



**TOWN OF NEWBURGH
PLANNING BOARD
TECHNICAL REVIEW COMMENTS**

PROJECT NAME: GARNER RIDGE
PROJECT NO.: 2002-29
PROJECT LOCATION: SECTION 75, BLOCK 1, LOT 4.12
REVIEW DATE: 15 OCTOBER 2021
MEETING DATE: 21 OCTOBER 2021
PROJECT REPRESENTATIVE: DOCE ASSOCIATES, DARREN DOCE, P.E.

1. The project was last before the Board on 3 September 2020 requesting a concept approval for a revised entrance to be relocated from North Plank Road to Gardnertown Road across from Creek Run Road. The project proposes a realignment of Creek Run Road to form a four-way intersection.
2. Extensive grading on the North side of Gardnertown Road is proposed. The plans depict a retaining wall to prevent grading onto private property. Construction of the retaining wall should be addressed with the Town of Newburgh Highway Superintendent and Town Board. Location of the retaining wall appears to be very close to the property lines depicted on the plans. Grading appears behind the proposed retaining wall onto private property on the plan sheet identified as Sheet 1 of 3.
3. Ken Wersted's comments regarding site distance and the grades to the west of the proposed intersection should be received.
4. Impact to utilities within Creek Run and Gardnertown Road should be addressed.
5. Long-term stability of the regraded slope may be an issue. This office previously commented on grading for the access drive onto the site as well.
6. The applicants are once again requested to explain the change in the driveway access. Previously it was noted that the Central Hudson Easement prevented the access. Additional information should be provided.
7. The recently submitted plan depicts a revised location for the senior apartments as well as a revised parking area.
8. The single access point should be addressed with jurisdictional emergency services regarding concerns for access into the site.
9. Revised detail plans should be submitted including water, sewer, drainage, erosion and sediment control, as well as site development details.

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10. It appears that the water utilities are proposed to be relocated to Gardnertown Road in the vicinity of the very steep slopes identified for grading of the roadway.
11. An amended site plan application should be submitted along with SEQRA documents for the project.
12. Comments from the Highway Superintendent should be received regarding the driveway location as well as potential roadway realignment of Gardnertown Road.
13. A revised traffic study should be provided identifying any potential impacts to the newly proposed intersections for the Board's review.

Respectfully submitted,

MHE Engineering, D.P.C.

A handwritten signature in blue ink that reads "Patrick J. Hines". The signature is written in a cursive style with a large initial 'P'.

Patrick J. Hines
Principal

PJH/dns

DENSITY CALCULATIONS:

TOTAL PARCEL AREA = 23.4± AC.
 LESS WETLANDS, EASEMENTS, R.O.W.'s = 7.4± AC.
 100-YR FLOODPLAINS AND SLOPES 25% OR GREATER = 16.0± AC.
 USEABLE AREA = 6 DU/ACRE
 MULTIPLE FAMILY DWELLINGS MAXIMUM ALLOWABLE DENSITY = 96 DWELLING UNITS
 ALLOWABLE NUMBER OF UNITS = 96 DWELLING UNITS

DENSITY BONUS FOR PROJECTS CONSISTING OF SENIOR CITIZEN MULTIPLE DWELLING UNITS AND NON-SENIOR- CITIZEN MULTIPLE DWELLING UNITS:
 MAXIMUM DENSITY = 9 DU/ACRE
 MAXIMUM ALLOWABLE UNITS = 144 UNITS
 BONUS UNITS = 144 UNITS - 96 UNITS = 48 UNITS
 SENIOR HOUSING UNITS REQUIRED = 48 UNITS/3 = 16 UNITS

TOTAL UNITS PROPOSED = 144 UNITS
 BONUS UNITS PROPOSED = 144 UNITS - 96 UNITS = 48 UNITS
 SENIOR HOUSING UNITS REQUIRED = 48 BONUS UNITS/3 = 16 UNITS
 NON-SENIOR APARTMENTS PROPOSED = 108 UNITS
 SENIOR HOUSING UNITS PROPOSED = 36 UNITS

PARKING CALCULATIONS:

108 NON-SENIOR APARTMENTS
 SPACES REQUIRED (2 SPACES/DU REQ.) = 216 SPACES
 SPACES PROVIDED:
 GARAGES = 70 SPACES
 DRIVEWAY = 70 SPACES
 PARKING LOT SPACES = 79 SPACES
 NON-SENIOR APARTMENTS: SPACES PROPOSED = 219 SPACES

36 SENIOR HOUSING APARTMENTS
 SPACES REQUIRED (2 SPACES/DU REQ.) = 72 SPACES
 SPACES PROVIDED:
 PARKING LOT SPACES = 80 SPACES
 CLUBHOUSE
 SPACES PROVIDED = 9 SPACES

TOTAL PARKING PROVIDED: 308 SPACES
 ACCESSIBLE PARKING SPACES (NYS BUILDING CODE SECTION 1106):
 SPACES REQUIRED: 301 - 400 SPACES = 8 SPACES
 SPACES PROVIDED: 16 SPACES

PROMISSONS SHALL BE PLACED IN EACH LEASE AGREEMENT THAT REQUIRES EACH TENANT WITH A GARAGE TO MAINTAIN THAT GARAGE FOR THE PURPOSE OF PARKING A VEHICLE.

RECORD OWNER

GARDNER RIDGE ASSOCIATES, LLC
 134 FAIRVIEW RD
 ROCKAWAY NJ, 07866

ZONING INFORMATION:

TAX LOT DATA: 75-1-4.2

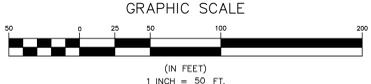
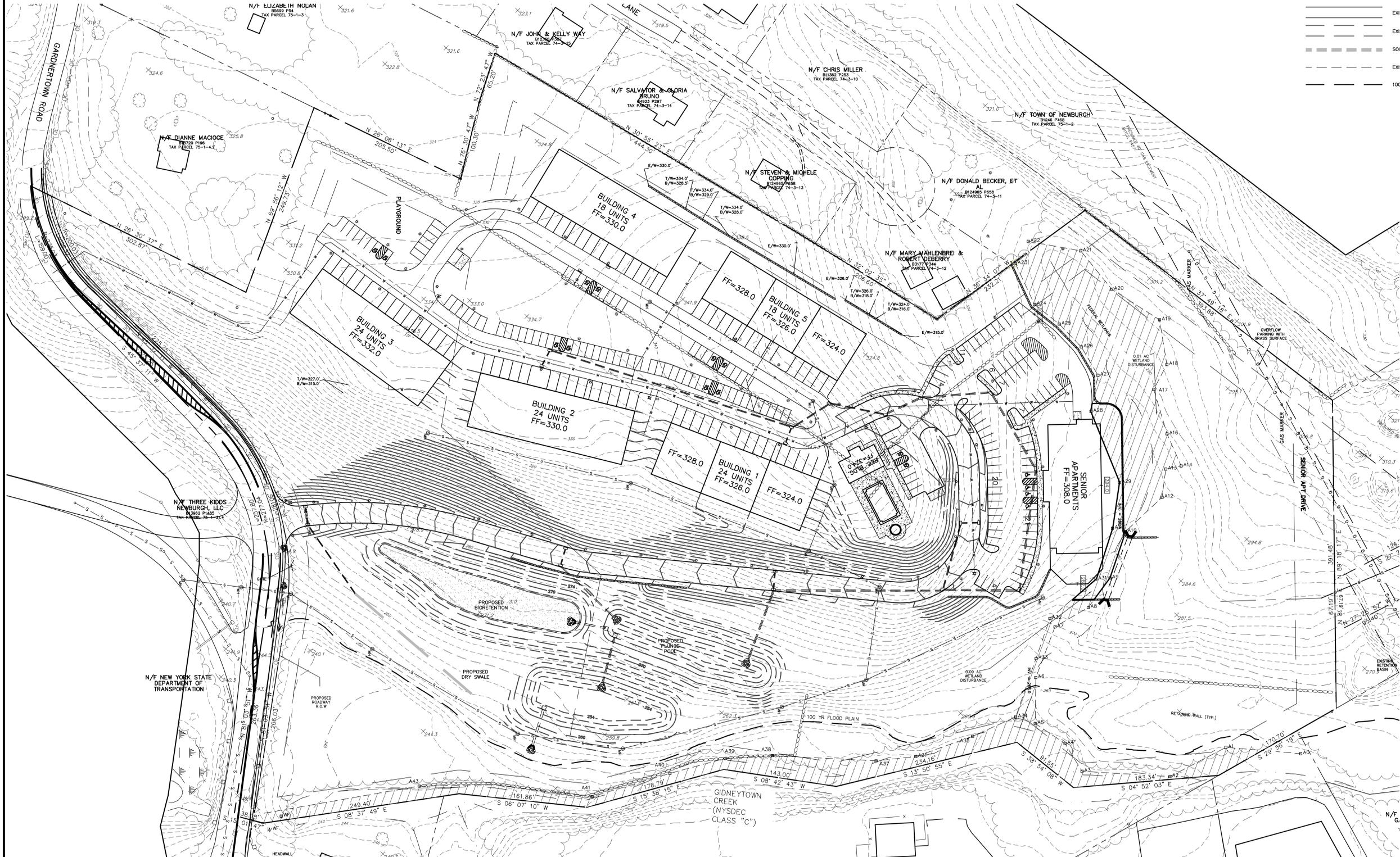
TOTAL ACREAGE: 23.4 ACRES ±
 ZONING DISTRICT: R-3

NOTES:

- BOUNDARY SURVEY SHOWN HEREON IS FROM AN ACTUAL FIELD SURVEY PREPARED BY MARTIN F ANTHONISEN JR. ON DECEMBER 24, 2015.
- THE TOPOGRAPHIC SURVEY SHOWN HEREON IS THE RESULT OF AN ACTUAL FIELD SURVEY PREPARED BY VINCENT DOCE ENGINEERING & SURVEYING IN APRIL 2003.
- THE PROJECT SITE IS LOCATED WITHIN THE FOLLOWING DISTRICTS:
 A. NEWBURGH SCHOOL DISTRICT.
 B. CRONOMER FIRE DISTRICT.
 C. CONSOL LT.
 D. CONSOL WATER DISTRICT 1.
 E. CONSOL WATER DISTRICT 2.
- TOWN OF NEWBURGH SEWER AND WATER SERVICES ARE PROVIDED FOR THIS PROPERTY.

LEGEND

- EXISTING CONTOURS
- EXISTING SITE BOUNDARY LINE
- EXISTING ADJOINING PROPERTY LINE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING TREES AND/OR BUSHES
- EXISTING STREAM
- EXISTING BUILDINGS
- EXISTING UTILITY POLE
- EXISTING STREET SIGN
- EXISTING WATER MAIN
- EXISTING HYDRANT
- EXISTING WATER VALVE
- EXISTING CLEANOUT
- EXISTING CURB STOP
- EXISTING SEWER MAIN AND MANHOLE
- EXISTING PAVED ROAD/DRIVEWAY
- EXISTING GRAVEL ROAD/DRIVEWAY
- SOILS BOUNDARY
- EXISTING FEDERAL WETLANDS BOUNDARY
- 100 YR FLOODPLAIN BOUNDARY



NO.	DATE	DESCRIPTION	BY

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PROPOSED SITE PLAN AMENDMENT
GARDNER RIDGE
GARDNERTOWN ROAD
 TOWN OF NEWBURGH, ORANGE COUNTY, NY

Traffic Impact Study

Gardner Ridge
Town of Newburgh
Orange County, NY
Project No. 14000375A

August 13, 2021

Prepared for:

Gardner Ridge Associates
134 Fairview Road
Rockaway, NJ 07866

Prepared by:



Philip J. Grealy, Ph.D., P.E.
Geographic Discipline Leader
NY Professional Engineer
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I. Introduction

A. Project Description and Location

(Figure No. 1)

This updated report has been prepared to evaluate the potential traffic impacts associated with the proposed Gardner Ridge development. Gardner Ridge is a proposed 144 dwelling unit residential development, which is planned to be developed on property located on the north side of Gardnertown Road as identified on Figure No. 1.

Associated with the construction of the access to the site, plans have been developed to realign and improve the Creek Run Road intersection with Gardnertown Road. The purpose will be to improve the alignment, sight distance, and create additional distance separation from the Gidney Avenue intersection, together with the provision of a separate left turn lane. More details regarding the intersection alignment are shown in Appendix "E".

The following sections describe the evaluation, which utilizes a Design Year of 2025 for analysis purposes.

B. Scope of Study

This study has been prepared to identify current and future traffic operating conditions on the surrounding roadway network and to assess the potential traffic impacts of the proposed residential development.

All available traffic count data for the study area intersections were obtained from previous reports prepared by our office. These data were supplemented with new traffic counts collected by representatives of Colliers Engineering & Design CT, P.C. These data were also compared to count data obtained from the New York State Department of Transportation (NYSDOT). Together these data were utilized to establish the Year 2021 Existing Traffic Volumes representing existing traffic conditions in the vicinity of the site.

The Year 2021 Existing Traffic Volumes were then projected to the 2025 Design Year to take into account background traffic growth. In addition, traffic for other specific potential or approved developments in the area were estimated and then added to the Projected Traffic Volumes to obtain the Year 2025 No-Build Traffic Volumes.

Estimates were then made of the potential traffic that the proposed development would generate during each of the peak hours (see Section III-C for further discussion). The resulting site generated traffic volumes were then added to the roadway system and combined with the Year 2025 No-Build Traffic Volumes resulting in the Year 2025 Build Traffic Volumes.

The Existing, No-Build and Build Traffic Volumes were then compared to roadway capacities based on the procedures from the Highway Capacity Manual to determine existing and future

Levels of Service and operating conditions. Recommendations for improvements were made where necessary to serve the existing and/or future traffic volumes.

II. Existing Roadway and Traffic Descriptions

A. Description of Existing Roadways

The following is a brief description of the roadways located within the study area. In addition, Section III-F provides a further description of the existing geometrics, traffic control and a summary of the existing and future Levels of Service and any recommended improvements for each of the study area intersections. Appendix "D" contains copies of the capacity analyses which indicate the existing geometrics (including lane widths) and other characteristics for each of the individual intersections studied.

1. Gidney Avenue

Gidney Avenue is a two-lane Town roadway, which originates at a signalized intersection with NYS Route 32, opposite Noel Drive. The roadway continues in a southwesterly direction, intersecting with Gardnertown Road, other local roadways, and also has access to the Mid-Valley Mall. The roadway continues south crossing over I-84 and into the City of Newburgh. The roadway has a posted speed limit of 30 MPH.

2. Gardnertown Road

Gardnertown Road originates at a "Stop" sign controlled "T" intersection with Gidney Avenue. The roadway continues as a two-lane roadway in a westerly direction, providing access to other local roadways, and also intersecting with NYS Route 300 at a signalized intersection. The speed limit is posted at 30 MPH with an advisory speed of 20 MPH for the area west of Creek Run Road.

3. Creek Run Road

Creek Run Road originates at a skewed "T" intersection that is stop-sign controlled with Gardnertown Road. It continues in a generally southwesterly direction as a two-lane roadway with a double yellow centerline and a white fog line/white edge line for its length. The roadway continues and intersects with several local roads and terminates at an intersection with Greenlawn Avenue and Woodlawn Terrace further to the south. The roadway has a posted speed limit of 30 MPH (see further discussion regarding improvements planned for the intersection of Creek Run Road and Gardnertown Road in Section III.F of this report).

III. Evaluation of Future Traffic Conditions

A. Year 2025 No-Build Traffic Volumes

(Figure No. 4 through 9)

The Year 2021 Existing Traffic Volumes were increased by a growth factor of 1% per year to account for general background growth resulting in the Year 2025 Projected Traffic Volumes which are shown on Figures No. 4 and 5 for each of the Peak Hours. In addition, traffic from other specific potential developments in the area including the remainder of Gardnertown Commons (Farrell Apartments) as well as the Polo Club development, were identified. The resulting traffic volumes associated with these other developments are shown on Figures No. 6 and 7 for each of the peak hours. These volumes were added to the 2025 Projected Traffic Volumes resulting in the Year 2025 No-Build Traffic Volumes which are shown on Figures No. 8 and 9 for the Weekday Peak AM and Weekday Peak PM Hours, respectively.

