Transportation Impact Assessment

Proposed Driscoll School Expansion

Brookline, Massachusetts

Prepared for:

Jonathan Levi Architects
Boston, Massachusetts

Vanasse & Associates, Inc.
Transportation Engineers & Planners
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066

TRANSPORTATION IMPACT ASSESSMENT

PROPOSED DRISCOLL SCHOOL EXPANSION
BROOKLINE, MASSACHUSETTS

Prepared for:

Jonathan Levi Architects
Boston, Massachusetts

December 2018

Prepared by:

VANASSE & ASSOCIATES, INC.
Transportation Engineers & Planners
35 New England Business Center, Suite 140
Andover, MA 01810
(978) 474-8800

CONTENTS

FIGURES

TABLES

EXECUTIVE SUMMARY

Vanasse & Associates, Inc. (VAI) has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed Driscoll School Expansion located along Westbourne Terrace and Washington Street in Brookline, Massachusetts. The proposed expansion will accommodate up to 800 students with 125 staff. The school size will be increase by 168 students. As a result of the new school plan and recommended changes, the overall traffic and safety conditions in the area will be improved. This assessment has been completed in accordance with State and Town standards and those of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

- Based upon a safety assessment of the area, the school can be safely accommodated with the design as planned.

- The impact of the proposed school expansion will be minimal in relation to the existing conditions. Impacts are limited to a short 15-20-minute period during parents' drop-off and pick-up times.

- Traffic volumes are expected to increase by approximately 93 vehicle trips (57 entering/ 36 exiting) during the weekday morning peak school hour and 50 vehicle trips (21 entering/ 29 exiting) during the weekday afternoon peak school hour.

- The proposed driveway off Washington Street has adequate sight distances for safe and efficient operations.

- Safe pedestrians conditions will be achieved with crosswalks and crossing guards at Washington Street and Westbourne Terrace.

- The Project will increase traffic in the morning and afternoon periods with increased delays and queues at locations within the study area. These delays and queues will be confined to limited and distinct periods during the morning drop-off and afternoon pick-up periods (15-20 minutes at peaks) and these periods are non-coincident with the peak periods of the adjacent roadways.

In summary, the school expansion can be accommodated with traffic conditions at manageable levels. Recommendations and improvements will be necessary to minimize the impacts and enhance safety conditions.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to maintain safe and efficient access to the school and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements have been recommended as a part of this evaluation and will be completed in coordination with the Town.

Project Access

Access to the school parking area will be provided through a new driveway that will be located onto Washington Street. New Drop-Off/Pick-Up areas are provided along both Washington Street and Westbourne Terrace.

The following recommendations are offered with respect to the design and operation of the school site driveways:

- The driveway onto Washington Street should have a minimum 24-foot entrance and will be illuminated.
- A dedicated bus pull-off area is recommended off Washington Street in addition to a parent Drop-Off and Pick-Up area.
- The Westbourne Terrace Drop-Off and Pick-Up area shall consist of a 10-foot wide lane and a 4-foot painted island.
- A separate loading area is provided with access from Westbourne Terrace.
- School Zone signs, pavement markings and traffic control devices (i.e., flashing school speed limit signs) should be provided along Washington Street and Westbourne Terrace.
- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current Manual on Uniform Traffic Devices (MUTCD).[1]
- Signs and landscaping adjacent to the Project site driveway intersections should be designed and maintained so as not to restrict lines of sight.

Pedestrian Improvements

Crosswalks are proposed along Washington Street and Westbourne Terrace with crossing guards for safe pedestrian access and egress. Sidewalks are provided along all roadways in the school vicinity. From Westbourne Terrace, a new crosswalk and connection to the MBTA Stop is proposed.

[1] *Manual on Uniform Traffic Control Devices (MUTCD); Federal Highway Administration; Washington, D.C.; 2009*

Parking

Designated new teacher parking on local streets, if needed, must be approved by the Transportation Board. In addition, a separate parking lot is proposed under the new school building.

Bicycle Considerations

The following should be incorporated.

- Bicycle racks should be provided interior and exterior to the building.
- Shower Facilities should be provided for employers.

Transit Usage

The school should actively promote staff usage of public transportation to the school and a Transportation Demand Management (TDM) plan should be developed for staff.

School Drop-Off and Pick-Up Traffic Management Plan

A central feature of the Project is the implementation of a traffic and parking management plan for school drop-off and pick-up activities. The Project site and the site access and off-site improvements detailed herein have been developed to facilitate access to the school campus for pedestrians, bicyclists, school buses and parents/caregivers in a safe and efficient manner. The traffic and parking management plan has been designed to build-upon this created infrastructure and will consist of the following major elements, all of which are overseen by school staff:

- Crossing guards should be located at Washington Street and Westbourne Terrace.
- School staff should be stationed at the drop-off areas to manage traffic and to facilitate the safety of pedestrians and bicyclists.
- Designated drop-off/pick-up area should be designed to facilitate these movements.
- Parents and caregivers should be given information on school drop-off and pick-up times and procedures at the beginning of the school year, with periodic updates and reminders provided as may be necessary.

The elements of the traffic and parking management plan for school drop-off and pick-up activities should be reviewed and updated as may be necessary in order to ensure the safety of students.

Construction Management Plan

A detailed Construction Management Plan should be prepared and reviewed by the Town.

Traffic Monitoring

Within three months after school opening, a traffic monitoring study should be completed to review traffic counts at the school driveways and evaluate the traffic condition within the area.

Annually, the school should assess conditions and evaluate pedestrian safety and crossing guard locations to insure maximum safety for the school.

CONCLUSION

Overall, a safe environment to the school can be maintained and the increased traffic conditions with respect to delays and queues will be limited to short periods in the morning and afternoon.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment (TIA) in order to identify the potential traffic impacts associated with the proposed Driscoll School Expansion located along Westbourne Terrace and Washington Street in Brookline, MA. As typical with school traffic in Brookline, there is a relatively short peak period of impacts between 15 and 20 minutes as drop-off and pick-up occur at the school. Generally, the morning peak is more pronounced than the afternoon peak, as after school programs reduce the afternoon impacts. The focus of this study is to provide a safe environment for the school children, while minimizing the impacts to the surrounding neighborhood. This report identifies and analyzes existing and future traffic conditions both with and without the school expansion and reviews access requirements, potential off-site improvements, and safety considerations.

PROJECT DESCRIPTION

The Driscoll School Expansion will consist of an 800-student elementary school with 125 staff. The school will be serviced by one driveway onto Washington Street and drop-off/Pick-Up area along Washington Street and Westbourne Terrace. The school driveway is located at the opposite side of Salisbury Road and provide access to an underground parking area. This area will accommodate parking spaces for staff and visitors. In addition, currently there are 53 on-street designated teacher parking spaces which may be expanded.

STUDY METHODOLOGY

The scope of the Transportation Assessment was reviewed with Town officials. This study was prepared in general accordance with the state and town guidelines for Transportation Impact Assessments (TIA); and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; observations of traffic flow; and collection of daily and peak period traffic counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the school were assessed along with future traffic demands due to expected traffic growth independent of the project. A seven-year time horizon was selected for analyses consistent with state guidelines for the preparation of TIA. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of traffic conditions on the study area roadways was conducted. The field investigation consisted of an inventory of existing roadway geometrics, traffic volumes, and operating characteristics, as well as posted speed limits and land use information within the study area. The study area for the project was selected to contain the major roadway providing access to the school campus including Westbourne Terrace, Washington Street, Bartlett Street and Beacon Street, as well as 8 intersections located near the school:

1a. Washington Street at Beacon Street (eastbound)
1b. Washington Street at Beacon Street (westbound)
2. Westbourne Terrace at Beacon Street
3. Westbourne Terrace at School Drop-Off
4. Westbourne Terrace at Bartlett Street
5. Westbourne Terrace at Corey Road
6. Bartlett Street at Washington Street
7. Washington Street at Bartlett Street
8. School Drive/Salisbury Road at Washington Street

Figure 1 provides a Study Location Map and the study area intersections. The following describes the study area roadways and intersections.

GEOMETRY

Roadways

Westbourne Terrace

Westbourne Terrace, in the vicinity of the school, is a one-way roadway under local jurisdiction located along the east side of the school campus. Westbourne Terrace travels between Beacon Street in Brookline and Corey Road in Boston. Along the school campus Westbourne Terrace provides one 22-foot lane in the northbound direction. Parallel on-street parking spaces is provided along east side of the street. A sidewalk is provided along both sides of the street with crosswalks at major intersections and at the school. The posted speed limit during school hours the in the vicinity of the school is 20 miles per hour (mph). Land use along this roadway consists of the school campus and residential uses.

Figure 1

Site Location and Study Area Map

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Washington Street

Washington Street in the vicinity of the school accommodates one travel lane in each direction. Washington Street is classified as an urban minor arterial roadway under town jurisdiction. Washington Street runs between Route 9 in Brookline to the south and Cambridge Street to the north where it continues through Brighton Center to Newton Corner. Within the study area, Washington Street generally provides a single 12-foot-wide travel lane per direction separated by a single yellow centerline, with a 4-feet bike lane and 7- to 8-foot on-street parallel parking on the east side. Sidewalks are provided along both sides of the street. Within the study area, crosswalks are provided at major intersections. The posted speed limit during school hours the in the vicinity of the site is 20 miles per hour (mph). Land use along the corridor is a mix of retail and residential uses.

Beacon Street

Beacon Street is functionally classified as an Urban Principal Arterial and is under the jurisdiction of the Town of Brookline (Town). Beacon Street generally runs in an east-west direction and connects Newton to Boston through Brookline. Within the study area, Beacon Street is divided by a wide median where the Massachusetts Bay Transportation Authority (MBTA) Green Line trolley operates. Through the study area, Beacon Street provides two travel lanes in each direction with additional turn lanes at major intersections. Bicycle sharrows are provided in both directions. Sidewalks are provided on both sides of the roadway. Land uses along Beacon Street is primarily commercial.

