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(1960 – 2007)

TRAFFIC STUDY
FOR

ADVENT UNITED METHODIST
MIXED USE
SEC OF JAY AVENUE
AND
RANCHO DRIVE

FEBRUARY, 2024

Digitally signed by Ted T. Egerton
Date: 2024.02.23 17:46:13-08'00'

PROFESSIONAL ENGINEER - STATE OF NEVADA
TED T EGERTON
EXP. 12-31-24
CIVIL
No. 11286

CIVIL AND STRUCTURAL ENGINEERING
6345 South Jones Boulevard • Suite 100 • Las Vegas, NV 89118 • Phone (702) 365-9312 • Fax (702) 365-9317

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EXECUTIVE SUMMARY

The proposed mix use project shall be located on the southeast corner of Jay Avenue and Rancho Drive. The site shall consists of a clinic, day care and a residential component. The project is anticipated to generate 507 daily trips. Of these 507 daily trips, it is anticipated that 78 trips shall occur during the AM peak hour and 80 trips shall occur during the PM peak hour.

To offset traffic impacts that are anticipated with the completion of the project, the following recommendations have been made:

- *For the Nevada Department of Transportation to require all mandatory signage and striping to be shown on the project's civil engineering drawings and that they conform to Nevada Department of Transportation and MUTCD standards.*

- *For the developer to install an exclusive right turn lane on the south leg of Rancho Drive at Jay Avenue. This right turn lane will also be utilized as a bus pullout for the existing bus stop located at this location.*

A. SITE AND STUDY AREA BOUNDARIES

The proposed mixed use will be located on the southeast corner of Rancho Drive and Jay Avenue within Las Vegas, Nevada. Refer to Figure 1 for the vicinity map.

In discussions with representatives from the Nevada Department of Transportation, it was decided that this report would analyze the following intersections.

Jay Avenue at Rancho Drive

The analysis shall include intersection level of service analyses, left-turn storage analyses, and accident analyses.

B. EXISTING AND PROPOSED USES OF THE SITE

The site is comprised of two parcels that are described at assessor's parcel number (A.P.N.) 138-12-710-045 and 046. The site currently has a place of worship which will remain with the completed mix use project.

The proposed improvements to the site include the construction of 51 dwelling units, a 2,450 square foot daycare facility and a 1,200 square foot clinic.

C. EXISTING AND PROPOSED USES IN THE VICINITY OF THE SITE

East of the project is a single family residence.

South of the project is an existing auto body collision facility

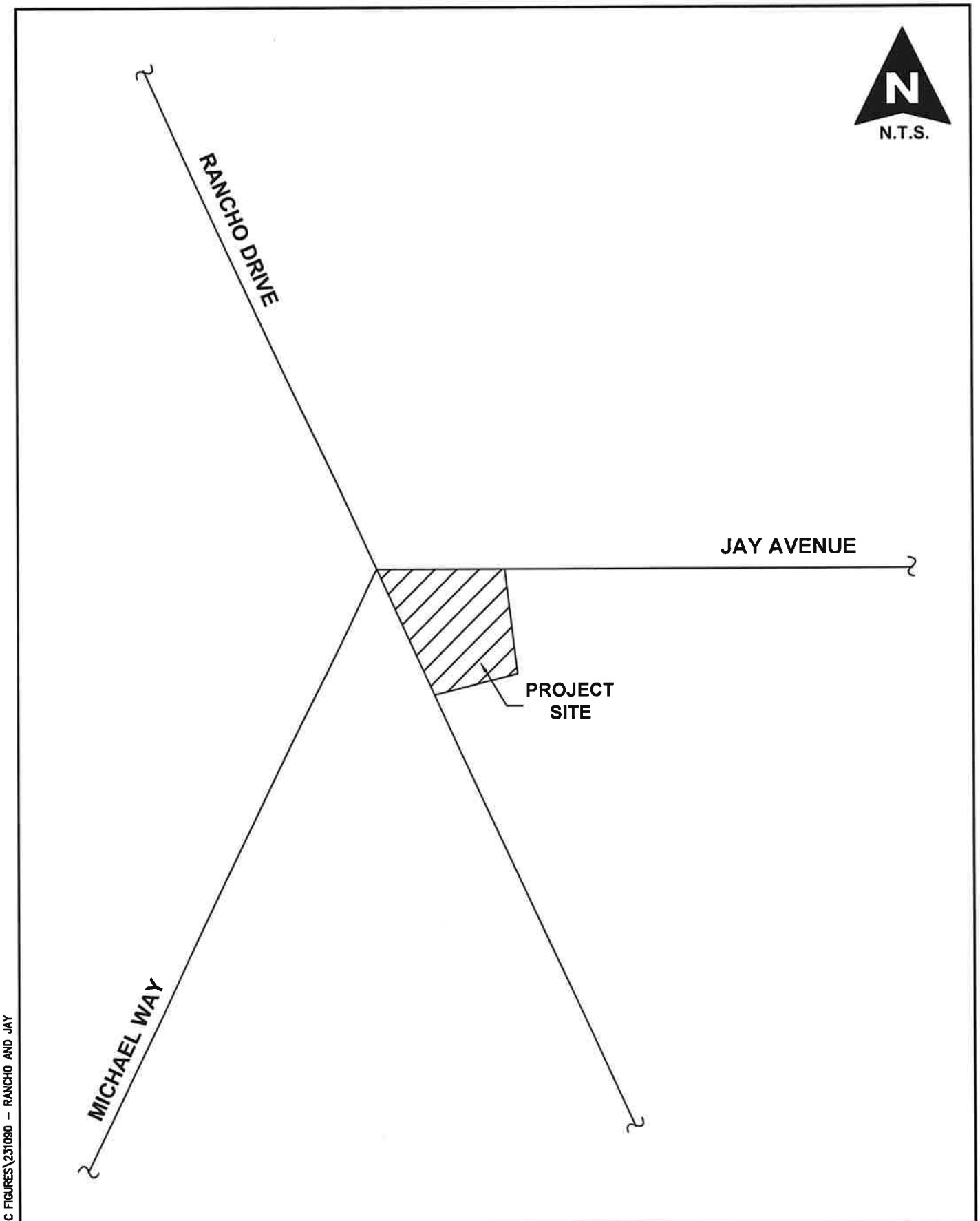
North of the site is a vacant parcel.

West of the project, on the west side of Rancho Drive, is a convenience store.

D. EXISTING ROADWAYS AND INTERSECTIONS

Rancho Drive

This northwest- southeast roadway consists of three lanes in each direction separated by a raised median island. The speed limit is 45 miles per hour and on-street parking is prohibited.



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VICINITY MAP
FIGURE 1

SUBJECT SITE ON RANCHO DRIVE & JAY AVENUE

Jay Avenue

This east - west roadway consists of one lane in each direction. The speed limit is 25 miles per hour and on-street parking is prohibited.

Jay Avenue / Michael Way at Rancho Drive

This four-leg intersection is currently stop controlled on the east and west legs. The west leg, Michael Way, consists of an exclusive left turn lane, a through lane, and an exclusive right turn lane. The east leg, Jay Avenue, consists of one travel lane for all movements. The north and south leg of Rancho Drive consists of an exclusive left turn lane, two through lanes and a through / right turn lane. As a condition of the project, an exclusive right turn lane on the south leg of Ranch Drive will be constructed as a part of this project.

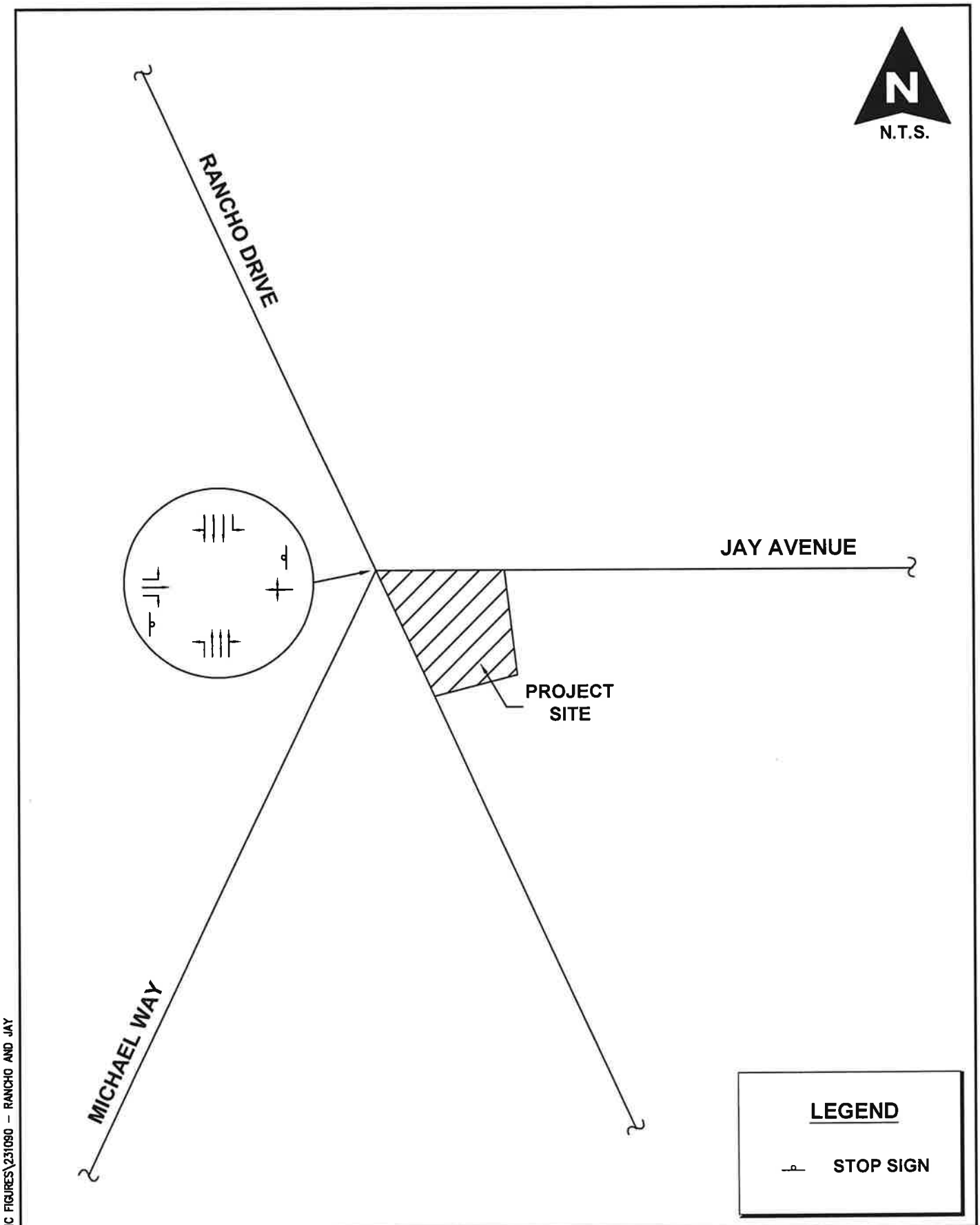
Existing lane configurations are depicted in Figure 2.

