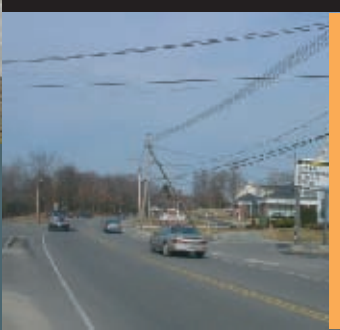
*transportation study*

# EAST ACTON VILLAGE



Submitted to: Town of Acton, Massachusetts
Planning Department

Submitted by: Vanasse Hangen Brustlin, Inc.
Watertown, Massachusetts

**Final Report**

pr.8017402cvr1.ai9

**Transportation Study**

# *East Acton Village Transportation Study*

## Acton, Massachusetts

Prepared for **Town of Acton**
**Acton, MA**

Prepared by ***VHB*/Vanasse Hangen Brustlin, Inc.**
**Watertown, Massachusetts**

**November 15, 2002**

# Table of Contents

# List of Tables

# List of Figures

# 1

# Introduction

The Town of Acton and the East Acton Village Planning Committee (EAVPC) retained the consulting firm of Vanasse Hangen Brustlin, Inc. (VHB) to conduct a transportation planning study for the East Acton Village area and surrounding roadways. This area includes Route 2A/119 (Great Road), Pope Road, Concord Road and several other roadways and developments in the region. The study is being undertaken to evaluate the existing transportation deficiencies, project future changes in travel patterns/demands, and define the long-term transportation improvements and streetscape enhancements needed in the East Acton Village area. This transportation study is a component of the East Acton Village Plan currently being drafted by the EAVPC and the Town of Acton Planning Department.

This section of the report provides a general overview of the goals for the study. Chapter 2 presents a review of the existing conditions for the study area transportation system. Chapter 3 of the report presents the future conditions analyses. Improvement alternatives developed and assessed for this study are discussed in Chapter 4.

## 1.1 Project Description

The project description for the East Acton Village Plan was defined by the Town of Acton and the EAVPC prior to the consultant selection process. This description provides the context for this transportation study effort.

### Goals and Objectives

The goals of the East Acton Village planning efforts are to promote and foster a village environment in East Acton that reflects both the goals of the Acton Master Plan and the wants and needs of stakeholders wherever possible. The Town's Master Plan goals and objectives emphasize supporting business growth of an appropriate scale that strengthens the village center and contributes to a mix of activities that improves the quality of life of the area and the fiscal stability of the Town as a whole. The East Acton Village Study will also focus on promoting a sense of community within the village by following these approaches:

### Improve Safety, Convenience, and Comfort for Pedestrians in the East Acton Village Area

- Provide traffic calming measures to facilitate pedestrian access, circulation, and safety.
- Support efforts to provide pedestrian amenities and safety features.
- Provide and complete pedestrian connections between East Acton Village and the surrounding neighborhoods and natural resource areas.
- Provide pedestrian interconnections between buildings and lots within the Village.

### Improve Bicycle Access and Safety in the East Acton Village Area

- Provide bikeways connecting East Acton Village with surrounding neighborhoods and natural resource areas, and the proposed bikeway along the Bruce Freeman rail trail[1].
- Improve the traffic circulation system to facilitate bicycle access, circulation, and safety.
- Ensure pedestrian and bicycle compatibility.
- Encourage bicycle use through incorporation of bicycle facilities.

### Improve Vehicular Circulation and Safety Within the East Acton Village Area

- Eliminate or mitigate points of automobile conflict.
- Improve traffic flow and increase safety of turning movements at intersections.

## 1.2 Study Goals

This study will develop a transportation component of the East Acton Village Plan. It will assist policy makers in determining the programming of future transportation improvements to the East Acton Village area. This study is intended to update and expand upon a similar study, referred to as the *East Acton Village Plan* that was completed by the MIT Planning Team in 1995 and the Town of Acton Master Plan Update prepared by the Acton Planning Board in 1998. It is the goal of this study to develop and recommend a series of integrated transportation solutions designed to address existing deficiencies and accommodate appropriate long-term growth in the East Acton Village area. Specifically, the study will:

▼

[1] The rail trail, part of a regional trail extending from Sudbury to Lowell, is generally referred to as the Bruce Freeman Rail Trail.

- Define the constraints under which the existing traffic, pedestrian, and bicycle infrastructure operates;
- Project future demands;
- Evaluate the ability of the transportation infrastructure to accommodate the current and long-term growth and traffic shifts associated with changing land uses, increased usage demands, and roadway/pedestrian system enhancements;
- Investigate various alternatives to address identified deficiencies and accommodate increased demands;
- Consider and summarize the ramifications of each improvement alternative on the surrounding properties, roadways, residents, businesses, and the environment, and,
- Provide recommendations to the Town and EAVPC based on the relative measures of effectiveness of each alternative on the transportation system, its cost, and the overall impact of the alternative on the surrounding environment.

The end result of the study will be a transportation component of the East Acton Village Plan, which, in concert with the Town's Master Plan and East Acton Village Plan, will serve as a planning tool for the Town. This planning tool will be able to be used by the community to identify future transportation infrastructure needs related to growth, and help define future expenditures of funds needed within the area to address these growth issues.

## 1.3 Study Area

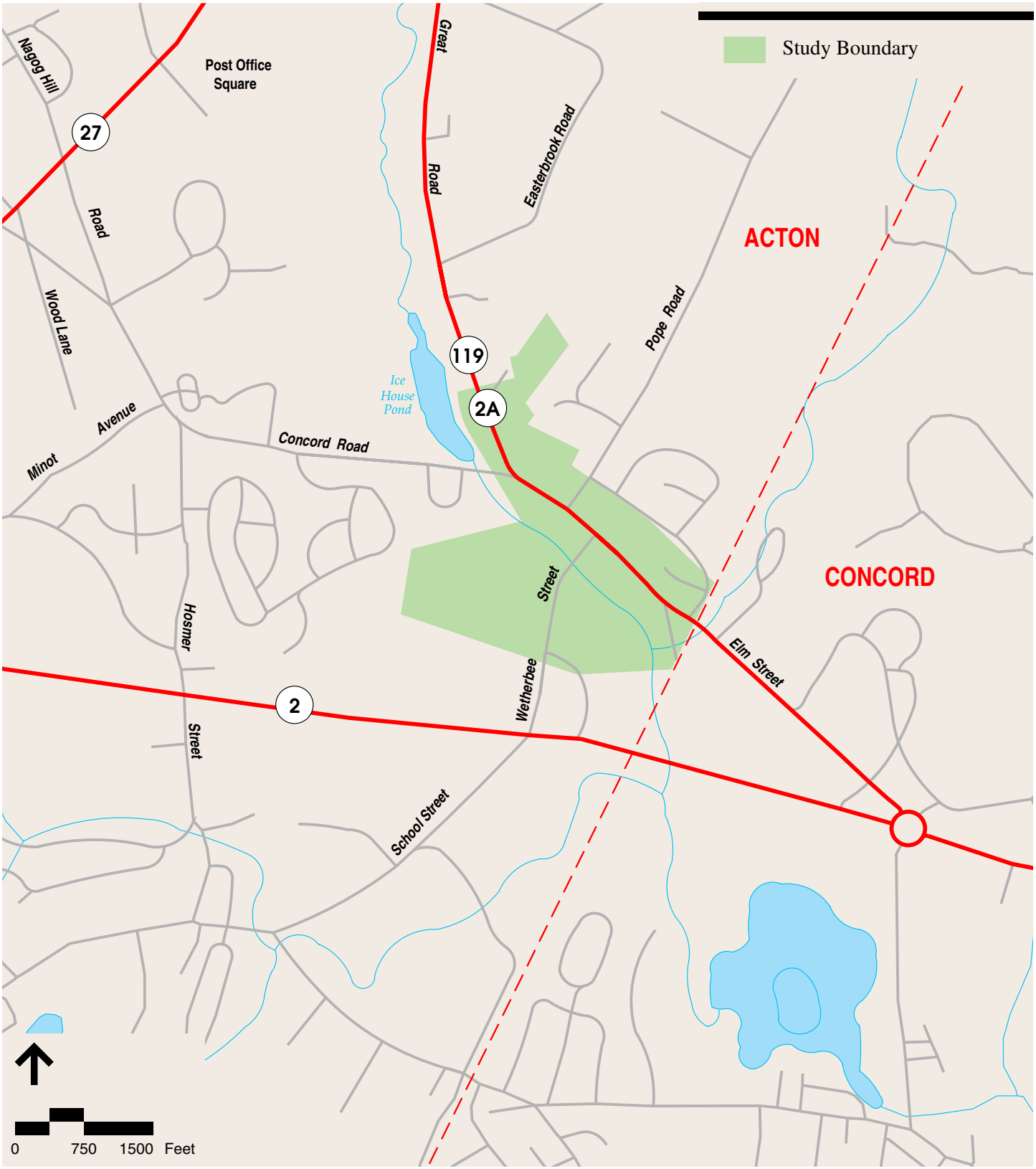
The study area for this transportation study includes key roadways and intersections in the East Acton Village area. Figure 1-1 presents a general study area map for this project. Actual descriptions of each of these roadways and intersections are provided in the Appendix to this report.

In general, the majority of the study area is located along Great Road (Route 2A/119) and is focused on its intersections with Concord Road, Pope Road, Wetherbee Street, Keefe Road, and the numerous businesses and residential properties located along the corridor.

## 1.4 Study Process

A 4-month schedule was established to complete the five major tasks that were identified for the study effort. These tasks are as follows:

- Task 1—Project Initiation/Compilation of Background Data
- Task 2—Analysis of Existing Conditions
- Task 3—Analysis of Future Conditions




Vanasse Hangen Brustlin, Inc.

Study Area Map Figure 1-1

- Task 4—Identification of Preliminary Transportation Alternatives
- Task 5—Development of Transportation Recommendations

Throughout the process, VHB presented findings to the EAVPC who has served as an Advisory Committee (AC) for this study. The committee is comprised of various transportation "stakeholders" in the East Acton region who were asked to participate and provide oversight for this, and other, projects. The purpose of the AC is to guide the study through the duration of the project, review all technical documents, and provide input on the recommendations. Most importantly, the AC will help foster cooperation and consensus for the implementation of the study's recommendations. Through the course of the project, a total of three AC meetings took take place at critical decision points.

## 1.5 Public Participation

A meaningful component of this project was public participation. Aside from the EAVPC meetings, public input was solicited through a local public informational meeting. The local outreach meeting was a widely publicized meeting with area residents and business owners to discuss specific issues and the viability of potential solutions. While the public informational meeting was somewhat structured, it was also held in an informal, "open-house" format where input was solicited broadly from the public.

# 2

# Existing Conditions

A broad understanding of the existing transportation conditions is an essential foundation to define both the short-term and long-term improvements and address safety concerns within the East Acton Village area. This chapter presents an assessment of the existing transportation conditions in the study area. Specifically, this section focuses on the existing roadway infrastructure, highlights current safety issues, and provides a discussion of how well the transportation system is accommodating current demands placed upon it. The evaluation of the existing transportation system includes a qualitative evaluation of operations within the study area and is supplemented with a quantitative evaluation of highway operations. The existing physical and operating conditions of the roadway system provide a basis for developing an understanding of the existing (and future) deficiencies and the needs of the system.

## 2.1 Existing Traffic Demand

Traffic volume data presented within this section are based on a combination of sources. In addition to the numerous referenced traffic reports[2], data were gathered through several manual counts conducted at locations where information was not available or was not current. This section provides a summary of the monthly, daily, and peak hour traffic volumes for study area roadway links and intersections used in the preparation of this study.

### 2.1.1 Monthly Traffic Demand Variation

To provide a basis for comparison of how traffic fluctuates during different months of the year in the East Acton Village area, traffic data from MassHighway was researched to determine the monthly variation in traffic volumes for the region. As part of this study, VHB gathered daily traffic volumes along the four major roadways within the study area:

- Great Road (Route 2A/119)
- Concord Road

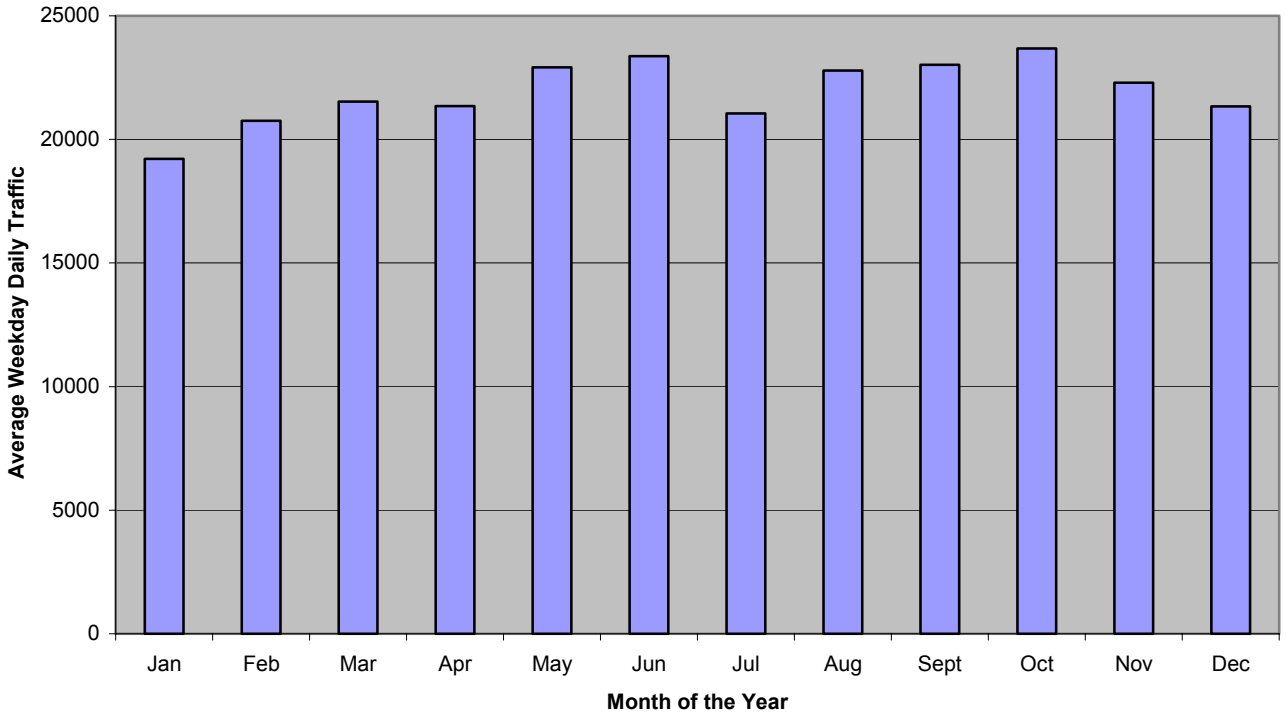
[2] See Appendix A – Bibliography for a complete listing of reference materials used in the preparation of this report.

- Pope Road, and
- Wetherbee Street

These counts were collected from March 22, 2002 through March 26, 2002 by automatic traffic recorder (ATRs). Next, the ATR data collected by VHB were seasonally adjusted using the MassHighway 2001 roadway factors for urban/rural arterials and collectors in the Acton area.

Based on the data gathered and the MassHighway regional data, March traffic volumes along Great Road (approximately 21,500 vehicles per weekday) represent annual average traffic volumes. Traffic volumes along the roadway would be expected to peak in the months of June and October at approximately 23,400 vehicles per weekday. Weekday traffic volumes are expected to be the lowest in the month of January at approximately 19,000 vehicles per weekday (vpd). Figure 2-1 presents the seasonal-based trends of weekday average daily traffic data for Great Road. The other roadways in the study area (Concord Road, Pope Road, and Wetherbee Street) show somewhat similar seasonal-based traffic fluctuations.

Figure 2-1
Monthly Variation of Weekday Traffic on Great Road



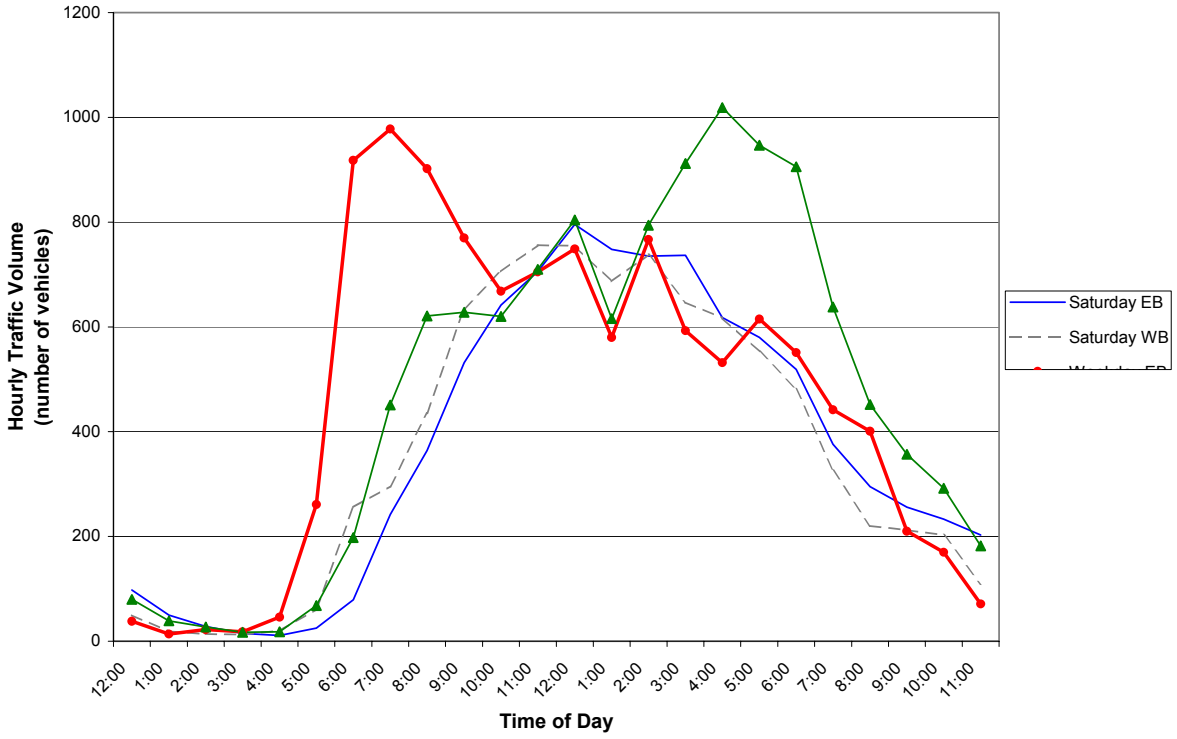

Source: ATR counts conducted by VHB in March 2002, adjusted in accordance with MassHighway seasonal data as noted at permanent count station #403 (Route 2 north of Concord Rotary).

■

### 2.1.2 Hourly Traffic Demand Variation

While the daily and monthly traffic data indicates the fluctuations in traffic by season, another set of valuable information to evaluate is the use of the roadways by time-of-day, particularly during peak periods. Looking at the peaking characteristics of demands over the course of the day helps to further understand traffic operations on a given roadway. One focus of this study was to evaluate how the key study area roadways are able to accommodate the fluctuations in daily demands. Figure 2-2 presents the weekday and Saturday traffic demand profiles for Great Road (Route 2A) using data collected by VHB on March 23, and March 26, 2002.