Intersections

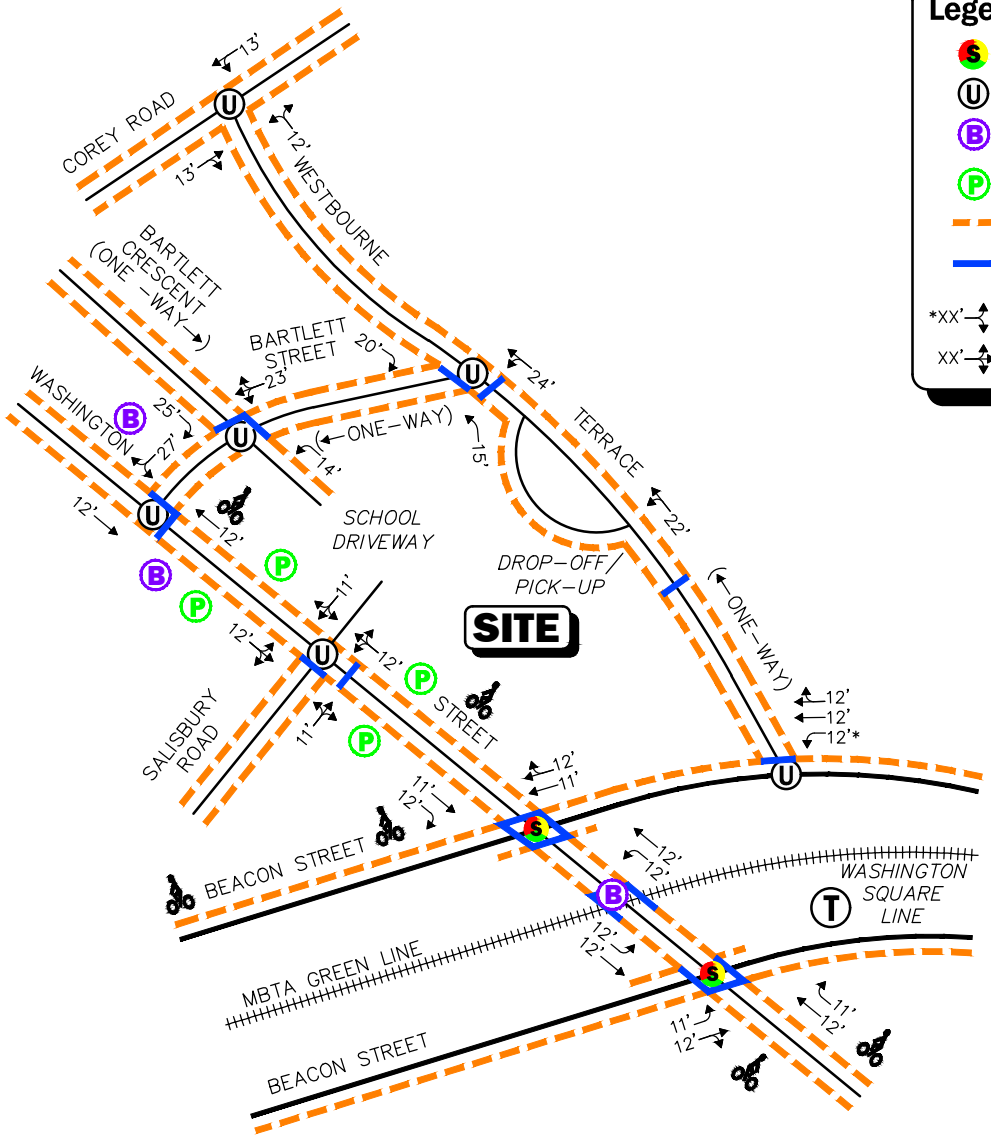
Figure 2 summarizes lane use and lane widths at the study area intersections as observed in November 2018.

EXISTING TRAFFIC VOLUMES

In order to determine existing traffic-volume demands and flow patterns within the study area, manual turning movement counts (TMCs) and vehicle classification counts were conducted on Thursday, October 11, 2018, when all schools and colleges were in session, during the weekday morning (7:00 to 9:00 AM) and weekday afternoon (1:00 to 4:00 PM)) peak periods at each study area intersection. These time periods were selected for analysis purposes as they are representative of the peak traffic volume hours for the school.

Traffic Volume Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, historical traffic data collected by MassDOT were examined. Based on a review of seasonal adjustment factors collected by MassDOT for urban arterials and collectors, October traffic volumes are typically 1 percent higher than average monthly conditions and, therefore, were not adjusted downward in order to provide a conservative (above-average) analysis condition. For purposes of the study, the weekday morning peak hour of the school generally occurs between 7:30 and 8:30 AM while the weekday afternoon peak hour of the school generally occurs between 2:00 and 3:00 PM. In all instances, these peak hours of the school were utilized for analysis purposes.



Not To Scale

Figure 2

Existing Intersection Lane Use, Travel Lane Width and Pedestrian Facilities

Vanasse & Associates, Inc.
Transportation Engineers & Planners

R:\8045\8045nt1.dwg, 12/3/2018 5:19:08 PM

The 2018 Existing traffic volumes are summarized in Table 1 and graphically depicted on Figure 3, respectively.

Table 1
EXISTING ROADWAY TRAFFIC-VOLUME SUMMARY

	Weekday Morning Peak Hour (7:00 - 8:00 AM)		Weekday Afternoon Peak Hour (2:00-3:00 PM)	
Location	Volume (vph)[b]	Predominant Flow	Volume (vph)	Predominant Flow
Washington Street, south of Salisbury Road and School Drive	994	57% EB	853	52% WB

[a]Two-way daily traffic expressed in vehicles per day;
[b]Manual turning movement counts conducted in October 2018
[c]The percent of daily traffic that occurs during the peak hour.
SB = southbound;

As can be seen in Table 1, Washington Street was found to accommodate 994 vehicles per hour (vph) during the weekday morning school peak hour and 853 vph during the weekday afternoon school peak hour. Directional traffic during the morning period is in the eastbound direction and during afternoon periods is in the westbound direction.

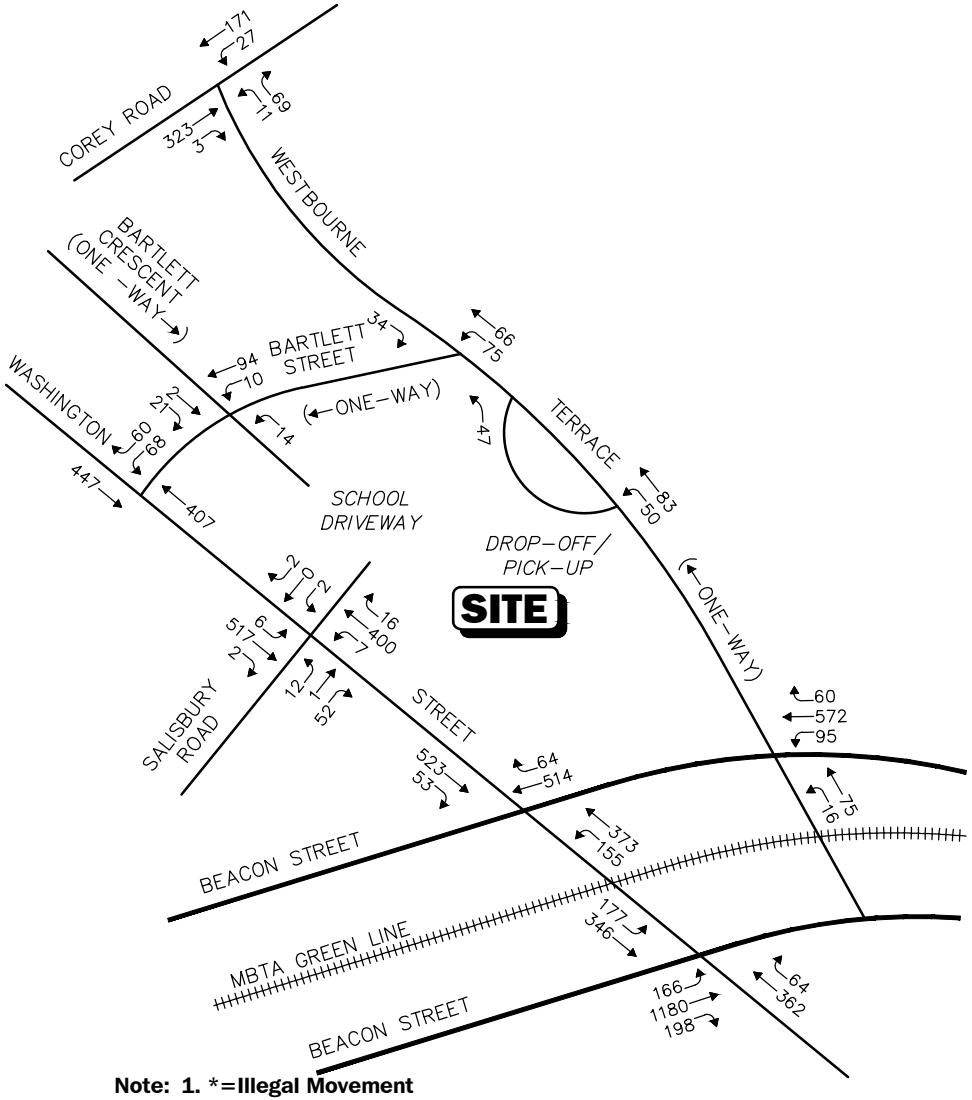
PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in October 2018. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadways and at the study intersections, as well as the location of bicycle facilities. Sidewalks are provided along both sides of Washington Street, Westbourne Terrace, Bartlett Street and north side of Beacon Street in the vicinity of the school, including all existing area pedestrian routes including areas where teacher parking occurs. Marked crosswalks are provided at all the study intersections, with exception of Westbourne Terrace at Corey Road. Bicycle lanes are currently provided in the vicinity of the school along east and north side of Washington Street and Beacon Street, respectively. Where bicycle lanes are not present a 'Share the Road' sign is provided alerting motorists of the shared travel way for motorists and bicyclists. Figure 4 graphically depict the pedestrian volumes recorded in the area during the weekday morning and weekday afternoon school peak hours.

