



October 27, 2020

Mr. Louis Ferrante
UDON Holdings, LLC
5801 N. Union Boulevard
Suite 100
Colorado Springs, CO 80918

Re: UDON Rezone Traffic Study (PCD File No. CS-20-2)
El Paso County, Colorado

Dear Mr. Ferrante:

This traffic study has been prepared for a proposed UDON Rezoning project to be located at 12265 CO-94 in El Paso County, Colorado. The existing property contains a residence. This project is proposed to rezone the existing 34.71-acre property from Residential Rural (RR5) to Commercial Service (CS). For purposes of this study to evaluate the highest and best use from a worst-case traffic scenario, it was assumed that the development would include a 4,200 square foot wholesale nursery and 4,200 square feet of retail space. The property would also like to include an area for potential vendors for special events or occasions, likely on weekends and holidays when activities are occurring in the area. This would change the designation of the parcel. For purposes of this traffic analysis, it was considered that a Food Truck Food Court could be present on site. The site will have the ability to accommodate about 20 parking spaces for such an event.

A vicinity map illustrating the location of the property is attached as **Figure 1**. The surrounding area primarily consists of rural residences, vacant and agricultural land, industrial uses, and Aztec Family Raceway. There are auto salvage yards located to the east of the site. The site area is shown in attached **Figure 2**.

This traffic study identifies the amount of traffic associated with this proposed rezoning and the expected trip distribution and traffic assignment along with an operational analysis for the project access intersection along State Highway 94 (SH-94 or CO-94). Also please state that the widening from 2 to 4 lanes is shown in Table 4: 2040 Roadway Improvement Projects of the MTCP. It is expected that project analysis was performed for the twenty-year horizon.

Existing Roadway Network and Traffic Counts

Regional access to the UDON Rezoning project is provided by CO-94. Direct access to the development will be provided by an access driveway along the south side of CO-94. This future access intersection will operate with stop control on the northbound exiting approach from the future development. CO-94 extends primarily east-west with one through lane in each direction with a speed limit of 65 miles per hour within the project limits. CO-94 provides a double yellow striped centerline within the project limits. Both The El Paso County Major Transportation Corridor Plan (MTCP) and the State Highway 94 Access Management Plan show that CO-94 will be widened from two lanes to four lanes within the project limits sometime in the future.

Existing daily and peak hour bi-directional count data was obtained from CDOT traffic information along CO-94 to the east of Space Village Avenue, which is in nearby vicinity of the existing UDON Rezoning property project access. These counts were collected on Thursday, July 11, 2019 and were conducted in one-hour intervals for 24 hours. These counts were adjusted by the annual growth rate to calculate existing 2020 volumes. The daily counts from the Colorado Department of Transportation (CDOT) Online Transportation Information System (OTIS) were used as a basis for providing a

directional split of project traffic. Existing lane configuration, and the existing peak hour counts are shown in attached **Figure 3**, with count information attached as well.

Unspecified Development Traffic Growth

Based on information provided on the website for the Colorado Department of Transportation, the 20-year growth factor along CO-94 adjacent to the study area is 1.25 which equates to an annual growth rate of approximately 1.12 percent per year. Traffic information from the CDOT Online Transportation Information System (OTIS) is attached. Based on this, a 1.12 percent annual growth rate was used to calculate future background traffic volumes at the study area access intersection. This annual growth rate was used to estimate short term 2022 and long term 2040 background traffic volumes at the key intersection.

Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the *Trip Generation Manual*¹ published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses. Trip generation is based on the ITE Trip Generation Manual, 10th Edition (most current edition) average rates and fitted curve equations for Nursery (Wholesale) (ITE Code 818) and Shopping Center (ITE Code 820) for traffic associated with this development. Of note, calculations were also conducted comparing the retail space to an office development or automobile care center, but the retail space Shopping Center equations were used instead as the retail use generates the highest traffic volume.

Project generated traffic volumes are identified on a weekday daily as well as on a morning peak hour and afternoon peak hour basis. The morning peak hour is the highest one-hour time period of adjacent street traffic during four consecutive 15-minute intervals during the morning peak hour, between 7:00 am and 9:00 am. The afternoon peak hour is the highest one-hour time period of four consecutive 15-minute intervals between the hours of 4:00 pm and 6:00 pm representing the afternoon peak hour. The following **Table 1** summarizes the anticipated weekday peak hour trip generation for the proposed project with the nursery and retail uses (trip generation calculation worksheets attached for the studied uses as well as the compared office and automobile care center uses).

Table 1 – UDON Rezoning Project Weekday Traffic Generation

Land Use and Size	Daily Vehicle Trips	Weekday Vehicle Trips					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Nursery (Wholesale) (ITE 818) – 4,200 Square Feet	164	5	5	10	11	11	22
Shopping Center (ITE 820) – 4,200 Square Feet	696	95	59	154	25	27	52
Total	860	100	64	164	36	38	74

As summarized in **Table 1**, the UDON Rezoning project with a 4,200 square foot wholesale nursery and a 4,200 square foot shopping center is anticipated to generate approximately 860 new daily weekday trips with 164 of these trips occurring during morning peak hour and 74 trips occurring during the afternoon peak hours based on ITE equations and data.

¹ Institute of Transportation Engineers, *Trip Generation Manual*, Tenth Edition, Washington DC, 2017.

As mentioned, the property would like to include services for people attending events and activities within the area on some weekends or holidays. For purposes of this analysis, a food truck food court was considered. As each food truck is approximately 250 feet square feet, and it is anticipated that four food trucks are possible on site with the planned 20 parking spaces of area available, a total “building” area of 1,000 square feet is thought to be possible. For calculation purposes, the ITE average rates for Fast Food Restaurant without Drive Thru (ITE Code 933) was considered to identify an applicable Saturday midday peak hour of generator. This trip generation is shown in **Table 2**.

Table 2 – UDON Rezoning Project Saturday Traffic Generation

Land Use and Size	Saturday Vehicle Trips		
	Midday Peak Hour		
	In	Out	Total
Fast Food Restaurant without Drive-Thru (ITE 933) – 1,000 Square Feet	27	28	55

As summarized in **Table 2**, the UDON Rezoning property when hosting a food truck food court (assumed as 1,000 square feet of fast food restaurant without drive thru for purposes of calculation) is anticipated to generate approximately 55 Saturday midday peak hour trips based on ITE equations and data.

Distribution, Assignment, and Total Traffic

Distribution of site traffic was based on the area street system characteristics, existing traffic patterns and volumes, and the proposed access system for the project. As mentioned previously, the traffic volumes from CDOT OTIS were used as a basis for providing a directional split of project traffic. The distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. Project traffic originating from either direction can access the site. As identified from the counts from CDOT OTIS, approximately 63 percent of the UDON Rezone trips arrive from and depart to the west. **Figure 4** illustrates the expected trip distribution for the proposed project.

Traffic assignment was obtained by applying the project trip distribution to the estimated project traffic generation of the development shown in the trip generation table. The traffic assignment is shown in **Figure 5**. Site traffic volumes were added to the 2022 and 2040 background volumes to represent estimated build-out year and long-term traffic conditions. These total traffic volumes for 2022 and 2040 are illustrated in **Figure 6** and **Figure 7**.

Traffic Operations Analysis

Kimley-Horn’s analysis of traffic operations in the site vicinity was conducted to determine potential capacity deficiencies at the project key intersections for the 2022 build-out and 2040 long term horizons. The acknowledged source for determining overall capacity is the *Highway Capacity Manual*².

Capacity analysis results are listed in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). For intersections and roadways in this study area, typical traffic study practice identifies overall intersection LOS D and movement or approach LOS E as the minimum thresholds for acceptable operations. The following **Table 3** shows the definition of level of service for signalized and unsignalized intersections.

² Transportation Research Board, *Highway Capacity Manual*, Sixth Edition, Washington DC, 2016.

Table 3 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

CO-94 and Project Access Intersection

The existing CO-94 and Project Access intersection is proposed to operate with stop control along the northbound exiting approach. With completion of the rezone project, construction of an eastbound right turn lane and a westbound left turn lane will need to be constructed according to CDOT SHAC requirements. With the recommended improvements and the addition of project traffic all movements at the proposed access intersection are expected to operate acceptably with LOS D or better during the peak hours throughout the 2040 horizon. **Table 3** provides the results of the level of service analysis for this intersection with LOS worksheets attached.

Table 3 – CO-94 and Project Access Intersection LOS Results

Scenario	AM Peak Hour		PM Peak Hour	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
2022 Background Plus Project #				
Northbound Approach	23.4	C	17.3	C
Westbound Left	10.8	B	8.3	A
2040 Background Plus Project #				
Northbound Approach	31.9	D	21.1	C
Westbound Left	12.2	B	8.6	A

Eastbound right turn lane and westbound left turn lane

CDOT Access Permit and Turn Lane Evaluation

The need or threshold for requiring an access permit along CDOT roadways occurs when a new access is proposed or if project traffic is anticipated to increase existing access traffic volumes by more than 20 percent. Whether this is a new access to serve the property or not, it is believed that CDOT will require an Access Permit.

