Eustachy-Wysong LLC(1)

2023

Eustachy-Wysong Ranch
Traffic Impact Study

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Management and Engineering

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2/1/2023

Traffic Impact Study Disclaimer

All recommendations and/or advice presented in this document regarding probable project conditions are the professional opinions of Civilize, PLLC. Project conditions are based on information and data sources that are readily available from the public sector, provided by the project owner, previously published studies by other competent professionals, and other reliable sources, including state agencies and local municipal government entities, all of which are relied upon as accurate. Our recommendations and/or advice are made on the basis of our experience and represent our judgment and opinions.

We have no control over new and/or non-public information, changing conditions, costs of land, labor, materials, equipment, and/or other construction costs, or over competitive bidding or market conditions. Therefore, we do not guarantee that actual conditions or actual costs will not vary from those presented in this report.

Table of Contents

Table of Figures

Table of Tables

TRAFFIC IMPACT ANALYSIS

Eustachy-Wysong Ranch

I. Executive Summary

A. Site Location and Study Area

Eustachy-Wysong Ranch is a proposed 10-lot subdivision, that is zoned for a main house and an accessory dwelling unit for each lot (20 total units). It is located in Teton County southwest of the City of Tetonia on 60 acres. Figure 1 shows the location of the proposed development.

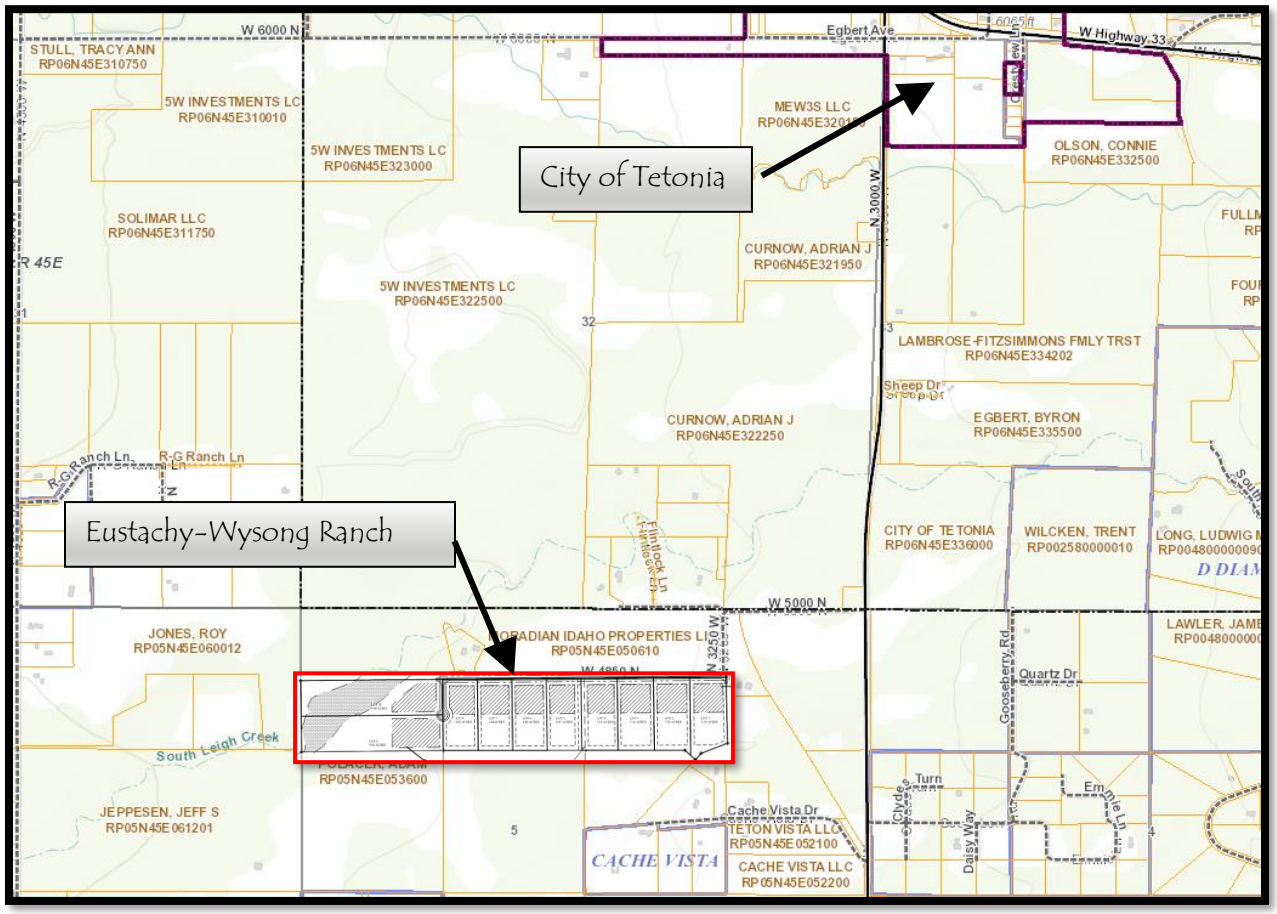


Figure 1 – Eustachy-Wysong Ranch Location Map

1. Development Description and Phasing

The original project was determined to be a 14-unit subdivision with 14 accessory dwelling units. Since the inception of the original project, the owners have reduced the number of main dwelling units from 14 to

10, representing a 29% reduction in density. The new projected land use for the build-out year of the proposed development comprises 10 main dwelling units and 10 accessory dwelling units, totaling 20 units.

The TIS was completed when the development was proposed for 14 lots and the data analysis is representative of the initial plan of 14 main dwellings and 14 accessory dwelling units. Therefore, the analysis is conservative for the current ten lot development although the difference in impact for four lots is negligible and the recommendations for mitigation will remain the same.

This traffic impact study evaluates the existing transportation conditions, the buildout condition, and a horizon year 20 years beyond the buildout year. The following analyses were performed:

- 2023 existing background traffic
- 2028 buildout year background traffic
- 2028 buildout year background plus site traffic
- 2048 horizon year background traffic
- 2048 buildout year background plus site traffic

B. Conclusions and Recommendations

After evaluating the proposed development within the context of zoning; projected land use; existing transportation system; background traffic counts for the principal roadways within the study impact area; projected traffic for horizon year's corresponding with project opening, project buildout, and a 20-year horizon year; the findings of the Traffic Impact Study are summarized below. In order to simplify the forecasted traffic conditions as they have progressed through this study, the following three (3) tables were produced. The first table shows the forecasted progression of the roadway segments, the second table shows the intersections, and the third shows the left or right turn lanes.

Table 1- Segment Traffic Conditions Progression Each Horizon Year

Segment 1: 3000W	Northbound V/C Ratio	LOS	Southbound V/C Ratio	LOS
2022 Existing Traffic	0.035	A	0.017	A
2028 Background	0.039	A	0.019	A
2028 Background plus Site Traffic	0.046	A	0.023	A
2048 Background	0.066	A	0.032	A
2048 Background plus Site Traffic	0.072	A	0.035	A

Segment 2: 4000N	Eastbound V/C Ratio	LOS	Westbound V/C Ratio	LOS
2022 Existing Traffic	0.031	A	0.040	A
2028 Background	0.035	A	0.045	A
2028 Background plus Site Traffic	0.038	A	0.052	A
2048 Background	0.058	A	0.076	A
2048 Background plus Site Traffic	0.061	A	0.082	A

Table 2- Intersection Traffic Conditions Progression Each Horizon Year

Int 1 - 3000W/5000N	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	8.7	A	n/a	n/a	0.5	A	0	A
2028 Background Traffic	8.7	A	n/a	n/a	0.5	A	0	A
2028 Background plus Site Traffic	8.7	A	n/a	n/a	2.5	A	0	A
2048 Background Traffic	8.9	A	n/a	n/a	2.5	A	0	A
2048 Background plus Site Traffic	9.1	A	n/a	n/a	2.5	A	0	A

Int 2 - 4000N/3000W	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	2.6	A	0.6	A	9.4	A	9.4	A
2028 Background Traffic	2.5	A	0.6	A	9.5	A	9.5	A
2028 Background plus Site Traffic	2.5	A	0.6	A	9.6	A	9.6	A
2048 Background Traffic	2.6	A	0.7	A	10.2	B	10.5	B
2048 Background plus Site Traffic	2.6	A	0.7	A	10.2	B	10.6	B

Int 3 - 4000N/2000W	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	1.1	A	0.2	A	9.2	A	9.3	A
2028 Background Traffic	1.2	A	0.2	A	9.3	A	9.3	A
2028 Background plus Site Traffic	1.2	A	0.2	A	9.4	A	9.4	A
2048 Background Traffic	1.2	A	0.2	A	9.9	A	10	B
2048 Background plus Site Traffic	1.2	A	0.2	A	10	B	10.2	B

Int 4 - Hwy 33/4000N	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	13.5	B	14.9	B	0.7	A	0.2	A
2028 Background Traffic	14.8	B	16.5	C	0.7	A	0.2	A
2028 Background plus Site Traffic	15	B	17	C	0.9	A	0.2	A
2048 Background Traffic	32.7	D	49.5	E	0.9	A	0.2	A
2048 Background plus Site Traffic	34.3	D	60.3	F	1	B	0.2	A

(Intersection Traffic Conditions Progression Each Horizon Year Table Continued)

Int 5 - 3000W/6000N	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	8.9	A	9	A	1.5	A	0.3	A
2028 Background Traffic	9	A	9	A	1.8	A	0.3	A
2028 Background plus Site Traffic	9	A	9.1	A	1.8	A	0.2	A
2048 Background Traffic	9.3	A	9.4	A	1.7	A	0.2	A
2048 Background plus Site Traffic	9.3	A	9.4	A	1.7	A	0.2	A

Int 6 - Hwy 33/3000W	Northeast		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	15.1	C	n/a	n/a	1.1	A	0	A
2028 Background Traffic	16	C	n/a	n/a	1.2	A	0	A
2028 Background plus Site Traffic	17.1	C	n/a	n/a	1.3	A	0	A
2048 Background Traffic	47.5	E	n/a	n/a	2.4	A	0	A
2048 Background plus Site Traffic	48.4	E	n/a	n/a	2.5	A	0	A

Table 3- Left and Right Turn Lane Progression Each Horizon Year

Int 6 - Hwy 33/3000W	Left Turn Lane	Right Turn Lane
	Northbound	Southbound
2023 Existing Traffic	Warranted	Not Warranted
2028 Background Traffic	Warranted	Not Warranted
2028 Background plus Site Traffic	Warranted	Not Warranted
2048 Background Traffic	Warranted	Warranted
2048 Background plus Site Traffic	Warranted	Warranted

C. Existing Traffic Conditions (2023)

The existing traffic conditions were analyzed with the existing intersection control and lane configurations, all the road segments and intersections are operating within minimum operational thresholds except:

- Int. 6 Hwy 33/3000W: Northwest bound, left turning traffic, exceeds the minimum safety level

1. Mitigating Measures

It is recommended that a left turn lane be constructed on Hwy 33 for the northwest-bound traffic at Intersection 6 to bring the intersection in conformance with ITD standards.

D. Projected Traffic

The projected land use for the build-out year of the proposed development initially comprised 14 main dwelling units and 14 accessory dwelling units. However, this has since been reduced to 10 main dwelling units and 10 accessory dwelling units, totaling 20 units. This reduction is not represented in the Traffic Impact Study (TIS), making the TIS a more conservative analysis. All other uses remain consistent with existing conditions.

The build-out conditions for fourteen lots are expected to generate approximately 268 vehicle trips per hour (vph) for the mean average daily traffic (MADT) and 21 vph during the PM peak hour by the year 2028.

E. 2028 Buildout Year Traffic Conditions Results

Besides those areas noted for the 2023 existing conditions, no new LOS or turning lane warrants have been identified as operating at an unacceptable level for the 2028 buildout year without or with the development.

1. Mitigation Measures for the 2028 Buildout Conditions

Since no new areas are identified to be operating at an unacceptable level, no new mitigation measures are warranted for the 2028 buildout year without or with the development.

F. 2048 Horizon Year Traffic Conditions Results

The forecasted 2048 traffic conditions were analyzed with the existing intersection control and lane configurations, all the road segments and intersections are within minimum operational thresholds except:

- Int. 4 Hwy 33/4000N: Westbound, left, thru, and right turning traffic, exceeds the minimum LOS standard without and with the development
- Int. 6 Hwy 33/3000W: Northeast bound, left and right turning traffic, exceeds the minimum LOS standard without and with the development
- Int. 6 Hwy 33/3000W: Southbound, right turning traffic, exceeds the minimum safety level without and with the development

1. Mitigating Measures for the 2048 Horizon Year

a. Int. 4: Hwy 33/4000N

Traffic modeling forecasts the westbound traffic at Int. 4 Hwy 33/4000N will operate at an unacceptable level in 2048. To improve this intersection so that each turning movement is forecasted to operate at an acceptable level, the following is recommended.

- Eastbound Traffic: A dedicated left and right turn lane be constructed
- Westbound Traffic: A dedicated left and right turn lane be constructed
- Northbound Traffic: An additional thru lane be added
- Southbound Traffic: An additional thru lane be added

b. Int. 6: Hwy 33/3000W

Traffic modeling forecasts the northeast bound left and right turning traffic at Int. 6 Hwy 33/3000W will operate at an unacceptable level in 2048. To improve this intersection so that each turning movement is forecasted to operate at an acceptable level, the following is recommended.

- Northeast Traffic: A dedicated left and right turn lane be constructed
- Northbound Traffic: A dedicated left turn lane be constructed
- Southbound Traffic: A dedicated right turn lane be constructed

G. Roadway Cross-Section Recommendations

It is recommended that the access roadway to the proposed subdivision have a minimum of 9' travel lanes, a minimum of 2' of shoulders on each side of the roadway, a minimum of 4" of compacted gravel, and a minimum of 11.25" of pit run depth.

H. Overall Study Conclusions

As can be seen from the above tables, the development is forecasted to have minimal impact to the traffic network within the study area beyond existing background traffic and the projected 20-year planning horizon. This study identified that even without the proposed development, improvements are warranted to the relevant Hwy 33 intersections for the buildout plus 20-year planning horizon. The addition traffic from this development does not change the recommended mitigating measures. The recommended mitigating measures include additional left, thru, and right turn lanes at Int. 4 Hwy 33/4000N and additional left and right turn lanes at Int. 6 Hwy 33/3000W to meet the minimum safety and traffic flow guidelines whether the development is approved and constructed or it is not.

This study also recommends that the roadway accessing the development meet the county standard (see Appendix H) with 4" of road base and 11.25" of pit run to handle the projected traffic at buildout of the proposed development.

II. Introduction and Summary

The Eustachy-Wysong Ranch is a proposed 10-lot subdivision located in Teton County, just southwest of the City of Tetonia. Each lot will consist of a main dwelling unit and an accessory dwelling unit, totaling 20 units. The concept for this project was approved on September 13, 2022. This Traffic Impact Study (TIS) is prepared for the Preliminary Plat submittal.

For a conservative analysis, the TIS includes data for the initial proposal of 14 main dwelling units and 14 accessory dwelling units. All other uses remain consistent with existing conditions. The build-out conditions are expected to generate approximately 268 vehicle trips per hour (vph) for the mean average daily traffic (MADT) and 21 vph during the PM peak hour by the year 2028.

The Teton County Planning & Zoning Commission approved the Concept Plan for the subdivision. The Tetonia Planning & Zoning Commission and the Tetonia City Council have approved the Preliminary Plat submittal. The application for Preliminary Plat submittal is currently being presented to the Teton County Planning & Zoning Commission for consideration. The application includes several stipulations that apply to the proposed subdivision, including the requirement for a Public Service/Fiscal Analysis to ascertain the financial impact the proposed development may have on public services.

Civilize, PLLC has been retained to prepare a Traffic Impact Study for the Eustachy-Wysong Ranch project in accordance with the requirements of Teton County.

A. Project Identification

The following table lists important project identification and contact information for the project.

Table 4 - Project Information Table

Project Name	
Owner	Eustachy Wysong LLC
Owner Contact Person	Larry Eustachy and Mike Wysong
Owner Address	5557 E Hootowl Dr Boise, ID 83716
Owner Telephone Number	(601) 543-5901
Owner Email	larryeustachy@icloud.com
Engineer	Civilize, PLLC
Engineer Contact Person	Brent E. “Husk” Crowther, P.E.
Engineer Address	3853 W. Mountain View Dr. Rexburg, ID 83440
Engineer Project Number	01-21-0060
Engineer Telephone Number	208-351-2824
Engineer Email	bcrowther@civilize.design

B. Location

Eustachy-Wysong Ranch is a proposed 14-lot subdivision, that will house a main and accessory dwelling unit (28 total units), that is located in Teton County southwest of the City of Tetonia on 60 acres. The following figure shows the location of the proposed development.

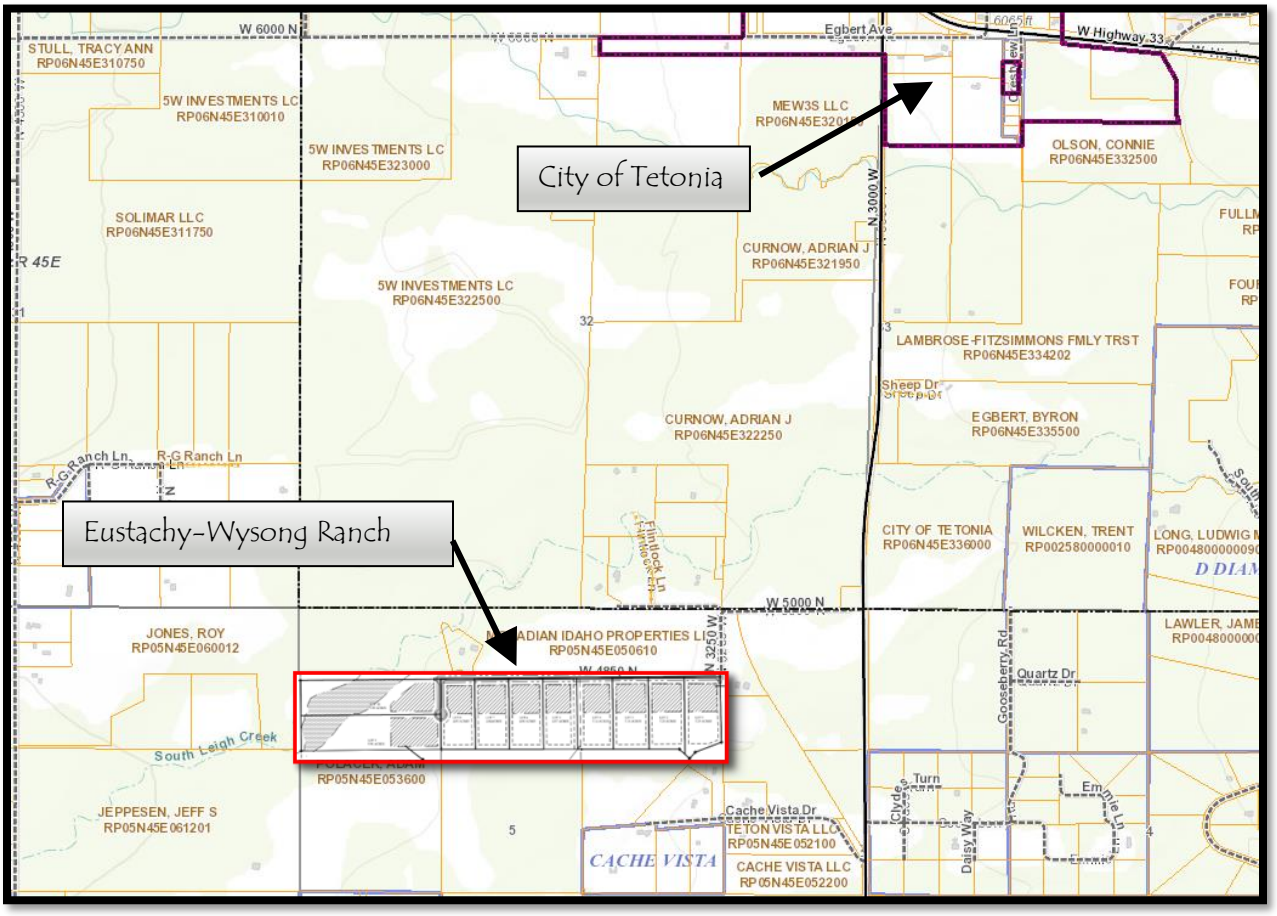


Figure 2 - Location Map

C. Applicable Regulations

The Teton County Code, Title 9 Subdivision Regulations, Chapter 3 Procedure for Approval, Section 2 Subdivision or Planned Unit Development, Paragraph C Preliminary Plat Phase, Paragraph 3 Regulations That May Apply, Item d Traffic Impact Study states:

Due to the impact that a subdivision or PUD may have on traffic levels, congestion levels, and levels of service on roads, the applicant for a proposed subdivision containing more than ten (10) lots or a proposed PUD containing more than ten (10) lots or dwelling units shall traffic impact study prepared by a professional engineer. A TIS may also be required if the Planning Administrator, the Commission, or the Board think that the condition of one or more of the roads that would provide access between the proposed development and the nearest State Highway is so poor that traffic from ten (10) or fewer lots or dwelling units could create public safety risks or

interfere with the efficient flow of traffic. Each required traffic impact study shall meet the following standards: (amd. 11-14-08)

D. Purpose of Report and Study Objectives

The purpose of the Traffic Impact Study (TIS) is to evaluate the traffic impacts resulting from the proposed development and to make recommendations for mitigation to the impacts if such prove necessary. This study discusses:

- The proposed development
- The study approach
- The area conditions
- Existing 2023 traffic volumes and conditions
- Projected traffic from the development
- Buildout 2028 traffic volumes and conditions without and with the development
- 20-Year Horizon Year traffic volumes and conditions without and with the development
- Conclusions, recommendations, and possible mitigation measures

III. Proposed Development

A. Description of On-Site Development

1. Description

The proposed development is platted for ten lots with zoning that allows a single-family residence and an accessory dwelling unit on each lot. However, the analysis within the document is based on fourteen lots, each with a main home and an accessory dwelling unit. The Traffic Impact Study (TIS) will be based on that type of development.

2. Location

As presented previously, the proposed development is located southwest of Tetonia and is comprised of 60 acres. The parcel number and address are:

- RP05N45E053100
- 3769W 4850N

3. Zoning

Currently, Teton County lists the west parcel as LA-35, Lowland Agricultural. The following map, from the Teton County GIS page, shows the zoning of the area

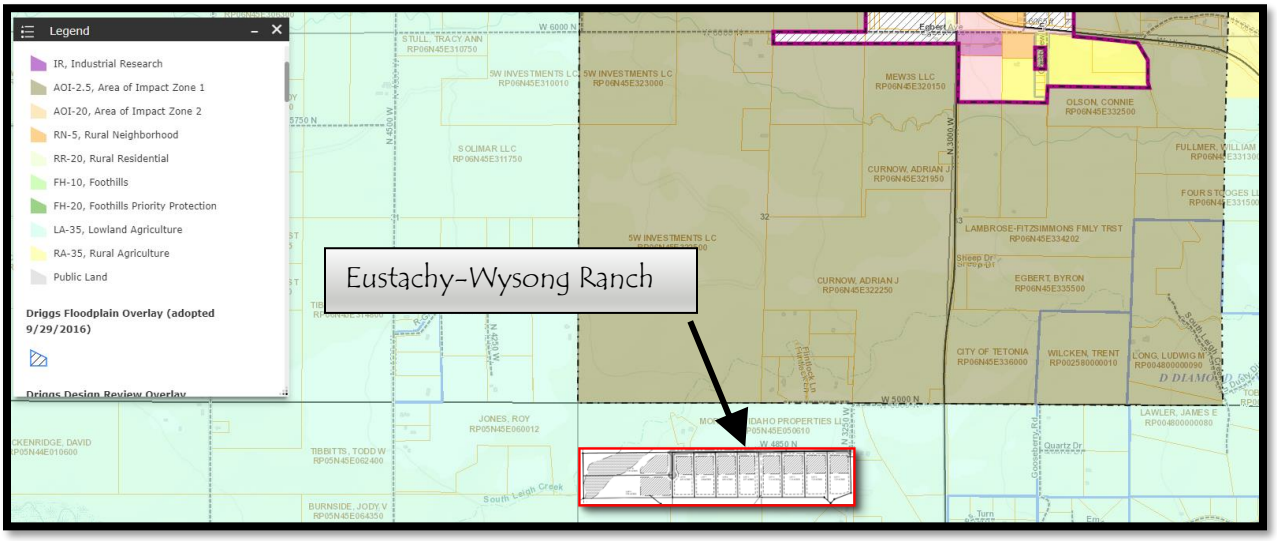


Figure 3 - Zoning Map

4. Site Plan

The site plan is presented in the following figure and in Appendix A. Although the site configuration may change slightly in the future, the site plan represents the best information regarding anticipated future development for land use and will be the basis of traffic projections generated by the proposed development.

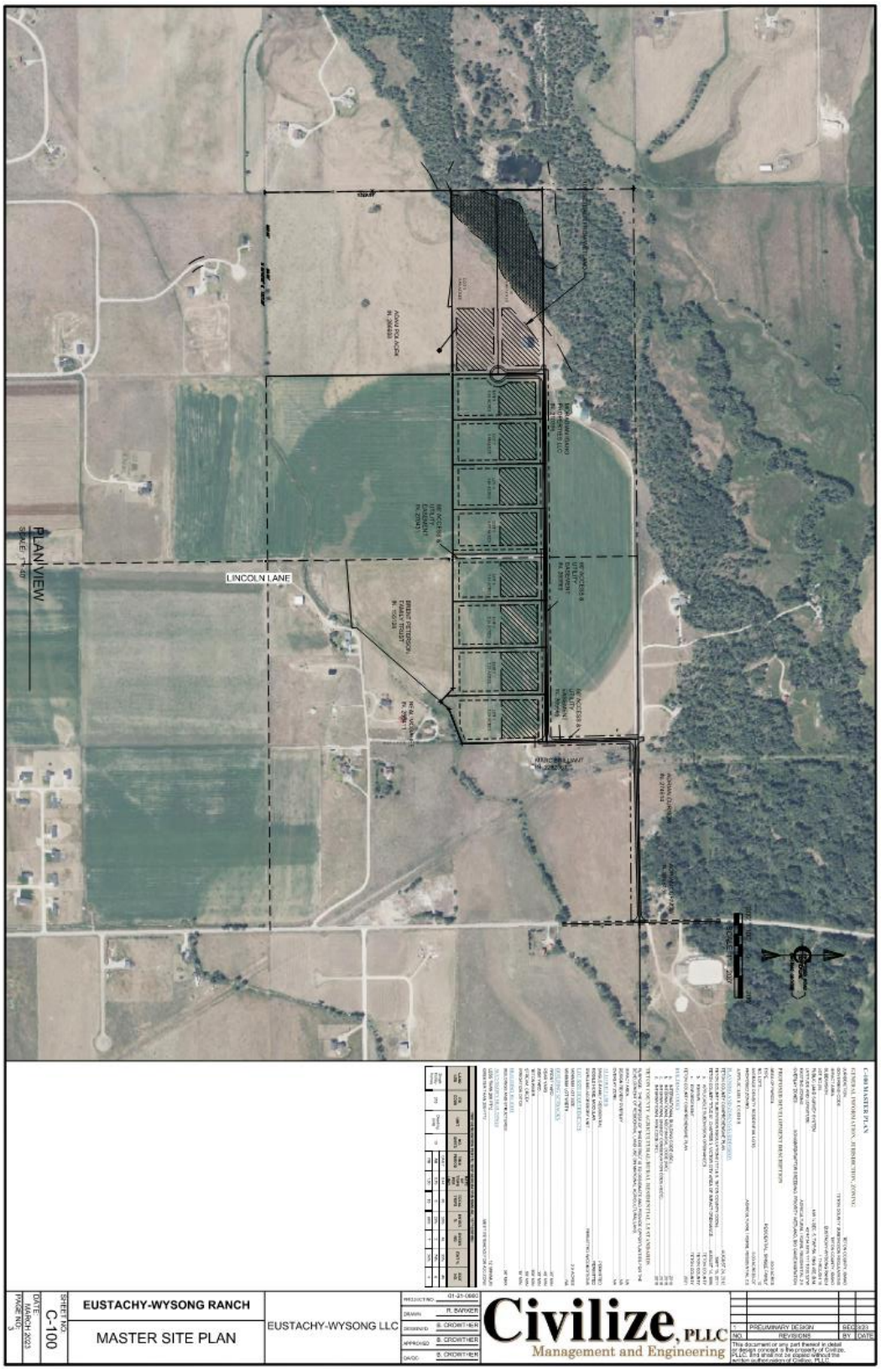


Figure 4 – Eustachy-Wysong Ranch Site Plan

5. Land Use and Intensity

The development was analyzed for 14 single-family residential lots. As stated earlier, the 14 lots will consist of a main and accessory dwelling unit for a total of 28 dwellings. The project has since been updated to reduce the number of lots to ten, each with a main home and an accessory dwelling unit for a total of 20 dwellings. The analysis was performed with the older 14 lot units making the TIS more conservative. While future development may occur in the area of the proposed project, that development is not currently defined and will not be considered in the traffic modeling, rather that responsibility will be relegated to future developers.

6. Phasing and Timing

a. Existing Conditions

The traffic counts were obtained in January of 2023. The existing condition year will be considered 2023.

b. Buildout Conditions

It is estimated that buildout will occur in five (5) years. The buildout conditions will be considered for 2028

c. 20-Year Horizon Year

The 20-year longer term traffic conditions occur 20 years after buildout. Therefore, the 20-year horizon year will be projected to year 2048. As mentioned earlier, this TIS will not consider additional traffic that may be generated from unknown developments within the study area.

IV. Study Approach

A. Full TIS or Minor TIS

The scope of this TIS is based on ITD's *Requirements for Transportation Impact Studies* (Supplement to Board Policy B-12-06) as well as the guidance document titled *Transportation Impact Analyses for Site Development*.published by the Institute of Transportation Engineers (ITE). These requirements outline a full or minor TIS as:

- A full TIS shall be required for developments that will generate more than 100 vph or 1000 vpd.
- A minor TIS is required for developments that will generate up to 99 vph or 999 vpd.

This development is forecasted to generate less than 99 vph, and less than 999 vpd, thus a minor TIS is applicable. Since this is determined to be a minor TIS, only the pm peak hour will be analyzed as recommended by the *Requirements for Transportation Impact Studies* by ITD

B. Study Period

The following study periods were identified for analysis:

1. 2023 (Existing)
2. 2028 (Project Buildout)
3. 2048 (Horizon year)

The following time intervals were identified for analysis:

1. Weekend PM peak hour

C. Segments and Intersections to be Studied

For roadway segments or links, the requirements state that if a segment experiences a directional increase of 250 vpd, and/or 25vph vehicles in the peak hour should be included in the study. In total, it is forecasted that the development at buildout will generate 268 vpd and 21 vph.

It is assumed that 75% of the traffic will be coming to and from the City of Driggs. The assumption is that when the new generated traffic exits the development, they will travel to the intersection of 3000W/5000N, then south to the intersection of 4000N/3000W, then through 4000N/2000W, and then to the intersection of Hwy 33/4000N turning right towards Driggs. The entering traffic will be the opposite order as the exit traffic.

It is assumed that the remaining 25% will be coming and going from the City of Tetonia. The assumption is that when the new generated traffic exits the development, they will travel to the intersection of 3000W/5000N, then north to the intersection of 3000W/6000N and then to the intersection of Hwy 33/3000N

The two (2) segments forecasted to see an increase in traffic by the development are 3000N and 4000W. Even though the forecasted traffic is less than the minimum recommended to study, these two (2) intersections will still be analyzed. The following is a list of the segments and intersections that will be studied.

1. Segment #1 – 3000W
2. Segment #2 – 4000N
3. Intersection #1 – 3000W/5000N
4. Intersection #2 – 4000N/3000W
5. Intersection #3 – 4000N/2000W
6. Intersection #4 – Hwy 33/4000N
7. Intersection #5 – 3000W/6000N
8. Intersection #6 – Hwy 33/3000W

D. Study Methodology, Limitations and Assumptions

1. Traffic Model

The data gathered will be entered into the Synchro Traffic Modeling Software Version 11. The traffic volumes (in vehicles per hour) during the pm peak hour will be entered into the traffic model. The following steps will be followed in this TIS:

1. PM peak traffic turning off and on Hwy 33 at the intersection of Hwy 33/4000N will be visually counted
2. PM peak traffic turning off and on Hwy 33 at the intersection of Hwy 33/3000W will be visually counted
3. PM peak traffic counts for all turning movements at the remaining intersections will be visually counted
4. Hwy 33 data will be obtained from ITD
5. Since the data was visually collected out of peak season, the visual data will be seasonally adjusted to the peak month to match the data from ITD
6. The adjusted volumes will be entered into a model for the 2023 existing conditions to establish a baseline
7. The proposed development will be analyzed to determine the projected generated traffic
8. A growth factor will be multiplied to the 2023 existing volumes to determine the forecasted 2028 traffic volumes and conditions **without** the development
9. The projected generated traffic from the development will be added to the 2028 forecasted traffic volumes to determine the forecasted 2028 traffic volumes and conditions **with** the development
10. The growth factor will be multiplied to the 2028 existing volumes to determine the forecasted 2048 (20-years after anticipated buildout) traffic volumes and conditions **without** the development
11. The projected generated traffic from the development will be added to the 2048 forecasted traffic volumes to determine the forecasted 2048 traffic volumes and conditions **with** the development
12. If a poor Level of Service (LOS) or a calculated safety issue is determined, mitigation measure will be discussed to improve the LOS

Along with entering in the traffic volumes into the model, a peak hour factor, as recommended by the Highway Capacity Manual HCM for rural roadways, of 0.88 and a 5% heavy vehicle factor will be used.