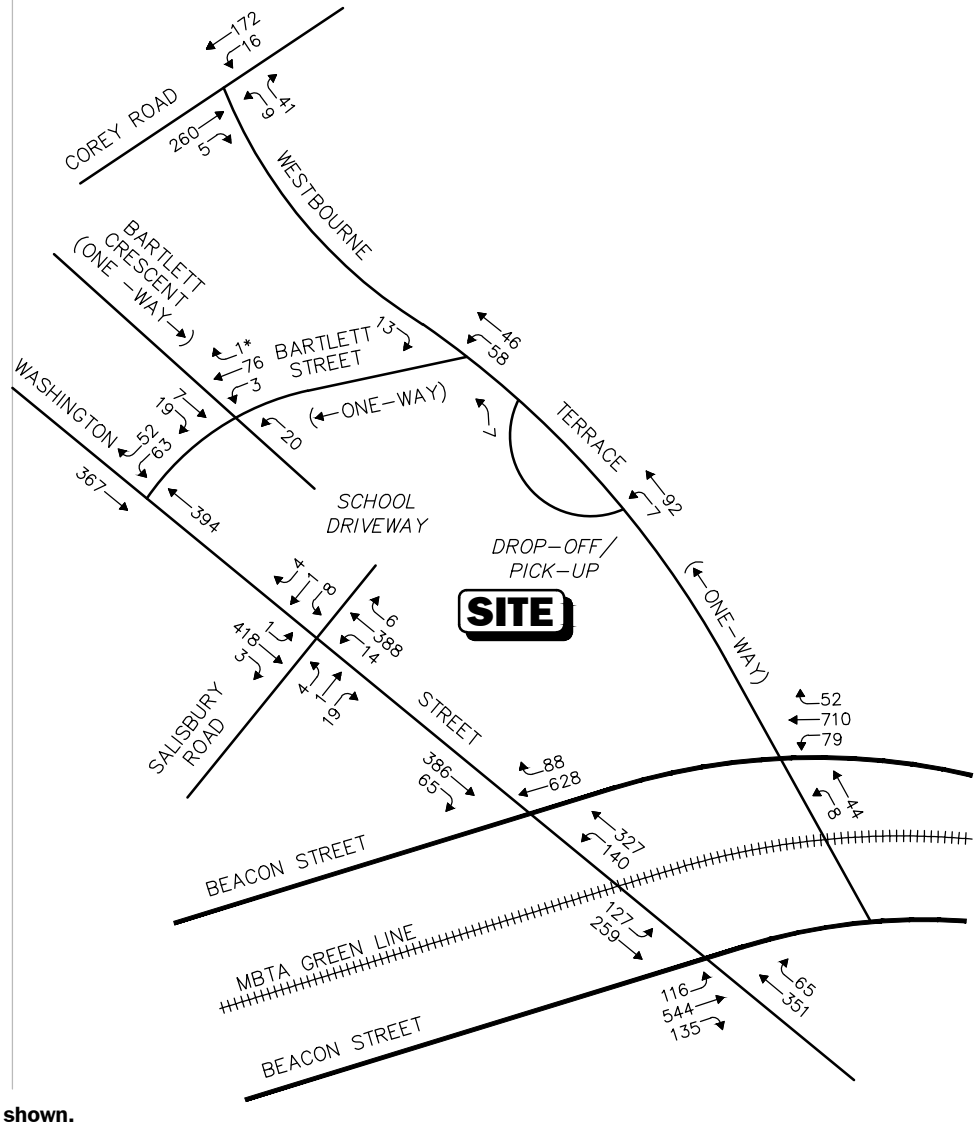
PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the Massachusetts Bay Transit Authority (MBTA). The MBTA operates fixed-route bus services in the vicinity. Bus Route 65 – Brighton Center – Kenmore Station stops at the intersection of Washington Street and Bartlett Street, approximately 0.1 miles north of the school entrance. This line operates with a peak-hour frequency between 7-15 minutes during 9:00 AM to 8:58 PM.

WEEKDAY MORNING PEAK HOUR (7:30 - 8:30 AM)



WEEKDAY AFTERNOON PEAK HOUR (2:00 - 3:00 PM)



Note: 1. *=Illegal Movement
2. Imbalances exist due to numerous curb cuts and side streets that are not shown.
3. Numbers indicate vehicles at intersections during an one hour period.

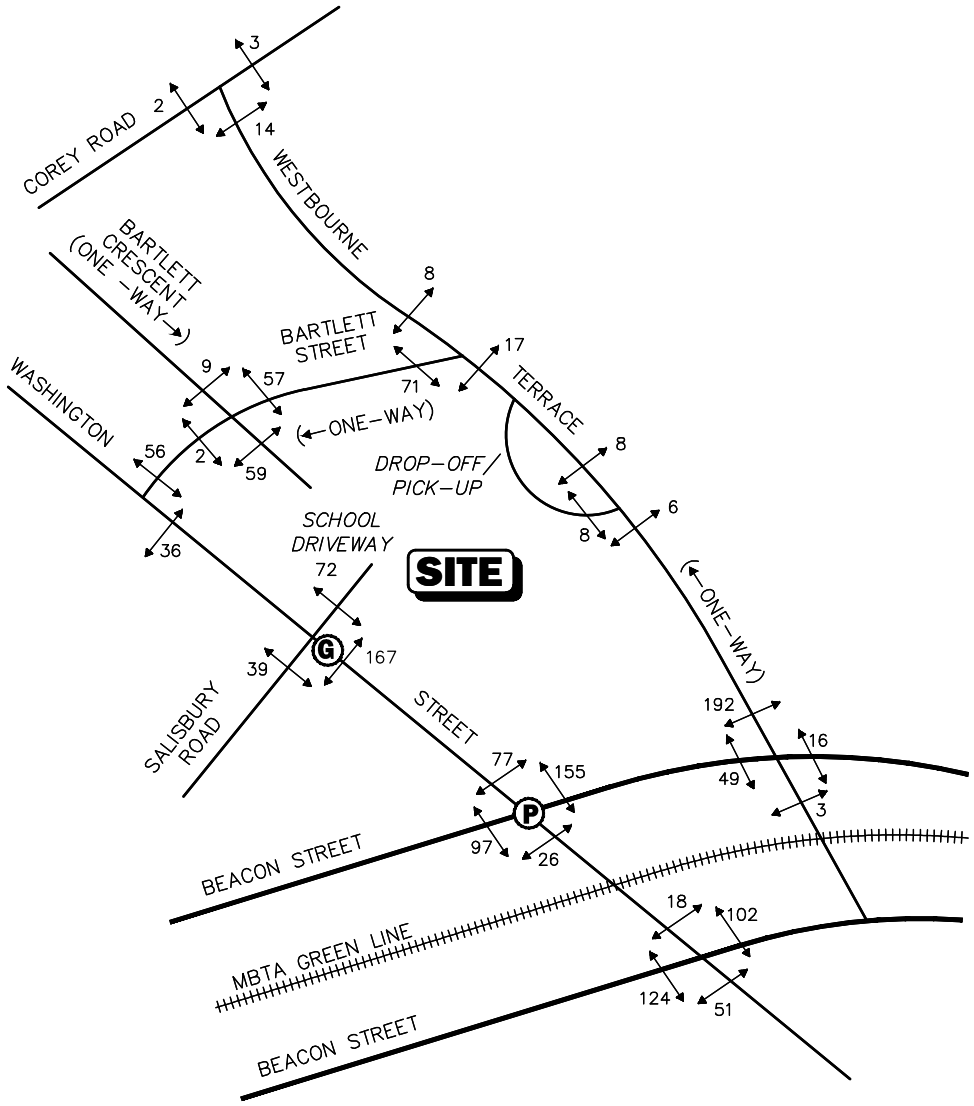
Not To Scale

Figure 3

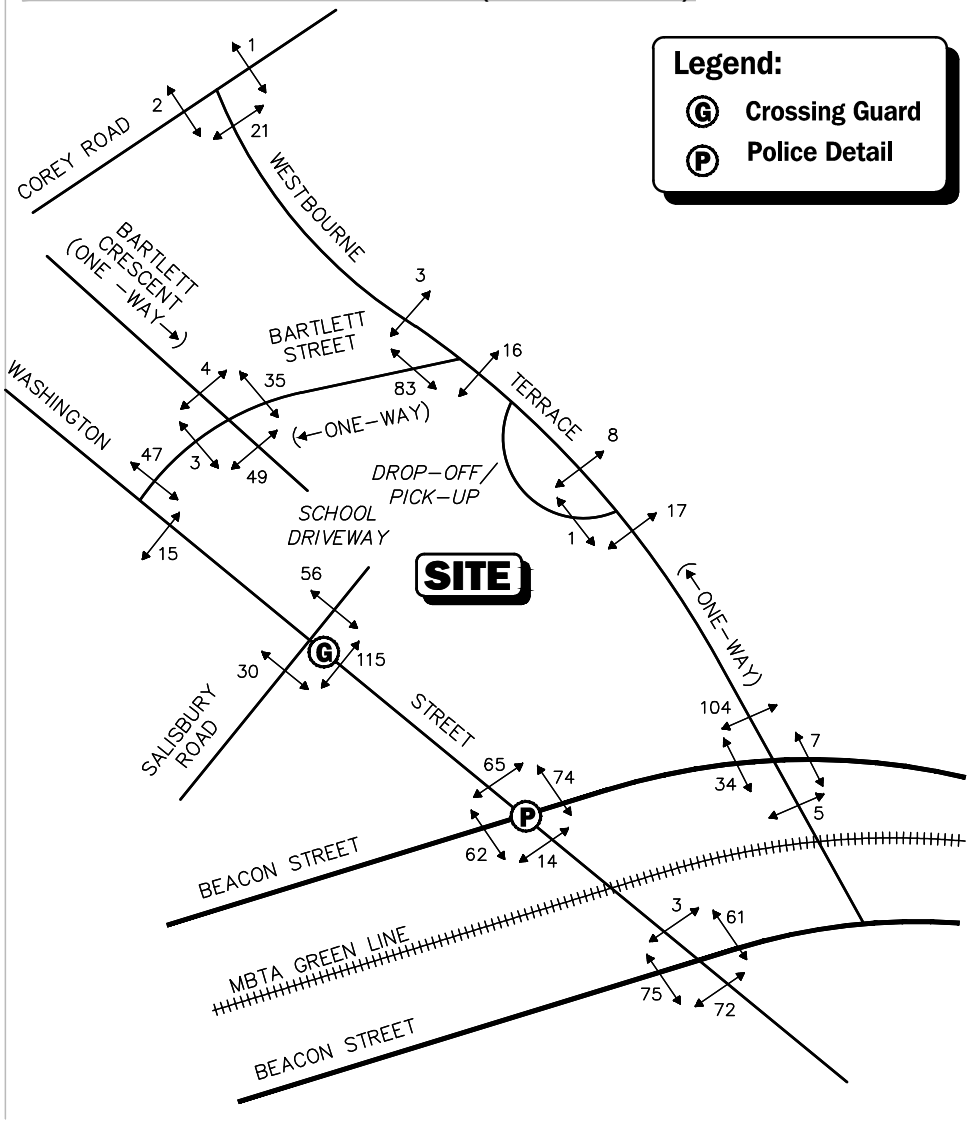
Vanasse & Associates, Inc.
Transportation Engineers & Planners

2018 Existing Weekday Peak School Hour Traffic Volumes

WEEKDAY MORNING PEAK HOUR (7:30 - 8:30 AM)



WEEKDAY AFTERNOON PEAK HOUR (2:00 - 3:00 PM)



Note: Numbers indicate both school and non school pedestrians during an one hour period.

Not To Scale

Figure 4

2018 Existing
Weekday
Peak School Hour Pedestrian Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

R:\8045\8045nt1.dwg, 12/3/2018 5:20:01 PM

The MBTA Green Line C Branch Washington Square Station is located Washington Street approximately 0.1 miles south of the school, less than a two-minute walk. The public transportation information (schedule and rates) is included in Appendix.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at the proposed school driveway exit with Washington Street in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)[2] standards. In brief, Stopping Sight Distance (SSD) is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. In accordance with AASHTO and MassDOT standards, at a minimum, sufficient stopping sight distances must be provided at an intersection. Table 2 presents the required and measured sight distances.

Table 2
SIGHT DISTANCE MEASUREMENTS

Intersection/Sight Distance Measurement	Required Minimum – Stopping Sight Distance (Feet)[a] 30 mph	35 mph	Measured (Feet)
Site Driveway at Washington Street			
Exiting Sight Distance:			
Looking to the east from the driveway	200	250	400+
Looking to the west from the driveway	200	250	400+

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets,* Fifth Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

As shown in Table 2, the proposed school driveway has acceptable sight distances for over 35 mph indicating that safe operation can exist based upon the existing geometrics.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash information for the study area intersections was provided by the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period along Beacon Street available (2012 through 2016) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, pavement condition and severity in Table 3.