Since CO-94 is a state owned and maintained facility, it is recommended that auxiliary turn lanes along CO-94 be constructed in accordance with the current CDOT State Highway Access Code (SHAC). CDOT categorizes the segment of CO-94 adjacent to the property as NR-A: Non-Rural Principal Highway. CO-94 has a posted speed limit of 65 miles per hour (mph) within the project limits. According to the State Highway Access Code for category NR-A roadways, the following thresholds apply:

- A left turn deceleration lane is required for any access with a projected average peak hour left turn ingress volume greater than 10 vehicles per hour (vph).
- A right turn deceleration lane is required for any access with a projected peak hour right turning volume greater than 25 vph.
- A right turn acceleration lane is required for any access with a projected peak hour right turning volume greater than 50 vph when the posted speed on the highway is greater than 40 mph.

Based on traffic projections and the above thresholds, auxiliary turn lane requirements were calculated for the CO-94 full movement access to the property. CO-94 provides one lane of travel in each direction and has a posted speed limit of 65 mph within the study area. As such, turn lane requirements at the study area intersection along CO-94 are as follows:

- An eastbound right turn deceleration lane **is** warranted based on projected 2022 background plus project traffic being 63 right turns during the peak hour. Since CO-94 has a category of NR-A the right turn lane requirement is deceleration length. Based on the 65-mile per hour speed limit, the deceleration lane length is 800 feet. Therefore, it is recommended that this lane be constructed to 800 feet (which includes the 300-foot taper) by 2022.
- An eastbound acceleration lane along CO-94 from the project access northbound right turn **is not** warranted based on projected 2022 background plus project traffic being 24 right turns during the peak hour.
- A westbound left turn deceleration lane **is** warranted based on projected 2022 background plus project traffic being 37 left turns during the peak hour. Since CO-94 has a category of NR-A the left turn lane requirement is deceleration and storage lengths. Based on the 65-mile per hour speed limit, the deceleration lane length is 800 feet plus 40 feet of storage for a total length of 840 feet (which includes the 300-foot taper). Therefore, it is recommended that this lane be constructed to 540 feet plus 300-foot taper by 2022.

Sight Distance Evaluation

It is recommended that appropriate sight distance triangles be provided at all site access points to give drivers exiting the development areas a clear view of oncoming traffic. Landscaping and objects within sight triangles must not obstruct drivers' views of the adjacent travel lanes. Intersection sight distances for left turn from stop and right turn from stop were analyzed for the proposed project accesses along CO-94.

With AASHTO standards and a design speed of 65 miles per hour along CO-94, the intersection sight distance for a vehicle turning left from stop is 720 feet, while the sight distance for a vehicle turning right from stop is 625 feet. Therefore, all obstructions for left turning vehicles from stop should be clear to the right within the triangle created with a vertex point located 14.5 feet from the edge of the major road traveled way (typical position of the minor road driver's eye when stopped) and a line of sight distance of 720 feet located in the middle of the westbound through lane along CO-94. Likewise, all obstructions for right turning vehicles from stop should be clear to the left within the triangle created with a vertex point located 14.5 feet from the edge of the major road traveled way and a line of sight distance of 625 feet located in the middle of the eastbound through lane along CO-94.

Bicycle and Pedestrian Access

Bicycle and pedestrian access evaluations were conducted for the UDON Rezone project. This focused on the areas of CO-94 adjacent to the site development areas. The following provides a description of the assessment.

Adjacent to the site, there are no bicycle lanes or sidewalks along CO-94. Although there are no bicycle lanes or sidewalks that exist within the study area there are very few destinations along CO-94. By 2040, the MTCP states that the secondary regional trail is proposed along CO-94 within the project limits.

Transportation Impact Fees

The applicant intends to opt out of the PID options and will pay the full fee amount at the time of building permit. The current "full-fare" is \$4,958 per 1,000 square feet of commercial building floor area. Since the highest and best use is 4,200 square feet of wholesale nursery and 4,200 square feet of shopping center the total fee amount is \$41,647. There are no apparent reimbursable improvements programmed in the MTCP in the general vicinity of the site.

Conclusions and Recommendations

In summary, this traffic study provides project traffic generation estimates to identify potential project traffic related impacts on the local street system with the proposed UDON Rezoning project. Based on the analysis presented in this study, Kimley-Horn believes the proposed UDON Rezoning project will be successfully incorporated into the existing and future roadway network. Based on the results of this study, it is recommended that the access intersection along CO-94 be stop controlled, and that a R1-1 "STOP" sign be installed on the northbound approach exiting the property. Also it is recommended that an eastbound right turn deceleration lane and a westbound left turn deceleration lane be constructed to comply with CDOT SHAC requirements. The recommended intersection lane configurations and control for the project development are illustrated in **Figure 8**. If you have any questions or require anything further, please feel free to call me at (303) 228-2304.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

