



Traffic Study

WESTWOOD MIDDLE SCHOOL TEMPORARY MODULAR SCHOOL

City of Gainesville, Alachua County, FL

Prepared for:

Alachua County Public Schools

Prepared by:

Kimley-Horn and Associates, Inc.

142880000

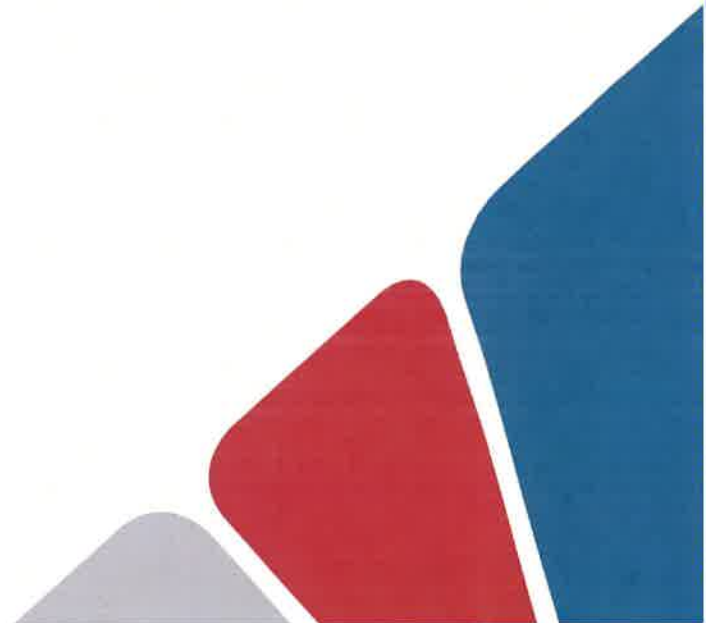
February 2020

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747 SW 2nd Avenue, Suite 171

Gainesville, FL 32601

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Traffic Study

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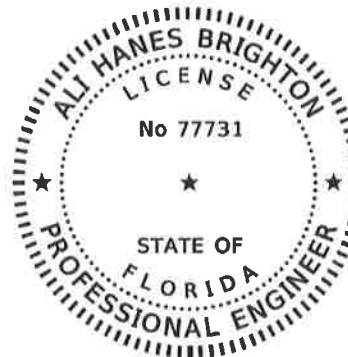
City of Gainesville, Alachua County, FL

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EXECUTIVE SUMMARY

Alachua County Public Schools (ACPS) has proposed utilizing temporary transition schools to facilitate the renovations at several schools across the county. One of the proposed locations for a transition school is in the vacant field area on the south end of the existing Westwood Middle School campus, east of State Road 121 (SR 121)/NW 34th Street and south of NW 15th Avenue in Gainesville, Florida. If implemented, the proposed Temporary Modular School is proposed to host students and faculty from Howard Bishop Middle School during the 2020–2021 school year, Westwood Middle School during the 2021–2022 school year, and Littlewood Elementary School during the 2022–2023 school year.

This study evaluated intersection and roadway segment operations in the vicinity of the proposed Temporary Modular School for each school year in order to identify any deficiencies that may require improvements or mitigation while the Temporary Modular School is in use. The following four scenarios for the Temporary Modular School were studied:

- Howard Bishop Middle School at the Temporary Modular School staggered 45 minutes later than the standard ACPS middle school bell schedule during the 2020–2021 school year
- Howard Bishop Middle School at the Temporary Modular School with Westwood Middle School staggered 20 minutes later than the standard ACPS middle school bell schedule during the 2020–2021 school year
- Westwood Middle School at the Temporary Modular School during the 2021–2022 school year
- Littlewood Elementary School at the Temporary Modular School during the 2022–2023 school year

The study intersections are expected to operate at adopted levels of service or better during the school's AM and PM peak hours with the exception of the stop-controlled approaches at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue during the school's arrival and dismissal periods under several of the Temporary Modular School study scenarios. However, the traffic impacts from each of the study scenarios are not expected to result in any significant and adverse impacts on the study area roadway segments.

Signal warrant analyses were performed at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue. The signal warrant analyses indicated that Warrant 2 (Four-Hour Vehicular Volume) and Warrant 3 (Peak Hour Volume) may be met during the school's arrival and dismissal periods under several of the Temporary Modular School study scenarios.

Based on the results of the intersection operation and signal warrant analyses, it is recommended that law enforcement officer (LEO) control of traffic be implemented for the following intersections and time periods:

- At the intersection of NW 8th Avenue at NW 31st Drive during the school's arrival and dismissal periods under the Howard Bishop 2020-2021 Temporary Conditions scenario with 45-minute staggered schedule
- At the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue during the school's arrival and dismissal periods under the Howard Bishop 2020-2021 Temporary Conditions scenario with Westwood 20-minute staggered schedule
- At the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue during the school's arrival period under the Littlewood 2022-2023 Temporary Conditions scenario

The LEO will facilitate the movement of traffic through the two subject intersections, resulting in traffic operations similar to a traffic signal control stopping the major street movements to allow for movements to and from the minor street (NW 31st Drive). This operational plan is common for facilities of this type in similar locations. In addition to the LEO control noted above, the following recommendations were made based on the field observations performed at the site:

- It is recommended that the buses for Howard Bishop Middle School utilize the Westside Park parking lot along NW 34th Street and a path be provided for students to reach the Temporary Modular School from there. Note that improvements are proposed for Westside Park from February 2020 through Fall 2020, which may limit the feasibility of utilizing the parking area for buses.
- It is recommended that a new sidewalk connection be added along NW 31st Drive near the existing bus loop area so that students attending the Temporary Modular School have a continuous sidewalk route without having to enter the existing Westwood Middle School campus.

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- Westwood Middle School Scenario – Existing Traffic Conditions

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INTRODUCTION

Major renovations are planned in the upcoming school years for the majority of the public schools in Alachua County. Alachua County Public Schools (ACPS) has proposed utilizing temporary transition schools to facilitate the renovations. One of the proposed locations for a transition school is at Westwood Middle School. If implemented, the proposed Temporary Modular School is proposed to host students and faculty from Howard Bishop Middle School during the 2020–2021 school year, Westwood Middle School during the 2021–2022 school year, and Littlewood Elementary School during the 2022–2023 school year.

Purpose and Need

The purpose of this traffic study is to evaluate potential impacts to the surrounding transportation network during each of the respective school years in which the three schools will utilize the Temporary Modular School at Westwood Middle School. The results of this study will be utilized in the decision-making process for determining whether this location will be utilized as a transition school during the renovations at Howard Bishop Middle School, Westwood Middle School, and Littlewood Elementary School.

Location and Study Area

The Temporary Modular School is planned to be located in the vacant field area on the south end of the existing Westwood Middle School campus, east of State Road 121 (SR 121)/NW 34th Street and south of NW 15th Avenue in Gainesville, Florida. The project location is illustrated in **Figure 1**.

The Temporary Modular School will have entirely separate classrooms, administrative spaces, and cafeteria facilities from the existing Westwood Middle School, as well as a separate parking area and parent drop-off/pick-up loop. The existing bus loop at Westwood Middle School or the parking area for Westside Park along SR 121/NW 34th Street may be utilized by both Westwood Middle School and the school using the Temporary Modular School during each respective year. A conceptual layout of the Temporary Modular School is provided in **Appendix A**.

The study area utilized for this traffic study includes six (6) intersections:

- SR 121/NW 34th Street and NW 16th Avenue (signalized)
- SR 121/NW 34th Street and NW 15th Avenue (unsignalized)
- SR 121/NW 34th Street and NW 8th Avenue (signalized)
- NW 31st Drive and NW 16th Avenue (unsignalized)
- NW 31st Drive and NW 15th Avenue (unsignalized)
- NW 31st Drive and NW 8th Avenue (unsignalized)

The study area intersections are identified in **Figure 1**.



FIGURE 1: PROJECT LOCATION

**WESTWOOD MIDDLE SCHOOL - TEMPORARY
MODULAR SCHOOL TRAFFIC STUDY
ALACHUA COUNTY, FLORIDA**

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Temporary Modular School Schedules

This traffic study evaluates the temporary traffic conditions over each of the next three school years during student drop-off and pick-up periods at the Temporary Modular School campus. Currently, the first bell for both Howard Bishop Middle School and Westwood Middle School is at 9:20 AM and the final dismissal bell is at 3:37 PM. When Howard Bishop Middle School operates in the Temporary Modular School during the 2020–2021 school year, the bell schedule is planned to be altered in order to minimize the adverse traffic impacts of hosting two middle schools on the same campus. Per direction from ACPS, the analyses in this study assume two staggered scenarios. The first scenario assumes that the Howard Bishop Middle School schedule will be approximately 45 minutes later than the standard ACPS middle school bell schedule at approximately 10:00 AM to 4:15 PM during the 2020–2021 school year. The second scenario considers a reduced staggering to only 20 minutes to maintain the existing shared busing operations between Howard Bishop Middle School and Abraham Lincoln Middle School. This scenario conservatively assumes that the peak hours for Westwood Middle School and Howard Bishop Middle School at the Temporary Modular School occur simultaneously during the 2020–2021 school year.

When Westwood Middle School operates in the Temporary Modular School during the 2021–2022 school year, the bell schedule will remain consistent with current operations.

Littlewood Elementary School's first bell is at 7:45 AM and the final dismissal bell is at 1:52 PM. Since this bell schedule does not interfere or overlap with that of Westwood Middle School, the same bell schedule will be used when Littlewood Elementary School operates from the Temporary Modular School during the 2022–2023 school year.

Data Collection

Existing traffic data within the study area was collected on Tuesday, January 28, 2020. The data collected includes turning movement counts at the six (6) study area intersections from 7:00 AM to 10:30 AM and from 1:00 PM to 5:00 PM, accounting for the peak periods of morning and afternoon school traffic. The turning movement counts included quantities for heavy vehicles, pedestrians, and bicyclists utilizing the study area intersections.

Additionally, approach and departure volumes to and from each of the school driveways were collected in the hours surrounding each school's respective schedules. At Howard Bishop Middle School and Westwood Middle School, driveway counts were collected from 8:00 AM to 10:00 AM and from 2:30 PM to 4:30 PM. At Littlewood Elementary School, driveway counts were collected from 7:00 AM to 9:00 AM and from 1:00 PM to 3:00 PM.

At the two unsignalized intersections of NW 31st Drive with NW 8th Avenue and with NW 16th Avenue, 12-hour continuous turning movement counts were collected from 7:00 AM to 7:00 PM for use in signal warrant analyses at the two intersections.

The existing traffic data was used as a basis for the existing conditions analyses and for forecasting future year turning movement volumes. The turning movement counts are provided in **Appendix B**.

HOWARD BISHOP MIDDLE SCHOOL (2020–2021 SCHOOL YEAR)

The first school planned to operate from the Temporary Modular School is Howard Bishop Middle School. Operations for Howard Bishop Middle School will be conducted in the Temporary Modular School during the 2020–2021 school year.

Field Observations

Existing conditions were observed at Howard Bishop Middle School on Tuesday, January 28, 2020. During the morning arrival period, it was observed that student drop-off times were spread throughout the morning, as opposed to being highly concentrated in the 15 to 30 minutes before first bell. During the afternoon dismissal period, the stacking exceeded the available capacity in the parent pick-up/drop-off loop on NE 9th Street. Additionally, vehicles were observed parking in the striped on-street parking on NE 9th Street and parking along the grass shoulders along NE 19th Place.

Bell Schedule (Existing and Proposed)

Howard Bishop Middle School currently operates with the standard ACPS middle school bell schedule, with first bell at 9:20 AM and the final dismissal bell at 3:37 PM. Turning movements into and out of the Howard Bishop Middle School driveways were collected from 8:00 AM to 10:00 AM and from 2:30 PM to 4:30 PM.

When Howard Bishop Middle School operates in the Temporary Modular School during the 2020–2021 school year, the bell schedules are planned to be altered in order to minimize the adverse traffic impacts of hosting two middle schools on the same campus. Per direction from ACPS, the analyses in this study assume two staggered scenarios. The first scenario assumes that the bell schedule for Howard Bishop Middle School will be approximately 45 minutes later during the 2020–2021 school year. The first scenario is evaluated by applying the Howard Bishop Middle School trip diversions to the existing turning movement volumes from 9:00 AM to 10:00 AM and from 4:00 PM to 5:00 PM.

The second scenario assumes that Howard Bishop Middle School's current bell schedule (9:20 AM to 3:37 PM) would be maintained and the Westwood Middle School bell schedule would be staggered 20 minutes later (9:40 AM to 3:57 PM). This scenario is based on information from ACPS in a memorandum provided on February 14, 2020 which notes that there may consideration for a less staggered bell schedule when Howard Bishop Middle School is hosted in the Temporary Modular School in order to minimize impacts to the busing schedule at Abraham Lincoln Middle School. The ACPS memorandum is included in **Appendix C**. The second scenario is evaluated by applying the Howard Bishop Middle School trip diversions to the existing turning movement volumes from 8:30 AM to 9:30 AM and from 3:30 PM to 4:30 PM.

Peak Traffic Conditions

In order to evaluate the school's peak traffic conditions anticipated for the Temporary Modular School in the 2020–2021 school year, the existing turning movement volumes are combined with the forecasted drop-off and pick-up peak hour traffic volumes to and from Howard Bishop Middle School. When projecting trips to and from the Temporary Modular School, the driveway volumes at Howard Bishop Middle School were adjusted to account for vehicles that did not enter the driveways as well as students who walked or bicycled to school but will not be within a reasonable distance to walk or bicycle to the Westwood Middle School campus.

Existing Conditions at Study Area Intersections

First Scenario: Howard Bishop Staggered 45-Minutes Later

Existing conditions at the study area intersections for the Howard Bishop Middle School first scenario are based on turning movement volumes during the hours surrounding the proposed bell schedule. Turning movement volumes from 9:00 AM to 10:00 AM are utilized for the school's AM peak hour analysis since the peak driveway volumes during the morning peak at Howard Bishop Middle School occurred in the hour leading up the first bell. Turning movement volumes from 4:00 PM to 5:00 PM are utilized for the school's PM peak hour analysis. The existing turning movement volumes utilized for the Howard Bishop Middle School first scenario are illustrated in **Figure 2**.

The intersection operating conditions were evaluated using *Synchro 10* software, which implements traffic analysis methodologies from the latest *Highway Capacity Manual* (HCM). Results are provided in terms of Level of Service (LOS), Volume-to-Capacity (V/C) ratio, and delay. **Table 1** summarizes the existing intersection operating conditions at the six (6) study area intersections during the AM peak (9:00 AM to 10:00 AM) and PM peak (4:00 PM to 5:00 PM) of the proposed Howard Bishop Middle School bell schedule.

All study area intersections operate at their adopted LOS standard (LOS E) or better during the school's AM and PM peak hours. All movement V/C ratios are less than one, signifying adequate capacity for the existing volumes. *Synchro* outputs are provided in **Appendix D**.