[2]*A Policy on Geometric Design of Highway and Streets,* 6th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2011.

Table 3
MOTOR VEHICLE CRASH DATA SUMMARY[a]

Scenario	Beacon Street at Washington Street (Signalized)	Beacon Street at Westbourne Terrace (Unsignalized)
Year:		
2012	2	2
2013	1	1
2014	6	1
2015	3	1
2016	5	3
Total	17	8
Average[a]	3.4	1.60
Crash Rate[b]	0.24	0.43
Significant	No	No
Type:		
Angle	4	6
Rear-End	3	0
Head-On	0	0
Sideswipe	5	0
Fixed Object	4	2
Other	1	0
Total	17	8
Pavement Conditions:		
Dry	14	6
Wet	3	2
Snow/Ice	0	0
Unknown/ Other	0	0
Total	17	8
Severity:		
Property Damage Only	9	7
Personal Injury	8	1
Fatality	0	0
Unknown	0	0
Total	17	8
Pedestrian/Bicycle Summary:		
Collision with bicycle	4	2
Collision with pedestrian	1	0

[a]Average crash over five-year period.
[b]Crash rate per million entering vehicles (mev).
Source: MassDOT Crash Data, 2012 through 2016.

As can be seen in Table 3, the intersection of Beacon Street at Washington Street experienced a total of 17 accidents reported at the intersection over the five-year review period, averaging 3.4 accidents per year. Beacon Street at Westbourne Terrace experienced 1.6 accidents per year. Both intersections were found to have a motor vehicle crash rate below the MassDOT average for the District 6 (0.71 for signalized intersections and 0.52 for unsignalized intersections). The Beacon Street at Washington Street intersection is listed on the Highway Safety Improvement Program (HSIP) as a high crash cluster for 2006-2015 HSIP Bicycle Cluster. No fatalities were reported at these intersections over the five-year review period. The detailed MassDOT Crash Rate Worksheets and the MassDOT HISP map are provided in the Appendix. Local Town of Brookline accident data has been requested for the study area intersections.

FUTURE CONDITIONS

To determine the impact of school expansion on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2025. Traffic volumes on the roadway network at that time, in the absence of the expansion (that is, the No-Build condition), would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific development by others expected to be completed by 2025. Inclusion of these factors resulted in the development of 2025 No-Build traffic volumes. Anticipated school-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop the 2025 Build traffic-volume conditions.

FUTURE TRAFFIC GROWTH

Traffic growth on area roadways is a function of the expected land development in the immediate area, as well as the surrounding region. Several methods are used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used.

General Background Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine general background traffic growth trends. Based on a review of this data, a 1.0 percent per year compounded annual background traffic growth rate was used in order to conservatively account for future traffic growth and presently unforeseen development within the study area.

Specific Development by Others

The Town of Brookline and the City of Boston were contacted in order to determine if there are any planned or approved specific development projects within the area that would have an impact on future traffic volumes at the study intersections. Based on these discussions two projects were identified:

5 Washington Street. This Project will include 145 residential units and 12,000 square feet of retail space. The project will provide 105 vehicle parking spaces and 145 bicycle spaces. The Site Generated volumes from this development were incorporated into the No-Build Conditions (see distribution in appendix).

15 Washington Street. This Project includes new construction of up to 270 dwelling units consisting of multi-family apartments, a new approximately 45,753-square foot Whole Foods grocery store, a new approximately 3,593-square foot Citizens Bank, and up to 323 structured parking spaces that will support the residential and commercial uses. Both the existing Whole Foods grocery store and Citizens Bank will be reconstructed on the site and relocated into new buildings. The Site Generated volumes from this development were incorporated into the No-Build Conditions (see distribution in appendix).

No other background developments were identified within the study area.

Planned Roadway Improvements

The Town of Brookline and the City of Boston were contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area. Based on these discussions, no roadway improvement projects were identified in the study area.

No-Build Traffic Volumes

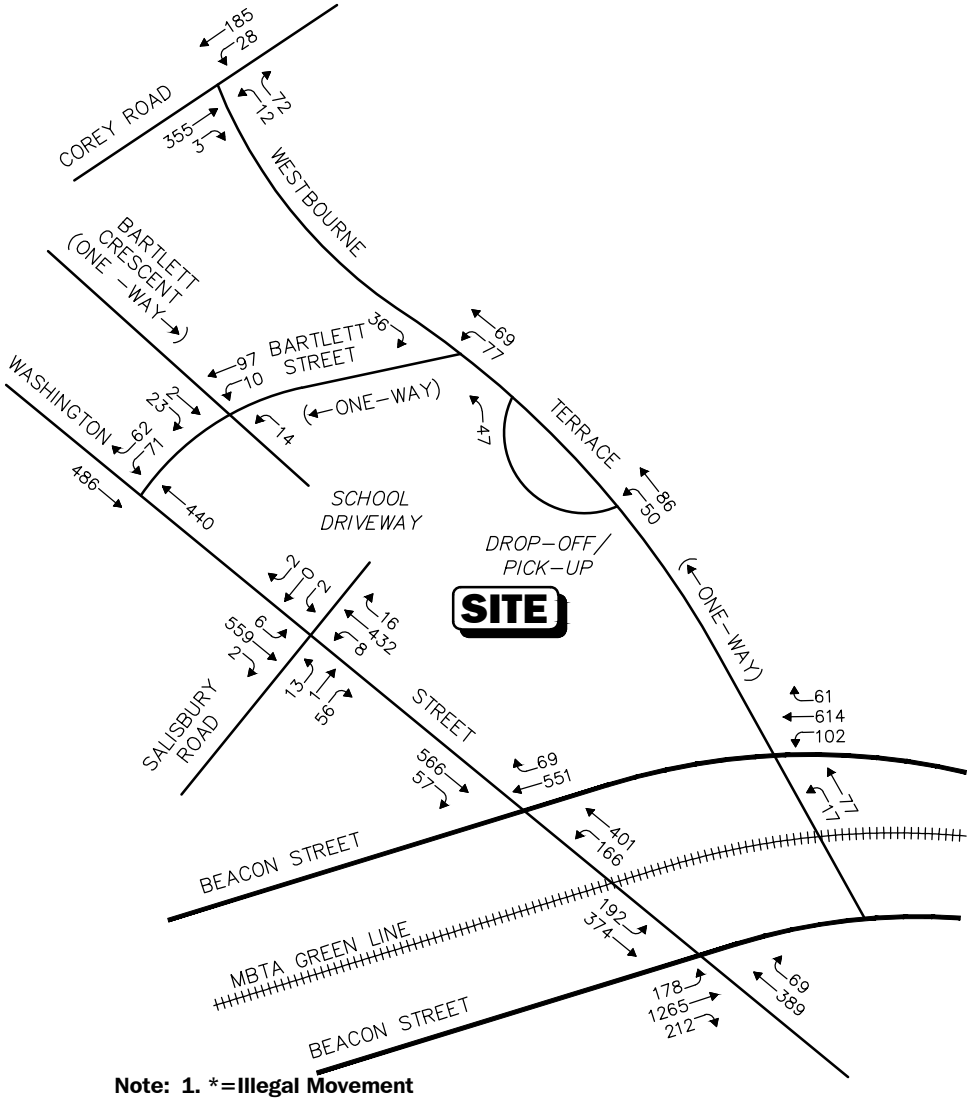
The 2025 No-Build school peak-hour traffic-volume networks for weekday morning and weekday afternoon were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the non-school traffic volumes plus the identified background development. The resulting 2025 No-Build weekday morning and weekday afternoon school peak-hour traffic volume networks are shown on Figure 5.

PROJECT-GENERATED TRAFFIC

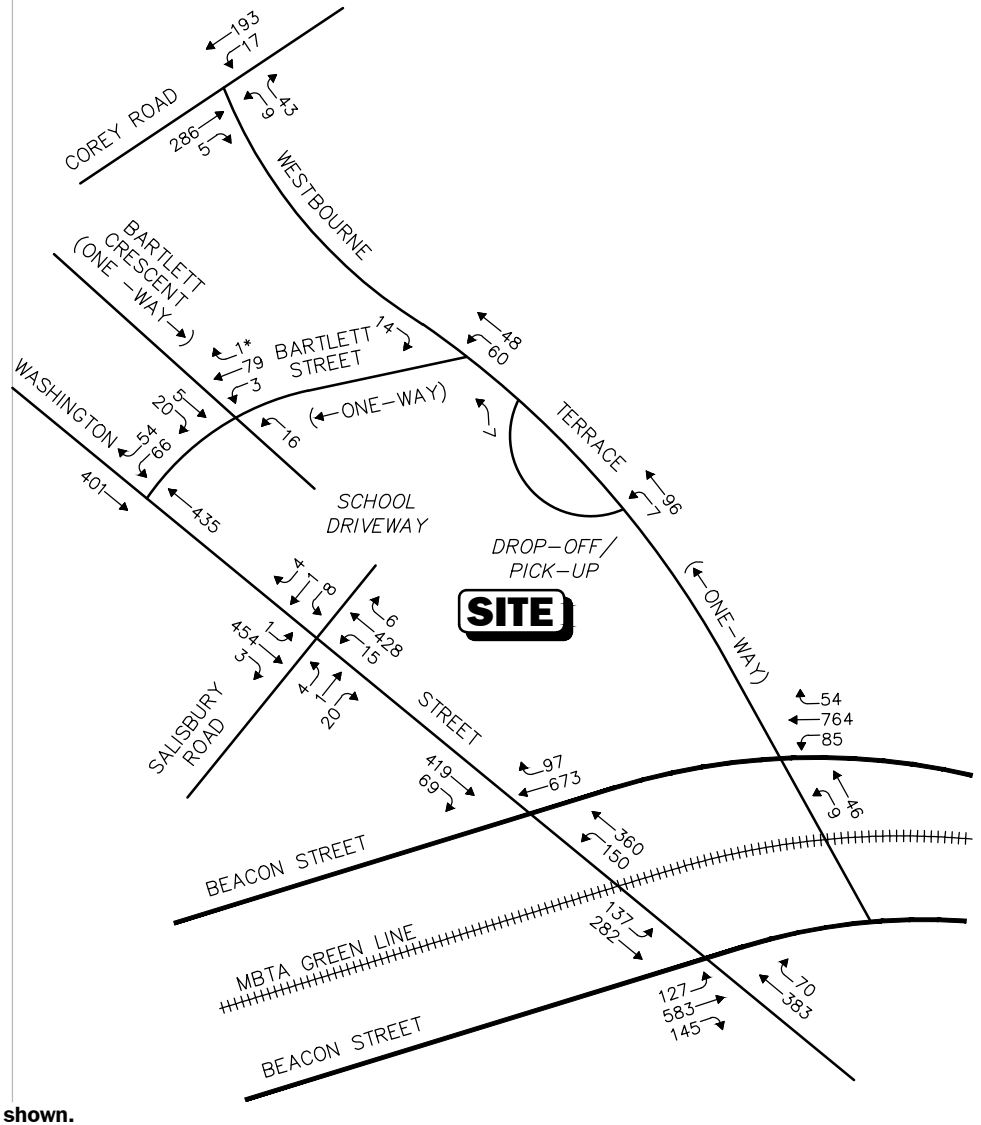
Design year (2025 Build) traffic volumes for the study area roadways were determined by estimating school-generated traffic volumes and assigning these volumes on the study roadways. The following describes the methodology used to establish the traffic characteristics of the school expansion. As proposed, the Project will entail the expansion of a 632-student elementary school with 99-staff member to an 800-student elementary school with 125-staff member.

