

**TRIP GENERATION & TRAFFIC IMPACT STUDY
PROPOSED 180-UNIT
CONDOMINIUM DEVELOPMENT
SMITHFIELD, RI**

Prepared by: Crossman Engineering
Engineers & Surveyors
151 Centerville Road
Warwick, RI 02886

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INTRODUCTION

A Traffic Impact Study was performed to assess the potential impact of a The Sand Trace development consisting of 180 residential condominium units. The proposed development will be located on the south side of Mann School Road with a main access driveway on Log Road located approximately 160' southeast of the intersection of Mann School Road / Log Road. There will be a secondary gated emergency access road for the development located approximately 150' east of the Mann School Road / Williams Road intersection.

This traffic study examines existing conditions, proposed development conditions and our subsequent conclusions/recommendations. The existing conditions consist of geometric data gathered from an on-site visit and existing traffic volume data collected for AM and PM peak hours. The proposed development section examines the site design, access and circulation, sight distance, projected site generated traffic, and capacity analysis of existing and proposed conditions. Our conclusions and recommendations are prepared following a comprehensive review of the capacity analysis.

EXISTING CONDITIONS

As stated, the proposed project site is located on the south side of Mann School Road with the main access driveway located approximately 160' southeast of the intersection of Mann School Road / Log Road. The traffic impact study evaluates area roadways and intersections that provide access to the site. The study area includes the following un-signalized intersections and is shown on Figure 1:

- Mann School Road / Williams Road
- Mann School Road / Log Road
- Log Road / Pleasant View Avenue

A. Roadway Geometrics

According to the Rhode Island Statewide Planning Program Existing Highway Statewide Classification map dated 3/22/16, Mann School Road and Log Road are classified as urban major collectors, Pleasant View Avenue is classified as an urban principal arterial and Williams Road is classified as a local road



Figure 1



CROSSMAN ENGINEERING

Rhode Island
 151 Centerville Road
 Warwick, RI 02886
 Phone: (401) 738-5660
 Email: cel@crossmaneng.com

Massachusetts
 103 Commonwealth Avenue
 North Attleboro, MA 02763
 Phone: (508) 695-1700

- CMI
- Transportation
- Environmental
- Site Planning
- Surveying
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TRAFFIC IMPACT STUDY SAND TRACE CONDOMINIUMS SMITHFIELD, RHODE ISLAND

AERIAL MAP

DATE: DECEMBER 2018

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Williams Road is a dead-end street that runs north-south to Mann School Road. It is a 2-way road that measures approximately 24' in width. The posted speed limit is 25 mph and the surrounding land use is residential. Williams Road intersects with Mann School Road to the south where it is stop-controlled.



Williams Rd facing northbound



Williams Rd facing southbound

Mann School Road generally runs east-west from Log Road to Tarklin Road. In the vicinity of the project, Mann School Road measures 25' wide with one 12.5' travel lane in each direction. The posted speed limit is 25 mph and the surrounding land use along Mann School Road is residential. There are no existing sidewalks. Approximately 450' east of the Mann School Road / Williams Road intersection, Mann School Road intersects with Log Road. Mann School Road is stop controlled at the intersection with Log Road.



Mann School Rd facing westbound at Williams Rd



Mann School Rd facing eastbound at Log Rd

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Log Road generally runs north-south from Nichols Road to Pleasant View Avenue. In the vicinity of Mann School Road, Log Road measures approximately 30' wide from the north and 28' wide from the east, with one travel lane in each direction. The speed limit is posted at 25 mph and the surrounding land use is residential near Mann School Road with the Fire Department and some businesses further southeast. Log Road is stop controlled along its south approach to Mann School Road and at its east approach to Pleasant View Avenue approximately 1,100' southeast of the Log Road / Mann School intersection. At the Pleasant View Avenue approach, Log Road measures approximately 24' wide. There are no sidewalks on Log Road except at the intersection at Pleasant View Avenue. At the eastbound approach to Pleasant View Avenue, Log Road widens to allow for occupancy of a left turning and right turning vehicle. At the eastbound approach to Pleasant View Avenue, there is an existing 10' wide pedestrian crosswalk, approximately 57' long, across Log Road.



Log Rd facing southbound at Mann School Rd



Log Rd facing northbound at Mann School Rd

Pleasant View Avenue generally runs north-south from Farnum Pike to Putnam Pike. At the Log Road intersection, Pleasant View Avenue measures approximately 31' in width and consists of a 12' travel lane in each direction with a 3-foot wide northbound shoulder and 4-foot wide southbound shoulder. There are 5-foot wide concrete sidewalks with curbing on both sides of the street. The speed limit is posted at 35 mph and the surrounding land use near the Log Road intersection is a mix of residential and businesses.



Pleasant View Ave facing northbound at Log Rd



Pleasant View Ave facing southbound at Log Rd

B. Existing Traffic Volumes

Manual traffic counts were conducted on December 4, 2018 between 7-9 AM and 4-6 PM at the three study intersections. For the study area, the weekday morning peak hour was determined to be 7-8 AM and the weekday afternoon peak was determined to be 4:30-5:30 PM. The peak hour volumes are shown in the tables on the following page.

	<u>Weekday</u> <u>AM Peak</u>	<u>Weekday</u> <u>PM Peak</u>
Mann School Rd	158	135
(at Log Road)		
Eastbound	132	43
Westbound	26	92
Williams Rd	41	28
Northbound	10	19
Southbound	31	9
Log Rd	252	250
(at Mann School Rd)		
Northbound	61	158
Southbound	191	92
Pleasant View Ave	1,021	1,389
Northbound	580	510
Southbound	441	879

The manual traffic counts can be found in the Appendix and the peak hour volumes are shown in Figure 2.