2. Anticipated Annual Growth

The growth will be based on the historical increase in traffic that the ITD has collected. This data shows that in 2002 the ADT was 1951 vpd and the in 2022 the ADT was 3252 vpd. Using the population growth formula of $P=P*(\exp(e^{rt}))$, we get an annual average increase of 2.55%. This increase will be used throughout this study.

3. Level of Service (LOS)

The traffic modeling software is used to determine the LOS. The LOS helps to determine when improvements are needed. The following sections discuss the difference between the segment and intersection LOS.

a. Segment LOS

At the time of this study, the free flow speed (FFS) was not available for the specific road segment being analyzed to determine the LOS. Therefore, in order to determine the LOS for the road segment through this area, the volume to capacity ratio (v/c ratio) will be used. In order to determine the v/c ratio, we divide the volume of the roadway by the capacity. According to the Highway Capacity Manual, the capacity of a two-lane highway is 1,700 vehicles per hour for each direction of travel. By dividing the peak hour by the peak hour capacity, we get a v/c ratio. The following table shows the correlation between the v/c ratio and the LOS. For this study, the mountainous terrain with 0% no passing will be used.

Table 5 - LOS Criteria for General Two-Lane Highway Segments

Level of Service Criteria for General Two-Lane Highway Segments

		V/C Ratio[a]																						
		Level Terrain							Rolling Terrain							Mountainous Terrain								
			% No-Passing Zone							% No-Passing Zone							% No-Passing Zone							
LOS	% Time Delay	Avg.[b] Speed	0	20	40	60	80	100	Avg.[b] Speed	0	20	40	60	80	100	Avg.[b] Speed	0	20	40	60	80	100		
A	≤ 30	≥ 58	0.15	0.12	0.09	0.07	0.05	0.04	≥ 57	0.15	0.10	0.07	0.05	0.04	0.03	≥ 56	0.14	0.09	0.07	0.04	0.02	0.01		
B	≤ 45	≥ 55	0.27	0.24	0.21	0.19	0.17	0.16	≥ 54	0.26	0.23	0.19	0.17	0.15	0.13	≥ 54	0.25	0.20	0.16	0.13	0.12	0.10		
C	≤ 60	≥ 52	0.43	0.39	0.36	0.34	0.33	0.32	≥ 51	0.42	0.39	0.35	0.32	0.30	0.28	≥ 49	0.39	0.33	0.28	0.23	0.20	0.16		
D	≤ 75	≥ 50	0.64	0.62	0.60	0.59	0.58	0.57	≥ 49	0.62	0.57	0.52	0.48	0.46	0.43	≥ 45	0.58	0.50	0.45	0.40	0.37	0.33		
E	> 75	≥ 45	1.00	1.00	1.00	1.00	1.00	1.00	≥ 40	0.97	0.94	0.92	0.91	0.90	0.90	≥ 35	0.91	0.87	0.84	0.82	0.80	0.78		
F	100	< 45	--	--	--	--	--	--	< 40	--	--	--	--	--	--	< 35	--	--	--	--	--	--		

The following figure helps define each of the six (6) segment LOS levels. When a LOS decreases to a LOS of E, mitigation measures/improvements are warranted.

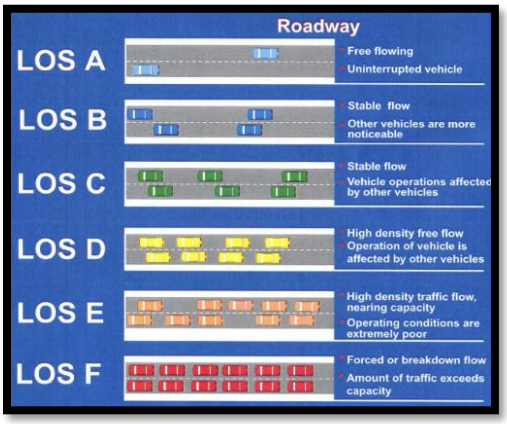


Figure 5 – Segment LOS

b. Intersection LOS

The LOS for an intersection is determined by the control delay per vehicle. The LOS is broken down into six (6) categories A through F; A being the best, F being the worst and E being the start of failure. In other words, when a LOS decreases from a D to an E, improvements are warranted. The following bulleted items and table breakdown the six (6) categories and show the correlation between the delay time and a LOS.

- LOS A: The intersection has no congestion, has less than a 10 second control delay per vehicle, and is operating below 55% capacity.
- LOS B: The intersection has very little congestion, has a control delay per vehicle between 10 and 15 seconds, and is operating between 55% and 64% capacity.
- LOS C: The intersection has no major congestion, has a control delay per vehicle between 15 and 25 seconds, and is operating between 64% and 73% capacity.
- LOS D: The intersection normally has no congestion, has a control delay per vehicle between 25 and 35 seconds, and is operating between 73% and 82% capacity.
- LOS E: The intersection is right on the verge of congested conditions, has a control delay per vehicle between 35 and 50 seconds, and is operating between 82% and 91% capacity.
- LOS F: The intersection is over capacity and experiences congestion, has a control delay per vehicle between 50 seconds or more, and is operating between 91% and 100% capacity.

Table 6 - Control Delay per Vehicle to LOS Correlation Table

Control Delay Per Vehicle (s)	LOS
≤10	A
10 to 15	B
15 to 25	C
25 to 35	D
35 to 50	E
>50	F

4. Left Turn and Right Turn Lane Warrant Analysis

The right-hand turn and left-hand turn lane warrants are analyzed following the guidance found in ITD's *Traffic Manual: Idaho's Supplementary Guide to the MUTCD*, which references *NCHRP Report 745 – Left-Turn Accommodations at Unsignalized Intersections.* In addition, the *NCHRP 457 – Evaluating Intersection Improvements: An Engineering Study Guide* was utilized for right-turn movements. The following figures show the left-turn and right-turn warrant charts for intersections on a two-lane rural highway.

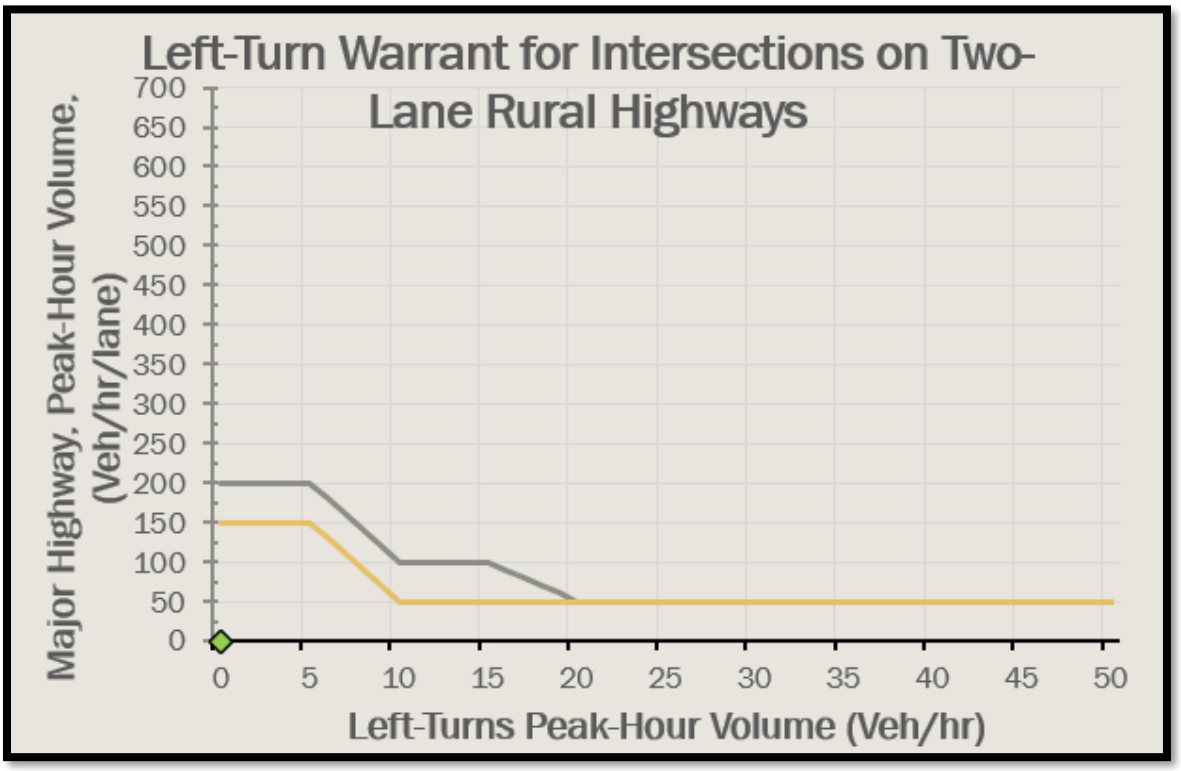


Figure 6 – Left-Turn Warrant Chart

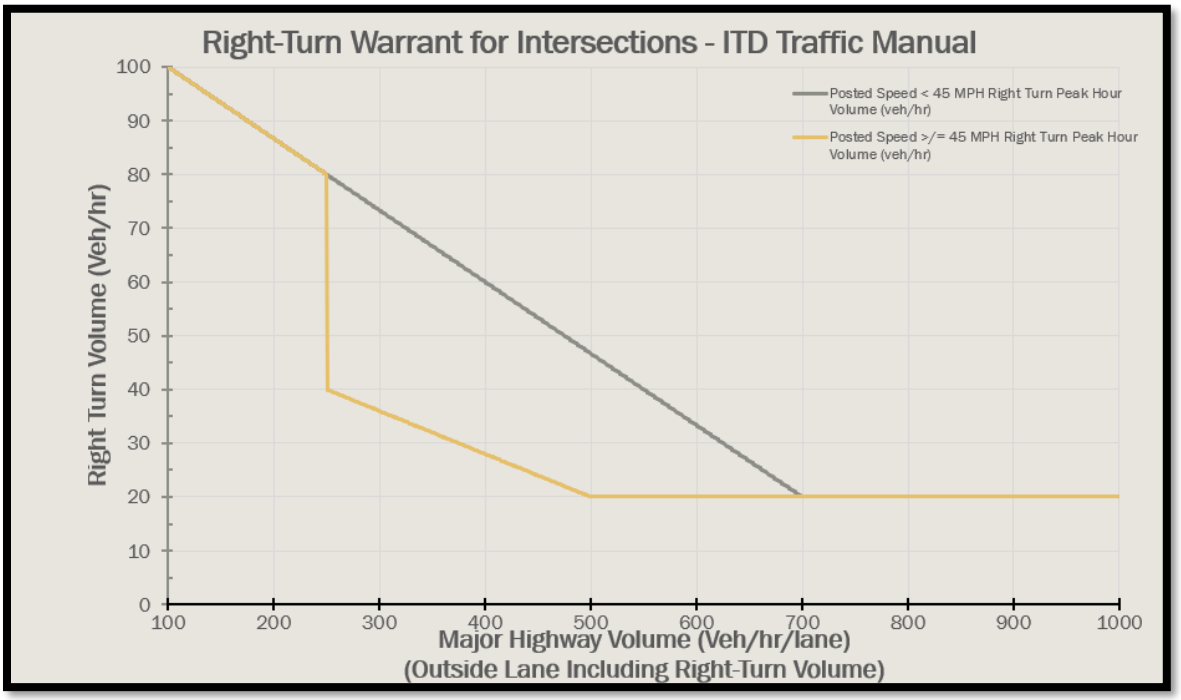


Figure 7 – Right-Turn Warrant Chart

V. Area Conditions

A. Study Area

1. Area of Influence and Significant Traffic Impact

The area of influence for this analysis includes the following roadway segments and intersections.

1. Segment #1 – 3000W
2. Segment #2 – 4000N
3. Intersection #1 – 3000W/5000N
4. Intersection #2 – 4000N/3000W
5. Intersection #3 – 4000N/2000W
6. Intersection #4 – Hwy 33/4000N
7. Intersection #5 – 3000W/6000N
8. Intersection #6 – Hwy 33/3000W

The area of influence is presented in the following figure.

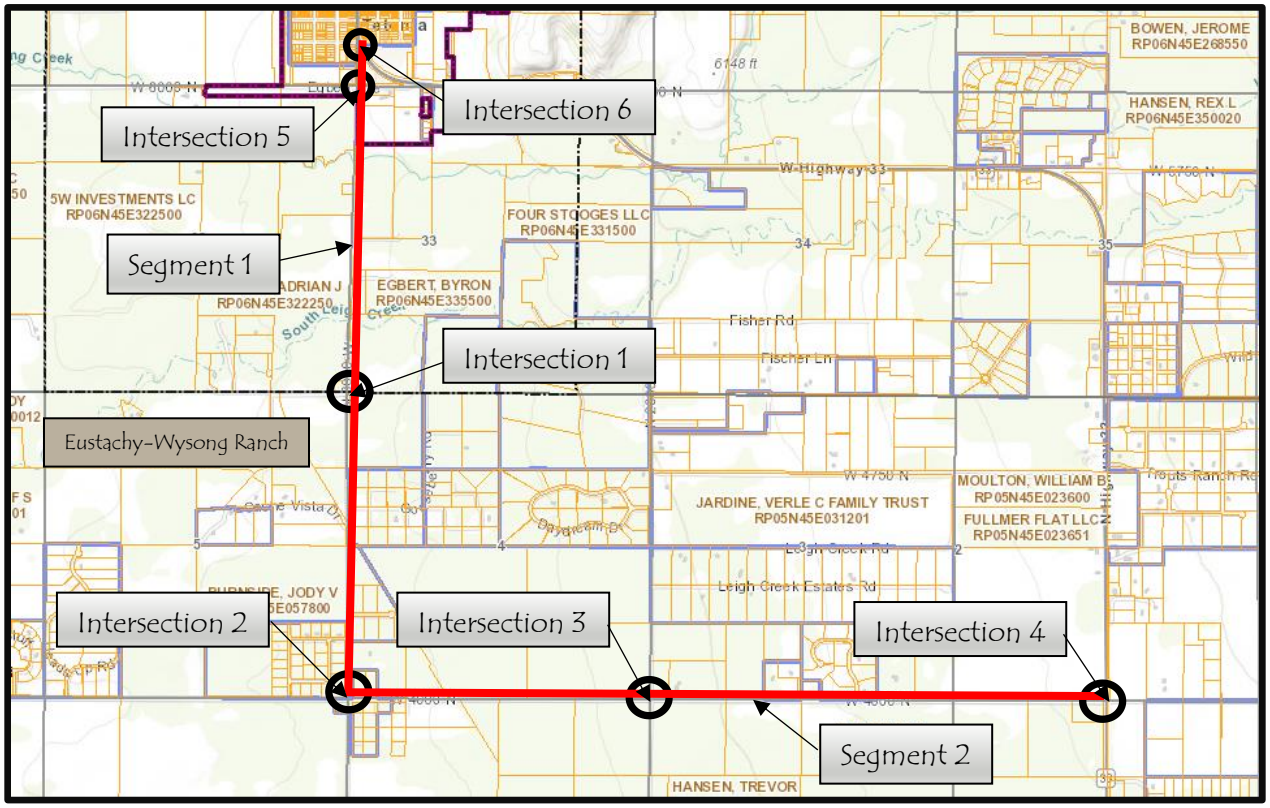


Figure 8 – Area of Influence and Significant Traffic Impact

B. Study Area Land Use

1. Existing Land Uses

The current land use is agricultural interspersed with scattered residential use. The City of Tetonia is a small rural community located just southwest of the development. The use can be observed in the various figures presented and in viewing the parcels using various commercial mapping platforms available to the public such as Google Earth, Bing Maps, and the Teton County GIS parcel viewer.

2. Existing Zoning

Currently, Teton County lists the west parcel as LA-35, Lowland Agricultural. The use of the land reflects that zone.

3. Anticipated Future Development

The future development in the area is the proposed project which consists of 14 single-family residences lots. As stated earlier, the 14 lots will consist of a main and an accessory dwelling unit for a total of 28 dwellings. This has since been reduced in density to 10 single-family residences on 10 lots for a total of 20 dwellings.

C. Site Accessibility

Access to the site will be by 3000W, 4000N, and 5000N.

1. Road Network Functional Classification.

For access guidelines, the Road Classification Map published by Teton County shows that 3000W is a minor collector, 4000N is a major collector, and 5000N is a minor neighborhood. see the following figure for the Teton County Road Classification Map.

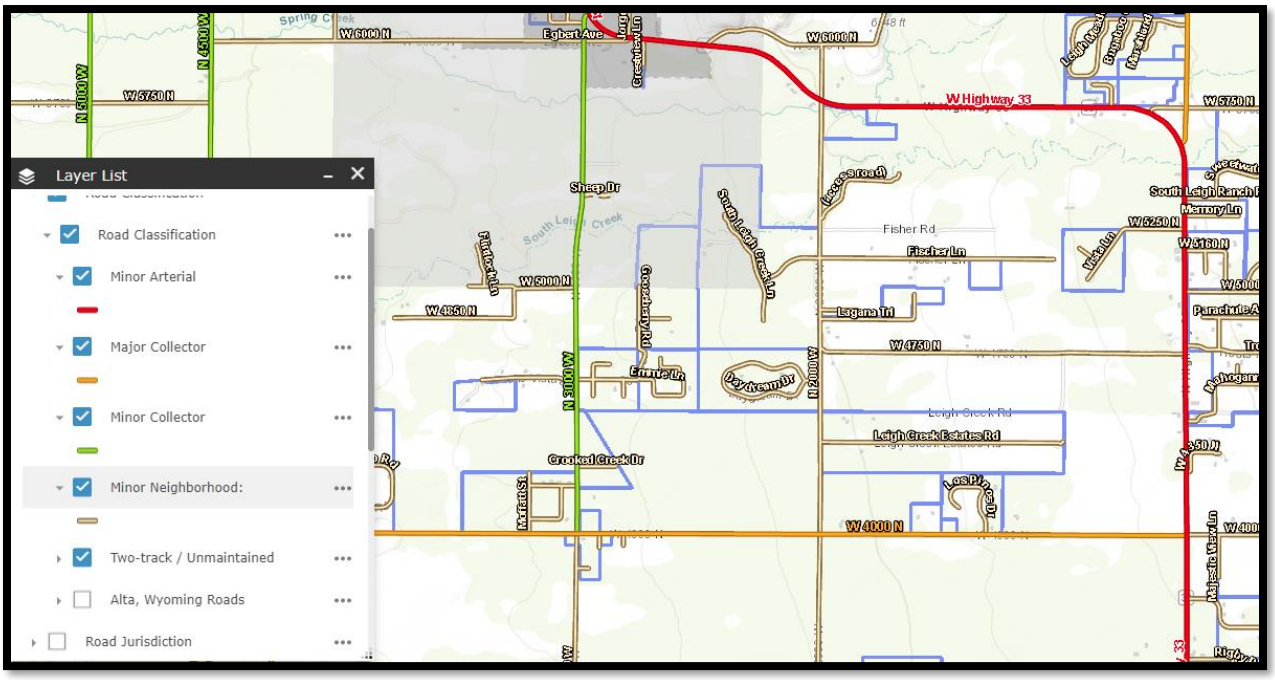


Figure 9 - Teton County Road Classification Map

2. Access Management

Access management within a city is intended to facilitate safe and convenient access and circulation for vehicular traffic, pedestrians, and bicycles within a jurisdiction. Access management for the state highway system intended to provide safe transit for reginal and interstate traffic. As such, the objectives of access management within a city can sometimes be different than those for a state highway system.

a. Teton County

Access management for Teton County is governed by the publication Highway & Street Guidelines for Design and Construction in Teton County, Idaho as amended April 11, 2013. A review of that publication does not reveal any specific requirements for access management.

3. Area Transportation Elements and Roadway System

a. Existing Roadway Network

The existing roadway network consists of rural two-lane roadways.

b. Transit Service

TRPTA operates public transit services in the area but not on roadways within the study area of this Traffic Impact Study.

c. Bicycle and Pedestrian Facilities

There are no bicycle or pedestrian facilities on the roads in the vicinity of the development.

d. Future

Other than the roads for the proposed development, there are no known future road improvements in the vicinity.

4. Accident History

a. ITD Crash Data

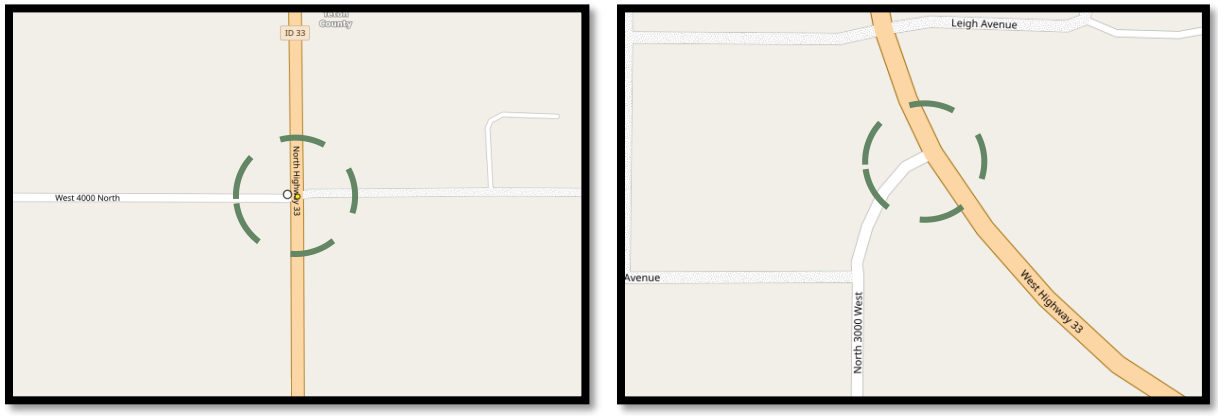


Figure 10 - LHTAC Crash Data for Int. 4 (Hwy 33/4000N) & Int. 6 (Hwy 33/3000W)

According to the Idaho Local Road Crash Data that was obtained from the Local Highway Technical Assistance Council (LHTAC) there has been two (2) crashes within the influence study area at Intersection 4 and zero (0) at Intersection 6 as depicted in the above Figure. Of these accidents, no fatalilites have been recorded and are below the base rate for a similar intersection types in Idaho.

VI. Existing 2023 Traffic Volumes and Conditions

A. Traffic Forecasting

There are diverse ways to forecast future traffic flow and patterns. A common forecasting method is to take the historic population and forecast the traffic from those values. However, in this situation, recreation and tourism is a major factor, therefore using traffic data trends from ITD traffic counts will provide more satisfactory results from which to draw conclusions and make recommendations for mitigation. This study will use traffic data obtained from the ITD to determine traffic conditions for the 2023 (existing), 2028 (Project buildout), and the 2048 (20-year after buildout) horizon years.

B. Roadway Network

Within the area of influence there will be two (2) roadway segments and six (6) existing intersection studied. The segments and the intersections that will analyzed are:

1. Segment #1 – 3000W
2. Segment #2 – 4000N
3. Intersection #1 – 3000W/5000N
4. Intersection #2 – 4000N/3000W
5. Intersection #3 – 4000N/2000W
6. Intersection #4 – Hwy 33/4000N
7. Intersection #5 – 3000W/6000N
8. Intersection #6 – Hwy 33/3000W

C. Seasonal Adjustment

As a recreational destination, the traffic volumes fluctuate throughout the year with the summer months exhibiting the highest ADT. It has been determined that the peak month in 2022 was July with an ADT of 4,219 vpd. The visual counts were performed in January of 2023; the change in traffic percentage from January 2022 to July of 2022 will be used to determine the seasonal adjustment. The ITD data for January of 2022 shows that there was an ADT of 2,357 vpd. This indicated that the seasonal difference between when the visual counts were performed (January) and the peak month (July) is a difference of 79.0%. Throughout this study, all visual counts in January will be increased by 79.0% to help project the traffic in July.

D. Existing 2023 Segment PM Peak Traffic Volumes

This section discusses the ADT, the peak hour flows, and the trip distribution for the existing traffic. As stated previously, the segments of 3000W and 4000N will be analyzed. Traffic counts in the study area were visually collected on January 13, 2023 during the pm peak hour.

1. Seg. 1 - 3000W Existing 2023 PM Peak Hr Flow

The results of this visual count show that there were 33 vph headed north and 16 vph headed south during pm peak hour. Increasing these counts by the 79.0% seasonal adjustment, it is calculated that there are 59 vph headed north and 29 vph headed south.

2. Seg. 2 – 4000N Existing 2023 PM Peak Hr Flow

The results of this visual count show that there were 29 vph headed east and 38 vph headed west during pm peak hour. Increasing these counts by the 79.0% seasonal adjustment it is calculated that there are 52 vph headed east and 68 vph headed west.

E. Existing 2023 PM Peak Intersection Traffic Volumes

1. Highway 33 Peak Hr Flow

For the two (2) intersections that include Hwy 33, only the turning movements off of Hwy 33 were counted. This is due to the fact that the ITD has counters on Hwy 33 that collect a number of different data items that provides a larger window of data. The data obtained from the ITD for Hwy 33 will be adjusted to the study area and added to the seasonally adjusted visual counts. The ITD website for Road Data features an interactive map that allows a query by road milepost for Average Annual Daily Traffic (AADT), which is the total volume of traffic on a road for a year divided by the number of days (365) in a year. However, these values are annual averages rather than peak days that reflect summertime travel. ITD also maintains Automatic Traffic Recorders (ATRs) throughout the state including District 6, two (2) of these ATRs are located on Hwy 33; ATR 59 east of Newdale and ATR 239 south of Driggs. The ATR most relevant to this project is ATR #59 near Newdale which records the traffic on Hwy 33. The monthly AADT for ATR #59 in 2023 ranged from a low in January of 2,357 vpd to a high in July of 4,219 vpd. This study will focus on the July MADT or peak season and not the ADT. The following figure shows the locations of the ATRs in the area.

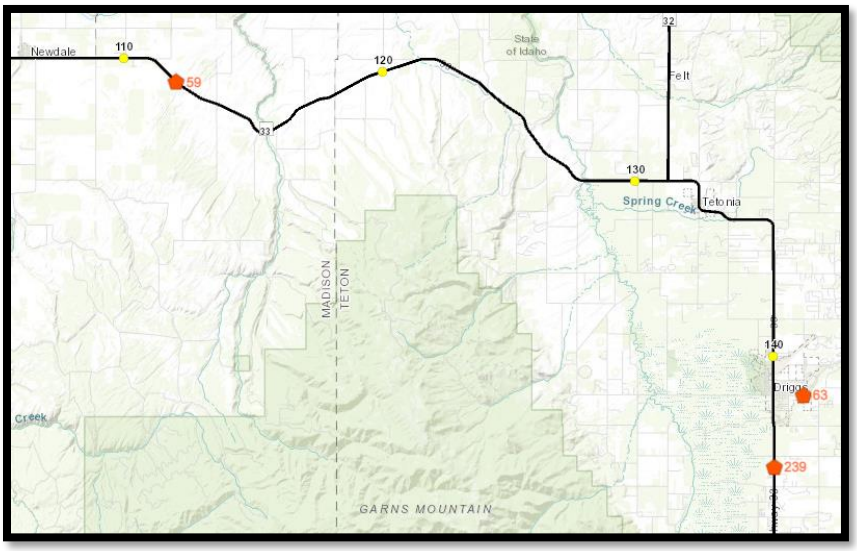


Figure 11: Hwy 33 ATR Locations

Furthermore, an adjustment needs to be made due to the fact that ATR 59 is 25 miles away from the study area. The ITD does have a database that has the ADT for each milepost along Hwy 33. In order to make these adjustments, the ADT difference between ATR 59 (Milepost 113) and the study area (Milepost 133 and Milepost 137.3) will be used. The following figure shows the mileposts along Hwy 33.

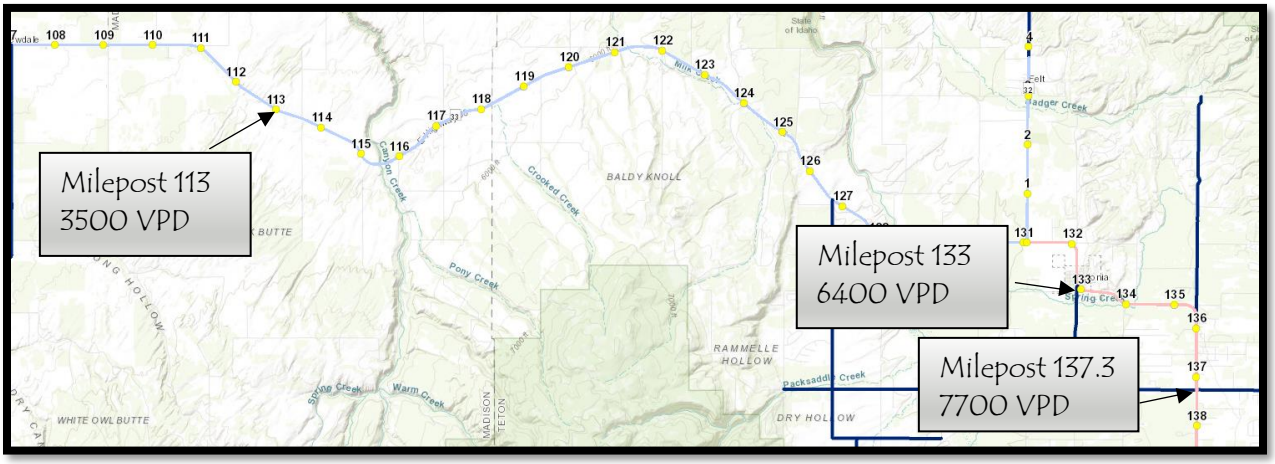


Figure 12: Hwy 33 Mileposts and ADT

The ITD website shows that the ADT at Milepost 113 is 3500 vpd, at Milepost 133 it is 6400 vpd, and at Milepost 137.3 is 7700 vpd. It is calculated that there is an increase in traffic of 82.9% between Milepost 113 and Milepost 133 and an increase of 20.3% between mileposts 133 and 137.3.

Data retrieved at ATR 59 shows that in July, the highest traffic day is Friday. Furthermore, the highest pm peak hour traffic occurs between 5:00 pm and 6:00 pm on Fridays with a monthly average pm peak of 407 vph with 192 vph traveling east and 214 vph traveling west.

The last step is to take the recorded pm peak hour traffic and adjust it proportionately to the milepost ADT increases; an increase of 82.9% from Milepost 113 to Milepost 133 and an increase of 20.3% from Milepost 132 to Milepost 137.3. The following table shows the calculated PM peak hour volumes that will be used in this study. These volumes will be used in analyzing the intersections.

Table 7 Existing Segment ADT, Peak Hour, and Trip Distribution Volumes

Milepost	Year	ADT	July PM Peak	PM Peak Eastbound	PM Peak Westbound
113	2022	3500	407	192	214
Milepost	**Year**	**ADT**	**July PM Peak**	**PM Peak Northbound**	**PM Peak Southbound**
133	2022	6400	742	351	391
137.3	2022	7700	893	422	471

2. Int. 1 – 3000W/5000N Peak Hr Volume

The traffic volumes that were collected on January 13, 2023 were seasonally adjusted to help emulate the peak month of July. The results are shown in the following figure.

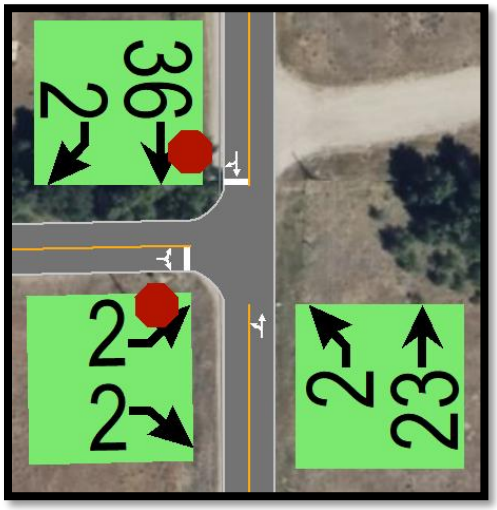


Figure 13: Int. 1 Existing 2023 PM Peak Hr Volume

3. Int. 2 – 4000N/3000W Peak Hr Volume

The traffic volumes that were collected on January 13, 2023 were seasonally adjusted to help emulate the peak month of July. The results are shown in the following figure.

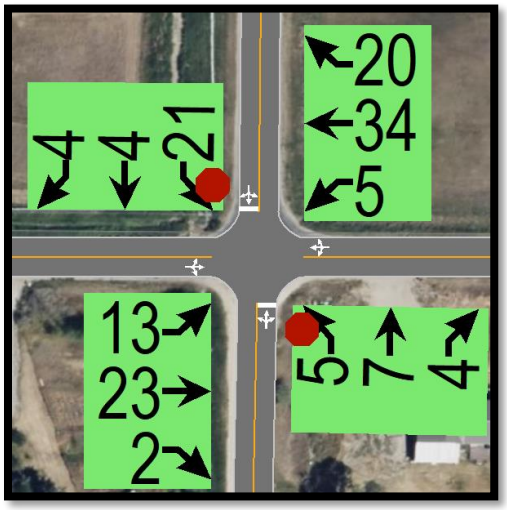


Figure 14: Int. 2 Existing 2023 PM Peak Hour Volume

4. Int. 3 – 4000N/2000WPeak Hour Volume

The traffic volumes that were collected on January 13, 2023 were seasonally adjusted to help emulate the peak month of July. The results are shown in the following figure.