E. TRIP GENERATION RATES

Trip generation rates were based upon the ITE publication entitled *Trip Generation* (11th Edition). The independent variable utilized was the square footage of the facility.

The trip generation calculations are as follows:

TRIP GENERATION DAYCARE CENTER ITE CODE 565 2,450 SQUARE FEET	
AM PEAK HOUR	
Average Rate = 11.00 trips per 1000 square feet Trips = (11.0) (2.45) Trips = 26.9 or **27 Trips**	
53% Entering 14 Trips	47% Exiting 13 Trips
PM PEAK HOUR	
Average Rate = 11.73 trips per 1000 square feet Trips = (11.73) (2.45) Trips = 28.7 or **29 Trips**	
47% Entering 14 Trips	53% Exiting 15 Trips
WEEKDAY	
Average Rate = 47.62 trips per 1000 square feet Trips = (47.62) (2.45) Trips = 116.7 or **117 Trips**	



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EXISTING LANE CONFIGURATION
FIGURE 2

SUBJECT SITE ON RANCHO DRIVE & JAY AVENUE

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TRIP GENERATION CLINIC ITE CODE 630 1,200 SQUARE FEET	
AM PEAK HOUR	
T = 2.19 (X) + 8.68 T = 2.19 (1.2) + 8.68 Trips = 11.3 or **12 Trips**	
81% Entering 10 Trips	19% Exiting 2 Trips
PM PEAK HOUR	
T = 3.53 (X) + 2.98 T = 3.53 (1.2) + 2.98 Trips = 7.2 or **8 Trips**	
30% Entering 2 Trips	70% Exiting 6 Trips
WEEKDAY	
Average Rate = 37.6 trips per 1000 square feet Trips = (37.6) (1.2) Trips = 45.1 or **46 Trips**	

TRIP GENERATION MULTIFAMILY ITE CODE 220 51 DWELLING UNITS	
AM PEAK HOUR	
T = 0.61 (X) + 22.85 T = 0.61 (51) + 22.85 Trips = 38.6 or **39 Trips**	
24% Entering 10 Trips	76% Exiting 2 Trips
PM PEAK HOUR	
T = 0.43 (X) + 20.55 T = 0.43 (51) + 20.55 Trips = 42.4 or **43 Trips**	
63% Entering 27 Trips	37% Exiting 16 Trips
WEEKDAY	
Average Rate = 6.74 trips per dwelling unit Trips = (6.74) (51) Trips = 343.7 or **344 Trips**	

TOTAL TRIP GENERATION	
AM PEAK HOUR	
Entering 33 Trips	Exiting 45 Trips
PM PEAK HOUR	
Entering 43 Trips	Exiting 37 Trips
WEEKDAY	
Trips = **507 Trips**	

F. TRIP DISTRIBUTION AND TRIP ASSIGNMENTS

The trip distribution was based on the location of the street network and surrounding commercial areas. Refer to Figure 3 for the trip distribution

Trip assignments were calculated using the trip distribution and trip generation information. Refer to Figure 4 for the trip assignments.

G. EXISTING AND PROJECTED TRAFFIC VOLUMES

Traffic volumes at each subject intersection were recorded on the following dates:

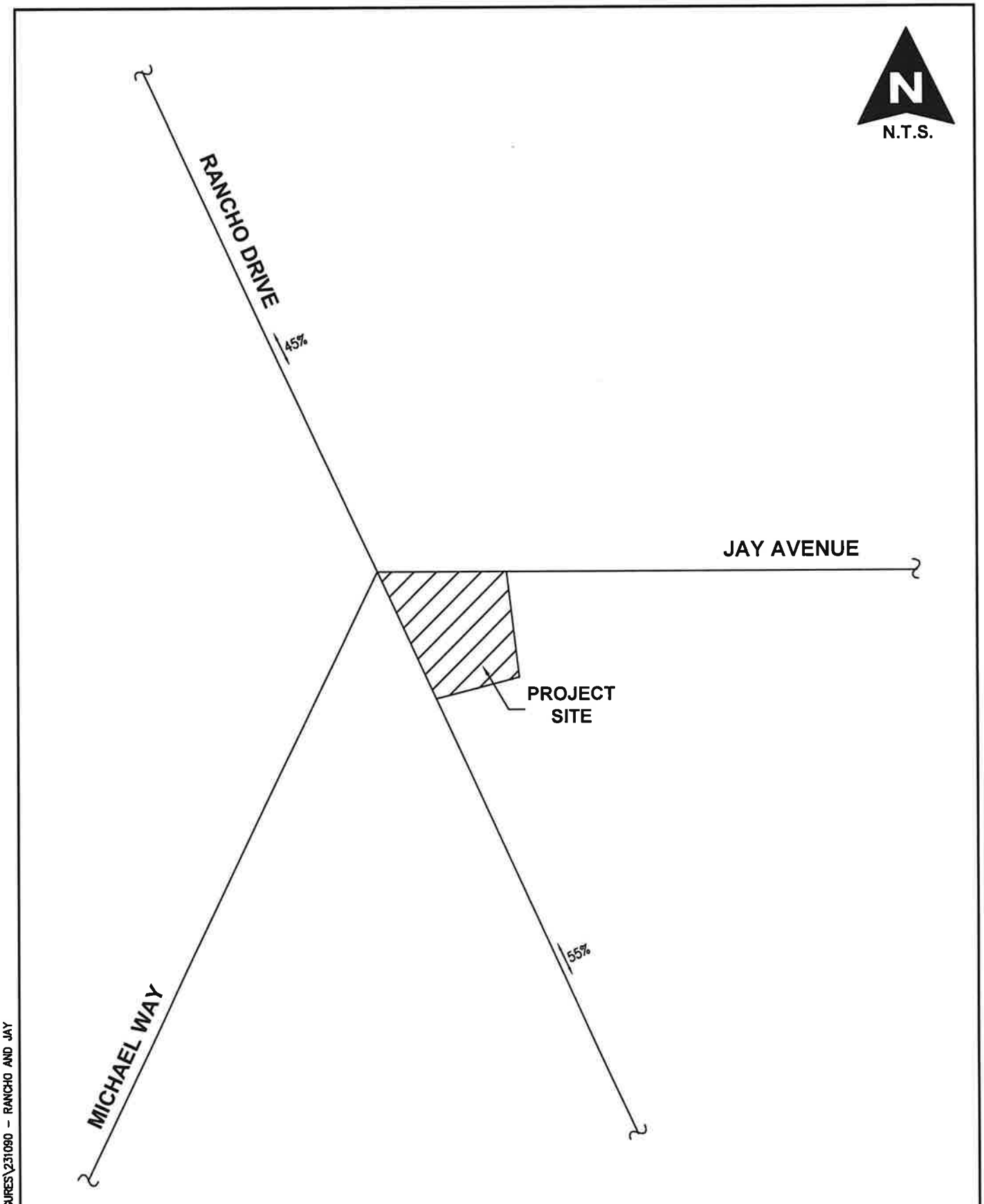
Jay Avenue at Rancho Drive 2/6/24

The volumes were recorded in 15-minute intervals between the hours of 7:00 am to 9:00 am and 4:00 pm to 6:00 pm. The 15-minute volume counts are contained in Appendix B. Refer to Figure 5 for the existing volumes.

The anticipated project completion date is 2025. Based upon area counting stations the yearly traffic has seen a yearly decrease of traffic. Due to this, a yearly growth rate was not applied. . Refer to Figure 6 for the 2025 Background and Figure 7 for 2025 Background and Project Volumes.