C. Accident Summary

Crash data for the intersections in the vicinity of the study area were analyzed for the most recent three year period. From January 2016 to the end of December 2018, a total of 8 accidents occurred within the study area intersections. The majority of the accidents was rear-end type and occurred at the intersection of Log Road / Pleasant View Avenue.

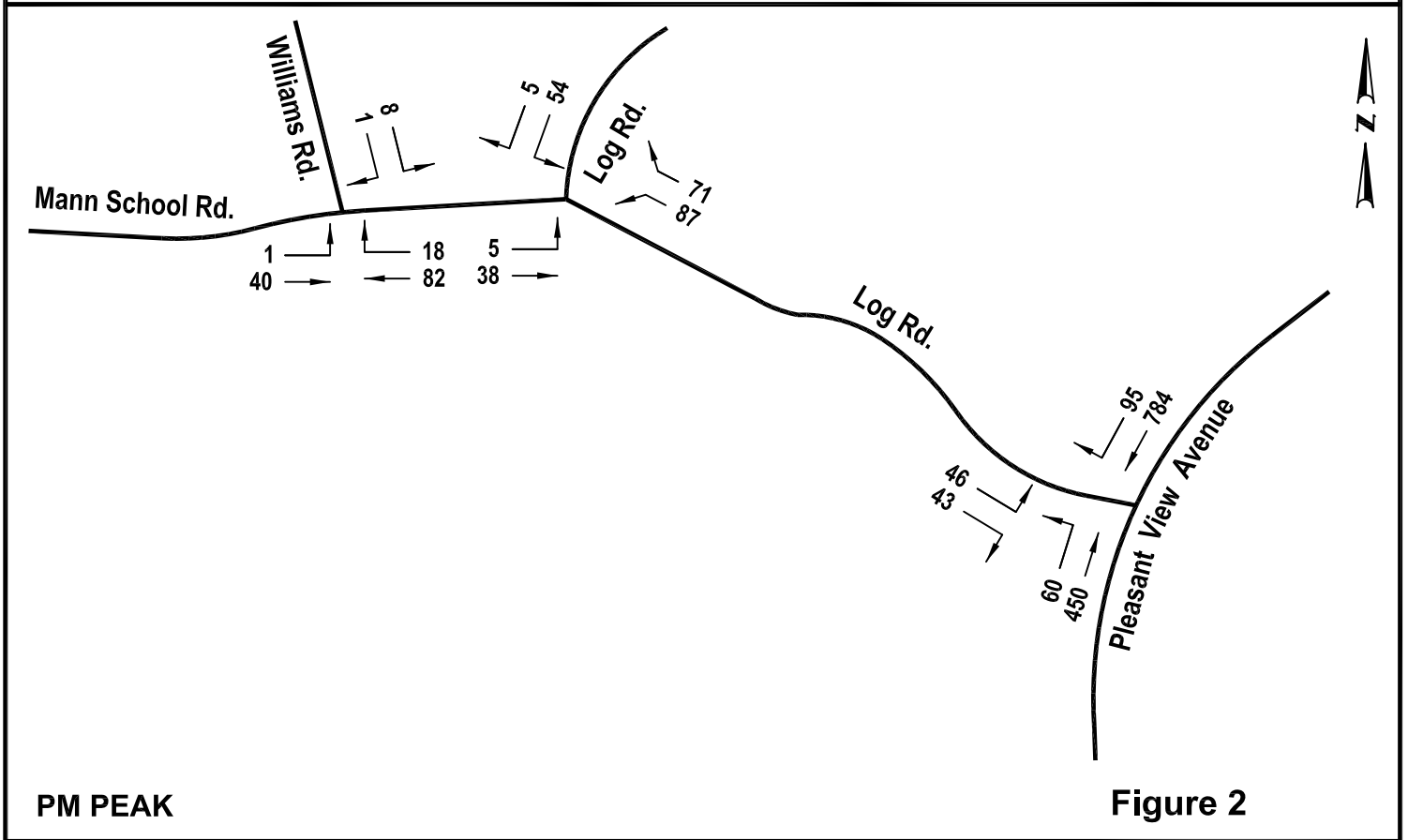
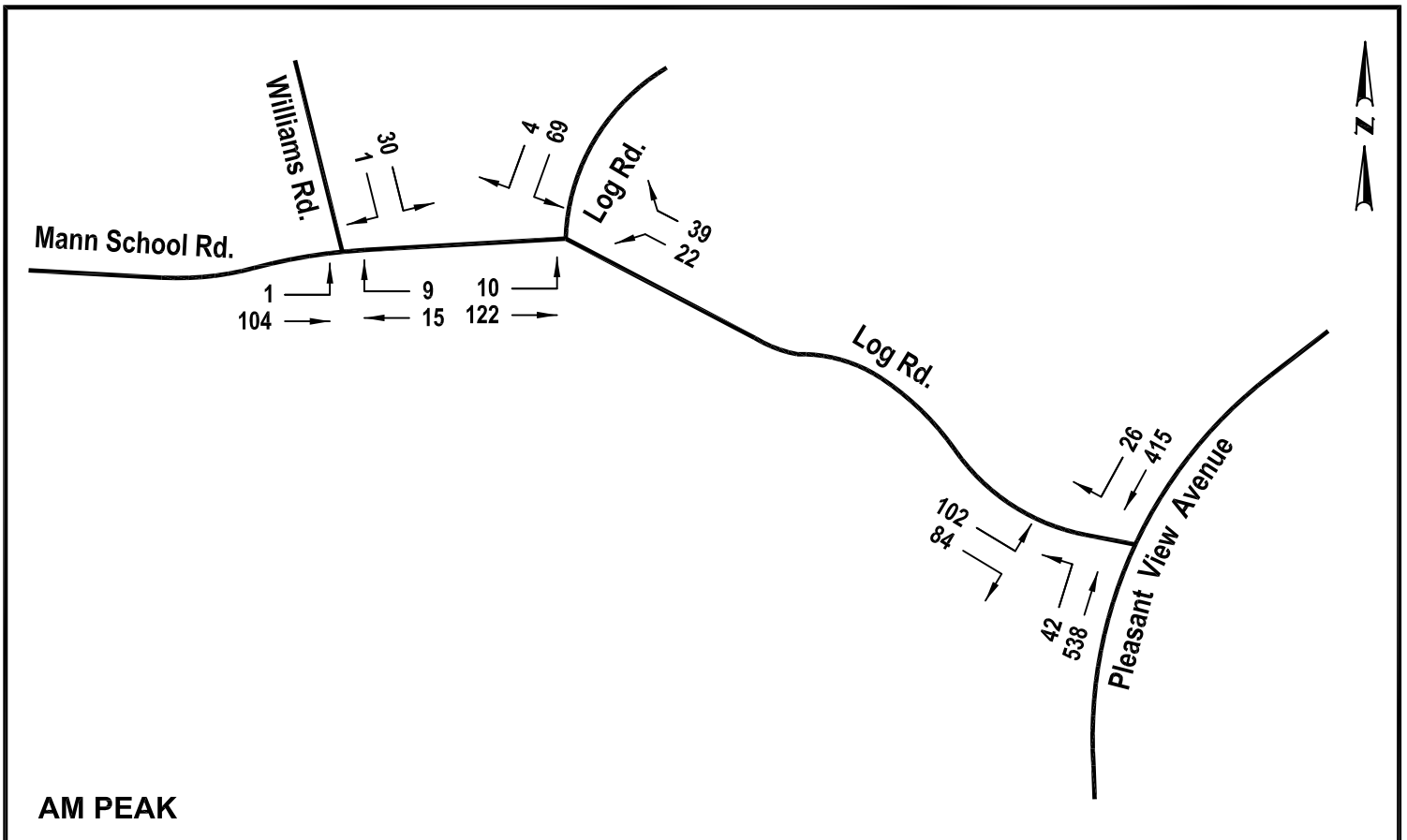