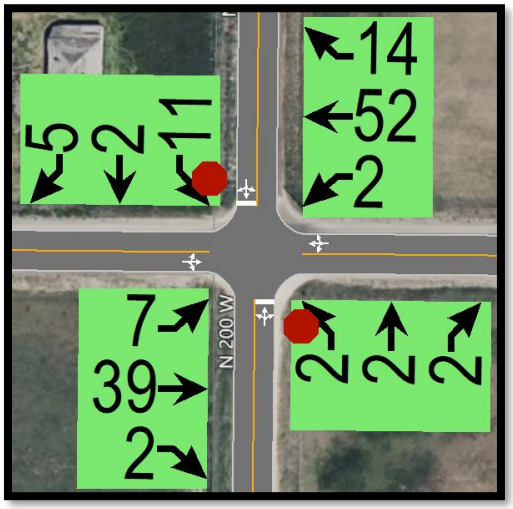


Figure 15: Int. 3 Existing 2023 PM Peak Hour Volume

5. Int. 4 – Hwy 33/4000N Peak Hour Volume

The turning movements that were visually counted on January 13, 2023 were seasonally adjusted to July and were added to the collected July traffic counts provided by the ITD. The results are shown in the following figure.

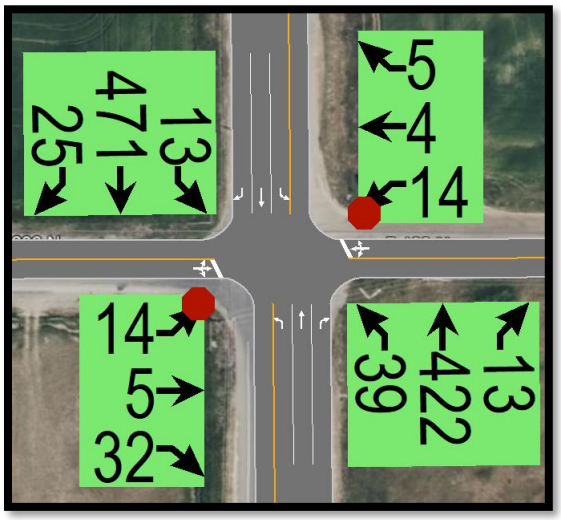


Figure 16: Int. 4 Existing 2023 PM Peak Hour Volume

6. Int. 5 – 3000W/6000N Peak Hour Volume

The traffic volumes that were collected on January 13, 2023 were seasonally adjusted to help emulate the peak month of July. The results are shown in the following figure.

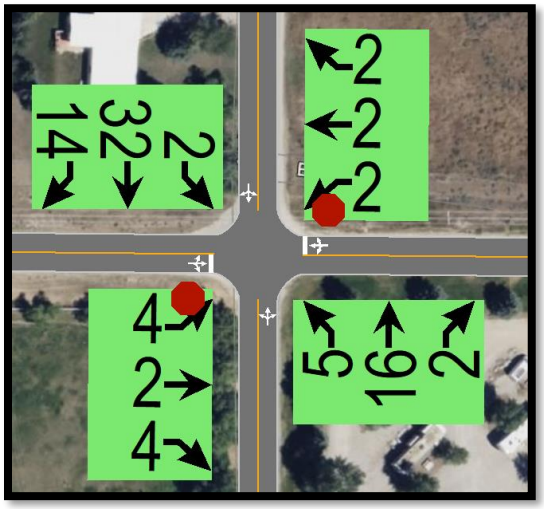


Figure 17: Int. 5 Existing 2023 PM Peak Hour Volume

7. Int. 6 – Hwy 33/3000W Peak Hour Volume

The traffic volumes that were collected on January 13, 2023 were seasonally adjusted to help emulate the peak month of July. The results are shown in the following figure.

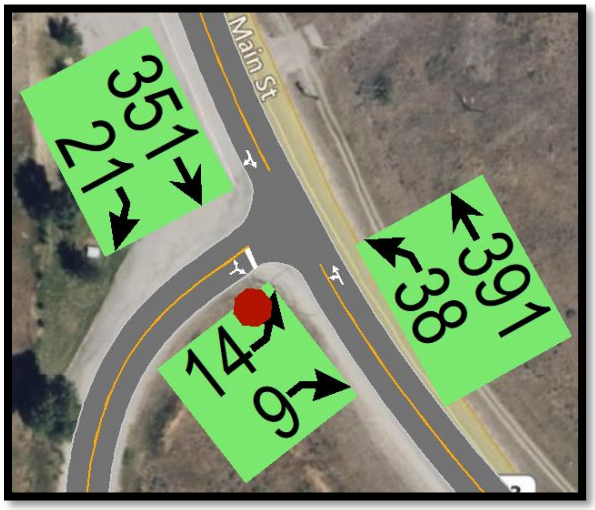


Figure 18: Int. 6 Existing 2023 PM Peak Hour Volume

F. Existing 2023 Segment PM Peak Traffic Conditions

At the time of this study, the free flow speed (FFS) was not available for the specific road segment being analyzed. Therefore, in order to determine the LOS for the road segment through this area, the volume to capacity ratio (v/c ratio) will be used. In order to determine the v/c ratio, we divide the volume of the

roadway by the capacity. According to the Highway Capacity Manual, the capacity of a two-lane highway is 1,700 vehicles per hour for each direction of travel. By dividing the peak hour by the peak hour capacity, we get a v/c ratio. The following table shows the correlation between the v/c ratio and the LOS.

Table 8 Level of Service Criteria for General Two-Lane Highway Segments

Level of Service Criteria for General Two-Lane Highway Segments

		V/C Ratio[a]																		
		Level Terrain							Rolling Terrain							Mountainous Terrain						
			% No-Passing Zone							% No-Passing Zone							% No-Passing Zone					
LOS	% Time Delay	Avg.[b] Speed	0	20	40	60	80	100	Avg.[b] Speed	0	20	40	60	80	100	Avg.[b] Speed	0	20	40	60	80	100
A	≤ 30	≥ 58	0.15	0.12	0.09	0.07	0.05	0.04	≥ 57	0.15	0.10	0.07	0.05	0.04	0.03	≥ 56	0.14	0.09	0.07	0.04	0.02	0.01
B	≤ 45	≥ 55	0.27	0.24	0.21	0.19	0.17	0.16	≥ 54	0.26	0.23	0.19	0.17	0.15	0.13	≥ 54	0.25	0.20	0.16	0.13	0.12	0.10
C	≤ 60	≥ 52	0.43	0.39	0.36	0.34	0.33	0.32	≥ 51	0.42	0.39	0.35	0.32	0.30	0.28	≥ 49	0.39	0.33	0.28	0.23	0.20	0.16
D	≤ 75	≥ 50	0.64	0.62	0.60	0.59	0.58	0.57	≥ 49	0.62	0.57	0.52	0.48	0.46	0.43	≥ 45	0.58	0.50	0.45	0.40	0.37	0.33
E	> 75	≥ 45	1.00	1.00	1.00	1.00	1.00	1.00	≥ 40	0.97	0.94	0.92	0.91	0.90	0.90	≥ 35	0.91	0.87	0.84	0.82	0.80	0.78
F	100	< 45	--	--	--	--	--	--	< 40	--	--	--	--	--	--	< 35	--	--	--	--	--	--

1. Seg. 1 – 3000W Existing 2023 PM Peak Hour Traffic Conditions

The visual counts that were seasonally adjusted show that there were 59 vph heading north and 29 vph heading south during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.035 for northbound traffic and 0.017 for southbound traffic. The terrain within the study area is considered level and a 0% no passing zone will be used. This results in a LOS of A for both directions.

a. Seg. 1: 3000W Existing 2023 Mitigation Measures

Since the worst LOS is an A, no improvements are warranted for the existing segment conditions.

2. Seg. 2: 5000N Existing 2023 PM Peak Hour Traffic Conditions

The visual counts that were seasonally adjusted show that there are 52 vph heading east and 68 vph heading west during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.031 for eastbound and 0.040 for westbound. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

a. Seg. 2: 5000N Existing 2023 Mitigation Measures

Since the worst LOS is an A, no improvements are warranted for the existing segment conditions.

G. Existing 2023 Intersection PM Peak Hour Traffic Conditions

In order to determine how well an intersection is functioning, the intersection's Measures of Effectiveness (MOEs) for the peak hour are analyzed. The MOEs include:

1. Level of Service (LOS)
2. Control Delay
3. Volume/Capacity Ratio (V/C Ratio)
4. 95th Percentile Queue

Using the traffic volumes and turning movements shown previously, the 2023 existing MOEs for the intersections can be determined.

1. Int. 1 – 3000W/5000N Existing 2023 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 1 are shown in the following table.

Table 9 –Int. 1 – Existing (2023) Peak Hour MOEs

HCM 2000 SIGNING SETTINGS	EBL	EBR	NBL	NBT	SBT	SBR
Lanes and Sharing (#RL)						
Traffic Volume (vph)	2	2	2	23	36	2
Future Volume (vph)	2	2	2	23	36	2
Sign Control	Stop	—	—	Free	Free	—
Median Width (ft)	12	—	—	0	0	—
TWLTL Median	☐	—	—	☐	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	6.4	6.2	4.1	—	—	—
Follow Up Time, tF (s)	3.5	3.3	2.2	—	—	—
Volume to Capacity Ratio	0.00	0.00	0.00	0.00	0.02	0.02
Control Delay (s)	8.7	8.7	0.0	0.5	0.0	0.0
Level of Service	A	A	A	A	A	A
Queue Length 95th (ft)	0	0	0	0	0	0
Approach Delay (s)	8.7	—	—	0.5	0.0	—

2. Int. 2 – 4000N/3000W Existing 2023 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 2 are shown in the following table.

Table 10 –Int. 2 - Existing (2023) Peak Hour MOEs

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	13	23	2	5	34	20	5	7	4	21	4	4
Future Volume (vph)	13	23	2	5	34	20	5	7	4	21	4	4
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—	☐	—	—	☐	—	—	☐	—	—	☐	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.02	0.02	0.04	0.04	0.04
Control Delay (s)	0.1	2.6	2.6	0.0	0.6	0.6	9.4	9.4	9.4	9.4	9.4	9.4
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	0	0	0	2	2	2	3	3	3
Approach Delay (s)	—	2.6	—	—	0.6	—	—	9.4	—	—	9.4	—

3. Int. 3 – 4000N/2000W Existing 2023 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 3 are shown in the following table.

Table 11 –Int. 3 - Existing (2023) Peak Hour MOEs

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	7	39	2	2	52	14	2	2	2	11	2	5
Future Volume (vph)	7	39	2	2	52	14	2	2	2	11	2	5
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—	☐	—	—	☐	—	—	☐	—	—	☐	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02
Control Delay (s)	0.0	1.2	1.2	0.0	0.2	0.2	9.2	9.2	9.2	9.3	9.3	9.3
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	0	0	0	0	0	0	1	1	1	2	2	2
Approach Delay (s)	—	1.2	—	—	0.2	—	—	9.2	—	—	9.3	—

4. Int. 4 – Hwy 33/4000N Existing 2023 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 4 are shown in the following table.

Table 12 –Int. 4 – Existing (2023) Peak Hour MOEs

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	14	5	32	14	4	5	39	422	13	13	471	25
Future Volume (vph)	14	5	32	14	4	5	39	422	13	13	471	25
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	12	—	—	12	—
TWLTL Median	—	☐	—	—	☐	—	—	☑	—	—	☑	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.11	0.11	0.11	0.06	0.06	0.06	0.04	0.27	0.01	0.01	0.30	0.02
Control Delay (s)	13.5	13.5	13.5	14.9	14.9	14.9	8.6	0.0	0.0	8.3	0.0	0.0
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Queue Length 95th (ft)	10	10	10	5	5	5	3	0	0	1	0	0
Approach Delay (s)	—	13.5	—	—	14.9	—	—	0.7	—	—	0.2	—

5. Int. 5 – 3000W/6000N Existing 2023 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 5 are shown in the following table.

Table 13 –Int. 5 - Existing (2023) Peak Hour MOEs

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	4	2	4	2	2	2	5	16	2	2	32	14
Future Volume (vph)	4	2	4	2	2	2	5	16	2	2	32	14
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Control Delay (s)	8.9	8.9	8.9	9.0	9.0	9.0	0.0	1.5	1.5	0.0	0.3	0.3
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	0	0	0	0	0	0	0	0	0
Approach Delay (s)	—	8.9	—	—	9.0	—	—	1.5	—	—	0.3	—

6. Int. 6 – Hwy 33/3000W Existing 2023 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 6 are shown in the following table.

Table 14 –Int. 6 - Existing (2023) Peak Hour MOEs

HCM 2000 SIGNING SETTINGS	NBL	NBT	SBT	SBR	NEL	NER
Lanes and Sharing (#RL)						
Traffic Volume (vph)	38	391	351	21	14	9
Future Volume (vph)	38	391	351	21	14	9
Sign Control	—	Free	Free	—	Stop	—
Median Width (ft)	—	0	0	—	12	—
TWLTL Median	—			—		—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	4.1	—	—	—	6.4	6.2
Follow Up Time, tF (s)	2.2	—	—	—	3.5	3.3
Volume to Capacity Ratio	0.04	0.04	0.24	0.24	0.07	0.07
Control Delay (s)	0.4	1.1	0.0	0.0	15.1	15.1
Level of Service	A	A	A	A	C	C
Queue Length 95th (ft)	3	3	0	0	5	5
Approach Delay (s)	—	1.1	0.0	—	15.1	—

H. Turn Lane Warrants Based on Safety Analysis of Intersections

1. Existing Conditions Left Turn Lane Analysis

Intersection #1 and #2 were evaluated for safety using ITD guidelines which recommend using the *National Cooperative Highway Research Report 745 –Left-Turn Accommodations at Unsignalized Intersections* (*NCHRP 745) to evaluate left-hand turns and* National Cooperative Highway Research Report 457: Evaluating Intersection Improvements: An Engineering Study Guide (NCHRP 457) *to evaluate right-turn movements to determine if turning movements are consistent with national standards for safety based on traffic volumes.* These guidelines show that if a three-leg intersection has traffic higher than 200 vph per lane on the major roadway and more than 150 vph per lane on a four-leg intersection, a left turn is warranted (see left-turn lane warrant chart in Chapter 4).

The only intersections that are close to this volume are Intersection 4 and Intersection 6 on Hwy 33. Currently, Intersection 4 already has a left turn lane, thus, only Intersection 6 will be analyzed. Based on the ITD guidelines, a left-turn lane is warranted for the northwest-bound traffic at Intersection 6 (see Appendix F for the left-turn worksheet).

2. Existing Conditions Right Turn Lane Analysis

The Right-hand turn warrant analysis follows the guidance found in ITD's *Traffic Manual: Idaho's Supplementary Guide to the MUTCD* (reference the right-turn lane warrant chart in Chapter 4).

The only intersections that are close to this volume are Intersection 4 and Intersection 6 on Hwy 33. Currently, Intersection 4 already has a right turn lane, thus, only Intersection 6 will be analyzed. Based on these guidelines, no right-turning lanes are warranted for existing conditions (see Appendix G for the right-turn worksheet).

I. Analysis of Existing 2023 PM Peak Hour Traffic Conditions Summary

This chapter has identified the following:

1. Segments

a. Seg. 1: 3000W

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

b. Seg. 2: 4000N

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

c. Segment Summary

The following table is a summary of each segment's v/c ratio and LOS for each direction.

Table 15 –Existing 2023 Segments Traffic Condition Summary

3000W	2023	
Direction	v/c	LOS
North	0.035	A
South	0.017	A

4000N	2023	
Direction	v/c	LOS
East	0.031	A
West	0.040	A

2. Intersections

a. Int. 1: 3000W/5000N

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

b. Int. 2: 4000N/3000W

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

c. Int. 3: 4000N/2000W

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

d. Int. 4: Hwy 33/4000N

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of B during the PM peak hour of the day.

e. Int. 5: 3000W/6000N

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

f. Int. 6: Hwy 33/3000W

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of C during the PM peak hour of the day.

g. Intersection Summary

The following table is a summary of each intersection's LOS and delay time for each turning movement.

Table 16 –Existing 2023 Intersections Traffic Condition Summary

Int 1 - 3000W/5000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2022 Traffic	2	n/a	2	n/a	n/a	n/a	2	23	n/a	n/a	36	2
LOS	A	n/a	A	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	8.7	n/a	8.7	n/a	n/a	n/a	0	0.5	n/a	n/a	0	0

Int 2 - 4000N/3000W - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2022 Traffic	13	23	2	5	34	20	5	7	4	21	4	4
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	0.1	2.6	2.6	0	0.6	0.6	9.4	9.4	9.4	9.4	9.4	9.4

Int 3 - 4000N/2000W - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2022 Traffic	7	39	2	2	52	14	2	2	2	11	2	5
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	0	1.2	1.2	0	0.2	0.2	9.2	9.2	9.2	9.3	9.3	9.3

Int 4 - Hwy 33/4000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2022 Traffic	14	5	32	14	4	5	39	422	13	13	471	25
LOS	B	B	B	B	B	B	A	A	A	A	A	A
Delay	13.5	13.5	13.5	14.9	14.9	14.9	8.6	0	0	8.3	0	0

Int 5 - 3000W/6000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2022 Traffic	4	2	4	2	2	2	5	16	2	2	32	14
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	8.9	8.9	8.9	9.0	9.0	9.0	0	1.5	1.5	0	0.3	0.3

Int 6 - Hwy 33/3000W - Build LOS and Delay Times without the Development												
	Northeast Bound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2022 Traffic	14	n/a	9	n/a	n/a	n/a	38	391	n/a	n/a	351	21
LOS	C	n/a	C	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	15.1	n/a	15.1	n/a	n/a	n/a	0.4	1.1	n/a	n/a	0	0

3. Turn Lane Analysis

The following table is a summary of the left and right turn analysis for Intersection 6.

Table 17 –Existing 2023 Int. 6 Left and Right Turn Analysis Summary

Int 6 - Hwy 33/3000W	Left Turn Lane	Right Turn Lane
	Northbound	Southbound
2023 Existing Traffic	Warranted	Not Warranted

4. Overall Summary for 2023

In summary, the following is determined to be operating at an unacceptable level for the existing conditions:

- Int. 6 Hwy 33/3000W: Northwest bound, left turning traffic, exceeds the minimum ITD safety level

5. Mitigation Measures for the 2023 Existing Conditions

It is recommended that a left turn lane be constructed on Hwy 33 for the northwest-bound traffic at Int. 6.

VII. Projected Traffic

A. Site Traffic

It is anticipated that the buildout of the development will be complete by 2028.

1. Trip Generation

In order to determine the trips generated by the proposed development, the ITE Trip Generation 10th Edition Manual was used. This study will use traffic data obtained from the ITD to determine traffic conditions for the 2023 (existing), 2028 (Project buildout), and 2048 (Future) horizon years.

a. Buildout (2028)

The following two (2) tables show the land use and trip generation for the ADT and the peak hour.

Table 18- Land Use and Trip Generation (ADT) for Buildout (2028)

Land Use Category	ITE Code	Size	Units	Trip Generation per unit	Total Trips	Internal Capture Trips		Pass-by Trips		Primary Trips Total
Weekday Trips										
Single-Family Detached Housing (Main)	210	14	Dwelling Untis	9.57	134	0%	0	-	-	134
Single-Family Detached Housing (Accessory)	210	14	Dwelling Untis	9.57	134	0%	0	-	-	134
Total					**268**		**0**		**0**	**268**

Table 19- Land Use and Trip Generation (Peak Hour) for Buildout (2028)

Land Use Category	ITE Code	Size	Units	Trip Generation per unit	Total Trips	Internal Capture Trips		Pass-by Trips		Primary Trips Total
Weekday Peak Hour										
Single-Family Detached Housing (Main)	210	14	Dwelling Untis	0.76	11	0%	0	-	-	11
Single-Family Detached Housing (Accessory)	210	14	Dwelling Untis	0.76	11	0%	0	-	-	11
Total					**21**		**0**		**0**	**21**

2. Trip Distribution

Trip distribution is a percentage indicating what percentage of traffic is entering or exiting the study area. The ITE Trip Generation Handbook outlines the trip distribution for each land use. The following two (2) tables show the land use, trip generation, and trip distribution for the ADT and the peak hour.

Table 20- Trip Distribution (ADT) for Buildout (2028)

Land Use Category	ITE Code	Size	Units	Trip Generation per unit	Total Trips	Internal Capture Trips		Pass-by Trips		Primary Trips Total	Primary Trips Entering		Primary Trips Exiting	
Weekday Trips														
Single-Family Detached Housing (Main)	210	14	Dwelling Untis	9.57	134	0%	0	-	-	134	50%	67	50%	67
Single-Family Detached Housing (Accessory)	210	14	Dwelling Untis	9.57	134	0%	0	-	-	134	50%	67	50%	67
Total					**268**		**0**		**0**	**268**		**134**		**134**

Table 21- Trip Distribution (Peak Hour) for Buildout (2028)

Land Use Category	ITE Code	Size	Units	Trip Generation per unit	Total Trips	Internal Capture Trips		Pass-by Trips		Primary Trips Total	Primary Trips Entering		Primary Trips Exiting	
Weekday Peak Hour														
Single-Family Detached Housing (Main)	210	14	Dwelling Untis	0.76	11	0%	0	-	-	11	64%	7	36%	4
Single-Family Detached Housing (Accessory)	210	14	Dwelling Untis	0.76	11	0%	0	-	-	11	64%	7	36%	4
Total					**21**		**0**		**0**	**21**		**14**		**8**

3. Modal Split

Modal split is the determination of different travel modes (automobile, heavy vehicles, walk, etc.) from an origin to a given destination. Analyzing the pedestrian traffic is outside the scope of this study and it is assumed that no heavy vehicles will be generated from the development. A standard 5% heavy vehicle percentage will be applied to this study.

4. Trip Assignment

It is assumed that 75% of the traffic will come to and from Driggs via 4000N and 3000W and 25% will come to and from Tetonia via 3000W.

B. Through Traffic (Non-Site Traffic)

1. Non-Site Traffic for Anticipated Development in Study Area

a. Method of Projections

Pass-by trips are made as intermediate stops on the way from an origin to a destination without a route diversion. In other words, a pass-by trip is when the traffic on an adjacent roadway is attracted to a certain land use in a development as non-site traffic. The trip generally goes from the origin to the generator and then returns to the origin. The proposed development does not have any land uses that would be considered pass-by trips.

b. Trip Distribution

This section is not applicable due to the fact that single-family detached housing is not considered a non-site traffic generator.

c. Modal Split

This section is not applicable due to the fact that single-family detached housing is not considered a non-site traffic generator.

d. Trip Assignment

This section is not applicable due to the fact that single-family detached housing is not considered a non-site traffic generator.

C. Total Traffic

The total trips generated by the development and the impact to each intersection for the 2028 Buildout are shown in the following figures.

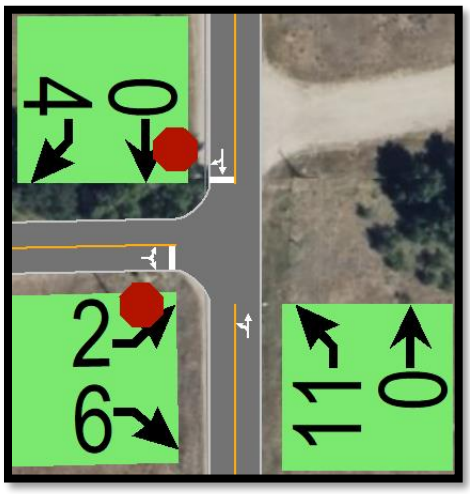


Figure 19- Int. 1 3000W/5000N PM Peak Generated Traffic

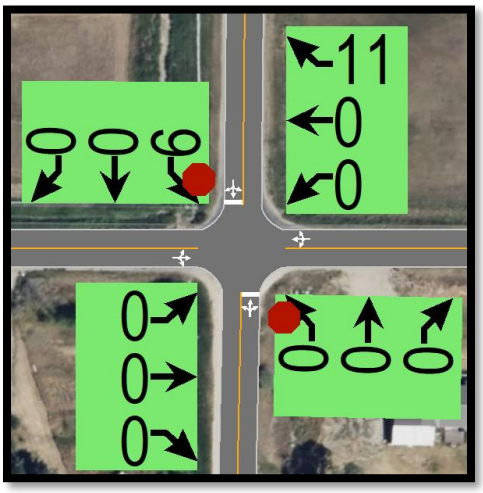


Figure 20- Int. 2 4000N/3000W PM Peak Generated Traffic

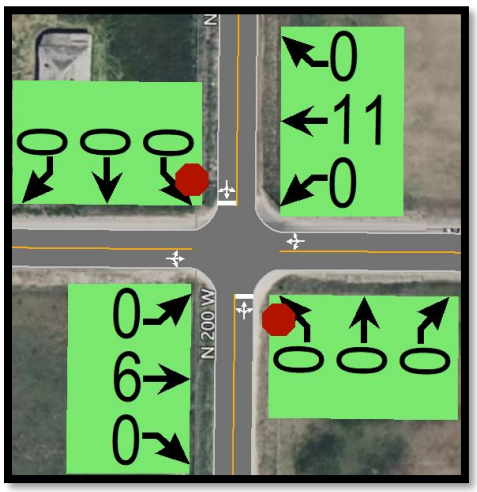


Figure 21- Int. 3 4000N/2000W PM Peak Generated Traffic

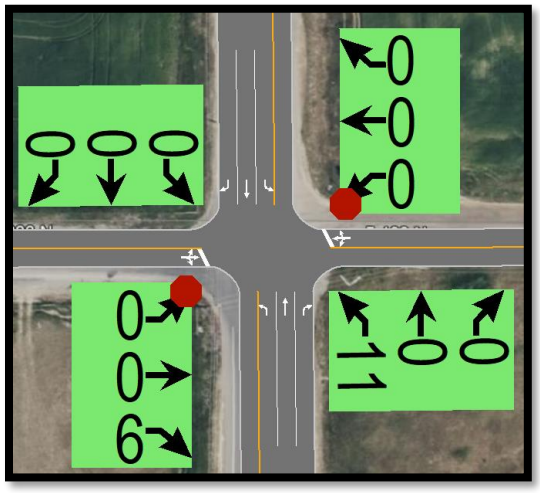


Figure 22- Int. 4 Hwy 33/4000N PM Peak Generated Traffic

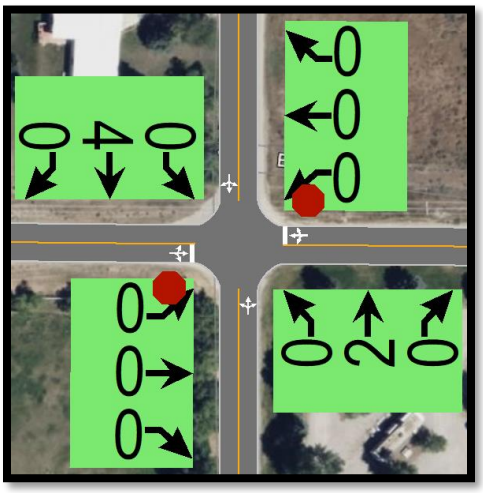


Figure 23- Int. 5 3000W/6000N PM Peak Generated Traffic

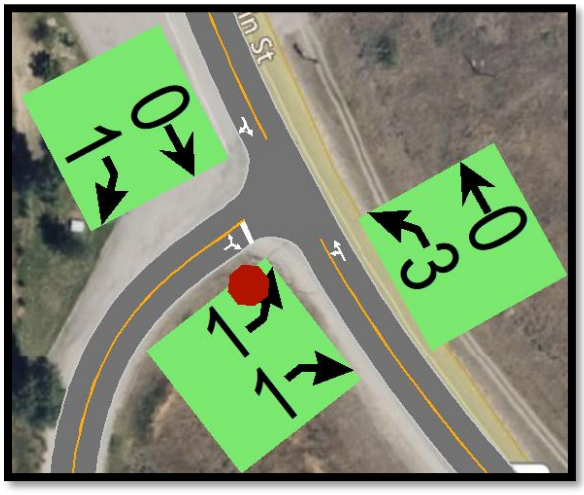


Figure 24- Int. 6 Hwy 33/3000W PM Peak Generated Traffic

VIII. 2028 Horizon Year Traffic Analysis (Buildout)

A. On-Site Development

Buildout is assumed to be complete by the year 2028.

B. Traffic Forecasting

The traffic counts from Chapter 6 were increased by the annual growth rate percentages to establish the background traffic. This chapter will analyze two (2) scenarios for each segment and intersection; 2028 background traffic (without the development) and 2028 background plus site traffic (with the development).

C. Roadway Network

Within the area of influence there will be two (2) roadway segments, six (6) intersections studied. The segments and the intersections that will analyzed are:

1. Segment #1 – 3000W
2. Segment #2 – 4000N
3. Intersection #1 – 3000W/5000N
4. Intersection #2 – 4000N/3000W
5. Intersection #3 – 4000N/2000W
6. Intersection #4 – Hwy 33/4000N
7. Intersection #5 – 3000W/6000N
8. Intersection #6 – Hwy 33/3000W

D. 2028 PM Peak Segment Traffic Volumes

1. Seg. 1 – 3000W 2028 PM Peak Segment Traffic Volumes

a. 2028 Background 3000W PM Peak Hour Flow

The traffic volumes for the 2023 Existing Conditions were increased by the annual growth rate to forecast the 2028 Background Traffic. The results of this project 67 vph headed north and 33 vph headed south during pm peak hour.

b. 2028 Background plus Site Traffic 3000W PM Peak Hour Flow

The traffic generated by the development was added to the 2028 Background Traffic. The results of this project 70 vph headed north and 35 vph headed south during pm peak hour after buildout.

2. Seg. 2 – 4000N 2028 PM Peak Segment Traffic Volumes

a. 2028 Background 4000N PM Peak Hour Flow

The traffic volumes for the 2023 Existing Conditions were increased by the annual growth rate to forecast the 2028 Background Traffic. The results of this project 59 vph headed eastbound and 77 vph headed westbound during pm peak hour.

b. 2028 Background plus Site Traffic 4000N PM Peak Hour Flow

The traffic generated by the development was added to the 2028 Background Traffic. The results of this project 65 vph headed northbound and 88 vph headed southbound during pm peak hour after buildout.

E. 2028 PM Peak Intersection Traffic Volumes

The traffic volumes for the 2023 Existing Conditions were increased by the annual growth rate to forecast the 2028 Background Traffic for each intersection. The following sections show the projected intersection traffic volumes without and with the proposed development.

