526 & 528

Boston Post Road Redevelopment
Sudbury, MA

MEADOW WALK
SUDBURY

AVALON
SUDBURY

Environmental Notification Form

February 16, 2016

SUBMITTED TO
Executive Office of Energy and Environmental Affairs

Massachusetts Environmental Policy Act Office

A PARTNERSHIP OF
BPR Sudbury Development LLC

AvalonBay COMMUNITIES

ND NATIONAL DEVELOPMENT

PREPARED BY

vhb
101 Walnut Street
PO Box 9151
Watertown, Massachusetts 02471

IN ASSOCIATION WITH
Tata & Howard
Sanborn, Head & Associates
Goulston & Storrs

ATTACHMENT A: FIGURES

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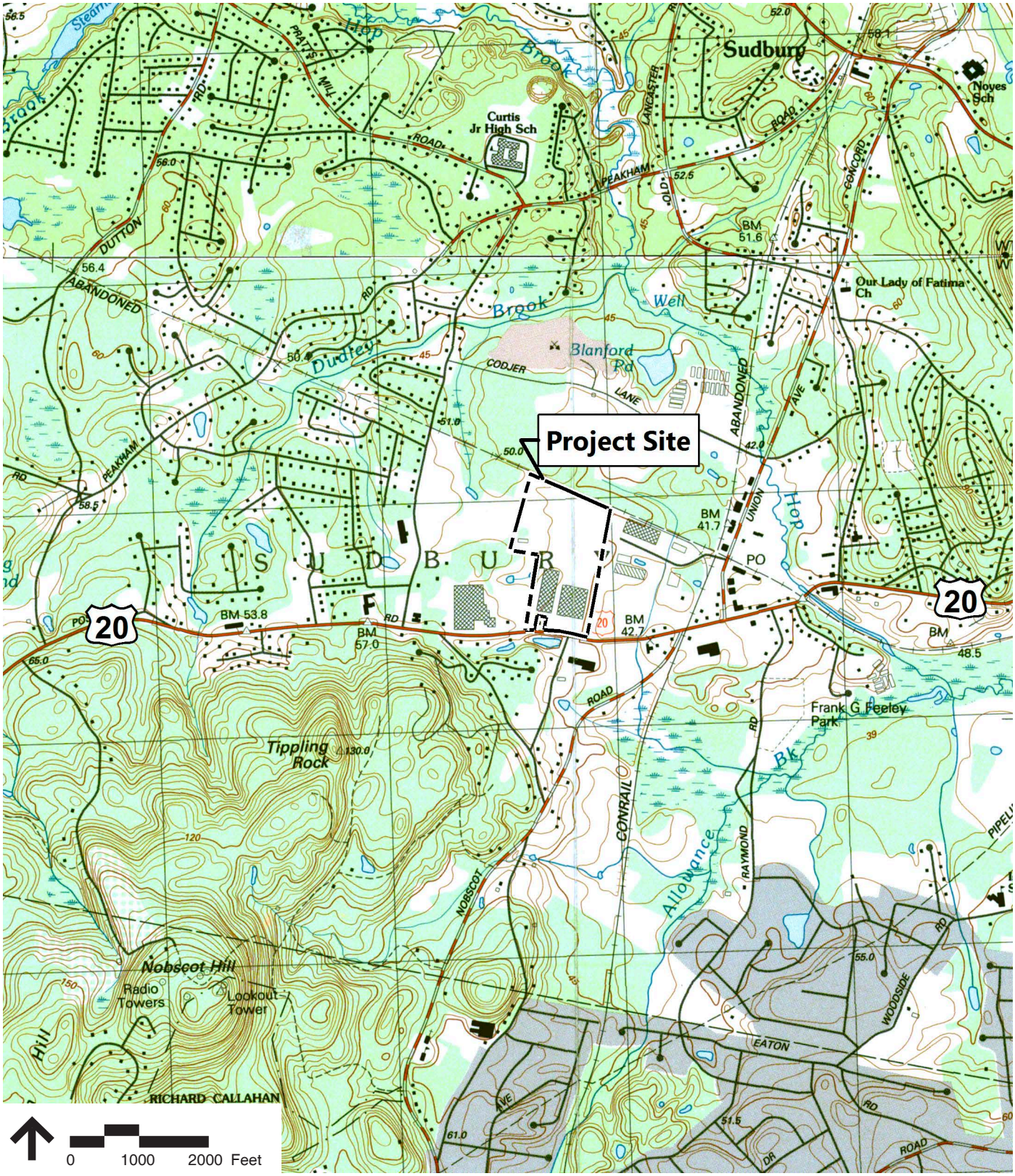

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Figure 1

USGS Locus Map

526 and 528 Boston Post Road Redevelopment

Source: MassGIS

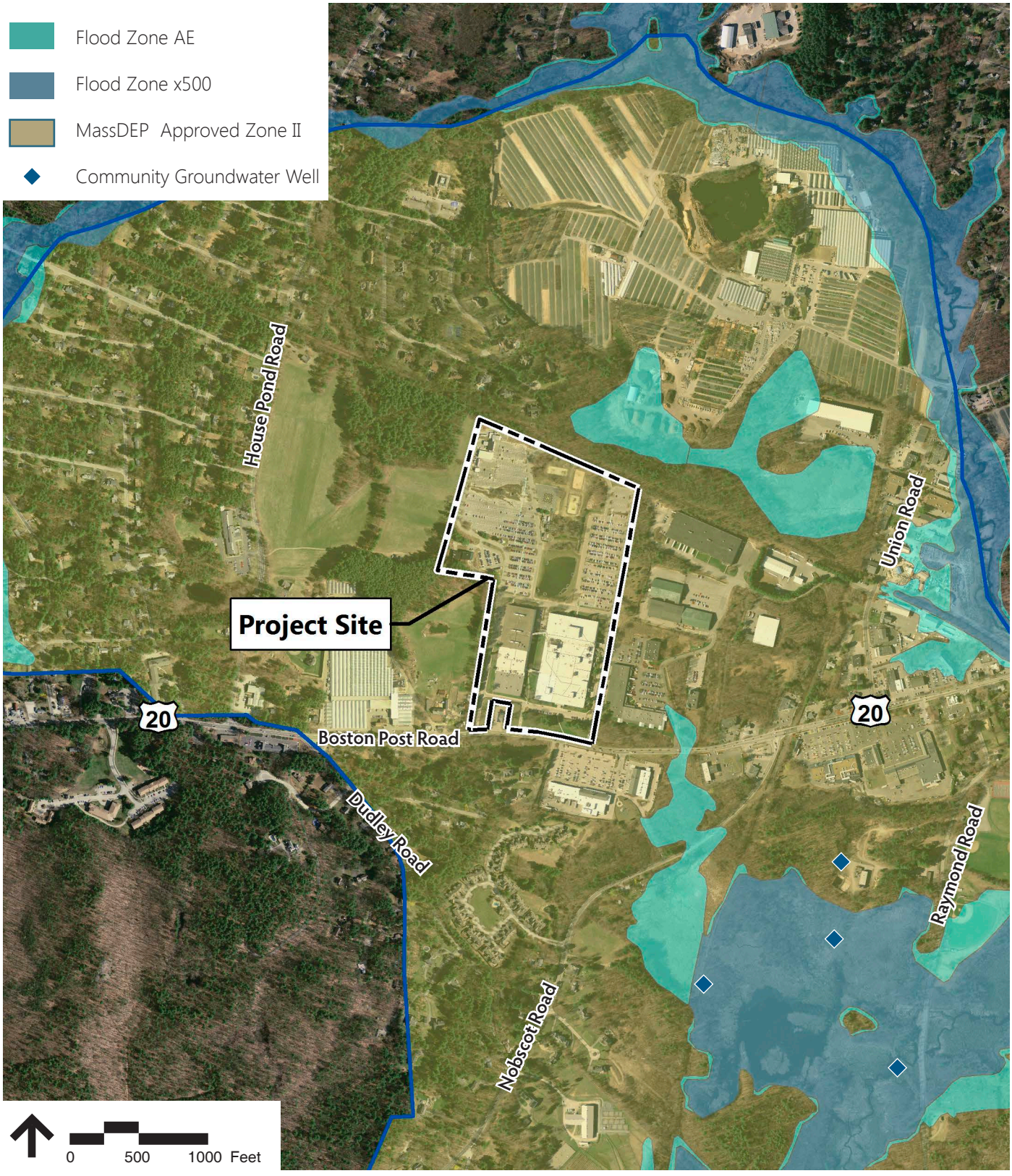

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Figure 2

Project Area Context

Source: ArcGIS Bing Aerial

AVALON SUDBURY

MEADOW WALK SUDBURY

526 and 528 Boston Post Road Redevelopment

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Figure 3

Existing Conditions Site Plan

AVALON SUDBURY

MEADOW WALK SUDBURY

526 and 528 Boston Post Road Redevelopment

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Figure 4

Proposed Conditions Site Plan

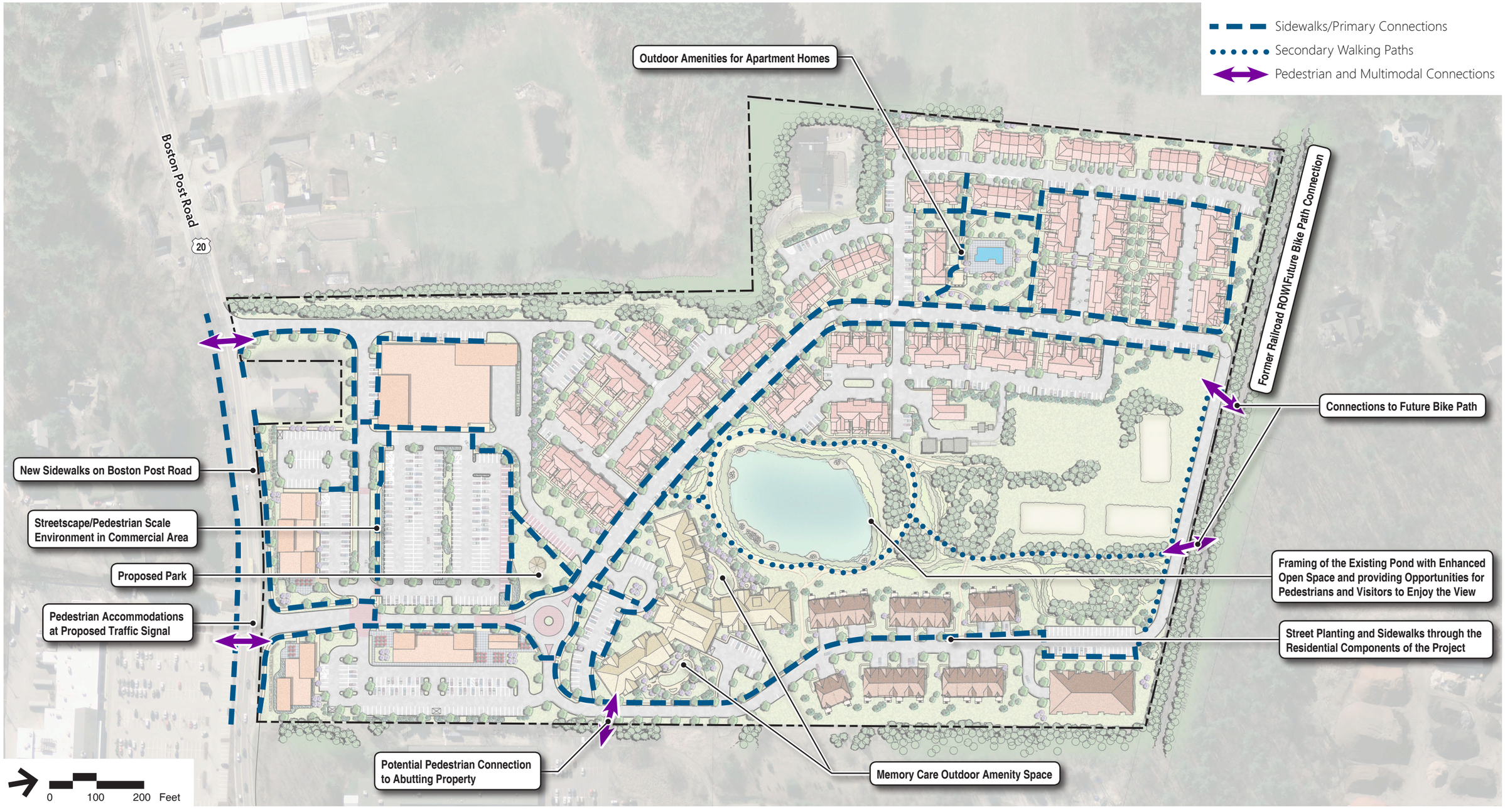

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Figure 5

Proposed Open Space and Pedestrian Corridors

Residential Apartments

Retail/Grocer

Memory Care Assisted Living

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Figure 6
Project Renderings

Source: TAT

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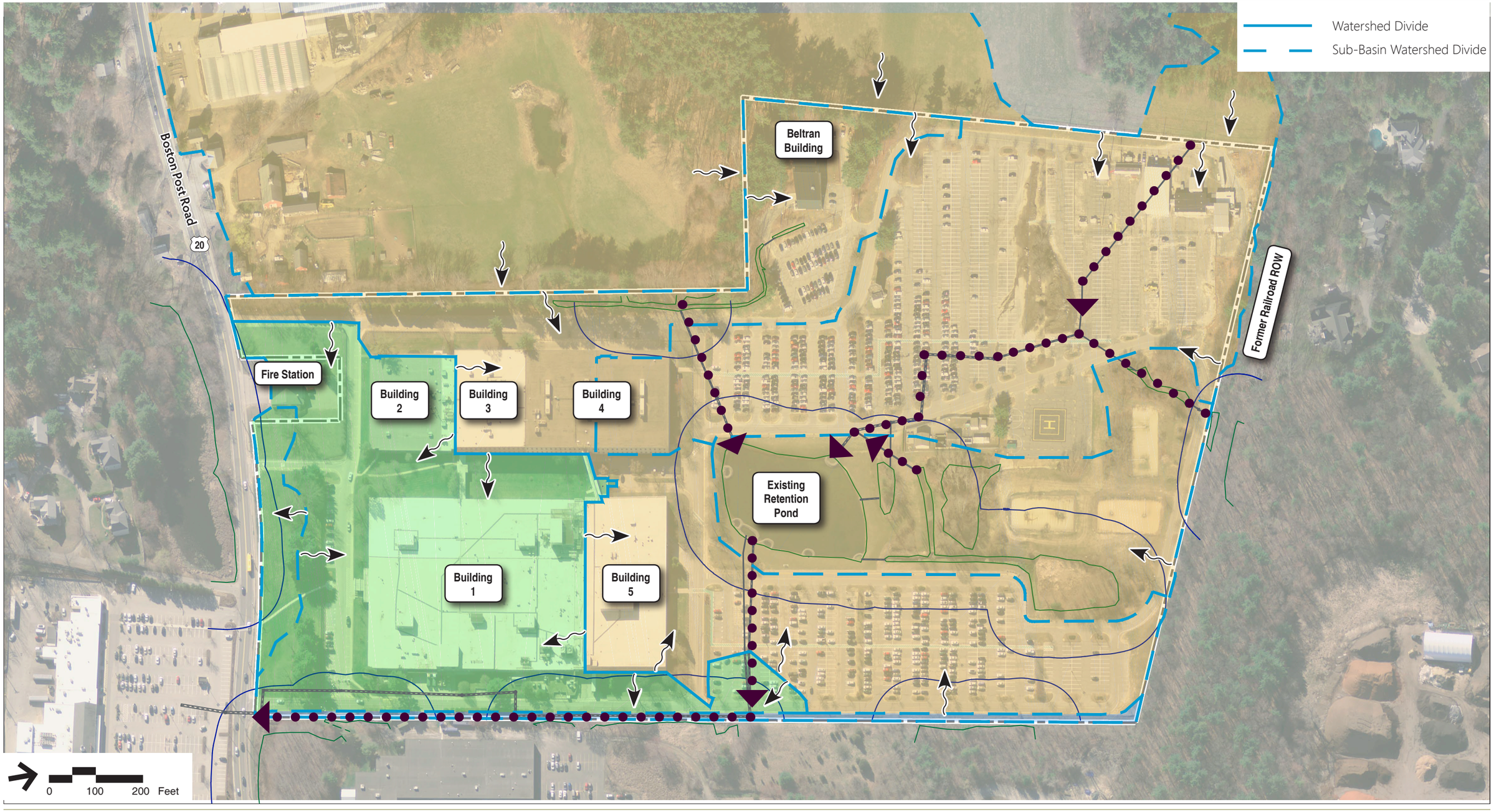
Figure 7

Existing Wetland Resources



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526 and 528 Boston Post Road Redevelopment

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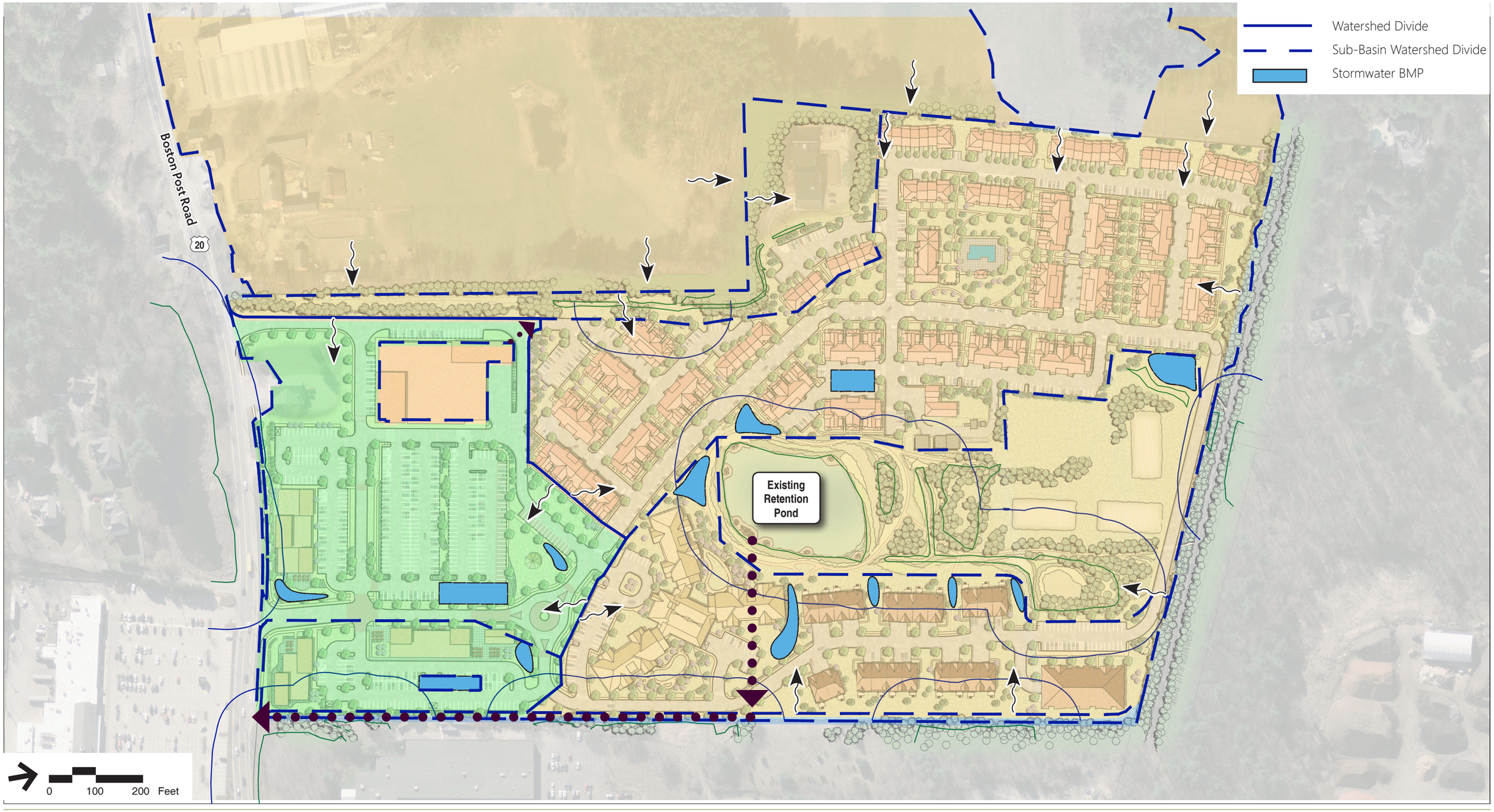
Figure 8

Existing Drainage Conditions



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526 and 528 Boston Post Road Redevelopment