Figure 2

Year	Williams Rd / Mann School Rd	Log Rd / Mann School Rd	Log Rd / Pleasant View Ave	Total
2016	1	1	2	4
2017	-	-	4	4
2018	1	-	-	1
Type				
Angle	-	-	2	2
Animal		-	1	1
Fixed Object	2	1	-	3
Rear End	-	-	3	3
Weather / Road				
Clear / Dry	2	-	3	5
Clear / Snow	-	-	1	1
Rain / Ice	-	1	-	1
Rain / Wet	-	-	2	2
Time				
7AM - 9AM	-	1	-	1
9AM – 4PM	1	-	4	5
4PM – 6PM	-	-	1	1
6PM – 7AM	1	-	1	2

PROPOSED DEVELOPMENT

A. Site Design

The proposed project consists of the construction of a 180-unit residential condominium development. The proposed development will be located on the south side of Mann School Road with a main access driveway on Log Road located approximately 160' southeast of the intersection of Mann School Road / Log Road. There will be a secondary gated emergency access road for the development located approximately 150' east of the Mann School Road / Williams Road intersection. The updated site plan by DiPrete Engineering dated 11/15/18 shows the site access driveway to Log Road will consist of a left turn and right turn lane out of the site.

B. Access and Circulation

The proposed development will be located on the south side of Mann School Road with a main access driveway on Log Road located approximately 160' southeast of the intersection of Mann School Road / Log Road. There will be a secondary gated emergency access road for the

development located approximately 150' east of the Mann School Road / Williams Road intersection.

C. Sight Distance

Sight distance measurements were performed at the proposed site driveway location. Sight distance is the length of roadway ahead that is visible to the driver. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. SSD is the distance required by a vehicle traveling at or near the design speed of a roadway to stop prior to reaching an object in its travel path. ISD is the sight distance required by a driver entering or crossing an intersecting roadway to perceive on-coming traffic and safely complete a turning or crossing maneuver. In accordance with American Association of State Highway and Transportation Officials (AASHTO) standards, the measured ISD should be at least equal to the required SSD value for the appropriate design speed. The measured sight distances were compared to those recommended from **AASHTO's *A Policy on Geometric Design of Highways and Streets, 2011, 6th Edition***.



Log Rd facing northbound from proposed site driveway



Log Rd facing southbound from proposed site driveway

Table 1 presents the measured sight distances at the subject intersection. Table 2 shows the minimum required sight distances for various design speeds.

TABLE 1

Location	Measured Sight Distance	
	Looking Northwest	Looking Southeast
Proposed main site driveway on Log Road	~240'	~ 500'

TABLE 2

Design Speed	SSD	ISD	
		Left Turn From Stop	Right Turn From Stop
25 mph	155'	280'	240'
30 mph	200'	335'	290'
35 mph	250'	390'	335'
40 mph	305'	445'	385'

Sight distances were taken from Tables 3-1, 9-6 and 9-8 from "A Policy on Geometric Design of Highways and Streets, 2011, 6th Edition"

The existing speed limit on Log Road in the vicinity of the site driveway is 25 mph. Based on the speed limit, both SSDs and ISDs are met.

D. Future No-Build Traffic

Existing traffic volumes in the study area were projected to the year 2023, which reflects a five-year planning horizon. We assumed a growth rate of 1% per year. The 1% annual growth over 5 years was added to the existing traffic volumes to arrive at future No-Build traffic volumes which are shown in Figure 3.

2025 NO-BUILD CONDITIONS

No-Build reflects expected traffic conditions for the study design year 2023 without the proposed development. No-Build traffic volumes are determined by growing existing volumes by a historic annual growth rate to the design year, in this case, 2023.

