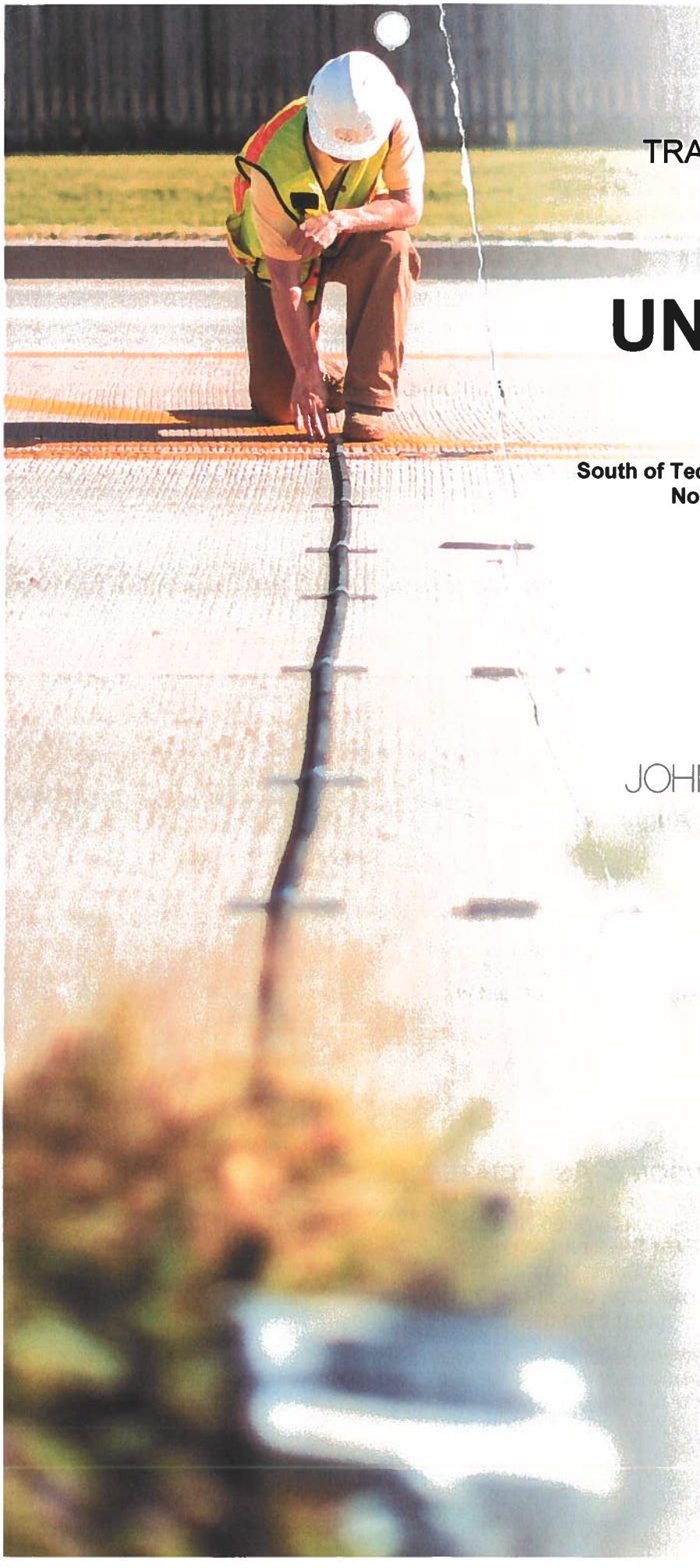

TRAFFIC IMPACT ANALYSIS

To Serve A

UNP DAYCARE

located

South of Tecumseh Rd. & east of 24th Ave. N.W.
Norman, Cleveland County, Oklahoma

JOHNSON & ASSOCIATES

Prepared by:

JOHNSON & ASSOCIATES
CERTIFICATE OF AUTHORIZATION #1484
EXPIRATION DATE: 06-30-2023
1 EAST SHERIDAN AVENUE
SUITE 200
OKLAHOMA CITY, OKLAHOMA 73104
(405) 235-8075