B. Site Generated Traffic Volumes

(Table No. 1)

Estimates of the amount of traffic to be generated by the proposed residential development during each of the peak hours were developed based on information published by the Institute of Transportation Engineers (ITE) as contained in the report entitled "Trip Generation", 10th Edition, 2017, based on Land Use Category – 220 Multi-Family Housing. Table No. 1 summarizes the trip generation rates and corresponding site generated traffic volumes for the Weekday Peak AM and Weekday Peak PM Hours.

C. Arrival/Departure Distribution

(Figures No. 10 and 11)

It was necessary to establish arrival and departure distributions to assign the site generated traffic volumes to the surrounding roadway network. Based on a review of the Existing Traffic Volumes and the expected travel patterns on the surrounding roadway network, the distributions were identified. The anticipated arrival and departure distributions are shown on Figures No. 10 and 11, respectively.

D. 2025 Build Conditions Traffic Volumes

(Figures No. 12 through 15)

The site generated traffic volumes were assigned to the roadway network based on the arrival and departure distributions referenced above. The resulting site generated traffic volumes for each of the study area intersections are shown on Figures No. 12 and 13 for each of the peak hours, respectively. The site generated traffic volumes were then added to the Year 2025 No-Build Traffic Volumes to obtain the Year 2025 Build Traffic Volumes. The resulting Year 2025 Build Traffic Volumes are shown on Figures No. 14 and 15 for the Weekday Peak AM and Weekday Peak PM Hours, respectively.

E. Description of Analysis Procedures

It was necessary to perform capacity analyses in order to determine existing and future traffic operating conditions at the study area intersections. The following is a brief description of the analysis method utilized in this report:

- Signalized Intersection Capacity Analysis

The capacity analysis for a signalized intersection was performed in accordance with the procedures described in the Highway Capacity Manual, 6th Edition, dated 2016, published by the Transportation Research Board. The terminology used in identifying traffic flow conditions is Levels of Service. A Level of Service "A" represents the best condition and a Level of Service "F" represents the worst condition. A Level of Service "C" is generally used as a design standard while a Level of Service "D" is acceptable during peak periods. A Level of Service "E" represents an operation near capacity. In order to identify an intersection's Level of Service, the average amount of vehicle delay is computed for each approach to the intersection as well as for the overall intersection.

- Unsignalized Intersection Capacity Analysis

The unsignalized intersection capacity analysis method utilized in this report was also performed in accordance with the procedures described in the Highway Capacity Manual, 6th Edition, dated 2016. The procedure is based on total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. The average total delay for any particular critical movement is a function of the service rate or capacity of the approach and the degree of saturation. In order to identify the Level of Service, the average amount of vehicle delay is computed for each critical movement to the intersection.

Additional information concerning signalized and unsignalized Levels of Service can be found in Appendix "C" of this report.

F. Results of Analysis

(Table No. 2)

Capacity analyses which take into consideration appropriate truck percentages, pedestrian activity, roadway grades and other factors were performed at the study area intersections utilizing the procedures described above to determine the Levels of Service and average vehicle delays. Summarized below are a description of the existing geometrics, traffic control and a summary of the existing and future Levels of Service as well as any recommended improvements.

Table No. 2 summarizes the results of the capacity analysis for the 2021 Existing, 2025 No-Build and 2025 Build Conditions. Appendix "D" contains copies of the capacity analysis which also indicate the existing geometrics (including lane widths) and other characteristics for each of the individual intersections studied.

1. Gidney Avenue and Gardnertown Road

Gardnertown Road currently intersects with Gidney Avenue at a traffic signal controlled "T" type intersection. The Gidney Avenue southbound approach consists of one lane and the northbound approach consists of a separate left turn and one through lane. The Gardnertown Road approach consists on two lanes including a separate left and a separate right turn lane. Capacity analysis conducted at this intersection indicates that an overall intersection Level of Service "C" or better is experienced at this intersection under existing conditions. Similar Levels of Service are expected under the future No-Build and Build conditions (see improvements described for Location 2 below).

2. Gardnertown Road and Creek Run Road/Proposed Site Access

Associated with the development of the access to this property, Creek Run Road is proposed to be realigned to intersect with Garndertown Road at a more conventional intersection and remove the current skewed condition. The intersection will be shifted further to the west along Gardnertown Road to increase the stacking distance approaching the traffic signal at Gidney Avenue. In addition, Gardnertown Road will be widened to develop separate left turn lanes for movements turning into the development as well as turning onto Creek Run Road. Also, significant clearing of vegetation and grading along the site frontage will be completed to provide adequate sight distances for all approaches to the intersection. The Creek Run Road and site access approaches to the intersection will be stop-sign controlled (see Conceptual Improvement Drawing CP-1 for further details).

G. Summary of Findings and Recommendations

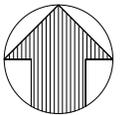
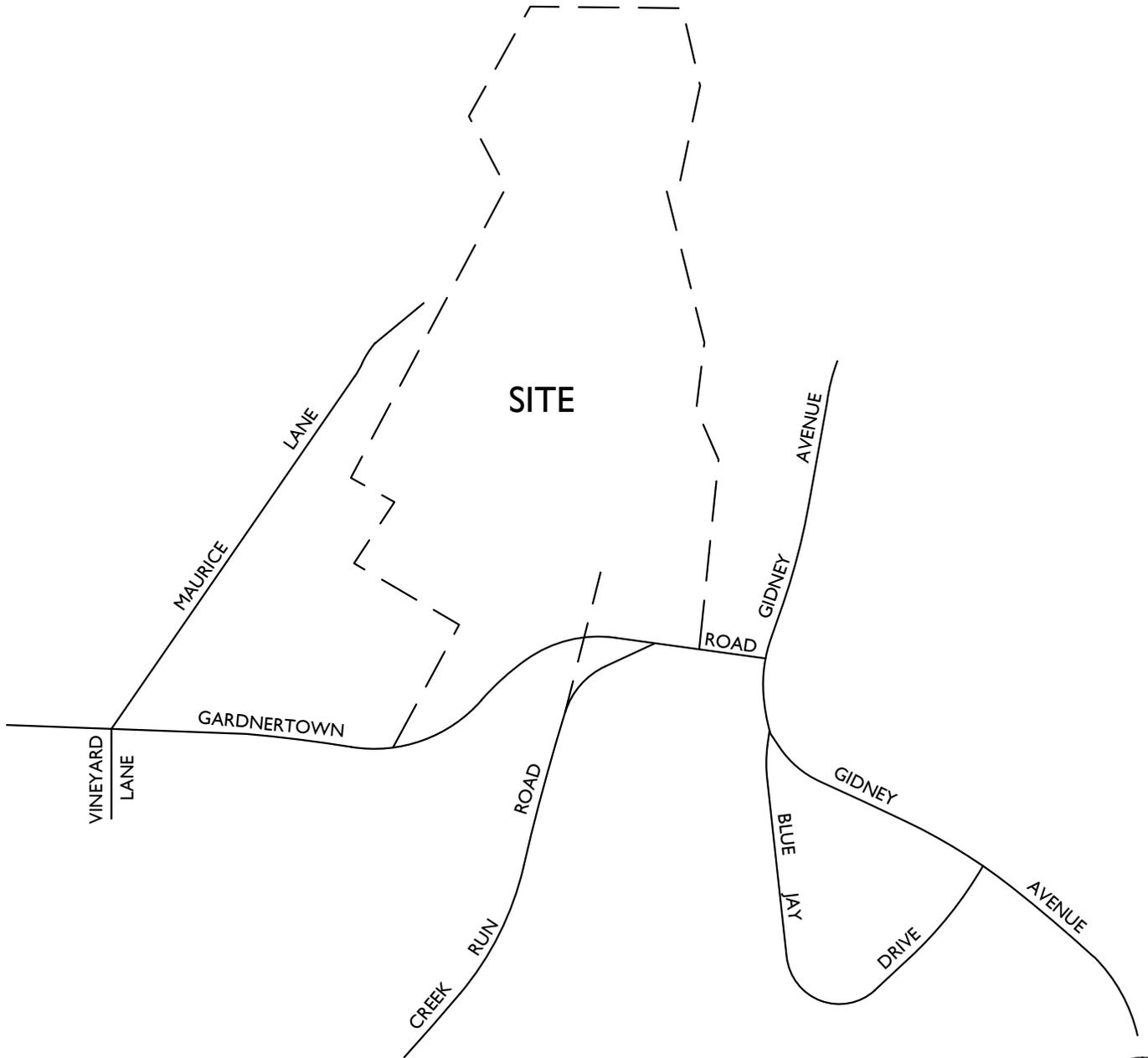
The proposed Gardner Ridge multifamily housing development will be served via a driveway connection to Garnertown Road aligning with the relocated and upgraded existing Creek Run Road. Certain improvements at this intersection, including separate left turn lanes and a realignment of Creek Run Road, will be completed to serve this development. In addition, a separate connection from the site should be provided for emergency access to the development.

IV. Summary and Conclusion

Based on the results of the analysis contained herein, the construction of the proposed Gardner Ridge residential development will not result in significant increases in vehicle delays or changes in Levels of Service at the area intersections. However, associated with the access plan, improvements will be required at the intersection of Creek Run Road and Gardnertown Road. With these improvements, as well as provision of an emergency access connection, safe and efficient traffic patterns will exist on the area roadways after the completion of the proposed development.

Traffic Impact Study

Appendix A | Traffic Figures



NOTE: LINE DIAGRAM NOT TO SCALE



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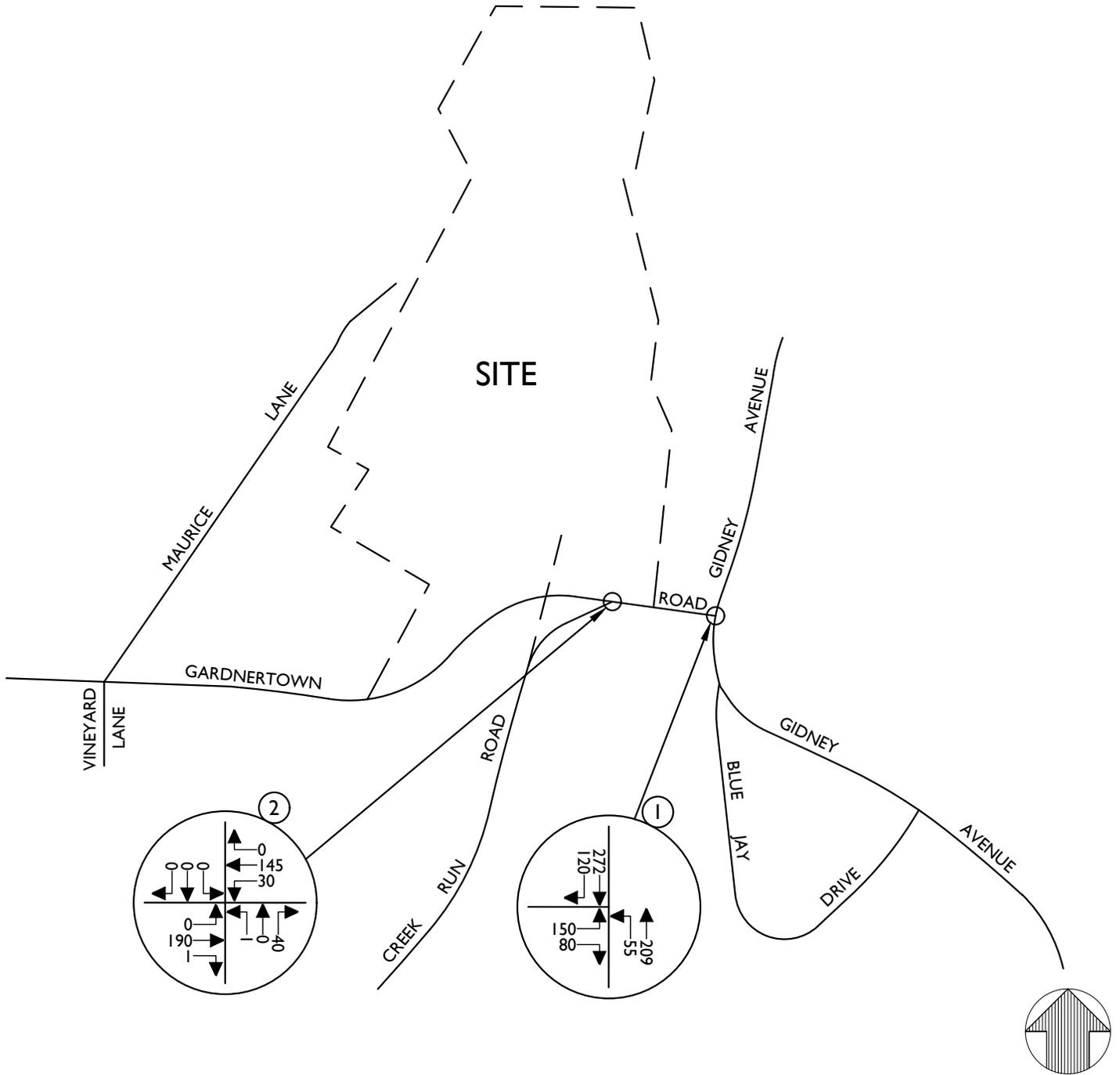
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TRAFFIC IMPACT STUDY

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AS SHOWN	8/9/21	R.H.	P.J.G.
PROJECT NUMBER:	DRAWING NAME:		
14000375A	210809RH_FIGURE		

SHEET TITLE:	
SITE LOCATION MAP	
SHEET NUMBER:	
1	



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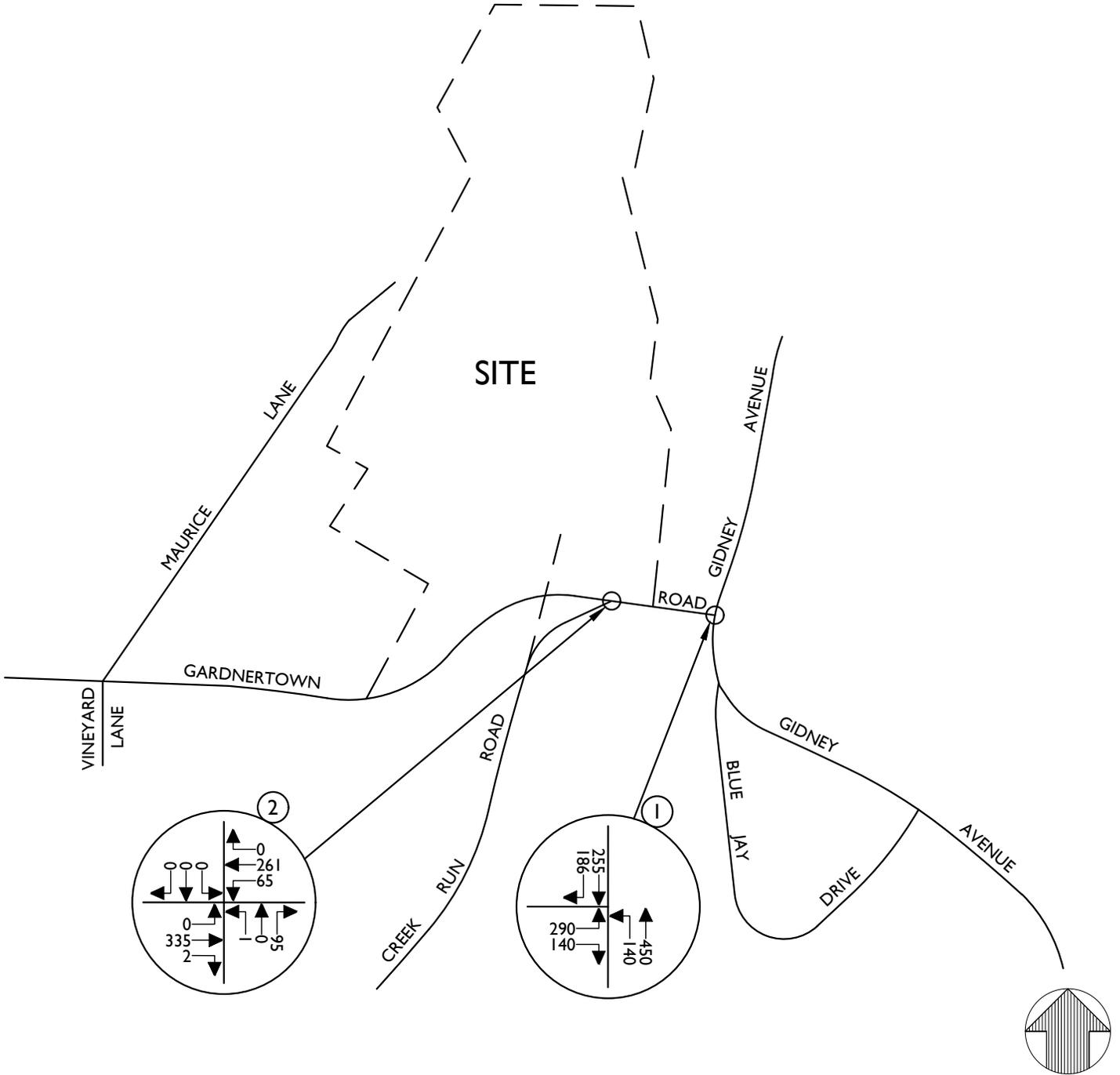
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SHEET TITLE:
**2021 EXISTING TRAFFIC VOLUMES
WEEKDAY PEAK AM HOUR**

