

# TECHNICAL MEMORANDUM

Project: Next Generation Daycare  
Date: September 1, 2023  
By: Roger Dickinson, PE  
Subject: Traffic Impact Assessment



## Introduction

Next Generation Daycare proposes to convert an existing single-family residence located at 150 Old Stage Rd in Georgia to provide a licensed daycare (hereafter referred to as the Project) with a maximum capacity of 16 children.

Access to the Project will be via the existing two driveways onto the west side of Old Stage Rd. The northerly driveway will serve as the designated entrance and the southerly driveway the designated exit. This will establish a counter-clockwise circulation pattern in the parking area between the two driveways.

This traffic impact assessment (TIA) examines existing and future traffic congestion and safety conditions on the adjacent highway network in the vicinity of this Project, and analyzes the probable impacts that this Project will have on those conditions. The results of the requested analyses are presented in the following sections.

## Background Traffic Volumes

A review of VTrans' Transportation Data Management System determined that no recent traffic counts have been performed in the vicinity of the Project. Consequently, this office performed weekday turning movement counts at the Ballard Rd / Old Stage Rd intersection during the morning and afternoon peak periods in order to provide the necessary background traffic volumes. Those counts were performed on Thursday, August 24, 2023 from 7-9 am and 4-6 pm. The count results are included in Appendix A.

The observed peak hour volumes from the above turning movement counts were adjusted to estimated design hour volumes (DHV) using comparable August 2022 traffic volumes from Continuous Count Station F029 located on US Route 7 in Georgia. The DHV, by definition, is the 30<sup>th</sup> highest hour of traffic volumes in a year, and is used in the design of streets and intersections. The resulting DHV adjustment factor increased the observed afternoon peak hour volumes by 2.4%.

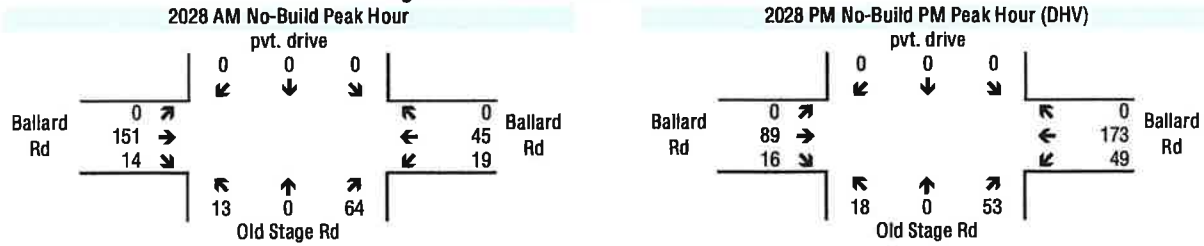
The observed peak hour volumes were also adjusted to reflect background traffic growth from 2023 to 2028. The background traffic growth rate is estimated by VTrans to equal 2.1% during that 5-year period.<sup>1</sup>

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<sup>1</sup> Continuous Traffic Counter Report (Redbook), Vermont Agency of Transportation, June 2023

The resulting projected 2028 peak hour volumes (representing the No-Build analysis scenario) are shown in Figure 1.

Figure 1 – No-Build Peak Hour Volumes



### Project-Generated Traffic

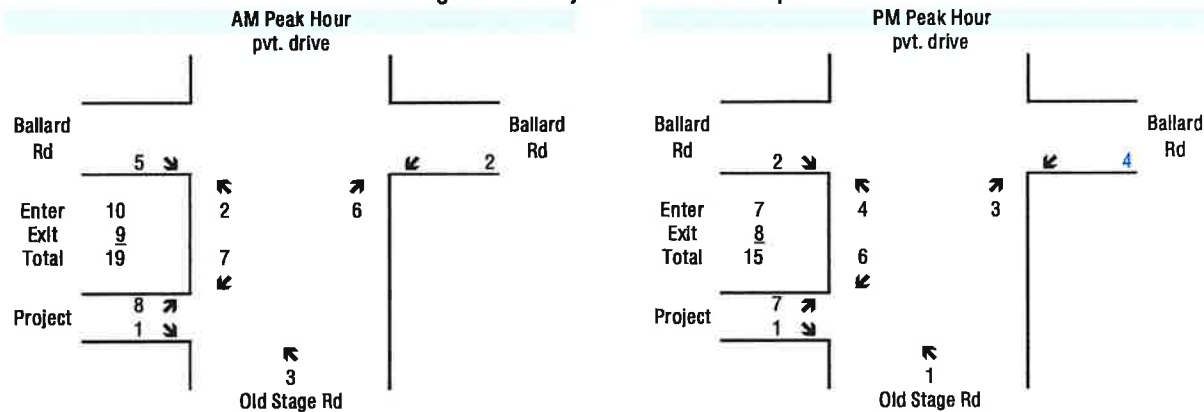
The weekday peak hour vehicular trip generation of the Project was estimated using published Institute of Transportation Engineers (ITE) trip generation rates.<sup>2</sup> ITE land-use category #565 – Day Care Center was used with the number of students as the determinant. Table 1 presents the estimated weekday peak hour trip generation of this Project.

Table 1 - Weekday Trip Generation

AM Peak Hour (vte/hr)			PM Peak Hour (vte/hr)		
Enter	Exit	Total	Enter	Exit	Total
10	9	19	7	8	15

The directional distributions of peak hour project-generated trips were estimated using existing traffic patterns at the Ballard Rd / Old Stage Rd intersection. The resulting peak hour project-generated trips are shown in Figure 2.