H. INTERSECTION ANALYSIS

Based upon the preceding information, a level of service analysis was performed for each intersection. Techniques presented in the Transportation Research Board publication entitled *Highway Capacity Manual 2010 – Fifth Edition* were utilized for this analysis. The analysis worksheets are provided in Appendix C. The analysis for the study intersections are as follows:



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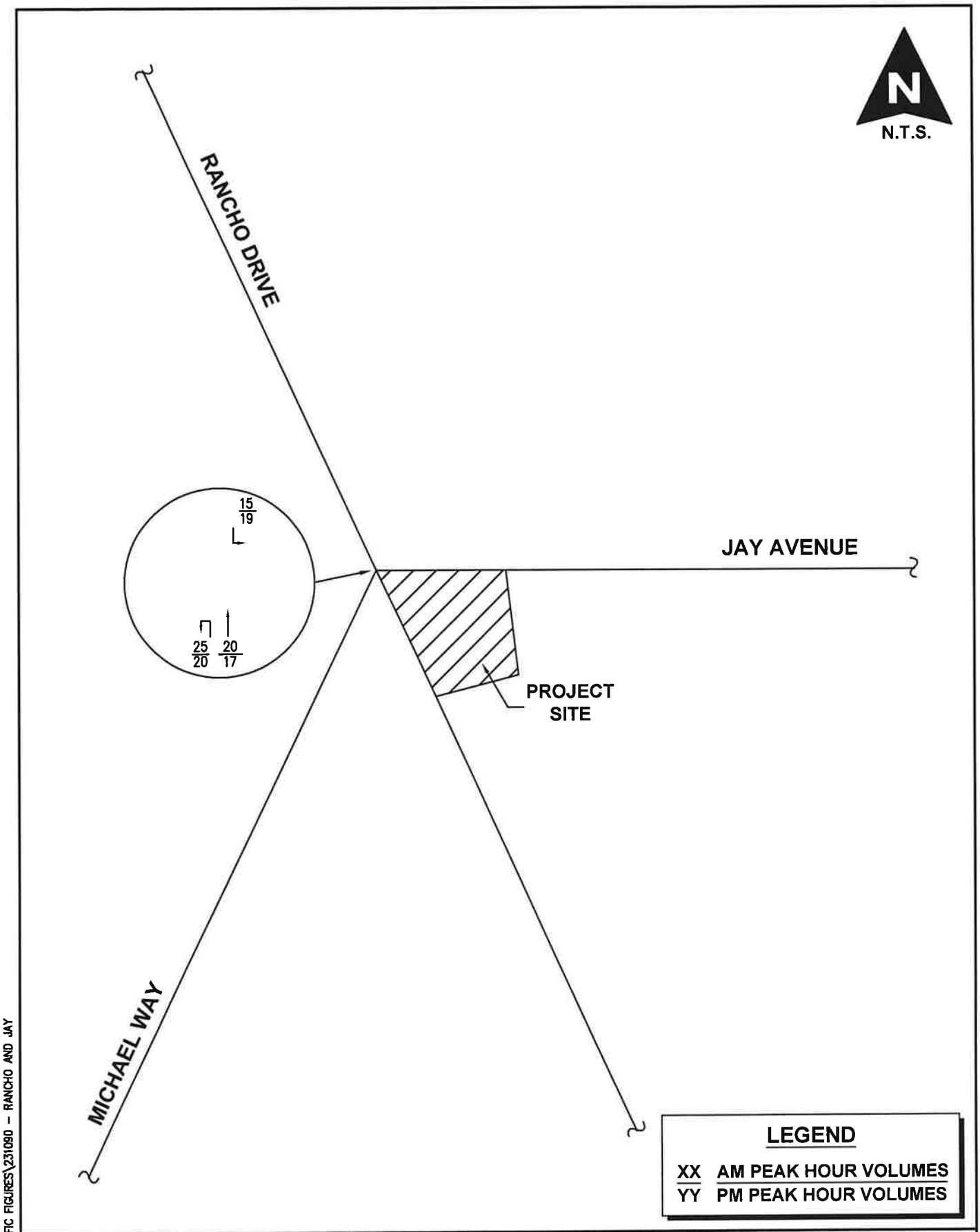
TRIP DISTRIBUTION
FIGURE 3

SUBJECT SITE ON RANCHO DRIVE & JAY AVENUE



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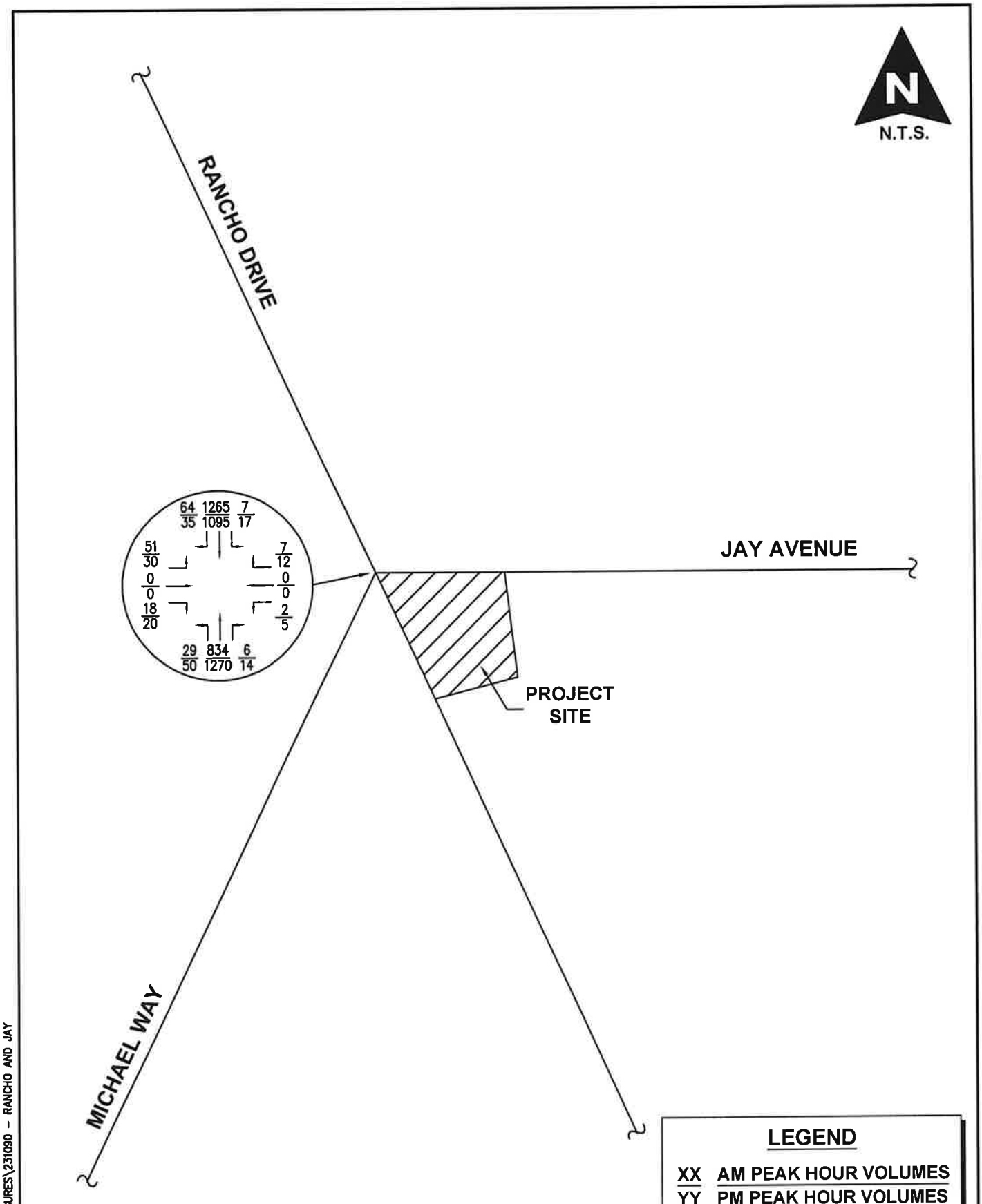
TRIP ASSIGNMENT
FIGURE 4

SUBJECT SITE ON RANCHO DRIVE & JAY AVENUE



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EXISTING VOLUMES
FIGURE 5

SUBJECT SITE ON
RANCHO DRIVE &
JAY AVENUE

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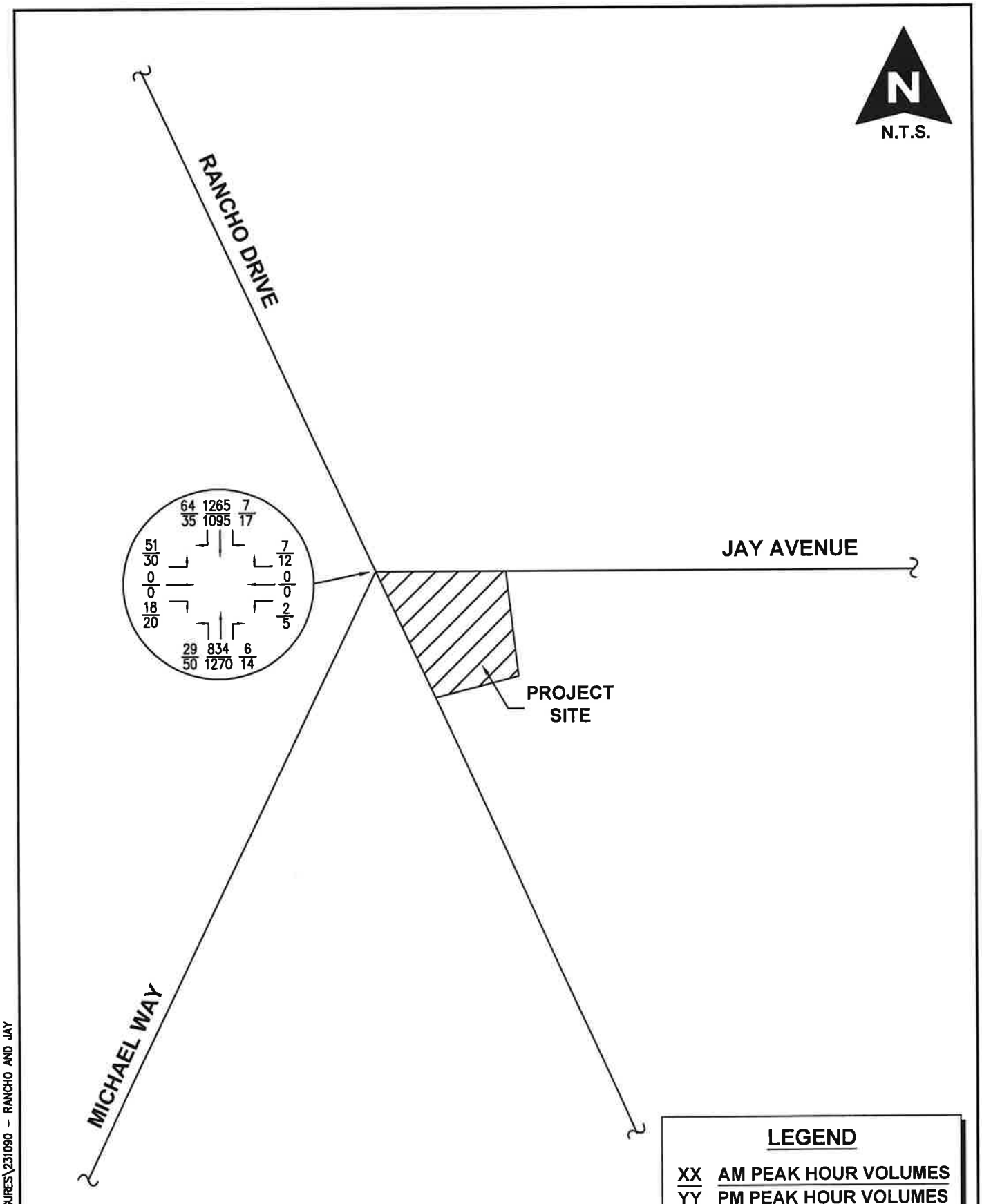