SHEET NUMBER:

2



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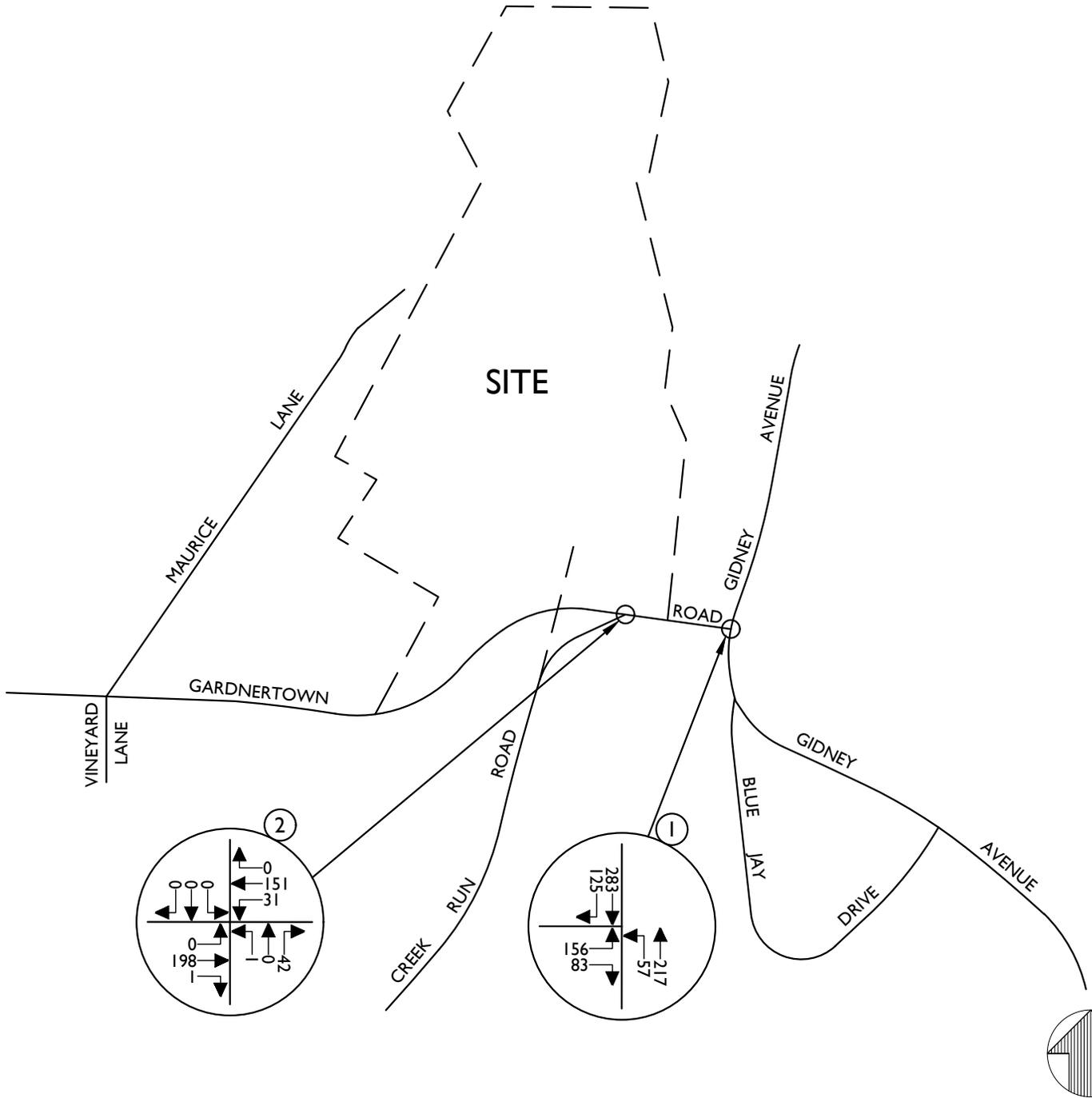
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SHEET TITLE:
**2021 EXISTING TRAFFIC VOLUMES
WEEKDAY PEAK PM HOUR**

SHEET NUMBER:
3



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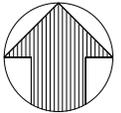
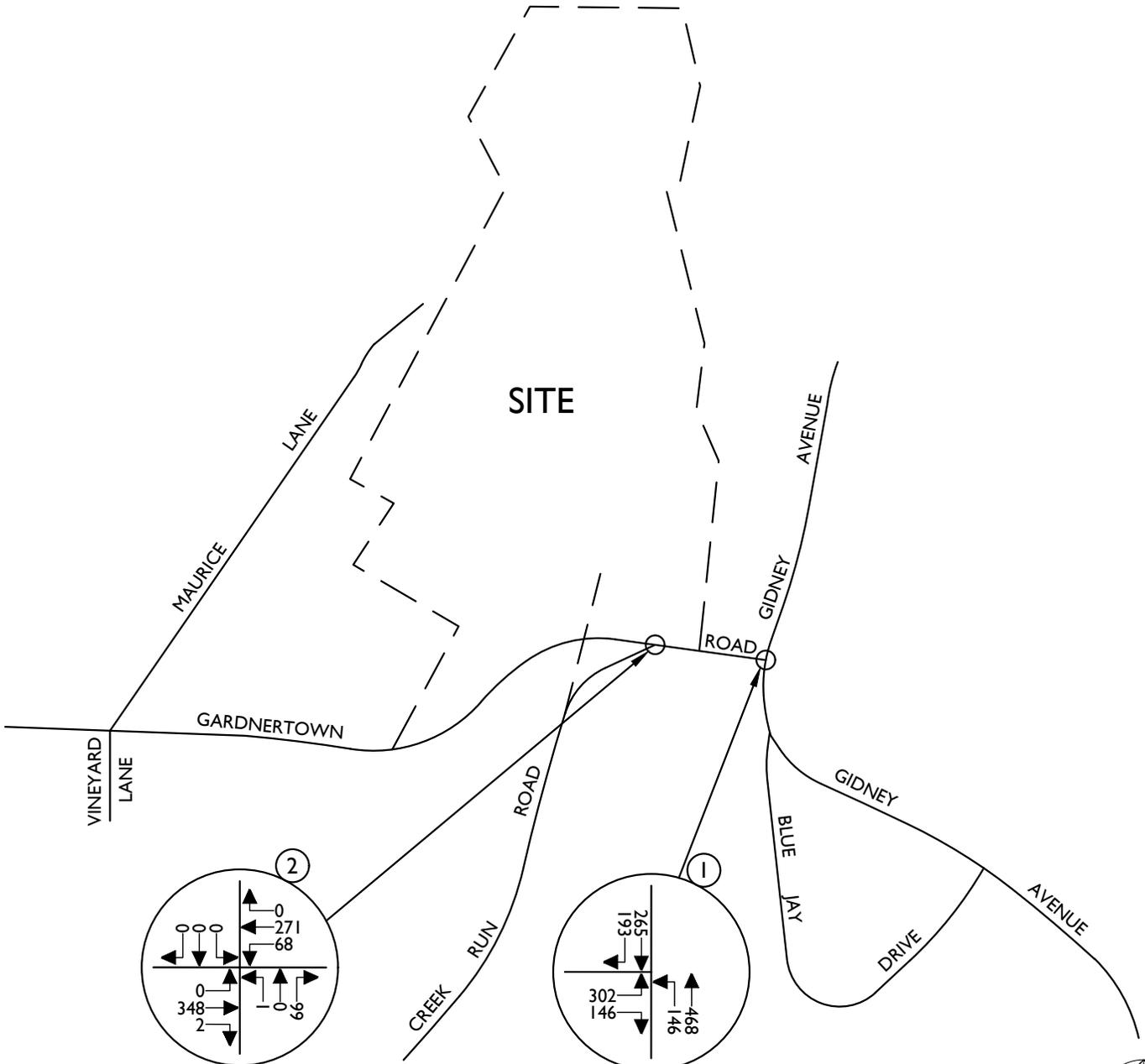
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WEEKDAY PEAK AM HOUR**

SHEET NUMBER:

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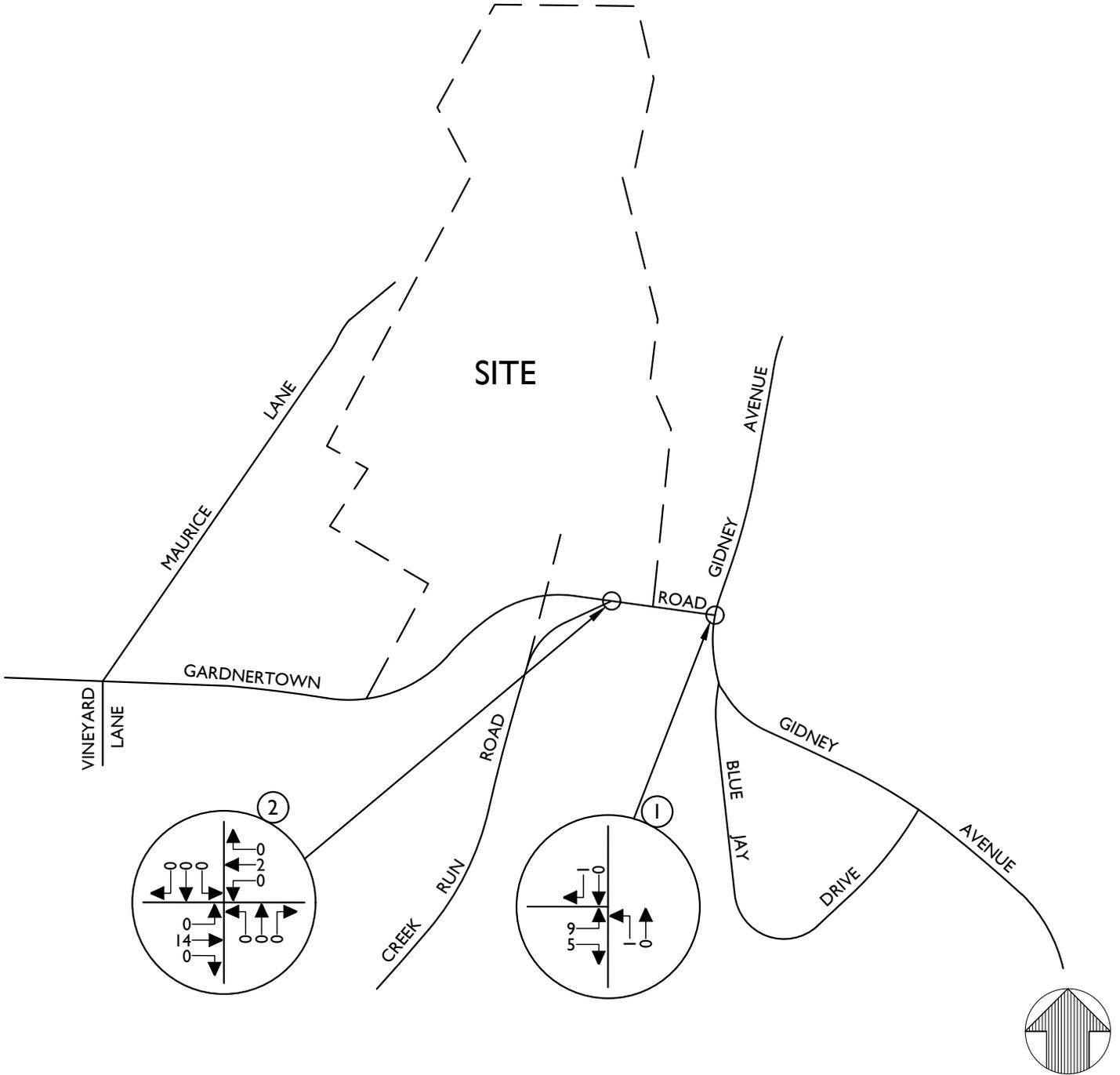
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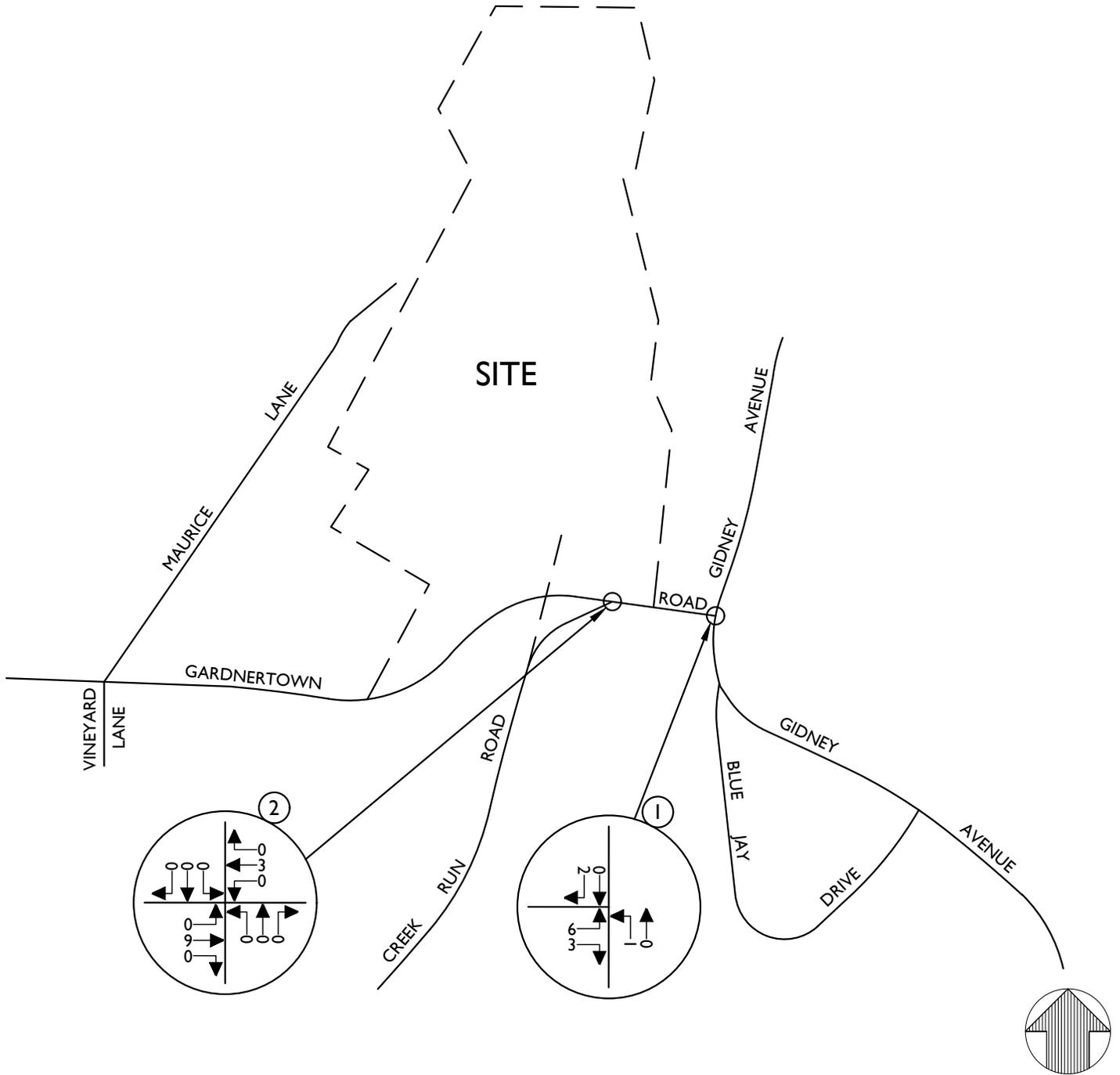
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SHEET TITLE:
OTHER DEVELOPMENT
TRAFFIC VOLUMES
WEEKDAY PEAK AM HOUR