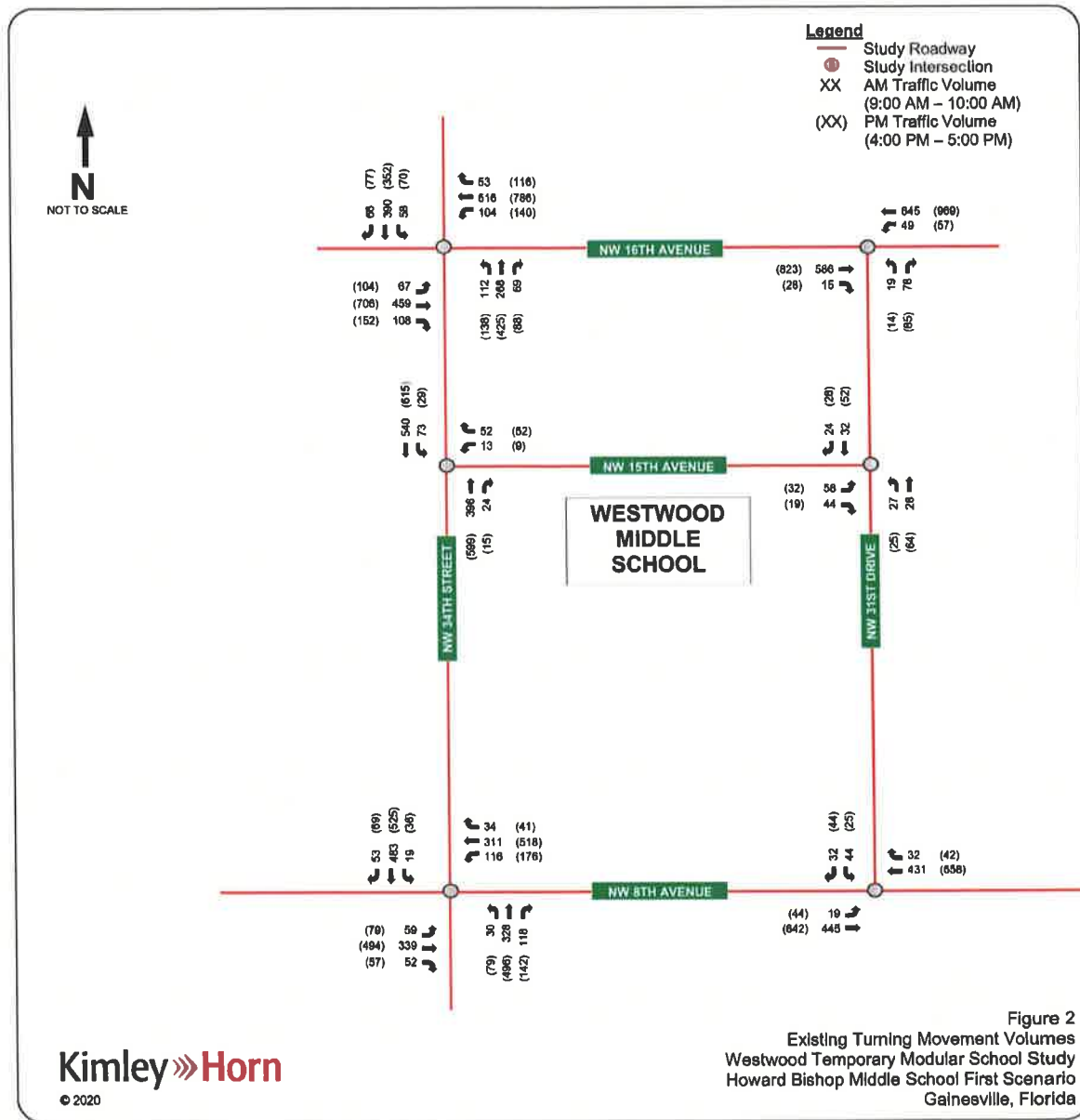


Table 1: Existing Intersection Operations, Howard Bishop First Scenario

		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	38.0	D	-	58.5	E	-
	Northbound	31.1	C	-	10.9	B	-
	NBL	24.5	C	0.41	23.7	C	0.38
	NBT/R	33.3	C	0.54	7.4	A	0.66
	Southbound	39.5	D	-	34.8	C	-
	SBL	22.8	C	0.17	23.0	C	0.16
	SBT/R	41.6	D	0.75	36.7	D	0.67
	Eastbound	43.2	D	-	82.3	F	-
	EBL	31.6	C	0.27	46.0	D	0.68
	EBT/R	44.5	D	0.66	86.5	F	0.95
	Westbound	36.5	D	-	77.7	E	-
	WBL	26.1	C	0.37	50.9	D	0.79
	WBT/R	38.4	D	0.57	81.9	F	0.94
NW 31st Drive & NW 16th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	17.6	C	-	22.5	C	-
	NBL/R	17.6	C	0.29	22.5	C	0.35
	Westbound	-	-	-	-	-	-
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	13.8	B	-	14.7	B	-
	WBL/R	13.8	B	0.16	14.7	B	0.15
	Southbound	-	-	-	-	-	-
NW 31st Drive & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	-	-	-	-	-	-
	NBL	7.6	A	0.04	7.5	A	0.02
	Eastbound	10.2	B	-	9.7	A	-
	EBL	11.1	B	0.16	10.2	B	0.06
	EBR	9.1	A	0.09	8.8	A	0.03
NW 34th Street & NW 8th Avenue	Overall Intersection	34.7	C	-	52.0	D	-
	Northbound	28.3	C	-	27.6	C	-
	NBL	21.1	C	0.15	21.7	C	0.25
	NBT/R	28.8	C	0.65	28.3	C	0.65
	Southbound	34.0	C	-	39.0	D	-
	SBL	19.8	B	0.08	20.6	C	0.11
	SBT/R	34.6	C	0.77	40.1	D	0.61
	Eastbound	43.0	D	-	81.0	F	-
	EBL	33.4	C	0.21	52.1	D	0.41
	EBT/R	44.4	D	0.60	85.6	F	0.89
	Westbound	34.0	C	-	62.1	E	-
	WBL	26.4	C	0.38	57.2	E	0.77
	WBT/R	36.6	D	0.41	63.7	E	0.72
NW 8th Avenue & NW 31st Drive	Overall Intersection	-	-	-	-	-	-
	Eastbound	-	-	-	-	-	-
	EBL	8.4	A	0.02	9.4	A	0.05
	Southbound	15.6	C	-	20.9	C	-
	SBL/R	15.6	C	0.19	20.9	C	0.24

Second Scenario: Westwood Staggered 20-Minutes Later

Existing conditions at the study area intersections for the Howard Bishop Middle School second scenario are based on turning movement volumes during the hours surrounding the existing bell schedule. Turning movement volumes from 8:30 AM to 9:30 AM are utilized for the school's AM peak hour analysis and turning movement volumes from 3:00 PM to 4:00 PM are utilized for the school's PM peak hour analysis. The existing turning movement volumes utilized for the second scenario are illustrated in **Figure 3**.

The intersection operating conditions were evaluated using *Synchro 10* software. Results are provided in terms of LOS, V/C ratio, and delay. **Table 2** summarizes the existing intersection operating conditions at the six (6) study area intersections during the AM peak (8:30 AM to 9:30 AM) and PM peak (3:30 PM to 4:30 PM) of the Howard Bishop Middle School bell schedule.

All study area intersections operate at their adopted LOS standard or better during the school's AM and PM peak hours. All movement V/C ratios are less than one, signifying adequate capacity for the existing volumes. *Synchro* outputs are provided in **Appendix D**.

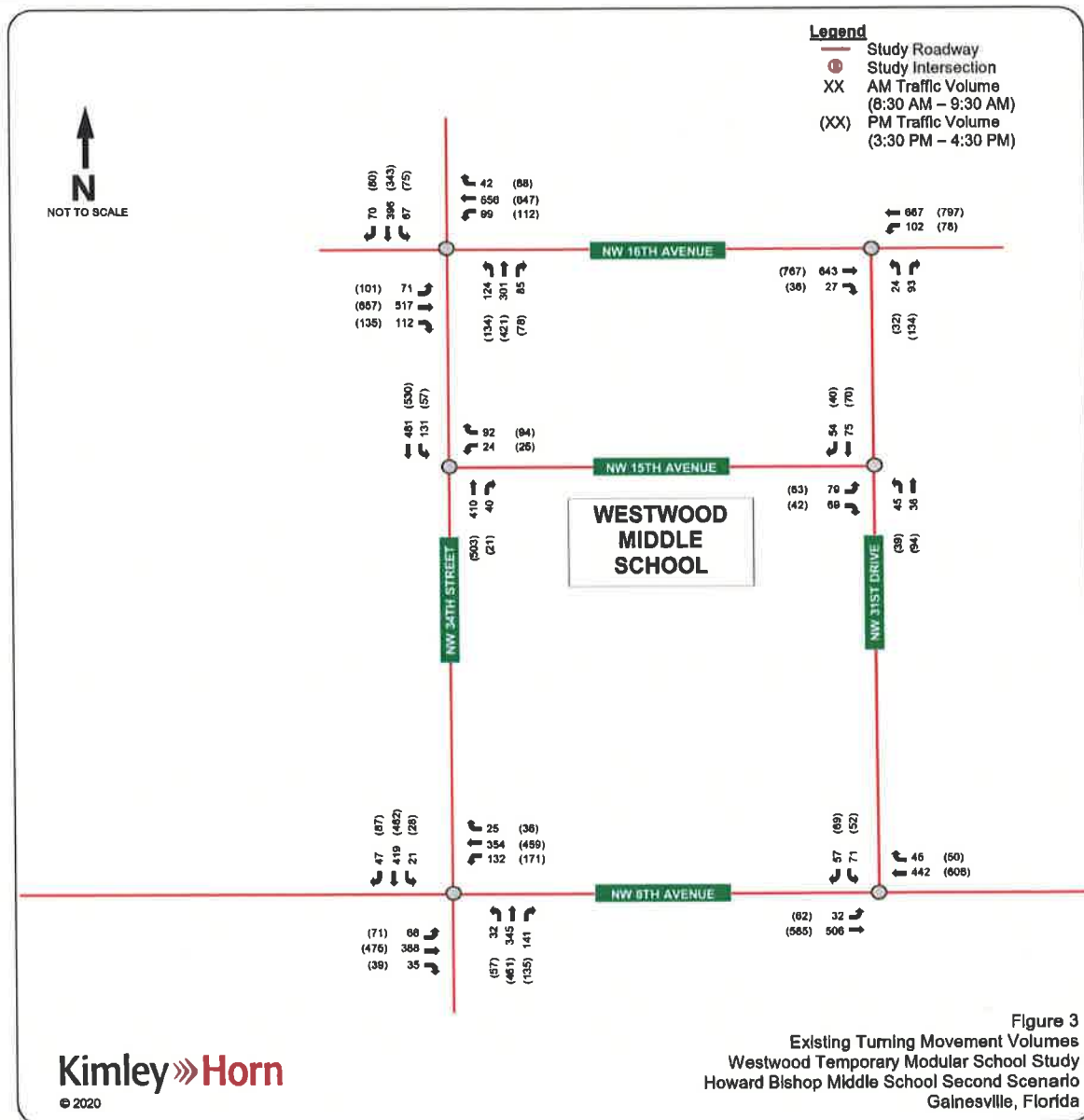


Table 2: Existing Intersection Operations, Howard Bishop Second Scenario

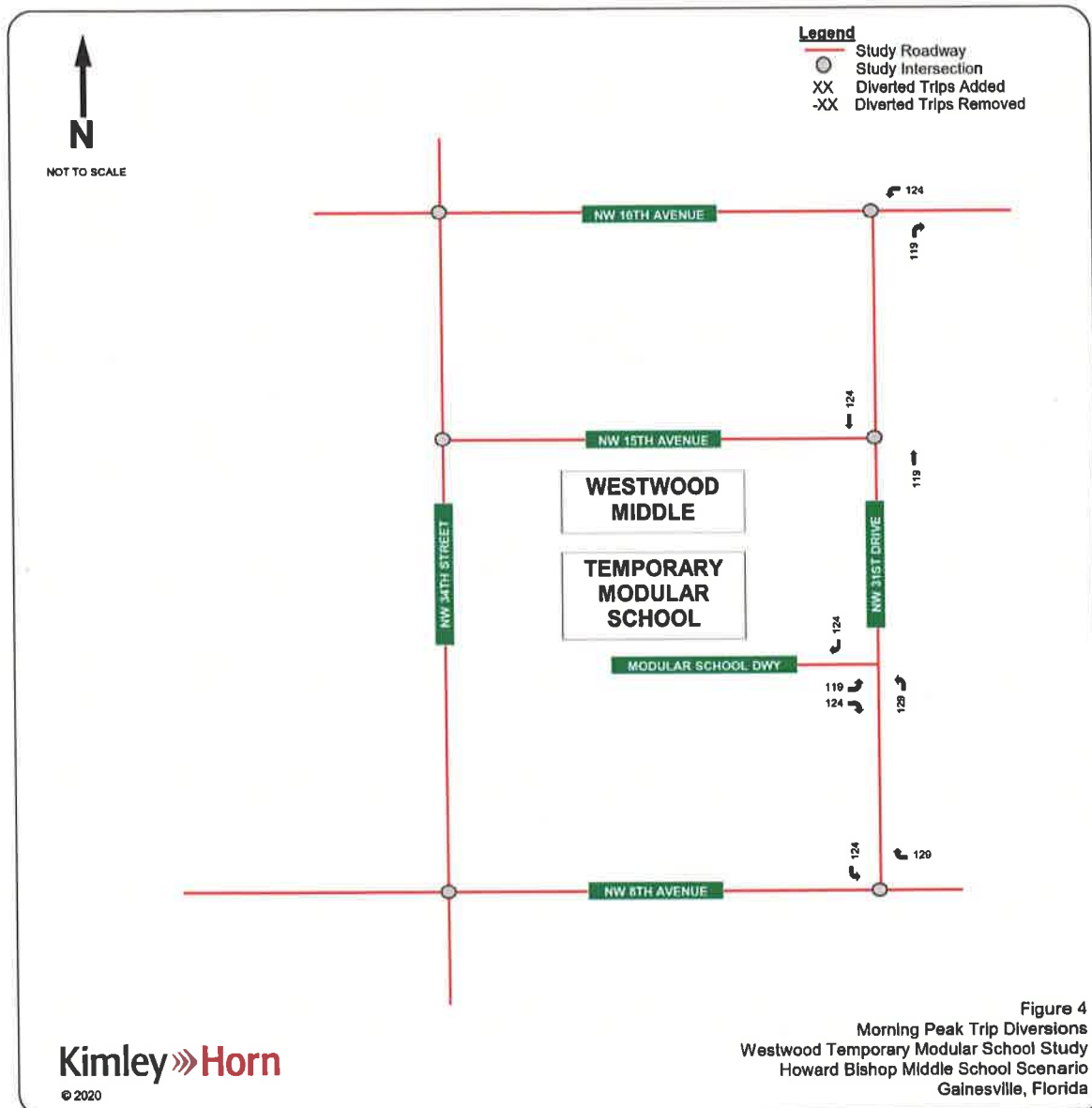
		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	38.5	D	-	51.0	D	-
	Northbound	33.0	C	-	47.9	D	-
	NBL	24.8	C	0.43	31.1	C	0.45
	NBT/R	35.6	D	0.60	52.4	D	0.78
	Southbound	39.7	D	-	46.2	D	-
	SBL	23.6	C	0.20	33.4	C	0.33
	SBT/R	37.4	D	0.74	48.4	D	0.68
	Eastbound	43.2	D	-	57.4	E	-
	EBL	31.1	C	0.28	38.8	D	0.48
	EBT/R	44.5	D	0.68	59.8	E	0.81
	Westbound	37.0	D	-	49.4	D	-
	WBL	26.8	C	0.36	36.8	D	0.52
	WBT/R	38.6	D	0.56	51.4	D	0.69
NW 31st Drive & NW 16th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	20.0	C	-	34.4	D	-
	NBL/R	20.0	C	0.35	34.4	D	0.62
	Westbound	-	-	-	-	-	-
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	15.4	C	-	15.3	C	-
	WBL/R	15.4	C	0.27	15.3	C	0.26
	Southbound	-	-	-	-	-	-
NW 31st Drive & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	-	-	-	-	-	-
	NBL	7.6	A	0.04	7.6	A	0.04
	Eastbound	10.3	B	-	10.9	B	-
NW 34th Street & NW 8th Avenue	Overall Intersection	33.8	C	-	50.1	D	-
	Northbound	31.8	C	-	48.4	D	-
	NBL	20.1	C	0.14	31.1	C	0.28
	NBT/R	32.6	C	0.74	50.1	D	0.82
	Southbound	31.5	C	-	46.9	D	-
	SBL	21.0	C	0.10	33.0	C	0.17
	SBT/R	32.0	C	0.70	47.7	D	0.77
	Eastbound	40.4	D	-	61.3	E	-
	EBL	30.9	C	0.23	46.7	D	0.27
	EBT/R	41.9	D	0.62	63.3	E	0.68
	Westbound	31.5	C	-	44.5	D	-
	WBL	24.2	C	0.41	37.1	D	0.53
	WBT/R	34.1	C	0.43	47.0	D	0.47
NW 8th Avenue & NW 31st Drive	Overall Intersection	-	-	-	-	-	-
	Eastbound	-	-	-	-	-	-
	EBL	8.8	A	0.04	9.2	A	0.07
	Southbound	23.3	C	-	24.0	C	-
	SBL/R	23.3	C	0.44	24.0	C	0.40

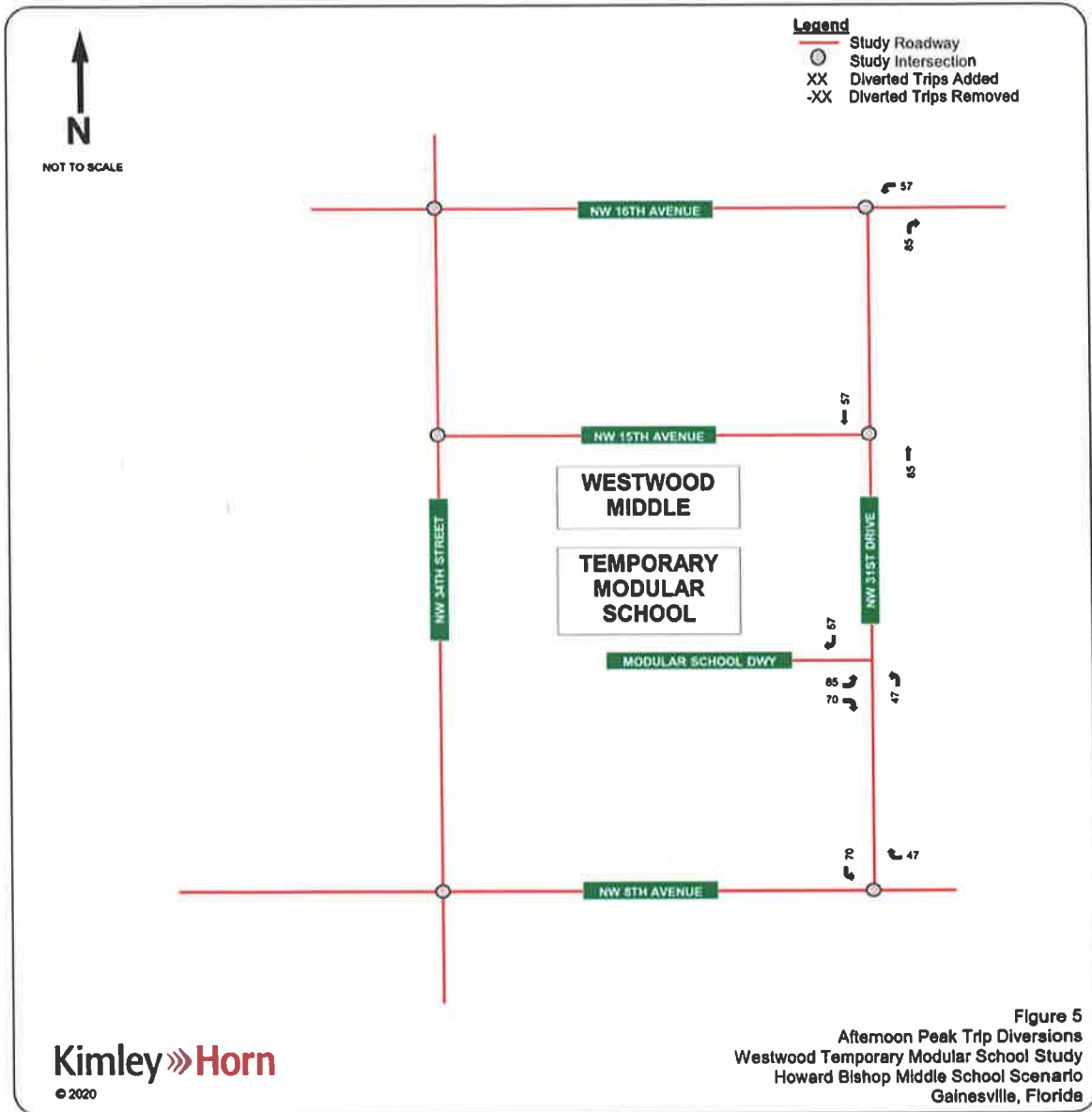
Temporary Traffic Projections/Diversions