No-Build Traffic Volumes

The 2018 existing peak hour traffic volumes were grown by 1% percent per year over the five-year study horizon to establish the 2023 future year base traffic volumes. The resulting 2023 No-Build weekday morning and weekday afternoon peak hour traffic volume networks are shown in Figure 3.

E. Projected Build Traffic

Build Conditions represent traffic conditions with the proposed development in place. 2023 Build volumes were determined by adding or superimposing the expected vehicle trips generated by the proposed development onto the 2023 No-Build volumes. Daily and peak hour vehicle trip generation estimates for the proposed development were determined using trip generation rates published by the *ITE Trip Generation, 10th Edition (2017) Manual*. For this proposed

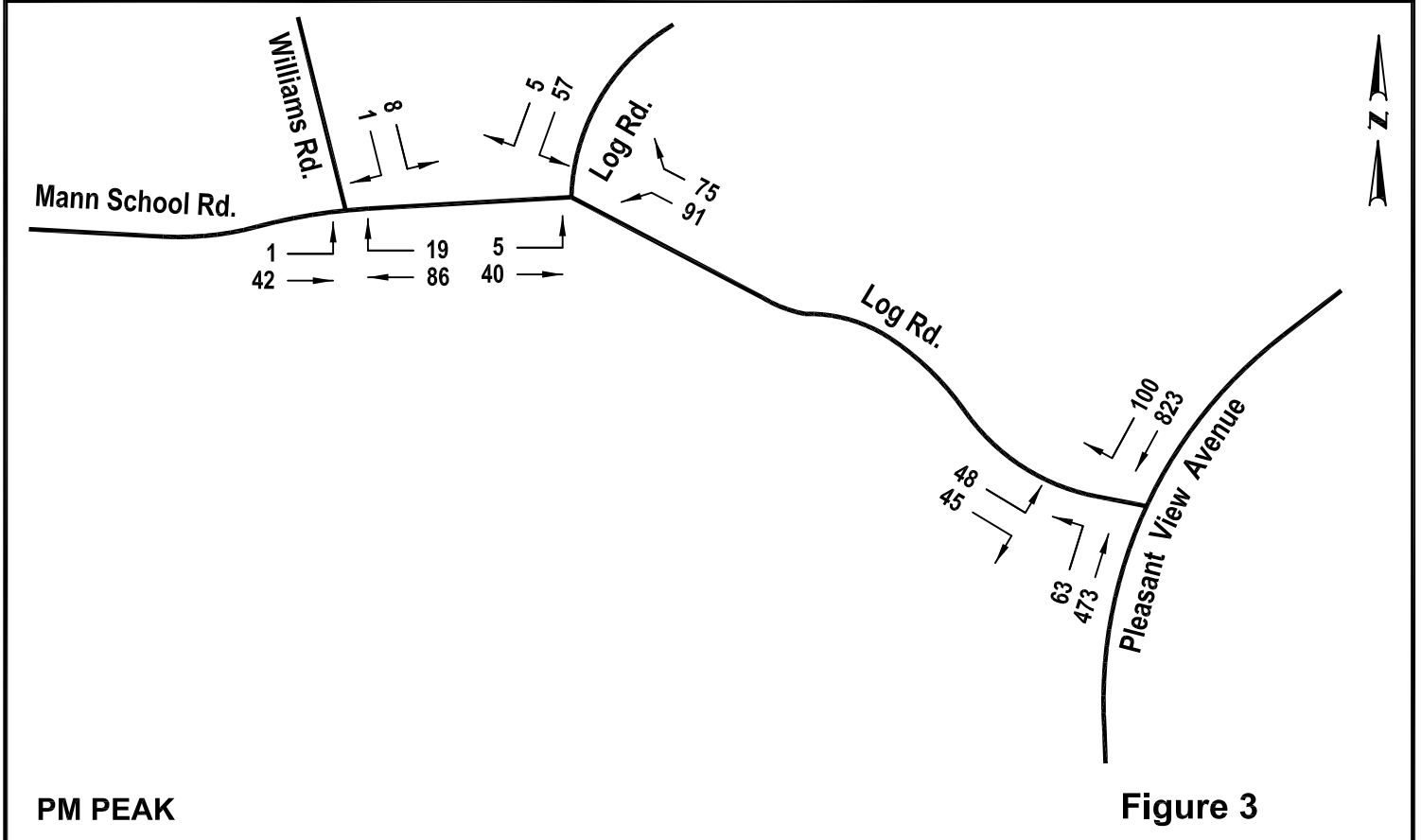
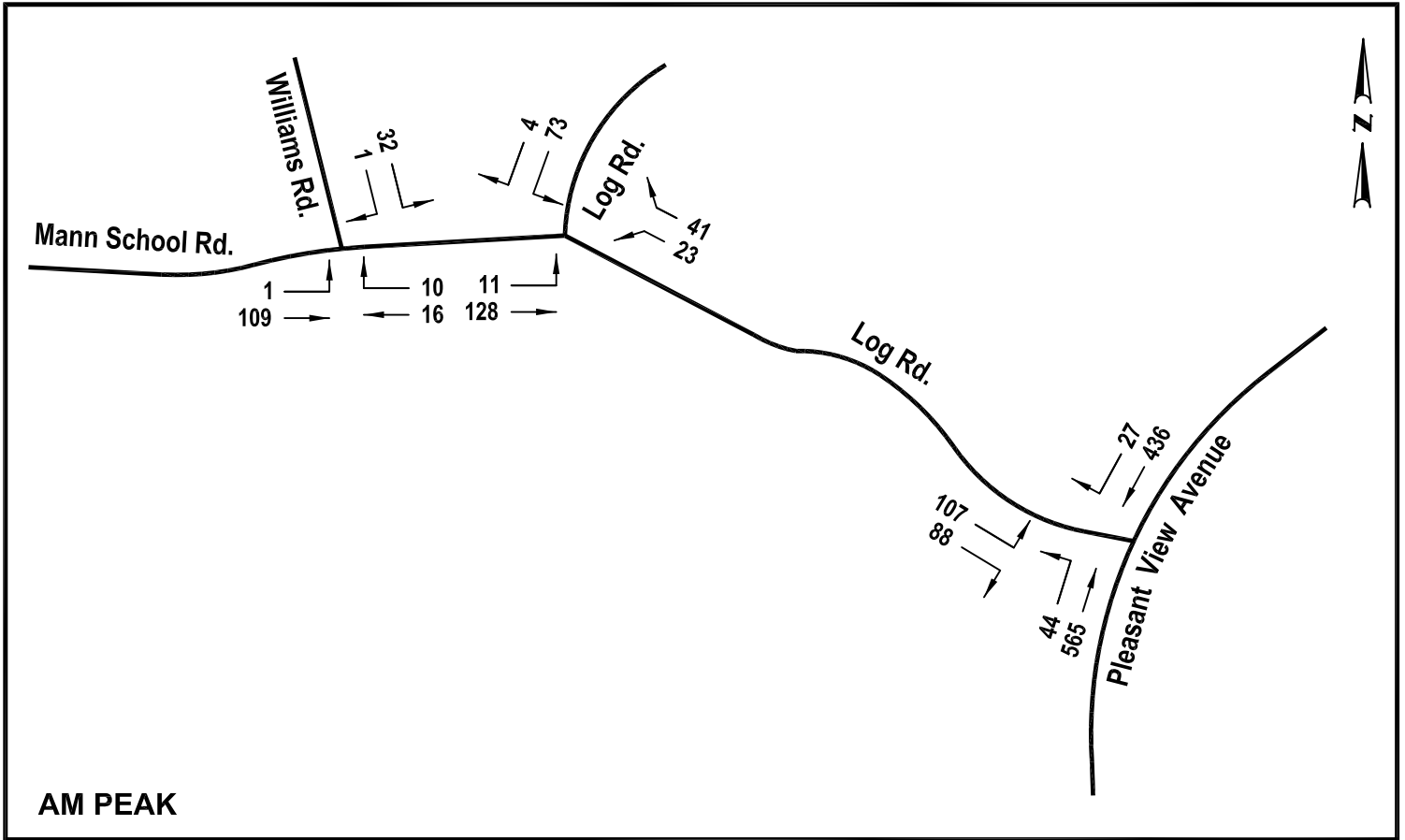