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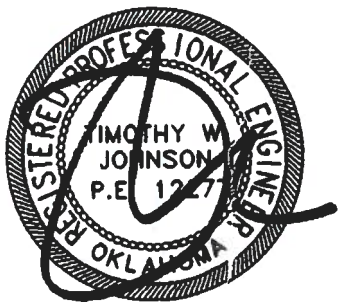


August 27, 2021

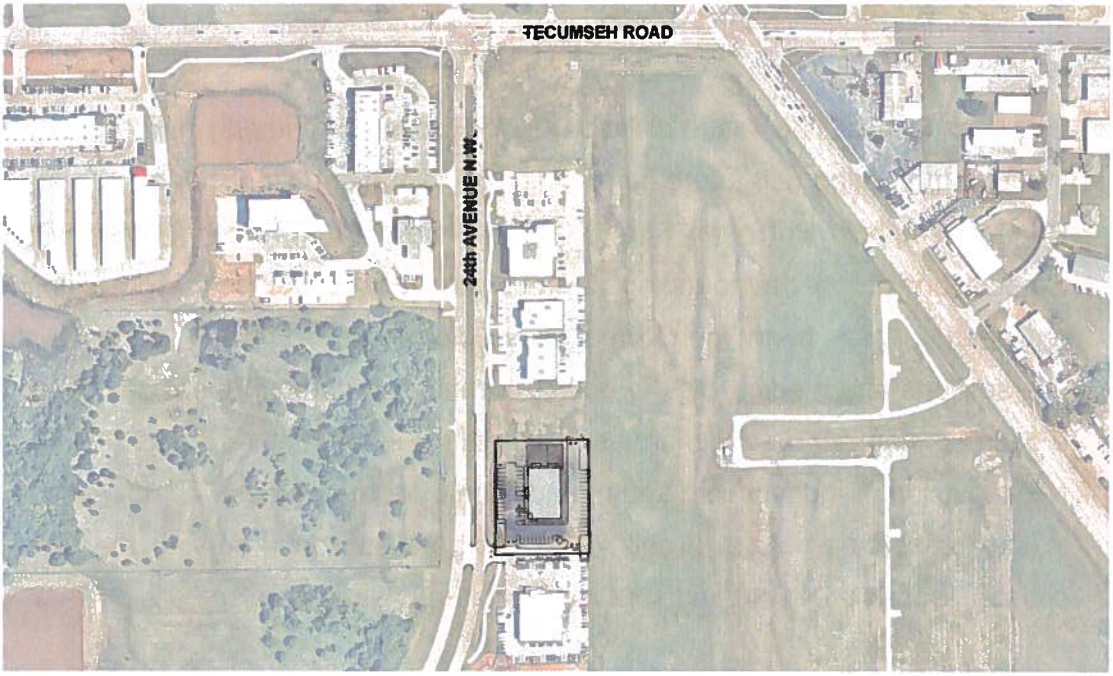
Prepared for:
Crosslands Companies
5750 DTC Parkway #145
Greenwood Village, CO 80111

Prepared by:

JOHNSON & ASSOCIATES
CERTIFICATE OF AUTHORIZATION #1484
EXPIRATION DATE: 06-30-2023
1 EAST SHERIDAN AVENUE
SUITE 200
OKLAHOMA CITY, OKLAHOMA 73104
(405) 235-8075

EXECUTIVE SUMMARY

Johnson & Associates has been retained to provide a traffic study for the proposed UNP Daycare development located south of Tecumseh Road and east of 24th Avenue N.W. This proposed development will share an access drive onto 24th Avenue with Premiere Pediatrics to the south. This report analyzes this shared access and the impact of the proposed daycare on existing traffic conditions at the intersection with 24th Avenue N.W.



The results of the analyses in this report show that the intersection at the existing access drive operates at a Level-of-Service (LOS) "A" currently serving Premiere Pediatrics and will continue to do so after the construction of the proposed daycare facility during both the AM and PM peak hours. The analyses show longest delays for vehicles leaving the site turning left during the PM peak hour currently operating at a LOS "C" and a delay of 15.4 seconds which will remain at a LOS "C" after the proposed development and increase in delay slightly to 18.7 seconds.