SHEET NUMBER:

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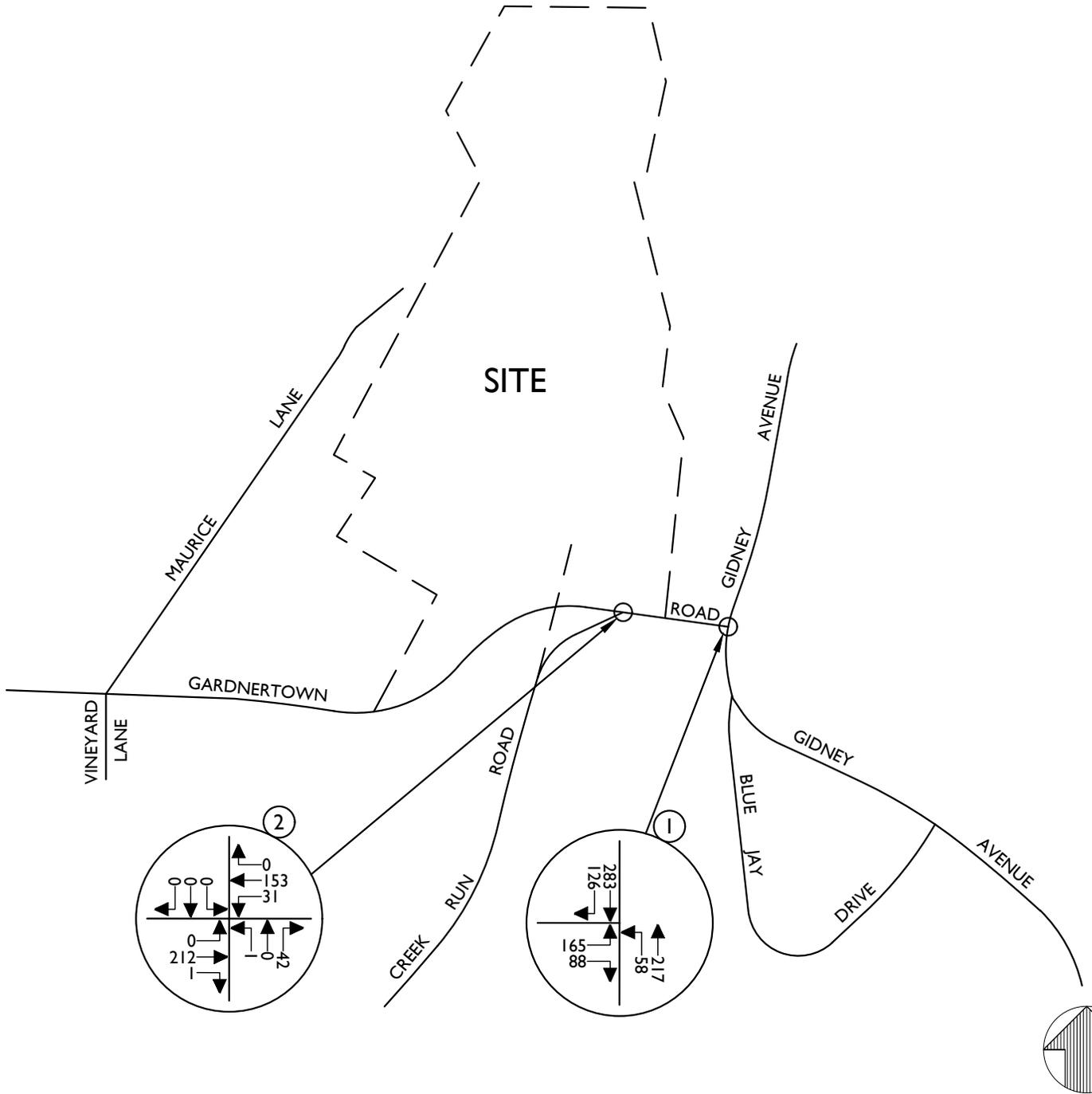
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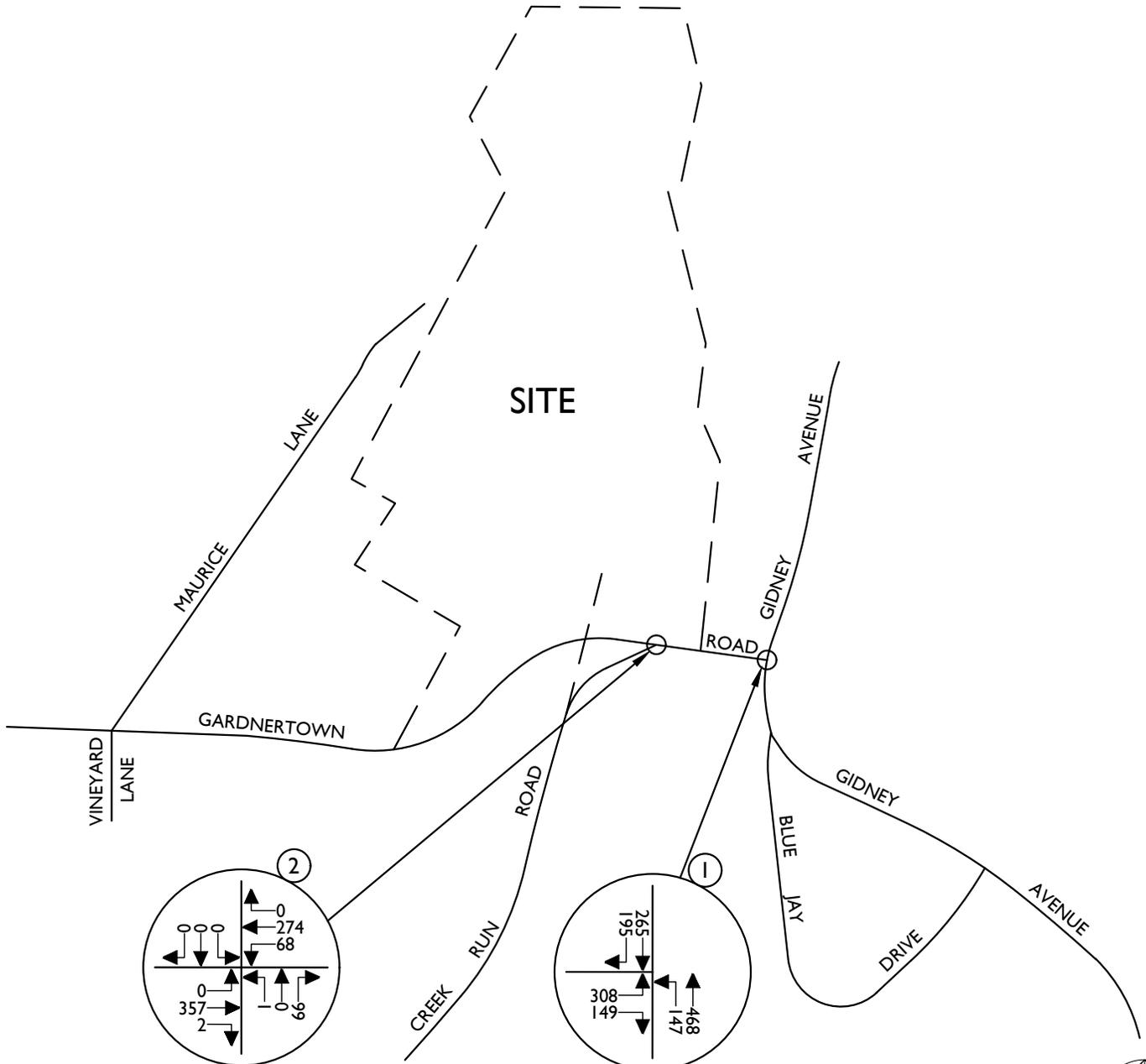
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WEEKDAY PEAK AM HOUR**

SHEET NUMBER:

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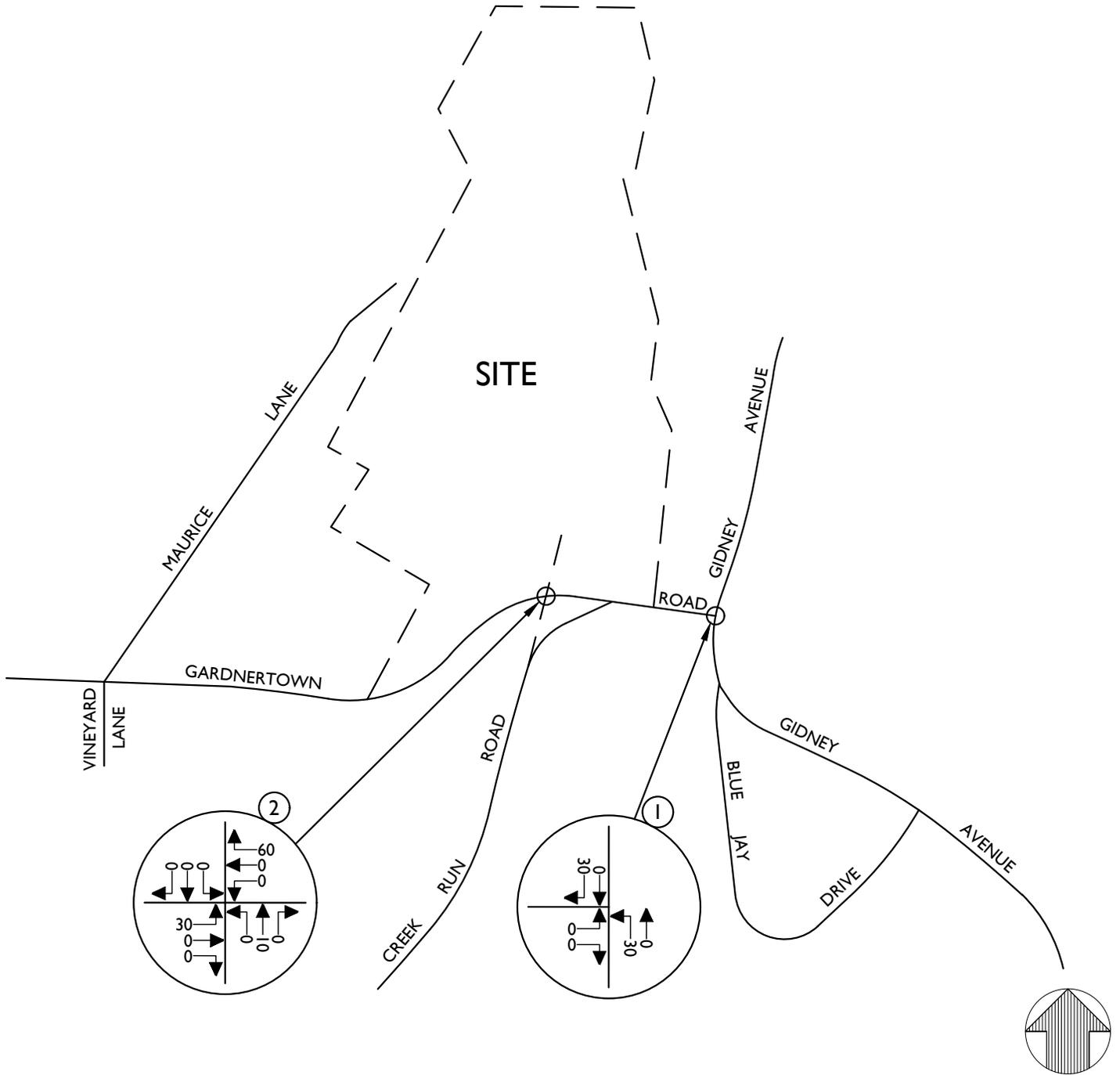
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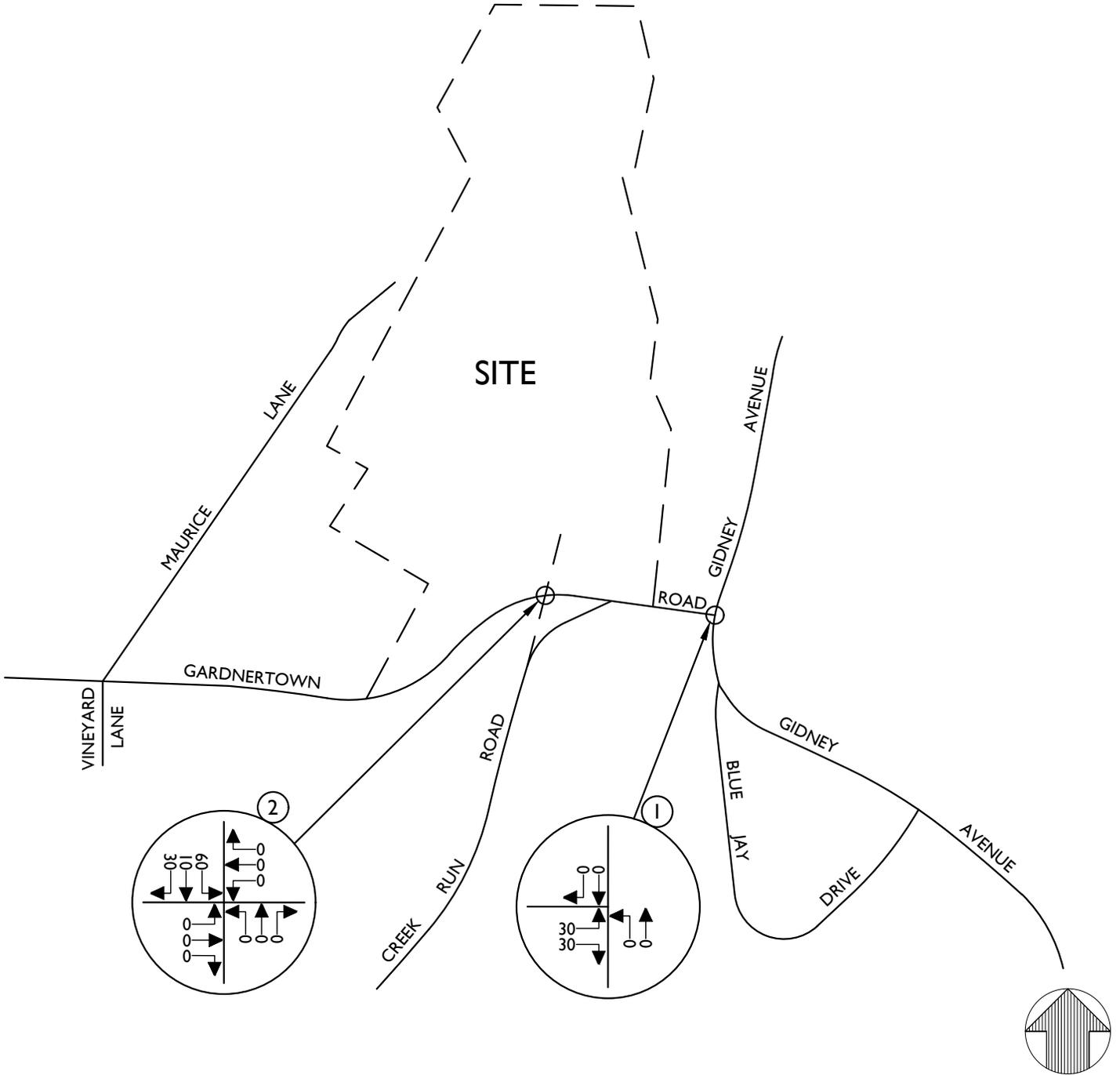
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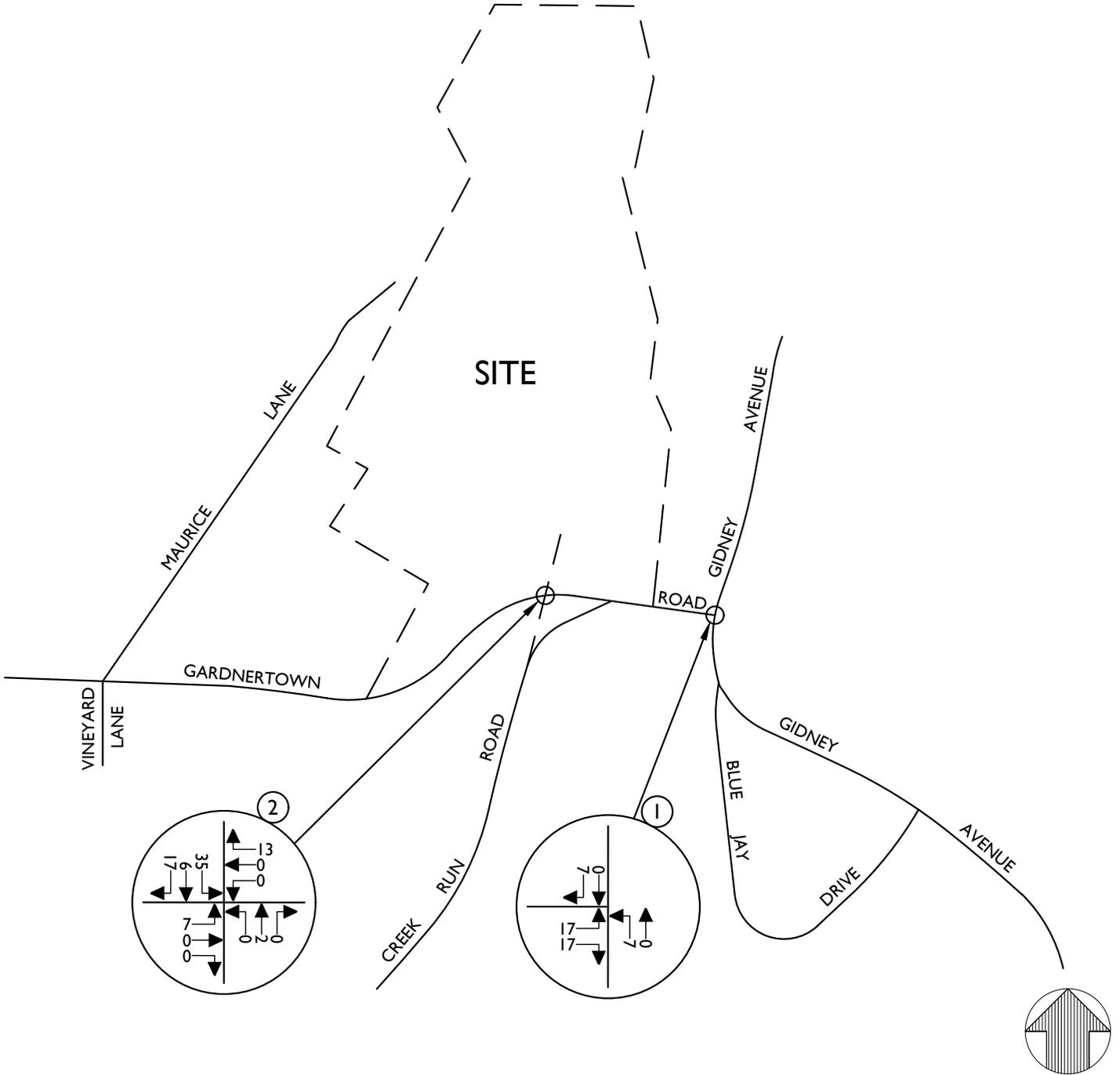
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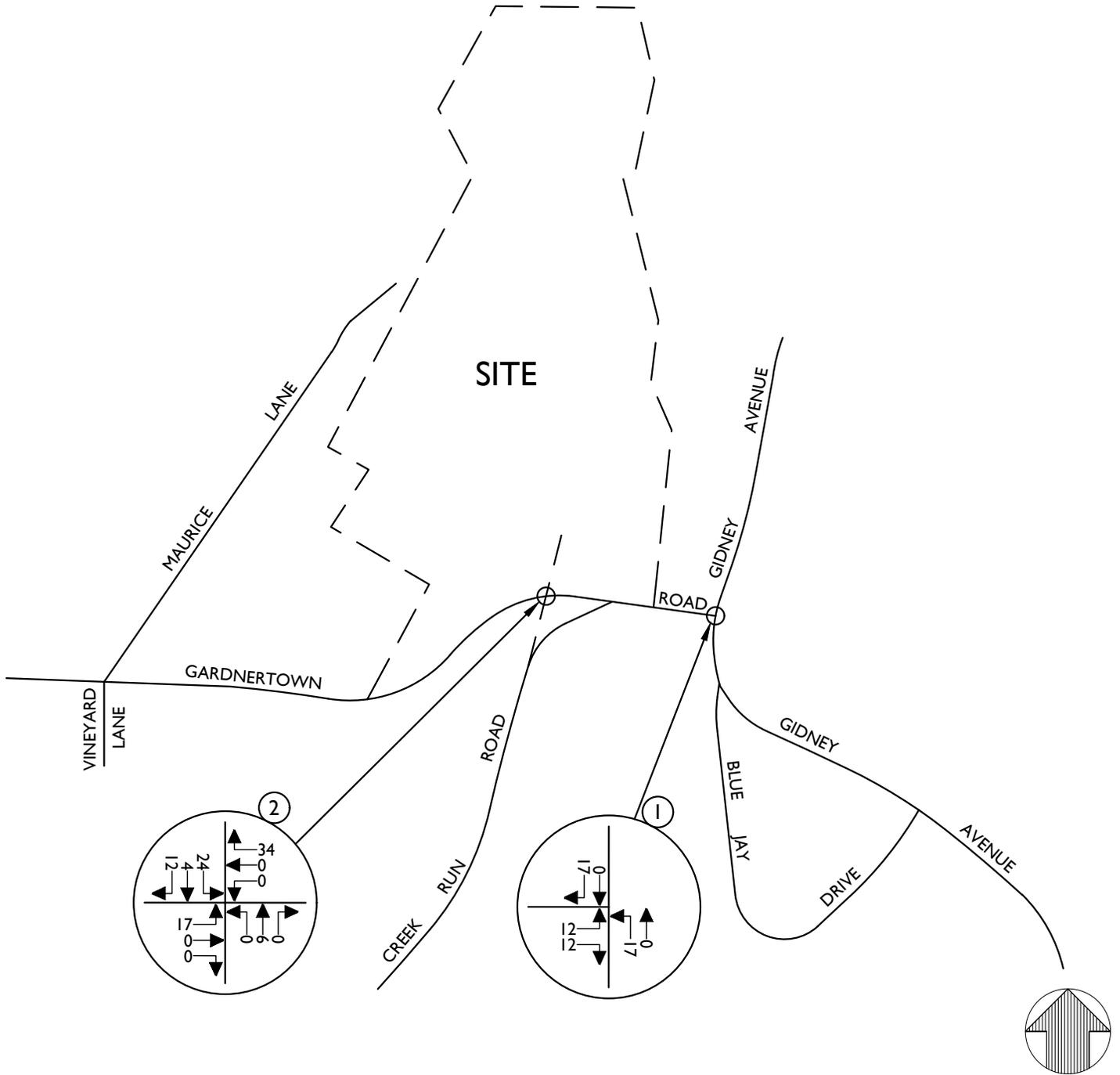
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WEEKDAY PEAK AM HOUR

