

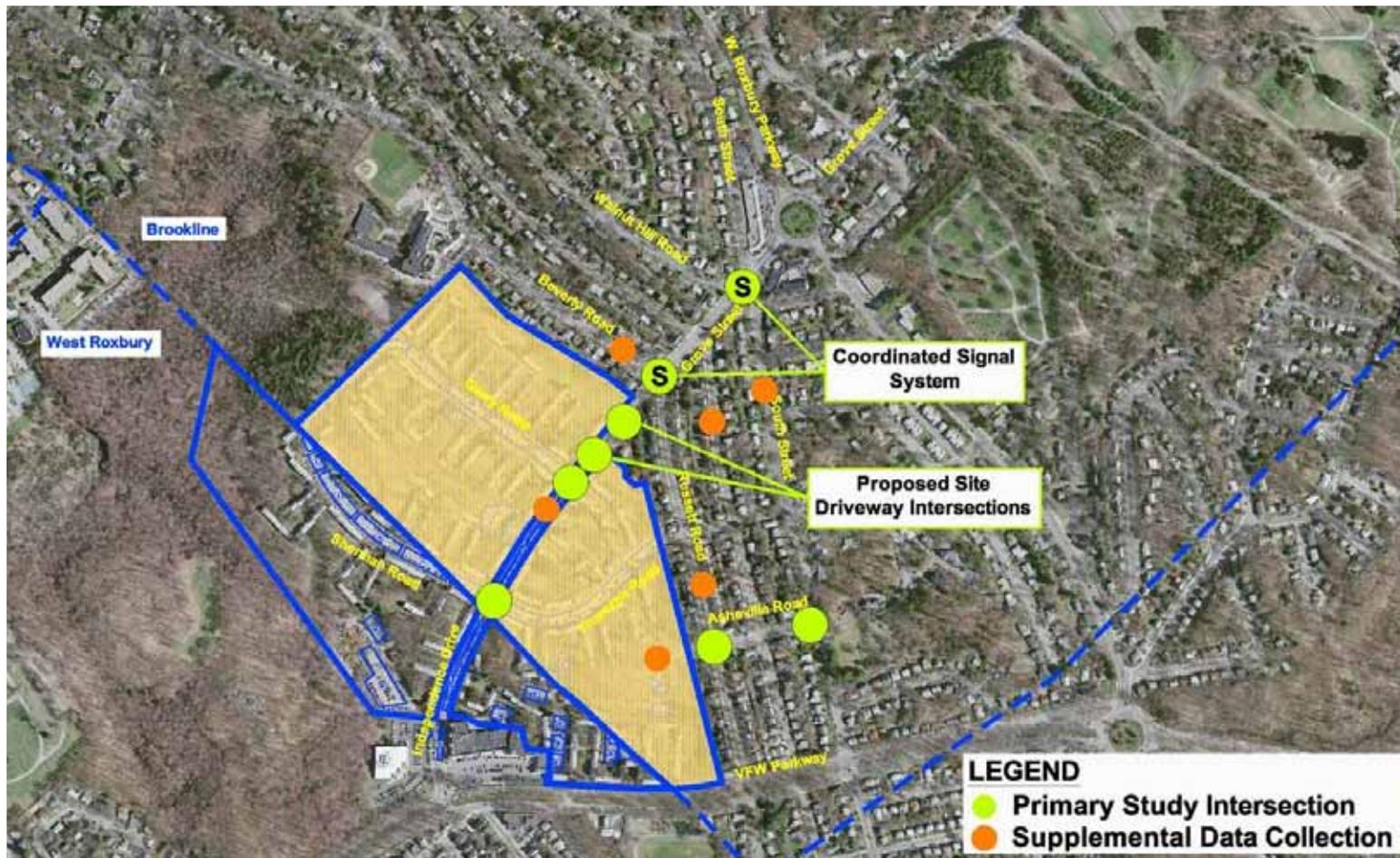
Residences of South Brookline Transportation Peer Review Responses

I. Peer Review (BETA) : Received 3/21/14

- Concurrence with methodology and industry standards
- Supplemental Data (to confirm growth trends)
- Site access and circulation, emergency vehicles
- Evaluation of Off-Site Mitigation & TDM

#1 – Study Area

- The study area is appropriate.



#2 – Supplemental Data Collection

- Supplemental traffic volume data collected along Independence Drive in 2014 indicates area traffic growth of 0.4% per year or less.
- Comparison of the November 2013 TIA peak hour volumes to historical volumes at the Grove Street signals indicates area growth of 0.25% per year or less.

#2 – Supplemental Data Collection

TRAFFIC VOLUME COMPARISON INDEPENDENCE DRIVE SOUTH OF GERRY ROAD

Time Period	Vehicular Traffic Volumes		
	2007 ¹	2014 ²	Difference
Daily Traffic	13,921	13,858	-0.5%
AM Peak Hour	1,273	1,112	-12.6%
PM Peak Hour	1,181	1,212	+2.6%

¹Traffic volumes collected using an ATR along Independence Drive south of Gerry Road in September 2007.

²Traffic volumes collected using an ATR along Independence Drive south of Gerry Road in April 2014.

#2 – Supplemental Data Collection

TRAFFIC VOLUME COMPARISON GROVE STREET SIGNALIZED INTERSECTIONS

Time Period	Vehicular Traffic Volumes		
	2004 FDR ¹	2013 TIA ²	Difference
<i>Grove Street/Beverly Road/Russett Road</i>			
AM Peak Hour	1,435	1,460	+1.7%
PM Peak Hour	1,451	1,481	+2.1%
<i>Grove Street/South Street/Walnut Hill Road</i>			
AM Peak Hour	1,888	1,841	-2.5%
PM Peak Hour	1,693	1,580	-6.7%

¹Turning movement count data collected in March 2004 as reported in *Functional Design Report, Transportation Engineering Services at Three Intersections, Grove Street/Independence Drive at Beverly Road/Russett Road, Grove Street at South Street/Walnut Hill Road, Grove Street at Allandale Road*, prepared by The Louis Berger Group, Inc., dated March 2005.

²Turning movement count data collected in April 2012 as reported in *Technical Memorandum, Traffic Impact Assessment, Proposed Residences of South Brookline – 40B, Brookline, Massachusetts*, prepared by MDM Transportation Consultants, Inc., dated November 18, 2013.

#3 – Travel Speed Data

- Travel speed data has been collected in 2014 along Independence Drive.

SPEED STUDY RESULTS – INDEPENDENCE DRIVE

	Travel Speeds		
Travel Direction	Posted	Mean ¹	85 th Percentile ²
Northbound	35	34	39
Southbound	35	30	35

¹ Arithmetic mean (mph)

² The speed at or below which 85 percent of the vehicles are traveling

#4 – Expanded Sight Distance Evaluation

- The sight distance evaluation has been expanded to reflect the ambient (85th percentile) travel speeds along Independence Drive. Adequate sight lines will be provided (available exceeds 500 feet).

#5 – Verify On-Site Garage Sight Lines

- Specific design is subject to ongoing review with BETA as part of the site plan and drainage design review.

#6 – Police Department Crash Records

- A supplemental crash analysis has been conducted based on Brookline Police Department crash records with results that are generally consistent with the crash analysis based on MassDOT crash data.
- No safety deficiencies were identified.