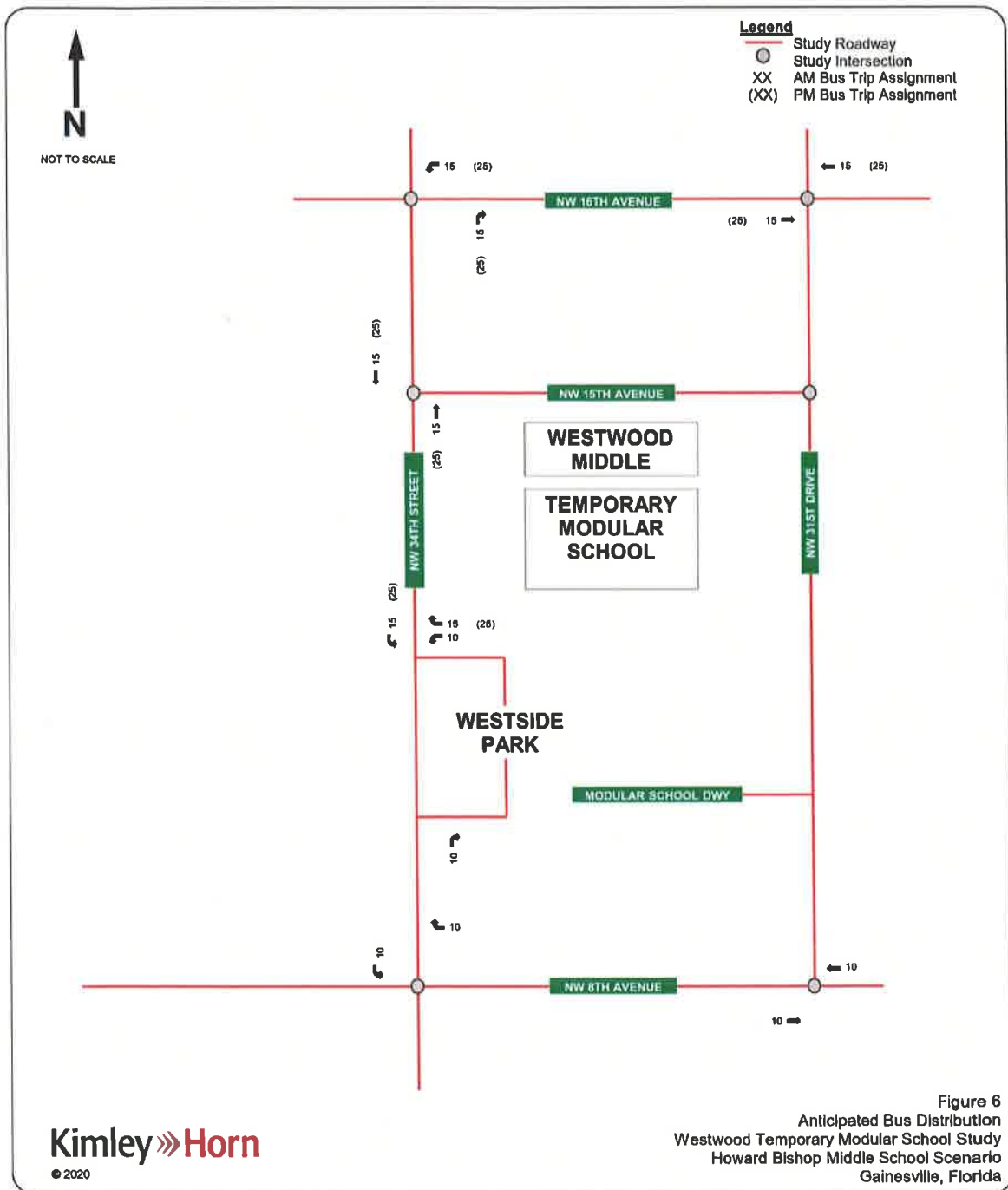
Howard Bishop Middle School is approximately 3.5 miles east of Westwood Middle School, generally located north of NE 16th Avenue and east of NE 9th Street. All diverted school traffic associated with parent and bus trips at the Temporary Modular School will come from and depart toward the east along either NW 16th Avenue or NW 8th Avenue. The number of trips forecasted to each route is estimated based on the directionality of entering and exiting trips at the Howard Bishop Middle School during data collection; trips coming from and going to the south are projected to utilize NW 8th Avenue and trips coming from and going to the north are projected to utilize NW 16th Avenue. Note that the number of trips diverted to the study intersections is assumed to be the same for both bell schedule scenarios for Howard Bishop Middle School.

The number of vehicle-trips assumed to and from the Temporary Modular School is anticipated to be approximately 11 percent (11%) greater than existing driveway volumes counted at Howard Bishop Middle School since approximately 11 percent (11%) of the student population lives within one mile of Howard Bishop Middle School and would no longer be likely to walk or bicycle to school. **Figure 4** and **Figure 5** illustrate the trip distribution estimates for the Howard Bishop Middle School scenario during the school AM peak hour and school PM peak hour, respectively. This provides for a conservative analysis since it is assumed that the majority of these students would likely be bussed.

The number of buses utilizing each route was provided by ACPS in a memorandum provided on February 14, 2020. The ACPS memorandum is included in **Appendix C**. The existing Westwood Middle School bus loop on NW 31st Drive does not have sufficient capacity for the projected 25 buses that would serve Howard Bishop Middle School students. Therefore, it is recommended that the buses for Howard Bishop Middle School utilize the Westside Park parking lot along NW 34th Street and a path be provided for students to reach the Temporary Modular School from there. Note that improvements are proposed for Westside Park from February 2020 through Fall 2020, which may limit the feasibility of utilizing the parking area for buses. **Figure 6** depicts the assignment of buses to study area intersections.







Temporary Traffic Conditions Operations Analysis

First Scenario: Howard Bishop Staggered 45-Minutes Later

Temporary conditions at the study area intersections for the 2020–2021 school year are forecasted based on background growth of the existing turning movement volumes (**Figure 2**) and the addition of parent and bus traffic diverted from Howard Bishop Middle School to the Temporary Modular School. The temporary turning movement volumes during the 2020–2021 school year are illustrated in **Figure 7** for the first scenario. Intersection volume development worksheets detailing the temporary turning movement volume development for each intersection are provided in **Appendix E**.

The temporary future intersection operating conditions were evaluated using *Synchro 10* software. Results are provided in terms of LOS, V/C ratio, and delay. **Table 3** summarizes the temporary intersection operating conditions at the six (6) study area intersections during the AM peak (9:00 AM to 10:00 AM) and PM peak (4:00 PM to 5:00 PM) of the proposed Howard Bishop Middle School first scenario bell schedule during the 2020–2021 school year.

All study area intersections are expected to continue to operate at their adopted LOS standard or better during the school's AM and PM peak hours with the inclusion of Howard Bishop Middle School traffic at the Temporary Modular School based on the first scenario bell schedule. All movement V/C ratios are less than one, signifying sufficient capacity for the existing volumes. *Synchro* outputs are provided in **Appendix D**.

The impacts of Temporary Modular School traffic on roadway segments within the study area were also evaluated for the school AM and PM peak hours. Peak hour directional service capacities for area roadways were determined based on daily roadway service capacities published in the Gainesville Metropolitan Transportation Planning Organization (MTPo) Multimodal LOS Report. Existing directional segment volumes, background directional segment volumes, and future directional segment volumes including trip diversions to the Temporary Modular School were compared to the respective peak hour directional capacities of area roadways. No roadway segments were determined to exceed their peak hour directional service capacities under the Howard Bishop Middle School first scenario bell schedule during the 2020–2021 school year. The results of the segment analyses are depicted in **Table 4**.

The impacts of the Howard Bishop Middle School first scenario are most concentrated at the stop-controlled intersections at the northern and southern termini of NW 31st Drive. The Signal Warrant Analysis section of this report will further discuss the impacts of added traffic volumes at those two intersections.

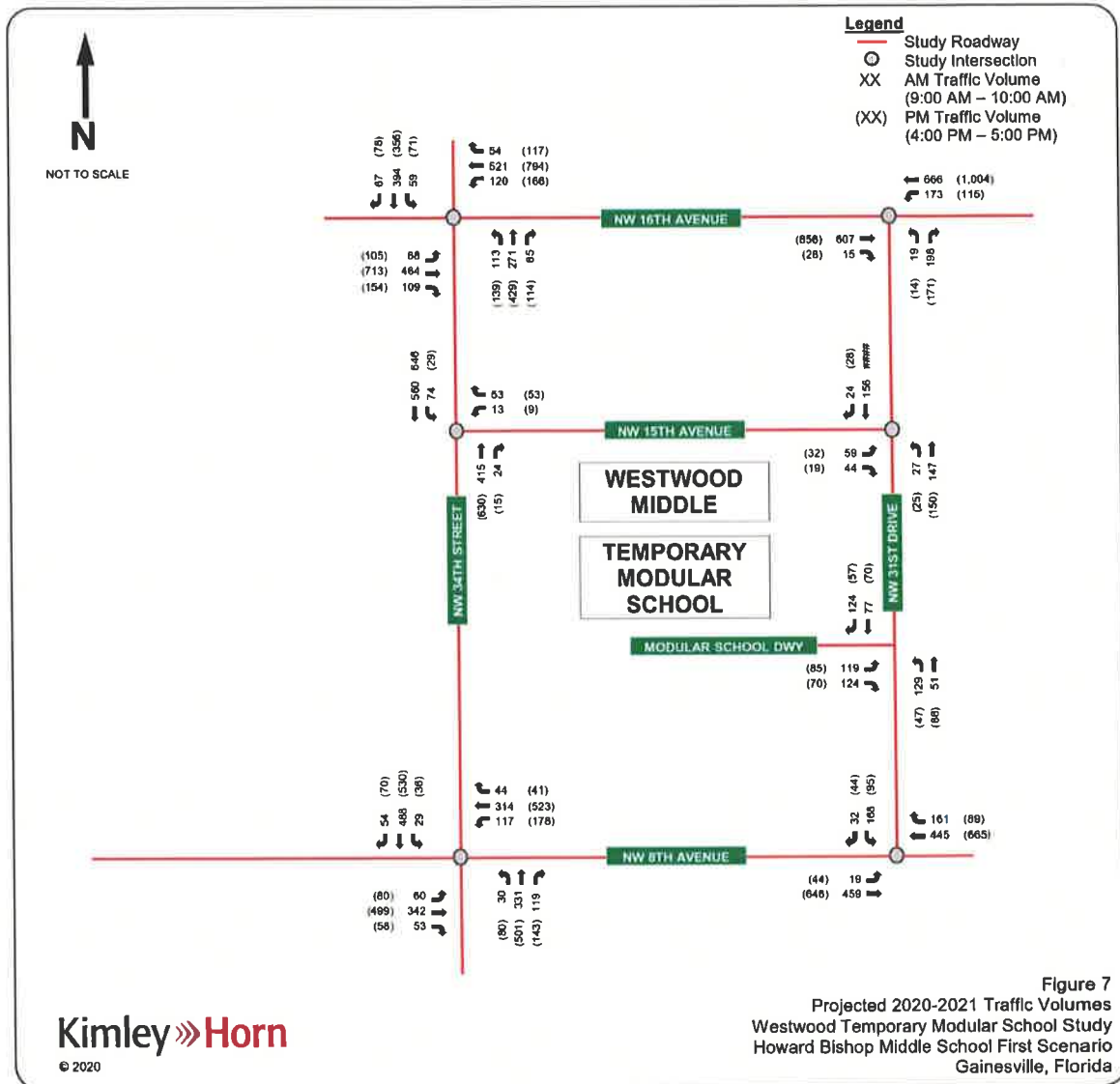


Table 3: Temporary (2020–2021) Intersection Operations, Howard Bishop First Scenario

		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	39.2	D	-	57.6	E	-
	Northbound	33.0	C	-	13.5	B	-
	NBL	25.7	C	0.43	25.0	C	0.40
	NBT/R	35.3	C	0.57	10.6	B	0.72
	Southbound	41.1	D	-	37.0	D	-
	SBL	24.1	C	0.18	24.5	C	0.18
	SBT/R	43.3	D	0.76	39.0	D	0.60
	Eastbound	45.0	D	-	83.2	F	-
	EBL	32.8	C	0.27	45.3	D	0.65
	EBT/R	46.4	D	0.67	87.8	F	0.96
	Westbound	36.7	D	-	71.9	E	-
	WBL	26.8	C	0.41	59.6	E	0.85
	WBT/R	38.8	D	0.56	74.2	E	0.91
NW 31st Drive & NW 16th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	31.6	D	-	32.3	D	-
	NBL/R	31.6	D	0.68	32.3	D	0.62
	Westbound	-	-	-	-	-	-
	WBL	10.6	B	0.24	11.3	B	0.18
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	14.2	B	-	15.3	C	-
	WBL/R	14.2	B	0.17	15.3	C	0.16
	Southbound	-	-	-	-	-	-
	SBL	8.8	A	0.09	9.1	A	0.03
NW 31st Drive & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	-	-	-	-	-	-
	NBL	8.2	A	0.05	7.6	A	0.02
	Eastbound	15.8	C	-	10.8	B	-
	EBL	19.6	C	0.33	11.7	B	0.07
	EBR	10.8	B	0.13	9.2	A	0.03
NW 34th Street & NW 8th Avenue	Overall Intersection	35.4	D	-	52.3	D	-
	Northbound	30.5	C	-	28.1	C	-
	NBL	22.0	C	0.16	22.1	C	0.25
	NBT/R	31.0	C	0.68	28.8	C	0.66
	Southbound	34.7	C	-	39.5	D	-
	SBL	19.7	B	0.11	21.0	C	0.12
	SBT/R	35.5	D	0.79	40.7	D	0.62
	Eastbound	42.8	D	-	81.4	F	-
	EBL	33.2	C	0.21	51.9	D	0.41
	EBT/R	44.3	D	0.64	85.2	F	0.89
	Westbound	33.9	C	-	62.0	E	-
	WBL	26.2	C	0.38	57.5	E	0.77
	WBT/R	36.5	D	0.43	11.5	E	0.72
NW 8th Avenue & NW 31st Drive	Overall Intersection	-	-	-	-	-	-
	Eastbound	-	-	-	-	-	-
	EBL	8.9	A	0.02	9.6	A	0.06
	Southbound	34.4	D	-	47.0	E	-
	SBL/R	32.9	D	0.65	47.0	E	0.65

Table 4: Segment Analyses – Howard Bishop Middle School (2020–2021) First Scenario

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Notes:

1. Reliability attributes were obtained from the Guineville Metropolis Transportation Planning Organization Multimodal Level of Service Report (2016).
2. Peak Hour Directional Service Volumes are reported based on the Florida Department of Transportation Quality Level of Service Handbook (2013).
3. Peak Hour Directional Volumes are calculated based on the approach and departure volumes from turning movement counts collected in January 2020.
4. Peak Hour Directional volumes are calculated based on the approach and departure volumes at study area intersections under future background conditions.
5. Project traffic was calculated as the maximum across the segment.
6. Peak-hour Directional Volumes are the sum of the future background conditions volumes and project traffic.

Second Scenario: Westwood Staggered 20-Minutes Later

Temporary conditions at the study area intersections for the 2020–2021 school year are forecasted based on background growth of the existing turning movement volumes (**Figure 3**) and the addition of parent and bus traffic diverted from Howard Bishop Middle School to the Temporary Modular School during the same peak periods as Westwood Middle School. The temporary turning movement volumes during the 2020–2021 school year are illustrated in **Figure 8** for the second scenario. Intersection volume development worksheets detailing the temporary turning movement volume development for each intersection are provided in **Appendix E**.

The temporary future intersection operating conditions were evaluated using *Synchro 10* software. Results are provided in terms of LOS, V/C ratio, and delay. **Table 5** summarizes the temporary intersection operating conditions at the six (6) study area intersections during the AM peak (8:30 AM to 9:30 AM) and PM peak (3:30 PM to 4:30 PM) of the proposed Howard Bishop Middle School second scenario bell schedule during the 2020–2021 school year.

During the school's AM and PM peak hours, the study intersections are expected to continue to operate at their adopted LOS standard or better with the exception of the stop-controlled approaches at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue, which are expected to operate at LOS F. This result is common when a minor street stop-controlled approach crosses a high-volume major street free-flow approach during peak periods.

In order to address the operational issues anticipated on the minor street stop-controlled approaches at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue, it is recommended that law enforcement officer (LEO) control of traffic be implemented at these intersections during the school's arrival and dismissal periods during the 2020–2021 school year. This operational plan is common for facilities of this type in similar locations. The LEO will facilitate the movement of traffic through the two subject intersections, and resulting operations are expected to be similar to a signal control stopping the major street movements to allow for movements to and from the minor street. In order to replicate LEO control, the intersections were analyzed as a signalized intersection using *Synchro 10* software. The results are summarized in **Table 5**. Both intersections would be expected to operate at their adopted LOS standard or better during the school's AM and PM peak hours with LEO control.

Synchro outputs are provided in **Appendix D**.