In order to develop the traffic characteristics of the school, vehicles entering and exiting at the school driveway were counted. Table 4 summarizes the existing traffic generation of the school based upon the actual counts.

WEEKDAY MORNING PEAK HOUR (7:30 - 8:30 AM)



WEEKDAY AFTERNOON PEAK HOUR (2:00 - 3:00 PM)



Note: 1. *=Illegal Movement
2. Imbalances exist due to numerous curb cuts and side streets that are not shown.
3. Numbers indicate vehicles at intersections during an one hour period.

Not To Scale

Figure 5

Vanasse & Associates, Inc.
Transportation Engineers & Planners

2025 No-Build
Weekday
Peak School Hour Traffic Volumes

R:\8045\8045nt1.dwg, 12/3/2018 5:20:12 PM

Table 4
EXISTING TRIP GENERATION SUMMARY

	School Driveway		On-Street Parking Drop-Off-Pick-up				
Time Period	Westbourne Terrace Driveway	Bartlett Street Driveway and Washington Street Driveway	Washington Street	Bartlett Street	Westbourne Terrace	Staff[1]	Total Exiting Trips 632 Students[2]
Weekday Morning Peak Hour:							
Entering	50	33	25	21	15	45	189
Exiting	47	12	25	21	15	0	120
Total	97	45	50	42	30	45	309
Weekday Afternoon Peak Hour:							
Entering	7	12	11	13	26	0	69
Exiting	7	29	11	13	26	10	96
Total	14	41	22	26	52	10	165

[1]Estimated staff on-street parking
[2]Numbers Represent – Staff, Buses and Parent Vehicles.

As can be seen in Table 4, the existing 632-student Driscoll School generates approximately 309 vehicle trips during the weekday morning school peak hour (189 entering and 120 exiting), with 165 vehicle trips during the weekday evening peak hour (69 entering and 96 exiting). The school population is projected to increase by 168 students or an increase of 26%. In order to provide a conservative projection a 30% increase in traffic volume was estimated. A summary of expected vehicle trip generation for the School expansion is summarized in Table 5.

Table 5
PROPOSED TRIP GENERATION

	Total Trips		
Time Period	632 Students[1]	800 Students[2]	New Trips[2]
Weekday Morning Peak Hour:			
Entering	189	246	57
Exiting	120	156	36
Total	309	402	93
Weekday Afternoon Peak Hour:			
Entering	69	90	21
Exiting	96	125	29
Total	165	215	50

[1]Note: 26% increase in Students. Assume 30% increase in Traffic.
[2]Increase includes staff and student drop-off/pick up.

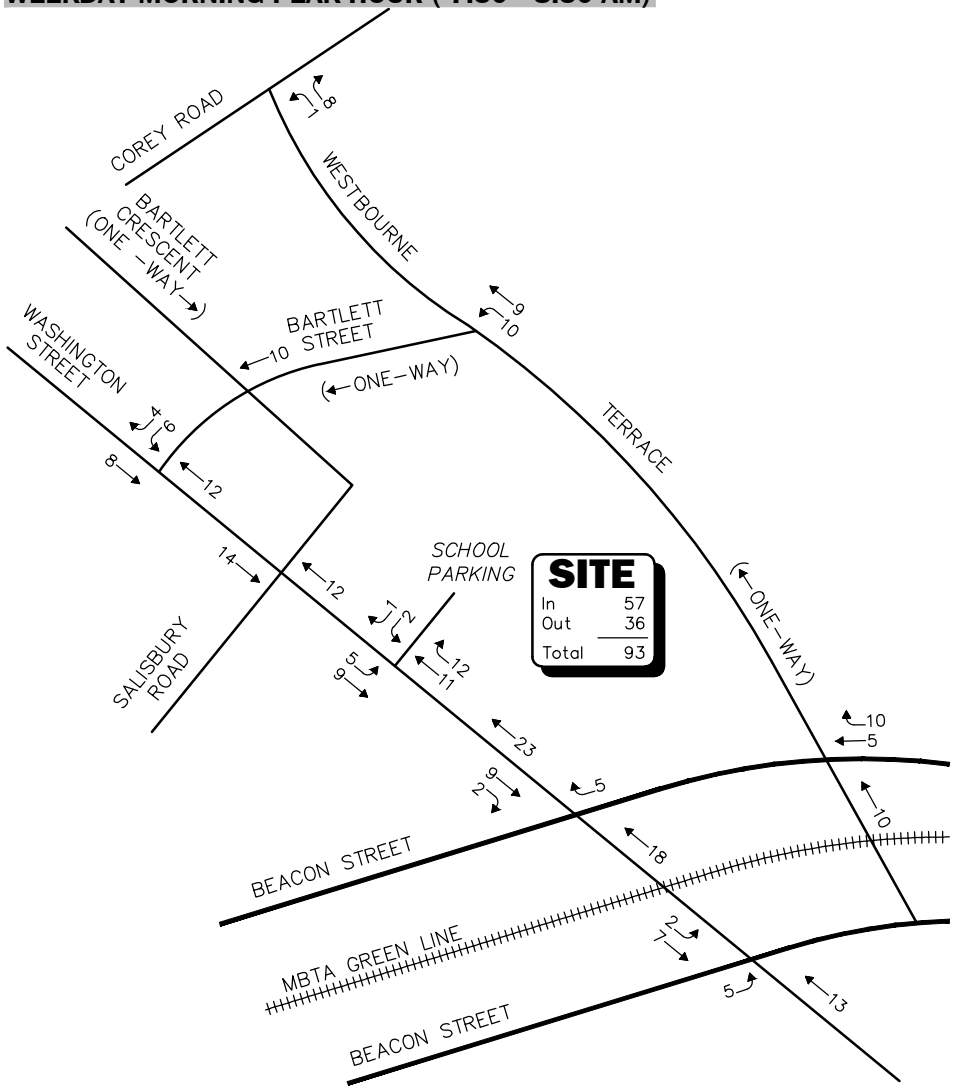
As can be seen in Table 5, the expansion of the Driscoll School is expected to result in approximately 93 additional vehicle trips (57 vehicles entering and 36 exiting) during the weekday morning peak-hour and 50 additional vehicle trips (21 vehicles entering and 29 exiting) during the weekday afternoon peak-hour.

Projected vehicles generated by the school was distributed onto the study roadways and through the study intersections based a review of the peak hour turning movement volumes at the school driveways and Drop-off/Pick-ups area within study area. Figure 6 depicts the School Trip Generation which is based upon current traffic and patterns. Rerouting of the school traffic to the new driveway and Drop-Off/Pick-up area onto Washington Street and Westbourne Terrace was also completed.

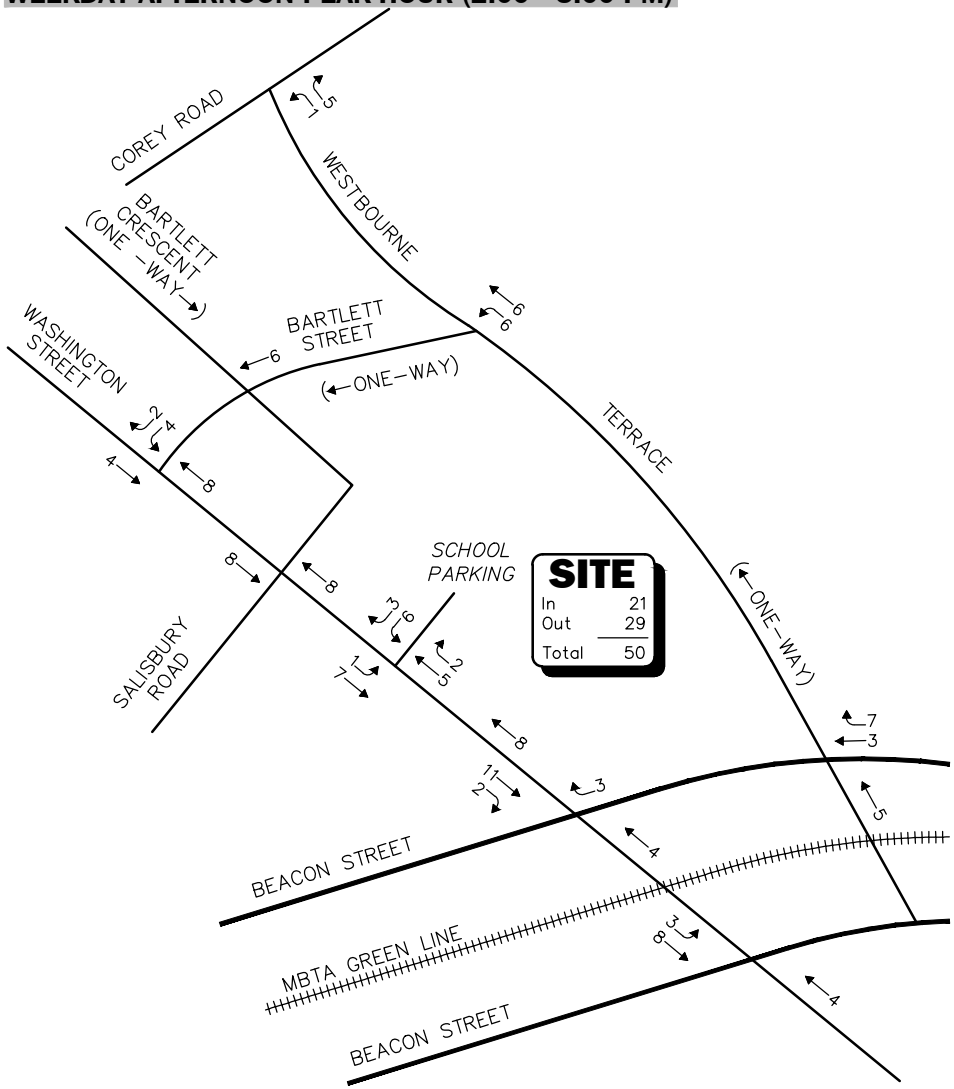
FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2025 Build condition networks consist of the 2025 No-Build traffic volumes with the anticipated site-generated traffic added to them. The 2025 Build weekday morning and weekday afternoon traffic-volume networks are graphically depicted on Figure 7. As can be seen in Figure 7, the overall traffic increases are not significant with most increase less than 20 vehicles.