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Figure 9

Proposed Drainage Conditions

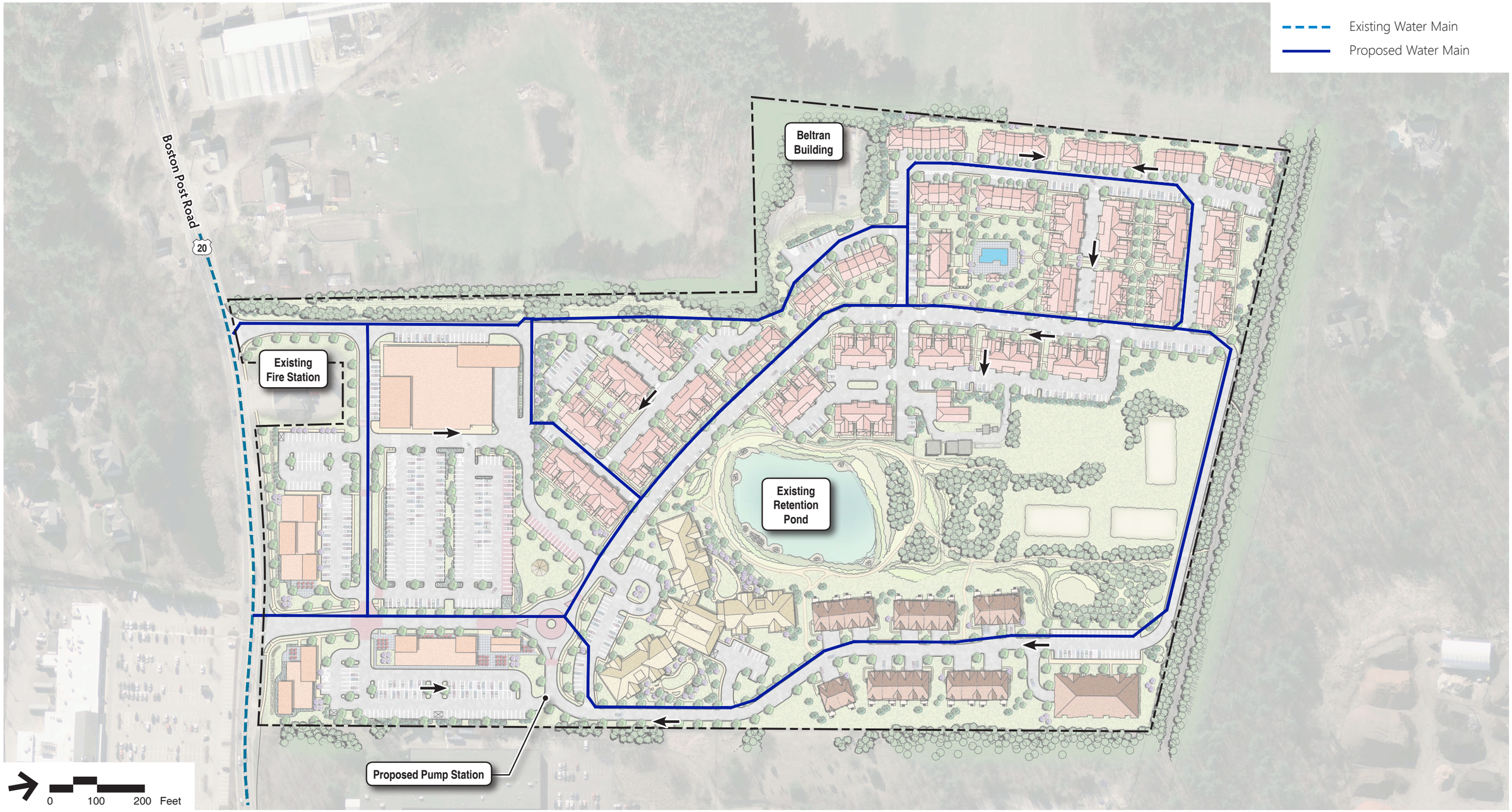

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Figure 10a

Water Distribution System

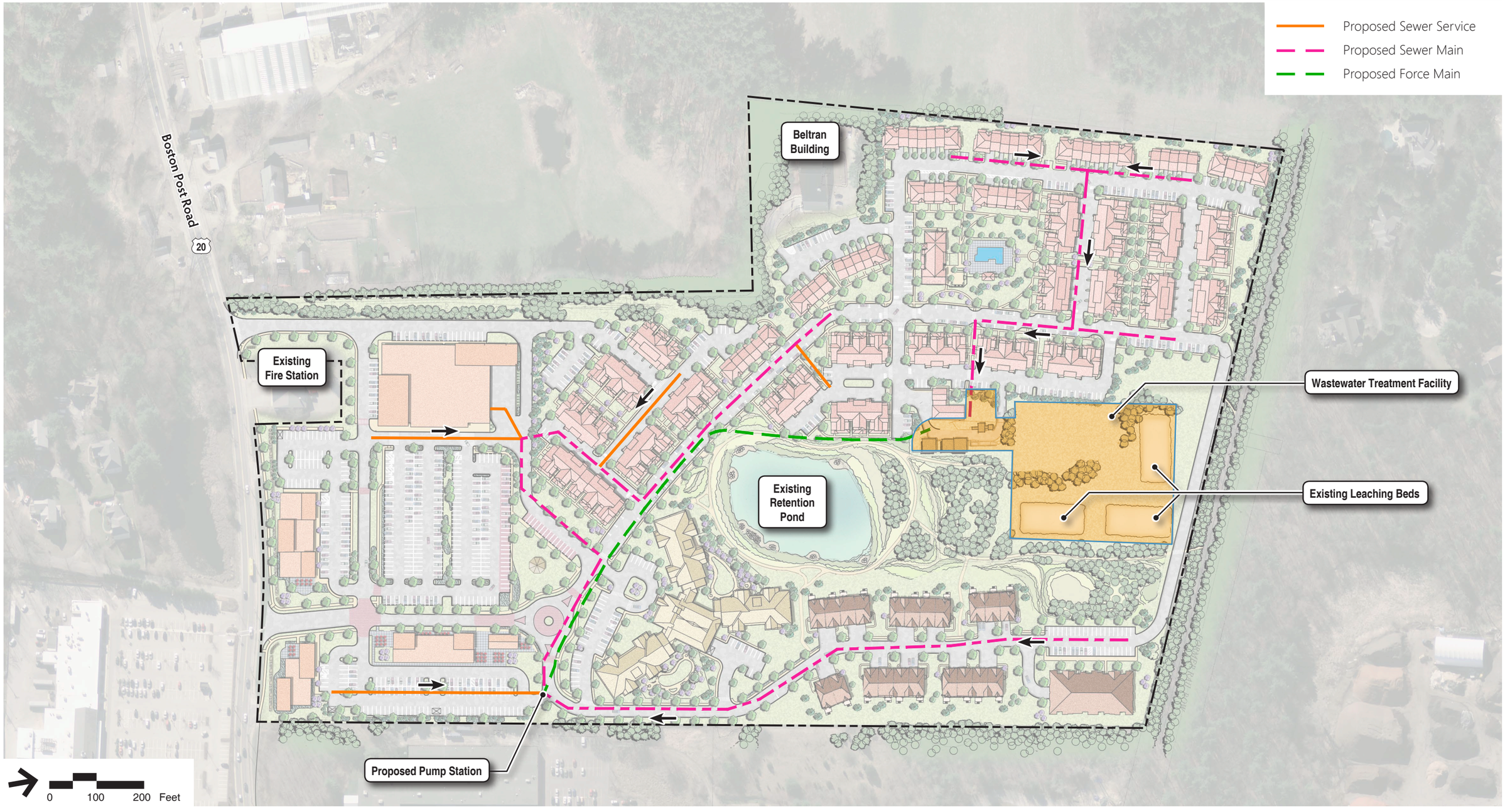

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Figure 10b
Sewer System

NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "EXISTING CONDITIONS PLAN OF LAND", PREPARED BY VANASSE HANGEN BRUSTLIN, INC. (VHB) OF WATERTOWN, MA, DATED OCTOBER 12, 2015 WITH AN ORIGINAL SCALE OF 1" = 40'.
2. EXPLORATION DESIGNATED SH-3 THROUGH SH-7 WERE ADVANCED BY GEOSEARCH, INC. (GEOSEARCH) OF FITCHBURG, MA AND OBSERVED BY SANBORN HEAD BETWEEN MAY 27 AND 29, 2015.
3. EXPLORATION DESIGNATED SH-8 THROUGH SH-10 WERE ADVANCED BY GEOSEARCH AND OBSERVED BY SANBORN HEAD ON MAY 29, 2015.
4. EXPLORATION DESIGNATED SH-1(W) THROUGH SH-2(W) WERE ADVANCED BY GEOSEARCH AND OBSERVED BY SANBORN HEAD BETWEEN MAY 27 AND 28, 2015.
5. APPROXIMATE LOCATIONS OF EXPLORATIONS BY SANBORN HEAD ARE BASED ON TAPED MEASUREMENTS MADE IN THE FIELD RELATIVE TO PROMINENT SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
6. APPROXIMATE LOCATIONS OF EXPLORATIONS BY OTHERS ARE BASED ON PLANS BY OTHERS. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND:

- SH-5 — APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING BY SANBORN HEAD (MAY 2015)
- SH-1W — APPROXIMATE LOCATION AND DESIGNATION TEST BORING COMPLETED AS A MONITORING WELL BY SANBORN HEAD (MAY 2015)
- SH-10 — APPROXIMATE LOCATION AND DESIGNATION OF SHALLOW TEST BORING BY SANBORN HEAD (MAY 2015)
- GZ-4 — APPROXIMATE LOCATION AND DESIGNATION OF MONITORING WELL BY OTHERS
- GZ-7 — APPROXIMATE LOCATION OF DESTROYED MONITORING WELL

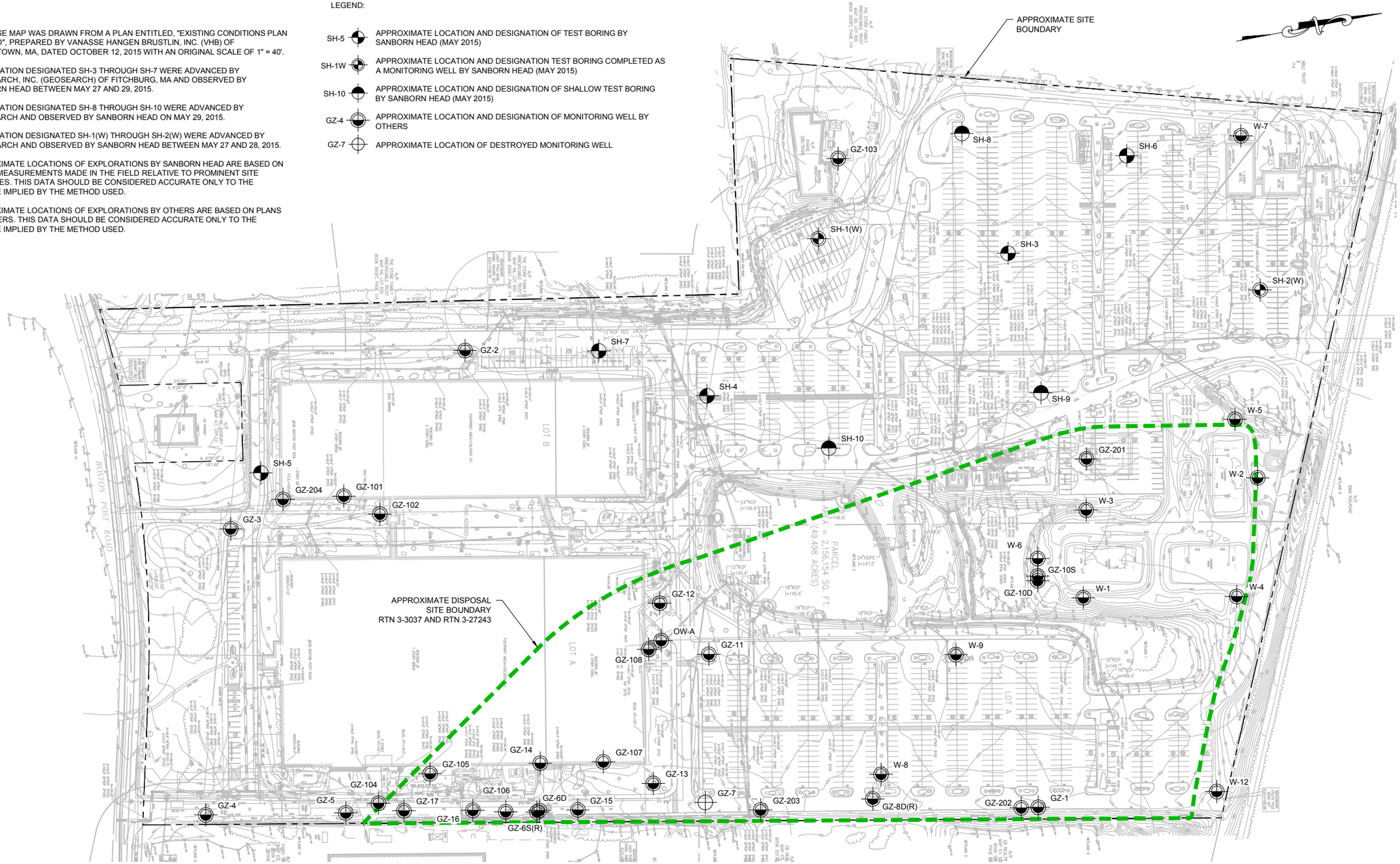

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Figure 11
Boring Locations

Source: Sanborn Head Associates

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526 and 528 Boston Post Road Redevelopment

Figure 12

As-of-Right Build Alternative

ATTACHMENT B: LETTERS OF SUPPORT

Town of Sudbury

Office of Selectmen
www.sudbury.ma.us

Flynn Building
278 Old Sudbury Rd
Sudbury, MA 01776-1843
978-639-3381
Fax: 978-443-0756
Email: selectmen@sudbury.ma.us

February 25, 2015

Mr. T. Bradley Duffin
Director of Facilities and Real Estate
Raytheon Company
350 Lowell Street
Andover, MA 01810

RE: Sudbury Raytheon Redevelopment

Dear Mr. Duffin:

The Town of Sudbury, acting through its Board of Selectmen and Planning Board, has held several meetings to discuss the Town's goals and priorities as they relate to redevelopment of the Raytheon property upon its sale to a private developer. First, we thank you for meeting with Town officials and indicating Raytheon's desire for a smooth transition. These early discussions set the stage for a productive process which we hope results in a redevelopment scheme that is mutually beneficial for all parties. We also thank Raytheon for being an outstanding corporate citizen for six decades. While the decision to vacate the property by Raytheon is a great loss for Sudbury, we trust that a continued cooperative approach by all parties will result in positive developments for the community. This letter is the product of several months of discussion between the parties on this topic and is intended to provide clarity regarding the Town's goals for the disposition and future development of the property.

We have studied the property and understand its development potential, acknowledging current zoning and other permitting limitations. We have come to understand limitations in the market for certain commercial uses, including the current use of the property for large scale office. This knowledge has encouraged us to consider new uses for the property that can help fulfill several different Town needs and goals.

From the Town's perspective, we feel that the property is well suited for a mixed use project with a focus on residential with supporting retail. The Town's objective in suggesting these uses is to help promote a project that reflects the nature and character of Sudbury and which will create enough affordable housing units to reach, or nearly reach, our 10% state requirement in order to enable Sudbury to successfully prevent undesirable 40B projects that would circumvent town planning and zoning. Sudbury's affordable housing gap is approximately 240 units. It is our strong preference that any housing component be developed entirely as rental housing under a state-recognized subsidy program so that all units count towards this requirement. This will entail that no less than 25% of the units are affordable under the state's definition and are eligible to count on Sudbury's Subsidized Housing Inventory. It is our desire that the maximum allowable percentage of the new housing units be age restricted housing, in order to minimize the impacts of this redevelopment on our already burdened school system and provide additional housing diversity for our growing senior population. Congregate care and assisted living facilities would be welcomed, especially if they also included an affordable component. We also think some amount of retail and limited office use of proper scale and character would complement the area and provide convenient services to the new residents.

Town of Sudbury

Office of Selectmen
www.sudbury.ma.us

Flynn Building
278 Old Sudbury Rd
Sudbury, MA 01776-1843
978-639-3381
Fax: 978-443-0756
Email: selectmen@sudbury.ma.us

The Town will consider endorsing a Local Initiative Program (LIP) 40B application if the proposed development is responsive to the above Town objectives and helps the Town achieve its affordable housing goal. The LIP process will likely prove to be the most expeditious, as it would not require a zoning change.

With any project, we expect that all impacts will be fully mitigated, including but not limited to increases in the number of school-aged children, potential environmental contamination, traffic and support service needs. The Town will also seek to obtain certain additional items from the developer to enhance the new development on the site and provide benefits to the Town as a whole, including but not limited to access to the abutting rail trail, expansion/relocation of the Route 20 Fire Station, reservation of land for active and/or passive recreation, streetscape improvements and maintaining a location for the medi-vac helipad.

We have appreciated your forthright approach to the discussion regarding the property thus far. The redevelopment of this property provides a unique opportunity for Sudbury and may be a catalyst for longer term mutually beneficial economic development initiatives, including renewed interest in installing a sewer along Route 20. We are exploring innovative funding initiatives at the state level to fund the sewer project, including District Increment Financing. With such expanded wastewater capacity, the future value of the Raytheon property will increase and additional community-embraced development opportunities will be possible. Such an economic development tool will be most effective if supported by the developer and Raytheon and we would seek such support if we proceed in this manner.

The Town is ready and willing to continue to work with Raytheon and its partners to discuss the redevelopment of this property in a manner that is consistent with Town goals and mitigates identified impacts. Please let us know how and when we can be of continued service as this project proceeds.

On behalf of the Board of Selectmen,

Charles C. Woodard, Chairman

On behalf of the Planning Board,

Craig Lizotte, Chairman

cc: Albert G. Tierney III, McCall & Almy

ATTACHMENT C: DISTRIBUTION LIST

ENF Distribution List

In accordance with the MEPA regulations at 301 CMR 11.16, the Proponent is circulating this Environmental Notification Form (ENF) for the Mixed-Use Redevelopment of 526 and 528 Boston Post Road to the public agencies and interested stakeholders listed below.

It is expected that notice of the availability of this ENF will be published in the February 24th edition of the *Environmental Monitor*, initiating a 20-day public comment period that will end on **March 15th.** The Secretary will issue a determination on **March 25th.**

Federal

EPA New England, Region 1
Attention: NPDES Permit Division
5 Post Office Square, Suite 100
Boston, MA 02109-3912

Commonwealth of Massachusetts

Secretary Matthew Beaton (provided herein)
Executive Office of Energy and Environmental Affairs (EEA)
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Department of Environmental Protection
Commissioner's Office
One Winter Street
Boston, MA 02108

DEP/Northeast Regional Office
Attn: MEPA Coordinator
205B Lowell Street
Wilmington, MA 01887

Massachusetts Department of Transportation
Public/Private Development Unit
10 Park Plaza
Boston, MA 02116

MassDOT - District #3
Attn: MEPA Coordinator
403 Belmont Street
Worcester, MA 01604

Metropolitan Area Planning Council
60 Temple Place/6th floor
Boston, MA 02111

Metropolitan Area Planning Council
Attn: Tanya Paglia, MAGIC Subregional Coordinator
60 Temple Place/6th floor
Boston, MA 02111

Massachusetts Water Resource Authority
Attn: MEPA Coordinator
100 First Avenue
Charlestown Navy Yard
Boston, MA 02129

Town of Sudbury

Sudbury Board of Selectmen
278 Old Sudbury Road
Sudbury, MA 01776

Sudbury Planning and Community Development Department
278 Old Sudbury Road
Sudbury, MA 01776

Sudbury Conservation Office
275 Old Lancaster Road
Sudbury, MA 01776

Sudbury Health Department
275 Old Lancaster Road
Sudbury, MA 01776

Sudbury Fire Department
77 Hudson Road
Sudbury, MA 01776

ATTACHMENT D: TRANSPORTATION IMPACT AND ACCESS STUDY

[Supporting documentation provided in CD on back cover]

Meadow Walk

526-528 Boston Post Road

Sudbury, Massachusetts

PREPARED FOR

MEADOW WALK
SUDBURY

BPR Sudbury Development, LLC

PREPARED BY

101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

February 16, 2016

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Summary

On behalf of BPR Sudbury Development, LLC (the "Proponent"), VHB has prepared this traffic impact and access study (the "Study") to evaluate the impacts of *Meadow Walk Sudbury,* a proposed mixed-use retail and residential development that will be located at the existing Raytheon office/R&D facility located at 526-528 Boston Post Road in Sudbury (the "Site"). The Study incorporates comments from the Town of Sudbury's traffic peer review consultant.

The Site is currently developed with a 563,300± sf Raytheon facility, which consists of office space (421,300± sf), research & development space (112,000± sf) and manufacturing facilities (28,000± sf) in multiple buildings. Parking needs of the office/R&D facility is supported by 2,040± paved surface parking spaces. Raytheon has begun their relocation process and will be winding down their operations at the Site over the next year. The Proponent will demolish the existing buildings on the Site in phases and construct a mixed-use development comprising of 80,000± sf of retail (including a grocery store), a 250-unit apartment development, a 60-unit active adult residential development and a 54-bed assisted living/memory care facility. While the Study has been prepared to quantify and address the impacts of the full build-out of the development, various elements of the Study, such has trip generation, distribution and traffic signal warrant analysis, have been separately calculated to provide an understanding of the effect of the phased construction of the proposed uses.

Compared to the re-use of the existing facilities on the Site by a new office/R&D tenant, the Project is expected to generate less traffic during the weekday morning and weekday evening peak hours. Specifically, in comparison to a 563,300± sf office/R&D user that would generate 765 weekday morning peak hour trips and 710 weekday evening peak hour trips, the Project would generate 63 percent and 37 percent fewer trips during the same peak hours, respectively. Due to the mixed-use nature of the development, distribution of Site traffic is expected to occur over the course of the day rather than being focused during just the peak commute hours, and the lower traffic intensity of the proposed uses contributes to the peak hour trip reduction during the weekdays. Such a significant reduction in the peak hour traffic

volumes can be expected to have a noticeable beneficial effect on the area roadway weekday traffic operations.

Due to the introduction of a retail component in the proposed development plan, the Project is estimated to generate 365 *net new* additional vehicular trips per hour during the Saturday midday peak hour when compared to an office/R&D use. Distributed over the study area roadway network, this total hourly increase corresponds to an increase in the range of five (5) to 85 vehicle trips per hour at different locations/directions.

Detailed capacity analysis indicates that even without the implementation of any capacity improvements, the Project will have comparable, if not improved operations on weekdays at the study locations when compared to a 563,300± sf office/R&D tenant on the Site. The operational impact due to the limited additional new traffic on Saturdays is also expected to be nominal.

Nonetheless, the Proponent plans to implement multiple improvements to help further reduce the impact of the Project and improve existing conditions. An outline of the improvement measures is presented below.

- Construction of a new traffic signal on Boston Post Road by aligning the primary Site driveway with the westerly driveway for Sudbury Plaza and Highland Avenue (a private way). This would also include the construction of designated left turn lanes on Boston Post Road, a new actuated pedestrian crosswalk and bicycle accommodations at the intersection; in addition to the Project, these improvements will also benefit the retail plaza and the residents of Highland Avenue on the south side of Boston Post Road.
- Improved safety through the elimination of traffic control by a police officer at the primary Site driveway during the weekday evening peak hour;
- Improved pedestrian accommodations by widening the existing sidewalk on the north side of Boston Post Road along the Site frontage and extending the limits of the existing sidewalk on the south side of Boston Post Road;
- Implementation of a time-based coordinated signal system between the new signalized Site driveway, Nobscot Road and Union Avenue intersections on Boston Post Road to better manage vehicular queues and improve progression of through traffic at multiple intersections;
- Construction of a new emergency preemption signal at the fire station located along the Site frontage and integration of the signal into the new traffic signal at the primary Site driveway;
- Subject to right of way availability, addition of five-foot paved shoulders (which could become part of future bike lanes) on either side of Boston Post Road within the limits of the roadway improvements; and,

- Implementation of a robust Traffic Demand Management (TDM) program as part of the full build-out of the Project, underpinned by a significant investment in on-site circulation enhancements.

1 Introduction

VHB, on behalf of BPR Sudbury Development LLC (the "Proponent"), has prepared a traffic impact and access study (the "Study") in support of the redevelopment of an approximately 50-acre parcel of land at 526-528 Boston Post Road (aka Route 20) (the "Site") in Sudbury, Massachusetts. The Site is currently occupied by a 563,300± sf square foot (sf) Raytheon facility that includes a mix of office and research and development space, supported by approximately 2,040 parking spaces. Figure 1 shows a Site location map.

As part of the overall redevelopment, all existing buildings on the Site (with the exception of approximately 15,000± sf of ancillary R&D space) would be eventually demolished and a new mixed-use development would be constructed in multiple construction phases.

The Project described in this Study consists of the following new development components:

- 80,000± sf of mixed retail use (including a 45,000± sf grocery store);
- A residential development with 250 apartment units;
- An active adult (age-restricted) residential development with up to 60 housing units; and,
- An assisted living/memory care facility with up to 54 beds.

The Study quantifies existing and projected future traffic conditions with and without the Project. Based on these analyses, the Study includes recommendations for access and traffic improvements to provide safe and efficient access to the Site and to improve some of the deficiencies that currently exist independent of the Project. The improvement plan also takes into consideration the Massachusetts Department of Transportation (MassDOT) Healthy Transportation Policy Directive relative to multi-modal accommodations to the extent that such accommodations can be constructed

0 2000 4000 Feet

Study Intersections

MEADOW WALK
SUDBURY

Figure 1

Study Area Intersections

Source: MassGIS, BING

within the public right of way, on land controlled by the Proponent and/or land negotiated for permanent easements from abutting properties, while at the same time, balancing the potential environmental (wetland) impacts associated with such improvements.