Figure 2-2
Hourly Variation of Vehicles on Great Road (2002)



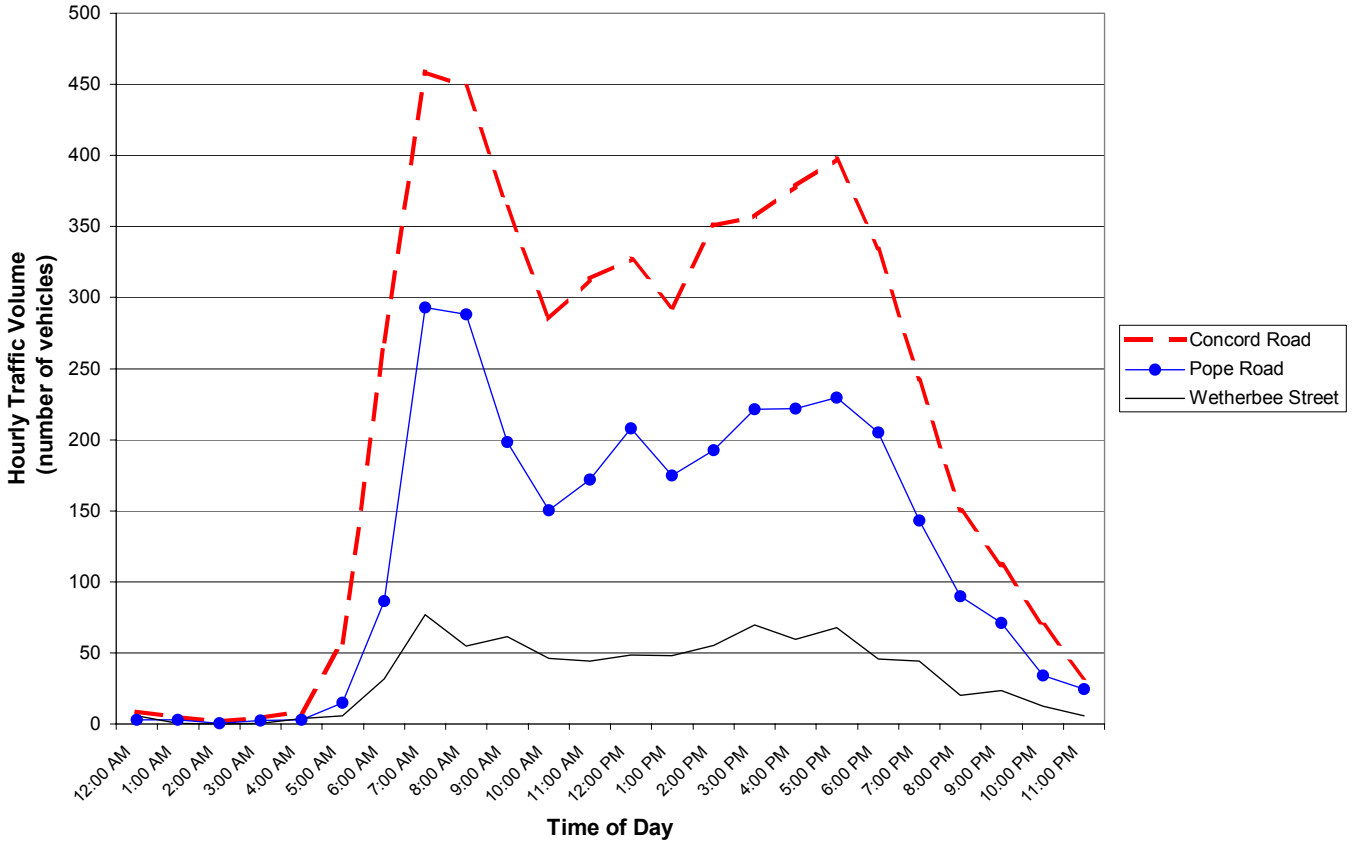

Source: VHB Automatic Traffic Recorder Counts conducted along Great Road in March 2002. Volumes represent both directions of travel.

Based on the traffic data collected by VHB, on a typical weekday, traffic demands on Great Road exhibit a distinct peak period during the morning between the hours of 7:00 AM and 9:00 AM. A longer second peak occurs around 2:00 PM and lasts until around 7:00 PM. The peak two-way traffic demand along Great Road occurs in the late afternoon between 4:00 PM and 5:00 PM with approximately 1,560 vehicles per hour (vph).

As would be expected, Saturday traffic demands on Great Road exhibit slightly different peaking characteristics than weekday traffic demands. On a Saturday, Great Road has an extended peak period from just before noontime until about 3:00 PM. The peak traffic demands occur in the early afternoon at about 1,550 vph.

Other corridors in the study area exhibit similar peaking trends and characteristics. Figure 2-3 presents a comparison of the hourly fluctuation of all study area roadways during the weekday. As shown, although much lower in volume, Wetherbee Street, Pope Road, and Concord Road peak simultaneously during a typical day.

Figure 2-3
Hourly Variation of Vehicles on Other Roads (2002)




Source: VHB Automatic Traffic Recorder Counts conducted along subject roadways in March 2002. Volumes represent both directions of travel.

■

## 2.1.3 Peak Hour Traffic Volumes

Peak period turning movement counts (TMCs) were conducted at study area intersections by VHB staff during the weekday morning and evening peak hours (on March 21, 2002), as well as midday Saturday (on March 23, 2002). These TMCs were conducted during the weekday between the hours of 6:30 to 8:30 AM and 4:00 to 6:00 PM, to coincide with the peak commuter traffic activity identified previously. Since traffic patterns tend to shift from a commuter-mode to a leisure mode on Saturday and Sunday, daily traffic volumes were reviewed and it was determined that manual turning movement counts be conducted from 11:00 to 1:00 PM on Saturday. To assure that the traffic assessment neither underestimates nor overestimates intersection and roadway deficiencies, VHB compared the traffic

volumes to data previously obtained[3] within the study area. This comparison indicates that the traffic volumes collected in March 2002 are reflective of a "typical" day. While, in total, the daily traffic volume along Great Road is significantly lower on a Saturday, the Saturday peak periods are very similar to the demands experienced during the weekday morning and evening peak periods. Table 2-1 presents the peak hour volume comparison along roadways within the study area.

All of the data compiled for this report represent average annual conditions as described above. Figures 2-4 to 2-6 present the existing weekday morning, evening, and Saturday peak hour traffic volume networks, respectively.

Table 2-1
Comparison of Weekday Peak Hour Volumes and
Peak Saturday Volumes for Key Study Area Roadways

| Location | Weekday Morning Peak Hour Volumes[1] | Weekday Evening Peak Hour Volumes[2] | Saturday Peak Hour Volumes[3] |
|---|---|---|---|
| Great Road (between Concord Rd and Wetherbee St.) | 1,520 | 1,560 | 1,550 |
| Wetherbee Street | 70 | 85 | 80 |
| Pope Road | 225 | 230 | 170 |
| Concord Road | 440 | 475 | 415 |

1 As presented in Figure 2-4 entitled Existing Morning Peak Hour Traffic Volumes.
2 As presented in Figure 2-5 entitled Existing Evening Peak Hour Traffic Volumes.
3 As presented in Figure 2-6 entitled Existing Saturday Peak Hour Traffic Volumes.

As the table indicates, morning and evening peak traffic volumes are very similar over the three periods for a specific roadway. Of note is along Pope Road where peak volumes are approximately 225-230 vehicles per peak hour on the weekday but drop to 170 during the weekend. This is a potential indication that Pope Road is being used as cut through roadway during the peak commuter periods to bypass the more congested areas in and around the East Acton Village area.

■

### 2.1.4 The Concord Rotary

One of the specific issues noted by members of the general public and of the EAVPC was the influence of the Concord Rotary on the study area roadways. According to members of the EAVPC, during the peak commuting periods it is common to see the Route 2A approach to the rotary back up significantly, which has a direct impact on traffic operations within the East Acton Village area. Specifically, members noted several occasions when the traffic queue extended from the Rotary all the way to Concord Road. In these cases, drivers would use Pope Road as a means of

▼

[3] *Brookside Village Shops; Traffic Impact Study* prepared by VHB, 2002.


Vanasse Hangen Brustlin, Inc.

2002 Existing Weekday Morning Peak Hour Traffic Volumes

Figure 2-4


Vanasse Hangen Brustlin, Inc.

2002 Existing Weekday Evening Peak Hour Traffic Volumes

Figure 2-5


Vanasse Hangen Brustlin, Inc.

2002 Existing Saturday Midday Peak Hour Traffic Volumes

Figure 2-6

by-passing the congestion created by the Rotary. While it is unclear how many vehicles per day use Pope Road as a means of avoiding the Rotary, it was noted that cut through traffic is evident at certain times of the day.

On the many occurrences that VHB staff and representatives have been in the study area during the early morning peak commuter hours and during the afternoon commuter periods, traffic queues were not observed to extend into the project study area. While the queue was observed to be significant at times, it never was observed to extend past the Concord/Acton town line into the EAVPC area. This issue was discussed with the Town's Planning and Engineering staff who concurred that a vehicle queue extending into the EAVPC area is an exception more than the general rule.

Regardless, it was decided that the development of improvement alternatives will take into consideration the rotary's impact on both the existing and projected future traffic volumes within the study area.

## 2.2 Existing Traffic Operations

The next step in the study process was to evaluate the operations of the study area roadway system with the Concord rotary influence being considered. This analysis provides a technical assessment of the operational qualities of intersections, and roadway links, using the procedures documented in the *2000 Highway Capacity Manual*[4] and the hourly traffic demand volumes. The traffic analysis was conducted using morning, evening, and Saturday peak period traffic volumes, collected by VHB in March, 2002, and the geometric design conditions as they currently exist along the study area roadways.

Understanding the relationship between the supply and demand on a roadway is a fundamental consideration in evaluating how well a transportation facility fulfills its objective to safely and efficiently accommodate the traveling public. The traffic operations analysis procedures used to evaluate the study area roadways assigns a level-of-service (LOS) rating for each specific segment, intersection, or area of roadway analyzed. LOS is a qualitative measurement of the operating conditions of a roadway facility or intersections taking into account a number of variables such as speed, vehicle maneuverability, driver comfort, and safety. Similar to a report card, LOS designations are letter based, ranging from A to F, with LOS A representing free flow conditions and LOS E and F representing conditions where a roadway is operating at capacity or failing.

4 *Special Report 209 – Highway Capacity Manual;* Transportation Research Board, National Research Council; Washington D.C. 2000

■

### 2.2.1 Roadway Level of Service

Traffic operating conditions along various sections of study area roadways were evaluated using the standard analysis procedures noted. Roadway analysis takes into account a number of factors, including volume, lane width and the width of shoulders, general terrain features (level roadway or rolling hills), vehicle speeds, and the variety of the vehicles traveling along the corridor.

The roadway segment LOS results for the specific links along Great Road within the study area are shown in Table 2-2. Important to note in the evaluation is the volume-to-capacity (V/C) measurement. V/C is a measurement of how many vehicles are traveling along the roadway versus the theoretical maximum number of vehicles that could be traveling along it[5]. For example, a V/C ratio of 0.50 indicates that the roadway is carrying 50 percent of its theoretical available capacity. Generally, a v/c ratio of 0.75 is considered the effective capacity of a roadway.

Table 2-2
Roadway Segment Capacity Analysis

| | Morning Peak Hour | | | Evening Peak Hour | | | Saturday Peak Hour | | |
|---|---|---|---|---|---|---|---|---|---|
| Roadway Segment | Volume | V/C[1] | LOS[2] | Volume | V/C | LOS | Volume | V/C | LOS |
| Great Road, between Concord TL[3] and Wetherbee Street | 1,375 | 0.48 | E | 1,420 | 0.49 | E | 1,490 | 0.52 | E |
| Great Road, between Wetherbee Street and Pope Road | 1,410 | 0.49 | E | 1,470 | 0.51 | E | 1,505 | 0.52 | E |
| Great Road, between Pope Road and Concord Road | 1,525 | 0.53 | E | 1,480 | 0.51 | E | 1,505 | 0.52 | E |
| Great Road, between Concord Road and study area limits | 1,205 | 0.42 | E | 1,310 | 0.46 | E | 1,405 | 0.49 | E |

1 V/C - Volume-to-capacity ratio.
2 LOS - Level-of-service.
3 TL – Town Line

As Table 2-2 indicates, for the most part, Great Road is operating at around 50 percent of its capacity (LOS E). Because this is a peak period analysis, the remaining periods of the day are expected to exhibit better roadway operations than those shown in Table 2-2. It should be noted that during the traffic counting periods, traffic back-ups from the Concord rotary did not extend into the East Acton Village study area. For this reason, the analysis shown is representative of a free-flow capacity condition and was not artificially influenced by traffic congestion at the rotary. Other roadways such as Concord Road, Pope Road, and Wetherbee Street operate at around 25 percent of their capacity.

▼

[5] v/c calculations and theoretical comparisons are preformed in accordance with the methodology presented in the 2000 Highway Capacity Manual.

■

### 2.2.2 Intersection Level of Service

The procedures for analyzing the existing operational conditions of unsignalized intersections are based on analysis procedures presented in Chapter 10 (Unsignalized Intersections) of the *2000 Highway Capacity Manual*. A detailed discussion of the LOS criteria for unsignalized intersections is provided in the Appendix B to this report.

The results of the intersection analysis under existing peak hour conditions are summarized in Table 2-3 for the key unsignalized intersections in the study area. It is important to note that the unsignalized intersection analysis presents operating conditions for the critical side street and left-turn movements from Great Road. The unsignalized analysis assumes that through-traffic along Great Road is generally not affected by the delays occurring on the side streets. Table 2-3 provides the level of service for movements from the side street approaches.

Table 2-3
Unsignalized Intersection Capacity Analysis- Existing Conditions

| | | Movement[1] | Demand[2] | Delay[3] | LOS[4] |
|---|---|---|---|---|---|
| Great Road at Wetherbee Street | Morning Peak Hour | Northbound | 15 | 20 | C |
| | Evening Peak Hour | Northbound | 10 | 27 | D |
| | Saturday Peak Hour | Northbound | 10 | 25 | C |
| Great Road at Pope Road | Morning Peak Hour | Southbound | 95 | 38 | E |
| | Evening Peak Hour | Southbound | 100 | 49 | E |
| | Saturday Peak Hour | Southbound | 80 | 40 | E |
| Great Road at Concord Road | Morning Peak Hour | Northbound | 335 | 50 | F |
| | Evening Peak Hour | Northbound | 185 | 42 | E |
| | Saturday Peak Hour | Northbound | 195 | 55 | F |

1 For unsignalized intersections, the operations of the critical movements from the minor street and the left-turn movement from the major street are reported.
2 Demand refers to the number of vehicles exiting the side street during the peak hour analyzed.
3 Approach delay, expressed in seconds per vehicle.
4 LOS: Level-of-service.

As Table 2-3 indicates, two of the three unsignalized intersections currently operate with long delays to vehicles exiting the side street based on the operational criteria during the peak periods. The intersection of Wetherbee Street at Great Road operates at an acceptable operating level during peak hours.

Left-turns from Pope Road experience regular delays. Evidence of drivers cutting through the adjacent retail facility to avoid the left-turn delays was noted as well, which could indicate that left-turn traffic demand is actually greater at this location. Left-turns from Concord Road operate at LOS F during the weekday morning and Saturday midday peak periods. In this case, based on field observations, drivers are taking less than adequate gaps to enter the Great Road traffic stream (i.e. they are

pulling out in front of on-coming traffic expecting the mainline drivers to slow down as they accelerate). This is a safety issue and typically highlights that there may be the need for further examination, although it does not appear that this is manifesting itself in a higher than normal accident trend based on the review of accident data (following this section).

In addition to the key intersections, there are many unsignalized driveways located along the Great Road corridor. Generally, left-turns from all of these driveways become difficult during the peak periods, and similar delays can be experienced. Unsignalized intersections that may be candidates for future signalization will be reviewed as part of a later stage of this study.

## 2.3 Existing Safety and Accident Analysis

A safety evaluation was conducted to identify study area locations that may be unsafe to motorists and/or pedestrians. This evaluation consisted of compiling and analyzing accident data, provided by the Massachusetts Highway Department (MassHighway) and the Town of Acton, reviewing the existing roadway geometry for design deficiencies, and providing a qualitative assessment of pedestrian needs based on field observations.

### 2.3.1 MassHighway Crash Data

Crash data were obtained from the Massachusetts Highway Department for the three-year period from January 1, 1998 to December 31, 2000 (the most recent data available). As Table 2-4 shows, a total of 28 accidents have occurred at the study area intersections over this time period. The highest accident incidence was experienced at Great Road and Concord Road (11 accidents). The next highest incidence was at Pope Road (8 accidents), followed by Wetherbee Street (2 accidents).

The majority of crashes at the study area intersections are of the angle or rear-end type. Angle-type accidents are indicative of vehicles from the minor road turning onto a high-speed/ high-volume major road or visa versa. Rear-end accidents are often indicative of vehicles attempting to turn onto or from a minor road and the vehicles behind them either not slowing in time or advancing thinking that the turning vehicle has already proceeded. Personal injury accidents occurring at the three intersections may be attributed to the volume and speed of traffic on Great Road. It is important to note that many of the accidents occurred during off-peak times of the weekday and on dry pavement. This indicates that congestion is not a general cause of the accidents occurring in the field and that roadway alignment and geometrics *could* be influencing the safety issues along the corridor.

Crash rates are calculated based on the number of accidents at an intersection and the volume of traffic traveling through that intersection on a daily basis. Rates that

exceed the statewide average could indicate safety or geometric issues at an intersection. The 2001 statewide average crash rate is 0.65 accidents for an unsignalized intersection and 0.89 for a signalized intersection. These rates imply that, on average, 0.65 accidents occurred per million entering vehicles at unsignalized intersections throughout the state of Massachusetts in 2000. None of the intersections within the East Acton Study Area exceed the statewide average.

Finally, as part of the accident database, MassHighway has prepared a list of the top 1,000 high accident locations through the entire state of Massachusetts. The most current list (1999) compiles data from 1994, 1995, and 1996. None of the study area intersections in East Acton are designated as a high accident location.[6]

[6] *High Accident Intersection Report.* Prepared by the MassHighway Safety Management Unit. 1999.

## Table 2-4
## Vehicular Crash Summary (1998 - 2000)

| Scenario | Concord Road | Great Road at Pope Road | Wetherbee Street | Other[1] | Total |
|---|---|---|---|---|---|
| Year | | | | | |
| 1998 | 4 | 3 | 1 | 3 | 11 |
| 1999 | 5 | 2 | 1 | 4 | 12 |
| 2000 | 2 | 3 | 0 | 0 | 5 |
| Total | 11 | 8 | 2 | 7 | 28 |
| Collision Type | | | | | |
| Angle | 4 | 2 | 2 | 5 | 13 |
| Rear-end | 7 | 5 | 0 | 0 | 12 |
| Unknown | 0 | 1 | 0 | 2 | 3 |
| Total | 11 | 8 | 2 | 7 | 28 |
| Severity | | | | | |
| Hit and Run | 0 | 1 | 0 | 0 | 1 |
| Injury Accident | 4 | 2 | 0 | 3 | 9 |
| Fatality | 0 | 0 | 0 | 0 | 0 |
| Property Only | 7 | 5 | 2 | 4 | 18 |
| Total | 11 | 8 | 2 | 7 | 28 |
| Time of day | | | | | |
| 7:00 AM - 9:00 AM | 2 | 2 | 0 | 1 | 5 |
| 9:00 AM - 4:00 PM | 6 | 5 | 1 | 5 | 17 |
| 4:00 PM - 6:00 PM | 2 | 0 | 1 | 0 | 3 |
| 6:00 PM - 7:00 AM | 1 | 1 | 0 | 1 | 3 |
| Day of Week | | | | | |
| Monday-Friday | 10 | 5 | 1 | 6 | 22 |
| Saturday-Sunday | 1 | 3 | 1 | 1 | 6 |
| Total | 11 | 8 | 2 | 7 | 28 |
| Pavement Conditions | | | | | |
| Dry | 6 | 7 | 2 | 5 | 20 |
| Icy | 1 | 0 | 0 | 0 | 1 |
| Snowy | 0 | 1 | 0 | 0 | 1 |
| Wet | 4 | 0 | 0 | 2 | 6 |
| Total | 11 | 8 | 2 | 7 | 28 |
| MassHighway Crash Rates | 0.54 | 0.42 | 0.11 | | |

Source: Compiled by VHB from data obtained from MassHighway.
1 Includes crashes not occurring at any of the specifically defined study area intersections.