WEEKDAY MORNING PEAK HOUR (7:30 - 8:30 AM)



WEEKDAY AFTERNOON PEAK HOUR (2:00 - 3:00 PM)



Not To Scale

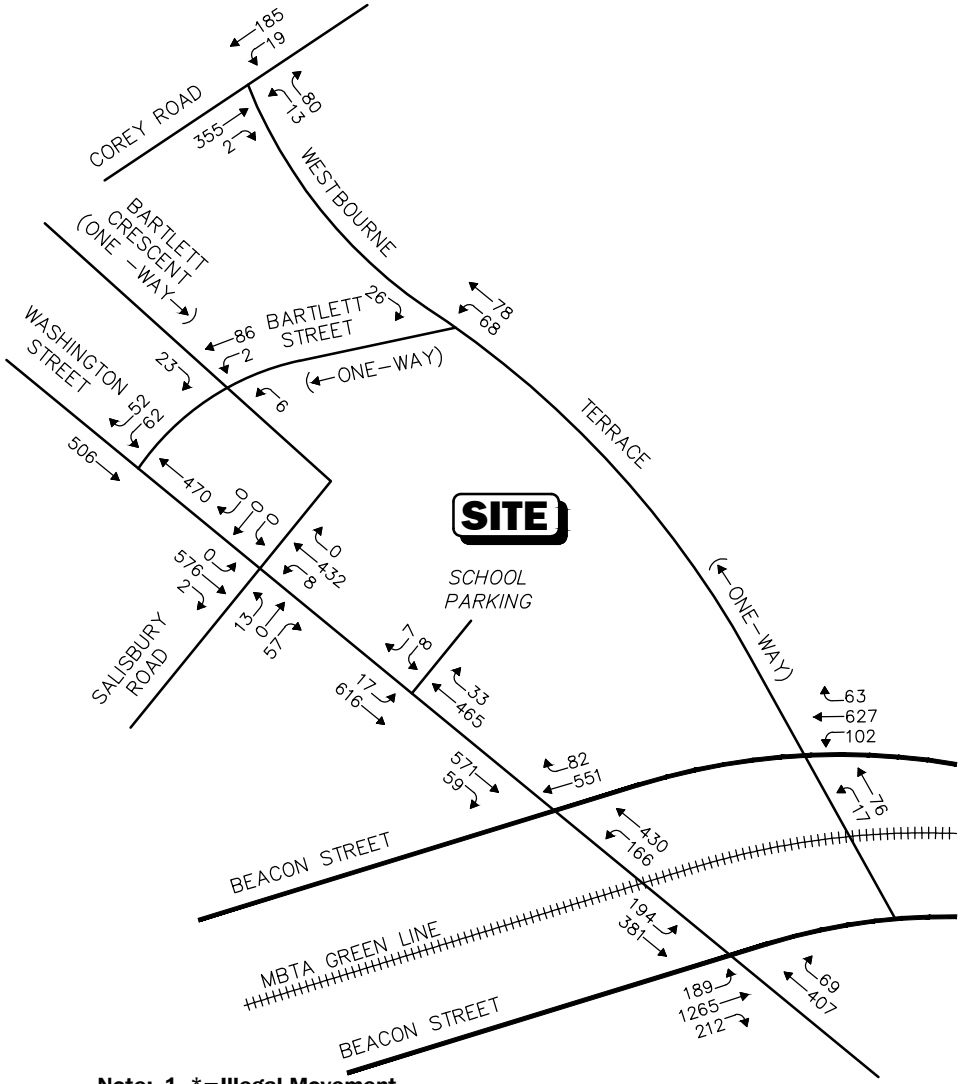
Figure 6

Project Generated
Weekday
Peak School Hour Traffic Volumes

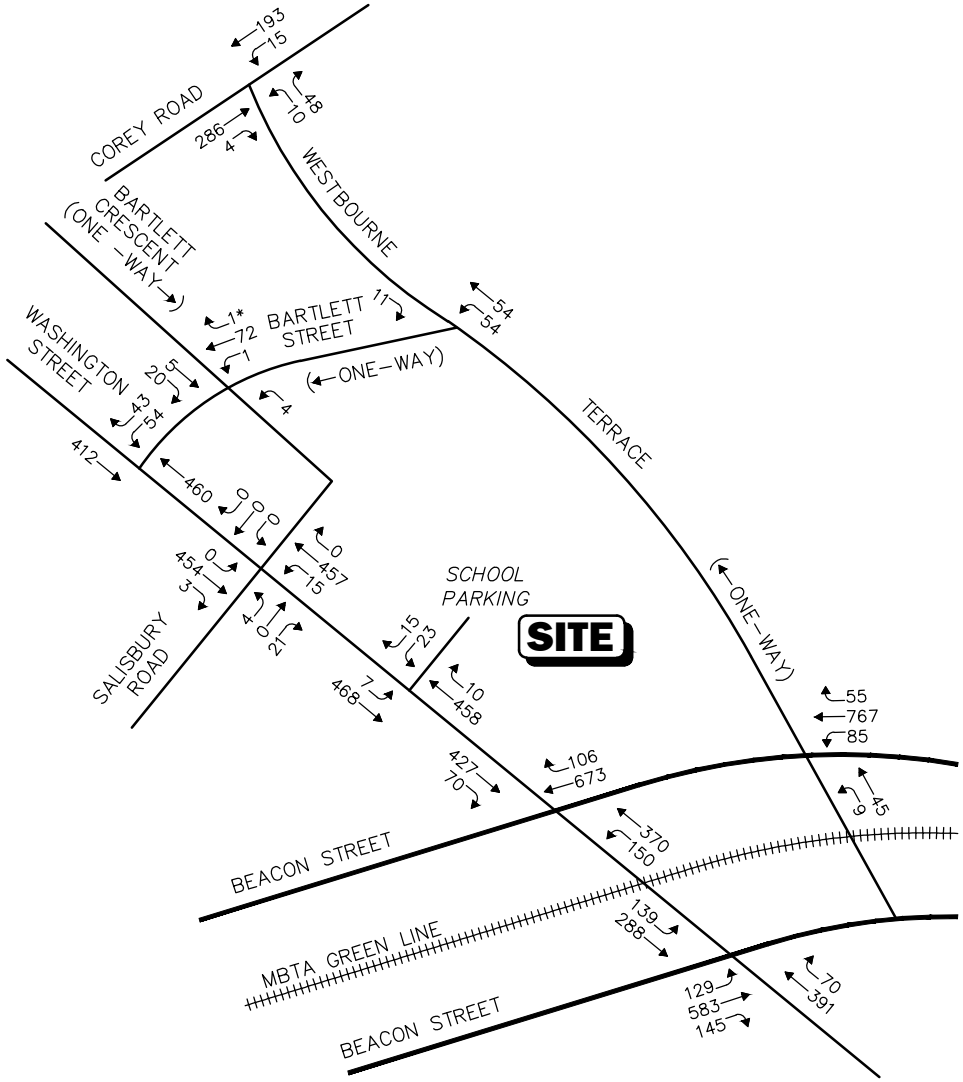
Vanasse & Associates, Inc.
Transportation Engineers & Planners

R:\8045\8045nt1.dwg, 12/3/2018 5:21:04 PM

WEEKDAY MORNING PEAK HOUR (7:30 - 8:30 AM)



WEEKDAY AFTERNOON PEAK HOUR (2:00 - 3:00 PM)



Note: 1. *=Illegal Movement
2. Imbalances exist due to numerous curb cuts and side streets that are not shown.
3. Numbers indicate vehicles at intersections during an one hour period.

Not To Scale

Figure 7

2025 Build
Weekday
Peak School Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

R:\8045\8045nt1.dwg, 12/3/2018 5:21:16 PM

TRAFFIC OPERATIONS ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of level of service to traffic facilities under various traffic-flow conditions.[3] The concept of level of service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with level-of-service (LOS) A representing the best operating conditions and LOS F representing congested or constrained operating conditions.

Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

[3]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual;* Transportation Research Board; Washington, DC; 2010.

Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual*.[4] Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the *2010 Highway Capacity Manual*. Table 6 summarizes the relationship between level of service and average control delay for two way stop controlled and all-way stop controlled intersections.

Table 6
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[a]

Level-Of-Service by Volume-to-Capacity Ratio		Average Control Delay
v/c ≤ 1.0	v/c > 1.0	(Seconds Per Vehicle)
A	F	≤10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	>50.0

[a]Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 19-2.

[4]*Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010.

Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- *LOS A* describes operations with very low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2010 *Highway Capacity Manual*. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. Table 7 summarizes the relationship between level of service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table 7
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[a]

Level-Of-Service by Volume-to-Capacity Ratio		Average Control Delay
v/c ≤ 1.0	v/c > 1.0	(Seconds Per Vehicle)
A	F	≤10.0
B	F	10.1 to 20.0
C	F	20.1 to 35.0
D	F	35.1 to 55.0
E	F	55.1 to 80.0
F	F	>80.0

[a]Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 18-6.

ANALYSIS RESULTS

Level-of-service analyses were conducted for Baseline, 2025 No-Build, and 2025 Build conditions for the study area intersections. The results of the intersection capacity analysis within the study area are described below, with a tabular summary provided in Tables 8 and 9.

Unsignalized Intersection Analysis Results

Westbourne Terrace at Beacon Street

Under all conditions, Beacon Street operates at LOS C during the weekday morning and weekday afternoon peak school hour.

Westbourne Terrace at School Drop-Off

Westbourne Terrace at the school Drop-Off/Pick-Up area operates at LOS A during the weekday morning and weekday afternoon peak school hour. This will be closed under the new school plan.

Westbourne Terrace at Bartlett Street

Under all conditions, this intersection operates at LOS A during the weekday morning and weekday afternoon peak school hour.

Westbourne Terrace at Corey Road

Under existing and future conditions, this intersection operates at LOS C or higher during the weekday morning peak school hours and LOS B during weekday afternoon peak school hours.

Bartlett Street at Bartlett Crescent and School Driveway

Under all conditions, this intersection operates at LOS A during the weekday morning and weekday afternoon peak school hour.

Washington Street at Bartlett Street

Under existing and future conditions, this intersection operates at LOS D during the weekday morning peak school hours and LOS C during weekday afternoon peak school hours.

School Drive/Salisbury Road at Washington Street

Under Existing and no-build conditions, this intersection operates at LOS C during the weekday morning and weekday afternoon peak school hour. Under build condition, this intersection operates at LOS C during the weekday morning peak school hour and at LOS B during the weekday afternoon peak school hour.

Washington Street at New School Driveway

This proposed intersection will operate at LOS C during the weekday morning peak hour and at LOS C during the weekday afternoon peak hour.

Signalized Intersection Analysis Results

Beacon Street at Washington Street (Eastbound)

Under all conditions, this intersection operates at LOS C during the weekday morning peak hour and at LOS B during the weekday afternoon peak hour.

Beacon Street at Washington Street (Westbound)

Under all conditions, this intersection operates at LOS D during the weekday morning peak hour and at LOS C during the weekday afternoon peak hour.