Study Methodology

The Site abuts Boston Post Road (Route 20), which is a state-owned and operated highway. Development on the Site and the construction of off-site traffic improvements on Boston Post road will therefore require an Access Permit from MassDOT. The Project is also subject to review by the Town of Sudbury. As a precursor for the review through the Massachusetts Environmental Protection Act (MEPA) process, a Traffic Scoping Letter (TSL) was submitted to MassDOT's Private/Public Development Unit in October 2015. This letter included a study area, as well as an overview of the methodologies to be used in developing this Study. The TSL and subsequent responses from MassDOT are included in the Appendix. Concurrent with the review of the TSL by MassDOT, VHB also consulted with the Planning Department staff in Sudbury to confirm the study area as well as to identify focus areas relative to traffic and safety issues that are of interest to the town.

Following the consultation with MassDOT and the town's planning staff, VHB prepared the traffic assessment in three stages. The first stage involved an assessment of existing traffic conditions within the Project study area including an inventory of existing roadway geometry; observations of traffic flow, including daily and peak period traffic counts; and a review of vehicular crash data.

The second stage of the study established the framework for evaluating the transportation impacts of the proposed Project. Specific travel demand forecasts for the Project were assessed along with future traffic demands on the study area roadways due to projected background traffic growth and other proposed area developments that may occur independent of the proposed development. The year 2022, a seven-year time horizon from the time of the MassDOT scoping review process, was selected as the design year for analysis for the preparation of this traffic impact and access assessment in accordance with MassDOT guidelines.

The third and final stage involved conducting traffic analyses to identify both existing and projected future roadway capacities and demands. This analysis was used as the basis for determining potential Project impacts and to identify mitigation measures that would be implemented by the Proponent as part of the Project.

Finally, the initial version of the Study was updated, as presented herein, to incorporate review comments from the town's traffic peer review consultant.

2

Existing Conditions

Evaluation of the transportation impacts associated with the Project requires a thorough understanding of the existing transportation conditions in the study area including, roadway geometry, traffic controls, daily and peak hour traffic flow, and traffic safety data. Each of these elements is described in detail below.

Study Area

The study area includes the following locations and their approach roadways recommended by MassDOT for the review of the Project. The study area locations are identified in Figure 1.

- Boston Post Road at Horse Pond Road
- Boston Post Road at Dudley Road
- Boston Post Road at Highland Avenue and Sudbury Plaza (West)
- Boston Post Road at Sudbury Plaza (East)
- Boston Post Road at Nobscot Road (*signalized)*
- Boston Post Road at Union Avenue *(signalized)*
- Boston Post Road at Raymond Road
- Boston Post Road at Concord Road *(signalized)*
- Boston Post Road at Landham Road *(proposed to be signalized by MassDOT)*

The existing conditions analysis consisted of an inventory of the traffic control, roadway, driveway, and intersection geometry in the study area, the collection of daily and peak hour traffic volumes, and a review of recent crash history.

Roadway Geometry

Descriptions of the Study area roadways and intersections are included below. Figure 2 shows lane configuration and traffic control at the study intersections.

Roadways

Boston Post Road

Boston Post Road within the Study area is functionally classified as an Urban Arterial and is under the jurisdiction of MassDOT. Within the study area, Boston Post Road is a two-lane roadway, which widens out to accommodate exclusive turn lanes at two of the signalized study intersections. Sidewalks are provided intermittently along both sides of Boston Post Road throughout the corridor with shoulders of varying width. The posted speed limit within the study area varies from 30 mph to 45 mph. The land use along Boston Post Road in the study area primarily consists of commercial uses with some residential and agricultural uses.

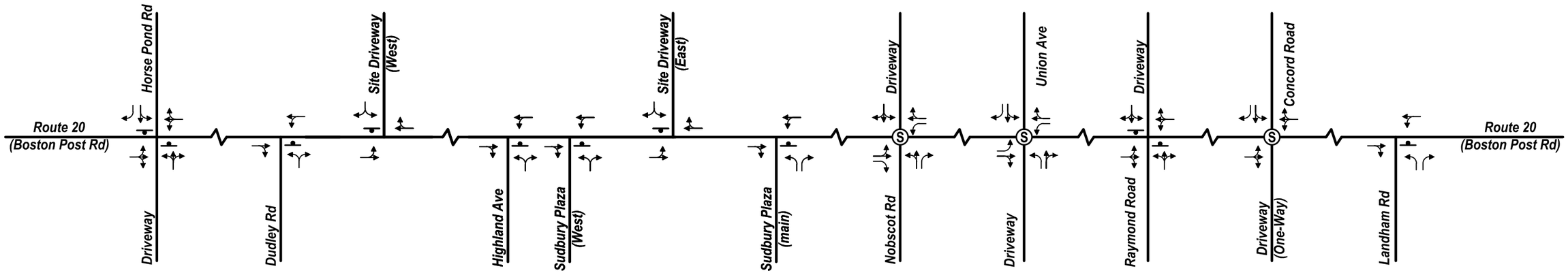
Intersections

Boston Post Road at Horse Pond Road

Horse Pond Road Intersects Boston Post Road from the north to form a three-legged unsignalized intersection. A small retail plaza is located directly on the south side of the intersection with open driveway width of approximately 140 feet. Both approaches from Boston Post Road have one general-purpose lane while the Horse Pond Road approach has one exclusive left-turn lane and one exclusive right-turn lane with approximately 125 feet of storage. Horse Pond Road operates under "STOP" control. Sidewalks are provided along the northern side of Boston Post Road and the western side of Horse Pond Road. A crosswalk is provided along Horse Pond Road, setback approximately 30 feet from the intersection. Land use in the vicinity of this intersection is primarily commercial and underdeveloped land.

Boston Post Road at Dudley Road

Dudley Road intersects Boston Post Road at an angle from the south to form a three-legged unsignalized intersection. Each approach to the intersection provides one general-purpose lane with Dudley Road operating under "STOP" control. A sidewalk is



Existing Lane Configurations

Legend

Neg	<5 Vehicles
XX →	Traffic Volume
⊣	Stop Controlled
Ⓢ	Signalized Intersection

MEADOW WALK
SUDBURY

vhb

Existing Lane Configurations
Meadow Walk
Mixed-Use Develpment
Sudbury, Massachusetts

Figure 2

February 16, 2016

provided along the northern side of Boston Post Road. There are no sidewalks along Dudley Road near Boston Post Road. No crosswalks are provided at the intersection. Land use varies in the vicinity of this intersection with undeveloped land and residential uses along the south/east, a plant nursery to the north and commercial to the west of the intersection.

Boston Post Road at Highland Avenue and Sudbury Plaza West driveway

Highland Avenue (a private way) serving five single family homes, intersects Boston Post Road from the south to form a three-legged unsignalized intersection. The westerly Sudbury Plaza driveway, located approximately 50 feet to the east of Highland Avenue, also intersects Boston Post Road from the south to form another three-legged unsignalized intersection in proximity to the Highland Avenue intersection. Each approach to the intersection provides one general-purpose lane. A narrow walking path is provided along the northern side of Boston Post Road and the eastern side of Sudbury Plaza (West). A crosswalk is provided across Boston Post Road on the eastern side of Sudbury Plaza (West) that connects to a pedestrian walkway on the Site. Land uses in the vicinity of the intersection includes commercial, office/R&D and residential uses.

Boston Post Road at Sudbury Plaza (East)

The Sudbury Plaza easterly driveway intersects Boston Post Road from the south to form a three-legged unsignalized intersection. Each approach to the intersection provides one general-purpose lane. Sidewalks are provided along the northern side of Boston Post Road, along the southern side of Boston Post Road east of the intension, and the western side of Sudbury Plaza (East) driveway. Land use in the vicinity of the intersection includes commercial and office/R&D uses.

Boston Post Road at Nobscot Road

Nobscot Road intersects Boston Post Road from the south and a bank driveway intersects it from the north to form a four-legged signalized intersection. From the west, Boston Post Road provides two approach lanes with one thru/left-turn lane and one exclusive right-turn lane. From the east Boston Post Road provides two approach lanes with one thru/right-turn lane and one exclusive left turn lane. From the South, Nobscot Road provides one thru/left-turn lane and one exclusive right-turn lane. The bank driveway provides one general-purpose lane. Sidewalks are provided along the northern side of Boston Post Road. Crosswalks are provided across three of the four intersection approaches, including signalized walk/don't walk displays. A crosswalk is

not provided across the Boston Post Road eastbound approach. At this intersection, wheelchair ramps are provided on the southeast and southwest corners, however there are no sidewalks extending from these ramps. Land use in the vicinity of the intersection is primarily commercial in nature.

Boston Post Road at Union Avenue

Union Avenue intersects Boston Post Road from the north to form a four-legged signalized intersection with the Sudbury Crossing Plaza driveway. Boston Post Road has two approach lanes in both the eastbound and westbound directions, with one thru/right-turn, and one exclusive left-turn lane. On the southbound approach, Union Avenue has two approach lanes with one thru/left-turn lane and one exclusive right-turn lane. In the northbound direction the Sudbury Crossing Plaza driveway has two approach lanes with one thru/right- turn lane and one exclusive right turn lane. Sidewalks are provided along the northern side if Boston Post Road and the western side of the Sudbury Crossing driveway. An unsignalized crosswalk is provided across the Union Avenue approach. Land use in the vicinity of the intersection is primarily commercial in nature.

Boston Post Road at Raymond Road

Raymond Road intersects Boston Post Road from the south to form a three-legged unsignalized intersection. Boston Post Road has one general-purpose approach lane in both the eastbound and westbound directions. In the northbound direction, Raymond Road has one general-purpose approach lane. Sidewalks are provided on both sides of Boston Post Road and on the eastern side of Raymond Road. A crosswalk is provided across Raymond Road. Lane use in the vicinity of the intersection is commercial and residential in nature.

Boston Post Road at Concord Road

Concord Road intersects Boston Post Road from the North to form a three-legged signalized intersection. Boston Post Road has one general-purpose approach lane in both the eastbound and westbound directions. In the southbound direction, Concord Road has two approach lanes with one exclusive left-turn lane and one exclusive right-turn lane. A driveway for a retail plaza is located within the signalized intersection footprint, on the south side of Boston Post Road, but it is not signalized. Sidewalks are provided on both sides of Boston Post Road and the eastern side of Concord Road. Crosswalks are provided across all approaches with signalized crossings. Lane use in the vicinity of the intersection is commercial in nature.

Boston Post Road at Landham Road

Landham Road intersects Boston Post Road from the south to form a three-legged unsignalized intersection. In the eastbound direction, Boston Post Road has two approach lanes with one through lane and a short channelized right-turn lane. In the westbound direction, Boston Post Road has one general-purpose lane. In the northbound direction Landham Road has two approach lanes, with one left-turn land and one channelized right-turn lane. Sidewalks are provided along the northern side of Boston Post Road, along the southern side of Boston Post Road (east of Landham Road), and the western side of Landham Road. Crosswalks are provided across the Landham Road approach, with pedestrian refuges located within the median/channelizing islands. This intersection is planned for a major upgrade, including signalization, as part of an on-going MassDOT project that is currently in the design phase.

Traffic Volumes

Traffic volumes for the study area roadways and intersections were recorded in May and November 2015. Peak hour turning movement and classification (TMC) counts were collected at the study area intersections during the weekday morning peak period from 7:00 AM to 9:00 AM, weekday evening peak period from 4:00 PM to 6:00 PM, and Saturday midday peak period from 11:00 AM to 2 PM. These three peak periods represents the times that are appropriate for traffic impact analysis of the Project. These times also represent typical times when the roadway traffic also peaks in the area.

Based on a review of the data, it was determined that the analysis peak hours for the Study are from 7:30 AM to 8:30 AM and 5:00 PM to 6:00 PM on weekdays and from 11:30 AM to 12:30 PM on Saturday.

In addition, an automatic traffic recorder (ATR) count was conducted on Boston Post Road in May 2015. The ATR count is summarized below in Table 1.

The ATR count indicates that on a typical weekday, approximately 20,500 vehicles per day (vpd) travel along Boston Post Road, in the vicinity of the Site. The traffic volumes along Boston Post Road are heavier in the eastbound direction during the weekday morning and heavier in the westbound direction during the weekday evening peak hours, respectively, depicting the commuter traffic patterns on the roadway. Traffic volume on Boston Post Road is slightly heavier in the westbound direction during the Saturday midday peak hour.

Table 1 Existing Daily Traffic Volume

Location	Daily [a]	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Daily [a]	Saturday Midday Peak Hour		
	Weekday	Volume[b]	K Factor[c]	Dir. Dist.[d]	Volume	K Factor	Dir. Dist.	Saturday	Volume	K Factor	Dir. Dist.
Boston Post Road West of Highland Avenue	20,500	1,275	6%	67% EB	1,585	8%	65% WB	17,600	1,430	8%	56% WB

Source: Based on automatic traffic recorder (ATR) counts conducted in May 2015
a average daily traffic (ADT) volume expressed in vehicles per day
b peak period traffic volumes expressed in vehicles per hour
c percent of daily traffic that occurs during the peak period
d directional distribution of peak period traffic
Note: peak hours do not necessarily coincide with the peak hours of the individual intersection turning movement counts

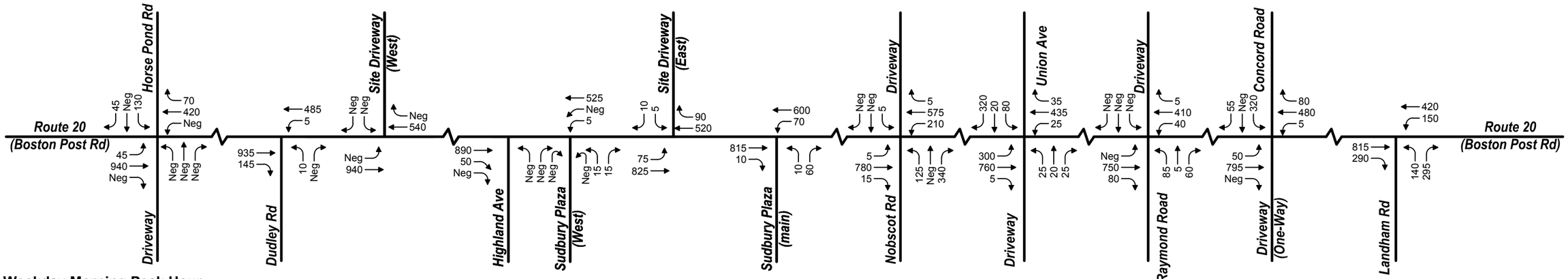
Seasonal Adjustment

The traffic data collected for the Study was obtained during the months of May and November. To quantify the seasonal variation of traffic volumes in the area, historic traffic data available from MassDOT were reviewed. According to published MassDOT seasonal factors, May and November traffic counts are higher than average month conditions. However, to present a conservative analysis, the traffic volumes were not reduced to reflect average month conditions. Where appropriate, traffic volumes were balanced between the intersections. The resulting 2015 Existing conditions weekday morning, weekday evening and Saturday midday peak hour traffic volume networks are presented in Figure 3.

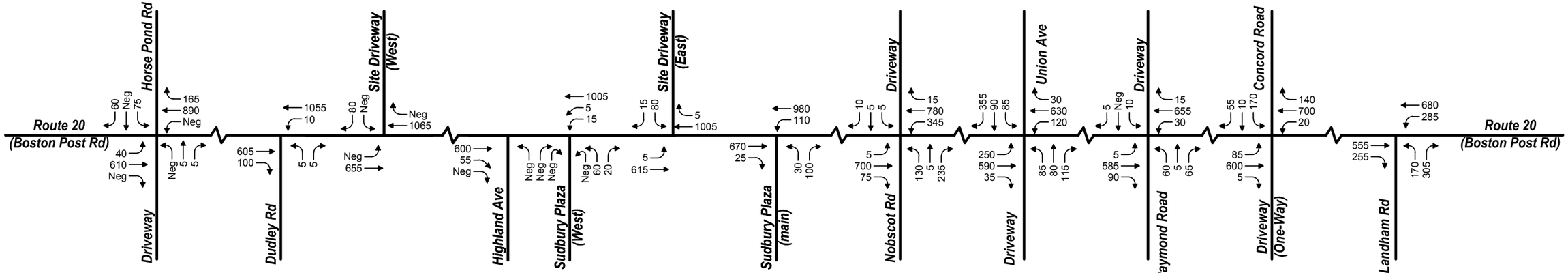
Bicycle and Pedestrian Accommodations

Within the study area, there are limited accommodations for bicyclists and pedestrians. A sidewalk of variable width runs along the north side of Boston Post Road along the entire study area, while intermittent segments of sidewalk exist along the south side of the roadway. Condition of the sidewalk in some areas along the corridor appears to be poor.

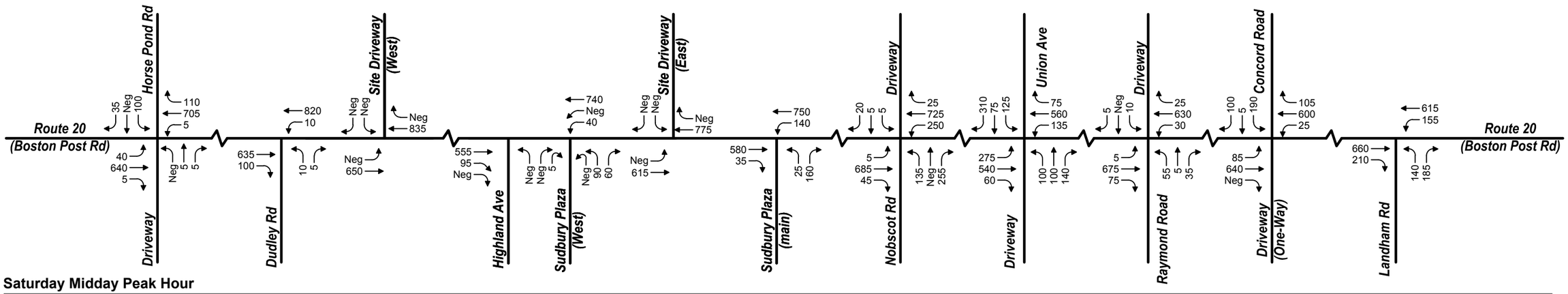
Existing on-street bicycle accommodations within the study area are limited, with varying width shoulders. Two proposed bicycle trails that will run through Sudbury are in proximity to the Site, including the Mass Central Rail Trail (to the north of the Site) and the Bruce Freeman Rail Trail (to the east of the Site). A temporary section of the Bay Circuit Trail currently runs along Boston Post Road to the east of the Site, connecting with a permanent trail along Nobscot Road.



Weekday Morning Peak Hour



Weekday Evening Peak Hour



Saturday Midday Peak Hour

Legend
Neg **<5 Vehicles**
XX ⟶ **Traffic Volume**

MEADOW WALK
SUDBURY

2015 Existing Traffic Volumes
Meadow Walk
Mixed-Use Development
Sudbury, Massachusetts

Figure 3

February 16, 2016

Public Transportation

Sudbury is a member community of the MetroWest regional Transit Authority (MWRTA) system, with a seat on the Advisory Board. Currently, there is no MWRTA service on Boston Post Road in Sudbury near the Site. The nearest MWRTA bus routes to the Site are located at Hager Street in Marlborough to the west (Route 7C) and at Nobscot Shopping Center in Framingham to the South (Routes 2 and 3). The nearest stops to the Site along these routes are located at a distance of approximately three miles to the west and south, respectively.

A recently completed Comprehensive Service Assessment by the MWRTA indicates that service gaps have been identified and their resolution could enhance mobility needs in the region. Specifically, the assessment refers to the extension of the current weekday service along Route 7C in Marlborough to include Sudbury and Wayland along Boston Post Road as a new service recommendation. The route, when extended, would provide hourly service along Boston Post Road between 6:00 AM and 8:00 PM. Additionally, the potential for extending MWRTA Routes 2 and 3 that currently serve Nobscot Shopping Center in Framingham to Boston Post Road in Sudbury was noted in the MWRTA Service Assessment.

Crash History

To identify crash trends in the study area, the most current available crash data were obtained for the study area intersections from MassDOT for a five-year period (2009 through 2013). A summary of the data is presented in Table 2.

Angle collisions and rear-end collisions represent the majority of the crashes at the Study locations. A fatal crash occurred at the intersection of Boston Post Road and Landham Road in May 2011. A total of four non-motor vehicles crashes (pedestrian or bicycle related) were reported during the study period, two of which occurred at the Boston Post Road at Highland Avenue and the Sudbury Plaza (West) driveway.

According to MassDOT, the year 2010 MassDOT District 3 average crash rate is 0.89 for signalized intersections and 0.66 for unsignalized intersections. The crash rates represent the number of reported crashes for every million vehicles that pass through an intersection.

As shown in Table 2, two of the unsignalized study area intersections have crash rates that are currently higher than the respective District 3 averages. The intersection of Boston Post Road at Highland Avenue and the Sudbury Plaza (West) driveway had an average crash rate of 0.80 and the Landham Road intersection has a crash rate of 0.94, both of which are over that District 3 average.

As noted earlier, the Landham Road intersection is currently the subject of an on-going MassDOT design project that is aimed at addressing the safety and capacity deficiencies at the intersection. Chapter 5 of this Study discusses potential improvements at the Sudbury Plaza driveways and at the Site driveways.

Table 2 Vehicle Crash Summary (2009-2013) along Boston Post Road

	At Horse Pond Road	At Dudley Road	At Highland Avenue and Sudbury Plaza (West) Driveway	At Sudbury Plaza (East) Driveway	At Nobscot Road	At Union Avenue	At Landham Road	At Raymond Road	At Concord road
Year									
2009	3	1	11	1	5	12	4	2	7
2010	4	4	6	0	8	13	12	1	2
2011	1	0	6	0	6	6	9	0	3
2012	5	5	3	0	6	8	13	0	2
2013	3	2	5	1	1	5	10	2	3
Total	16	12	31	2	26	44	48	5	17
Collision Type									
Angle	7	0	11	0	10	27	21	2	3
Head-on	0	0	0	0	0	0	2	0	0
Rear-end	6	11	11	1	13	10	15	3	12
Rear-to-Rear	0	0	0	0	0	0	0	0	0
Sideswipe, opposite direction	1	0	2	1	1	2	2	0	0
Sideswipe, same direction	1	0	0	0	0	1	2	0	2
Single vehicle crash	1	1	5	0	1	3	6	0	0
Unknown	0	0	1	0	0	0	0	0	0
Not reported	0	0	1	0	1	1	0	0	0
Crash Severity									
Fatal injury	0	0	0	0	0	0	1	0	0
Non-fatal injury	3	4	9	1	9	6	9	1	6
Property damage only (none injured)	12	8	21	1	16	38	37	4	11
Not Reported	1	0	1	0	1	0		0	0
Unknown	0	0	0	0	0	0	1	0	0
Time of Day									
Weekday, 7:00 AM - 9:00 AM	3	5	2	0	5	6	3	3	2
Weekday, 4:00 PM - 6:00 PM	4	4	9	1	6	7	8	1	2
Saturday, 11:00 AM - 2:00 PM	1	0	2	0	0	1	1	0	0
Weekday, other time	2	2	15	1	11	25	29	1	7
Weekend, other time	6	1	3	0	4	5	7	0	6
Pavement Conditions									
Dry	10	8	21	2	17	33	39	5	11
Wet	6	2	7	0	5	8	6	0	5
Snow	0	1	0	0	1	1	2	0	1
Ice	0	0	0	0	0	0	1	0	0
Sand, mud, dirt, oil, gravel	0	0	2	0	0	1	21	0	0
Not reported	0	1	1	0	3	1	2	0	0
Non Motorist (Bike, Pedestrian)	1	0	2	0	0	1	0	0	0
MassDOT Crash Rates	0.38	0.29	0.80	0.05	0.49	0.78	0.94	0.14	0.42

Source: MassDOT Crash Data

3

Future Conditions

Traffic volumes in the study area were projected to the year 2022, which reflects a seven-year traffic-planning horizon from the time of the MassDOT scoping process. Independent of the Project, volumes on the roadway network under year 2022 No-Build conditions were assumed to include existing traffic and new traffic resulting from background traffic growth. Under the 2022 Build condition, Project generated traffic volumes were added to the 2022 No-Build volumes to reflect the year 2022 Build conditions within the Project study area.