Figure 3

Trip Generation & Traffic Impact Study
Condominium Development – Smithfield, RI

condominium development, the trip generation used was Land Use Code (LUC) 220 – Multifamily Housing (Low Rise – one or two levels). The data provided by ITE is based on similar land uses and is an industry standard. The estimated trip generation for the proposed project is summarized in Table 3 below and these ITE land use code rates are included in the appendix.

TABLE 3 –Trips Generated by Condominiums (180 units)

	180 units Multifamily Housing Low Rise (LUC 220) <u># of Trips</u>
<i>Average Weekday Daily:</i>	
Entering	660
<u>Exiting</u>	<u>660</u>
Total	1,320
<i>Weekday AM Peak Hour:</i>	
Entering	19
<u>Exiting</u>	<u>65</u>
Total	84
<i>Weekday PM Peak Hour:</i>	
Entering	63
<u>Exiting</u>	<u>37</u>
Total	100

Trip distribution for the proposed residential development is based on the existing traffic patterns in the study area. The site is near Pleasant View Avenue to the east, which is a main access route to I-295 and other highways. As a result, most of the traffic is travelling to and from the east on Mann School Road during both AM and PM peak hours. The expected vehicle trips generated by the proposed project were assigned on the study area roadway network as shown in Figure 4.

To establish the 2023 Build peak hour traffic volumes, the project related traffic was assigned to the surrounding roadway network based on the existing distribution patterns. These volumes were superimposed / added to the 2023 No-Build peak hour traffic volumes to represent the 2023 Build peak hour traffic volumes. The resulting 2023 Build weekday morning and weekday afternoon peak hour traffic volumes are presented in Figure 5.