In summary, the new school expansion will not change the level of service at any of the study area locations.

Table 8
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

	2018 Existing				2025 No-Build				2025 Build			
Unsignalized Intersection Movements	Demand[a]	Delay[b]	LOS[c]	Queue[d]	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue
Westbourne Terrace at Beacon Street												
Weekday Morning :												
Beacon Street U-turn NB TH	75	18.6	C	1.3	77	20.2	C	1.5	76	20.5	C	1.5
Weekday Afternoon:												
Beacon Street U- turn NB TH	44	19.0	C	0.8	46	20.6	C	0.9	45	20.6	C	0.9
Westbourne Terrace at School Drop-Off/Pick-Up												
Weekday Morning :												
Drop-Off/Pick-Up Exit NB LT	47	9.3	A	0.2	47	9.3	A	0.2	--	--	--	--
Weekday Afternoon:												
Drop-Off/Pick-Up Exit NB LT	7	9.1	A	0.0	7	9.2	A	0.0	--	--	--	--
Westbourne Terrace at Bartlett Street												
Weekday Morning :												
Westbourne Terrace NB LT TH	141	10.0	A	0.1	146	10.0	A	0.8	146	10.0	A	0.3
Westbourne Terrace SB LT	34	5.4	A	0.8	36	8.5	A	1.9	26	8.4	A	0.8
Weekday Afternoon:												
Westbourne Terrace NB LT TH	104	9.4	A	0.5	108	9.4	A	10.0	108	9.4	A	0.4
Westbourne Terrace SB LT	13	8.4	A	0.0	14	8.4	A	8.5	11	8.3	A	0.0
Westbourne Terrace at Corey Road												
Weekday Morning :												
Westbourne Terrace NB LT RT	80	15.8	C	0.9	84	17.5	C	1.1	93	17.8	C	1.3
Corey Road EB LT	27	8.9	A	0.1	28	9.2	A	0.1	19	9.1	A	0.1
Weekday Afternoon:												
Westbourne Terrace NB LT RT	50	11.1	B	0.3	52	11.5	B	0.3	58	11.5	B	0.3
Corey Road EB LT	16	8.0	A	0.0	17	8.1	A	0.1	17	8.1	A	0.1
Bartlett Street at Bartlett Crescent and School Driveway												
Weekday Morning :												
Bartlett Crescent NB LT	14	9.8	A	0.1	14	9.8	A	0.1	6	9.5	A	0.0
Bartlett Crescent SBTH RT	23	9.1	A	0.1	25	9.1	A	0.1	23	8.9	A	0.1
Weekday Afternoon:												
Bartlett Crescent NB LT	16	9.5	A	0.1	16	9.5	A	0.1	4	9.3	A	0.0
Bartlett Crescent SB RT	20	9.1	A	0.1	25	9.1	A	0.1	25	9.0	A	0.1

See notes at end of table.

Table 8 (Continued)
UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

	2018 Existing				2025 No-Build				2025 Build			
Unsignalized Intersection Movements	Demand[a]	Delay[b]	LOS[c]	Queue[d]	Demand	Delay	LOS	Queue	Demand	Delay	LOS	Queue
Washington Street at Bartlett Street												
Weekday Morning :												
Bartlett Street WB LT	68	25.8	D	2.7	71	31.8	D	3.4	62	31.9	D	3.0
Weekday Afternoon:												
Bartlett Street WB LT	63	18.8	C	1.7	66	20.1	C	1.9	54	21.0	C	1.6
Washington Street at Salisbury Road and School Drive/Bartlett Crescent												
Weekday Morning :												
School Driveway WB LT/TH /RT	4	19.4	C	0.1	4	21.8	C	0.1	--	--	--	--
Salisbury Road EB LT/TH/RT	65	17.2	C	0.9	70	19.1	C	1.1	70	19.0	C	1.1
Weekday Afternoon:												
School Driveway WB LT/TH /RT	13	17.6	C	0.2	13	19.3	C	0.2	--	--	--	--
Salisbury Road EB LT/TH/RT	24	13.1	B	0.2	25	13.7	B	0.2	25	13.4	B	0.2
Washington Street at New School Driveway												
Weekday Morning :												
School Driveway WB LT RT	--	--	--	--	--	--	--	--	15	18.9	C	0.2
Washington Street SB LT	--	--	--	--	--	--	--	--	17	8.6	A	0.1
Weekday Afternoon:												
School Driveway WB LT RT	--	--	--	--	--	--	--	--	38	17.6	C	0.4
Washington Street SB LT	--	--	--	--	--	--	--	--	7	8.4	A	0.0

[a]Demand in vehicles per hour
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Queue Length in Vehicles.
SB= southbound; SE= southeast; LT = left-turning movements; RT = right-turning movements

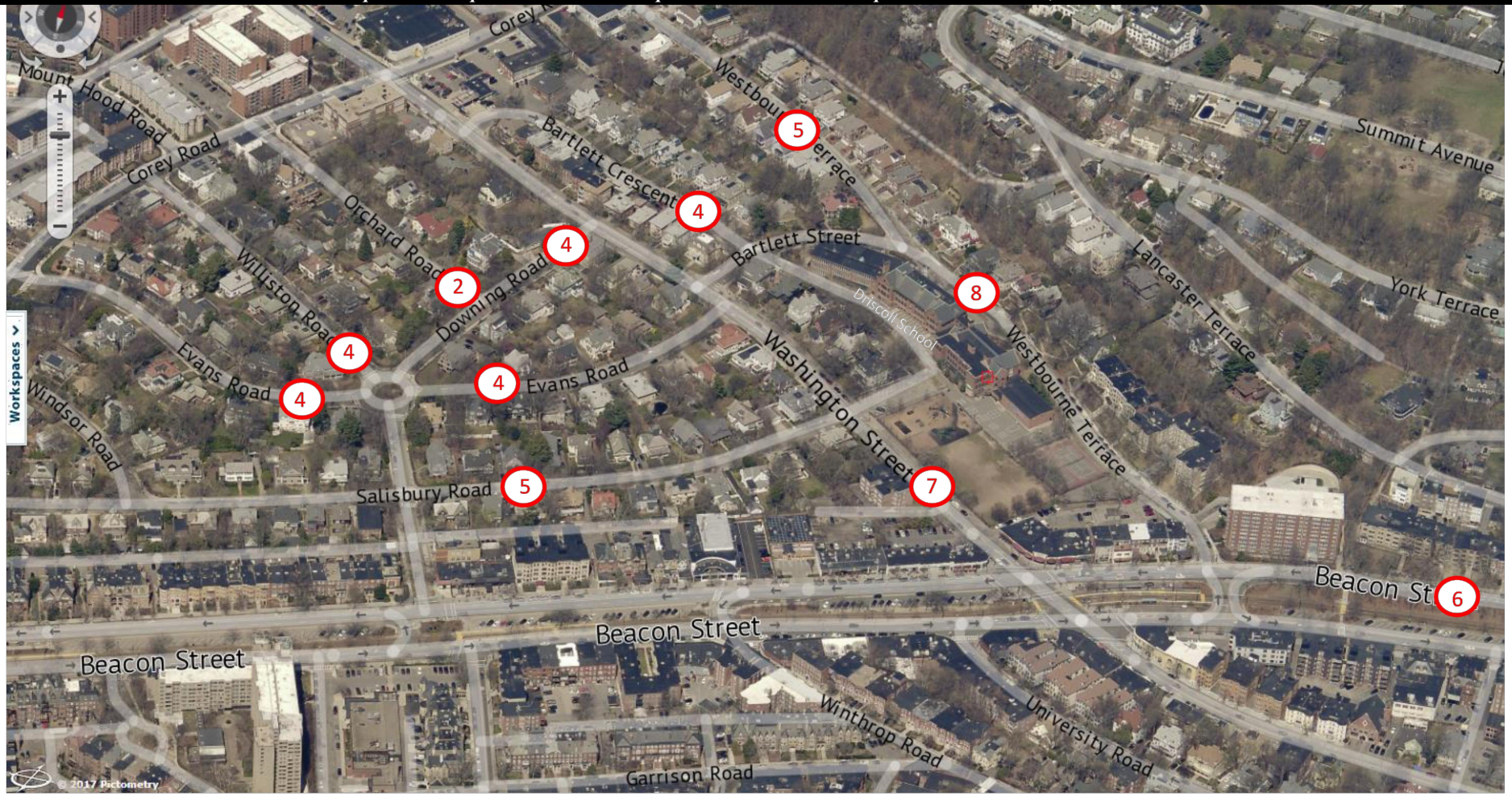
Table 9
SIGNALIZED INTERSECTION CAPACITY ANALYSIS SUMMARY

	2018 Existing				2025 No-Build				2025 Build			
Signalized Intersection Movements	V/C[a]	Delay[b]	LOS[c]	Queue	V/C	Delay	LOS	Queue	V/C	Delay	LOS	Queue
Washington Street at Beacon Street (Eastbound)												
Weekday Morning:												
Beacon Street EB LT	0.55	46.2	D	92/147	0.58	49.1	D	98/155	0.60	53.3	D	104/165
Beacon Street EB TH	0.80	22.2	C	336/430	0.86	25.2	C	380/487	0.86	25.2	C	380/487
Washington Street SE LT	0.65	13.8	B	4/11	0.75	20.2	C	9/11	0.78	21.7	C	10/11
Washington Street SE TH	0.59	11.1	B	7/21	0.64	18.0	B	18/21	0.66	19.3	B	20/21
Washington Street NW TH	0.35	20.5	C	88/128	0.37	21.0	C	96/138	0.39	21.2	C	102/144
Overall	**2.05**	**21.2**	**C**	--	**2.19**	**24.6**	**C**	--	**2.19**	**25.3**	**C**	--
Weekday Afternoon:												
Beacon Street EB LT	0.48	42.5	D	69/115	0.51	43.1	D	76/123	0.51	43.4	D	77/124
Beacon Street EB TH	0.43	13.7	B	127/166	0.46	14.1	B	140/181	0.46	14.1	B	140/181
Washington Street SE LT	0.49	8.1	A	5/8	0.57	9.9	A	6/8	0.58	10.4	B	5/10
Washington Street SE TH	0.46	5.5	A	10/14	0.50	6.1	A	11/15	0.51	6.5	A	12/19
Washington Street NW TH	0.35	20.3	C	87/127	0.38	20.8	C	97/139	0.38	21.0	C	100/142
Overall	**0.77**	**15.5**	**B**	--	**0.85**	**16.1**	**B**	--	**0.87**	**16.3**	**B**	--
Washington Street at Beacon Street (Westbound)												
Weekday Morning:												
Beacon Street WBTH	0.66	34.0	C	162/261	0.72	36.2	D	178/292	0.75	37.5	D	184/301
Washington Street SE TH	0.91	47.3	D	332/479	0.99	61.7	E	374/540	1.00	64.3	E	379/547
Washington Street SE RT	0.10	0.3	A	0/0	0.10	0.3	A	0/0	0.11	0.3	A	0/0
Washington Street NW LH	0.84	57.2	E	95/213	0.90	66.8	E	104/233	0.90	66.4	E	105/233
Washington Street NW TH	0.61	26.1	C	214/311	0.65	26.8	C	233/337	0.70	27.9	C	254/363
Overall	**0.91**	**37.7**	**D**	--	**0.99**	**44.2**	**D**	--	**1.00**	**45.3**	**D**	--
Weekday Afternoon:												
Beacon Street WBTH	0.77	36.1	D	213/347	0.85	40.9	D	237/398	0.86	42.0	D	241/407
Washington Street SE TH	0.64	28.6	C	205/294	0.69	30.5	C	229/324	0.71	31.0	C	234/333
Washington Street SE RT	0.11	0.3	A	0/0	0.12	0.6	A	0/1	0.12	0.7	A	0/2
Washington Street NW LH	0.67	35.6	D	76/166	0.83	56.1	E	86/200	0.87	62.3	E	87/204
Washington Street NW TH	0.49	19.9	B	66/91	0.54	20.3	C	72/97	0.55	20.4	C	74/100
Overall	**0.77**	**29.7**	**C**	--	**0.85**	**33.9**	**C**	--	**0.87**	**35.0**	**C**	--