Crash Locations – 2011 through 2013 Brookline Police Department Records



Crash Rates - 2011 through 2013 Brookline Police Department Records



Brookline Police Crash Data 2011-2013

MDM ID#	Date	Location	Type of Crash	Severity	Pavement Conditions
1	2/8/2011	Independence Drive / Sherman Road	Rear-End	PI	Dry
2	3/2/2011	45 Independence Drive / Gerry Road	Rear-End	PDO	Dry
3	6/11/2011	131 Independence Drive	Rear-End	PI	Water
4	7/18/2011	100 Beverly Road	Single Vehicle	PI	Dry
5	11/22/2011	Independence Drive / Sherman Road	Rear-End	PI	Dry
6	12/3/2011	Independence Drive / Russett Road	Angle	PI	Dry
7	12/11/2011	127 Independence Drive	Single Vehicle	Unknown	Unknown
8	2/16/2012	136 Beverly Road	Single Vehicle	PI	Dry
9	7/26/2012	Independence Drive / Gerry Road	Angle	PI	Dry
10	8/8/2012	194 Grove Street	Rear-End	PI	Dry
11	2/5/2013	242 Grove Street	Single Vehicle	PDO	Snow
12	7/21/2013	290 Beverly Road / Grove Street	Rear-End	Unknown	Dry
13	9/12/2013	33 Independence Drive	Rear-End	PI	Dry
14	10/25/2013	Grove Street / South Street	Single Vehicle	Unknown	Dry

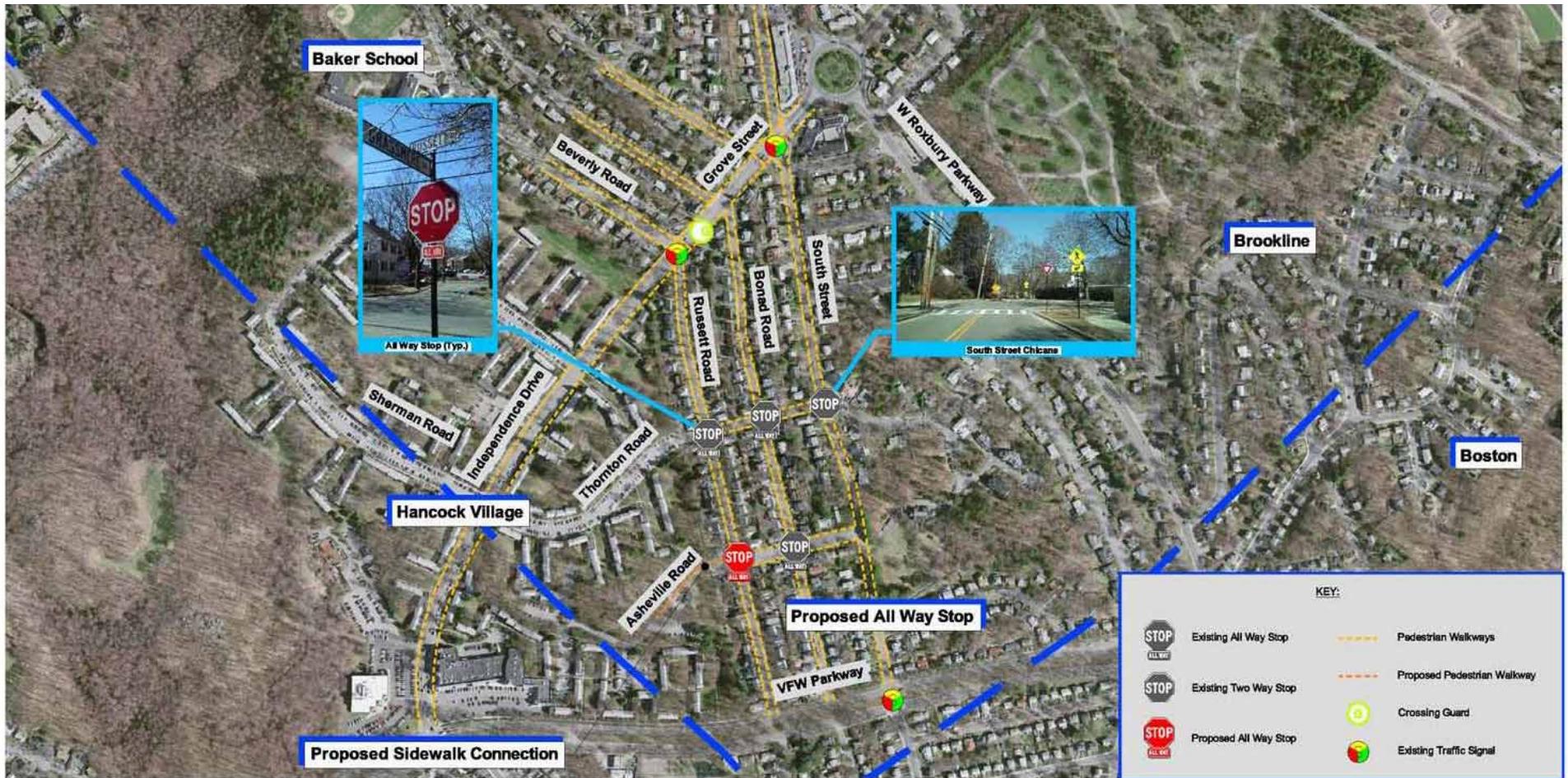
#7 – Trip Generation Estimates

- The trip generation estimates are appropriate. No response required.

#8 – Traffic Calming

- The Town has implemented traffic calming measures in the adjoining neighborhood.
- Additional traffic calming measures beyond those already in place are not warranted along Asheville Road, Russett Road or South Street based on review of crash records, traffic volume data and travel speeds.

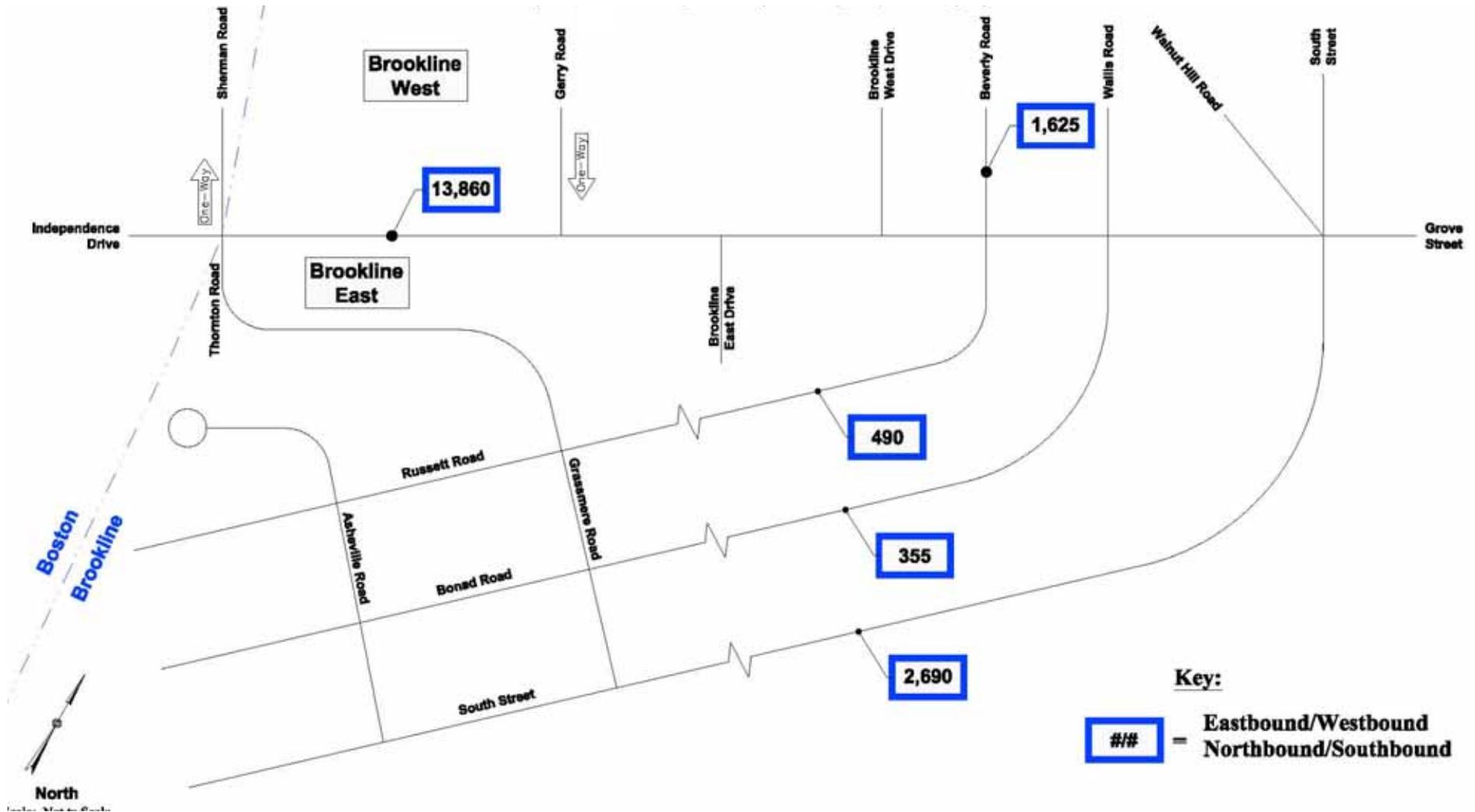
Neighborhood Traffic Controls & Facilities



