

TECHNICAL MEMORANDUM

REF: MAX-2017039

DATE: July 14, 2017

TO: Mr. Joel Kahn
Powder Road LLC
205 Willow Street
Waltham, Massachusetts 02453

FROM: Ms. Heather L. Monticup, P.E., Senior Project Manager
Ms. Susannah E. Theriault, P.E., Engineer

RE: Traffic Impact and Access Study
Powder Mill Place
Maynard/Acton, Massachusetts

INTRODUCTION

Greenman-Pedersen, Inc. (GPI) has prepared this *Traffic Impact and Access Study* (TIAS) for a proposed residential development to be permitted under Chapter 40B regulations and located on the north side of Powder Mill Road (Route 62) on the Maynard/Acton Town line in Massachusetts. The site is currently occupied by a factory, warehouse, shop, and residential homes. The project consists of razing the existing structures on the site and constructing four buildings containing a total of 254 apartment units and a club house. There are two historic buildings on the property that will be relocated to the southwest corner of the site as part of the project. Access and egress to the site is proposed via two driveways on Powder Mill Road (Route 62). This TIAS evaluates the traffic impacts and access/egress requirements for the proposed residential development.

The site is bounded by the Assabet River to the north, Powder Mill Road (Route 62) to the south, residential homes to the west, and Last National Wine Company to the east. The site location in relation to the surrounding roadways is shown on the map on Figure 1.

GPI Greenman-Pedersen, Inc.

181 BALLARDVALE STREET, SUITE 202, WILMINGTON, MA 01887 TELEPHONE: (978) 570-2999 FACSIMILE: (978) 658-3044

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Figure 1
Site Location Map

EXISTING CONDITIONS

Study Area

Evaluation of the traffic impacts associated with the proposed project requires an evaluation of existing and projected traffic volumes on the adjacent streets, the volume of traffic expected to be generated by the project, and the impact that this traffic will have on the adjacent streets and nearby intersections. In preparing the TIAS for the proposed site, the following intersections have been analyzed and evaluated:

- Powder Mill Road (Route 62) at Powder Mill Circle and Birch Terrace
- Powder Mill Road (Route 62) at Deer Path (Deer Hedge Run Condominiums Driveway)
- Powder Mill Road (Route 62) at 109 Powder Mill Driveway (Loading Dock Driveway)
- Powder Mill Road (Route 62) at Existing Factory Driveway (2R Powder Mill Road)
- Powder Mill Road (Route 62) at 109 Powder Mill Driveway (Parking Lot Driveway)
- Powder Mill Road (Route 62) at Former Stratus Technologies Driveway (111 Powder Mill Road)
- Powder Mill Road (Route 62) at Wendy's Driveway (115 Powder Mill Road)

Powder Mill Road (Route 62)

Within the vicinity of the site, Powder Mill Road (Route 62) is under the jurisdiction of the Town and is classified as an Urban Principal Arterial. Powder Mill Road provides one general-purpose lane in each direction and has a posted speed limit of 35 miles per hour (mph). Adjacent to the site, a sidewalk is only provided on the northern side of Powder Mill Road. Land uses in the vicinity consist of residential and commercial uses.

Traffic Volumes

Base traffic conditions within the study area were developed by conducting manual-turning movement counts (TMCs), vehicle classification counts, and automatic traffic recorder (ATR) counts in June 2017 while both Maynard and Acton-Boxborough schools were still in session. The TMCs and vehicle classification counts were performed during the weekday AM peak period (7:00 to 9:00 AM), weekday PM peak period (4:00 to 6:00 PM), and Saturday midday peak period (11:00 AM to 2:00 PM). The ATRs were used to obtain weekday daily traffic volumes along Powder Mill Road (Route 62) adjacent to the site. All traffic-count data are provided in the Appendix.

Traffic on a given roadway typically fluctuates throughout the year depending on the area and the type of roadway. To determine if the June traffic-volume data needed to be adjusted to account

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for this fluctuation, historical traffic-volume data were reviewed from the Massachusetts Department of Transportation (MassDOT) records.¹ This information revealed that June traffic volumes are above average-month conditions. Therefore, the traffic counts were used as counted to reflect an above average-month analysis condition. The MassDOT seasonal adjustment data is provided in the Appendix.

Table 1 summarizes the existing daily and peak-hour traffic volumes on Powder Mill Road (Route 62) adjacent to the site. The 2017 Existing traffic-flow networks for the weekday AM, weekday PM, and Saturday midday peak hours are shown graphically on Figures 2, 3, and 4, respectively.

Table 1
EXISTING TRAFFIC-VOLUME SUMMARY

Location/Time Period	Daily Volume (vpd) ^a	Peak Hour Volume (vph) ^b	K Factor (%) ^c	Directional Distribution ^d
Route 62 adjacent to site:				
Weekday Daily	11,390			
Weekday AM Peak Hour		798	7.0	70% EB
Weekday PM Peak Hour		927	8.1	61% WB
Saturday Midday Peak Hour		759	--	51% EB

^a In vehicles per day.

^b In vehicles per hour.

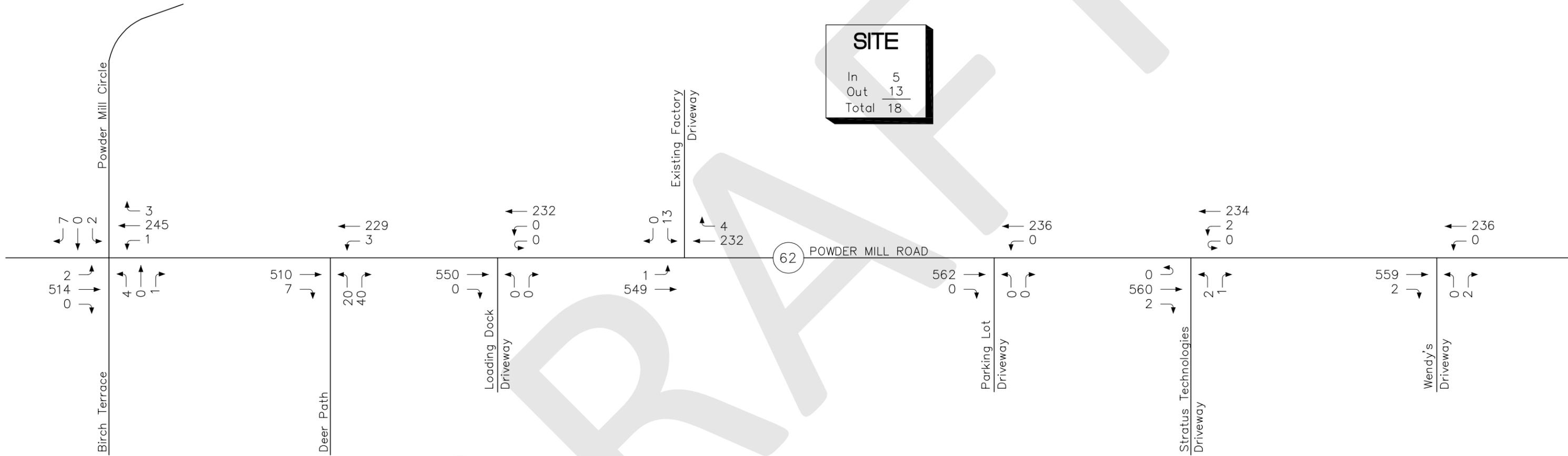
^c Percentage of daily traffic occurring during the peak hour.

^d EB = eastbound; WB = westbound.

¹ MassDOT 2009 Traffic Volumes; Station 403 – Route 2, East of Concord Rotary (Concord).

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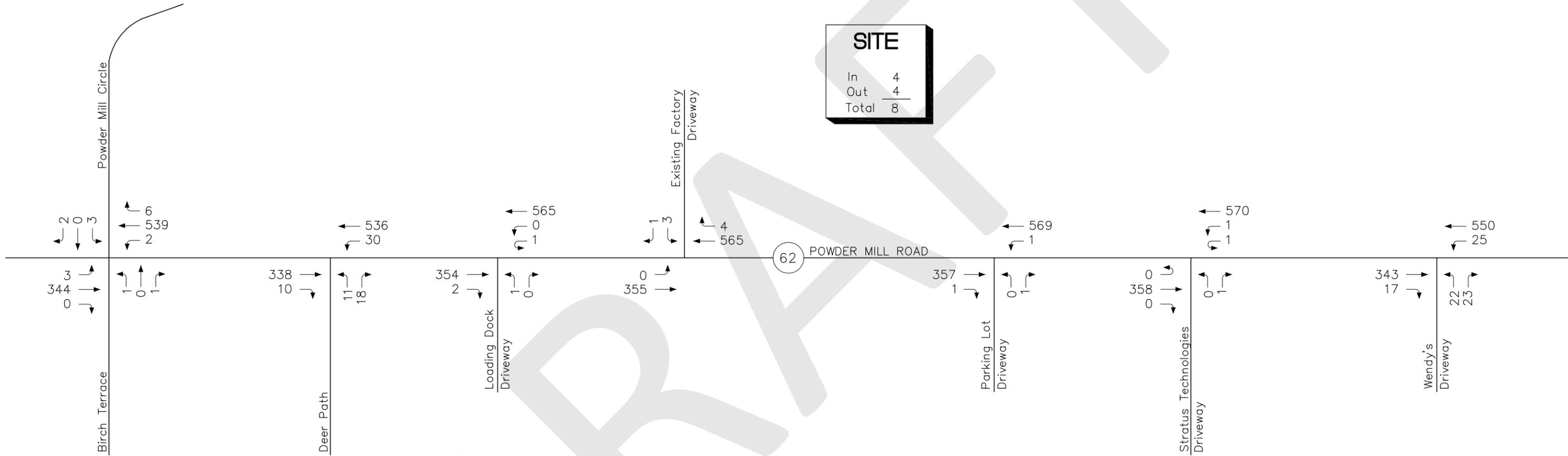
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Figure 2

2017 Existing
Weekday AM
Peak Hour Traffic Volumes

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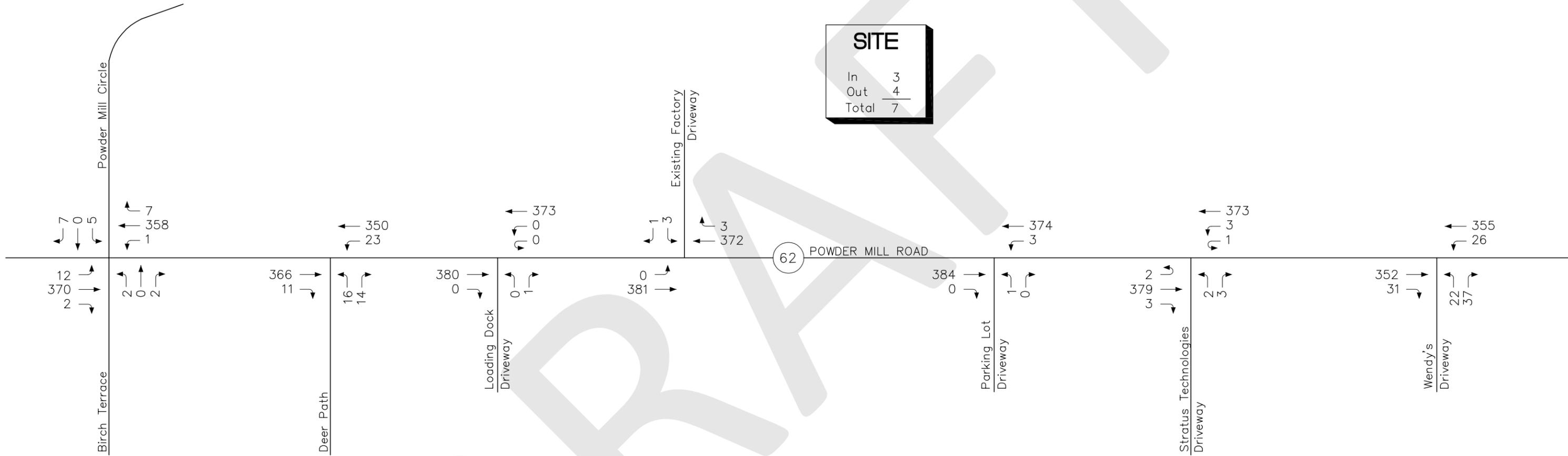
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Figure 3

2017 Existing
Weekday PM
Peak Hour Traffic Volumes

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Figure 4

2017 Existing
Saturday Midday
Peak Hour Traffic Volumes

Collisions

Collision data for the study area intersections were obtained from the Maynard Police Department and MassDOT for the latest complete five years available. A summary of the crash data is provided in Table 2.