The impacts of Temporary Modular School traffic on roadway segments within the study area were also evaluated for the school's AM and PM peak hours. Peak hour directional service capacities for area roadways were determined based on daily roadway service capacities published in the Gainesville MTPo Multimodal LOS Report. Existing directional segment volumes, background directional segment volumes, and future directional segment volumes including trip diversions to the Temporary Modular School were compared to the respective peak hour directional capacities of area roadways. No roadway segments were determined to exceed their peak hour directional service capacities under the Howard Bishop Middle School second scenario bell schedule during the 2020–2021 school year. The results of the segment analyses are depicted in **Table 6**.

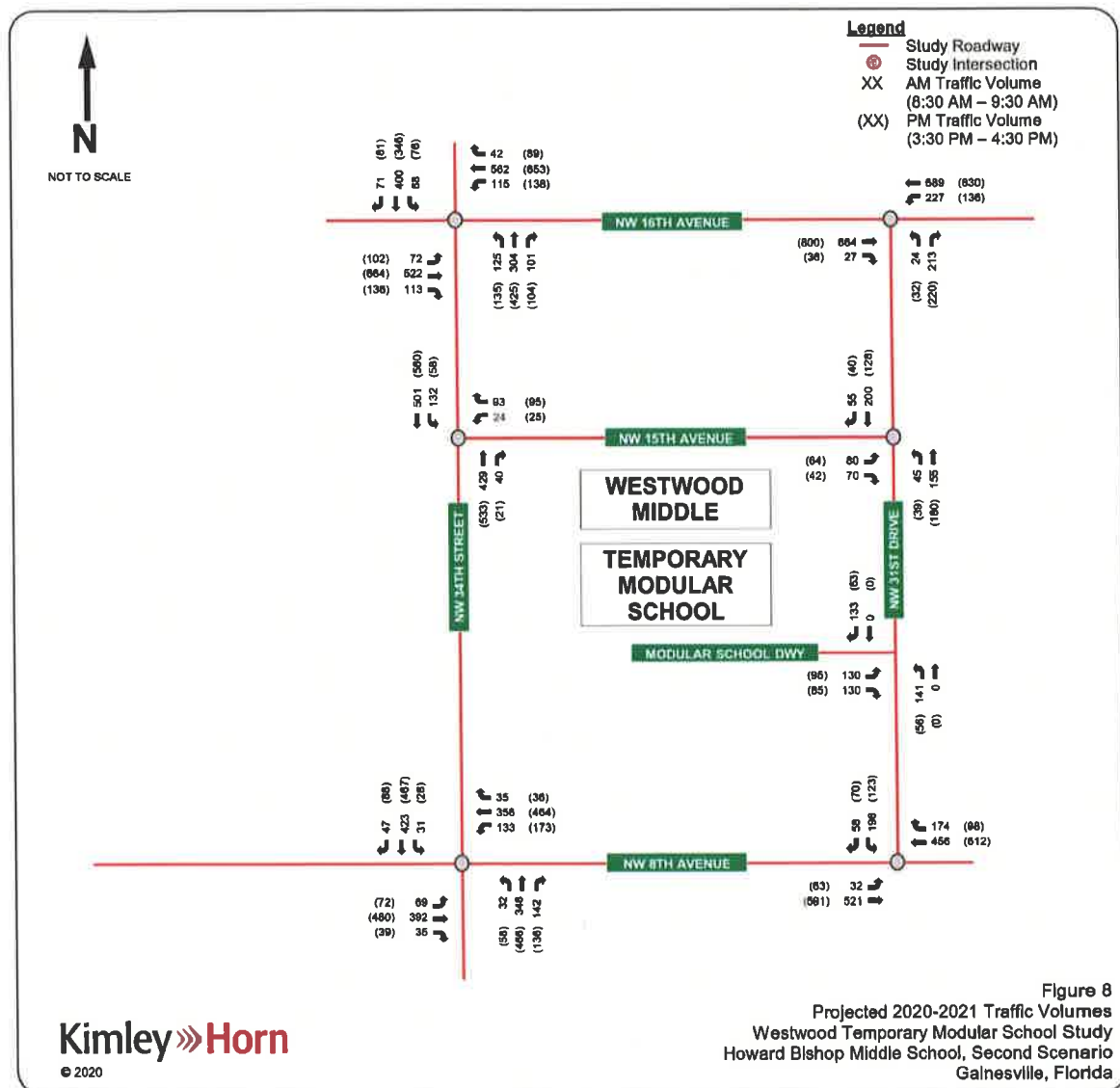


Table 5: Temporary (2020–2021) Intersection Operations, Howard Bishop Second Scenario

		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	39.8	D	-	56.0	E	-
	Northbound	34.8	C	-	51.2	D	-
	NBL	25.9	C	0.44	32.2	C	0.40
	NBT/R	37.6	D	0.63	56.0	E	0.72
	Southbound	41.3	D	-	47.0	D	-
	SBL	24.9	C	0.21	35.4	D	0.18
	SBT/R	43.7	D	0.75	49.1	D	0.60
	Eastbound	45.1	D	-	67.0	E	-
	EBL	32.5	C	0.28	42.8	D	0.65
	EBT/R	46.6	D	0.69	70.1	E	0.96
	Westbound	37.2	D	-	53.4	D	-
	WBL	27.2	C	0.40	43.1	D	0.85
	WBT/R	39.1	D	0.55	55.3	E	0.91
NW 31st Drive & NW 16th Avenue (Unsignalized)	Overall Intersection	-	-	-	-	-	-
	Northbound	38.7	E	-	83.5	F	-
	NBL/R	38.7	E	0.73	83.5	F	0.97
	Westbound	-	-	-	-	-	-
	WBL	10.8	B	0.28	11.2	B	0.21
NW 31st Drive & NW 16th Avenue (LEO Control)	Overall Intersection	15.9	B	-	14.4	B	-
	Northbound	27.4	C	-	28.2	C	-
	NBL/R	27.4	C	0.33	28.2	C	0.41
	Westbound	10.4	B	-	8.6	A	-
	WBL	27.8	C	0.69	30.2	C	0.64
	WBT	4.7	A	0.32	5.1	A	0.40
	Eastbound	19.3	B	-	17.0	B	-
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	15.8	C	-	16.0	C	-
	WBL/R	15.8	C	0.28	16.0	C	0.28
	Southbound	-	-	-	-	-	-
	SBL	9.1	A	0.14	8.9	A	0.06
NW 31st Drive & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	-	-	-	-	-	-
	NBL	8.0	A	0.04	7.8	A	0.04
	Eastbound	12.7	B	-	13.0	B	-
	EBL	14.8	B	0.21	15.2	C	0.21
	EBR	10.3	B	0.11	9.7	A	0.07
NW 34th Street & NW 8th Avenue	Overall Intersection	34.6	C	-	50.7	D	-
	Northbound	34.5	C	-	48.6	D	-
	NBL	20.9	C	0.14	31.5	C	0.29
	NBT/R	35.4	D	0.77	50.2	D	0.82
	Southbound	31.5	C	-	47.4	D	-
	SBL	20.9	C	0.14	33.4	C	0.18
	SBT/R	32.2	C	0.71	48.2	D	0.78
	Eastbound	40.7	D	-	62.4	E	-
	EBL	31.1	C	0.24	47.5	D	0.28
	EBT/R	42.3	D	0.62	64.5	E	0.69
	Westbound	32.0	C	-	45.3	D	-
	WBL	24.4	C	0.41	38.0	D	0.54
	WBT/R	34.6	C	0.44	47.9	D	0.48
NW 8th Avenue & NW 31st Drive (Unsignalized)	Overall Intersection	-	-	-	-	-	-
	Eastbound	-	-	-	-	-	-
	EBL	9.4	A	0.04	9.4	A	0.07
	Southbound	146.5	F	-	55.2	F	-
NW 8th Avenue & NW 31st Drive (LEO Control)	Overall Intersection	25.5	C	-	19.0	B	-
	Eastbound	10.7	B	-	9.8	A	-
	EBL	61.3	E	0.64	49.4	D	0.62
	EBT	7.6	A	0.29	5.6	A	0.25
	Westbound	27.1	C	-	20.0	B	-
	WBT/R	27.1	C	0.85	20.0	B	0.76
	Southbound	54.0	D	-	46.9	D	-
	SBL/R	54.0	D	0.87	46.9	D	0.75

Table 6: Segment Analyses – Howard Bishop Middle School (2020–2021) Second Scenario

Roadway From To	Roadway Attributes ¹			Peak Hour Directional Service Capacity ²		Existing (2020) AM Peak Hour Conditions		Existing (2020) PM Peak Hour Conditions		Future (2021) Background AM Peak Hour Conditions		Future (2021) Background PM Peak Hour Conditions		AM Peak Hour Project Traffic		PM Peak Hour Project Traffic		Future (2021) Total AM Peak Hour Conditions		Future (2021) Total PM Peak Hour Conditions	
	Functional Classification	Adopted LOS	Number of Lanes	Speed Limit	Direction	NB/EB Volume ³	SB/WB Volume ³	LOS	Direction	NB/EB Volume ⁴	SB/WB Volume ⁴	LOS	Direction	NB/EB Volume ⁵	SB/WB Volume ⁵	LOS	Direction	NB/EB Volume ⁶	SB/WB Volume ⁶	LOS	Direction
SR 121/NW 34th Street SR 261/University Ave. NW 19th Avenue NW 16th Avenue SR 222/NW 39th Ave	I State	E	20 2U	35 40		518 414	612 533	D C		523 418	618 538	D C		15 0	15 0			538 418	633 538	D C	
NW 16th Avenue NW 43rd Street US 44/NW 13th Street	I Major County	E	40	40		736	769	C		743	777	C		134	139			877	916	C	
NW 8th Avenue SR 251/Newberry Road W 22nd Street	I Major City	E	4U	40		577	511	C		583	516	C		134	139			717	655	C	
NW 31st Drive NW 8th Avenue NW 16th Avenue	City	E	2U	25		117	144	C		119	145	C		129	124			247	269	D	
NW 19th Avenue SR 121/NW 34th Street NW 31st Drive	City	E	2U	25		171	116	C		173	117	C		0	0			173	117	C	

- Notes:
1. Roadway attributes were obtained from the Gainesville Metropolitan Transportation Planning Organization Multimodal Level of Service Report (2018).
 2. Peak-hour Directional Service Volumes are reported based on the Florida Department of Transportation Quality Level of Service Handbook (2013).
 3. Peak-hour Directional Service Volumes are calculated based on the approach and departure volumes from turning movement counts collected in January 2020.
 4. Peak-hour Directional Volumes are calculated based on the approach and departure volumes at study area intersections under future background conditions.
 5. Project traffic was calculated as the maximum across the segment.
 6. Peak-hour Directional Volumes are the sum of the future background conditions, volume and project traffic.

WESTWOOD MIDDLE SCHOOL (2021–2022 SCHOOL YEAR)

The second school planned to operate from the Temporary Modular School is Westwood Middle School. Operations for Westwood Middle School will be conducted in the Temporary Modular School during the 2021–2022 school year.

Field Observations

Existing conditions were observed at Westwood Middle School during the school's arrival and dismissal peak periods on Tuesday, January 28, 2020. During the arrival period, it was observed that student drop-off times were spread throughout the morning, as opposed to being highly concentrated in the 15 to 30 minutes before first bell. Westwood Middle School hosts a Morning Study Hall period beginning at 7:15 AM during which many students are dropped off early.

The northbound queues at NW 34th Street and NW 16th Avenue were observed extending south past the intersection of NW 34th Street and NW 15th Avenue, which caused some back-up on the westbound NW 15th Avenue approach as well. At times, the crossing guard at the intersection of NW 34th Street and NW 15th Avenue directed traffic, stopping through traffic on NW 34th Street to allow westbound left- and right-turns from NW 15th Avenue and southbound left-turns onto NW 15th Avenue.

During the dismissal period, it was observed that the buses serving Westwood Middle School stack beyond the available capacity of the bus loop. The condition was brief, but in the few minutes before and after the final dismissal bell, at least one bus was observed waiting on NW 31st Drive outside of the driveway.

Bell Schedule

Westwood Middle School operates with the standard Alachua County Public Schools middle school bell schedule, with first bell at 9:25 AM and the final dismissal bell at 3:37 PM. Turning movements into and out of the Westwood Middle School driveways were collected from 8:00 AM to 10:00 AM and from 2:30 PM to 4:30 PM.

The bell schedule for Westwood Middle School is expected to remain during the 2021–2022 school year when Westwood Middle school occupies the Temporary Modular School.

Peak Traffic Conditions

Traffic conditions for the Temporary Modular School in the 2021–2022 school year are expected to be very similar to existing conditions, since traffic patterns would be nearly identical to existing conditions. The number of students who walk, bicycle, ride a bus, or get dropped off by parents is not expected to change. Minor adjustments are applied to the distribution of driveway volumes within the study area to account for the change of the parent drop-off and pick-up location from NW 15th Avenue to NW 31st Drive.

Existing Conditions at Study Area Intersections

Existing conditions at the study area intersections for the Westwood Middle School scenario are based on turning movement volumes during the hours surrounding the existing bell schedule. Turning movement volumes from 8:30 AM to 9:30 AM are utilized for the school's AM peak hour analysis and turning movement volumes from 3:30 PM to 4:30 PM are utilized for the school's PM peak hour analysis. The existing turning movement volumes utilized for the Westwood Middle School scenario are illustrated in **Figure 9**.

The intersection operating conditions were evaluated using *Synchro 10* software. Results are provided in terms of LOS, V/C ratio, and delay. **Table 7** summarizes the existing intersection operating conditions at the six (6) study area intersections during the AM peak (8:30 AM to 9:30 AM) and PM peak (3:30 PM to 4:30 PM) of the Westwood Middle School bell schedule.

All study area intersections operate at their adopted LOS standard or better during the school's AM and PM peak hours. All movement V/C ratios are less than one, signifying adequate capacity for the existing volumes. *Synchro* outputs are provided in **Appendix D**.