85th Percentile Travel Speeds



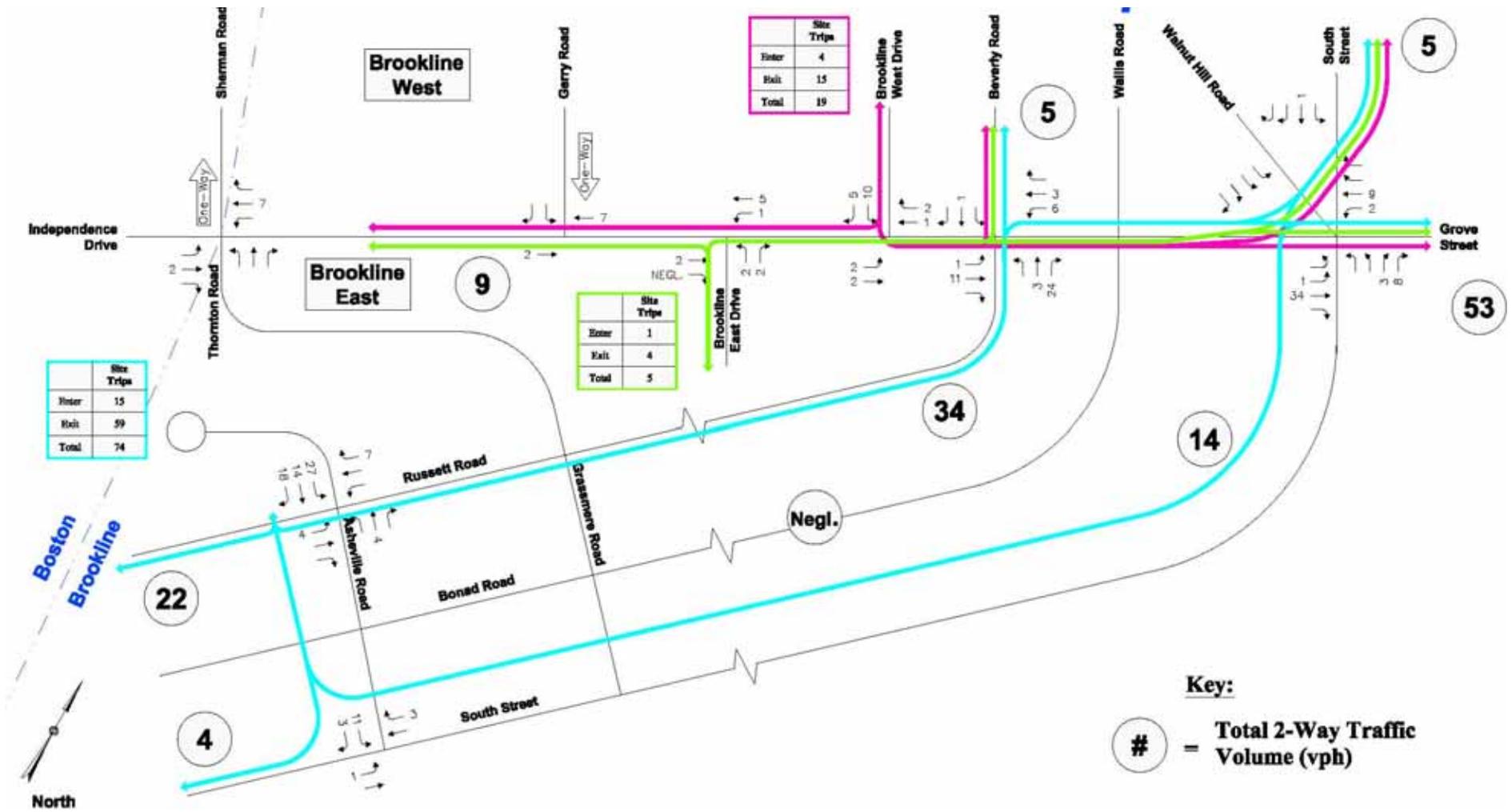
Daily Traffic Volumes



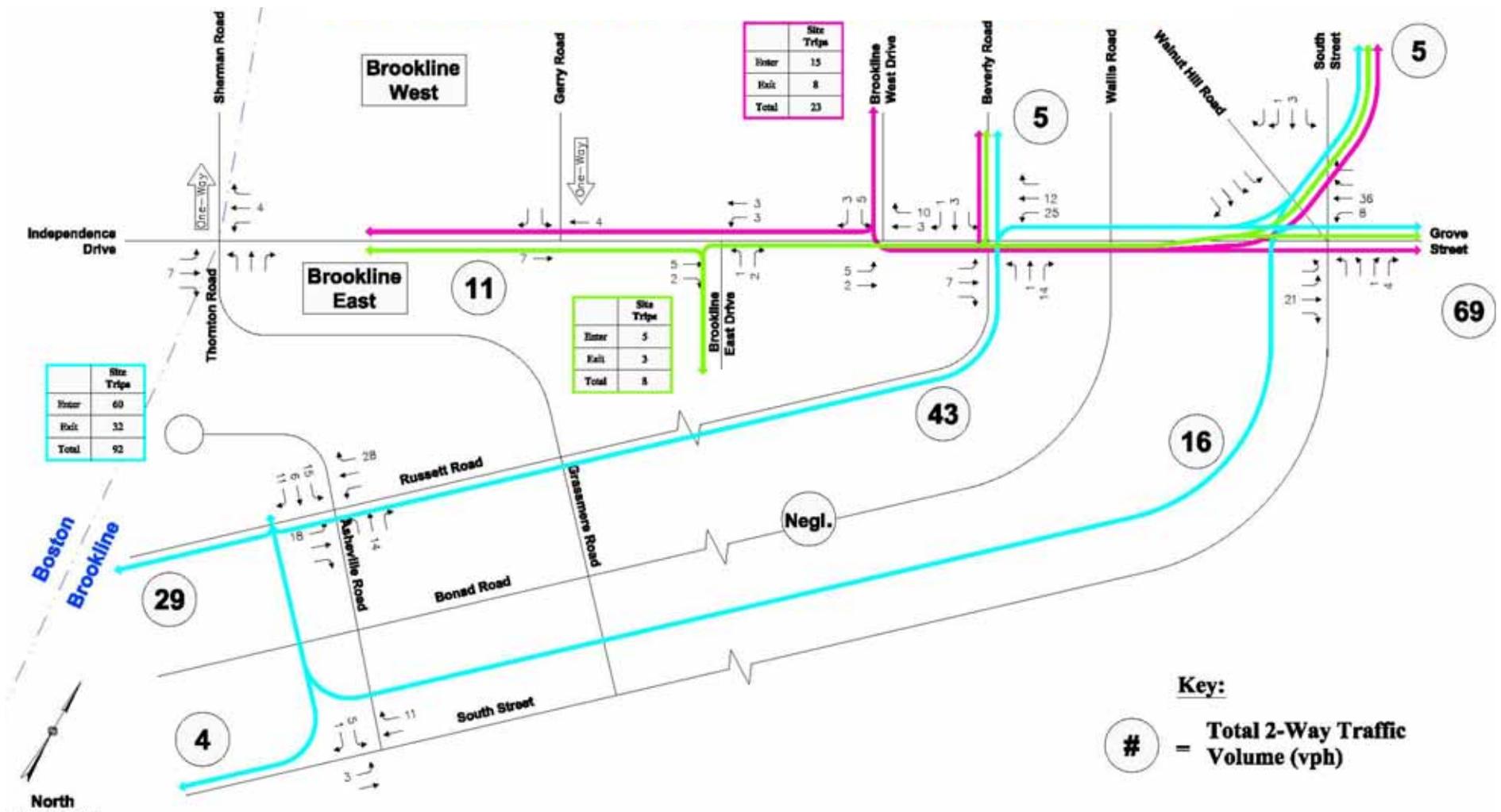
#9 – Trip Distribution

- The trip distribution methodology is appropriate.
- The patterns reflect existing trends for Hancock Village.
- Trip increases in the neighborhood streets are modest.