1. Int. 1 – 3000W/5000N 2028 PM Peak Segment Traffic Volumes

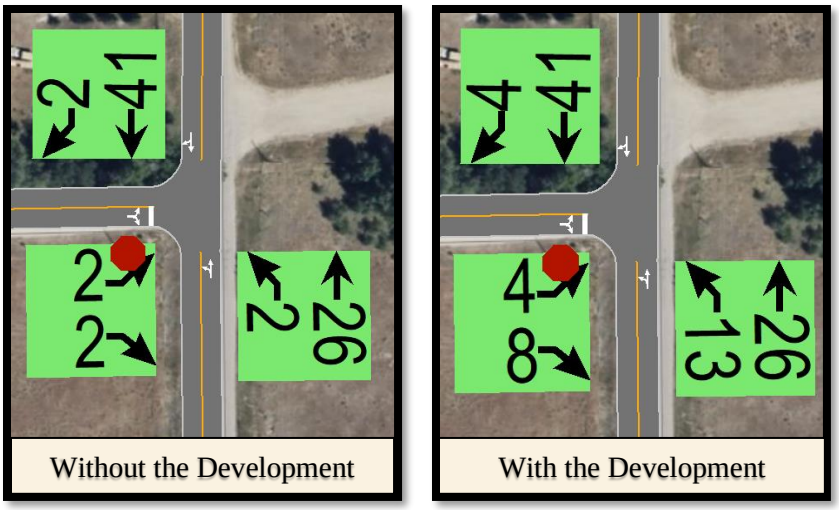


Figure 25: 3000W/5000N 2028 Traffic Volumes without and with the Development

2. Int. 2 – 4000N/3000W 2028 PM Peak Segment Traffic Volumes

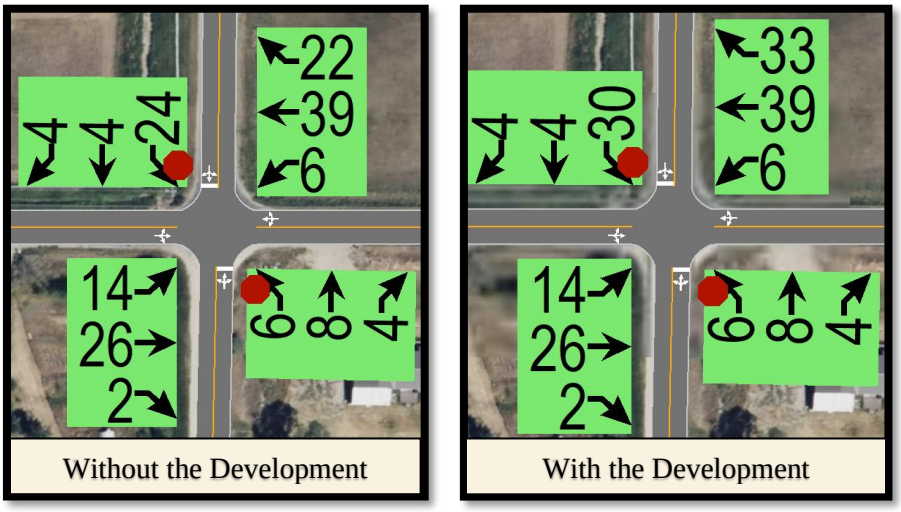


Figure 26: 4000N/3000W 2028 Traffic Volumes without and with the Development

3. Int. 3 – 4000N/2000W 2028 PM Peak Segment Traffic Volumes

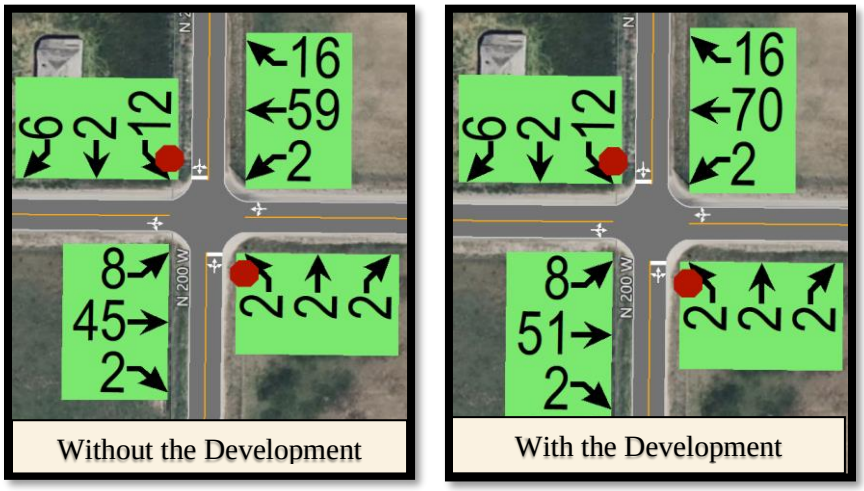


Figure 27: 4000N/2000W 2028 Traffic Volumes without and with the Development

4. Int. 4 – Hwy 33/4000N 2028 PM Peak Segment Traffic Volumes

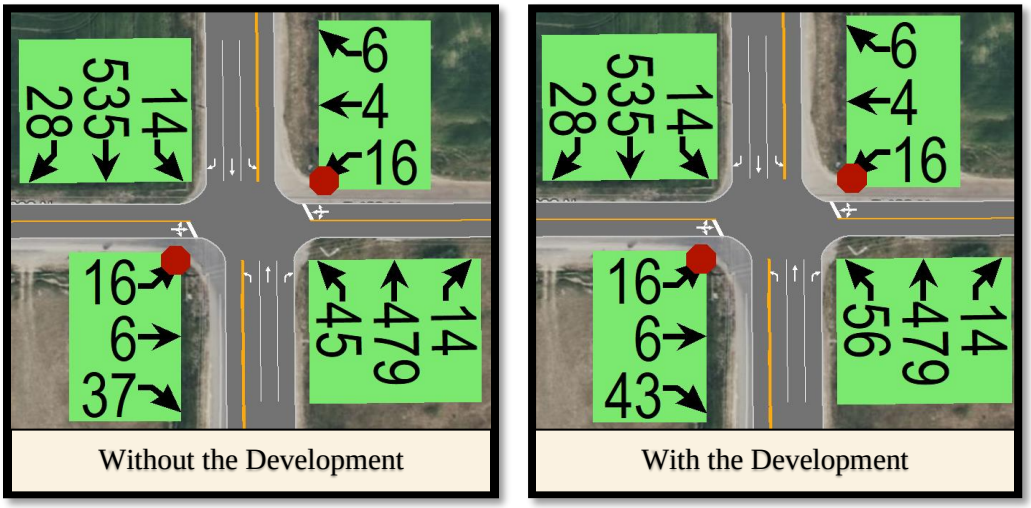


Figure 28: Hwy 33/4000N 2028 Traffic Volumes without and with the Development

5. Int. 5 –3000W/6000N 2028 PM Peak Segment Traffic Volumes

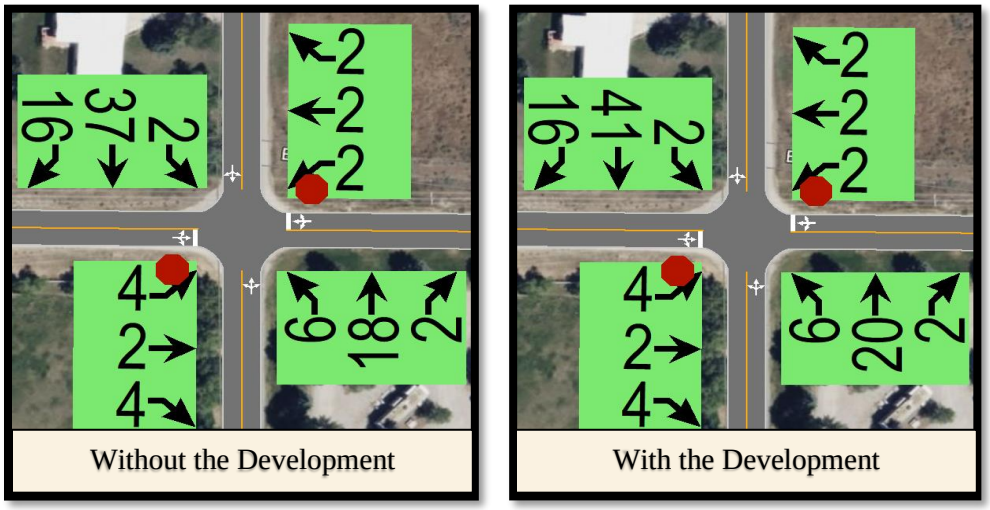


Figure 29: 3000W/6000N 2028 Traffic Volumes without and with the Development

6. Int. 6 – Hwy 33/3000W 2028 PM Peak Segment Traffic Volumes

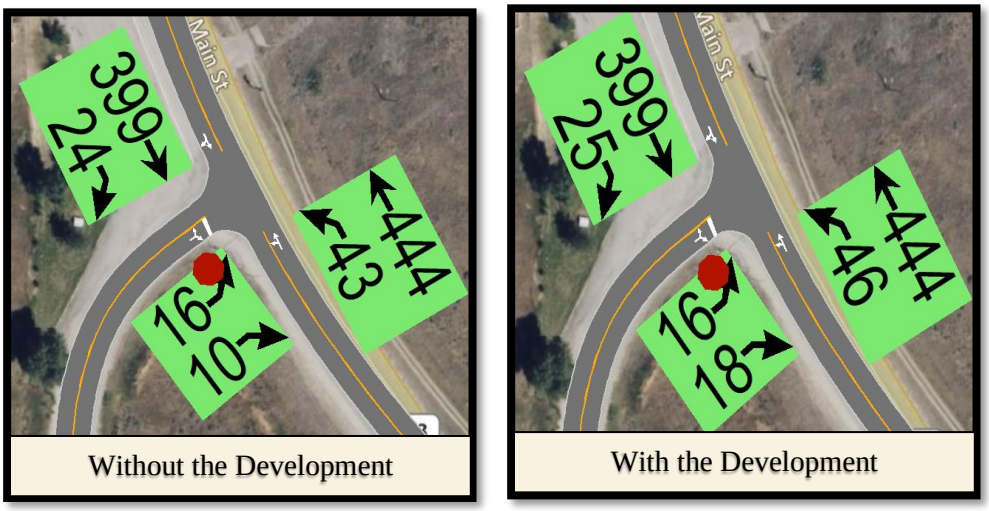


Figure 30: Hwy 33/3000W 2028 Traffic Volumes without and with the Development

F. 2028 Segment PM Peak Hour Traffic Conditions

The traffic counts shown previously in the chapter were used to determine the forecasted conditions without and with the proposed development. The following sections identify the projected LOS for each segment for both scenarios.

1. Seg. 1 – 3000W 2028 PM Peak Hour Segment Traffic Conditions

a. Seg.1 - 3000W 2028 Background PM Peak Hour Traffic Conditions

The visual counts that were seasonally adjusted show that there were 67 vph heading north and 33 vph heading south during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.039 for

northbound traffic and 0.019 for southbound traffic. The terrain within the study area is considered level and a 0% no passing zone will be used. This results in a LOS of A for both directions.

b. Seg.1 - 3000W 2028 Background plus Site Traffic PM Peak Hour Traffic Conditions

The traffic generated by the development was added to the 2028 Background Traffic. The results show that there are 78 vph heading north and 39 vph heading south during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.046 for northbound traffic and 0.023 for southbound traffic. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

c. Seg.1-3000W 2028 Background plus Site Traffic PM Peak Hour Mitigation Measures

Since the worst LOS is an A, no improvements are warranted for the 2028 conditions without or with the development.

2. Seg. 2 – 4000N 2028 PM Peak Hour Segment Traffic Conditions

a. Seg.2 – 4000N 2028 Background PM Peak Hour Traffic Conditions

The visual counts that were seasonally adjusted show that there are 59 vph heading eastbound and 77 vph heading westbound during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.035 for eastbound and 0.045 for westbound. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

b. Seg.2 - 4000N 2028 Background plus Site Traffic PM Peak Hour Traffic Conditions

The traffic generated by the development was added to the 2028 Background Traffic. The results show that there are 65 vph heading eastbound and 88 vph heading westbound during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.038 for eastbound and 0.052 for westbound. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

c. Seg.2-4000N 2028 Background plus Site Traffic PM Peak Hour Mitigation Measures

Since the worst LOS is an A, no improvements are warranted for the 2028 conditions without or with the development.

G. 2028 Intersection PM Peak Hour Traffic Conditions

In order to determine how well an intersection is functioning, the intersection's Measures of Effectiveness (MOEs) for the peak hour are analyzed. The MOEs include:

1. Level of Service (LOS)
2. Control Delay
3. Volume/Capacity Ratio (V/C Ratio)
4. 95th Percentile Queue

Using the traffic volumes and turning movements shown previously, the 2028 MOEs for the intersections, without and with the development, can be determined.

1. Int. 1 – 3000W/5000N 2028 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 1, without and with the development, are shown in the following table.

Table 22 –Int. 1 – 2028 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBR	NBL	NBT	SBT	SBR
Lanes and Sharing (#RL)						
Traffic Volume (vph)	2	2	2	26	41	2
Future Volume (vph)	2	2	2	26	41	2
Sign Control	Stop	—	—	Free	Free	—
Median Width (ft)	12	—	—	0	0	—
TWLTL Median	☐	—	—	☐	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	6.4	6.2	4.1	—	—	—
Follow Up Time, tF (s)	3.5	3.3	2.2	—	—	—
Volume to Capacity Ratio	0.00	0.00	0.00	0.00	0.03	0.03
Control Delay (s)	8.7	8.7	0.0	0.5	0.0	0.0
Level of Service	A	A	A	A	A	A
Queue Length 95th (ft)	0	0	0	0	0	0
Approach Delay (s)	8.7	—	—	0.5	0.0	—

Table 23 –Int. 1 – 2028 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBR	NBL	NBT	SBT	SBR
Lanes and Sharing (#RL)						
Traffic Volume (vph)	4	8	13	26	41	4
Future Volume (vph)	4	8	13	26	41	4
Sign Control	Stop	—	—	Free	Free	—
Median Width (ft)	12	—	—	0	0	—
TWLTL Median	☐	—	—	☐	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	6.4	6.2	4.1	—	—	—
Follow Up Time, tF (s)	3.5	3.3	2.2	—	—	—
Volume to Capacity Ratio	0.01	0.01	0.01	0.01	0.03	0.03
Control Delay (s)	8.7	8.7	0.1	2.5	0.0	0.0
Level of Service	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	1	0	0
Approach Delay (s)	8.7	—	—	2.5	0.0	—

2. Int. 2 – 4000N/3000W 2028 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 2, without and with the development, are shown in the following table.

Table 24 –Int. 2 – 2028 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	14	26	2	6	39	22	6	8	4	24	4	4
Future Volume (vph)	14	26	2	6	39	22	6	8	4	24	4	4
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.02	0.02	0.04	0.04	0.04
Control Delay (s)	0.1	2.5	2.5	0.0	0.7	0.7	9.5	9.5	9.5	9.5	9.5	9.5
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	0	0	0	2	2	2	3	3	3
Approach Delay (s)	—	2.5	—	—	0.7	—	—	9.5	—	—	9.5	—

Table 25 –Int. 2 – 2028 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	14	26	2	6	39	33	6	8	4	30	4	4
Future Volume (vph)	14	26	2	6	39	33	6	8	4	30	4	4
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.02	0.02	0.05	0.05	0.05
Control Delay (s)	0.1	2.5	2.5	0.0	0.6	0.6	9.6	9.6	9.6	9.6	9.6	9.6
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	0	0	0	2	2	2	4	4	4
Approach Delay (s)	—	2.5	—	—	0.6	—	—	9.6	—	—	9.6	—

3. Int. 3 – 4000N/2000W 2028 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 3, without and with the development, are shown in the following table.

Table 26 –Int. 3 – 2028 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	8	45	2	2	59	16	2	2	2	12	2	6
Future Volume (vph)	8	45	2	2	59	16	2	2	2	12	2	6
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.03	0.03
Control Delay (s)	0.0	1.1	1.1	0.0	0.2	0.2	9.3	9.3	9.3	9.3	9.3	9.3
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	0	0	0	0	0	0	1	1	1	2	2	2
Approach Delay (s)	—	1.1	—	—	0.2	—	—	9.3	—	—	9.3	—

Table 27 –Int. 3 – 2028 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	8	51	2	2	70	16	2	2	2	12	2	6
Future Volume (vph)	8	51	2	2	70	16	2	2	2	12	2	6
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.03	0.03
Control Delay (s)	0.0	1.1	1.1	0.0	0.2	0.2	9.4	9.4	9.4	9.4	9.4	9.4
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	0	0	0	0	0	0	1	1	1	2	2	2
Approach Delay (s)	—	1.1	—	—	0.2	—	—	9.4	—	—	9.4	—

4. Int. 4 – Hwy 33/4000N 2028 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 4, without and with the development, are shown in the following table.

Table 28 –Int. 4 – 2028 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	16	6	37	16	4	6	45	479	14	14	535	28
Future Volume (vph)	16	6	37	16	4	6	45	479	14	14	535	28
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	12	—	—	12	—
TWLTL Median	—	☐	—	—	☐	—	—	☑	—	—	☑	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.15	0.15	0.15	0.08	0.08	0.08	0.05	0.31	0.01	0.01	0.34	0.02
Control Delay (s)	14.8	14.8	14.8	16.5	16.5	16.5	8.9	0.0	0.0	8.5	0.0	0.0
Level of Service	B	B	B	C	C	C	A	A	A	A	A	A
Queue Length 95th (ft)	13	13	13	7	7	7	4	0	0	1	0	0
Approach Delay (s)	—	14.8	—	—	16.5	—	—	0.7	—	—	0.2	—

Table 29 –Int. 4 – 2028 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	16	6	43	16	4	6	56	479	14	14	535	28
Future Volume (vph)	16	6	43	16	4	6	56	479	14	14	535	28
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	12	—	—	12	—
TWLTL Median	—	☐	—	—	☐	—	—	☑	—	—	☑	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.16	0.16	0.16	0.09	0.09	0.09	0.06	0.31	0.01	0.01	0.34	0.02
Control Delay (s)	15.0	15.0	15.0	17.0	17.0	17.0	9.0	0.0	0.0	8.5	0.0	0.0
Level of Service	B	B	B	C	C	C	A	A	A	A	A	A
Queue Length 95th (ft)	15	15	15	7	7	7	5	0	0	1	0	0
Approach Delay (s)	—	15.0	—	—	17.0	—	—	0.9	—	—	0.2	—

5. Int. 5 –3000W/6000N 2028 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 5, without and with the development, are shown in the following table.

Table 30 –Int. 5 – 2028 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	4	2	4	2	2	2	6	18	2	2	37	16
Future Volume (vph)	4	2	4	2	2	2	6	18	2	2	37	16
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Control Delay (s)	9.0	9.0	9.0	9.0	9.0	9.0	0.0	1.8	1.8	0.0	0.3	0.3
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	1	1	1	0	0	0	0	0	0
Approach Delay (s)	—	9.0	—	—	9.0	—	—	1.8	—	—	0.3	—

Table 31 –Int. 5 – 2028 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	4	2	4	2	2	2	6	20	2	2	41	16
Future Volume (vph)	4	2	4	2	2	2	6	20	2	2	41	16
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Control Delay (s)	9.0	9.0	9.0	9.1	9.1	9.1	0.0	1.7	1.7	0.0	0.2	0.2
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	1	1	1	0	0	0	0	0	0
Approach Delay (s)	—	9.0	—	—	9.1	—	—	1.7	—	—	0.2	—

6. Int. 6 – Hwy 33/3000W 2028 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 6, without and with the development, are shown in the following table.

Table 32 –Int. 6 – 2028 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	NBL	NBT	SBT	SBR	NEL	NER
Lanes and Sharing (#RL)						
Traffic Volume (vph)	43	444	399	24	16	10
Future Volume (vph)	43	444	399	24	16	10
Sign Control	—	Free	Free	—	Stop	—
Median Width (ft)	—	0	0	—	12	—
TWLTL Median	—	☐	☐	—	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	4.1	—	—	—	6.4	6.2
Follow Up Time, tF (s)	2.2	—	—	—	3.5	3.3
Volume to Capacity Ratio	0.04	0.04	0.27	0.27	0.09	0.09
Control Delay (s)	0.5	1.2	0.0	0.0	17.1	17.1
Level of Service	A	A	A	A	C	C
Queue Length 95th (ft)	3	3	0	0	7	7
Approach Delay (s)	—	1.2	0.0	—	17.1	—

Table 33 –Int. 6 – 2028 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	NBL	NBT	SBT	SBR	NEL	NER
Lanes and Sharing (#RL)						
Traffic Volume (vph)	46	444	399	25	16	18
Future Volume (vph)	46	444	399	25	16	18
Sign Control	—	Free	Free	—	Stop	—
Median Width (ft)	—	0	0	—	12	—
TWLTL Median	—	☐	☐	—	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	4.1	—	—	—	6.4	6.2
Follow Up Time, tF (s)	2.2	—	—	—	3.5	3.3
Volume to Capacity Ratio	0.05	0.05	0.27	0.27	0.10	0.10
Control Delay (s)	0.5	1.3	0.0	0.0	16.0	16.0
Level of Service	A	A	A	A	C	C
Queue Length 95th (ft)	4	4	0	0	8	8
Approach Delay (s)	—	1.3	0.0	—	16.0	—

H. Turn Lane Warrants Based on Safety Analysis of Intersections

1. 2028 Left Turn Lane Analysis

Intersection 6 was evaluated for safety using ITD guidelines which recommend using the *National Cooperative Highway Research Report 745 –Left-Turn Accommodations at Unsignalized Intersections* (*NCHRP 745) to evaluate left-hand turns and* National Cooperative Highway Research Report 457: Evaluating Intersection Improvements: An Engineering Study Guide (NCHRP 457) *to evaluate right-turn movements to determine if turning movements are consistent with national standards for safety based on traffic volumes.* These guidelines show that if a three-leg intersection has traffic higher than 200 vph per lane on the major roadway and more than 150 vph per lane on a four-leg intersection, a left turn is warranted (see left-turn lane warrant chart in Chapter 4).

It was found in the 2023 Existing Conditions Chapter that a left turn lane is warranted at Intersection 6 for northwest-bound traffic. Based on the ITD guidelines, no new turn lanes are warranted from the increase (including the projected traffic generated by the proposed development) in traffic from 2028 to 2048 (see Appendix K for the left-turn worksheet).

2. 2028 Right Turn Lane Analysis

The Right-hand turn warrant analysis follows the guidance found in ITD's *Traffic Manual: Idaho's Supplementary Guide to the MUTCD* (reference the right-turn lane warrant chart in Chapter 4). Based on these guidelines, no right-turning lanes are warranted for existing conditions (see Appendix K for the right-turn worksheet).

I. 2028 PM Peak Hour Traffic Conditions Summary without and with the Development

This chapter has identified the following:

1. Segments

a. Seg. 1: 3000W without the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

b. Seg. 1: 3000W with the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

c. Seg. 2: 4000N without the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

d. Seg. 2: 4000N with the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

e. Segment Summary

The following tables are a summary of each segment's v/c ratio and LOS for each direction without and with the development.

Table 34 –Seg. 1 3000W 2028 Segments Traffic Condition Summary

3000W	2023		2028	
Direction	v/c	LOS	v/c	LOS
North	0.035	A	0.039	A
South	0.017	A	0.019	A
Without the Development				

3000W	2023		2028	
Direction	v/c	LOS	v/c	LOS
North	n/a	n/a	0.046	A
South	n/a	n/a	0.023	A
With the Development				

Table 35 –Seg. 2 4000N 2028 Segments Traffic Condition Summary

4000N	2023		2028	
Direction	v/c	LOS	v/c	LOS
East	0.031	A	0.035	A
West	0.040	A	0.045	A
Without the Development				

4000N	2023		2028	
Direction	v/c	LOS	v/c	LOS
East	n/a	n/a	0.038	A
West	n/a	n/a	0.052	A
With the Development				

2. Intersections

a. Int. 1: 3000W/5000N without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

b. Int. 1: 3000W/5000N with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

c. Int. 2: 4000N/3000W without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

d. Int. 2: 4000N/3000W with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

e. Int. 3: 4000N/2000W without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

f. Int. 3: 4000N/2000W with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

g. Int. 4: Hwy 33/4000N without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of C during the PM peak hour of the day.

h. Int. 4: Hwy 33/4000N with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of C during the PM peak hour of the day.

i. Int. 5: 3000W/6000N without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

j. Int. 5: 3000W/6000N with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

k. Int. 6: Hwy 33/3000W without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of C during the PM peak hour of the day.

l. Int. 6: Hwy 33/3000W with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of C during the PM peak hour of the day.

m. Intersection Summary

The following tables are a summary of each intersection's LOS and delay time for each turning movement. It should be noted that by adding the trips generated by the development, none of the LOS's degraded.

Table 36 –Int. 1 2028 Traffic Condition Summary without and with the Development

Int 1 - 3000W/5000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	2	n/a	2	n/a	n/a	n/a	2	26	n/a	n/a	41	2
LOS	A	n/a	A	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	8.7	n/a	8.7	n/a	n/a	n/a	0	0.5	n/a	n/a	0	0

Int 1 - 3000W/5000N - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	4	n/a	8	n/a	n/a	n/a	13	26	n/a	n/a	41	4
LOS	A	n/a	A	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	8.7	n/a	8.7	n/a	n/a	n/a	0.1	2.5	n/a	n/a	0	0

Table 37 –Int. 2 2028 Traffic Condition Summary without and with the Development

Int 2 - 4000N/3000W - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	14	26	2	6	39	22	6	8	4	24	4	4
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	0.1	2.5	2.5	0	0.7	0.7	9.5	9.5	9.5	9.5	9.5	9.5

Int 2 - 4000N/3000W - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	14	26	2	6	39	33	6	8	4	30	4	4
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	0.1	2.5	2.5	0	0.6	0.6	9.6	9.6	9.6	9.6	9.6	9.6

Table 38 –Int. 3 2028 Traffic Condition Summary without and with the Development

Int 3 - 4000N/2000W - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	8	45	2	2	59	16	2	2	2	12	2	6
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	0	1.1	1.1	0	0.2	0.2	9.3	9.3	9.3	9.3	9.3	9.3

Int 3 - 4000N/2000W - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	8	51	2	2	70	16	2	2	2	12	2	6
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	0	1.1	1.1	0	0.2	0.2	9.4	9.4	9.4	9.4	9.4	9.4

Table 39 –Int. 4 2028 Traffic Condition Summary with the Development

Int 4 - Hwy 33/4000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	16	6	37	16	4	6	45	479	14	14	535	28
LOS	B	B	B	C	C	C	A	A	A	A	A	A
Delay	14.8	15	14.8	16.5	16.5	16.5	8.9	0	0	8.5	0	0

Int 4 - Hwy 33/4000N - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	16	6	43	16	4	6	56	479	14	14	535	28
LOS	B	B	B	C	C	C	A	A	A	A	A	A
Delay	15.0	15.0	15.0	17.0	17.0	17.0	9.0	0	0	8.5	0	0

Table 40 –Int. 5 2028 Traffic Condition Summary with the Development

Int 5 - 3000W/6000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	4	2	4	2	2	2	6	18	2	2	37	16
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	9.0	9.0	9.0	9.0	9.0	9.0	0	1.8	1.8	0	0.3	0.3

Int 5 - 3000W/6000N - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	4	2	4	2	2	2	6	20	2	2	41	16
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	9.0	9.0	9.0	9.1	9.1	9.1	0	1.7	1.7	0	0.2	0.2

Table 41 –Int. 6 2028 Traffic Condition Summary with the Development

Int 6 - Hwy 33/3000W - Build LOS and Delay Times without the Development												
	Northeast Bound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	16	n/a	10	n/a	n/a	n/a	43	444	n/a	n/a	399	24
LOS	C	n/a	C	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	17.1	n/a	17.1	n/a	n/a	n/a	0.5	1.2	n/a	n/a	0	0

Int 6 - Hwy 33/3000W - Build LOS and Delay Times with the Development												
	Northeast Bound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2028 Traffic	16	n/a	18	n/a	n/a	n/a	46	444	n/a	n/a	399	25
LOS	C	n/a	C	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	16.0	n/a	16.0	n/a	n/a	n/a	0.5	1.3	n/a	n/a	0	0

3. Turn Lane Analysis

The following table is a summary of the left and right turn analysis for Intersection 6.

Table 42 –Existing 2028 Int. 6 Left and Right Turn Analysis Summary

Int 6 - Hwy 33/3000W	Left Turn Lane	Right Turn Lane
	Northbound	Southbound
2023 Existing Traffic	Warranted	Not Warranted
2028 Background Traffic	Warranted	Not Warranted
2028 Background plus Site Traffic	Warranted	Not Warranted

4. Overall Summary for 2028

a. 2023 Existing Conditions Review

In summary, the following was determined in a previous chapter to be operating at an unacceptable level for the 2023 existing conditions:

- Int. 6 Hwy 33/3000W: Northwest bound, left turning traffic, exceeds the minimum ITD safety level

(1) 2023 Mitigation Measures

It is recommended that a left turn lane be constructed on Hwy 33 at Intersection 6 for the northwest bound traffic for the 2023 existing/current conditions.

b. 2028 Buildout Conditions Summary

Besides those areas noted for the 2023 existing conditions, no new LOS or turning lane warrants have been identified as operating at an unacceptable level for the 2028 buildout year without or with the development.

5. Mitigation Measures for the 2028 Buildout Conditions

Since no new areas are identified to be operating at an unacceptable level, no new mitigation measures are warranted for the 2028 buildout year without or with the development.

IX. 2048 Horizon Year Traffic Analysis (20-Year after Buildout)

A. On-Site Development

Buildout is assumed to be complete by the year 2028. This chapter will analyze the forecasted conditions for the 20-years after buildout.

B. Traffic Forecasting

The traffic counts from Chapter 6 were increased by the annual growth rate percentages to establish the background traffic. This chapter will analyze two (2) scenarios for each segment and intersection; 2028 background traffic (without the development) and 2028 background plus site traffic (with the development).

C. Roadway Network

Within the area of influence there will be two (2) roadway segments, six (6) intersections studied. The segments and the intersections that will analyzed are:

1. Segment #1 – 3000W
2. Segment #2 – 4000N
3. Intersection #1 – 3000W/5000N
4. Intersection #2 – 4000N/3000W
5. Intersection #3 – 4000N/2000W
6. Intersection #4 – Hwy 33/4000N
7. Intersection #5 – 3000W/6000N
8. Intersection #6 – Hwy 33/3000W

D. 2048 PM Peak Segment Traffic Volumes

1. Seg. 1 – 3000W 2048 PM Peak Segment Traffic Volumes

a. 2048 Background 3000W PM Peak Hour Flow

The traffic volumes for the 2028 buildout conditions were increased by the annual growth rate to project the 2048 Background Traffic. The results of this projects 112 vph headed north and 54 vph headed south during pm peak hour.

b. 2048 Background plus Site Traffic 3000W PM Peak Hour Flow

The traffic generated by the development was added to the 2028 Background Traffic. The results of this projects 123 vph headed north and 60 vph headed south during pm peak hour after buildout.

2. Seg. 2 – 4000N 2048 PM Peak Segment Traffic Volumes

c. 2048 Background 4000N PM Peak Hour Flow

The traffic volumes for the 2028 buildout conditions were increased by the annual growth rate to project the 2048 Background Traffic. The results of this project 98 vph headed eastbound and 129 vph headed westbound during pm peak hour.

d. 2048 Background plus Site Traffic 4000N PM Peak Hour Flow

The traffic generated by the development was added to the 2028 Background Traffic. The results of this projects 104 vph headed northbound and 140 vph headed southbound during pm peak hour after buildout.

E. 2048 PM Peak Intersection Traffic Volumes

The traffic volumes for the 2028 Existing Conditions were increased by the annual growth rate to project the 2048 Background Traffic for each intersection. The following sections show the projected intersection traffic volumes without and with the proposed development.