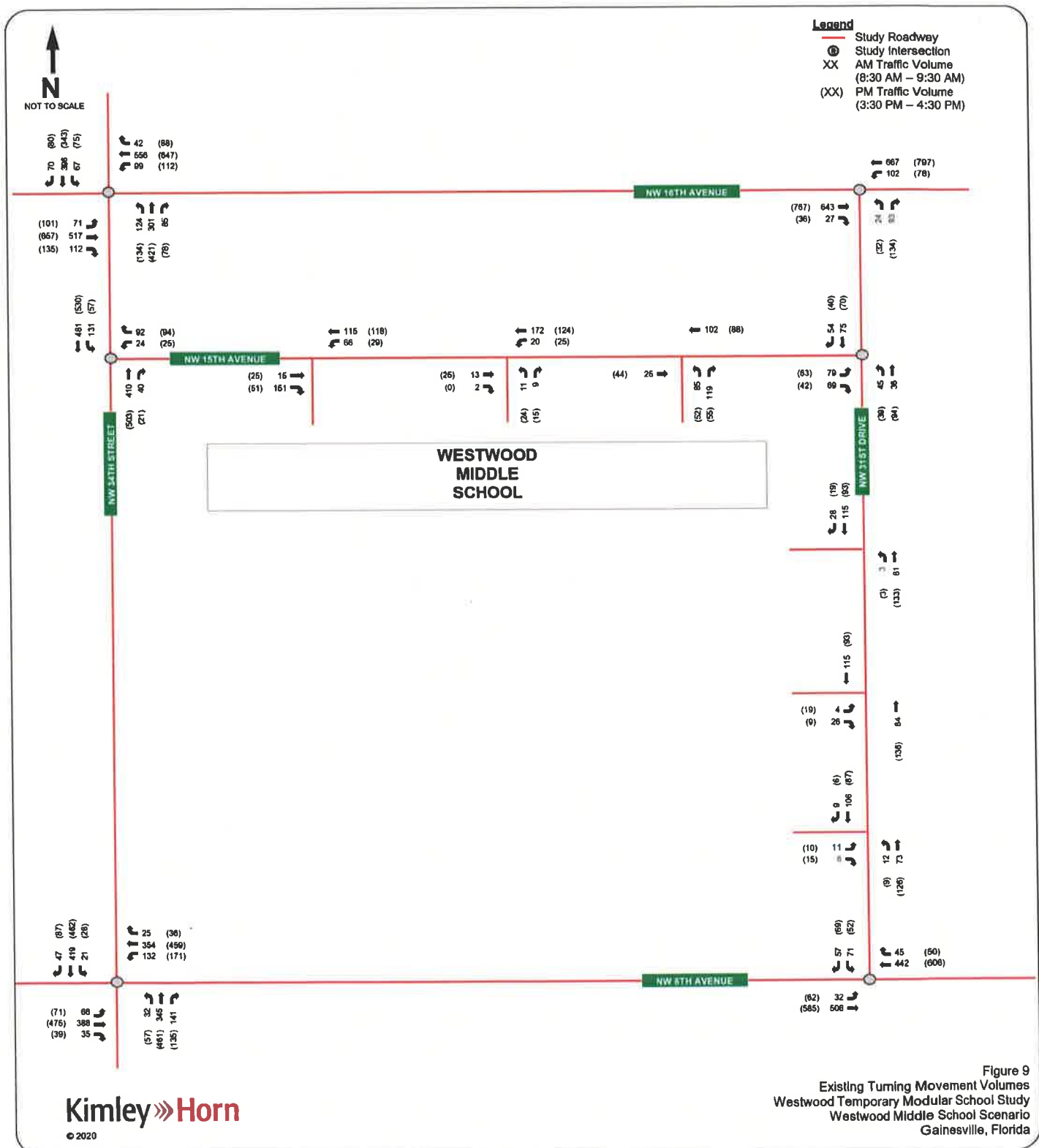


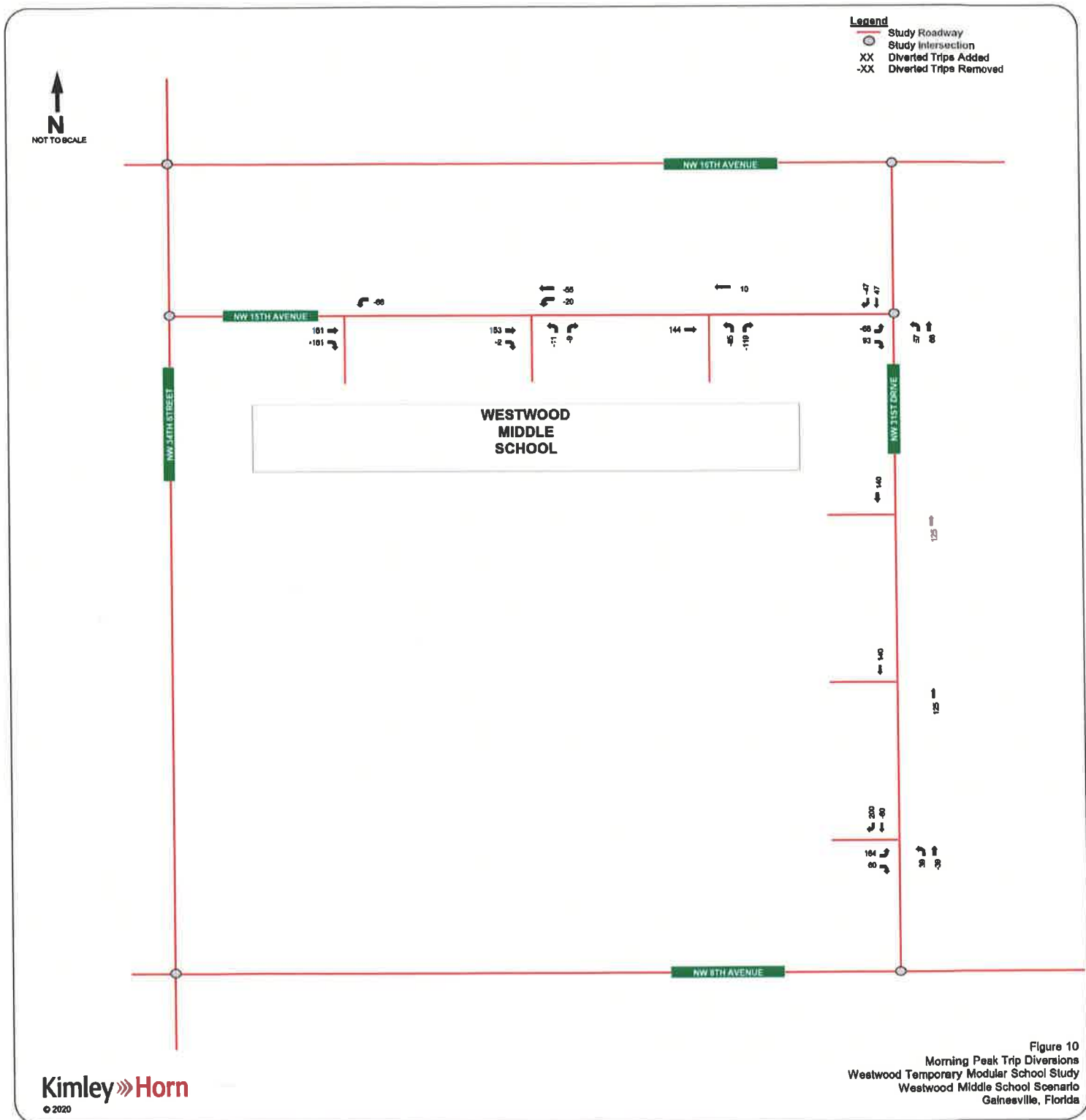
Table 7: Existing Conditions Intersection Operations, Westwood Scenario

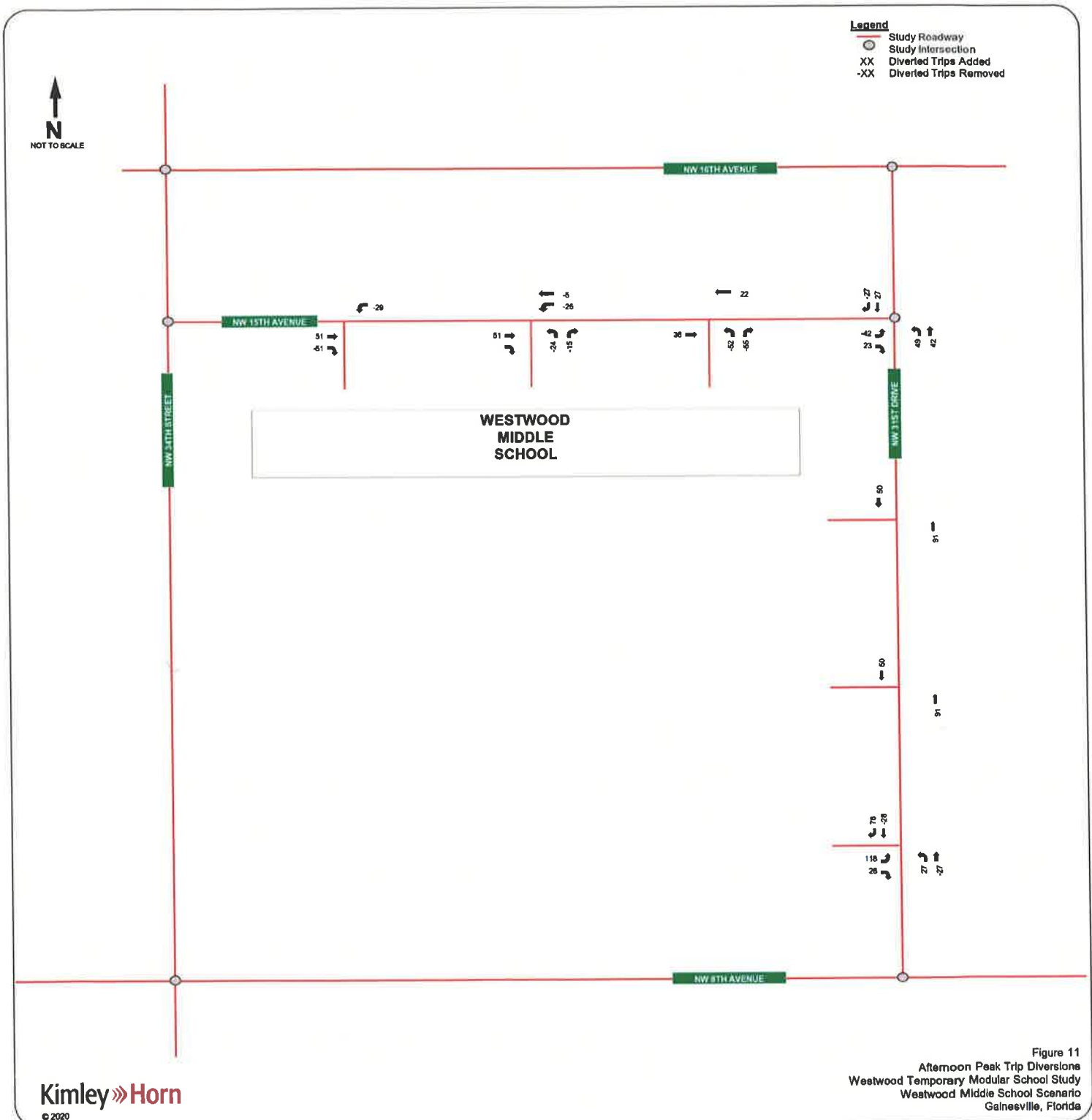
		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	38.5	D	-	51.0	D	-
	Northbound	33.0	C	-	47.9	D	-
	NBL	24.8	C	0.43	31.1	C	0.45
	NBT/R	35.6	D	0.60	52.4	D	0.78
	Southbound	39.7	D	-	46.2	D	-
	SBL	23.6	C	0.20	33.4	C	0.33
	SBT/R	37.4	D	0.74	48.4	D	0.68
	Eastbound	43.2	D	-	57.4	E	-
	EBL	31.1	C	0.28	38.8	D	0.48
	EBT/R	44.5	D	0.68	59.8	E	0.81
	Westbound	37.0	D	-	49.4	D	-
	WBL	26.8	C	0.36	36.8	D	0.52
	WBT/R	38.6	D	0.56	51.4	D	0.69
NW 31st Drive & NW 16th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	20.0	C	-	34.4	D	-
	NBL/R	20.0	C	0.35	34.4	D	0.62
	Westbound	-	-	-	-	-	-
	WBL	9.7	A	0.13	10.4	B	0.12
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	15.4	C	-	15.3	C	-
	WBL/R	15.4	C	0.27	15.3	C	0.26
	Southbound	-	-	-	-	-	-
	SBL	9.0	A	0.14	8.8	A	0.06
NW 31st Drive & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	-	-	-	-	-	-
	NBL	7.6	A	0.04	7.6	A	0.04
	Eastbound	10.3	B	-	10.9	B	-
	EBL	11.1	B	0.14	12.1	B	0.15
	EBR	9.3	A	0.09	9.2	A	0.07
NW 34th Street & NW 8th Avenue	Overall Intersection	33.8	C	-	50.1	D	-
	Northbound	31.8	C	-	48.4	D	-
	NBL	20.1	C	0.14	31.1	C	0.28
	NBT/R	32.6	C	0.74	50.1	D	0.82
	Southbound	31.5	C	-	46.9	D	-
	SBL	21.0	C	0.10	33.0	C	0.17
	SBT/R	32.0	C	0.70	47.7	D	0.77
	Eastbound	40.4	D	-	61.3	E	-
	EBL	30.9	C	0.23	46.7	D	0.27
	EBT/R	41.9	D	0.62	63.3	E	0.68
	Westbound	31.5	C	-	44.5	D	-
	WBL	24.2	C	0.41	37.1	D	0.53
	WBT/R	34.1	C	0.43	47.0	D	0.47
NW 8th Avenue & NW 31st Drive	Overall Intersection	-	-	-	-	-	-
	Eastbound	-	-	-	-	-	-
	EBL	8.8	A	0.04	9.2	A	0.07
	Southbound	23.3	C	-	24.0	C	-
	SBL/R	23.3	C	0.44	24.0	C	0.40

Temporary Traffic Projections/Diversions

Diverted traffic for the Westwood Middle School scenario is contained to NW 15th Avenue and NW 31st Drive, since the student population is consistent with existing conditions. Adjustments for diverted trips were made to address the change in parent drop-off/pick-up location from NW 15th Avenue to NW 31st Drive.

Figure 10 and **Figure 11** illustrate the trip diversion estimates for the Westwood Middle School scenario during the school's AM and PM peak hour, respectively. It is assumed that buses will utilize the existing bus loop on NW 31st Drive for this scenario.





Temporary Traffic Conditions Operations Analysis

Temporary conditions at the study area intersections for the 2021–2022 school year are forecasted based on background growth of the existing turning movement volumes and the diversion of parent drop-off/pick-up traffic to the Temporary Modular School driveway on NW 31st Drive. The temporary turning movement volumes during the 2021–2022 school year are illustrated in **Figure 12**. Intersection volume development worksheets detailing the temporary turning movement volume development for each intersection are provided in **Appendix E**.

The temporary future intersection operating conditions were evaluated using *Synchro 10* software. Results are provided in terms of LOS, V/C ratio, and delay. **Table 8** summarizes the temporary intersection operating conditions at the six (6) study area intersections during the AM peak (8:30 AM to 9:30 AM) and PM peak (3:30 PM to 4:30 PM) of the Westwood Middle School bell schedule during the 2021–2022 school year.

All study area intersections are expected to continue to operate at their adopted LOS standard or better during the school's AM and PM peak hours under the Westwood Middle School scenario. All movement V/C ratios are less than one, signifying adequate capacity for the existing volumes. *Synchro* outputs are provided in **Appendix D**.



- Legend**
- Study Roadway
 - Study Intersection
 - XX AM Traffic Volume (8:30 AM – 9:30 AM)
 - (XX) PM Traffic Volume (3:30 PM – 4:30 PM)

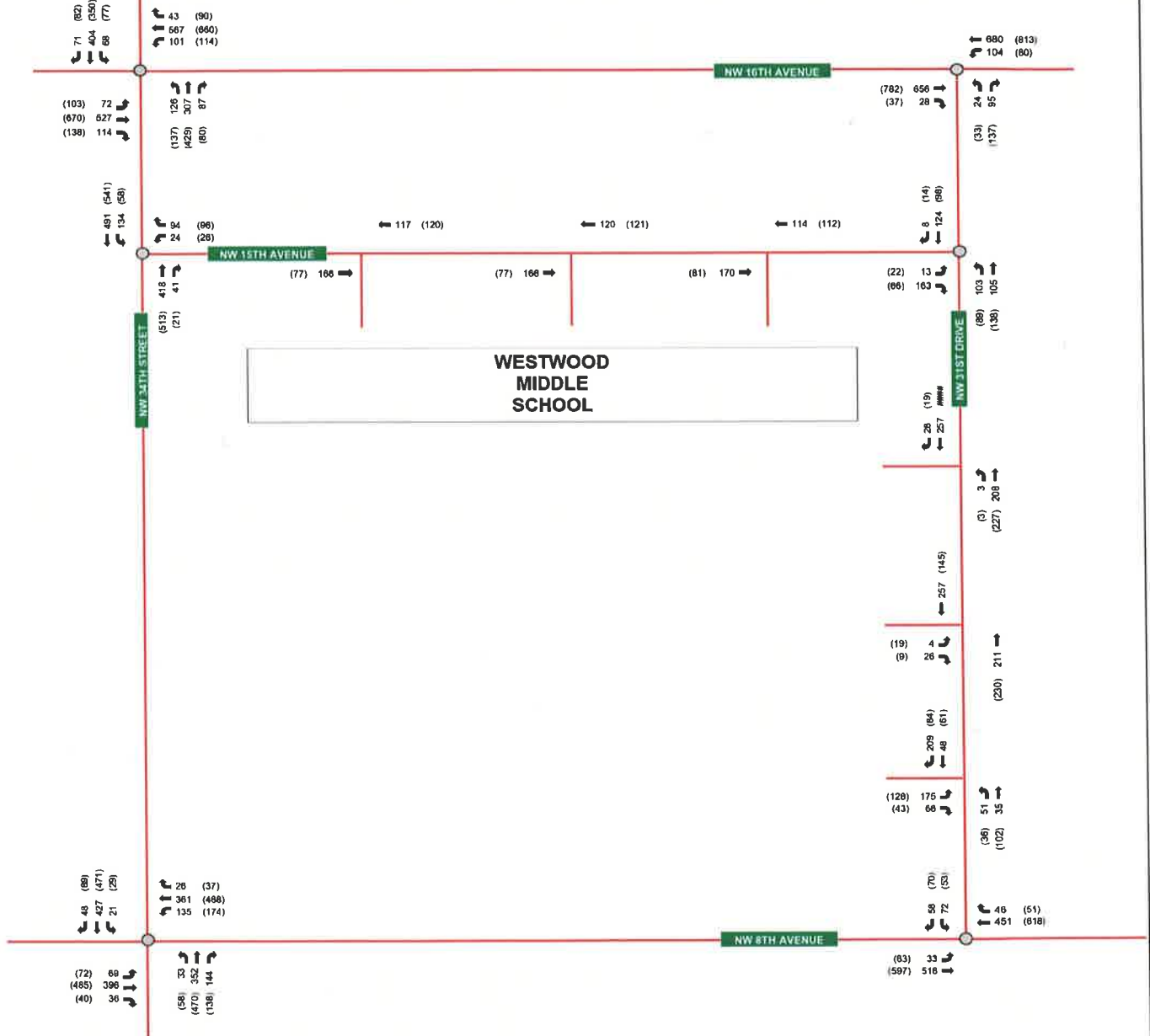


Figure 12
Projected 2021–2022 Turning Movement Volumes
Westwood Temporary Modular School Study
Westwood Middle School Scenario
Gainesville, Florida

Table 8: Temporary (2021–2022) Intersection Operations, Westwood Scenario

		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	39.5	D	-	52.8	D	-
	Northbound	33.6	C	-	49.6	D	-
	NBL	25.4	C	0.44	32.3	C	0.48
	NBT/R	36.2	D	0.61	54.3	D	0.79
	Southbound	40.7	D	-	48.0	D	-
	SBL	24.2	C	0.20	34.8	C	0.35
	SBT/R	43.0	D	0.75	50.4	D	0.69
	Eastbound	44.4	D	-	59.3	E	-
	EBL	32.0	C	0.29	39.7	D	0.50
	EBT/R	45.8	D	0.69	61.8	E	0.82
	Westbound	37.9	D	-	51.1	D	-
	WBL	27.6	C	0.37	38.3	D	0.54
	WBT/R	39.7	D	0.57	53.1	D	0.70
NW 31st Drive & NW 16th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	20.5	C	-	38.8	E	-
	NBL/R	20.5	C	0.36	38.8	E	0.66
	Westbound	-	-	-	-	-	-
	WBL	9.8	A	0.13	10.5	B	0.12
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	15.6	C	-	15.6	C	-
	WBL/R	15.6	C	0.28	15.6	C	0.28
	Southbound	-	-	-	-	-	-
NW 31st Drive & NW 15th Avenue	SBL	9.0	A	0.14	8.8	A	0.06
	Overall Intersection	-	-	-	-	-	-
	Northbound	-	-	-	-	-	-
	NBL	7.8	A	0.09	7.8	A	0.09
	Eastbound	10.4	B	-	10.8	B	-
	EBL	13.0	B	0.03	14.5	B	0.08
NW 34th Street & NW 8th Avenue	EBR	10.2	B	0.22	9.5	A	0.11
	Overall Intersection	34.6	C	-	51.4	D	-
	Northbound	32.5	C	-	49.6	D	-
	NBL	20.5	C	0.14	32.0	C	0.29
	NBT/R	33.4	C	0.74	51.2	D	0.83
	Southbound	32.0	C	-	48.2	D	-
	SBL	21.4	C	0.10	34.0	C	0.19
	SBT/R	32.5	C	0.71	48.9	D	0.78
	Eastbound	41.6	D	-	63.1	E	-
	EBL	31.7	C	0.24	47.9	D	0.28
	EBT/R	43.1	D	0.63	65.2	E	0.69
	Westbound	32.3	C	-	45.7	D	-
NW 8th Avenue & NW 31st Drive	WBL	24.9	C	0.42	38.4	D	0.55
	WBT/R	34.9	C	0.43	48.2	D	0.48
	Overall Intersection	-	-	-	-	-	-
	Eastbound	-	-	-	-	-	-
	EBL	8.8	A	0.04	9.3	A	0.07
	Southbound	24.4	C	-	25.1	D	-
	SBL/R	24.4	C	0.46	25.1	D	0.42

LITTLEWOOD ELEMENTARY SCHOOL (2022–2023 SCHOOL YEAR)

The third school planned to operate from the Temporary Modular School is Littlewood Elementary School. Operations for Littlewood Elementary School will be conducted in the Temporary Modular School during the 2022–2023 school year.