AM Peak Hour Site-Generated Trips



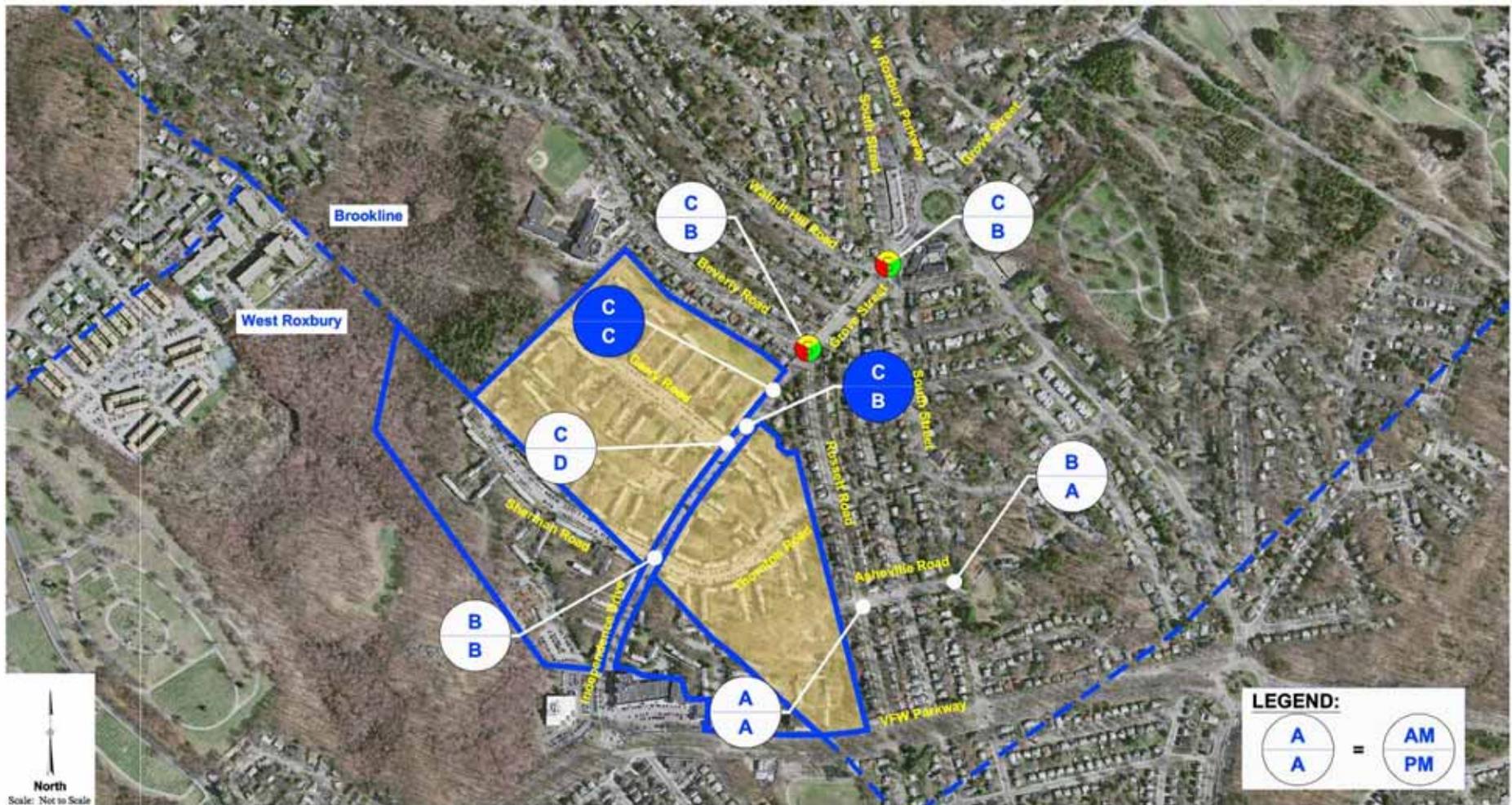
PM Peak Hour Site-Generated Trips



#10 – Capacity Analysis

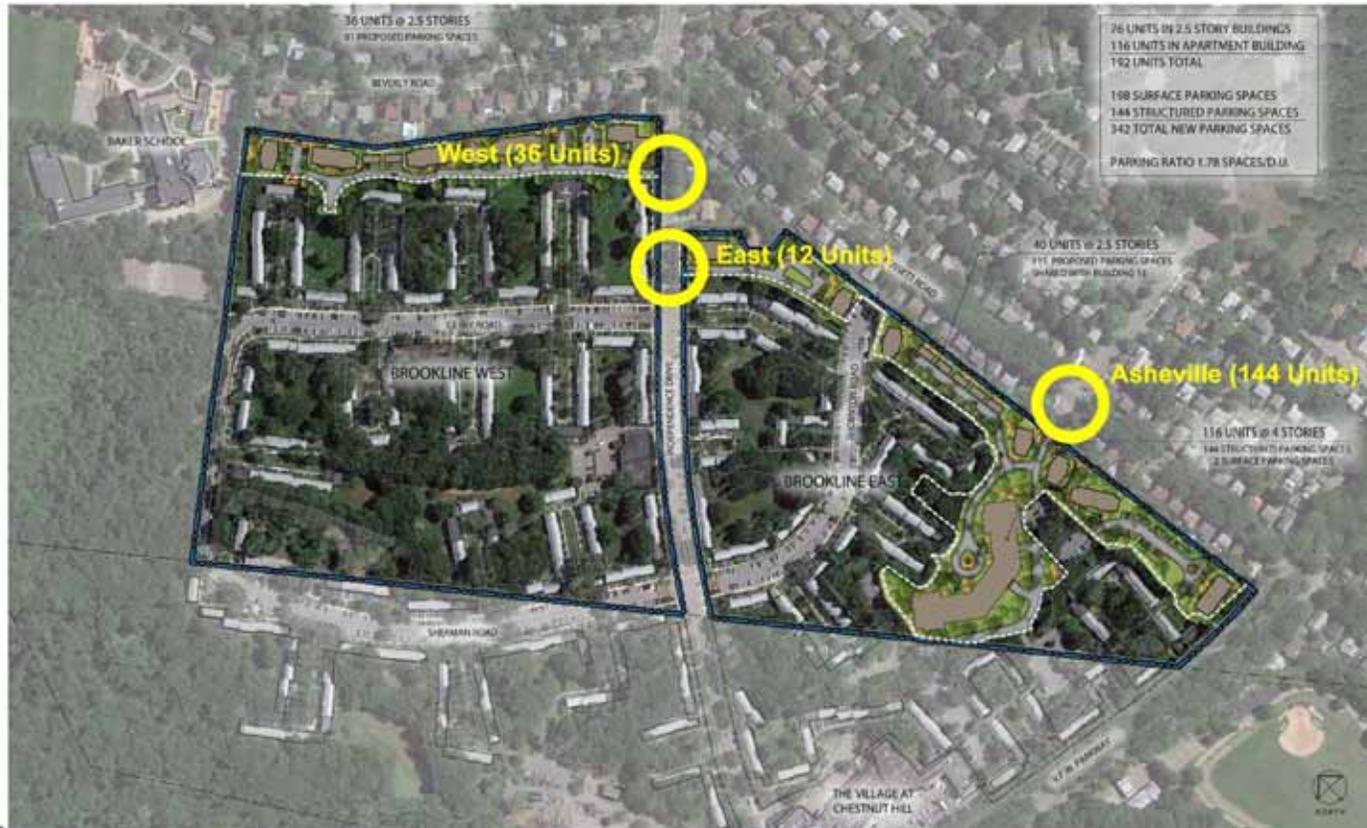
- The capacity analysis was conducted in accordance with industry standards using valid traffic volume data.

Intersection Operation – Build Condition (No Change)



#11 – Multiple Access Points

- The use of multiple driveways will result in less traffic impact.