1. Int. 1 – 3000W/5000N 2048 PM Peak Segment Traffic Volumes

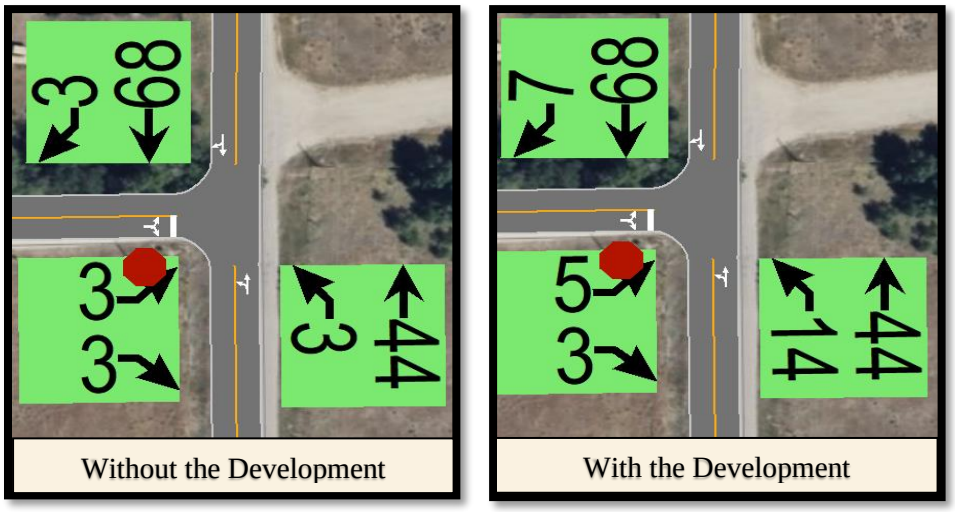


Figure 31: 3000W/5000N 2048 Traffic Volumes without and with the Development

2. Int. 2 – 4000N/3000W 2048 PM Peak Segment Traffic Volumes

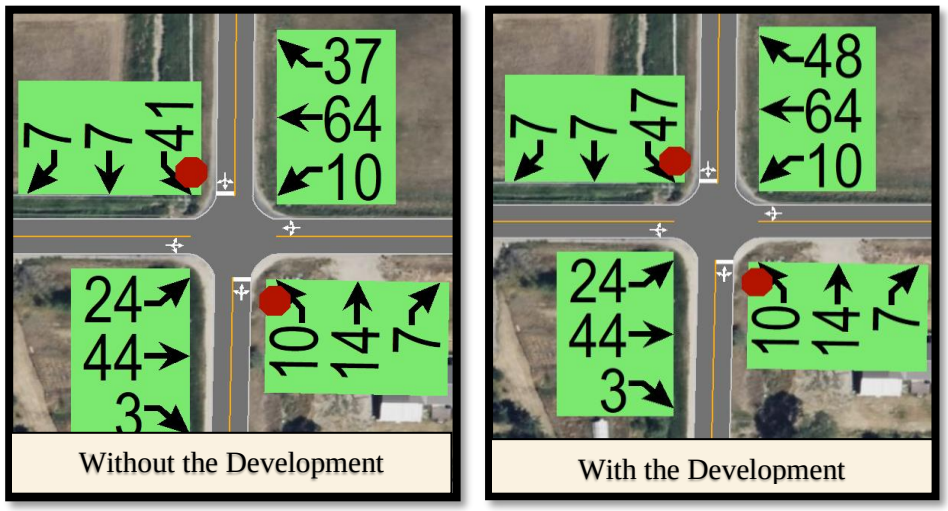


Figure 32: 4000N/3000W 2048 Traffic Volumes without and with the Development

3. Int. 3 – 4000N/2000W 2048 PM Peak Segment Traffic Volumes

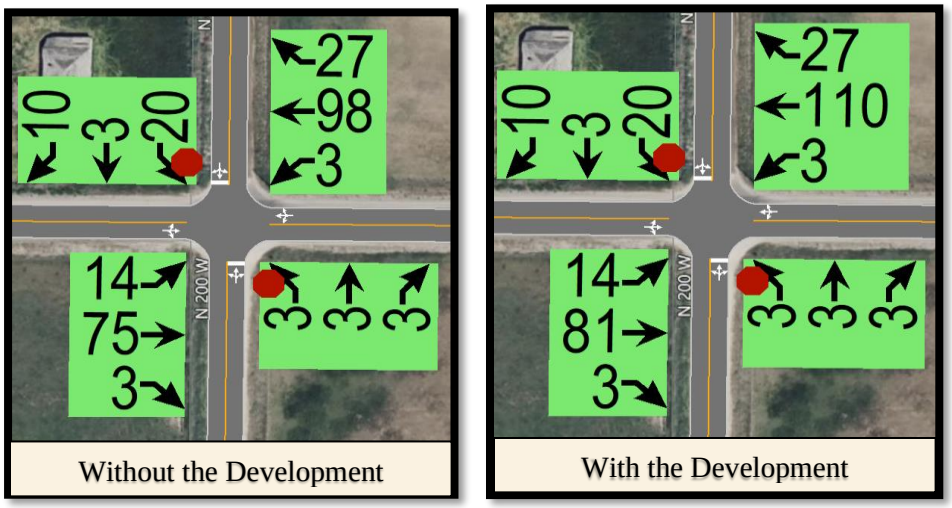


Figure 33: 4000N/2000W 2048 Traffic Volumes without and with the Development

4. Int. 4 – Hwy 33/4000N 2048 PM Peak Segment Traffic Volumes

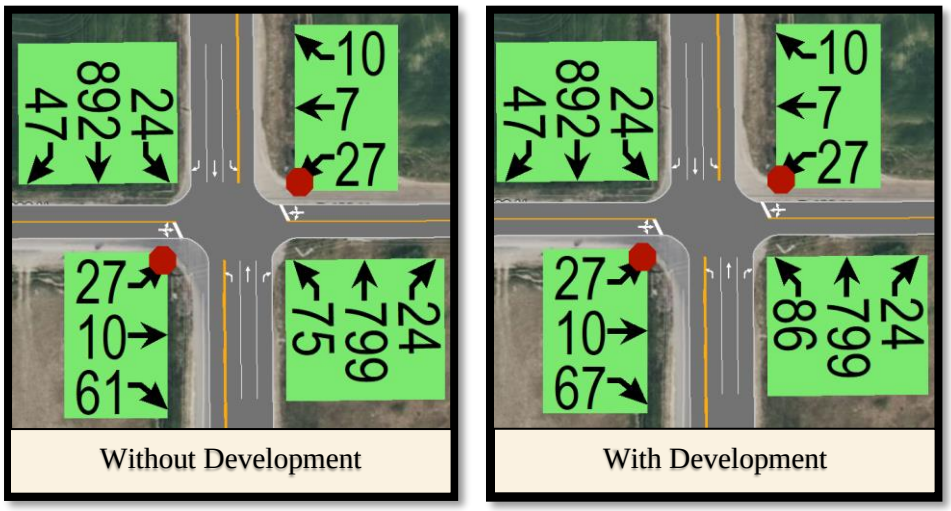


Figure 34: Hwy 33/4000N 2048 Traffic Volumes without and with the Development

5. Int. 5 –3000W/6000N 2048 PM Peak Segment Traffic Volumes

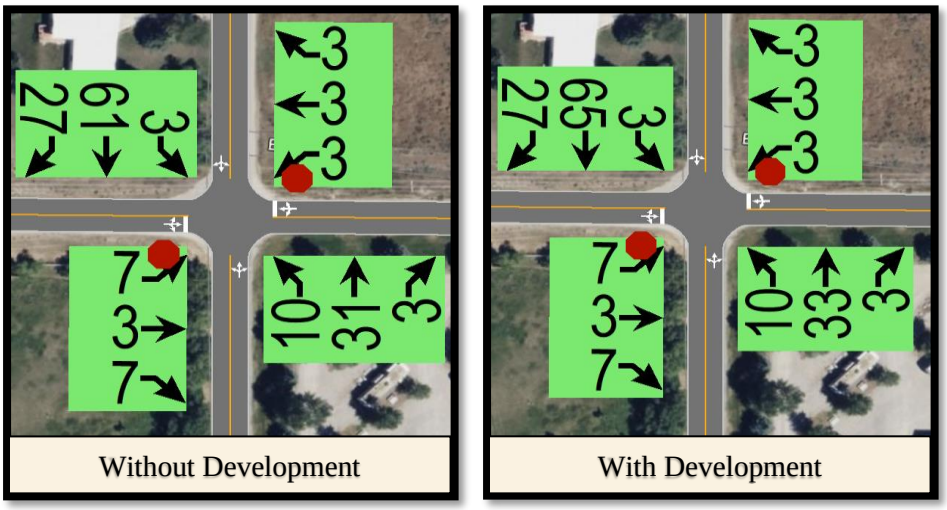


Figure 35: 3000W/6000N 2048 Traffic Volumes without and with the Development

6. Int. 6 – Hwy 33/3000W 2048 PM Peak Segment Traffic Volumes

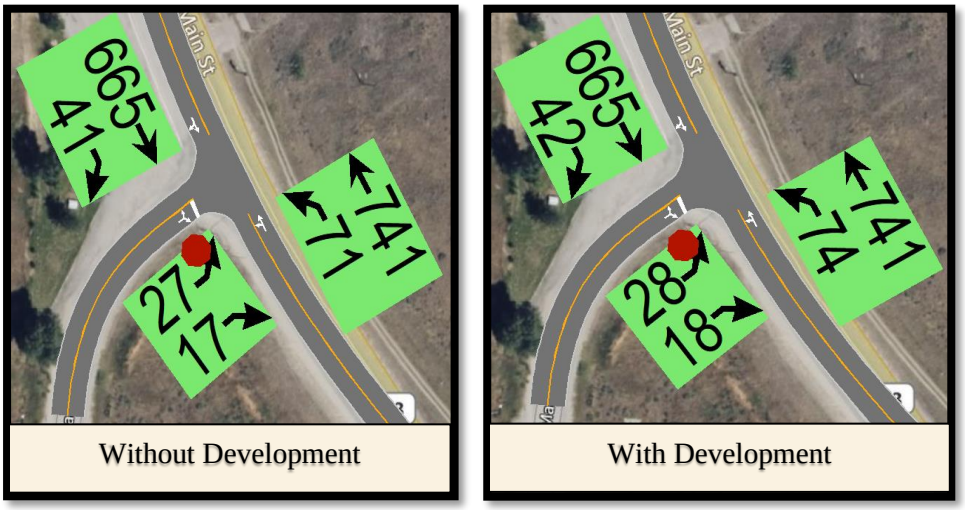


Figure 36: Hwy 33/3000W 2048 Traffic Volumes without and with the Development

F. 2048 Segment PM Peak Hour Traffic Conditions

The traffic counts shown previously in the chapter were used to determine the forecasted conditions without and with the proposed development. The following sections identify the projected LOS for each segment for both scenarios.

1. Seg. 1 – 3000W 2048 PM Peak Hour Segment Traffic Conditions

a. Seg.1 - 3000W 2048 Background PM Peak Hour Traffic Conditions

The visual counts that were seasonally adjusted show that there were 112 vph heading north and 54 vph heading south during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.066 for northbound traffic and 0.032 for southbound traffic. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

b. Seg.1 - 3000W 2048 Background plus Site Traffic PM Peak Hour Traffic Conditions

The traffic generated by the development was added to the 2048 Background Traffic. The results show that there are 123 vph heading north and 60 vph heading south during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.072 for northbound traffic and 0.035 for southbound traffic. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

c. Seg.1-3000W 2048 Background plus Site Traffic PM Peak Hour Mitigation Measures

Since the worst LOS is an A, no improvements are warranted for the 2048 conditions without or with the development.

2. Seg. 2 – 4000N 2048 PM Peak Hour Segment Traffic Conditions

a. Seg.2 – 4000N 2048 Background PM Peak Hour Traffic Conditions

The visual counts that were seasonally adjusted show that there are 98 vph heading eastbound and 129 vph heading westbound during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.058

for eastbound and 0.076 for westbound. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

b. Seg.2 - 4000N 2048 Background plus Site Traffic PM Peak Hour Traffic Conditions

The traffic generated by the development was added to the 2048 Background Traffic. The results show that there are 104 vph heading eastbound and 140 vph heading westbound during the pm peak hour. Dividing these volumes by 1700 vph, the v/c ratio is 0.061 for eastbound and 0.082 for westbound. The terrain within the study area is considered level and a 0% no-passing zone will be used. This results in a LOS of A for both directions.

c. Seg.2-4000N 2048 Background plus Site Traffic PM Peak Hour Mitigation Measures

Since the worst LOS is an A, no improvements are warranted for the 2048 conditions without or with the development.

G. 2048 Intersection PM Peak Hour Traffic Conditions

In order to determine how well an intersection is functioning, the intersection's Measures of Effectiveness (MOEs) for the peak hour are analyzed. The MOEs include:

1. Level of Service (LOS)
2. Control Delay
3. Volume/Capacity Ratio (V/C Ratio)
4. 95th Percentile Queue

Using the traffic volumes and turning movements shown previously, the 2048 MOEs for the intersections, without and with the development, can be determined.

1. Int. 1 – 3000W/5000N 2048 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 1, without and with the development, are shown in the following table.

Table 43 –Int. 1 – 2048 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBR	NBL	NBT	SBT	SBR
Lanes and Sharing (#RL)						
Traffic Volume (vph)	3	3	3	44	68	3
Future Volume (vph)	3	3	3	44	68	3
Sign Control	Stop		—	Free	Free	—
Median Width (ft)	12	—	—	0	0	—
TWLTL Median	☐	—	—	☐	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	6.4	6.2	4.1	—	—	—
Follow Up Time, tF (s)	3.5	3.3	2.2	—	—	—
Volume to Capacity Ratio	0.01	0.01	0.00	0.00	0.05	0.05
Control Delay (s)	8.9	8.9	0.0	0.4	0.0	0.0
Level of Service	A	A	A	A	A	A
Queue Length 95th (ft)	0	0	0	0	0	0
Approach Delay (s)	8.9	—	—	0.4	0.0	—

Table 44 –Int. 1 – 2048 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBR	NBL	NBT	SBT	SBR
Lanes and Sharing (#RL)						
Traffic Volume (vph)	5	3	14	44	68	7
Future Volume (vph)	5	3	14	44	68	7
Sign Control	Stop	—	—	Free	Free	—
Median Width (ft)	12	—	—	0	0	—
TWLTL Median	☐	—	—	☐	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	6.4	6.2	4.1	—	—	—
Follow Up Time, tF (s)	3.5	3.3	2.2	—	—	—
Volume to Capacity Ratio	0.01	0.01	0.01	0.01	0.05	0.05
Control Delay (s)	9.1	9.1	0.1	1.8	0.0	0.0
Level of Service	A	A	A	A	A	A
Queue Length 95th (ft)	1	1	1	1	0	0
Approach Delay (s)	9.1	—	—	1.8	0.0	—

2. Int. 2 – 4000N/3000W 2048 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 2, without and with the development, are shown in the following table.

Table 45 –Int. 2 – 2048 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	24	44	3	10	64	37	10	14	7	41	7	7
Future Volume (vph)	24	44	3	10	64	37	10	14	7	41	7	7
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.02	0.02	0.02	0.01	0.01	0.01	0.05	0.05	0.05	0.09	0.09	0.09
Control Delay (s)	0.1	2.6	2.6	0.1	0.7	0.7	10.2	10.2	10.2	10.5	10.5	10.5
Level of Service	A	A	A	A	A	A	B	B	B	B	B	B
Queue Length 95th (ft)	1	1	1	1	1	1	4	4	4	7	7	7
Approach Delay (s)	—	2.6	—	—	0.7	—	—	10.2	—	—	10.5	—

Table 46 –Int. 2 – 2048 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	24	44	3	10	64	48	10	14	7	47	7	7
Future Volume (vph)	24	44	3	10	64	48	10	14	7	47	7	7
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.02	0.02	0.02	0.01	0.01	0.01	0.05	0.05	0.05	0.09	0.09	0.09
Control Delay (s)	0.1	2.6	2.6	0.1	0.7	0.7	10.2	10.2	10.2	10.6	10.6	10.6
Level of Service	A	A	A	A	A	A	B	B	B	B	B	B
Queue Length 95th (ft)	1	1	1	1	1	1	4	4	4	8	8	8
Approach Delay (s)	—	2.6	—	—	0.7	—	—	10.2	—	—	10.6	—

3. Int. 3 – 4000N/2000W 2048 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 3, without and with the development, are shown in the following table.

Table 47 –Int. 3 – 2048 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	14	75	3	3	98	27	3	3	3	20	3	10
Future Volume (vph)	14	75	3	3	98	27	3	3	3	20	3	10
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.05	0.05	0.05
Control Delay (s)	0.1	1.2	1.2	0.0	0.2	0.2	9.9	9.9	9.9	10.0	10.0	10.0
Level of Service	A	A	A	A	A	A	A	A	A	B	B	B
Queue Length 95th (ft)	1	1	1	0	0	0	1	1	1	4	4	4
Approach Delay (s)	—	1.2	—	—	0.2	—	—	9.9	—	—	10.0	—

Table 48 –Int. 3 – 2048 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	14	81	3	3	110	27	3	3	3	20	3	10
Future Volume (vph)	14	81	3	3	110	27	3	3	3	20	3	10
Sign Control	—	Free	—	—	Free	—	—	Stop	—	—	Stop	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	4.1	—	—	4.1	—	—	7.1	6.5	6.2	7.1	6.5	6.2
Follow Up Time, tF (s)	2.2	—	—	2.2	—	—	3.5	4.0	3.3	3.5	4.0	3.3
Volume to Capacity Ratio	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.05	0.05	0.05
Control Delay (s)	0.1	1.1	1.1	0.0	0.2	0.2	10.0	10.0	10.0	10.2	10.2	10.2
Level of Service	A	A	A	A	A	A	B	B	B	B	B	B
Queue Length 95th (ft)	1	1	1	0	0	0	1	1	1	4	4	4
Approach Delay (s)	—	1.1	—	—	0.2	—	—	10.0	—	—	10.2	—

4. Int. 4 – Hwy 33/4000N 2048 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 4, without and with the development, are shown in the following table.

Table 49 –Int. 4 – 2048 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	27	10	61	27	7	10	75	799	24	24	892	47
Future Volume (vph)	27	10	61	27	7	10	75	799	24	24	892	47
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	12	—	—	12	—
TWLTL Median	—	☐	—	—	☐	—	—	☑	—	—	☑	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.45	0.45	0.45	0.38	0.38	0.38	0.12	0.51	0.02	0.03	0.57	0.03
Control Delay (s)	32.7	32.7	32.7	49.5	49.5	49.5	11.0	0.0	0.0	9.9	0.0	0.0
Level of Service	D	D	D	E	E	E	B	A	A	A	A	A
Queue Length 95th (ft)	55	55	55	39	39	39	10	0	0	3	0	0
Approach Delay (s)	—	32.7	—	—	49.5	—	—	0.9	—	—	0.2	—

Table 50 –Int. 4 – 2048 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	27	10	67	27	7	10	86	799	24	24	892	47
Future Volume (vph)	27	10	67	27	7	10	86	799	24	24	892	47
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	12	—	—	12	—
TWLTL Median	—	☐	—	—	☐	—	—	☑	—	—	☑	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.49	0.49	0.49	0.43	0.43	0.43	0.14	0.51	0.02	0.03	0.57	0.03
Control Delay (s)	34.3	34.3	34.3	60.3	60.3	60.3	11.1	0.0	0.0	9.9	0.0	0.0
Level of Service	D	D	D	F	F	F	B	A	A	A	A	A
Queue Length 95th (ft)	61	61	61	46	46	46	12	0	0	3	0	0
Approach Delay (s)	—	34.3	—	—	60.3	—	—	1.0	—	—	0.2	—

5. Int. 5 –3000W/6000N 2048 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 5, without and with the development, are shown in the following table.

Table 51 –Int. 5 – 2048 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	7	3	7	3	3	3	10	31	3	3	61	27
Future Volume (vph)	7	3	7	3	3	3	10	31	3	3	61	27
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Control Delay (s)	9.3	9.3	9.3	9.4	9.4	9.4	0.1	1.7	1.7	0.0	0.2	0.2
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	2	2	2	1	1	1	1	1	1	0	0	0
Approach Delay (s)	—	9.3	—	—	9.4	—	—	1.7	—	—	0.2	—

Table 52 –Int. 5 – 2048 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	7	3	7	3	3	3	10	33	3	3	65	27
Future Volume (vph)	7	3	7	3	3	3	10	33	3	3	65	27
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	0	—	—	0	—	—	0	—	—	0	—
TWLTL Median	—		—	—		—	—		—	—		—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Control Delay (s)	9.3	9.3	9.3	9.4	9.4	9.4	0.1	1.7	1.7	0.0	0.2	0.2
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Queue Length 95th (ft)	2	2	2	1	1	1	1	1	1	0	0	0
Approach Delay (s)	—	9.3	—	—	9.4	—	—	1.7	—	—	0.2	—

6. Int. 6 – Hwy 33/3000W 2048 PM Peak Hour Traffic Conditions

The traffic volumes, identified at the beginning of this chapter, were entered into the computer modeling software Synchro. The results from the model for Intersection 6, without and with the development, are shown in the following table.

Table 53 –Int. 6 – 2048 Peak Hour MOEs without the Development

HCM 2000 SIGNING SETTINGS	NBL	NBT	SBT	SBR	NEL	NER
Lanes and Sharing (#RL)						
Traffic Volume (vph)	71	741	665	41	27	17
Future Volume (vph)	71	741	665	41	27	17
Sign Control	—	Free	Free	—	Stop	—
Median Width (ft)	—	0	0	—	12	—
TWLTL Median	—	☐	☐	—	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	4.1	—	—	—	6.4	6.2
Follow Up Time, tF (s)	2.2	—	—	—	3.5	3.3
Volume to Capacity Ratio	0.09	0.09	0.45	0.45	0.36	0.36
Control Delay (s)	1.7	2.4	0.0	0.0	47.5	47.5
Level of Service	A	A	A	A	E	E
Queue Length 95th (ft)	7	7	0	0	37	37
Approach Delay (s)	—	2.4	0.0	—	47.5	—

Table 54 –Int. 6 – 2048 Peak Hour MOEs with the Development

HCM 2000 SIGNING SETTINGS	NBL	NBT	SBT	SBR	NEL	NER
Lanes and Sharing (#RL)						
Traffic Volume (vph)	74	741	665	42	28	18
Future Volume (vph)	74	741	665	42	28	18
Sign Control	—	Free	Free	—	Stop	—
Median Width (ft)	—	0	0	—	12	—
TWLTL Median	—	☐	☐	—	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	4.1	—	—	—	6.4	6.2
Follow Up Time, tF (s)	2.2	—	—	—	3.5	3.3
Volume to Capacity Ratio	0.09	0.09	0.45	0.45	0.38	0.38
Control Delay (s)	1.7	2.5	0.0	0.0	48.4	48.4
Level of Service	A	A	A	A	E	E
Queue Length 95th (ft)	8	8	0	0	40	40
Approach Delay (s)	—	2.5	0.0	—	48.4	—

H. Turn Lane Warrants Based on Safety Analysis of Intersections

1. 2048 Left Turn Lane Analysis

Intersection 6 was evaluated for safety using ITD guidelines which recommend using the *National Cooperative Highway Research Report 745 –Left-Turn Accommodations at Unsignalized Intersections (NCHRP 745) to evaluate left-hand turns and* National Cooperative Highway Research Report 457: Evaluating Intersection Improvements: An Engineering Study Guide (NCHRP 457) *to evaluate right-turn movements to determine if turning movements are consistent with national standards for safety based on traffic volumes.* These guidelines show that if a three-leg intersection has traffic higher than 200 vph per lane on the major roadway and more than 150 vph per lane on a four-leg intersection, a left turn is warranted (see left-turn lane warrant chart in Chapter 4).

It was found in the 2023 Existing Conditions Chapter that a left turn lane is warranted at Intersection 6 for westbound traffic. Based on the ITD guidelines, no new turn-lanes are warranted from the increase (including the projected traffic generated by the proposed development) in traffic from 2023 to 2048 (see Appendix K for the left-turn worksheet).

2. 2048 Right Turn Lane Analysis

The Right-hand turn warrant analysis follows the guidance found in ITD's *Traffic Manual: Idaho's Supplementary Guide to the MUTCD* (reference the right-turn lane warrant chart in Chapter 4). Based on these guidelines, a right-turning lane is warranted for 2048 Horizon Year southeastbound traffic without or with the development (see Appendix K for the right-turn worksheet) at Intersection 6 for the southbound traffic.

I. 2048 PM Peak Hour Traffic Conditions Summary without and with the Development

This chapter has identified the following:

1. Segments

a. Seg. 1: 3000W without the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

b. Seg. 1: 3000W with the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

c. Seg. 2: 4000N without the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

d. Seg. 2: 4000N with the Development

The segment/link v/c ratio results in a LOS of A. Therefore, in accordance with ITD guidelines, no improvements are warranted for the existing conditions.

e. Segment Summary

The following tables are a summary of each segment's v/c ratio and LOS for each direction without and with the development.

Table 55 –Seg. 1 3000W 2048 Segments Traffic Condition Summary

3000W	2023		2028		2048	
Direction	v/c	LOS	v/c	LOS	v/c	LOS
North	0.035	A	0.039	A	0.066	A
South	0.017	A	0.019	A	0.032	A
Without the Development						

3000W	2023		2028		2048	
Direction	v/c	LOS	v/c	LOS	v/c	LOS
North	n/a	n/a	0.046	A	0.072	A
South	n/a	n/a	0.023	A	0.035	A
With the Development						

Table 56 –Seg. 2 4000N 2048 Segments Traffic Condition Summary

4000N	2023		2028		2048	
Direction	v/c	LOS	v/c	LOS	v/c	LOS
East	0.031	A	0.035	A	0.058	A
West	0.040	A	0.045	A	0.076	A
Without the Development						

4000N	2023		2028		2048	
Direction	v/c	LOS	v/c	LOS	v/c	LOS
East	n/a	n/a	0.038	A	0.061	A
West	n/a	n/a	0.052	A	0.082	A
With the Development						

2. Intersections

a. Int. 1: 3000W/5000N without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

b. Int. 1: 3000W/5000N with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

c. Int. 2: 4000N/3000W without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of B during the PM peak hour of the day.

d. Int. 2: 4000N/3000W with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of B during the PM peak hour of the day.

e. Int. 3: 4000N/2000W without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of B during the PM peak hour of the day.

f. Int. 3: 4000N/2000W with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of B during the PM peak hour of the day.

g. Int. 4: Hwy 33/4000N without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of E during the PM peak hour of the day.

h. Int. 4: Hwy 33/4000N with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of F during the PM peak hour of the day.

i. Int. 5: 3000W/6000N without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

j. Int. 5: 3000W/6000N with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of A during the PM peak hour of the day.

k. Int. 6: Hwy 33/3000W without the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of E during the PM peak hour of the day.

l. Int. 6: Hwy 33/3000W with the Development

The delay times, v/c ratio, and LOS indicate that the intersection's worst turning movement is operating at a LOS of E during the PM peak hour of the day.

m. Intersection Summary

The following tables are a summary of each intersection's LOS and delay time for each turning movement. It should be noted that by adding the trips generated by the development, the northbound traffic at Intersection 3 degrades from a LOS of A to B with the development and the westbound traffic at Intersection 4 degrades from a LOS of E to F with the development (degraded LOS highlighted in red).

Table 57 –Int. 1 2048 Traffic Condition Summary without and with the Development

Int 1 - 3000W/5000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	3	n/a	3	n/a	n/a	n/a	3	44	n/a	n/a	68	3
LOS	A	n/a	A	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	9.1	n/a	9.1	n/a	n/a	n/a	0.1	1.8	n/a	n/a	0	0

Int 1 - 3000W/5000N - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	3	n/a	3	n/a	n/a	n/a	3	44	n/a	n/a	68	3
LOS	A	n/a	A	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	8.9	n/a	8.9	n/a	n/a	n/a	0	0.4	n/a	n/a	0	0

Table 58 –Int. 2 2048 Traffic Condition Summary without and with the Development

Int 2 - 4000N/3000W - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	24	44	3	10	64	37	10	14	7	41	7	7
LOS	A	A	A	A	A	A	B	B	B	B	B	B
Delay	0.1	2.6	2.6	0.1	0.7	0.7	10.2	10.2	10.2	10.5	10.5	10.5

Int 2 - 4000N/3000W - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	24	44	3	10	64	48	10	14	7	47	7	7
LOS	A	A	A	A	A	A	B	B	B	B	B	B
Delay	0.1	2.6	2.6	0.1	0.7	0.7	10.2	10.2	10.2	10.6	10.6	10.6

Table 59 –Int. 3 2048 Traffic Condition Summary without and with the Development

Int 3 - 4000N/2000W - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	14	75	3	3	98	27	3	3	3	20	3	10
LOS	A	A	A	A	A	A	A	A	A	B	B	B
Delay	0.1	1.2	1.2	0	0.2	0.2	9.9	9.9	9.9	10.0	10.0	10.0

Int 3 - 4000N/2000W - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	14	81	3	3	110	27	3	3	3	20	3	10
LOS	A	A	A	A	A	A	B	B	B	B	B	B
Delay	0.1	1.1	1.1	0	0.2	0.2	10.0	10.0	10.0	10.2	10.2	10.2

Table 60 –Int. 4 2048 Traffic Condition Summary with the Development

Int 4 - Hwy 33/4000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	27	10	61	27	7	10	75	799	24	24	892	47
LOS	D	D	D	E	E	E	B	A	A	A	A	A
Delay	32.7	32.7	32.7	49.5	49.5	49.5	11.0	0	0	9.9	0	0

Int 4 - Hwy 33/4000N - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	27	10	67	27	7	10	86	799	24	24	892	47
LOS	D	D	D	F	F	F	B	A	A	A	A	A
Delay	34.3	34.3	34.3	60.3	60.3	60.3	11.1	0	0	9.9	0	0

Table 61 –Int. 5 2048 Traffic Condition Summary with the Development

Int 5 - 3000W/6000N - Build LOS and Delay Times without the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	7	3	7	3	3	3	10	31	3	3	61	27
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	9.3	9.3	9.3	9.4	9.4	9.4	0.1	1.7	1.7	0	0.2	0.2

Int 5 - 3000W/6000N - Build LOS and Delay Times with the Development												
	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	7	3	7	3	3	3	10	33	3	3	65	27
LOS	A	A	A	A	A	A	A	A	A	A	A	A
Delay	9.3	9.3	9.3	9.4	9.4	9.4	0.1	1.7	1.7	0	0.2	0.2

Table 62 –Int. 6 2048 Traffic Condition Summary with the Development

Int 6 - Hwy 33/3000W - Build LOS and Delay Times without the Development												
	Northeast Bound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	27	n/a	17	n/a	n/a	n/a	71	741	n/a	n/a	665	41
LOS	E	n/a	E	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	47.5	n/a	47.5	n/a	n/a	n/a	1.7	2.4	n/a	n/a	0	0

Int 6 - Hwy 33/3000W - Build LOS and Delay Times with the Development												
	Northeast Bound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
2048 Traffic	28	n/a	18	n/a	n/a	n/a	74	741	n/a	n/a	665	42
LOS	E	n/a	E	n/a	n/a	n/a	A	A	n/a	n/a	A	A
Delay	48.4	n/a	48.4	n/a	n/a	n/a	1.7	2.5	n/a	n/a	0	0

3. Turn Lane Analysis

The following table is a summary of the left and right turn analysis for Intersection 6.

Table 63 –Existing 2048 Int. 6 Left and Right Turn Analysis Summary

Int 6 - Hwy 33/3000W	Left Turn Lane	Right Turn Lane
	Northbound	Southbound
2023 Existing Traffic	Warranted	Not Warranted
2028 Background Traffic	Warranted	Not Warranted
2028 Background plus Site Traffic	Warranted	Not Warranted
2048 Background Traffic	Warranted	Warranted
2048 Background plus Site Traffic	Warranted	Warranted

4. Overall Summary for 2048 Horizon Year Traffic

a. 2023 Existing Conditions Review

In summary, the following was determined in a previous chapter to be operating at an unacceptable level for the 2024 existing conditions:

- Int. 6 Hwy 33/3000W: Northwest bound, left turning traffic, exceeds the minimum ITD safety level

(1) 2024 Mitigation Measures

It is recommended that a left turn lane be constructed on Hwy 33 at Intersection 6 for the northbound traffic for the 2024 existing/current conditions.

b. 2028 Buildout Conditions Review

Besides those areas noted for the 2024 existing conditions, no new LOS or turning lane warrants have been identified as operating at an unacceptable level for the 2028 buildout year without or with the development.

(1) 2028 Mitigation Measures

Since no new areas are identified to be operating at an unacceptable level, no new mitigation measures are warranted for the 2028 buildout year without or with the development.

c. 2048 Horizon Year Conditions Summary

In summary, the following was determined to be operating at an unacceptable level for the 2048 conditions:

- Int. 4 Hwy 33/4000N: Westbound, left, thru, and right turning traffic, exceeds the minimum LOS standard without and with the development
- Int. 6 Hwy 33/3000W: Northeast bound, left and right turning traffic, exceeds the minimum LOS standard without and with the development
- Int. 6 Hwy 33/3000W: Southbound, right turning traffic, exceeds the minimum ITD safety level without and with the development

5. Mitigation Measures for the 2048 Horizon Year Traffic

a. Int. 4: Hwy 33/4000N

It has been forecasted that the westbound traffic at Int. 4 Hwy 33/4000N will operate at an unacceptable level in 2048. In order to improve this intersection so that each turning movement is forecasted to operate at an acceptable level, the following is recommended.

- Eastbound Traffic: A dedicated left and right turn lane be constructed
- Westbound Traffic: A dedicated left and right turn lane be constructed
- Northbound Traffic: An additional thru lane be added
- Southbound Traffic: An additional thru lane be added

The following figure and table show the projected layout, traffic volumes, and LOS results for the 2048 mitigation measures.

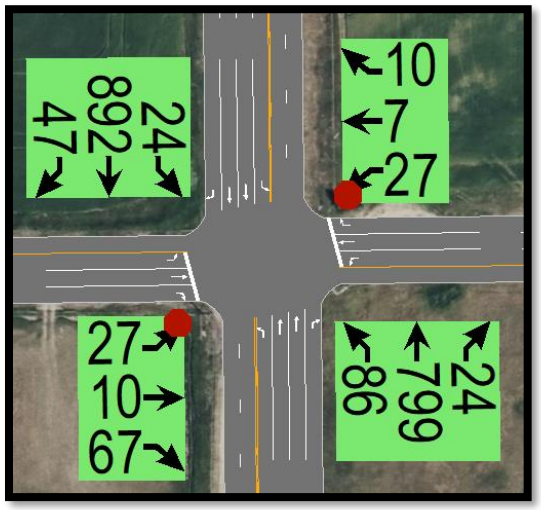


Figure 37: Int. 4 2048 Horizon Year Mitigation Measures Improvements Layout and Volumes

Table 64 –Int. 4 – 2048 Peak Hour MOEs with the Development Mitigation Measures

HCM 2000 SIGNING SETTINGS	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lanes and Sharing (#RL)												
Traffic Volume (vph)	27	10	67	27	7	10	86	799	24	24	892	47
Future Volume (vph)	27	10	67	27	7	10	86	799	24	24	892	47
Sign Control	—	Stop	—	—	Stop	—	—	Free	—	—	Free	—
Median Width (ft)	—	12	—	—	12	—	—	12	—	—	12	—
TWLTL Median	—	☐	—	—	☐	—	—	☑	—	—	☑	—
Right Turn Channelized	—	—	None	—	—	None	—	—	None	—	—	None
Critical Gap, tC (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1	—	—	4.1	—	—
Follow Up Time, tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	—	—	2.2	—	—
Volume to Capacity Ratio	0.15	0.06	0.14	0.18	0.05	0.02	0.14	0.26	0.02	0.03	0.29	0.03
Control Delay (s)	26.4	26.3	12.9	31.5	29.5	11.4	11.2	0.0	0.0	9.9	0.0	0.0
Level of Service	D	D	B	D	D	B	B	A	A	A	A	A
Queue Length 95th (ft)	13	5	12	15	4	1	12	0	0	3	0	0
Approach Delay (s)	—	17.7	—	—	26.5	—	—	1.1	—	—	0.2	—

b. Int. 6: Hwy 33/3000W

It has been forecasted that the northeast bound left and right turning traffic at Int. 6 Hwy 33/3000W will operate at an unacceptable level in 2048. In order to improve this intersection so that each turning movement is forecasted to operate at an acceptable level, the following is recommended.

- Northeast Traffic: A dedicated left and right turn lane be constructed
- Northbound Traffic: A dedicated left turn lane be constructed
- Southbound Traffic: A dedicated right turn lane be constructed

The following figure and table show the projected layout, traffic volumes, and LOS results for the 2048 mitigation measures.

