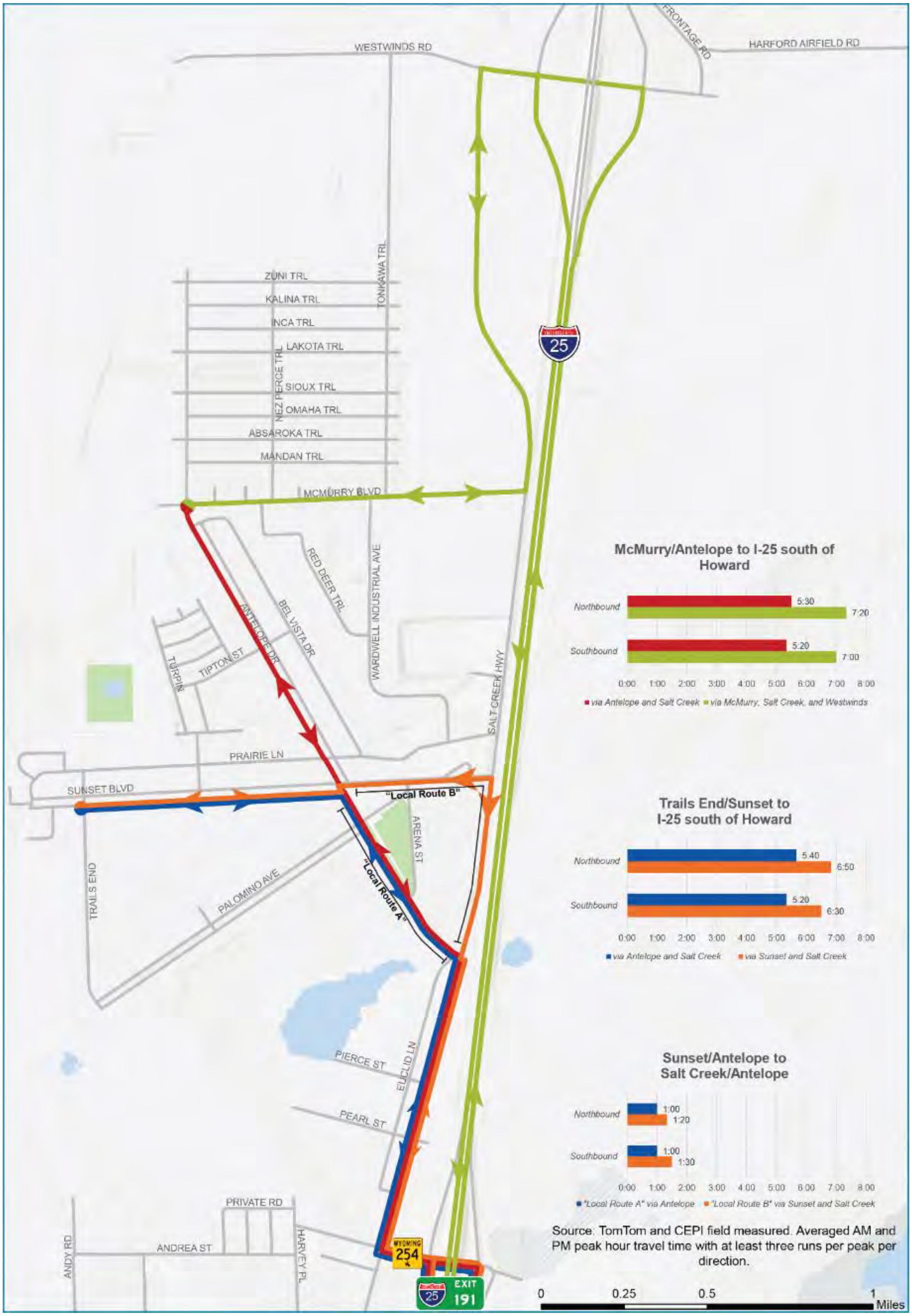
TABLE 1. TRAVEL TIME RESULTS

McMurry/Antelope to I-25 south of Howard	via Antelope and Salt Creek	via McMurry, Salt Creek, Westwinds, and I-25	Difference
Southbound	5:20	7:00	1:40
Northbound	5:30	7:20	1:50

Trails End/Sunset to I-25 south of Howard	via Antelope and Salt Creek	via Sunset and Salt Creek	Difference
Southbound	5:20	6:30	1:10
Northbound	5:40	6:50	1:10

Sunset/Antelope to Salt Creek/Antelope	Local Route A via Antelope	Local Route B via Sunset and Salt Creek	Difference
Southbound	1:00	1:30	0:30
Northbound	1:00	1:20	0:20

As the data shows, travelling via McMurry, Salt Creek, Westwinds, and I-25 adds at least one minute forty seconds to travel time via Antelope and Salt Creek from McMurry/Antelope to I-25 south of Howard and vice versa. Travelling via Sunset adds about one minute ten seconds to travel time via Antelope from the Trails End/Sunset intersection to I-25 south of Howard and vice versa. Finally, the short trip between Sunset/Antelope and Salt Creek/Antelope takes twenty to thirty seconds longer via Sunset and Salt Creek than via Antelope. Note that there are worst case travel time changes, for motorists going to or from the last house on Antelope near Salt Creek Highway. Vehicles traveling to or from houses closer to Palomino and Sunset would experience less significant travel time increases if Antelope Drive is closed at Salt Creek Highway.



MAP 3 — ESTIMATED TRAVEL TIMES FOR SELECTED ROUTES

Capacity Analysis

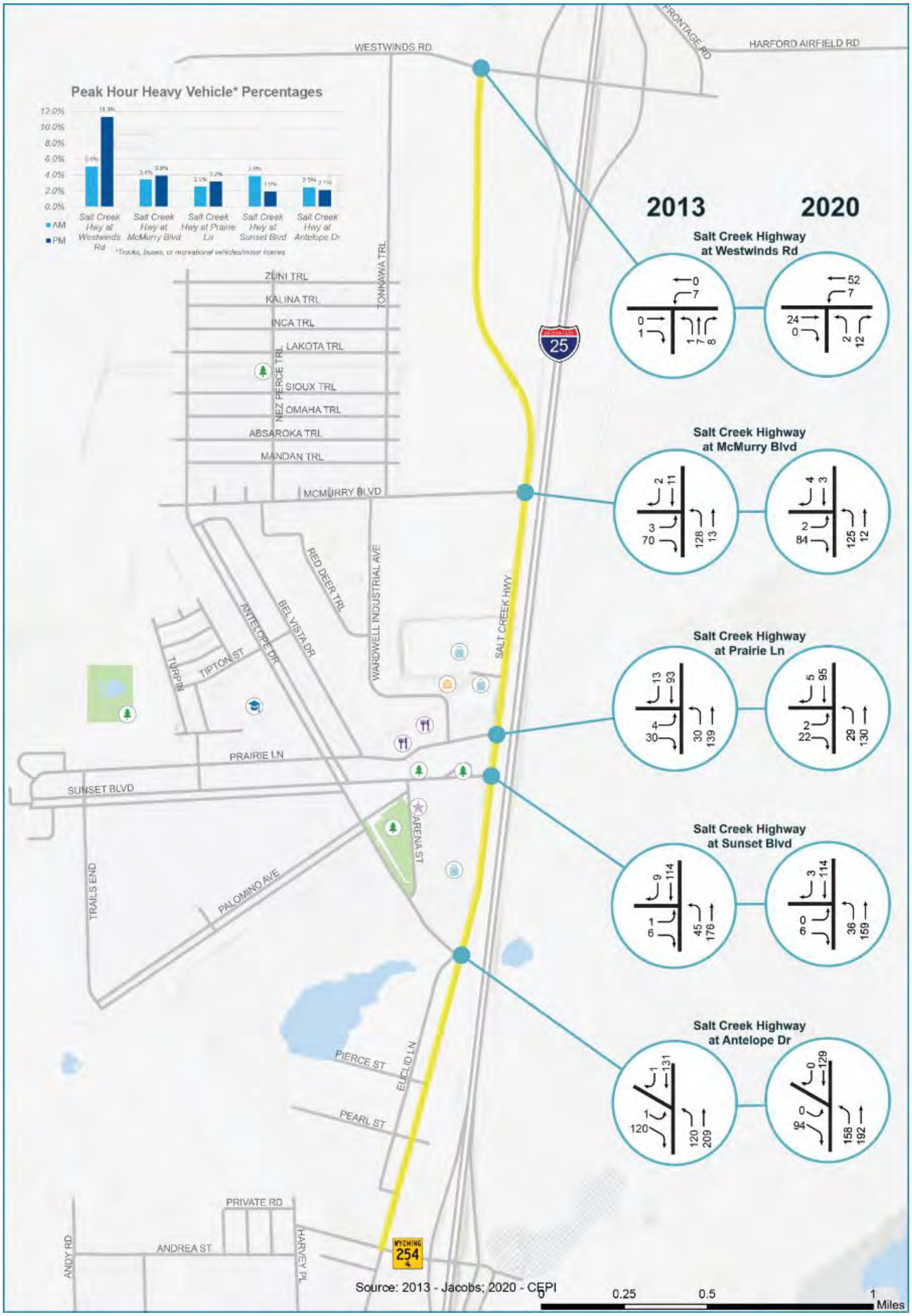
A capacity analysis of the Salt Creek Highway corridor was performed using Synchro 10, a macroscopic and deterministic traffic analysis software which implements the *Highway Capacity Manual* (HCM) methodology. Existing and historical 2013 peak hour PM intersection traffic volumes along with percent heavy vehicles are shown in Map 4. Truck, bus and motorhome traffic consists of between 3% to 12% of the overall traffic volumes. The existing AM and PM peak hour traffic volumes, intersection traffic control type, and geometric data such as number of lanes, lane configuration, and storage length were input into Synchro to create a base conditions traffic model.

Synchro was used to report the delay, Level of Service (LOS), and volume-to-capacity ratio at the six study intersections. The analysis results are presented in Table 2. Detailed Synchro reports are available in Appendix C. The existing conditions analysis shows that all intersections operate acceptably and that there are no operational concerns along the study corridor. All movements are below capacity and operate at an LOS C or better.

TABLE 2 -- SALT CREEK HIGHWAY CAPACITY ANALYSIS – EXISTING CONDITIONS

#	Intersection	Approach*	Existing Conditions – AM (PM)					
			Delay/Veh (sec)		Level of Service		Volume/ Capacity Ratio	
1	Salt Creek Hwy & Westwinds Rd	Westbound	3	(1)	A	(A)	0.01	(0.01)
		Northbound	9	(9)	A	(A)	0.02	(0.01)
2	Salt Creek Hwy & McMurry Blvd	Eastbound	9	(9)	A	(A)	0.18	(0.09)
		Northbound	7	(7)	A	(A)	0.03	(0.08)
3	Salt Creek Hwy & Prairie Ln	Eastbound	9	(9)	A	(A)	0.03	(0.03)
		Northbound	2	(1)	A	(A)	0.02	(0.02)
4	Salt Creek Hwy & Sunset Blvd	Eastbound	10	(9)	A	(A)	0.04	(0.01)
		Northbound	1	(1)	A	(A)	0.01	(0.03)
5	Salt Creek Hwy & Antelope Dr	Eastbound	11	(10)	B	(A)	0.24	(0.11)
		Northbound	4	(4)	A	(A)	0.07	(0.12)
6	Salt Creek Hwy & Howard St	Eastbound	10	(10)	B	(B)	0.06	(0.03)
		Westbound	11	(12)	B	(B)	0.53	(0.39)
		Northbound	12	(15)	B	(B)	0.36	(0.51)
		Southbound	13	(12)	B	(B)	0.72	(0.35)

**Note: Approaches with free movements and no vehicle delay are omitted*



MAP 4 — INTERSECTION TRAFFIC VOLUMES

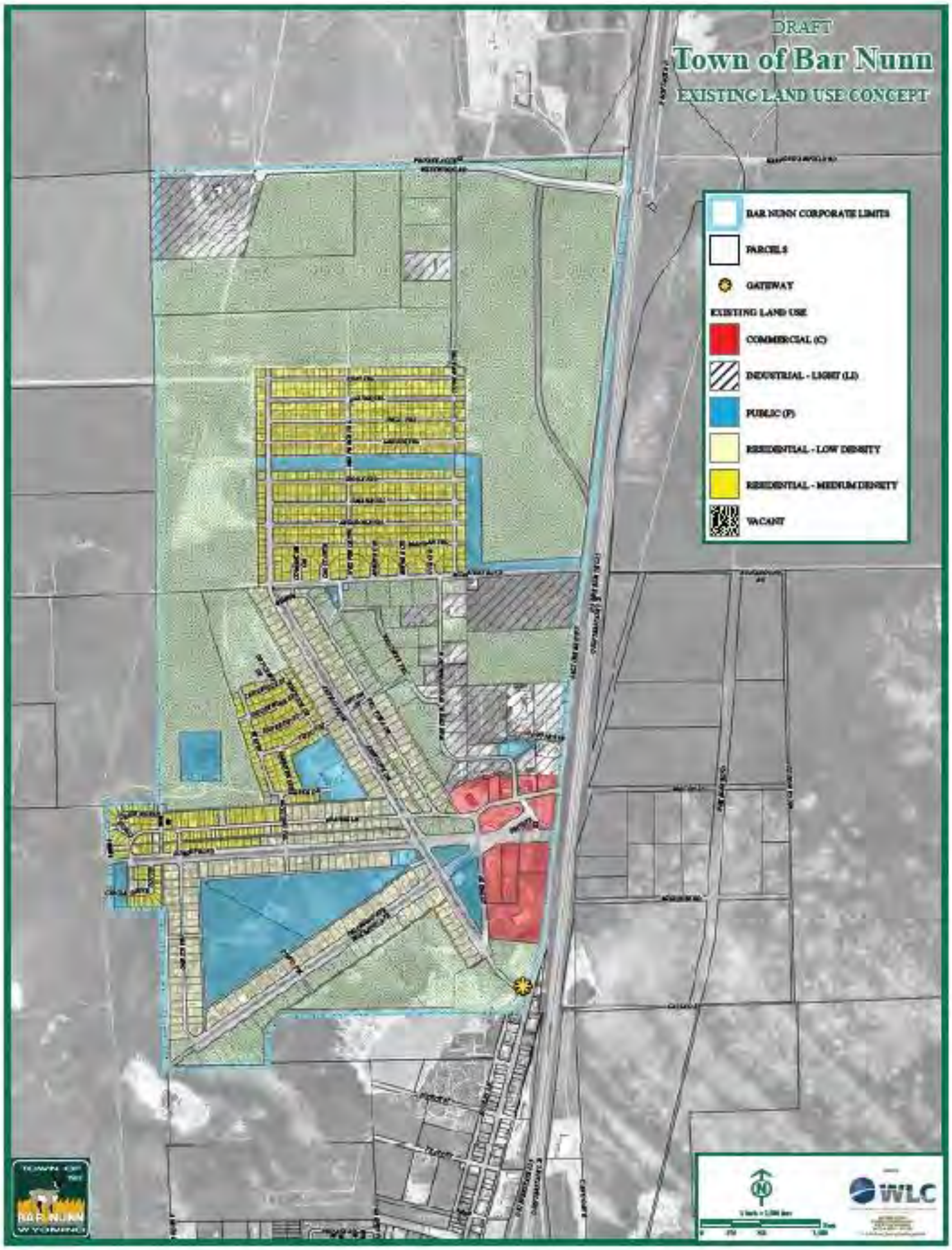
Multi-Modal Assessment

Many Bar Nunn residents walk and bike on a regular basis (mostly during warmer months), in addition to driving, both for local recreation and to in-town destinations such as parks and mailboxes. As shown in Map 5, there are significant sidewalk networks within the residential neighborhoods of Bar Nunn, but these networks are disconnected from the commercial center of the Town, where government buildings, restaurants and recreational sites are located, and from Salt Creek Highway. While there are no dedicated bicycle facilities in Bar Nunn, streets are wide and volumes are low, so bicycling is still a safe option for many riders. There are no transit stops within Bar Nunn, but middle and high school students do board school buses at multiple locations along Antelope Drive, and students of all grade levels board buses along Nez Perce Trail near High Plains Park.

MAP 5 – SIDEWALKS AND PEDESTRIAN DESTINATIONS

Existing Land Use and Zoning

Existing land uses in Bar Nunn comprise a commercial and industrial core roughly bounded by Bel Vista Drive, Antelope Drive, Salt Creek Highway, and McMurry Boulevard and multiple, mostly single-family, residential neighborhoods to the west and north of the industrial core. As shown in Map 6, the Town anticipates further industrial development along Westwinds Road and relocated Salt Creek Highway and expanded residential neighborhoods through the rest of the Town.



MAP 6 – EXISTING LAND USE

3. Public Involvement

To solicit community and stakeholder input, a public open house was held on October 14, 2020 at The Hangar from 5 PM to 8 PM. Meeting announcements were posted on the MPO and Town newsletter and in social media and website channels. A questionnaire survey was also developed to solicit input on existing conditions. The survey was available online on the MPO and Town of Bar Nunn website, as well as hard copies at Bar Nunn Town Hall. The meeting included a short presentation on the study purpose and goals and objectives, plus existing data and conditions, followed by an open house with roll plans and posters of the study area and transportation data. Approximately 20 people attended. The attendees were asked to provide feedback on the existing conditions findings and offer ideas on improving access to the Town.

Public Engagement at Public Meeting #1

Public Meeting Comments / Survey Results

The questionnaire survey asked for opinions on traffic safety, congestion, travel routes and multimodal needs along Salt Creek Highway and within the Town of Bar Nunn. The hard copy of the survey is shown in Figure 4.

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Salt Creek Highway Corridor Study

The Town of Bar Nunn is assessing Salt Creek Highway from Howard Street to Westwinds Road, with an eye towards improving safety and operations at the intersections along the corridor, reducing ongoing maintenance burdens, making it easier to walk and bicycle to and along Salt Creek Highway, and developing a community "Gateway" along Sunset Boulevard. This survey will ask for your thoughts about traffic, safety, and community destinations, which will help us identify key questions to answer in this study and develop ideas for how to address them.

We anticipate this survey will take about five minutes to complete. At the end of the survey you will have the opportunity to optionally provide your street name, which will help us better understand travel patterns and survey responses, and a contact email, which will allow us to follow up with further information as the study progresses. Survey responses will be accepted from October 22 through November 5.

Thank you for your participation!

1-2. Please indicate how concerned you are about the following at **each intersection along Salt Creek Highway** (1 = no concern; 5 = high concern)

	1. Traffic **Delay**	2. Traffic **Safety**
Westwinds Road	1—2—3—4—5	1—2—3—4—5
McMurry Boulevard	1—2—3—4—5	1—2—3—4—5
Prairie Lane	1—2—3—4—5	1—2—3—4—5
Sunset Boulevard	1—2—3—4—5	1—2—3—4—5
Antelope Drive	1—2—3—4—5	1—2—3—4—5
Howard Street	1—2—3—4—5	1—2—3—4—5

3. What are your concerns, if any, at or near each intersection?

Westwinds Road

McMurry Boulevard

Prairie Lane

Sunset Boulevard

Antelope Drive

Howard Street

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4. How do you usually access I-25 when travelling south towards Casper?
   - ☐ Salt Creek Highway north to the new Westwinds Road interchange
   - ☐ Salt Creek Highway south to the Howard Street interchange
5. How do you usually access Salt Creek Highway from your home?
   - ☐ McMurry Boulevard
   - ☐ Prairie Lane
   - ☐ Sunset Boulevard
   - ☐ Antelope Drive
   - ☐ Another route (please describe below)
6. How do you feel about the following types of intersection traffic control? (1 = I strongly dislike this type of traffic control; 5 = I strongly like this type of traffic control)

Four-way stop	1—2—3—4—5
Side-street-only stop	1—2—3—4—5
Traffic signal	1—2—3—4—5
Roundabout	1—2—3—4—5

7. What are your main walking and bicycling destinations…

…within Bar Nunn?

…within the Casper region?

8. Do you have any additional comments?

9. Contact Information (optional)

Name Street Email Address

Thank you for your participation!

FIGURE 4 – COMMUNITY TRANSPORTATION SURVEY

The results of the community survey, highlighted in Figure 5, confirmed that Town residents are nearly evenly split between accessing I-25 via the Westwinds interchange and the Howard Street interchange. The intersection with the highest level of safety concern and perceived traffic delay was Antelope Drive and Salt Creek Highway. No strong preference on a preferred traffic control type was expressed.

Additional comments received at the public meeting included the traffic delay impacts of school bus stops/ routes, traffic safety for left-turning traffic along Salt Creek Highway and the need for separate left-turn lanes, RV parking issues along Sunset Blvd and truck traffic on residential streets from the Wardell industrial area.

A second public open house took place on January 14th, 2021, at The Hangar from 4 PM to 7 PM, to present and discuss alternative solutions developed for this study. This meeting and resulting input is described later in this report.

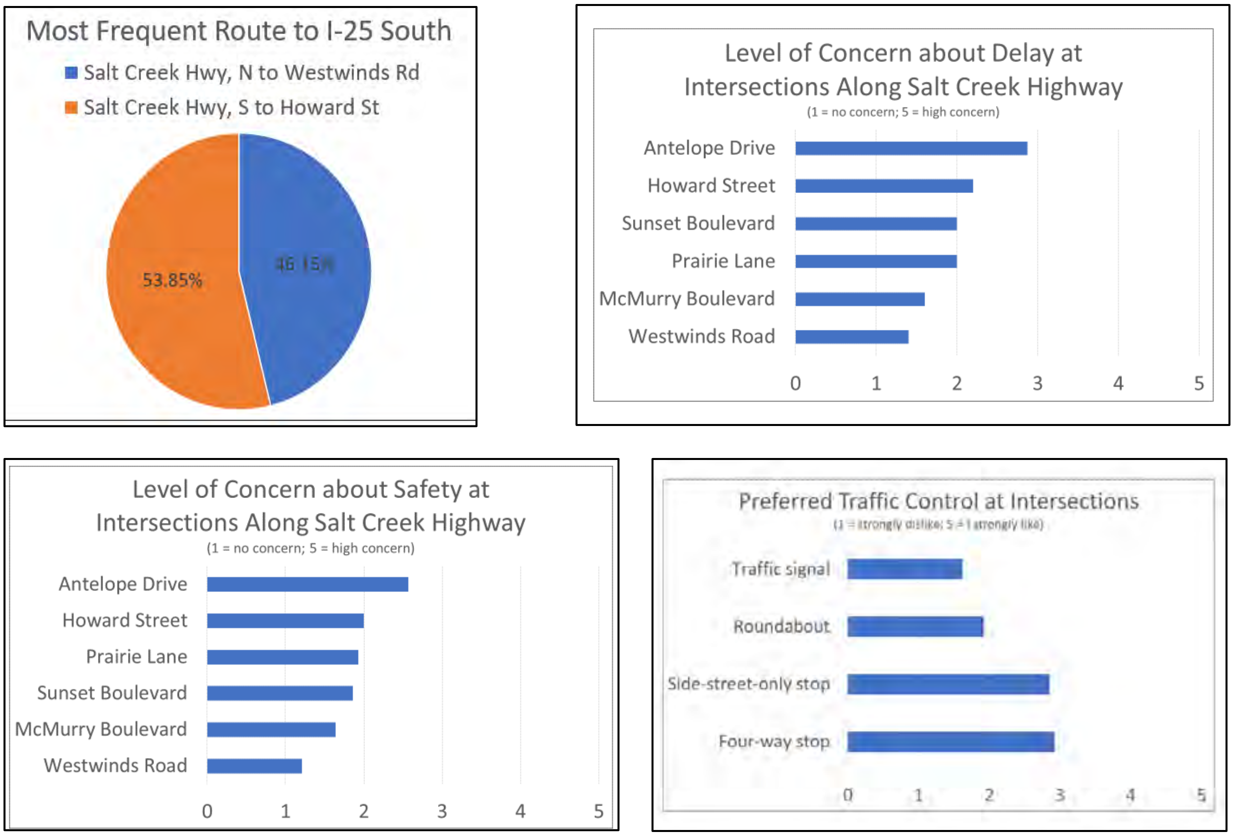


FIGURE 5 -- COMMUNITY SURVEY RESULTS

Agency Input – Town input

The Town of Bar Nunn's Mayor and maintenance staff provided input during the stakeholder and community engagement process. Due to the Town's street network following the old airport runways and taxiways, the Town is burdened with excessive roadway widths and pavement, plus close parallel roads that both increase maintenance costs and encourage high travel speeds within the Town. With the pending transfer of Salt Creek Highway to the Town's roadway network, the need to manage future roadway maintenance costs is critical. The Town expressed concerns about the sustainability of maintaining Antelope Drive, with costs for subsurface reconstruction and underdrains potentially exceeding $500,000. The Town has also begun 'tactical' traffic calming designs including chokers and raised crosswalks along McMurray Blvd and Antelope Drive to both slow traffic down and reduce truck traffic on residential streets.

4. Existing Needs Assessment

Needs and Barriers

The existing conditions assessment identified several needs for, and barriers to safe multi-modal transportation along the Salt Creek Highway corridor, and access to the Town including:

- Need to prioritize short-term improvements, whereas previous study recommendations focused primarily on long-term transportation improvements.
- Need to reduce roadway maintenance costs for the Town due to excessive pavement widths and pavement failures. Designs to reduce pavement width and roadway mileage are needed.
- Need to reduce excessive speeds on Town roads, due mainly to the straight, wide roads.
- Need to improve the visibility of the Town. There is a lack of a formal gateway and wayfinding signage that are visible and command attention for the Town along Salt Creek Highway. Enhanced streetscapes and gateway features are needed.
- Need to improve traffic safety. There is a history of frequent crashes at Salt Creek and Antelope and at the intersection of Salt Creek and Howard. Upgraded traffic controls are needed.
- Need to improve multi-modal connections. There is a lack of pedestrian and bicycle connections along Salt Creek Highway south of Town to the existing commercial area.
- The current slow growth in the energy industry and the lack of diversity in the economy are barriers.

Opportunities and Constraints

The existing conditions assessment identified several opportunities and constraints to address when developing future short- and long-term alternatives, including:

- Opportunity to reduce speeding by development of low-cost traffic calming improvements.
- Opportunity to enhance safety by upgrading intersection traffic controls and accommodating all design vehicles and traffic diversions from Antelope Drive.
- Opportunity to improve the town visibility and aesthetics by developing a streetscape plan for the primary Town access point that includes a gateway feature/ pocket park.
- Opportunity to reduce truck impacts on residential streets with construction of a new direct roadway connection from Wardell Road to Salt Creek Highway, with minimal right-of-way acquisition.
- Opportunity to enhance pedestrian and bicycle access to Bar Nunn by developing a multi-modal connection from the Town to the commercial area along Howard Street within the existing right-of-way and minimizing utility impacts.
- Opportunity to ensure that future improvements of Salt Creek Highway can handle planned growth.
- Available right-of way and funding are constraints.