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2025 BACKGROUND VOLUMES FIGURE 6

SUBJECT SITE ON RANCHO DRIVE & JAY AVENUE

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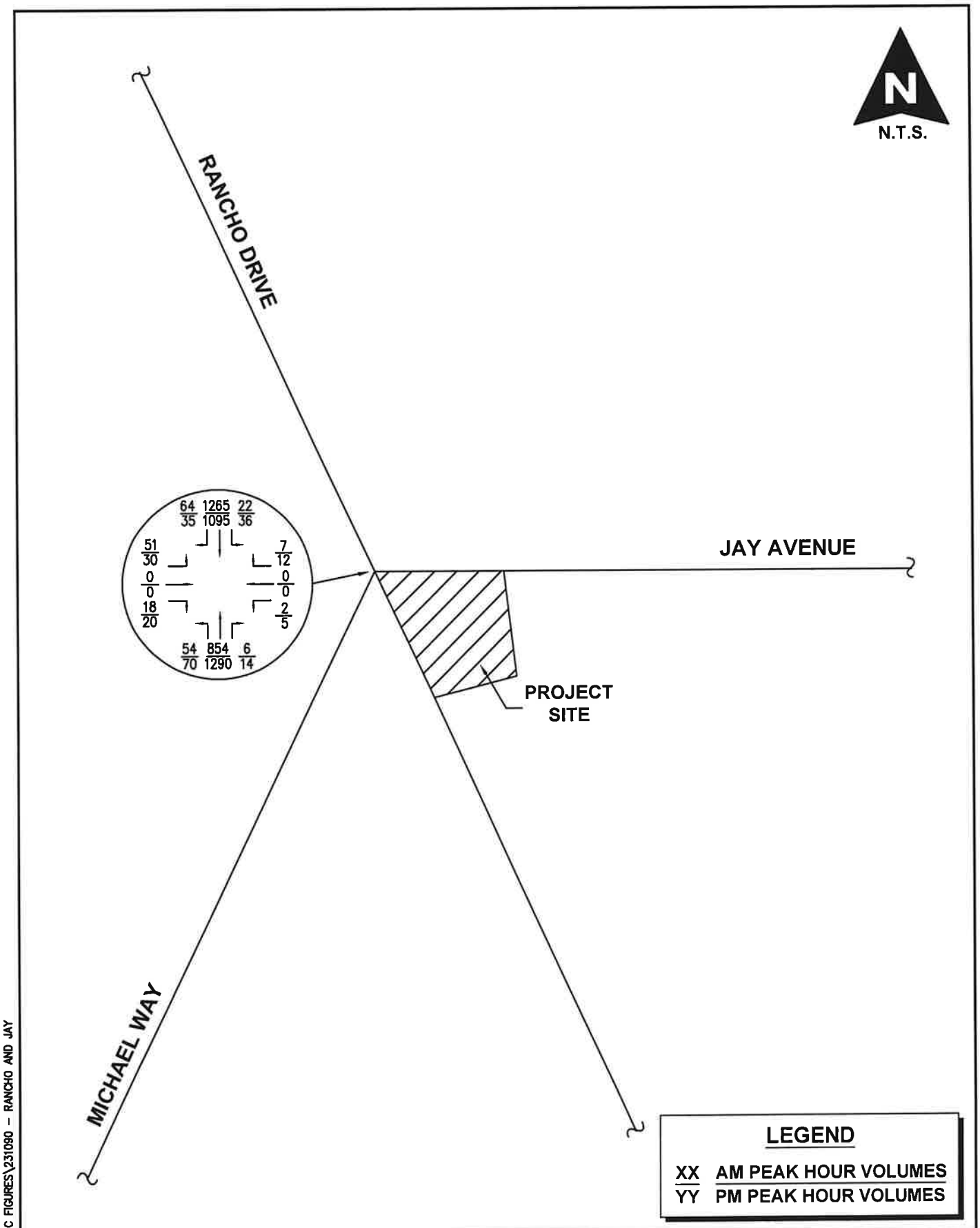

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2025 BACKGROUND & PROJECT VOLUMES
FIGURE 7

SUBJECT SITE ON RANCHO DRIVE & JAY AVENUE

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UNSIGNALIZED INTERSECTION JAY AVENUE AT RANCHO DRIVE							
		EXISTING VOLUMES		2025 BACKGROUND VOLUMES		2025 BACKGROUND VOLUMES WITH PROJECT	
		AM PEAK	PM PEAK	AM PEAK	PM PEAK	AM PEAK	PM PEAK
EASTBOUND	Level of Service	F	F	F	F	F	F
	Average Delay (Sec)	125.2	75.7	125.2	75.7	224.9	119.7
WESTBOUND	Level of Service	C	E	C	E	C	E
	Average Delay (Sec)	19.5	37.4	19.5	37.4	23.1	48.2
NORTHBOUND LEFT	Level of Service	C	C	C	C	C	C
	Average Delay (Sec)	22.3	18.5	22.3	18.5	24.8	19.6
SOUTHBOUND LEFT	Level of Service	B	C	B	C	B	C
	Average Delay (Sec)	13.5	19.5	13.5	19.5	14.0	21.2

Jay Avenue at Rancho Drive

This intersection is experiencing excessive delays during both peak hours on the west leg of the intersection (Michael Way). This is due to the left turn movements and the volumes associated with Rancho Drive. This situation is anticipated to continue upon completion of the project.

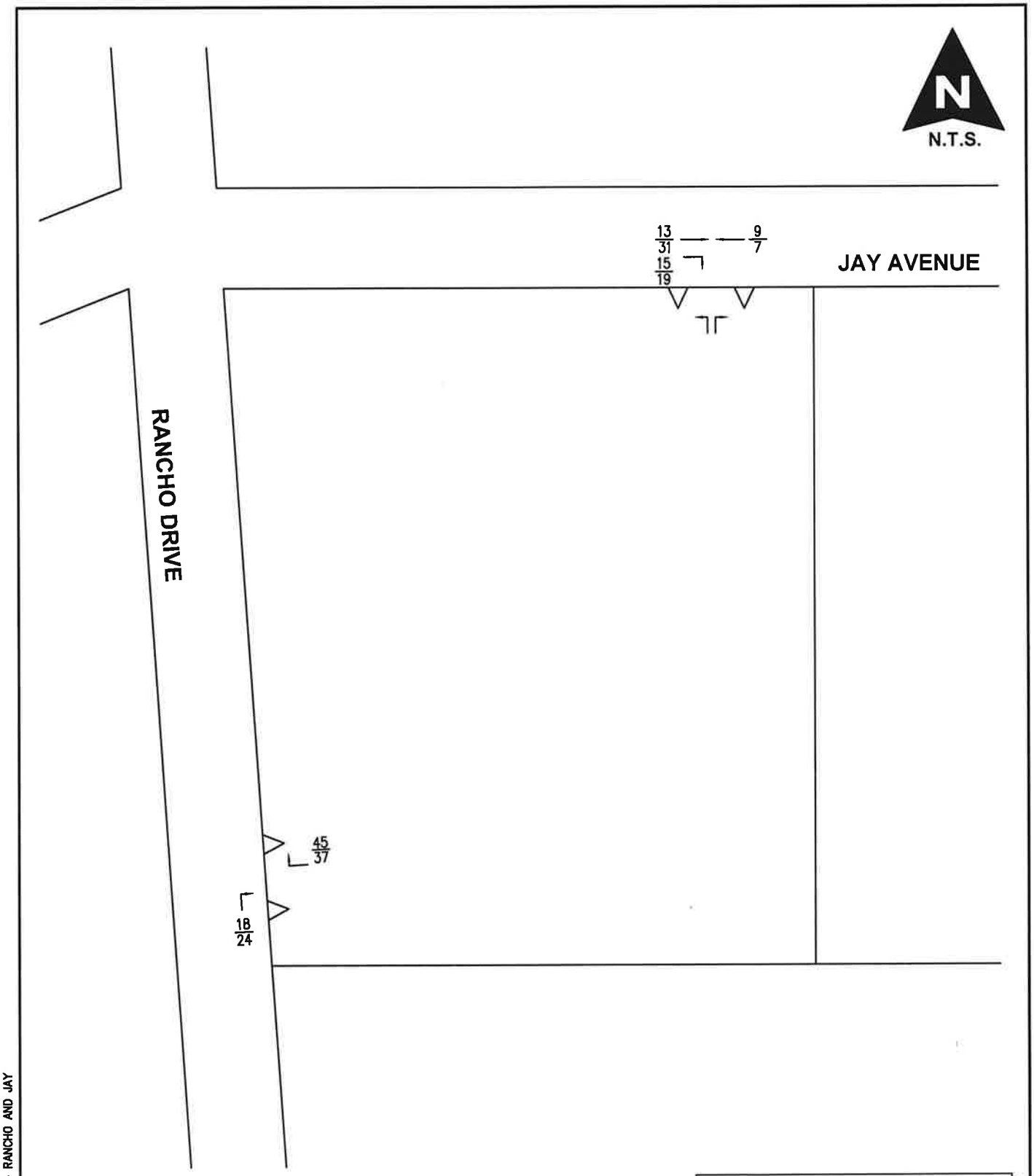
I. DRIVEWAY ANALYSIS

Referring to the enclosed site plan, the project shall access the local roadway network via one existing driveway on Jay Avenue and one existing driveway on Rancho Drive. The Rancho Drive access is restricted to right turning movements due to an existing median island within Rancho Drive. The existing driveway on Jay Avenue allows full access. Due to this a level of service analysis was prepared for the existing access on Jay Avenue.