## 2.4 Bicycle and Pedestrian Infrastructure

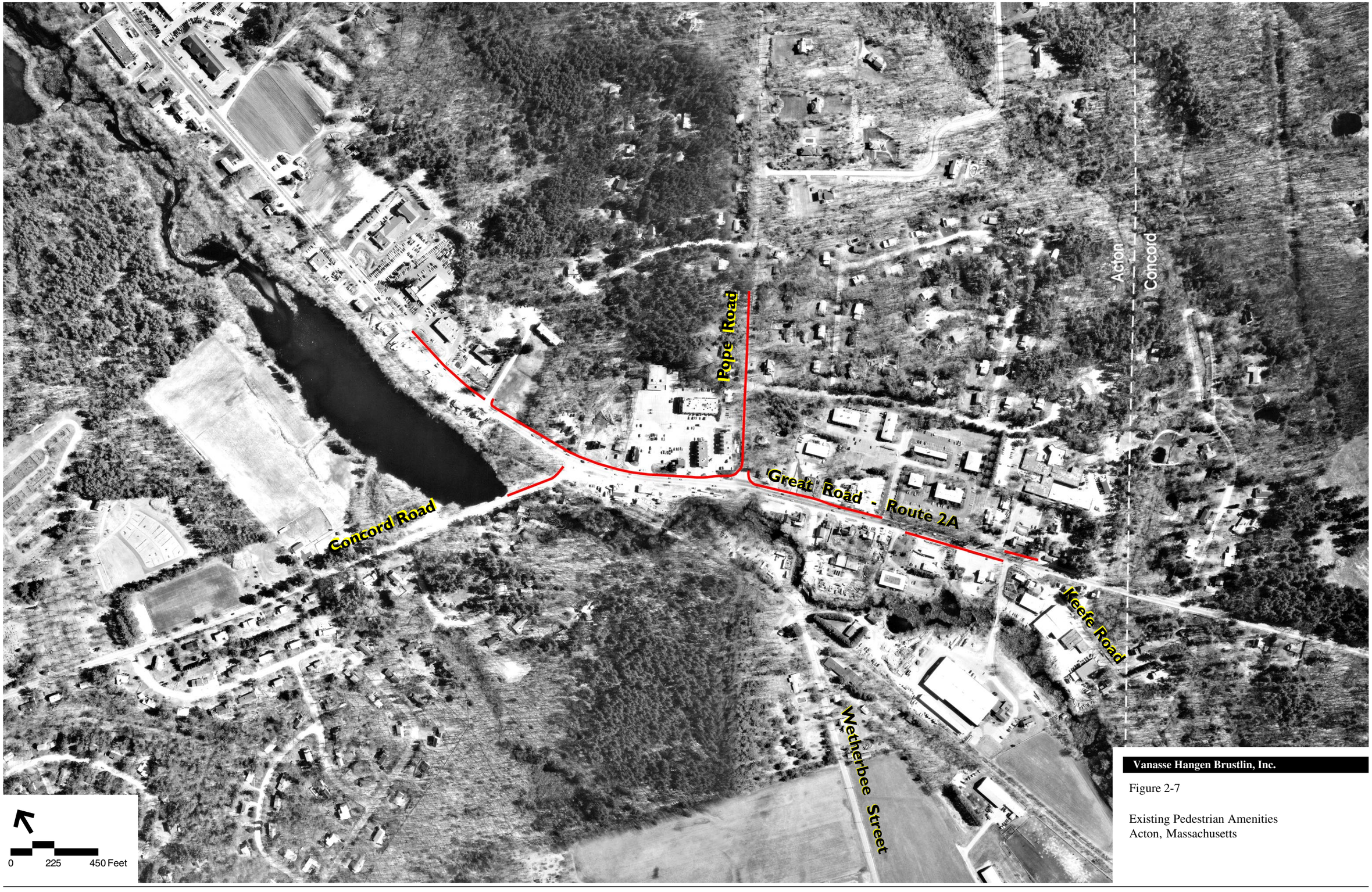
A major goal of this study is to improve the safety, convenience, and comfort of pedestrians and bicyclists in the village area. As the Town of Acton strives to re-establish a village character within the community, strong bicycle and pedestrian connections in and around the surrounding areas become vital. It is envisioned that these connections will decrease the need for automobile use within the village and increase pedestrian and bicycle accessibility by connecting East Acton corridors to those of the surrounding villages and shopping areas. A major objective of this study was to identify and address existing pedestrian and bicycle deficiencies. As such, a comprehensive field visit and data collection effort was undertaken by VHB to review the condition of the roadways, sidewalks, and amenities serving non-motorized modes of transportation within the study area. The findings are summarized below and in Figure 2-7:

- Sidewalk conditions vary widely from poor conditions (broken pavement or non-existent) to excellent conditions with full width pavement/concrete and adequate connections to other pedestrian amenities;
- No crosswalks exist along Great Road within the study area to allow pedestrians to cross at locations where the sidewalk ends; and
- No formalized bicycle facilities are present. However there is a five-foot shoulder on either side of Great Road that could accommodate bicycles.

Largely, these findings are consistent with the deficiencies noted in the Town's Master Plan Update; limited facilities for pedestrians and cyclists result in poor conditions within and between village centers and the outlying residential areas. However, it is important to note that the Town does have a comprehensive sidewalk master plan. While this study identifies deficiencies within the study area, sidewalks exist outside the study area in many locations. A complete sidewalk inventory provided by the Town of Acton can be found in Appendix C.

Subsequent steps in the study process identify and prioritize steps to improve connections and conditions within East Acton Village. This includes identifying those connections already being considered in the Town, such as the Bruce Freeman rail trail.

\\mawatr\ts. 08021\graphics\figures\8021-EC2\8658\10/29/2002




**Vanasse Hangen Brustlin, Inc.**

Figure 2-7

Existing Pedestrian Amenities
Acton, Massachusetts

## 2.5 Existing Conditions Summary

The evaluation of existing traffic operations has provided an overview of the operational characteristics at study area intersections and roadways. The analysis has shown that there are specific locations where traffic operations do not meet the desired standards (LOS D or better). Figure 2-8 summarizes the overall operational conditions in the study area.

### Traffic Operations

This study analyzed traffic operations at various locations within the East Acton Village Area.

**Unsignalized Intersections**. A total of three unsignalized intersections were evaluated as part of this project. These locations include Concord Road, Pope Road, and Wetherbee Street's various intersections with Great Road and were selected based on consultation with the East Acton Village Planning Committee (EAVPC), and observed traffic exiting and entering the side streets. The intersections of Concord Road at Great Road and Pope Road at Great Road are currently operating at poor levels of service with somewhat extended delays experienced by vehicles exiting the side streets.

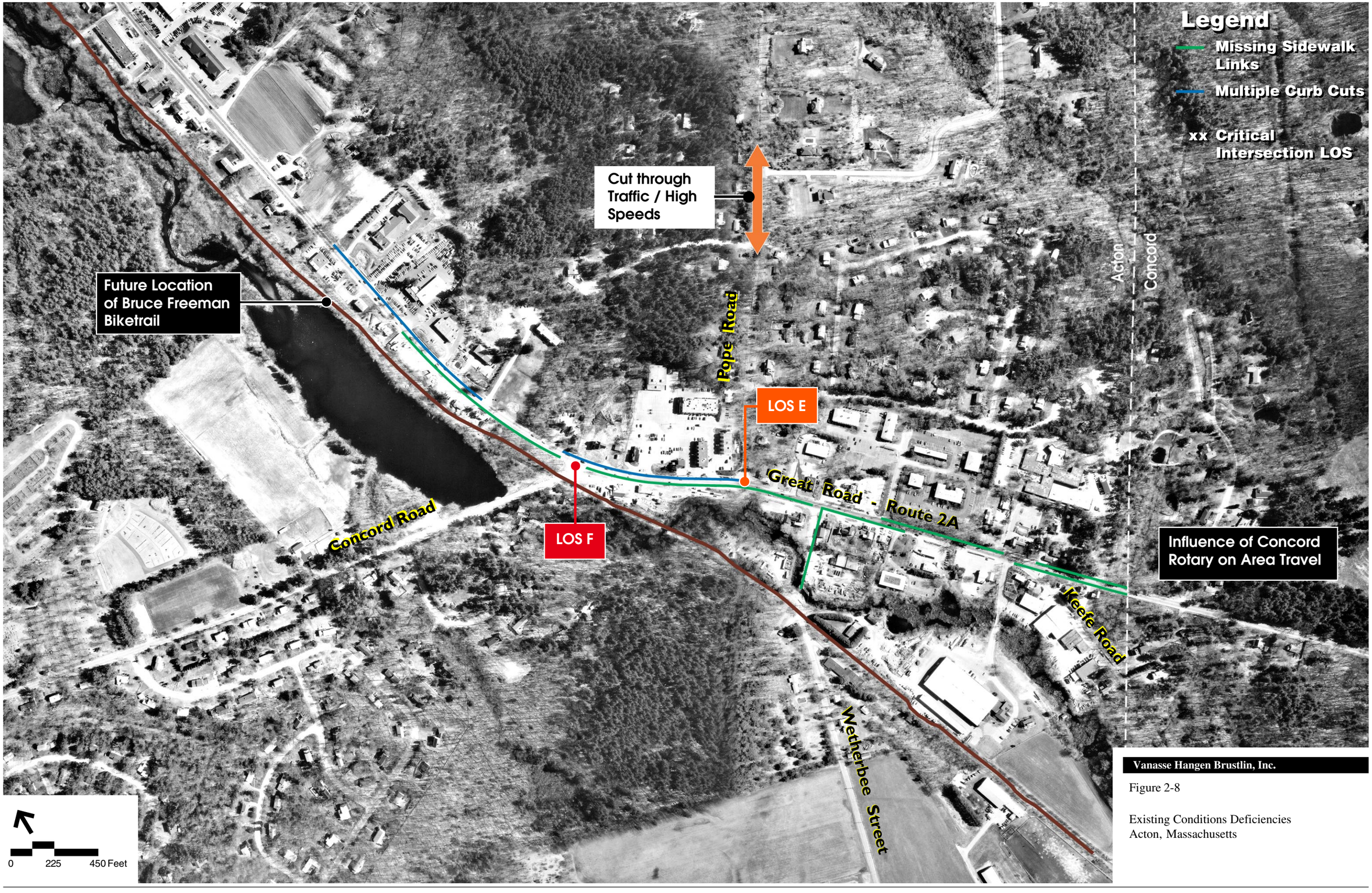
**Roadway Segments**. Four sections of Great Road within the study area were evaluated based on their ability to carry the current traffic volume loads. All of these segments operate at LOS E, but appear to have additional capacity to accommodate growth in the future.

### Safety

Traffic safety data for the East Acton Village area (for the most recent three-year period available) indicates that there are no intersections within the project limits that are exhibiting "higher than expected" crash rates. However, the high number of accidents occurring along Great Road between intersections indicates that the many curb-cuts along the corridor may be contributing to some of the perceived (and real) safety issues that do exist within the study area.

### Bicycle and Pedestrian Amenities

The review of in-field conditions noted that there are limited pedestrian facilities along Great Road. Sidewalks are not consistently provided and do not lead from the residential neighborhood to the many local shops. No pedestrian crosswalks or bicycle facilities exist within the study area, although there are several connections that would be desirable. There is also a lack of bicycle amenities currently within the study area.




**Vanasse Hangen Brustlin, Inc.**

Figure 2-8

Existing Conditions Deficiencies
Acton, Massachusetts

# 3

# Future Conditions Analysis

The second phase of the East Acton Village Transportation Study involved developing an understanding of the anticipated future transportation conditions throughout the study area. This chapter summarizes the results of the future conditions traffic assessment. Data collected and assembled during the existing conditions task of this study were used in conjunction with information prepared by the Acton Planning Department to forecast future vehicular travel demands. These projected traffic volumes were used to assess future traffic conditions on roadways and at key intersections within the study area.

## 3.1 Methodology

This future conditions assessment has projected traffic volumes to a 10-year (2012) planning horizon for the weekday morning, evening, and Saturday peak periods. To arrive at a 2012 'No-Build' traffic condition (without factoring into the analysis any other speculative traffic growth within the East Acton Village area), the existing (2002) traffic volumes were increased by applying a general area growth rate and by adding traffic associated with planned and approved area developments.

In addition to developing the 2012 No-Build traffic conditions, VHB evaluated two additional traffic build out scenarios as part of this task, as requested by the Town of Acton and the EAVPC. Each option considers development within the East Acton Village area based on two different zoning build out scenarios.

The first scenario considers the potential of developing the East Acton Village study area to the maximum extent possible under current zoning. The second scenario considers the potential impacts of modifying the current zoning within the East Acton Village study area to permit more intensive development of commercial and retail properties. In both cases, potential build out scenarios were provided to VHB by the Town and assumed to be representative of the build out potential for the area.

Once the potential build out scenarios were identified, VHB estimated the traffic impacts associated with the development scenarios and assigned the new traffic to the area roadways to develop the 2012 "Current Zoning Build Out Scenario" and the 2012 "Modified Zoning Build Out Scenario" traffic volume networks.

Using these traffic volume projections, VHB then assessed study area traffic operations assuming existing roadway conditions remain the same. The resulting findings will form the basis for identifying specific mid-term and long-term roadway and infrastructure needs and deficiencies for the East Acton Village area.

## 3.2 Development of Future Traffic Volumes

The traffic growth on the area roadways is a function of the expected land development in the area, historical traffic growth and a number of potential outside factors such as developments and roadway improvements outside of the Town. Historical traffic growth in the East Acton Village area was reviewed along with potential build out scenarios highlighted by the Town and EAVPC. The following sections discuss the specific methods used to determine the future traffic volumes within the East Acton Village area and will set the framework for the next stage of the study – evaluation of the future transportation improvements along study area roadways.

### 3.2.1 Historical Traffic Growth

Traffic volumes provided in a number of independent traffic studies and planning efforts performed in the vicinity of the East Acton Village area were reviewed including the Route 27 Corridor Study[7], information provided by MassHighway, and a regional growth model provided by the Central Transportation Planning Staff (CTPS)[8]. These volumes were then compared to those collected as part of this study in 2002. Table 3-1 below outlines the historical information used as part of this study. The results of this traffic growth research show that roadway traffic volumes in the vicinity of the Village area have been growing at an overall rate of about 1 percent per year. Therefore, for the purposes of developing the 2012 No Build scenario, a 1.0 percent per year background growth rate was defined for all study area roadways. The regional model figures used to derive these percentages are presented in the Appendix.

[7] *Route 27 Corridor Study*, VHB August 2001

[8] *Route 2 Long Range Feasibility Study*, Central Transportation Planning Staff, July 1996

Table 3-1
Growth Information[1]

| Roadway Segment | Morning Peak Hour Percent Growth[2] | | | Evening Peak Hour Percent Growth | | |
|---|---|---|---|---|---|---|
| | NB or EB | SB or WB | Total | NB or EB | SB or WB | Total |
| Route 27 (south of Brook Street) | 1.3 % | 1.3 % | 1.3 % | 1.2 % | 1.3 % | 1.3 % |
| Route 27 (north of Hayward Road) | 1.0 | 1.0 | 1.0 | 1.1 | 1.1 | 1.1 |
| Route 2 (south of Taylor) | 0.5 | 1.2 | 0.9 | 1.7 | 1.0 | 1.4 |
| Route 2 (north of Hayward) | 0.3 | 1.0 | 0.7 | 1.5 | 1.0 | 1.3 |
| Taylor Road | 1.2 | 0.5 | 0.9 | 0.5 | 0.5 | 0.5 |
| Route 2A (north of Concord Road) | 1.6 | 0.5 | 1.1 | 0.5 | 0.5 | 0.5 |
| Average growth for area roadways | 1.0 % | 0.9 % | 1.0 % | 1.1% | 0.9% | 1.0% |

1 Percent growth based on the CTPS Regional Model.
2 Percent growth represents annual average growth between 1995 and 2020 based on regional model traffic volumes.

■

### 3.2.2 Site Specific Traffic Growth

In addition to the historical traffic growth for the area, VHB and the Town also researched specific land development projects that are either approved for development or are currently in the pipeline for development. These projects are either under construction or are in the planning process and not expected to change significantly as the process moves forward.

As part of this research, two specific projects were identified that may have a potential impact on traffic volumes and patterns through the East Acton Village area. These two projects are discussed briefly below:

- ***Brookside Village Shops*** – This project is currently under construction and is located just outside of the East Acton Village area at the intersection of Great Road and Esterbrook Road. The project consists of 74,000 square feet of retail development. The traffic estimates for this project were detailed in a traffic impact and access study[9] prepared by VHB in May 2000 and the traffic estimates are provided in the Appendix to this study for reference purposes.

- ***Conversion of Movie Cinema to Retail Store –*** This project is located at the corner of Pope Road and Great Road within the East Acton Village area. The project entails the conversion of a movie cinema to a liquor store and recycling center. In addition to the conversion of the land use, several site modifications will take place aimed at reducing the potential for cut-through

▼

[9] *Draft Environmental Impact Report, Brookside Village Shops*, Tocci/Brace Partners May 2000 EOEA #12170

traffic currently using the site to avoid delays at the intersection of Pope Road and Great Road as well as aesthetic improvements to the corridor.

The traffic estimates associated with each project were also included along with the general background traffic growth to develop the 2012 No Build (baseline) traffic volume networks. This represents the known traffic that will likely be traveling along the roadways exclusive of any speculative development scenarios. Over the next 10 years, however, there could be additional development and associated traffic growth not included in these numbers, which are discussed in the next section. The 2012 No Build scenario simply defines what is known to be in the pipeline and will most likely become a reality.

■

### 3.2.3 Development Scenarios

Once the historic traffic growth trends were identified along with any known site-specific development projects, the next step in determining the long-term growth of traffic volumes in the area was to consider potential development within the Village area. As part of this transportation study, the Town and EAVPC developed two potential growth projections based on current and Modified Zoning scenarios within the study area.

The two different growth scenarios that were prepared for this study are based on discussions with the Town's Planning Department. They are based on the current zoning with slight modification (scenario 1) and the current zoning with significant modification (scenario 2) within the study area (as shown in Figure 3-1) and consider the following:

- Parcel Size
- Developable Parcel Area
- Current Building Square Footage and Use (residential, commercial, retail)
- Existing Floor-to-Area Ratios (FAR) under current zoning
- Potential Remaining Building Square Footage or Residential Units

In short, scenario 1 assumes that all properties will be built to their maximum potential under current zoning or remain at their existing density (whichever is larger). This scenario also assumes extension of the EAV zone to include R-2 properties along Wetherbee Street and some of the LB zone along Great Road. Scenario 2 assumes that all commercially zoned properties in scenario 1 will be developed to a 0.4 floor area ratio (FAR), and that the Moritz parcels on Wetherbee Street would be developed to a 0.2 FAR.