Planned Roadway Improvements

The intersection of Landham Road and Boston Post Road is currently under design by MassDOT. The intersection, which is currently under STOP sign control, is proposed to be reconstructed and improved with the installation of a fully actuated traffic signal, widening Boston Post Road to accommodate a westbound designated left turn lane, an eastbound designated right turn lane, five-foot shoulders, new sidewalk on the south side of Boston Post Road and west side of Landham Road, and new ADA-compliant wheelchair ramps and crosswalks. Earlier conceptual designs for the intersection contemplated additional widening of Boston Post Road to accommodate a second through lane in each direction, but was subsequently dropped from the plan. 25-percent design plans for the intersection are currently under review by MassDOT. Construction start date has not yet been identified for the improvements at this time. This Study assumes that the intersection will be improved within the seven-year time horizon used in the traffic analysis.

Background Traffic Growth

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. Several methods can be used to estimate this growth. A procedure frequently employed is to estimate an annual percentage increase and apply that increase to study area traffic volumes. An alternative procedure is to identify estimated traffic generated by planned new major developments that would be expected to impact the project study area roadways. For the purpose of this assessment, both methods were utilized.

Historic Traffic Growth

To determine an applicable annual growth rate, historical traffic volumes within the study area were reviewed. Based on the data in the Route 20 Corridor Study completed in 2012 by the Town of Sudbury, the peak hour volumes have generally either remained constant or decreased slightly. To present a conservative analysis and for consistency with the corridor study assumptions, an annual growth rate of one percent per year was used for the future conditions traffic analyses to account for growth in traffic over the next seven years.

Site-specific Growth

In addition to accounting for background growth, the traffic associated with other planned and/or approved developments near the Site were considered. Based on feedback from the Town of Sudbury planning staff, and knowledge of planned developments in the area, the projects shown in Table 3 below were reviewed to determine if they could generate additional traffic through the study area.

Table 3 Summary of Planned Background Developments

Project Name	Type of Development	Project Size
Village at Sudbury Station	Residential	250 units
Concord Road Retail Plaza (existing vacant site)	Retail/Commercial	8,040 sf
275-290 Boston Post Road (currently inactive)	Residential	72 units

No record traffic studies are available at this time for the potential projects noted in Table 3. Therefore, potential future traffic volumes associated with each of the developments was estimated using ITE rates and distributed through the Study network for consideration in the future conditions analysis where appropriate.

In addition to the aforementioned background traffic growth assumptions, and with MassDOT's concurrence on the approach, full reuse of the existing office and R&D facilities was also included in the No-Build traffic growth assumptions. This is because, if the currently proposed Project is not constructed, the existing office and R&D facilities on the Site would be re-tenanted to a new office and/or R&D user. The estimation of these "Site re-use" trips is discussed below.

The Site currently houses a 563,300± sf office complex, which consists of office space (421,300± sf), research & development space (112,000± sf) and manufacturing facilities (28,000± sf) in multiple buildings. Raytheon has begun their relocation process and will be winding down their operations at the Site over the next two years. If Raytheon were to vacate the Site entirely and the Proponent were not to construct the proposed mixed-use Project, other office/R&D tenant(s) would be identified to move in and use the entire 563,300± sf space and 2,040± parking spaces that currently exist on the Site. To estimate the effect of such a reuse of the Site, Institute of Transportation Engineers (ITE) *Trip Generation*[1] guidelines were used to calculate the number of vehicle trips that would be generated by a new re-use tenant. Specifically, ITE Land Use Code (LUC) 710 (General Office Building), ITE LUC 760 (R&D) and LUC 140 (Manufacturing) were used in the calculations summarized in Table 4. These estimated "No-Build Site re-use" traffic volumes were included in the analysis.

Table 4 Peak Hour Site Trips under "No-Build" Condition

Time Period	Reuse of Office/R&D Space
Morning Peak Hour (vph)	
Enter	665
Exit	100
Total	765
Evening Peak Hour (vph)	
Enter	125
Exit	585
Total	710
Saturday Midday Peak Hour (vph)	
Enter	115
Exit	100
Total	215

vph vehicle trips per hour

An additional element of future traffic that was also considered the No-Build conditions analysis is the relocation of Raytheon's current operations. Based on information provided by Raytheon, the employees that currently work at the Site will

▼

1 Trip Generation Handbook; *9th Edition* Institute of Transportation Engineers; Washington, DC; 2009.

be reassigned to their other existing facilities. For analysis purposes, and based on input from the town's traffic consultant, it was assumed that any reassigned Raytheon related trips along Boston Post Road are covered by the background growth rate assumption.

The average annual traffic growth rate of one-percent per year was applied to the existing roadway traffic volumes and estimated future traffic volumes from the above development related assumptions were added, where appropriate, to the 2015 Existing traffic volumes to develop the 2022 No-Build traffic volumes for the weekday morning, weekday evening and Saturday midday peak hours. The resulting 2022 No-Build peak hour traffic volume networks are presented in Figure 4.

Site-generated Traffic Volumes

The rate at which any development generates traffic is dependent upon a number of factors such as size, location, and nature of the use. To estimate the trip-generating characteristics for a development project, traffic projections are typically derived from trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation*[2] manual. Empirical data, if available for a specific use, is also used to further refine the trip projections that are based on the ITE rates. As noted previously, the analysis methodology used for the estimation of Project related traffic volumes in this Study was discussed with, and approved by MassDOT during the Transportation Scoping Letter review process. This methodology is described in the following sections.

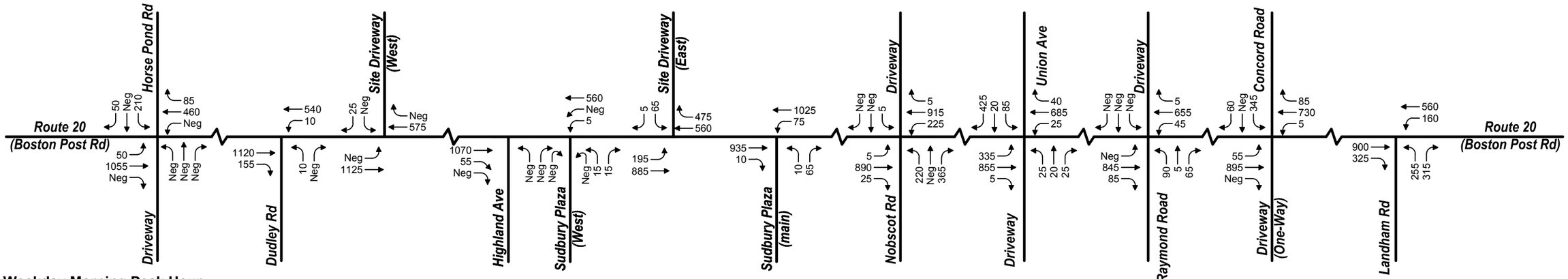
Project Trip Generation

Future conditions daily trip generation estimates were developed based on the following ITE land use codes. The unadjusted daily trip generation calculations are summarized in Table 5. For comparison, the table also includes a corresponding estimate of the daily traffic for the re-use of the existing office and R&D space on the Site.

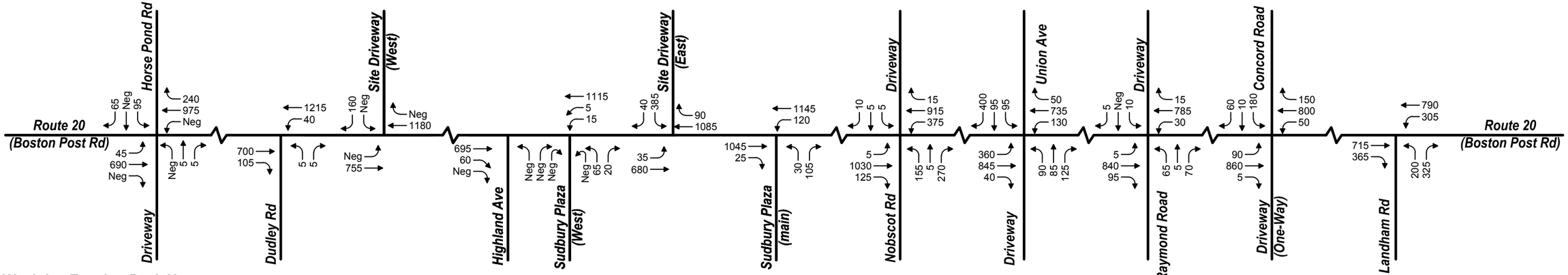
- Mixed-use retail: ITE LUC 820 (Shopping Center)
- Apartments: ITE LUC 220 (Apartments)
- Active adult residential use: ITE LUC 252 (Senior Adult Housing – *Attached*)
- Memory care/Assisted living use: ITE LUC 254 (Assisted Living)

The daily trip generation in Table 5 represents unadjusted trip estimates as required by MassDOT for the purpose of determining the Massachusetts Environmental Policy Act (MEPA) trip threshold calculations. As shown in the table, the Project is projected to generated approximately 2,810 unadjusted new daily vehicle trips when compared to the trips that could be generated by a re-use of the Site by an office/R&D tenant.

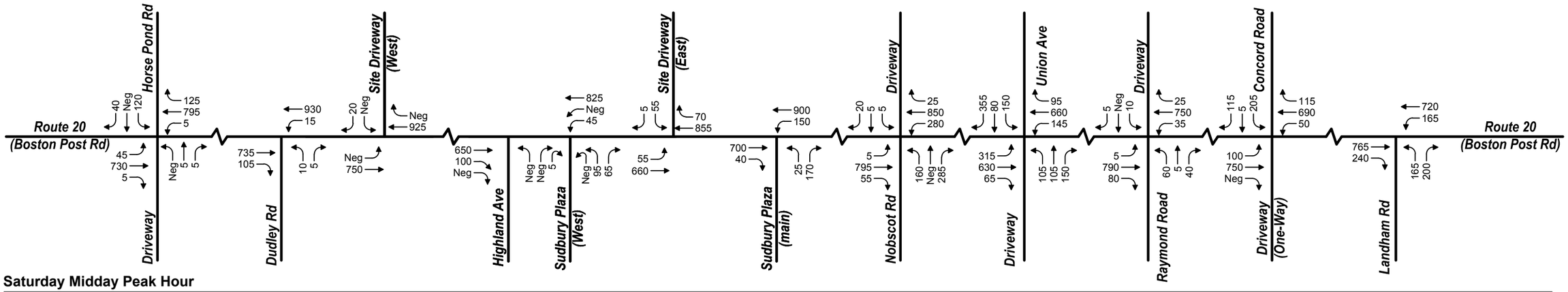
2 Trip Generation Handbook; *9th Edition* Institute of Transportation Engineers; Washington, DC; 2009.



Weekday Morning Peak Hour



Weekday Evening Peak Hour



Saturday Midday Peak Hour

Legend
Neg **<5 Vehicles**
XX → **Traffic Volume**

MEADOW WALK
SUDBURY

2022 No-Build Traffic Volumes
Meadow Walk
Mixed-Use Development
Sudbury, Massachusetts

Figure 4

February 16, 2016

Table 5 Daily Trip Generation Comparison

Movement	Existing Development on the Site			Future Full Build-out				Increase
	Office Space	R&D	Manufacturing	Mixed-Retail	Apartments	Age-restricted Housing	Assisted Living	(Future – Existing)
ITE LUC	*710*	*760*	*140*	*820* [a]	*220*	*252*	*254*	
Size	*421.3 ksf*	*112 ksf*	*28,000 sf*	*80 ksf*	*250 Units*	*60 Units*	*54 Beds*	
Enter	1,960	550	45	2,940	820	100	100	**+ 1,405**
Exit	1,960	550	45	2,940	820	100	100	**+ 1,405**
Total	3,920	1,100	90	5,880	1,640	200	200	**+ 2,810**

Note: All numbers in the table represent "vehicle trips per day"

a LUC 820 used only for the estimation of the retail daily trips. Retail peak hour trips are based on empirical rates, as discussed in the MassDOT Transportation Scoping Letter

Peak Hour Retail Trip Generation

The previously noted daily retail trip estimates are based on ITE LUC 820 (Shopping Center). While the use of LUC 820 for daily estimates is adequate for determining MEPA review thresholds, etc., as discussed in the MassDOT TSL and acknowledged by MassDOT, retail trips in the region have been generally known to be lower than ITE estimates. As a result, use of ITE LUC 820 estimates for peak hour retail trip generation may not be appropriate as such a methodology could result in an overestimation of Site generated traffic and, as a consequence, the potential overdesign of roadway infrastructure improvements. Therefore, using MassDOT's recommended methodology for the use of empirical trip rates, peak hour data was collected at four other retail plazas that have a supermarket anchors. Based on input from the town's traffic consultant, empirical trip rates were developed by averaging the rates for the individual plazas rather than base on calculation on weighted averages. This methodology resulted in trip rates that are slightly higher than the weighted average methodology, thus resulting in a more conservative (worse case) analysis. The data and calculations for the empirical trip rates are included in the Appendix.

Peak Hour Trip Generation for the Site

Similar to the comparison of the daily trip estimates, unadjusted peak hour trip generation calculations were also performed for the Project and compared to the corresponding estimate for the re-use of the existing office and R&D facilities on the Site. The calculations are summarized in Table 6. Future Site trips are based on the following land use codes. Detailed calculations showing the estimated unadjusted peak hour trips for each use is included in the Appendix.

- Mixed-use retail: Empirical trip rates
- Apartments: ITE LUC 220 (Apartments)
- Active adult residential use: ITE LUC 252 (Senior Adult Housing – *Attached*)
- Memory care/Assisted living use: ITE LUC 254 (Assisted Living)

As shown in Table 6, when compared to the re-use of the existing facilities on the Site by a new office/R&D tenant, the future uses are expected to generate less entering traffic during the weekday morning peak hour and less exiting traffic during the weekday evening peak hours. These changes are representative of the effect of the mixed-use nature of the Project and can be expected to have a beneficial effect on the area roadway traffic operations. The Project is expected to result in an increase in traffic during the Saturday midday peak hour (gross estimates) when compared to the re-use of the existing facilities. This is an expected outcome in the redevelopment of office focused uses to mixed-uses redevelopment projects that are aimed at creating a vibrant and thriving community that activates the development site on weekends. It is noted that the traffic volumes presented in Table 6 are *gross* trip estimates, and do not reflect the effect of trip reduction characteristics that are inherent to mixed-use developments. Application of the adjustment factors further reduces the overall trip generation for the Project as discussed and demonstrated below.

Table 6 Comparison of Gross Peak Hour Trip Generation

Movement	Existing Development On The Site	Future Full Build-Out [a]	Gross Increase (Future – Existing)
Morning Peak Hour			
Enter	665	155	-510
Exit	100	185	85
Total	765	340	-425
Evening Peak Hour			
Enter	125	350	225
Exit	585	325	-260
Total	710	675	-35
Saturday Midday Peak Hour			
Enter	100	435	335
Exit	85	395	310
Total	185	830	645

Note: All numbers in the table represent "vehicle trips per hour"

a Represents *gross* trips as they do not reflect adjustments for shared trips between uses and pass-by trip reductions associated with retail uses

Traffic projections for mixed-use development should reflect the efficiency between the uses on the Site in the form of internal capture or shared trips. The peak hour traffic projections would also need to take into account customer visits to the retail

uses that are drawn from vehicles currently passing the Site on Boston Post Road in the form of pass-by trips. These adjustments, described briefly below, have the net effect of reducing the number of new trips on the area roadways. The adjustments outlined below were reviewed by MassDOT as part of the TSL review process.

Internal Capture

Given the mixed-use nature of the Project, it is expected that there will be shared trips between the residential and retail components of the Project. These shared trips, summarized in Table 7, would not show up as additional new vehicle trips on the surrounding roadway network. An example of this could be a resident of the apartments shopping at the retail tenants on the Site or dining at a restaurant without needing to drive onto Boston Post Road. While it is highly likely that some of the residents on the Site would also shop at Sudbury Plaza located directly across from the Site, no shared trips adjustments were applied between the Site and Sudbury Plaza or other retail tenants within a walking distance of the Site.

Based on input from the town's peer review consultant, VHB limited the total internal capture to no more than 15 percent of the total residential trips during the weekday evening peak hours. During the Saturday midday peak hours, when higher internal capture could be expected, a capture of 30 percent of the total residential trips was assumed. Guidelines provided by the National Cooperative Highway Research Program (NCHRP) for the calculation of internal capture trips were also initially reviewed. These guidelines resulted in internal capture rates higher than the values assumed in this Study. While use of the NCHRP trip capture rates is an acceptable method for estimating internal trips, the lower trip capture rates discussed with the town's consultant were used to develop the trip estimates presented in Table 7.

Pass-by Vehicle Trips

While the ITE rates provide estimates for all the traffic associated with each land use, not all of the traffic generated by the Project will be new to the area roadways. For example, a portion of the retail vehicle-trips generated by the Site will likely be drawn from motorists already on the roadways adjacent to the Site. The primary origin and destination for these trips is elsewhere and the primary trip will be resumed following the visit to the Site. Based on MassDOT guidelines, ITE recommended pass-by rates were utilized to estimate pass-by trips for the proposed retail plaza. ITE recommends pass-by trip adjustment rates of 42 percent for the weekday evening peak hour and 37 percent for the Saturday midday peak hours. As ITE does not provide pass-by rates for the weekday morning peak hour for retail uses, the lower of the two ITE rates (i.e., the Saturday adjustment rate) was utilized for the morning peak hour adjustment.

Table 7 summarizes the peak hour trip adjustment calculations for the determination of the net change in trips associated with the Project when compared to the re-use of the Site by an office/R&D tenant.

Table 7 Peak Hour Trip Generation – Net Change

Time Period	Gross Increase Due to Project [a]	Internal Capture [b]	Pass-By [c]	Net New Trips [d]
Morning Peak Hour				
Enter	-510	Neg	30	-540
Exit	85	Neg	30	55
Total	-425	Neg	60	-485
Evening Peak Hour				
Enter	225	15	100	110
Exit	-260	15	100	-375
Total	-35	30	200	-265
Saturday Midday Peak Hour				
Enter	335	20	120	195
Exit	310	20	120	170
Total	645	40	240	365

Note: All numbers in the table represent "vehicle trips per hour"

Neg Negligible
a From table 6
b Internal capture assumed between retail and residential uses limited to 15-percent and 30-percent of the total residential trips during the weekday evening and the Saturday midday peak hour conditions, respectively.
c Retail pass-by trips rates of 37% for AM & Saturday peak hours and 42% for PM peak hour
d Net new trips = gross increase – adjustments noted above

It is noted that the Build conditions analysis and the Project mitigation will be based on the Future Condition volumes shown in Table 6 less internal capture trips shown in Table 7 and adjusted to reflect pass-by trip making patterns. The intent of calculating "Net New Trips" in Table 7 is to demonstrate the relative degree of impact associated with a by-right reuse of the office/R&D facilities versus the proposed mixed-use redevelopment of the Site. The lower level of future trip generation when compared to the existing uses at their full occupancy can be expected to result in better overall traffic operations in the future on weekdays. During the Saturday midday peak hours, the analysis shows that there would be an estimated increase in *net new* traffic of approximately 365 trips per hour when compared to the prior use.

Trip Distribution

The directional distribution of Site-generated traffic is based on various factors. The methodology used in developing the individual distributions is described below:

Retail Distribution: The retail distribution was based on the three hours of existing driveway turning movements at the Sudbury Plaza and Sudbury Farms retail centers during the Saturday midday peak period. The data during this period indicated that approximately 38% of the retail traffic is oriented to/from the west along Boston Post Road, and the remaining from the east. This general east/west distribution of retail traffic was further refined based on the observed travel patterns within the study area, such as propensity of drivers to rely on right turns over left turns, etc., to develop the final trip assignment percentages for the retail traffic.

Non-Retail Distribution: Since Boston Post Road is a commuter route, it is expected that residential trip distribution for the Site would be consistent with the weekday commuting patterns on the roadway. The existing travel patterns were also confirmed and refined using a U.S. Census journey-to-work model.

Table 8 summarizes the calculations. Related information and calculation worksheets are provided in the Appendix.

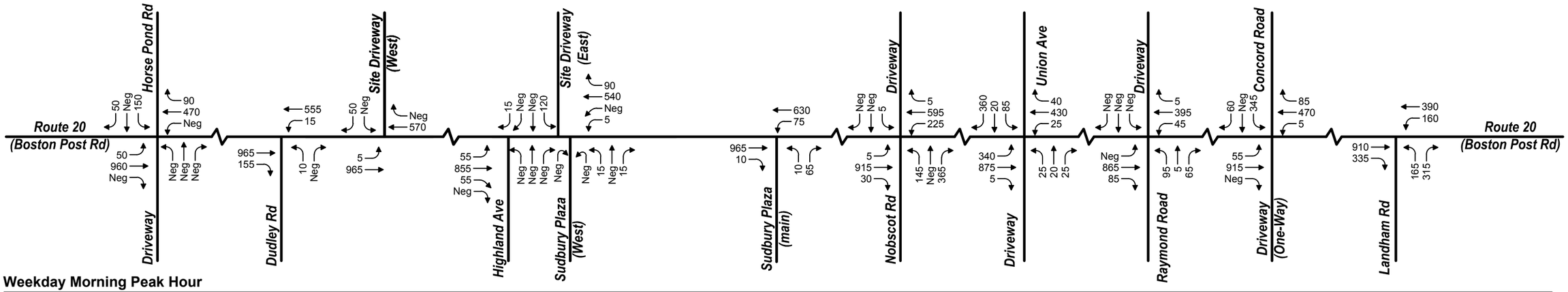
Table 8 Trip Distribution Summary

Roadway	Direction (From/To)	Retail % Site Traffic	Residential % Site Traffic
Boston Post Road	East	22%	30%
	West	23%	18%
Landham Road	South	15%	16%
Union Avenue	North	15%	12%
Local roads to/from the south	South	15%	13%
Local roads to/from the west/north	North	10%	11%
	Total	*100%*	*100%*

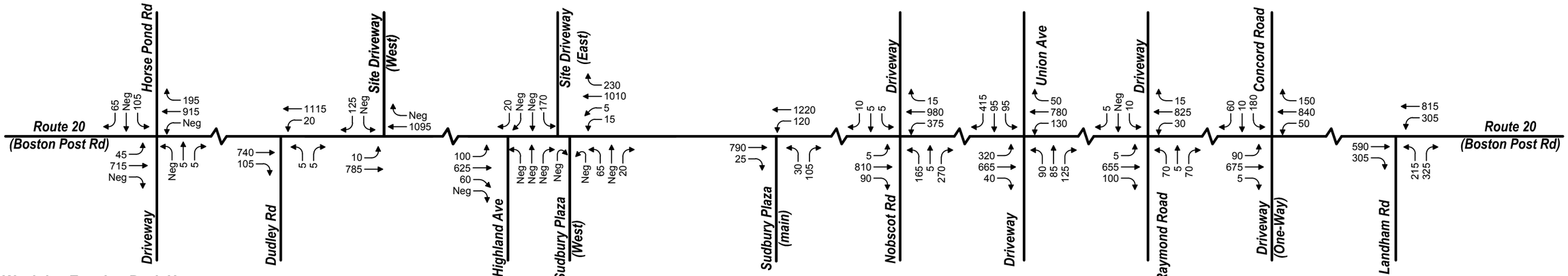
To develop the 2022 Build conditions peak hour traffic volume, Project generated traffic volumes noted above were added to the 2022 No-Build conditions peak hour traffic volumes. The 2022 Build traffic volume networks are shown in Figure 5. Separate traffic volume networks showing trip assignments for the reuse of the Site by a new office/R&D tenant and the future development related traffic are included in the Appendix.