Given the minor impact of the proposed development on the fully developed 24th Avenue N.W., Johnson & Associates recommends the project be allowed to proceed without any street infrastructure improvements.

PROJECT SCOPE

Johnson & Associates has been retained to provide a Traffic Impact Analysis (TIA) for UNP Daycare located approximately 1200 feet south of Tecumseh Road on the east side of 24th Avenue N.W. in Norman. As it stands the site is currently undeveloped and will include a 10,000 square feet of daycare facility. Access to the site will be obtained through an existing shared access drive that currently serves Premiere Pediatrics to the south. **Figure 1** shows the site location, surrounding streets, and the access drive.

24th Avenue N.W. is a 4-lane divided, 45 MPH roadway primarily utilized to convey traffic from existing and future surrounding development either north to Tecumseh Road or south to Robinson Street. 24th Avenue N.W. was constructed with the expectation of the surrounding area being fully developed, and significant engineering has been performed over the years to place traffic signals, intersections and median cuts to optimize traffic flow through the area. Given this broad planning approach, changes to the street infrastructure along 24th Avenue N.W., outside of median cuts and the addition of left turn lanes, are not anticipated in the foreseeable future. When the existing access drive serving the site was constructed a median cut and southbound left turn lane was also built.

This report will analyze the intersection of this access drive with 24th Avenue N.W. including analyses for the existing condition and conditions after the proposed daycare has been constructed.

TRAFFIC COUNTS

Recent 24-hour street counts for the area were obtained from the Association of Central Oklahoma Governments (ACOG). Traffic counts from January of this year just south of the proposed site indicate that 24th Avenue N.W. carries approximately 9,919 vehicles per day. The existing traffic counts can be found in the **Appendix**.