Table 3-2 and Table 3-3 present summaries of the potential development scenarios as prepared by the Town and EAVPC for the scenarios tested. Each table provides a summary of the existing square footage of commercial, retail, and residential space for each of the various zoning districts within the study area. They also provide a

description of the potential additional commercial and residential development permitted for each of the zoning districts


**Vanasse Hangen Brustlin, Inc.**

Figure 3-1

East Acton Village Study Area
Current Zoning
Acton, Massachusetts

within the study area. Detailed development scenarios provided by the Town and a description of each of the zoning districts are provided in the Appendix for reference purposes.

Table 3-2
Potential Development – Current Zoning[1]

| Zone | Existing Commercial Floor Area (sf) | Existing Residential (Units) | Potential Additional Commercial Floor Area (sf) | Potential Additional Residential (Units) |
|---|---|---|---|---|
| EAV | 121,532 | 24 | 58,011 | -24[2] |
| LB | 15,381 | 1 | 26,214 | -1[2] |
| R-8 | 3,360 | 1 | 0 | 2 |
| SM | 83,683 | 2 | 6,121 | -2[2] |
| R2 & R-8/4 | 6,437 | 5 | 35,116 | 25 |
| R-A | 0 | 226 | 0 | 0 |
| Total | 230,393 sf | 259 | 125,462 sf | - 0 - |

1 As defined by the Town of Acton Planning Department.
2 Assumes residential units are redeveloped into commercial space.

As Table 3-2 shows there is approximately 125,500 sf of additional commercial floor area remaining to be constructed within the study area environment under the existing zoning. It also notes that there are approximately 27 new residential units that could be developed within R-8 and R2&R-8/4 districts. However, the scenarios used assume that 27 existing residential units located within the EAV, LB, and SM zoning districts would be redeveloped as commercial uses. Therefore, there were no net additional residential units considered as part of scenario 1.

Table 3-3
Potential Development – Modified Zoning[1]

| Zone | Existing Commercial Floor Area | Existing Residential Units | Potential Additional Commercial Floor Area | Potential Additional Residential Units |
|---|---|---|---|---|
| EAVPC | 121,532 | 24 | 246,279 | -24[2] |
| LB | 15,381 | 1 | 64,922 | -1[2] |
| R-8 | 3,360 | 1 | 0 | 2 |
| SM | 83,683 | 2 | 82,265 | -2[2] |
| R2 & R-8/4 | 6,437 | 5 | 347,647 | -5[2] |
| R-A | 0 | 226 | 0 | 0 |
| Total | 230,393 sf | 259 | 741,113 sf | -30 |

1 As defined by the Town of Acton Planning Department.
2 Assumes residential units are redeveloped into commercial space

As Table 3-3 indicates, if changes to the current zoning are instituted based on the scenario provided by the Town (details of the specific changes are provided in the Appendix), the potential additional commercial floor area increases from 125,500

square feet under current zoning to approximately 741,000 square feet. Similar to the existing zoning scenario, in order to reach the building totals noted in this scenario, approximately 30 residential units within the study area would be redeveloped as commercial space.

It should be noted that these build out scenarios assume that the parcels are constructed to the maximum extent possible under each parcel's current or modified zoning and that residential uses will change to commercial uses, even if both types of uses are allowed under current zoning. In cases where existing commercial square footage exceeds current zoning for the site, the existing commercial square footage was assumed unchanged.

Figure 3-2 presents the potential weekday morning and evening peak hour, and Saturday midday traffic generation of each grouping of parcels based on current zoning and the potential development remaining as defined by the Town. Basically, this is an estimate of the traffic generation of each parcel if it were to be developed to its maximum extent under the current zoning in place.

Figure 3-3 presents the potential weekday morning and evening peak hour, and Saturday midday peak hour traffic generation of each grouping of parcels based on the modified zoning plan as defined by the Town and EAVPC. Essentially, this graphic presents the potential traffic generation of the parcels within the East Acton Village area should the current zoning be modified to permit more intensive commercial development within the study area.

While it is unlikely that the development highlighted in these scenarios will be achieved within the 10-year planning horizon, it does present an opportunity for the EAVPC to understand the potential impacts of modifying the zoning of these parcels and sets a framework for defining and analyzing the recommendations later in this study.

Figure 3-4 through Figure 3-12 show the traffic volume networks for each of the various weekday morning and evening peak hours as well as the Saturday midday peak hour with the East Acton Village growth alternative scenarios integrated.


**Vanasse Hangen Brustlin, Inc.**

Figure 3-2

Potential Additional Trip Generation
Under Current Zoning Build Out
Acton, Massachusetts


**Vanasse Hangen Brustlin, Inc.**

Figure 3-3

Potential Additional Trip Generation
Under Modified Zoning Build Out
Acton, Massachusetts


Vanasse Hangen Brustlin, Inc.

2012 No Build
Morning Peak Hour Traffic Volumes

Figure 3-4


Vanasse Hangen Brustlin, Inc.

2012 No Build
Evening Peak Hour Traffic Volumes

Figure 3-5


Vanasse Hangen Brustlin, Inc.

2012 No Build
Saturday Peak Hour Traffic Volumes

Figure 3-6


Vanasse Hangen Brustlin, Inc.

2012 Weekday Morning Peak Hour Buildout Under Current Zoning

Figure 3-7


Vanasse Hangen Brustlin, Inc.

2012 Weekday Evening Peak Hour Buildout Under Current Zoning

Figure 3-8


Vanasse Hangen Brustlin, Inc.

2012 Saturday Midday Peak Hour Buildout Under Current Zoning

Figure 3-9


Vanasse Hangen Brustlin, Inc.

2012 Weekday Morning Peak Hour Buildout Under Modified Zoning

Figure 3-10


Vanasse Hangen Brustlin, Inc.

2012 Weekday Evening Peak Hour
Buildout Under Modified Zoning

Figure 3-11


Vanasse Hangen Brustlin, Inc.

2012 Saturday Midday Peak Hour Buildout under Modified Zoning

Figure 3-12

## 3.3 Capacity Analysis Results

Future intersection and roadway link analyses were prepared using the procedures documented previously in Chapter 2. The traffic analyses were conducted using 2012 morning, evening, and Saturday peak hour traffic volumes and the existing roadway conditions.

■

### 3.3.1 Roadway Level of Service

Traffic operating conditions along various segments of study area roadways were evaluated based on anticipated future traffic demands. The weekday morning and evening and Saturday midday future roadway segment LOS results for the specific links within the overall study area are shown in Table 3-4.

As the tables indicates, there are a number of roadway links that are projected to operate at LOS E or worse during the 2012 peak period conditions. Furthermore, as traffic volumes increase based on the zoning development scenarios, the Level of Service and available capacity along the corridor will diminish as well.

Table 3-4
Roadway Segment Capacity Analysis- Peak Hour Conditions (2012)

| Roadway Segment | No Build | | | Current Zoning Build Out Scenario | | | Modified Zoning Build Out Scenario | | |
|---|---|---|---|---|---|---|---|---|---|
| | Vol.[1] | V/C[2] | LOS[3] | Vol. | V/C | LOS | Vol. | V/C | LOS |
| *Weekday Morning Peak Hour* | | | | | | | | | |
| Great Road (between Concord TL and Wetherbee Street) | 1,519 | 0.53 | E | 1,582 | 0.55 | E | 1,881 | 0.65 | E |
| Great Road (between Wetherbee Street and Pope Road) | 1,557 | 0.54 | E | 1,646 | 0.57 | E | 2,139 | 0.74 | E |
| Great Road (between Pope Road and Concord Road) | 1,684 | 0.59 | E | 1,763 | 0.61 | E | 2,262 | 0.79 | E |
| Great Road (between Concord Road and study area limit) | 1,332 | 0.46 | E | 1,349 | 0.47 | E | 1,733 | 0.60 | E |
| *Weekday Evening Peak Hour* | | | | | | | | | |
| Great Road (between Concord TL and Wetherbee Street) | 1,761 | 0.61 | E | 1,927 | 0.67 | E | 2,465 | 0.86 | F |
| Great Road (between Wetherbee Street and Pope Road) | 1,799 | 0.63 | E | 1,970 | 0.68 | E | 2,727 | 0.95 | F |
| Great Road (between Pope Road and Concord Road) | 1,901 | 0.66 | E | 2,072 | 0.72 | E | 2,796 | 0.97 | F |
| Great Road (between Concord Road and study area limit) | 1,792 | 0.62 | E | 1,917 | 0.67 | E | 2,531 | 0.88 | E |
| *Saturday Midday Peak Hour* | | | | | | | | | |
| Great Road (between Concord TL and Wetherbee Street) | 1,820 | 0.63 | E | 1,954 | 0.68 | E | 2,554 | 0.89 | E |
| Great Road (between Wetherbee Street and Pope Road) | 1,863 | 0.65 | E | 2,013 | 0.70 | E | 2,705 | 0.94 | E |
| Great Road (between Pope Road and Concord Road) | 1,934 | 0.67 | E | 2,104 | 0.73 | E | 2,794 | 0.97 | E |
| Great Road (between Concord Road and study area limit) | 1,907 | 0.66 | E | 2,080 | 0.72 | E | 2,605 | 0.91 | E |

1 Vol. - Volume of traffic along corridor between locations
2 V/C - Volume to capacity ratio.
3 LOS - Level of Service
4 TL - Town Line

Great Road will operate at its capacity under all three of the future build out scenarios. Basically, the corridor will operate at approximately 60 to 65 percent of its capacity under the No Build scenario, 65 to 70 percent of its capacity under the Current Zoning build out analysis, and approximately 85 to 95 percent of its capacity under the Modified Zoning build out analysis with the link between Concord Road and Pope Road being the most congested segment within the study area. This analysis assumes that no improvements are made to the corridor.

■

### 3.3.2 Intersection Operations

Capacity analyses were conducted at the three unsignalized intersections within the study area. These locations represent the locations that experience the highest traffic volumes and are locations that will be mainly affected by the future development

scenarios. Table 3-5 provides a summary of the analysis for the weekday morning, weekday evening, and Saturday midday peak hour conditions.

Table 3-5
Unsignalized Intersection Capacity Analysis (2012)

| | | No Build | | | Current Zoning Build Out Scenario | | | Modified Zoning Build Out Scenario | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Intersection | Critical Movement | Demand[1] | Delay[2] | LOS[3] | Demand | Delay | LOS | Demand | Delay | LOS |
| *Weekday Morning Peak Hour* | | | | | | | | | | |
| Great Road at Concord Road | Movements from Concord Rd. | 370 | >60 | F | 393 | >60 | F | 532 | >60 | F |
| Great Road at Pope Road | Movements from Pope Rd. | 105 | >60 | F | 112 | >60 | F | 154 | >60 | F |
| Great Road at Wetherbee Street | Movements from Wetherbee St. | 16 | 27 | D | 37 | 31 | D | 102 | >60 | F |
| *Weekday Evening Peak Hour* | | | | | | | | | | |
| Great Road at Concord Road | Movements from Concord Rd. | 250 | >60 | F | 266 | >60 | F | 321 | >60 | F |
| Great Road at Pope Road | Movements from Pope Rd. | 136 | >60 | F | 144 | >60 | F | 175 | >60 | F |
| Great Road at Wetherbee Street | Movements from Wetherbee St. | 16 | 43 | E | 75 | >60 | F | 564 | >60 | F |
| *Saturday Midday Peak Hour* | | | | | | | | | | |
| Great Road at Concord Road | Movements from Concord Rd. | 265 | >60 | F | 289 | >60 | F | 371 | >60 | F |
| Great Road at Pope Road | Movements from Pope Rd. | 121 | >60 | F | 133 | >60 | F | 174 | >60 | F |
| Great Road at Wetherbee Street | Movements from Wetherbee St. | 15 | 45 | E | 42 | >60 | F | 224 | >60 | F |

1 Traffic volume along critical approach during peak hour.
2 Average Delay expressed in seconds per vehicle.
3 Level of Service

As Table 3-5 shows, all the intersections are projected to operate at or over capacity under future 2012 peak hour conditions. It would be expected that other similar unsignalized roadways and driveways along the Great Road corridor would exhibit the operating conditions as those intersections noted in Table 3-5.

## 3.4 Pedestrian and Bicycle Environment

While the majority of this section has focused on vehicular traffic and its impacts along the corridor, the future of the East Acton Village area will also include increases in pedestrian and bicycle traffic over time. As development continues to occur, under either of the zoning build out scenarios, there will likely be a corresponding increase in pedestrian and bicycle traffic in the Village area. However, given the uncertainty of the types of developments likely to occur within the Village, it is difficult to speculate on the interaction between land uses and the numerical increases in pedestrian and bicycle traffic in the area.

If the development along Great Road begins to focus on a retail-based environment, depending on the level of development, it could begin to take on characteristics of an

open-air shopping environment. While the majority of visitors arriving in the area will probably use their personal automobiles, once they park their vehicles, the primary mode of transportation could be pedestrian – if the supporting infrastructure is in place.

As the project moves forward, pedestrian and bicycle amenities should be a fundamental design consideration in any recommendation developed. Connections between the Village area and the future location of the Bruce Freeman Bicycle Trail will be particularly important.

## 3.5 Conclusion

There are many different factors potentially affecting the quality of the transportation system within the East Acton Village area. Among those factors are the system's ability to accommodate additional traffic growth, both real (developments already approved) and the potential build-out (scenarios). This section has shown that the existing transportation infrastructure system will operate at or over capacity in the future with the various build out alternatives being considered. The following sections will focus on transportation, pedestrian, zoning, and land use issues and recommendations that can play a role in supporting both the character of the Village area as well as projected transportation needs of the study area.

# 4

# Improvement Alternatives

As identified in the previous two chapters, there are certain areas and locations within the East Acton Village area where roadway deficiencies and operational issues exist (or are projected to exist in the future). Those locations where deficiencies currently exist will only be exacerbated in the future through additional traffic volumes and more intense development in the Village area.

Once the existing and future deficiencies were defined, a series of ideas aimed at addressing the area's problems were developed. Through an iterative planning process and discussions with Town staff, approximately 10 physical improvement options were identified, along with several variations, to address the noted deficiencies or to improve the general transportation environment of the East Acton Village area. In addition to the physical infrastructure improvements developed, several "administrative" or "policy" ideas were also generated. For any of the ideas to be deemed viable, they had to be consistent with one or more of the project goals and objectives originally set forth in this project. This Chapter discusses the development of the various options and strategies aimed at meeting the core goals. The strategies and options are divided into four categories:

- ***Short Term*** – Immediate actions aimed at addressing existing safety, operational, and other identified deficiencies.

- ***Medium-Term*** – Actions aimed at addressing potential safety, operations, and other issues that are not currently identified as a problem, but could become one in the future under the build-out projections.

- ***Long-Term*** – Large-scale actions aimed at revamping the roadway systems in the Village area and potentially improving safety, operations, and other issues over the long-term.

- ***Policy Actions*** – Ideas aimed at changing the character of the community through land planning decisions, zoning changes, and aesthetic improvements.

## 4.1 Short-Term Alternatives Development

The short-term action items are intended to address the immediate needs of the East Acton Village transportation system. Most of these actions can be qualified as strategies that are generally low-cost, do not appear to have significant environmental impacts, and can be quickly scheduled for implementation. These specifically include improvements to locations where safety issues were identified, operational issues are present, or where simple modifications may lead to an overall improved transportation environment.

A brief discussion of each of the candidate short-term improvements / actions is provided below.

■

### Alternative 1: Northern Great Road Sidewalk Connection (Figure 4-1)

One of the goals of the study is to improve pedestrian accommodations within the project study area. One alternative considered to increase pedestrian safety is to provide a continuous sidewalk on at least one side of the Great Road corridor. The most logical location for a sidewalk extension is along the north side of Great Road – opposite from Keefe Road – where a current break in the continuity of the sidewalk exists.

The placement of a sidewalk in this location would address, in part, the goal of providing continuous sidewalk connections within the study area. This alternative specifically benefits the residential developments on the north side of Great Road and other commercial/retail developments along the corridor.

A goal in the design of the sidewalk should be to provide a buffer zone between the sidewalk and the edge of the roadway. Where possible, it is suggested that a minimum five-foot wide sidewalk with a 3-foot grass strip between the sidewalk and the curb/edge of the roadway be installed. Separating pedestrians from the travel lanes greatly increases their comfort as they use the sidewalks. In this specific case, the proposed sidewalk is located within the public right-of-way so that land takings would not be required (although construction easements may be required if drainage becomes an issue).

Construction of the sidewalk should be, at a minimum, consistent with the existing sidewalk materials that are currently used along Great Road, which at this location is bituminous concrete. However, one of the Town's Master Plan goals calls out the use of gray concrete sidewalks within all village areas. This should be considered when deciding which materials should be used. The use of curbing along areas where the sidewalk abuts the roadway is also recommended to help to define the pedestrian


**Vanasse Hangen Brustlin, Inc.**

Figure 4-1

Alternative 1
Northern Great Road Sidewalk Extension
Acton, Massachusetts

environment within the streetscape. Where bituminous concrete is used, vertical granite curbing is recommended with a curb height of no less than six inches.

### Advantages

- Provides continuous pedestrian link along the north side of Great Road within the study area, thereby reducing the potential for pedestrian/vehicular conflicts where sidewalks currently do not exist;
- Increases pedestrian safety and accessibility to the number of developments currently cut off from the sidewalks in the area; and
- Potentially promotes business growth associated with pedestrian activities.

### Disadvantages

- In this specific location, the construction of a new sidewalk would require the removal of approximately seven full-grown trees and several smaller trees (these should be replaced as part of the project);
- Depending on the level of impact to the neighboring property, the sidewalk construction may require the construction of a retaining wall and minor construction easements from private property owners; and
- There could be the potential for minor drainage impacts along the corridor that would need to be addressed prior to construction of the sidewalk connection.

### Costs

Based on our review of the sidewalk construction and the topography of the area, the rough cost estimate for the construction of the sidewalk is about $125,000. This cost estimate assumes a six-foot concrete sidewalk, retaining wall, and granite curbing; all approximately 600 feet in length. This improvement may require construction easements from private landowners and minor drainage improvements, which are not included in this estimate.

■

## Alternative 2 Sidewalk Upgrades

As part of the evaluation of the roadway geometry in the area, it was quickly identified that the majority of the sidewalks in and around the East Acton Village area are not compliant with the current handicap accessible requirements. The Americans with Disabilities Act (ADA) and the American Architectural Board's (AAB) requirements for pedestrian facilities are attached to this document and highlight the specific design requirements for these types of facilities.

These locations should be brought up to standard where they are not currently meeting the minimum guidelines as opportunities present themselves. For the most part, this involves reconstructing a number of wheelchair ramps and the slopes of some sidewalks within the area. While it is important to bring these locations up to

standard, there is not an immediate need to perform this improvement as it is assumed that they were laid out and built to ADA/AAB standards at the time of their construction – in essence "grandfathering" them. However, should any improvements suggested in this report (or other improvements made to the corridor that might affect the design of these facilities) be carried forward, then it is an ADA/AAB (and State) requirement to bring the deficient sidewalks up to current standards.

### Advantages

- Improves pedestrian accessibility and safety throughout the study area, and
- Reduces the liability of the Town with respect to ADA/AAB claims.

### Disadvantages

- In extreme circumstances, upgrades may require modifications (widening and/or regrading) of sidewalks to achieve standards.

### Costs

Due to the potential number of locations to be upgraded and the variability of in-field conditions between them, cost estimates for this alternative are highly flexible. Estimates range between $500 per location to $2,500 and higher (depending on the amount of grading required at each location).