SHEET NUMBER:
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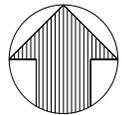
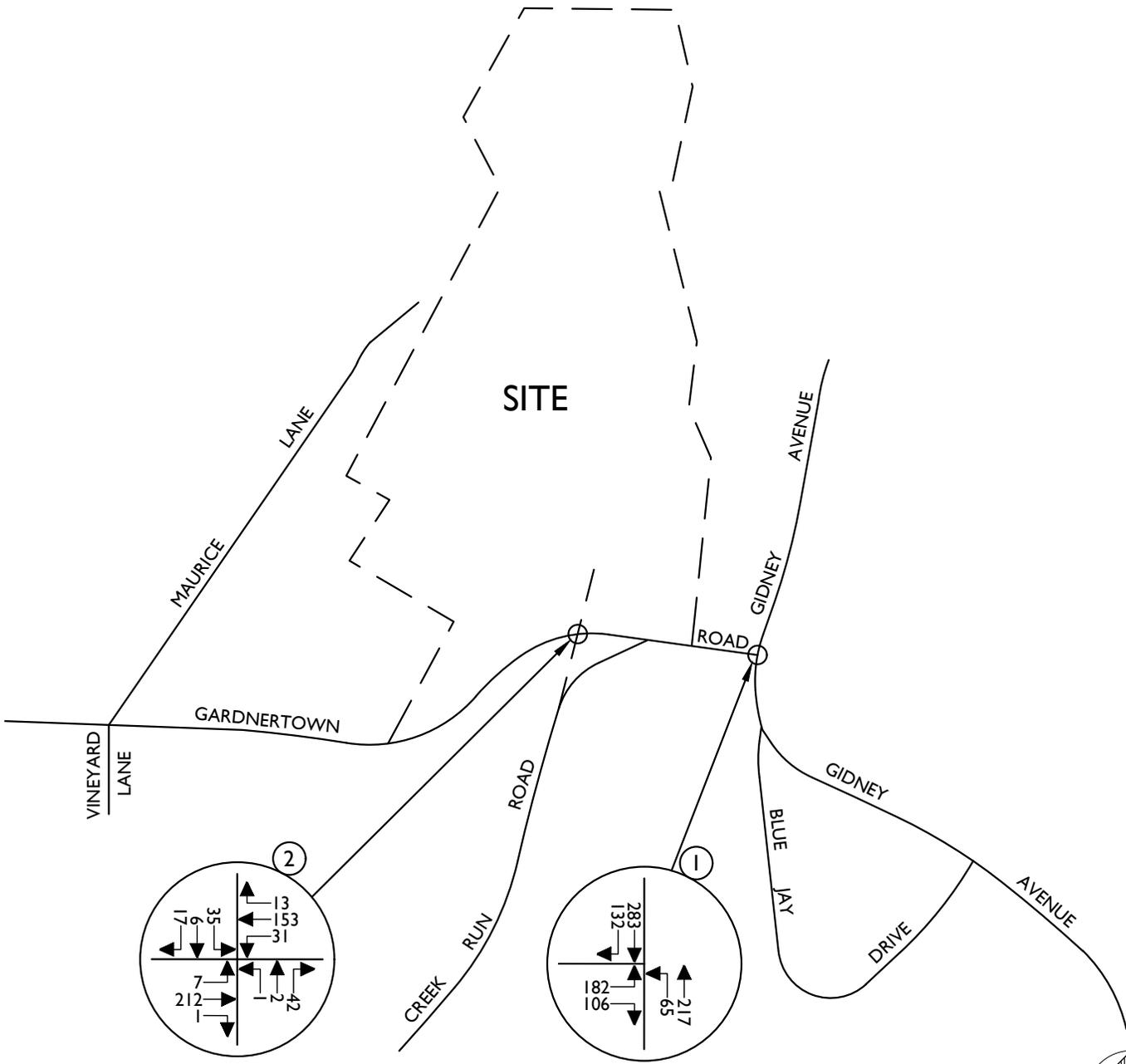
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WEEKDAY PEAK PM HOUR

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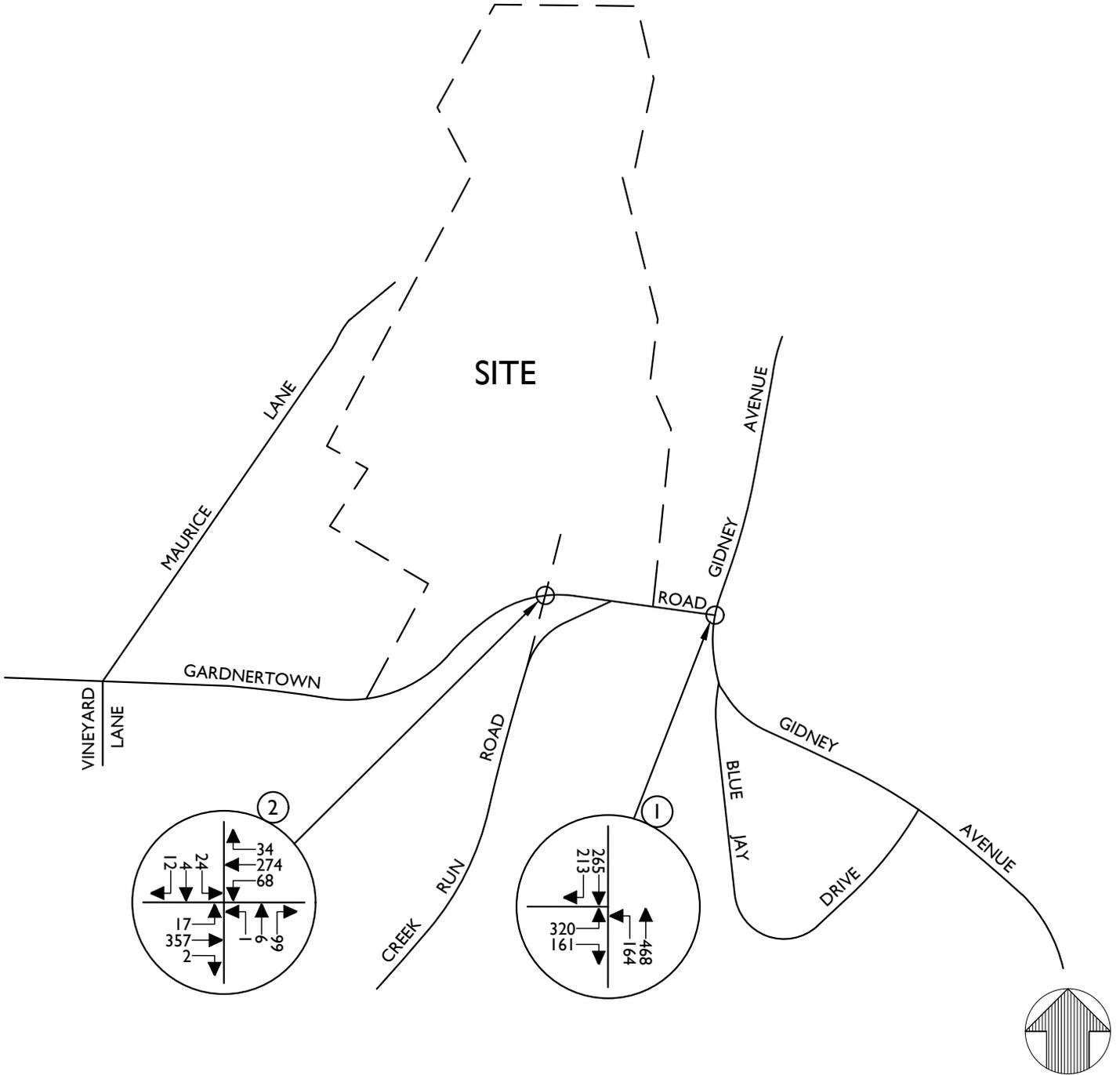
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WEEKDAY PEAK AM HOUR

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SHEET NUMBER:
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Traffic Impact Study

Appendix B | Tables

**Table No. 1
Hourly Trip Generation Rates (HTGR) and
Anticipated Site Generated Traffic Volumes**

Gardner Ridge Town of Newburgh, NY	Entry		Exit	
	HTGR ¹	Volume	HTGR ¹	HTGR ¹
Multi-Family Housing (144 Units)				
Peak AM Hour	0.15	22	0.40	58
Peak PM Hour	0.40	57	0.28	40

NOTES:

- 1) THE HOURLY TRIP GENERATION RATES (HTGR) ARE BASED ON DATA PUBLISHED BY THE INSTITUTE OF TRANSPORTATION ENGINEERS (ITE) AS CONTAINED IN THE TRIP GENERATION HANDBOOK, 10TH EDITION, 2017. ITE LAND USE CODE - 220 - MULTIFAMILY HOUSING.
- 2) NOTE THAT ALTHOUGH A PORTION OF THE UNITS MAYBE AGE RESTRICTED, NO ADJUSTMENT WAS MADE IN THE TRIP RATES SHOWN. THUS, THE VOLUMES SHOWN ABOVE ARE SOMEWHAT CONSERVATIVE SINCE AGE - RESTRICTED UNITS TYPICALLY GENERATE LOWER PEAK HOUR TRAFFIC VOLUMES.