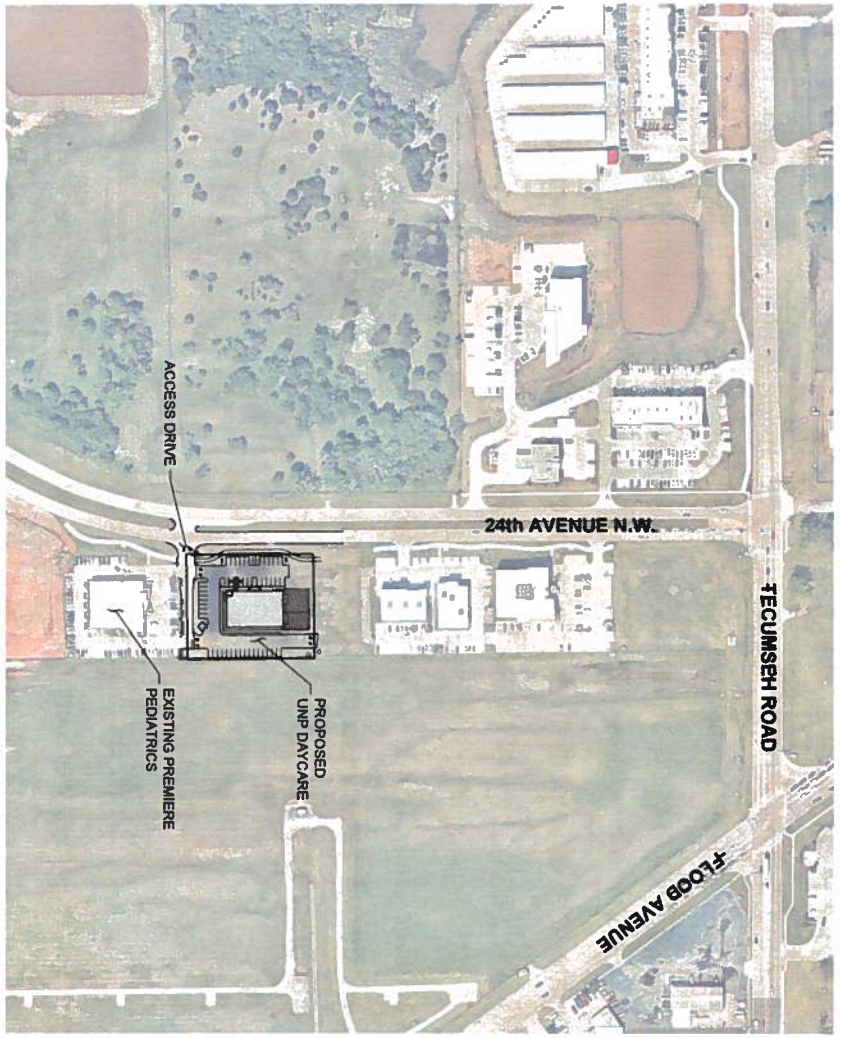


FIGURE 1

UNP DAYCARE

NORMAN, CLEVELAND COUNTY, OKLAHOMA

GENERAL LOCATION MAP

Johnson & Associates
1E. Sheridan Ave., Suite 200
Oklahoma City, OK 73104
ENGINEERS · SURVEYORS · PLANNERS

REVISIONS		
NO.	DESCRIPTION	DATE

UNP DAYCARE

TRIP GENERATION

To determine the amount of traffic generated by the proposed development and the existing Premiere Pediatrics to the south, the nationally accepted TRIP Generation Report, published by the Institute of Transportation Engineers (ITE) was utilized. The ITE Report is a compilation of studies conducted to project the expected number of trips that various land uses might be expected to generate. A TRIP, as defined by the report, is "a single or one-direction vehicle movement with either the origin or the destination (exiting or entering) inside a study site." One TRIP End is equal to one TRIP. For TRIP generation purposes, total TRIP Ends for a land use over a given period of time is the total of all trips entering plus all trips exiting a site during that designated time. The land uses determined to most accurately simulate the development is Daycare Center (565), and Medical / Dental Office (720). **Table 1** shows that the existing Premiere Pediatrics likely generates a total of 29 trips during AM peak hour and 44 trips during the PM peak hour while the Average Daily Traffic (ADT) generated is 441. The table also shows the proposed daycare will generate a total of **122 *trips during AM peak hour and 123 trips during the PM peak hour while the Average Daily Traffic (ADT) generated is 741***.

TRIP DISTRIBUTION

After the above traffic volumes were calculated they were then distributed onto the existing street system with assumptions made as to the direction that the vehicles would approach and leave the site. These assumptions are based on the existing traffic patterns of the adjacent street system and likely routes traffic will take in and out of the area. Given the simple nature of the access drive's intersection with 24th Avenue N.W. and the proximity of surrounding street and development, it was assumed the traffic would split evenly distributing north and south. This distribution was applied first to the existing Premiere Pediatrics facility and then to the proposed daycare traffic. The combination of these values with the existing traffic from the ACOG counts can be seen in the analyzed scenarios in the **Appendix**.

NORMAN DAYCARE CENTER
TRIP GENERATION
8/26/2021

Description, ITE Code (Unit Type) Trip Generation Details	Number of Units	Trip Generation Rates			Distribution Percentages					Total Trips			Trip Distribution					
		Weekday	AM	PM	Pass-By	AM Entering	AM Exiting	PM Entering	PM Exiting	Daily	AM Peak Hour	PM Peak Hour	AM Entering	AM Exiting	AM Pass-By	PM Entering	PM Exiting	PM Pass-By
EXISTING PEDIATRIC DEVELOPMENT																		
Medical / Dental Office 720 (S F) AM & PM Peak of Adjacent Street	12.200	36.13	2.39	3.57	NA	79%	21%	28%	72%	441	29	44	23	6	NA	12	32	NA
PROPOSED DAYCARE DEVELOPMENT																		
Daycare Center 565 (S F) AM & PM Peak of Adjacent Street	10.000	74.06	12.18	12.34	NA	53%	47%	47%	53%	741	122	123	65	57	NA	58	65	NA

TABLE 1

INTERSECTION CAPACITY ANALYSES

Capacity analyses were conducted on the adjacent access drive for both the AM and PM peak hours utilizing Synchro 11 Traffic Signal Software. The analyses were conducted to determine how the intersections currently operated and how they will operate after the proposed daycare is fully operational.