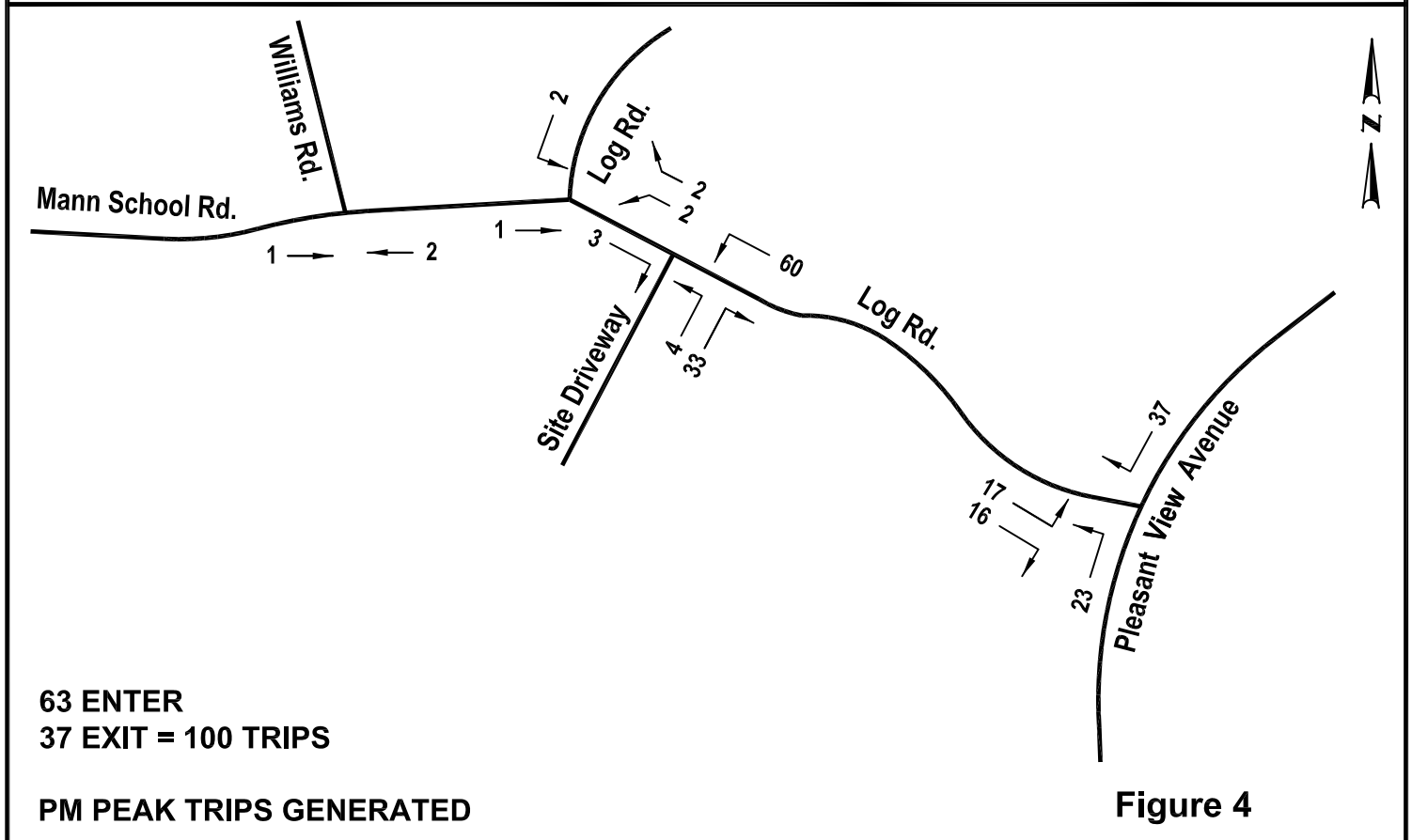
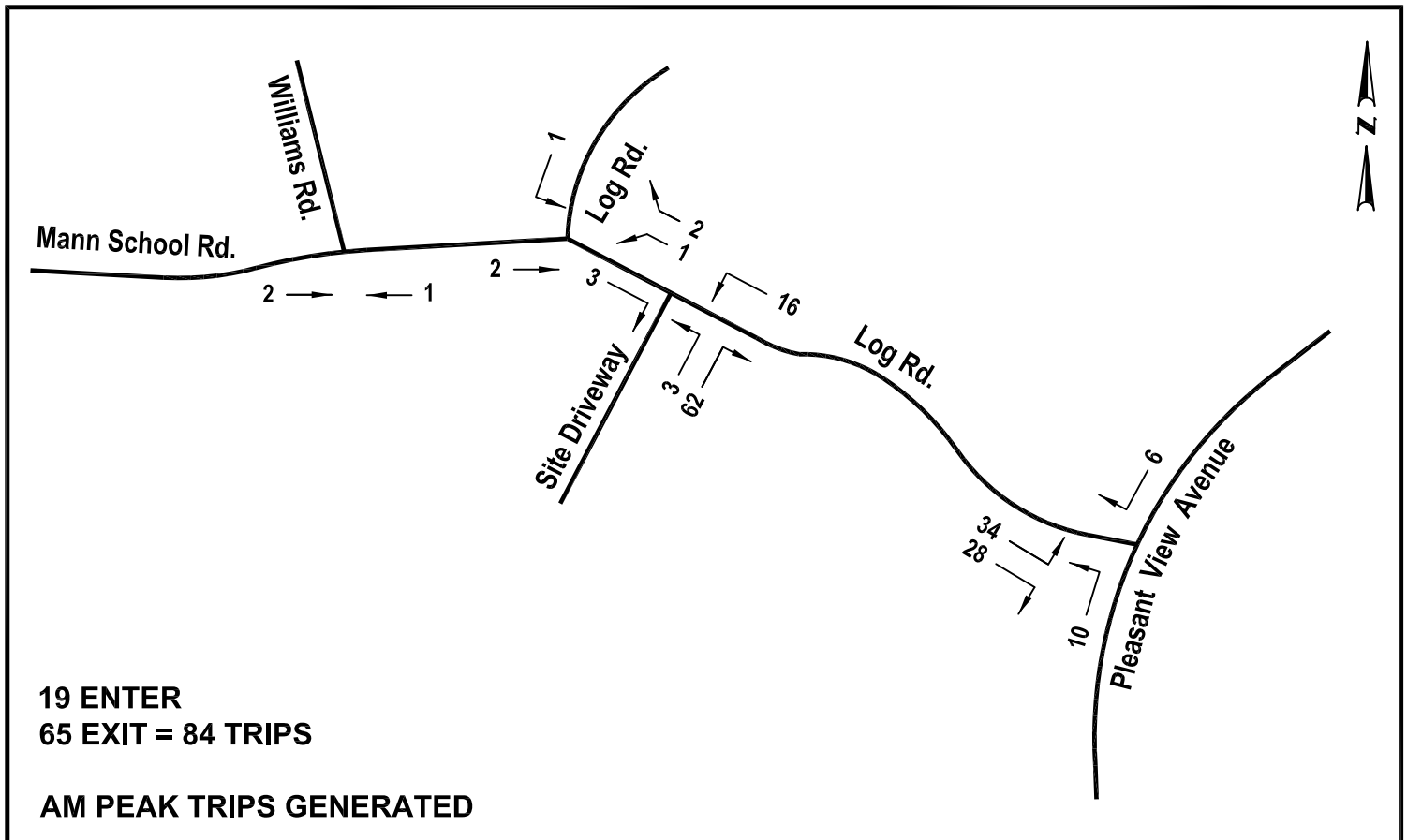