#12 – Expand the TDM Program

- The Proponent plans to expand the existing TDM program.
- Additional TDM elements may include:
 - Expanded Hancock Village shuttle service
 - Installation of bicycle storage facilities
 - Additional sidewalk construction
 - Request increased service from Zipcar

#13 – Russett Road/Asheville Road AWSC

- MUTCD volume-based criteria for installation of all-way stop control (AWSC) are **NOT** met under existing or future build-out traffic volume conditions.
- AWSC may be warranted based on additional (non-volume) criteria subject to Town approval.

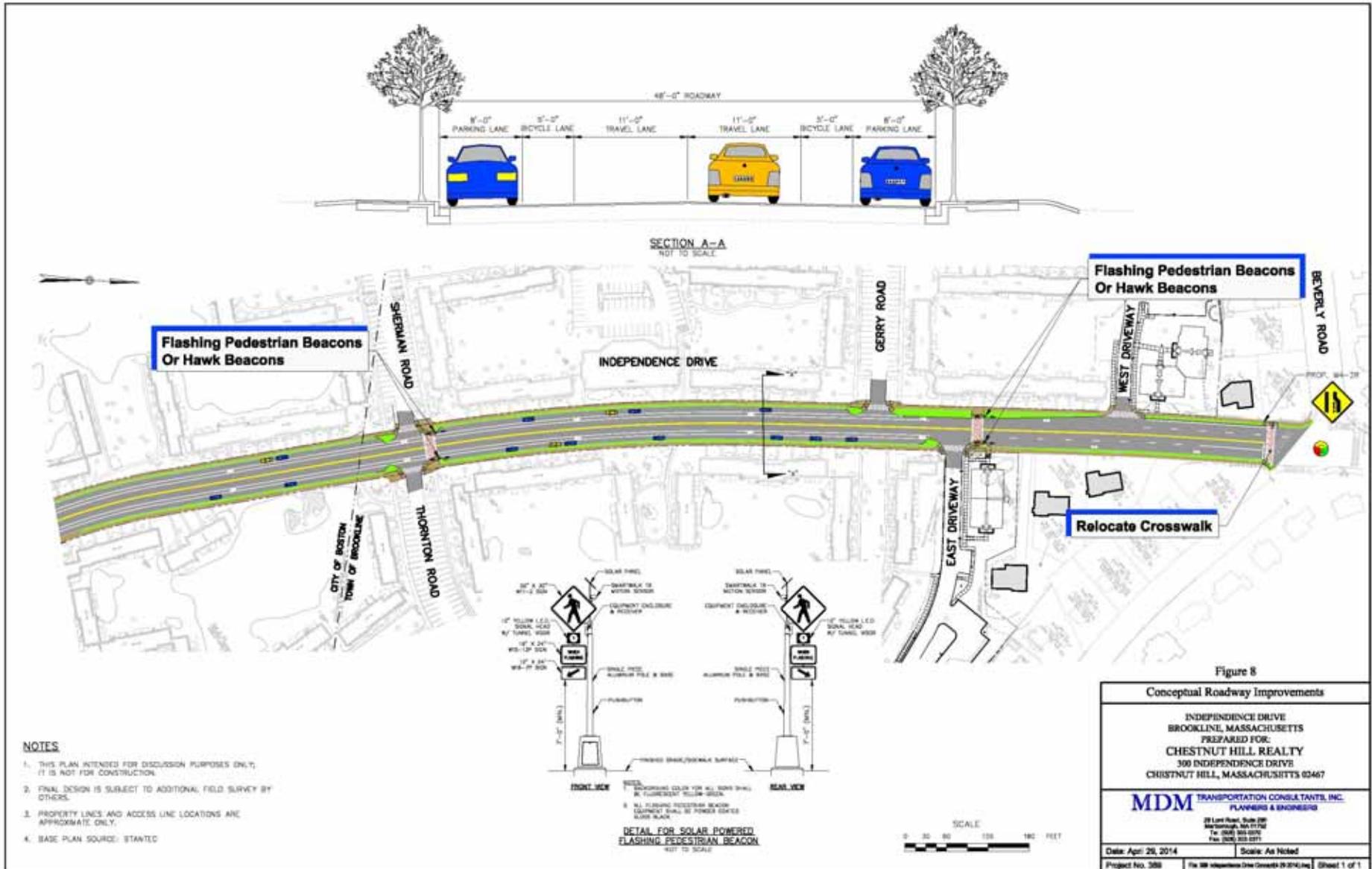
#14 – Traffic Calming Measures

- Additional traffic calming measures beyond those already in place are not warranted along Asheville Road, Russett Road or South Street.
- AWSC may be considered at the Russett Road/Asheville Road intersection subject to Town approval.
- Traffic calming measures may be warranted along Independence Drive subject to Town approval.

#15 – Independence Drive Improvements

- The Proponent has commissioned a preliminary concept plan that shows potential roadway improvements along Independence Drive between Sherman Road and Beverly Road.

Conceptual Roadway Improvements



Conceptual Roadway Improvements



Conceptual Roadway Improvements



MassDOT Bike Lane Example



#16 – Signal Warrant Analysis

- MUTCD traffic signal warrant criteria are **NOT** met for the Sherman Road/ Thornton Road and Gerry Road intersections.
- MUTCD warrant criteria for **pedestrian hybrid beacons** are met at both locations.

Pedestrian Beacon Options

High intensity Activated crossWalk (“HAWK”)



Pedestrian Beacon Options

Beacon (CrossAlert) - Motion Activated



#17 – On-Site Parking

- A total of 345 new parking spaces are proposed that equate to a parking ratio of 1.78 spaces/dwelling unit.

#18 – Crosswalk between Buildings 1 & 2

- The Proponent will incorporate these design elements into the revised site plan as recommended.