Traffic Volume Increases

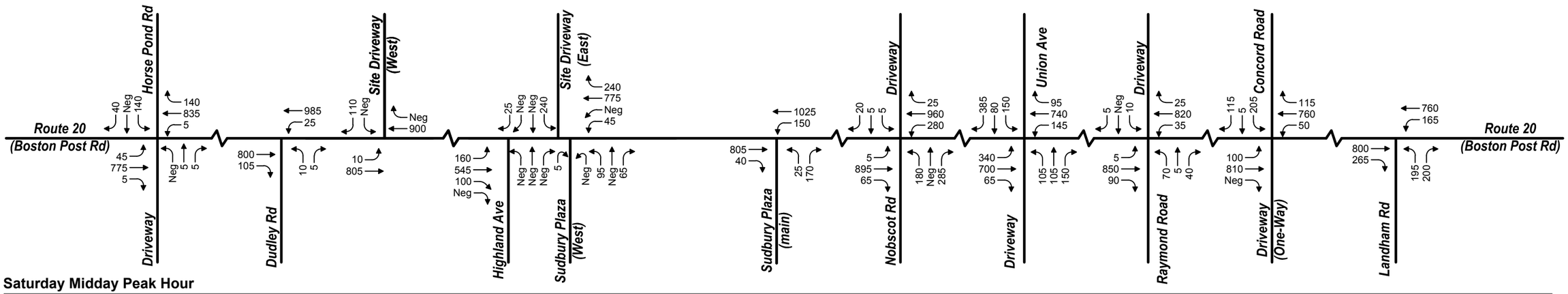
Table 9 provides a comparison of Existing, No-Build and Build condition peak period traffic volumes for various roadway segments within the study area, and the increase in traffic associated with the Project (difference between the Build condition that includes the Project and the No-Build conditions that includes the re-tenanting of the Site to a new office/R&D tenant).



Weekday Morning Peak Hour



Weekday Evening Peak Hour



Saturday Midday Peak Hour

Legend
Neg **<5 Vehicles**
XX → **Traffic Volume**

MEADOW WALK
SUDBURY

2022 Build Traffic Volumes
Meadow Walk
Mixed-Use Development
Sudbury, Massachusetts

Figure 5

February 16, 2016

Table 9 Change in Peak hour Traffic Volume

Location	Peak Period	Peak Hour Traffic Volumes			
		2015 Existing	2022 No-Build	2022 Build	CHANGE [a]
Boston Post Road east of Landham Road	Weekday Morning	1,680	1,935	1,775	-160
	Weekday Evening	1,825	2,135	2,035	-100
	Saturday Midday	1,615	1,850	1,925	75
Boston Post Road west of Horse Pond Road	Weekday Morning	1,450	1,615	1,615	-85
	Weekday Evening	1,600	1,775	1,740	-35
	Saturday Midday	1,425	1,615	1,700	85
Landham Road south of Boston Post Road	Weekday Morning	875	1,055	975	-80
	Weekday Evening	1,015	1,195	1,150	-45
	Saturday Midday	610	770	825	55
Concord Road north of Boston Post Road	Weekday Morning	505	545	545	Neg
	Weekday Evening	460	490	490	Neg
	Saturday Midday	485	540	540	Neg
Raymond Road south of Boston Post Road	Weekday Morning	270	290	295	5
	Weekday Evening	250	265	275	10
	Saturday Midday	200	220	240	20
Union Avenue north of Boston Post Road	Weekday Morning	775	905	845	-60
	Weekday Evening	890	1,085	975	-110
	Saturday Midday	960	1,100	1,050	-50
Nobscot Road south of Boston Post Road	Weekday Morning	690	835	765	-70
	Weekday Evening	795	935	905	-30
	Saturday Midday	690	785	810	25
Dudley Road south of Boston Post Road	Weekday Morning	160	175	195	20
	Weekday Evening	115	155	135	-20
	Saturday Midday	125	135	140	5
Horse Pond Road north of Boston Post Road	Weekday Morning	290	395	340	-55
	Weekday Evening	345	450	410	-40
	Saturday Midday	290	335	365	30

a Decrease (- value) or increase (+ value) in Project related traffic when compared to Office/R&D reuse of the Site
Neg Negligible

As shown in Table 9, weekday peak hour traffic is expected to decrease at most study area locations with the Project when compared to the scenario where a new office/R&D tenant reuses the Site as-is. In instances where traffic is expected to increase on study area roadways, overall increases in traffic as a result of the Project are expected to be nominal and in the range of five trips per hour on some of the side streets and up to approximately 85 trips per hour on Boston Post Road, depending on the specific location and the specific peak hour under consideration. Compared to the overall traffic volumes on area roadways, the above calculated increases associated with the Project are relatively small, and fall within the range of daily fluctuations or

roadway traffic flow. Traffic improvement measures to handle the additional Site generated traffic, independent of the reuse considerations of the Site, are discussed later in this report.

Signal Warrant Analysis

A traffic signal Warrant analysis was conducted to determine if the projected traffic volumes utilizing the primary Site drive at its intersection with Boston Post Road would exceed the thresholds for the installation of a traffic signal at the location. The analysis was conducted for three scenarios; an initial development phase that involves the construction of the 45,000± sf grocery store only, a phase that involves the construction of the 250-unit apartment community only, and a build-out of the full development plan.

The Manual on Uniform Traffic Control Devices[3] (MUTCD) is the established standard for Warrant analyses. The Warrants consider the roadway geometry, traffic volume entering the intersection, and speeds. Specifically, the traffic projections were evaluated for following three volume-based Warrants.

- **Warrant 1 (Eight Hour Vehicular Volume) –** Warrant 1 is based on any eight hours of a day where the traffic entering the intersection reaches a threshold that warrants considering signal control.
- **Warrant 2 (Four Hour Vehicular Volume) –** Warrant 2 is for any four hours of a day.
- **Warrant 3 (Peak Hour) –** Warrant 3 is for the peak hour of any given day.

The traffic signal Warrant analysis worksheets for two of the three scenarios (grocery store only and the full build-out of the development) indicates that the proposed primary Site driveway intersection on Boston Post Road would satisfy all three traffic volume-based Warrants for the installation of a traffic signal. The remaining scenario (construction of the 250-unit apartment community only) does not exceed the thresholds for the installation of a traffic signal. These findings were taken into consideration when developing the Site access improvements for the Project.

3 Manual on Uniform Traffic Control Devices, Federal Highway Administration, Washington DC

Sight Distance Analysis

A sight distance analysis, in conformance with guidelines of the American Association of State Highway and Transportation Officials (AASHTO)[4] was performed at the unsignalized Site driveway at the westerly limits of the property (approximately 550 feet west of Highland Avenue) that will be maintained. A sight-distance analysis was also conducted at the existing easterly driveway in the event that project phasing requires it to remain for some period prior to completion of the full-build out. These analyses are discussed below and summarized in Table 10.

Stopping Sight Distance (SSD) is the distance required for a vehicle approaching an intersection from either direction to perceive, react and come to a complete stop before colliding with an object in the road, in this case the exiting vehicle from a driveway. In this respect, SSD can be considered as the minimum visibility criterion for the safe operation of an unsignalized intersection.

Intersection Sight Distance (ISD) is based on the time required for perception, reaction and completion of the desired critical exiting maneuver (typically, a left turn) once the driver on a minor street approach (or a driveway) decides to execute the maneuver. Calculation for the critical ISD include the time to (1) turn left, and to clear the near half of the intersection without conflicting with the vehicles approaching from the left; and (2) upon turning left, to accelerate to the operating speed on the roadway without causing approaching vehicles on the main road to unduly reduce their speed. In this context, ISD can be considered as a desirable visibility criterion for the operation of an unsignalized intersection.

An additional criterion that is used especially in built-up areas with sight line constraints in proximity to driveways, is the use of "minimum ISD". This essentially involves the comparison of the available ISD to the SSD measurement to ensure that if the available ISD is not sufficient to cause approaching vehicles on the main road to only reduce their speed (as in the case of desirable ISD), that it is at least adequate for the approaching vehicle to come to a stop at the driveway, if necessary.

▼

4 A Policy on the Geometric Design of Highways and Streets; AASHTO; Washington DC

Table 10 Sight Distance Analysis Summary

	Boston Post Road at the Unsignalized West Site Driveway						
	Stopping Sight Distance (SSD)			Intersection Sight Distance (ISD)			
	Traveling	Required [a]	Measured [c]	Looking	Desired [a]	Minimum [b]	Measured [c]
Boston Post Road at West Driveway	Westbound	290′	>500′	Right	430′	290′	445′
	Eastbound	290′	>500′	Left	430′	290′	>500′
Boston Post Road at East Driveway	Westbound	290′	>500′	Right	430′	290′	>500′
	Eastbound	290′	>500′	Left	430′	290′	330′

a calculated sight distance, expressed in feet, based on observed travel speeds of 39 mph
b Minimum ISD = SSD
c measured sight distance, expressed in feet

Table 10 indicates that adequate SSD and ISD are available for traffic approaching the existing easterly driveway along Boston Post Road from the eastbound direction. When looking to the left, the view is obscured by vegetation along the back of the sidewalk, however sight distance in excess of the minimum SSD is available. If this driveway were to be utilized for an extended period of time, the Proponent will review the visibility criteria in the field and selectively trim/prune vegetation within the right of way to improve sight lines to and from the driveway.

As indicated in Table 10, adequate SSD and ISD are available for traffic approaching the westerly unsignalized Site drive intersection along Boston Post Road in both the eastbound and westbound directions. Field observations indicate that when looking to the right, the view is somewhat obscured by overgrown vegetation located at the back of the sidewalk. Selective trimming/pruning of this vegetation would result in the further improved ISD in that direction. Based on sight distance considerations, no turn restrictions will be necessary for the operation of the driveway.

The Project team will continue to work with the Town of Sudbury's Engineering Department and Fire Department to determine an appropriate configuration for the westerly Site driveway.

4

Traffic Operations Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity analyses were conducted with respect to Existing and projected 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. Roadway operating conditions are classified by calculated levels of service.

Level-of-Service Criteria

Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them. Roadway operating conditions are classified by calculated levels-of-service. The evaluation criteria used to analyze area intersections in this traffic study are based on the 2010 Highway Capacity Manual (HCM).[5] The term 'Level of Service' (LOS) is used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure that considers a number of factors including roadway geometry, speed, travel delay and freedom to maneuver. LOS provides an index to the operational qualities of a roadway segment or an intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing congested operating conditions.

In addition to LOS, two other measures of effectiveness (MOEs) are typically used to quantify the traffic operations at intersections; volume-to-capacity ratio (v/c) and delay (expressed in seconds per vehicle). For example, an existing v/c ratio of 0.9 for an intersection indicates that the intersection is operating at 90 percent of its available capacity. A delay of 15 seconds for a particular vehicular movement or approach indicates that vehicles on the movement or approach will experience an average additional travel time of 15 seconds. For a given LOS letter designation there may be a wide range of values for both v/c ratios and delay. Comparison of intersection capacity results therefore requires that, in addition to the LOS, the other MOEs should also be considered. The LOS criteria are summarized in Table 11.

▼

5 Transportation Research Board, Highway Capacity Manual, Washington, DC

Table 11 Level-of-Service Criteria

Level of Service	Unsignalized Intersections Delay	Signalized Intersections Delay
A	0 to 10 seconds	0 to 10 seconds
B	10 to 15 seconds	10 to 20 seconds
C	15 to 25 seconds	20 to 35 seconds
D	25 to 35 seconds	35 to 55 seconds
E	35 to 50 seconds	55 to 80 seconds
F	> 50 seconds	> 80 seconds

It should be noted that the analytical methodologies typically used for the analysis of unsignalized intersections use conservative analysis parameters, such as long critical gaps. Actual field observations indicate that drivers on minor streets generally accept shorter gaps in traffic than those used in the analysis procedures and therefore experience less delay than reported by the analysis software. The analysis methodologies also do not fully take into account the beneficial grouping effects caused by nearby signalized intersections. The net effect of these analysis procedures is the over-estimation of calculated delays at unsignalized intersections in the study area. Cautious judgment should therefore be exercised when interpreting the capacity analysis results at unsignalized intersections

Signalized Intersections Capacity Analysis

Capacity analyses conducted for the signalized intersections are summarized in Table 12 through 14. The capacity analyses were conducted for 2015 Existing, 2022 No-Build and 2022 Build conditions. It is noted that the Build conditions analysis presented in this report are for the full build-out of the Site. As noted earlier, the traffic signal warrant analysis results indicates that construction of the grocery store only would trigger the need for traffic signal control. However, construction of the apartment community only would not warrant signalization of the primary Site driveway.

Based on the traffic signal warrant analysis results presented in the previous chapter for the full build-out of the Site, and prior field observations of traffic flow into and out of the Site, it has been determined that signalization of the primary Site driveway is an essential element of the Site access plan when it is fully developed. As such, the Build conditions analysis presented in this chapter assumes that traffic signal control is provided at the primary Site driveway. An unsignalized analysis of the Site driveway is not provided for the Build condition. It is noted that if only the apartment community is constructed, the relatively low volume of traffic generated by it would be supported by an unsignalized driveway.

Based on discussions with the abutters regarding a preferred location of a new traffic signal along the Site frontage, and taking into consideration right of way and wetland constraints along the Boston Post Road corridor, it is proposed that the primary Site driveway be located opposite the westerly Sudbury Plaza driveway and Highland Avenue (a private way). This results in a new five-legged signalized intersection, with an exclusive signal phase for Highland Avenue. Due to the very low traffic volume that utilizes Highland Avenue (less than five total trips per hour during the peak hours), it is expected that the exclusive Highland Avenue signal phase will be rarely activated.

For review purposes, the intersection has been analyzed with two intersection signal phasing configurations. The analysis presented in Tables 12, 13 and 14 reflects the typical condition when the Highland Avenue phase is not in use. A separate analysis, presented in Table 15, was conducted to document the operations when the Highland Avenue signal phase is activated. The degradation in capacity shown in Table 15 when the exclusive Highland Avenue phase is activated can be expected to last approximately one to two cycles before operations return to normal, similar to the activation of an exclusive pedestrian phase.

As noted earlier, the intersection of Boston Post Road with Landham Road is currently under design by MassDOT. The proposed signal timings obtained from MassDOT from the intersection design plans were utilized in all future analyses of this intersection.

Table 12 Signalized Analysis Summary — Weekday Morning

Intersection	Lane Group	2015 Existing Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 No-Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions V/C	Delay	LOS	50th	95th
Boston Post Road at Site Driveway, Sudbury Plaza and Highland Avenue																
Boston Post Road	EB LT											0.13	9.6	A	<20	27
Boston Post Road	EB TH-RT											0.84	16.6	B	245	655
Boston Post Road	WB LT			Unsignalized				Unsignalized				0.33	51.9	D	<20	<20
Boston Post Road	WB TH-RT											0.65	12.0	B	203	332
Sudbury Plaza	NB LT											0.10	29.0	C	<20	29
Sudbury Plaza	NB TH-RT											0.01	28.4	C	<20	<20
Site Driveway	SB LT											0.60	35.7	D	59	#159
Site Driveway	SB TH-RT											0.01	28.4	C	<20	<20
	Overall											**0.82**	**16.5**	**B**	-	-
Boston Post Road at Nobscot Road/ Bank Driveway																
Boston Post Road	EB LT-TH	0.88	24.9	C	343	#631	1.07	70.7	E	~541	#765	1.07	68.2	E	~543	#793
Boston Post Road	EB RT	0.01	8.2	A	<20	<20	0.02	10.2	B	<20	<20	0.03	9.4	A	<20	<20
Boston Post Road	WB LT	0.66	18.2	B	38	#141	0.84	41.5	D	72	#196	0.82	38.2	D	68	#196
Boston Post Road	WB TH-RT	0.49	4.5	A	114	208	0.82	13.7	B	315	524	0.52	5.9	A	129	220
Nobscot Road	NB LT-TH	0.72	43.0	D	62	118	0.90	60.8	E	118	#247	0.67	37.2	D	73	135
Nobscot Road	NB RT	0.55	24.4	C	95	180	0.58	24.4	C	123	216	0.61	25.6	C	125	219
Bank Driveway	SB TH-RT	0.08	28.0	C	<20	<20	0.09	26.9	C	<20	<20	0.07	27.4	C	<20	<20
	Overall	**0.82**	**19.4**	**B**	-	-	**1.02**	**40.3**	**D**	-	-	**0.96**	**38.9**	**D**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 12 Signalized Analysis Summary — Weekday Morning (Continued)

Intersection	Lane Group	2015 Existing Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 No-Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions V/C	Delay	LOS	50th	95th
Boston Post Road at Union Avenue/ Shopping Plaza																
Boston Post Road	EB LT	0.58	9.5	A	40	136	0.80	33.9	C	133	#296	0.66	11.4	B	52	169
Boston Post Road	EB TH-RT	0.65	7.5	A	149	350	0.67	7.6	A	224	440	0.75	10.1	B	212	462
Boston Post Road	WB LT	0.11	13.9	B	<20	28	0.10	13.6	B	<20	28	0.12	14.2	B	<20	28
Boston Post Road	WB TH-RT	0.78	24.6	C	180	371	0.96	46.0	D	424	#750	0.77	24.3	C	181	360
Shopping Plaza	NB LT	0.17	23.9	C	<20	35	0.20	32.8	C	<20	35	0.17	23.6	C	<20	35
Shopping Plaza	NB TH-RT	0.13	23.5	C	<20	34	0.14	32.2	C	<20	34	0.12	23.2	C	<20	34
Union Avenue	SB LT-TH	0.49	26.7	C	38	105	0.59	39.1	D	58	111	0.50	26.6	C	41	111
Union Avenue	SB RT	0.22	24.1	C	<20	72	0.31	33.6	C	<20	90	0.25	24.0	C	<20	77
	Overall	**0.71**	**16.1**	**B**	-	-	**0.85**	**28.6**	**C**	-	-	**0.76**	**16.9**	**B**		
Boston Post Road at Concord Road																
Boston Post Rd	EB LT	0.87	17.1	B	218	390	0.93	23.6	C	299	#634	0.93	23.2	C	301	#640
Boston Post Rd	WB LT	0.61	7.8	A	111	172	0.77	10.9	B	201	353	0.53	6.2	A	99	165
Concord Road	SB LT-TH	1.15	117.9	F	~197	#325	1.19	>120	F	~206	#360	1.17	>120	F	~206	#360
Concord Road	SB RT	0.12	19.2	B	<20	34	0.11	23.1	C	<20	39	0.11	22.6	C	<20	39
	Overall	**0.94**	**35.0**	**D**	-	-	**0.98**	**37.2**	**D**	-	-	**0.98**	**37.6**	**D**	-	-
Boston Post Road at Landham Road																
Boston Post Rd	EB LT-TH						0.96	34.3	C	382	#830	0.94	30.2	C	356	#775
Boston Post Rd	EB RT						0.27	4.7	A	<20	41	0.29	4.8	A	<20	41
Boston Post Rd	WB LT			Unsignalized			0.60	18.7	B	24	97	0.58	16.0	B	<20	83
Boston Post Rd	WB TH-RT						0.47	3.6	A	81	188	0.32	2.6	A	39	90
Landham Road	NB LT-TH						1.47	>120	F	~186	#310	1.18	>120	F	~105	#200
Landham Road	NB RT						0.36	22.6	C	29	94	0.22	22.1	C	<20	55
	Overall						**1.20**	**45.8**	**D**	-	-	**1.14**	**29.3**	**C**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 13 Signalized Analysis Summary — Weekday Evening

Intersection	Lane Group	2015 Existing Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 No-Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions V/C	Delay	LOS	50th	95th
Boston Post Road at Site Driveway, Sudbury Plaza and Highland Avenue																
Boston Post Rd	EB LT											0.60	51.7	D	22	#126
Boston Post Rd	EB TH-RT											0.59	9.4	A	186	378
Boston Post Rd	WB LT			Police Control				Police Control				0.58	81.2	F	<20	33
Boston Post Rd	WB TH-RT											1.13	89.6	F	~1007	#1268
Sudbury Plaza	NB LT											0.46	44.0	D	58	83
Sudbury Plaza	NB TH-RT											0.02	39.4	D	<20	<20
Site Driveway	SB LT											0.88	76.3	E	123	#241
Site Driveway	SB TH-RT											0.01	39.4	D	<20	<20
	Overall											**1.06**	**60.3**	**E**	-	-
Boston Post Road at Nobscot Road/ Bank Driveway																
Boston Post Rd	EB LT-TH	0.82	21.1	C	289	#482	1.17	106.3	F	~681	#913	0.94	35.7	D	389	#650
Boston Post Rd	EB RT	.05	9.3	A	<20	<20	0.11	10.1	B	9	37	0.06	10.1	B	<20	20
Boston Post Rd	WB LT	0.91	40.4	D	~105	#293	1.25	>120	F	~208	#382	1.22	>120	F	~205	#378
Boston Post Rd	WB TH-RT	0.64	6.2	A	193	322	0.76	10.3	B	282	454	0.82	12.8	B	328	541
Nobscot Road	NB LT-TH	0.79	49.0	D	66	#131	0.75	43.9	D	81	#170	0.78	45.2	D	88	#186
Nobscot Road	NB RT	0.26	19.1	B	34	90	0.44	22.7	C	86	156	0.36	21.1	C	64	130
Bank Driveway	SB TH-RT	0.08	26.2	C	<20	<20	0.07	27.3	C	<20	<20	0.07	26.5	C	<20	<20
	Overall	**0.93**	**20.0**	**B**	-	-	**1.19**	**66.7**	**F**	-	-	**1.17**	**40.7**	**D**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 13 Signalized Analysis Summary — Weekday Evening (Continued)