5. Alternatives Development

The purpose of the *Town of Bar Nunn Antelope Drive and Salt Creek Highway Access Study and Plan* is to assess traffic and safety conditions, examine access to/from Bar Nunn, and identify short and long-term improvements to Salt Creek Highway. The goals of the alternatives are to 1) meet identified needs, 2) be cost-effective, 3) be feasible and implementable, and 4) improve quality of life for Town residents.

Alternative development was based on input from the MPO, Town Staff, Town Mayor and the public. The alternatives developed and evaluated for this report include:

- Street Pattern Changes: Developing ways to accommodate the possible abandoning and removing a costly section of Antelope Drive (currently the most heavily utilized access point into the town of Bar Nunn) due to failing subsurface conditions and excessive maintenance costs.
- Traffic Control Changes: Modifying traffic control devices (e.g. all-way stop control or roundabout control) at one or more existing intersections along Salt Creek providing enhanced access to the Town to provide traffic calming, improve traffic safety and enhance aesthetics. The ability to provide a "town gateway" could be included in these alternatives.
- Streetscape Improvements: Reconstructing Sunset Boulevard with an enhanced streetscape design from Antelope Drive to Salt Creek Highway that accommodates all modes of transportation.
- Wayfinding: Re-directing and encouraging residential and commercial traffic that currently use Antelope Drive to instead take other/better routes by employing better signage to the new interchange at Westwinds Road and alternative access points into town.
- New Roadways: Constructing a new access roadway to Salt Creek Highway from Wardwell Industrial Avenue to reduce or eliminate truck traffic in residential areas.
- Existing Roadway Improvements: Improving the typical cross-section along Salt Creek Highway to include separate left-turn lanes, a continuous two-way center turn lane, wider lanes, improved drainage, and/or a shared use side path for walking and biking.

The alternatives presented are intended to be considered for short-term (e.g., 1-2 years) or mid-term (3-5 years) implementation so as not to be duplicative of other long-term recommendations from other previous studies. These studies have developed unique long-term (e.g. town buildout) recommendations for the Town's future roadway network. Concept design plans are included in Appendix B.

Short-term Alternatives

(1) Concept #0a - Full Closure of Antelope Drive

This alternative would remove all existing pavement between Salt Creek Highway and the former Arena Street intersection and divert all traffic from that segment to Sunset Boulevard. The intended goal of this concept is to relieve the Town of the drainage challenges and high maintenance requirements of Antelope Drive that stem from the poor soils and topography upon which the road lies. In addition, there have been more traffic crashes in recent years at the intersection of Antelope Drive and Salt Creek Highway than any intersection in the study area except for Howard Street at Salt Creek Highway (due to the skewed alignment), and this concept would remove that intersection.

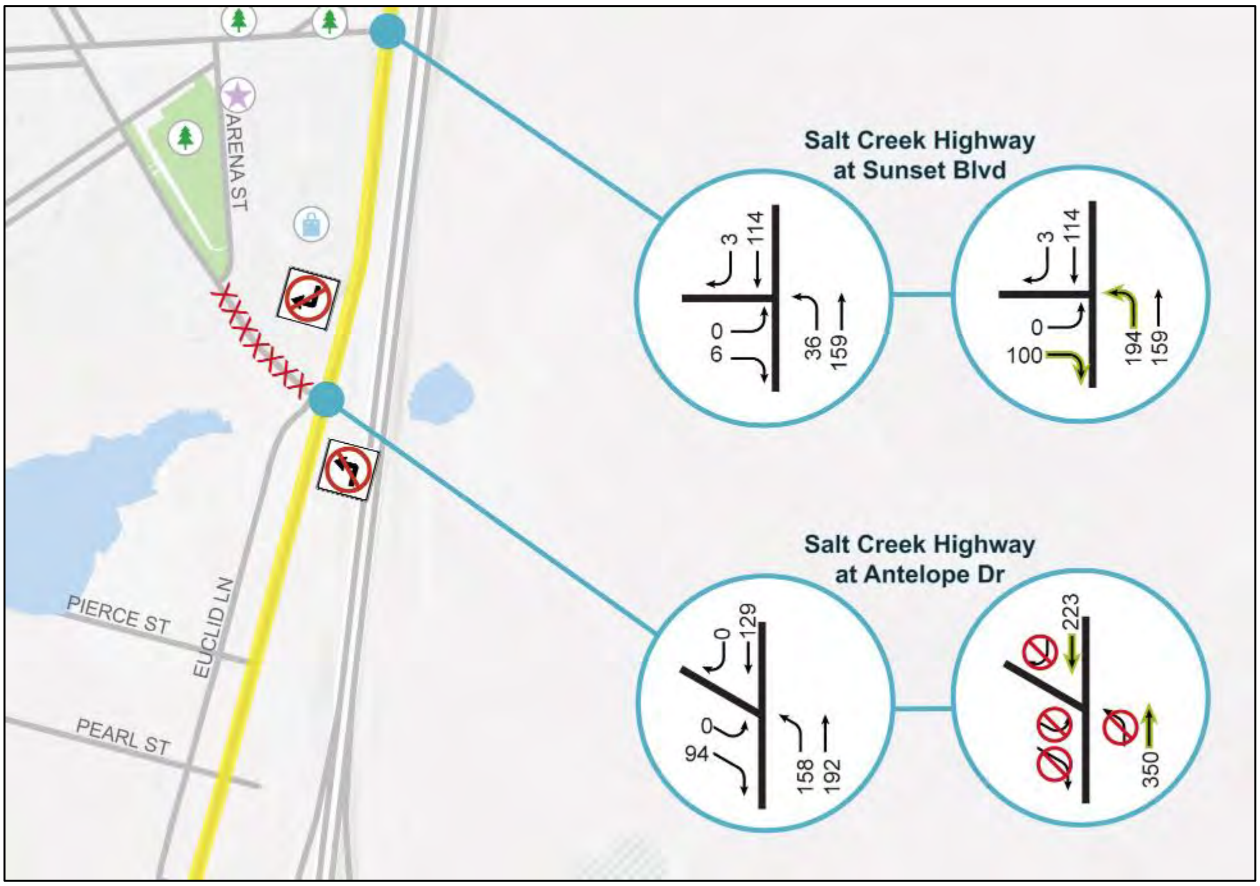


FIGURE 6 - CONCEPT #0A - FULL CLOSURE OF ANTELOPE DRIVE

(2) Concept #0b - Partial Closure of Antelope Drive

This concept would limit traffic to eastbound-only between Salt Creek Highway and the former Arena Street intersection, divert westbound traffic from that segment to Sunset Boulevard, and eliminate all left turns at the Salt Creek Highway/Antelope Drive intersection. Once those restrictions are in place, approximately half of Antelope Drive's pavement width could be removed. The resulting roadway would be approximately 14 feet wide. Like Concept #0a (full closure of Antelope Drive), the purpose of this concept is to reduce the drainage challenges and maintenance requirements of Antelope Drive by removing pavement and reduce the safety concerns present at the Salt Creek Highway and Antelope Drive intersection by removing left-turn movements.

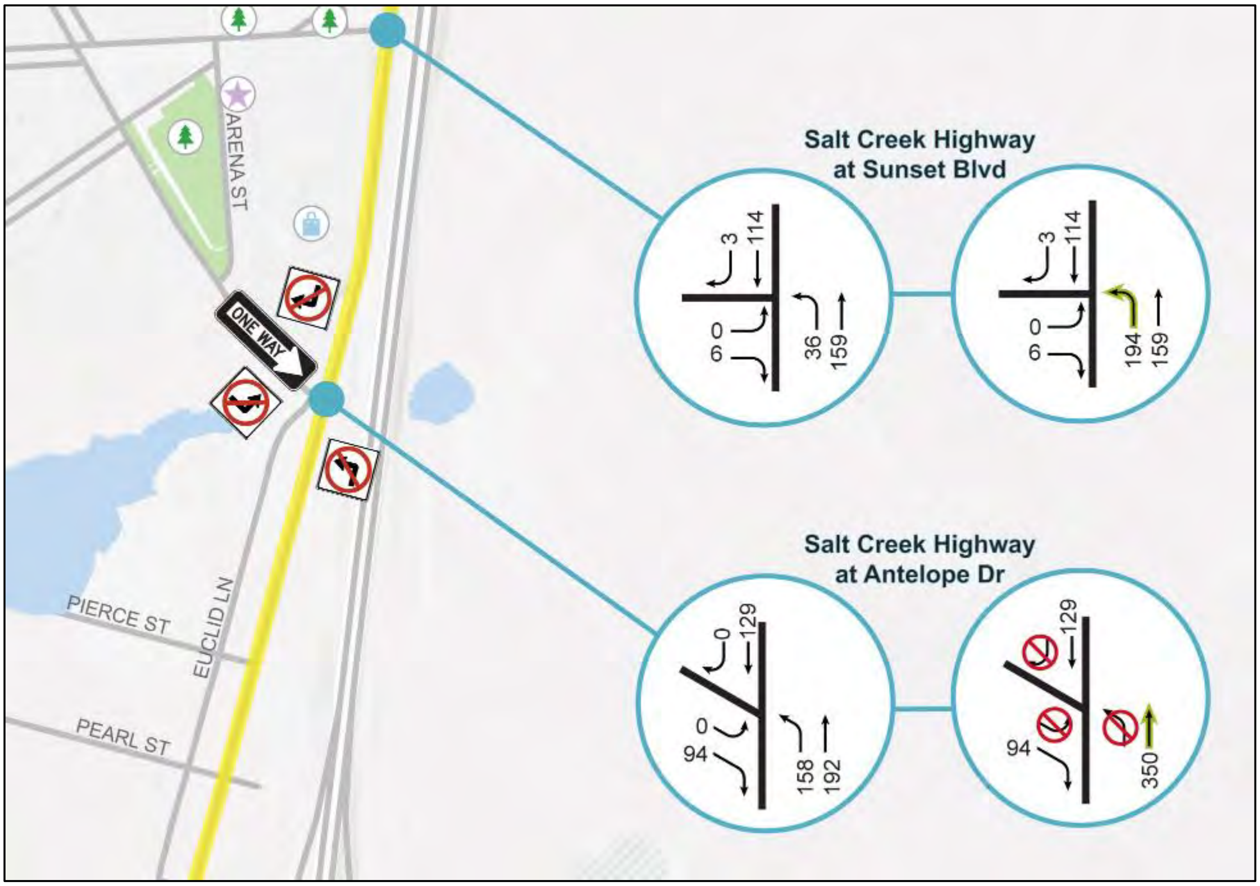


FIGURE 7 - CONCEPT #0B - PARTIAL CLOSURE OF ANTELOPE DRIVE

(3) Concept #0c – Wayfinding and Gateway Signage

This concept would modify or replace guide signs along I-25 to sign Westwinds Road (Exit 194) as the Bar Nunn interchange exit and install a large Bar Nunn welcome monument sign, visible from I-25, at the Salt Creek Highway and Sunset Boulevard intersection. Highway guide signs would be designed according to the MUTCD, while the monument sign would be designed according to the Casper Area MPO's regional wayfinding system graphic design guidelines and fabrication recommendations. The goal of this concept is to direct motorists to Westwinds Road, rather than Howard Street, to access Bar Nunn. This would lower traffic volumes at the Salt Creek Highway/Howard Street intersection, lessen traffic's wear and tear on Antelope Drive, and draw motorists' attention to the Town as they pass on I-25.

FIGURE 8 - CONCEPT #0C - WAYFINDING SIGNAGE

FIGURE 9 - CONCEPT #0C - GATEWAY SIGNAGE

(4) Concept #1 - New left-turn lanes along Salt Creek Highway

This concept would add northbound left turn lanes on Salt Creek Highway at any or all of the intersections with Antelope Drive, Sunset Blvd, Prairie Lane, Coyote Avenue, and McMurry Blvd. One 12-foot travel lane would be maintained in each direction while and an 11-foot left turn lane could be added in the northbound direction at each selected intersection. Turn bays would be approximately 100 feet long and include appropriate tapers ranging in length from 100 feet to 240 feet. The purpose of this concept is to enhance traffic safety and the risk for rear-end crashes and reduce traffic delay at the intersections by separating left-turning from through traffic.

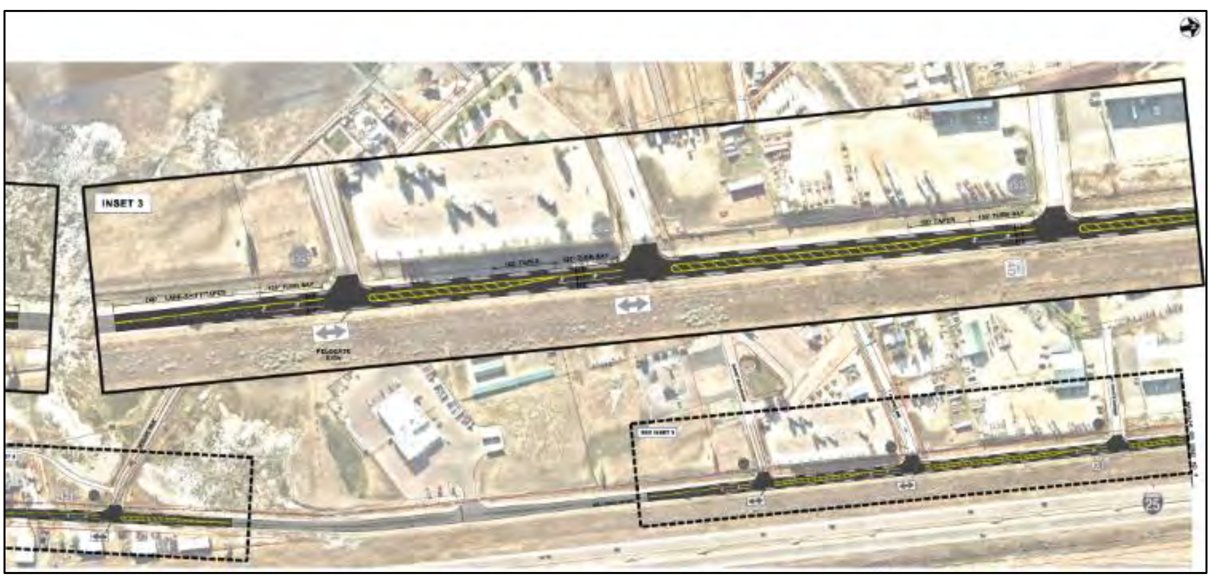


FIGURE 10 - CONCEPT #1 - NEW LEFT-TURN LANES ALONG SALT CREEK HIGHWAY,

(5) Concept #2 - Traffic control upgrades

This concept considers several traffic control upgrades including all-way stop, roundabout and signal control at multiple locations including Antelope Drive and Sunset Blvd. Initial assessment of traffic control needs, and locations suggests that signal control or all-way stop control would not be warranted based on existing or near-term traffic volumes. Locating upgraded traffic controls such as a roundabout at Antelope Drive would not serve to meet the project goals of reducing maintenance costs. Therefore, this concept would construct a new modern roundabout Sunset Boulevard, to accommodate trucks, buses and emergency vehicles. The roundabout's inscribed circle diameter (ICD) would be around 105 feet, the single lane circulating roadway would be 18 feet wide, it would have a 40-foot center island, and would include splitter islands, pedestrian ramps and crosswalks and an apron to accommodate Recreational Vehicles and Tractor Trailers. This concept has three objectives: reducing traffic delay at the Salt Creek Highway/Sunset Boulevard intersection, reducing turning crashes (currently at Antelope Drive) and providing a gateway treatment for Bar Nunn that establishes Sunset Boulevard as the primary entrance into the Town.

FIGURE 11 – CONCEPT #2 - ROUNDABOUT AT SUNSET

(6) Concept #3 - Internal Town intersection improvements – Sunset / Antelope (channelization)

This concept outlines the installation of curb extensions, crosswalks, all-way stop signs and stop bars, and sidewalk or multi-use trail segments at the intersections of Antelope Drive with Sunset Boulevard and Prairie Lane. At each intersection, curb extensions would narrow each roadway to 24 feet wide, providing one 12-foot travel lane in each direction. The multi-use trail would be 8 feet wide with a 2- to 6-foot buffer from the roadways, while the sidewalk would be 5 feet wide and immediately adjacent to Antelope Drive. This concept has multiple goals, including to improve drainage, reduce vehicle speeds, increase safety for pedestrians and bicyclists, and create an aesthetic and attractive streetscape at this central location within the Town.

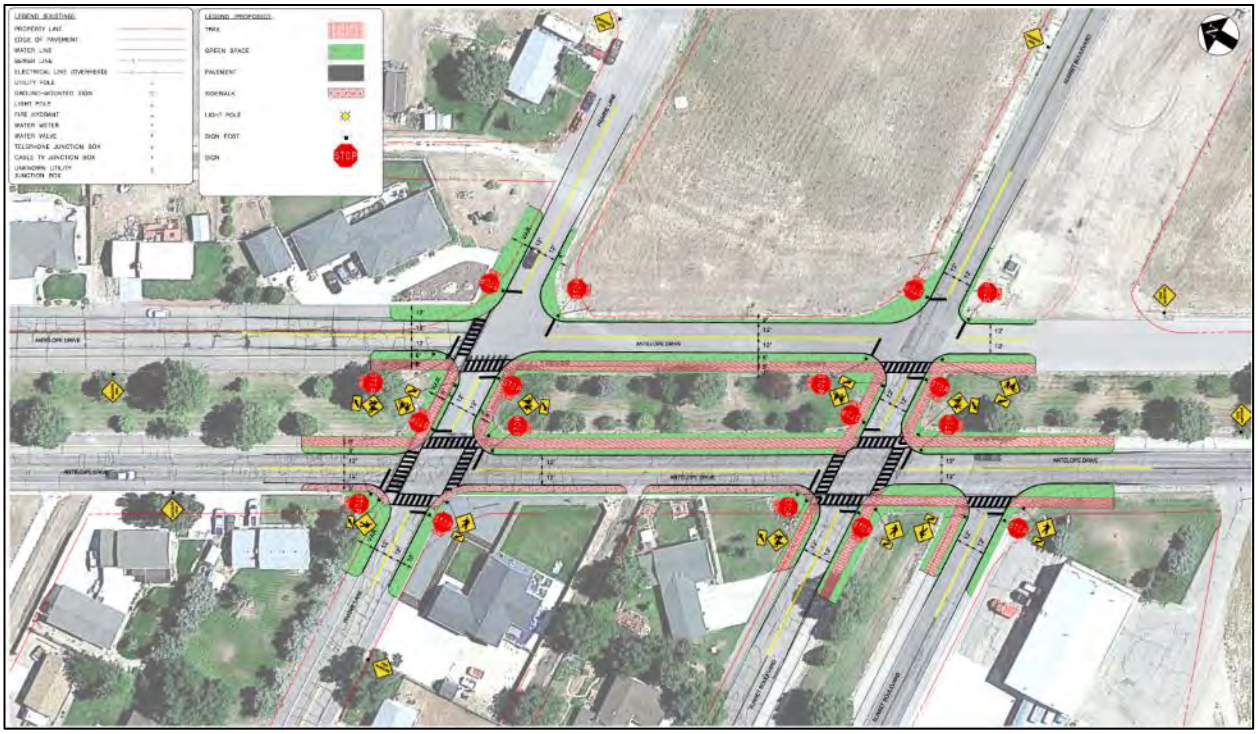


FIGURE 12 -- CONCEPT #3 - INTERNAL TOWN INTERSECTION IMPROVEMENTS – SUNSET / ANTELOPE

(7) Concept #4 - Streetscape Improvements Sunset from Salt Creek to Antelope

This concept presents the addition of wide decorative sidewalks, plantings, pedestrian lighting, street trees, and a pocket park along Sunset Boulevard between Salt Creek Highway and Antelope Drive. New curb along Sunset Boulevard would create a consistent roadway width of 28 feet to provide for one 14-foot travel lane in each direction. An 8-foot decorative multi-use path would be located on the north side of the roadway, with a 3.5-foot landscaped buffer separating it from the roadway, while on the south side of the roadway, a similar path would be separated from the roadway by a 12-foot landscaped buffer. The concept illustration shows an approximately 12,000 square foot pocket park about 210 feet east of Antelope Drive, but the park could be located at any location along this segment where right-of-way accommodates it. Similar to Concept #3, the purpose of this concept is to create an attractive streetscape for Sunset Boulevard that is inviting to pedestrians and bicyclists and reflects its function as a gateway to the Town.

FIGURE 13 -- CONCEPT #4 - STREETSCAPE IMPROVEMENTS, SUNSET FROM SALT CREEK TO ANTELOPE

FIGURE 14 -- RENDERING OF SUNSET BOULEVARD STREETSCAPE IMPROVEMENTS

Mid-term Alternatives

(8) Concept #5 - New location street connection to Salt Creek for truck access

Several options were considered for connecting the Wardell Industrial Area to Salt Creek, including a new location roadway and an extension of Coyote Avenue. The extension of Coyote Avenue would require additional horizontal curves and impact several parcels, so a new location roadway parallel to Coyote Avenue and McMurray Blvd was developed. This new street, approximately 1,635 feet long, between Salt Creek Highway and Wardwell Industrial Avenue, would be approximately 750 feet north of Coyote Lane and 1,370 feet south of McMurry Boulevard. The roadway would be constructed with a 28-foot section to provide one 14-foot travel lane in each direction, with a stronger pavement section to accommodate heavy trucks. This concept would provide truck access to the industrial core of Bar Nunn directly from Salt Creek Highway, better separating motorists from freight traffic by providing access to Wardwell Industrial Avenue that does not rely on residential streets (McMurry Boulevard or Prairie Lane) where houses are located. It would also reduce the number of turns truck drivers need to make to access industrial properties along Wardwell Industrial Avenue from Salt Creek Highway.

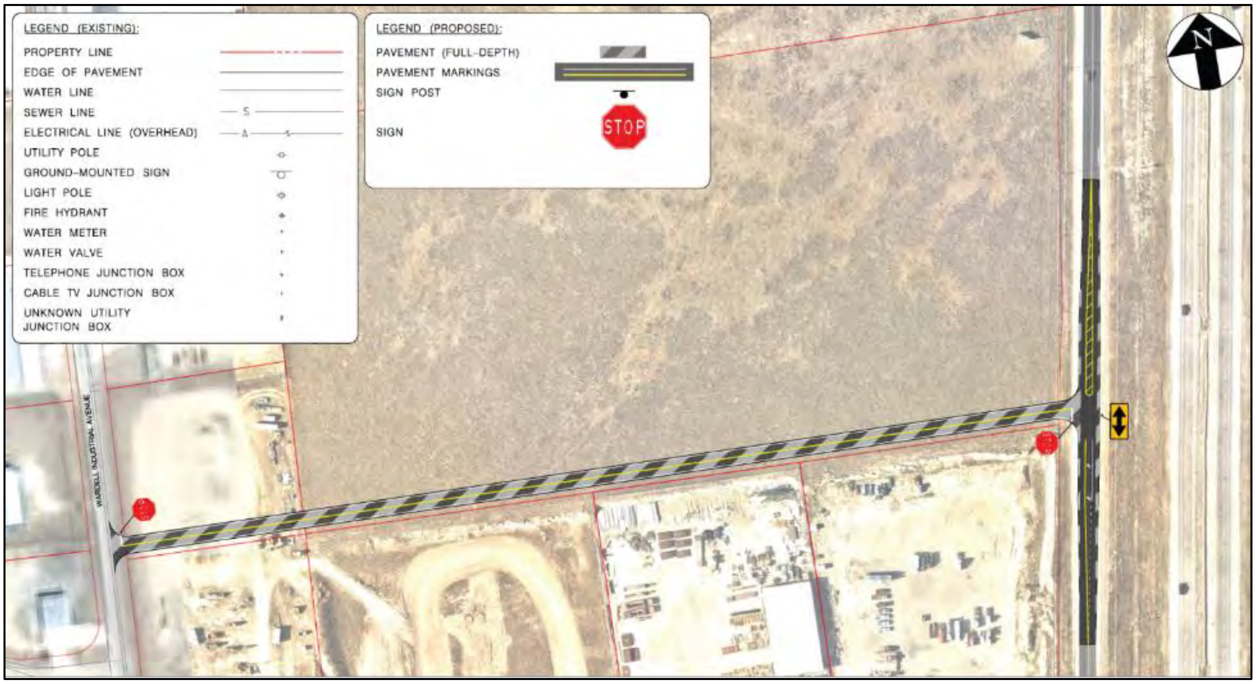


FIGURE 15 - CONCEPT #5 - NEW LOCATION STREET CONNECTION TO SALT CREEK FOR TRUCK ACCESS

(9) Concept #6 - Salt Creek cross-section improvements (center turn lane) with Shared Use Path (south of Antelope)

This concept would widen Salt Creek Highway to two lanes per direction between Howard Street and the widened section north of McMurry, essentially extending the widened section south through the Town, with left turn lanes at intersections and enclosed drainage/curbs. It would include a multi-use path along Salt Creek Highway from Howard Street to Antelope Drive. The widened roadway section would be a closed section with curb and gutter, have one 12-foot travel lane in each direction and a 12-foot two-way center turn lane that would allow for left-turns at all intersections. The pathway would be 10 feet wide and be separated from the roadway by a variable-width landscaped buffer. The intended goal of this concept is to reduce traffic delays and increase capacity, improve safety and drainage, and provide comfortable and safe accommodation for people walking and bicycling between Bar Nunn and points south.