In addition to the collision summary, crash occurrence also should be compared to the volume of traffic through a particular intersection to determine any significance. Accordingly, the crash rate was calculated for the study area intersection and compared with the statewide and district-wide averages. An intersection crash rate is a measure of the frequency of collisions compared to the volume of traffic through an intersection and is presented in crashes per million entering vehicles (c/mev). For unsignalized intersections, the statewide average is 0.58 c/mev and the district-wide average is 0.65 c/mev. A comparison of the calculated crash rate to these averages can be used to establish the significance of collision occurrence and whether or not potential safety problems exist. All crash rate worksheets are provided in the Appendix.

Based on the collision data from the Maynard Police Department, the unsignalized intersection of Route 62 at Powder Mill Circle and Birch Terrace has experienced, on average, 0.20 crashes per year over the five-year study period (2012 to 2016). The one crash was a rear end and resulted in property damage only. It did not occur during commuter peak periods or wet/icy conditions. The crash rate for the intersection (0.05 c/mev) is well below the statewide (0.58 c/mev) and district-wide (0.65 c/mev) averages for unsignalized intersections.

Based on the collision data from the Maynard Police Department, the unsignalized intersection of Route 62 at the loading dock driveway of 109 Powder Mill Road has experienced, on average, 0.20 crashes per year over the five-year study period (2012 to 2016). The one crash was a single-vehicle crash and resulted in property damage only. It did not occur during commuter peak periods, but did occur in wet/icy conditions. The crash rate for the intersection (0.05 c/mev) is well below the statewide (0.58 c/mev) and district-wide (0.65 c/mev) averages for unsignalized intersections.

Based on the collision data from the Maynard Police Department, the unsignalized intersection of Route 62 at the parking lot driveway of 109 Powder Mill Road has experienced, on average, 0.20 crashes per year over the five-year study period (2012 to 2016). The one crash was a rear end and resulted in property damage only. It occurred during commuter peak periods and wet/icy conditions. The crash rate for the intersection (0.05 c/mev) is well below the statewide (0.58 c/mev) and district-wide (0.65 c/mev) averages for unsignalized intersections.

Based on the collision data from the Maynard Police Department, the unsignalized intersection of Route 62 at the Wendy's driveway has experienced, on average, 0.20 crashes per year over the five-year study period (2012 to 2016). The one crash was an angle collision and resulted in property damage only. It occurred during commuter peak periods, but not wet/icy conditions.

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The crash rate for the intersection (0.05 c/mev) is well below the statewide (0.58 c/mev) and district-wide (0.65 c/mev) averages for unsignalized intersections.

Based on the collision data from MassDOT, the unsignalized intersection of Route 62 at the parking lot driveway of 109 Powder Mill Road has experienced, on average, 0.20 crashes per year over the five-year study period (2010 to 2014). The one crash was with a fixed object and resulted in property damage only. It did not occur during commuter peak periods, but did occur in wet/icy conditions. The crash rate for the intersection (0.05 c/mev) is well below the statewide (0.58 c/mev) and district-wide (0.65 c/mev) averages for unsignalized intersections.

Based on the collision data from MassDOT, the unsignalized intersection of Route 62 at the Wendy's driveway has experienced, on average, 0.40 crashes per year over the five-year study period (2010 to 2014). One crash resulted in property damage only and one did not report the crash severity. One crash was a cross movement/angle collision and the other was a single-vehicle crash. One of the two crashes occurred during commuter peak periods, and neither occurred in wet/icy conditions. The crash rate for the intersection (0.09 c/mev) is well below the statewide (0.58 c/mev) and district-wide (0.65 c/mev) averages for unsignalized intersections.

Based on the data provided, none of these collisions indicate a pattern correctable by engineering measures.

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**Table 2
COLLISION SUMMARY**

Location	Number of Collisions			Severity ^a				Collision Type ^b					Percent During	
	Total	Average per Year	Crash Rate ^c	PD	PI	F	NR	SS	RE	CM	FO	SV	Commuter Peak ^d	Wet/Icy Conditions ^e
Maynard Police Department (2012-2016)														
Route 62 at Powder Mill Cir/Birch Terr	1	0.20	0.05	1	--	--	--	--	1	--	--	--	0%	0%
Route 62 at Deer Path	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at 109 Powder Mill Rd (Loading Dock Driveway)	1	0.20	0.05	1	--	--	--	--	--	--	--	1	0%	100%
Route 62 at Existing Factory Driveway	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at 109 Powder Mill Rd (Parking Lot Driveway)	1	0.20	0.05	1	--	--	--	--	1	--	--	--	100%	100%
Route 62 at Stratus Technologies Driveway	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at Wendy's Driveway	1	0.20	0.05	1	--	--	--	--	--	1	--	--	100%	0%
MassDOT (2010-2014)														
Route 62 at Powder Mill Cir/Birch Terr	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at Deer Path	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at 109 Powder Mill Rd (Loading Dock Driveway)	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at Existing Factory Driveway	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at 109 Powder Mill Rd (Parking Lot Driveway)	1	0.20	0.05	1	--	--	--	--	--	--	1	--	0%	100%
Route 62 at Stratus Technologies Driveway	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Route 62 at Wendy's Driveway	2	0.40	0.09	1	--	--	1	--	--	1	--	1	50%	0%

^a PD = property damage only; PI = personal injury; F = fatality, NR = not reported.

^b SS = sideswipe; RE = rear end; CM = cross movement/angle; FO = fixed object; SV = single vehicle.

^c Measured in crashes per million entering vehicles.

^d Percent of vehicle incidents that occurred during the weekday AM (7:00 AM-9:00 AM) and weekday PM (4:00 PM -6:00 PM) commuter peak periods.

^e Represents the percentage of only "known" collisions occurring during inclement weather conditions.

Vehicle Speeds

Vehicle speed measurements were conducted along Powder Mill Road (Route 62) by measuring the elapsed time for vehicles traveling a short, pre-measured distance between two checkpoints. The travel times were recorded using ATRs and the speeds were derived by dividing the elapsed time into the measured distance between checkpoints. The primary use of this information is explained in the *Sight Distance* section where the speeds are correlated to sight distance measurements taken at the location of the site driveways to assure that adequate sight distances exist at the driveway to provide safe operation. The results of the speed measurements are summarized in Table 3.

Table 3
OBSERVED TRAVEL SPEEDS ^a

Location/Direction	Posted Speed Limit	Average Speed ^b	85 th Percentile Speed ^c
Powder Mill Road (Route 62)			
adjacent to site:	35	36	40
<i>Eastbound</i>	35	36	40
<i>Westbound</i>			

^a In miles per hour (mph).

^b Average speed of all observed vehicles.

^c Speed at, or below which 85 percent of all observed vehicles travel.

As shown in Table 3, the average speeds along Powder Mill Road (Route 62) were found to be 36 miles per hour (mph) with the 85th percentile speed at 40 mph. The observed speeds were found to be generally consistent with the posted speed limit of 35 mph adjacent.

FUTURE CONDITIONS

To estimate the impact of site-generated traffic within the study area, existing traffic volumes were projected to the expected opening year (2019) of the Project consistent with local guidelines and to the year 2024, representing a seven-year design horizon in accordance with state guidelines. Traffic volumes on the roadway network at these times will include existing traffic, new traffic due to normal background traffic growth, and traffic related to any significant development by others expected to be completed within the area by the 2019 and 2024 design years. Consideration of these factors resulted in the development of 2019 No-Build and 2024 No-Build traffic volumes, which assume that the proposed development is not built. The incremental impacts of the proposed project may then be determined by adding site-generated traffic volumes (Build conditions) and making comparisons to the No-Build conditions.

Traffic Growth

To develop the 2019 No-Build and 2024 No-Build forecast volumes, two components of traffic growth were considered. First, an annual growth percentage was determined. Based on historic traffic-volume counts provided by MassDOT, traffic volumes in the area have been decreasing at a rate of approximately 1.80 percent per year.² Therefore, to provide a conservative (worse than expected) analysis scenario, a 1.0 percent compounded annual growth was assumed for the project area, consistent with other projects in the area. The MassDOT adjustment data are provided in the Appendix.

Second, any planned or approved specific developments in the area that would generate a significant volume of traffic on study area roadways within the next seven years were considered. The Planning Departments of Maynard and Acton were contacted and the following projects were identified:

- **Maynard Crossing** is a proposed commercial and residential development project to be located at 129 Parker Street in Maynard, Massachusetts. Traffic volumes and methodology associated with the development were obtained from the TIAS³ prepared for the project and distributed along the adjacent roadway system. The trip generation data associated with this development is provided in the Appendix.
- The **Mill and Main Development** project is located at the mill complex (formerly known as Clock Tower Place) in Maynard, Massachusetts. Per discussions with the Town Planner, no traffic study was submitted for this redevelopment project. Accordingly, the

² *MassDOT 2009 Transportation Data Management System*; Station 4167 (Acton), Station 4003 (Concord), Station 4008 (Maynard).

³ Green International Affiliates, Inc., *Traffic Impact and Access Study, Maynard Crossing, Maynard, Massachusetts*. January 2017.

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traffic volumes associated with this project are included within the conservative annual growth rate.

- A potential school with ancillary facilities is under discussions to be located at 111 Powder Mill Road (former Stratus property). Since no plans have been submitted at this time, the traffic associated with this potential use was not included in the traffic-volume networks.
- The Acton Senior Center will be relocated from 50 Audobon Drive to 30 Sudbury Road this summer (2017). Traffic patterns adjacent to the project site are not expected to change due to the relocation. Any minimal increase in traffic along Route 62 will be accounted for in the 1.0 percent compounded annual growth rate.