In order to qualitatively compare and measure the effectiveness of intersections the nationally accepted Level-Of-Service (LOS) rating system was employed. This rating system utilizes many factors such as speed, traffic interruptions, reaction time and queue lengths to determine delays and saturation experienced at an intersection. The two nationally accepted methods of calculating LOS for an intersection are the Highway Capacity Manual (HCM) method, primarily used for signalized intersections and all-way stop unsignalized intersections, and the Intersection Capacity Utilization (ICU) method, primarily used for intersections with driveways and minor streets where the major street is not required to stop.

The ICU method sums the amount of time required to serve all movements at saturation for a given cycle length and divides by that reference cycle length to give a percentage of the full capacity for the intersection. This places the intersection in one of eight categories from "A" to "H" with a LOS "A" representing the best operating conditions and LOS "H" representing the worst operating conditions. The ICU criteria for LOS ranking is listed in the following table.

ICU INTERSECTION LOS CRITERIA	
Level-of-Service	Percent of Full Capacity
A	≤55%
B	>55%-64%
C	>64%-73%
D	>73%-82%
E	>82%-91%
F	>91%-100%
G	>100%-109%
H	>109%

Utilizing the ICU method for the access drive the analyses show that the adjacent intersection with 24th Avenue N.W. currently operates at a LOS "A" for both the AM and PM peak hours with the longest movement delay being the PM exiting westbound left turn at 15.4 seconds and a LOS "C". After the proposed daycare development, the intersection as a whole continues to operate at a LOS "A" for both the AM & PM peak hours while the PM westbound left turn increases in delay to 18.7 seconds but remaining at a LOS "C". Details of the analyses for all the scenarios are included in the **Appendix**.