Figure 4

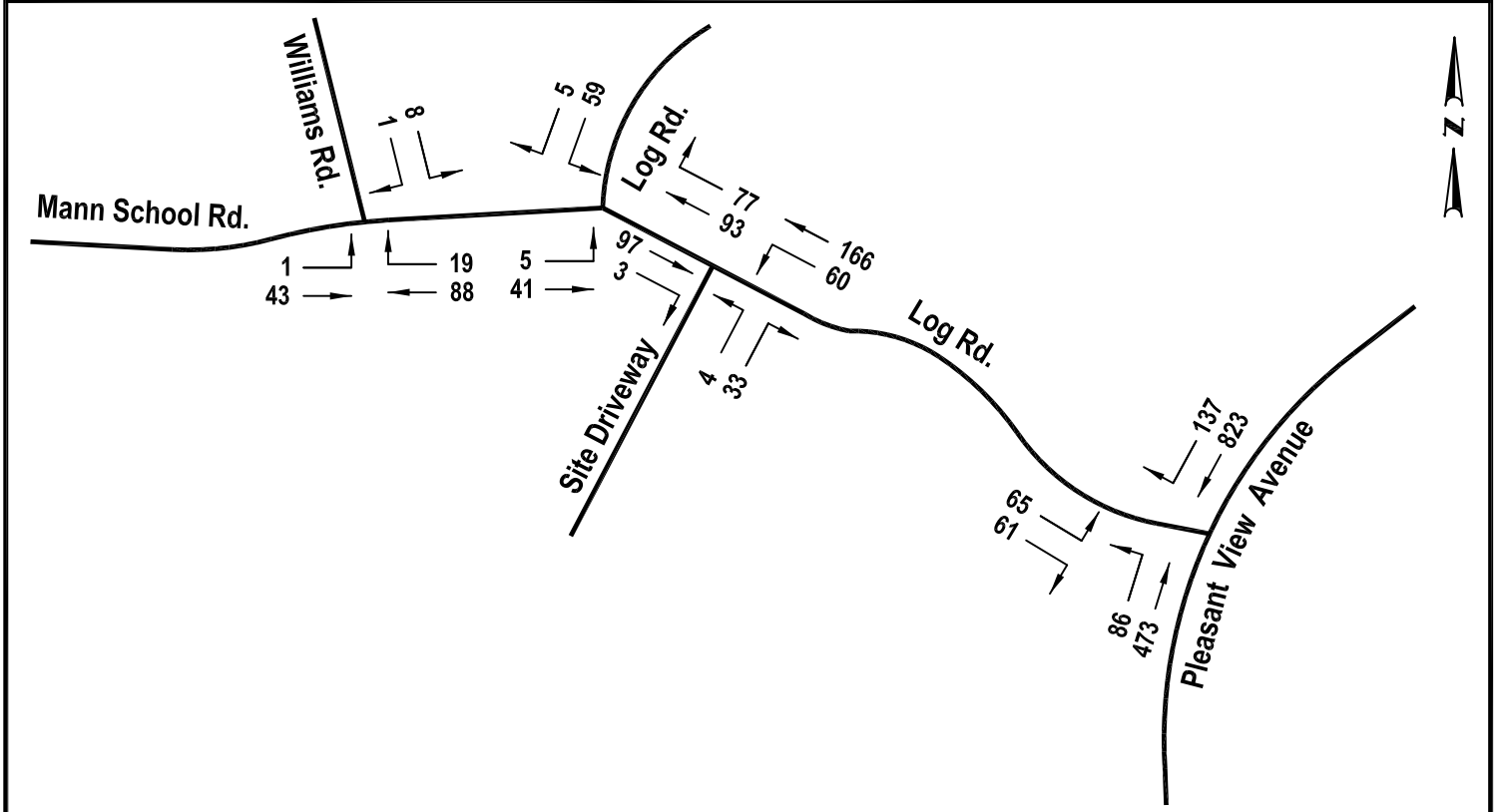
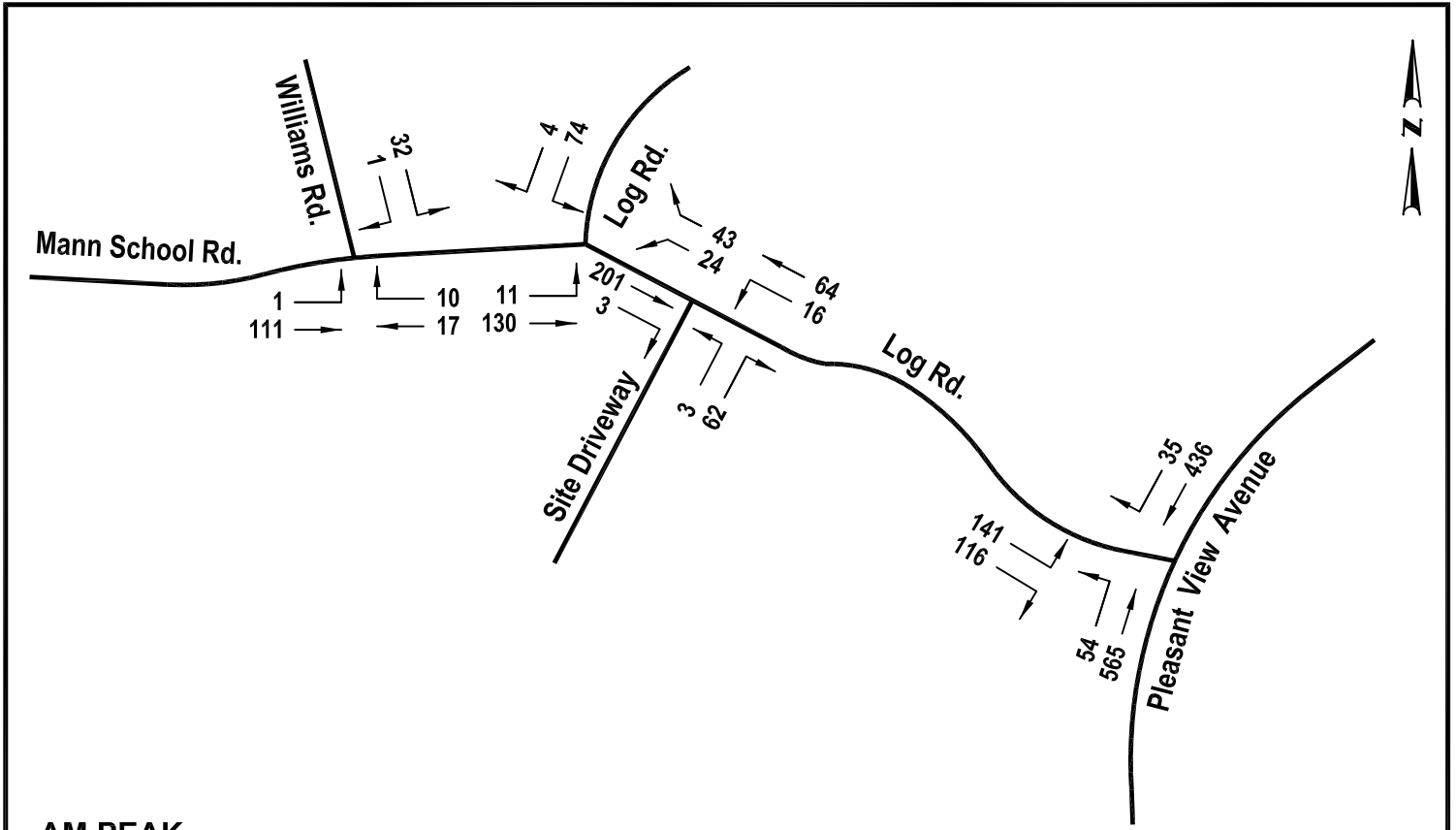