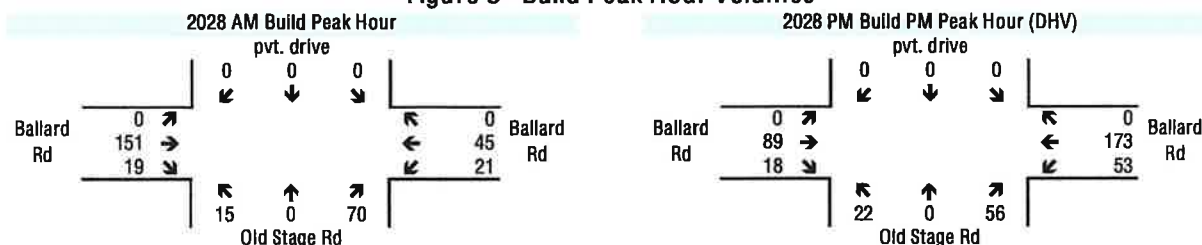
Figure 2 - Project Peak Hour Trips



<sup>2</sup> Trip Generation, Institute of Transportation Engineers, 11<sup>th</sup> Edition

Combining the project-generated trips with the no-build volumes provides the 2028 Build design hour volumes shown in Figure 3.

Figure 3 - Build Peak Hour Volumes



### Traffic Congestion

Levels of service (LOS) at intersections are determined by the average control delay; measured in seconds per vehicle. The methodology for analyzing LOS is established by the *Highway Capacity Manual (HCM)*.<sup>3</sup> Table 2 summarizes the LOS delay thresholds for unsignalized intersections.

Table 2 – Unsignalized Intersection Level of Service Criteria

LOS	Avg. Delay*	LOS	Avg. Delay*
A	≤10	D	≤35
B	≤15	E	≤50
C	≤25	F	>50

\* seconds per vehicle

In Vermont, VTrans' Level of Service Policy<sup>4</sup> sets LOS D as the desired design standard for two-way stop controlled (unsignalized) intersections having greater than 100 vph approach volume on a single-lane side street approach or greater than 150 vph approach volume on a two-lane side street approach. There is no level of service standard for unsignalized intersections with lower than the above indicated side street volume thresholds. Existing and future peak hour volumes at the existing Old Stage Rd at its intersection with Ballard Rd do not meet the 100 vph threshold for a single-lane side street approach. There is, therefore, no level of service standard to be applied at this low-volume intersection.

Table 3 presents the results of intersection capacity analyses performed at the Ballard Rd / Old Stage Rd intersection. All analyses were performed using *Synchro v. 11* software. Detailed analysis worksheets are enclosed in Appendix B.

The intersection capacity analyses results show minimal traffic congestion and delays. Additionally, comparing the results of the No-Build and Build analyses indicates that the small amount of additional traffic generated by this Project will have a minimal impact on future traffic congestion conditions.

<sup>3</sup> *Highway Capacity Manual*, Transportation Research Board, 6<sup>th</sup> Edition

<sup>4</sup> Vermont Agency of Transportation Highway Design "Level of Service" Policy, May 31, 2007

**Table 3 -Ballard Rd / Old Stage Rd Capacity Analyses Results**

Approach / Lane Group	LOS	Avg. Delay	V/C*	LOS	Avg. Delay	V/C*
	2028 No-Build			2028 Build		
	AM Peak Hour					
Ballard Rd EB TH/RT	A	0.0	0.00	A	0.0	0.00
Ballard Rd WB LT/TH	A	7.6	0.01	A	7.6	0.02
Old Stage Rd NB LT/RT	A	9.7	0.09	A	9.8	0.10
PM Peak Hour (DHF)						
Ballard Rd EB TH/RT	A	0.0	0.00	A	0.0	0.00
Ballard Rd WB LT/TH	A	7.5	0.03	A	7.5	0.04
Old Stage Rd NB LT/RT	A	9.8	0.09	B	10.0	0.10

\* V/C = volume/capacity ratio

### **Traffic Safety**

The posted speed limit on Old Stage Rd is 35 mph. At that speed the recommended intersection sight distance equals 380 ft. For traffic safety purposes, the minimum sight distance is the safe stopping sight distance, which at 35 mph descending a 6% grade equals 290 ft. It is important to note that the sight triangles for these distances are determined from a point 15 ft from the roadway edge in the Project's exiting driveway.

Available sight distances from the exiting driveway were measured, and found to equal 380 ft to the north. The limiting condition to the north is a horizontal curve in Old Stage Rd and vegetation growing in the right-of-way on the west side to the north of this property. To the south, the available sight distance is again limited by vegetation growing in the right-of-way along the project's frontage on the west side of Old Stage Rd. Mowing or removing that vegetation would provide over 450 ft of sight distance to the south.

The 2018-2022 crash history of Ballard Rd and Old Stage Rd in the vicinity of the Project was also examined using VTrans' Public Crash Data Query Tool. The results showed no crashes over that five-year period.

Based on the above, the small amount of additional traffic generated by this Project can be reasonably expected have little, if any, effect on future traffic safety conditions on Old Stage Rd and other nearby streets.

### **Conclusions**

Based on the results of the foregoing analyses, and with the removal of vegetation to south of the Project's exiting driveway on the west side of Old Stage Rd in order to provide adequate sight distances (380 ft recommended minimum), we conclude that this Project will not create undue levels of traffic congestion or unsafe conditions on the adjacent roadway network.