■

## Alternative 3 Keefe Road Driveway Consolidation (Figure 4-2)

Multiple curb cuts along Great Road, and other roadways, create many opportunities for conflict between the drivers, pedestrian and other drivers. A notably poor section of Great Road is due to Keefe Road's proximity to Acton Indoor Sports, several area business driveways, and a school bus stop. Alternative 3 suggests consolidating the access points at the Keefe Road intersection with Great Road to limit the number of conflicts faced by pedestrians and vehicles at this location.

Providing only one access point will channel drivers onto Great Road and limit the number of potential conflict points. A reduction in access points can also refocus the driver's attention on pedestrian and bicycle activity and vehicular activity along Great Road. For example, a driver will no longer need to be concerned about additional vehicles entering or exiting Keefe Road at the adjacent driveway. In addition, it could improve vehicular flow through the area by reducing the number of potential interruptions by vehicles entering the traffic stream. Should this alternative be carried forward, truck access to the area will have to be further coordinated with the businesses that would be impacted by the proposal – although it appears that the redesign can accommodate a normal truck turning radius within the redesigned roadway.


**Vanasse Hangen Brustlin, Inc.**

Figure 4-2

Alternative 3
Keefe Road Driveway Consolidation
Acton, Massachusetts

### Advantages

- Consolidation will reduce the number of curb cuts and therefore the number of conflict points along the roadway;
- Improves pedestrian safety by reducing the crossing distance over Keefe Road; and
- Presents an opportunity to create a 'gateway' area to the East Acton Village Area or, at a minimum, creates additional green space along the Great Road corridor.

### Disadvantages

- Potentially could impact business operations along Keefe Road by restricting large truck traffic; and
- Drainage will need to be reviewed to confirm it will not impact the business owners along Keefe Road.

### Costs

Based on our review of the design, the rough cost estimate for the construction of the consolidated intersection is about $50,000. This includes consolidation of the driveway and creation of a gateway to the East Acton Village Area, but does not include any private land takings (which do not appear needed).

■

## Alternative 4: Traffic Calming along Pope Road (Figure 4-3)

Cut-through traffic and vehicle speed on Pope Road were identified early in this process as an important issue for consideration by both the Town and the EAVPC. As long as traffic is seeking to avoid the congestion resulting from the Concord Rotary, Pope Road will continue to experience cut through traffic along its length. While Pope Road provides a bypass to the congestion of the Concord Rotary for a few drivers, it was not designed to carry a significant volume of through traffic and the neighborhoods that abut the roadway did not anticipate heavier utilization in their driveway placement.

One series of actions recommended to be instituted along Pope Road is to install a series of integrated traffic calming measures along its length at key locations. These measures include:

- signage,
- high-visibility pedestrian crosswalks, and
- other traffic control devices.

The intent of these devices is to both slow traffic down along the length of the roadway, to reduce the desirability of Pope Road as a short cut, and promote a safer

pedestrian environment along the corridor. Figure 4-3 provides a recommended series of actions for the corridor and Figure 4-4 presents a summary of other traffic calming measures that the Town and residents along Pope Road may also want to consider if cut through traffic or high-speed traffic continues to use the corridor.

With this in mind, Alternative 4 recommends providing a new, stamped asphalt crosswalk across Pope Road at its intersection with Great Road and providing a raised crosswalk further north across Pope Road at Bayberry Road creating a more direct pedestrian connection into the shopping center. Additional treatments should also be considered along Pope Road at variable locations that both slow vehicles down and promote improved pedestrian safety along the corridor.

These crosswalk treatments can create a 'mini- gateway' and alert drivers to the change in roadway character from the higher speed Great Road corridor to a more residential Pope Road corridor. This gateway can begin to help bring the area to a pedestrian scale where all users can take advantage of the Village Center. The raised crosswalk also will serve to slow vehicle speeds by creating a de facto 'speed bump' in the roadway to slow drivers as they both transition into and out of the Pope Road residential areas.

### Advantages

- Improves pedestrian connections within the neighborhood (if properly located);
- Provides a well defined transition in character of the roadway from the commercial East Acton Village area to the residential uses along Pope Road; and
- Does not have significant right-of-way impacts along the corridor as most of the work can be done within the existing street layout.

### Disadvantages

- Maintenance of raised crosswalk requires special treatment from Town, especially with snow plow operations;
- Raised crosswalks can create drainage issues if not installed properly (although the placement of the raised crosswalk at the Bayberry Road intersection provides the ability to tie into an existing catch basin, thereby reducing the drainage issue at this specific location); and
- Creates minor additional delays for emergency response vehicles.

### Costs

Based on our review of the in-field conditions, the rough cost estimate for both the raised crosswalk and the stamped pedestrian crossing at the Pope Road intersection with Great Road will be approximately $16,000. Additional traffic calming measures along the corridor would be in excess of this estimate.

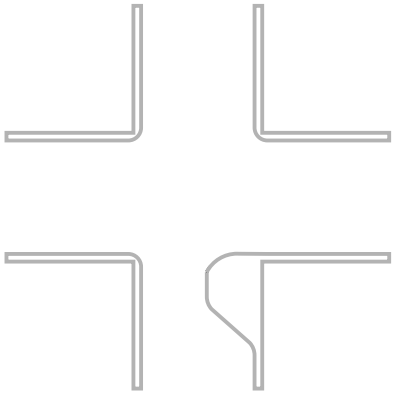

**Vanasse Hangen Brustlin, Inc.**

Figure 4-3

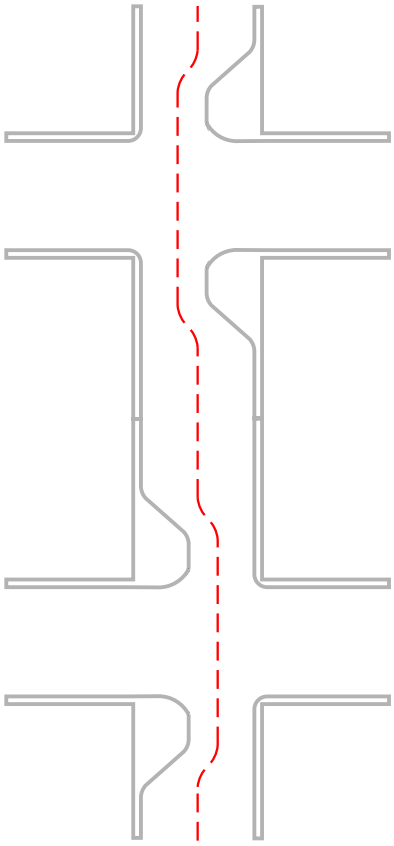
Alternative 4
Traffic Calming along Pope Road
Acton, Massachusetts

# Physical Barriers

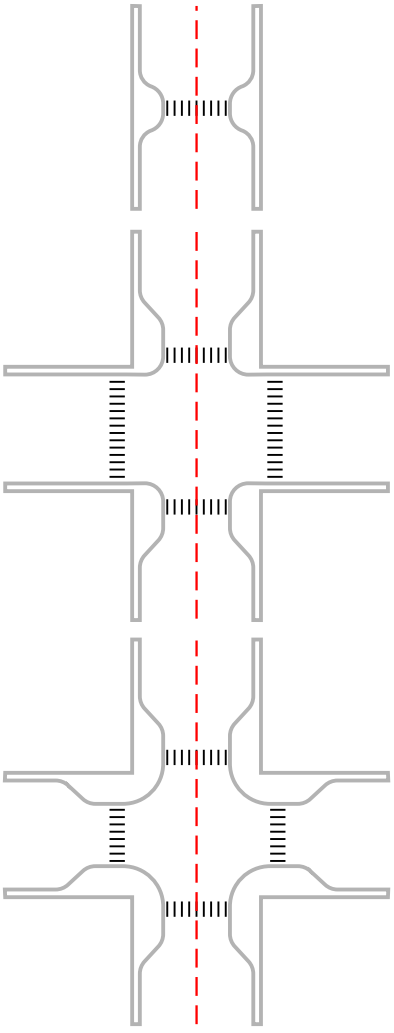
**Traffic Calming Devices**
**Figure 4-4**



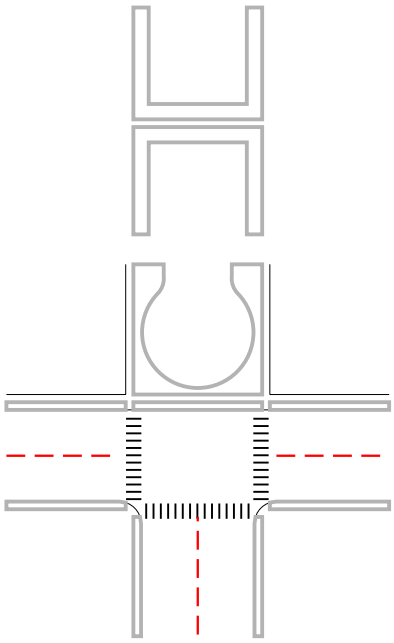
**Semi-Diverter**



**Chicane**



**Neckdowns**



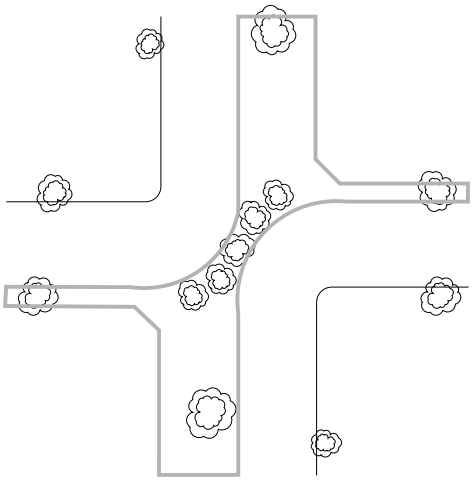
**Complete Street Closure (Cul-de-Sac)**

VHB

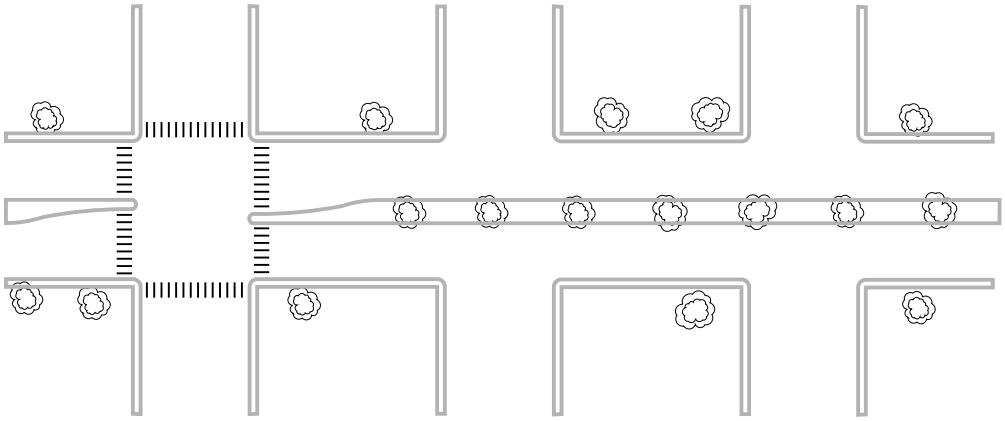
Note: Not to scale. Shown for conceptual purposes only.

# Physical Barriers

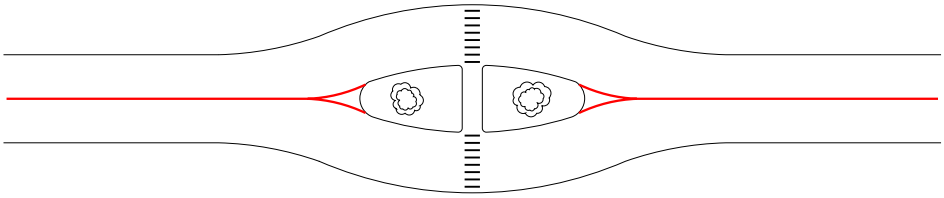
**Traffic Calming Devices**
**Figure 4-4**



**Diagonal Diverter**



**Median Barrier**



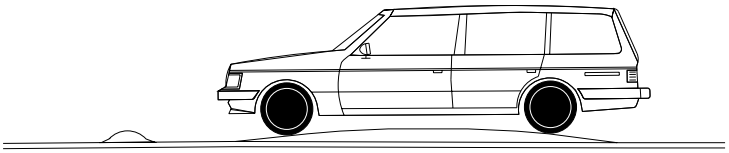
**Traffic Island**

VHB

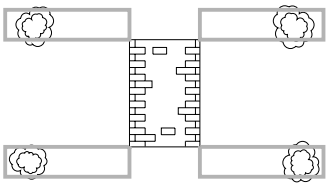
Note: Not to scale. Shown for conceptual purposes only.

# Roadway Treatments

**Traffic Calming Devices**
**Figure 4-4**

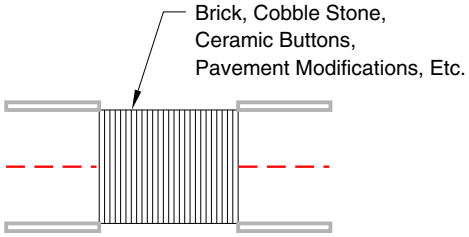


Speed Bump Speed Hump



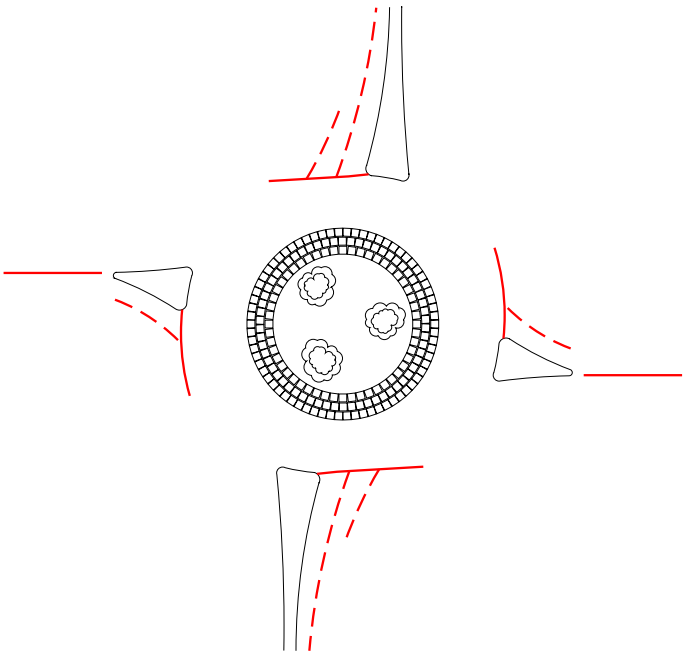
Textured Surface

**Speed Humps**

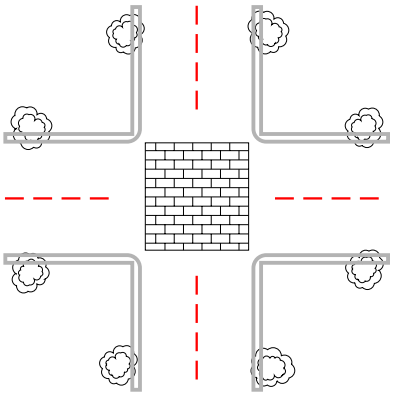



**Raised Textured Pedestrian Crossing**

# Intersection Treatments



**Roundabout**



**Raised Intersection**

VHB

Note: Not to scale. Shown for conceptual purposes only.

■

## Alternative 5: Provide Bicycle Accommodations along Great Road

In order to promote bicycle use and other forms of alternative transportation within the East Acton Village area, a recommendation is made to add a clearly defined bicycle commuting lane in both directions along Great Road, which would extend not just within the East Acton Village area, but also through it and connect with other bicycle facilities in the Acton area.

The MassHighway recommended cross-section for the inclusion of a bicycle lane along a state highway is 32.8 feet (10 meters), which includes a 12.3-foot travel lane for vehicles and a 4.1-foot shoulder for bicycles. The minimum cross-section allowed by MassHighway is 29.5 feet (9 meters), which provides a 12.3 foot travel lane for vehicles and a 2.5 foot shoulder. These requirements are provided in Figure 4-5. Based on these requirements, a bicycle lane can be provided along the corridor and is recommended.

In addition to the striping of the bicycle lane, signage should be provided directing bicyclists and motorists to 'share the road' through the village area.

### Advantages

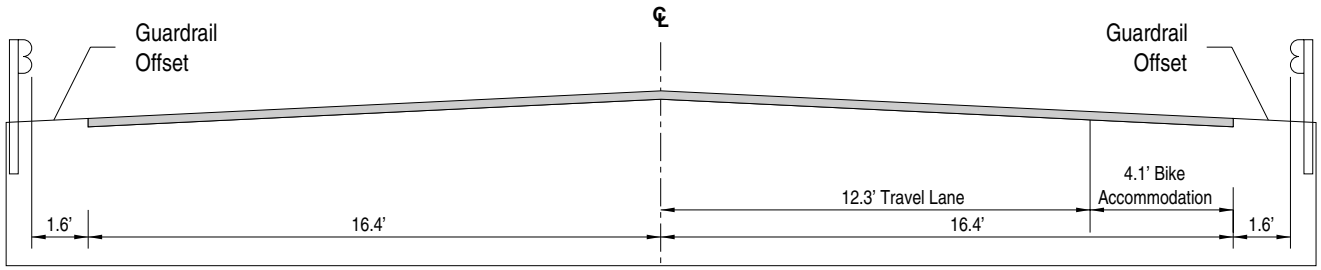
- Provides bicyclists with a safe designated travel lane;
- Could provide future direct connection to Bruce Freeman Bicycle Trail;
- Gives drivers along the corridor the "feel" that the roadway is narrower than it actually is; and
- Has the potential to slow down traffic.

### Disadvantages

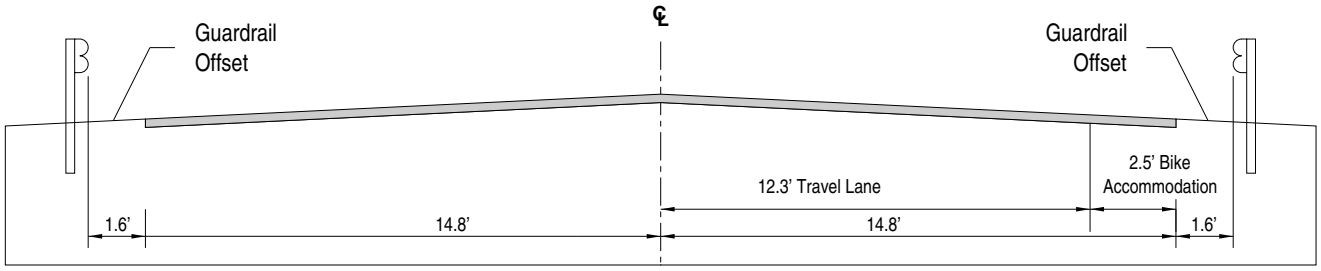
- Could require minor (0.5 foot) widening in some locations.

### Costs

The cost for this improvement is minimal if only lane striping and signage are required along the corridor. Assuming thermoplastic pavement markings and no widenings are required, the cost is estimated at approximately $10,000.