Planned Roadway Improvements

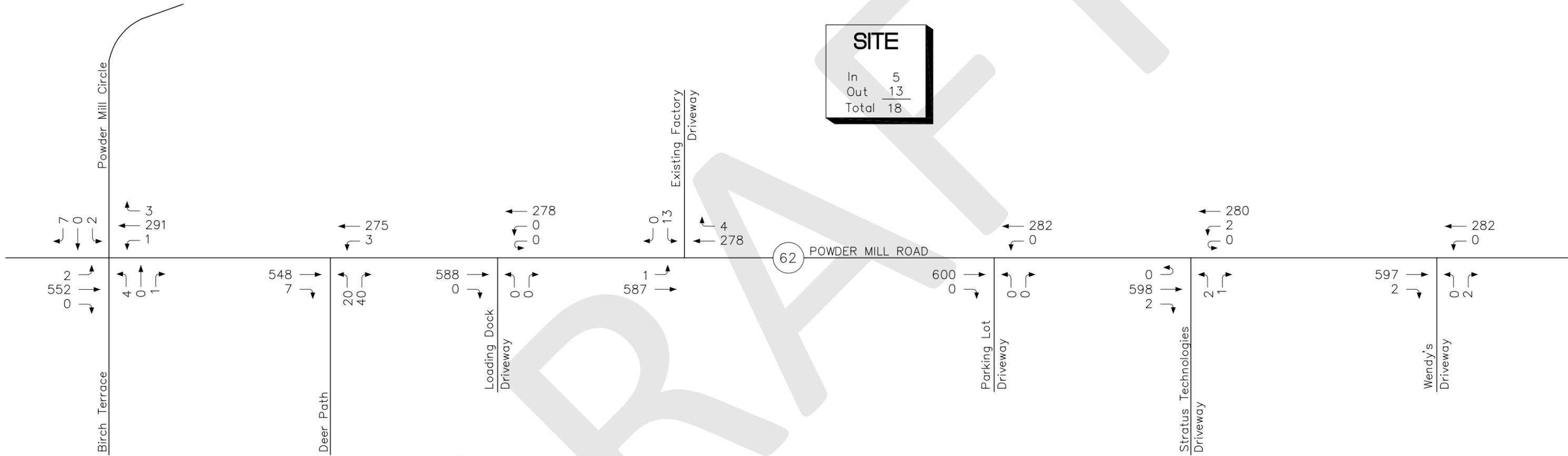
The Department of Public Works of Maynard and Acton were contacted for any planned roadway improvements in the area and none were identified.

No-Build Conditions

The 2019 No-Build peak-hour traffic volumes were developed by applying a 2.0 percent compounded annual traffic growth rate (1.0 percent compounded over two years) to the 2017 Existing traffic volumes and adding the traffic to be generated by the Maynard Crossing development. The 2024 No-Build peak hour traffic volumes were developed by applying a total growth of 7.2 percent (1.0 percent compounded over seven years) to the 2017 Existing traffic volumes and adding the traffic to be generated by the Maynard Crossing development. The 2019 No-Build and 2024 No-Build traffic volumes are shown graphically on Figures 5 through 10 for the weekday AM, weekday PM, and Saturday midday peak hours.

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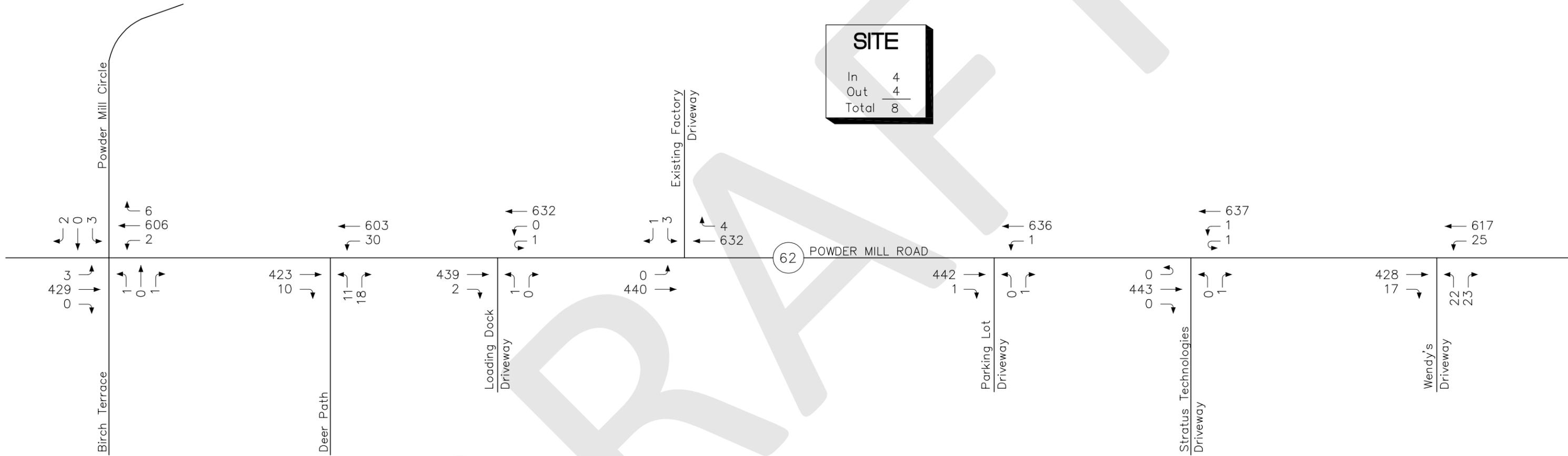


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Figure 5
2019 No-Build
Weekday AM
Peak Hour Traffic Volumes

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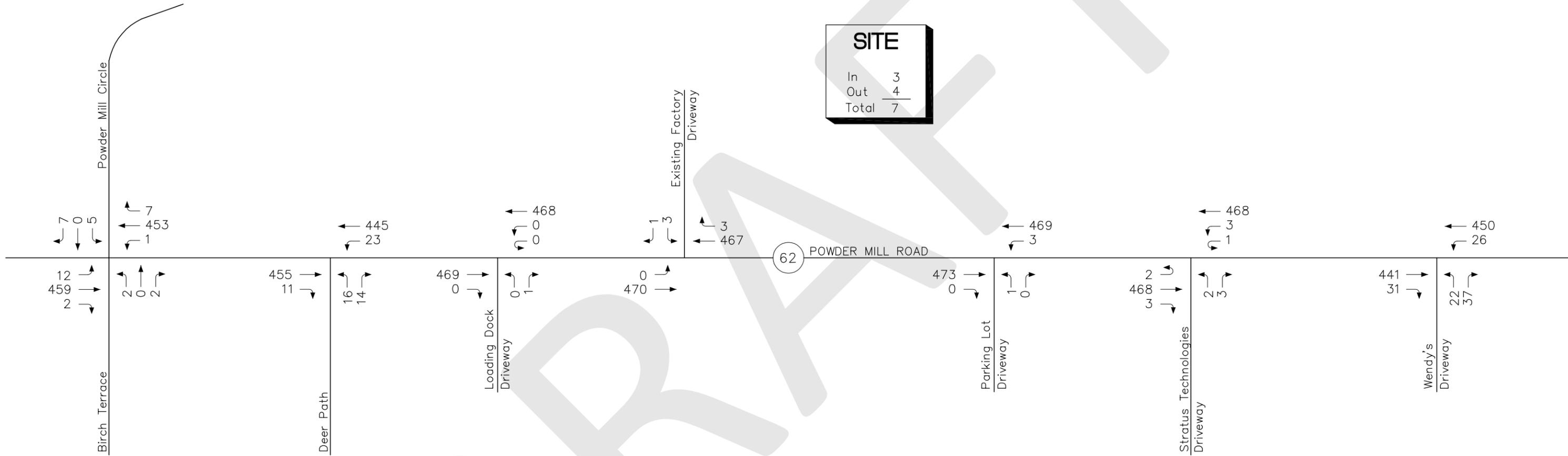
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Figure 6

2019 No-Build
Weekday PM
Peak Hour Traffic Volumes

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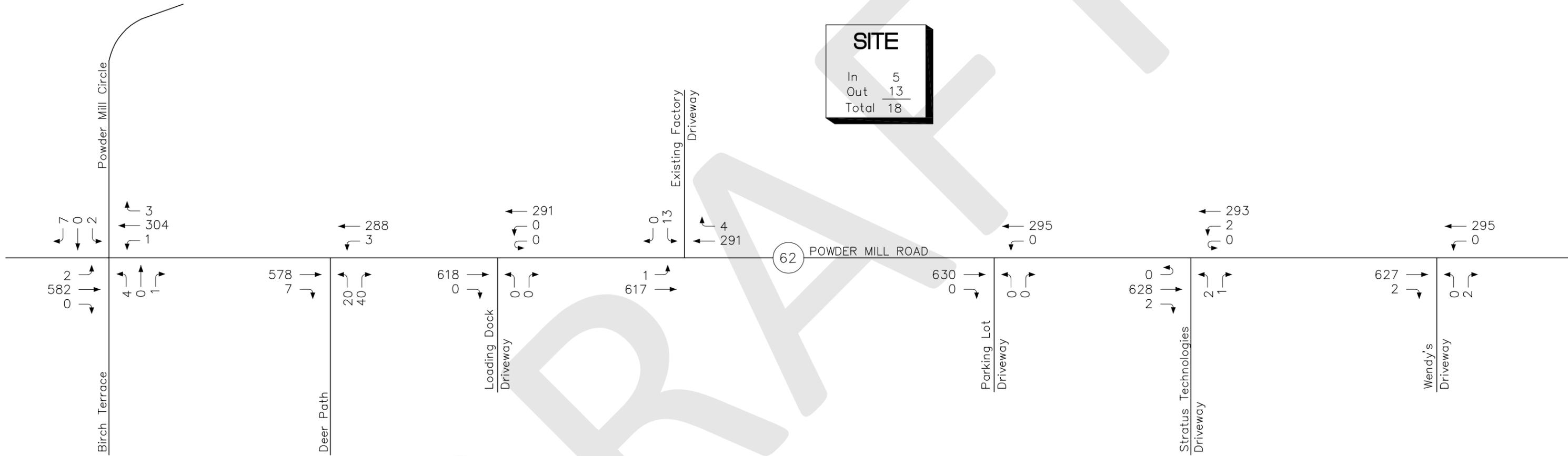
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Figure 7

2019 No-Build
Saturday Midday
Peak Hour Traffic Volumes

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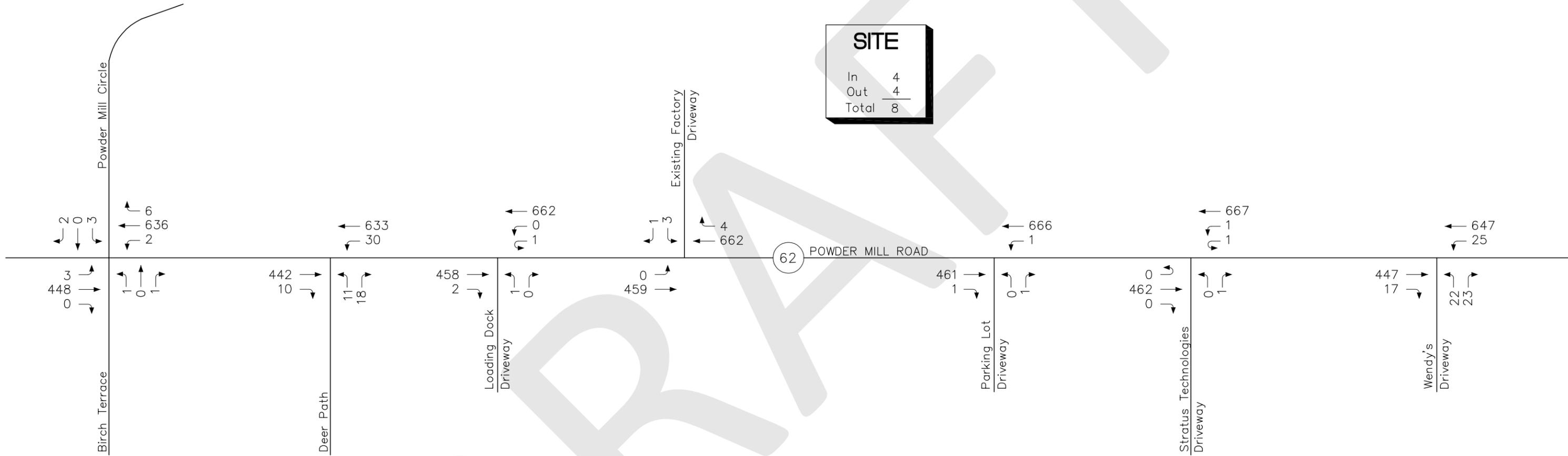
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Figure 8