Intersection	Lane Group	2015 Existing Conditions					2022 No-Build Conditions					2022 Build Conditions				
		V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	V/C	Delay	LOS	50th	95th	V/C	Delay	LOS	50th	95th
Boston Post Road at Union Avenue/ Shopping Plaza																
Boston Post Rd	EB LT	0.64	22.9	B	82	163	0.87	44.1	D	164	#321	0.79	35.3	C	134	#259
Boston Post Rd	EB TH-RT	0.53	8.0	A	165	241	0.72	11.3	B	298	445	0.58	8.6	A	200	294
Boston Post Rd	WB LT	0.39	18.4	B	50	104	0.56	23.4	C	63	132	0.45	20.1	C	59	117
Boston Post Rd	WB TH-RT	0.92	39.6	D	370	#622	1.08	82.4	F	~583	#808	1.13	101.7	F	~638	#878
Shopping Plaza	NB LT	0.43	30.4	C	51	98	0.50	34.8	C	53	106	0.49	34.4	C	53	105
Shopping Plaza	NB TH-RT	0.46	30.2	C	82	148	0.48	33.6	C	84	160	0.48	33.3	C	84	160
Union Avenue	SB LT-TH	0.82	53.1	D	107	#235	1.00	100.2	F	~125	#269	0.99	94.6	F	124	#268
Union Avenue	SB RT	0.25	28.2	C	<20	78	0.30	31.8	C	<20	90	0.37	32.2	C	<20	112
	Overall	**0.83**	**27.3**	**C**	-	-	**1.01**	**44.8**	**D**	-	-	**1.01**	**50.8**	**D**	-	-
Boston Post Road at Concord Road																
Boston Post Rd	EB LT	0.77	10.8	B	150	270	0.94	23.9	C	314	#673	0.81	11.4	B	192	#417
Boston Post Rd	WB LT	0.80	11.4	B	185	322	0.90	16.8	B	289	#664	0.92	19.1	B	311	#694
Concord Road	SB LT-TH	0.68	27.8	C	62	#184	0.83	50.0	D	88	#194	0.82	47.1	D	88	#194
Concord Road	SB RT	0.04	19.7	B	<20	28	0.04	26.4	C	<20	31	0.04	25.7	C	<20	31
	Overall	**0.77**	**13.1**	**B**	-	-	**0.92**	**23.0**	**C**	-	-	**0.90**	**19.0**	**B**	-	-
Boston Post Rd at Landham Road																
Boston Post Rd	EB LT-TH						0.93	26.6	D	312	#598	0.76	20.9	C	227	#445
Boston Post Rd	EB RT						0.33	9.5	A	19	55	0.25	9.0	A	<20	37
Boston Post Rd	WB LT			Unsignalized			0.61	18.1	B	74	168	0.52	8.1	A	27	103
Boston Post Rd	WB TH-RT						0.58	3.8	A	105	224	0.60	3.9	A	111	238
Landham Road	NB LT-TH						1.38	>120	F	~135	#239	1.49	>120	F	~150	#259
Landham Road	NB RT						0.22	15.3	B	<20	45	0.22	15.3	B	<20	45
	Overall						**1.11**	**33.8**	**C**	-	-	**1.02**	**34.3**	**C**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 14 Signalized Analysis Summary — Saturday Midday

Intersection	Lane Group	2015 Existing Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 No-Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions V/C	Delay	LOS	50th	95th
Boston Post Road at Site Driveway, Sudbury Plaza and Highland Avenue																
Boston Post Rd	EB LT											0.95	80.2	F	~83	#210
Boston Post Rd	EB TH-RT											0.65	16.9	B	376	445
Boston Post Rd	WB LT											0.40	50.7	D	28	69
Boston Post Rd	WB TH-RT	Unsignalized					Unsignalized					1.01	54.5	D	~782	#1036
Sudbury Plaza	NB LT											0.47	37.8	D	81	105
Sudbury Plaza	NB TH-RT											0.06	33.3	C	<20	<20
Site Driveway	SB LT											0.92	73.6	E	172	#319
Site Driveway	SB TH-RT											0.02	33.0	C	<20	<20
	Overall											**0.99**	**45.9**	**D**	**-**	**-**
Boston Post Rd at Nobscot Road/ Bank Driveway																
Boston Post Rd	EB LT-TH	0.84	24.1	C	276	439	0.92	32.6	C	366	#623	1.00	50.0	D	~490	#742
Boston Post Rd	EB RT	0.03	10.3	B	<20	<20	0.04	10.2	B	<20	<20	0.04	10.0	B	<20	<20
Boston Post Rd	WB LT	0.73	20.6	C	49	#163	0.87	41.8	D	89	#237	0.92	53.6	D	95	#245
Boston Post Rd	WB TH-RT	0.63	7.8	A	171	283	0.71	9.1	A	237	383	0.79	11.6	B	315	507
Nobscot Road	NB LT-TH	0.64	31.2	C	73	124	0.69	37.0	D	82	#161	0.78	45.8	D	94	#191
Nobscot Road	NB RT	0.34	18.2	B	49	94	0.38	20.6	C	68	137	0.42	22.4	C	81	152
Bank Driveway	SB TH-RT	0.05	23.1	C	<20	27	0.05	25.8	C	<20	27	0.05	27.0	C	<20	27
	Overall	**0.78**	**17.7**	**B**	**-**	**-**	**0.87**	**23.7**	**C**	**-**	**-**	**0.95**	**32.2**	**C**	**-**	**-**

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 14 Signalized Analysis Summary — Saturday Midday (Continued)

Intersection	Lane Group	2015 Existing Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 No-Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions V/C	Delay	LOS	50th	95th
Boston Post Road at Union Avenue/ Shopping Plaza																
Boston Post Rd	EB LT	0.69	25.3	C	99	188	0.78	34.9	C	134	#255	0.83	39.0	D	153	#296
Boston Post Rd	EB TH-RT	0.53	8.4	A	159	235	0.59	8.7	A	202	297	0.65	9.7	A	239	355
Boston Post Rd	WB LT	0.45	20.1	C	59	117	0.50	20.8	C	68	133	0.55	22.4	C	69	139
Boston Post Rd	WB TH-RT	0.91	40.5	D	359	#585	1.03	65.8	E	~532	#764	1.14	106.1	F	~643	#880
Shopping Plaza	NB LT	0.55	33.0	C	61	#130	0.72	49.2	D	65	#154	0.73	49.9	D	65	#155
Shopping Plaza	NB TH-RT	0.55	31.2	C	110	194	0.61	36.1	D	116	204	0.61	36.6	D	116	204
Union Avenue	SB LT-TH	1.24	>120	F	~182	#315	1.70	>120	F	~224	#375	1.72	>120	F	~225	#375
Union Avenue	SB RT	0.23	27.7	C	<20	62	0.25	31.0	C	<20	79	0.27	31.4	C	<20	81
	Overall	**0.95**	**38.9**	**D**	-	-	**1.14**	**64.3**	**E**	-	-	**1.21**	**75.2**	**E**	-	-
Boston Post Road at Concord Road																
Boston Post Rd	EB LT	0.80	12.6	B	170	300	0.90	19.2	B	250	#564	0.94	25.4	C	303	#630
Boston Post Rd	WB LT	0.73	9.7	A	157	262	0.83	13.1	B	224	#423	0.87	16.0	B	273	#609
Concord Road	SB LT-TH	0.61	23.1	C	61	#183	0.73	33.2	C	94	#195	0.77	38.1	D	94	#195
Concord Road	SB RT	0.07	17.9	B	<20	39	0.08	22.2	C	<20	39	0.08	24.0	C	<20	41
	Overall	**0.75**	**12.9**	**B**	-	-	**0.86**	**18.2**	**B**	-	-	**0.91**	**22.5**	**C**	-	-
Boston Post Rd at Landham Road																
Boston Post Rd	EB LT-TH						0.86	20.2	C	238	#550	0.90	24.2	C	260	#587
Boston Post Rd	EB RT						0.22	4.7	A	<20	29	0.24	4.8	A	<20	32
Boston Post Rd	WB LT			Unsignalized			0.51	9.6	A	<20	51	0.56	11.6	B	<20	65
Boston Post Rd	WB TH-RT						0.58	4.1	A	96	189	0.61	4.4	A	106	211
Landham Road	NB LT-TH						1.09	>120	F	~77	#182	1.29	>120	F	~104	#220
Landham Road	NB RT						0.14	17.3	B	<20	41	0.14	17.3	B	<20	41
	Overall						**1.16**	**20.1**	**C**	-	-	**1.24**	**28.5**	**C**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 15 Site Driveway Signalized Analysis Comparison

Intersection	Lane Group	2022 Build Conditions – without Highland Avenue Phase Activation V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 Build Conditions – with Highland Avenue Phase Activation V/C	Delay	LOS	50th	95th
Weekday Morning											
Boston Post Rd	EB LT	0.13	9.6	A	<20	27	0.15	14.1	B	<20	33
Boston Post Rd	EB TH-RT	0.84	16.6	B	245	655	0.89	24.2	C	266	806
Boston Post Rd	WB LT	0.33	51.9	D	<20	<20	0.36	59.0	E	<20	<20
Boston Post Rd	WB TH-RT	0.65	12.0	B	203	332	0.69	15.7	B	214	415
Sudbury Plaza	NB LT	0.10	29.0	C	<20	29	0.11	33.1	C	<20	32
Sudbury Plaza	NB TH-RT	0.01	28.4	C	<20	<20	0.01	32.4	C	<20	<20
Site Driveway	SB LT	0.60	35.7	D	59	#159	0.63	41.8	D	57	#208
Site Driveway	SB TH-RT	0.01	28.4	C	<20	<20	0.08	32.8	C	<20	34
Highland Ave	NEB LTR	N/A	N/A	N/A	N/A	N/A	0.15	49.4	D	<20	<20
	Overall	**0.82**	**16.5**	**B**	-	-	**0.86**	**22.4**	**C**	-	-
Weekday Evening											
Boston Post Rd	EB LT	0.60	51.7	D	22	#126	0.60	54.9	D	23	#141
Boston Post Rd	EB TH-RT	0.59	9.4	A	186	378	0.63	13.0	B	198	516
Boston Post Rd	WB LT	0.58	81.2	F	<20	33	0.71	118.6	F	<20	42
Boston Post Rd	WB TH-RT	1.13	89.6	F	~1007	#1268	1.22	131.8	F	~1069	#1513
Sudbury Plaza	NB LT	0.46	44.0	D	58	83	0.47	47.6	D	60	91
Sudbury Plaza	NB TH-RT	0.02	39.4	D	<20	<20	0.02	42.8	D	<20	<20
Site Driveway	SB LT	0.88	76.3	E	123	#241	0.89	82.9	F	126	#271
Site Driveway	SB TH-RT	0.01	39.4	D	<20	<20	0.09	43.4	D	<20	40
Highland Ave	NEB LTR	N/A	N/A	N/A	N/A	N/A	0.17	64.9	E	<20	<20
	Overall	**1.06**	**60.3**	**E**	-	-	**1.12**	**84.7**	**F**	-	-
Saturday Midday											
Boston Post Rd	EB LT	0.95	80.2	F	~83	#210	0.92	90.9	F	71	#243
Boston Post Rd	EB TH-RT	0.65	16.9	B	376	445	0.70	21.2	C	316	515
Boston Post Rd	WB LT	0.40	50.7	D	28	69	0.53	59.3	E	32	76
Boston Post Rd	WB TH-RT	1.01	54.5	D	~782	#1036	1.12	94.0	F	~786	#1219
Sudbury Plaza	NB LT	0.47	37.8	D	81	105	0.47	40.2	D	81	117
Sudbury Plaza	NB TH-RT	0.06	33.3	C	<20	<20	0.06	35.5	D	<20	<20
Site Driveway	SB LT	0.92	73.6	E	172	#319	0.92	77.4	E	172	#367
Site Driveway	SB TH-RT	0.02	33.0	C	<20	<20	0.08	35.7	D	<20	43
Highland Ave	NEB LTR	N/A	N/A	N/A	N/A	N/A	0.00	56.1	E	<20	<20
	Overall	**0.99**	**45.9**	**D**	**-**	**-**	**1.03**	**65.4**	**E**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

A review of the analysis worksheets for the signalized study locations summarized in Tables 12 through 14 indicates that, when compared to the operations with traffic generated by an office/R&D use on the Site, the signalized study intersections are expected to operate better during the weekday peak hour conditions. All signalized intersections are expected to operate at LOS D or better during all peak periods, except the intersection of Union Street and Boston Post Road, which is expected to operate at LOS E during the Saturday midday peak hour in all the future condition analyses.

It is noted that even with the substantially reduced weekday peak hour trip generation for the full build-out of the Project when compared to the office/R&D reuse of the property, relatively long vehicular queues are estimated on Boston Post Road at the signalized Site driveway. It is expected that additional enhancements, including traffic signal coordination discussed later in this report, have the potential to better manage vehicular queues on the roadway after their implementation and performance of necessary field adjustments to the traffic signal controllers' settings.

Unsignalized Intersection Capacity Analysis

Table 16 presents a summary of the capacity analyses for the unsignalized intersections in the study area.

The unsignalized intersection analysis summary indicates that the stop controlled movements from Horse Pond Road, Dudley Street and Raymond Road are currently operating at congested levels and they will continue to operate at these levels in the future No-Build condition (i.e., with an office/R&D tenant on the Site). A review of the delay and v/c measures in the table indicate that compared to the No-Build condition, the weekday peak hour operations at these locations are expected to operate in a similar manner or see a slight improvement under the Build condition (i.e., with the Project). This is also corroborated by the information in Table 9 in the previous chapter, which indicates that the Project is expected to result in a decrease in peak hour traffic on these roadways during some periods, and relatively limited additional traffic during other peak times.

Table 16 Unsignalized Intersection Analysis Summary

Location	Period	Movement	2015 Existing				2022 No-Build				2022 Build			
			Dem [a]	v/c [b]	Delay [c]	LOS [d]	Dem	v/c	Delay	LOS	Dem	v/c	Delay	LOS
Boston Post Road at Horse Pond Road and Barnstead Shoppes Driveway	Weekday Morning	SB-LR	175	1.81	>120	F	260	>2	>120	F	200	>2	>120	F
	Weekday Evening	SB-LR	135	1.96	>120	F	160	>2	>120	F	170	>2	>120	F
	Saturday Midday	SB-LR	135	1.67	>120	F	160	>2	>120	F	180	>2	>120	F
Boston Post Road at Dudley Road	Weekday Morning	NB-LR	10	0.16	42.7	E	10	0.24	65.4	F	10	0.23	52.6	F
	Weekday Evening	NB-LR	10	0.13	34.4	D	10	0.21	56.5	F	10	0.18	48.1	E
	Saturday Midday	NB-LR	15	0.15	32.2	D	15	0.21	44.8	E	15	0.26	57.2	F
Boston Post Road at Existing Site Driveway (West)	Weekday Morning	SB-LR	0	0	0	A	25	0.05	12.6	B	45	0.10	12.2	B
	Weekday Evening	SB-LR	80	0.36	29.5	D	160	>2	>120	F	125	0.79	77.2	F
	Saturday Midday	SB-LR	0	0	0	A	20	0.07	18.3	C	110	0.36	21.9	C
Boston Post Road at Sudbury Plaza Driveway (West)	Weekday Morning	NB-LR	30	0.24	32.2	D	30	0.33	46.7	E	Reconfigured to operate as Signalized Intersection			
	Weekday Evening	NB-LR	80	>2	>120	F	85	>2	>120	F				
	Saturday Midday	NB-LR	150	1.20	>120	F	160	1.67	>120	F				
Boston Post Road at Existing Site Driveway (East)	Weekday Morning	SB-LR	15	0.08	23.9	C	70	>2	>120	F	Relocated Site Driveway to align with Sudbury Plaza Driveway and Highland Avenue			
	Weekday Evening	SB-LR	Police Control				Police Control							
	Saturday Midday	SB-LR	0	0	0	A	60	0.77	>120	F				
Boston Post Road at Sudbury Plaza Driveway (East)	Weekday Morning	NB-L	10	0.12	48.6	E	10	0.26	113.3	F	10	0.21	89.4	F
		NB-R	60	0.19	17.5	C	65	0.25	20.8	C	65	0.27	22.8	C
	Weekday Evening	NB-L	30	0.61	>120	F	30	>2	>120	F	30	>2	>120	F
		NB-R	100	0.28	16.8	C	105	0.58	43.2	E	105	0.35	20.7	C
	Saturday Midday	NB-L	25	0.50	107.6	F	25	0.74	>120	F	25	>2	>120	F
		NB-R	160	0.43	18.5	C	170	0.47	21.8	C	170	0.54	27.2	D
Boston Post Road at Raymond Road	Weekday Morning	NB-LR	150	1.31	>120	F	160	0.80	66.2	F	165	1.93	>120	F
	Weekday Evening	NB-LR	130	0.60	38.6	E	140	0.73	58.8	F	145	0.91	100.9	F
	Saturday Midday	NB-LR	95	0.58	45.7	E	105	0.80	91.0	F	115	1.04	>120	F
Boston Post Road at Landham Road	Weekday Morning	NB-LR	435	>2	>120	F	Signalized				Signalized			
	Weekday Evening	NB-LR	475	>2	>120	F								
	Saturday Midday	NB-LR	325	>2	>120	F								

5

Potential Traffic Improvements

Chapter 3 indicated that increase in traffic associated with the Project on the study area roadways, when compared to the re-tenanting of the Site to a new office/R&D tenant, is lower at most locations during the weekday. Increase are mostly during the Saturday midday peak hours and are expected range from five trips per hour up to approximately 65 trips per hour, depending on the specific location. Compared to the overall traffic volumes on area roadways, the calculated traffic increases associated with the Project are relatively small and fall within the range of daily fluctuations of roadway traffic flow. Detailed capacity analyses in Chapter 4 confirmed that the Project-related traffic is expected to cause minimal additional impacts at study area locations when compared to the No-Build condition.

This chapter discusses potential traffic improvement measures could be implemented to further minimize the potential for Project-related traffic impacts. It is noted that improvements on Boston Post Road that are presented in this chapter are subject to review and approval by MassDOT as part of the MEPA review as well as the Access Permit review process.

Potential Intersection and Roadway Improvements

Site Access Improvements

As noted earlier, signalization of the primary Site driveway has been determined to be an essential element of the Site access improvement plan at full build-out of the Project. However, the traffic signal warrant analysis indicates that the construction of the apartment community only does not warrant signalization of the primary Site

driveway. If an apartment community is only constructed on the Site, it will be supported by an unsignalized driveway onto Boston Post Road.

Traffic signal control at the primary Site driveway at full build-out will not only accommodate safe and efficient vehicular access for the Site, it will also provide a signalized access for the customers of Sudbury Plaza and residents of Highland Avenue located on the south side of Boston Post Road as well as provide a much desired safe pedestrian crossing location on Boston Post Road west of the Nobscot Road signalized intersection.

Figure 6 shows a conceptual Site access improvement plan for the Project. As shown in the conceptual access improvement plan, the existing westerly driveway will be maintained at its current location, albeit modified to accommodate truck turning maneuvers. The existing middle and easterly driveways will be eliminated. A new Site driveway will be constructed opposite the existing westerly driveway to Sudbury Plaza and a traffic signal system will be installed at the intersection. The existing westerly driveway for Sudbury Plaza would need to be modified as indicated on the plan.

In general, the proposed signalized intersection control for the Site will have the following features to enhance Site access, vehicular traffic flow and pedestrian safety.

- Construction of a new traffic signal on Boston Post Road by aligning the primary Site driveway with the westerly driveway for Sudbury Plaza and Highland Avenue (a private way). This would also include the construction of designated left turn lanes on Boston Post Road, a new actuated pedestrian crosswalk and bicycle accommodations at the intersection; in addition to the Project, these improvements will also benefit the retail plaza and the residents of Highland Avenue on the south side of Boston Post Road.
- Widen the existing sidewalk on the north side of Boston Post Road along the Site frontage and extend the limits of the existing sidewalk on the south side of Boston Post Road; and,
- Subject to right of way availability, addition of five-foot paved shoulders (which could become part of future bike lanes) on either side of Boston Post Road within the limits of the roadway improvements.

Traffic signal analysis results based on the signalized Site access are presented under the Build condition in Tables 12 through 15 in Chapter 4.

A review of the intersection traffic volumes, available crash data and the operational configuration of the signal control indicate that a new traffic signal at the proposed location and the associated geometric improvements will serve multiple purposes. It will:

- Provide a long desired traffic signal on Boston Post Road near the Site which enhances the redevelopment potential of a very valuable, visible and significant property in the Town of Sudbury;

SECONDARY SITE DRIVEWAY

FIRE STATION

PROJECT SITE (SEE SITE PLANS)

PRIMARY SITE DRIVEWAY

PROPOSED TRAFFIC SIGNAL

BOSTON POST ROAD (1901 S.H.L.O.)

HIGHLAND AVENUE (PRIVATE WAY)

MODIFY EXISTING DRIVEWAY

SUDBURY PLAZA WEST DRIVEWAY

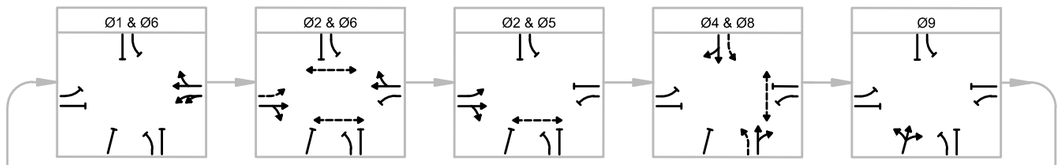
SUDBURY PLAZA

SUDBURY PLAZA EAST DRIVEWAY

LEGEND:

- EXISTING STATE HIGHWAY LAYOUT
- PROP CEMENT CONCRETE WALK
- PROP MILLING AND OVERLAY OR FULL DEPTH PAVEMENT
- PROP LOAM AND SEED
- EXISTING SIDEWALK

PREFERENTIAL PHASE SEQUENCE



0 50 100 Feet

Conceptual Access Improvement Plan **Figure 6**
Meadow Walk
Mixed-Use Development February 16, 2016
Sudbury, Massachusetts

- Improved safety through the elimination of traffic control by a police officer at the primary Site driveway during the weekday evening peak hour;
- Enhance the operations of an existing major retail plaza in town by incorporating its driveway into the new traffic signal;
- Provide safe access and egress for residents of Highland Avenue;
- Limit the effect of turning traffic on the through traffic flow on Boston Post Road by means of exclusive turn lanes;
- Minimize vehicular backup and congestion on the Site;
- Help reduce angle crashes for vehicles entering and exiting the both the Site and Sudbury Plaza driveways; and,
- Provide safe pedestrian access between the Site and Sudbury Plaza.

As the design progresses and advances to the 25% MassDOT submittal, the geometry will be optimized further to minimize impacts along Boston Post Road while balancing the need to provide an enhanced roadway cross-section.

Fire Station Preemption Signal

Sudbury Fire Department has expressed a desire to fulfill its long term goal of implementing preemption traffic signal control on Boston Post Road in front of the fire station that is located along the Site frontage. The proximity of the fire station to the proposed new traffic signal at the primary Site driveway requires that consideration be given to the integration of the fire station preemption signal into the proposed driveway signal. The specific details of how the preemption can be accommodated into the overall intersection design will be worked out with the fire department and MassDOT during later stages of design development.

Traffic Signal Coordination

In addition to the Site access improvements outlined previously, the Proponent proposes to implement a time-based coordinated signal system that will comprise of three signalized intersections on Boston Post Road including the signalized primary Site driveway, Nobscot Road and Union Street intersections[6]. The coordination will likely be accomplished with GPS timers or radio technology. The specific technology for the coordination will be identified during the design phase of the improvements.

[6] Consideration was given to extending the coordinated signal system to include the existing signal at Concord Road; however, it was determined that due to the number of driveways between Union Avenue and Concord Road, as well as the shorter cycle length needed at Concord Road, there would be little benefit to extending the system to that location.

To accommodate the commuter peak traffic patterns along Boston Post Road, separate timing plans would be required for the weekday morning, weekday evening and Saturday midday peak hours. Table 17 through 19 summarizes the analysis results based on the implementation of a time based coordination system between the three intersections.

As shown in Tables 17 through 19, the benefits of the coordinated system will be realized the most during the weekday evening and Saturday midday peak hours at the intersections of Nobscot Road and Union Avenue. The coordinated system provides a metering effect which helps in better queue management. The effect of this is observed the most in the segment of Boston Post Road between Nobscot Road and Union Street. The improved flow along Boston Post Road would also benefit the numerous unsignalized intersections and driveways along that section of roadway by introducing more gaps within the Boston Post Road traffic flow. Fine tuning of the coordinated signal system settings during construction can be expected to provide additional opportunities to further manage queues and optimize operations in real-time.