Curtis D. Rowe, P.E., PTOE
Vice President



Traffic Engineer's Statement

The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

Curtis D. Rowe, P.E., PTOE, PE #36355

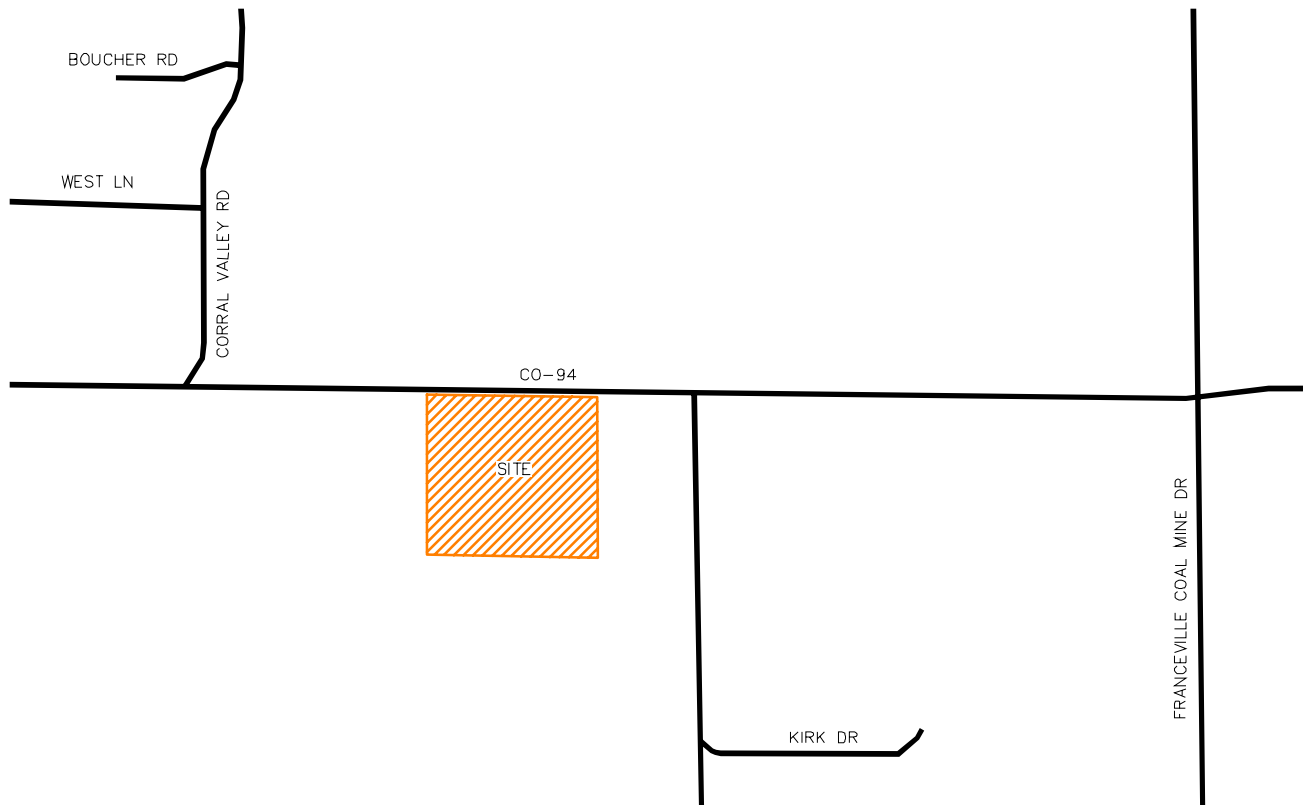
October 27, 2020
Date

Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

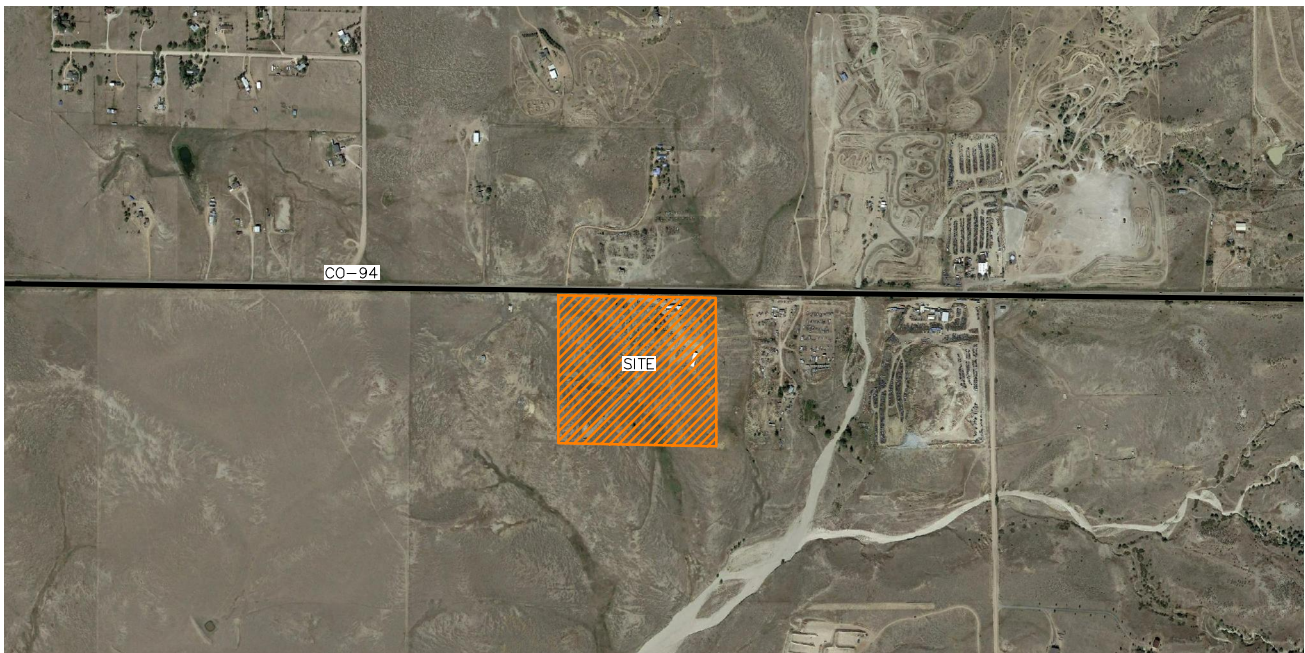
Mr. Louis Ferrante
UDON Holdings, LLC
5801 N. Union Boulevard
Suite 100
Colorado Springs, CO 80918

Date



UDON REZONE
VICINITY MAP

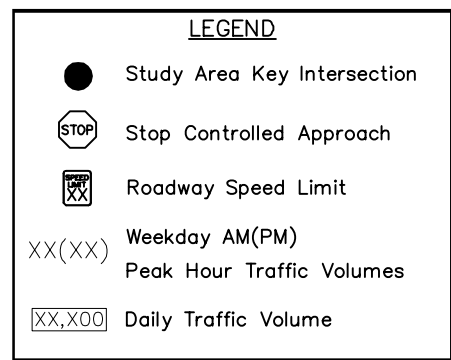
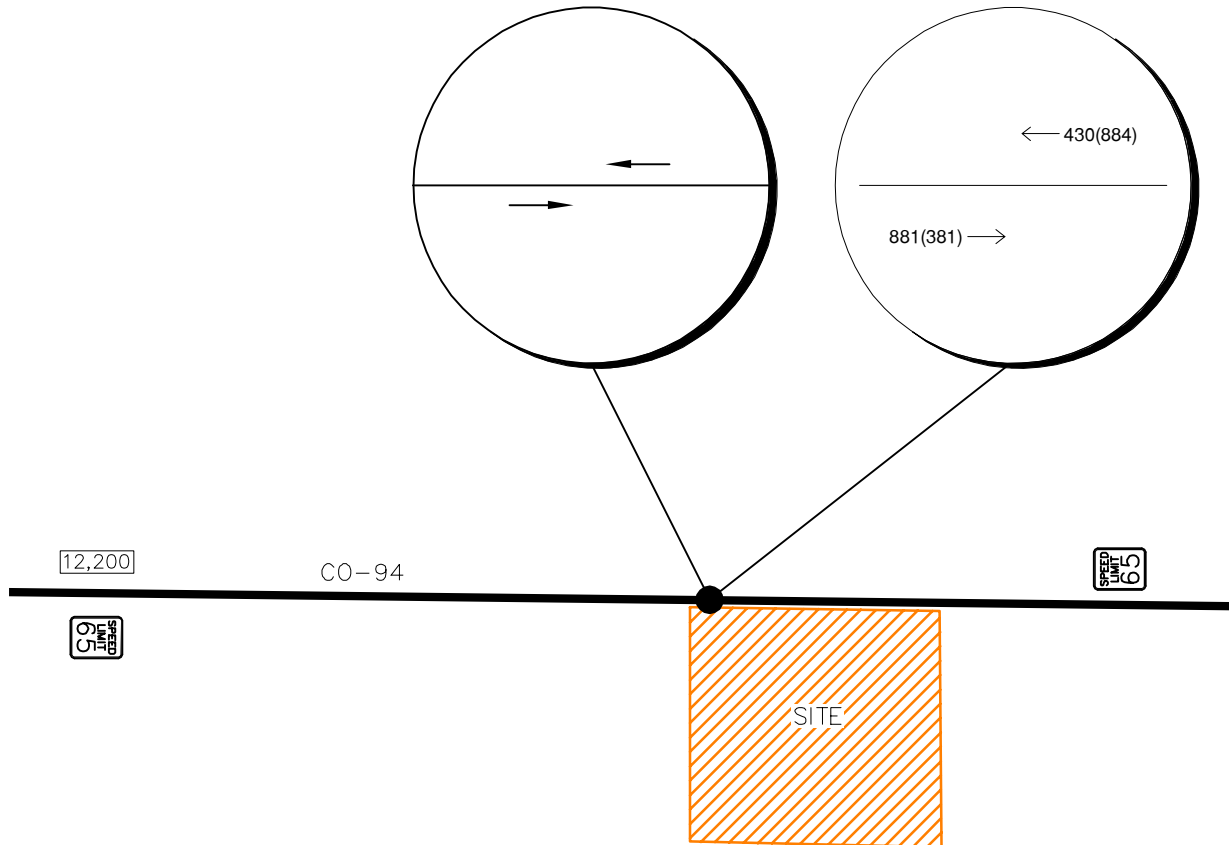
FIGURE 1