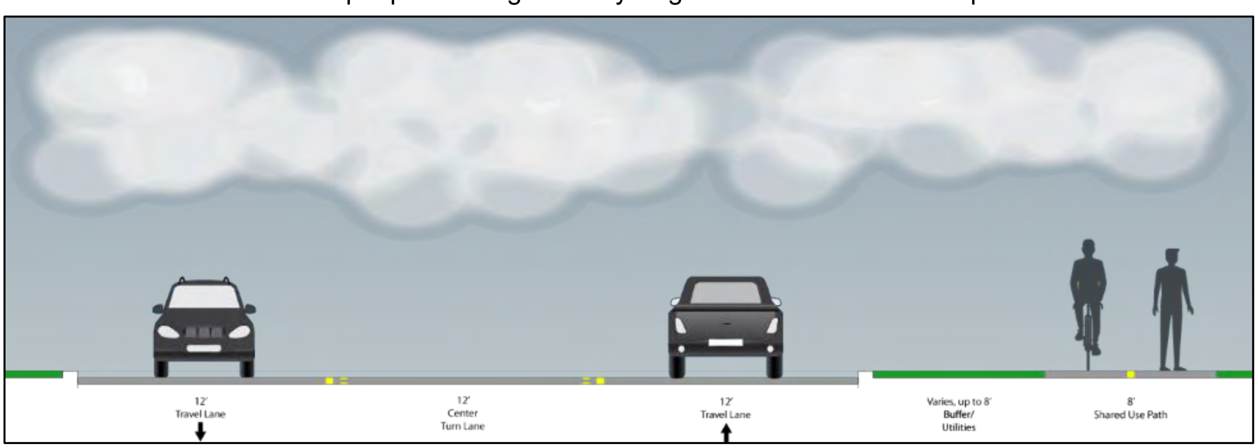


FIGURE 16 - CONCEPT #6 - CROSS-SECTION IMPROVEMENTS WITH SHARED USE PATH, TYPICAL SECTION

FIGURE 17 - CONCEPT #6 - CROSS-SECTION IMPROVEMENTS WITH SHARED USE PATH, SHEET 1

(10) Concept #7 - Shared Use path/sidewalk to Howard

This concept would construct a multi-use path along Salt Creek Highway from Howard Street to Antelope Drive but make no changes to the roadway itself. The pathway would be 10 feet wide and be separated from the roadway by a landscaped buffer ranging from 1 foot to 10 feet wide. This concept would provide comfortable and safe accommodation for people walking and bicycling between Bar Nunn and points south if the roadway improvements envisioned in Concept #6 do not need to be made.

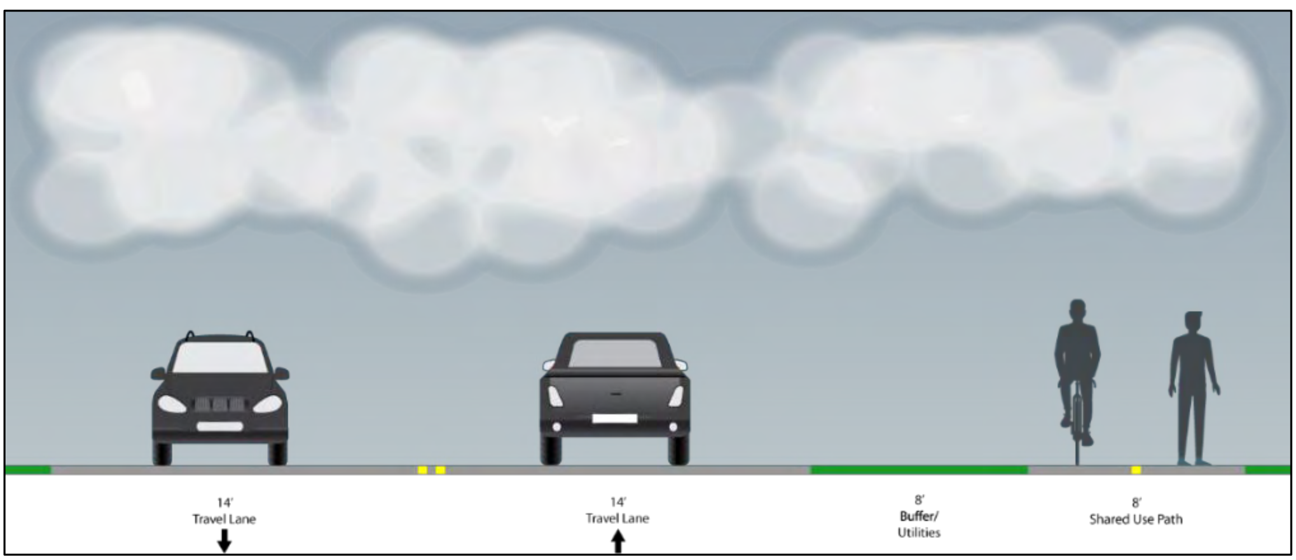


FIGURE 18 - CONCEPT #7 - SHARED USE PATH/SIDEWALK TO HOWARD, TYPICAL SECTION

FIGURE 19 - CONCEPT #7 - SHARED USE PATH/SIDEWALK ANTELOPE TO HOWARD

6. Future Land Use

Travel Model Demographics and Land Use

This section describes the future growth rates and future conditions developed for this study. This effort focused primarily on two sources: The current and future land use (zoning) found in the draft Bar Nunn Future Land Use Plan maps (Town of Bar N999unn & WLC Engineering, 2018); and the Casper Regional Travel Demand Model as updated for the Casper Area MPO (N. Marshall, February 2020). These were assessed and combined to derive the projected growth in 2025 land use and traffic volumes. An overview of each is provided below.

Town Land Use Plan

In 2017, the Casper Area MPO funded an update to the Bar Nunn Future land use (and zoning) plan. While still in draft form the current land use and future zoning from this update (previous plans were adopted in 2008) were reviewed and used for the current study. Future land use plans are shown in Figure 20. As can be seen the parcels just to the west of I-25, east of Arena St. and adjacent (north and south) of Sunset Blvd are currently commercial properties. The proposed future land use expands the light industrial, commercial, and commercial highway zoning west of I-25 to extend from Antelope Drive in the south up to and beyond Westwinds Blvd to the north. Additional multi-family dwelling zoning has also been included in the undeveloped portions of the city primarily in the north. A summary of the future land use zoning is provided in Table 3. These were converted into potential future dwelling units and Commercial – Light Industrial square footage shown in Table 4.

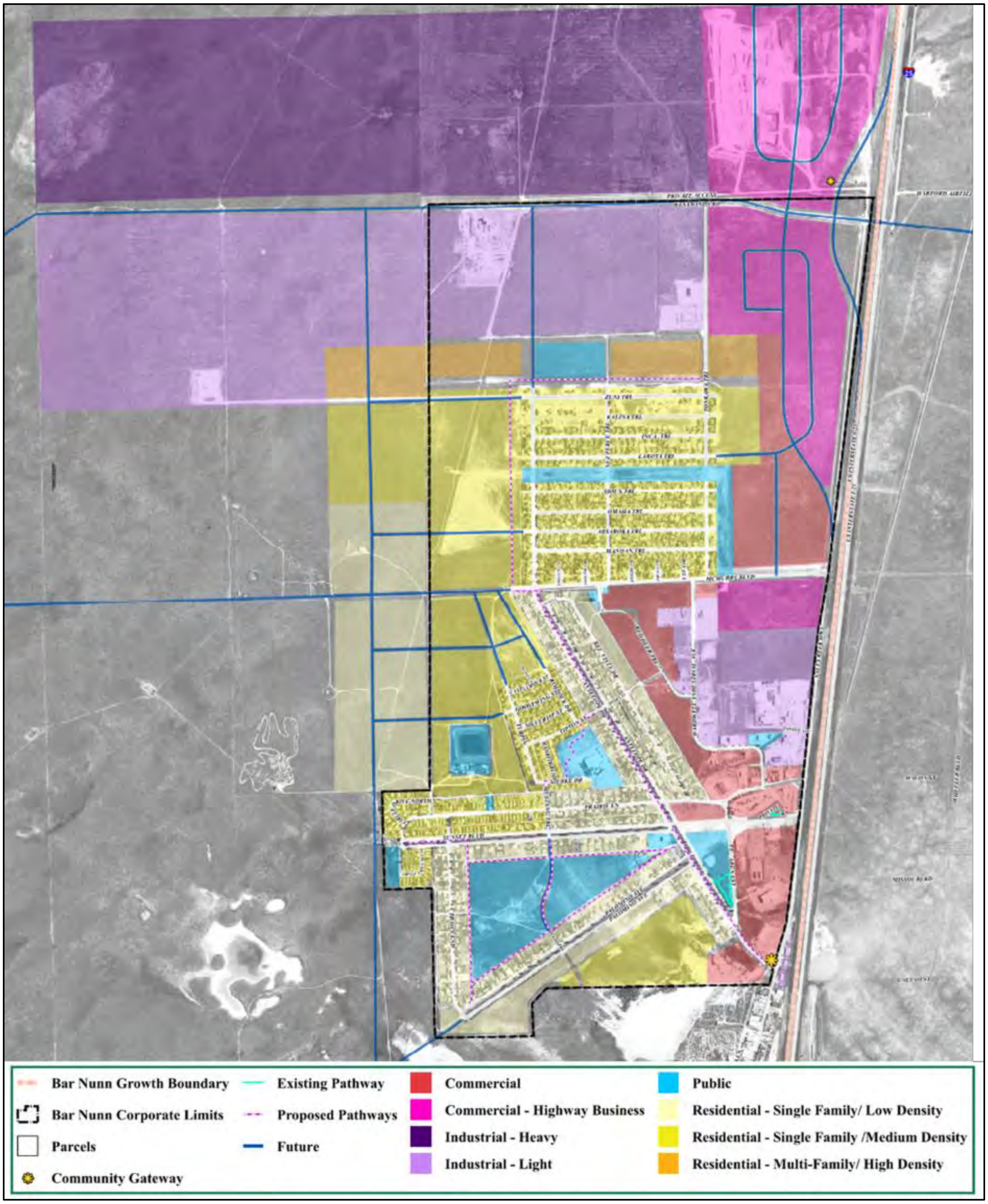


FIGURE 20 -- TOWN OF BAR NUNN FUTURE ZONING (DRAFT)

TABLE 3 - FUTURE LAND USE SUMMARY

Total Unbuilt	'000 sqft	Proportion
Residential - Low	5,683	8%
Residential - Medium/High	12,670	17%
Industrial	41,062	56%
Commercial	14,550	20%
Total	73,965	100%
Westwind	**'000 sqft**	**Proportion**
Industrial	40,062	78%
Commercial	11,422	22%
Total	51,484	100%
McMurry	**'000 sqft**	**Proportion**
Commercial	3,351	26%
Residential	9,583	74%
Total	12,934	100%
Prairie	**'000 sqft**	**Proportion**
Commercial	1,600	62%
Industrial	1,000	38%
Total	2,600	100%
Sunset	**'000 sqft**	**Proportion**
Commercial	503	5%
Residential	8,770	95%
Total	9,273	100%

TABLE 4 - FUTURE PLANNED DWELLING UNITS AND COMMERCIAL INDUSTRIAL SQUARE FEET.

Projected Growth	Current Planned Land Use
Dwelling Units	1,603
Commercial + Industrial sq ft	15,369,129

This potential growth in development was also compared to the Long-Range Plan Model inputs/outputs.

Casper Travel Demand Model (TDM)

A new advanced travel forecasting model, the Casper Travel Demand Model (TDM), was developed and validated as part of the Casper Area MPO Long Range Plan Update: Connecting Crossroads (Casper Regional Travel Demand Model 2020, N. Marshall, February 2020). The inputs and outputs of the model base year (2015) and horizon year (2048) future scenarios were also reviewed and compared with historic growth for this study.

The Casper TDM included the following significant enhancements over the MPO's previous version: Estimation of Walk/Bike Trips, Time of Day modeling (AM, Midday, PM, Night), Dynamic Traffic Assignment (DTA), and additional travel time validation (versus just validating to traffic counts). The model uses the TRANSCAD travel forecasting software as a foundation to store inputs/outputs/display results, but also the SmartDTA (a version of DTALite) to carry out the dynamic traffic assignment portions of the process. DTA provides the ability to analyze traffic congestion bottlenecks as they vary throughout the day and other operational attributes (such as signal timing and coordination).

To review the LRP inputs and results, the Casper TDM was obtained and implemented for this study. The model coverage and traffic analysis zones (TAZs), along with the Bar Nunn subarea are shown in Figure 21. The master network file (both current and future) is shown in Figure 22.

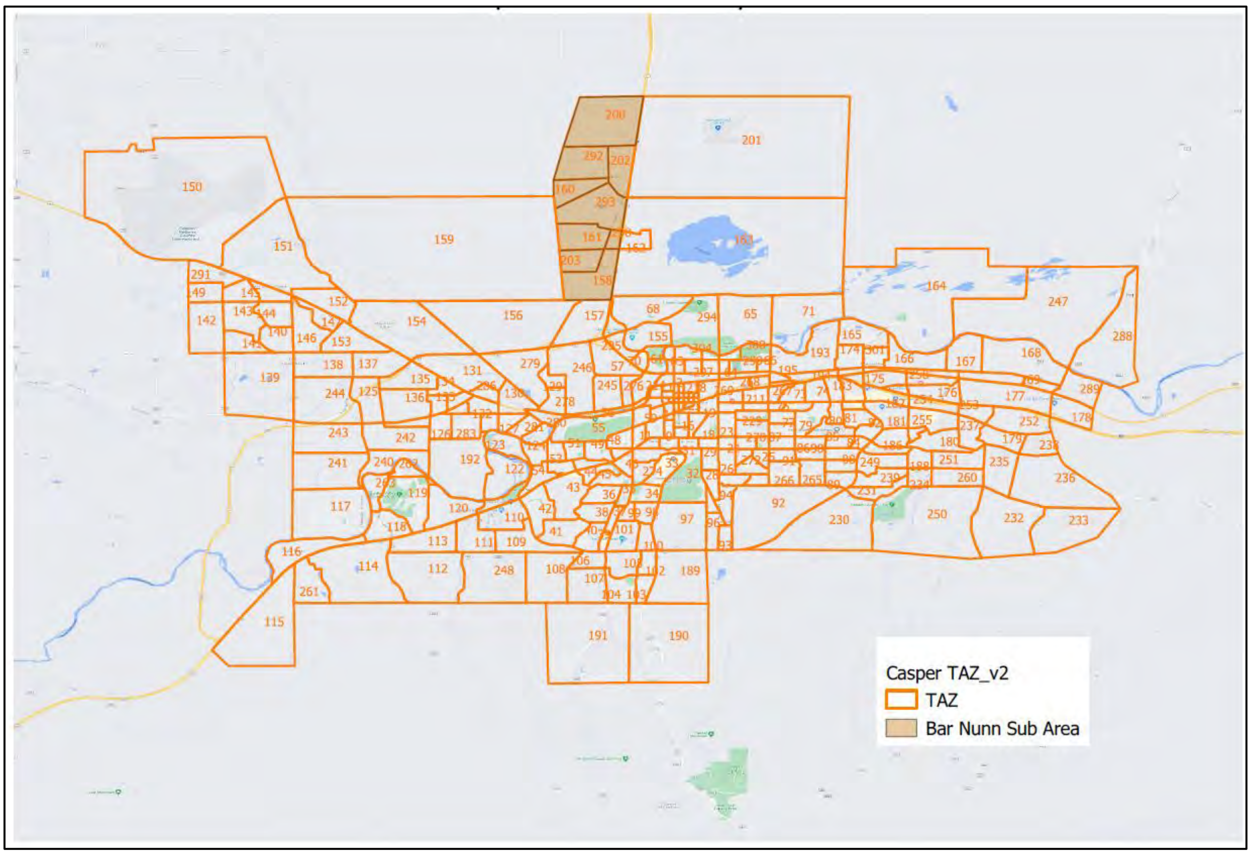


FIGURE 21 -- CASPER TDM TRAFFIC ANALYSIS ZONES

FIGURE 22 -- CASPER TDM TRANSPORTATION NETWORK

Six different scenarios were developed as part of the LRP Update. These were combinations of three different network options (No Build, Multimodal, and Auto-Oriented), and two different land use scenarios (compact focusing on the dense areas of Casper, and Suburban which provided a more distributed growth pattern). Within the Bar Nunn subarea, both land use scenarios had the same land use (however, the suburban scenario had additional development east of I-25 in TAZs 201 and 163). When examining the difference in outputs, the Compact No Build scenario was chosen for review. The change in households for this scenario is shown in Figure 23, and the change in employment is shown in Figure 24. Note that there is very little change in households assumed in the regional LRP and model forecast within Bar Nunn sub area with the exception of TAZs 161 and 203 which are south of the town boundaries. The same is true for the change in employment; however, the percentage change in employment for TAZs 161 and 203 is somewhat less.

Note that the zoning and land use proposed provides for much more growth within the Town of Bar Nunn than the regional LRP assumes. This often happens on the edges of MPO or model regions. The potential growth of trips from the proposed land and failure analysis was therefore used for assessing the 2025 traffic impacts.

The future traffic projections from the model along with past historic growth and potential traffic generated from the new zoning were also examined to derive the near-term growth in traffic for the 2025 network analysis.

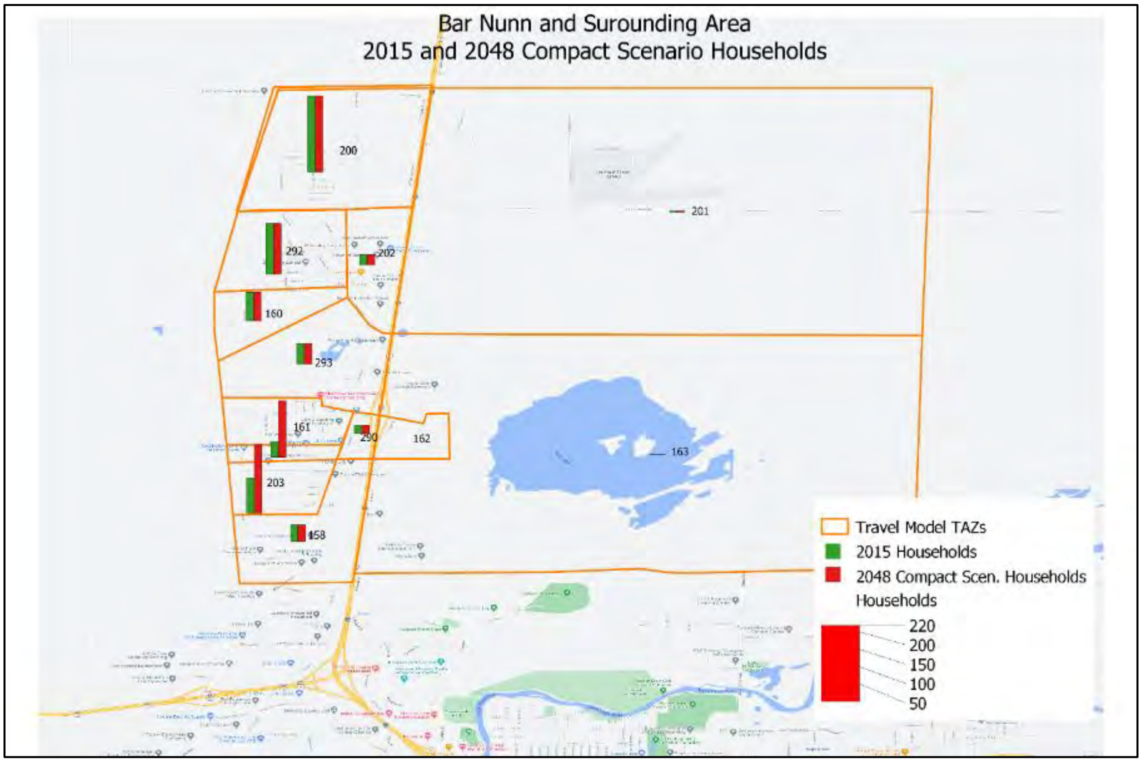


FIGURE 23 -- 2015 VERSUS 2048 CHANGE IN HOUSEHOLDS

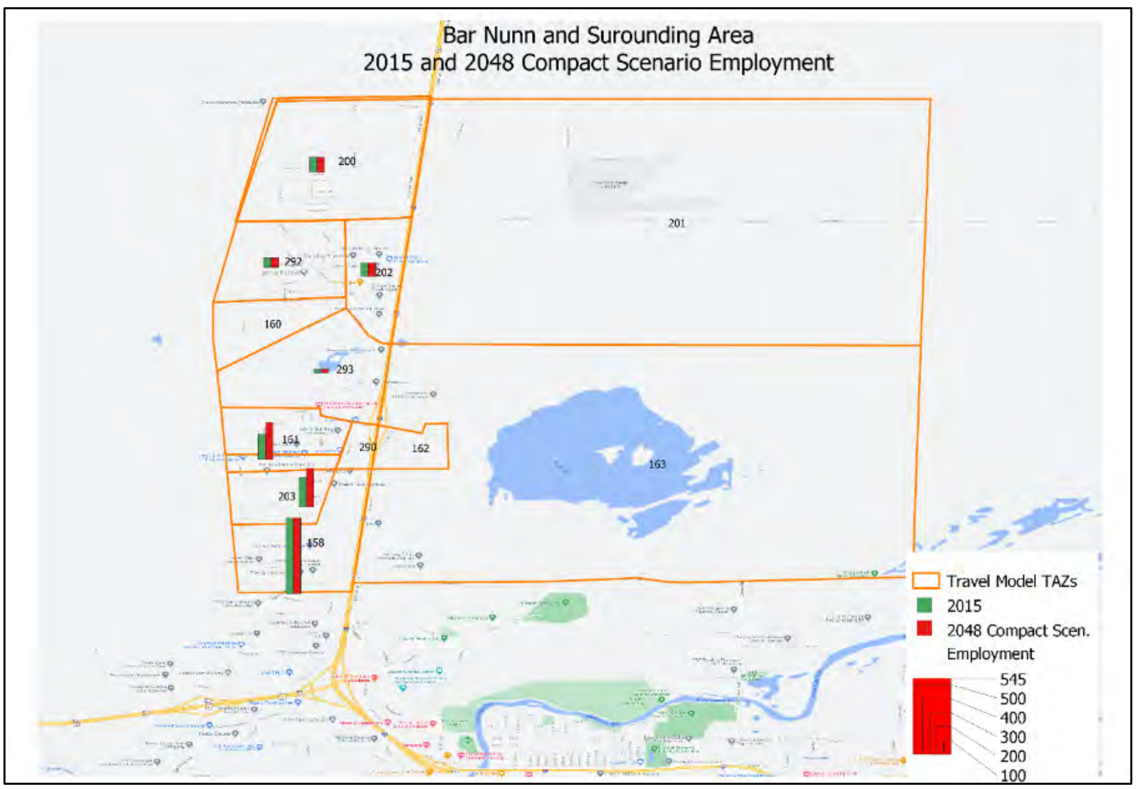


FIGURE 24 -- 2015 TO 2048 CHANGE IN EMPLOYMENT

7. Future Traffic Projections and Traffic Operations Analysis

A future conditions capacity analysis of the Salt Creek Highway corridor was performed to evaluate the impacts of the proposed concepts, to identify the short-term capacity of the corridor, and to assess what future land use and new development can be supported by the remaining roadway capacity of the corridor with the short and mid-term improvements in place.

2025 No Build

A future conditions capacity analysis of the Salt Creek Highway corridor was performed using Synchro 10, a macroscopic and deterministic traffic analysis software which implements the *Highway Capacity Manual* (HCM) methodology. Future 2025 No Build volumes, shown in Figure 25 , were developed by applying a simple annual growth rate to the existing conditions volumes. A 0.75% annual growth rate was used based on a detailed review of the Casper Regional Travel Demand Model, historical traffic counts, and Annual Population Estimates from the US Census Bureau.

Synchro was used to report the average vehicle delays and Level of Service (LOS) at the six study intersections. The analysis results are presented in Table 5. Detailed Synchro reports are available in Appendix C. The 2025 No-Build analysis shows that all intersections are expected to operate acceptably in 2025. All movements are below capacity and operate at an LOS C or better.

TABLE 5 -- SALT CREEK HIGHWAY CAPACITY ANALYSIS - 2025 NO BUILD

#	Intersection	Approach	Existing Conditions AM (PM)				No Build 2025 AM (PM)			
			Delay/Veh (sec)		Level of Service		Delay/Veh (sec)		Level of Service	
1	Salt Creek Hwy & Westwinds Rd	Westbound	3	(1)	A	(A)	3	(1)	A	(A)
		Northbound	9	(9)	A	(A)	9	(9)	A	(A)
2	Salt Creek Hwy & McMurry Rd	Eastbound	9	(9)	A	(A)	9	(9)	A	(A)
		Northbound	7	(7)	A	(A)	7	(7)	A	(A)
3	Salt Creek Hwy & Prairie Ln	Eastbound	9	(9)	A	(A)	10	(9)	A	(A)
		Northbound	2	(1)	A	(A)	2	(1)	A	(A)
4	Salt Creek Hwy & Sunset Blvd	Eastbound	10	(9)	A	(A)	10	(9)	A	(A)
		Northbound	1	(1)	A	(A)	1	(1)	A	(A)
5	Salt Creek Hwy & Antelope Dr	Eastbound	11	(10)	B	(A)	11	(10)	B	(A)
		Northbound	4	(4)	A	(A)	4	(4)	A	(A)
6	Salt Creek Hwy & Howard St	Eastbound	10	(10)	B	(B)	11	(10)	B	(B)
		Westbound	11	(12)	B	(B)	12	(12)	B	(B)
		Northbound	12	(15)	B	(B)	13	(16)	B	(C)
		Southbound	13	(12)	B	(B)	14	(12)	B	(B)

**Note: Approaches with free movements and no vehicle delay are omitted*

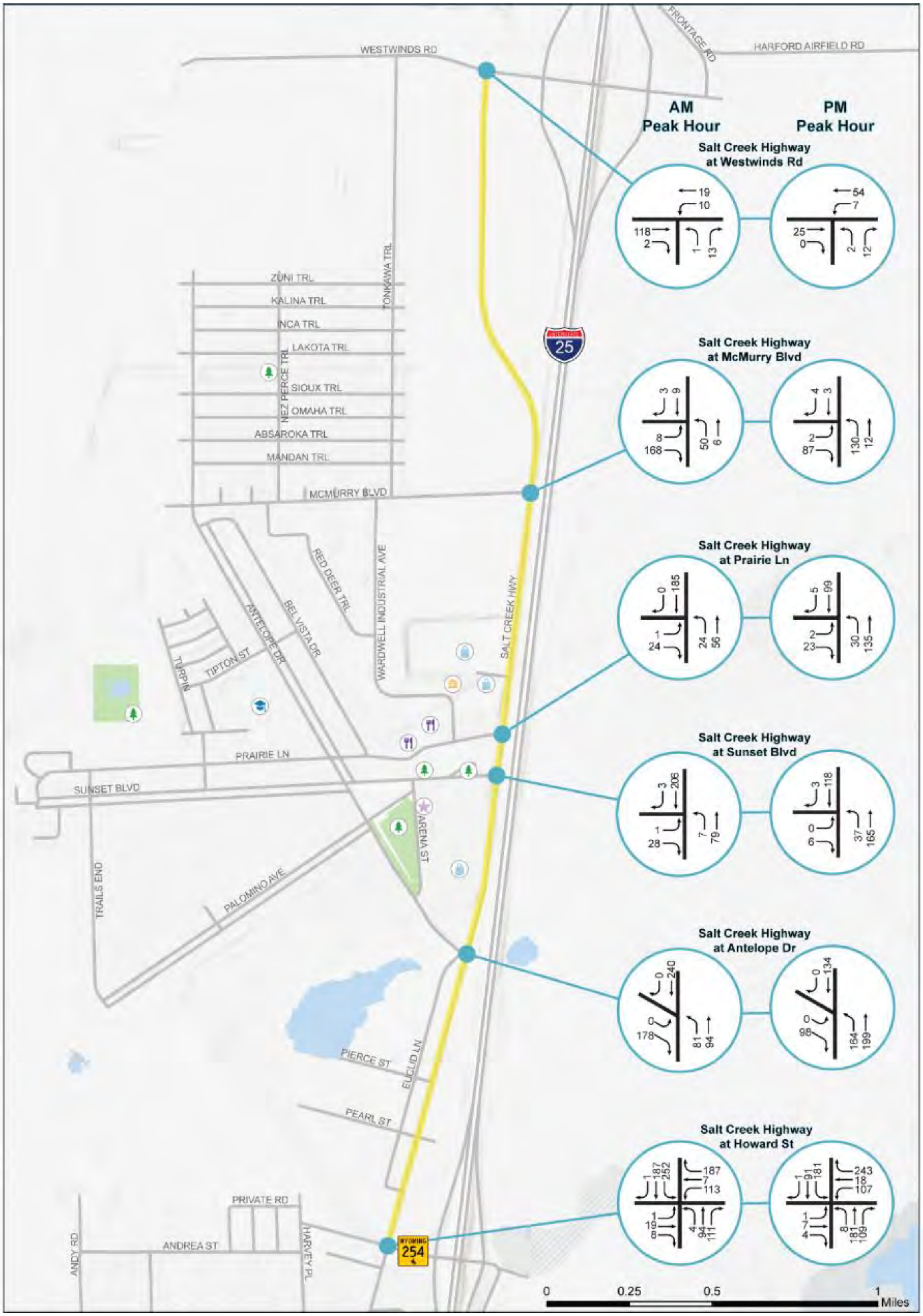


FIGURE 25 -- INTERSECTION TRAFFIC VOLUMES - 2025 NO BUILD

2025 Build

The concepts which impact traffic operations along Salt Creek Highway were analyzed in Synchro software under 2025 conditions. The concepts included in the analysis are listed below:

- **Concept 0a**: Full Closure of Antelope Dr.
  - Note: Concept 0a was included in the analysis of all other concepts.
- **Concept 2**: Traffic Control Upgrades (Roundabout at Sunset Blvd.)
- **Concept 1 and 6**:
  - Concept 1: New Left-Turn Lanes along Salt Creek Highway
  - Concept 6: Salt Creek Cross-Section Improvements

Concepts 1 and 6 were analyzed using the same Synchro model as they are operationally identical: the two concepts result in the same intersection lane configuration along the corridor.