**Table No. 2
Level of Service Summary Table
Weekday Peak AM Hour**

				2021 Existing			2025 No-Build			2025 Build			Change in Delay No-Build to Build
				v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	
1	Gardnertown Road & Gidney Avenue		Signalized										
	Gardnertown Road	EB	L	0.69	C	20.3	0.71	C	20.2	0.72	C	20.2	0.0
			R	0.42	B	18.6	0.43	B	18.4	0.47	B	18.5	0.1
	Gidney Avenue	NB	L	0.09	A	6.3	0.10	A	6.9	0.12	A	7.6	0.7
			T	0.19	A	3.9	0.20	A	4.2	0.20	A	4.5	0.3
	Gidney Avenue	SB	TR	0.40	A	5.3	0.42	A	5.7	0.44	A	6.2	0.5
		Overall	-	A	8.8	-	A	9.2	-	A	9.8	0.6	
2	Gardnertown Road & Creek Run Road		Unsignalized										
	Gardnertown Road	EB	LTR	-	-	-	-	-	-	0.01	A	7.7	-
	Gardnertown Road	WB	LTR	0.03	A	7.8	0.03	A	7.8	0.03	A	7.8	-
	Creek Run Road	NB	LTR	0.06	A	9.8	0.06	B	10.0	0.07	B	10.2	-
	Site Access	SB	LTR	-	-	-	-	-	-	0.14	B	13.6	-

NOTES:

- 1) THE ABOVE REPRESENTS THE LEVEL OF SERVICE AND VEHICLE DELAY IN SECONDS, C [16.2], FOR EACH KEY APPROACH OF THE UNSIGNALIZED INTERSECTIONS AS WELL AS FOR EACH APPROACH AND THE OVERALL INTERSECTION FOR THE SIGNALIZED INTERSECTIONS. SEE APPENDIX "C" FOR A DESCRIPTION OF THE LEVELS OF SERVICE.

**Table No. 2
Level of Service Summary Table
Weekday Peak PM Hour**

				2021 Existing			2025 No-Build			2025 Build			Change in Delay No-Build to Build
				v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	
1	Gardnertown Road & Gidney Avenue		Signalized										
	Gardnertown Road	EB	L	0.80	C	20.3	0.81	C	21.7	0.82	C	22.7	1.0
			R	0.43	B	17.3	0.44	B	17.2	0.46	B	17.2	0.0
	Gidney Avenue	NB	L	0.28	B	12.1	0.31	B	13.5	0.36	B	15.3	1.8
			T	0.43	A	7.6	0.45	A	8.2	0.46	A	8.5	0.3
	Gidney Avenue	SB	TR	0.48	A	8.3	0.51	A	9.0	0.53	A	9.7	0.7
		Overall	-	B	11.7	-	B	12.5	-	B	13.3	0.8	
2	Gardnertown Road & Creek Run Road		Unsignalized										
	Gardnertown Road	EB	LTR	-	-	-	-	-	-	0.02	A	8.0	-
	Gardnertown Road	WB	LTR	0.06	A	8.2	0.06	A	8.3	0.06	A	8.3	-
	Creek Run Road	NB	LTR	0.15	B	11.3	0.17	B	11.6	0.19	B	12.5	-
	Site Access	SB	LTR	-	-	-	-	-	-	0.18	C	22.7	-

NOTES:

- 1) THE ABOVE REPRESENTS THE LEVEL OF SERVICE AND VEHICLE DELAY IN SECONDS, C [16.2], FOR EACH KEY APPROACH OF THE UNSIGNALIZED INTERSECTIONS AS WELL AS FOR EACH APPROACH AND THE OVERALL INTERSECTION FOR THE SIGNALIZED INTERSECTIONS. SEE APPENDIX "C" FOR A DESCRIPTION OF THE LEVELS OF SERVICE.

Traffic Impact Study

Appendix C | Level of Service Standards

Level of Service Standards

Level of Service for Signalized Intersections

Level of Service (LOS) can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay and volume-to-capacity (v/c) ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a measure of driver discomfort and fuel consumption. The volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group.

- **LOS A** describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
- **LOS B** describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
- **LOS C** describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate.
- **LOS D** describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long.
- **LOS E** describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long.
- **LOS F** describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long.

A lane group can incur a delay less than 80 s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

The Level of Service Criteria for signalized intersections are given in Exhibit 19-8 from the *Highway Capacity Manual, 6th Edition* published by the Transportation Research Board.

Exhibit 19-8 LOS by Volume-to-Capacity Ratio

Control Delay (s/veh)	$v/c \leq 1.0$	$v/c \geq 1.0$
≤ 10	A	F
>10-20	B	F
>20-35	C	F
>35-55	D	F
>55-80	E	F
>80	F	F

For approach-based and intersection wide assessments, LOS is defined solely by control delay.

Level of Service Criteria For Two-Way Stop-Controlled (TWSC) Unsignalized Intersections

Level of Service (LOS) for a two-way stop-controlled (TWSC) intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns. LOS is not defined for the intersection as a whole or for major-street approaches.

The Level of Service Criteria for TWSC unsignalized intersections are given in Exhibit 20-2 from the Highway Capacity Manual, 6th Edition published by the Transportation Research Board.

Exhibit 20-2 LOS by Volume-to-Capacity Ratio

Control Delay (s/veh)	$v/c \leq 1.0$	$v/c \geq 1.0$
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

As Exhibit 20-2 notes, LOS F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay.

The Level of Service Criteria for unsignalized intersections are somewhat different from the criteria for signalized intersections.

Level of Service Criteria For All-Way Stop-Controlled (AWSC) Unsignalized Intersections

The Levels of Service (LOS) for all-way stop-controlled (AWSC) intersections are given in Exhibit 21-8. As the exhibit notes, LOS F is assigned if the volume-to-capacity (v/c) ratio of a lane exceeds 1.0, regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay.

The Level of Service Criteria for AWSC unsignalized intersections are given in Exhibit 21-8 from the *Highway Capacity Manual, 6th Edition* published by the Transportation Research Board.

Exhibit 21-8 LOS by Volume-to-Capacity Ratio

Control Delay (s/veh)	$v/c \leq 1.0$	$v/c \geq 1.0$
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

For approaches and intersection wide assessment, LOS is defined solely by control delay.

Traffic Impact Study

Appendix D | Capacity Analysis

2021 Existing Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak AM Hour
 08/11/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	150	80	55	209	272	120
Future Volume (vph)	150	80	55	209	272	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	10	12	12	12
Grade (%)	5%			-3%	0%	
Storage Length (ft)	85	0	55			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850			0.959	
Fl _t Protected	0.950		0.950			
Satd. Flow (prot)	1620	1400	1629	1837	1735	0
Fl _t Permitted	0.950		0.492			
Satd. Flow (perm)	1620	1400	843	1837	1735	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		90			53	
Link Speed (mph)	30			30	30	
Link Distance (ft)	308			413	360	
Travel Time (s)	7.0			9.4	8.2	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	169	90	62	235	306	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	90	62	235	441	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.08	1.13	1.07	0.98	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	2	2	2	2	2	
Detector Template						
Leading Detector (ft)	83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40	
Detector 2 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	

2021 Existing Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak AM Hour
 08/11/2021

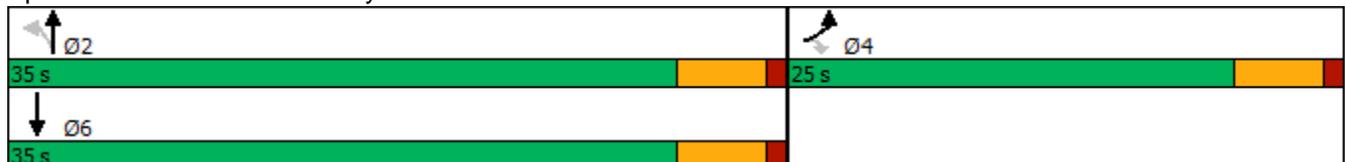


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	25.0	25.0	35.0	35.0	35.0	
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	
Maximum Green (s)	20.0	20.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	Max	Max	Max	
v/c Ratio	0.55	0.27	0.11	0.19	0.37	
Control Delay	25.1	6.8	5.7	5.4	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.1	6.8	5.7	5.4	6.0	
Queue Length 50th (ft)	45	0	6	25	47	
Queue Length 95th (ft)	89	26	23	63	115	
Internal Link Dist (ft)	228			333	280	
Turn Bay Length (ft)	85		55			
Base Capacity (vph)	642	609	568	1239	1187	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.26	0.15	0.11	0.19	0.37	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 50.5
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Gidney Avenue & Gardnertown Road



2021 Existing Traffic Volumes
1: Gidney Avenue & Gardnertown Road

Peak AM Hour
08/11/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	150	80	55	209	272	120
Future Volume (veh/h)	150	80	55	209	272	120
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1679	1679	1943	1943	1826	1826
Adj Flow Rate, veh/h	169	90	62	235	306	135
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	243	216	656	1235	764	337
Arrive On Green	0.15	0.15	0.64	0.64	0.64	0.64
Sat Flow, veh/h	1599	1423	985	1943	1201	530
Grp Volume(v), veh/h	169	90	62	235	0	441
Grp Sat Flow(s),veh/h/ln	1599	1423	985	1943	0	1731
Q Serve(g_s), s	4.7	2.7	1.5	2.4	0.0	5.9
Cycle Q Clear(g_c), s	4.7	2.7	7.4	2.4	0.0	5.9
Prop In Lane	1.00	1.00	1.00			0.31
Lane Grp Cap(c), veh/h	243	216	656	1235	0	1100
V/C Ratio(X)	0.69	0.42	0.09	0.19	0.00	0.40
Avail Cap(c_a), veh/h	678	603	656	1235	0	1100
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.0	18.1	6.0	3.6	0.0	4.2
Incr Delay (d2), s/veh	1.3	0.5	0.3	0.3	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.8	0.3	0.6	0.0	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.3	18.6	6.3	3.9	0.0	5.3
LnGrp LOS	C	B	A	A	A	A
Approach Vol, veh/h	259			297	441	
Approach Delay, s/veh	19.7			4.4	5.3	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		35.0		12.2		35.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		30.0		20.0		30.0
Max Q Clear Time (g_c+l1), s		9.4		6.7		7.9
Green Ext Time (p_c), s		1.0		0.7		1.6
Intersection Summary						
HCM 6th Ctrl Delay			8.8			
HCM 6th LOS			A			

2021 Existing Traffic Volumes
 2: Creek Run Road & Gardnertown Road

Peak AM Hour
 08/11/2021



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑	↑	
Traffic Volume (vph)	190	1	30	145	1	40
Future Volume (vph)	190	1	30	145	1	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	12	12	15	12	12
Grade (%)	-8%			-4%	0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999				0.868	
Flt Protected				0.992	0.999	
Satd. Flow (prot)	1943	0	0	2014	1569	0
Flt Permitted				0.992	0.999	
Satd. Flow (perm)	1943	0	0	2014	1569	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	534			308	386	
Travel Time (s)	12.1			7.0	8.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	218	1	34	167	1	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	219	0	0	201	47	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			11	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.91	0.95	0.97	0.86	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

Intersection						
Int Delay, s/veh	1.5					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	190	1	30	145	1	40
Future Vol, veh/h	190	1	30	145	1	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage#	-	-	-	0	0	-
Grade, %	-8	-	-	-4	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	218	1	34	167	1	46

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	219
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-2.245	-3.545
Pot Cap-1 Maneuver	-	-	1333
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1333
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NE
HCM Control Delay, s	0	1.3	9.8
HCM LOS			A

Minor Lane/Major Mvm	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	803	-	-	1333	-
HCM Lane V/C Ratio	0.059	-	-	0.026	-
HCM Control Delay (s)	9.8	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

2021 Existing Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak PM Hour
 08/11/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	290	140	140	450	255	186
Future Volume (vph)	290	140	140	450	255	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	10	12	12	12
Grade (%)	5%			-3%	0%	
Storage Length (ft)	85	0	55			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.943	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1620	1400	1629	1837	1706	0
Flt Permitted	0.950		0.441			
Satd. Flow (perm)	1620	1400	756	1837	1706	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		147			88	
Link Speed (mph)	30			30	30	
Link Distance (ft)	308			413	360	
Travel Time (s)	7.0			9.4	8.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	305	147	147	474	268	196
Shared Lane Traffic (%)						
Lane Group Flow (vph)	305	147	147	474	464	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.08	1.13	1.07	0.98	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	2	2	2	2	2	
Detector Template						
Leading Detector (ft)	83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40	
Detector 2 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	

2021 Existing Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak PM Hour
 08/11/2021

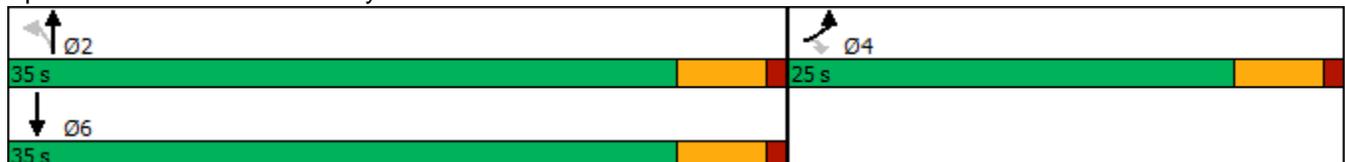


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	25.0	25.0	35.0	35.0	35.0	
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	
Maximum Green (s)	20.0	20.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	Max	Max	Max	
v/c Ratio	0.72	0.31	0.35	0.47	0.47	
Control Delay	28.7	5.2	11.2	10.1	8.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.7	5.2	11.2	10.1	8.6	
Queue Length 50th (ft)	89	0	23	82	62	
Queue Length 95th (ft)	159	32	71	179	151	
Internal Link Dist (ft)	228			333	280	
Turn Bay Length (ft)	85		55			
Base Capacity (vph)	599	610	419	1019	986	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.51	0.24	0.35	0.47	0.47	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 54.4
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Gidney Avenue & Gardnertown Road



2021 Existing Traffic Volumes
1: Gidney Avenue & Gardnertown Road

Peak PM Hour
08/11/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	290	140	140	450	255	186
Future Volume (veh/h)	290	140	140	450	255	186
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1679	1679	1943	1943	1826	1826
Adj Flow Rate, veh/h	305	147	147	474	268	196
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	381	339	532	1110	560	409
Arrive On Green	0.24	0.24	0.57	0.57	0.57	0.57
Sat Flow, veh/h	1599	1423	964	1943	980	717
Grp Volume(v), veh/h	305	147	147	474	0	464
Grp Sat Flow(s),veh/h/ln	1599	1423	964	1943	0	1697
Q Serve(g_s), s	9.4	4.6	5.6	7.3	0.0	8.5
Cycle Q Clear(g_c), s	9.4	4.6	14.1	7.3	0.0	8.5
Prop In Lane	1.00	1.00	1.00			0.42
Lane Grp Cap(c), veh/h	381	339	532	1110	0	969
V/C Ratio(X)	0.80	0.43	0.28	0.43	0.00	0.48
Avail Cap(c_a), veh/h	609	542	532	1110	0	969
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	17.0	10.8	6.4	0.0	6.6
Incr Delay (d2), s/veh	1.5	0.3	1.3	1.2	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	1.4	1.2	2.5	0.0	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.3	17.3	12.1	7.6	0.0	8.3
LnGrp LOS	C	B	B	A	A	A
Approach Vol, veh/h	452			621	464	
Approach Delay, s/veh	19.4			8.7	8.3	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		35.0		17.5		35.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		30.0		20.0		30.0
Max Q Clear Time (g_c+I1), s		16.1		11.4		10.5
Green Ext Time (p_c), s		2.2		1.1		1.7
Intersection Summary						
HCM 6th Ctrl Delay			11.7			
HCM 6th LOS			B			