**MHD Desirable Cross Section (32.8')**




**MHD Minimum Cross Section (29.5')**

Horizontal Scale


**Vanasse Hangen Brustlin, Inc.**

East Acton Village Transportation Study — Figure 4-5
Cross-Section Alternative
MHD Engineering Directive (5/5/98)
Bicycles and Pedestrian Accommodation

## 4.2 Medium-Term Alternatives Development

The medium-term action items are intended to address the projected needs of the East Acton Village transportation system. Most of these actions can be qualified as strategies that are relatively low-to-medium cost actions, do not appear to have significant environmental impacts (but may require some right-of-way from adjacent private properties), and can be scheduled for implementation with a minor level of effort – such as requiring Town approvals (Conservation Commission, for example) or some level of engineering design and funding. These specifically include improvements to locations where traffic demands are projected to cause congestion in the future or where safety issues might be created through the addition of new development-related traffic.

A brief discussion of each of the candidate medium-term improvements / actions is provided below.

■

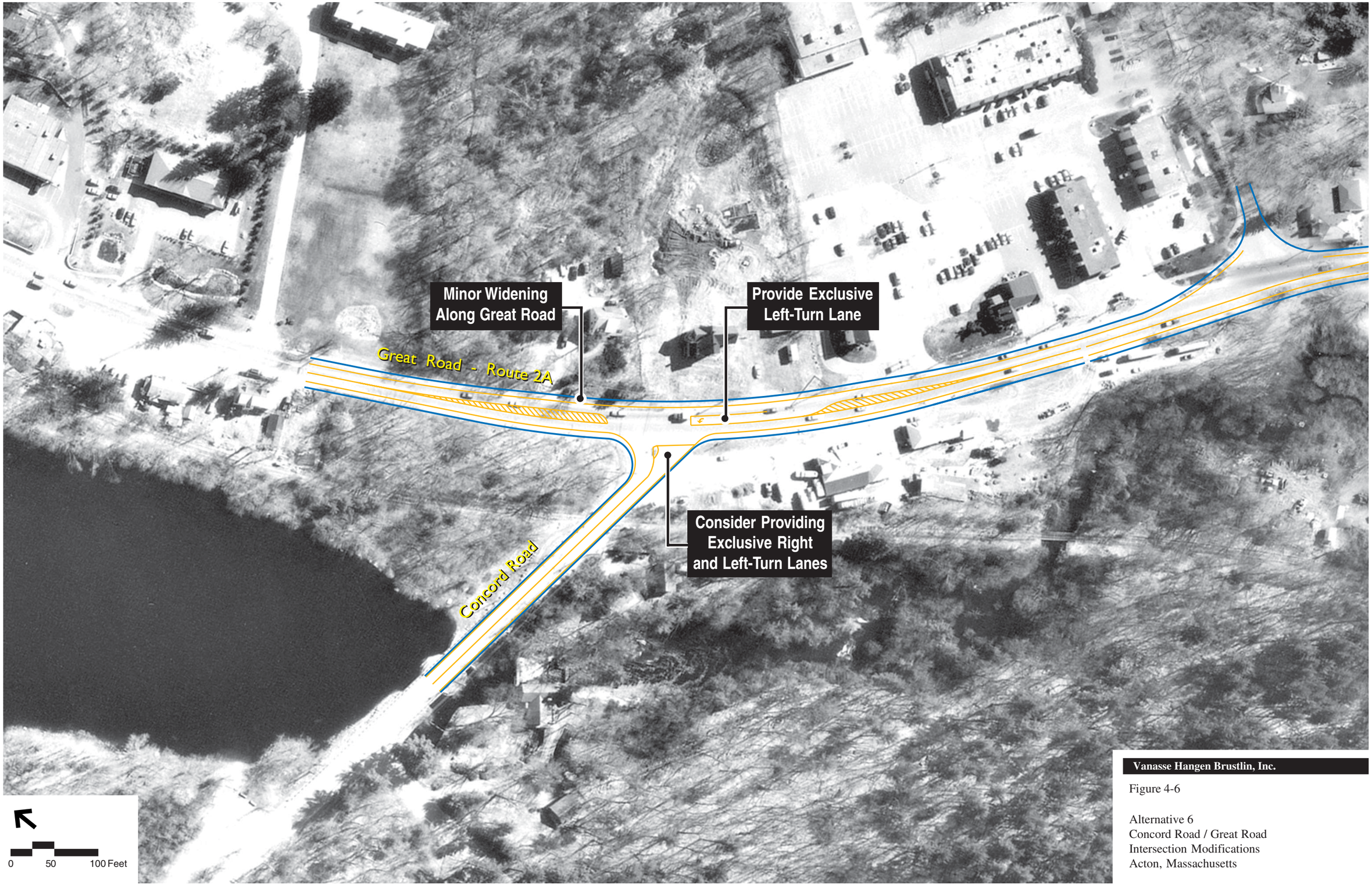
### Alternative 6: Modifications to the Concord Road/Great Road Intersection (Figure 4-6)

To facilitate a growing demand of left-turn volume from Great Road onto Concord Road, Alternative 6 recommends creating an exclusive westbound left-turn lane along Great Road. This left-turn lane can improve intersection operations by allowing through traffic to safely travel around the turning vehicle and continue westbound along Great Road without traveling in the shoulder lane. In addition, vehicles exiting Concord Road will be better able to distinguish between left-turning and through vehicles when judging if enough of a gap is available to make a left-turn onto Great Road.

Similarly, either in conjunction with the left-turn lane from Great Road onto Concord Road or as an exclusive measure, separate left- and right-turn lanes should be considered along the Concord Road approach to Great Road. This would reduce the number of occurrences where left-turning vehicles inhibit right-turning vehicles at this location and would improve traffic operations to acceptable levels over the long-term. Should construction of separate left and right turning lanes be considered, the grade of Concord Road at the intersection would have to be adjusted to permit right turning vehicles to be able to approach Great Road on a relatively flat grade. Consideration should also be given to ensure adequate sight distance is provided for right turning vehicles to see around drivers waiting to turn left along Concord Road.

Additionally, as part of this intersection assessment, traffic signal warrants were reviewed to determine if signalization of this intersection would be warranted. Based on the traffic volume thresholds set forth by the Federal Highway

Administration, a traffic signal is not warranted at this location based on current and projected 10 year traffic volumes.




**Vanasse Hangen Brustlin, Inc.**

Figure 4-6

Alternative 6
Concord Road / Great Road
Intersection Modifications
Acton, Massachusetts

Improvements to this intersection, however, could potentially lead to other issues that should be considered. Specifically, the creation of a left-turn lane along Great Road could increase vehicle speeds along the Great Road corridor. Drivers would be able to by-pass the waiting left-turning vehicles in their own lane – which could result in higher travel speeds through the intersection. Also improving traffic operations along Concord Road by providing separate right- and left-turn lanes at the STOP sign might encourage more drivers to use Concord Road as a means of traveling through Acton.

Finally, the increase in pavement required to provide the separate turning lanes makes the intersection a more lengthy crossing location for pedestrians and would potentially require minor land takings if fully constructed (particularly along the Concord Road approach). The added pavement width would also need to be coordinated with the Bruce Freeman Bicycle trail, as this will impact the bicycle crossing distance as well.

### Advantages

- Improves intersection traffic operations;
- Improves definition of vehicular right of way.

### Disadvantages

- Increases the distance that pedestrians need to travel across both Concord Road and Great Road;
- Requires minor land takings;
- Has potential to promote Concord Road as a cut-through roadway; and
- Could increase vehicle travel speeds along Great Road.

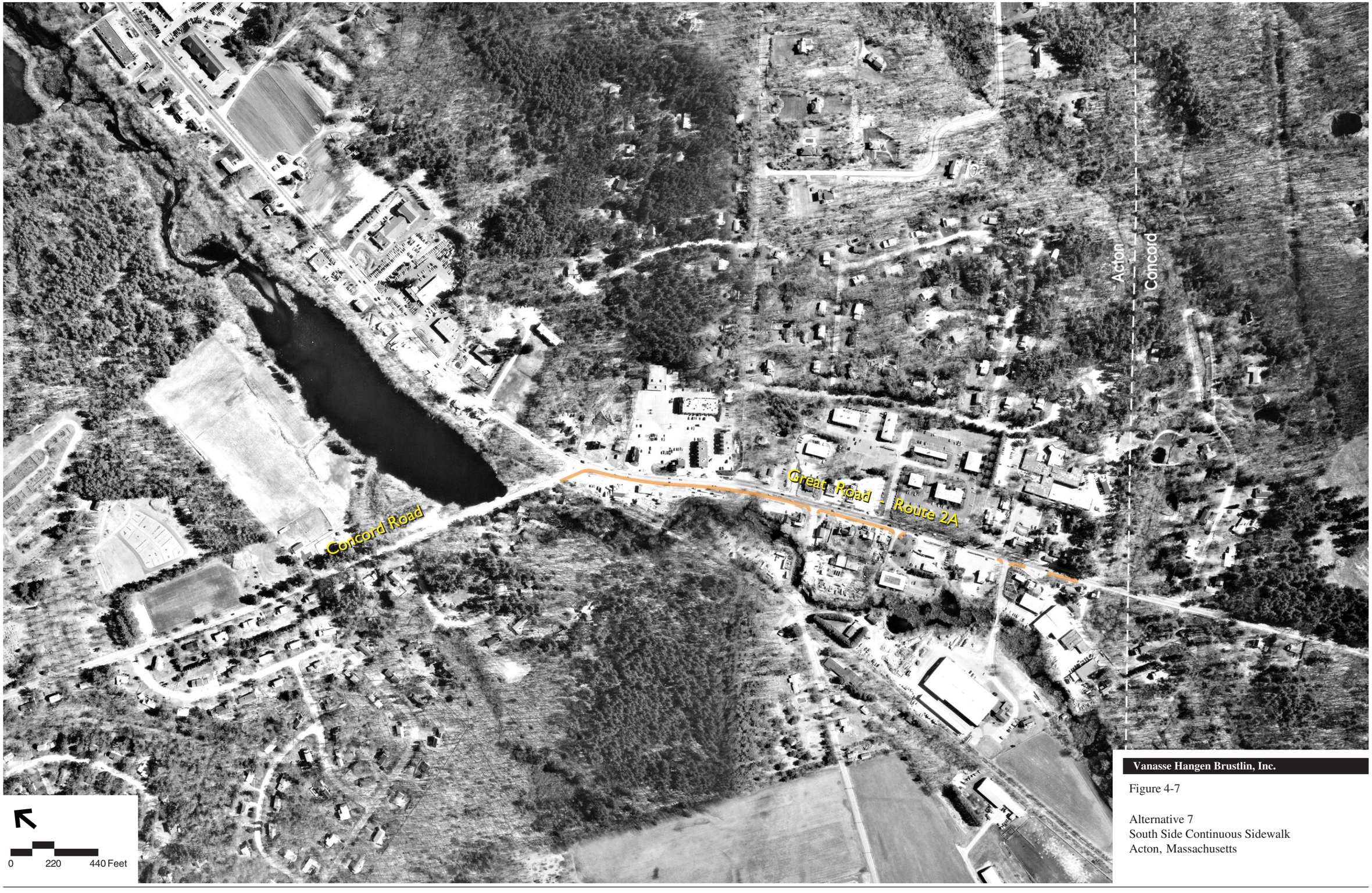
### Costs

The cost estimate for both these improvements totals approximately $220,000 and it would appear to be beneficial to implement these changes concurrently with the bicycle trail construction. This cost is exclusive of any required land takings.

■

## Alternative 7: South Side Continuous Sidewalk (Figure 4-7)

As plans move forward for the design and construction of the bikeway along the Bruce Freeman rail trail, provisions should be made to bring riders and walkers from the trail into the East Acton Village community. The first step in this process is providing clear and convenient connections from the Bruce Freeman rail trail into the Village area. It appears that the two main focal points of this connection should be at the rail trail's intersections with Wetherbee Street and Concord Road, as these two locations lend themselves to gateways to and from the rail trail.




**Vanasse Hangen Brustlin, Inc.**

Figure 4-7

Alternative 7
South Side Continuous Sidewalk
Acton, Massachusetts

In order to promote both the bicycle connections and to improve pedestrian connections in general within the community, provision of a continuous sidewalk along the south side of Great Road should be considered.

Similar to Alternative 1, Alternative 7 could provide a continuous sidewalk along the entire south side of Great Road and is suggested in order to provide an environment that promotes walking through this area. The sidewalk would be approximately 2,300 feet in length and would run adjacent to Great Road. This sidewalk connection is consistent with the EAVPC goal of improving safety, convenience, and comfort of pedestrians within the East Acton Village Area and addresses many of the issues raised in wanting improved accessibility along Great Road.

As an added benefit, by providing sidewalks along the southern side of Great Road, it is possible to limit and/or narrow driveway entrances, thereby eliminating or reducing the potential conflict points and providing safer vehicular, pedestrian, and bicycle operations.

Should this alternative be carried forward, design and material used in the sidewalk construction should be consistent with the guidelines provided previously (see Alternative 1). Drainage should also be a consideration in the design of the sidewalk as this could prove to be a significant issue along the corridor as well.

### Advantages

- Provides continuous pedestrian link along the south side of Great Road within the study area;
- Increases pedestrian safety and accessibility to the number of properties located along the southern side of Great Road;
- Provides more direct connections with the future Bruce Freeman bicycle trail;
- Appears to be able to be implemented with limited or no right of way impacts;
- Provides an opportunity to consolidate driveway openings; and
- Promotes business growth of a pedestrian nature.

### Disadvantages

- May have minor wetlands impacts immediately opposite the Pope Road intersection which could present minor obstacles towards complete construction of the Bruce Freeman bicycle trail;
- Has the potential to create drainage problems along Great Road if not accommodated properly.

### Costs

The cost estimate for these improvements totals approximately $165,000 exclusive of land takings and any environmental permitting. This cost is estimated for 2300 feet

of six-foot wide sidewalk and granite curbing, as well as landscaping. There is also the potential for an additional $200,000 in drainage improvements.

## Crosswalks

In addition to the provision of sidewalks on both sides of the Great Road corridor, crosswalks are a critical element of the pedestrian network. It is of little use to have a complete sidewalk system in place if pedestrians cannot safely and conveniently cross the intervening streets. Crosswalks should be placed in locations where it is safe and convenient to cross the roadways. It is critical to clearly define these locations so that both motorist and pedestrians understand their locations and purposes.

Currently, there are no crosswalks designated on the side streets that intersect with Great Road within the study area. As part of an integrated pedestrian plan, crossings are suggested at the following locations along the Great Road corridor (some of these locations may already exist informally, but will need to be upgraded to the standards suggested herein):

- Across Wetherbee Street;
- Across Pope Road; and
- Across Concord Road.

These crossings have been located in areas where there is a logical pedestrian travel pattern, especially if sidewalk upgrades/construction is implemented. Consistent crosswalk treatment helps drivers recognize that pedestrian areas exist along the study area corridor. VHB suggests that, in these locations, stamped asphalt crosswalks be utilized as they provide a physical transition from the arterial roadway system along Great Road to the more residential nature of the side streets. All crosswalks and curb ramps should be consistent with current ADA/AAB standards.

After reviewing all the pedestrian crossing locations along Great Road, there do not appear to be any pedestrian crossing locations that are "head and shoulders" better than any other locations along the corridor. This being noted, the following locations are suggested as potential Great Road crossing locations:

- Just west of the Concord Road intersection; and
- Just east of the Wetherbee Street intersection.

These two crosswalks were selected based on their relatively safe locations and placement within the overall pedestrian environment (connections to other pedestrian amenities and the future pedestrian/bicycle connection). In initial discussions with MassHighway, these locations appear to be the most logical from their perspective as well; however, they have stated they will want to review the

engineering technical support for these crossings prior to issuing any final approval of these locations.

### Crosswalk Signage

It is recommended that the signage associated with the Great Road crosswalks be the visible yellow pedestrian warning signs (W11-2) with a supplemental distance marker indicating the distance from the sign to the crossing location. These signs should be posted to give enough advance notice for approaching vehicles to stop, a minimum of 200 feet in advance of the crosswalk. At the crossing, a yellow crosswalk (W11A-2) sign is also recommended. It is important to maintain a consistent signage treatment for the crossings throughout the corridor so that motorists are aware of and can respond to pedestrians in the crosswalk.

## 4.3 Long-Term Alternatives Development

The long-term action items are intended to provide opportunities to re-shape the character of the East Acton Village area and create benefits for the community through larger scale "out-of-the-box" ideas. While the first reaction to these improvements may be one of 'shock', they are intended to address a wide range of both existing and potential transportation infrastructure deficiencies as well as provide an alternative vision for the community. It is important to consider that these ideas have not been endorsed by the EAVPC. They are "thought provoking" ideas that may or may not have a place in the ultimate future of the East Acton Village area.

Most of these actions can be qualified as higher cost actions, they could have environmental impacts (but are not insurmountable and are able to be overcome with some level of effort), will require right-of-way from adjacent properties (and may require large scale land-takings), and will require a longer time to foster support for, coordinate, design, and construct.

A brief discussion of each of the candidate long-term improvements / actions are provided below.

■

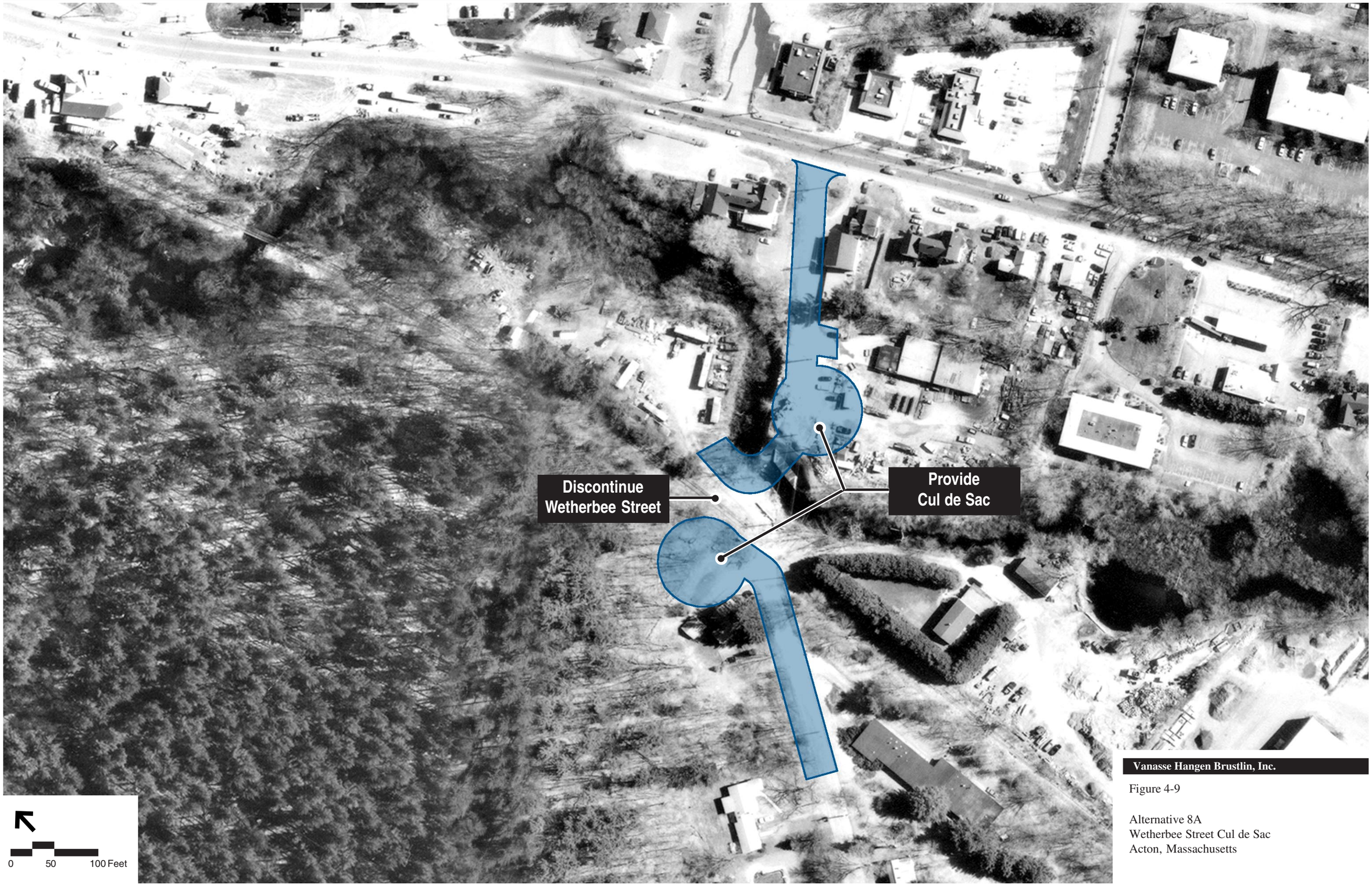
### Alternative 8: Discontinuation of Wetherbee Street (Figure 4-8 and 4-9)

Alternative 8 presents the discontinuation of Wetherbee Street south of Great Road. While this alternative limits the connection between East Acton Village and Route 2 westbound, it eliminates some of the conflicting movements at the intersection of Great Road and thereby reduces the volume of traffic along its length. It is conceptually envisioned that the roadway could become a pedestrian and bicycle way and could provide a pedestrian-friendly connection between the neighborhood and the Bruce Freeman rail trail.