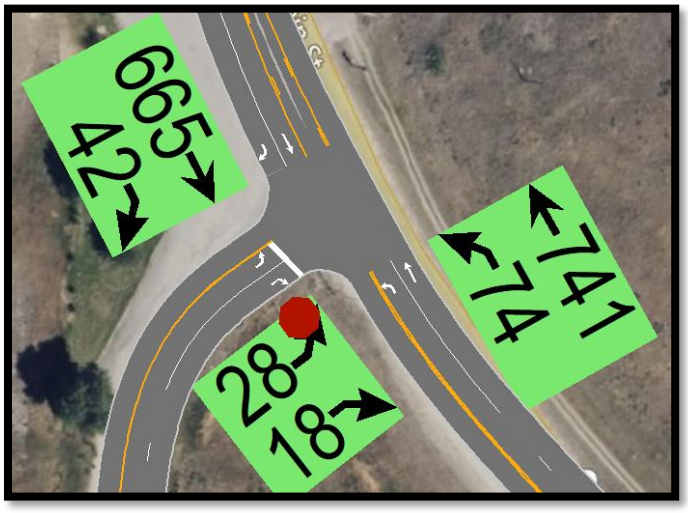


Figure 38: Int. 6 2048 Horizon Year Mitigation Measures Improvements Layout and Volumes

Table 65 –Int. 6 – 2048 Peak Hour MOEs with the Development Mitigation Measures

HCM 2000 SIGNING SETTINGS	NBL	NBT	SBT	SBR	NEL	NER
Lanes and Sharing (#RL)						
Traffic Volume (vph)	74	741	665	42	28	18
Future Volume (vph)	74	741	665	42	28	18
Sign Control	—	Free	Free	—	Stop	—
Median Width (ft)	—	12	12	—	12	—
TWLTL Median	—	☑	☑	—	☐	—
Right Turn Channelized	—	None	—	None	—	None
Critical Gap, tC (s)	4.1	—	—	—	6.4	6.2
Follow Up Time, tF (s)	2.2	—	—	—	3.5	3.3
Volume to Capacity Ratio	0.09	0.47	0.43	0.03	0.11	0.05
Control Delay (s)	9.7	0.0	0.0	0.0	19.3	13.9
Level of Service	A	A	A	A	C	B
Queue Length 95th (ft)	8	0	0	0	9	4
Approach Delay (s)	—	0.9	0.0	—	17.1	—

X. Roadway Width and Thickness Design

The *Adopting Highway & Street Guidelines for Design & Construction in Teton County* and the *AASHTO Pavement Thickness Design Guide* will be used in this Chapter to recommend a width and thickness for 5000N accessing the proposed development.

A. Average Daily Traffic (ADT)

It has been identified that the proposed development is projected to generate 268 vpd at buildout. The 268 vph added to the projected background traffic at buildout (55 vpd) shows an ADT of 323.

B. Roadway Width

5000N is considered a minor neighborhood roadway, also known as a local roadway. The *Adopting Highway & Street Guidelines for Design & Construction in Teton County* (see Appendix H) shows that a local roadway has the following cross-section:

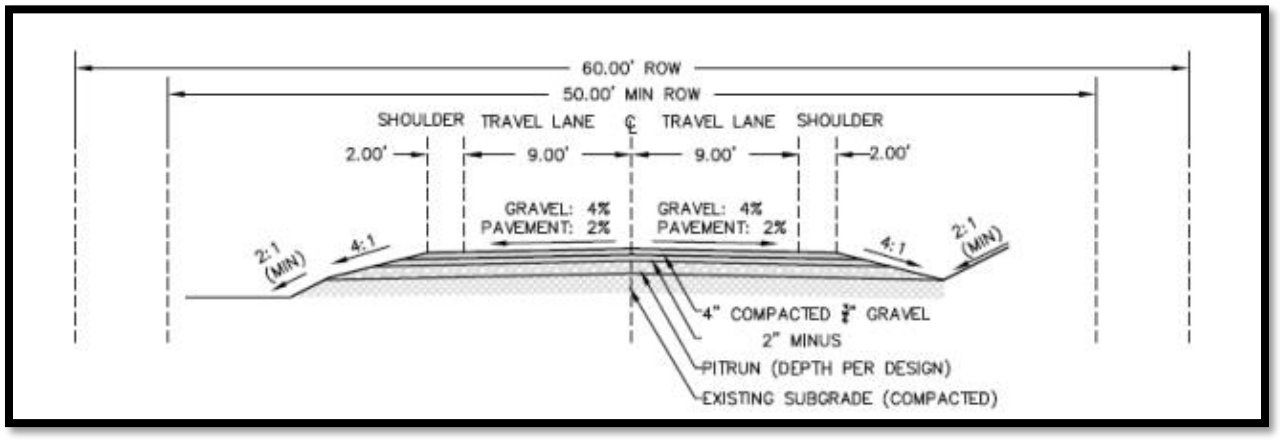


Figure 39: Teton County Local Road Standard

The existing roadway matches the width standard.

C. Roadway Thickness

From the above figure, the only unknown is the pit run depth. Using the *AASHTO Pavement Thickness Design Guide* (see Appendix I). The recommended coefficients shown in the AASHTO design guide and the following two (2) equations are used to determine the pit run depth:

$$log_{10}(W_{18}) = Z_R S_o + 9.36 log_{10}(SN+1) - 0.20 + \frac{log_{10}\left(\frac{\Delta PSI}{4.5-1.5}\right)}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 log_{10}(M_R) - 8.07$$

$$SN = a_1 d_1 + a_2 d_2 m_2 + a_3 d_3 m_3$$

Figure 40: Roadway ESAL and Structural Number Equations

The first step is to convert the ADT to ESALS; an ESAL is the acronym for equivalent single axle load. ESAL is a concept developed from data collected at the American Association of State Highway Officials (AASHO) Road Test to establish a damage relationship for comparing the effects of axles carrying different loads. The reference axle load is an 18,000-lb. single axle with dual tires.

It is calculated that the 323 vpd have an ESAL of 16,875. Using a Terminal Serviceability Index of 2.0 for local roads, a recommended 30-year life, a reliability of 80% for local roads, and a California Bearing Ratio of 12, it is determined that the required structural number for the projected roadway volume loading is 1.79. From the Teton County Road Standard identifying a minimum of 4" of compacted gravel, a pit run depth of 11.25" is calculated to have a structural number of 1.79.

D. Roadway Cross-Section Recommendations

It is recommended that the access roadway to the proposed subdivision have a minimum of 9' travel lanes, a minimum of 2' of shoulders on each side of the roadway, a minimum of 4" of compacted gravel, and a minimum of 11.25" of pit run depth.

XI. Conclusions.

After evaluating the proposed development within the context of zoning; projected land use; existing transportation system; background traffic counts for the principal roadways within the study impact area; projected traffic for horizon year's corresponding with project opening, project buildout, and a 20-year horizon year; the findings of the Traffic Impact Study are summarized below. In order to simplify the forecasted traffic conditions as they have progressed through this study, the following three (3) tables were produced. The first table shows the forecasted progression of the roadway segments, the second table shows the intersections, and the third shows the left or right turn lanes.

Table 66- Segment Traffic Conditions Progression Each Horizon Year

Segment 1: 3000W	Northbound V/C Ratio	LOS	Southbound V/C Ratio	LOS
2022 Existing Traffic	0.035	A	0.017	A
2028 Background	0.039	A	0.019	A
2028 Background plus Site Traffic	0.046	A	0.023	A
2048 Background	0.066	A	0.032	A
2048 Background plus Site Traffic	0.072	A	0.035	A

Segment 2: 4000N	Eastbound V/C Ratio	LOS	Westbound V/C Ratio	LOS
2022 Existing Traffic	0.031	A	0.040	A
2028 Background	0.035	A	0.045	A
2028 Background plus Site Traffic	0.038	A	0.052	A
2048 Background	0.058	A	0.076	A
2048 Background plus Site Traffic	0.061	A	0.082	A

Table 67- Intersection Traffic Conditions Progression Each Horizon Year

Int 1 - 3000W/5000N	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	8.7	A	n/a	n/a	0.5	A	0	A
2028 Background Traffic	8.7	A	n/a	n/a	0.5	A	0	A
2028 Background plus Site Traffic	8.7	A	n/a	n/a	2.5	A	0	A
2048 Background Traffic	8.9	A	n/a	n/a	2.5	A	0	A
2048 Background plus Site Traffic	9.1	A	n/a	n/a	2.5	A	0	A

Int 2 - 4000N/3000W	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	2.6	A	0.6	A	9.4	A	9.4	A
2028 Background Traffic	2.5	A	0.6	A	9.5	A	9.5	A
2028 Background plus Site Traffic	2.5	A	0.6	A	9.6	A	9.6	A
2048 Background Traffic	2.6	A	0.7	A	10.2	B	10.5	B
2048 Background plus Site Traffic	2.6	A	0.7	A	10.2	B	10.6	B

Int 3 - 4000N/2000W	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	1.1	A	0.2	A	9.2	A	9.3	A
2028 Background Traffic	1.2	A	0.2	A	9.3	A	9.3	A
2028 Background plus Site Traffic	1.2	A	0.2	A	9.4	A	9.4	A
2048 Background Traffic	1.2	A	0.2	A	9.9	A	10	B
2048 Background plus Site Traffic	1.2	A	0.2	A	10	B	10.2	B

Int 4 - Hwy 33/4000N	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	13.5	B	14.9	B	0.7	A	0.2	A
2028 Background Traffic	14.8	B	16.5	C	0.7	A	0.2	A
2028 Background plus Site Traffic	15	B	17	C	0.9	A	0.2	A
2048 Background Traffic	32.7	D	49.5	E	0.9	A	0.2	A
2048 Background plus Site Traffic	34.3	D	60.3	F	1	B	0.2	A

(Intersection Traffic Conditions Progression Each Horizon Year Table Continued)

Int 5 - 3000W/6000N	Eastbound		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	8.9	A	9	A	1.5	A	0.3	A
2028 Background Traffic	9	A	9	A	1.8	A	0.3	A
2028 Background plus Site Traffic	9	A	9.1	A	1.8	A	0.2	A
2048 Background Traffic	9.3	A	9.4	A	1.7	A	0.2	A
2048 Background plus Site Traffic	9.3	A	9.4	A	1.7	A	0.2	A

Int 6 - Hwy 33/3000W	Northeast		Westbound		Northbound		Southbound	
	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS	Approach Delay	Max LOS
2023 Existing Traffic	15.1	C	n/a	n/a	1.1	A	0	A
2028 Background Traffic	16	C	n/a	n/a	1.2	A	0	A
2028 Background plus Site Traffic	17.1	C	n/a	n/a	1.3	A	0	A
2048 Background Traffic	47.5	E	n/a	n/a	2.4	A	0	A
2048 Background plus Site Traffic	48.4	E	n/a	n/a	2.5	A	0	A

Table 68- Left and Right Turn Lane Progression Each Horizon Year

Int 6 - Hwy 33/3000W	Left Turn Lane	Right Turn Lane
	Northbound	Southbound
2023 Existing Traffic	Warranted	Not Warranted
2028 Background Traffic	Warranted	Not Warranted
2028 Background plus Site Traffic	Warranted	Not Warranted
2048 Background Traffic	Warranted	Warranted
2048 Background plus Site Traffic	Warranted	Warranted

A. Existing Traffic Conditions (2023)

The existing traffic conditions were analyzed with the existing intersection control and lane configurations, all the road segments and intersections are operating within minimum operational thresholds except:

- Int. 6 Hwy 33/3000W: Northwest bound, left turning traffic, exceeds the minimum ITD safety level

1. Mitigating Measures

It is recommended that a left turn lane be constructed on Hwy 33 for the northwest bound traffic at Intersection 6 to get the intersection in compliance with ITD standards.

B. Projected Traffic

The projected land use for the build-out year of the proposed development initially comprised 14 main dwelling units and 14 accessory dwelling units (28 units total). However, the development has been updated to 10 lots with 10 accessory dwelling units (20 units total). For a conservative analysis, the TIS includes data for the initial proposal of 14 main dwelling units and 14 accessory dwelling units. All other uses remain consistent with existing conditions. The build-out conditions are expected to generate approximately 268 vehicle trips per hour (vph) for the mean average daily traffic (MADT) and 21 vph during the PM peak hour by the year 2028.

C. 2028 Buildout Year Traffic Conditions Results

Besides those areas noted for the 2023 existing conditions, no new LOS or turning lane warrants have been identified as operating at an unacceptable level for the 2028 buildout year without or with the development.

1. Mitigation Measures for the 2028 Buildout Conditions

Since no new areas are identified to be operating at an unacceptable level, no new mitigation measures are warranted for the 2028 buildout year without or with the development.

D. 2048 Horizon Year Traffic Conditions Results

The forecasted 2048 traffic conditions were analyzed with the existing intersection control and lane configurations, all the road segments and intersections are within minimum operational thresholds except:

- Int. 4 Hwy 33/4000N: Westbound, left, thru, and right turning traffic, exceeds the minimum LOS standard without and with the development
- Int. 6 Hwy 33/3000W: Northeast bound, left and right turning traffic, exceeds the minimum LOS standard without and with the development
- Int. 6 Hwy 33/3000W: Southbound, right turning traffic, exceeds the minimum ITD safety level without and with the development

1. Mitigating Measures for the 2048 Horizon Year

a. Int. 4: Hwy 33/4000N

It has been forecasted that the westbound traffic at Int. 4 Hwy 33/4000N will operate at an unacceptable level in 2048. In order to improve this intersection so that each turning movement is forecasted to operate at an acceptable level, the following is recommended.

- Eastbound Traffic: A dedicated left and right turn lane be constructed
- Westbound Traffic: A dedicated left and right turn lane be constructed
- Northbound Traffic: An additional thru lane be added
- Southbound Traffic: An additional thru lane be added

b. Int. 6: Hwy 33/3000W

It has been forecasted that the northeast bound left and right turning traffic at Int. 6 Hwy 33/3000W will operate at an unacceptable level in 2048. In order to improve this intersection so that each turning movement is forecasted to operate at an acceptable level, the following is recommended.

- Northeast Traffic: A dedicated left and right turn lane be constructed
- Northbound Traffic: A dedicated left turn lane be constructed
- Southbound Traffic: A dedicated right turn lane be constructed

E. Roadway Cross-Section Recommendations

It is recommended that the access roadway to the proposed subdivision have a minimum of 9' travel lanes, a minimum of 2' of shoulders on each side of the roadway, a minimum of 4" of compacted gravel, and a minimum of 11.25" of pit run depth.

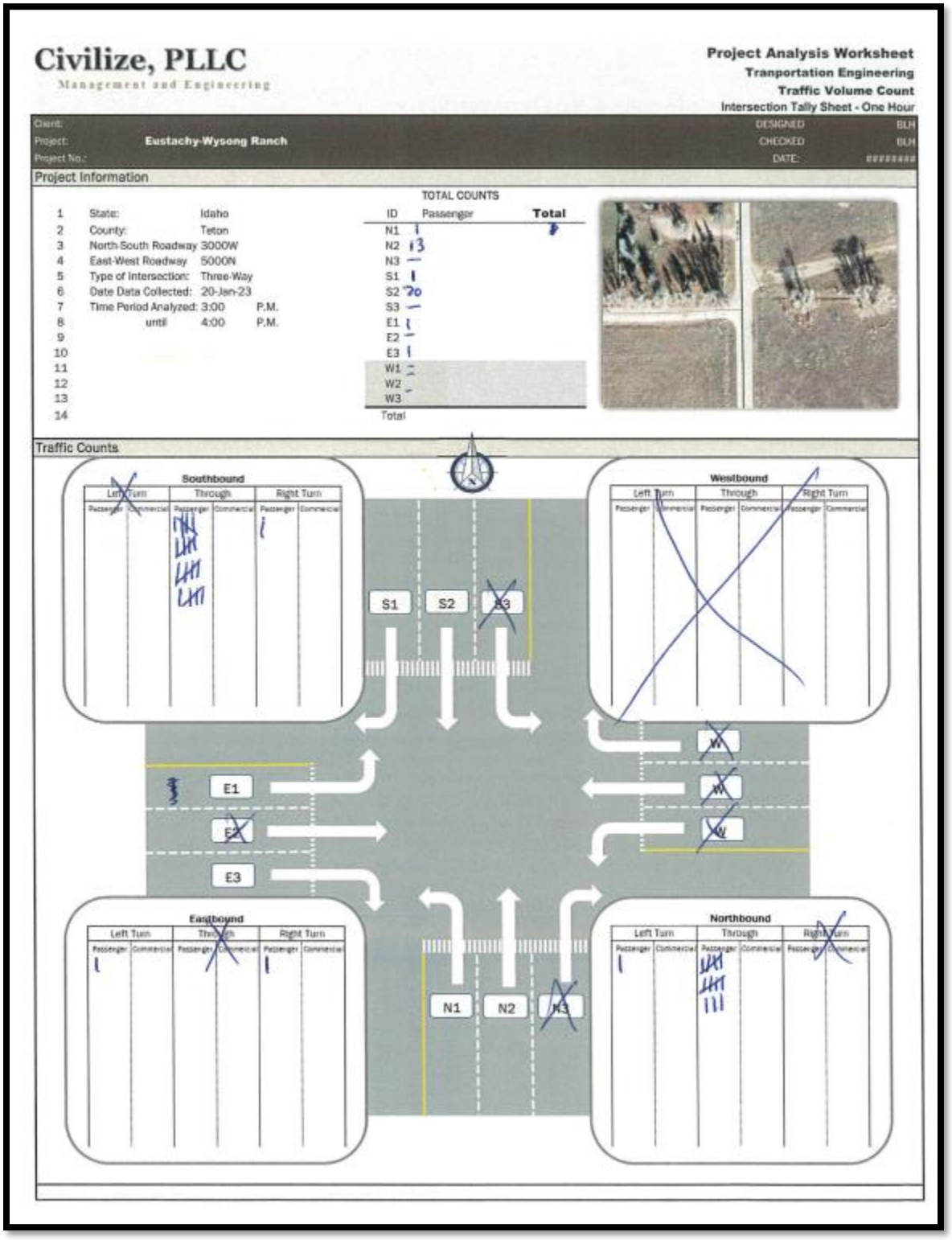
F. Overall Study Conclusions

As can be seen from the tables in this chapter, the development is forecasted to have minimal impact to the traffic network within the study area. This study has identified that without or with the proposed development, improvements are warranted within the 25 years to the Hwy 33 intersections. These improvements include additional left, thru, and right turn lanes at Int. 4 Hwy 33/4000N and additional left and right turn lanes at Int. 6 Hwy 33/3000W to meet the minimum safety and traffic flow guidelines without or with the development.

This study also recommends that the roadway accessing the development meet the county standard (see Appendix H) with 4" of road base and 11.25" of pit run to handle the projected traffic at the buildout of the proposed development.

XII. Appendix A: Site Master Plan

XIII. Appendix B: Traffic Counts



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Management and Engineering

Project Analysis Worksheet
Tranportation Engineering
Traffic Volume Count
Intersection Tally Sheet - One Hour

Client:
Project: Eustachy-Wysong Ranch
Project No.:
DESIGNED BLH
CHECKED BLH
DATE: ########

Project Information

1	State:	Idaho	
2	County:	Teton	
3	North-South Roadway	3000W	
4	East-West Roadway	5000N	
5	Type of Intersection:	Three-Way	
6	Date Data Collected:	20-Jan-23	
7	Time Period Analyzed:	3:00	P.M.
8	until	4:00	P.M.
9			
10			
11			
12			
13			
14			

TOTAL COUNTS

ID	Passenger	Total
N1	1	
N2	13	
N3	—	
S1	1	
S2	20	
S3	—	
E1	1	
E2	—	
E3	1	
W1	11	
W2	—	
W3		
Total		

Traffic Counts

Southbound
Left Turn | Through | Right Turn
Passenger | Commercial | Passenger | Commercial | Passenger | Commercial

Westbound
Left Turn | Through | Right Turn
Passenger | Commercial | Passenger | Commercial | Passenger | Commercial

Eastbound
Left Turn | Through | Right Turn
Passenger | Commercial | Passenger | Commercial | Passenger | Commercial

Northbound
Left Turn | Through | Right Turn
Passenger | Commercial | Passenger | Commercial | Passenger | Commercial

S1 S2 S3
W1 W2 W3
E1 E2 E3
N1 N2 N3

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Project Analysis Worksheet
Tranportation Engineering
Traffic Volume Count
Intersection Tally Sheet - One Hour

Client:
Project: **Eustachy-Wysong Ranch**
Project No.:

DESIGNED: BLH
CHECKED: BLH
DATE: ########

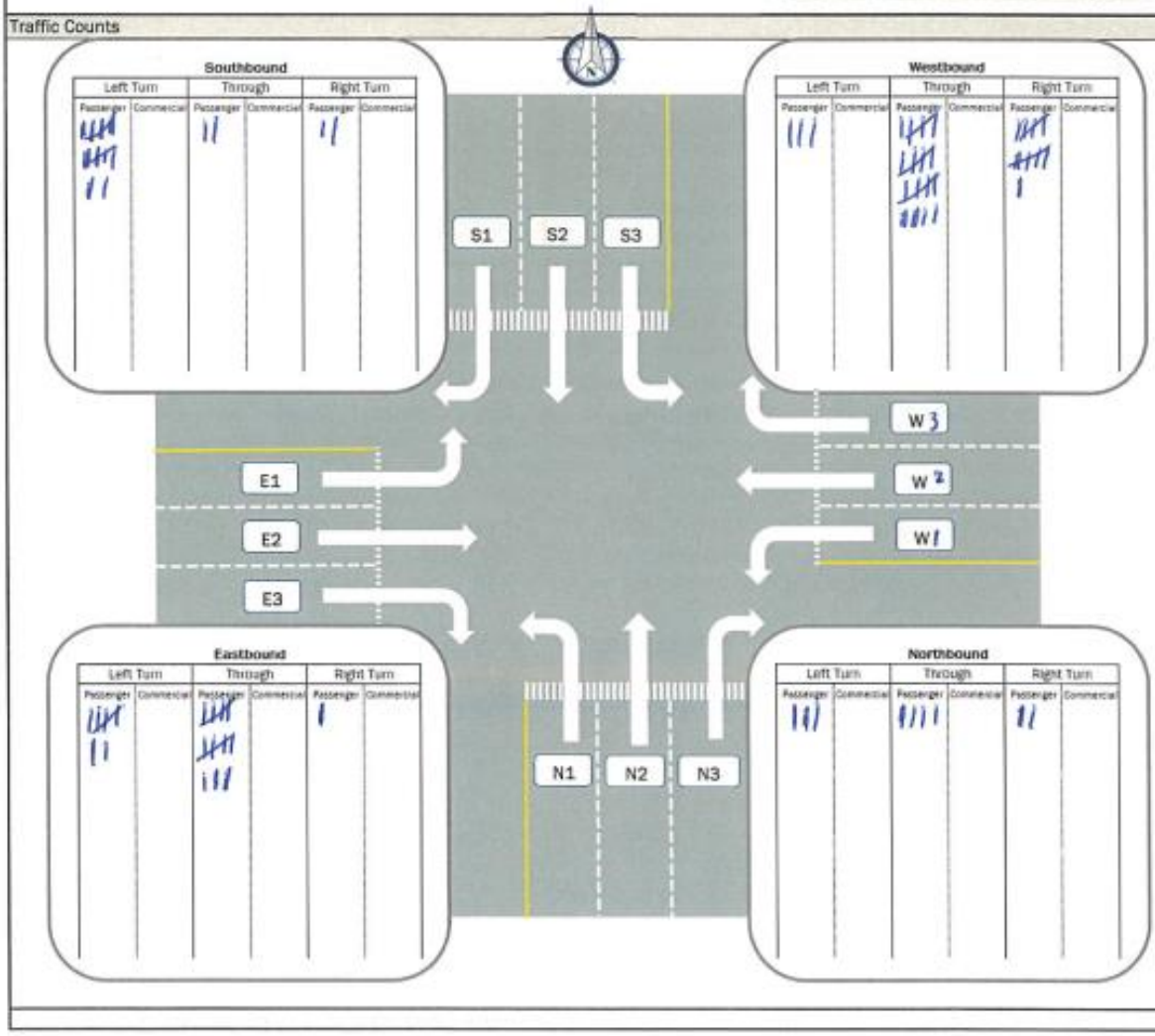
Project Information

1	State:	Idaho	
2	County:	Teton	
3	North-South Roadway	3000W	
4	East-West Roadway	4000N	
5	Type of Intersection:	Four-Way	
6	Date Data Collected:	20-Jan-23	
7	Time Period Analyzed:	3:00	P.M.
8	until	4:00	P.M.
9			
10			
11			
12			
13			
14			

TOTAL COUNTS

ID	Passenger	Total
N1	3	
N2	4	
N3	2	
S1	2	
S2	2	
S3	12	
E1	7	
E2	13	
E3	1	
W1	8	
W2	19	
W3	11	
Total		

Traffic Counts



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Project Analysis Worksheet
Tranportation Engineering
Traffic Volume Count
Intersection Tally Sheet - One Hour

Client:
Project: **Eustachy-Wysong Ranch**
Project No.:

DESIGNED: BLH
CHECKED: BLH
DATE: ########

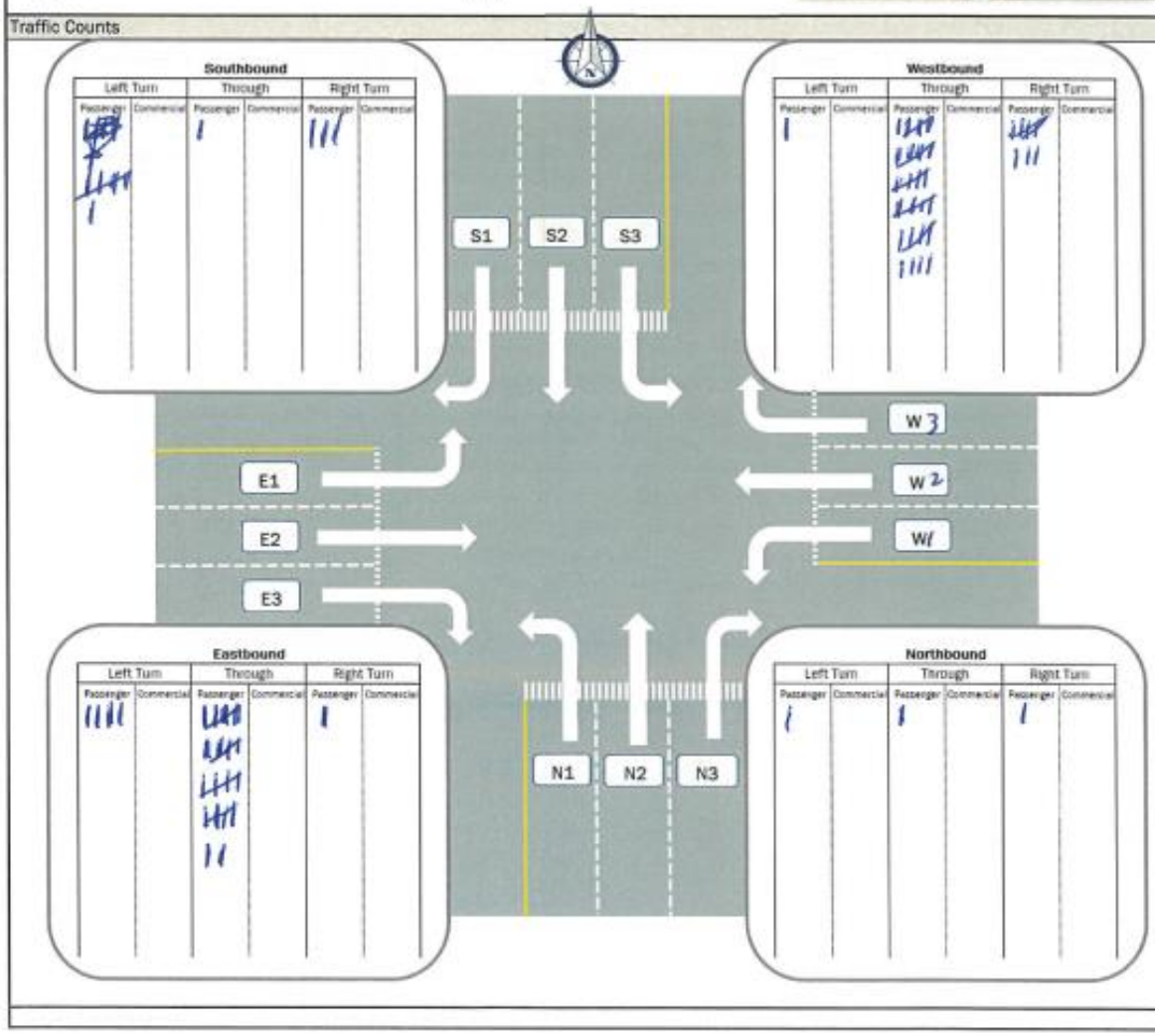
Project Information

1	State:	Idaho	
2	County:	Teton	
3	North-South Roadway	2000W	
4	East/West Roadway	4000N	
5	Type of Intersection:	Four-Way	
6	Date Data Collected:	20-Jan-23	
7	Time Period Analyzed:	4:00	P.M.
8	until	5:00	P.M.
9			
10			
11			
12			
13			
14			

TOTAL COUNTS

ID	Passenger	Total
N1	1	
N2	1	
N3	1	
S1	3	
S2	1	
S3	6	
E1	4	
E2	22	
E3	1	
W1	1	
W2	28	
W3	8	
Total		

Traffic Counts



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Management and Engineering

Project Analysis Worksheet
Tranportation Engineering
Traffic Volume Count
Intersection Tally Sheet - One Hour

Client:
Project: **Eustachy-Wysong Ranch**
Project No.:

DESIGNED: BLH
CHECKED: BLH
DATE: ########

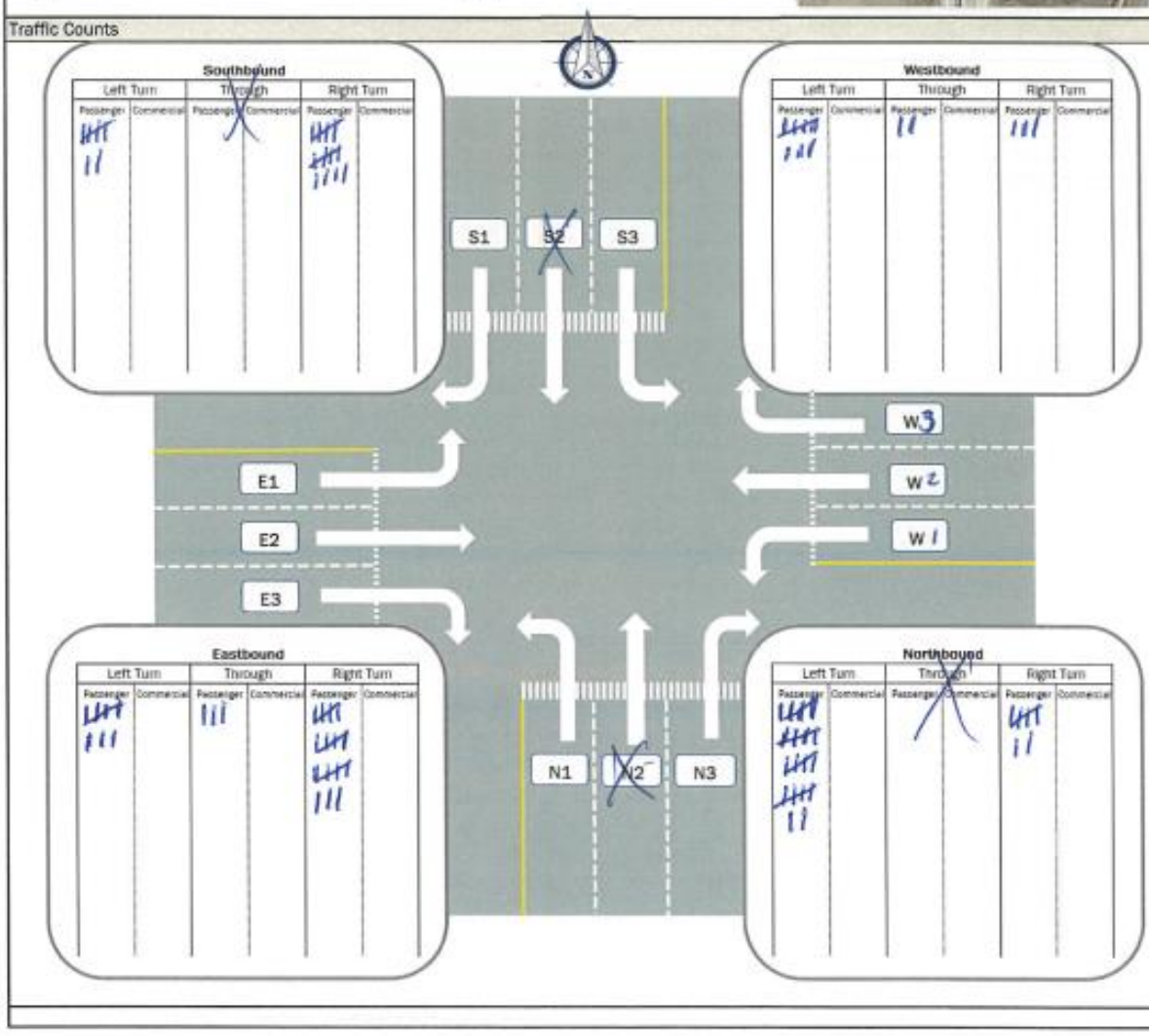
Project Information

1	State:	Idaho	
2	County:	Teton	
3	North-South Roadway	Hwy 33	
4	East-West Roadway	4000N	
5	Type of Intersection:	Four-Way	
6	Date Data Collected:	20-Jan-23	
7	Time Period Analyzed:	4:00	P.M.
8	until	5:00	P.M.
9			
10			
11			
12			
13			
14			