Each driveway was observed on February 6th, 2024. The results of these observations revealed that during the weekday peak hours the driveways were not being used by the existing Ministry. Therefore, the volumes that are anticipated to utilize these driveways are the new land uses. These volumes are depicted in Figure 8. Based upon these volumes a level of service analysis was prepared. The worksheets are contained in Appendix D. The results are as follows:

UNSIGNALIZED INTERSECTION DRIVEWAY ON JAY AVENUE			
		2025 BACKGROUND VOLUMES WITH PROJECT	
		AM PEAK	PM PEAK
WESTBOUND	Level of Service	A	A
	Average Delay (Sec)	7.3	7.3
NORTHBOUND	Level of Service	A	A
	Average Delay (Sec)	8.4	8.5

The existing driveway on Rancho Drive was also reviewed with respect to the Nevada Department of Transportation publication entitled "Access Management System and Standards (2017 Edition). Rancho Drive is classified as an "other Principal Arterial" with a posted speed limit of 45 miles per hour. Based upon these attributes and Table 4-1: Access Spacing Standards, the spacing between driveways is a minimum of 660 for a limited access driveway.



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DRIVEWAY VOLUMES
FIGURE 8

SUBJECT SITE ON
RANCHO DRIVE &
JAY AVENUE

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The existing driveway is currently approximately 270 feet southeast of the intersection of Jay Avenue at Rancho Drive and approximately 120 northwest of an existing driveway on Rancho Drive.

As noted, the project currently has an existing driveway on Jay Avenue and the existing driveway on Rancho Drive. The need for the existing driveway is required for residential component of this project. Residents that are moving into or out of the project will have the need for moving vehicles ranging from moving vans to semitrucks. Referring to the attached site plan, the moving trucks may enter the site from the Jay Avenue driveway but requires the Rancho Drive access to exit the site. An exhibit is contained herein which depicts the need to retain the access.

It should also be noted that the access is also required for fire access. While an emergency access gate could be installed, the access would still be required for the residential component.

In addition, the driveway was reviewed for the need for an exclusive right turn lane. Referring to Table 4-14 in the previously referenced NDOT publication, an exclusive right turn lane is warranted however right of way for the right turn lane is not available to the south of the driveway.

J. LEFT-TURN STORAGE ANALYSIS

As required by the Nevada Department of Transportation, left-turn storage bays at the study intersections and the project driveways were analyzed for storage length requirements. A three-minute storage period was utilized for the unsignalized intersection. Refer to Appendix D for analysis worksheets. The results of the left turn storage analysis are as follows:

LEFT TURN STORAGE ANALYSIS			
	REQUIRED MINIMUM STORAGE LENGTH		
	AM PEAK HOUR	PM PEAK HOUR	EXISTING STORAGE LENGTH
Jay Avenue at Rancho Drive– North Leg	50 feet	50 feet	150 feet
Jay Avenue at Rancho Drive– North Leg	75 feet	100 feet	150 feet

K. AVERAGE DAILY TRAFFIC

As required by the Nevada Department of Transportation, the increase in Average Daily Traffic (ADT) adjacent to the project was calculated. The analysis was based upon a counting station located on Rancho Drive approximately 475 feet south of Cheyenne Avenue. The calculations are as follows:

SOURCE: NEVADA DEPARTMENT OF TRANSPORTATION TRAFFIC RECORDS INFORMATION ACCESS STATION 030618, Rancho Drive 475 feet south of Cheyenne Avenue			
2019	**2020**	**2021**	**2022**
28700	21700	25300	26200
Growth Rate = $\{26200\}^{1/3}$ / $\{28700\} = 0.97$			

2024 Background & Project ADT on Rancho Drive = (28700) + 507 = 29,207

Based upon the preceding calculations, it is anticipated that 29,207 vehicles per day shall utilize Rancho Drive upon completion of the project.

L. ACCIDENT ANALYSIS

As required by Nevada Department of Transportation, the increase in accidents was calculated. The analyses assumed that the existing PM peak hour traffic is responsible for ten percent of the average daily traffic. The worksheets are contained in Appendix E. The results are as follows:

Jay Avenue at Rancho Drive

In the last three years there has been 7 recorded accidents. The calculated accident rate based upon this information is 0.2509 accidents per one million vehicles entering the intersection. The number of accidents that are attributable to the project is 0.0321 accidents per year.

M. PUBLIC TRANSPORTATION

As required by City of North Las Vegas, a review of public transportation has been prepared. Referring to the Regional Transportation (RTC) bus routes, Route 106 travels on Rancho Drive. Currently there is an existing bus stop adjacent to the site. As conditioned by the City of Las Vegas, this development shall construct a right turn / bus pullout on the south leg of Rancho Drive at Jay Avenue.

N. RECOMMENDATIONS

To offset traffic impacts that are anticipated with the completion of the project, the following recommendations have been made:

- *For the Nevada Department of Transportation to require all mandatory signage and striping to be shown on the project's civil engineering drawings and that they conform to Nevada Department of Transportation and MUTCD standards.*

- *For the developer to install an exclusive right turn lane on the south leg of Rancho Drive at Jay Avenue. This right turn lane will also be utilized as a bus pullout for the existing bus stop located at this location.*

APPENDIX A

NDOT SCOPING LETTER

Traffic Impact Study Scope Request

District 1: 123 E Washington Avenue, P.O. Box 170 Las Vegas, NV 89125 Phone: 702-385-6500 Fax: 702-385-6511

Date Requested 1/25/24 Applicant Monica Gressen

Contact Person Ted Egerton Firm Brazen Architecture

Contact Email Ted@lochsa.com Address 6345 S. Jones

Telephone 702-365-9312 Las Vegas, NV 89118

Development Name & Description MIXED USE

Encroachment Cross Streets JAY STREET AT RANCHO

Mile Post _____ Route 599

City Las Vegas County Clark

Describe nature of encroachment into State right-of-way Right turn lane on Rancho for Jay Street - Utilize Existing Driveway

Trip Generation Total

ITE Code	Land Use	Area or Units	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
220	Apartment	51 DU	9	30	39	27	16	43	345
565	Daycare	2450 SF	14	13	27	14	15	29	117
630	Clinic	1200 SF	10	2	12	2	6	8	46
		Total:	33	45	78	43	37	80	507

To be completed by NDOT District 1 Traffic:

☐ Courtesy Study ☐ Master Study ☒ Technical Study ☐ Master Study Update ☐ Techincal Update

Intersections	LOS	Left/Right Turn Lane Storage Analysis
Rancho Dr and Jay Ave/Michael Way	X	X
Address major deviation to AMSS spacing standards for project's	driveway on Rancho Dr, and address	
alternative access available on Jay Ave.		

☒ Conformance to NDOT 2017 Access Management Policy ☒ Traffic Signing/Striping Plan ☒ Site Plan ☒ Pedestrian / Bike / Transit Analysis

☒ School Walking Routes ☒ Traffic Counts ☒ Traffic Crash Analysis

APPENDIX B

15-MINUTE VOLUME COUNTS

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File Name : RanchoJay
Site Code : 00000000
Start Date : 2/6/2024
Page No : 1

Groups Printed- Unshifted

	Rancho Drive From North				Jay Avenue From East				Rancho Drive From South				Michael Way From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	12	288	1	0	2	0	3	0	0	171	3	0	2	0	8	0	490
07:15 AM	22	309	3	0	2	0	0	0	3	190	8	0	7	0	13	0	557
07:30 AM	12	331	0	0	0	0	1	0	0	224	5	0	7	0	13	0	593
07:45 AM	19	344	2	0	4	0	1	0	2	225	8	0	3	0	8	0	616
Total	65	1272	6	0	8	0	5	0	5	810	24	0	19	0	42	0	2256
08:00 AM	11	281	2	0	1	0	0	0	1	195	8	0	1	0	17	0	517
08:15 AM	8	214	0	0	2	0	2	0	2	203	5	0	2	0	4	0	442
08:30 AM	7	220	1	0	1	0	3	0	3	238	3	0	2	0	9	0	487
08:45 AM	3	178	1	0	4	0	2	0	1	162	2	0	4	0	10	0	367
Total	29	893	4	0	8	0	7	0	7	798	18	0	9	0	40	0	1813
*** BREAK ***																	
04:00 PM	6	255	4	0	2	0	2	0	4	317	7	0	6	0	8	0	611
04:15 PM	13	279	3	0	3	0	0	0	3	289	11	0	7	0	11	0	619
04:30 PM	8	270	4	0	1	0	1	0	3	349	17	0	3	0	6	0	662
04:45 PM	8	291	6	0	6	0	2	0	4	315	15	0	4	0	5	0	656
Total	35	1095	17	0	12	0	5	0	14	1270	50	0	20	0	30	0	2548
05:00 PM	17	213	2	0	3	0	5	0	6	277	6	0	3	0	13	0	545
05:15 PM	11	245	4	0	4	0	1	0	8	311	14	0	2	0	4	0	604
05:30 PM	6	199	3	0	8	0	0	0	2	333	12	0	2	0	5	0	570
05:45 PM	14	208	7	0	2	0	3	0	7	258	9	0	8	0	15	0	531
Total	48	865	16	0	17	0	9	0	23	1179	41	0	15	0	37	0	2250
Grand Total	177	4125	43	0	45	0	26	0	49	4057	133	0	63	0	149	0	8867
Apprch %	4.1	94.9	1	0	63.4	0	36.6	0	1.2	95.7	3.1	0	29.7	0	70.3	0	
Total %	2	46.5	0.5	0	0.5	0	0.3	0	0.6	45.8	1.5	0	0.7	0	1.7	0	