Field Observations

Existing conditions were observed at Littlewood Elementary School during the arrival and dismissal peak periods on Tuesday, January 28, 2020. During the arrival period, several buses were observed using the Westside Park parking area as a staging area before entering the bus loop on NW 34th Street, since the bus loop is only long enough to accommodate approximately five buses at one time. Additionally, the Westside Park parking area was utilized by parents avoiding the drop-off queue on the south side of the school. The drop-off queue was observed winding throughout the southern portion of the parking area and backed up into NW 8th Avenue (both the eastbound left-turn and the westbound right-turn movement) at times during the arrival period. It was also observed that a law enforcement officer set up a traffic barrier during the arrival period to prohibit southbound left-turns from the school driveway.

During the school's dismissal period, queues from the parent pick-up queue again exceeded the available capacity in the southern lot, resulting in backup into the inside eastbound through lane and the outside westbound through lane on NW 8th Avenue. There is no eastbound left-turn lane on NW 8th Avenue for vehicles turning into Littlewood Elementary School to queue.

Bell Schedule

Littlewood Elementary School operates with the standard Alachua County Public Schools elementary school bell schedule, with first bell at 7:40 AM and the final dismissal bell at 1:47 PM. Turning movements into and out of the Littlewood Elementary School driveways were collected from 7:00 AM to 9:00 AM and from 1:00 PM to 3:00 PM. The bell schedule for Littlewood Elementary School is expected to remain during the 2022–2023 school year when Littlewood Elementary school occupies the Temporary Modular School.

Peak Traffic Conditions

In order to evaluate the peak traffic conditions anticipated for the Temporary Modular School in the 2022–2023 school year, the existing turning movement volumes are combined with the forecasted drop-off and pick-up peak hour traffic volumes to and from Littlewood Elementary School. The number of students who walk, bicycle, ride a bus, or get dropped off by parents is not expected to change since Littlewood Elementary School is only one-quarter mile south of the Temporary Modular School. When projecting trips to and from the Temporary Modular School, the magnitude of driveway volumes at Littlewood Elementary School were assumed to remain the same as existing.

Existing Conditions at Study Area Intersections

Existing conditions at the study area intersections for the Littlewood Elementary School scenario are based on turning movement volumes during the hours surrounding the existing bell schedule. Turning movement volumes from 7:00 AM to 8:00 AM are utilized for the school's AM peak hour analysis and turning movement volumes from 1:15 PM to 2:15 PM are utilized for the school's PM peak hour analysis. The existing turning movement volumes utilized for the Littlewood Elementary School scenario are illustrated in **Figure 13**.

The intersection operating conditions were evaluated using *Synchro 10* software. Results are provided in terms of LOS, V/C ratio, and delay. **Table 9** summarizes the existing intersection operating conditions at the six (6) study area intersections during the AM peak (7:00 AM to 8:00 AM) and PM peak (1:15 PM to 2:15 PM) of the Littlewood Elementary School bell schedule.

All study area intersections operate at their adopted LOS standard or better during the school's AM and PM peak hours. All movement V/C ratios are less than one, signifying adequate capacity for the existing volumes. *Synchro* outputs are provided in **Appendix D**.

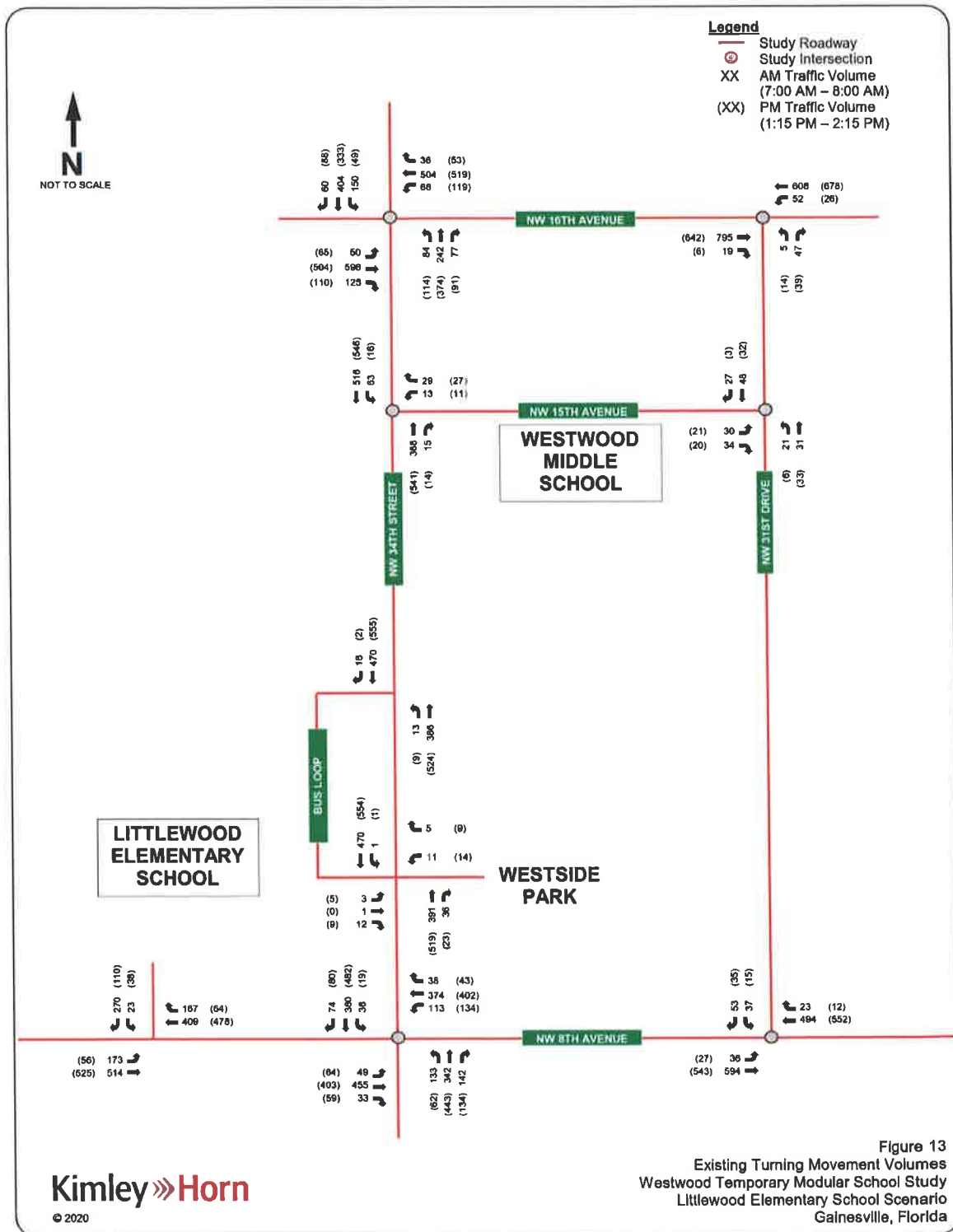


Table 9: Existing Conditions Intersection Operations, Littlewood Scenario

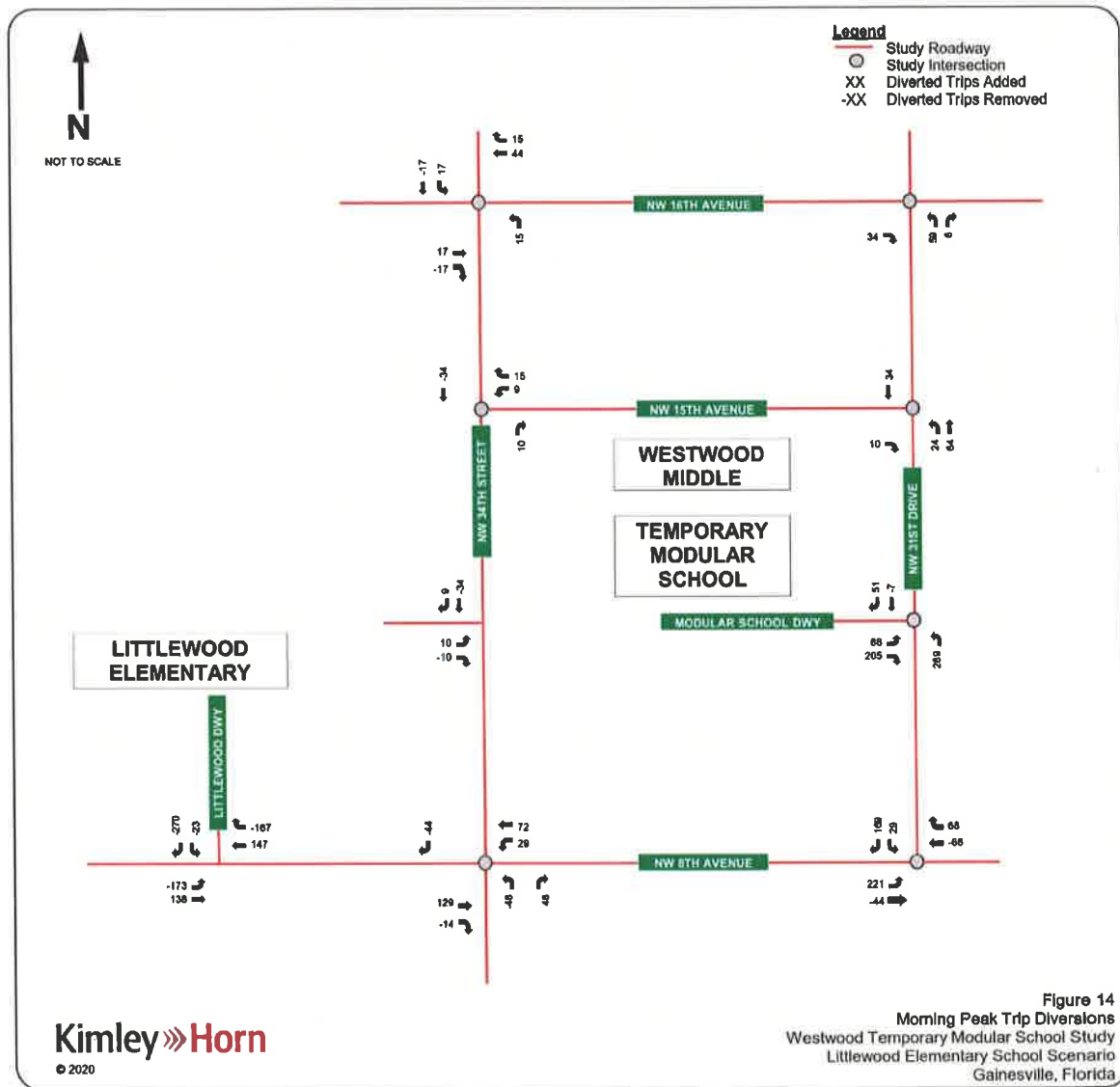
		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	48.4	D	-	37.3	D	-
	Northbound	51.5	D	-	34.7	C	-
	NBL	40.5	D	0.49	22.9	C	0.38
	NBT/R	54.4	D	0.66	37.6	D	0.72
	Southbound	52.3	D	-	38.1	D	-
	SBL	32.6	C	0.51	25.5	C	0.20
	SBT/R	58.7	E	0.83	39.5	D	0.71
	Eastbound	49.6	D	-	42.3	D	-
	EBL	33.8	C	0.22	29.9	C	0.24
	EBT/R	50.7	D	0.70	43.7	D	0.70
	Westbound	41.1	D	-	34.0	C	-
	WBL	33.1	C	0.37	24.8	C	0.41
	WBT/R	42.1	D	0.49	36.0	D	0.54
NW 31st Drive & NW 16th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	17.0	C	-	14.9	B	-
	NBL/R	17.0	C	0.18	14.9	B	0.13
	Westbound	10.9	B	-	9.1	A	-
	WBL	10.9	B	0.10	9.1	A	0.03
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	13.7	B	-	14.2	B	-
	WBL/R	13.7	B	0.11	14.2	B	0.10
	Southbound	8.6	A	-	8.8	A	-
	SBL	8.6	A	0.07	8.8	A	0.02
NW 31st Drive & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	7.5	A	-	7.3	A	-
	NBL	7.5	A	0.02	7.3	A	0.01
	Eastbound	9.4	A	-	9.0	A	-
	EBL	10.0	B	0.06	9.3	A	0.04
	EBR	8.9	A	0.05	8.6	A	0.03
NW 34th Street & NW 8th Avenue	Overall Intersection	40.7	D	-	40.6	D	-
	Northbound	34.2	C	-	34.6	C	-
	NBL	24.3	C	0.53	23.6	C	0.25
	NBT/R	36.9	D	0.75	35.8	D	0.73
	Southbound	40.9	D	-	39.9	D	-
	SBL	25.6	C	0.17	25.3	C	0.09
	SBT/R	42.2	D	0.77	40.4	D	0.76
	Eastbound	49.9	D	-	50.5	D	-
	EBL	36.6	D	0.21	39.5	D	0.22
	EBT/R	51.3	D	0.70	52.0	D	0.62
	Westbound	38.8	D	-	39.0	D	-
	WBL	31.0	C	0.47	30.8	C	0.40
	WBT/R	41.0	D	0.48	41.5	D	0.45
NW 8th Avenue & NW 31st Drive	Overall Intersection	-	-	-	-	-	-
	Eastbound	9.1	A	-	8.8	A	-
	EBL	9.1	A	0.05	8.8	A	0.03
	Southbound	23.2	C	-	15.1	C	-
	SBL/R	23.2	C	0.37	15.1	C	0.13

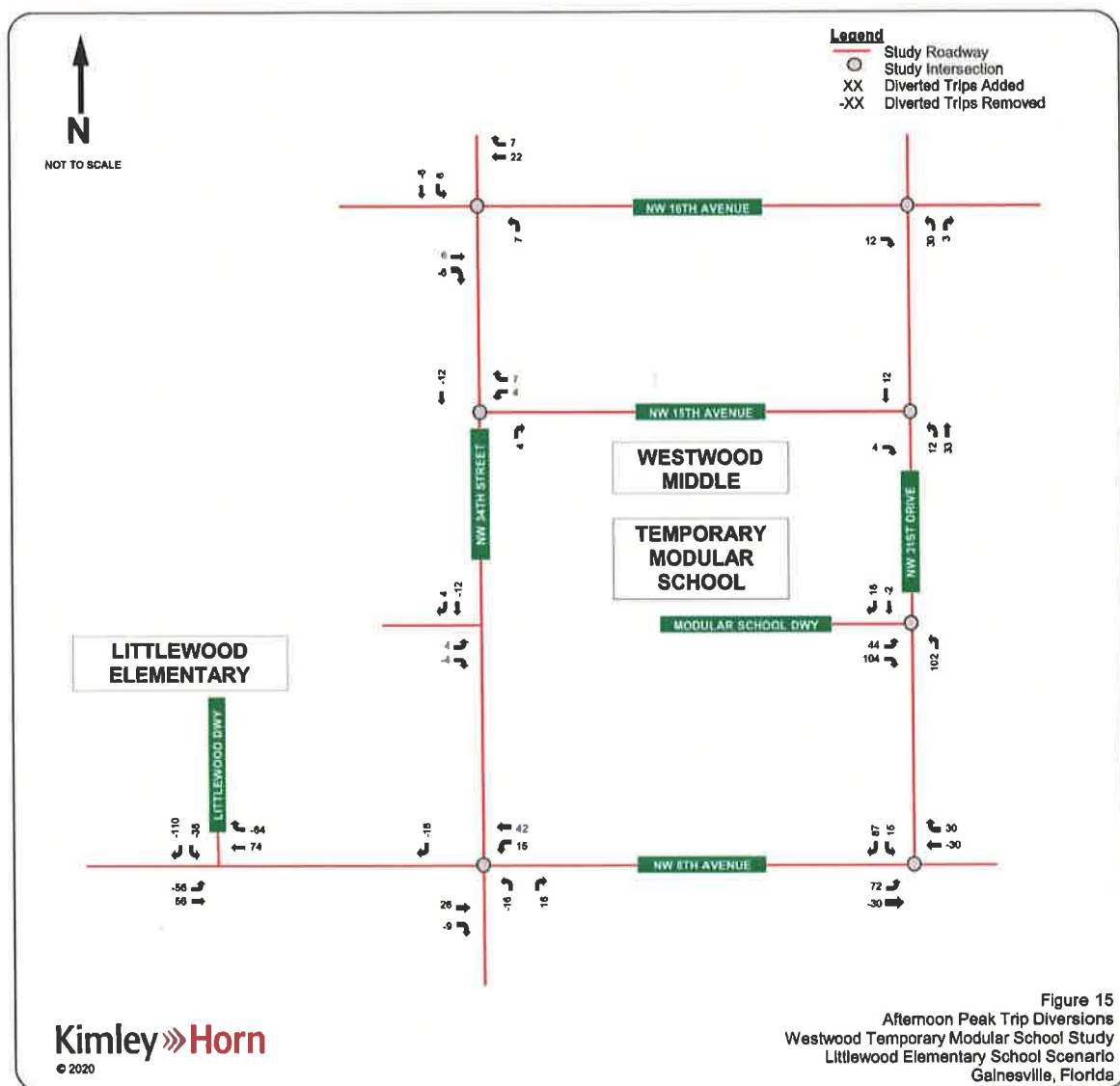
Temporary Traffic Projections/Diversions

The overall number of vehicle-trips entering the Temporary Modular School is expected to be equivalent to the number counted at the Littlewood Elementary School driveway, since the number of students who walk, bicycle, ride a bus, or get dropped off by parents is not expected to change. Diverted traffic for the Littlewood Elementary School scenario is expected to primarily access the Temporary Modular School via the intersection of NW 8th Avenue and NW 31st Drive. Approximately 85 percent (85%) of Littlewood Elementary School traffic is estimated to enter the Temporary Modular School from the south and 15 percent (15%) from the north.