TOTAL COUNTS

ID	Passenger	Total
N1	22	
N2		
N3	7	
S1	14	
S2		
S3	7	
E1	8	
E2	3	
E3	18	
W1	8	
W2	2	
W3	3	
Total		

Traffic Counts



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Project Analysis Worksheet
Tranportation Engineering
Traffic Volume Count
Intersection Tally Sheet - One Hour

Client:
Project: **Eustachy-Wysong Ranch**
Project No.:

DESIGNED: BLH
CHECKED: BLH
DATE: ########

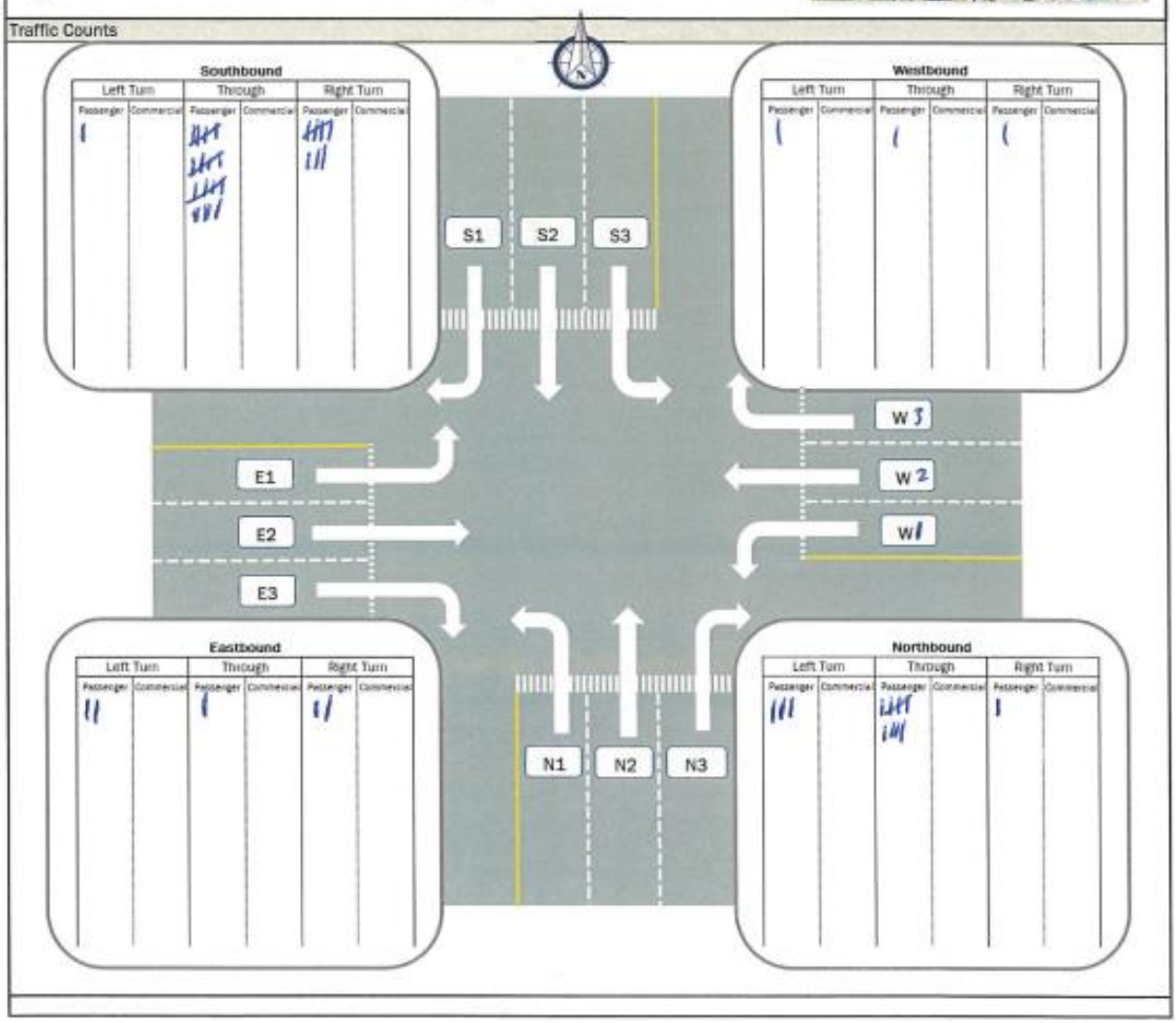
Project Information

1	State:	Idaho	
2	County:	Teton	
3	North-South Roadway	3000W	
4	East-West Roadway	6000N	
5	Type of Intersection:	Four-Way	
6	Date Data Collected:	20-Jan-23	
7	Time Period Analyzed:	5:00	P.M.
8	until	6:00	P.M.
9			
10			
11			
12			
13			
14			

TOTAL COUNTS

ID	Passenger	Total
N1	3	
N2	9	
N3	1	
S1	8	
S2	18	
S3	1	
E1	2	
E2	1	
E3	2	
W1	1	
W2	1	
W3	1	
Total		

Traffic Counts



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Project Analysis Worksheet
Tranportation Engineering
Traffic Volume Count
Intersection Tally Sheet - One Hour

Client:
Project: **Eustachy-Wysong Ranch**
Project No.:

DESIGNED: BLH
CHECKED: BLH
DATE: ########

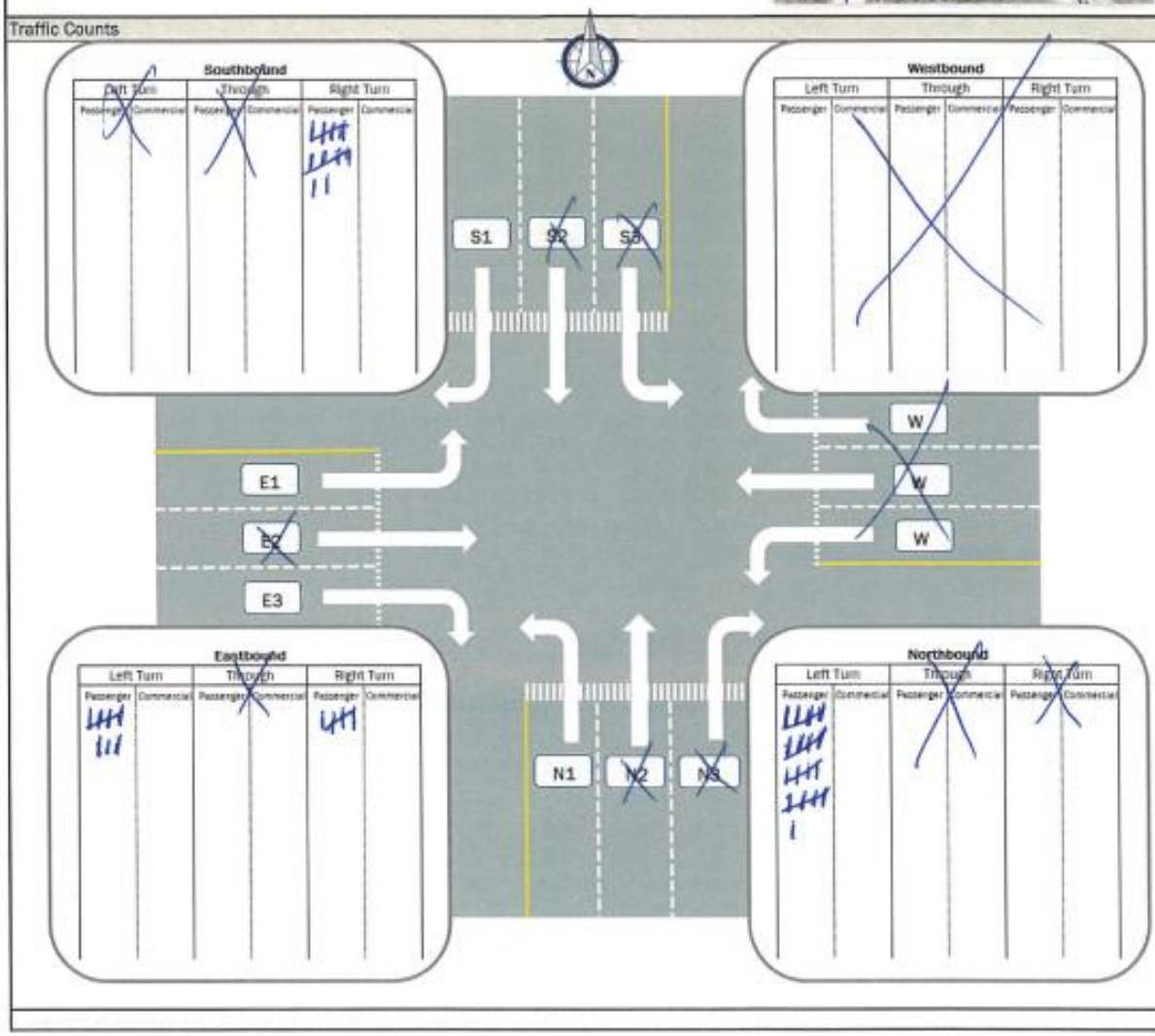
Project Information

1	State:	Idaho	
2	County:	Teton	
3	North-South Roadway	Hwy 33	
4	East-West Roadway	3000W	
5	Type of Intersection:	Four-Way	
6	Date Data Collected:	20-Jan-23	
7	Time Period Analyzed:	5:00	P.M.
8	until	6:00	P.M.
9			
10			
11			
12			
13			
14			

TOTAL COUNTS

ID	Passenger	Total
N1	21	
N2		
N3		
S1	12	
S2		
S3		
E1	8	
E2		
E3	5	
W1		
W2		
W3		
Total		

Traffic Counts



#059 - Newdale - ATR | Average Daily Traffic | Published Reports

Automatic Counter Volumes

Report Types

Year	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	24-Hour	Annual Avg.
1990	835	895	1230	1375	1428	1505	1876	1777	1389	1396	1091	1047	1324	
1991	859	1021	1069	1327	1461	1616	1820	1799	1521	1580	1066	1061	1352	
1992	1029	1131	1242	1557	1635	1761	2079	1877	1696	1348	1149	905	1455	
1993	835	915	1208	1463	1669	1706	2053	1838	1724	1550	1168	1159	1444	
1994	1145	1138	1415	1729	1674	1842	2147	2032	1762	1579	1234	1172	1575	
1995	1211	1245	1660	1919	2157	1883	2208	2143	1922	1788	1407	1409	1746	
1996	1025	1282	1528	1739	1765	1886	2188	2071	1814	1653	1273	1049	1606	
1997	1072	1230	1329	1639	1893	1997	2297	2194	1936	1704	1427	1399	1676	
1998	1141	1280	1479	1678	1860	1901	2201	2176	1935	1786	1466	1353	1688	
1999	1331	1302	1604	1764	1896	2084	2479	2392	2124	1651	1473	1433	1794	
2000	1120	1310	1578	1763	1824	2038	2352	2349	1983	1825	1506	1484	1761	
2001	1451	1516	1695	1906	1999	2122	2379	2336	2155	1893	1662	1571	1890	
2002	1305	1480	1786	1819	2048	2152	2574	2451	2258	2065	1752	1723	1951	
2003	1635	1637	1737	1899	2103	2202	2438	2393	2121	1955	1642	1627	1949	
2004	1371	1596	1785	1949	2031	2170	2614	2380	2227	1955	1813	1816	1976	
2005	1584	1746	1846	1992	2190	2363	2600	2395	2108	2085	1762	1822	2041	
2006	1611	1734	1870	2011	2294	2507	2706	2766	2500	2370	1978	2079	2202	
2007	1967	2179	2321	2417	2666	2980	3089	3314	2977	2726	2351	2173	2597	
2008	1806	1703	2170	2158	2306	2533	2714	2538	2341	2222	1846	1632	2164	
2009	1660	1721	1768	1911	2180	2483	2625	2411	2414	2062	1704	1700	2053	
2010	1659	1712	1793	1814	2036	2360	2668	2321	2263	2024	1585	1518	1979	
2011	1519	1505	1667	1679	1887	2097	2482	2234	2180	1909	1505	1535	1850	
2012	1461	1566	1615	1802	1844	2155	2352	2212	2044	1747	1518	1567	1824	
2013	1416	1530	1604	1741	1894	2306	2410	2107	1976	1874	1622	1612	1841	
2014	1562	1556	1805	1907	1995	2440	2480	2293	2217	2018	1701	1730	1975	
2015	1732	1833	1920	2084	2089	2508	2879	2688	2522	2255	1957	1861	2194	
2016	1826	2000	2147	2219	2367	2744	3115	2954	2655	2293	2011	1838	2347	
2017	1804	1918	2154	2322	2529	2991	3293	3402	2880	2633	2264	2251	2537	
2018	2191	2152	2246	2444	2733	3146	3478	3164	3126	2853	2296	2169	2666	
2019	2139	1706		2604	2764	3189	3526	3434	3084	2666	2395	2318	2697	
2020	2157	2257	1971	1920	2651	3078	3430	3565	3461	3015	2454	2460	2701	
2021	2519	2129	2702	2809	3276	3948	4073	3529	3045	2528	2349	2287	2933	
2022	2357	2547	2730	2777	3242	3791	4219	4145	4135	3685	2869	2533		

Idaho Transportation Department

Monthly Hourly Day of Week Summary for July 2022

Site names: 00059
County: Madison
Funct Class: R Minor Arterial - Other
Location: SH-33 5.3 Mi. E of Main St

Seasonal Factor Grp: 4
Daily Factor Grp: 3
Axle Factor Grp: 3
Growth Factor Grp: 7

	SUN			MON			TUE			WED			THU			FRI			SAT		
	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W
00:00	40	23	17	18	10	8	26	17	9	15	9	6	21	9	12	24	10	13	37	18	19
01:00	18	8	10	9	3	5	10	6	3	9	4	5	8	3	5	9	5	4	15	6	8
02:00	11	6	5	5	2	3	6	1	4	7	4	2	9	3	5	8	3	4	11	7	4
03:00	11	7	3	8	5	3	8	5	3	8	4	4	9	6	3	6	4	1	9	6	3
04:00	12	8	4	24	20	4	21	16	4	22	16	6	20	18	2	20	17	3	23	16	7
05:00	31	20	11	113	101	12	115	101	14	122	113	9	118	106	12	98	85	13	57	43	14
06:00	41	27	14	181	161	20	215	193	22	220	194	25	216	193	23	187	163	24	100	76	24
07:00	70	35	35	217	153	63	251	185	65	257	194	63	256	191	65	252	185	66	158	100	58
08:00	117	51	66	247	149	97	267	173	94	265	175	89	280	193	87	256	163	93	228	131	97
09:00	168	66	102	276	147	128	281	156	124	268	161	106	314	188	126	285	155	130	274	139	135
10:00	204	80	124	248	119	129	272	138	133	267	132	134	288	150	138	286	146	139	304	141	163
11:00	230	91	138	246	110	136	267	115	152	256	115	141	270	133	137	286	128	157	306	137	168
12:00	219	87	131	237	101	136	248	104	143	247	111	135	274	123	150	307	136	171	283	137	146
13:00	222	97	125	226	102	124	252	123	129	249	129	120	257	126	131	304	141	163	283	144	138
14:00	215	108	106	258	124	134	257	122	134	253	112	141	261	124	137	325	146	179	277	132	145
15:00	231	118	113	249	113	136	283	131	152	278	127	151	318	151	167	344	163	181	294	143	151
16:00	236	125	111	273	108	165	325	125	200	312	124	187	344	150	193	397	188	209	294	136	158
17:00	209	112	96	316	112	204	356	124	232	357	123	233	368	140	228	407	192	214	278	117	160
18:00	197	98	99	305	111	193	335	106	228	324	107	216	328	112	216	345	161	184	248	106	142
19:00	169	88	80	184	63	120	209	70	138	217	81	136	228	89	139	270	133	137	204	85	118
20:00	141	74	66	125	54	71	138	61	76	133	57	76	150	60	90	210	91	118	158	67	91
21:00	116	59	56	96	46	50	104	46	58	121	53	68	121	55	66	152	70	82	147	64	83
22:00	76	38	38	70	29	40	67	32	34	86	43	43	91	38	53	143	57	86	105	48	56
23:00	41	24	17	59	28	31	34	15	18	38	18	20	47	19	27	97	33	63	67	33	34
MADW	3,033	1,458	1,574	3,999	1,980	2,019	4,354	2,174	2,179	4,339	2,213	2,125	4,607	2,387	2,219	5,027	2,584	2,442	4,170	2,040	2,129
N Days	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5

Idaho Transportation Department

Monthly Hourly Day of Week Summary for November 2022

Site names: 00059
County: Madison
Funct Class: R Minor Arterial - Other
Location: SH-33 5.3 Mi. E of Main St

Seasonal Factor Grp: 4
Daily Factor Grp: 3
Axle Factor Grp: 3
Growth Factor Grp: 7

	SUN			MON			TUE			WED			THU			FRI			SAT		
	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W	Road	E	W
00:00	17	12	5	8	6	2	7	4	3	11	5	5	9	5	4	9	5	3	17	10	7
01:00	5	3	2	4	3	1	2	1	1	6	3	2	4	2	1	3	2	1	6	3	3
02:00	5	3	1	3	2	0	3	2	0	6	4	1	4	3	1	5	3	1	7	4	2
03:00	7	4	3	7	4	2	5	3	2	4	2	2	4	2	1	3	1	1	6	4	2
04:00	7	4	3	13	9	3	12	9	2	14	11	3	12	8	4	10	7	3	11	6	5
05:00	15	5	10	77	69	8	86	77	9	80	74	5	66	57	8	56	44	11	24	14	9
06:00	32	18	14	158	143	15	160	142	18	163	143	19	128	112	15	114	97	16	49	35	14
07:00	61	40	20	203	147	55	216	161	54	211	155	56	187	138	48	190	140	49	113	76	36
08:00	89	41	48	215	143	72	222	157	65	225	154	71	184	122	61	211	134	77	146	87	58
09:00	117	45	72	212	127	84	222	127	94	207	126	81	187	105	81	228	117	111	163	85	77
10:00	144	47	96	172	96	76	184	98	86	183	96	86	173	95	78	223	110	113	178	66	112
11:00	140	51	89	168	80	88	178	85	93	171	77	93	159	80	79	204	87	116	209	79	130
12:00	142	57	85	173	75	98	178	77	100	165	73	92	173	79	94	216	92	124	212	85	127
13:00	143	60	83	178	74	104	182	78	103	165	72	93	163	80	83	221	97	124	200	91	109
14:00	160	71	88	181	79	101	200	86	113	195	80	115	164	73	91	242	106	136	191	88	103
15:00	170	85	85	198	77	120	223	95	128	219	93	126	188	78	110	244	107	136	219	100	119
16:00	173	90	83	246	87	159	275	96	179	248	83	165	224	71	152	288	113	174	230	96	134
17:00	142	78	64	292	80	211	313	89	224	279	83	196	264	79	185	301	123	178	213	97	115
18:00	110	67	43	210	65	145	235	68	167	225	71	154	214	69	145	213	93	119	151	79	71
19:00	63	36	27	93	39	54	115	44	70	125	51	74	134	51	83	144	72	72	118	67	51
20:00	55	37	18	58	30	28	67	34	33	70	33	36	82	43	39	97	45	51	90	51	38
21:00	34	24	10	57	36	21	55	32	23	52	32	19	61	41	19	72	35	36	78	46	32
22:00	26	18	8	27	16	11	28	18	10	30	20	10	32	19	12	54	31	23	55	37	17
23:00	12	8	3	13	7	5	18	10	7	15	9	6	20	12	7	33	19	13	29	17	11
MADW	1,877	910	966	2,974	1,504	1,470	3,198	1,602	1,595	3,077	1,559	1,518	2,844	1,433	1,410	3,389	1,691	1,698	2,722	1,333	1,389
N Days	3	3	3	4	4	4	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4

XIV. Appendix C: 2023 Existing Conditions Traffic Model Results

Eustachy-Wysong Ranch - 2023 Existing Conditions - Int 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	2	2	23	36	2
Future Volume (Veh/h)	2	2	2	23	36	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2	2	25	39	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	69	40	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	69	40	41			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	934	1031	1568			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	4	27	41
Volume Left	2	2	0
Volume Right	2	0	2
cSH	981	1568	1700
Volume to Capacity	0.00	0.00	0.02
Queue Length 95th (ft)	0	0	0
Control Delay (s)	8.7	0.5	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	0.5	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Eustachy-Wysong Ranch - 2023 Existing Conditions - Int 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	23	2	5	34	20	5	7	4	21	4	4
Future Volume (Veh/h)	13	23	2	5	34	20	5	7	4	21	4	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	14	25	2	5	37	22	5	8	4	23	4	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	59			27			118	123	26	120	113	48
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	59			27			118	123	26	120	113	48
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	99	100	97	99	100
cM capacity (veh/h)	1545			1587			843	758	1050	837	768	1021

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	41	64	17	31
Volume Left	14	5	5	23
Volume Right	2	22	4	4
cSH	1545	1587	838	847
Volume to Capacity	0.01	0.00	0.02	0.04
Queue Length 95th (ft)	1	0	2	3
Control Delay (s)	2.6	0.6	9.4	9.4
Lane LOS	A	A	A	A
Approach Delay (s)	2.6	0.6	9.4	9.4
Approach LOS			A	A

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	15.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Eustachy-Wysong Ranch - 2023 Existing Conditions - Int 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	39	2	2	52	14	2	2	2	11	2	5
Future Volume (Veh/h)	7	39	2	2	52	14	2	2	2	11	2	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	42	2	2	57	15	2	2	2	12	2	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	72			44			134	135	43	130	128	64
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72			44			134	135	43	130	128	64
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1528			1564			828	751	1027	834	757	1000

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	52	74	6	19
Volume Left	8	2	2	12
Volume Right	2	15	2	5
cSH	1528	1564	854	863
Volume to Capacity	0.01	0.00	0.01	0.02
Queue Length 95th (ft)	0	0	1	2
Control Delay (s)	1.2	0.2	9.2	9.3
Lane LOS	A	A	A	A
Approach Delay (s)	1.2	0.2	9.2	9.3
Approach LOS			A	A

Intersection Summary					
Average Delay	2.0				
Intersection Capacity Utilization	15.6%	ICU Level of Service	A		
Analysis Period (min)	15				

Eustachy-Wysong Ranch - 2023 Existing Conditions - Int 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	5	32	14	4	5	39	422	13	13	471	25
Future Volume (Veh/h)	14	5	32	14	4	5	39	422	13	13	471	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	15	5	35	15	4	5	42	459	14	14	512	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1090	1097	512	1120	1110	459	539			473		
vC1, stage 1 conf vol	540	540		543	543							
vC2, stage 2 conf vol	550	557		578	567							
vCu, unblocked vol	1090	1097	512	1120	1110	459	539			473		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	99	94	96	99	99	96			99		
cM capacity (veh/h)	382	387	562	348	375	602	1029			1089		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	55	24	42	459	14	14	512	27
Volume Left	15	15	42	0	0	14	0	0
Volume Right	35	5	0	0	14	0	0	27
cSH	480	386	1029	1700	1700	1089	1700	1700
Volume to Capacity	0.11	0.06	0.04	0.27	0.01	0.01	0.30	0.02
Queue Length 95th (ft)	10	5	3	0	0	1	0	0
Control Delay (s)	13.5	14.9	8.6	0.0	0.0	8.3	0.0	0.0
Lane LOS	B	B	A			A		
Approach Delay (s)	13.5	14.9	0.7			0.2		
Approach LOS	B	B						

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	41.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Eustachy-Wysong Ranch - 2023 Existing Conditions - Int 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	2	4	2	2	2	5	16	2	2	32	14
Future Volume (Veh/h)	4	2	4	2	2	2	5	16	2	2	32	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	2	4	2	2	2	5	17	2	2	35	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	78	76	42	80	82	18	50			19		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	78	76	42	80	82	18	50			19		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	905	811	1028	901	805	1061	1557			1597		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	6	24	52
Volume Left	4	2	5	2
Volume Right	4	2	2	15
cSH	928	910	1557	1597
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	8.9	9.0	1.5	0.3
Lane LOS	A	A	A	A
Approach Delay (s)	8.9	9.0	1.5	0.3
Approach LOS	A	A		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Eustachy-Wysong Ranch - 2023 Existing Conditions - Int 6

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	38	391	351	21	14	9
Future Volume (Veh/h)	38	391	351	21	14	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	425	382	23	15	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	405				900	394
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	405				900	394
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				95	98
cM capacity (veh/h)	1154				298	655

Direction, Lane #	NB 1	SB 1	NE 1
Volume Total	466	405	25
Volume Left	41	0	15
Volume Right	0	23	10
cSH	1154	1700	381
Volume to Capacity	0.04	0.24	0.07
Queue Length 95th (ft)	3	0	5
Control Delay (s)	1.1	0.0	15.1
Lane LOS	A		C
Approach Delay (s)	1.1	0.0	15.1
Approach LOS			C

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

XV. Appendix D: 2028 Buildout Traffic Model Results

Without the Development

Eustachy-Wysong Ranch - 2028 Without Development - Int 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	2	2	26	41	2
Future Volume (Veh/h)	2	2	2	26	41	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2	2	28	45	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	78	46	47			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	78	46	47			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	924	1023	1560			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	4	30	47
Volume Left	2	2	0
Volume Right	2	0	2
cSH	971	1560	1700
Volume to Capacity	0.00	0.00	0.03
Queue Length 95th (ft)	0	0	0
Control Delay (s)	8.7	0.5	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	0.5	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

With the Development

Eustachy-Wysong Ranch - 2028 With Development - Int 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	8	13	26	41	4
Future Volume (Veh/h)	4	8	13	26	41	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	9	14	28	45	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	103	47	49			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	103	47	49			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	887	1022	1558			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	42	49
Volume Left	4	14	0
Volume Right	9	0	4
cSH	976	1558	1700
Volume to Capacity	0.01	0.01	0.03
Queue Length 95th (ft)	1	1	0
Control Delay (s)	8.7	2.5	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	2.5	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	18.8%	ICU Level of Service	A
Analysis Period (min)	15		

Without the Development

Eustachy-Wysong Ranch - 2028 Without Development - Int 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	26	2	6	39	22	6	8	4	24	4	4
Future Volume (Veh/h)	14	26	2	6	39	22	6	8	4	24	4	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	15	28	2	7	42	24	7	9	4	26	4	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	66			30			133	139	29	136	128	54
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	66			30			133	139	29	136	128	54
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	99	100	97	99	100
cM capacity (veh/h)	1536			1583			823	741	1046	816	752	1013

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	45	73	20	34
Volume Left	15	7	7	26
Volume Right	2	24	4	4
cSH	1536	1583	817	827
Volume to Capacity	0.01	0.00	0.02	0.04
Queue Length 95th (ft)	1	0	2	3
Control Delay (s)	2.5	0.7	9.5	9.5
Lane LOS	A	A	A	A
Approach Delay (s)	2.5	0.7	9.5	9.5
Approach LOS			A	A

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	15.9%	ICU Level of Service	A	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2028 With Development - Int 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	26	2	6	39	33	6	8	4	30	4	4
Future Volume (Veh/h)	14	26	2	6	39	33	6	8	4	30	4	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	15	28	2	7	42	36	7	9	4	33	4	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	78			30			139	151	29	142	134	60
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	78			30			139	151	29	142	134	60
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	99	100	96	99	100
cM capacity (veh/h)	1520			1583			816	730	1046	808	746	1005

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	45	85	20	41
Volume Left	15	7	7	33
Volume Right	2	36	4	4
cSH	1520	1583	809	817
Volume to Capacity	0.01	0.00	0.02	0.05
Queue Length 95th (ft)	1	0	2	4
Control Delay (s)	2.5	0.6	9.6	9.6
Lane LOS	A	A	A	A
Approach Delay (s)	2.5	0.6	9.6	9.6
Approach LOS			A	A

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	17.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2028 Without Development - Int 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	45	2	2	59	16	2	2	2	12	2	6
Future Volume (Veh/h)	8	45	2	2	59	16	2	2	2	12	2	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	49	2	2	64	17	2	2	2	13	2	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	81			51			152	153	50	148	146	72
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	81			51			152	153	50	148	146	72
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	98	100	99
cM capacity (veh/h)	1517			1555			803	733	1018	813	740	990

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	83	6	22
Volume Left	9	2	2	13
Volume Right	2	17	2	7
cSH	1517	1555	835	854
Volume to Capacity	0.01	0.00	0.01	0.03
Queue Length 95th (ft)	0	0	1	2
Control Delay (s)	1.1	0.2	9.3	9.3
Lane LOS	A	A	A	A
Approach Delay (s)	1.1	0.2	9.3	9.3
Approach LOS			A	A

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	16.6%	ICU Level of Service	A	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2028 With Development - Int 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	51	2	2	70	16	2	2	2	12	2	6
Future Volume (Veh/h)	8	51	2	2	70	16	2	2	2	12	2	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	55	2	2	76	17	2	2	2	13	2	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	93			57			170	171	56	166	164	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			57			170	171	56	166	164	84
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	98	100	99
cM capacity (veh/h)	1501			1547			781	717	1011	791	724	975

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	66	95	6	22
Volume Left	9	2	2	13
Volume Right	2	17	2	7
cSH	1501	1547	819	834
Volume to Capacity	0.01	0.00	0.01	0.03
Queue Length 95th (ft)	0	0	1	2
Control Delay (s)	1.1	0.2	9.4	9.4
Lane LOS	A	A	A	A
Approach Delay (s)	1.1	0.2	9.4	9.4
Approach LOS			A	A

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	17.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2028 Without Development - Int 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	6	37	16	4	6	45	479	14	14	535	28
Future Volume (Veh/h)	16	6	37	16	4	6	45	479	14	14	535	28
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	17	7	40	17	4	7	49	521	15	15	582	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1240	1246	582	1274	1261	521	612			536		
vC1, stage 1 conf vol	612	612		619	619							
vC2, stage 2 conf vol	628	634		656	642							
vCu, unblocked vol	1240	1246	582	1274	1261	521	612			536		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	92	94	99	99	95			99		
cM capacity (veh/h)	336	348	513	297	333	555	967			1032		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	64	28	49	521	15	15	582	30
Volume Left	17	17	49	0	0	15	0	0
Volume Right	40	7	0	0	15	0	0	30
cSH	430	342	967	1700	1700	1032	1700	1700
Volume to Capacity	0.15	0.08	0.05	0.31	0.01	0.01	0.34	0.02
Queue Length 95th (ft)	13	7	4	0	0	1	0	0
Control Delay (s)	14.8	16.5	8.9	0.0	0.0	8.5	0.0	0.0
Lane LOS	B	C	A			A		
Approach Delay (s)	14.8	16.5	0.7			0.2		
Approach LOS	B	C						

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	45.0%	ICU Level of Service	A	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2028 With Development - Int 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	6	43	16	4	6	56	479	14	14	535	28
Future Volume (Veh/h)	16	6	43	16	4	6	56	479	14	14	535	28
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	17	7	47	17	4	7	61	521	15	15	582	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1264	1270	582	1306	1285	521	612			536		
vC1, stage 1 conf vol	612	612		643	643							
vC2, stage 2 conf vol	652	658		662	642							
vCu, unblocked vol	1264	1270	582	1306	1285	521	612			536		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	98	91	94	99	99	94			99		
cM capacity (veh/h)	326	339	513	280	322	555	967			1032		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	71	28	61	521	15	15	582	30
Volume Left	17	17	61	0	0	15	0	0
Volume Right	47	7	0	0	15	0	0	30
cSH	432	327	967	1700	1700	1032	1700	1700
Volume to Capacity	0.16	0.09	0.06	0.31	0.01	0.01	0.34	0.02
Queue Length 95th (ft)	15	7	5	0	0	1	0	0
Control Delay (s)	15.0	17.0	9.0	0.0	0.0	8.5	0.0	0.0
Lane LOS	B	C	A			A		
Approach Delay (s)	15.0	17.0	0.9			0.2		
Approach LOS	B	C						

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	45.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2028 Without Development - Int 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	2	4	2	2	2	6	18	2	2	37	16
Future Volume (Veh/h)	4	2	4	2	2	2	6	18	2	2	37	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	2	4	2	2	2	7	20	2	2	40	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	90	88	48	92	96	21	57			22		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	90	88	48	92	96	21	57			22		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	887	797	1020	882	789	1056	1547			1593		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	6	29	59
Volume Left	4	2	7	2
Volume Right	4	2	2	17
cSH	914	896	1547	1593
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	9.0	9.0	1.8	0.3
Lane LOS	A	A	A	A
Approach Delay (s)	9.0	9.0	1.8	0.3
Approach LOS	A	A		

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	13.9%	ICU Level of Service	A	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2028 With Development - Int 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	2	4	2	2	2	6	20	2	2	41	16
Future Volume (Veh/h)	4	2	4	2	2	2	6	20	2	2	41	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	2	4	2	2	2	7	22	2	2	45	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	98	96	54	100	103	23	62			24		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98	96	54	100	103	23	62			24		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	877	790	1014	873	782	1054	1541			1591		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	6	31	64
Volume Left	4	2	7	2
Volume Right	4	2	2	17
cSH	906	890	1541	1591
Volume to Capacity	0.01	0.01	0.00	0.00
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	9.0	9.1	1.7	0.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.0	9.1	1.7	0.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	14.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2028 Without Development - Int 6