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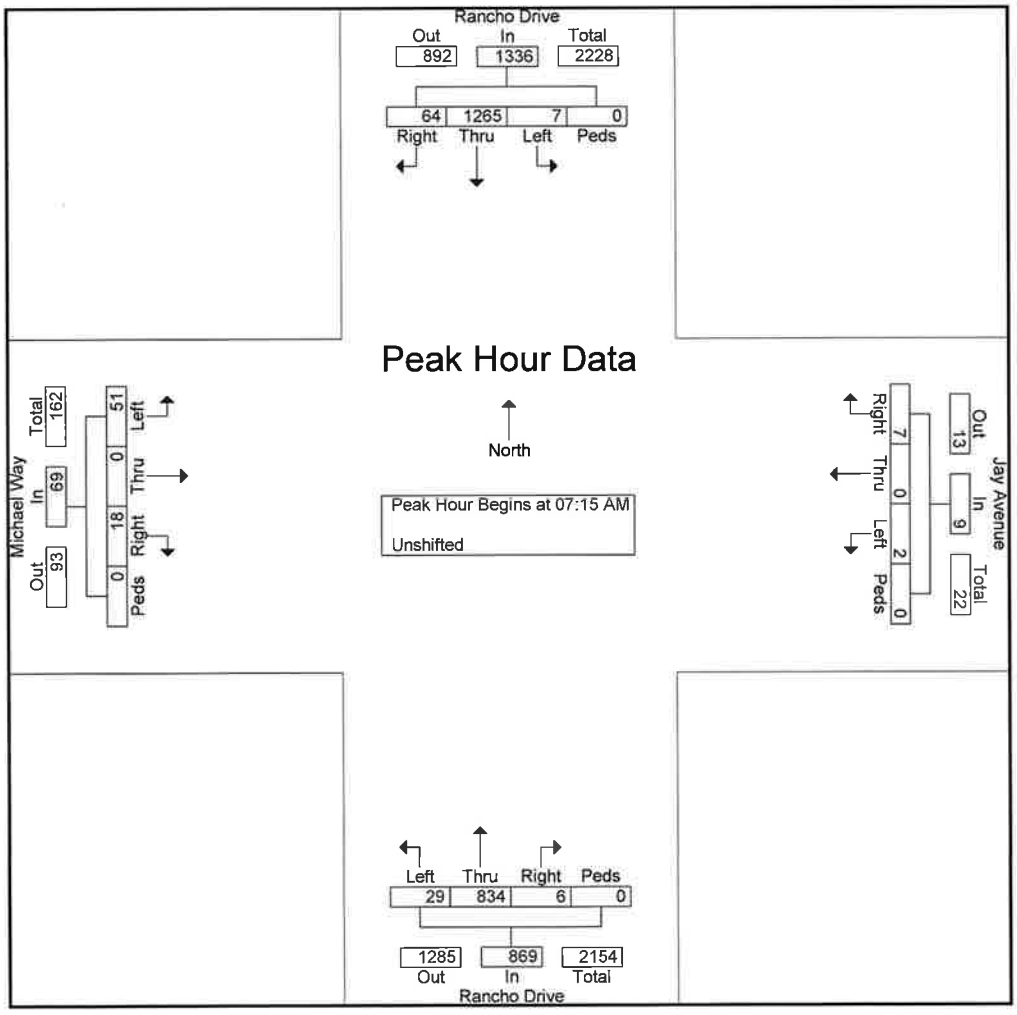
File Name : RanchoJay
Site Code : 00000000
Start Date : 2/6/2024
Page No : 2

	Rancho Drive From North					Jay Avenue From East					Rancho Drive From South					Michael Way From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	**22**	309	**3**	0	334	2	0	0	0	2	**3**	190	**8**	0	201	**7**	0	13	0	**20**	557
07:30 AM	12	331	0	0	343	0	0	**1**	0	1	0	224	5	0	229	7	0	13	0	20	593
07:45 AM	19	**344**	2	0	**365**	**4**	0	1	0	**5**	2	**225**	8	0	**235**	3	0	8	0	11	**616**
08:00 AM	11	281	2	0	294	1	0	0	0	1	1	195	8	0	204	1	0	**17**	0	18	517
Total Volume	64	1265	7	0	1336	7	0	2	0	9	6	834	29	0	869	18	0	51	0	69	2283
% App. Total	4.8	94.7	0.5	0		77.8	0	22.2	0		0.7	96	3.3	0		26.1	0	73.9	0		
PHF	.727	.919	.583	.000	.915	.438	.000	.500	.000	.450	.500	.927	.906	.000	.924	.643	.000	.750	.000	.863	.927



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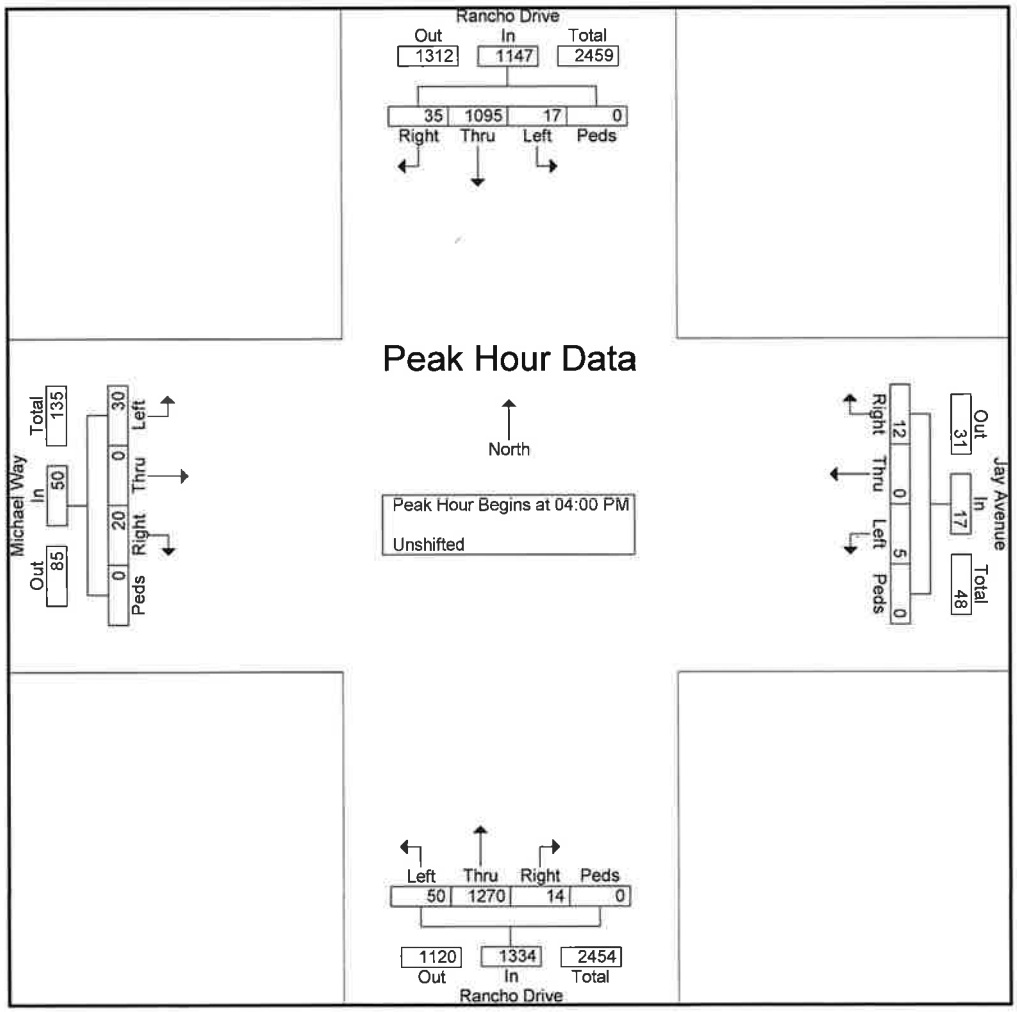
File Name : RanchoJay
Site Code : 00000000
Start Date : 2/6/2024
Page No : 3

	Rancho Drive From North					Jay Avenue From East					Rancho Drive From South					Michael Way From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	6	255	4	0	265	2	0	**2**	0	4	**4**	317	7	0	328	6	0	8	0	14	611
04:15 PM	**13**	279	3	0	295	3	0	0	0	3	3	289	11	0	303	**7**	0	**11**	0	**18**	619
04:30 PM	8	270	4	0	282	1	0	1	0	2	3	**349**	**17**	0	**369**	3	0	6	0	9	**662**
04:45 PM	8	**291**	**6**	0	**305**	**6**	0	2	0	**8**	4	315	15	0	334	4	0	5	0	9	656
Total Volume	35	1095	17	0	1147	12	0	5	0	17	14	1270	50	0	1334	20	0	30	0	50	2548
% App. Total	3.1	95.5	1.5	0		70.6	0	29.4	0		1	95.2	3.7	0		40	0	60	0		
PHF	.673	.941	.708	.000	.940	.500	.000	.625	.000	.531	.875	.910	.735	.000	.904	.714	.000	.682	.000	.694	.962