**Vanasse Hangen Brustlin, Inc.**

Figure 4-8

Alternative 8
Discontinuation of Wetherbee Street
Acton, Massachusetts




Vanasse Hangen Brustlin, Inc.

Figure 4-9

Alternative 8A
Wetherbee Street Cul de Sac
Acton, Massachusetts

The discontinuation of the roadway could also support a new environment of increased growth within the village. The closure of the roadway can lead to land use rezoning in the area and creation of appropriate scale businesses on both sides of the Bruce Freeman rail trail. These businesses could encourage local usage of the village without compromising the integrity of the village character and quality of life.

In addition to supporting potential business growth within the East Acton Village area, the potential exists for the Town to consider other options for development on the large, undeveloped parcels located on Wetherbee Street. While these properties are currently zoned for residential development, the Town might consider re-zoning the property to a more commercial classification to increase the tax base. Through the closure of Wetherbee Street at the future bicycle trail, the traffic impacts to the Great Road corridor would be minimal, but the potential business generated by the commercial development on these parcels could spill over to the Village area.

The significant impact created by this option would be to close off the East Acton Village area from directly accessing Route 2 westbound. Traffic would need to travel to the Concord Rotary, Hosmer Street, Minot Avenue to Taylor Road, or along Route 27 to reach Route 2 westbound. This would also, ultimately, reduce the potential for a cross-Acton roadway system supported by several town members.

### Advantages

- Eliminates the vehicle conflicts at the intersection of Wetherbee Street and Great Road;
- Provides potential pedestrian/bike connections to/from Great Road from the future Bruce Freeman bike trail;
- Provide the potential to increase the tax base of the town by rezoning Wetherbee Street parcels to more commercial-oriented land uses.

### Disadvantages

- Traffic originating within the East Acton Village area must seek alternative routes to access Route 2 westbound;
- Closes access to the existing businesses along Wetherbee Street (although the concept of cul-de-sac'ing Wetherbee Street and providing access to these parcels is a potential variation of this suggestion- see figures 4-8 and 4-9).

### Costs

The cost estimate for these improvements totals approximately $200,000.

■

## Alternative 9: Bayberry Road Extension (Figure 4-10)

Alternative 9 suggests extending Bayberry Road around the East Acton shopping center, creating a four-way signalized intersection at Concord Road and a three-way

stop intersection at Pope Road and Bayberry Road. This alternative includes discontinuing (or modifying) the Pope Road connection between Bayberry Road and Great Road.

This option would permit the intersection of Great Road, Concord Road, and the newly created Bayberry Road extension to be signalized. A signal along the corridor could aid in reducing vehicle speed along Great Road through the Village area, can provide protected (safer) left-turn movements at the intersection, and provide a protected (signalized) pedestrian crossing across Great Road.

Through signal design and by creating a longer, more circuitous route along the corridor there exists the potential to reduce the number of cut-through drivers along Pope Road. In addition, the relocated Bayberry Road could be further designed (using more aggressive forms of traffic calming) to reduce the desire/demand to use the corridor as a means of avoiding the Concord Rotary. It is important to note, however, that reducing the desirability of the roadway could make access for residents more difficult as well.

Finally, the provision of a signalized intersection along Great Road at this location would create a 'platoon' effect on eastbound Great Road traffic that could improve the ability of drivers to exit the driveways along the corridor.

Obviously, the extension of Bayberry Road has major right-of-way and property impacts, including the removal of numerous mature trees and some existing residential structures, as well as potential wetlands impacts. This alternative also will require significant capital and land owner support to implement. A more detailed analysis of impacts would need to be conducted within the area to determine the magnitude of these impacts.

### Advantages

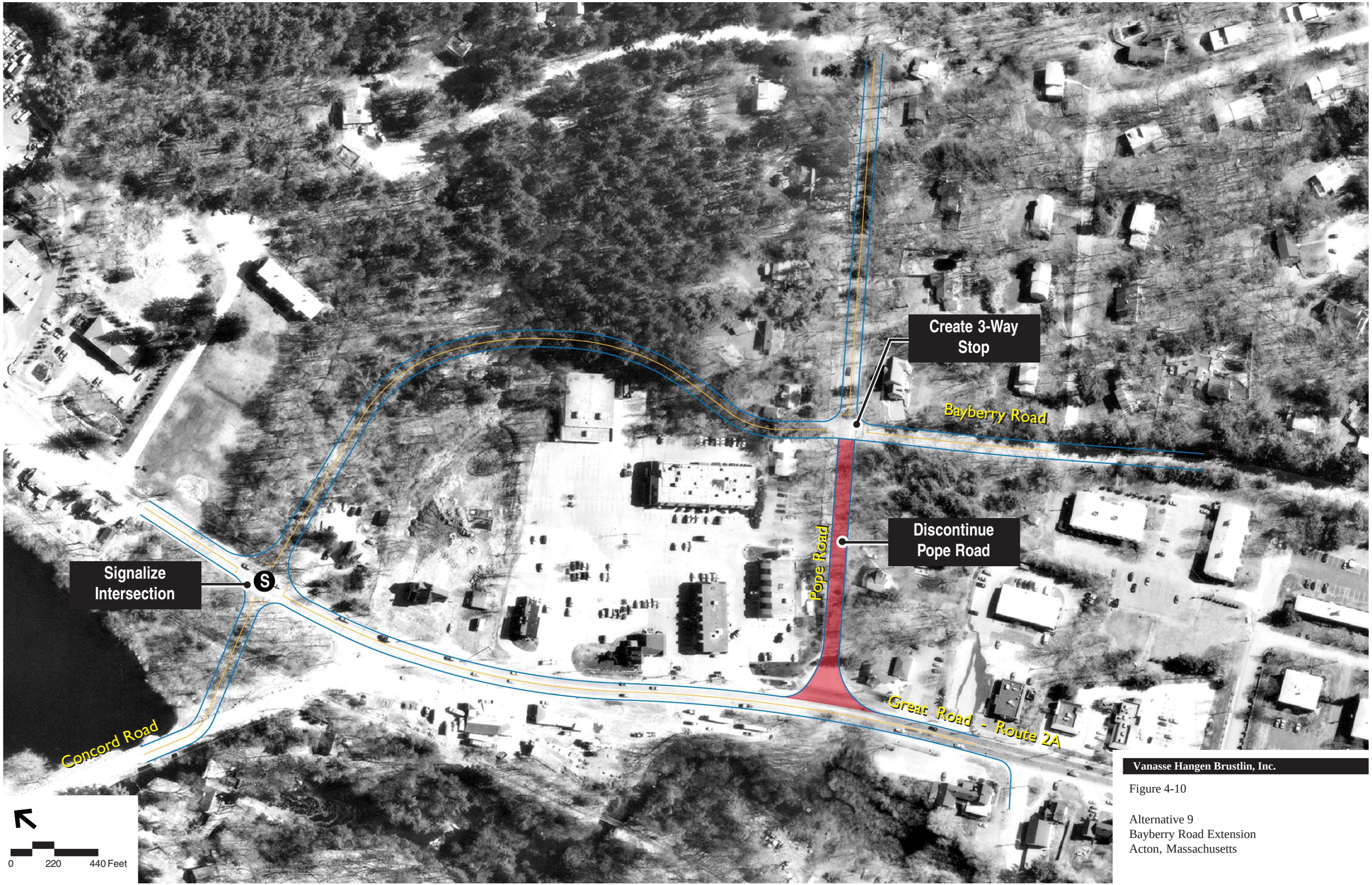
- Traffic signal can aid in reducing traffic congestion and speed along Great Road, thereby improving pedestrian, bicycle, and vehicular safety, and improving local access; and
- Could reduce cut-through traffic along Pope Road by rerouting vehicles along a more circuitous path.

### Disadvantages

- Major right-of-way impacts along Bayberry Road extension;
- Potential wetlands impacts; and
- Significant capital cost required to implement.

### Costs

The cost estimate for these improvements totals approximately $725,000 plus extensive land takings and permitting costs.




**Vanasse Hangen Brustlin, Inc.**

Figure 4-10

Alternative 9
Bayberry Road Extension
Acton, Massachusetts

■

## Alternative 10: Median Divided Great Road (Figure 4-11)

As a means to reduce the number of conflicting traffic movements along the Great Road corridor and to reduce the desirability of using the Pope Road corridor as a cut-through route, one suggestion for consideration is to construct a median along the length of Great Road from the Concord Road intersection to the Keefe Road intersection.

The provision of a median area, which could be designed as a boulevard-style corridor, would eliminate any left turning traffic along the corridor and, thereby, eliminate the desire to use Pope Road as a short-cut to avoid the congested Concord Rotary.

Signals could be constructed at the intersections at the ends of the median to foster u-turn movements so that the businesses along Great Road would not be significantly impacted (although the amount of pass-by/impulse traffic would be reduced for retail and restaurant uses along the corridor). In addition, pedestrian refuge could be provided within a protected area in the median and crossings could be provided at the signals on either end of the corridor.

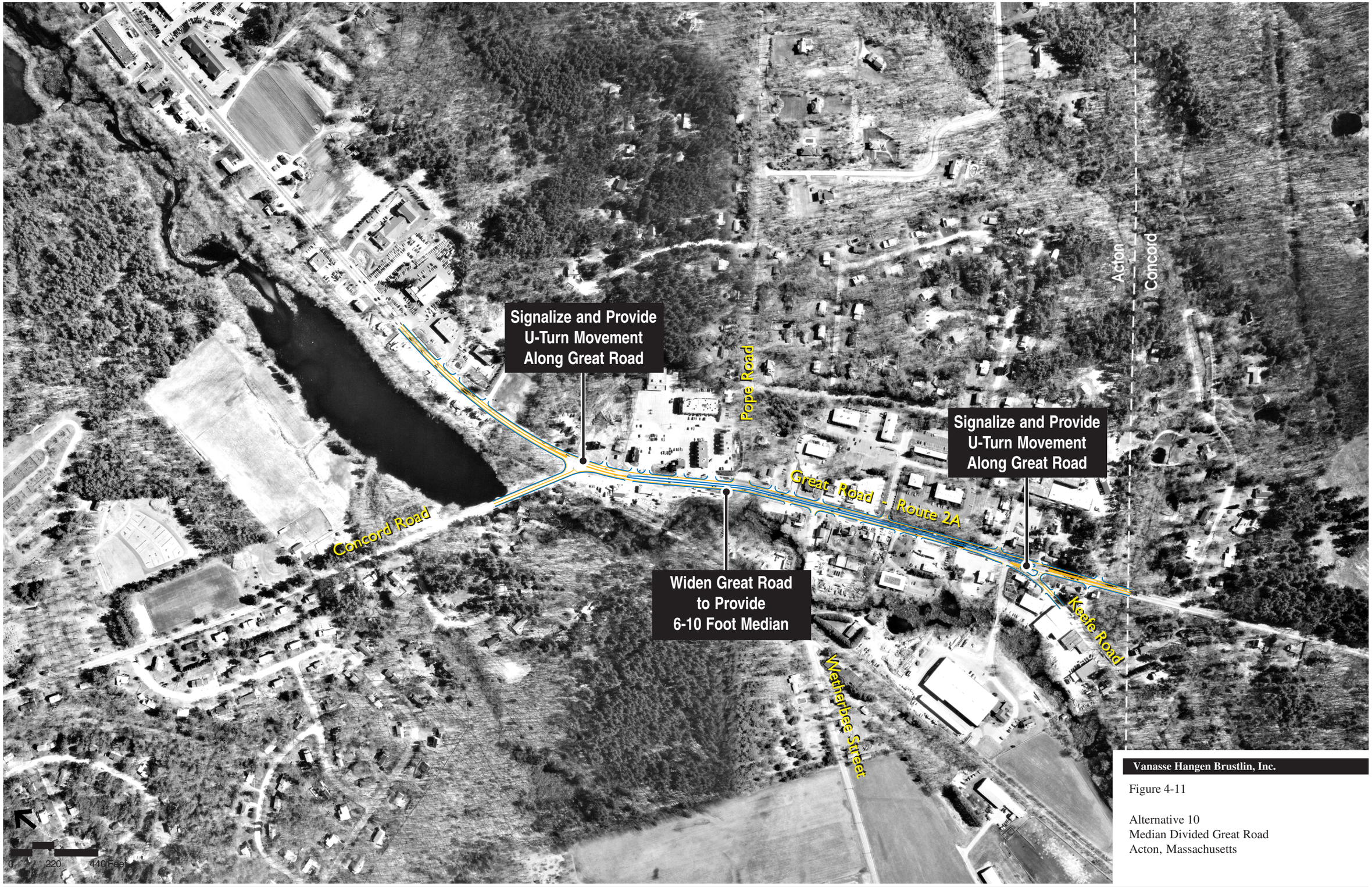
Given the current cross-section available and the need to provide at least 6 feet for a median (preferred 10 feet if plantings might be considered in the median itself), there would be the need to acquire additional land on either side of Great Road. Based on initial evaluations, at least 6 feet of additional right-of-way would be required to provide the minimum cross-section along Great Road with approximately 10 feet required if the plantings were desired in the median. Additional widening would be necessary to accommodate both the median and bicycle lanes. Another potential obstacle to this option would be the ability to adequately address drainage issues within the corridor.

### Advantages

- Reduces the number of vehicle conflicts along Great Road;
- Reduces the desirability of using Pope Road as a cut-through;
- Improves the pedestrian environment by placing a refuge area within the median of the corridor;

### Disadvantages

- Requires additional land for implementation;
- Could have significant drainage impacts that would need to be overcome;
- Significant impacts to retail and restaurant businesses due to restrictions placed on access to and from the sites.




**Vanasse Hangen Brustlin, Inc.**

Figure 4-11

Alternative 10
Median Divided Great Road
Acton, Massachusetts

### Costs

The cost estimate for these improvements totals approximately $1.3 million plus extensive land takings and permitting costs.

## 4.4 Policy Actions

The last step in developing recommendations to the East Acton Village transportation plan is to identify policies and strategies that could, over time, lead to a community-oriented environment. These actions include land use planning, suggested improvements to the aesthetics of the corridor, and considering issues outside of the Village area that could affect transportation issues within the Village area.

These are not intended to be quick fixes, but instead create a roadmap to assist the policy makers in beginning the process of steering the look and feel of the corridor through implementing specific controls and following pre-defined strategies.

A brief discussion of each of the candidate policy actions are provided below.

■

### Land Use Policies

To reinforce the goals established by the EAVPC to create a unique and defining identity for future redevelopment in the East Acton Village area, consideration should be given toward making revisions to the Town's land use regulations and policies. In addition to action items specified in the 1998 Acton Master Plan Update, other revisions to the Town of Acton's Zoning Bylaw could promote future development in the East Acton Village that is more consistent with characteristics of a traditional New England village. The following suggestions should be considered to promote a consistent "look and feel" in the East Acton Village area.

### Zoning Bylaw Revisions

The 1998 Acton Master Plan Update suggests a series of recommended changes for the East Acton Village Zoning District. Most of these recommendations promote methods to increase density so that future development is more in line with a village rather than a suburban style strip character, and to reduce parking standards as a means to encourage a mixed-use and pedestrian-oriented environment. Additionally, the recommendations in the Master Plan Update suggest revisions to the use tables in the By-laws to include uses in the East Acton Village that are permitted in other Village Districts. The following recommendations would achieve the goals set forth in the Master Plan Update for the East Acton Village Center.

### Increased Floor Area Ratio

The Table of Standard Dimensional Regulations sets forth a maximum Floor Area Ratio (FAR) (the ratio of net floor area of all buildings to the amount of developable land on the site) for development in the East Acton Village District as 0.20. Typically, this is relatively low FAR for a village center, leaving more land available for either open space or parking, characteristics which are typically found in suburban strip development. By increasing the maximum FAR in the East Acton Village District to a ratio of 0.40, more density in the area would be encouraged. This is consistent with the "modified" zoning analysis performed in Chapter 3 of this report and would result in additional traffic along the roadways, but could serve as a means of better promoting pedestrian and reasonable development, if used in conjunction with the other suggestions provided in Chapter 4.

The increased density, supplemented by promoting opportunities for shared parking between uses, could create an environment that promotes pedestrian activity in the area. Increased densities may also prove to be more attractive in encouraging redevelopment, offering incentives to promote infill development on underutilized parcels by reducing land development costs and encouraging 'higher-end' users on the properties instead of the auto maintenance yards and other industrial uses which do not necessarily lend themselves to a village character.

### Reduced Parking Regulations

As a means to encourage mixed use development, section 5.5.4.1.1 of the Zoning By-Law permits a reduction of parking for mixed use developments in the East Acton Village District, requiring only 85 percent of the total number of parking spaces to be provided for a mixed use development. However, in the parking regulations, Section 6.9.2.4 provides a reduction equal to 70 percent in the amount of required parking for the collective use of parking facilities in the West Acton and South Acton Village Districts. It is recommended that a reduction equal to 70 percent in the amount of required parking be provided in the East Acton Village as a means to encourage flexible development options and promote development of mixed use centers in the area.

### Permitted Uses

To provide more flexibility and promote more uses in the East Acton Village District, the 1998 Master Plan Update recommends updating the Table of Use Regulations. The recommendations are intended not only to clarify and modernize the definitions of some uses, but also to allow uses in the East Acton Village that are permitted in other Village Districts. Such updates to the Zoning By-law would provide more opportunities for additional development and promote more diversified options for mixed use development in the East Acton Village District.

## Village Design

Action Step LU-9 of the 1998 Acton Master Plan Update specifies the creation of design guidelines to encourage the desired type of development in village centers. One method of promoting a unique sense of character in the East Acton Village area is to set forth regulations that guide development according to a distinct set of site development criteria, or design standards. Such development criteria would be included as part of the dimensional regulations for the underlying zone district, and approved during the Town's site plan review process.