2021 Existing Traffic Volumes
 2: Creek Run Road & Gardnertown Road

Peak PM Hour
 08/11/2021



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑			↑	↑	
Traffic Volume (vph)	335	2	65	261	1	95
Future Volume (vph)	335	2	65	261	1	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	12	12	15	12	12
Grade (%)	-8%			-4%	0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999				0.866	
Flt Protected				0.990		
Satd. Flow (prot)	1943	0	0	2010	1567	0
Flt Permitted				0.990		
Satd. Flow (perm)	1943	0	0	2010	1567	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	534			308	386	
Travel Time (s)	12.1			7.0	8.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	360	2	70	281	1	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	362	0	0	351	103	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			11	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.91	0.95	0.97	0.86	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

Intersection

Int Delay, s/veh 2.1

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↶			↷	↷	
Traffic Vol, veh/h	335	2	65	261	1	95
Future Vol, veh/h	335	2	65	261	1	95
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage#	-	-	-	0	0	-
Grade, %	-8	-	-	-4	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	360	2	70	281	1	102

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	362
Stage 1	-	-	361
Stage 2	-	-	421
Critical Hdwy	-	4.15	6.45
Critical Hdwy Stg 1	-	-	5.45
Critical Hdwy Stg 2	-	-	5.45
Follow-up Hdwy	-	2.245	3.345
Pot Cap-1 Maneuver	-	1180	359
Stage 1	-	-	699
Stage 2	-	-	656
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1180	334
Mov Cap-2 Maneuver	-	-	334
Stage 1	-	-	650
Stage 2	-	-	656

Approach	EB	WB	NE
HCM Control Delay, s	0	1.6	11.3
HCM LOS			B

Minor Lane/Major Mvm	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	670	-	-	1180	-
HCM Lane V/C Ratio	0.154	-	-	0.059	-
HCM Control Delay (s)	11.3	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.2	-

2025 No-Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak AM Hour
 08/11/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	165	88	58	217	283	126
Future Volume (vph)	165	88	58	217	283	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	10	12	12	12
Grade (%)	5%			-3%	0%	
Storage Length (ft)	85	0	55			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.958	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1620	1400	1629	1837	1734	0
Flt Permitted	0.950		0.476			
Satd. Flow (perm)	1620	1400	816	1837	1734	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		99			54	
Link Speed (mph)	30			30	30	
Link Distance (ft)	308			413	360	
Travel Time (s)	7.0			9.4	8.2	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	185	99	65	244	318	142
Shared Lane Traffic (%)						
Lane Group Flow (vph)	185	99	65	244	460	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.08	1.13	1.07	0.98	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	2	2	2	2	2	
Detector Template						
Leading Detector (ft)	83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40	
Detector 2 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	

2025 No-Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak AM Hour
 08/11/2021

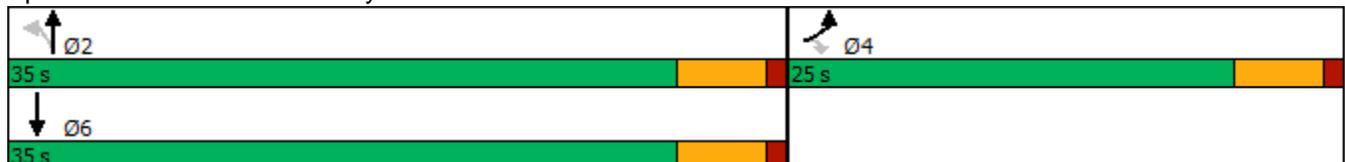


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	25.0	25.0	35.0	35.0	35.0	
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	
Maximum Green (s)	20.0	20.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	Max	Max	Max	
v/c Ratio	0.57	0.28	0.12	0.20	0.39	
Control Delay	25.5	6.6	6.1	5.7	6.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.5	6.6	6.1	5.7	6.4	
Queue Length 50th (ft)	49	0	7	27	52	
Queue Length 95th (ft)	96	27	25	68	127	
Internal Link Dist (ft)	228			333	280	
Turn Bay Length (ft)	85		55			
Base Capacity (vph)	636	609	545	1228	1178	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.29	0.16	0.12	0.20	0.39	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 51
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Gidney Avenue & Gardnertown Road



2025 No-Build Traffic Volumes
1: Gidney Avenue & Gardnertown Road

Peak AM Hour
08/11/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	165	88	58	217	283	126
Future Volume (veh/h)	165	88	58	217	283	126
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1679	1679	1943	1943	1826	1826
Adj Flow Rate, veh/h	185	99	65	244	318	142
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	261	233	627	1219	750	335
Arrive On Green	0.16	0.16	0.63	0.63	0.63	0.63
Sat Flow, veh/h	1599	1423	968	1943	1196	534
Grp Volume(v), veh/h	185	99	65	244	0	460
Grp Sat Flow(s),veh/h/ln	1599	1423	968	1943	0	1730
Q Serve(g_s), s	5.2	3.0	1.7	2.6	0.0	6.5
Cycle Q Clear(g_c), s	5.2	3.0	8.2	2.6	0.0	6.5
Prop In Lane	1.00	1.00	1.00			0.31
Lane Grp Cap(c), veh/h	261	233	627	1219	0	1085
V/C Ratio(X)	0.71	0.43	0.10	0.20	0.00	0.42
Avail Cap(c_a), veh/h	669	595	627	1219	0	1085
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	18.0	6.6	3.8	0.0	4.5
Incr Delay (d2), s/veh	1.3	0.5	0.3	0.4	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.9	0.3	0.7	0.0	1.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.2	18.4	6.9	4.2	0.0	5.7
LnGrp LOS	C	B	A	A	A	A
Approach Vol, veh/h	284			309	460	
Approach Delay, s/veh	19.6			4.7	5.7	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		35.0		12.8		35.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		30.0		20.0		30.0
Max Q Clear Time (g_c+I1), s		10.2		7.2		8.5
Green Ext Time (p_c), s		1.0		0.8		1.7
Intersection Summary						
HCM 6th Ctrl Delay			9.2			
HCM 6th LOS			A			

2025 No-Build Traffic Volumes
 2: Creek Run Road & Gardnertown Road

Peak AM Hour
 08/11/2021



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	212	1	31	153	1	42
Future Volume (vph)	212	1	31	153	1	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	12	12	15	12	12
Grade (%)	-8%			-4%	0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999				0.868	
Flt Protected				0.992	0.999	
Satd. Flow (prot)	1943	0	0	2014	1569	0
Flt Permitted				0.992	0.999	
Satd. Flow (perm)	1943	0	0	2014	1569	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	534			308	386	
Travel Time (s)	12.1			7.0	8.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	244	1	36	176	1	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	245	0	0	212	49	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			11	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	0.91	0.95	0.97	0.86	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

Intersection						
Int Delay, s/veh	1.5					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	212	1	31	153	1	42
Future Vol, veh/h	212	1	31	153	1	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage#	-	-	-	0	0	-
Grade, %	-8	-	-	-4	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	244	1	36	176	1	48

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	245
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.15
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-2.245	-3.545
Pot Cap-1 Maneuver	-	-	1304
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1304
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NE
HCM Control Delay, s	0	1.3	10
HCM LOS			B

Minor Lane/Major Mvm	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	776	-	-	1304	-
HCM Lane V/C Ratio	0.064	-	-	0.027	-
HCM Control Delay (s)	10	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

2025 No-Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak PM Hour
 08/11/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	308	149	147	468	265	195
Future Volume (vph)	308	149	147	468	265	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	10	12	12	12
Grade (%)	5%			-3%	0%	
Storage Length (ft)	85	0	55			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.943	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1620	1400	1629	1837	1706	0
Flt Permitted	0.950		0.421			
Satd. Flow (perm)	1620	1400	722	1837	1706	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		157			88	
Link Speed (mph)	30			30	30	
Link Distance (ft)	308			413	360	
Travel Time (s)	7.0			9.4	8.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	324	157	155	493	279	205
Shared Lane Traffic (%)						
Lane Group Flow (vph)	324	157	155	493	484	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.08	1.13	1.07	0.98	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	2	2	2	2	2	
Detector Template						
Leading Detector (ft)	83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40	
Detector 2 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	

2025 No-Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak PM Hour
 08/11/2021

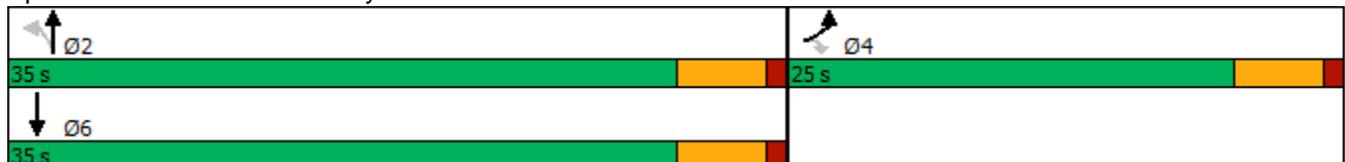


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	25.0	25.0	35.0	35.0	35.0	
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	
Maximum Green (s)	20.0	20.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	Max	Max	Max	
v/c Ratio	0.75	0.32	0.39	0.49	0.50	
Control Delay	29.8	5.1	12.3	10.7	9.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.8	5.1	12.3	10.7	9.1	
Queue Length 50th (ft)	96	0	26	90	69	
Queue Length 95th (ft)	170	33	78	188	162	
Internal Link Dist (ft)	228			333	280	
Turn Bay Length (ft)	85		55			
Base Capacity (vph)	593	612	396	1009	977	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.55	0.26	0.39	0.49	0.50	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 54.9
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Gidney Avenue & Gardnertown Road



2025 No-Build Traffic Volumes
1: Gidney Avenue & Gardnertown Road

Peak PM Hour
08/11/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	308	149	147	468	265	195
Future Volume (veh/h)	308	149	147	468	265	195
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1679	1679	1943	1943	1826	1826
Adj Flow Rate, veh/h	324	157	155	493	279	205
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	399	355	503	1094	550	404
Arrive On Green	0.25	0.25	0.56	0.56	0.56	0.56
Sat Flow, veh/h	1599	1423	947	1943	978	719
Grp Volume(v), veh/h	324	157	155	493	0	484
Grp Sat Flow(s),veh/h/ln	1599	1423	947	1943	0	1697
Q Serve(g_s), s	10.2	5.0	6.4	7.9	0.0	9.3
Cycle Q Clear(g_c), s	10.2	5.0	15.7	7.9	0.0	9.3
Prop In Lane	1.00	1.00	1.00			0.42
Lane Grp Cap(c), veh/h	399	355	503	1094	0	955
V/C Ratio(X)	0.81	0.44	0.31	0.45	0.00	0.51
Avail Cap(c_a), veh/h	600	534	503	1094	0	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	16.9	11.9	6.8	0.0	7.1
Incr Delay (d2), s/veh	2.9	0.3	1.6	1.3	0.0	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	1.5	1.4	2.8	0.0	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.7	17.2	13.5	8.2	0.0	9.0
LnGrp LOS	C	B	B	A	A	A
Approach Vol, veh/h	481			648	484	
Approach Delay, s/veh	20.3			9.4	9.0	
Approach LOS	C			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		35.0		18.3		35.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		30.0		20.0		30.0
Max Q Clear Time (g_c+l1), s		17.7		12.2		11.3
Green Ext Time (p_c), s		2.2		1.1		1.7
Intersection Summary						
HCM 6th Ctrl Delay			12.5			
HCM 6th LOS			B			

2025 No-Build Traffic Volumes
 2: Creek Run Road & Gardnertown Road

Peak PM Hour
 08/11/2021



Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	357	2	68	274	1	99
Future Volume (vph)	357	2	68	274	1	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	12	12	15	12	12
Grade (%)	-8%			-4%	0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.999			0.866		
Flt Protected				0.990		
Satd. Flow (prot)	1943	0	0	2010	1567	0
Flt Permitted				0.990		
Satd. Flow (perm)	1943	0	0	2010	1567	0
Link Speed (mph)	30			30		
Link Distance (ft)	534			308		
Travel Time (s)	12.1			7.0		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	384	2	73	295	1	106
Shared Lane Traffic (%)						
Lane Group Flow (vph)	386	0	0	368	107	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			11		
Link Offset(ft)	0			0		
Crosswalk Width(ft)	16			16		
Two way Left Turn Lane						
Headway Factor	0.91	0.95	0.97	0.86	1.00	1.00
Turning Speed (mph)	9		15		15	
Sign Control	Free			Free		
				Stop		

Intersection Summary

Area Type: Other
 Control Type: Unsignalized

Intersection						
Int Delay, s/veh	2.2					
Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↵			↶	↷	
Traffic Vol, veh/h	357	2	68	274	1	99
Future Vol, veh/h	357	2	68	274	1	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage#	-	-	-	0	0	-
Grade, %	-8	-	-	-4	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	5	5	5	5	5	5
Mvmt Flow	384	2	73	295	1	106

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	386	0	826
Stage 1	-	-	-	-	385
Stage 2	-	-	-	-	441
Critical Hdwy	-	-	4.15	-	6.45
Critical Hdwy Stg 1	-	-	-	-	5.45
Critical Hdwy Stg 2	-	-	-	-	5.45
Follow-up Hdwy	-	-2.245	-	-3.545	3.345
Pot Cap-1 Maneuver	-	-	1156	-	338
Stage 1	-	-	-	-	681
Stage 2	-	-	-	-	642
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1156	-	312
Mov Cap-2 Maneuver	-	-	-	-	312
Stage 1	-	-	-	-	629
Stage 2	-	-	-	-	642

Approach	EB	WB	NE
HCM Control Delay, s	0	1.7	11.6
HCM LOS			B

Minor Lane/Major Mvm	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	649	-	-	1156	-
HCM Lane V/C Ratio	0.166	-	-	0.063	-
HCM Control Delay (s)	11.6	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

2025 Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak AM Hour
 08/11/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	182	106	65	217	283	132
Future Volume (vph)	182	106	65	217	283	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	10	12	12	12
Grade (%)	5%			-3%	0%	
Storage Length (ft)	85	0	55			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.957	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1620	1400	1629	1837	1732	0
Flt Permitted	0.950		0.459			
Satd. Flow (perm)	1620	1400	787	1837	1732	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		119			56	
Link Speed (mph)	30			30	30	
Link Distance (ft)	422			413	360	
Travel Time (s)	9.6			9.4	8.2	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	204	119	73	244	318	148
Shared Lane Traffic (%)						
Lane Group Flow (vph)	204	119	73	244	466	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.08	1.13	1.07	0.98	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	2	2	2	2	2	
Detector Template						
Leading Detector (ft)	83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40	
Detector 2 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	

2025 Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak AM Hour
 08/11/2021

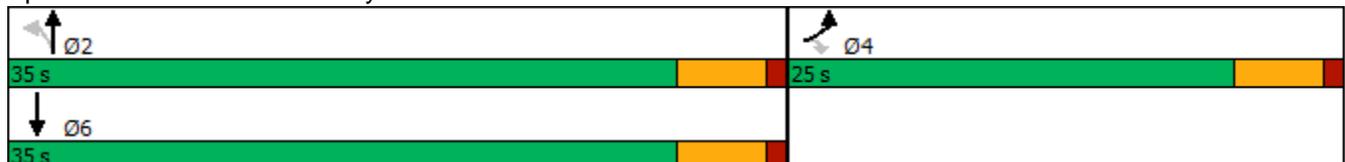


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	25.0	25.0	35.0	35.0	35.0	
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	
Maximum Green (s)	20.0	20.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	Max	Max	Max	
v/c Ratio	0.60	0.31	0.16	0.22	0.44	
Control Delay	25.6	6.3	6.8	6.4	7.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	6.3	6.8	6.4	7.4	
Queue Length 50th (ft)	55	0	8	29	55	
Queue Length 95th (ft)	105	30	29	72	136	
Internal Link Dist (ft)	342			333	280	
Turn Bay Length (ft)	85		55			
Base Capacity (vph)	639	624	465	1087	1048	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.32	0.19	0.16	0.22	0.44	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 50.9
 Natural Cycle: 40
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Gidney Avenue & Gardnertown Road