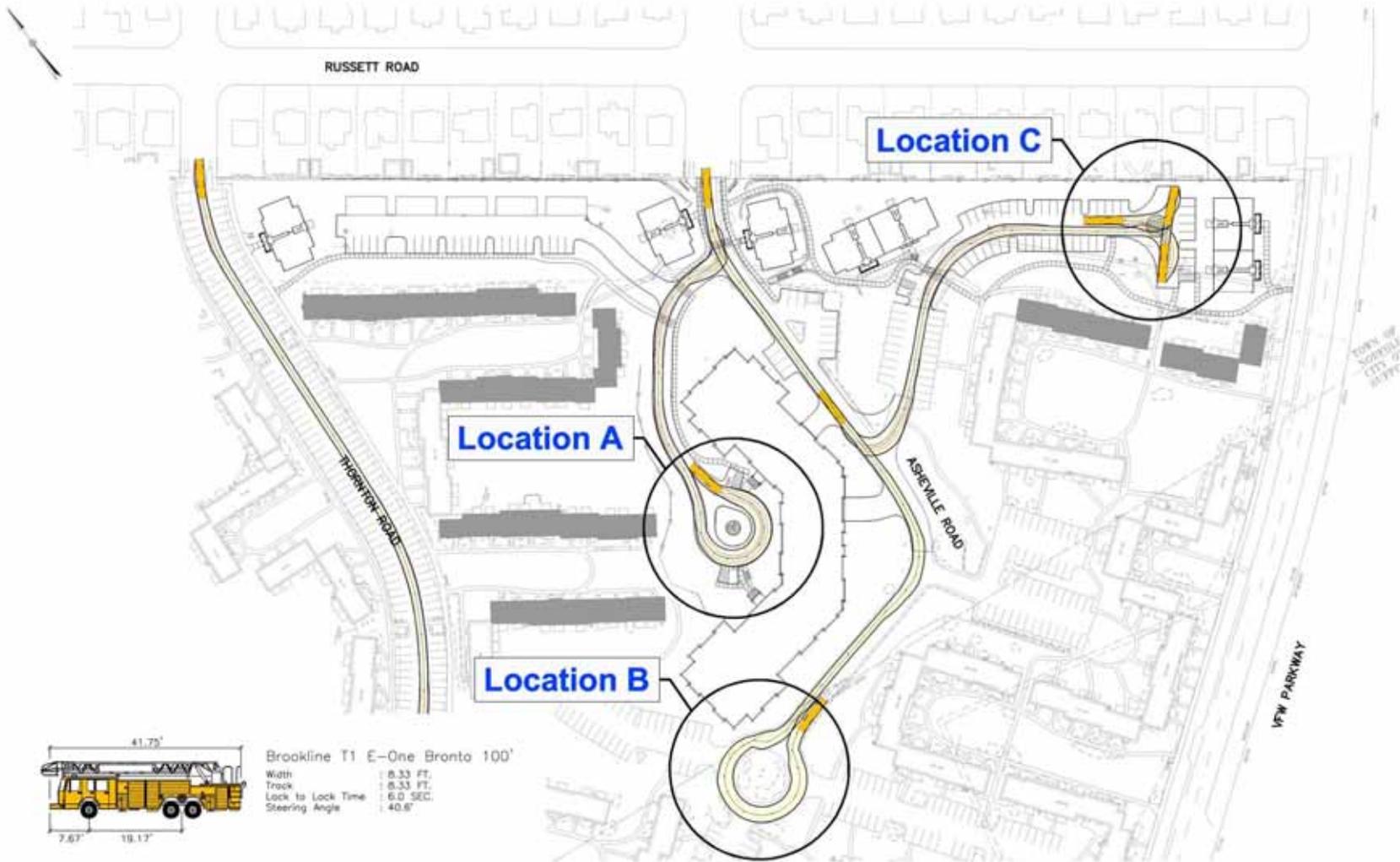
#19 – Emergency Vehicle Circulation

a) AutoTurn® movements for largest apparatus serving the Site

- ❖ Brookline E-One Bronto 100' Tower Truck Modeled
- ❖ Sufficient maneuvering area for multiple trucks with ability to “bypass” one another
- ❖ Consistent design with recently approved Brookline residential projects
- ❖ Consistent design with recently approved residential projects in adjacent communities (Newton and Needham)

b) Proposed Buildings will be sprinklered

AutoTurn® Analysis



AutoTurn® Analysis



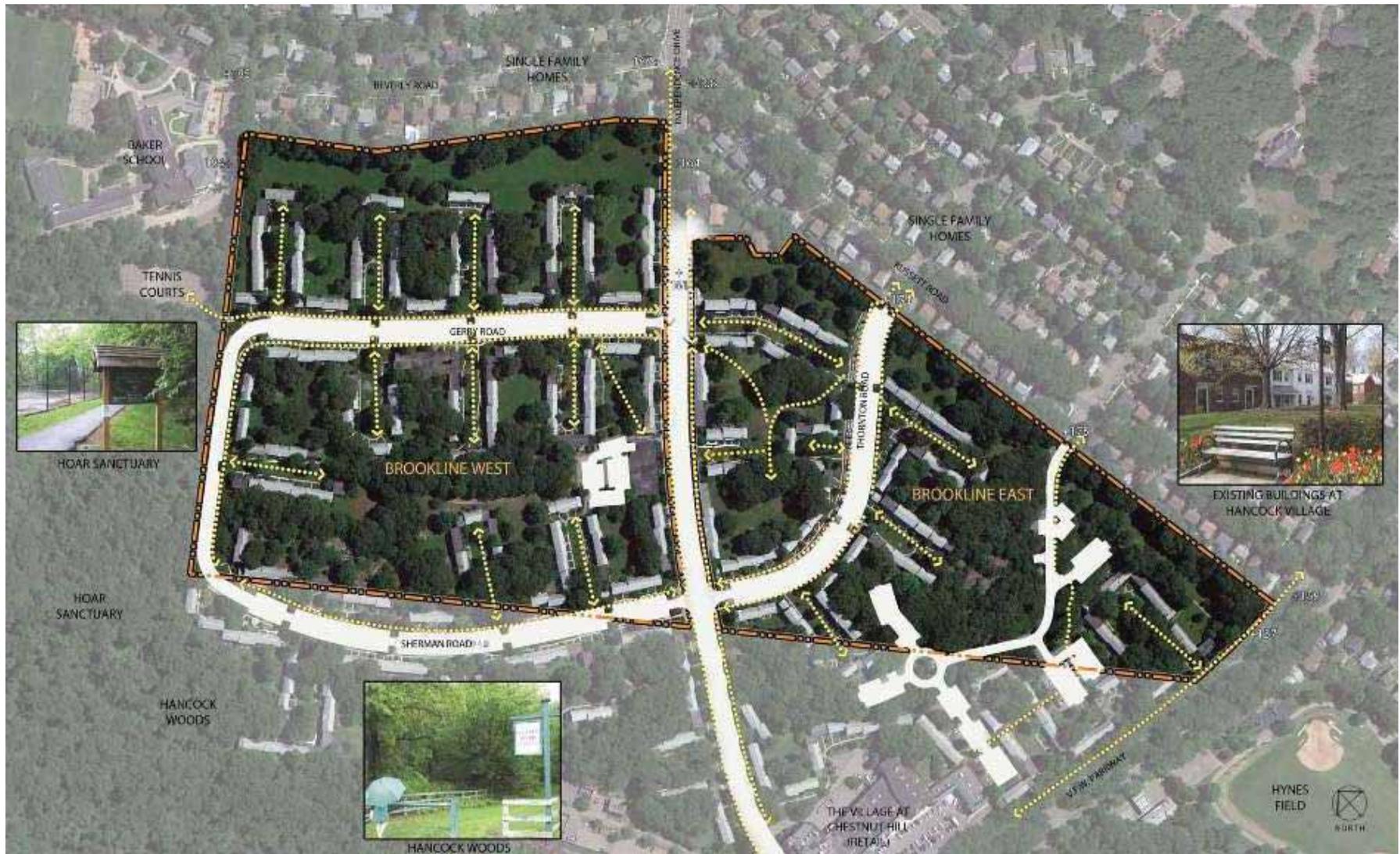
#20 – Fire Trucks in Opposite Directions

- The proposed site roadway width of 22 feet satisfies Brookline zoning requirements and is consistent with roadways that serve Hancock Village.
- Proposed on-site roadways will adequately accommodate emergency vehicles travelling in opposing direction without conflict.