UDON REZONE
SITE AREA

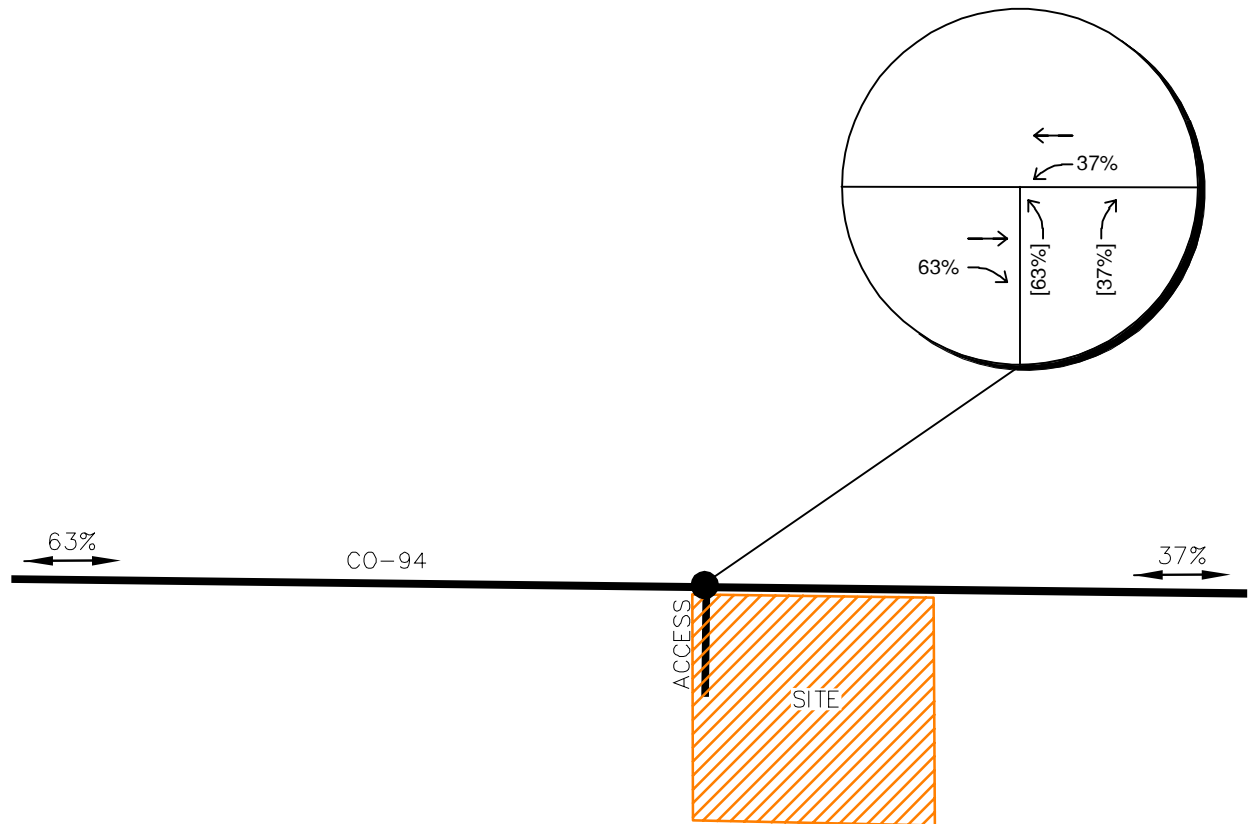
FIGURE 2

Counts adjusted from
 Thursday, July 11, 2019
 7:00–8:00 AM (4:00–5:00 PM)



UDON REZONE
 EXISTING LANE CONFIGURATIONS &
 TRAFFIC VOLUMES

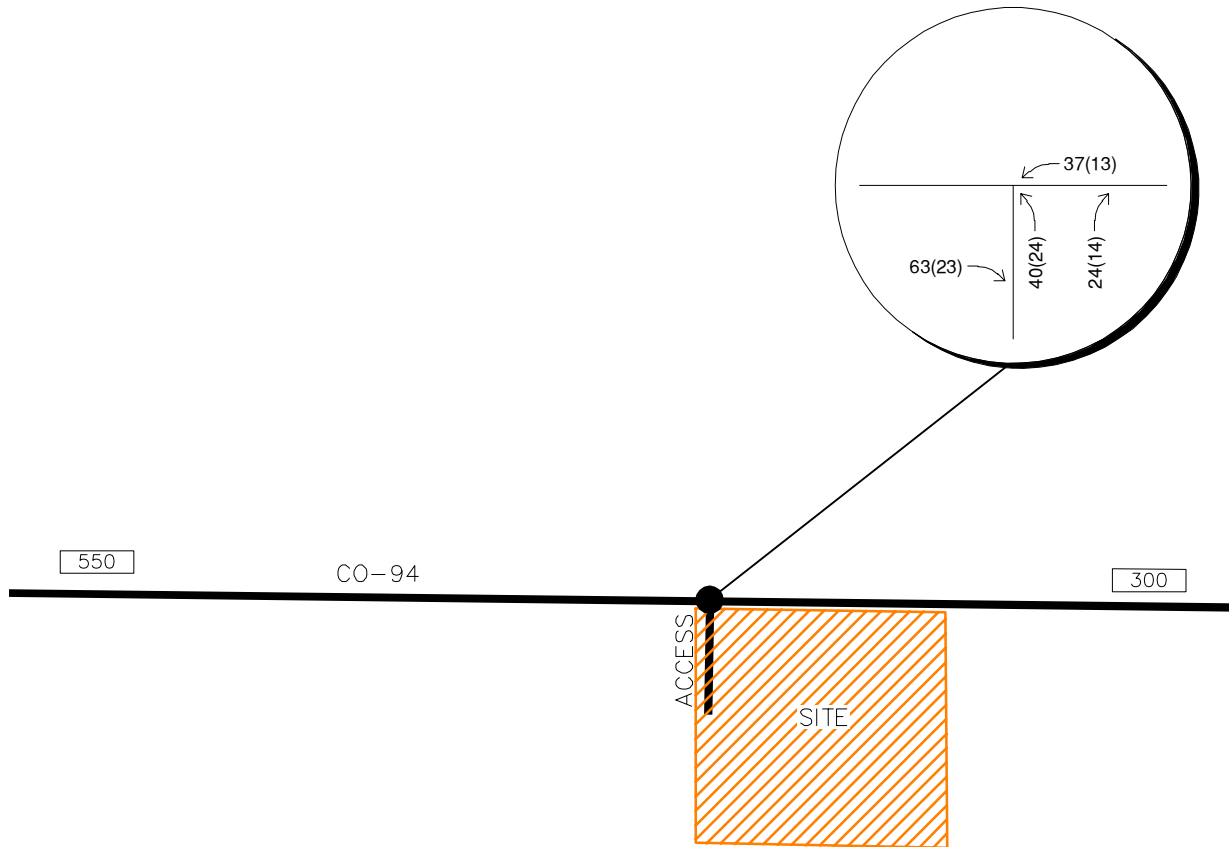
FIGURE 3



LEGEND	
	Study Area Key Intersection
	External Trip Distribution Percentage
	Entering[Exiting] Trip Distribution Percentage

UDON REZONE
PROJECT TRIP DISTRIBUTION

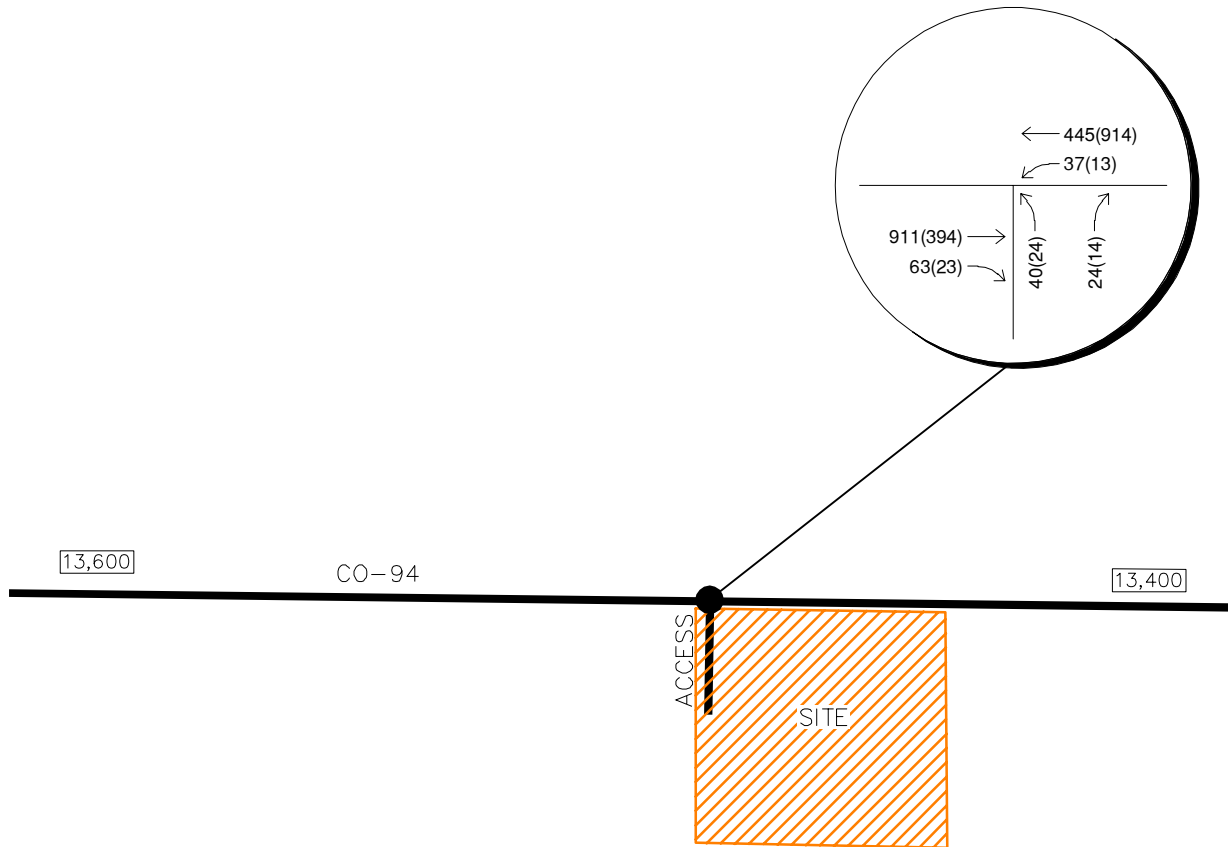
FIGURE 4



LEGEND	
●	Study Area Key Intersection
xxx(xxx)	Weekday AM(PM) Peak Hour Traffic Volumes
xx,x00	Estimated Daily Traffic Volume