2024 No-Build
Weekday AM
Peak Hour Traffic Volumes

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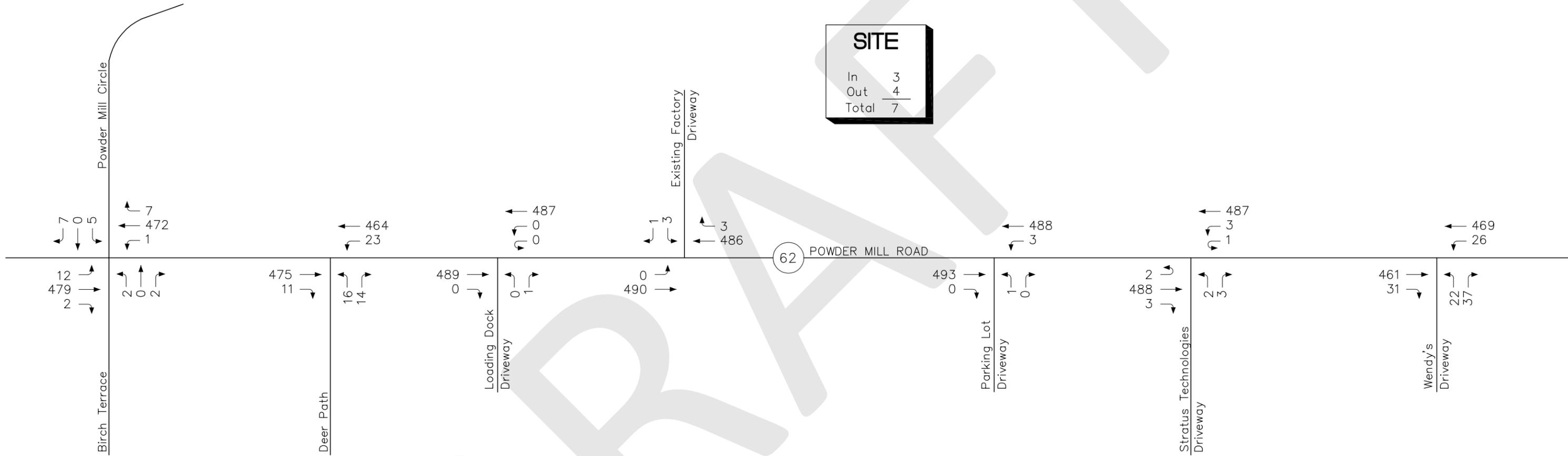
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Figure 9

2024 No-Build
Weekday PM
Peak Hour Traffic Volumes

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Figure 10

2024 No-Build
Saturday Midday
Peak Hour Traffic Volumes

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Trip Generation

The site is currently occupied by a factory, warehouse, shop, and residential homes. The project consists of razing the existing structures on the site and constructing four buildings containing a total of 254 apartment units and a club house. To estimate the volume of traffic to be generated by the proposed development, trip-generation rates published by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*⁴ were researched. Land Use Code (LUC) 220 (Apartment) was used to estimate the potential trip generation of the proposed residential development. All trip-generation data are provided in the Appendix.

Table 4
TRIP-GENERATION SUMMARY

Time Period/Direction	Existing Trips ^a	Proposed Trips ^b	Additional Trips ^c
Weekday Daily	--	1,690	--
Weekday AM Peak Hour:			
<i>Enter</i>	5	26	21
<i>Exit</i>	<u>13</u>	<u>104</u>	<u>91</u>
<i>Total</i>	18	130	112
Weekday PM Peak Hour:			
<i>Enter</i>	4	102	98
<i>Exit</i>	<u>4</u>	<u>55</u>	<u>51</u>
<i>Total</i>	8	157	149
Saturday Daily	--	1,620	--
Saturday Midday Peak Hour:			
<i>Enter</i>	3	71	68
<i>Exit</i>	<u>4</u>	<u>61</u>	<u>57</u>
<i>Total</i>	7	132	125

^a Based on peak-hour traffic counts performed on Thursday, June 1, 2017 and Saturday, June 3, 2017.

^b Based on LUC 220 (Apartment) for 254 dwelling units.

^c Proposed Trips minus Existing Trips.

As shown in Table 4, the proposed redevelopment is expected to generate 112 *new* vehicle trips (21 entering and 91 exiting) during the weekday AM peak hour, 149 *new* vehicle trips (98 entering and 51 exiting) during the weekday PM peak hour, and 125 *new* trips (68 entering and 57 exiting) during the Saturday midday peak hour.

⁴ *Trip Generation Manual*, 9th Edition; Institute of Transportation Engineers; Washington, DC; 2012.

Trip Distribution

Having estimated project-generated vehicle trips, the next step is to determine the distribution of project traffic and assign these trips to the local roadway network. The distribution of proposed site traffic on the area roadways is based on United States Census Bureau Journey-to-Work information and expected travel routes to the site. Accordingly, approximately 20 percent of the site-generated traffic is expected to and from the west along Powder Mill Road (Route 62) and 80 percent is expected to and from the east along Powder Mill Road (Route 62). The Journey-to-Work data are provided in the Appendix. The driveway distribution was determined based on the layout of the units on site. It was assumed that of the traffic to/from the west along Powder Mill Road (Route 62), 75 percent will utilize the western driveway and 25 percent will utilize the eastern driveway. Of the traffic to/from the east along Powder Mill Road (Route 62), 60 percent will utilize the western driveway and 40 percent will utilize the eastern driveway.

Sight Distance

To identify potential safety concerns associated with site access and egress, sight distances have been evaluated at the proposed site driveway locations to determine if the available sight distances for vehicles exiting the site meet or exceed the minimum distances required for approaching vehicles to safely stop. The available sight distances were compared with minimum requirements, as established by the American Association of State Highway and Transportation Officials (AASHTO)⁵. AASHTO is the national standard by which vehicle sight distance is calculated, measured, and reported. The Massachusetts Executive Office of Transportation (EOT) and the Executive Office of Energy and Environmental Affairs (EEA) require the use of AASHTO sight distance standards when preparing traffic impact assessments and studies, as stated in their guidelines for traffic impact assessments.

Sight distance is the length of roadway ahead that is visible to the driver. Stopping Sight Distance (SSD) is the minimum distance required for a vehicle traveling at a certain speed to safely stop before reaching a stationary object in its path. The values are based on a driver perception and reaction time of 2.5 seconds and a braking distance calculated for wet, level pavements. When the roadway is either on an upgrade or downgrade, grade correction factors are applied. Stopping sight distance is measured from an eye height of 3.5 feet to an object height of 2 feet above street level, equivalent to the taillight height of a passenger car. The SSD is measured along the centerline of the traveled way of the major road.

Intersection sight distance (ISD) is provided on minor street approaches to allow the drivers of stopped vehicles a sufficient view of the major roadway to decide when to enter the major roadway. By definition, ISD is the minimum distance required for a motorist exiting a minor

⁵ *A Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 2011.

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street to turn onto the major street, without being overtaken by an approaching vehicle reducing its speed from the design speed to 70 percent of the design speed. ISD is measured from an eye height of 3.5 feet to an object height of 3.5 feet above street level. The use of an object height equal to the driver eye height makes intersection sight distances reciprocal (i.e., if one driver can see another vehicle, then the driver of that vehicle can also see the first vehicle). When the minor street is on an upgrade that exceeds 3 percent, grade correction factors are applied.

SSD is generally more important as it represents the minimum distance required for safe stopping while ISD is based only upon acceptable speed reductions to the approaching traffic stream. The ISD, however, must be equal to or greater than the minimum required SSD in order to provide safe operations at the intersection. In accordance with the AASHTO manual, *“If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, this may require a major-road vehicle to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.”* Accordingly, ISD should be at least equal to the distance required to allow a driver approaching the minor road to safely stop.

The available SSD and ISD at the proposed site driveway locations were measured and compared to minimum requirements as established by AASHTO. Based on the posted and observed speeds on Powder Mill Road (Route 62), the SSD and ISD requirements at this intersection were calculated. The required minimum sight distances for the driveway are compared to the available distances, as shown in Table 5.

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Table 5
SIGHT DISTANCE SUMMARY

Location/Direction	Stopping Sight Distance (feet)		Intersection Sight Distance (feet)		
	Measured	Minimum Required ^a	Measured	Minimum Required ^b	Desirable ^c
Powder Mill Road (Route 62) at Western Site Driveway:					
<i>East of intersection (WB)</i>	400+	305	400+	305	390
<i>West of intersection (EB)</i>	400+	305	400+	305	390
Powder Mill Road (Route 62) at Eastern Site Driveway:					
<i>East of intersection (WB)</i>	400+	305	400+	305	415
<i>West of intersection (EB)</i>	400+	305	415	305	415

^a Values based on AASHTO requirements for the 85th percentile speed of 40 mph in the westbound and eastbound directions.

^b Values based on AASHTO requirements for SSD.

^c Values based on AASHTO requirements for posted speed limit of 35 mph on Route 62.

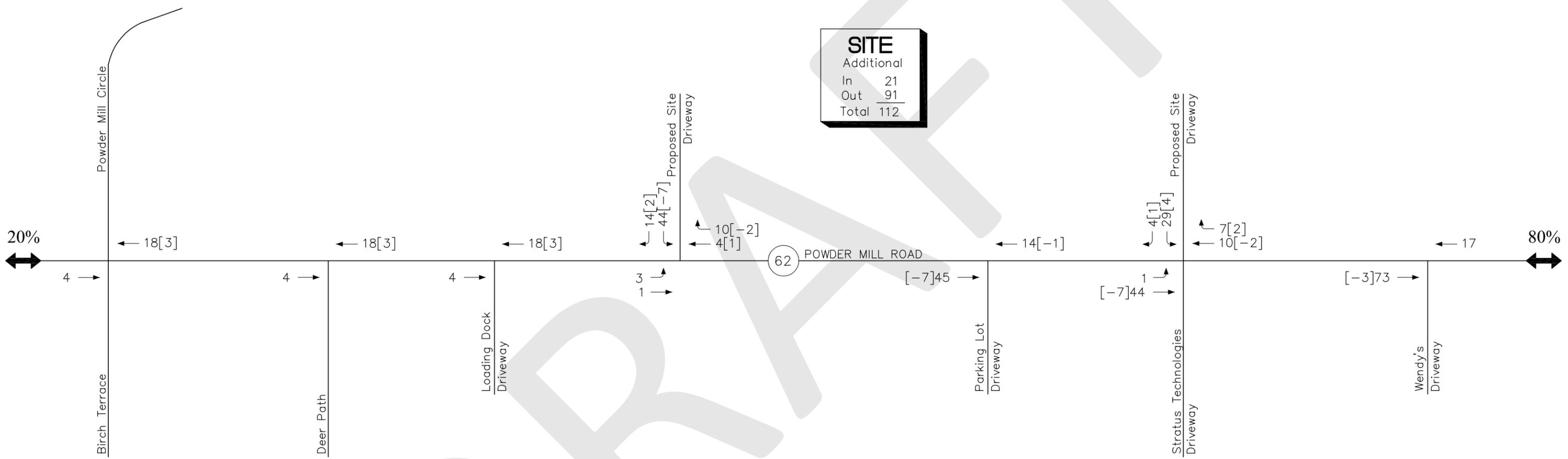
As indicated in Table 5, available sight distances at the proposed site driveways meet or exceed the minimum and desirable SSD and ISD requirements for safe operation. In addition, it is recommended that any proposed plantings, vegetation, landscaping, and signing along the site frontage be kept low to the ground (no more than 3.0 feet above street level) or set back sufficiently from Powder Mill Road (Route 62) so as not to inhibit the available sight lines.