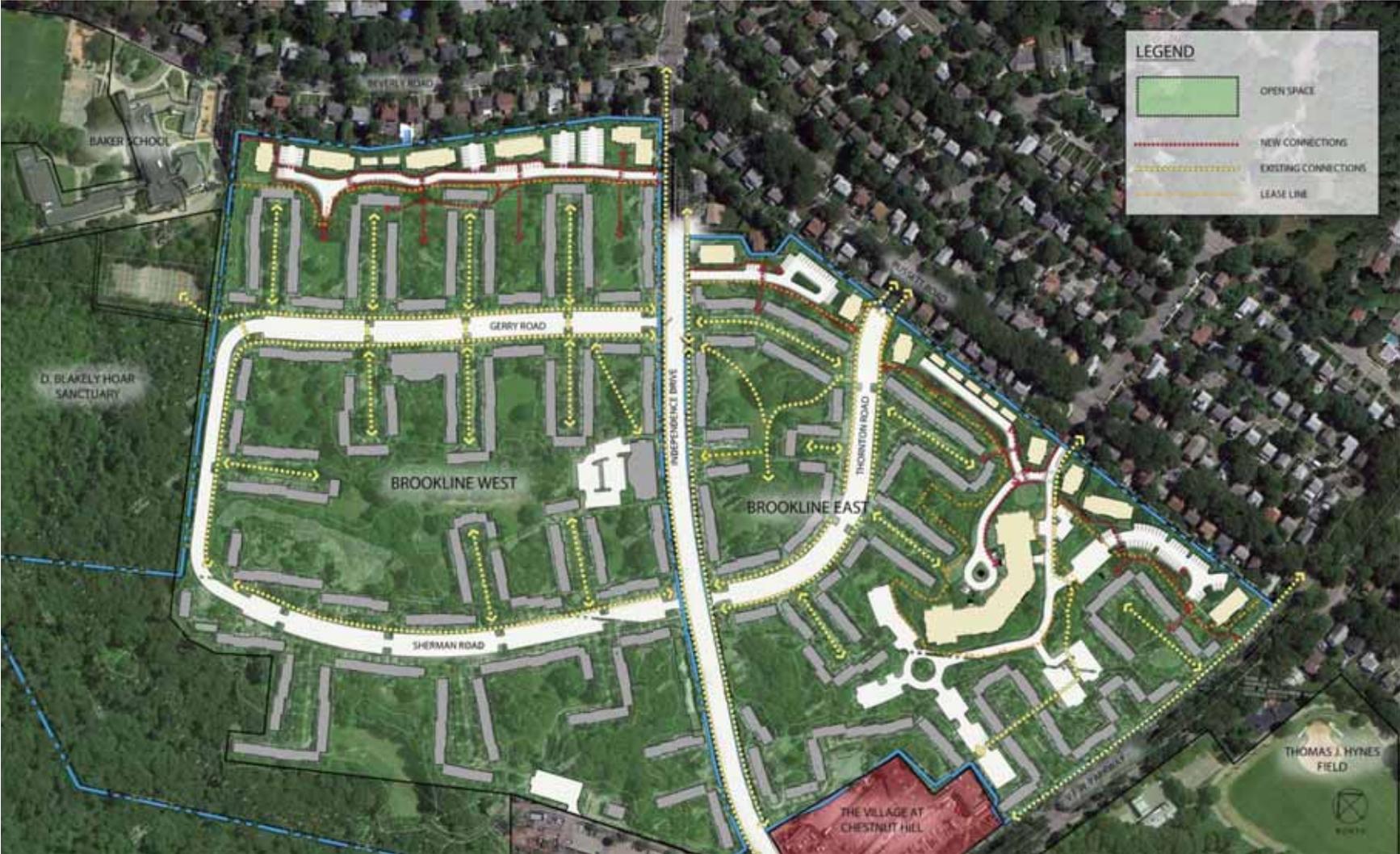
#21 – Pedestrian Safety

- The extensive existing pedestrian system is proposed to be expanded providing adequate and safe access to area amenities (i.e., Baker School).

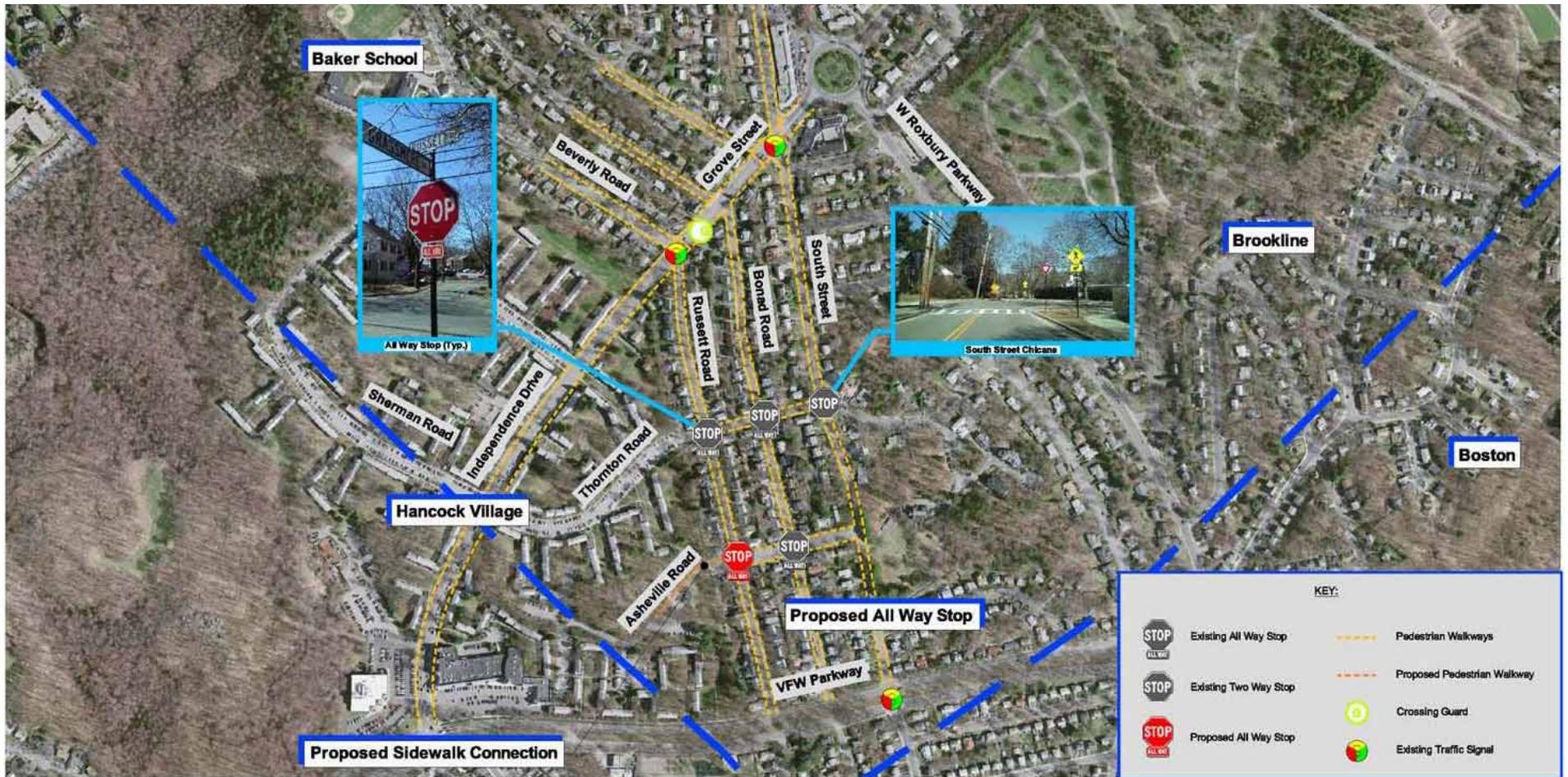
Existing Pedestrian Access/Site Circulation



Proposed Pedestrian Access/Site Circulation



Neighborhood Traffic Controls & Facilities



#22 – VFW Parkway/Independence Drive

- The anticipated impact to the VFW Parkway/Independence Drive intersection in the City of Boston is inconsequential and immaterial (less than 1 additional vehicle trip every 5 minutes along the Independence Drive approach to the intersection).