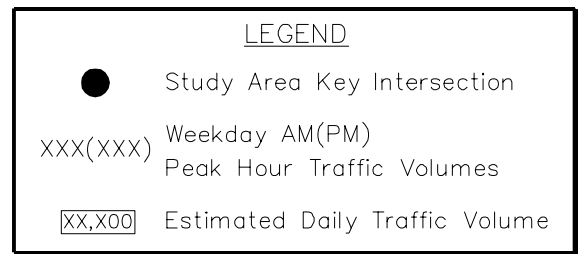
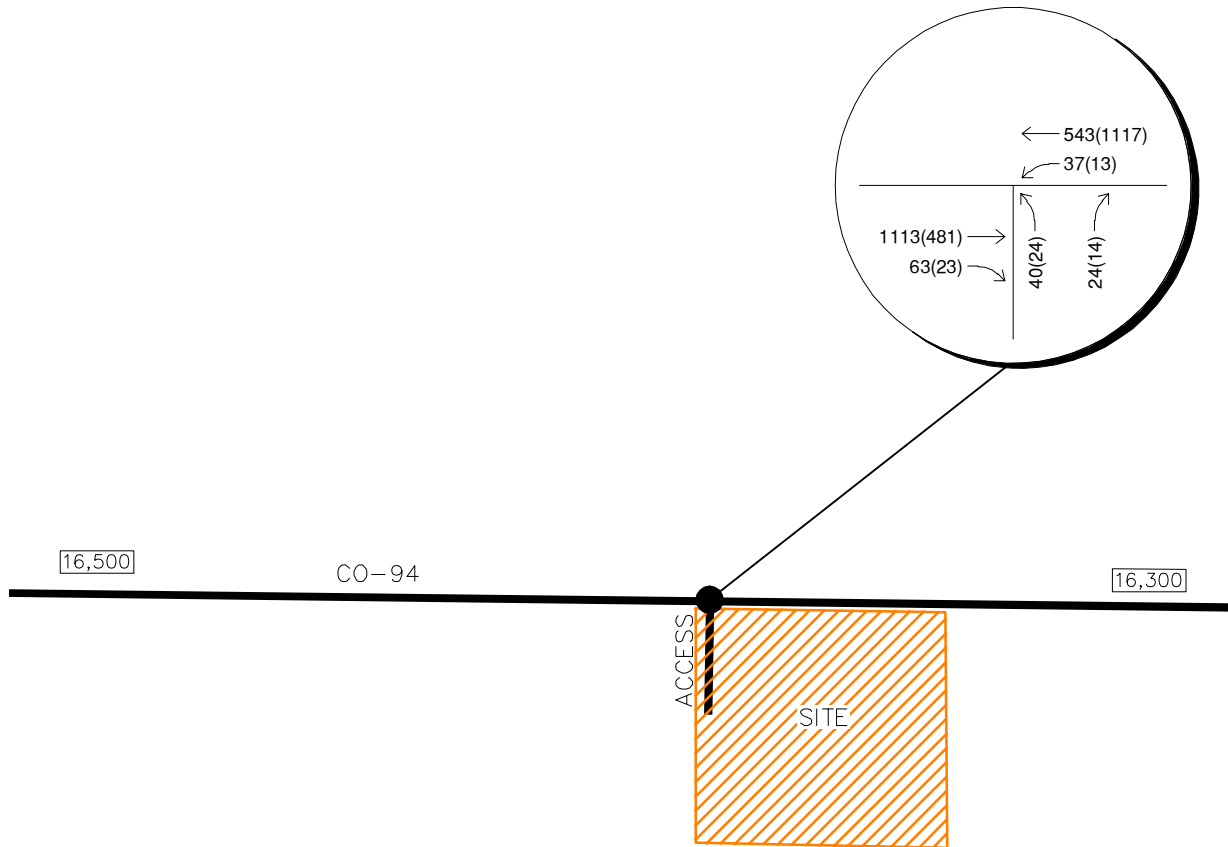
UDON REZONE
PROJECT TRAFFIC ASSIGNMENT

FIGURE 5



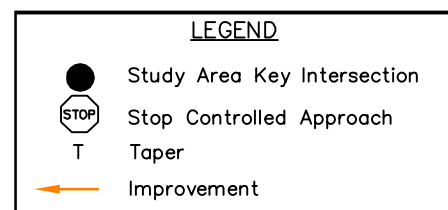
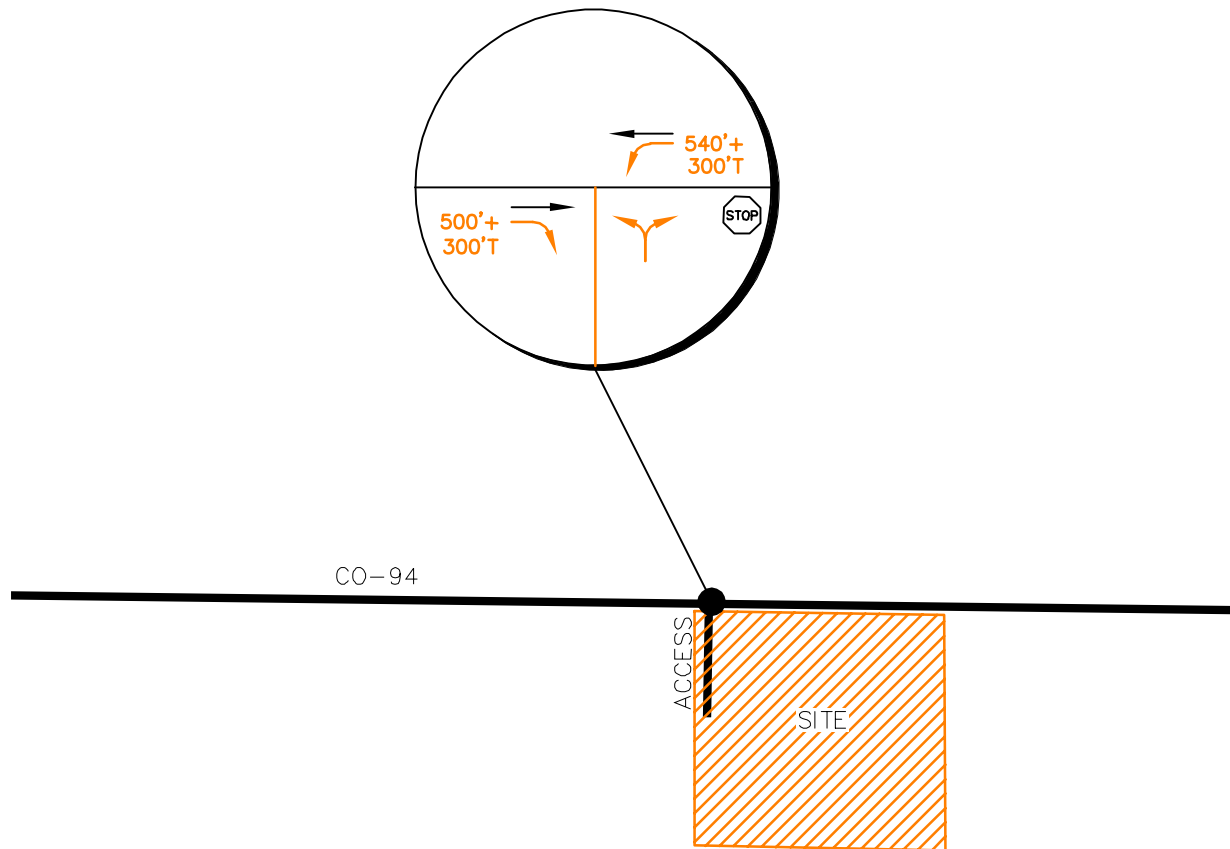
UDON REZONE
 2022 TOTAL TRAFFIC VOLUMES

FIGURE 6



UDON REZONE
 2040 TOTAL TRAFFIC VOLUMES

FIGURE 7



UDON REZONE
RECOMMENDED LANE CONFIGURATIONS

FIGURE 8

2019 CDOT Traffic Volume Data
Thursday, July 11, 2019
On SH-94 E/O Space Village Ave CR 2804

COUNTDIR	HOUR0	HOUR1	HOUR2	HOUR3	HOUR4	HOUR5	HOUR6	HOUR7	HOUR8	HOUR9	HOUR10	HOUR11	HOUR12	HOUR13	HOUR14	HOUR15	HOUR16	HOUR17	HOUR18	HOUR19	HOUR20	HOUR21	HOUR22	HOUR23	Total
P (EB)	22	23	16	13	93	272	747	871	439	262	248	222	286	246	282	292	377	429	309	224	155	129	95	52	6104
S (WB)	17	6	9	14	48	169	370	425	316	293	274	325	289	297	443	670	874	572	320	150	94	56	39	50	6120
Total	39	29	25	27	141	441	1117	1296	755	555	522	547	575	543	725	962	1251	1001	629	374	249	185	134	102	12224
Hour	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00	5:00-6:00	6:00-7:00	7:00-8:00	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00	5:00-6:00	6:00-7:00	7:00-8:00	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	