Figure 14 and **Figure 15** illustrate the trip diversion estimates for the Littlewood Elementary School scenario during the school's AM and PM peak hour, respectively.

Buses for Littlewood Elementary School are assumed to utilize the parking area at Westside Park, consistent with bus staging operations under existing conditions. Therefore, no diversion of bus trips was applied when calculating the temporary traffic conditions for the Littlewood Elementary School scenario at the Temporary Modular School.





Temporary Traffic Conditions Operations Analysis

Temporary conditions at the study area intersections for the 2022–2023 school year are forecasted based on background growth of the existing turning movement volumes and the diversion of parent drop-off/pick-up traffic to the Temporary Modular School driveway on NW 31st Drive. The temporary turning movement volumes during the 2022–2023 school year are illustrated in **Figure 16**. Intersection volume development worksheets detailing the temporary turning movement volume development for each intersection are provided in **Appendix E**.

The temporary future intersection operating conditions were evaluated using *Synchro 10* software. Results are provided in terms of LOS, V/C ratio, and delay. **Table 10** summarizes the temporary intersection operating conditions at the six (6) study area intersections during the AM peak (7:00 AM to 8:00 AM) and PM peak (1:15 PM to 2:15 PM) of the Littlewood Elementary School bell schedule during the 2022–2023 school year.

The study intersections are expected to continue to operate at their adopted LOS standard or better during the school's AM and PM peak hours with the exception of the stop-controlled approaches at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue which are expected to operate at LOS F during the school's AM Peak hour. This result is common when a minor street stop-controlled approach crosses a high-volume major street free-flow approach during peak periods.

In order to address the operational issues anticipated on the minor street stop-controlled approaches at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue, it is recommended that law enforcement officer (LEO) control of traffic be implemented at these intersections during the school's arrival period during the 2022-2023 school year. This operational plan is common for facilities of this type in similar locations. The LEO will facilitate the movement of traffic through the two subject intersections, and resulting operations are expected to be similar to a signal control stopping the major street movements to allow for movements to and from the minor street. In order to replicate LEO control, the intersections were analyzed as signalized intersections using *Synchro 10* software. The results are summarized in **Table 10**. Both intersections would be expected to operate at their adopted LOS standard or better during the school's AM peak hour with LEO control.

Synchro outputs are provided in **Appendix D**.

The impacts of Temporary Modular School traffic on roadway segments within the study area were also evaluated for the school's AM and PM peak hours. Peak hour directional service capacities for area roadways were determined based on daily roadway service capacities published in the Gainesville MTPO Multimodal LOS Report. Existing directional segment volumes, background directional segment volumes, and future directional segment volumes including trip diversions to the Temporary Modular School were compared to the respective peak hour directional capacities of area roadways. No roadway segments were determined to exceed their peak hour directional service capacities under the Littlewood Elementary School scenario during the 2022–2023 school year. The results of the segment analyses are depicted in **Table 11**.

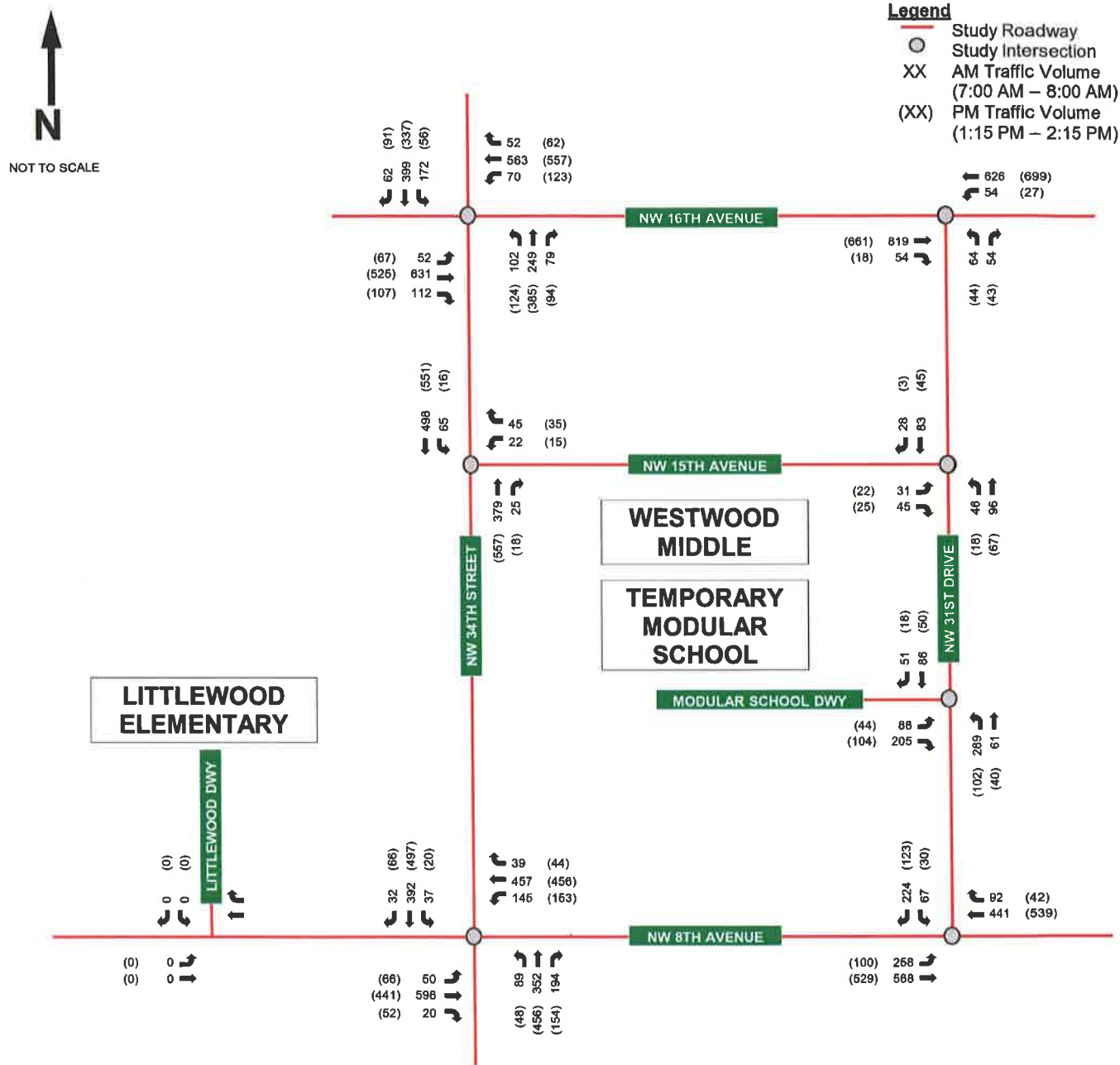


Figure 16
Projected 2022-2023 Traffic Volumes
Westwood Temporary Modular School Study
Littlewood Elementary School Scenario
Gainesville, Florida

Table 10: Temporary (2022–2023) Intersection Operations, Littlewood Scenario

		AM Peak Hour			PM Peak Hour		
		Delay (sec/veh)	LOS	V/C	Delay (sec/veh)	LOS	V/C
NW 34th Street & NW 16th Avenue	Overall Intersection	51.3	D	-	39.0	D	-
	Northbound	57.8	E	-	38.5	D	-
	NBL	46.5	D	0.60	24.4	C	0.42
	NBT/R	61.3	E	0.71	42.2	D	0.77
	Southbound	58.4	E	-	39.5	D	-
	SBL	37.9	D	0.61	26.0	C	0.24
	SBT/R	66.1	E	0.86	41.3	D	0.72
	Eastbound	49.6	D	-	43.3	D	-
	EBL	34.2	C	0.25	30.6	C	0.27
	EBT/R	50.6	D	0.69	44.6	D	0.71
	Westbound	42.6	D	-	35.1	D	-
	WBL	33.8	C	0.38	25.4	C	0.43
	WBT/R	43.5	D	0.54	37.0	D	0.58
NW 31st Drive & NW 16th Avenue (Unsignalized)	Overall Intersection	-	-	-	-	-	-
	Northbound	151.0	F	-	22.4	C	-
	NBL/R	151.0	F	1.05	22.4	C	0.31
	Westbound	-	-	-	-	-	-
	WBL	11.3	B	0.11	9.2	A	0.03
NW 31st Drive & NW 16th Avenue (LEO Control)	Overall Intersection	13.9	B	-	10.8	B	-
	Northbound	34.5	C	-	23.4	C	-
	NBL/R	34.5	C	0.66	23.4	C	0.38
	Westbound	7.8	A	-	5.7	A	-
	WBL	35.6	D	0.60	21.9	C	0.15
	WBT	5.4	A	0.35	5.1	A	0.34
	Eastbound	15.9	B	-	14.7	B	-
	EBT/R	15.9	B	0.73	14.7	B	0.60
NW 34th Street & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Westbound	14.7	B	-	14.8	B	-
	WBL/R	14.7	B	0.18	14.8	B	0.13
	Southbound	-	-	-	-	-	-
	SBL	8.7	A	0.08	8.9	A	0.02
NW 31st Drive & NW 15th Avenue	Overall Intersection	-	-	-	-	-	-
	Northbound	7.7	A	-	7.4	A	-
	NBL	7.7	A	0.05	7.4	A	0.02
	Eastbound	10.4	B	-	9.3	A	-
	EBL	12.1	B	0.08	10.0	B	0.04
	EBR	9.3	A	0.08	8.7	A	0.04
NW 34th Street & NW 8th Avenue	Overall Intersection	51.5	D	-	44.5	D	-
	Northbound	56.2	E	-	40.3	D	-
	NBL	31.3	C	0.39	25.9	C	0.20
	NBT/R	60.2	E	0.89	41.4	D	0.77
	Southbound	46.3	D	-	39.5	D	-
	SBL	36.6	D	0.28	27.5	C	0.10
	SBT/R	47.2	D	0.69	40.0	D	0.72
	Eastbound	58.9	E	-	56.3	E	-
	EBL	41.6	D	0.21	43.7	D	0.24
	EBT/R	60.3	E	0.74	58.0	E	0.65
	Westbound	42.8	D	-	43.0	D	-
	WBL	38.1	D	0.59	34.4	C	0.46
	WBT/R	44.1	D	0.47	45.6	D	0.48
NW 8th Avenue & NW 31st Drive (Unsignalized)	Overall Intersection	-	-	-	-	-	-
	Eastbound	-	-	-	-	-	-
	EBL	11.1	B	0.36	9.2	A	0.11
	Southbound	446.3	F	-	20.1	C	-
	SBL/R	446.3	F	1.86	20.1	C	0.40
NW 8th Avenue & NW 31st Drive (LEO Control)	Overall Intersection	44.6	D	-	14.7	B	-
	Eastbound	26.3	C	-	9.2	A	-
	EBL	65.8	E	0.89	36.4	D	0.64
	EBT	8.4	A	0.31	4.1	A	0.23
	Westbound	60.0	E	-	16.7	B	-
	WBT/R	60.0	E	0.96	16.7	B	0.71
	Southbound	68.5	E	-	29.9	C	-
	SBL/R	68.5	E	0.89	29.9	C	0.32

Table 11: Segment Analyses – Littlewood Elementary School (2022–2023) Scenario

Roadway From To	Roadway Attributes ¹		Peak Hour Directional Service Capacity ²	Existing (2020) AM Peak Hour Conditions		Existing (2020) PM Peak Hour Conditions		Future (2023) Background AM Peak Hour Conditions		Future (2023) Background PM Peak Hour Conditions		AM Peak Hour Project Traffic		PM Peak Hour Project Traffic		Future (2023) Total AM Peak Hour Conditions		Future (2023) Total PM Peak Hour Conditions	
	Functional Classification	Adopted LOS	Number of Lanes	NB/EB Volume ³	SBWB Volume ⁴	LOS	NB/EB Volume ³	SBWB Volume ⁴	LOS	NB/EB Volume ⁴	SBWB Volume ⁴	NB/EB ⁵	SBWB ⁵	NB/EB ⁵	SBWB ⁵	NB/EB Volume ⁴	SBWB Volume ⁴	NB/EB Volume ⁴	SBWB Volume ⁴
SR 121/NW 34th Street SR 25/University Ave NW 16th Avenue NW 16th Avenue SR 222/NW 38th Ave	II State I State	E E	20 20	617 328	567 614	D C	639 492	675 470	D C	636 358	615 633	15 15	0 0	7 7	0 0	661 353	615 633	665 514	695 484
NW 16th Avenue NW 43rd Street US 441/NW 13th Street		E	40	842	660	C	681	721	C	868	680	68	59	24	30	536	739	726	773
NW 8th Avenue SR 25/Newberry Road W 22nd Street		E	40	1,710	561	C	570	537	C	652	559	160	189	36	69	612	768	623	674
NW 31st Drive NW 8th Avenue NW 16th Avenue		E	20	576	90	C	54	52	C	63	90	238	205	84	102	301	298	140	156
NW 15th Avenue SR 121/NW 34th Street NW 31st Drive		E	20	576	78	C	41	38	C	90	49	27	24	10	12	107	73	52	51

- Notes:
1. Roadway attributes were obtained from the Gainesville Metropolitan Transportation Planning Organization Multimodal Level of Service Report (2018).
 2. Peak Hour Directional Service Volumes are reported based on the Florida Department of Transportation Quality/Level of Service Handbook (2013).
 3. Peak Hour Directional volumes are calculated based on the approach and departure volumes from turning movement counts collected in January 2020.
 4. Peak Hour Directional volumes are calculated based on the approach and departure volumes at study area intersections under future background conditions.
 5. Project traffic was calculated as the maximum across the segment.
 6. Peak Hour Directional volumes are the sum of the future background conditions volumes and project traffic.

TRAFFIC SIGNAL WARRANT ANALYSES

Signal warrant analyses were performed at the intersection of NW 8th Avenue and NW 31st Drive as well as the intersection of NW 16th Avenue and NW 31st Drive. The signal warrant analyses were performed based upon the criteria contained in the 2009 Edition of the *Manual on Uniform Traffic Control Devices (MUTCD)*.

The signal warrant analyses evaluated existing conditions at the two intersections as well as the expected traffic conditions in the future years during which the Temporary Modular School will be utilized by Howard Bishop Middle School (2020–2021) and by Littlewood Elementary School (2022–2023). Analyses were completed for both of the Howard Bishop Middle School bell schedule scenarios.

The analyses for each condition were conducted assuming two different minor street assumptions; NW 31st Drive was considered the minor street in the first analysis for each condition and the mainline left turn (eastbound left turn for NW 8th Avenue and westbound left turn for NW 16th Avenue) was considered the minor street in the second analysis for each condition.

Right-turn volume reductions on the minor street approaches were applied in accordance with Pagones Theorem. The Pagones Theorem is included in **Appendix F**. This theorem stipulates various right-turn volume reductions for minor-street approaches based on the ratio of the right-turn volume to approach volume or minor street lane configuration. **Table 12** summarizes the right-turn volume reduction that should be applied based on the approach lane configuration and percentage of the right-turn hourly volume compared to the other movements' hourly volumes. The appropriate reductions were applied to the minor-street right-turn volume on an hourly basis.

Table 12: Pagones Theorem Hourly Right-Turn Volume Reduction

Situation	Minor-Street Approach Configuration	Right-Turn Percentage	Right-Turn Reduction
1	Shared left/through/right	$R > 0.7A$	60%
1	Shared left/through/right	$0.7A \geq R \geq 0.35A$	30%
1	Shared left/through/right	$R \leq 0.35A$	20%
2	Exclusive left, shared through/right lane	$R > 3T$	60%
2	Exclusive left, shared through/right lane	$3T \geq R \geq T/3$	30%
2	Exclusive left, shared through/right lane	$R \leq T/3$	20%
3	Any configuration with an exclusive right turn lane	-	75%

A = Approach volume

R = Right-turn volume

T = Through volume

The existing and future volumes at the two intersections were compared to criteria contained in the *MUTCD* for the following warrants:

- Warrant Number 1: Eight-Hour Vehicular Volume Warrant
 - Condition A: Minimum Vehicular Volume
 - Condition B: Interruption of Continuous Traffic
 - Combination of Conditions A & B
- Warrant Number 2: Four-Hour Vehicular Volume Warrant
- Warrant Number 3: Peak Hour Warrant
- Warrant Number 5: School Crossing
- Warrant Number 7: Crash Experience

NW 8th Avenue and NW 31st Drive

The intersection of NW 8th Avenue and NW 31st Drive is currently a two-way stop-controlled intersection with the southbound approach along NW 31st Drive operating under stop-controlled conditions. The westbound and eastbound approaches along NW 8th Avenue operate under free-flow conditions.

The following roadway characteristics were incorporated into the signal warrant analysis:

- Major street approaches number of lanes = 2
- Minor street approach number of lanes = 1
- Posted speed along major street = 35 mph

A reduction factor was applied to the southbound right-turn volume based on Pagones Theorem and the turning movement volumes at the intersection. The reduction factor varied at different count hours from 30 percent (30%) to 60 percent (60%).