[a]Volume to Capacity
[b]Delay in seconds per vehicle.
[c]Level of service.
[d]Queue Length in Feet (50^{th}/95^{th} percentile)
SE = southeast; NW= northwest; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

PARKING

Under existing conditions, 53 teacher spaces are accommodated on-street in addition to the existing parking lot off Washington Street, which accommodates approximately 50 spaces. Figure 8 graphically depicts the existing staff on-street parking. A new parking lot under the school is proposed for staff and visitors. Any proposed new teacher parking on-street will need the approval from the Transportation Board.



Driscoll School

7/19/2018 - Parking

Approve by
Transportation Board

52 Parking Lot Spaces

53 Approved TBoard Parking Spaces

Source: Brookline Transportation Board

Not To scale

Figure 8

Staff On-Street Parking

Vanasse & Associates, Inc.
Transportation Engineers & Planners

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed Driscoll School Expansion located along Westbourne Terrace and Washington Street in Brookline, Massachusetts. The proposed expansion will accommodate up to 800 students with 125 staff. The school size will be increase by 168 students. As a result of the new school plan and recommended changes, the overall traffic and safety conditions in the area will be improved. This assessment has been completed in accordance with State and Town standards and those of the Traffic Engineering and Transportation Planning professions for the preparation of such reports. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

- Based upon a safety assessment of the area, the school can be safely accommodated with the design as planned.
- The impact of the proposed school expansion will be minimal in relation to the existing conditions. Impacts are limited to a short 15-20-minute period during parents' drop-off and pick-up times.
- Traffic volumes are expected to increase by approximately 93 vehicle trips (57 entering/ 36 exiting) during the weekday morning peak school hour and 50 vehicle trips (21 entering/ 29 exiting) during the weekday afternoon peak school hour.
- The proposed driveway off Washington Street has adequate sight distances for safe and efficient operations.
- Safe pedestrians conditions will be achieved with crosswalks and crossing guards at Washington Street and Westbourne Terrace.

- The Project will increase traffic in the morning and afternoon periods with increased delays and queues at locations within the study area. These delays and queues will be confined to limited and distinct periods during the morning drop-off and afternoon pick-up periods (15-20 minutes at peaks) and these periods are non-coincident with the peak periods of the adjacent roadways.

In summary, the school expansion can be accommodated with traffic conditions at manageable levels. Recommendations and improvements will be necessary to minimize the impacts and enhance safety conditions.

RECOMMENDATIONS

A detailed transportation improvement program has been developed that is designed to maintain safe and efficient access to the school and address any deficiencies identified at off-site locations evaluated in conjunction with this study. The following improvements as depicted in Figure 9 have been recommended as a part of this evaluation and will be completed in coordination with the Town.

Project Access

Access to the school parking area will be provided through a new driveway that will be located onto Washington Street. New Drop-Off/Pick-Up areas are provided along both Washington Street and Westbourne Terrace.

The following recommendations are offered with respect to the design and operation of the school site driveways:

- The driveway onto Washington Street should have a minimum 24-foot entrance and will be illuminated.

- A dedicated bus pull-off area is recommended off Washington Street in addition to a parent Drop-Off and Pick-Up area.

- The Westbourne Terrace Drop-Off and Pick-Up area shall consist of a 10-foot wide lane and a 4-foot painted island.

- A separate loading area is provided with access from Westbourne Terrace.

- School Zone signs, pavement markings and traffic control devices (i.e., flashing school speed limit signs) should be provided along Washington Street and Westbourne Terrace.

- All signs and other pavement markings to be installed within the Project site shall conform to the applicable standards of the current Manual on Uniform Traffic Devices (MUTCD).[5]

- Signs and landscaping adjacent to the Project site driveway intersections should be designed and maintained so as not to restrict lines of sight.

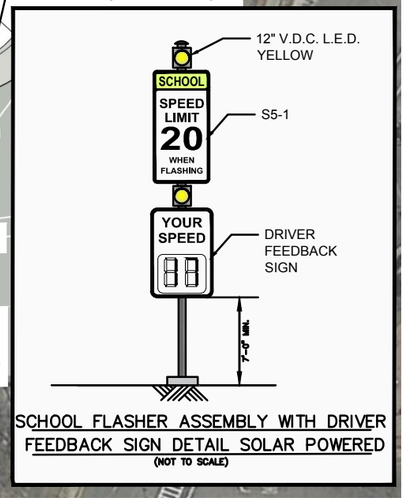
[5] *Manual on Uniform Traffic Control Devices (MUTCD); Federal Highway Administration; Washington, D.C.; 2009*

Legend:
- (G) Crossing Guard
- (P) Police Detail

PROP 4' STRIPING ISLAND (TYP)
S5-2
S1-1
S5-1 W/ FLASHING BEACONS AND DRIVER FEEDBACK SIGH
PROP CROSSWALK
PROP 10' LANE PARENT DROP-OFF /PICK-UP AREA (TYP)
PROP CROSSWALK W/ CROSSING GUARD
EXISTING PARKING TO REMAIN AS IS
S1-1
PROP CROSSWALK
SITE PROPERTY LINE
ZONING SETBACK (25')
Westbourne Terr
PARENT DROP-OFF
S5-1 W/ FLASHING BEACONS AND DRIVER FEEDBACK SIGH
SPEC01 *"STUDENT LOADING ONLY/ DRIVE MUST REMAIN IN VEHICLE"*
SPEC01 *"STUDENT LOADING ONLY/ DRIVE MUST REMAIN IN VEHICLE"*
TO BE DEMOLISHED
PROP PARENT DROP-OFF /PICK-UP AREA
SPEC01 *"STUDENT LOADING ONLY/ DRIVE MUST REMAIN IN VEHICLE"*
PLAYFIELD
R1-1
ENTRANCE TO 2ND FLOOR
Bartlett St.
Bartlett Crescent
PROP SERVICE DRIVE
S5-1 W/ FLASHING BEACONS AND DRIVER FEEDBACK SIGH
W11-2, W16-7P
SERVICE COURT
S1-1
POLICE OFFICER DETAIL (EXISTING)
R1-1
PROP CROSSWALK
R1-1
S5-1 W/ FLASHING BEACONS AND DRIVER FEEDBACK SIGH
SPEC01 *"STUDENT LOADING ONLY/ DRIVE MUST REMAIN IN VEHICLE"*
BIKE RACKS
S5-2
PARKING ENTRANCE
BUS DROP-OFF
Washington St.
SPEC02 *" BUS ONLY NO STUDENT DROP-OFF/PICK-UP"*
S5-2
CROSSING GUARD (EXISTING)
W11-2, W16-7P
R1-1
SPEC01 *"STUDENT LOADING ONLY/ DRIVE MUST REMAIN IN VEHICLE"*
PROP PARENT DROP-OFF /PICK-UP AREA
S1-1

SIGN LEGEND

R1-1	STOP	S5-2	END SCHOOL ZONE	W16-7P(Y)		SPEC02	BUSES ONLY NO STUDENT DROP-OFF
S1-1	AHEAD	W11-2		SPEC01	NO PARKING STUDENT LOADING ONLY DRIVE MUST REMAIN IN VEHICLE		



SCHOOL FLASHER ASSEMBLY WITH DRIVER FEEDBACK SIGN DETAIL SOLAR POWERED
(NOT TO SCALE)

Source: Google Earth Aerial and Jonathan Levi Architects Driscoll School Plans

0 40 80 Scale in Feet

Figure 9

Conceptual Improvement Plan
Pedestrian Access and School Signage Plan

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Pedestrian Improvements

Crosswalks are proposed along Washington Street and Westbourne Terrace with crossing guards for safe pedestrian access and egress. Sidewalks are provided along all roadways in the school vicinity. From Westbourne Terrace, a new crosswalk and connection to the MBTA Stop is proposed.

Parking

Designated new teacher parking on local streets, if needed, must be approved by the Transportation Board. In addition, a separate parking lot is proposed under the new school building.

Bicycle Considerations

The following should be incorporated.

- Bicycle racks should be provided interior and exterior to the building.
- Shower Facilities should be provided for employers.

Transit Usage

The school should actively promote staff usage of public transportation to the school and a Transportation Demand Management (TDM) plan should be developed for staff.

School Drop-Off and Pick-Up Traffic Management Plan

A central feature of the Project is the implementation of a traffic and parking management plan for school drop-off and pick-up activities. The Project site and the site access and off-site improvements detailed herein have been developed to facilitate access to the school campus for pedestrians, bicyclists, school buses and parents/caregivers in a safe and efficient manner. The traffic and parking management plan has been designed to build-upon this created infrastructure and will consist of the following major elements, all of which are overseen by school staff:

- Crossing guards should be located at Washington Street and Westbourne Terrace.
- School staff should be stationed at the drop-off areas to manage traffic and to facilitate the safety of pedestrians and bicyclists.
- Designated drop-off/pick-up area should be designed to facilitate these movements.
- Parents and caregivers should be given information on school drop-off and pick-up times and procedures at the beginning of the school year, with periodic updates and reminders provided as may be necessary.

The elements of the traffic and parking management plan for school drop-off and pick-up activities should be reviewed and updated as may be necessary in order to ensure the safety of students.

Construction Management Plan

A detailed Construction Management Plan should be prepared and reviewed by the Town.

Traffic Monitoring

Within three months after school opening, a traffic monitoring study should be completed to review traffic counts at the school driveways and evaluate the traffic condition within the area.

Annually, the school should assess conditions and evaluate pedestrian safety, crossing guards, at the school campus, and evaluate the level of student busing and make adjustments, as necessary.

CONCLUSION

Overall, a safe environment to the school can be maintained and the increased traffic conditions with respect to delays and queues will be limited to short periods in the morning and afternoon.