2025 Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak AM Hour
 08/11/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	182	106	65	217	283	132
Future Volume (veh/h)	182	106	65	217	283	132
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1679	1679	1943	1943	1826	1826
Adj Flow Rate, veh/h	204	119	73	244	318	148
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	284	252	606	1199	727	338
Arrive On Green	0.18	0.18	0.62	0.62	0.62	0.62
Sat Flow, veh/h	1599	1423	963	1943	1179	549
Grp Volume(v), veh/h	204	119	73	244	0	466
Grp Sat Flow(s),veh/h/ln	1599	1423	963	1943	0	1727
Q Serve(g_s), s	5.9	3.7	2.1	2.7	0.0	6.9
Cycle Q Clear(g_c), s	5.9	3.7	9.0	2.7	0.0	6.9
Prop In Lane	1.00	1.00	1.00			0.32
Lane Grp Cap(c), veh/h	284	252	606	1199	0	1066
V/C Ratio(X)	0.72	0.47	0.12	0.20	0.00	0.44
Avail Cap(c_a), veh/h	658	585	606	1199	0	1066
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	18.0	7.2	4.1	0.0	4.9
Incr Delay (d2), s/veh	1.3	0.5	0.4	0.4	0.0	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	1.1	0.4	0.8	0.0	1.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.2	18.5	7.6	4.5	0.0	6.2
LnGrp LOS	C	B	A	A	A	A
Approach Vol, veh/h	323			317	466	
Approach Delay, s/veh	19.5			5.2	6.2	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		35.0		13.6		35.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		30.0		20.0		30.0
Max Q Clear Time (g_c+l1), s		11.0		7.9		8.9
Green Ext Time (p_c), s		1.1		0.9		1.7
Intersection Summary						
HCM 6th Ctrl Delay			9.8			
HCM 6th LOS			A			

2025 Build Traffic Volumes
 2: Creek Run Road/Site Access & Gardnertown Road

Peak AM Hour
 08/11/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	7	212	1	31	153	13	1	2	42	35	6	17
Future Volume (vph)	7	212	1	31	153	13	1	2	42	35	6	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	15	12	12	12	12	12	12	12
Grade (%)		-8%			-4%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.991			0.873			0.960	
Flt Protected		0.998			0.992			0.999			0.971	
Satd. Flow (prot)	0	1939	0	0	1996	0	0	1578	0	0	1687	0
Flt Permitted		0.998			0.992			0.999			0.971	
Satd. Flow (perm)	0	1939	0	0	1996	0	0	1578	0	0	1687	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		432			422			388			154	
Travel Time (s)		9.8			9.6			8.8			3.5	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	8	244	1	36	176	15	1	2	48	40	7	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	253	0	0	227	0	0	51	0	0	67	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.95	0.91	0.95	0.97	0.86	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	212	1	31	153	13	1	2	42	35	6	17
Future Vol, veh/h	7	212	1	31	153	13	1	2	42	35	6	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	-8	-	-	-4	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	8	244	1	36	176	15	1	2	48	40	7	20

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	191	0	0	245
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.15	-	-	4.15
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.245	-	-	2.245
Pot Cap-1 Maneuver	865	-	-	1304
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	865	-	-	1304
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.2	10.2	13.6
HCM LOS			B	B

Minor Lane/Major Mvm	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)		746	1365	-	-	1304	-	484
HCM Lane V/C Ratio		0.069	0.006	-	-	0.027	-	0.138
HCM Control Delay (s)		10.2	7.7	0	-	7.8	0	13.6
HCM Lane LOS		B	A	A	-	A	A	B
HCM 95th %tile Q(veh)		0.2	0	-	-	0.1	-	0.5

2025 Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak PM Hour
 08/11/2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	320	161	164	468	265	213
Future Volume (vph)	320	161	164	468	265	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	10	12	12	12
Grade (%)	5%			-3%	0%	
Storage Length (ft)	85	0	55			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850			0.940	
Fl _t Protected	0.950		0.950			
Satd. Flow (prot)	1620	1400	1629	1837	1701	0
Fl _t Permitted	0.950		0.403			
Satd. Flow (perm)	1620	1400	691	1837	1701	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		169			96	
Link Speed (mph)	30			30	30	
Link Distance (ft)	422			413	360	
Travel Time (s)	9.6			9.4	8.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	337	169	173	493	279	224
Shared Lane Traffic (%)						
Lane Group Flow (vph)	337	169	173	493	503	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	11			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.08	1.13	1.07	0.98	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	2	2	2	2	2	
Detector Template						
Leading Detector (ft)	83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40	
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40	
Detector 2 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	

2025 Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak PM Hour
 08/11/2021

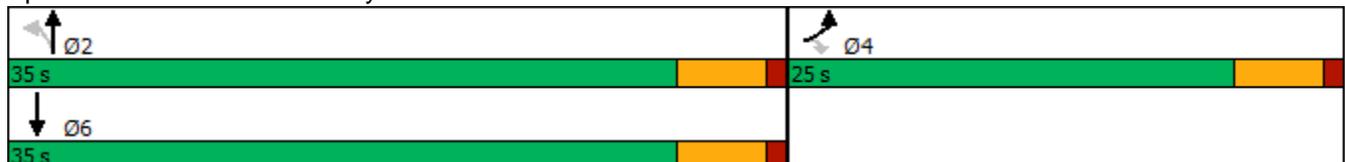


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	
Total Split (s)	25.0	25.0	35.0	35.0	35.0	
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	
Maximum Green (s)	20.0	20.0	30.0	30.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	None	None	Max	Max	Max	
v/c Ratio	0.76	0.33	0.46	0.49	0.52	
Control Delay	30.0	5.0	14.3	11.0	9.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.0	5.0	14.3	11.0	9.6	
Queue Length 50th (ft)	101	0	32	92	74	
Queue Length 95th (ft)	178	35	92	188	169	
Internal Link Dist (ft)	342			333	280	
Turn Bay Length (ft)	85		55			
Base Capacity (vph)	587	615	376	999	969	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.57	0.27	0.46	0.49	0.52	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 55.5
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Gidney Avenue & Gardnertown Road



2025 Build Traffic Volumes
 1: Gidney Avenue & Gardnertown Road

Peak PM Hour
 08/11/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	320	161	164	468	265	213
Future Volume (veh/h)	320	161	164	468	265	213
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1679	1679	1943	1943	1826	1826
Adj Flow Rate, veh/h	337	169	173	493	279	224
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	5	5	5	5	5	5
Cap, veh/h	411	366	478	1083	522	419
Arrive On Green	0.26	0.26	0.56	0.56	0.56	0.56
Sat Flow, veh/h	1599	1423	930	1943	938	753
Grp Volume(v), veh/h	337	169	173	493	0	503
Grp Sat Flow(s),veh/h/ln	1599	1423	930	1943	0	1690
Q Serve(g_s), s	10.7	5.4	7.8	8.1	0.0	10.1
Cycle Q Clear(g_c), s	10.7	5.4	17.9	8.1	0.0	10.1
Prop In Lane	1.00	1.00	1.00			0.45
Lane Grp Cap(c), veh/h	411	366	478	1083	0	942
V/C Ratio(X)	0.82	0.46	0.36	0.46	0.00	0.53
Avail Cap(c_a), veh/h	594	528	478	1083	0	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.8	16.9	13.1	7.1	0.0	7.5
Incr Delay (d2), s/veh	3.9	0.3	2.1	1.4	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	1.6	1.7	2.9	0.0	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.7	17.2	15.3	8.5	0.0	9.7
LnGrp LOS	C	B	B	A	A	A
Approach Vol, veh/h	506			666	503	
Approach Delay, s/veh	20.9			10.2	9.7	
Approach LOS	C			B	A	
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		35.0		18.8		35.0
Change Period (Y+Rc), s		5.0		5.0		5.0
Max Green Setting (Gmax), s		30.0		20.0		30.0
Max Q Clear Time (g_c+l1), s		19.9		12.7		12.1
Green Ext Time (p_c), s		2.1		1.2		1.8
Intersection Summary						
HCM 6th Ctrl Delay			13.3			
HCM 6th LOS			B			

2025 Build Traffic Volumes
2: Creek Run Road/Site Access & Gardnertown Road

Peak PM Hour
08/11/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	17	357	2	68	274	34	1	6	99	24	4	12
Future Volume (vph)	17	357	2	68	274	34	1	6	99	24	4	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	13	12	12	15	12	12	12	12	12	12	12
Grade (%)		-8%			-4%			0%			0%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.999			0.988			0.873			0.959	
Fl _t Protected		0.998			0.991						0.971	
Satd. Flow (prot)	0	1939	0	0	1988	0	0	1580	0	0	1685	0
Fl _t Permitted		0.998			0.991						0.971	
Satd. Flow (perm)	0	1939	0	0	1988	0	0	1580	0	0	1685	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		432			422			388			154	
Travel Time (s)		9.8			9.6			8.8			3.5	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	18	384	2	73	295	37	1	6	106	26	4	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	404	0	0	405	0	0	113	0	0	43	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.95	0.91	0.95	0.97	0.86	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

2025 Build Traffic Volumes
 2: Creek Run Road/Site Access & Gardnertown Road

Peak PM Hour
 08/11/2021

Intersection

Int Delay, s/veh 3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	357	2	68	274	34	1	6	99	24	4	12
Future Vol, veh/h	17	357	2	68	274	34	1	6	99	24	4	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	-8	-	-	-4	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	18	384	2	73	295	37	1	6	106	26	4	13

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	332	0	0	386
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.15	-	-	4.15
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.245	-	-	2.245
Pot Cap-1 Maneuver	1211	-	-	1156
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1211	-	-	1156
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.4	1.5	12.5	22.7
HCM LOS			B	C

Minor Lane/Major Mvm	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	591	1211	-	-	1156	-	-	246
HCM Lane V/C Ratio	0.193	0.015	-	-	-0.063	-	-	-0.175
HCM Control Delay (s)	12.5	8	0	-	8.3	0	-	22.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0.2	-	-	0.6

Traffic Impact Study

Appendix E | Conceptual Access Plan



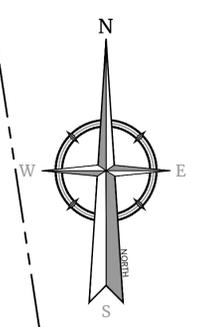
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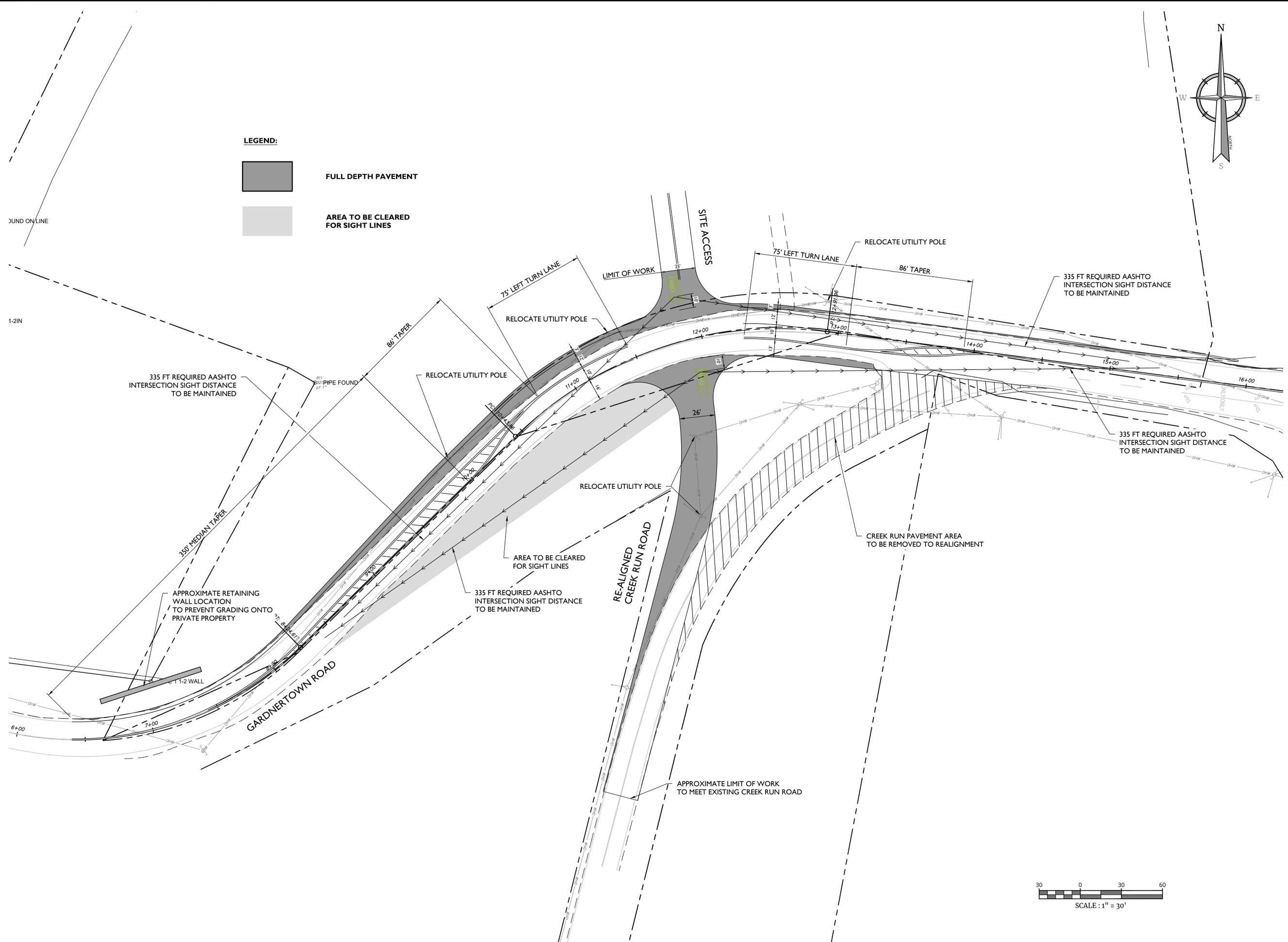
*Civil/Site • Traffic/Transportation • Governmental • Survey/Geospatial
Infrastructure • Geotechnical/Environmental • Telecommunications • Utilities/Energy*



LEGEND:

FULL DEPTH PAVEMENT

AREA TO BE CLEARED FOR SIGHT LINES



REV.	DATE	DRAWN BY	DESCRIPTION

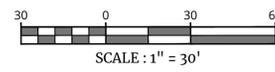
CONCEPTUAL IMPROVEMENT PLAN
 FOR
GARDNER RIDGE ASSOCIATES, LLC
 GARDNERTOWN ROAD & CREEK RUN ROAD
 TOWN OF NEWBURGH
 ORANGE COUNTY
 NEW YORK

Colliers Engineering & Design
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 Phone: 914.347.7500
COLLIERS ENGINEERING & DESIGN CT, P.C. DOING BUSINESS AS MASER CONSULTANTS ENGINEERING & LAND SURVEYING

SCALE: AS SHOWN	DATE: 8/27/21	DRAWN BY: MJA	CHECKED BY: P.J.G./A.P.R.
PROJECT NUMBER: 140003750	DRAWING NAME: R-PL01-EXBT		

SHEET TITLE:
CONCEPT PLAN (LAYOUT ONLY)

SHEET NUMBER:
2 of 3



2014140003750/Transportation/Chubb&S&P/EBT/Ames/PROJ/CONCEPT PLAN/LAYOUT/01 - B: WAMINDOLA

VINCENT J. DOCE ASSOCIATES

ENGINEERS ~ SURVEYORS ~ PLANNERS
PROJECT CONSULTANTS - LAND CONSULTANTS
41 MEAD ALLEY, MONTGOMERY, NY 12549
TEL. 845-561-1170

October 1, 2021

John P. Ewasutyn, Chairman
Town of Newburgh Planning Board
21 Hudson Valley Professional Plaza
Newburgh, NY 12550

RE: Gardner Ridge Plan Amendment
Gardnertown Road
Tax Parcel: Section 75 Block 1 Lot 4.12
Town Project No. 2002-29

Dear Mr. Ewasutyn:

Enclosed is an amended site plan and a conceptual improvement plan for the project's revised Gardnertown Road access.

At the September 3, 2020 planning board meeting, the project received a concept approval for a revised entrance which was relocated from North Plank Road to Gardnertown Road. The relocation of the access drive includes offsite roadway improvements to Gardnertown Road and the Creek Run Road/Gardnertown Road intersection. The Conceptual Improvement Plan outlines these improvements.

The site plan has been amended to show the revised access drive. Also, the senior building area has been relocated away from the northerly property line toward the center of the site.

After receiving planning board comments, more detailed design plans will be provided. Thank you for your time and consideration.

Sincerely,

Darren C. Doce