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	43	444	399	24	16	10
Future Volume (Veh/h)	43	444	399	24	16	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	483	434	26	17	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	460				1024	447
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	460				1024	447
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				93	98
cM capacity (veh/h)	1101				250	612

Direction, Lane #	NB 1	SB 1	NE 1
Volume Total	530	460	28
Volume Left	47	0	17
Volume Right	0	26	11
cSH	1101	1700	325
Volume to Capacity	0.04	0.27	0.09
Queue Length 95th (ft)	3	0	7
Control Delay (s)	1.2	0.0	17.1
Lane LOS	A		C
Approach Delay (s)	1.2	0.0	17.1
Approach LOS			C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

With the Development

Eustachy-Wysong Ranch - 2028 With Development - Int 6

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	46	444	399	25	16	18
Future Volume (Veh/h)	46	444	399	25	16	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	483	434	27	17	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	461				1030	448
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	461				1030	448
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				93	97
cM capacity (veh/h)	1100				247	611

Direction, Lane #	NB 1	SB 1	NE 1
Volume Total	533	461	37
Volume Left	50	0	17
Volume Right	0	27	20
cSH	1100	1700	364
Volume to Capacity	0.05	0.27	0.10
Queue Length 95th (ft)	4	0	8
Control Delay (s)	1.3	0.0	16.0
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	16.0
Approach LOS			C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

XVI. Appendix E: 2048 Horizon Year Traffic Analysis

Without the Development

Eustachy-Wysong Ranch - 2048 Without Development
Intersection 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	3	3	44	68	3
Future Volume (Veh/h)	3	3	3	44	68	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	3	3	48	74	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	130	76	77			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	130	76	77			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	863	986	1522			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	6	51	77
Volume Left	3	3	0
Volume Right	3	0	3
cSH	920	1522	1700
Volume to Capacity	0.01	0.00	0.05
Queue Length 95th (ft)	0	0	0
Control Delay (s)	8.9	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	0.4	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	14.8%	ICU Level of Service	A
Analysis Period (min)	15		

With the Development

Eustachy-Wysong Ranch - 2048 With Development
Intersection 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	3	14	44	68	7
Future Volume (Veh/h)	5	3	14	44	68	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	3	15	48	74	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	156	78	82			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	156	78	82			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	99			
cM capacity (veh/h)	827	983	1515			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	8	63	82
Volume Left	5	15	0
Volume Right	3	0	8
cSH	879	1515	1700
Volume to Capacity	0.01	0.01	0.05
Queue Length 95th (ft)	1	1	0
Control Delay (s)	9.1	1.8	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	1.8	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	19.8%	ICU Level of Service	A
Analysis Period (min)	15		

Without the Development

Eustachy-Wysong Ranch - 2048 Without Development
Intersection 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	44	3	10	64	37	10	14	7	41	7	7
Future Volume (Veh/h)	24	44	3	10	64	37	10	14	7	41	7	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	26	48	3	11	70	40	11	15	8	45	8	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	110			51			226	234	50	229	215	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	110			51			226	234	50	229	215	90
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			98	98	99	94	99	99
cM capacity (veh/h)	1480			1555			704	650	1019	695	666	968

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	77	121	34	61
Volume Left	26	11	11	45
Volume Right	3	40	8	8
cSH	1480	1555	731	717
Volume to Capacity	0.02	0.01	0.05	0.09
Queue Length 95th (ft)	1	1	4	7
Control Delay (s)	2.6	0.7	10.2	10.5
Lane LOS	A	A	B	B
Approach Delay (s)	2.6	0.7	10.2	10.5
Approach LOS			B	B

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	22.6%	ICU Level of Service	A	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2048 With Development
Intersection 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	44	3	10	64	48	10	14	7	47	7	7
Future Volume (Veh/h)	24	44	3	10	64	48	10	14	7	47	7	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	26	48	3	11	70	52	11	15	8	51	8	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	122			51			232	246	50	235	221	96
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	122			51			232	246	50	235	221	96
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			98	98	99	93	99	99
cM capacity (veh/h)	1465			1555			697	640	1019	688	661	960

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	77	133	34	67
Volume Left	26	11	11	51
Volume Right	3	52	8	8
cSH	1465	1555	723	709
Volume to Capacity	0.02	0.01	0.05	0.09
Queue Length 95th (ft)	1	1	4	8
Control Delay (s)	2.6	0.7	10.2	10.6
Lane LOS	A	A	B	B
Approach Delay (s)	2.6	0.7	10.2	10.6
Approach LOS			B	B

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	23.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2048 Without Development
Intersection 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	75	3	3	98	27	3	3	3	20	3	10
Future Volume (Veh/h)	14	75	3	3	98	27	3	3	3	20	3	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	15	82	3	3	107	29	3	3	3	22	3	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	136			85			254	256	84	246	242	122
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	136			85			254	256	84	246	242	122
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	97	100	99
cM capacity (veh/h)	1448			1512			683	640	976	697	651	930

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	100	139	9	36
Volume Left	15	3	3	22
Volume Right	3	29	3	11
cSH	1448	1512	740	750
Volume to Capacity	0.01	0.00	0.01	0.05
Queue Length 95th (ft)	1	0	1	4
Control Delay (s)	1.2	0.2	9.9	10.0
Lane LOS	A	A	A	B
Approach Delay (s)	1.2	0.2	9.9	10.0
Approach LOS			A	B

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	21.6%	ICU Level of Service	A	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2048 With Development
Intersection 3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	81	3	3	110	27	3	3	3	20	3	10
Future Volume (Veh/h)	14	81	3	3	110	27	3	3	3	20	3	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	15	88	3	3	120	29	3	3	3	22	3	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	149			91			272	274	90	264	262	134
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	149			91			272	274	90	264	262	134
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	97	100	99
cM capacity (veh/h)	1432			1504			663	625	968	677	635	914

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	106	152	9	36
Volume Left	15	3	3	22
Volume Right	3	29	3	11
cSH	1432	1504	724	731
Volume to Capacity	0.01	0.00	0.01	0.05
Queue Length 95th (ft)	1	0	1	4
Control Delay (s)	1.1	0.2	10.0	10.2
Lane LOS	A	A	B	B
Approach Delay (s)	1.1	0.2	10.0	10.2
Approach LOS			B	B

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	22.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2048 Without Development
Intersection 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	10	61	27	7	10	75	799	24	24	892	47
Future Volume (Veh/h)	27	10	61	27	7	10	75	799	24	24	892	47
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	29	11	66	29	8	11	82	868	26	26	970	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2069	2080	970	2126	2105	868	1021			894		
vC1, stage 1 conf vol	1022	1022		1032	1032							
vC2, stage 2 conf vol	1047	1058		1094	1073							
vCu, unblocked vol	2069	2080	970	2126	2105	868	1021			894		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	94	79	70	95	97	88			97		
cM capacity (veh/h)	160	187	307	98	164	352	680			759		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	106	48	82	868	26	26	970	51
Volume Left	29	29	82	0	0	26	0	0
Volume Right	66	11	0	0	26	0	0	51
cSH	233	127	680	1700	1700	759	1700	1700
Volume to Capacity	0.45	0.38	0.12	0.51	0.02	0.03	0.57	0.03
Queue Length 95th (ft)	55	39	10	0	0	3	0	0
Control Delay (s)	32.7	49.5	11.0	0.0	0.0	9.9	0.0	0.0
Lane LOS	D	E	B			A		
Approach Delay (s)	32.7	49.5	0.9			0.2		
Approach LOS	D	E						

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	67.0%	ICU Level of Service	C	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2048 With Development
Intersection 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	10	67	27	7	10	86	799	24	24	892	47
Future Volume (Veh/h)	27	10	67	27	7	10	86	799	24	24	892	47
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	29	11	73	29	8	11	93	868	26	26	970	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2091	2102	970	2154	2127	868	1021			894		
vC1, stage 1 conf vol	1022	1022		1054	1054							
vC2, stage 2 conf vol	1069	1080		1100	1073							
vCu, unblocked vol	2091	2102	970	2154	2127	868	1021			894		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	81	94	76	65	95	97	86			97		
cM capacity (veh/h)	154	181	307	83	156	352	680			759		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	113	48	93	868	26	26	970	51
Volume Left	29	29	93	0	0	26	0	0
Volume Right	73	11	0	0	26	0	0	51
cSH	232	111	680	1700	1700	759	1700	1700
Volume to Capacity	0.49	0.43	0.14	0.51	0.02	0.03	0.57	0.03
Queue Length 95th (ft)	61	46	12	0	0	3	0	0
Control Delay (s)	34.3	60.3	11.1	0.0	0.0	9.9	0.0	0.0
Lane LOS	D	F	B			A		
Approach Delay (s)	34.3	60.3	1.0			0.2		
Approach LOS	D	F						

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	67.9%	ICU Level of Service	C	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2048 Without Development
Intersection 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	3	7	3	3	3	10	31	3	3	61	27
Future Volume (Veh/h)	7	3	7	3	3	3	10	31	3	3	61	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	3	8	3	3	3	11	34	3	3	66	29
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	148	146	80	154	158	36	95			37		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	148	146	80	154	158	36	95			37		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	100	100	100	99			100		
cM capacity (veh/h)	809	739	980	799	727	1037	1499			1574		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	9	48	98
Volume Left	8	3	11	3
Volume Right	8	3	3	29
cSH	859	835	1499	1574
Volume to Capacity	0.02	0.01	0.01	0.00
Queue Length 95th (ft)	2	1	1	0
Control Delay (s)	9.3	9.4	1.7	0.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.3	9.4	1.7	0.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	16.7%	ICU Level of Service	A	
Analysis Period (min)	15			

With the Development

Eustachy-Wysong Ranch - 2048 With Development
Intersection 5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	3	7	3	3	3	10	33	3	3	65	27
Future Volume (Veh/h)	7	3	7	3	3	3	10	33	3	3	65	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	3	8	3	3	3	11	36	3	3	71	29
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	156	152	86	160	166	38	100			39		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	156	152	86	160	166	38	100			39		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	100	100	100	99			100		
cM capacity (veh/h)	800	732	973	790	720	1035	1493			1571		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	9	50	103
Volume Left	8	3	11	3
Volume Right	8	3	3	29
cSH	852	829	1493	1571
Volume to Capacity	0.02	0.01	0.01	0.00
Queue Length 95th (ft)	2	1	1	0
Control Delay (s)	9.3	9.4	1.7	0.2
Lane LOS	A	A	A	A
Approach Delay (s)	9.3	9.4	1.7	0.2
Approach LOS	A	A		

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	16.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Without the Development

Eustachy-Wysong Ranch - 2048 Without Development
Intersection 6

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	71	741	665	41	27	17
Future Volume (Veh/h)	71	741	665	41	27	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	805	723	45	29	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	768				1704	746
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	768				1704	746
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				68	96
cM capacity (veh/h)	846				91	414

Direction, Lane #	NB 1	SB 1	NE 1
Volume Total	882	768	47
Volume Left	77	0	29
Volume Right	0	45	18
cSH	846	1700	130
Volume to Capacity	0.09	0.45	0.36
Queue Length 95th (ft)	7	0	37
Control Delay (s)	2.4	0.0	47.5
Lane LOS	A		E
Approach Delay (s)	2.4	0.0	47.5
Approach LOS			E

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization		93.7%	ICU Level of Service F
Analysis Period (min)		15	

With the Development

Eustachy-Wysong Ranch - 2048 With Development
Intersection 6

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	74	741	665	42	28	18
Future Volume (Veh/h)	74	741	665	42	28	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	805	723	46	30	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	769				1711	746
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	769				1711	746
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				67	95
cM capacity (veh/h)	845				90	413

Direction, Lane #	NB 1	SB 1	NE 1
Volume Total	885	769	50
Volume Left	80	0	30
Volume Right	0	46	20
cSH	845	1700	131
Volume to Capacity	0.09	0.45	0.38
Queue Length 95th (ft)	8	0	40
Control Delay (s)	2.5	0.0	48.4
Lane LOS	A		E
Approach Delay (s)	2.5	0.0	48.4
Approach LOS			E

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	94.0%	ICU Level of Service	F	
Analysis Period (min)	15			

Intersection 4 - 2048 Mitigation Measures

Eustachy-Wysong Ranch - 2048 Mitigation Measures
Intersection 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	10	67	27	7	10	86	799	24	24	892	47
Future Volume (Veh/h)	27	10	67	27	7	10	86	799	24	24	892	47
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	29	11	73	29	8	11	93	868	26	26	970	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1657	2102	485	1670	2127	434	1021			894		
vC1, stage 1 conf vol	1022	1022		1054	1054							
vC2, stage 2 conf vol	635	1080		616	1073							
vCu, unblocked vol	1657	2102	485	1670	2127	434	1021			894		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	94	86	82	95	98	86			97		
cM capacity (veh/h)	197	180	528	165	155	570	675			755		

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2
Volume Total	29	11	73	29	8	11	93	434	434	26	26	485
Volume Left	29	0	0	29	0	0	93	0	0	0	26	0
Volume Right	0	0	73	0	0	11	0	0	0	26	0	0
cSH	197	180	528	165	155	570	675	1700	1700	1700	755	1700
Volume to Capacity	0.15	0.06	0.14	0.18	0.05	0.02	0.14	0.26	0.26	0.02	0.03	0.29
Queue Length 95th (ft)	13	5	12	15	4	1	12	0	0	0	3	0
Control Delay (s)	26.4	26.3	12.9	31.5	29.5	11.4	11.2	0.0	0.0	0.0	9.9	0.0
Lane LOS	D	D	B	D	D	B	B				A	
Approach Delay (s)	17.7			26.5			1.1				0.2	
Approach LOS	C			D								

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	47.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection 6 - 2048 Mitigation Measures

Eustachy-Wysong Ranch - 2048 Mitigation Measures
Intersection 6

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	74	741	665	42	28	18
Future Volume (Veh/h)	74	741	665	42	28	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	805	723	46	30	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	769				1688	723
vC1, stage 1 conf vol					723	
vC2, stage 2 conf vol					965	
vCu, unblocked vol	769				1688	723
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	91				89	95
cM capacity (veh/h)	845				281	426

Direction, Lane #	NB 1	NB 2	SB 1	SB 2	NE 1	NE 2
Volume Total	80	805	723	46	30	20
Volume Left	80	0	0	0	30	0
Volume Right	0	0	0	46	0	20
cSH	845	1700	1700	1700	281	426
Volume to Capacity	0.09	0.47	0.43	0.03	0.11	0.05
Queue Length 95th (ft)	8	0	0	0	9	4
Control Delay (s)	9.7	0.0	0.0	0.0	19.3	13.9
Lane LOS	A				C	B
Approach Delay (s)	0.9		0.0		17.1	
Approach LOS					C	

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	52.4%	ICU Level of Service		A
Analysis Period (min)	15			

XVII. Appendix F: Left Turn Lane Warrant Analyses

Civilize, PLLC
Management and Engineering

Project Analysis Worksheet
Tranportation Engineering
Left Hand Turn Analysis/Warrant at Unsignalized Intersections
Based on ITD Traffic Manual / NCHRP Report 745

Client:
Project: **Eustachy-Wyson Ranch**
Project No.:
DESIGNED BLH
CHECKED BLH
DATE: 1/25/2023

Description: Northbound Traffic at Intersection 6 **Horizon Years:** 2023, 2028, 2048

ITD Traffic Manual, Section 3B.04 White Lane Line Pavement Markings and Warrants
Warrants for left-turn lanes on uncontrolled highways can be found in "NCHRP Report 745 – Left-Turn Accommodations at Unsignalized Intersections."

NCHRP Report 745 - Left-Turn Accommodations at Unsignalized Intersections
Before installing a left-turn lane (or any other roadway improvement), it is necessary to consider the characteristics of the location where it would be installed. These characteristics guide the practitioner's decisions about whether to install the lane and what specific design criteria need to be emphasized to optimize the operation of the lane at that location.

The basic geometry of the intersection needed for use with the warrants is the number of lanes on the major roadway and the number of approaches to the intersection. The number of approaches and the development type (rural or urban/ suburban) are included in the warrants because the crash prediction methodology used to develop the warrants varied by these features. Rural crash prediction equations vary by number of lanes on the major roadway, so the warrants for rural highways also vary by number of lanes.

Technical warrants are an important element of the decision-making process; however, other factors should also be considered when deciding whether to install a left-turn lane, including:
• Sight distance relative to the position of the driver and
• Design consistency within the corridor.
These factors should be considered in conjunction with the numerical warrants.

DESIGN CRITERIA (Input the following based on observation, historical data, and/or results of a site specific study)

1	Jurisdiction	ITD	Horizon or Planning Year	2023	2028	2048	
2	Subdivision or Development Name	Eustachy-Wysong Ranch	Development Type	Rural	Rural	Rural	
3	Name of Major Roadway	US Hwy. 33	No. of lanes on the major	Two	Two	Two	
4	Name of Minor Roadway/Approach	3000W	Number of Legs	Three	Three	Three	
5	Peak Hour	PM	Peak-hr, left-turn lane vol	38	43	71	(vehicles per hour)
6	Posted Speed Limit (MPH)	45	Major Roadway Peak-hr vc	391	444	741	(veh/hour/lane).

Analysis - Table and graph reproduced from NCHRP Report 745 (Axes on the graph are reversed from source)

Intersection Northbound Traffic at Intersection 6 **Horizon Years** 2023, 2028, 2048

1 Consult chart below and evaluate the type of intersection and the left-turn, peak-hour volume

Left Turn Peak Hour Volume (Veh/hr)	Three Leg Intersection, Major Two-Lane Highway Peak-Hour Volume that Warrants a Left-Turn Lane (Veh/hr/lane)	Four Leg Intersection, Major Two-Lane Highway Peak-Hour Volume that Warrants a Left-Turn Lane (Veh/hr/lane)	Three Leg Intersection, Major Four-Lane Highway Peak-Hour Volume that Warrants a Left-Turn Lane (Veh/hr/lane)	Four Leg Intersection, Major Four-Lane Highway Peak-Hour Volume that Warrants a Left-Turn Lane (Veh/hr/lane)	Three Leg Intersection, Major Four-Lane Highway Peak-Hour Volume that Warrants a Left-Turn Lane (Veh/hr/lane)	Four Leg Intersection, Major Four-Lane Highway Peak-Hour Volume that Warrants a Left-Turn Lane (Veh/hr/lane)
5	200	150	75	50	450	50
10	100	50	75	25	300	50
15	100	50	50	25	250	50
20	50	<50	50	25	200	50
25	50	<50	50	<25	200	50
30	50	<50	50	<25	150	50
35	50	<50	50	<25	150	50
40	50	<50	50	<25	150	50
45	50	<50	50	<25	150	<50
50	50	<50	50	<25	100	<50

2 Check the plotted point(s) on the chart below against the anticpated intersection of major-road volume and peak-hour left-turn volume in the volume advancing.

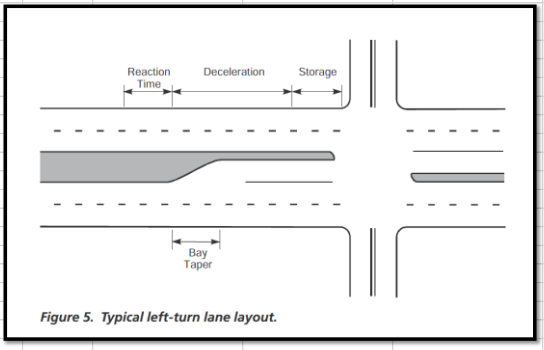
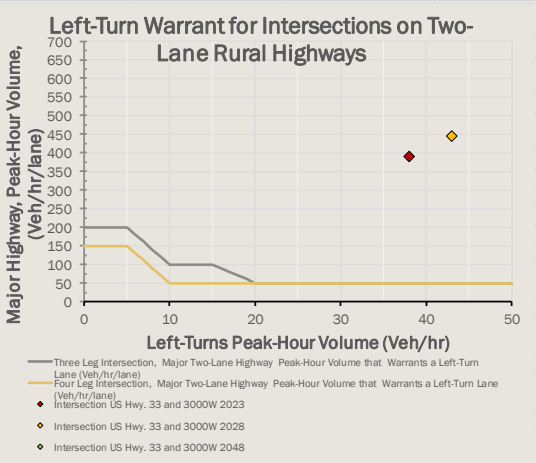


Figure 5. Typical left-turn lane layout.



XVIII. Appendix G: Right Turn Lane Warrant Analyses

Civilize, PLLC
Management and Engineering

Project Analysis Worksheet
Tranportation Engineering
Right-Hand Turn Analysis/Warrant for Uncontrolled Roads Intersecting with Public Highways/Approaches
Based on ITD Traffic Manual

Client:
Project: **Eustachy-Wyson Ranch**
Project No.:
DESIGNED BLH
CHECKED BLH
DATE: 1/25/2023

Description: Southbound Traffic at Intersection 6
Horizon Years: 2023, 2028, 2048

ITD Traffic Manual, Section 3B.04 White Lane Line Pavement Markings and Warrants
A right-turn lane warrant is shown in Figure 3B-1 that can be used for uncontrolled highways intersecting with public roads or approaches. Right-turn lanes can be further analyzed using the economic analysis procedure for right-turn deceleration lanes described in the article "Operational and Safety Effects of Right-Turn Deceleration Lanes on Urban and Suburban Arterials" that was published in the "Transportation Research Record, Volume 2023." The methodology can be used for rural highways in addition to urban and suburban arterials

DESIGN CRITERIA (Input the following based on observation, historical data, and/or results of a site specific study)

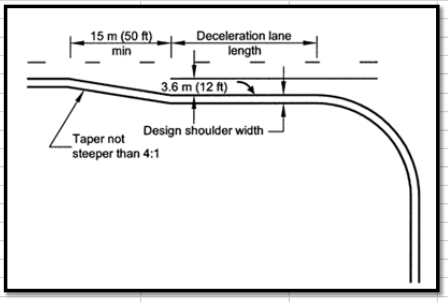
1	Jurisdiction	ITD	Horizon or Planning Year	2023	2028	2048	
2	Subdivision or Development Name	Eustachy-Wyson Ranch	Development Type	Rural	Rural	Rural	
3	Name of Major Roadway	US Hwy. 33	No. of lanes on the major	Two	Two	Two	
4	Name of Minor Roadway/Approach	3000W	Number of legs	Three	Three	Three	
5	Peak Hour	PM	Major roadway volume	351	399	665	(veh/hour/lane).
6	Posted Speed Limit (MPH)	45	Right-Turn, Peak Hour Vol	21	24	41	(veh/hour).

Analysis - Table and graph reproduced from NCHRP Report 745 (Axes on the graph are reversed from source)

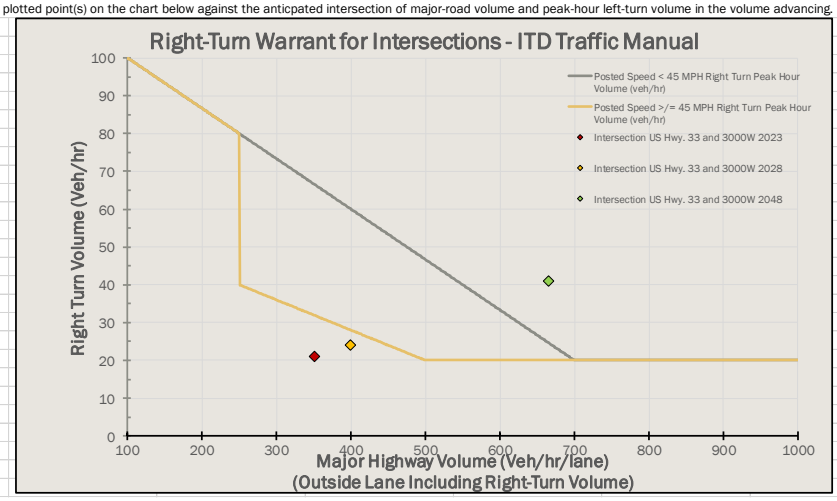
Intersection Southbound Traffic at Intersection 6 **Horizon Years** 2023, 2028, 2048

1 Consult chart below and evaluate the type of intersection and the left-turn, peak-hour volume

Posted Speed < 45 MPH Highway Volume Outside Lane Only Including R-T Volume (Veh/hr/lane)	Posted Speed < 45 MPH Right Turn Peak Hour Volume (veh/hr)	Posted Speed >/= 45 MPH Right Turn Peak Hour Volume (veh/hr)
0	100	100
100	100	100
200	87	87
300	73	35
400	60	25
500	47	20
600	33	<20
700	20	<20
800	<20	<20
900	<20	<20
1000	<20	<20



2 Check the plotted point(s) on the chart below against the anticpated intersection of major-road volume and peak-hour left-turn volume in the volume advancing.



XIX. Appendix H: Adopting Highway & Street Guidelines for Design & Construction in Teton County Manual

Minor Collectors

(See Figure 2 for minor collector routes in Teton County)

Minor collector roads differ from major collectors in that these routes should be "spaced at intervals consistent with population density to accumulate traffic from local roads and bring all developed areas within reasonable distances of collector roads; provide service to the remaining smaller communities; and link the locally important traffic generators with their rural hinterland" (AASHTO, 2004).

Although the designation of a minor collector is not based on ADT, major collectors in Teton County as defined in Figure 2 generally have a traffic volume ranging from 150 to 400 vehicles per day. The road standard for minor collectors in Teton County, Idaho is shown in Table 5 below, while the cross-section may be viewed in Figure 6.

Table 5. Minor Collector Standard

Lane Width (ft)	Shoulder Width (ft)	Road Width (ft)	ADT (veh/day)	Speed Limit (mph)
10	2	24	150-400	35-45

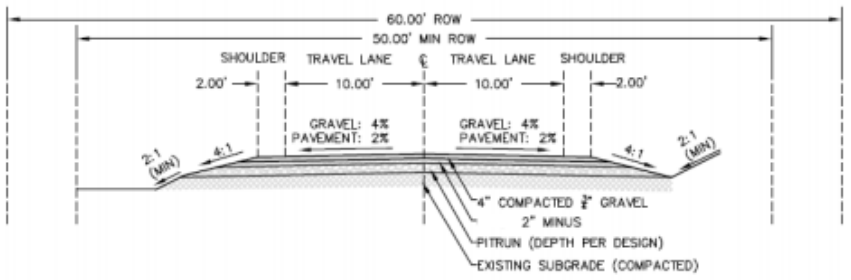


Figure 6. Minor Collector Cross-Section

For paved minor collectors having an ADT exceeding 400 and that are identified as bike routes, shoulders should be widened to establish bike lanes. AASHTO recommends the use of 4 foot shoulders for bike traffic. The road cross section for minor collectors with accommodating bike lanes can be seen in Table 6 below.

Table 6. Minor Collector Standard w/ Bike Lanes

Lane Width (ft)	Shoulder Width (ft)	Road Width (ft)	ADT (veh/day)	Speed Limit (mph)
10	4	28	400+	35-45

Minor collectors can be constructed with either a paved or gravel wearing surface. It should be noted that a paved surface will increase the longevity of the roadway, and can also elevate the speed limit

Page **17** of **46**
Highway & Street Guidelines for Design and Construction in Teton County, Idaho-4/11/2013

Local Roads

(See Figure 2 for local routes in Teton County)

According to the American Association of State Highway and Transportation Officials (AASHTO): "The rural local road system, in comparison to collectors and arterial systems, primarily provides access to land adjacent to the collector network and serves travel over relatively short distances. The local road system constitutes all rural roads not classified as principal arterials, minor arterials, or collector roads." Local roads typically serve 65-75% of the total rural road length in a given county.

Local roads as defined in Figure 2 generally have an ADT of less than 150 vehicles per day, although many exceed this value. The design standard for local roads in Teton County, Idaho is outlined in Table 7 below, while the cross-section may be viewed in Figure 7.

Table 7. Local Road Standard

Lane Width (ft)	Shoulder Width (ft)	Road Width (ft)	ADT (veh/day)	Speed Limit (mph)
9	2	22	<150	25-35

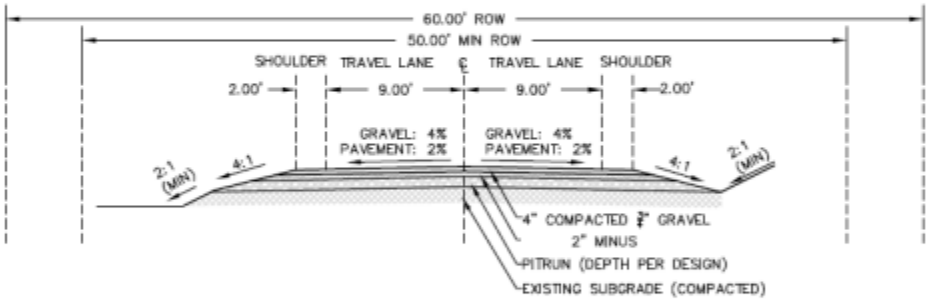


Figure 7. Local Road Cross-Section

Local roads are typically constructed with a gravel wearing surface, although a paved surface is also applicable.

Recreational Access Roads

Recreational accesses are generally Forest Service roads and are not listed on the functional classification map for Teton County, Idaho. According to AASHTO: "Recreational and scenic roads serve specialized land uses, including parks, tourist attractions, and recreation facilities, such as campsite or boat-launch ramps. Traffic is open to the general public, and their users are more likely than users of other functional sub-classes of local roads to consist of unfamiliar drivers. Recreational and scenic roads do not generally carry significant volumes of truck traffic, but do serve recreational vehicles including motor homes, campers, and passenger cars pulling boats and other

Page **18** of **46**
Highway & Street Guidelines for Design and Construction in Teton County, Idaho-4/11/2013

XX. Appendix I: AASHTO Pavement Thickness Design Guide

AASHTO Pavement Thickness Design Guide

When designing pavement thickness for flexible and rigid pavements, the following considerations should be used.

1. Performance criteria (serviceability indexes). Condition of pavements are rated with a present serviceability index (PSI) ranging from 5 (perfect condition) to 0 (impossible to travel).
   a. Initial serviceability index (Po) – Po is considered to be that PSI immediately after the pavement is open. AASHTO values are 4.5 for rigid pavement and 4.2 for flexible pavement.
   b. Terminal serviceability index (Pt) – Pt is considered to be that PSI that represents the lowest acceptable level before resurfacing or reconstruction becomes necessary.
      - Pt = 2.00 for Secondary Roads, Local Residential Streets.
      - Pt = 2.25 for Minor Collectors, Industrial and Commercial Streets.
      - Pt = 2.50 for Major Collectors and all Arterials.
   c. Serviceability loss (dPSI) – dPSI is the difference between Po and Pt (Po-Pt). The dPSI is the basis for the pavement design.

2. Design variables
   a. Analysis period (n) – n is the period of time for which the analysis is to be conducted. Normally 50 years for concrete and 30 years for asphalt.
   b. Design Traffic (ESALs) – ESALs is the estimate of number of Equivalent 18 kip Single Axle Loads (ESALs) during the analysis period is required. This value can be estimated based on:
      - The Average Annual Daily Traffic (AADT) in the base year
      - The average percentage of trucks expected to use the road
      - The average annual traffic growth rate, and
      - The analysis period

      To estimate the design ESALs, the following procedure may be used.

      1.) Obtain an estimate of the design AADT for the beginning, or base year of the analysis period.
      2.) Obtain an estimate of the average percentage of the AADT that will be trucks.
      3.) Calculate the ESALs for the base year.
      4.) Calculate the growth factor based on the annual traffic growth rate (r - %) and the analysis period (n). Growth Factor = (((1+r)^n) – 1)/r
      5.) Multiply the base year ESALs by the Growth Factor to obtain the total ESALs for the analysis period.

1

c. Reliability (R - %)/ Normal Deviation (ZR) – R is the probability that the design will succed for the life of the pavement. The following reliability and normal deviation (ZR) values are recommended.

- Local Streets: R = 80%, ZR = -0.841
- Collector Streets: R = 88%, ZR = -1.270
- Arterial Streets: R = 95%, ZR = -1.645

d. Overall standard deviation (So) – So is the coefficient which describes how well the AASHTO Road Test data fits the AASHTO Design Equations. The lower the overall deviation, the better the equations model the data. The following ranges are recommended.

- Rigid Pavements: 0.30 to 0.40
- Flexible Pavements: 0.40 to 0.50

3. Material properties for structural design

a. Roadbed soil resilient modulus (MR) – MR is the property of the soil which indicates the stiffness or elasticity of the soil under dynamic loading. MR is also adjusted for seasonal fluctuation from temperature etc.

b. Modulus of subgrade reaction (k and kc) – k is the modulus of the subgrade soil.

c. Approximate relationship of k to MR: k=MR/19.4

d. Composite modulus of subgrade reaction (kc) - kc is the composite modulus of the subbase materials, which will take into account any base placed on top of the subgrade. If a base is used kc is input into the equation rather than k.

Type of Soil	Subgrade Strength	K Value Range (pci) (Rigid Pavement)	Resilient Modulus MR, (psi) (Flexible Pavement	CBR
Silts and clays of high compressibility (liquid limit >= 50), natural density (not recommended for subgrades without treatment)	Very Low	50 - 100	1000 - 2700	3 or less
Fine grain soils in which silt and clay size particles predominate (low compressibility, liquid limit < 50)	Low	100 - 150	2700 - 4000	3 to 5.5
Poorly grades sands and soils that are predominately sandy with moderate amounts of silts and clays (well drained)	Medium	150 - 220	4000 - 5700	5.5 to 12
Gravely soils, well graded sands, and sand gravel mixtures relatively free of plastic fines	High	220 – 250+	>5700	>12

2