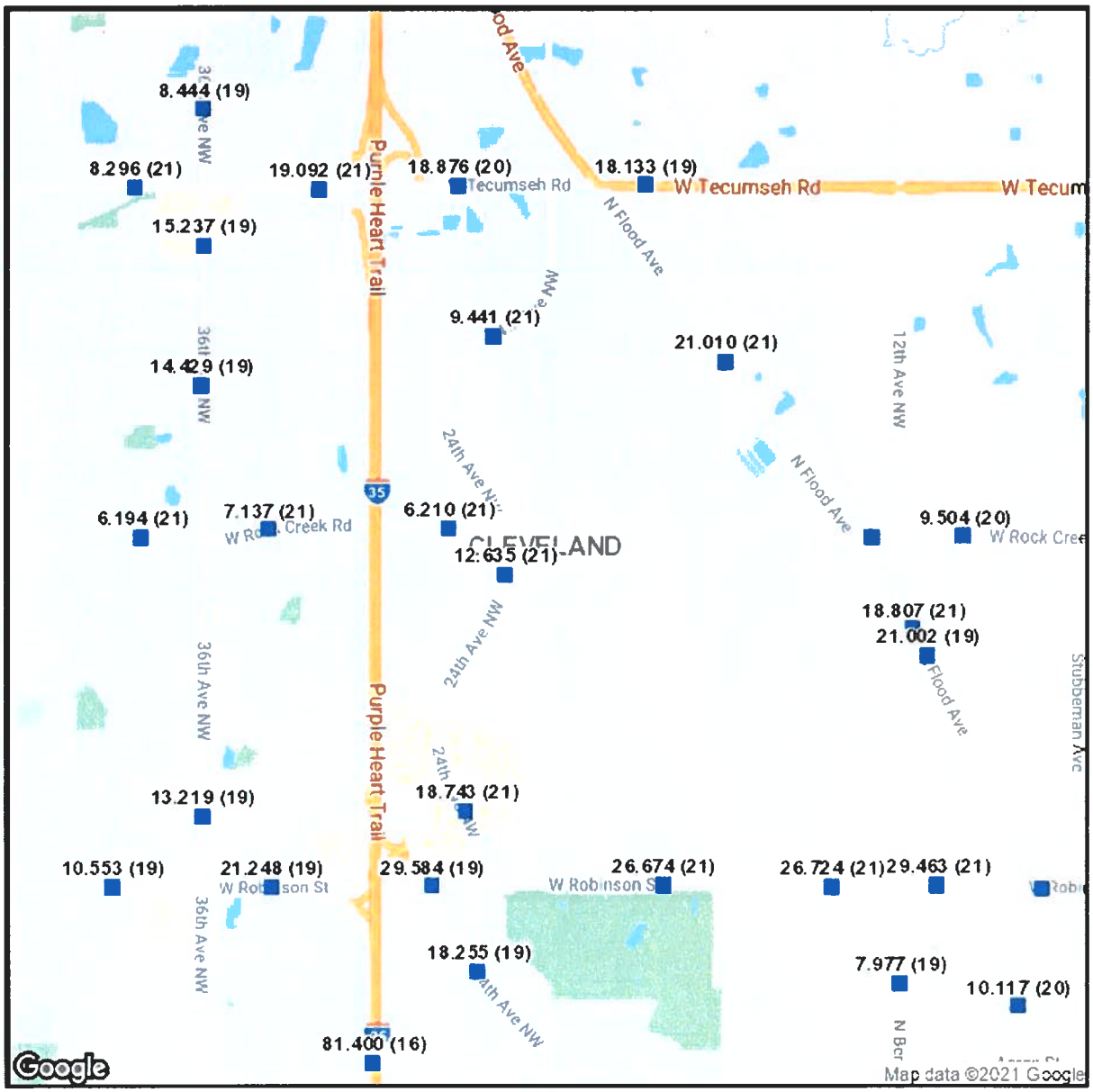
CONCLUSIONS

It is anticipated that the access for the proposed development will continue to operate similar to any other development in commercial areas that gain access to a major arterial. Additionally, the existing medical facility and the proposed daycare pair well together utilizing the same access point do to their differing peak times of traffic to each facility. The analyses in this report take this into consideration and analyze the worst case which is the actual traffic generated from these facilities during the adjacent street peak time. These the analyses show that the intersection at the existing access drive and 24th Avenue N.W. operates at a Level-of-Service (LOS) "A" currently serving Premiere Pediatrics and will continue to do so after the construction of the proposed daycare facility during both the AM and PM peak hours. The analyses show longest delays for vehicles leaving the site turning left during the PM peak hour currently operating at a LOS "C" and a delay of 15.4 seconds and will remain at a LOS "C" after the proposed development and increase in delay slightly to 18.7 seconds.

Given the minor impact of the proposed development on the fully developed 24th Avenue N.W., Johnson & Associates recommends the project be allowed to proceed without any street infrastructure improvements.

Appendix

Existing Traffic Counts


8.444 (19)
8.296 (21)
19.092 (21)
18.876 (20)
Tecumseh Rd
18.133 (19)
W Tecumseh Rd
W Tecum
15.237 (19)
Purple Heart Trail
N Flood Ave
9.441 (21)
21.010 (21)
14.429 (19)
12th Ave NW
24th Ave NW
N Flood Ave
6.194 (21)
7.137 (21)
6.210 (21)
9.504 (20)
W Rock Creek Rd
CLEVELAND
12.635 (21)
18.807 (21)
21.002 (19)
36th Ave NW
24th Ave NW
Flood Ave
Stubbeman Ave
Purple Heart Trail
13.219 (19)
18.743 (21)
10.553 (19)
21.248 (19)
29.584 (19)
26.674 (21)
W Robinson St
26.724 (21)
29.463 (21)
36th Ave NW
18.255 (19)
7.977 (19)
10.117 (20)
81.400 (16)
Google
Map data ©2021 Google
0
3000
6000
Feet
N
TCDS Locations
Short
Continuous
WIM
Located Short
Located Continuous
Located WIM
Inactive Location
acog
8/26/2021

Association of Central Oklahoma Governments

acog

MS2

Transportation Data Management System

Volume Count Report

LOCATION INFO	
Location ID	52500-5001
Type	LINK
Fnct'l Class	Minor Arterial
Located On	24TH AVE NW
From Road	TECUMSEH RD
To Road	W ROCK CREEK RD
Direction	2-WAY
County	Cleveland
Community	Norman
MPO ID	
HPMS ID	
Agency	ACOG OK