Existing Conditions

Based on existing turning movement volumes, the intersection of NW 8th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the stop-controlled southbound NW 31st Drive approach as the minor street or when considering the NW 8th Avenue eastbound left-turn movement as the minor street.

The intersection also does not satisfy the thresholds for Warrant 5, since the highest number of major street crossings during school peak periods (including bicycles and pedestrians) in any 1 hour was 16 crossings and the minimum requirement to meet Warrant 5 is 20 crossings during the highest hour.

Based on crash history at this intersection, the criteria for Warrant 7 is not met since there were not at least 5 crashes susceptible to correction by a traffic signal within a 12-month period. Crash data from the University of Florida's *Signal Four Analytics* shows that 16 crashes occurred at this intersection from 2015 through 2019. The most common crash type was rear-end (14 crashes) and primarily involved westbound congestion at the adjacent intersection of NW 8th Avenue and NW 34th Street. The crash data is summarized in **Appendix F**.

The signal warrant analysis considering existing turning movement volumes is summarized in **Table 13**. A more thorough breakdown of the signal warrant analysis is included in **Appendix F**.

Table 13: Signal Warrant Summary – NW 8th Avenue and NW 31st Drive, Existing Conditions

Table 13A: Southbound NW 31st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	2 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	4 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	2 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied
Table 13B: Eastbound NW 8th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

Temporary Conditions, Howard Bishop Middle School (2020–2021), First Scenario

Based on forecasted turning movement volumes for the Howard Bishop Middle School first bell scenario, the intersection of NW 8th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1 or Warrant 3 when considering the stop-controlled southbound NW 31st Drive approach as the minor street, but may exceed the thresholds for Warrant 2 (Four Hour Vehicular Volume) during the school arrival and dismissal periods. The intersection does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the eastbound NW 8th Avenue left-turn movement as the minor street.

The signal warrant analysis considering forecasted turning movement volumes for the Temporary Modular School during the 2020–2021 school year with the first bell scenario for Howard Bishop Middle School is summarized in **Table 14**. A more thorough breakdown of the signal warrant analysis is included in **Appendix F**. Since the signal is only warranted during the temporary school's arrival and dismissal period, it is recommended that law enforcement officer (LEO) control of traffic be implemented at this intersection during these peak periods during the 2020-2021 school year. The LEO will facilitate the movement of traffic through the subject intersection, and resulting operations are expected to be similar to a signal control stopping the major street movements to allow for movements to and from the minor street. This operational plan is common for facilities of this type in similar locations.

Table 14: Signal Warrant Summary – NW 8th Avenue and NW 31st Drive, Temporary (2020–2021) Conditions, Howard Bishop First Scenario

Table 14A: Southbound NW 31 st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	1 hour	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	5 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	3 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	4 hours	Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied
Table 14B: Eastbound NW 8 th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

Temporary Conditions, Howard Bishop Middle School (2020–2021), Second Scenario

Based on forecasted turning movement volumes for the Howard Bishop Middle School second bell scenario, the intersection of NW 8th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1 or Warrant 2 when considering the stop-controlled southbound NW 31st Drive approach as the minor street, but may exceed the thresholds for Warrant 3 (Peak Hour Vehicular Volume) during the school arrival period. The intersection does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the eastbound NW 8th Avenue left-turn movement as the minor street.

The signal warrant analysis considering forecasted turning movement volumes for the Temporary Modular School during the 2020–2021 school year with the second bell scenario for Howard Bishop Middle School is summarized in **Table 15**. A more thorough breakdown of the signal warrant analysis is included in **Appendix F**. Since the signal is only warranted during the temporary school's arrival period, it is recommended that law enforcement officer (LEO) control of traffic be implemented at this intersection during the school's peak periods during the 2020-2021 school year. The LEO will facilitate the movement of traffic through the subject intersection, and resulting operations are expected to be similar to a signal control stopping the major street movements to allow for movements to and from the minor street. This operational plan is common for facilities of this type in similar locations.

Table 15: Signal Warrant Summary – NW 8th Avenue and NW 31st Drive, Temporary (2020–2021) Conditions, Howard Bishop Second Scenario

Table 15A: Southbound NW 31st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	2 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	4 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	2 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	2 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	1 hour	Satisfied
Table 15B: Eastbound NW 8th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

Temporary Conditions, Littlewood Elementary School (2022–2023) Scenario

Based on forecasted turning movement volumes for the Littlewood Elementary School scenario, the intersection of NW 8th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1 or Warrant 2 when considering the stop-controlled southbound NW 31st Drive approach as the minor street, but may exceed the thresholds for Warrant 3 (Peak Hour Vehicular Volume) during the school arrival period. The intersection does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the eastbound NW 8th Avenue left-turn movement as the minor street.

The signal warrant analysis considering forecasted turning movement volumes for the Temporary Modular School during the 2022–2023 school year for Littlewood Elementary School is summarized in **Table 16**. A more thorough breakdown of the signal warrant analysis is included in **Appendix F**. Since the signal is only warranted during the temporary school's arrival period, it is recommended that law enforcement officer (LEO) control of traffic be implemented at this intersection during the school's arrival period during the 2022-2023 school year. The LEO will facilitate the movement of traffic through the subject intersection, and resulting operations are expected to be similar to a signal control stopping the major street movements to allow for movements to and from the minor street. This operational plan is common for facilities of this type in similar locations.

Table 16: Signal Warrant Summary – NW 8th Avenue and NW 31st Drive, Temporary (2022–2023) Conditions, Littlewood Elementary School Scenario

Table 16A: Southbound NW 31st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	1 hour	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	4 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	2 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	3 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	1 hour	Satisfied
Table 16B: Eastbound NW 8th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	1 hour	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

NW 16th Avenue and NW 31st Drive

The intersection of NW 16th Avenue and NW 31st Drive is currently a two-way stop-controlled intersection with the northbound approach along NW 31st Drive operating under stop-controlled conditions. The westbound and eastbound approaches along NW 16th Avenue operate under free-flow conditions.

The following roadway characteristics were incorporated into the signal warrant analysis:

- Major street approaches number of lanes = 2
- Minor street approach number of lanes = 1
- Posted speed along major street = 40 mph

A reduction factor of 60 percent (60%) was applied to the northbound right-turn volumes based on Pagones Theorem and the turning movement volumes at the intersection.

Existing Conditions

Based on existing turning movement volumes, the intersection of NW 16th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the stop-controlled northbound NW 31st Drive approach as the minor street or when considering the westbound NW 16th Avenue left-turn movement as the minor street.

The intersection also does not satisfy the thresholds for Warrant 5, since zero major street crossings were observed during school peak periods (including bicycles and pedestrians) and the minimum requirement to meet Warrant 5 is 20 crossings during the highest hour.

Based on crash history at this intersection, the criteria for Warrant 7 is not met since there were not at least 5 crashes susceptible to correction by a traffic signal within a 12-month period. Crash data from the University of Florida's Signal Four Analytics shows that three crashes occurred at this intersection from 2015 through 2019. All three (3) crashes were rear-end collisions not correctable by a traffic signal. The crash data is summarized in **Appendix G**.

The signal warrant analysis considering existing turning movement volumes is summarized in **Table 17**. A more thorough breakdown of the signal warrant analysis is included in **Appendix G**.

Table 17: Signal Warrant Summary – NW 16th Avenue and NW 31st Drive, Existing Conditions

Table 17A: Northbound NW 31st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	1 hour	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied
Table 17B: Westbound NW 16th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

Temporary Conditions, Howard Bishop Middle School (2020–2021), First Scenario

Based on forecasted turning movement volumes for the Howard Bishop Middle School first bell scenario, the intersection of NW 16th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the stop-controlled northbound NW 31st Drive approach as the minor street or when considering the westbound NW 16th Avenue left-turn movement as the minor street.

The signal warrant analysis considering forecasted turning movement volumes for the Temporary Modular School during the 2020–2021 school year with the first bell scenario for Howard Bishop Middle School is summarized in **Table 18**. A more thorough breakdown of the signal warrant analysis is included in **Appendix G**.

Table 18: Signal Warrant Summary – NW 16th Avenue and NW 31st Drive, Temporary (2020–2021) Conditions, Howard Bishop First Scenario

Table 18A: Northbound NW 31 st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	3 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	3 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied
Table 18B: Westbound NW 16 th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	1 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	1 hour	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

Temporary Conditions, Howard Bishop Middle School (2020–2021), Second Scenario

Based on forecasted turning movement volumes for the Howard Bishop Middle School second bell scenario, the intersection of NW 16th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1 or Warrant 2 when considering the stop-controlled southbound NW 31st Drive approach as the minor street, but may exceed the thresholds for Warrant 3 (Peak Hour Vehicular Volume) during the school arrival and dismissal period. The intersection does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the westbound NW 16th Avenue left-turn movement as the minor street.

The signal warrant analysis considering forecasted turning movement volumes for the Temporary Modular School during the 2020–2021 school year with the second bell scenario for Howard Bishop Middle School is summarized in **Table 19**. A more thorough breakdown of the signal warrant analysis is included in **Appendix G**. Since the signal is only warranted during the temporary school's arrival and dismissal periods, it is recommended that law enforcement officer (LEO) control of traffic be implemented at this intersection during the school's peak periods during the 2020-2021 school year. The LEO will facilitate the movement of traffic through the subject intersection, and resulting operations are expected to be similar to a signal control stopping the major street movements to allow for movements to and from the minor street. This operational plan is common for facilities of this type in similar locations.

Table 19: Signal Warrant Summary – NW 16th Avenue and NW 31st Drive, Temporary (2020–2021) Conditions, Howard Bishop Second Scenario

Table 19A: Northbound NW 31st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hour	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	2 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	2 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	2 hours	Satisfied
Table 19B: Westbound NW 16th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	1 hour	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	2 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	1 hour	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

Temporary Conditions, Littlewood Elementary School (2022–2023) Scenario

Based on forecasted turning movement volumes for the Littlewood Elementary School scenario, the intersection of NW 16th Avenue and NW 31st Drive does not satisfy the thresholds for Warrant 1, Warrant 2, or Warrant 3 when considering the stop-controlled northbound NW 31st Drive approach as the minor street or when considering the westbound NW 16th Avenue left-turn movement as the minor street.

The signal warrant analysis considering forecasted turning movement volumes for the Temporary Modular School during the 2022–2023 school year for Littlewood Elementary School is summarized in **Table 20**. A more thorough breakdown of the signal warrant analysis is included in **Appendix G**.

Table 20: Signal Warrant Summary – NW 16th Avenue and NW 31st Drive, Temporary (2022–2023) Conditions, Littlewood Elementary School Scenario

Table 20A: Northbound NW 31st Drive Approach as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	2 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	1 hour	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied
Table 20B: Westbound NW 16th Avenue Left-turn Movement as Minor Street			
MUTCD Warrant	Criteria Needed	Observed	Satisfied/ Not Satisfied
Warrant No. 1, Condition A Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1, Condition B Eight-Hour Vehicular Volume	8 hours	0 hours	Not Satisfied
Warrant No. 1 Combination of Condition A & B	8 hours	0 hours	Not Satisfied
Warrant No. 2 Four-Hour Vehicular Volume	4 hours	0 hours	Not Satisfied
Warrant No. 3 Peak Hour Warrant	1 hour	0 hours	Not Satisfied

SUMMARY AND RECOMMENDATIONS

This traffic study has been completed for Alachua County Public Schools to evaluate the potential traffic impacts of hosting a Temporary Modular School on the Westwood Middle School campus east of NW 34th Street and south of NW 15th Avenue in Gainesville, Florida. The study considered the effect of hosting Howard Bishop Middle School in the Temporary Modular School during the 2020–2021 school year, Westwood Middle School in the Temporary Modular School during the 2021–2022 school year, and Littlewood Elementary School in the Temporary Modular School during the 2022–2023 school year. The study evaluated intersection operations and roadway operations in the vicinity of the Temporary Modular School for each school year in order to identify any deficiencies that may require improvements or mitigation while the Temporary Modular School is in use.

2020–2021 School Year: Howard Bishop Middle School

Two bell schedule scenarios were evaluated for the year during which Howard Bishop Middle School would potentially occupy the Temporary Modular School. The first scenario assumes that the bell schedule for Howard Bishop Middle School will be approximately 45 minutes later than the standard ACPS middle school bell schedule during the 2020–2021 school year. The second scenario assumes that Howard Bishop Middle School's current bell schedule would be maintained, and the Westwood Middle School bell schedule would be staggered 20 minutes later than the standard ACPS middle school bell schedule. The second scenario allows the existing shared bus operations serving Howard Bishop Middle School students and Abraham Lincoln Middle School students to remain during the 2020–2021 school year.

Traffic impacts from the Howard Bishop Middle School first scenario are not expected to result in any significant and adverse impacts on the study area roadway segments or intersections during the school's AM peak hour or PM peak hour during the 2020–2021 school year.

Signal warrant analyses were completed for the Howard Bishop Middle School first bell schedule scenario. The signal warrant analyses indicated that the volume thresholds for Warrant 2 (Four Hour Vehicular Volumes) may be exceeded at the intersection of NW 8th Avenue and NW 31st Drive during the school's arrival and dismissal periods with the first bell schedule scenario.

Under the Howard Bishop Middle School second scenario, the study intersections are expected to operate at their adopted LOS standard or better during the school's AM and PM peak hours with the exception of the stop-controlled approaches at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue. However, traffic impacts from the Howard Bishop Middle School second scenario are not expected to result in any significant and adverse impacts on the study area roadway segments.

Signal warrant analyses were also completed for the Howard Bishop Middle School second bell schedule scenario. The signal warrant analyses indicated that the volume thresholds for Warrant 2 (Four Hour Vehicular Volumes) may be exceeded at the intersection of NW 8th Avenue and NW 31st Drive during the school's arrival period and the volume thresholds for Warrant 3 (Peak Hour Vehicular Volumes) may be exceeded at the intersection of NW 16th Avenue and NW 31st Drive during the school's arrival and dismissal periods with the second bell schedule scenario.

2021–2022 School Year: Westwood Middle School

Traffic impacts would be minimal during the 2021–2022 school year since Westwood Middle School would be hosted at the adjacent Temporary Modular School. Diverted traffic for Westwood Middle School would be contained to NW 15th Avenue and NW 31st Drive within the study area. An intersection

operations analysis was completed for the Westwood Middle School scenario, which was effectively an evaluation of background traffic growth at the study area intersections.

Traffic impacts from the Westwood Middle School scenario are not expected to result in any significant and adverse impacts on the study area intersections or roadway segments during the school's arrival or dismissal periods during the 2021–2022 school year.

2022–2023 School Year: Littlewood Elementary School

The Littlewood Elementary School scenario during the 2022–2023 school year would involve traffic diversions from the existing Littlewood Elementary School campus to the Temporary Modular School approximately one-quarter mile north. Since the campuses are in such close proximity, the number of students who walk, bicycle, ride a bus, or get dropped off by parents is not expected to change in this scenario. The bell schedule for Littlewood Elementary School would remain as it is under existing conditions, since the times would not overlap or interfere with the bell schedule at Westwood Middle School.

Under the Littlewood Elementary School scenario, the study intersections are expected to operate at their adopted LOS or better during the school's AM and PM peak hour with the exception of the stop-controlled approaches at the intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue during the school's AM peak hour.

Traffic impacts from the Littlewood Elementary School scenario are not expected to result in any significant and adverse impacts on the study area roadway segments.

Signal warrant analyses were completed for the Littlewood Elementary School scenario. The signal warrant analyses indicated that the volume thresholds for Warrant 3 (Peak Hour Vehicular Volumes) may be exceeded at the intersection of NW 8th Avenue and NW 31st Drive during the school's arrival period. The forecasted volumes did not indicate that a signal was warranted at the intersection of NW 16th Avenue and NW 31st Drive in the Littlewood Elementary School scenario.

Recommended Improvements

Anticipated intersection operations and signal warrant analysis results potentially justify the installation of traffic signals at the intersection of NW 16th Avenue and NW 31st Drive and the intersection of NW 8th Avenue and NW 31st Drive. However, given that these results are limited to the temporary school's arrival and dismissal periods under certain conditions, it is recommended that law enforcement officer (LEO) control of traffic be implemented for the following:

- Under Howard Bishop 2020-2021 Temporary Conditions First Bell Schedule Scenario: Intersection of NW 8th Avenue at NW 31st Drive during the school's arrival and dismissal periods
- Under Howard Bishop 2020-2021 Temporary Conditions Second Bell Schedule Scenario: Intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue during the school's arrival and dismissal periods
- Under Littlewood Elementary 2022-2023 Temporary Conditions: Intersections of NW 31st Drive with NW 16th Avenue and with NW 8th Avenue during the school's arrival period

The LEO could facilitate the movement of traffic through the two subject intersections during the peak morning drop-off period and the peak afternoon pick-up period as a cost-effective solution for the two impacted school years. This operational plan is common for facilities of this type in similar locations.

During the field observations, it was noted that the existing Westwood Middle School bus loop on NW 31st Drive does not have sufficient capacity for the projected 25 buses that would serve Howard Bishop

Middle School students. Therefore, it is recommended that the buses for Howard Bishop Middle School utilize the Westside Park parking lot along NW 34th Street and a path be provided for students to reach the Temporary Modular School from there. Note that improvements are proposed for Westside Park from February 2020 through Fall 2020, which may limit the feasibility of utilizing the parking area for buses.

Additionally, it was observed that the existing sidewalk along NW 31st Drive south of NW 15th Avenue is situated on the west side of the bus loop and requires pedestrians traveling along this section of NW 31st Drive to either enter the bus loop area on the existing Westwood Middle School campus or walk along the street. It is recommended that a new sidewalk connection be added along NW 31st Drive in this area so that students at the Temporary Modular School have a continuous sidewalk route without having to enter the existing Westwood Middle School campus.