CDOT Traffic Projection - UDON Rezone

ROUTE	REFPT	ENDREFPT	LENGTH	AADT	AADTYR	YR20FACTOR	DHV	LOCATION
094A	1	8.085	7.077	11000	2018	1.25	12.5	ON SH 94 E/O SPACE VILLAGE AVE CR 2804

Annual Growth 1.12%

Project UDON Rezone
 Subject Trip Generation for Small Office Building
 Designed by TES Date October 21, 2020 Job No. 196020000
 Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 10th Edition, Average Rates

Land Use Code - Small Office Building (712)

Independant Variable - 1000 Square Feet (X)

SF = **4,200**

X = 4.200

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (700 Series Page 95)

Directional Distribution: 83% ent. 17% exit.
 T = 8 Average Vehicle Trip Ends
 7 entering 1 exiting
 7 + 1 = 8
 (T) = 1.92 (X)
 (T) = 1.92 * (4.2)

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (700 Series Page 96)

Directional Distribution: 32% ent. 68% exit.
 T = 10 Average Vehicle Trip Ends
 3 entering 7 exiting
 3 + 7 = 10
 (T) = 2.45 (X)
 (T) = 2.45 * (4.2)

Weekday (700 Series Page 94)

Average Weekday
 Directional Distribution: 50% ent. 50% exit.
 T = 68 Average Vehicle Trip Ends
 34 entering 34 exiting
 34 + 34 = 68
 (T) = 16.19 (X)
 (T) = 16.19 * (4.2)

Saturday, Peak Hour of Generator (700 Series Page 9)

Daily Weekday
 Directional Distribution: 50% ent. 50% exit.
 T = 2 Average Vehicle Trip Ends
 1 entering 1 exiting
 1 + 1 = 2
 (T) = 0.40 (X)
 (T) = 0.40 * (4.2)

Project UDON Rezone
 Subject Trip Generation for Nursery (Wholesale)
 Designed by TES Date October 21, 2020 Job No. 196020000
 Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 10th Edition, Average Rates

Land Use Code - Nursery (Wholesale) (818)

Independant Variable - 1,000 Square Feet (X)

Square Feet = **4,200**

SF = 4.200

T = Average Vehicle Trip Ends

Weekday (800 Series Page 110)

Average Weekday

T = 39.00 (X)

T = 39.0 * (4.2)

Directional Distribution: 50% ent. 50% exit.

T = 164 Average Vehicle Trip Ends

82 entering 82 exiting

82 + 82 = 164

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (800 Series Page 111)

T = 2.40 (X)

T = 2.40 * (4.2)

Directional Distribution: 50% ent. 50% exit.

T = 10 Average Vehicle Trip Ends

5 entering 5 exiting

5 + 5 = 10

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (800 Series Page 112)

T = 5.18 (X)

T = 5.18 * (4.2)

Directional Distribution: 50% ent. 50% exit.

T = 22 Average Vehicle Trip Ends

11 entering 11 exiting

11 + 11 = 22

Saturday (800 Series Page 115)

Average Saturday

T = 29.94 (X)

T = 29.94 * (4.2)

Directional Distribution: 50% ent. 50% exit.

T = 126 Average Vehicle Trip Ends

63 entering 63 exiting

63 + 63 = 126

Saturday Peak Hour of Generator (800 Series Page 116)

T = 5.53 (X)

T = 5.53 * (4.2)

Directional Distribution: 50% ent. 50% exit.

T = 23 Average Vehicle Trip Ends

12 entering 12 exiting

12 + 11 = 23

Project UDON Rezone
 Subject Trip Generation for Shopping Center
 Designed by TES Date October 21, 2020 Job No. 196020000
 Checked by _____ Date _____ Sheet No. _____ of _____

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 10th Edition, Fitted Curve Equations

Land Use Code - Shopping Center (820)

Independant Variable - 1000 Square Feet Gross Leasable Area (X)

Gross Leasable Area = **4,200** Square Feet

X = 4.200

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (800 Series Page 139)

Directional Distribution: 62% ent. 38% exit.
 $T = 0.50 * (X) + 151.78$
 $T = 0.50 * 4 + 151.78$
 T = 154 Average Vehicle Trip Ends
 95 entering 59 exiting

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (800 Series Page 140)

Directional Distribution: 48% ent. 52% exit.
 $\ln(T) = 0.74 \ln(X) + 2.89$
 $\ln(T) = 0.74 * \ln(4) + 2.89$
 T = 52 Average Vehicle Trip Ends
 25 entering 27 exiting

Weekday (800 Series Page 138)

Daily Weekday
 $\ln(T) = 0.68 \ln(X) + 5.57$
 $\ln(T) = 0.68 * \ln(4) + 5.57$
 Directional Distribution: 50% entering, 50% exiting
 T = 696 Average Vehicle Trip Ends
 348 entering 348 exiting

Saturday Peak Hour of Generator (Page 144)

Average Saturday
 $\ln(T) = 0.79 \ln(X) + 2.79$
 $\ln(T) = 0.79 * \ln(4) + 2.79$
 Directional Distribution: 52% ent. 48% exit.
 T = 51 Average Vehicle Trip Ends
 27 entering 24 exiting

Non Pass-By Trip Volumes (Per ITE Trip Generation Handbook, 3rd Edition September 2017-Page 190)

AM Peak Hour =	66%	Non-Pass By	PM Peak Hour =	66%	Non-Pass By
	IN	Out	Total		
AM Peak	63	39	102		
PM Peak	16	18	34		
Daily	230	230	460	PM Peak Hour Rate Applied to Daily	

Pass-By Trip Volumes (Per ITE Trip Generation Handbook, 3rd Edition September 2017 -Page 190)

AM Peak Hour =	34%	Pass By	PM Peak Hour =	34%	Pass By
	IN	Out	Total		
AM Peak	32	20	53		
PM Peak	8	9	18		
Daily	118	118	236	PM Peak Hour Rate Applied to Daily	

Project UDON Rezone
 Subject Trip Generation for Fast-Food Restaurant without Drive-Through Window
 Designed by TES Date May 28, 2020 Job No. 196020000
 Checked by Date Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 10th Edition, Average Rate Equations

Land Use Code - Fast Food Restaurant Without Drive-Through Window (933)

Independant Variable - 1000 Square Feet Gross Floor Area (X)

Gross Floor Area = 1,000 Square Feet

X = 1.000

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (900 Series page 132)

Average Weekday	Directional Distribution:	60% ent.	40% exit.
T = 25.10 (X)	T = 25	Average Vehicle Trip Ends	
T = 25.10 * 1.000	15 entering	10 exiting	
	15 + 10 = 25		

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (900 Series page 133)

Average Weekday	Directional Distribution:	50% ent.	50% exit.
T = 28.34 (X)	T = 28	Average Vehicle Trip Ends	
T = 28.34 * 1.000	14 entering	14 exiting	
	14 + 14 = 28		

Weekday (900 Series page 131)

Average Weekday	Directional Distribution:	50% entering, 50% exiting
T = 346.23 (X)	T = 348	Average Vehicle Trip Ends
T = 346.23 * 1.000	174 entering	174 exiting
	174 + 174 = 348	

Saturday Peak Hour of Generator (900 Series page 137)

	Directional Distribution:	49% ent.	51% exit.
T = 54.60 (X)	T = 55	Average Vehicle Trip Ends	
T = 54.60 * 1.000	27 entering	28 exiting	
	27 + 28 = 55		

Non Pass-By Trip Volumes (Per ITE Trip Generation Handbook, 3rd Edition September 2017)

AM Peak Hour = 51% Non-Pass By	PM Peak Hour = 50% Non-Pass By
IN Out Total	
AM Peak 8 5 13	
PM Peak 7 7 14	
Daily 87 87 174	PM Peak Hour Rate Applied to Daily

Pass-By Trip Volumes (Per ITE Trip Generation Handbook, 3rd Edition September 2017)

AM Peak Hour = 49% Pass By	PM Peak Hour = 50% Pass By
IN Out Total	
AM Peak 7 5 12	
PM Peak 7 7 14	
Daily 87 87 174	PM Peak Hour Rate Applied to Daily