Concept 0a

Concept 0a consists of the closure of Antelope Drive at Salt Creek Highway. The 2025 No-Build traffic volumes were rerouted through the study network to account for the closure, as shown in Figure 26. Synchro was used to report the delay and LOS at the six study intersections. The analysis results are presented in Table 6. The Concept 0a analysis shows that all movements at the study intersections are expected remain below capacity and operate at an LOS C or better.

TABLE 6 -- SALT CREEK HIGHWAY CAPACITY ANALYSIS – CONCEPT 0A

#	Intersection	Approach*	No Build 2025 AM (PM)				Concept 0a 2025 (Antelope Dr. Closed) AM (PM)			
			Delay/Veh (sec)		Level of Service		Delay/Veh (sec)		Level of Service	
1	Salt Creek Hwy & Westwinds Rd	Westbound	3	(1)	A	(A)	3	(1)	A	(A)
		Northbound	9	(9)	A	(A)	9	(9)	A	(A)
2	Salt Creek Hwy & McMurry Rd	Eastbound	9	(9)	A	(A)	9	(9)	A	(A)
		Northbound	7	(7)	A	(A)	7	(7)	A	(A)
3	Salt Creek Hwy & Prairie Ln	Eastbound	10	(9)	A	(A)	10	(9)	A	(A)
		Northbound	2	(1)	A	(A)	2	(1)	A	(A)
4	Salt Creek Hwy & Sunset Blvd	Eastbound	10	(9)	A	(A)	11	(10)	B	(A)
		Northbound	1	(1)	A	(A)	4	(4)	A	(A)
5	Salt Creek Hwy & Antelope Dr	Eastbound	11	(10)	B	(A)	-	(-)	-	(-)
		Northbound	4	(4)	A	(A)	-	(-)	-	(-)
6	Salt Creek Hwy & Howard St	Eastbound	11	(10)	B	(B)	11	(10)	B	(B)
		Westbound	12	(12)	B	(B)	12	(12)	B	(B)
		Northbound	13	(16)	B	(C)	13	(16)	B	(C)
		Southbound	14	(12)	B	(B)	14	(12)	B	(B)

**Note: Approaches with free movements and no vehicle delay are omitted*

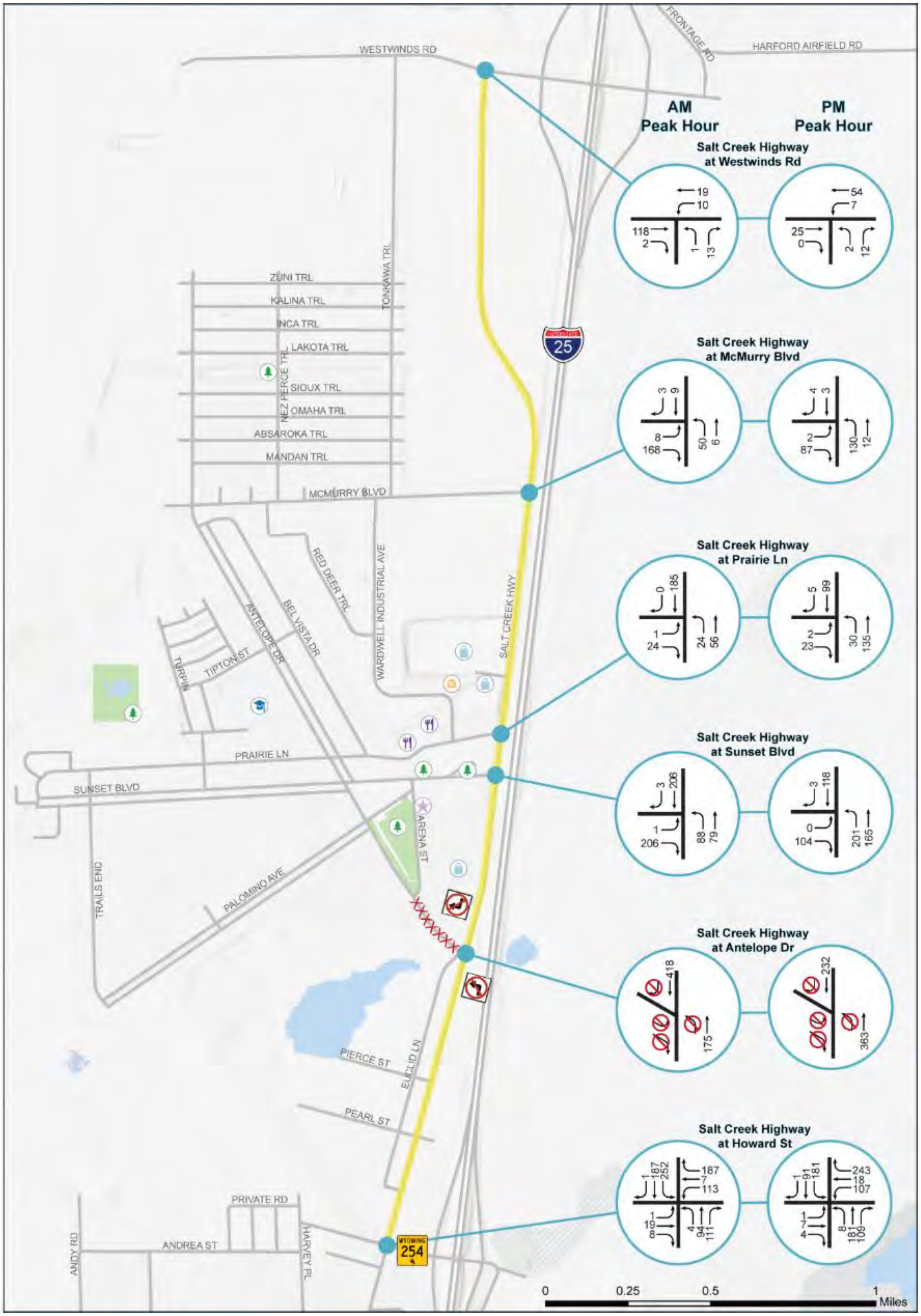


FIGURE 26 -- INTERSECTION TRAFFIC VOLUMES - 2025 ANTELOPE DR CLOSURE

Concept 2

Concept 2 consists of the conversions of the Sunset Blvd. at Salt Creek Highway intersection to a roundabout. The concept also assumes the closure of Antelope Dr. The Synchro reported intersection delay and LOS are presented in Table 7. Detailed Synchro reports are available in Appendix C. The analysis shows that all movements at the study intersections are expected to remain below capacity and operate at an LOS C or better. The conversion of the Sunset Blvd intersection to a roundabout is expected to reduce side street delays and a slightly increase mainline delays along the Salt Creek Highway approaches.

Concepts 1 and 6

Concept 1 introduces mainline left-turn lanes at the six study intersections. Concept 6 adds a center turn lane along Salt Creek Highway between Westwinds Road to the north and Howard Street to the south. The two concepts were analyzed using the same Synchro model as they are operationally identical at the study intersections. The Synchro reported intersection delay and LOS are presented in Table 7. The analysis shows that all movements at the study intersections are expected to remain below capacity and operate at an LOS C or better.

TABLE 7 -- SALT CREEK HIGHWAY CAPACITY ANALYSIS – 2025 CONCEPTS 1, 2, AND 6

#	Intersection	Approach*	Sunset Roundabout 2025 - AM (PM)				Left Turn Lanes 2025 - AM (PM)			
			Delay/Veh (sec)		Level of Service		Delay/Veh (sec)		Level of Service	
1	Salt Creek Hwy & Westwinds Rd	Westbound	3	(1)	A	(A)	3	(1)	A	(A)
		Northbound	9	(9)	A	(A)	9	(9)	A	(A)
2	Salt Creek Hwy & McMurry Rd	Eastbound	9	(9)	A	(A)	9	(9)	A	(A)
		Northbound	7	(7)	A	(A)	7	(7)	A	(A)
3	Salt Creek Hwy & Prairie Ln	Eastbound	10	(9)	A	(A)	10	(9)	A	(A)
		Northbound	2	(1)	A	(A)	2	(1)	A	(A)
4	Salt Creek Hwy & Sunset Blvd	Eastbound	5	(4)	A	(A)	11	(10)	B	(A)
		Northbound	4	(5)	A	(A)	4	(4)	A	(A)
		Southbound**	5	(4)	A	(A)	-	(-)	-	(-)
5	Salt Creek Hwy & Antelope Dr	Eastbound	-	(-)	-	(-)	-	(-)	-	(-)
		Northbound	-	(-)	-	(-)	-	(-)	-	(-)
6	Salt Creek Hwy & Howard St	Eastbound	11	(10)	B	(B)	10	(10)	B	(B)
		Westbound	12	(12)	B	(B)	12	(12)	B	(B)
		Northbound	13	(16)	B	(C)	12	(15)	B	(B)
		Southbound	14	(12)	B	(B)	14	(12)	B	(B)

**Note: Approaches with free movements and no vehicle delay are omitted*

***The southbound approach of Salt Creek Hwy & Sunset Blvd only experiences vehicle delays under the Sunset Roundabout 2025 alternative.*

Corridor Spare Capacity

The spare capacity of the Salt Creek Highway corridor with all short and mid-term build improvements was evaluated using the Synchro model. Volumes were increased uniformly at each intersection until one of the movements stopped operating acceptably (LOS D or worse). The capacity evaluation assumed that Concept 0a (closure of Antelope Dr) and Concept 2 (Roundabout at Sunset Blvd) were implemented.

The intersection of Sunset Blvd and Salt Creek Highway has the least spare capacity, excluding the Howard St intersection as it is located outside the Bar Nunn town limits. The resulting failure volumes are presented in Figure 27. It is estimated that the corridor could accommodate several hundred additional peak hour vehicle trips at each intersection approach prior to failing.

Land Use / Development Thresholds

As the Sunset Blvd and Salt Creek Highway intersection has the least spare capacity, it was used to assess what additional land use can be supported within the corridor. The spare capacity was calculated as the difference of the failure traffic volumes and the 2025 Build traffic volumes. This spare capacity was then assigned to potential land uses according to the Institute of Transportation Engineer's *Trip Generation Manual,* 10th Edition trip rates. The spare capacity was assigned to an even mix of residential, commercial, and industrial land use using ITE land use codes and trip rates shown in Table 8. With the short-term and mid-term improvements in place, the corridor can accommodate approximately an additional 621 dwelling units, 587,000 gross square feet of commercial land use, and 335,000 gross square feet of industrial land use, as shown in Table 9.

TABLE 8 -- ITE TRIP RATES

Zoning (Land Use)	Land Use Code	Trip Rates		Trip Rate Unit
		AM	PM	
Residential (Single-Family Detached Housing)	210	0.74	0.99	Dwelling Unit
Commercial (Industrial Park)	130	0.40	0.40	1000 Sq. Ft. GFA
Industrial (General Light Industrial)	110	0.70	0.63	1000 Sq. Ft. GFA

TABLE 9 -- ADDITIONAL LAND USE ACCOMMODATED BY SPARE CORRIDOR CAPACITY

Peak Period	Corridor Trip Capacity	Dwelling Units	Commercial		Industrial	
			Area [sqft]	Jobs	Area [sqft]	Jobs
AM	939	634	586,644	587	335,225	436
PM	1,229	621	768,300	768	487,810	634
Add. Land Use	**-**	**621**	**586,644**	**587**	**335,225**	**436**

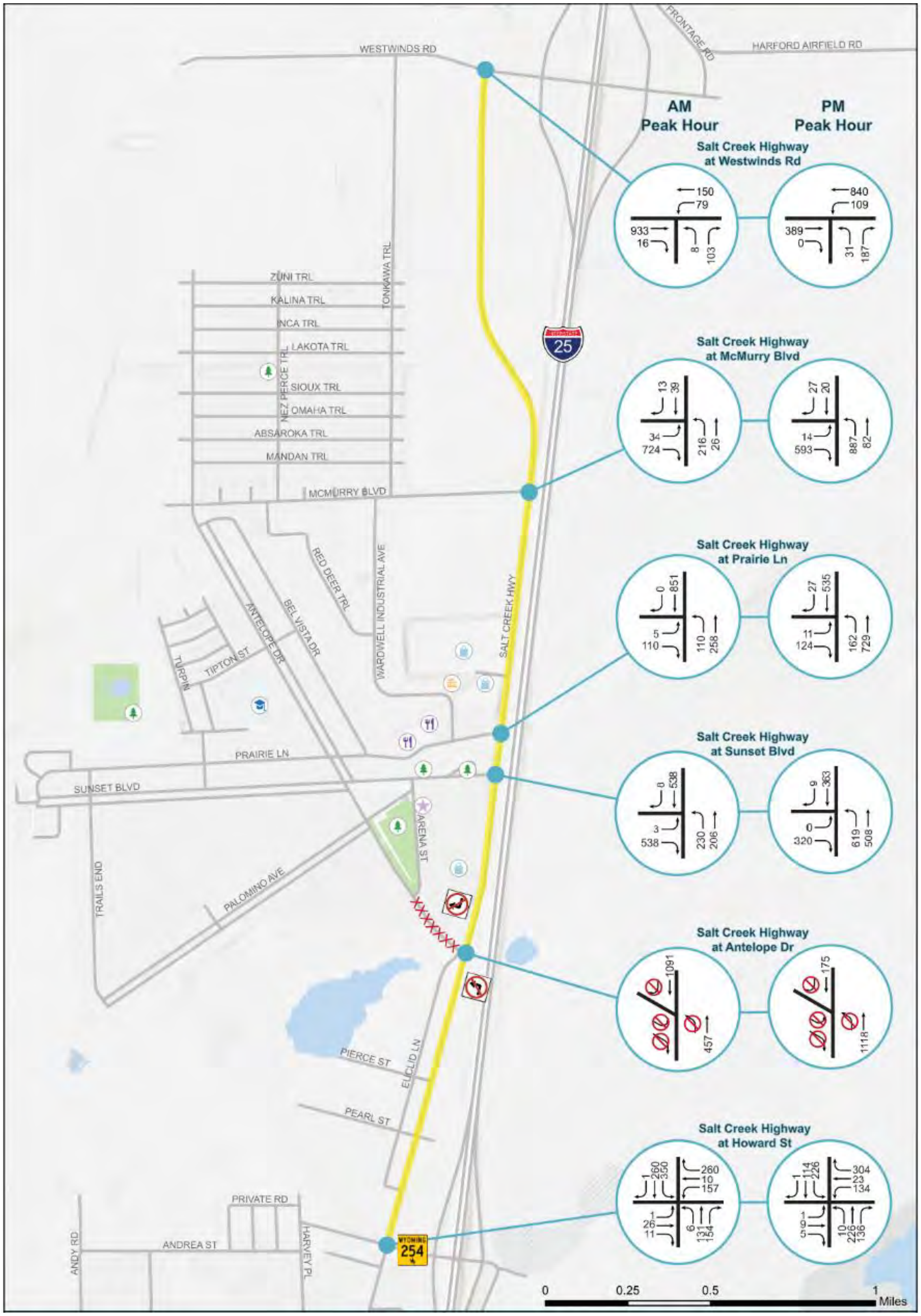


FIGURE 27 - INTERSECTION TRAFFIC VOLUMES - FAILURE VOLUMES

Mitigation Strategies to Accommodate Additional Land Use/Development Capacity

The current planned land use for the ultimate build out of Bar Nunn is greater than what can be accommodated by the corridor with the short and mid-term roadway improvements. A comparison of the current planned land use, the land use growth from the Casper TDM model, and the land use that can be accommodated by the Salt Creek Highway corridor (failure year analysis) is shown in Figure 28.

The capacity along the study corridor can be increased to accommodate additional future developments through several further traffic control, traffic management and intersection improvement strategies to extend the life of the short and mid-term improvements:

- Widening Salt Creek Highway from one to two through lanes per direction
- Introducing separate right and left-turn lanes at cross streets
- Installing channelized right-turns with acceleration lanes for cross streets
- Diversions of trips to the Westwinds Rd interchange that are now using the southern portions of Salt Creek Highway to enter the Town
- Installing traffic signals at key intersections along the corridor

Changing the intersection operation acceptability threshold from LOS C to LOS D or E would also permit the corridor to accommodate more new trips and related development sites.

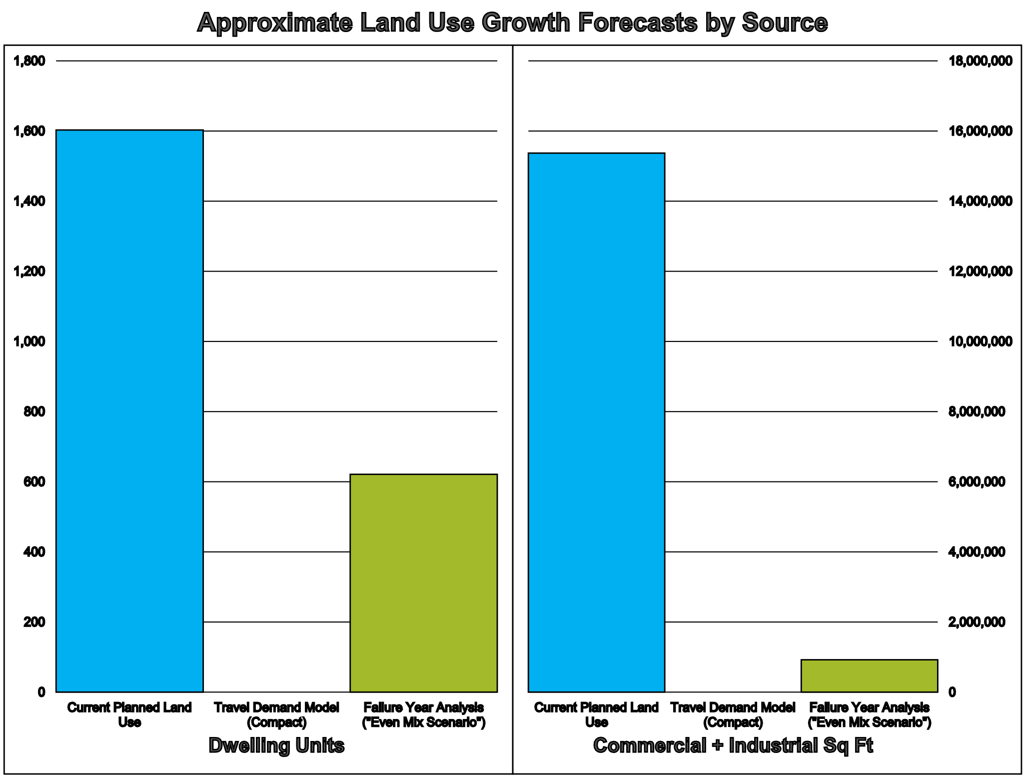


FIGURE 28 - COMPARISON OF LAND USE FORECASTS

8. Initial Construction Cost Estimates

Construction cost estimates were developed for the retained alternatives using a major quantities cost estimating methodology. Major quantities estimates are used to estimate construction costs during the planning stage and early in the preliminary engineering stage. The idea is to estimate as accurately as possible those categories that can be estimated in the very early stages such as grading, paving, structures and shoulders items and calculate the remaining categories as percentages of those categories. A total of nine separate engineering categories were used for estimates including mobilization, earthwork, drainage, structures, paving, shoulders, traffic, landscaping and utilities.

Detailed cost estimate worksheets can be found in Appendix D. The quantities used in each cost estimate were based on the conceptual engineering plans. The total cost and unit prices are calculated in present value dollars. Adjustments should be made for inflating costs to future years if improvements are delayed. Contingency percentages are consistent with WYDOT planning-level cost estimate practices. The raw construction costs do not include engineering design fees, right-of-way acquisition or utility relocation costs but they may be covered under contingent percentage. Lastly, the costs assume full resurfacing of the roadway (e.g., mill and overlay) for any partial roadway work.

The cost estimates include a no-build cost, which is the cost of maintaining and rehabilitating Antelope Drive. The build costs assume that Antelope Drive is closed and removed and that the future maintenance funds are repurposed for constructing one or more of the short or mid-term alternatives. If Antelope Drive remains open, and one or more short or mid-term alternatives are built, the total cost estimate would need to include the cost of the No Build (e.g. Antelope Drive rehabilitation) as well.

Table 10 summarizes the cost estimates for each alternative.

TABLE 10 -- SUMMARY OF COST ESTIMATES FOR RETAINED ALTERNATIVES

Alternative	Cost
No Build (Antelope Drive Rehabilitation)	\$500,000 - \$600,000
Short-Term Concept 1 Left Turn Lanes	\$400,000 - \$500,000 (\$100,000 per int.)
Short-Term Concept 2 Roundabout	\$500,000 - \$600,000
Short-Term Concept 3 Channelization	\$500,000 - \$600,000
Short-Term Concept 4 Streetscape	\$900,000 - \$1,000,000
Short-Term Concept 5 Truck Access Road	\$600,000 - \$700,000
Mid-Term Concept 6 Salt Creek 3 Lane Section + Path	\$1,900,000 - \$2,000,000
Mid-Term Concept 7 Salt Creek Side Path	\$200,000 - \$300,000

Potential Impacts

Right-Of-Way - It is anticipated that the roundabout, left-turn lanes, truck access road and shared use path may require additional right-of-way or easements. Potentially land swaps may be possible at the intersection with Sunset Blvd between WYDOT and the Town.

Utilities - The existing open drainage swale and associated culverts on the west side of Salt Creek Highway would be impacted with the construction of the roundabout, left-turn lanes or shared use path. Under the widening of Salt Creek, it is anticipate that a closed drainage system would be installed.

Environmental - The improvements to Salt Creek Highway for individual left-turn lanes or mid-term corridor widening would impact the existing salt flats and would require underdrains and subsurface stabilization as part of any roadwork. It is suggested that funds for the long-term rehabilitation of Salt Creek be provided to the Town as part of the roadway transfer agreement with WYDOT.

9. Measures of Effectiveness and Screening

The retained alternatives were evaluated based on specific measures of effectiveness (MOE) selected in consultation with the MPO and Town. The screening of the MOEs was performed in two levels.

Level 1 Screening

The first level of screening evaluated 15 initial alternatives, ideas, and concepts to determine whether they should advance to a more detailed screening. This screening step first assessed whether the outcomes associated with the concept would meet the goals and objectives the Town has laid out for this project. Ten of the initial concepts met this criterion, while the remaining five did not, for the reasons outlined below.

- Partial Closure of Antelope Drive: this would not effectively address the maintenance challenges of Antelope Drive
- I-25 Guide Signing: by itself, this would not effectively address the desire for a gateway treatment to the Town, nor would it have a meaningful impact on traffic patterns along Salt Creek Highway
- All-way stop or signal control at the Salt Creek Highway/Sunset Blvd intersection: these treatments are not warranted based on traffic volumes, nor would they serve as an inviting gateway treatment to the Town.
- Roundabout at the Salt Creek Highway and Antelope Drive intersection: maintaining even some traffic on Antelope Drive between Salt Creek Highway and the former Arena Street intersection would not meet the Town's goals; therefore, there is no reason to construct a roundabout at the intersection.

A second criterion, whether a concept was feasible within the short- to mid-term timeframe of this study, eliminated one additional concept: extending Coyote Avenue to Wardwell Industrial Avenue. Between these two criteria, nine concepts advanced to a Level 2 evaluation described below. Table 11, below, summarizes the Level 1 screening.