Section 5.6 of the Town of Acton Zoning Bylaw provides a list of special provisions and dimensional regulations for land development the Kelley's Corner District. The provisions are intended to "*ensure that future development will help create the form, cohesion, order, and supporting infrastructure that will identify the Kelley's Corner District as an attractive, pleasant, and desirable center for business, shopping and other commercial and community activities*." Subsections of these special provisions address elements to encourage building and site design that reinforces a pedestrian oriented scale. Many of these subsections would also be appropriate if they were modeled and applied as site development criteria specific to the East Acton Village, and could be included as a new subsection under Section 5.5 Special Provisions for Village Districts. Such design elements could include:

- Ensuring that building design reflects the architecture of traditional New England commercial/village centers in terms of scale, massing, roof shape and materials.
- Designing building facades that face the street or other public right of way areas to emphasize a vertical orientation rather than a horizontal expanse of single structure, as reflected in a typical strip development. For single buildings with multiple uses having separate entryways, building design should appear as though it is a series of clustered separate buildings, rather than a more suburban commercial 'strip' development.
- Creating separate entrances to each ground floor business where buildings have a public, commercial or office use on the ground floor. Main entryways could be identified by elements including porches, signage, canopies or awnings.
- Designing building facades to contain at least 20 percent, but not more than 80 percent, of windows at ground level, framed by the surrounding wall, or recessed into or projected from the wall.
- Designing roofs gabled with a minimum pitch of 9/12 (9" vertical for every 12" horizontal). Two or three story buildings may have a flat roof, provided that the facades are treated with an articulated cornice, dormers, or other architectural treatment that appears an integral part of the building from all visible sides.
- Continuing the main features of the architectural treatment of the building fronts facades, including materials used, around all sides of the building that are visible from a street, parking area or pedestrian right-of-way.

- Restricting garage doors or loading areas from the building front.
- Screening (through landscaping) service areas and mechanical equipment placed to the rear or side of buildings, to prevent direct views from adjacent properties or from public uses.
- Locating mechanical equipment unobtrusively when viewed from the street or adjacent lots.

While not directly impacting transportation elements within the Village area, this text would begin to craft a "look and feel" for the Village and would lead to an improved and increased pedestrian environment.

## Circulation Standards

In addition to building design standards to promote a village center character, other elements should be considered for inclusion in the Zoning By-Law's dimensional regulations specific to the East Acton Village. Such elements could include the following site layout and circulation standards.

- Orienting buildings along property frontages, with parking at the side and rear of the site, to avoid the appearance of a "sea of asphalt."
- Promoting safety and efficiency, when access to parking areas or vehicle circulation corridors are being provided at locations where existing or proposed access points are provided across the main roadway, the access points should be designed to directly align with each other, giving the appearance and function of a street intersection. To the maximum extent possible, access points should be perpendicular to the main roadway to provide for sufficient visibility of on-coming vehicles and pedestrians.
- Encouraging shared access driveways and parking areas for mixed-use developments, which have different hours, days and/or seasons of peak parking demand.
- Designing internal parking and roadways could be looped rather than dead-ended to allow for efficient circulation and movement.
- Including internal landscaped islands, shade trees and exterior landscaped buffer areas in parking design to soften the visual impacts of parking areas.
- Prohibiting parking and garages for all residential and commercial uses in front yard setback areas.
- Designing on site pedestrian circulation networks to provide safe access through the site, especially between buildings and parking areas. Paving and ground surface treatments should reinforce and define pedestrian circulation direction and patterns. Materials may be simple, but should have a level of patterning and detail through change in materials, color or scoring patterns.
- Providing street-trees along all pedestrian corridors along with the planting of ground cover. A street tree canopy should appear tight, formal and planted in clusters at entry nodes and plazas. Ground surface materials

should be natural and soft, and remain low, well below sight lines of pedestrians.

- Incorporating pedestrian lighting into the design of parking areas and along pedestrian walkways. Additional lighting could be used to reinforce architectural edges as well as highlight special elements. Nighttime illumination should provide for safety and security of residents and visitors to the East Acton Village Center.
- Including provisions for the "parking" of bicycles in parking area locations that are safely segregated from automobile traffic and parking.

Finally, the development of a village landscaping policy or zoning by-law to be used as a guideline for future development along the corridor would serve to promote a consistent character for the community. While outside the scope of this effort, some suggested ideas for pedestrian and community-friendly landscaping applications are included in the Appendix to this report.

■

## Concord Rotary Issues

The on-going saga of the Route 2 – Concord Rotary will have a significant impact on the transportation environment within the East Acton Village area. Discussions with the Town Staff, MassHighway, and the Central Transportation Planning Staff (CTPS) identified that there has been some work done on the potential redesign of the Concord Rotary. While this project is still far from becoming reality, it is a project that will potentially create ripple effects throughout the Town of Acton.

Currently under consideration are a number of options with variable levels of impact to the East Acton Village area. Some increase traffic through the area and some significantly reduce traffic through the area.

The short-term and medium-term improvements identified herein are needed independent of any construction at the Rotary. The long-term alternatives, particularly those that deal with Wetherbee Street, could be impacted or have an impact on the ultimate design of the Rotary solution (at least those currently under consideration). These impacts will have to be further studied as the Rotary project progresses.

Over the long-term, if the ultimate goal of the community is to develop a village character and keep traffic volumes reasonable within the study area, Town officials and members of the community should guard against Rotary solutions that significantly increase traffic through the Great Road corridor and support alternatives that keep traffic volumes relatively steady or slightly decrease demands at the cost of losing by pass traffic for commercial businesses.

■

## Great Road Speed Limit Issues

Finally, one of the most complex issues facing many villages and townships located along busy roadways is the speed in which traffic travels through them. Many times, this is an issue that is based on perception and less on technical engineering studies and can be reviewed as needed with the proper authorities.

In the case of Great Road, the corridor is under the jurisdiction of the Massachusetts Highway Department (MassHighway). Several years ago, the speed limit along Great Road was posted as 45 miles per hour. Over the years, this speed limit has been revisited and remains unchanged.

The factors involved in setting (and changing) a posted speed limit are two-fold:

- Is this a safe speed limit?
- Is this a reasonable and self-enforcing speed limit?

For the example of Great Road, the ability to review the operating conditions gives us some insight into the "safety" of the corridor. Basically, since there is not a high preponderance of accidents currently occurring along the corridor, 45 mph will likely be viewed as a safe operating speed by regulatory authorities. While this does not address character issues and pedestrian / bicyclist safety concerns in the village area, there simply is not a statistical reason to deem this roadway as unsafe at 45 miles per hour.

Similarly, based on VHB's observations, this speed limit appears to be self-enforcing as well. The fact that drivers are not regularly exceeding this speed limit by excessive amounts gives the impression that this is a self-enforcing speed limit.

Finally, the reasonable factor is somewhat subjective. At this time, the speed limit appears to be reasonable given the purpose of the roadway (arterial in nature) and there do not appear to be many pedestrians seeking to cross the roadway. It is reasonable to expect that the reason only a limited number of pedestrians are seeking to cross the roadway is because of the high rate of speed, but this is a matter that would need to be studied in more detail before clearly being noted.

***Regulations*** – Based on the Commonwealth's *Procedures for Speed Zoning on State and Municipal Roadways*[10], it is the objective of the MassHighway department to provide means to promote safe and efficient traffic flow along the Commonwealth's roadways. The goal of their speed program has always been to "provide appropriate

▼

[10] *Commonwealth of Massachusetts Procedures for Speed Zoning on State and Municipal Roadways*, MassHighway, 1998

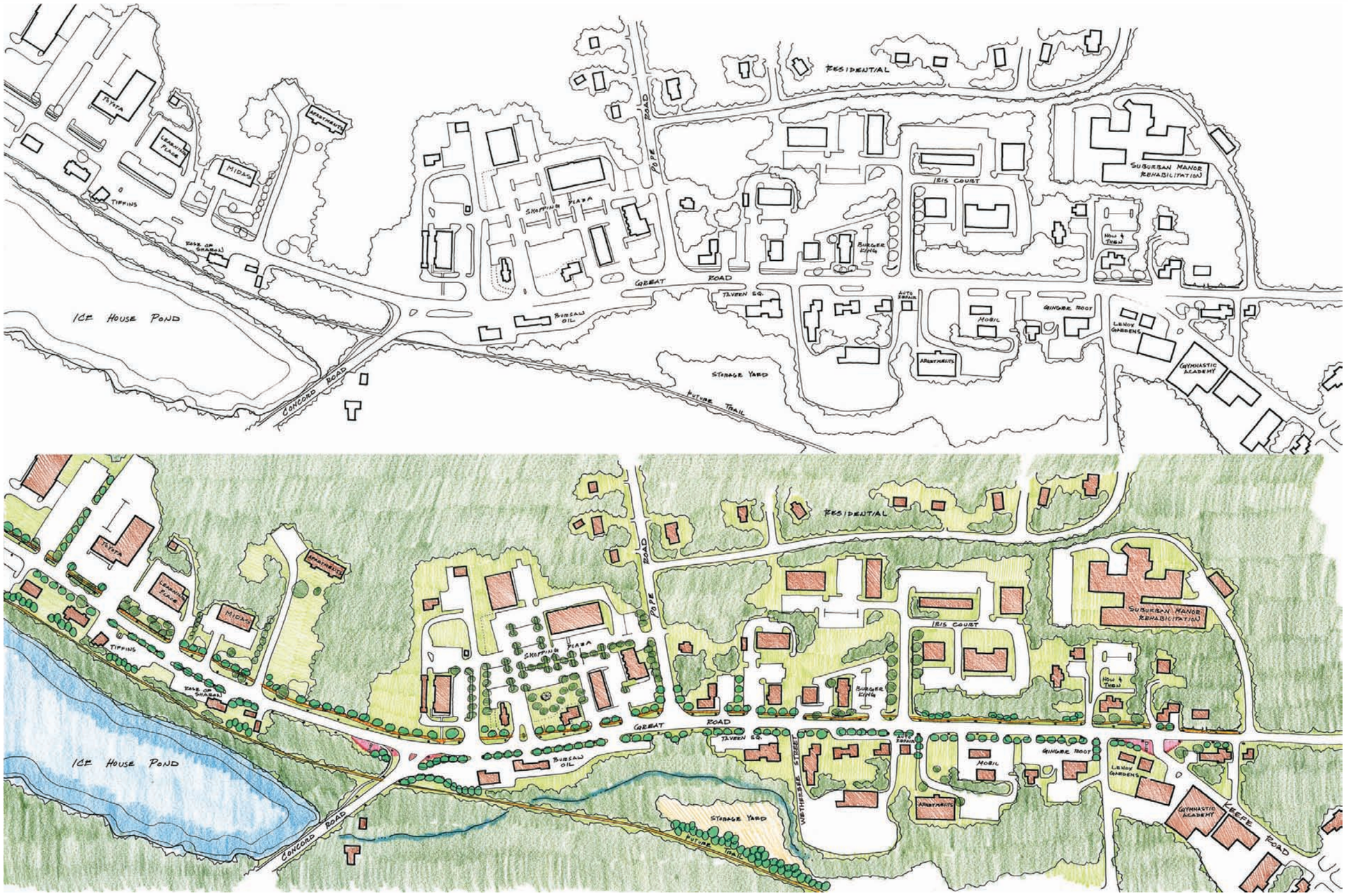
and enforceable speed limits on all paved streets and highways in the best interest of the motoring public's right to use a roadway in a reasonable and proper manner."

As such, MassHighway requires that an engineering and traffic study be conducted in compliance with traffic engineering practices. In their eyes, the proper speed limit is both acceptable by the prudent driver and enforceable by police departments. Specifics on the speed study are included in the Appendix to this report and are based on standard MassHighway guidelines.

It should be noted that, generally, the posted speed limit on undivided highways outside of a posted thickly settled district is 40 miles per hour. While this corridor was posted as a thickly settled corridor, MassHighway (at the request of an Acton resident) recently reviewed speed limits along Great Road and found that the previously posted "thickly settled" signage near the East Acton Village area was improperly posted. This signage and designation has, therefore, been removed along the corridor. Finally, according to MassHighway, this corridor is also part of a "special speed regulation" which designates Great Road as a 45 mile per hour corridor for its entirety through Acton.

However, if efforts were successful in convincing MassHighway to reduce the speed limit along this corridor, some of the benefits to the East Acton Village area might include:

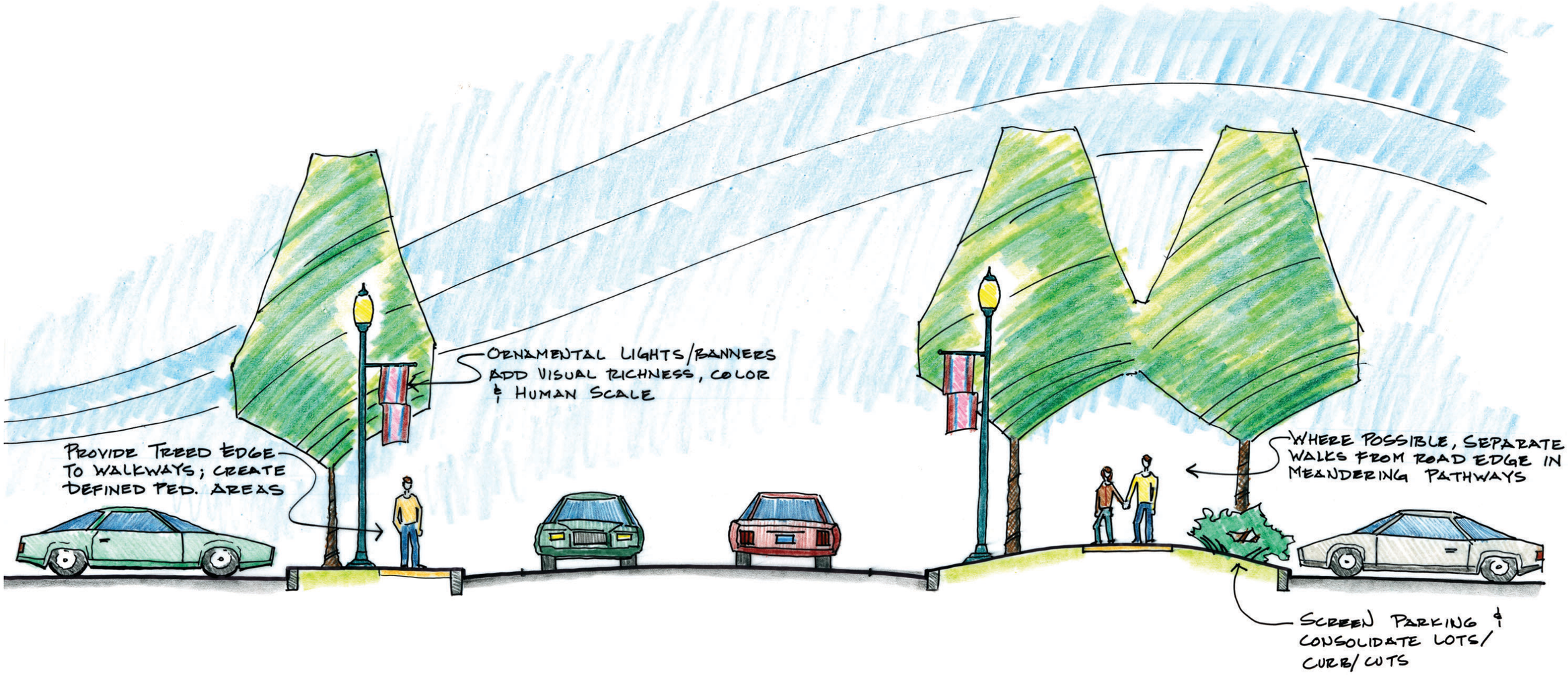
- Improved pedestrian and bicyclist safety, including a greater potential to locate pedestrian crosswalks along Great Road.
- Improved access into and out of driveways along the corridor.




**Vanasse Hangen Brustlin, Inc.**

Figure A-1

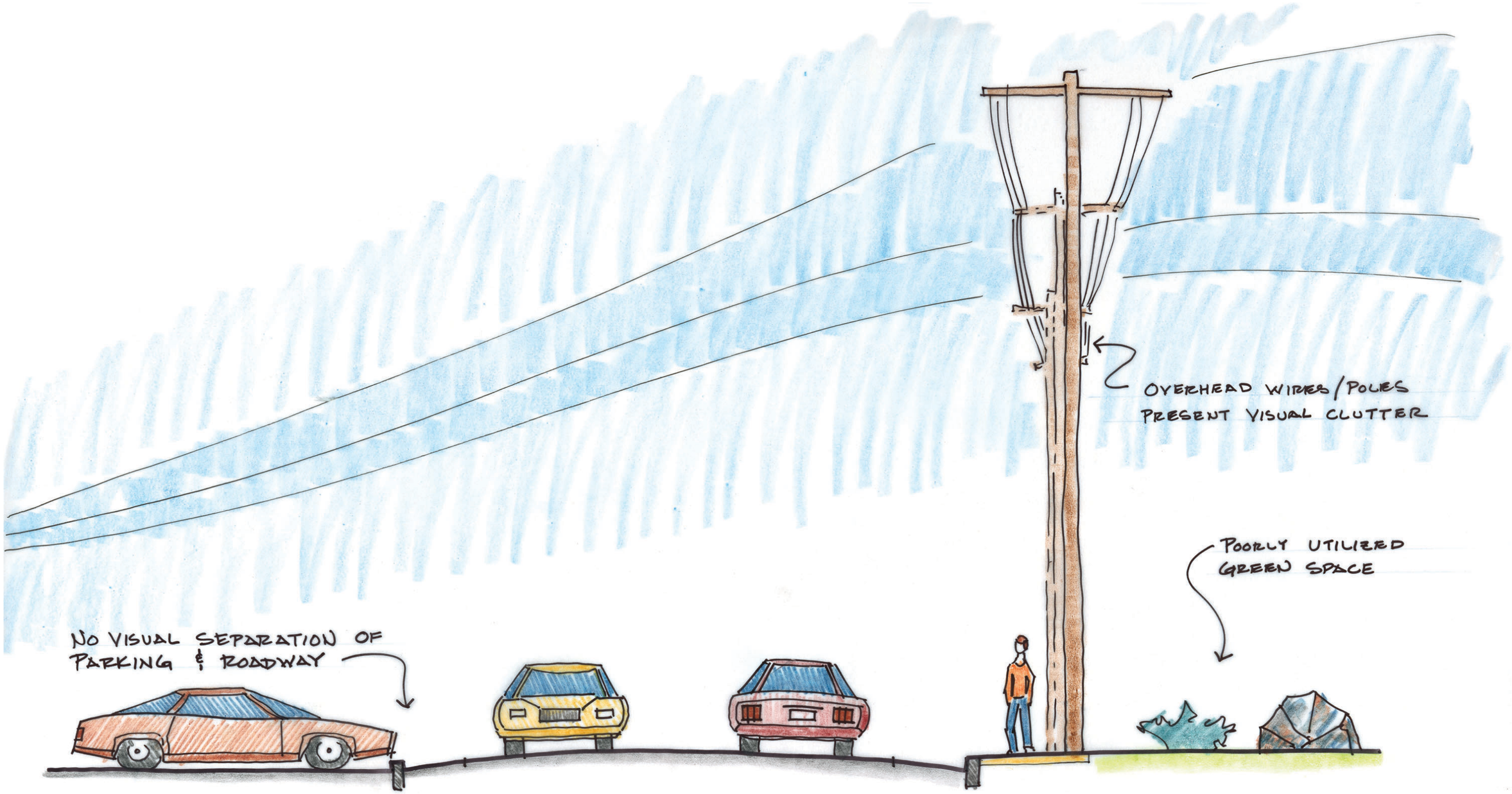
Existing and Conceptual
Landscaping Plan




**Vanasse Hangen Brustlin, Inc.**

Figure A-3

Conceptual Streetscape Design Option




**Vanasse Hangen Brustlin, Inc.**

Figure A-2

Existing Streetscape Conditions