Project UDON Rezone
 Subject Trip Generation for Automobile Care Center
 Designed by TES Date October 21, 2020 Job No. 196020000
 Checked by _____ Date _____ Sheet No. 1 of 1

TRIP GENERATION MANUAL TECHNIQUES

ITE Trip Generation Manual 10th Edition, Average Rate Equations

Land Use Code - Automobile Care Center (942)

Independant Variable - 1000 Square Feet Gross Floor Feet (X)

Gross Floor Area = 4,200

X = 4.2

T = Average Vehicle Trip Ends

Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m. (900 Series Page 283)

		Directional Distribution:	66% ent.	34% exit.
T = 2.25 (X)		T = 9	Average Vehicle Trip Ends	
T = 2.25 *	4.2	6 entering	3	exiting

Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m. (900 Series Page 284)

		Directional Distribution:	48% ent.	52% exit.
T = 3.11 (X)		T = 14	Average Vehicle Trip Ends	
T = 3.11 *	4.2	7 entering	7	exiting

Weekday (10% K-Factor from PM Peak Hour)

Average Weekday		Directional Distribution:	50% entering, 50% exiting	
(T) = PM Peak Total / K Factor	0.1	T = 140	Average Vehicle Trip Ends	
		70 entering	70	exiting
		70 + 70 =	140	

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	
Traffic Vol, veh/h	911	63	37	445	40	24
Future Vol, veh/h	911	63	37	445	40	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	800	250	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	990	68	40	484	43	26
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1058	0	1554	990
Stage 1	-	-	-	-	990	-
Stage 2	-	-	-	-	564	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	658	-	125	299
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	569	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	658	-	117	299
Mov Cap-2 Maneuver	-	-	-	-	247	-
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	534	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.8		23.4	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	264	-	-	658	-	
HCM Lane V/C Ratio	0.264	-	-	0.061	-	
HCM Control Delay (s)	23.4	-	-	10.8	-	
HCM Lane LOS	C	-	-	B	-	
HCM 95th %tile Q(veh)	1	-	-	0.2	-	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘↗	
Traffic Vol, veh/h	394	23	13	914	24	14
Future Vol, veh/h	394	23	13	914	24	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	800	250	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	428	25	14	993	26	15
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	453	0	1449	428
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	1021	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1108	-	144	627
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	348	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1108	-	142	627
Mov Cap-2 Maneuver	-	-	-	-	262	-
Stage 1	-	-	-	-	657	-
Stage 2	-	-	-	-	343	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		17.3	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	334	-	-	1108	-	
HCM Lane V/C Ratio	0.124	-	-	0.013	-	
HCM Control Delay (s)	17.3	-	-	8.3	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0	-	

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘	
Traffic Vol, veh/h	1113	63	37	543	40	24
Future Vol, veh/h	1113	63	37	543	40	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	800	250	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1210	68	40	590	43	26
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1278	0	1880	1210
Stage 1	-	-	-	-	1210	-
Stage 2	-	-	-	-	670	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	543	-	78	223
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	509	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	543	-	72	223
Mov Cap-2 Maneuver	-	-	-	-	191	-
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	471	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.8		31.9	
HCM LOS					D	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	202	-	-	543	-	
HCM Lane V/C Ratio	0.344	-	-	0.074	-	
HCM Control Delay (s)	31.9	-	-	12.2	-	
HCM Lane LOS	D	-	-	B	-	
HCM 95th %tile Q(veh)	1.4	-	-	0.2	-	

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↘↗	
Traffic Vol, veh/h	481	23	13	1117	24	14
Future Vol, veh/h	481	23	13	1117	24	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	800	250	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	523	25	14	1214	26	15
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	548	0	1765	523
Stage 1	-	-	-	-	523	-
Stage 2	-	-	-	-	1242	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1021	-	92	554
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	272	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1021	-	91	554
Mov Cap-2 Maneuver	-	-	-	-	203	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	268	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		21.1	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	265	-	-	1021	-	
HCM Lane V/C Ratio	0.156	-	-	0.014	-	
HCM Control Delay (s)	21.1	-	-	8.6	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Please review the for the highest and best uses in the cs zoned district and rewrite the traffic study accordingly.

Response: The report was updated to show the highest and best uses



May 28, 2020

Response: PCD File No. CS-20-2 was added to the report

Add PCD File No. CS202

Mr. Louis Ferrante
UDON Holdings, LLC
5801 N. Union Boulevard
Suite 100
Colorado Springs, CO 80918

Response: Standard county signature blocks were provided.

Please provide the standard County signature blocks.

Re: UDON Rezone Traffic Study
El Paso County, Colorado

Please indicate what this site is being rezoned to: from Residential Rural (RR5) to Commercial Service (CS). Also please indicate the size of the site (i.e. 40 acres).

Dear Mr. Ferrante:

please delete

Response: The report was updated to indicate what this site is being rezoned to and the size of the site.

This traffic study letter has been updated to reflect a proposed UDON Rezoning project to be located at 12265 CO-94 in El Paso County. The existing property contains a residence. This project is proposed to rezone the existing property to include a 2,000 square foot contractor's office for general weekday use. The property is also proposed to include an area for potential vendors for special events or occasions, likely on weekends. For purposes of this traffic analysis, it was considered that a Food Truck Food Court could be present on site. The site will have the ability to accommodate about 20 parking spaces for such an event.

Response: "Letter" was deleted throughout the report

A vicinity map illustrating the location of the property is attached as **Figure 1**. The surrounding area primarily consists of rural residences, vacant and agricultural land, industrial uses, and Aztec Family Raceway. There are auto salvage yards located to the east of the site. The site area is shown in attached **Figure 2**.

This traffic study identifies the amount of traffic associated with this proposed rezoning and the expected trip distribution and traffic assignment along with an operational analysis for the project access intersection along State Highway 94 (SH-94 or CO-94). It is expected that project construction will be completed within a couple of years; therefore, an analysis was conducted for the build out horizon as well as the 2040 long-term twenty-year horizon.

please indicate whether this access is intended to be a driveway or roadway. If its a roadway, please indicate the anticipated roadway classification.

Existing Roadway Network and Traffic Counts

Regional access to the UDON Rezoning project is provided by CO-94. Direct access to the development will be provided by an access along the south side of CO-94. This intersection will operate with stop control on the northbound side of CO-94. CO-94 extends primarily east-west with one through lane in each direction with a speed limit of 65 miles per hour within the project limits. CO-94 provides a double yellow striped centerline within the project limits.

Response: The report was updated to show that this access is intended to be a driveway.

Existing daily and peak hour bi-directional count data was obtained from CDOT traffic information along CO-94 to the east of Space Village Avenue, which is in nearby vicinity of the existing UDON Rezoning property project access. These counts were collected on Thursday, July 11, 2019 and were conducted in one-hour intervals for 24 hours. These counts were adjusted by the annual growth rate to calculate existing 2020 volumes. The daily counts from the Colorado Department of Transportation (CDOT) Online Transportation Information System (OTIS) were used as a basis for providing a directional split of project traffic. Existing lane configuration, and the existing peak hour counts are shown in attached **Figure 3**, with count information attached as well.

Unspecified Development Traffic Growth

Based on information provided on the website for the Colorado Department of Transportation, the 20-year growth factor along CO-94 adjacent to the study area is 1.25 which equates to an annual growth

The traffic report shall analyze the property for the highest and best use. Along with the proposed uses a "worst case" scenario shall be analyzed for the site that shall include any impacts/improvements to the surrounding infrastructure. Please update your study accordingly.

rate of approximately 1.12 percent per year. Traffic information from the CDOT Online Transportation Information System (OTIS) is used to estimate short term 20 years was used to calculate future traffic volumes. The rate was used to estimate short term 20 years.

Response: The report was updated to reflect the highest and best use. It is believed that the highest and best use is also the worst case scenario for this project because it will produce the most trips.

Trip Generation

Site-generated traffic estimates are determined through a process known as trip generation. Rates and equations are applied to the proposed land use to estimate traffic generated by the development during a specific time interval. The acknowledged source for trip generation rates is the *Trip Generation Manual*¹ published by the Institute of Transportation Engineers (ITE). ITE has established trip rates in nationwide studies of similar land uses. Trip generation is based on the ITE Trip Generation Manual, 10th Edition (most current edition) average rates for Office Building (ITE Code 710) for traffic associated with this development.

Project generated traffic volumes are identified on a weekday daily as well as on a morning peak hour and afternoon peak hour basis. The morning peak hour is the highest one-hour time period of adjacent street traffic during four consecutive 15-minute intervals during the morning peak hour, between 7:00 am and 9:00 am. The afternoon peak hour is the highest one-hour time period of four consecutive 15-minute intervals between the hours of 4:00 pm and 6:00 pm representing the afternoon peak hour. The following **Table 1** summarizes the anticipated weekday peak hour trip generation for the proposed contractor's office project with the trip generation calculation worksheet attached.