Build Traffic Volumes

Based on the traffic generation and distribution estimates for this project, the traffic volumes associated with the proposed development were assigned to the roadway network. The site-generated traffic networks are shown on Figures 11, 12, and 13 for the weekday AM, weekday PM, and Saturday midday peak hours, respectively. The site-generated traffic volumes were then combined with the 2019 and 2024 No-Build traffic volumes to develop the 2019 and 2024 Build peak-hour traffic-volume networks. The 2019 and 2024 Build traffic volumes are illustrated on Figures 14 through 19 for the weekday AM, weekday PM, and Saturday midday peak hour.

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[Re-Distributed Existing Trips]

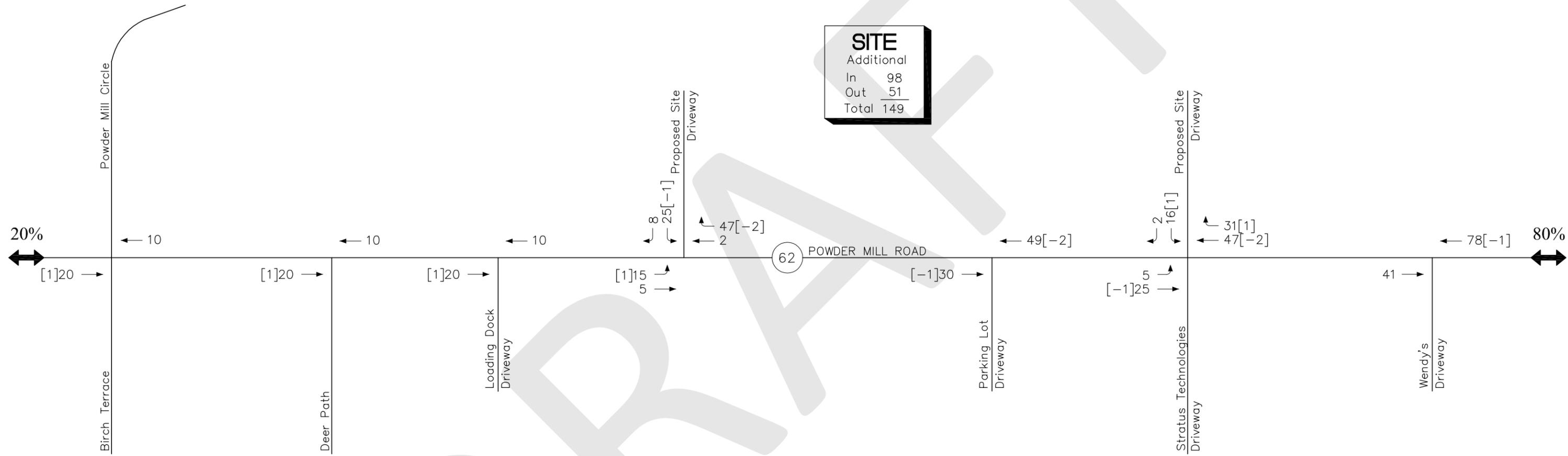


NOT TO SCALE

Figure 11
 Site-Generated
 Weekday AM
 Peak Hour Traffic Volumes

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place - Maynard/Acton, Massachusetts



[Re-Distributed Existing Trips]

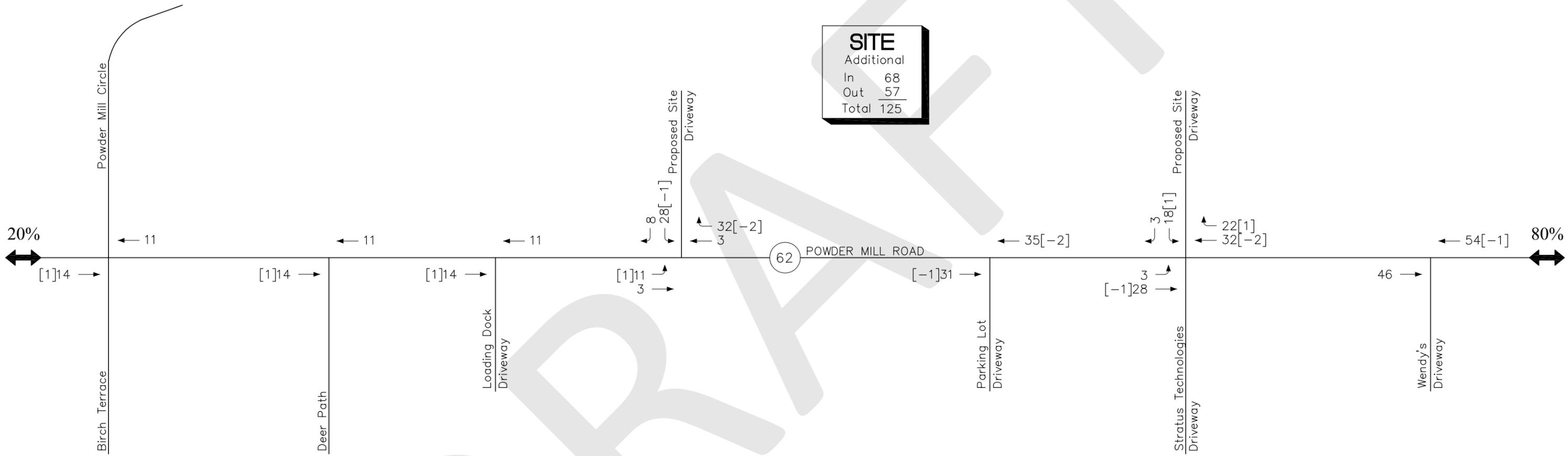


NOT TO SCALE

Figure 12
 Site-Generated
 Weekday PM
 Peak Hour Traffic Volumes

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place - Maynard/Acton, Massachusetts



SITE	
Additional	
In	68
Out	57
Total	125

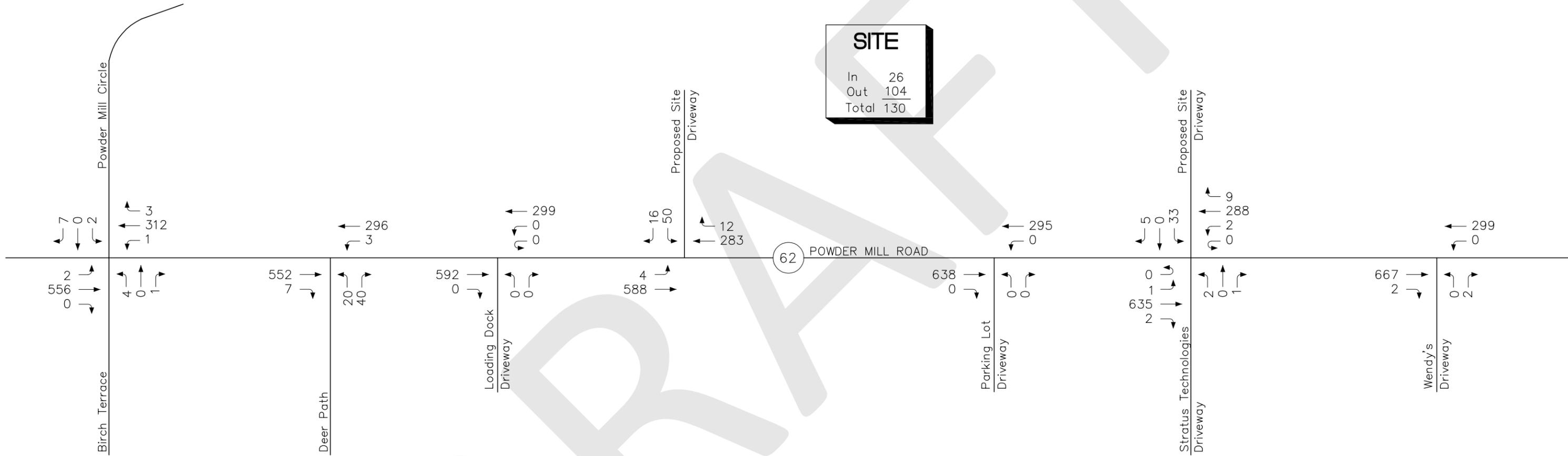
NOT TO SCALE

[Re-Distributed Existing Trips]

Figure 13
Site-Generated
Saturday Midday
Peak Hour Traffic Volumes

TRAFFIC IMPACT AND ACCESS STUDY

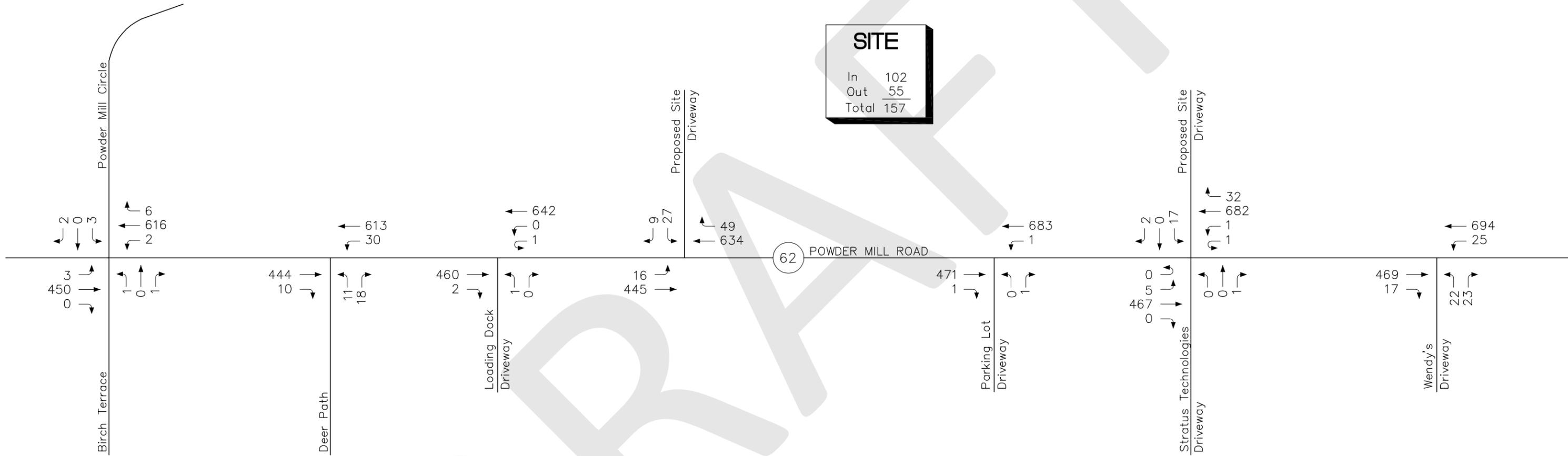
Powder Mill Place - Maynard/Acton, Massachusetts