TABLE 11 -- LEVEL 1 SCREENING MATRIX

Alternative	Type	Description	Meets Community and Project Goals	Feasibility
Alt 0A	**Street Pattern**	**<u>Full Closure of Antelope Drive</u>** Remove existing pavement between Salt Creek and Arena and divert traffic to Sunset Blvd	**Yes**	**Yes**
Alt 0B	**Street Pattern**	**<u>Partial Closure of Antelope Drive</u>** Restrict westbound traffic between Salt Creek and Arena and divert traffic to Sunset Blvd	**No**	**No**
Alt 0C	**Wayfinding**	**<u>I-25 Guide Signing</u>** Modify/Replace I-25 exit signs to sign Westwinds as the Bar Nunn interchange exit	**No**	**Yes**
Alt 0D	**Wayfinding**	**<u>Gateway Marquee</u>** Install large monument Bar Nunn welcome sign at Salt Creek/Sunset	**Yes**	**Yes**
Alt 1	**Safety/ Capacity**	**<u>Salt Creek Highway Left Turn Lanes</u>** Add northbound left turn lanes on Salt Creek Highway at Sunset, Prairie, New Truck Road, Coyote, and McMurry. Include storage for stopping distance and appropriate tapers.	**Yes**	**Yes**
Alt 2-A	**Traffic Control**	**<u>Roundabout at Salt Creek Highway & Sunset Blvd</u>** Construct a modern roundabout at the intersection, to accommodate trucks, buses and emergency vehicles.	**Yes**	**Yes**
Alt 2-B	**Traffic Control**	**<u>All-Way Stop Control at Salt Creek Highway & Sunset Blvd</u>** Install all-way stop signs on each approach.	**No**	**Yes**
Alt 2-C	**Traffic Control**	**<u>Signal Control at Salt Creek Highway & Sunset Blvd</u>** Install a new traffic signal	**No**	**Yes**

Alternative	Type	Description	Meets Community and Project Goals	Feasibility
Alt 2-D	**Traffic Control**	**Roundabout at Salt Creek Highway & Antelope Drive** Construct a modern roundabout at the intersection, to accommodate trucks, buses and emergency vehicles.	**No**	**No**
Alt 3	**Traffic Calming**	**Antelope/Sunset Intersection Improvements** Install curb extensions, crosswalks, all-way stop signs and stop bars.	**Yes**	**Yes**
Alt 4	**Streetscape**	**Streetscape Improvements on Sunset Blvd** Wide decorative sidewalks, plantings, pedestrian lighting, street trees, pocket park between Salt Creek Highway and Antelope Drive.	**Yes**	**Yes**
Alt 5A	**Truck Route**	**New Truck Route to Wardwell Industrial Avenue** Construct a new road between Prairie and Coyote.	**Yes**	**Yes**
Alt 5B	**Truck Route**	**New Truck Route to Wardwell Industrial Avenue** Extend Coyote Avenue to Wardell Industrial Avenue	**Yes**	**No**
Alt 6	**Safety/ Capacity**	**Mid-Term Widening of Salt Creek Highway** Widen to two lanes per direction between Howard Street and the widened section north of McMurry, with left turn lanes at intersections and enclosed drainage/curbs.	**Yes**	**Yes**
Alt 7	**Multimodal**	**Shared Use Path on the West Side of Salt Creek Highway** Construct multi-use path from Howard to Antelope Drive.	**Yes**	**Yes**

Level 2 Evaluation

The second level of screening evaluated the nine concepts that advanced from the Level 1 screening for their benefits and impacts across the following categories:

- Construction costs
- Maintenance costs
- Aesthetic value
- Traffic safety benefit
- Traffic operations benefits
- Multi-modal benefits
- Truck traffic reduction
- Community/ Town support

Construction costs

The lowest-cost concepts are the full closure of Antelope Drive (Concept #0A) and the installation of the marquee sign (Concept #0D), while the highest-cost concepts are the road construction projects that would install streetscaping elements (Concept #4), create a new truck route to Wardwell Industrial Avenue (Concept #5A) and widen Salt Creek Highway (Concept #6).

Maintenance costs

Fully closing Antelope Drive between Salt Creek Highway and the former Arena Street intersection (Concept #0A) would result in a reduction in maintenance costs. Among the other improvement concepts, the gateway marquee sign (Concept #0D), Salt Creek Highway/Sunset Boulevard roundabout (Concept #2C), and Antelope/Sunset intersection improvements (Concept #3) would have the lowest ongoing maintenance costs, while the mid-term widening of Salt Creek Highway (Concept #6) would have the highest ongoing maintenance costs.

Aesthetic value

The gateway marquee sign (Concept #0D), roundabout and streetscape improvements (Concepts #2C through #4) and shared-use path (Concept #7) would add aesthetic value to the Town, while the other concepts would be aesthetically neutral.

Traffic safety benefits

The Salt Creek Highway and Sunset Boulevard roundabout (Concept #2C) and Antelope/Sunset intersection improvements (Concept #3) would likely have the greatest traffic safety benefit, The Antelope Drive closure (Concept #0A), new left turn lanes (Concept #1), new truck route (Concept #5), Salt Creek Highway widening (Concept #6), and multi-use pathway (Concept #7) would have lesser benefits. None of the concepts would be detrimental to traffic safety.

Traffic operational benefits

The new truck route to Wardwell Industrial Avenue (Concept #5) and widening of Salt Creek Highway (Concept #6) would have more operational benefits than the Antelope Drive closure (Concept #0A), left-turn lanes along Salt Creek Highway (Concept #1), or roundabout at Salt Creek Highway and Sunset Boulevard (Concept #2C). None of the concepts would likely be detrimental to traffic operations.

Multi-modal benefits

Fully closing Antelope Drive (Concept #0A), constructing a roundabout at Salt Creek Highway and Sunset Boulevard (Concept #2C), improving the intersection at Salt Creek Highway and Antelope Drive (Concept #3), adding streetscape improvements along Sunset Boulevard (Concept #4), and creating a shared-use pathway along Salt Creek Highway (Concept #7) would all improve multimodal accessibility within the Town.

Reduced Truck Traffic on Salt Creek Highway

Current truck traffic volumes range from approximately 3% to 12% during peak hours, according to traffic counts collected as part of this study. The continued use of Salt Creek Highway by trucks will result in deterioration of the roadway and additional maintenance costs by the Town, particularly in the area between Sunset Blvd and Antelope Drive where the salt flats lie. Extending Salt Creek Highway's pavement life cycle by reducing truck traffic along Salt Creek can be accomplished by installing new traffic controls and encouraging trucks to utilize the Westwinds interchanges to access Westwinds Blvd and points north of Sunset Blvd. Concept #2C (roundabout at Sunset Blvd) would best meet this objective.

Community/Town support

Fully closing Antelope Drive between Salt Creek Highway and the former Arena Street intersection (Concept #0A) may have moderate quality-of-life impacts and face challenges in acceptance from Town residents. However, the public should expect few to no quality-of-life drawbacks resulting from any of the other concepts.

Table 12, below, summarizes the Level 2 screening.

TABLE 12 -- LEVEL 2 EVALUATION MATRIX

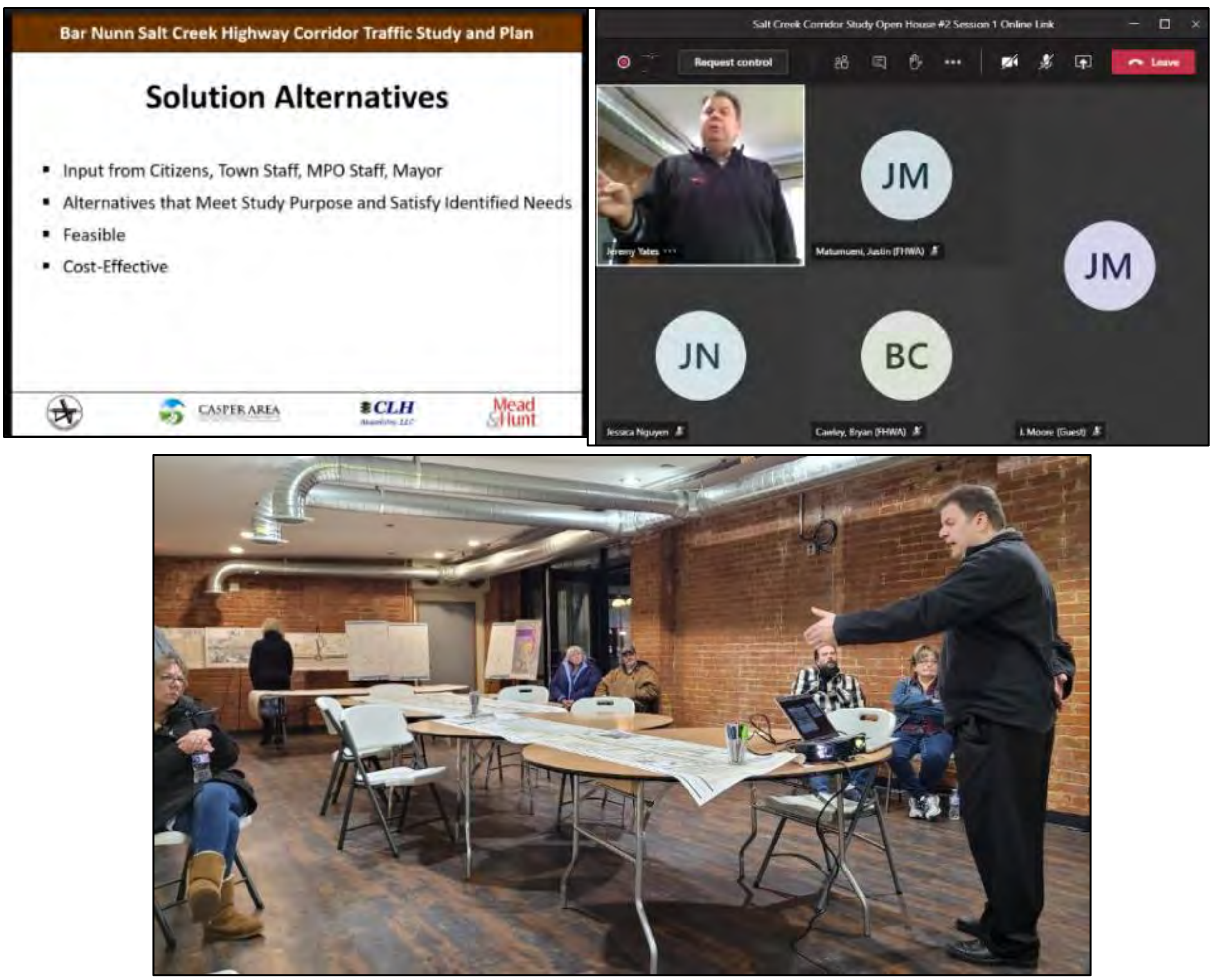
Concept			**Screening Criteria**								
Alternative	**Type**	**Description**	**Construction Costs**	**Maintenance Costs**	**Aesthetic Value**	**Traffic Safety Impact**	**Traffic Operations**	**Multimodal Accessibility**	**Quality of Life**	**Truck Traffic Reduction**	**Public Acceptance**
Alt 0C	**Street Pattern**	**<u>Full Closure of Antelope Drive</u>** - Remove existing pavement between Salt Creek and Arena and divert traffc to Sunset Blvd									
Alt 0D	**Wayfinding**	**<u>Gateway Marquee</u>** - Install large monument Bar Nunn welcome sign at Salt Creek/ Sunset									
Alt 1	**Safety/ Capacity**	**<u>Salt Creek Highway Left Turn Lanes</u>** - Add northbound left turn lanes on Salt Creek Highway at Sunset, Prairie, New Truck Road, Coyote, and McMurry. Include storage for stopping distance and appropriate tapers.									
Alt 2C	**Traffic Control**	**<u>Roundabout at Salt Creek Highway & Sunset Blvd</u>** - Construct a modern roundabout at the intersection, to accommodate trucks, buses and emergency vehicles.									
Alt 3	**Traffic Calming**	**<u>Antelope/Sunset Intersection Improvements</u>** - Install curb extensions, crosswalks, all-way stop signs and stop bars.									
Alt 4	**Streetscape**	**<u>Streetscape Improvements on Sunset Blvd</u>** - Wide decorative sidewalks, plantings, pedestrian lighting, street trees, pocket park between Salt Creek Highway and Antelope Drive.									
Alt 5A	**Truck Route**	**<u>New Truck Route to Wardwell Industrial Avenue</u>** - Construct a new road between Prairie and Coyote.									
Alt 6	**Safety/ Capacity**	**<u>Mid-Term Widening of Salt Creek Highway</u>** - Widen to two lanes per direction between Howard Street and the widened section north of McMurry, with left turn lanes at intersections and enclosed drainage/curbs.									
Alt 7	**Multimodal**	**<u>Shared Use Path on the West Side of Salt Creek Highway</u>** - construct multi-use path from Howard to Antelope Drive.									

High Impact/ Low Benefit	**Medium Impact/ Medium Benefit**	**Low Impact/ Slight Benefit**	**Neutral Impact/ Neutral Benefit**	**No Impact/ High Benefit**

10. Second Public Meeting

To solicit community and stakeholder input on the potential alternative solutions, a second public open house was held on January 14, 2020 at The Hangar from 4 PM to 7 PM. The meeting was simulcast through the MPO via a Microsoft Teams meeting that was accessible via the MPO's social media page. Meeting announcements were posted on the MPO's social media account and in social media Town newsletter. The meeting included a short presentation on the study purpose and goals and objectives, plus existing data and conditions, followed by an open house with roll plans and posters of the proposed alternative solutions. Approximately 15 people attended in person and about 5 attended virtually. The attendees were asked to provide feedback on proposed access improvements to the Town.

Favorable comments were received by community members for the left-turn lanes, streetscape, truck route and roundabout. Unfavorable comments were received on the roundabout. Written public comments are included in Appendix E.



In-person and virtual public engagement at Public Meeting #2

11. Recommendations and Implementation

After review of the Phase 2 screening summarized in Table 12, and considering town citizen, council and mayor input, a series of short- and mid-term solutions were recommended. Public/community acceptance ultimately determines the true viability of any solutions. Cost and the availability of funds are critical factors that must be at the forefront of determining recommended solutions.

Arguably, the most effective mid-term improvement on Salt Creek Highway is also the most expensive. Widening Salt Creek Highway to 3-lane section would cost approximately $2,000,000. The cost for a roundabout is approximately $600,000, while each left turn lane would cost approximately $100,000. The streetscape cost is approximately $1,000,000 and the multimodal option (shared use path alone) cost is $300,000.

The following alternatives are recommended, in the following priority order:

a. Short-Term: Remove or discontinue the maintenance of the pavement on the section of Antelope Drive near Salt Creek Highway. If removed, seek an opportunity to include a multi-use path connection in the former Antelope Drive right-of-way. If remained open, consider implementing a peak hour ‘No Left-Turn’ prohibition once other Salt Creek Highway intersections are improved.

b. Short-Term: Construct a new roundabout at Sunset Blvd. and extend the taper/ transition to provide a left-turn lane at Prairie Lane. The roundabout will serve as a traffic calming treatment, enhance traffic safety, encourage diversion of traffic entering and exiting the Town to other streets and interchanges, and reduce truck traffic, prolonging the life of Salt Creek Highway.

c. Short-Term: Construct the channelization improvements along Sunset Blvd and Prairie Lane at Antelope. The design should follow the initial tactical treatments already initiated by the Town to potentially reduce construction costs while maintaining the desired traffic calming and streetscape elements.

d. Mid-Term: Construct the streetscape improvements along Sunset Blvd between Salt Creek and Antelope Drive. This will provide the opportunity to build an attractive and more visible gateway to Bar Nunn, plus a “town center” area. It is recommended that this project occur as part of the new Town Hall construction or other redevelopment so that the site plan and streetscape design can be best coordinated, and the public realm most efficiently activated.

"When the project began, we knew that we needed to address a multitude of concerns and issues, but we were not sure what exactly would be the best solution. This is exactly why we wanted to engage in this study. Living in Wyoming my entire life, I have not spent much time using roundabouts and as such was not particularly open to the idea of a roundabout as any part of the solution to our issues. However, after talking with consultants and engineers, along with reviewing the data and statistics of the various options presented, it became clear that the roundabout suggested in this study is the best option for solving our issues. It is clearly the most cost-effective solution that provides for continual and safer traffic flows."

Mayor Patrick Ford, Town of Bar Nunn

e. Mid-Term: Construct the new road from Salt Creek Highway to the Wardwell Industrial Avenue. Construct a left turn lane on Salt Creek Highway

f. Long-Term: Construct the shared use path along the west side of Salt Creek Highway from Sunset Blvd. to Howard Street. Provide room for possible future widening of Salt Creek Highway.

In addition to the above capital improvements, the following non-capital solutions should be investigated further and considered:

1) Coordinate with the school district to relocate and/or improve bus stops. Provide pull-out areas where possible.

2) Increase enforcement of speeds, truck routes and traffic control compliance.

3) Coordinate with property owners to secure needed right-of-way, including the KOA and WYDOT.

Funding is always a challenge to secure. With the change of federal administration, there is an increased possibility of substantial federal transportation infrastructure investment. To secure these funds, Wyoming is likely to need to provide additional matching funds for the state match. There are various grant programs available including BUILD, Transportation Alternatives Program, Safe Routes to School, Highway Safety Improvement Program, Energy/ Mineral Grant. Additionally, new programs may be added in the future. Opportunities for public/private partnerships with developers should be pursued, whenever possible.

Finally, is recommended that the Casper Area MPO and the Town of Bar Nunn advance the study recommendations into preliminary and final design and list the projects in the local Transportation Improvement Program (TIP) so that Bar Nunn is in an advantageous position to compete for and secure funding.

Appendix A. Crash Data

TABLE 13. CRASHES AT SALT CREEK HIGHWAY/HOWARD STREET, 2004-14; 2018-19

Crash Type and Direction	Number of Crashes
Unknown	
Angle Direction not Specified	2
Other	4
Angle (force exceeds 15 degrees)	
Angle (Front to Side), Opposing Direction	6
Angle Right (Front to Side, includes Broadside)	8
Angle Same Direction (Front to Side)	1
Opposing (Opposite Direction within 15 degrees	
Angle (Front to Side), Opposing Direction	2
Head On (Front to Front)	1
Rear to Front (Normally Backing)	1
Passing (glancing collision from same direction)	
Sideswipe Same Direction (Passing)	2
Same (same direction within 15 degrees)	
Rear End (Front to Rear)	4
Grand Total	**31**

Crash Severity	Number of Crashes
Incapacitating Injury	1
No Injury	20
Non-Incapacitating Injury	2
Possible Injury	4
Property Damage Only	4
Grand Total	**31**

TABLE 13 CONTINUED

Weather and Roadway Conditions	Number of Crashes
Darkness Lighted	
Clear	
Dry	3
Darkness Unlighted	
Clear	
Roadway Condition Unknown	1
Dry	2
Ice/Frost	1
Snow	1
Dawn	
Clear	
Dry	1
Daylight	
Clear	
Roadway Condition Unknown	1
Dry	13
Snow	1
Wet	1
Cloudy, Overcast	
Unknown	1
Raining	
Roadway Condition Unknown	1
Water Standing/Running	1
Wet	1
Snowing	
Roadway Condition Unknown	1
Ice/Frost	1
Grand Total	**31**

TABLE 14. CRASHES AT SALT CREEK HIGHWAY/ANTELOPE DRIVE, 2004-14; 2018-19

Crash Type and Direction	Number of Crashes
Unknown	
Other	3
Angle (force exceeds 15 degrees)	
Angle (Front to Side), Opposing Direction	3
Angle Same Direction (Front to Side)	1
Meeting (glancing collision from opposite direction)	
Angle (Front to Side), Opposing Direction	1
Opposing (Opposite Direction within 15 degrees	
Head On (Front to Front)	1
Same (same direction within 15 degrees)	
Rear End (Front to Rear)	1
Grand Total	**10**

Crash Severity	Number of Crashes
Incapacitating Injury	1
No Injury	8
Possible Injury	1
Grand Total	**10**

Weather and Roadway Conditions	Number of Crashes
Darkness Lighted	
Snowing	
Ice/Frost	2
Snow	1
Daylight	
Clear	
Roadway Condition Unknown	1
Dry	5
Ice/Frost	1
Grand Total	**10**

TABLE 15. CRASHES ELSEWHERE IN THE STUDY AREA (MP 16.26 TO MP 18.82); 2004-14; 2018-19

Crash Type and Direction	Number of Crashes
Unknown	
Other	1
Unknown	3
Angle (force exceeds 15 degrees)	
Angle (Front to Side), Opposing Direction	2
Angle Right (Front to Side, includes Broadside)	3
Rear to Side (Normally Backing)	2
Meeting (glancing collision from opposite direction)	
Sideswipe Opposite Direction (Meeting)	1
Passing (glancing collision from same direction)	
Not a Collision w/2 Vehicles in Transport	1
Same (same direction within 15 degrees)	
Not a Collision w/2 Vehicles in Transport	9
Rear End (Front to Rear)	7
Unknown	
Not a Collision w/2 Vehicles in Transport	1
Grand Total	**30**

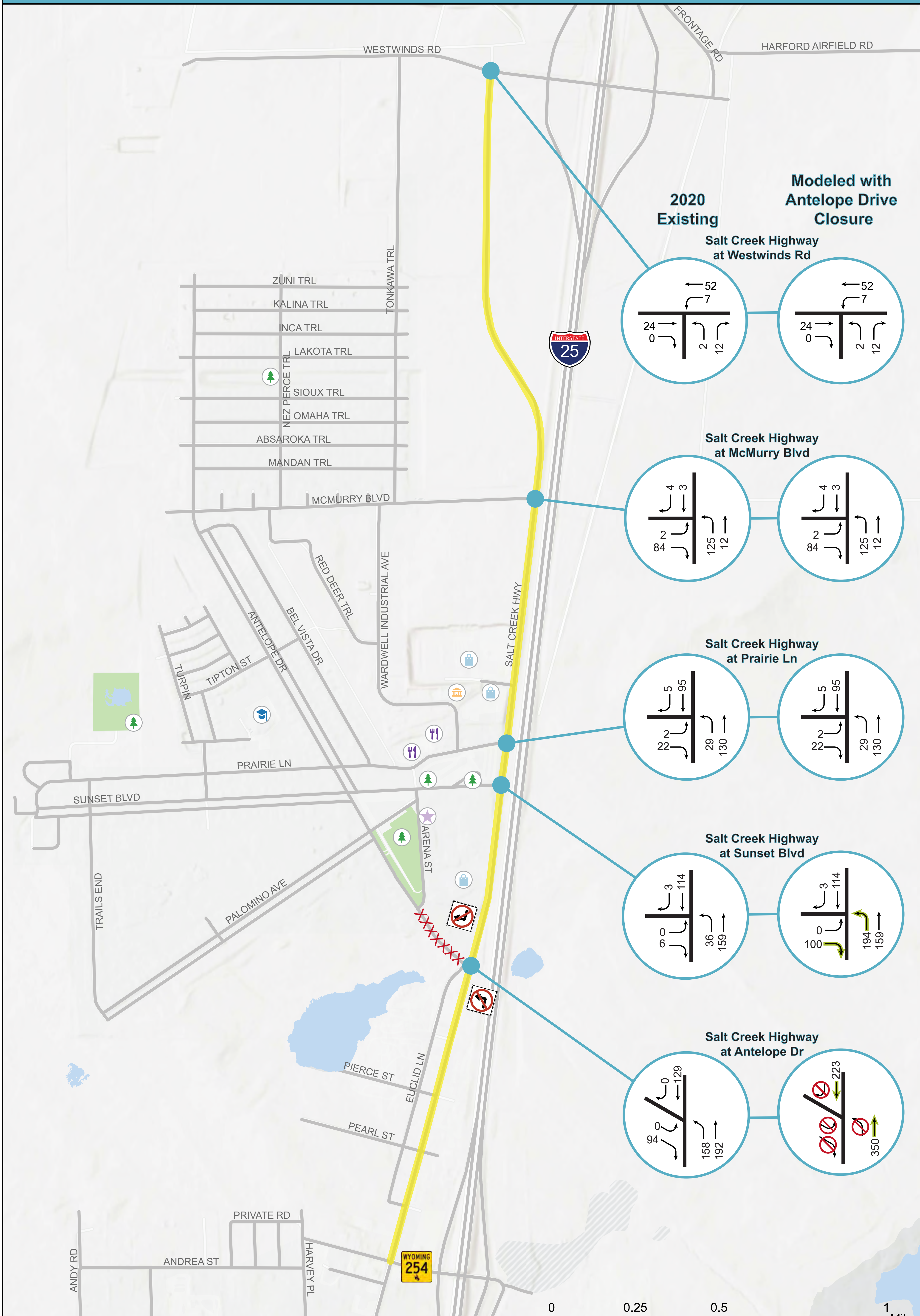
Crash Severity	Number of Crashes
Fatal	1
Incapacitating Injury	2
No Injury	15
Non-Incapacitating Injury	3
Possible Injury	4
Property Damage Only	5
Grand Total	**30**

TABLE 15 CONTINUED

Weather and Roadway Conditions	Number of Crashes
Darkness Lighted	
Clear	
Dry	1
Darkness Unlighted	
Blowing Snow	
Ice/Frost	1
Clear	
Unknown	3
Dry	4
Ice/Frost	2
Snow	2
Unknown	
Dry	1
Dawn	
Clear	
Dry	1
Daylight	
Blowing Snow	
Ice/Frost	1
Clear	
Unknown	1
Dry	8
Ice/Frost	1
Wet	1
Snowing	
Ice/Frost	2
Snow	1
Grand Total	**30**