APPENDIX C

INTERSECTION LEVEL OF SERVICE

HCS Two-Way Stop-Control Report

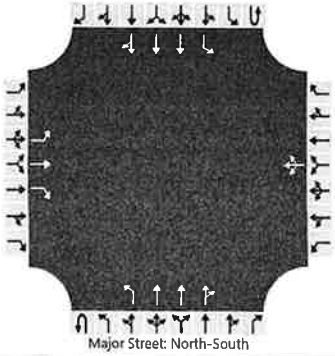
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2024
Time Analyzed	AM EXIST
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	JAY AVENUE AT RANCHO DRIVE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	RANCHO DRIVE
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		0	1	0	0	1	3	0	0	1	3	0
Configuration		L	T	R			LTR			L	T	TR		L	T	TR
Volume (veh/h)		51	0	18		2	0	7	0	29	834	6	0	7	1265	64
Percent Heavy Vehicles (%)		3	3	3		3	3	3	3	3			3	3		
Proportion Time Blocked		0.000	0.000	0.000		0.000	0.000	0.000		0.000				0.000		
Percent Grade (%)		0				0										
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		6.4	6.5	7.1		6.4	6.5	7.1		5.3				5.3		
Critical Headway (sec)		6.46	6.56	7.16		6.46	6.56	7.16		5.36				5.36		
Base Follow-Up Headway (sec)		3.8	4.0	3.9		3.8	4.0	3.9		3.1				3.1		
Follow-Up Headway (sec)		3.83	4.03	3.93		3.83	4.03	3.93		3.13				3.13		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		55	0	19			10			31				8		
Capacity, c (veh/h)		67	29	319			257			239				433		
v/c Ratio		0.82	0.00	0.06			0.04			0.13				0.02		
95% Queue Length, Q_{95} (veh)		3.8	0.0	0.2			0.1			0.4				0.1		
Control Delay (s/veh)		163.3	130.0	17.0			19.5			22.3				13.5		
Level of Service (LOS)		F	F	C			C			C				B		
Approach Delay (s/veh)		125.2				19.5				0.7				0.1		
Approach LOS		F				C				A				A		

HCS Two-Way Stop-Control Report

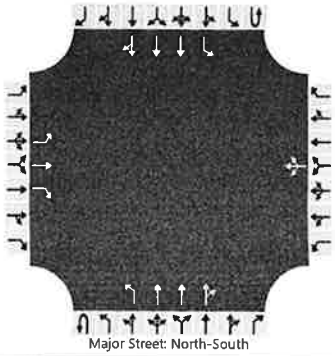
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2024
Time Analyzed	PM EXIST
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	JAY AVENUE AT RANCHO DRIVE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	RANCHO DRIVE
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		0	1	0	0	1	3	0	0	1	3	0
Configuration		L	T	R			LTR			L	T	TR		L	T	TR
Volume (veh/h)		30	0	20		5	0	12	0	50	1270	14	0	17	1095	35
Percent Heavy Vehicles (%)		3	3	3		3	3	3	3	3			3	3		
Proportion Time Blocked		0.000	0.000	0.000		0.000	0.000	0.000		0.000				0.000		
Percent Grade (%)		0				0										
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		6.4	6.5	7.1		6.4	6.5	7.1		5.3				5.3		
Critical Headway (sec)		6.46	6.56	7.16		6.46	6.56	7.16		5.36				5.36		
Base Follow-Up Headway (sec)		3.8	4.0	3.9		3.8	4.0	3.9		3.1				3.1		
Follow-Up Headway (sec)		3.83	4.03	3.93		3.83	4.03	3.93		3.13				3.13		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		31	0	21			18			52				18		
Capacity, c (veh/h)		60	18	385			129			318				266		
v/c Ratio		0.52	0.00	0.05			0.14			0.16				0.07		
95% Queue Length, Q_{95} (veh)		2.1	0.0	0.2			0.5			0.6				0.2		
Control Delay (s/veh)		116.3	207.1	14.9			37.4			18.5				19.5		
Level of Service (LOS)		F	F	B			E			C				C		
Approach Delay (s/veh)		75.7				37.4				0.7				0.3		
Approach LOS		F				E				A				A		

HCS Two-Way Stop-Control Report

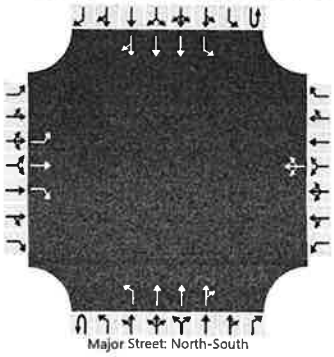
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2025
Time Analyzed	AM BACKGROUND
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	JAY AVENUE AT RANCHO DRIVE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	RANCHO DRIVE
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		0	1	0	0	1	3	0	0	1	3	0
Configuration		L	T	R			LTR			L	T	TR		L	T	TR
Volume (veh/h)		51	0	18		2	0	7	0	29	834	6	0	7	1265	64
Percent Heavy Vehicles (%)		3	3	3		3	3	3	3	3			3	3		
Proportion Time Blocked		0.000	0.000	0.000		0.000	0.000	0.000		0.000				0.000		
Percent Grade (%)		0				0										
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		6.4	6.5	7.1		6.4	6.5	7.1		5.3				5.3		
Critical Headway (sec)		6.46	6.56	7.16		6.46	6.56	7.16		5.36				5.36		
Base Follow-Up Headway (sec)		3.8	4.0	3.9		3.8	4.0	3.9		3.1				3.1		
Follow-Up Headway (sec)		3.83	4.03	3.93		3.83	4.03	3.93		3.13				3.13		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		55	0	19			10			31				8		
Capacity, c (veh/h)		67	29	319			257			239				433		
v/c Ratio		0.82	0.00	0.06			0.04			0.13				0.02		
95% Queue Length, Q_{95} (veh)		3.8	0.0	0.2			0.1			0.4				0.1		
Control Delay (s/veh)		163.3	130.0	17.0			19.5			22.3				13.5		
Level of Service (LOS)		F	F	C			C			C				B		
Approach Delay (s/veh)		125.2				19.5				0.7				0.1		
Approach LOS		F				C				A				A		

HCS Two-Way Stop-Control Report

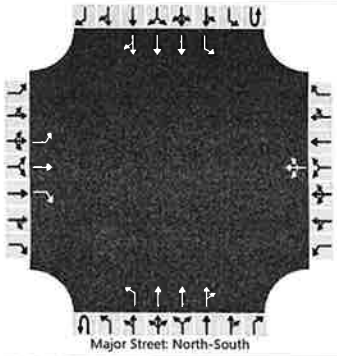
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2025
Time Analyzed	PM BACKGROUND
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	JAY AVENUE AT RANCHO DRIVE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	RANCHO DRIVE
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		0	1	0	0	1	3	0	0	1	3	0
Configuration		L	T	R			LTR			L	T	TR		L	T	TR
Volume (veh/h)		30	0	20		5	0	12	0	50	1270	14	0	17	1095	35
Percent Heavy Vehicles (%)		3	3	3		3	3	3	3	3			3	3		
Proportion Time Blocked		0.000	0.000	0.000		0.000	0.000	0.000		0.000				0.000		
Percent Grade (%)		0				0										
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		6.4	6.5	7.1		6.4	6.5	7.1		5.3				5.3		
Critical Headway (sec)		6.46	6.56	7.16		6.46	6.56	7.16		5.36				5.36		
Base Follow-Up Headway (sec)		3.8	4.0	3.9		3.8	4.0	3.9		3.1				3.1		
Follow-Up Headway (sec)		3.83	4.03	3.93		3.83	4.03	3.93		3.13				3.13		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		31	0	21			18			52				18		
Capacity, c (veh/h)		60	18	385			129			318				266		
v/c Ratio		0.52	0.00	0.05			0.14			0.16				0.07		
95% Queue Length, Q_{95} (veh)		2.1	0.0	0.2			0.5			0.6				0.2		
Control Delay (s/veh)		116.3	207.1	14.9			37.4			18.5				19.5		
Level of Service (LOS)		F	F	B			E			C				C		
Approach Delay (s/veh)		75.7				37.4				0.7				0.3		
Approach LOS		F				E				A				A		

HCS Two-Way Stop-Control Report

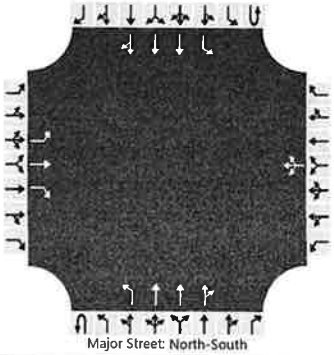
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2025
Time Analyzed	AM BACKGROUND W PROJ
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	JAY AVENUE AT RANCHO DRIVE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	RANCHO DRIVE
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		0	1	0	0	1	3	0	0	1	3	0
Configuration		L	T	R			LTR			L	T	TR		L	T	TR
Volume (veh/h)		51	0	18		2	0	7	0	54	854	6	0	22	1265	64
Percent Heavy Vehicles (%)		3	3	3		3	3	3	3	3			3	3		
Proportion Time Blocked		0.000	0.000	0.000		0.000	0.000	0.000		0.000				0.000		
Percent Grade (%)		0				0										
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		6.4	6.5	7.1		6.4	6.5	7.1		5.3				5.3		
Critical Headway (sec)		6.46	6.56	7.16		6.46	6.56	7.16		5.36				5.36		
Base Follow-Up Headway (sec)		3.8	4.0	3.9		3.8	4.0	3.9		3.1				3.1		
Follow-Up Headway (sec)		3.83	4.03	3.93		3.83	4.03	3.93		3.13				3.13		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		55	0	19			10			58				24		
Capacity, c (veh/h)		49	21	319			209			239				422		
v/c Ratio		1.12	0.00	0.06			0.05			0.24				0.06		
95% Queue Length, Q_{95} (veh)		4.9	0.0	0.2			0.1			0.9				0.2		
Control Delay (s/veh)		298.3	180.4	17.0			23.1			24.8				14.0		
Level of Service (LOS)		F	F	C			C			C				B		
Approach Delay (s/veh)		224.9				23.1				1.5				0.2		
Approach LOS		F				C				A				A		