Table 1 – UDON Rezoning Project Weekday Traffic Generation

Land Use and Size	Daily Vehicle Trips	Weekday Vehicle Trips					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Office (ITE 710) – 2,000 Square Feet	20	2	0	2	0	2	2

As summarized in **Table 1**, the UDON Rezoning project with a 2,000 square foot office is anticipated to generate approximately 20 new daily weekday trips with 2 of these trips occurring during each of the morning and afternoon peak hours based on ITE equations and data.

As mentioned, the property would like to include services for people attending events and activities within the area on some weekends or holidays. For purposes of this analysis, a food truck food court was considered. As each food truck is approximately 250 feet square feet, and it is anticipated that four food trucks are possible on site with the planned 20 parking spaces of area available, a total "building" area of 1,000 square feet is thought to be possible. For calculation purposes, the ITE average rates for Fast Food Restaurant without Drive Thru (ITE Code 933) was considered to identify an applicable Saturday midday peak hour of generator. This trip generation is shown in **Table 2**.

Table 2 – UDON Rezoning Project Saturday Traffic Generation

Land Use and Size	Saturday Vehicle Trips		
	Midday Peak Hour		
	In	Out	Total
Fast Food Restaurant without Drive-Thru (ITE 933) – 1,000 Square Feet	27	28	55

¹ Institute of Transportation Engineers, *Trip Generation Manual*, Tenth Edition, Washington DC, 2017.

? There was no mention of a campground in the previous pages. Revise accordingly

UDON Rezone
196020000

Response: The reference to campgrounds was removed.

As summarized in **Table 2**, the UDON Rezoning property when hosting a food truck food court (assumed as 1,000 square feet of fast food restaurant without drive thru for purposes of calculation) is anticipated to generate approximately 55 Saturday midday peak hour trips based on ITE equations and data.

Distribution, Assignment, and Total Traffic

Distribution of site traffic was based on the area street system characteristics, existing traffic patterns and volumes, and the proposed access system for the project. As mentioned previously, the traffic volumes from CDOT OTIS were used as a basis for providing a directional split of project traffic. The distribution of traffic is a means to quantify the percentage of site-generated traffic that approaches the site from a given direction and departs the site back to the original source. Project traffic originating from either direction can access the site. As identified from the counts from CDOT OTIS, approximately 63 percent of the UDON Rezone trips arrive from and depart to the west. **Figure 4** illustrates the expected trip distribution for the proposed **campground expansion project**.

Traffic assignment was obtained by applying the project trip distribution to the estimated project traffic generation of the development shown in the trip generation table. The traffic assignment is shown in **Figure 5**. Site traffic volumes were added to the 2022 and 2040 background volumes to represent estimated build-out year and long-term traffic conditions. These total traffic volumes for 2022 and 2040 are illustrated in **Figure 6** and **Figure 7**.

Please include in your narrative how the background traffic volumes were determined.

Traffic Operations Analysis

Kimley-Horn's analysis of traffic operations in the site vicinity was conducted to determine potential capacity deficiencies at the project key intersections for the 2022 build-out and 2040 horizon. The acknowledged source for determining overall capacity is the *Manual*².

Response: It is explained how the background traffic volumes were derived earlier in the report in the section titled "Unspecified Development Traffic Growth".

Capacity analysis results are listed in terms of Level of Service (LOS). LOS describes operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). For intersections and roadways in this study area, typical traffic study practice identifies overall intersection LOS D and movement or approach LOS E as the minimum thresholds for acceptable operations. The following **Table 3** shows the definition of level of service for signalized and unsignalized intersections.

Table 3 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

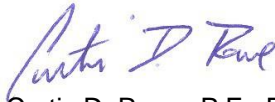
² Transportation Research Board, *Highway Capacity Manual*, Sixth Edition, Washington DC, 2016.

Conclusions and Recommendations

In summary, this traffic study letter provides project traffic generation estimates to identify potential project traffic related impacts on the local street system with the proposed UDON Rezoning project. Based on the analysis presented in this study, Kimley-Horn believes the proposed UDON Rezoning project will be successfully incorporated into the existing and future roadway network. Based on the results of this study, it is recommended that the access intersection along CO-94 be stop controlled, and that a R1-1 "STOP" sign be installed on the northbound approach exiting the property. The recommended intersection lane configurations and control for the project development are illustrated in **Figure 8**. If you have any questions or require anything further, please feel free to call me at (303) 228-2304.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.



Curtis D. Rowe, P.E., PTOE
Vice President

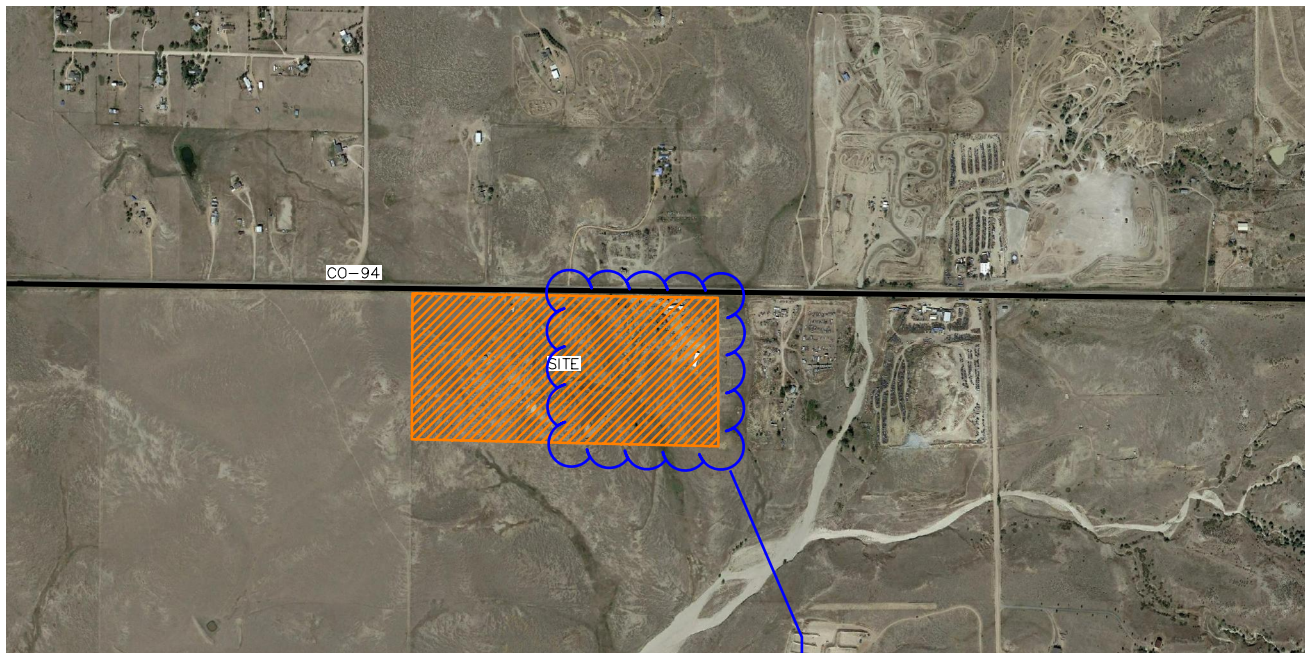


Please address the following:

- Clearly state in the text what the ADT is at the proposed access at full development, and long term.
- State whether the MTCP or other approved corridor study calls for the construction of improvements in the immediate area.
- State whether or not any improvements affected by the project are reimbursable under the current MTCP
- State what the sight distance is for the access and whether it can be met. If it cannot be met, state the required modifications so that it can be met. Also, indicate the anticipated location of the access. Is the access location appropriate?
- State what the current applicable Transportation Impact Fees are.
- provide discussion of Pedestrian & bicycle facilities. Are there any sidewalks or trails along HWY 94? Is there anything indicated in the MTCP or hwy 94 access management plan? etc.

Response:

- The ADT at the proposed full access is stated in the report. Since there is only one access the ADT at the access is the same as the daily trip generation.
- The report was updated to show the improvements from the MTCP.
- The report was updated to show if the improvements are reimbursable under the current MTCP.
- The sight distance was added to the report along with required modifications. The anticipated location of the access was added to the report, the location of this access is appropriate.
- The transportation impact fees were added to the report.
- A discussion about pedestrian and bicycle facilities was added to the report. The MTCP and Hwy 94 access management plan was reviewed for and future improvements.



It appears that the extents of the site is limited to the clouded area. Please revise the site area. Typical throughout the attached figures.

Response: The site area was revised in the study to show only what is in the bubble.

UDON REZONE
SITE AREA

FIGURE 2