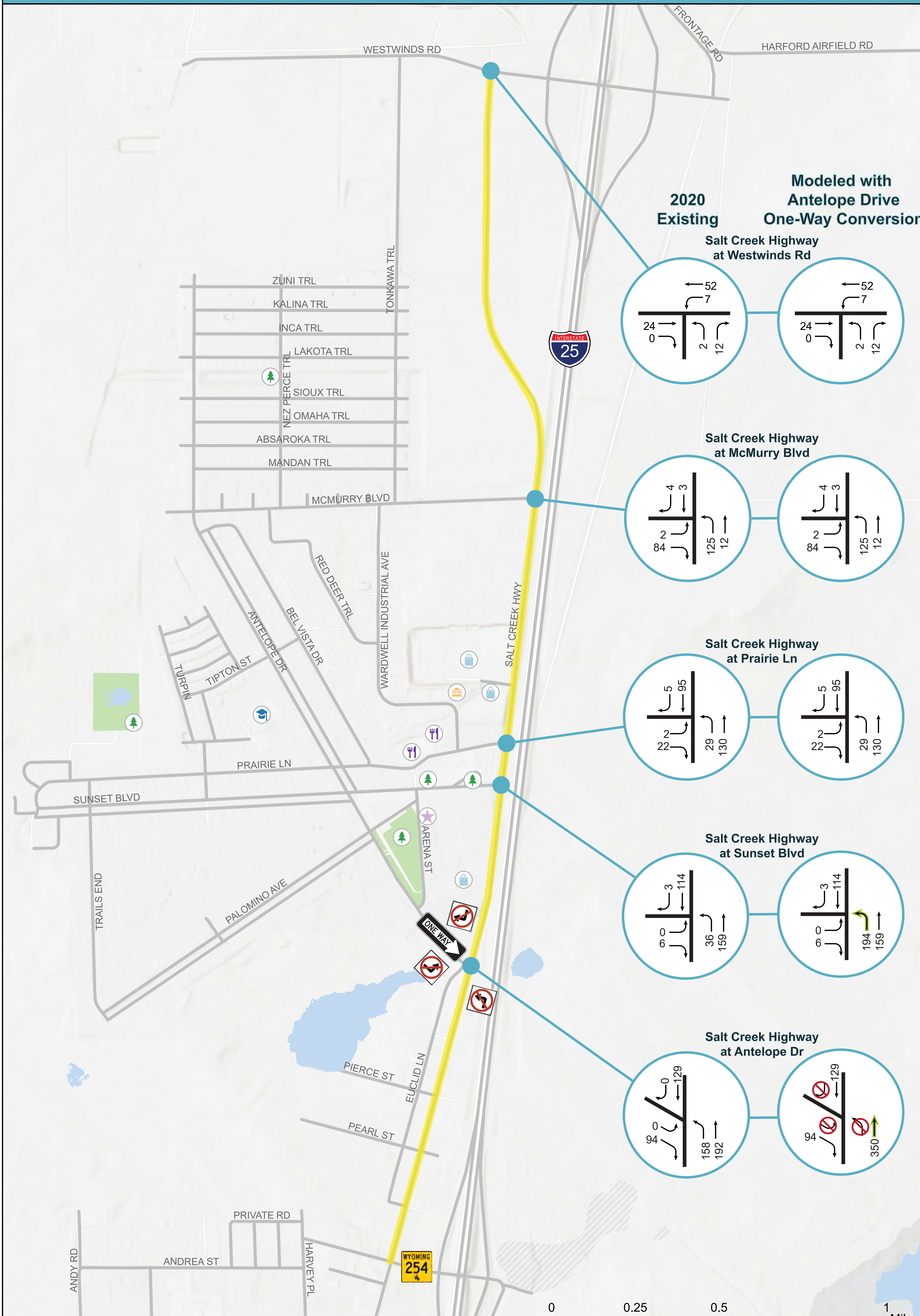
Appendix B. Concepts

Salt Creek Highway PM Peak Hour Traffic Volumes

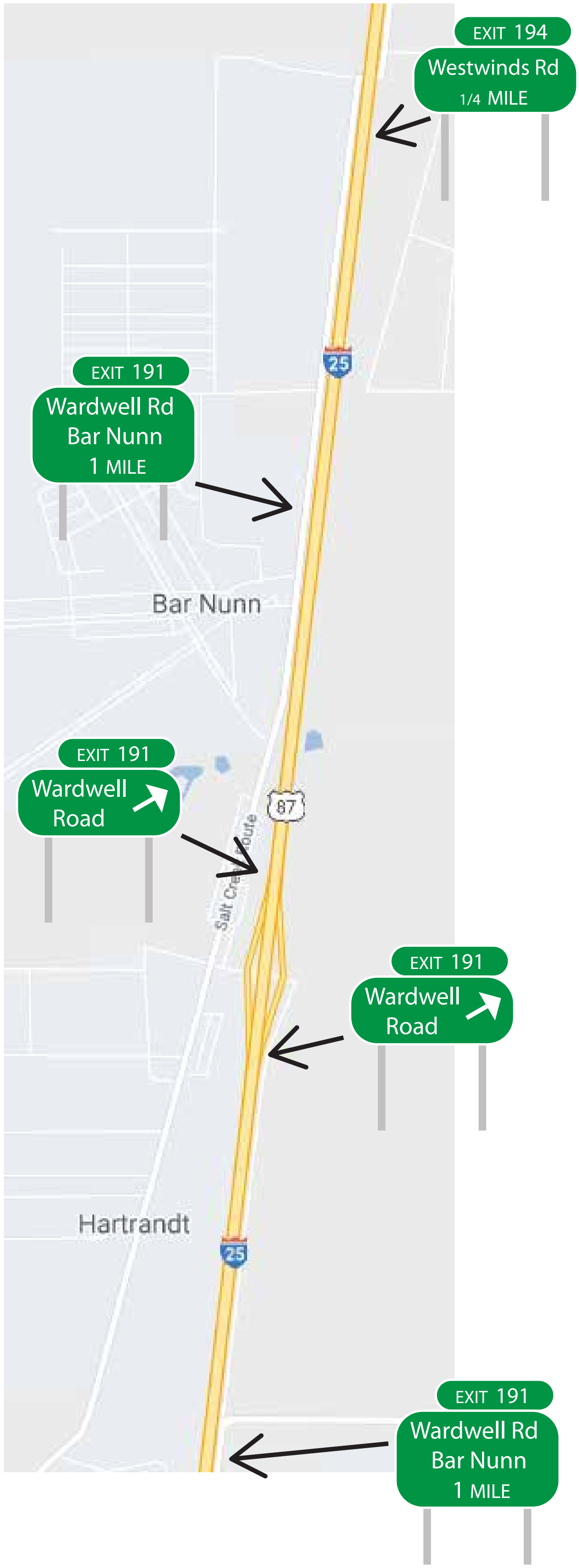


CASPER AREA
METROPOLITAN PLANNING ORGANIZATION

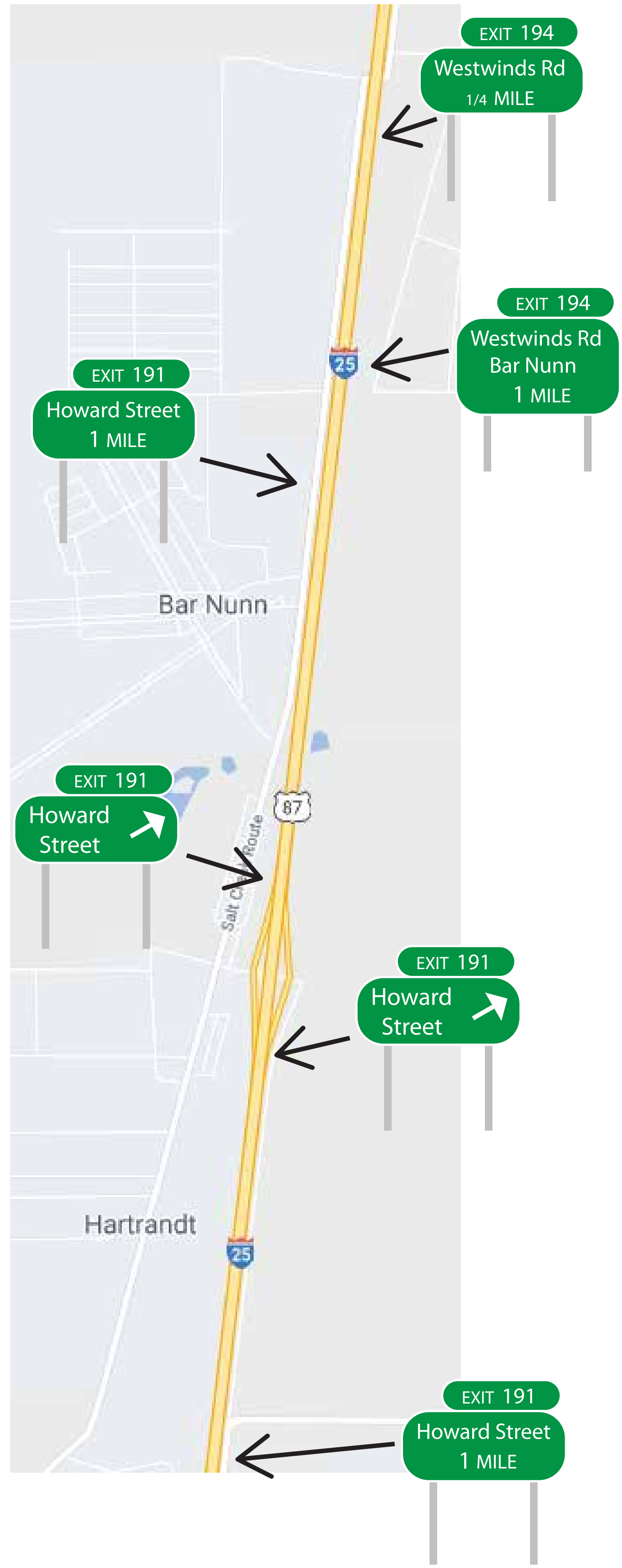
Salt Creek Highway PM Peak Hour Traffic Volumes



EXISTING SIGNAGE ON I-25



REVISED SIGNAGE ON I-25




Bar Nunn
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CLH Associates, LLC

Mead & Hunt

Concept 1: Salt Creek Highway Left-Turn Lanes

CLH Associates, LLC
Mead & Hunt

Concept 1: Salt Creek Highway Left–Turn Lanes

60' 0 60' 120'
SCALE: 1" = 60'

Sheet No. 2

CLH Associates, LLC

Mead & Hunt

Concept 2: Salt Creek Hwy at Sunset Blvd Roundabout

30' 0 30' 60'
SCALE: 1" = 30'

OPERATOR02430 — PLOTTED: 11/30/2020
FILE NAMEX: \4665131\201353.01\TECH\CAD\drawings\SaltCreekCorridor_Concepts.dgn

LEGEND (EXISTING):

- PROPERTY LINE
- EDGE OF PAVEMENT
- WATER LINE
- SEWER LINE
- ELECTRICAL LINE (OVERHEAD)
- UTILITY POLE
- GROUND-MOUNTED SIGN
- LIGHT POLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- TELEPHONE JUNCTION BOX
- CABLE TV JUNCTION BOX
- UNKNOWN UTILITY JUNCTION BOX

LEGEND (PROPOSED):

- TRAIL
- GREEN SPACE
- PAVEMENT
- SIDEWALK
- LIGHT POLE
- SIGN POST
- SIGN

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Concept 3: Antelope Rd at Sunset Blvd. and Prairie Lane Intersection Improvements

30' 0 30' 60'
SCALE: 1" = 30'

OPERATOR02430 – PLOTTED: 11/30/2020
FILE NAMEX: \4665131\201353.01\TECH\CAD\drawings\SaltCreekCorridor_Concepts.dgn

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*Pocket Park can be located anywhere within available right-of-way

Concept 4: Sunset Boulevard Streetscape – from Antelope Drive to Salt Creek Highway

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Concept 5: Proposed Truck Access – Wardell Industrial Avenue to Salt Creek Highway

SCALE: 1" = 120'

OPERATOR02430 – PLOTTED: 11/30/2020
FILE NAMEX: \466513 1\201353.01\TECH\CAD\drawings\SaltCreekCorridor_Concepts.dgn

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Concept 6: Salt Creek Highway Center Turn Lane and Shared–Use Path

Sheet No. 1

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Concept 6: Salt Creek Highway Center Turn Lane and Shared–Use Path

Sheet No. 2

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Concept 7: Salt Creek Highway Shared–Use Path – from Howard Street to Antelope Drive

Appendix C. Capacity Analysis Worksheets

Existing Conditions AM

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	114	2	10	18	1	13
Future Vol, veh/h	114	2	10	18	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	124	2	11	20	1	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	126	0	167	125
Stage 1	-	-	-	-	125	-
Stage 2	-	-	-	-	42	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1460	-	823	926
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	980	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1460	-	816	926
Mov Cap-2 Maneuver	-	-	-	-	795	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	972	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.7	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	795	926	-	-	1460	-
HCM Lane V/C Ratio	0.001	0.015	-	-	0.007	-
HCM Control Delay (s)	9.5	8.9	-	-	7.5	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	162	48	6	9	3
Future Vol, veh/h	8	162	48	6	9	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	176	52	7	10	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	123	12	13	0	-	0
Stage 1	12	-	-	-	-	-
Stage 2	111	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	872	1069	1606	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	914	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	844	1069	1606	-	-	-
Mov Cap-2 Maneuver	812	-	-	-	-	-
Stage 1	979	-	-	-	-	-
Stage 2	914	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	6.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1606	-	1053	-	-
HCM Lane V/C Ratio	0.032	-	0.175	-	-
HCM Control Delay (s)	7.3	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	23	23	54	178	0
Future Vol, veh/h	1	23	23	54	178	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	25	25	59	193	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	302	193	193	0	-	0
Stage 1	193	-	-	-	-	-
Stage 2	109	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	690	849	1380	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	677	849	1380	-	-	-
Mov Cap-2 Maneuver	677	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	916	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	2.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1380	-	840	-	-
HCM Lane V/C Ratio	0.018	-	0.031	-	-
HCM Control Delay (s)	7.7	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	27	7	76	198	3
Future Vol, veh/h	1	27	7	76	198	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	29	8	83	215	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	316	217	218	0	-	0
Stage 1	217	-	-	-	-	-
Stage 2	99	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	677	823	1352	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	925	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	673	823	1352	-	-	-
Mov Cap-2 Maneuver	673	-	-	-	-	-
Stage 1	814	-	-	-	-	-
Stage 2	925	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	9.6		0.6		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1352	-	817	-	-
HCM Lane V/C Ratio	0.006	-	0.037	-	-
HCM Control Delay (s)	7.7	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	171	78	91	231	0
Future Vol, veh/h	0	171	78	91	231	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	186	85	99	251	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	520	251	251	0	-	0
Stage 1	251	-	-	-	-	-
Stage 2	269	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	516	788	1314	-	-	-
Stage 1	791	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	481	788	1314	-	-	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	776	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	3.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1314	-	788	-	-
HCM Lane V/C Ratio	0.065	-	0.236	-	-
HCM Control Delay (s)	7.9	0	11	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.9	-	-

Intersection	
Intersection Delay, s/veh	12.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	18	8	109	7	180	4	91	107	243	180	1
Future Vol, veh/h	1	18	8	109	7	180	4	91	107	243	180	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	20	9	118	8	196	4	99	116	264	196	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.3	11.4	12.3	13.3
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	4%	94%	0%	100%	0%
Vol Thru, %	45%	67%	6%	0%	0%	99%
Vol Right, %	53%	30%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	202	27	116	180	243	181
LT Vol	4	1	109	0	243	0
Through Vol	91	18	7	0	0	180
RT Vol	107	8	0	180	0	1
Lane Flow Rate	220	29	126	196	264	197
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.36	0.056	0.243	0.312	0.47	0.322
Departure Headway (Hd)	5.91	6.833	6.925	5.738	6.411	5.901
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	608	523	518	626	563	610
Service Time	3.95	4.891	4.666	3.478	4.147	3.637
HCM Lane V/C Ratio	0.362	0.055	0.243	0.313	0.469	0.323
HCM Control Delay	12.3	10.3	11.9	11.1	14.7	11.4
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	1.6	0.2	0.9	1.3	2.5	1.4

Existing Conditions PM

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	24	0	7	52	2	12
Future Vol, veh/h	24	0	7	52	2	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	0	8	57	2	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	26	0	99	26
Stage 1	-	-	-	-	26	-
Stage 2	-	-	-	-	73	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1588	-	900	1050
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	950	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1588	-	896	1050
Mov Cap-2 Maneuver	-	-	-	-	848	-
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	945	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	848	1050	-	-	1588	-
HCM Lane V/C Ratio	0.003	0.012	-	-	0.005	-
HCM Control Delay (s)	9.3	8.5	-	-	7.3	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	84	125	12	3	4
Future Vol, veh/h	2	84	125	12	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	91	136	13	3	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	290	5	7	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	285	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	701	1078	1614	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	763	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	641	1078	1614	-	-	-
Mov Cap-2 Maneuver	663	-	-	-	-	-
Stage 1	931	-	-	-	-	-
Stage 2	763	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	6.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1614	-	1063	-	-
HCM Lane V/C Ratio	0.084	-	0.088	-	-
HCM Control Delay (s)	7.4	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Intersection						
Int Delay, s/veh	1.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	22	29	130	95	5
Future Vol, veh/h	2	22	29	130	95	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	24	32	141	103	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	311	106	108	0	-	0
Stage 1	106	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	681	948	1483	-	-	-
Stage 1	918	-	-	-	-	-
Stage 2	829	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	665	948	1483	-	-	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1483	-	916	-	-
HCM Lane V/C Ratio	0.021	-	0.028	-	-
HCM Control Delay (s)	7.5	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	6	36	159	114	3
Future Vol, veh/h	0	6	36	159	114	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	7	39	173	124	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	377	126	127	0	-	0
Stage 1	126	-	-	-	-	-
Stage 2	251	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	625	924	1459	-	-	-
Stage 1	900	-	-	-	-	-
Stage 2	791	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	606	924	1459	-	-	-
Mov Cap-2 Maneuver	606	-	-	-	-	-
Stage 1	873	-	-	-	-	-
Stage 2	791	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	8.9		1.4		0	
HCM LOS	A					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1459	-	924	-	-
HCM Lane V/C Ratio	0.027	-	0.007	-	-
HCM Control Delay (s)	7.5	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection						
Int Delay, s/veh	3.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	94	158	192	129	0
Future Vol, veh/h	0	94	158	192	129	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	102	172	209	140	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	693	140	140	0	-	0
Stage 1	140	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	409	908	1443	-	-	-
Stage 1	887	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	354	908	1443	-	-	-
Mov Cap-2 Maneuver	354	-	-	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	576	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	3.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1443	-	908	-	-
HCM Lane V/C Ratio	0.119	-	0.113	-	-
HCM Control Delay (s)	7.8	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	7	4	103	17	234	8	174	105	174	88	1
Future Vol, veh/h	1	7	4	103	17	234	8	174	105	174	88	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	4	112	18	254	9	189	114	189	96	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.1	11.8	14.9	12
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	8%	86%	0%	100%	0%
Vol Thru, %	61%	58%	14%	0%	0%	99%
Vol Right, %	37%	33%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	287	12	120	234	174	89
LT Vol	8	1	103	0	174	0
Through Vol	174	7	17	0	0	88
RT Vol	105	4	0	234	0	1
Lane Flow Rate	312	13	130	254	189	97
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.51	0.025	0.243	0.394	0.348	0.164
Departure Headway (Hd)	5.882	6.828	6.716	5.571	6.633	6.117
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	611	523	535	646	543	586
Service Time	3.919	4.893	4.455	3.31	4.375	3.86
HCM Lane V/C Ratio	0.511	0.025	0.243	0.393	0.348	0.166
HCM Control Delay	14.9	10.1	11.6	11.9	12.9	10.1
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2.9	0.1	0.9	1.9	1.5	0.6

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Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	118	2	10	19	1	13
Future Vol, veh/h	118	2	10	19	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	2	11	21	1	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	172	129
Stage 1	-	-	-	-	129	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	818	921
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	811	921
Mov Cap-2 Maneuver	-	-	-	-	791	-
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	971	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	791	921	-	-	1455	-
HCM Lane V/C Ratio	0.001	0.015	-	-	0.007	-
HCM Control Delay (s)	9.6	9	-	-	7.5	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection						
Int Delay, s/veh	8.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	168	50	6	9	3
Future Vol, veh/h	8	168	50	6	9	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	183	54	7	10	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	127	12	13	0	-	0
Stage 1	12	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	868	1069	1606	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	838	1069	1606	-	-	-
Mov Cap-2 Maneuver	808	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	910	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	6.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1606	-	1054	-	-
HCM Lane V/C Ratio	0.034	-	0.182	-	-
HCM Control Delay (s)	7.3	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	24	24	56	185	0
Future Vol, veh/h	1	24	24	56	185	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	26	26	61	201	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	314	201	201	0	-	0
Stage 1	201	-	-	-	-	-
Stage 2	113	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	679	840	1371	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	665	840	1371	-	-	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	816	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	2.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1371	-	831	-	-
HCM Lane V/C Ratio	0.019	-	0.033	-	-
HCM Control Delay (s)	7.7	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	28	7	79	206	3
Future Vol, veh/h	1	28	7	79	206	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	30	8	86	224	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	328	226	227	0	-	0
Stage 1	226	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	666	813	1341	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	662	813	1341	-	-	-
Mov Cap-2 Maneuver	662	-	-	-	-	-
Stage 1	807	-	-	-	-	-
Stage 2	922	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1341	-	807	-	-
HCM Lane V/C Ratio	0.006	-	0.039	-	-
HCM Control Delay (s)	7.7	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	4.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	178	81	94	240	0
Future Vol, veh/h	0	178	81	94	240	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	193	88	102	261	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	539	261	261	0	-	0
Stage 1	261	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	503	778	1303	-	-	-
Stage 1	783	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	467	778	1303	-	-	-
Mov Cap-2 Maneuver	467	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	769	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	3.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1303	-	778	-	-
HCM Lane V/C Ratio	0.068	-	0.249	-	-
HCM Control Delay (s)	8	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1	-	-

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Future Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	21	9	123	8	203	4	102	121	274	203	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.5	11.7	12.6	13.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	4%	94%	0%	100%	0%
Vol Thru, %	45%	68%	6%	0%	0%	99%
Vol Right, %	53%	29%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	209	28	120	187	252	188
LT Vol	4	1	113	0	252	0
Through Vol	94	19	7	0	0	187
RT Vol	111	8	0	187	0	1
Lane Flow Rate	227	30	130	203	274	204
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.378	0.059	0.254	0.328	0.493	0.339
Departure Headway (Hd)	5.983	6.947	7.001	5.812	6.476	5.966
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	600	513	513	618	556	603
Service Time	4.027	5.016	4.749	3.559	4.216	3.706
HCM Lane V/C Ratio	0.378	0.058	0.253	0.328	0.493	0.338
HCM Control Delay	12.6	10.5	12.1	11.4	15.4	11.8
HCM Lane LOS	B	B	B	B	C	B
HCM 95th-tile Q	1.8	0.2	1	1.4	2.7	1.5

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Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	0	7	54	2	12
Future Vol, veh/h	25	0	7	54	2	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	0	8	59	2	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	27	0	102	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	75	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1587	-	896	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	948	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1587	-	892	1048
Mov Cap-2 Maneuver	-	-	-	-	845	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	845	1048	-	-	1587	-
HCM Lane V/C Ratio	0.003	0.012	-	-	0.005	-
HCM Control Delay (s)	9.3	8.5	-	-	7.3	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	87	130	12	3	4
Future Vol, veh/h	2	87	130	12	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	95	141	13	3	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	300	5	7	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	691	1078	1614	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	630	1078	1614	-	-	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	928	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	6.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1614	-	1063	-	-
HCM Lane V/C Ratio	0.088	-	0.091	-	-
HCM Control Delay (s)	7.4	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	23	30	135	99	5
Future Vol, veh/h	2	23	30	135	99	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	25	33	147	108	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	324	111	113	0	-	0
Stage 1	111	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	670	942	1476	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	654	942	1476	-	-	-
Mov Cap-2 Maneuver	654	-	-	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	823	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1476	-	910	-	-
HCM Lane V/C Ratio	0.022	-	0.03	-	-
HCM Control Delay (s)	7.5	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection						
Int Delay, s/veh	1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	6	37	165	118	3
Future Vol, veh/h	0	6	37	165	118	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	7	40	179	128	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	389	130	131	0	-	0
Stage 1	130	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	615	920	1454	-	-	-
Stage 1	896	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	596	920	1454	-	-	-
Mov Cap-2 Maneuver	596	-	-	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	784	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1454	-	920	-	-
HCM Lane V/C Ratio	0.028	-	0.007	-	-
HCM Control Delay (s)	7.5	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection						
Int Delay, s/veh	3.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	98	164	199	134	0
Future Vol, veh/h	0	98	164	199	134	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	107	178	216	146	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	718	146	146	0	-	0
Stage 1	146	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	396	901	1436	-	-	-
Stage 1	881	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	340	901	1436	-	-	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	565	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	3.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1436	-	901	-	-
HCM Lane V/C Ratio	0.124	-	0.118	-	-
HCM Control Delay (s)	7.9	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.4	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Future Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	4	116	20	264	9	197	118	197	99	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.2	12.2	15.7	12.3
HCM LOS	B	B	C	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	8%	86%	0%	100%	0%
Vol Thru, %	61%	58%	14%	0%	0%	99%
Vol Right, %	37%	33%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	298	12	125	243	181	92
LT Vol	8	1	107	0	181	0
Through Vol	181	7	18	0	0	91
RT Vol	109	4	0	243	0	1
Lane Flow Rate	324	13	136	264	197	100
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.535	0.025	0.256	0.414	0.367	0.172
Departure Headway (Hd)	5.951	6.953	6.788	5.643	6.712	6.196
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	606	513	529	637	535	578
Service Time	3.991	5.026	4.532	3.387	4.457	3.941
HCM Lane V/C Ratio	0.535	0.025	0.257	0.414	0.368	0.173
HCM Control Delay	15.7	10.2	11.9	12.3	13.3	10.2
HCM Lane LOS	C	B	B	B	B	B
HCM 95th-tile Q	3.2	0.1	1	2	1.7	0.6

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Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	118	2	10	19	1	13
Future Vol, veh/h	118	2	10	19	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	2	11	21	1	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	172	129
Stage 1	-	-	-	-	129	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	818	921
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	811	921
Mov Cap-2 Maneuver	-	-	-	-	791	-
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	971	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	791	921	-	-	1455	-
HCM Lane V/C Ratio	0.001	0.015	-	-	0.007	-
HCM Control Delay (s)	9.6	9	-	-	7.5	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	168	50	6	9	3
Future Vol, veh/h	8	168	50	6	9	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	183	54	7	10	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	127	12	13	0	-	0
Stage 1	12	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	868	1069	1606	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	838	1069	1606	-	-	-
Mov Cap-2 Maneuver	808	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	910	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	6.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1606	-	1054	-	-
HCM Lane V/C Ratio	0.034	-	0.182	-	-
HCM Control Delay (s)	7.3	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection						
Int Delay, s/veh	1.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	24	24	56	185	0
Future Vol, veh/h	1	24	24	56	185	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	26	26	61	201	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	314	201	201	0	-	0
Stage 1	201	-	-	-	-	-
Stage 2	113	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	679	840	1371	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	665	840	1371	-	-	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	816	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	2.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1371	-	831	-	-
HCM Lane V/C Ratio	0.019	-	0.033	-	-
HCM Control Delay (s)	7.7	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection						
Int Delay, s/veh	5.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	206	88	79	206	3
Future Vol, veh/h	1	206	88	79	206	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	224	96	86	224	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	504	226	227	0	-	0
Stage 1	226	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	528	813	1341	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	488	813	1341	-	-	-
Mov Cap-2 Maneuver	488	-	-	-	-	-
Stage 1	751	-	-	-	-	-
Stage 2	769	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	4.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1341	-	810	-	-
HCM Lane V/C Ratio	0.071	-	0.278	-	-
HCM Control Delay (s)	7.9	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	-	-