COUNT DATA INFO	
Count Status	Accepted
Start Date	Thu 1/28/2021
End Date	Fri 1/29/2021
Start Time	11:00:00 AM
End Time	11:00:00 AM
Direction	
Notes	
Station	5001
Study	
Speed Limit	
Description	
Sensor Type	
Source	
Latitude,Longitude	

INTERVAL:60-MIN	
Time	Hourly Count
0:00-1:00	31
1:00-2:00	17
2:00-3:00	18
3:00-4:00	19
4:00-5:00	21
5:00-6:00	47
6:00-7:00	164
7:00-8:00	530
8:00-9:00	706
9:00-10:00	672
10:00-11:00	753
11:00-12:00	729
12:00-13:00	850
13:00-14:00	723
14:00-15:00	726
15:00-16:00	762
16:00-17:00	781
17:00-18:00	855
18:00-19:00	604
19:00-20:00	394
20:00-21:00	250
21:00-22:00	160
22:00-23:00	61
23:00-24:00	46
Total	9,919
AADT	9,919
AM Peak	10:00-11:00 753
PM Peak	17:00-18:00 855

Existing Access Drive Analyses

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	3	353	12	11	353
Future Volume (Veh/h)	3	3	353	12	11	353
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	384	13	12	384
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	606	198			397	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606	198			397	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			99	
cM capacity (veh/h)	424	809			1158	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	3	3	256	141	12	192	192
Volume Left	3	0	0	0	12	0	0
Volume Right	0	3	0	13	0	0	0
cSH	424	809	1700	1700	1158	1700	1700
Volume to Capacity	0.01	0.00	0.15	0.08	0.01	0.11	0.11
Queue Length 95th (ft)	1	0	0	0	1	0	0
Control Delay (s)	13.6	9.5	0.0	0.0	8.1	0.0	0.0
Lane LOS	B	A			A		
Approach Delay (s)	11.5		0.0		0.2		
Approach LOS	B						

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	16	428	6	6	427
Future Volume (Veh/h)	16	16	428	6	6	427
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)	17	17	465	7	7	464
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	714	236			472	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	714	236			472	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			99	
cM capacity (veh/h)	363	766			1086	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	17	17	310	162	7	232	232
Volume Left	17	0	0	0	7	0	0
Volume Right	0	17	0	7	0	0	0
cSH	363	766	1700	1700	1086	1700	1700
Volume to Capacity	0.05	0.02	0.18	0.10	0.01	0.14	0.14
Queue Length 95th (ft)	4	2	0	0	0	0	0
Control Delay (s)	15.4	9.8	0.0	0.0	8.3	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	12.6		0.0		0.1		
Approach LOS	B						

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		

Future Access Drive Analyses

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	32	31	353	44	44	353
Future Volume (Veh/h)	32	31	353	44	44	353
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)	35	34	384	48	48	384
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	696	216			432	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	696	216			432	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	96			96	
cM capacity (veh/h)	360	789			1124	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	35	34	256	176	48	192	192
Volume Left	35	0	0	0	48	0	0
Volume Right	0	34	0	48	0	0	0
cSH	360	789	1700	1700	1124	1700	1700
Volume to Capacity	0.10	0.04	0.15	0.10	0.04	0.11	0.11
Queue Length 95th (ft)	8	3	0	0	3	0	0
Control Delay (s)	16.1	9.8	0.0	0.0	8.3	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	13.0		0.0		0.9		
Approach LOS	B						

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	49	48	428	35	35	427
Future Volume (Veh/h)	49	48	428	35	35	427
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)	53	52	465	38	38	464
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	792	252			503	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	792	252			503	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	93			96	
cM capacity (veh/h)	315	748			1058	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	53	52	310	193	38	232	232
Volume Left	53	0	0	0	38	0	0
Volume Right	0	52	0	38	0	0	0
cSH	315	748	1700	1700	1058	1700	1700
Volume to Capacity	0.17	0.07	0.18	0.11	0.04	0.14	0.14
Queue Length 95th (ft)	15	6	0	0	3	0	0
Control Delay (s)	18.7	10.2	0.0	0.0	8.5	0.0	0.0
Lane LOS	C	B			A		
Approach Delay (s)	14.5		0.0		0.6		
Approach LOS	B						

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)	15		