HCS Two-Way Stop-Control Report

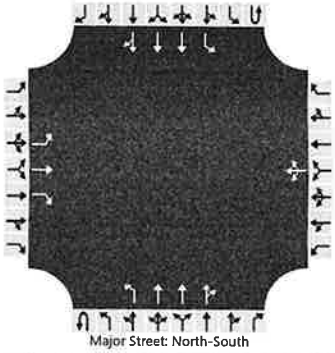
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2025
Time Analyzed	PM BACKGROUND W PROJ
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	JAY AVENUE AT RANCHO DRIVE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	RANCHO DRIVE
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		1	1	1		0	1	0	0	1	3	0	0	1	3	0
Configuration		L	T	R			LTR			L	T	TR		L	T	TR
Volume (veh/h)		30	0	20		5	0	12	0	70	1290	14	0	36	1095	35
Percent Heavy Vehicles (%)		3	3	3		3	3	3	3	3			3	3		
Proportion Time Blocked		0.000	0.000	0.000		0.000	0.000	0.000		0.000				0.000		
Percent Grade (%)		0				0										
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		6.4	6.5	7.1		6.4	6.5	7.1		5.3				5.3		
Critical Headway (sec)		6.46	6.56	7.16		6.46	6.56	7.16		5.36				5.36		
Base Follow-Up Headway (sec)		3.8	4.0	3.9		3.8	4.0	3.9		3.1				3.1		
Follow-Up Headway (sec)		3.83	4.03	3.93		3.83	4.03	3.93		3.13				3.13		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		31	0	21			18			73				38		
Capacity, c (veh/h)		45	13	385			101			318				259		
v/c Ratio		0.70	0.00	0.05			0.18			0.23				0.14		
95% Queue Length, Q_{95} (veh)		2.7	0.0	0.2			0.6			0.9				0.5		
Control Delay (s/veh)		189.6	284.0	14.9			48.2			19.6				21.2		
Level of Service (LOS)		F	F	B			E			C				C		
Approach Delay (s/veh)		119.7				48.2				1.0				0.7		
Approach LOS		F				E				A				A		

APPENDIX D

DRIVEWAY LEVEL OF SERVICE ANALYSIS

HCS Two-Way Stop-Control Report

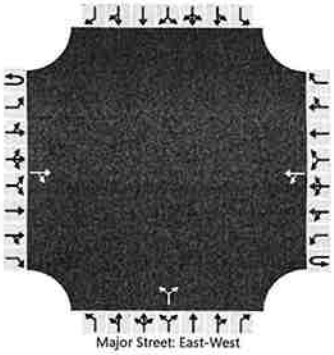
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2024
Time Analyzed	AM
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	DRIVEWAY ON JAY AVENUE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	DRIVEWAY
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			13	15		0	9			0		1				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						0					1					
Capacity, c (veh/h)						1576					1052					
v/c Ratio						0.00					0.00					
95% Queue Length, Q_{95} (veh)						0.0					0.0					
Control Delay (s/veh)						7.3	0.0				8.4					
Level of Service (LOS)						A	A				A					
Approach Delay (s/veh)					0.0				8.4							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report

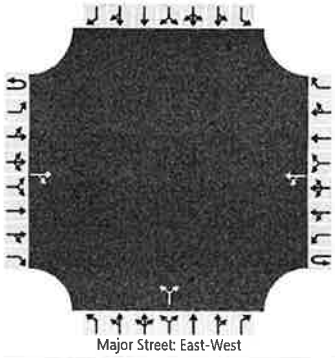
General Information

Analyst	TTE
Agency/Co.	LOCHSA
Date Performed	2/11/2024
Analysis Year	2024
Time Analyzed	PM
Intersection Orientation	East-West
Project Description	

Site Information

Intersection	DRIVEWAY ON JAY AVENUE
Jurisdiction	NDOT
East/West Street	JAY AVENUE
North/South Street	DRIVEWAY
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			31	19		0	17			0		1				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						0					1					
Capacity, c (veh/h)						1544					1023					
v/c Ratio						0.00					0.00					
95% Queue Length, Q_{95} (veh)						0.0					0.0					
Control Delay (s/veh)						7.3	0.0				8.5					
Level of Service (LOS)						A	A				A					
Approach Delay (s/veh)					0.0				8.5							
Approach LOS					A				A							

APPENDIX E

LEFT-TURN STORAGE ANALYSIS

THREE MINUTE STORAGE REQUIREMENTS ANALYSIS

JAY AVENUE AT RANCHO DRIVE - NORTH LEG
AM

EXISTING VOLUME (VPH) = 0

PROJECT VOLUME (VPH) = 22

TOTAL VOLUME (VPH) = 22

REQUIRED STORAGE = (TOTAL VPH) * (3 MIN) * (25 FT/VEH) / (60 MIN/HR)

REQUIRED STORAGE LENGTH = 27.5 FEET

THREE MINUTE STORAGE REQUIREMENTS ANALYSIS

JAY AVENUE AT RANCHO DRIVE - NORTH LEG
PM

EXISTING VOLUME (VPH) = 0

PROJECT VOLUME (VPH) = 36

TOTAL VOLUME (VPH) = 36

REQUIRED STORAGE = (TOTAL VPH) * (3 MIN) * (25 FT/VEH) / (60 MIN/HR)

REQUIRED STORAGE LENGTH = 45 FEET

THREE MINUTE STORAGE REQUIREMENTS ANALYSIS

JAY AVENUE AT RANCHO DRIVE - SOUTH LEG
AM

EXISTING VOLUME (VPH) = 0

PROJECT VOLUME (VPH) = 54

TOTAL VOLUME (VPH) = 54

REQUIRED STORAGE = (TOTAL VPH) * (3 MIN) * (25 FT/VEH) / (60 MIN/HR)

REQUIRED STORAGE LENGTH = 67.5 FEET

THREE MINUTE STORAGE REQUIREMENTS ANALYSIS

JAY AVENUE AT RANCHO DRIVE - SOUTH LEG
PM

EXISTING VOLUME (VPH) = 0

PROJECT VOLUME (VPH) = 70

TOTAL VOLUME (VPH) = 70

REQUIRED STORAGE = (TOTAL VPH) * (3 MIN) * (25 FT/VEH) / (60 MIN/HR)

REQUIRED STORAGE LENGTH = 87.5 FEET

APPENDIX F

ACCIDENT ANALYSIS

JAY AVENUE AT RANCHO DRIVE

INCREASE IN ANNUAL ACCIDENT ATTRIBUTE TO PROJECT

FORMULA

#1 ((EXISTING PEAK HR VOL THRU INTERSECTION/PEAK HR % OF ADT)*365)*3=TOT VEH ENTERING INTERSECTION FOR 3 Y
#2 (ACC. OVER 3 YRS./TOT VEH ENTERING INTERSECTION)*1000000= ACC./MILLION ENTERING VEH. (RATE OF ACCIDENTS)
#3 (PROJECT PEAK HR VOL/PEAK HR. % OF ADT)*365= PROJECT ANNUAL VEH. THRU INTERSECTION
#4 (PROJECT ANNUAL VEH./1000000)* RATE OF MILLION ENTERING VEH. (MEV)= # OF ACCIDENTS ATTRIBUTABLE TO PROJ.

EXISTING PEAK HR. % OF ADT=	0.1
PROJECT PEAK HR. % OF ADT=	0.16
EXISTING INTERSECTION VOL. =	2548
PROJECT INTERSECTION VOL. =	56
ACCIDENTS (3 YRS.) =	7

ACCIDENT RATE (ACCIDENTS PER MEV) = **0.2509**
INCREASE IN ACCIDENTS ATTRIBUTABLE TO PROJECT **0.0321** ACC. PER YEAR

MEV = MILLIONS ENTERING VEHICLES

JAY AVENUE AT RANCHO DRIVE - 7

OBJECTID	Crash Seve	County	Crash Date	Crash Year	Crash Time	Primary Str	Distance	Dir	Secondary	Weather	Fatalities	Injured	Property D	Injury Type	Crash Type	Total Vehic
1870584	PROPERTY	CLARK	2/13/2020,	2,020	########	SR599S	No Data	AT INT	MICHAEL V	CLEAR	No Data	No Data	PDO	No Data	ANGLE	2
1874536	INJURY CR/	CLARK	3/14/2020,	2,020	########	SR599S	No Data	AT INT	MICHAEL V	CLEAR	No Data	1	No Data	C	ANGLE	3
1882279	INJURY CR/	CLARK	6/29/2020,	2,020	########	SR599S	No Data	AT INT	MICHAEL V	CLEAR	No Data	2	No Data	C	ANGLE	2
1885197	PROPERTY	CLARK	7/28/2020,	2,020	########	SR599S	250	N	MICHAEL V	CLEAR	No Data	No Data	PDO	No Data	SIDESWIPE	2
1892102	INJURY CR/	CLARK	9/30/2020,	2,020	########	SR599N	144	N	JAY AVE	CLEAR	No Data	1	No Data	C	ANGLE	2
1894849	PROPERTY	CLARK	10/24/202(	2,020	########	SR599N	No Data	AT INT	JAY AVE	CLEAR	No Data	No Data	PDO	No Data	ANGLE	2
1896286	PROPERTY	CLARK	11/5/2020,	2,020	########	N MICHAEI	150	S	SR599S	CLEAR	No Data	No Data	PDO	No Data	ANGLE	2