Table 17 Coordination Analysis Summary - Weekday Morning

Intersection	Lane Group	2022 No-Build Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions With Mitigation V/C	Delay	LOS	50th	95th
Boston Post Road at Site Driveway, Sudbury Plaza and Highland Avenue																
Boston Post Rd	EB LT						0.13	9.6	A	<20	27	0.12	10.2	B	<20	33
Boston Post Rd	EB TH-RT						0.84	16.6	B	245	655	0.79	15.6	B	273	#848
Boston Post Rd	WB LT			Unsignalized			0.33	51.9	D	<20	<20	0.22	62.6	E	<20	<20
Boston Post Rd	WB TH-RT						0.65	12.0	B	203	332	0.63	8.1	A	274	209
Sudbury Plaza	NB LT						0.10	29.0	C	<20	29	0.11	37.3	D	<20	25
Sudbury Plaza	NB TH-RT						0.01	28.4	C	<20	<20	0.01	36.6	D	<20	<20
Site Driveway	SB LT						0.60	35.7	D	59	#159	0.64	47.1	D	79	132
Site Driveway	SB TH-RT						0.01	28.4	C	<20	<20	0.01	36.5	D	<20	<20
	Overall						**0.82**	**16.5**	**B**	-	-	**0.78**	**15.6**	**B**	-	-
Boston Post Road at Nobscot Road/ Bank Driveway																
Boston Post Rd	EB LT-TH	1.07	70.7	E	~541	#765	1.07	68.2	E	~543	#793	0.91	29.6	C	372	#813
Boston Post Rd	EB RT	0.02	10.2	B	<20	<20	0.03	9.4	A	<20	<20	0.03	8.1	A	<20	<20
Boston Post Rd	WB LT	0.84	41.5	D	72	#196	0.82	38.2	D	68	#196	0.88	51.3	D	92	#234
Boston Post Rd	WB TH-RT	0.82	13.7	B	315	524	0.52	5.9	A	129	220	0.48	6.0	A	136	240
Nobscot Road	NB LT-TH	0.90	60.8	E	118	#247	0.67	37.2	D	73	135	0.79	60.1	E	97	#191
Nobscot Road	NB RT	0.58	24.4	C	123	216	0.61	25.6	C	125	219	0.65	36.8	D	152	266
Bank Driveway	SB TH-RT	0.09	26.9	C	<20	<20	0.07	27.4	C	<20	<20	0.10	37.5	D	<20	<20
	Overall	**1.02**	**40.3**	**D**	-	-	**0.96**	**38.9**	**D**	-	-	**0.89**	**28.4**	**C**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 17 Coordination Analysis Summary - Weekday Morning (Continued)

Intersection	Lane Group	2022 No-Build Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions With Mitigation V/C	Delay	LOS	50th	95th
Boston Post Road at Union Avenue/ Shopping Plaza																
Boston Post Rd	EB LT	0.80	33.9	C	133	#296	0.66	11.4	B	52	169	0.59	5.9	A	49	M91
Boston Post Rd	EB TH-RT	0.67	7.6	A	224	440	0.75	10.1	B	212	462	0.67	6.4	A	138	M529
Boston Post Rd	WB LT	0.10	13.6	B	<20	28	0.12	14.2	B	<20	28	0.08	10.0	A	<20	29
Boston Post Rd	WB TH-RT	0.96	46.0	D	424	#750	0.77	24.3	C	181	360	0.51	13.6	B	180	385
Shopping Plaza	NB LT	0.20	32.8	C	<20	35	0.17	23.6	C	<20	35	0.21	38.0	D	<20	36
Shopping Plaza	NB TH-RT	0.14	32.2	C	<20	34	0.12	23.2	C	<20	34	0.14	37.2	D	<20	35
Union Avenue	SB LT-TH	0.59	39.1	D	58	111	0.50	26.6	C	41	111	0.61	45.9	D	66	114
Union Avenue	SB RT	0.31	33.6	C	<20	90	0.25	24.0	C	<20	77	0.25	38.1	D	<20	78
	Overall	**0.85**	**28.6**	**C**	-	-	**0.76**	**16.9**	**B**			**0.70**	**15.9**	**B**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal

NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 18 Coordination Analysis Summary - Weekday Evening

Intersection	Lane Group	2022 No-Build Conditions V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	2022 Build Conditions V/C	Delay	LOS	50th	95th	2022 Build Conditions With Mitigation V/C	Delay	LOS	50th	95th
Boston Post Road at Site Driveway, Sudbury Plaza and Highland Avenue																
Boston Post Rd	EB LT						0.60	51.7	D	22	#126	0.55	44.4	D	<20	#108
Boston Post Rd	EB TH-RT						0.59	9.4	A	186	378	0.61	9.9	A	178	372
Boston Post Rd	WB LT			Unsignalized			0.58	81.2	F	<20	33	0.54	68.3	E	<20	M23
Boston Post Rd	WB TH-RT						1.13	89.6	F	~1007	#1268	1.18	104.6	F	~947	#1210
Sudbury Plaza	NB LT						0.46	44.0	D	58	83	0.45	39.5	D	54	78
Sudbury Plaza	NB TH-RT						0.02	39.4	D	<20	<20	0.02	35.4	D	<20	<20
Site Driveway	SB LT						0.88	76.3	E	123	#241	0.84	64.8	E	114	#227
Site Driveway	SB TH-RT						0.01	39.4	D	<20	<20	0.01	35.4	D	<20	<20
	Overall						**1.06**	**60.3**	**E**	-	-	**1.08**	**66.8**	**E**	-	-
Boston Post Road at Nobscot Road/Bank Driveway																
Boston Post Rd	EB LT-TH	1.17	106.3	F	~681	#913	0.94	35.7	D	389	#650	0.90	34.5	C	366	#735
Boston Post Rd	EB RT	0.11	10.1	B	9	37	0.06	10.1	B	<20	20	0.08	14.6	B	<20	M28
Boston Post Rd	WB LT	1.25	>120	F	~208	#382	1.22	>120	F	~205	#378	0.99	68.0	E	~237	m#325
Boston Post Rd	WB TH-RT	0.76	10.3	B	282	454	0.82	12.8	B	328	541	0.77	5.9	A	141	M122
Nobscot Road	NB LT-TH	0.75	43.9	D	81	#170	0.78	45.2	D	88	#186	0.87	71.3	E	116	#239
Nobscot Road	NB RT	0.44	22.7	C	86	156	0.36	21.1	C	64	130	0.34	24.6	C	76	149
Bank Driveway	SB TH-RT	0.07	27.3	C	<20	<20	0.07	26.5	C	<20	<20	0.07	35.9	D	<20	21
	Overall	**1.19**	**66.7**	**F**	-	-	**1.17**	**40.7**	**D**	-	-	**1.00**	**29.4**	**C**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 18 Coordination Analysis Summary - Weekday Evening (Continued)

Intersection	Lane Group	2022 No-Build Conditions					2022 Build Conditions					2022 Build Conditions With Mitigation				
		V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	V/C	Delay	LOS	50th	95th	V/C	Delay	LOS	50th	95th
Boston Post Road at Union Avenue/ Shopping Plaza																
Boston Post Rd	EB LT	0.87	44.1	D	164	#321	0.79	35.3	C	134	#259	1.05	79.7	E	~177	m#268
Boston Post Rd	EB TH-RT	0.72	11.3	B	298	445	0.58	8.6	A	200	294	0.57	12.5	B	390	M452
Boston Post Rd	WB LT	0.56	23.4	C	63	132	0.45	20.1	C	59	117	0.39	18.7	B	53	103
Boston Post Rd	WB TH-RT	1.08	82.4	F	~583	#808	1.13	101.7	F	~638	#878	0.97	48.2	D	526	#811
Shopping Plaza	NB LT	0.50	34.8	C	53	106	0.49	34.4	C	53	105	0.51	36.8	D	56	111
Shopping Plaza	NB TH-RT	0.48	33.6	C	84	160	0.48	33.3	C	84	160	0.49	35.6	D	91	169
Union Avenue	SB LT-TH	1.00	100.2	F	~125	#269	0.99	94.6	F	124	#268	1.01	106.7	F	~136	#283
Union Avenue	SB RT	0.30	31.8	C	<20	90	0.37	32.2	C	<20	112	0.57	37.7	D	63	#200
	Overall	**1.01**	**44.8**	**D**	-	-	**1.01**	**50.8**	**D**	-	-	**1.08**	**42.8**	**D**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 19 Coordination Analysis Summary - Saturday Midday

Intersection	Lane Group	2022 No-Build Conditions					2022 Build Conditions					2022 Build Conditions With Mitigation				
		V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	V/C	Delay	LOS	50th	95th	V/C	Delay	LOS	50th	95th
Boston Post Road at Site Driveway, Sudbury Plaza and Highland Avenue																
Boston Post Rd	EB LT						0.95	80.2	F	~83	#210	0.89	60.2	E	~77	#196
Boston Post Rd	EB TH-RT						0.65	16.9	B	376	445	0.66	18.3	B	347	419
Boston Post Rd	WB LT			Unsignalized			0.40	50.7	D	28	69	0.43	46.2	D	25	M51
Boston Post Rd	WB TH-RT						1.01	54.5	D	~782	#1036	1.04	57.7	E	~722	M#973
Sudbury Plaza	NB LT						0.47	37.8	D	81	105	0.46	35.0	C	76	99
Sudbury Plaza	NB TH-RT						0.06	33.3	C	<20	<20	0.06	30.8	C	<20	<20
Site Driveway	SB LT						0.92	73.6	E	172	#319	0.91	69.3	E	161	#306
Site Driveway	SB TH-RT						0.02	33.0	C	<20	<20	0.02	30.5	C	<20	<20
	Overall						**0.99**	**45.9**	**D**	**-**	**-**	**1.00**	**45.5**	**D**	-	-
Boston Post Road at Nobscot Road/ Bank Driveway																
Boston Post Rd	EB LT-TH	0.92	32.6	C	366	#623	1.00	50.0	D	~490	#742	0.88	23.5	C	323	M#621
Boston Post Rd	EB RT	0.04	10.2	B	<20	<20	0.04	10.0	B	<20	<20	0.04	7.4	A	<20	<20
Boston Post Rd	WB LT	0.87	41.8	D	89	#237	0.92	53.6	D	95	#245	1.00	79.9	E	~144	M#189
Boston Post Rd	WB TH-RT	0.71	9.1	A	237	383	0.79	11.6	B	315	507	0.74	4.7	A	43	M31
Nobscot Road	NB LT-TH	0.69	37.0	D	82	#161	0.78	45.8	D	94	#191	0.87	69.5	E	124	#254
Nobscot Road	NB RT	0.38	20.6	C	68	137	0.42	22.4	C	81	152	0.41	29.9	C	89	175
Bank Driveway	SB TH-RT	0.05	25.8	C	<20	27	0.05	27.0	C	<20	27	0.06	35.5	D	<20	32
	Overall	**0.87**	**23.7**	**C**	**-**	**-**	**0.95**	**32.2**	**C**	**-**	**-**	**1.00**	**26.1**	**C**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Table 19 Coordination Analysis Summary - Saturday Midday

Intersection	Lane Group	2022 No-Build Conditions					2022 Build Conditions					2022 Build Conditions With Mitigation				
		V/C[1]	Delay[2]	LOS[3]	50th[4]	95th[5]	V/C	Delay	LOS	50th	95th	V/C	Delay	LOS	50th	95th
Boston Post Road at Union Avenue/ Shopping Plaza																
Boston Post Rd	EB LT	0.78	34.9	C	134	#255	0.83	39.0	D	153	#296	1.12	103.9	F	~215	m#319
Boston Post Rd	EB TH-RT	0.59	8.7	A	202	297	0.65	9.7	A	239	355	0.70	20.2	C	465	M556
Boston Post Rd	WB LT	0.50	20.8	C	68	133	0.55	22.4	C	69	139	0.62	32.5	C	74	155
Boston Post Rd	WB TH-RT	1.03	65.8	E	~532	#764	1.14	106.1	F	~643	#880	1.10	92.2	F	~654	#895
Shopping Plaza	NB LT	0.72	49.2	D	65	#154	0.73	49.9	D	65	#155	0.50	32.5	C	61	120
Shopping Plaza	NB TH-RT	0.61	36.1	D	116	204	0.61	36.6	D	116	204	0.49	31.5	C	111	194
Union Avenue	SB LT-TH	1.70	>240	F	~224	#375	1.72	>120	F	~225	#375	1.13	>120	F	~184	#339
Union Avenue	SB RT	0.25	31.0	C	<20	79	0.27	31.4	C	<20	81	0.42	30.7	C	39	139
	Overall	**1.14**	**64.3**	**E**	-	-	**1.21**	**75.2**	**E**	-	-	**1.16**	**61.1**	**E**	-	-

1 V/C – Volume-to-capacity ratio
2 Delay – Control delay per vehicle
3 LOS – Level-of-Service
4 50th – 50th percentile queue length estimate, in feet
5 95th – 95th percentile queue length estimate, in feet
95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles
M Volume for 95th percentile queue is metered by upstream signal
NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = left-turn; TH = through; RT = right-turn

Traffic Demand Management Program

The goal of the Traffic Demand Management (TDM) plan is to reduce the Project's overall traffic impact through the implementation of measures that are aimed at affecting the demand side of the transportation equation, rather than the supply side. By their very nature, TDM programs attempt to change people's behavior, and to be successful, they must rely on incentives or disincentives to make these shifts in behavior attractive to the commuter.[7] TDM programs are designed to maximize the people-moving capability of the existing transportation infrastructure by increasing the number of persons in a vehicle, providing alternate modes of travel, or influencing the time of, or need to, travel.

In addition to the roadway and traffic signal improvements discussed in the previous sections, the Proponent is considering the implementation of various TDM services on the Site. The TDM plan will be aimed at minimizing the use of single-occupant vehicles and reducing peak hour vehicular demands. This program, which will be available to all residents, retail customer and employees of the Site, includes the following components:

- Designation of a Transportation Coordinator
- MetroWest/495 Transportation Management Association (TMA) Membership
- Ridesharing Programs
- Transit Service
- Bicycle and Pedestrian Enhancements

Transportation Coordinator

The Proponent will designate a transportation coordinator to prepare and implement the TDM program for the Site. This person will be available to provide residents, employees and customers with information regarding their commuting options and will coordinate the implementation of the TDM programs. This person will also be responsible for coordinating with the Metrowest/495 TMA, MassRides, and the MWRTA.

Metrowest/495 TMA Membership

The Proponent will explore membership opportunities with the Metrowest/ 495 Transportation Management Association (TMA). The TMA serves the commuting

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7 Implementing Effective Traffic Demand Management Measures: Inventory of Measures and Synthesis of Experience, prepared by Comsis Corporation and the Institute of Transportation Engineers, for the U.S. Department of Transportation, DOT-T-94-02, September, 1993, p. I-1.

needs of member communities in the MetroWest region (Framingham, Natick, Marlborough, Hudson, Southborough, Ashland, Sudbury, Wayland, Holliston, Hopkinton, Sherborn, Westborough, and Northborough) including those located along Interstate 495, by advocating for community interests relating to area wide transportation, aiming to relieve traffic congestion and broadening commuting options for residents of the towns it serves.

Ridesharing Programs

The Proponent will encourage residents and employees on the Site to participate in ridesharing programs to promote trip reduction and travel demand management during peak commuting hours. Ridesharing refers to encouraging commuters to ride in vehicles with other commuters, rather than drive alone. The most common forms of ridesharing are carpools and vanpools. The benefits of such programs include less congestion, reduced fuel consumption and better air quality. These programs are generally available to members of the TMA.

Transit Service

The nearest MWRTA bus service in the area is currently located approximately three miles to the west in Marlborough and three miles to the south in Framingham.

A recently completed Comprehensive Service Assessment by the MWRTA indicates that services gaps have been identified and their resolution could service specific mobility needs in the region. Specifically, the assessment refers to the extension of the current weekday service along Route 7C in Marlborough to include Sudbury and Wayland along Boston Post Road as a new service recommendation. The route, when extended, would provide hourly service along Boston Post Road between 6:00 AM and 8:00 PM. Additionally, the potential for extending MWRTA Routes 2 and 3 that currently serve Nobscot Shopping Center in Framingham to Boston Post Road in Sudbury has been noted as means to open up the system to the significant growth along the Boston Post Road corridor. The Proponent met with representatives of the MWRTA to gain a better understanding of the MWRTA's long-term growth plans and to ensure that the proposed roadway improvements and/or Site design could accommodate MWRTA vehicles if service is expanded to the study area in the future.

Bicycle and Pedestrian Enhancements

The proposed redevelopment plans for the Site reflects a conscious effort to make the overall Site more pedestrian and bicycle friendly. The bicycle/pedestrian enhancements proposed as part of the Project are listed below.

- Widening of the existing sidewalk on the north side of Boston Post Road within the limits of the roadway improvements and extending of the limits of the existing sidewalk on the south side of Boston Post Road, as depicted in Figure 6.
- Subject to right of way availability, addition of five-foot paved shoulders on either side of Boston Post Road within the limits of the roadway improvements depicted in Figure 6. These shoulders would become part of future bicycle lanes that may be implemented by others along the corridor in the future.
- Construction of a fully actuated pedestrian crosswalk at the proposed signalized Site driveway.
- Installation of bicycle detection at the signalized intersection.
- Secure bicycle parking at convenient locations on the Site.
- A well planned network of sidewalks throughout the Site.
- Accommodation of future connections to the planned Mass Central rail trail that would run along the north side of the Site.
- A potential pedestrian connection to the adjacent property on the east side of the Site has been discussed with the abutter.

6

Conclusion

This Study has been prepared in conformance with the Transportation Scoping Letter (TSL) reviewed by MassDOT. The Town of Sudbury planning staff was also consulted concurrent with MassDOT's review of the scope. The Study includes an evaluation of the existing traffic operations and safety conditions of the roadways near the Project, analyzed the impact of background traffic growth, estimated the impacts of the Project and identified improvements that are aimed at offsetting Project impacts as well as improve existing deficiencies.

The Site currently serves as an office/R&D facility for Raytheon and has 563,300± sf usable space and 2,040± parking spaces. Raytheon has begun their relocation process and will be winding down their operations at the Site over the next two years. The Proponent proposes to demolish the existing buildings in phases and construct a mixed-use residential/retail development with 80,000± sf of mixed retail (including a 45,000± sf grocery store), 250 apartment units, up to 60 age-restricted condominium units and a 54-bed assisted living/memory care facility. If the proposed redevelopment were not to proceed, a new office/R&D tenant could occupy the Site with minimal improvements.

Compared to the reuse of the existing office/R&D facilities, the Project is estimated to generate less traffic during the weekday peak hours. Specifically, in comparison to an office/R&D user that generates 765 weekday morning peak hour trips and 710 weekday evening peak hour trips, the Project is estimated to generate 63 and 37 percent fewer trips, respectively.

During the Saturday midday peak hour, replacement of the office/R&D use with the Project would result in an increase of approximately 365 additional *net new* trips. Distributed over the area roadway network, this represents an increase of five to 85 trips per hour at various Study locations. These calculated traffic increases during

the Saturday peak are relatively small and fall within the range of daily fluctuations of roadway traffic volumes.

Detailed capacity analyses indicate that deficiencies currently exist at certain locations within the study area. However, the analysis herein demonstrates that the limited additional Project related traffic will not have a noticeable effect on are roadway traffic operations.

The following improvements are proposed to mitigate the limited incremental effect of the peak hour and daily traffic demands of the Project as well as improve the existing conditions. They are designed to address some of the existing deficiencies that are identified as part of the Study.

- Construction of a new traffic signal on Boston Post Road by aligning the primary Site driveway with the westerly driveway for Sudbury Plaza and Highland Avenue (a private way). This would also include the construction of designated left turn lanes on Boston Post Road, a new actuated pedestrian crosswalk and bicycle accommodations at the intersection; in addition to the Project, these improvements will also benefit the retail plaza and the residents of Highland Avenue on the south side of Boston Post Road.
- Improved safety through the elimination of traffic control by a police officer at the primary Site driveway during the weekday evening peak hour;
- Widen the existing sidewalk on the north side of Boston Post Road along the Site frontage and extend the limits of the existing sidewalk on the south side of Boston Post Road;
- Subject to right of way availability, addition of five-foot paved shoulders on either side of Boston Post Road within the limits of the roadway widening. These shoulders would become part of future bicycle lanes that may be implemented by others along the corridor in the future.
- Possible implementation of a time-based coordinated signal system between the new signalized Site driveway, Nobscot Road and Union Avenue intersections on Boston Post Road;
- Pending Fire Department input, construction of a potential new emergency preemption signal at the fire station located along the Site frontage and integration of the signal into the new traffic signal at the primary Site driveway; and,
- Implementation of a comprehensive Traffic Demand Management (TDM) program to further promote vehicular traffic associated with the Project.

ATTACHMENT E: SITE CONDITIONS
LSP LETTER

SANBORN HEAD
Building Trust. Engineering Success.

1 Technology Park Drive
Westford, MA 01886

Mr. Steve Senna
National Development
2310 Washington Street
Newton Lower Falls, MA 02462

February 4, 2016
File No. 3888.02

Mr. Scott Dale
AvalonBay Communities, Inc.
51 Sleeper Street, Suite 750
Boston, MA 02210

Re: Proposed Redevelopment Project
528 Boston Post Road, Sudbury, MA
RTNs 3-03037, 3-17106, and 3-27243

Dear Steve and Scott:

Sanborn, Head & Associates, Inc. (Sanborn Head) has prepared this letter to describe the environmental conditions at the former Raytheon facility located at 528 Boston Post Road in Sudbury, MA (the Site) in the context of National Development/AvalonBay's proposed redevelopment. The Site is the location of three previously reported Massachusetts Contingency Plan (MCP) Release Tracking Numbers (RTNs), the status of which are described herein.

Raytheon has performed numerous rounds of sampling over the past 20 years and the results of these investigations have been filed with the Massachusetts Department of Environmental Protection (DEP) in accordance with the MCP. As a result, the environmental conditions at the Site have been thoroughly studied and are well understood. Specifically, 43 soil samples have been collected at the Site by Raytheon, and no residual contamination in soil that would pose a health risk to future users/residents has been identified. In addition, approximately 40 groundwater monitoring wells have been advanced at the Site by Raytheon, as shown on the attached figure. Currently, only three of these monitoring wells contain concentrations of constituents above applicable MCP standards. These wells are highlighted in yellow on the attached figure. The years of monitoring data show that the concentrations present in groundwater are decreasing over time. The groundwater containing concentrations above MCP standards represents about 5% of the total Site area.

In addition to the work previously performed by Raytheon, Sanborn Head also performed a Phase I Environmental Site Assessment with Subsurface Investigation for the Site in August 2015. This included advancement of ten soil borings and installation of two monitoring wells. Six soil samples and seven groundwater samples were collected (one from each of the new wells and five from existing wells). Based on the data collected, Sanborn Head did not identify any new Recognized Environmental Conditions at the Site.

During demolition and construction within the RTN area, we will implement a Release Abatement Measure (RAM) Plan which will identify the policies and procedures that will be followed in the event additional contamination is encountered. This plan will include a condition to stop work and contact the Licensed Site Professional (LSP) if suspected contamination is detected.

Additional details regarding the MCP status, current conditions and the proposed redevelopment project are provided below.