NOT TO SCALE

Figure 14

2019 Build
 Weekday AM
 Peak Hour Traffic Volumes



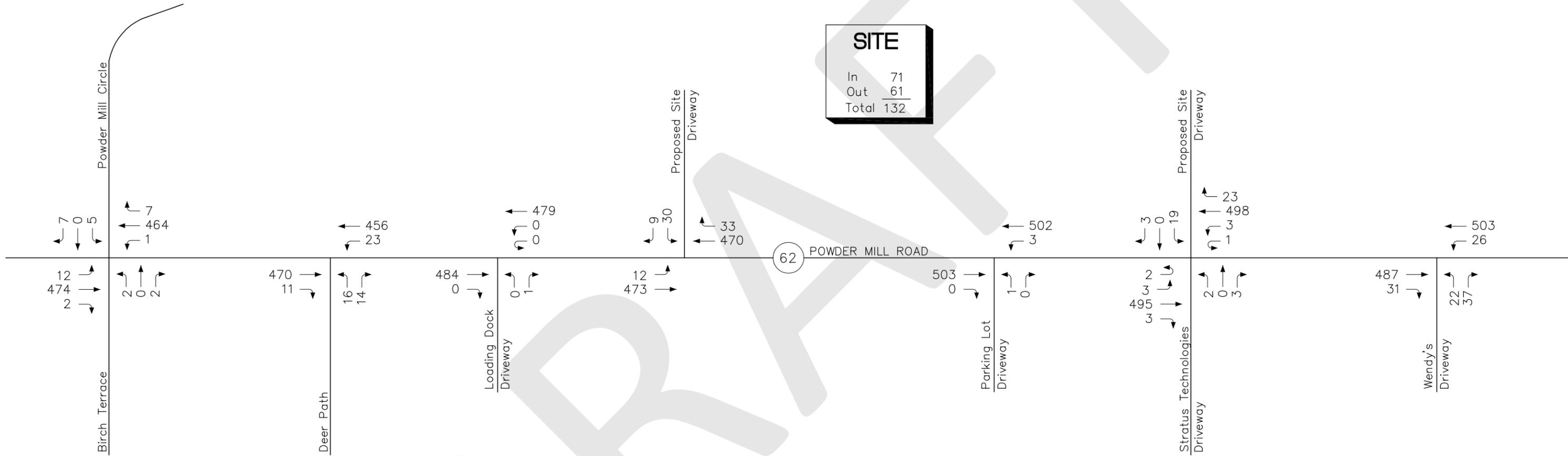
NOT TO SCALE

Figure 15

2019 Build
 Weekday PM
 Peak Hour Traffic Volumes

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place - Maynard/Acton, Massachusetts



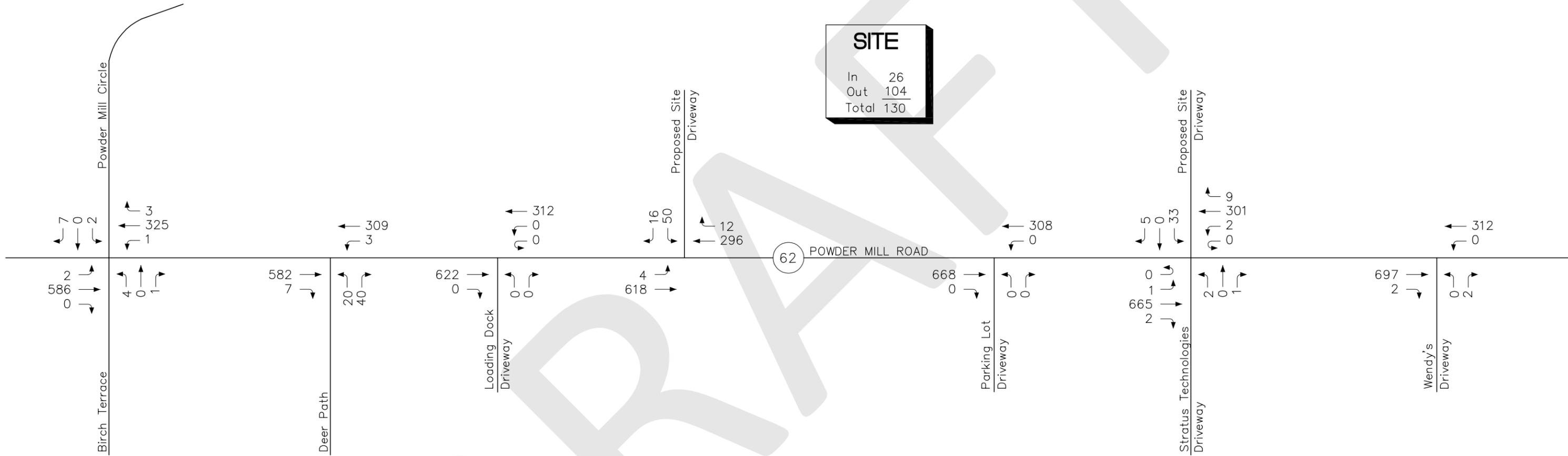
NOT TO SCALE

Figure 16

2019 Build
 Saturday Midday
 Peak Hour Traffic Volumes

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place - Maynard/Acton, Massachusetts



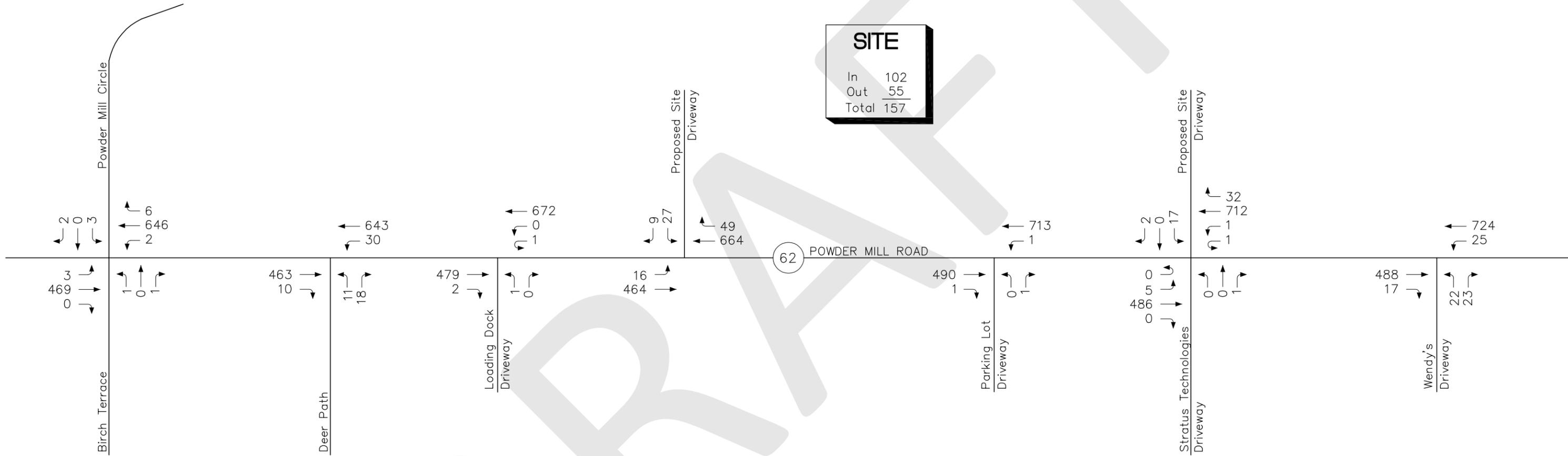
NOT TO SCALE

Figure 17

2024 Build
 Weekday AM
 Peak Hour Traffic Volumes

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place - Maynard/Acton, Massachusetts



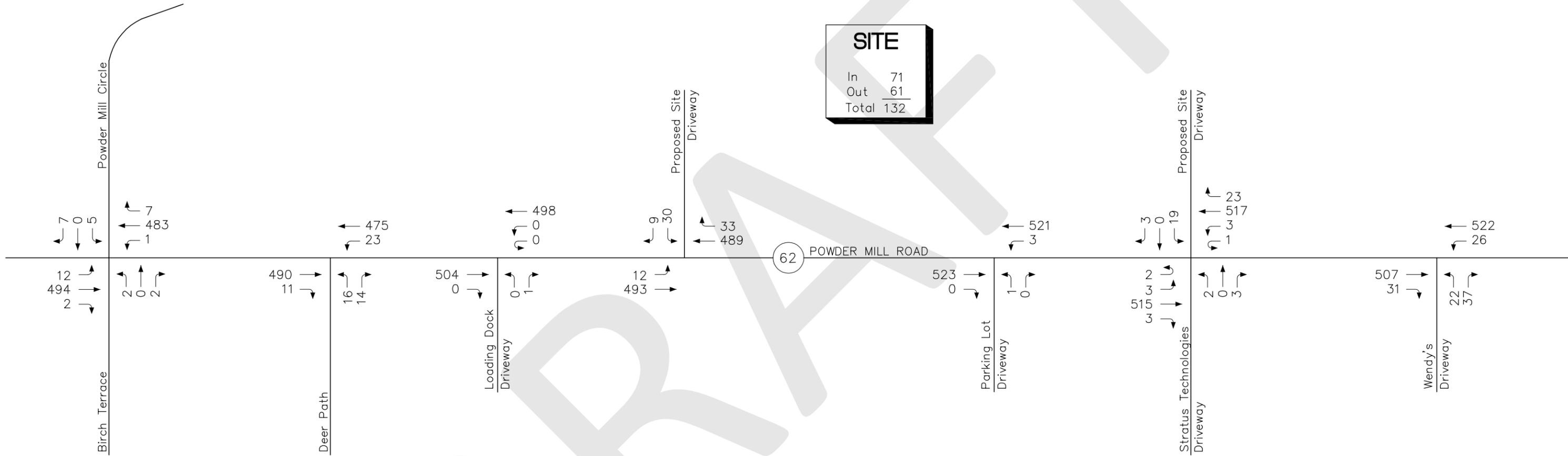
NOT TO SCALE

Figure 18

2024 Build
 Weekday PM
 Peak Hour Traffic Volumes

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place - Maynard/Acton, Massachusetts



NOT TO SCALE

Figure 19

2024 Build
Saturday Midday
Peak Hour Traffic Volumes

Traffic Increases

The proposed development will result in increases in traffic on the study area roadways. As shown on Figures 11, 12, and 13, traffic-volume increases beyond the study area during the peak hours are expected to be in the range of 25 to 118 vehicles. These increases represent, on average, one additional vehicle trip approximately every 30 seconds to 2.5 minutes during the peak hours.

CAPACITY AND QUEUE ANALYSIS

Capacity and queue analyses were conducted at all study area locations under 2017 Existing, 2019 No-Build, 2024 No-Build, 2019 Build, and 2024 Build traffic-volume conditions. The impact of site-generated traffic can be measured by comparing the No-Build conditions to the Build conditions.

Methodology

The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual (HCM)*⁶ and is described in the Appendix. The level-of-service results are presented and discussed below and the analysis worksheets for all conditions are provided in the Appendix.

For unsignalized intersections, the 95th percentile queue represents the length of queue of the critical minor-street movement that is not expected to be exceeded 95 percent of the time during the analysis period (typically one hour). In this case, the queue length is a function of the capacity of the movement and the movement's degree of saturation.

Analysis Results

The 2019 and 2024 results of the level-of-service (LOS) and queue analyses are shown in Tables 6 and 7, respectively, and are discussed below. Capacity and queue analyses were conducted at the study area intersections utilizing *Synchro* software.⁷

⁶ *HCM 2010: Highway Capacity Manual*. Washington, D.C.: Transport Research Board, 2010.

⁷ *Synchro plus SimTraffic 9*; Trafficware LLC.; Sugar Land, TX; 2014.

Powder Mill Road (Route 62) at Powder Mill Circle and Birch Terrace

As shown in Tables 6 and 7, under existing and future traffic volume conditions, the Powder Mill Road (Route 62) eastbound and westbound movements are anticipated to operate at optimal levels (LOS A) and the minor road approaches are expected to operate at LOS C or better. As a result of the redevelopment, increases in delay on all approaches are anticipated to be negligible (less than 1 second) with queue lengths of 1 vehicle or less.

Powder Mill Road (Route 62) at Deer Path (Deer Hedge Run Condominiums Driveway)

Under existing and future traffic volume conditions, the Powder Mill Road (Route 62) westbound left-turn movement is anticipated to operate at optimal levels (LOS A) and Deer Path is expected to operate at LOS C or better. As a result of the redevelopment, increases in delay on all approaches are anticipated to be negligible (less than 1 second) with queue lengths of 1 vehicle or less.