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Future Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	21	9	123	8	203	4	102	121	274	203	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.5	11.7	12.6	13.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	4%	94%	0%	100%	0%
Vol Thru, %	45%	68%	6%	0%	0%	99%
Vol Right, %	53%	29%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	209	28	120	187	252	188
LT Vol	4	1	113	0	252	0
Through Vol	94	19	7	0	0	187
RT Vol	111	8	0	187	0	1
Lane Flow Rate	227	30	130	203	274	204
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.378	0.059	0.254	0.328	0.493	0.339
Departure Headway (Hd)	5.983	6.947	7.001	5.812	6.476	5.966
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	600	513	513	618	556	603
Service Time	4.027	5.016	4.749	3.559	4.216	3.706
HCM Lane V/C Ratio	0.378	0.058	0.253	0.328	0.493	0.338
HCM Control Delay	12.6	10.5	12.1	11.4	15.4	11.8
HCM Lane LOS	B	B	B	B	C	B
HCM 95th-tile Q	1.8	0.2	1	1.4	2.7	1.5

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Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	0	7	54	2	12
Future Vol, veh/h	25	0	7	54	2	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	0	8	59	2	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	27	0	102	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	75	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1587	-	896	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	948	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1587	-	892	1048
Mov Cap-2 Maneuver	-	-	-	-	845	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	845	1048	-	-	1587	-
HCM Lane V/C Ratio	0.003	0.012	-	-	0.005	-
HCM Control Delay (s)	9.3	8.5	-	-	7.3	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	87	130	12	3	4
Future Vol, veh/h	2	87	130	12	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	95	141	13	3	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	300	5	7	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	691	1078	1614	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	630	1078	1614	-	-	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	928	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	6.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1614	-	1063	-	-
HCM Lane V/C Ratio	0.088	-	0.091	-	-
HCM Control Delay (s)	7.4	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Intersection						
Int Delay, s/veh	1.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	23	30	135	99	5
Future Vol, veh/h	2	23	30	135	99	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	25	33	147	108	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	324	111	113	0	-	0
Stage 1	111	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	670	942	1476	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	654	942	1476	-	-	-
Mov Cap-2 Maneuver	654	-	-	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	823	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1476	-	910	-	-
HCM Lane V/C Ratio	0.022	-	0.03	-	-
HCM Control Delay (s)	7.5	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection						
Int Delay, s/veh	4.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	104	201	165	118	3
Future Vol, veh/h	0	104	201	165	118	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	113	218	179	128	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	745	130	131	0	-	0
Stage 1	130	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	382	920	1454	-	-	-
Stage 1	896	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	318	920	1454	-	-	-
Mov Cap-2 Maneuver	318	-	-	-	-	-
Stage 1	746	-	-	-	-	-
Stage 2	539	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	4.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1454	-	920	-	-
HCM Lane V/C Ratio	0.15	-	0.123	-	-
HCM Control Delay (s)	7.9	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.5	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Future Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	4	116	20	264	9	197	118	197	99	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.2	12.2	15.7	12.3
HCM LOS	B	B	C	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	8%	86%	0%	100%	0%
Vol Thru, %	61%	58%	14%	0%	0%	99%
Vol Right, %	37%	33%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	298	12	125	243	181	92
LT Vol	8	1	107	0	181	0
Through Vol	181	7	18	0	0	91
RT Vol	109	4	0	243	0	1
Lane Flow Rate	324	13	136	264	197	100
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.535	0.025	0.256	0.414	0.367	0.172
Departure Headway (Hd)	5.951	6.953	6.788	5.643	6.712	6.196
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	606	513	529	637	535	578
Service Time	3.991	5.026	4.532	3.387	4.457	3.941
HCM Lane V/C Ratio	0.535	0.025	0.257	0.414	0.368	0.173
HCM Control Delay	15.7	10.2	11.9	12.3	13.3	10.2
HCM Lane LOS	C	B	B	B	B	B
HCM 95th-tile Q	3.2	0.1	1	2	1.7	0.6

2025 Left Turn Lanes Added AM

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	118	2	10	19	1	13
Future Vol, veh/h	118	2	10	19	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	2	11	21	1	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	172	129
Stage 1	-	-	-	-	129	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	818	921
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	811	921
Mov Cap-2 Maneuver	-	-	-	-	791	-
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	971	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	791	921	-	-	1455	-
HCM Lane V/C Ratio	0.001	0.015	-	-	0.007	-
HCM Control Delay (s)	9.6	9	-	-	7.5	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	168	50	6	9	3
Future Vol, veh/h	8	168	50	6	9	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	183	54	7	10	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	127	12	13	0	-	0
Stage 1	12	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	868	1069	1606	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	838	1069	1606	-	-	-
Mov Cap-2 Maneuver	808	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	910	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	6.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1606	-	1054	-	-
HCM Lane V/C Ratio	0.034	-	0.182	-	-
HCM Control Delay (s)	7.3	-	9.2	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection						
Int Delay, s/veh	1.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	24	24	56	185	0
Future Vol, veh/h	1	24	24	56	185	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	110	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	26	26	61	201	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	314	201	201	0	-	0
Stage 1	201	-	-	-	-	-
Stage 2	113	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	679	840	1371	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	666	840	1371	-	-	-
Mov Cap-2 Maneuver	666	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	2.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1371	-	831	-	-
HCM Lane V/C Ratio	0.019	-	0.033	-	-
HCM Control Delay (s)	7.7	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection						
Int Delay, s/veh	5.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	206	88	79	206	3
Future Vol, veh/h	1	206	88	79	206	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	224	96	86	224	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	504	226	227	0	-	0
Stage 1	226	-	-	-	-	-
Stage 2	278	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	528	813	1341	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	769	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	490	813	1341	-	-	-
Mov Cap-2 Maneuver	490	-	-	-	-	-
Stage 1	754	-	-	-	-	-
Stage 2	769	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	4.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1341	-	810	-	-
HCM Lane V/C Ratio	0.071	-	0.278	-	-
HCM Control Delay (s)	7.9	-	11.1	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.1	-	-

Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Future Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	21	9	123	8	203	4	102	121	274	203	1
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	1
HCM Control Delay	10.4	11.6	12.2	13.8
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	4%	94%	0%	100%	0%
Vol Thru, %	0%	46%	68%	6%	0%	0%	99%
Vol Right, %	0%	54%	29%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	4	205	28	120	187	252	188
LT Vol	4	0	1	113	0	252	0
Through Vol	0	94	19	7	0	0	187
RT Vol	0	111	8	0	187	0	1
Lane Flow Rate	4	223	30	130	203	274	204
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0.008	0.369	0.058	0.253	0.327	0.493	0.338
Departure Headway (Hd)	6.852	5.958	6.914	6.974	5.788	6.473	5.962
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	522	602	516	515	620	556	603
Service Time	4.602	3.708	4.982	4.722	3.536	4.214	3.703
HCM Lane V/C Ratio	0.008	0.37	0.058	0.252	0.327	0.493	0.338
HCM Control Delay	9.7	12.2	10.4	12.1	11.3	15.4	11.7
HCM Lane LOS	A	B	B	B	B	C	B
HCM 95th-tile Q	0	1.7	0.2	1	1.4	2.7	1.5

2025 Left Turn Lanes Added PM

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	0	7	54	2	12
Future Vol, veh/h	25	0	7	54	2	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	0	8	59	2	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	27	0	102	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	75	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1587	-	896	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	948	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1587	-	892	1048
Mov Cap-2 Maneuver	-	-	-	-	845	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	845	1048	-	-	1587	-
HCM Lane V/C Ratio	0.003	0.012	-	-	0.005	-
HCM Control Delay (s)	9.3	8.5	-	-	7.3	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection						
Int Delay, s/veh	7.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	87	130	12	3	4
Future Vol, veh/h	2	87	130	12	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	95	141	13	3	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	300	5	7	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	691	1078	1614	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	631	1078	1614	-	-	-
Mov Cap-2 Maneuver	656	-	-	-	-	-
Stage 1	929	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	6.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1614	-	1063	-	-
HCM Lane V/C Ratio	0.088	-	0.091	-	-
HCM Control Delay (s)	7.4	-	8.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Intersection						
Int Delay, s/veh	1.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	23	30	135	99	5
Future Vol, veh/h	2	23	30	135	99	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	110	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	25	33	147	108	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	324	111	113	0	-	0
Stage 1	111	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	670	942	1476	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	655	942	1476	-	-	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	894	-	-	-	-	-
Stage 2	823	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1476	-	910	-	-
HCM Lane V/C Ratio	0.022	-	0.03	-	-
HCM Control Delay (s)	7.5	-	9.1	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection						
Int Delay, s/veh	4.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	104	201	165	118	3
Future Vol, veh/h	0	104	201	165	118	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	125	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	113	218	179	128	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	745	130	131	0	-	0
Stage 1	130	-	-	-	-	-
Stage 2	615	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	382	920	1454	-	-	-
Stage 1	896	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	325	920	1454	-	-	-
Mov Cap-2 Maneuver	325	-	-	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	539	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	4.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1454	-	920	-	-
HCM Lane V/C Ratio	0.15	-	0.123	-	-
HCM Control Delay (s)	7.9	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.5	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	13
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Future Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	4	116	20	264	9	197	118	197	99	1
Number of Lanes	0	1	0	0	1	1	1	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	1
HCM Control Delay	10.2	12.1	14.8	12.3
HCM LOS	B	B	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	8%	86%	0%	100%	0%
Vol Thru, %	0%	62%	58%	14%	0%	0%	99%
Vol Right, %	0%	38%	33%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	290	12	125	243	181	92
LT Vol	8	0	1	107	0	181	0
Through Vol	0	181	7	18	0	0	91
RT Vol	0	109	4	0	243	0	1
Lane Flow Rate	9	315	13	136	264	197	100
Geometry Grp	7	7	6	7	7	7	7
Degree of Util (X)	0.016	0.519	0.025	0.255	0.412	0.367	0.172
Departure Headway (Hd)	6.701	5.927	6.91	6.758	5.616	6.707	6.191
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	534	608	516	531	639	535	579
Service Time	4.446	3.671	4.984	4.504	3.362	4.453	3.937
HCM Lane V/C Ratio	0.017	0.518	0.025	0.256	0.413	0.368	0.173
HCM Control Delay	9.6	14.9	10.2	11.8	12.3	13.3	10.2
HCM Lane LOS	A	B	B	B	B	B	B
HCM 95th-tile Q	0	3	0.1	1	2	1.7	0.6

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Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	118	2	10	19	1	13
Future Vol, veh/h	118	2	10	19	1	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	128	2	11	21	1	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	172	129
Stage 1	-	-	-	-	129	-
Stage 2	-	-	-	-	43	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	818	921
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	811	921
Mov Cap-2 Maneuver	-	-	-	-	791	-
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	971	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.6	9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	791	921	-	-	1455	-
HCM Lane V/C Ratio	0.001	0.015	-	-	0.007	-
HCM Control Delay (s)	9.6	9	-	-	7.5	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	168	50	6	9	3
Future Vol, veh/h	8	168	50	6	9	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	183	54	7	10	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	127	12	13	0	-	0
Stage 1	12	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	868	1069	1606	-	-	-
Stage 1	1011	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	838	1069	1606	-	-	-
Mov Cap-2 Maneuver	808	-	-	-	-	-
Stage 1	977	-	-	-	-	-
Stage 2	910	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	6.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1606	-	1054	-	-
HCM Lane V/C Ratio	0.034	-	0.182	-	-
HCM Control Delay (s)	7.3	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.7	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	24	24	56	185	0
Future Vol, veh/h	1	24	24	56	185	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	26	26	61	201	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	314	201	201	0	-	0
Stage 1	201	-	-	-	-	-
Stage 2	113	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	679	840	1371	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	665	840	1371	-	-	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	816	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	2.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1371	-	831	-	-
HCM Lane V/C Ratio	0.019	-	0.033	-	-
HCM Control Delay (s)	7.7	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection			
Intersection Delay, s/veh	4.6		
Intersection LOS	A		

Approach	EB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	225	182	227
Demand Flow Rate, veh/h	229	186	231
Vehicles Circulating, veh/h	228	1	98
Vehicles Exiting, veh/h	101	456	89
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.3	3.8	4.5
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	LR	LT	TR
Assumed Moves	LR	LT	TR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	229	186	231
Cap Entry Lane, veh/h	1094	1378	1249
Entry HV Adj Factor	0.983	0.980	0.981
Flow Entry, veh/h	225	182	227
Cap Entry, veh/h	1074	1351	1224
V/C Ratio	0.209	0.135	0.185
Control Delay, s/veh	5.3	3.8	4.5
LOS	A	A	A
95th %tile Queue, veh	1	0	1

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Future Vol, veh/h	1	19	8	113	7	187	4	94	111	252	187	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	21	9	123	8	203	4	102	121	274	203	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.5	11.7	12.6	13.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	2%	4%	94%	0%	100%	0%
Vol Thru, %	45%	68%	6%	0%	0%	99%
Vol Right, %	53%	29%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	209	28	120	187	252	188
LT Vol	4	1	113	0	252	0
Through Vol	94	19	7	0	0	187
RT Vol	111	8	0	187	0	1
Lane Flow Rate	227	30	130	203	274	204
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.378	0.059	0.254	0.328	0.493	0.339
Departure Headway (Hd)	5.983	6.947	7.001	5.812	6.476	5.966
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	600	513	513	618	556	603
Service Time	4.027	5.016	4.749	3.559	4.216	3.706
HCM Lane V/C Ratio	0.378	0.058	0.253	0.328	0.493	0.338
HCM Control Delay	12.6	10.5	12.1	11.4	15.4	11.8
HCM Lane LOS	B	B	B	B	C	B
HCM 95th-tile Q	1.8	0.2	1	1.4	2.7	1.5

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Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	0	7	54	2	12
Future Vol, veh/h	25	0	7	54	2	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	0	8	59	2	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	27	0	102	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	75	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1587	-	896	1048
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	948	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1587	-	892	1048
Mov Cap-2 Maneuver	-	-	-	-	845	-
Stage 1	-	-	-	-	996	-
Stage 2	-	-	-	-	943	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	845	1048	-	-	1587	-
HCM Lane V/C Ratio	0.003	0.012	-	-	0.005	-
HCM Control Delay (s)	9.3	8.5	-	-	7.3	-
HCM Lane LOS	A	A	-	-	A	-
HCM 95th %tile Q(veh)	0	0	-	-	0	-

Intersection						
Int Delay, s/veh	7.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	87	130	12	3	4
Future Vol, veh/h	2	87	130	12	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	95	141	13	3	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	300	5	7	0	-	0
Stage 1	5	-	-	-	-	-
Stage 2	295	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	691	1078	1614	-	-	-
Stage 1	1018	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	630	1078	1614	-	-	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	928	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.7	6.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1614	-	1063	-	-
HCM Lane V/C Ratio	0.088	-	0.091	-	-
HCM Control Delay (s)	7.4	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	23	30	135	99	5
Future Vol, veh/h	2	23	30	135	99	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	25	33	147	108	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	324	111	113	0	-	0
Stage 1	111	-	-	-	-	-
Stage 2	213	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	670	942	1476	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	654	942	1476	-	-	-
Mov Cap-2 Maneuver	654	-	-	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	823	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	1.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1476	-	910	-	-
HCM Lane V/C Ratio	0.022	-	0.03	-	-
HCM Control Delay (s)	7.5	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	4.8
Intersection LOS	A

Approach	EB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	113	397	131
Demand Flow Rate, veh/h	115	405	134
Vehicles Circulating, veh/h	131	0	222
Vehicles Exiting, veh/h	225	246	183
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.8	5.2	4.4
Approach LOS	A	A	A

Lane	Left	Left	Left
Designated Moves	LR	LT	TR
Assumed Moves	LR	LT	TR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	115	405	134
Cap Entry Lane, veh/h	1207	1380	1100
Entry HV Adj Factor	0.983	0.981	0.981
Flow Entry, veh/h	113	397	131
Cap Entry, veh/h	1186	1354	1079
V/C Ratio	0.095	0.294	0.122
Control Delay, s/veh	3.8	5.2	4.4
LOS	A	A	A
95th %tile Queue, veh	0	1	0

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Future Vol, veh/h	1	7	4	107	18	243	8	181	109	181	91	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	8	4	116	20	264	9	197	118	197	99	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	10.2	12.2	15.7	12.3
HCM LOS	B	B	C	B

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	8%	86%	0%	100%	0%
Vol Thru, %	61%	58%	14%	0%	0%	99%
Vol Right, %	37%	33%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	298	12	125	243	181	92
LT Vol	8	1	107	0	181	0
Through Vol	181	7	18	0	0	91
RT Vol	109	4	0	243	0	1
Lane Flow Rate	324	13	136	264	197	100
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.535	0.025	0.256	0.414	0.367	0.172
Departure Headway (Hd)	5.951	6.953	6.788	5.643	6.712	6.196
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	606	513	529	637	535	578
Service Time	3.991	5.026	4.532	3.387	4.457	3.941
HCM Lane V/C Ratio	0.535	0.025	0.257	0.414	0.368	0.173
HCM Control Delay	15.7	10.2	11.9	12.3	13.3	10.2
HCM Lane LOS	C	B	B	B	B	B
HCM 95th-tile Q	3.2	0.1	1	2	1.7	0.6

Intersection Failure Years AM

Intersection	
Intersection Delay, s/veh	14.6
Intersection LOS	B

Approach	EB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	588	474	594
Demand Flow Rate, veh/h	600	483	606
Vehicles Circulating, veh/h	597	3	255
Vehicles Exiting, veh/h	264	1194	231
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	25.4	5.9	10.8
Approach LOS	D	A	B

Lane	Left	Left	Left
Designated Moves	LR	LT	TR
Assumed Moves	LR	LT	TR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	600	483	606
Cap Entry Lane, veh/h	751	1376	1064
Entry HV Adj Factor	0.980	0.980	0.981
Flow Entry, veh/h	588	474	594
Cap Entry, veh/h	736	1349	1043
V/C Ratio	0.799	0.351	0.570
Control Delay, s/veh	25.4	5.9	10.8
LOS	D	A	B
95th %tile Queue, veh	8	2	4

Intersection Failure Years PM

Intersection	
Int Delay, s/veh	2.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	389	0	109	840	31	187
Future Vol, veh/h	389	0	109	840	31	187
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	423	0	118	913	34	203

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	423	0	1572	423
Stage 1	-	-	-	-	423	-
Stage 2	-	-	-	-	1149	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1136	-	121	631
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	302	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1136	-	108	631
Mov Cap-2 Maneuver	-	-	-	-	213	-
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	271	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	15.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	213	631	-	-	1136	-
HCM Lane V/C Ratio	0.158	0.322	-	-	0.104	-
HCM Control Delay (s)	25.1	13.4	-	-	8.5	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.6	1.4	-	-	0.3	-

Intersection	
Int Delay, s/veh	15.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	593	887	82	20	27
Future Vol, veh/h	14	593	887	82	20	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	2	2	2	2	2
Mvmt Flow	15	645	964	89	22	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2054	37	51	0	-	0
Stage 1	37	-	-	-	-	-
Stage 2	2017	-	-	-	-	-
Critical Hdwy	6.46	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	59	1035	1555	-	-	-
Stage 1	975	-	-	-	-	-
Stage 2	110	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	21	1035	1555	-	-	-
Mov Cap-2 Maneuver	83	-	-	-	-	-
Stage 1	339	-	-	-	-	-
Stage 2	110	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25	10.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1555	-	818	-	-
HCM Lane V/C Ratio	0.62	-	0.807	-	-
HCM Control Delay (s)	11	0	25	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	4.6	-	8.7	-	-

Intersection						
Int Delay, s/veh	3.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	124	162	729	535	27
Future Vol, veh/h	11	124	162	729	535	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	135	176	792	582	29

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1741	597	611	0	-	0
Stage 1	597	-	-	-	-	-
Stage 2	1144	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	95	503	968	-	-	-
Stage 1	550	-	-	-	-	-
Stage 2	304	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	64	503	968	-	-	-
Mov Cap-2 Maneuver	64	-	-	-	-	-
Stage 1	371	-	-	-	-	-
Stage 2	304	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.1	1.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	968	-	323	-	-
HCM Lane V/C Ratio	0.182	-	0.454	-	-
HCM Control Delay (s)	9.5	0	25.1	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.7	-	2.3	-	-

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Approach	EB	NB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	348	1225	405
Demand Flow Rate, veh/h	355	1249	413
Vehicles Circulating, veh/h	403	0	686
Vehicles Exiting, veh/h	696	758	563
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	8.5	25.1	16.1
Approach LOS	A	D	C

Lane	Left	Left	Left
Designated Moves	LR	LT	TR
Assumed Moves	LR	LT	TR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	355	1249	413
Cap Entry Lane, veh/h	915	1380	685
Entry HV Adj Factor	0.980	0.981	0.981
Flow Entry, veh/h	348	1225	405
Cap Entry, veh/h	897	1353	672
V/C Ratio	0.388	0.905	0.603
Control Delay, s/veh	8.5	25.1	16.1
LOS	A	D	C
95th %tile Queue, veh	2	15	4

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	9	5	134	23	304	10	226	136	226	114	1
Future Vol, veh/h	1	9	5	134	23	304	10	226	136	226	114	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	10	5	146	25	330	11	246	148	246	124	1
Number of Lanes	0	1	0	0	1	1	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	2	1
HCM Control Delay	11.3	15.7	24.7	15.2
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	3%	7%	85%	0%	100%	0%
Vol Thru, %	61%	60%	15%	0%	0%	99%
Vol Right, %	37%	33%	0%	100%	0%	1%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	372	15	157	304	226	115
LT Vol	10	1	134	0	226	0
Through Vol	226	9	23	0	0	114
RT Vol	136	5	0	304	0	1
Lane Flow Rate	404	16	171	330	246	125
Geometry Grp	6	6	7	7	7	7
Degree of Util (X)	0.723	0.036	0.346	0.565	0.497	0.235
Departure Headway (Hd)	6.437	8.008	7.304	6.154	7.28	6.763
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	558	450	490	582	491	527
Service Time	4.51	6.008	5.085	3.934	5.065	4.548
HCM Lane V/C Ratio	0.724	0.036	0.349	0.567	0.501	0.237
HCM Control Delay	24.7	11.3	13.9	16.7	17.1	11.6
HCM Lane LOS	C	B	B	C	C	B
HCM 95th-tile Q	6	0.1	1.5	3.5	2.7	0.9

Appendix D. Construction Cost Estimates

QUANTITIES ARE BASED ON THE CONCEPT ENGINEERING PLANS

TOTALS AND UNIT PRICES ARE CALCULATED IN PRESENT WORTH OR PRESENT VALUE DOLLARS. ADJUSTMENTS SHOULD BE MADE FOR YEARS BEYOND THE PRESENT YEAR TO BETTER ESTIMATE NEEDED CAPITAL DOLLARS FOR A FUTURE CAPITAL IMPROVEMENT PLAN(S).