Massachusetts Contingency Plan (MCP) Status

The three MCP RTNs associated with the Raytheon facility are summarized below:

- Release Tracking Numbers (RTNs) 3-27243 and 3-3037 are related to the presence of chlorinated volatile organic compounds (CVOCs) in groundwater in the northeastern portion of the property. The presence of CVOCs in groundwater, primarily trichloroethylene (TCE), was first identified between 1990 and 1991, and the Site was initially assigned RTN 3-3037. RTN 3-3037 achieved regulatory closure with DEP (Pending No Further Action status) in 1997. Raytheon continued to monitor groundwater quality at the Site, and in 2007 provided an additional notification to DEP under the MCP. While the groundwater concentrations had remained consistent with those detected during earlier studies, Raytheon provided notification as a conservative approach to assure regulatory compliance. That notification was assigned RTN 3-27243. In November 2008, Raytheon submitted a Class C Response Action Outcome (RAO) for RTN 3-27243, which concluded that a Temporary Solution had been achieved, active remediation was not required and that regulatory compliance would be maintained through monitored natural attenuation (MNA) and periodic groundwater monitoring. Raytheon has retained responsibility for performing ongoing monitoring activities related to this release.

- A 1987 spill of about 35 gallons of no. 2 heating oil occurred during filling of an underground storage tank (UST) associated with the former Boresite Building in the west-central portion of the Site. Documentation of the cleanup activities was provided in the DEP files for RTN 3-3037. The UST and impacted soil near the tank were removed for off-Site disposal. The UST closure report states that DEP concurred that sufficient soil removal had been performed. The report concluded that the site did not necessitate being listed on DEP's Location to be Investigated list for potential disposal sites in 1990, indicating that there is not a significant risk to human health and the environment related to this spill.

- A 1998 spill of 15 to 20 gallons of hydraulic oil, resulting from an overturned crane, was assigned RTN 3-17106. Absorbent materials were applied to remediate the spill, and approximately 1.5 cubic yards of impacted soil were also removed for off-site disposal. A Class A-2 RAO was filed with DEP for the release in September 1998, demonstrating that a Permanent Solution (i.e. regulatory closure) has been achieved for this release.

Current Conditions

The most recent groundwater sampling round was performed in March 2015. Based on this most recent data set, concentrations of TCE in groundwater have continued to decrease over time. TCE was only detected in two monitoring wells located on the eastern side of the property in 2015. These wells are screened from approximately 59 to 91 feet below ground surface in deep groundwater, and their locations are highlighted in yellow on the attached figure. While the concentrations detected slightly exceed the MCP GW-2 standards that are protective of vapor intrusion potential, TCE was not detected above laboratory reporting limits in shallower groundwater at the Site. DEP has concluded that the TCE contamination is too deep to cause vapor intrusion concerns and we agree.

Freon 7 was also detected in one groundwater well (GZ-106) at a concentration of 45 µg/L in 2015. GZ-106 is also highlighted in yellow on the attached figure. Although this concentration slightly exceeds the previously derived Method 2 GW-2 standard of 13 µg/L, this concentration is significantly lower than the Freon 7 level detected in GZ-106 during prior sampling rounds performed in 2013. Freon 7 has not been detected above the Method 2 GW-2 standard in the wells surrounding GZ-106. This data further supports that the residual groundwater concentrations in GZ-106 are localized and naturally decreasing over time.

Proposed Redevelopment Project

The proposed project will include demolition of the existing buildings and construction of a mix of retail and residential buildings. There are no plans to install drinking water wells at the Site and all buildings will be connected to the public water supply.

The lack of detectable TCE in shallow groundwater indicates that the potential for vapor intrusion of TCE into future Site buildings is not a concern. The presence of Freon 7 in one groundwater well on the eastern edge of the property does not indicate a potential for vapor intrusion as no buildings are currently planned in the vicinity of GZ-106. Should design plans change, Sanborn Head will provide a LSP evaluation of the potential for Freon 7 vapor intrusion in this area of the Site. Should a vapor intrusion potential be identified, appropriate and commonly used mitigation measures (e.g. vapor barriers and/or sub-slab venting systems) will be included in the design for the potentially affected building.

During redevelopment, Sanborn Head will provide monitoring and LSP services, and the work will be performed in accordance with MCP requirements. Specifically, the work performed within RTNs 3-27243 and 3-3037 will be performed under a RAM Plan. The RAM Plan will include requirements for soil management, construction dewatering, dust control and air monitoring. Provisions will also be included in the RAM Plan for addressing unanticipated conditions, should evidence of soil contamination be encountered beneath existing buildings or elsewhere. If such conditions are discovered, they will be addressed by the development team in accordance with the MCP and relevant local, state and federal regulations.

The 20 years of monitoring data available for the Site indicate that the groundwater constituents are not significantly impacting off-Site receptors, including the Town public water supply wells. Based on the data, it is our opinion that water infiltration related to demolition of Site buildings (e.g., a temporary reduction in impervious surface) or related to changes in the on-Site waste water treatment and disposal system will not affect the residual contamination due to its depth below ground surface and/or the size of the Site. No impacts to neighboring properties or the Town public water supply wells are expected.

We understand that DEP performed a recent review of the available files for the Site, which they summarized in a letter addressed to Mr. Bob Haarde, dated January 22, 2016. The conclusions described in DEP's letter are consistent with those described herein. We note that more recent data was collected in 2015 which showed even lower concentrations than reported in DEP's letter, as described above. A copy of the letter is attached for reference.

Conclusions

Current Site conditions indicate relatively low-level concentrations of TCE in two deep groundwater wells and Freon-7 in one shallow groundwater well. These concentrations continue to decrease with time. No drinking water wells are planned for the Site, and impacts to off-Site properties from Site redevelopment activities are not anticipated. Based on the current development plans, potential vapor intrusion issues are also not a concern.

No contamination in soil that would pose a health risk to future users/residents has been identified. Regardless, procedures will be implemented to appropriately address unanticipated conditions in soil, should they arise during construction. Construction activities performed within RTNs 3-27243 and 3-3037 will be performed under a RAM Plan in accordance with the MCP. Based on the above information, it is our opinion that the proposed redevelopment project will not pose a health, environmental or natural resource risk to future residents, neighbors or the community.

Please contact the undersigned if you have any questions.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

Patricia M. Pinto, P.E., LSP
Vice President

PMP/KPS: pmp

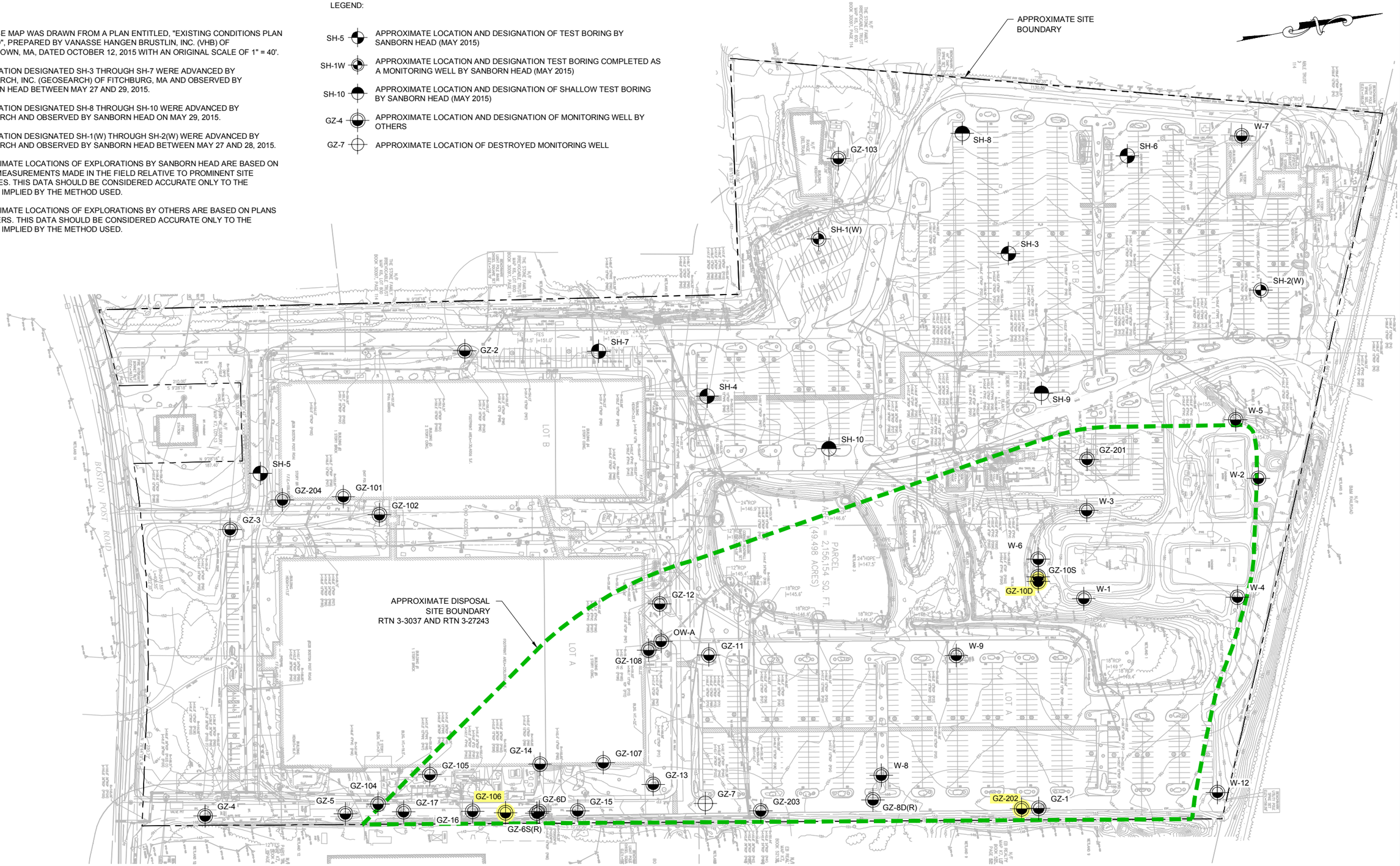
Encl: Figure 1, Exploration Location Plan
Letter from DEP to Bob Haarde, dated January 22, 2016

NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "EXISTING CONDITIONS PLAN OF LAND", PREPARED BY VANASSE HANGEN BRUSTLIN, INC. (VHB) OF WATERTOWN, MA, DATED OCTOBER 12, 2015 WITH AN ORIGINAL SCALE OF 1" = 40'.
2. EXPLORATION DESIGNATED SH-3 THROUGH SH-7 WERE ADVANCED BY GEOSEARCH, INC. (GEOSEARCH) OF FITCHBURG, MA AND OBSERVED BY SANBORN HEAD BETWEEN MAY 27 AND 29, 2015.
3. EXPLORATION DESIGNATED SH-8 THROUGH SH-10 WERE ADVANCED BY GEOSEARCH AND OBSERVED BY SANBORN HEAD ON MAY 29, 2015.
4. EXPLORATION DESIGNATED SH-1(W) THROUGH SH-2(W) WERE ADVANCED BY GEOSEARCH AND OBSERVED BY SANBORN HEAD BETWEEN MAY 27 AND 28, 2015.
5. APPROXIMATE LOCATIONS OF EXPLORATIONS BY SANBORN HEAD ARE BASED ON TAPED MEASUREMENTS MADE IN THE FIELD RELATIVE TO PROMINENT SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
6. APPROXIMATE LOCATIONS OF EXPLORATIONS BY OTHERS ARE BASED ON PLANS BY OTHERS. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND:

- SH-5 — APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING BY SANBORN HEAD (MAY 2015)
- SH-1W — APPROXIMATE LOCATION AND DESIGNATION TEST BORING COMPLETED AS A MONITORING WELL BY SANBORN HEAD (MAY 2015)
- SH-10 — APPROXIMATE LOCATION AND DESIGNATION OF SHALLOW TEST BORING BY SANBORN HEAD (MAY 2015)
- GZ-4 — APPROXIMATE LOCATION AND DESIGNATION OF MONITORING WELL BY OTHERS
- GZ-7 — APPROXIMATE LOCATION OF DESTROYED MONITORING WELL



SANBORN HEAD

GRAPHICAL SCALE
80' 40' 0' 80' 160'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.GREEN
DESIGNED BY: L.NORTON
REVIEWED BY: P.PINTO
PROJECT MGR: L.NORTON
PIC: P.PINTO
DATE: FEBRUARY 2016

ENVIRONMENTAL CONSULTING SERVICES
528 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS

PROJECT NUMBER: 3888.02

EXPLORATION LOCATION PLAN

SHEET NUMBER: 1

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

January 22, 2016

Bob Haarde, Selectman
37 Belcher Drive
Sudbury, MA 01776
Delivered via email to rhaarde@comcast.net

RE: Sudbury
528 Boston Post Road
Raytheon Facility
RTNs 3-03037, 3-17106, 3-27243

Dear Mr. Haarde,

In response to your inquiry of October 9, 2015, the Massachusetts Department of Environmental Protection (MassDEP) has reviewed our files for the Raytheon site located at 528 Boston Post Road in Sudbury. The review focused on potential risks to future residents, from the presence of oil and hazardous materials at the property. A summary of the review is presented in the attached memorandum.

While investigations at the site began in 1984, the most pertinent information is presented in a Comprehensive Site Assessment and a Periodic Review submitted to MassDEP in 2008 and 2013, respectively. The majority of environmental work focused on the presence of solvents in groundwater.

Based on the presence of solvent contamination remaining in groundwater, MassDEP recommends that a Licensed Site Professional evaluate any proposal to install drinking water wells in the contaminated areas, and the possible need for treatment.

MassDEP's evaluation found that the potential for exposures due to solvent vapor migration into buildings is generally not a concern for the current proposed locations of residential buildings, because at those locations the groundwater contamination is deep below the ground surface. However, one particular location of concern is monitoring well GZ-106, which has Freon contamination in groundwater. This monitoring well is located on the eastern edge of the property. Buildings constructed near GZ-106 should be evaluated for the possibility of Freon vapor intrusion to indoor air.

Limited soil testing has been performed at the property. Although the soil testing is limited, the information submitted to MassDEP does not indicate any contamination in soil that would pose a health risk to future residents. However, given the past uses of the facility and associated use of hazardous materials, further assessment is recommended to evaluate the soil beneath the buildings, if redevelopment of the site creates the potential for exposure to untested soils.

If you have any questions regarding this letter or the attached memorandum, please contact Andrew Friedmann at (978) 694-3217 or andrew.friedmann@state.ma.us.

Sincerely,

Andrew Friedmann
Site Management
Bureau of Waste Site Cleanup

John Miano
Chief, Site Management Section
Bureau of Waste Site Cleanup

cc (electronically):
Joanne Lynch (jjmlynch@gmail.com)
Bill Murphy, Board of Health, email: health@sudbury.ma.us
Rebecca McEnroe, Sudbury Water District, email: customerservice@sudburywater.com

Attachments:
Memorandum to File

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

MEMORANDUM

To: File

By: Andrew Friedmann, Ph.D., Site Management Section AF
Bureau of Waste Site Cleanup, Northeast Regional Office (BWSC/NERO)
Massachusetts Department of Environmental Protection (MassDEP)

Through: Jack Miano, Chief, Site Management Section, BWSC/NERO/MassDEP JFM
Stephen Johnson, Deputy Regional Director, BWSC/NERO/MassDEP

Subject: 528 Boston Post Road, Sudbury
MassDEP Release Tracking Numbers (RTN) 3-27243, 3-17106 & 3-3037
Evaluation of Site Investigation and Risk Assessment

Date: January 22, 2016

This memorandum was prepared in response to an inquiry regarding the possible human health risks related to the proposed residential redevelopment at this Site. The proposed development may include about 300 units of residential housing, a supermarket, retail stores and a 50 unit Alzheimer's care center.

MassDEP reviewed the site investigation reports and the Risk Characterization, and conducted a combined Method 1 and Method 2 Risk Characterization for the vapor intrusion pathway, as this pathway often has the greatest potential to pose risk to future residents of sites contaminated with volatile organic compounds. The vapor intrusion risk characterization was performed using groundwater and soil data that are presented in a Phase II Comprehensive Site Assessment, dated November 13, 2008, and a Periodic Review of the Temporary Solution (Periodic Review), dated November 8, 2013. The Phase II Comprehensive Site Assessment and the Periodic Review were written by GZA GeoEnvironmental, Inc. (GZA) on behalf of Raytheon Company.

Groundwater

According to the Periodic Review, groundwater samples collected from forty-four groundwater monitoring wells, obtained between 1990 and 2013, were analyzed for Volatile Organic Compounds (VOCs). A summary of the analytical results for VOC compounds detected in the groundwater investigation (obtained directly from the Periodic Review) are presented in Table 1 of this memo. A subset of samples collected in 2008 were also analyzed for metals. Of the three samples analyzed for metals, only zinc was detected. Zinc was present in monitoring well GZ-204 at 0.016 mg/L, well below the Method 1 Risk Assessment Standard. The following chlorinated VOCs were detected in groundwater samples:

- Trichlorofluoromethane (Freon 7)
- cis-1,2-Dichloroethene (cis-1,2-DCE)
- Chloroform
- Trichloroethene (TCE)

Tetrachloroethene (PCE) was not detected in the groundwater investigation, according to the Periodic Review.

The concentrations of three of the four Site contaminants in groundwater were compared to MassDEP's Method 1 GW-2 Standards. GW-2 Standards are designed to be protective of exposure to VOC vapors that can migrate from groundwater to indoor air. MassDEP has not developed a Method 1 GW-2 Standard for Freon 7. A Method 2 GW-2 Standard for Freon 7 (13 µg/L) was developed by GZA in accordance with MassDEP regulations.

Freon 7 was detected in one well, GZ-106, above the Method 2 GW-2 Standard. The well screen for GZ-106 is 14 to 19 feet below ground surface (bgs). Concentrations of Freon 7 in this well were detected up to 410 µg/L, greater than ten times the estimated Method 2 GW-2 Standard.

Cis-1,2-DCE and chloroform were both detected in one well each, GZ-202 and GZ-108, respectively. Both were detected at levels below the Method 1 GW-2 Standards. The Method 1 GW-2 Standard for cis-1,2-DCE is 20 µg/L, and the maximum detected concentration was 4.0 µg/L. The Method 1 GW-2 Standard for chloroform is 50 µg/L, and the maximum chloroform concentration detected was 1.5 µg/L.

In the most recent sampling rounds, TCE was detected in three wells at concentrations above the GW-2 Standard of 5 µg/L. These levels were detected in GZ-8D (screened at 98 to 108 feet bgs), GZ-10D (screened at 59 to 69 feet bgs), and GZ-202 (screened at 86.7 to 91.7 feet bgs). Contamination in these three wells is too deep to cause concern for vapor migration into indoor air. However, if private potable water wells were to be installed at this site in the future, a potential exposure pathway may exist.

Soil

In July 1998, a hydraulic oil release occurred as a result of an overturned crane that was performing work at the Raytheon facility. Approximately 15 gallons of hydraulic oil was released to a gravel parking area and a paved surface immediately east of the pavement. MassDEP assigned RTN 3-17106 for the hydraulic oil release. During an Immediate Response Action, impacted soil and gravel was removed from the Site. Two soil samples were collected from the excavation. The soil samples contained up to 5.8 mg/kg of C9-C18 Aliphatic Petroleum Compounds, 21.3 mg/kg of C19-C36 Aliphatic Petroleum Compounds, and 12.9 mg/kg of C11-C22 Aromatic Petroleum Compounds. These concentrations are well below the residential Method 1 Standards, indicating that a Condition of No Significant Risk has been established for soils impacted by the hydraulic oil release.

Soil samples were also obtained during the installation of soil borings and monitoring wells. Soil testing by photo-ionization detector (PID) field screening, and laboratory analysis, indicated that VOC levels in soil are very low. Field screening indicated the presence of VOCs in two soil samples. Therefore, two samples, from borings GZ-108 and GZ-202, were analyzed for chlorinated VOCs, and the laboratory results were "none detected". Based on the lack of detectable VOCs in soils from the vadose zone, there is no indication of a Significant Risk from exposures related to soil at the Site.

Historic Site Use

The following language from a 1990 study describes the past use of the site. "Only limited scale prototype production occurs at the Sudbury Equipment Development Laboratories (EDL) which is mainly occupied by office space. Small quantities of solvents and other process chemicals are used at the EDL. Chemical wastes are collected and disposed off-site in accordance with applicable RCRA regulations. Sanitary wastes are treated on site and discharged to sand filters (leaching beds) in the northern portion of the site."

The Periodic Review report notes a number of areas where VOCs were likely used. According to the Periodic Review, the buildings on the property are primarily used for office space, but that "... some research and development of microwave and radar components has historically been performed at the Site in the past" and that a "Test Area affiliated with these former activities is located in the northwest corner of the Property, which was used to test microwave and radar equipment." A sanitary waste water treatment plant and leaching fields are located on the north central part of the property. The Periodic Review also states that a "Former Bore Site Building" is located on the western property boundary. Presumably some industrial activities occurred in this building. Figure 1, from the 2013 report indicates other industrial use areas including:

- A "Chemical Receiving and Storage" area in Building No. 1;
- "Former Assembly and Lab Areas" in Building No. 1;
- A "Former Plated Wire Lab" in Building No. 2;
- A "Former Chemical Storage" area adjacent to Building No. 5; and
- A former "Waste Water Treatment Plant" in Building No. 5.

Shallow groundwater samples (e.g., 0 to 15 feet below ground surface) obtained downgradient of these areas where hazardous materials were likely used did not contain levels of VOCs above the GW-2 Standards, with the exception of Freon in GZ-106.

Recommendations

With the exception of the location of GZ-106, available groundwater and soil data from this Site indicate that vapor intrusion is not likely to be a pathway of concern for future residents at the property. However, given the possible presence of soil contaminated with VOCs beneath the buildings, if residential development occurs in the areas where buildings are/were present, further assessment is recommended to evaluate the soil beneath the buildings. Future private potable water wells could become contaminated with volatile organic chemicals present in deep groundwater, and if installed, an evaluation should be made to determine whether treatment of the water is needed.

LIMITATIONS

MassDEP's review of this site was intended to ascertain whether the response actions taken, as presented, appeared to be protective of public health and environmental interests, and consistent with pertinent MassDEP regulations, policies, and accepted engineering practices. MassDEP's findings in this matter are based upon

the information contained in MassDEP's files. MassDEP's findings would be subject to further review if MassDEP becomes aware of material omissions or misstatements.

Data Summary Tables, Prepared by MassDEP

Table 1

Groundwater Concentrations (ug/l)

	Maximum	GW-1 Standards	GW-2 Standards
Tetrachloroethene	ND	5	50
Trichloroethene	63	5	5
Cis-1,2-dichloroethene	4.0	70	20
Chloroform	1.5	70	50
Trichlorofluoromethane	410	Not Applicable	13 (estimated)
Zinc	16	5000	Not Applicable

Table 2

Soil Concentrations

	Maximum (mg/kg)	S1/GW1 Standard (mg/kg)
C9-C18 Aliphatic Petroleum Compounds	5.8	1000
C19-C36 Aliphatic Petroleum Compounds	21.3	3000
C11-C22 Aromatic Petroleum Compounds	12.9	1000

Notes:
ND=Not Detected
GW-1 & 2 Standards are 2014 values (To evaluate potential future exposures)
*Trichloroethene exceeds the GW-2 standard at several locations, but the contamination is deep below the ground surface, and therefore is not likely to pose a risk of exposure by vapor intrusion.