Figure 5

F. Capacity Analysis

Capacity analyses were performed for the un-signalized study intersections. The analysis was performed for the existing conditions, future No Build volumes and future Build volumes.

The analyses result in a Level of Service being assigned to the intersection. Level of Service is defined as a qualitative measure describing operational conditions based on vehicular delay. There are six levels of service ranging from Level A to Level F.

The levels of service at un-signalized intersections are determined by a procedure described in the 2010 Highway Capacity Manual. The level of service criteria for un-signalized intersections is described in Table 4.

TABLE 4 - Level of Service Criteria for Un-Signalized Intersections

<u>Level of Service</u>	<u>Control Delay per Vehicle (Secs.)</u>
A	<10.
B	>10.0 to 15.0
C	>15.0 to 25.0
D	>25.0 to 35.0
E	>35.0 to 50.0
F	>50.0

The capacity analyses indicated the levels of service as shown on the following page.

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Condominium Development – Smithfield, RI

		AM Peak LOS (Delay in Secs.)	PM Peak LOS (Delay in Secs.)
<u>Mann School Rd / Williams Rd</u>			
Mann School Rd – EB thru/left			
	2018 Existing Conditions	A (0.2)	A (0.5)
	2023 No-Build Conditions	A (0.2)	A (0.5)
	2023 Build Conditions	A (0.2)	A (0.5)
Williams Rd - SB			
	Existing Conditions	A (9.6)	A (9.6)
	No Build Conditions	A (9.6)	A (9.7)
	Build Conditions	A (9.7)	A (9.7)
<u>Log Rd / Mann School Rd</u>			
Log Rd - NB			
	Existing Condition-	A (7.5)	A (7.5)
	No-Build Conditions	A (7.5)	A (7.6)
	Build Conditions	A (7.5)	A (7.6)
Mann School Rd - EB			
	Existing Condition-	A (9.7)	A (9.4)
	No-Build Conditions	A (9.8)	A (9.5)
	Build Conditions	A (9.8)	A (9.5)
<u>Log Rd / Proposed Site Driveway</u>			
Log Rd – NB	Build Conditions	A (1.6)	A (2.3)
Site Drive – NE LT	Build Conditions	B (10.5)	B (11.4)
Site Drive – NE RT	Build Conditions	A (9.8)	A (8.9)
<u>Pleasant View Ave / Log Rd</u>			
Log Rd - EB			
	Existing Condition-	E (48.3)	E (42.8)
	No-Build Conditions	F (56.4)	F (54.5)
	Build Conditions	F (156.5)	F (146.5)
Pleasant View Ave - NB			
	Existing Condition-	A (1.4)	A (2.7)
	No-Build Conditions	A (1.4)	A (3.0)
	Build Conditions	A (1.7)	A (4.2)

CONCLUSION

After reviewing the data in this study, we conclude that the proposed Multi-Family Development will not have a significant impact at the Mann School intersections; however, it will continue to deteriorate level of service at Pleasant View Avenue / Log Road. This conclusion is based on the following facts:

- The Mann School Road intersections and the proposed driveway of the development will operate at a reasonable level of service.
- The proposed use is not a high traffic generator.
- The proposed safe stopping sight distance at the access driveway is more than sufficient.
- There have only been 9 accidents in the last 3 years within the entire study area.
- The existing Log Road approach at Pleasant View Avenue currently operates at capacity during AM and PM Peak hours. The intersection is expected to degrade to LOS F during peak conditions by 2023 without the construction of the project. The delays will increase with the additional traffic added by the project. A signal would benefit this intersection. We recommend the town have additional traffic volume data collected to determine if signal warrants are met to justify a signal.