Powder Mill Road (Route 62) at 109 Powder Mill driveway (Loading Dock Driveway)

Under existing and future traffic volume conditions, the Powder Mill Road (Route 62) westbound left-turn movement is anticipated to operate at optimal levels (LOS A) and the loading dock driveway at 109 Powder Mill Road is expected to operate at LOS D or better. As a result of the redevelopment, increases in delay on all approaches are anticipated to be negligible (1 second or less) with queue lengths of 1 vehicle or less.

Powder Mill Road (Route 62) at Existing Factory driveway (2R Powder Mill Road) / Proposed Site Driveway

Under existing and future traffic volume conditions, the Powder Mill Road (Route 62) eastbound left-turn movement is anticipated to operate at optimal levels (LOS A) and the existing factory driveway / proposed site driveway is expected to operate at LOS D or better. As a result of the redevelopment, increases in delay on all approaches are anticipated to be negligible (4 seconds or less) with queue lengths of 1 vehicle or less.

Powder Mill Road (Route 62) at 109 Powder Mill driveway (Parking Lot Driveway)

Under existing and future traffic volume conditions, the Powder Mill Road (Route 62) westbound left-turn movement is anticipated to operate at optimal levels (LOS A) and the parking lot driveway at 109 Powder Mill Road is expected to operate at LOS C or better. As a result of the redevelopment, increases in delay on all approaches are anticipated to be negligible (less than 2 seconds) with queue lengths of 1 vehicle or less.

Powder Mill Road (Route 62) at Stratus Technologies driveway (111 Powder Mill Road)

Under existing and future traffic volume conditions, the Powder Mill Road (Route 62) eastbound and westbound movements are anticipated to operate at optimal levels (LOS A). The Stratus Technologies driveway is expected to operate at LOS D or better and the site driveway is expected to operate at LOS E or better. As a result of the redevelopment, increases in delay on all existing approaches are anticipated to be less than 7 seconds with queue lengths of 1 vehicle or less.

Powder Mill Road (Route 62) at Wendy's driveway (115 Powder Mill Road)

Under existing and future traffic volume conditions, the Powder Mill Road (Route 62) westbound left-turn movement is anticipated to operate at optimal levels (LOS A) and Wendy's driveway is expected to operate at LOS E or better. As a result of the redevelopment, increases in delay on all approaches are anticipated to be 6 seconds or less with queue lengths of 1 vehicle or less.

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

**Table 6
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2019 CONDITIONS**

Intersection/Peak Hour/Lane Group	2017 Existing				2019 No-Build				2019 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Powder Mill Circle and Birch Terrace												
<i>Weekday AM:</i>												
Birch Terrace NB approach	0.04	17.8	C	--/ < 25	0.05	19.8	C	--/ < 25	0.05	20.4	C	--/ < 25
Route 62 EB left-turn	0.00	7.8	A	--/ 0	0.00	8.0	A	--/ 0	0.00	8.0	A	--/ 0
Route 62 WB left-turn	0.00	8.6	A	--/ 0	0.00	8.7	A	--/ 0	0.00	8.7	A	--/ 0
Powder Mill Circle SB approach	0.03	12.3	B	--/ < 25	0.04	13.2	B	--/ < 25	0.04	13.6	B	--/ < 25
<i>Weekday PM:</i>												
Birch Terrace NB approach	0.02	16.1	C	--/ < 25	0.03	19.2	C	--/ < 25	0.03	19.9	C	--/ < 25
Route 62 EB left-turn	0.00	8.7	A	--/ 0	0.00	8.9	A	--/ 0	0.00	8.9	A	--/ 0
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.3	A	--/ 0	0.00	8.4	A	--/ 0
Powder Mill Circle SB approach	0.03	18.0	C	--/ < 25	0.04	21.5	C	--/ < 25	0.04	22.3	C	--/ < 25
<i>Saturday MIDDAY:</i>												
Birch Terrace NB approach	0.03	14.5	B	--/ < 25	0.04	17.5	C	--/ < 25	0.04	18.1	C	--/ < 25
Route 62 EB left-turn	0.01	8.1	A	--/ 0	0.01	8.4	A	--/ 0	0.01	8.4	A	--/ 0
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.4	A	--/ 0	0.00	8.5	A	--/ 0
Powder Mill Circle SB approach	0.04	14.0	B	--/ < 25	0.05	16.7	C	--/ < 25	0.05	17.1	C	--/ < 25

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 6 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2019 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2019 No-Build				2019 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Deer Path												
<i>Weekday AM:</i>												
Deer Path NB approach	0.19	15.3	C	--/ < 25	0.20	16.5	C	--/ < 25	0.21	16.8	C	--/ < 25
Route 62 WB left-turn	0.00	8.6	A	--/ 0	0.00	8.8	A	--/ 0	0.00	8.8	A	--/ 0
<i>Weekday PM:</i>												
Deer Path NB approach	0.12	15.4	C	--/ < 25	0.15	18.1	C	--/ < 25	0.16	18.8	C	--/ < 25
Route 62 WB left-turn	0.03	8.1	A	--/ < 25	0.03	8.4	A	--/ < 25	0.03	8.5	A	--/ < 25
<i>Saturday MIDDAY:</i>												
Deer Path NB approach	0.11	14.6	B	--/ < 25	0.14	17.6	C	--/ < 25	0.15	18.1	C	--/ < 25
Route 62 WB left-turn	0.02	8.2	A	--/ < 25	0.02	8.5	A	--/ < 25	0.02	8.5	A	--/ < 25
Powder Mill Road (Route 62) at 109 Powder Mill Driveway (Loading Dock)												
<i>Weekday AM:</i>												
Loading Dock Driveway NB approach	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0
Route 62 WB left-turn	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0
<i>Weekday PM:</i>												
Loading Dock Driveway NB approach	0.02	19.3	C	--/ 0	0.02	23.2	C	--/ < 25	0.02	24.1	C	--/ < 25
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.4	A	--/ 0	0.00	8.5	A	--/ 0
<i>Saturday MIDDAY:</i>												
Loading Dock Driveway NB approach	0.01	10.6	B	--/ 0	0.01	11.3	B	--/ 0	0.01	11.4	B	--/ 0
Route 62 WB left-turn	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 6 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2019 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2019 No-Build				2019 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Existing Factory Driveway/Proposed Site Driveway												
<i>Weekday AM:</i>												
Route 62 EB left-turn	0.00	7.9	A	--/0	0.00	8.0	A	--/0	0.00	8.1	A	--/0
Factory/Site Driveway SB approach	0.09	20.6	C	--/<25	0.11	23.5	C	--/<25	0.24	20.8	C	--/<25
<i>Weekday PM:</i>												
Route 62 EB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.02	9.3	A	--/<25
Factory/Site Driveway SB approach	0.03	19.3	C	--/<25	0.04	23.1	C	--/<25	0.19	26.3	D	--/<25
<i>Saturday MIDDAY:</i>												
Route 62 EB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.01	8.5	A	--/0
Factory/Site Driveway SB approach	0.02	14.2	B	--/<25	0.03	16.9	C	--/<25	0.15	20.1	C	--/<25
Powder Mill Road (Route 62) at 109 Powder Mill Driveway (Parking Lot)												
<i>Weekday AM:</i>												
Parking Lot Driveway NB approach	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
Route 62 WB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
<i>Weekday PM:</i>												
Parking Lot Driveway NB approach	0.01	10.6	B	--/0	0.01	11.4	B	--/0	0.01	11.6	B	--/0
Route 62 WB left-turn	0.00	8.1	A	--/0	0.00	8.4	A	--/0	0.00	8.5	A	--/0
<i>Saturday MIDDAY:</i>												
Parking Lot Driveway NB approach	0.01	15.6	C	--/0	0.02	22.0	C	--/<25	0.02	20.3	C	--/<25
Route 62 WB left-turn	0.00	8.1	A	--/0	0.00	8.3	A	--/0	0.00	8.4	A	--/0

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 6 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2019 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2019 No-Build				2019 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Former Stratus Technologies Driveway and Proposed Site Driveway												
<i>Weekday AM:</i>												
Stratus Technologies Driveway NB left-turn	0.02	16.9	C	--/<25	0.02	18.7	C	--/<25	0.03	23.5	C	--/<25
Stratus Technologies Driveway NB right-turn	0.01	15.2	C	--/0	0.01	15.8	C	--/0	0.01	16.5	C	--/0
Route 62 EB left-turn	--	--	--	--/--	--	--	--	--/--	0.00	8.1	A	--/0
Route 62 WB left-turn	0.00	8.7	A	--/0	0.00	8.8	A	--/0	0.00	8.9	A	--/0
Site Driveway SB approach	--	--	--	--/--	--	--	--	--/--	0.19	25.3	D	--/<25
<i>Weekday PM:</i>												
Stratus Technologies Driveway NB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
Stratus Technologies Driveway NB right-turn	0.01	10.6	B	--/0	0.01	11.4	B	--/0	0.01	11.7	B	--/0
Route 62 EB left-turn	--	--	--	--/--	--	--	--	--/--	0.01	9.4	A	--/0
Route 62 WB left-turn	0.00	8.1	A	--/0	0.00	8.4	A	--/0	0.00	8.5	A	--/0
Site Driveway SB approach	--	--	--	--/--	--	--	--	--/--	0.15	35.0	E	--/<25
<i>Saturday MIDDAY:</i>												
Stratus Technologies Driveway NB left-turn	0.01	15.4	C	--/0	0.01	18.6	C	--/0	0.02	24.2	C	--/<25
Stratus Technologies Driveway NB right-turn	0.01	10.5	B	--/0	0.01	11.2	B	--/0	0.01	11.5	B	--/0
Route 62 EB left-turn	--	--	--	--/--	--	--	--	--/--	0.01	8.6	A	--/0
Route 62 WB left-turn	0.00	8.1	A	--/0	0.00	8.3	A	--/0	0.00	8.4	A	--/0
Site Driveway SB approach	--	--	--	--/--	--	--	--	--/--	0.12	24.8	C	--/<25

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 6 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2019 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2019 No-Build				2019 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Wendy's Driveway												
<i>Weekday AM:</i>												
Wendy's Driveway NB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
Wendy's Driveway NB right-turn	0.01	12.3	B	--/0	0.01	12.6	B	--/0	0.01	13.4	B	--/0
Route 62 WB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
<i>Weekday PM:</i>												
Wendy's Driveway NB left-turn	0.12	22.0	C	--/<25	0.15	27.4	D	--/<25	0.18	32.7	D	--/<25
Wendy's Driveway NB right-turn	0.05	10.9	B	--/<25	0.05	11.8	B	--/<25	0.06	12.3	B	--/<25
Route 62 WB left-turn	0.02	8.2	A	--/<25	0.03	8.5	A	--/<25	0.03	8.7	A	--/<25
<i>Saturday Midday:</i>												
Wendy's Driveway NB left-turn	0.09	17.0	C	--/<25	0.11	21.4	C	--/<25	0.13	24.3	C	--/<25
Wendy's Driveway NB right-turn	0.07	10.8	B	--/<25	0.08	11.6	B	--/<25	0.09	12.1	B	--/<25
Route 62 WB left-turn	0.03	8.2	A	--/<25	0.03	8.5	A	--/<25	0.03	8.6	A	--/<25