Does not include Engineering Design Fees but may be covered under contingency

Does not include ROW or utility relocaitons but may be covered under contingency

Assumes full resurfacing for any partial roadway work

SALT CREEK HIGHWAY CONCEPT 0 - ANTELOPE DRIVE CLOSURE					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	10% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$2,000
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	0.00	$0
202	Removal of existing pavement	CY	$40.00	500.00	$20,000
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$20,000
	Category 3 - Drainage				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0
	Category 4 - Structures				
401	Park bench	EA	$ 1,000.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	0.00	$0
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	0.00	$0
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	0.00	$0
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	0.00	$0
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	0.00	$0
508	2 inch superpave asphalt mix for surface	TON	$80.00	0.00	$0
509	6 inch superpave asphalt mix for base	TON	$160.00	0.00	$0
510	4 inch graded aggregate base course	SY	$6.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,500.00	0.00	$0
602	Brick walkway	SF	$10.00	0.00	$0
603	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$35.00	0.00	$0
604	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 7 - Landscaping				
	10% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$2,000
	Category 8 - Traffic				
801	Lighting structure	EA	$13,000.00	0.00	$0
802	Relocate existing telecom box	EA	$500.00	0.00	$0
803	Square perforated tubular steel sign post	EA	$50.00	3.00	$150
804	Square perforated tubular steel anchor bases	EA	$100.00	3.00	$300
805	Sheet aluminum signs	SF	$50.00	19.00	$950
806	Remove existing ground mounted signs and supports	SF	$15.00	36.75	$551
				CATEGORY TOTAL	$1,951
				SUB TOTAL	$25,951
			CONTINGENCY	25%	$6,488
			RIGHT-OF-WAY/EASEMENTS	N/A	
				TOTAL	$32,439
				CONSTRUCTION TOTAL	**$33,000**

SALT CREEK HIGHWAY CONCEPT 1 - SALT CREEK HIGHWAY LEFT-TURN LANES					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	20% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$58,148
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	1,617.00	$48,510
202	Removal of existing pavement	CY	$35.00	0.00	$0
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$48,510
	Category 3 - Drainage				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0
	Category 4 - Structures				
401	Park bench	EA	$ 1,000.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	1,600.00	$2,400
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	10,900.00	$16,350
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	1,250.00	$2,188
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	0.00	$0
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	230.00	$1,610
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	220.00	$5,500
508	2 inch superpave asphalt mix for surface	TON	$80.00	1,605.00	$128,400
509	6 inch superpave asphalt mix for base	TON	$160.00	445.00	$71,200
510	4 inch graded aggregate base course	SY	$6.00	2,430.00	$14,580
				CATEGORY TOTAL	$242,228
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,500.00	0.00	$0
602	Brick walkway	SF	$10.00	0.00	$0
603	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$35.00	0.00	$0
604	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 7 - Landscaping				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0
	Category 8 - Traffic				
801	Lighting structure	EA	$13,000.00	0.00	$0
802	Relocate existing telecom box	EA	$500.00	0.00	$0
803	Square perforated tubular steel sign post	EA	$50.00	0.00	$0
804	Square perforated tubular steel anchor bases	EA	$100.00	0.00	$0
805	Sheet aluminum signs	SF	$50.00	0.00	$0
806	Relocate existing ground mounted signs	SF	$35.00	24.00	$840
					$0
				CATEGORY TOTAL	$840
				SUB TOTAL	$349,725
			CONTINGENCY	25%	$87,431
			RIGHT-OF-WAY/EASEMENTS	N/A	
				TOTAL	$437,156
				CONSTRUCTION TOTAL	**$440,000**

SALT CREEK HIGHWAY CONCEPT 2 - SALT CREEK HIGHWAY AT SUNSET BLVD. ROUNDABOUT					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	20% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$61,249
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	3,185.00	$95,550
202	Removal of existing pavement	CY	$35.00	23.00	$805
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$96,355
	Category 3 - Drainage				
	10% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$30,624.30
	Category 4 - Structures				
401	Park bench	EA	$ 1,000.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	2,655.00	$3,983
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	5,200.00	$7,800
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	120.00	$210
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	50.00	$88
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	0.00	$0
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	25.00	$175
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	91.00	$2,275
508	2 inch superpave asphalt mix for surface	TON	$80.00	531.00	$42,480
509	6 inch superpave asphalt mix for base	TON	$160.00	283.00	$45,280
510	4 inch graded aggregate base course	SY	$6.00	1,558.00	$9,348
				CATEGORY TOTAL	$111,638
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,500.00	3.00	$4,500
602	Brick walkway	SF	$10.00	0.00	$0
606	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$25.00	3,750.00	$93,750
607	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$98,250
	Category 7 - Landscaping				
	10% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$30,624
	Category 8 - Traffic				
801	Lighting structure	EA	$13,000.00	2.00	$26,000
802	Relocate existing telecom box	EA	$500.00	0.00	$0
803	Square perforated tubular steel sign post	EA	$50.00	9.00	$450
804	Square perforated tubular steel anchor bases	EA	$100.00	9.00	$900
805	Sheet aluminum signs	SF	$50.00	56.00	$2,800
806	Relocate existing ground mounted signs	SF	$35.00	10.00	$350
					$0
				CATEGORY TOTAL	$30,500
				SUB TOTAL	$459,240
			CONTINGENCY	25%	$114,810
				TOTAL	$574,050
				CONSTRUCTION TOTAL	**$580,000**

SALT CREEK HIGHWAY CONCEPT 3 - SUNSET BLVD. & PRAIRIE LANE INTERSECTION IMPROVEMENTS					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	20% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$61,344
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	0.00	$0
202	Removal of existing pavement	CY	$35.00	645.00	$22,575
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$22,575
	Category 3 - Drainage				
	5% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$15,336
	Category 4 - Structures				
401	Park bench	EA	$ 1,000.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	4,045.00	$6,068
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	3,500.00	$5,250
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	960.00	$1,920
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	1,215.00	$8,505
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	0.00	$0
508	2 inch superpave asphalt mix for surface	TON	$80.00	0.00	$0
509	6 inch superpave asphalt mix for base	TON	$160.00	0.00	$0
510	4 inch graded aggregate base course	SY	$6.00	0.00	$0
				CATEGORY TOTAL	$21,743
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,250.00	15.00	$18,750
602	Brick walkway	SF	$10.00	16,240.00	$162,400
606	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$25.00	3,250.00	$81,250
607	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$262,400
	Category 7 - Landscaping				
	10% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$30,672
	Category 8 - Traffic				
801	Lighting structure	EA	$13,000.00	0.00	$0
802	Relocate existing telecom box	EA	$500.00	0.00	$0
803	Square perforated tubular steel sign post	EA	$100.00	38.00	$3,800
804	Square perforated tubular steel anchor bases	EA	$100.00	38.00	$3,800
805	Sheet aluminum signs	SF	$50.00	275.00	$13,750
806	Relocate existing ground mounted signs	SF	$35.00	0.00	$0
					$0
				CATEGORY TOTAL	$21,350
				SUB TOTAL	$435,419
			CONTINGENCY	25%	$108,855
			RIGHT-OF-WAY/EASEMENTS	N/A	
				TOTAL	$544,273
				CONSTRUCTION TOTAL	**$550,000**

SALT CREEK HIGHWAY CONCEPT 4 - SUNSET BLVD. STREETSCAPE					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	20% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$75,578
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	0.00	$0
202	Removal of existing pavement	CY	$35.00	0.00	$0
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 3 - Drainage				
	5% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$18,894.50
	Category 4 - Structures				
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	0.00	$0
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	0.00	$0
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	0.00	$0
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	1,270.00	$8,890
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	0.00	$0
508	2 inch superpave asphalt mix for surface	TON	$80.00	0.00	$0
509	6 inch superpave asphalt mix for base	TON	$160.00	0.00	$0
510	4 inch graded aggregate base course	SY	$6.00	0.00	$0
				CATEGORY TOTAL	$8,890
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,250.00	18.00	$22,500
602	Brick walkway	SF	$10.00	26,400.00	$264,000
606	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$25.00	3,300.00	$82,500
607	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$369,000
	Category 7 - Landscaping				
	20% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$75,578
	Category 8 - Traffic				
801	Lighting structure (pedestrian)	EA	$4,000.00	40.00	$160,000
802	Relocate existing telecom box	EA	$500.00	0.00	$0
803	Monument sign	SF	$300.00	40.00	$12,000
804	Square perforated tubular steel sign post	EA	$100.00	4.00	$400
805	Square perforated tubular steel anchor bases	EA	$0.00	4.00	$0
806	Sheet aluminum signs	SF	$50.00	33.00	$1,650
807	Relocate existing ground mounted signs	SF	$35.00	0.00	$0
					$0
				CATEGORY TOTAL	$174,050
				SUB TOTAL	$721,991
			CONTINGENCY	25%	$180,498
				TOTAL	$902,488
				CONSTRUCTION TOTAL	**$910,000**

[1]$20/SF for commercial property and $5/SF for residential land assumed.

SALT CREEK HIGHWAY CONCEPT 5 - SALT CREEK HIGHWAY TO WARDELL INDUSTRIAL AVENUE PROPOSED TRUCK ACCESS					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	20% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$81,785
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	3,890.00	$116,700
202	Removal of existing pavement	CY	$35.00	0.00	$0
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$116,700
	Category 3 - Drainage				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0
	Category 4 - Structures				
401	Park bench	EA	$ 1,000.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	3,600.00	$5,400
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	5,400.00	$8,100
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	180.00	$315
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	0.00	$0
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	45.00	$315
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	31.00	$775
508	2 inch superpave asphalt mix for surface	TON	$80.00	907.00	$72,560
509	6 inch superpave asphalt mix for base	TON	$160.00	1,061.00	$169,760
510	4 inch graded aggregate base course	SY	$6.00	5,833.00	$34,998
				CATEGORY TOTAL	$292,223
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,250.00	0.00	$0
602	Brick walkway	SF	$10.00	0.00	$0
606	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$35.00	0.00	$0
607	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 7 - Landscaping				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0
	Category 8 - Traffic				
801	Lighting structure	EA	$13,000.00	4.00	$52,000
802	Relocate existing telecom box	EA	$500.00	0.00	$0
803	Square perforated tubular steel sign post	EA	$100.00	3.00	$300
804	Square perforated tubular steel anchor bases	EA	$100.00	3.00	$300
805	Sheet aluminum signs	SF	$50.00	21.00	$1,050
806	Relocate existing ground mounted signs	SF	$35.00	0.00	$0
					$0
				CATEGORY TOTAL	$53,650
				SUB TOTAL	$544,358
			CONTINGENCY	25%	$136,089
			RIGHT-OF-WAY/EASEMENTS	N/A	
				TOTAL	$680,447
				CONSTRUCTION TOTAL	**$690,000**

SALT CREEK HIGHWAY CONCEPT 6 - SALT CREEK HIGHWAY CENTER-TURN LANE					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	20% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$254,410
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	4,955.00	$148,650
202	Removal of existing pavement	CY	$35.00	0.00	$0
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$148,650
	Category 3 - Drainage				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0
	Category 4 - Structures				
401	Park bench	EA	$ 1,000.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	800.00	$1,200
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	24,200.00	$36,300
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	465.00	$814
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	0.00	$0
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	25.00	$175
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	715.00	$17,875
508	2 inch superpave asphalt mix for surface	TON	$80.00	4,383.00	$350,640
509	6 inch superpave asphalt mix for base	TON	$160.00	1,355.00	$216,800
510	4 inch graded aggregate base course	SY	$6.00	7,433.00	$44,598
				CATEGORY TOTAL	$668,402
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,250.00	0.00	$0
602	Brick walkway	SF	$10.00	0.00	$0
606	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$35.00	13,000.00	$455,000
607	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$455,000
	Category 7 - Landscaping				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0
	Category 8 - Traffic				
801	Lighting structure	EA	$13,000.00	0.00	$0
802	Relocate existing telecom box	EA	$500.00	3.00	$1,500
803	Square perforated tubular steel sign post	EA	$100.00	18.00	$1,800
804	Square perforated tubular steel anchor bases	EA	$100.00	18.00	$1,800
805	Sheet aluminum signs	SF	$50.00	132.00	$6,600
806	Relocate existing ground mounted signs	SF	$35.00	24.00	$840
					$0
				CATEGORY TOTAL	$12,540
				SUB TOTAL	$1,539,002
			CONTINGENCY	25%	$384,751
			RIGHT-OF-WAY/EASEMENTS	N/A	
				TOTAL	$1,923,753
				CONSTRUCTION TOTAL	**$1,930,000**

SALT CREEK HIGHWAY CONCEPT 7 - SALT CREEK HIGHWAY SHARED-USE PATH					
ITEM	CATEGORY & ITEM DESCRIPTION	UNIT	PRICE	QUANTITY	AMOUNT
	Category 1 - Preliminary				
	10% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$14,050
	Category 2 - Grading				
201	Class 1 excavation	CY	$30.00	1,600.00	$48,000
202	Removal of existing pavement	CY	$35.00	0.00	$0
203	Removal of existing sidewalk	CY	$100.00	0.00	$0
				CATEGORY TOTAL	$48,000
	Category 3 - Drainage				
	0% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$0.00
	Category 4 - Structures				
401	Park bench	EA	$ 1,000.00	0.00	$0
				CATEGORY TOTAL	$0
	Category 5 - Paving				
501	5 inch white reflective thermoplastic pavement markings	LF	$1.50	0.00	$0
502	5 inch yellow reflective thermoplastic pavement markings	LF	$1.50	0.00	$0
503	10 inch white reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
504	10 inch yellow reflective thermoplastic pavement markings	LF	$1.75	0.00	$0
505	12 inch white reflective thermoplastic pavement markings	LF	$2.00	0.00	$0
506	24 inch white reflective thermoplastic pavement markings	LF	$7.00	0.00	$0
507	Preformed thermoplastic pavement marking legend and arrows	SF	$25.00	0.00	$0
508	2 inch superpave asphalt mix for surface	TON	$80.00	200.00	$16,000
509	6 inch superpave asphalt mix for base	TON	$160.00	400.00	$64,000
510	4 inch graded aggregate base course	SY	$6.00	0.00	$0
				CATEGORY TOTAL	$80,000
	Category 6 - Shoulders				
601	ADA ramp	EA	$1,250.00	10.00	$12,500
602	Brick walkway	SF	$10.00	0.00	$0
606	Type A curb and gutter - 12 inch gutter pan 8 inch depth	LF	$35.00	0.00	$0
607	5 inch concrete sidewalk	SF	$7.00	0.00	$0
				CATEGORY TOTAL	$12,500
	Category 7 - Landscaping				
	5% of Categories 2, 4, 5, 6			CATEGORY TOTAL	$7,025
	Category 8 - Traffic				
801	Lighting structure	EA	$13,000.00	0.00	$0
802	Relocate existing telecom box	EA	$500.00	1.00	$500
803	Square perforated tubular steel sign post	EA	$100.00	0.00	$0
804	Square perforated tubular steel anchor bases	EA	$100.00	0.00	$0
805	Sheet aluminum signs	SF	$50.00	0.00	$0
806	Relocate existing ground mounted signs	SF	$35.00	117.00	$4,095
					$0
				CATEGORY TOTAL	$4,595
				SUB TOTAL	$166,170
			CONTINGENCY	25%	$41,543
			RIGHT-OF-WAY/EASEMENTS	N/A	
				TOTAL	$207,713
				CONSTRUCTION TOTAL	**$210,000**

Appendix E. Survey Results and Stakeholder Comments

Salt Creek Highway Corridor Study

Q1. Traffic Delay

	Weighted Average
Westwinds Road	1.4
McMurry Boulevard	1.6
Prairie Lane	2
Sunset Boulevard	2
Antelope Drive	2.87
Howard Street	2.2

Q2. Traffic Safety

	Weighted Average
Westwinds Road	1.21
McMurry Boulevard	1.64
Prairie Lane	1.93
Sunset Boulevard	1.86
Antelope Drive	2.57
Howard Street	2

Q3. What are your concerns, if any, at or near each intersection?

Answer Choices	Responses								
Westwinds Road	congestion and effects of how traffic will be with new businesses			None, drive to the highway every day.		None			
McMurry Boulevard	narrow and congestion			None. Been driving it for 13 years.		None			Speed
Prairie Lane	safe crossing		Traffic too fast	None		None	People driving too fast down Bel Vista to Prairie Lane and barely stopping or coming around the corner from Prairie Lane onto Bel Vista		
Sunset Boulevard	safe crossing		Traffic too fast	None		None			
Antelope Drive	congestion and narrow	Traffic backing up when school buses are running	Traffic too fast	None	Speeding	Very Icey in the winter time.		Failure to stop. Speeding	Speed
Howard Street	crossing	People not understanding how 4 way stops work	Too much traffic. Turn lane is not long enough.	Not sure where this is	Turn lanes into convenience store. Widen road between interstate and Salt Creek Rd	None			

Q4. How do you usually access I-25 when travelling south towards Casper?

Answer Choices	Responses	
Salt Creek Highway north to the new Wes	46.15%	6
Salt Creek Highway south to the Howard	53.85%	7

Q5. How do you usually access Salt Creek Highway from your home?

Answer Choices	Responses				
McMurry Boulevard	38.46%	5			
Prairie Lane	7.69%	1			
Sunset Boulevard	0.00%	0			
Antelope Drive	38.46%	5			
Another route (please describe)	15.38%	2		westwinds	Both Antelope and Praire

Q6. How do you feel about the following types of intersection traffic control?

	Weighted Average
Four-way stop	2.92
Side-street-only stop	2.85
Traffic signal	1.62
Roundabout	1.92

Q7. What are your main walking and bicycling destinations...

Answer Choices	Responses							
...within Bar Nunn?	McMurray Pathway	None	drainage walkway between Lakota and Sioux	Parks	None	All over Bar Nunn	do not use	Bar Nunn school, parks, hanger, loaf n jug, mailboxes on McMurry
...within the Casper region?	Don't really go walking in Casper	None	none	Parks mountain	None	The path along the river	do not use	

Q8. Do you have any additional comments?

Responses
not at this time
Better ice control in winter. Road is downright dangerous
Please no additional lighting, would favor turning off street lights between ll:00 pm and 4:00 am to reduce the lighting expense in half. Also, for the walkways, motion lighting vs. just timed lighting would be beneficial.
No
More concerned about winter roads. Many of us start to work at 430 to 5 in the morning. Most of the time the roads are not clear and make detting to work difficult. The hospital has an unrealistic idea that if the roads are not cleared for us to get to work. That our fire department will get us there.
Keep the four way stop on Salt Creek and Howard. It is working.
Speed ramps on residential streets are 100% needed.

Q9. Contact Information (optional)

Name:	Street:	Email Address:
Peter Boyer	2116 Omaha Trail	boyerpeter56_89@yahoo.com
Kevin Miller	2230 Kalina Trail	kevinlee2004@att.net
Louis and Debra Fico	1913 Lakota Trail	louisfico1960@yahoo.com
Samantha	Turpin	svarney14@hotmail.com
Marianne Magee	4755 Bel Vista	mvmagee@me.com
Levi	Inca Trl	Lharper153@gmail.com

From: Jack Moore <jmcfd86@me.com>
Sent: Tuesday, January 26, 2021 6:25 PM
To: Jeremy Yates <jyates@casperwy.gov>
Subject: Bar Nunn Salt Creek Feedback

Jeremy,

Howdy, hope this email finds you well. I wanted to give you my very brief feedback on the Bar Nunn study. I was only able to attend online. These are the three options, that in my opinion, will have the most significant positive impact to the Town of Bar Nunn. These three options will drastically increase the safety and access to Bar Nunn while providing some fiscal savings.

1) Abandon the predetermined section of Antelope

- As noted in the presentation there is a positive fiscal impact associated with this option.
- Most importantly however, I foresee no significant safety impact to the Town of Bar Nunn. Ambulance and Fire Protection Response to Bar Nunn come from Wyoming Medical Center and Natrona County Fire Protection District primarily. The slight increase in response time to the neighborhoods effected by abandoning the small section of Antelope and rerouting of response through Sunset Blvd would most likely be negligible. The affected areas I speak of would be houses on Antelope St. south of Palomino as well as the entirety of Palomino St. I would estimate less than one min. impact to response times.

2) Improvement and Widening (including turn lanes and walking path) of Salt Creek from McMurry Blvd to Howard street.

- This option by far poses the highest financial impact to the area, but the positive impact to the Town of Bar Nunn would be easily measured in Safety, Access and Aesthetics.
- Safe access for foot traffic and bike traffic by constructing a pathway to Howard from the Town of Bar Nunn will make Bar Nunn a much more desirable location to live. The Loaf and Jug will continue to be a stop gap for those trips to the store for small items that don’t require a run all the way into Casper. Adults and young adults

would chose to utilize their bikes or even get some exercise. Over the years I have wanted to ride my bike into Casper to report to work, I could never bring myself to do it do to the lack of a shoulder on the road. This is a huge safety issue that would be the best possible option of the three I am suggesting.

3) Round about at Sunset.

- This one is the extra nicety I would like to see. This will slow traffic and create a gateway to our wonderfull community. We need that aesthetic focal point to advertise I presence.
- Also, round about will slow traffic and enhance the already safer Salt Creek corridor after the widening and addition of turn lanes.

Thank you for your hard work on this project. I would definitely vote for these three items should they show up on a ballot.

Jack L. Moore
5318 Nez Perce Tr
Bar Nunn, WY 82601

-----Original Message-----
From: Mary Sue Sorenson <marysuesorenson@townofbarnunn.com>
Sent: Monday, February 1, 2021 10:08 PM
To: Jeremy Yates <jyates@casperwy.gov>
Cc: marysuesorenson@townofbarnunn.com
Subject: Bar Nunn Salt Creek Hwy Corridor Traffic Study & Plan

Jeremy:
I hope it is not too late to add my comments.

NO Build Antelope - Is the road really that bad?
Concept 1 - Left Turn Lanes - this is the best option in my opinion Concept 2 - Sunset Roundabout - I am not a fan of roundabouts.
Concept 3 -Channelization- I am not in favor of adding stop signs on Antelope at Sunset or at Prairie Concept 4- Sunset Streetscape - not a necessary expenditure for the Town
Concept 5 -Truck Access Road - is this really needed?
Concept 6 - Way too expensive!
Concept 7 - SC Side Path - am I missing something here because why would anyone want to walk/bike along Salt Creek Hwy when we have such nice paths in the Town?

Thanks for your efforts on this project. Is another public meeting being planned for the future?

Mary Sue Sorenson
Bar Nunn Town Council
970.846.7254

Appendix F: Roundabout Design Guidelines

SOURCE: FEDERAL HIGHWAY ADMINISTRATION

Modern Roundabout Design Elements

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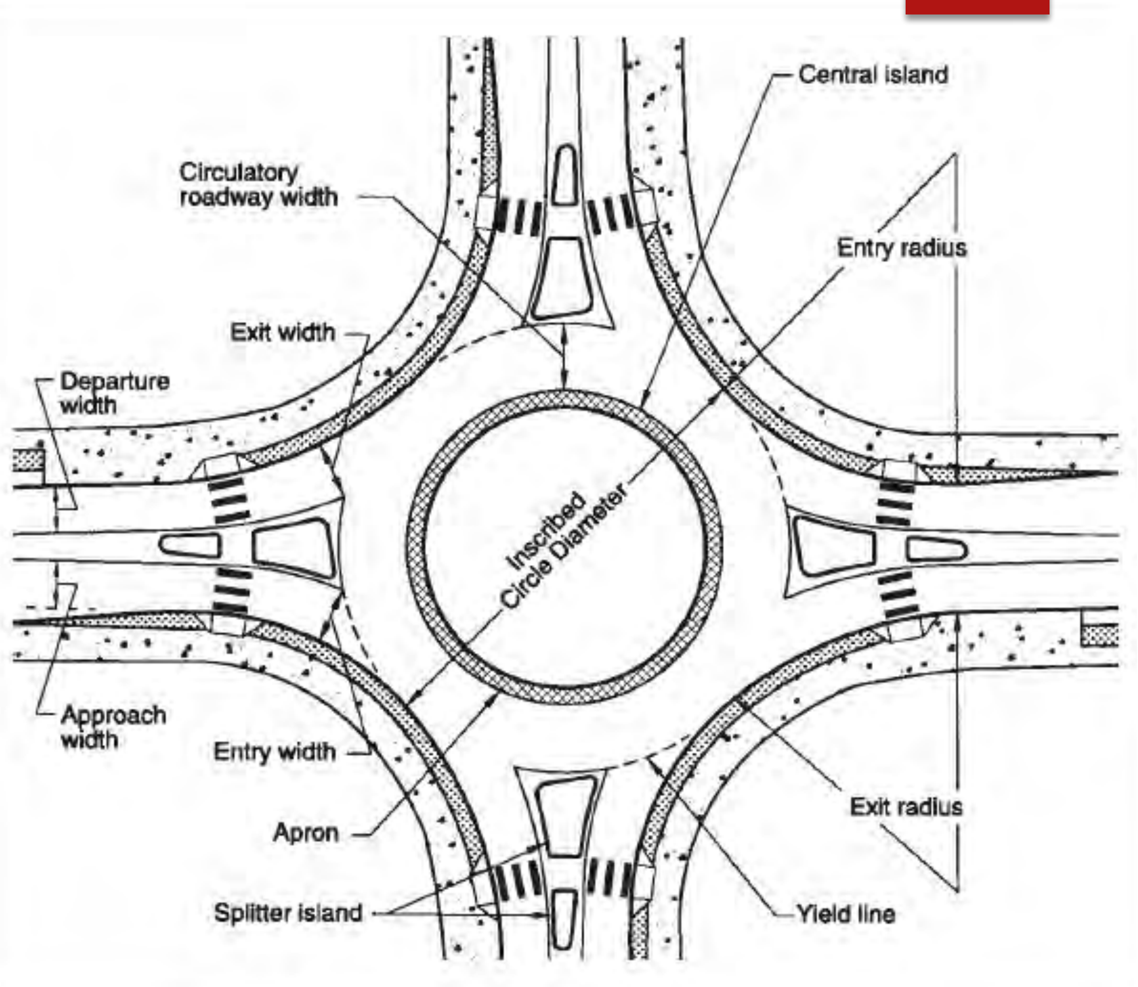
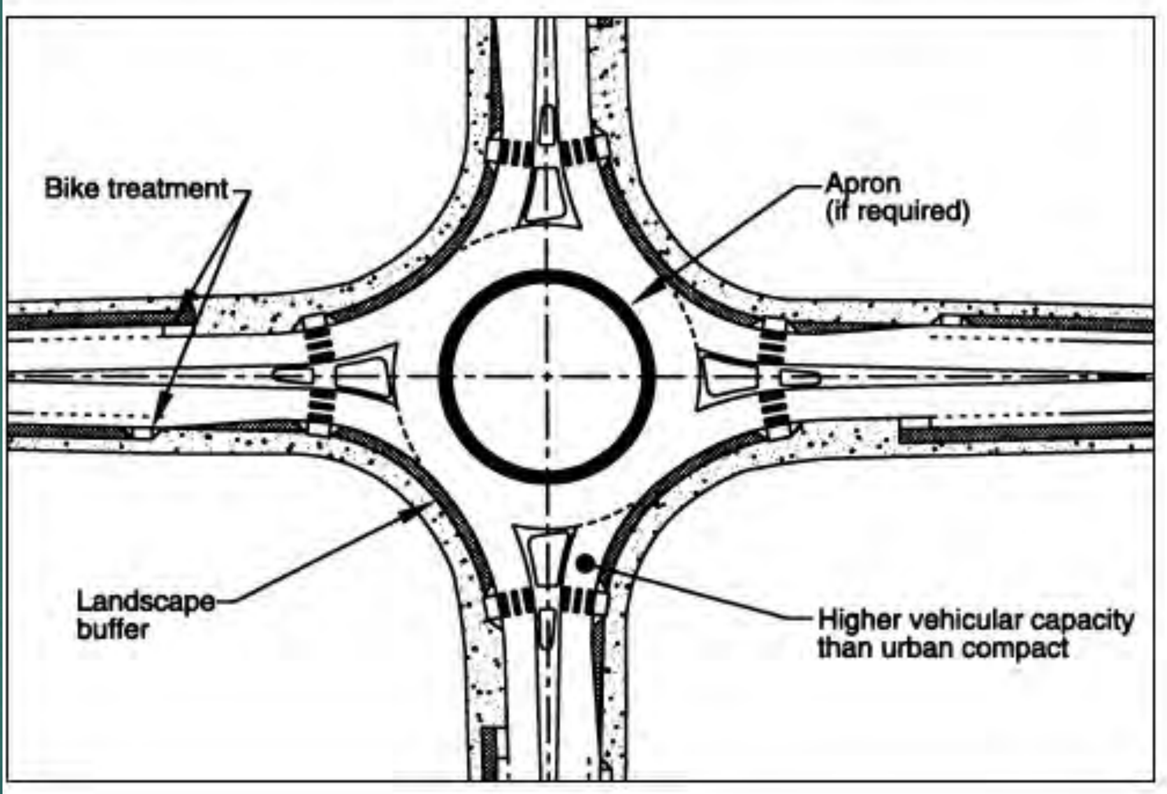
Roundabout Design Elements

- Modern Roundabouts differ from rotaries and traffic circles which have higher speeds, stop or signal control at entry points, little or no deflection and active uses in the center island.



Single Lane Roundabouts

- This type of roundabout is characterized as having a single lane entry at all legs and one circulatory lane, with a generous inscribed circle diameters and more tangential entries and exits, resulting in higher vehicle capacities. Their design allows slightly higher speeds at the entry, on the circulatory roadway, and at the exit.
- The roundabout design is focused on achieving consistent entering and circulating vehicle speeds.
- The geometric design includes raised splitter islands, a non-mountable central island, The geometric design includes raised splitter islands that incorporate at-grade pedestrian storage areas, and a non-mountable central island. There is usually an apron surrounding the non-mountable part of the compact central island to accommodate large vehicles.



Roundabout Advantages

Source: FHWA

Example Designs

- Lacy Road, WI (left)
- Golden Gate Park, CA (bottom)
- Folly Quarter Road, Ellicott City, MD