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

**Table 7
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2024 CONDITIONS**

Intersection/Peak Hour/Lane Group	2017 Existing				2024 No-Build				2024 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Powder Mill Circle and Birch Terrace												
<i>Weekday AM:</i>												
Birch Terrace NB approach	0.04	17.8	C	--/ < 25	0.05	21.0	C	--/ < 25	0.05	21.7	C	--/ < 25
Route 62 EB left-turn	0.00	7.8	A	--/ 0	0.00	8.0	A	--/ 0	0.00	8.1	A	--/ 0
Route 62 WB left-turn	0.00	8.6	A	--/ 0	0.00	8.8	A	--/ 0	0.00	8.8	A	--/ 0
Powder Mill Circle SB approach	0.03	12.3	B	--/ < 25	0.04	13.6	B	--/ < 25	0.04	14.0	B	--/ < 25
<i>Weekday PM:</i>												
Birch Terrace NB approach	0.02	16.1	C	--/ < 25	0.03	20.3	C	--/ < 25	0.03	21.0	C	--/ < 25
Route 62 EB left-turn	0.00	8.7	A	--/ 0	0.00	9.0	A	--/ 0	0.00	9.1	A	--/ 0
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.4	A	--/ 0	0.00	8.4	A	--/ 0
Powder Mill Circle SB approach	0.03	18.0	C	--/ < 25	0.04	22.9	C	--/ < 25	0.04	23.8	C	--/ < 25
<i>Saturday Midday:</i>												
Birch Terrace NB approach	0.03	14.5	B	--/ < 25	0.04	18.3	C	--/ < 25	0.05	19.0	C	--/ < 25
Route 62 EB left-turn	0.01	8.1	A	--/ 0	0.01	8.4	A	--/ 0	0.01	8.5	A	--/ 0
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.5	A	--/ 0	0.00	8.5	A	--/ 0
Powder Mill Circle SB approach	0.04	14.0	B	--/ < 25	0.05	17.3	C	--/ < 25	0.05	17.9	C	--/ < 25

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 7 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2024 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2024 No-Build				2024 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Deer Path												
<i>Weekday AM:</i>												
Deer Path NB approach	0.19	15.3	C	--/ < 25	0.22	17.4	C	--/ < 25	0.22	17.7	C	--/ < 25
Route 62 WB left-turn	0.00	8.6	A	--/ 0	0.00	8.9	A	--/ 0	0.00	8.9	A	--/ 0
<i>Weekday PM:</i>												
Deer Path NB approach	0.12	15.4	C	--/ < 25	0.16	19.1	C	--/ < 25	0.17	19.9	C	--/ < 25
Route 62 WB left-turn	0.03	8.1	A	--/ < 25	0.03	8.5	A	--/ < 25	0.03	8.6	A	--/ < 25
<i>Saturday MIDDAY:</i>												
Deer Path NB approach	0.11	14.6	B	--/ < 25	0.15	18.4	C	--/ < 25	0.16	18.9	C	--/ < 25
Route 62 WB left-turn	0.02	8.2	A	--/ < 25	0.02	8.5	A	--/ < 25	0.02	8.6	A	--/ < 25
Powder Mill Road (Route 62) at 109 Powder Mill Driveway (Loading Dock)												
<i>Weekday AM:</i>												
Loading Dock Driveway NB approach	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0
Route 62 WB left-turn	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0
<i>Weekday PM:</i>												
Loading Dock Driveway NB approach	0.02	19.3	C	--/ 0	0.02	24.7	C	--/ < 25	0.02	25.7	D	--/ < 25
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.5	A	--/ 0	0.00	8.5	A	--/ 0
<i>Saturday MIDDAY:</i>												
Loading Dock Driveway NB approach	0.01	10.6	B	--/ 0	0.01	11.5	B	--/ 0	0.01	11.6	B	--/ 0
Route 62 WB left-turn	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 7 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2024 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2024 No-Build				2024 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Existing Factory Driveway/Proposed Site Driveway												
<i>Weekday AM:</i>												
Route 62 EB left-turn	0.00	7.9	A	--/0	0.00	8.1	A	--/0	0.00	8.2	A	--/0
Factory/Site Driveway SB approach	0.09	20.6	C	--/<25	0.12	25.0	D	--/<25	0.26	22.2	C	--/25
<i>Weekday PM:</i>												
Route 62 EB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.02	9.4	A	--/<25
Factory/Site Driveway SB approach	0.03	19.3	C	--/<25	0.04	24.7	C	--/<25	0.21	28.3	D	--/<25
<i>Saturday MIDDAY:</i>												
Route 62 EB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.01	8.6	A	--/0
Factory/Site Driveway SB approach	0.02	14.2	B	--/<25	0.03	17.5	C	--/<25	0.16	21.0	C	--/<25
Powder Mill Road (Route 62) at 109 Powder Mill Driveway (Parking Lot)												
<i>Weekday AM:</i>												
Parking Lot Driveway NB approach	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
Route 62 WB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
<i>Weekday PM:</i>												
Parking Lot Driveway NB approach	0.01	10.6	B	--/0	0.01	11.5	B	--/0	0.01	11.8	B	--/0
Route 62 WB left-turn	0.00	8.1	A	--/0	0.00	8.4	A	--/0	0.00	8.5	A	--/0
<i>Saturday MIDDAY:</i>												
Parking Lot Driveway NB approach	0.01	15.6	C	--/0	0.02	19.8	C	--/0	0.02	21.2	C	--/<25
Route 62 WB left-turn	0.00	8.1	A	--/0	0.00	8.4	A	--/0	0.00	8.5	A	--/0

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 7 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2024 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2024 No-Build				2024 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Former Stratus Technologies Driveway and Proposed Site Driveway												
<i>Weekday AM:</i>												
Stratus Technologies Driveway NB left-turn	0.02	16.9	C	--/ < 25	0.02	19.7	C	--/ < 25	0.03	25.0	D	--/ < 25
Stratus Technologies Driveway NB right-turn	0.01	15.2	C	--/ 0	0.01	16.4	C	--/ 0	0.01	17.1	C	--/ 0
Route 62 EB left-turn	--	--	--	--/ --	--	--	--	--/ --	0.00	8.1	A	--/ 0
Route 62 WB left-turn	0.00	8.7	A	--/ 0	0.00	8.9	A	--/ 0	0.00	9.0	A	--/ 0
Site Driveway SB approach	--	--	--	--/ --	--	--	--	--/ --	0.21	27.2	D	--/ < 25
<i>Weekday PM:</i>												
Stratus Technologies Driveway NB left-turn	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0	0.00	0.0	A	--/ 0
Stratus Technologies Driveway NB right-turn	0.01	10.6	B	--/ 0	0.01	11.6	B	--/ 0	0.01	11.8	B	--/ 0
Route 62 EB left-turn	--	--	--	--/ --	--	--	--	--/ --	0.01	9.5	A	--/ 0
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.5	A	--/ 0	0.00	8.5	A	--/ 0
Site Driveway SB approach	--	--	--	--/ --	--	--	--	--/ --	0.16	38.3	E	--/ < 25
<i>Saturday MIDDAY:</i>												
Stratus Technologies Driveway NB left-turn	0.01	15.4	C	--/ 0	0.01	19.4	C	--/ 0	0.02	25.6	D	--/ < 25
Stratus Technologies Driveway NB right-turn	0.01	10.5	B	--/ 0	0.01	11.4	B	--/ 0	0.01	11.6	B	--/ 0
Route 62 EB left-turn	--	--	--	--/ --	--	--	--	--/ --	0.01	8.7	A	--/ 0
Route 62 WB left-turn	0.00	8.1	A	--/ 0	0.00	8.4	A	--/ 0	0.00	8.5	A	--/ 0
Site Driveway SB approach	--	--	--	--/ --	--	--	--	--/ --	0.13	26.3	D	--/ < 25

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

TRAFFIC IMPACT AND ACCESS STUDY

Powder Mill Place – Maynard/Acton, Massachusetts

Table 7 (continued)
INTERSECTION CAPACITY ANALYSIS SUMMARY – 2024 CONDITIONS

Intersection/Peak Hour/Lane Group	2017 Existing				2024 No-Build				2024 Build			
	V/C ^a	Del. ^b	LOS ^c	Queue ^d	V/C	Del.	LOS	Queue	V/C	Del.	LOS	Queue
Powder Mill Road (Route 62) at Wendy's Driveway												
<i>Weekday AM:</i>												
Wendy's Driveway NB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
Wendy's Driveway NB right-turn	0.01	12.3	B	--/0	0.01	13.0	B	--/0	0.01	13.8	B	--/0
Route 62 WB left-turn	0.00	0.0	A	--/0	0.00	0.0	A	--/0	0.00	0.0	A	--/0
<i>Weekday PM:</i>												
Wendy's Driveway NB left-turn	0.12	22.0	C	--/<25	0.16	29.5	D	--/<25	0.19	35.5	E	--/<25
Wendy's Driveway NB right-turn	0.05	10.9	B	--/<25	0.05	12.0	B	--/<25	0.06	12.5	B	--/<25
Route 62 WB left-turn	0.02	8.2	A	--/<25	0.03	8.6	A	--/<25	0.03	8.7	A	--/<25
<i>Saturday Midday:</i>												
Wendy's Driveway NB left-turn	0.09	17.0	C	--/<25	0.12	22.3	C	--/<25	0.14	25.7	D	--/<25
Wendy's Driveway NB right-turn	0.07	10.8	B	--/<25	0.08	11.8	B	--/<25	0.09	12.3	B	--/<25
Route 62 WB left-turn	0.03	8.2	A	--/<25	0.03	8.5	A	--/<25	0.03	8.7	A	--/<25

^a Volume-to-capacity ratio.

^b Average control delay in seconds per vehicle.

^c Level of service.

^d Average/95th percentile queue length in feet per lane (assuming 25 feet per vehicle).

CONCLUSIONS

Existing and future conditions in the study area have been described, analyzed, and evaluated with respect to traffic operations and the impact of the Powder Mill Place development. Conclusions of this effort are presented below.

- The site is currently occupied by a factory, warehouse, shop, and residential homes. The project consists of razing the existing structures on the site and constructing four buildings containing a total of 254 apartment units and a club house. Access and egress to the site is proposed via two driveways on Powder Mill Road (Route 62).
- The proposed redevelopment is expected to generate 112 *new* vehicle trips (21 entering and 91 exiting) during the weekday AM peak hour, 149 *new* vehicle trips (98 entering and 51 exiting) during the weekday PM peak hour, and 125 *new* trips (68 entering and 57 exiting) during the Saturday midday peak hour. Traffic-volume increases beyond the study area during the peak hours are expected to be in the range of 25 to 118 vehicles. These increases represent, on average, one additional vehicle trip approximately every 30 seconds to 2.5 minutes during the peak hours.
- Available sight distances at the proposed site driveways exceed the minimum and desirable SSD and ISD requirements for safe operation. In addition, it is recommended that any proposed plantings, vegetation, landscaping, and signing along the site frontage be kept low to the ground (no more than 3.0 feet above street level) or set back sufficiently from Powder Mill Road (Route 62) so as not to inhibit the available sight lines.
- Under existing and future traffic volume conditions, all Powder Mill Road (Route 62) movements are anticipated to operate at optimal levels (LOS A) with all minor road and existing driveway approaches at LOS E or better. Increases in delay on minor road and existing driveways as a result of the redevelopment are expected to be 7 seconds or less. Queue lengths at all intersections are anticipated to be 1 vehicle or less. The proposed site driveways are expected to operate at LOS E or better with queue lengths of 1 vehicle or less.

TRAFFIC IMPACT AND ACCESS STUDY

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APPENDIX

**TRAFFIC-COUNT DATA
TRAFFIC-VOLUME ADJUSTMENT DATA
MASSDOT CRASH RATE WORKSHEETS
BACKGROUND DEVELOPMENT DATA
TRIP-GENERATION CALCULATIONS
JOURNEY-TO-WORK DATA
CAPACITY ANALYSIS METHODOLOGY
CAPACITY AND QUEUE ANALYSIS WORKSHEETS**