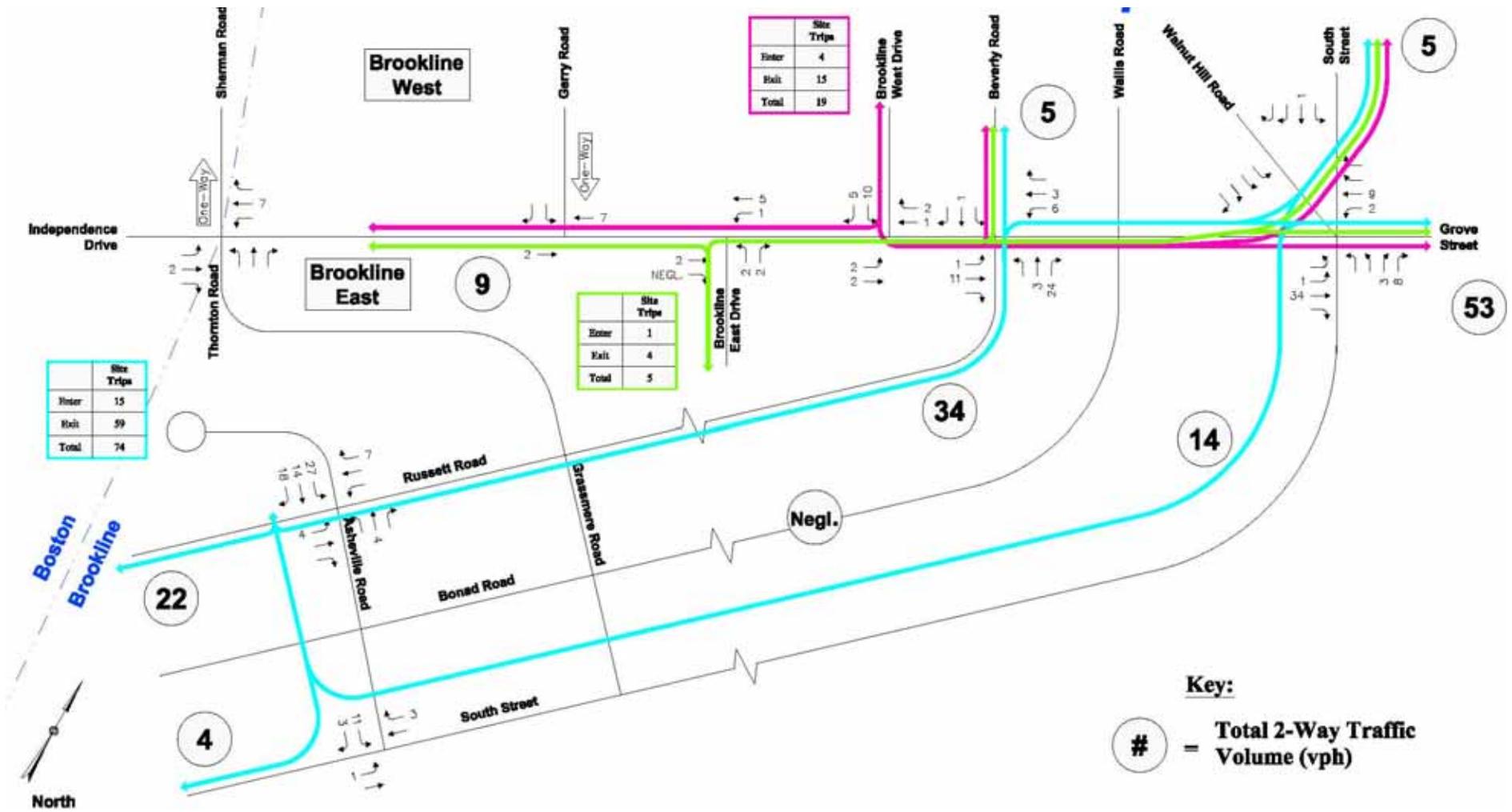
New Site Trips



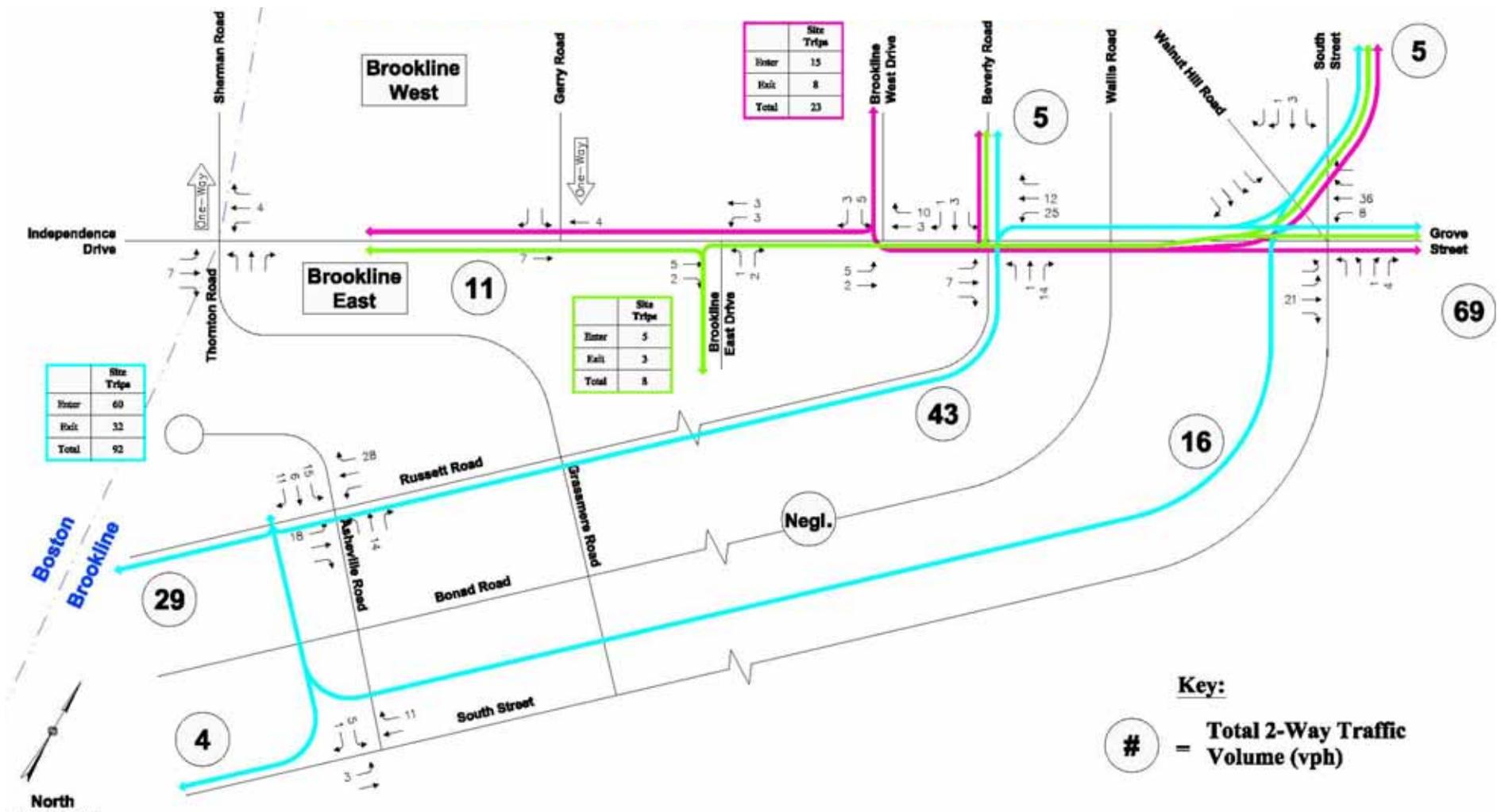
#23 – Asheville Access Cut-Through Traffic

- As previously discussed, the trip distribution methodology is appropriate and the resulting trip increases on area neighborhood streets are modest and represent 1 additional vehicle or less every 1 to 2 minutes during peak hours.

AM Peak Hour Site-Generated Trips



PM Peak Hour Site-Generated Trips



#24 – Russett/Asheville AWSC Analysis

- As previously discussed, the Proponent will work with the Town regarding installation of all-way stop control at the Russett Road/Asheville Road intersection.

#25 – Asheville Road Roadway Width

- Specific design is subject to ongoing review with BETA as part of the site plan and drainage design review.

#26 – Expand Shuttle & Zipcar Services

- The Proponent will expand the existing shuttle and at Hancock Village upon increase in demand and will work with Zipcar to expand their services at the site.

#27 – Independence/Sherman Signal Control

- As previously discussed, traffic signal control is not warranted at the Independence Drive/ Sherman Road/ Thornton Road intersection, but a pedestrian hybrid beacon is warranted.

#28 – Proposed Parking Supply Ratio

- As previously discussed, a total of 345 new parking spaces are proposed that equate to a parking ratio of 1.78 spaces/dwelling unit.

#29 – Asheville Road Grading/Sight Lines

- The Proponent will issue a revised site plan that addresses these issues.

#30 – Ensure Proper Crosswalk Location

- The Proponent will issue a revised site plan that addresses this issue.

#31 – Construction Traffic

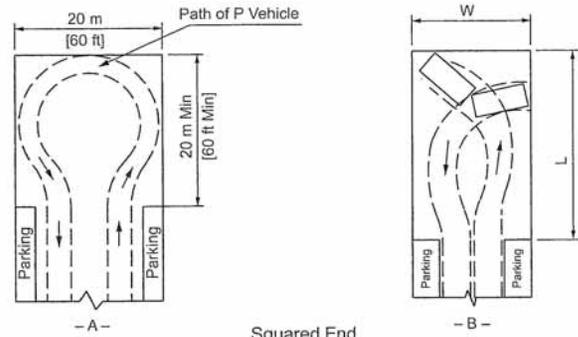
- The Proponent will prepare a construction management plan (CMP) that will define:
 - Appropriate truck travel routes
 - Truck Restrictions
 - Hours of construction and deliveries
 - Worker vehicle parking hours and locations
 - Material laydown areas
- The CMP will endeavor to avoid and minimize disruption of traffic and parking on neighborhood streets.

#32 – Independence Drive Improvements

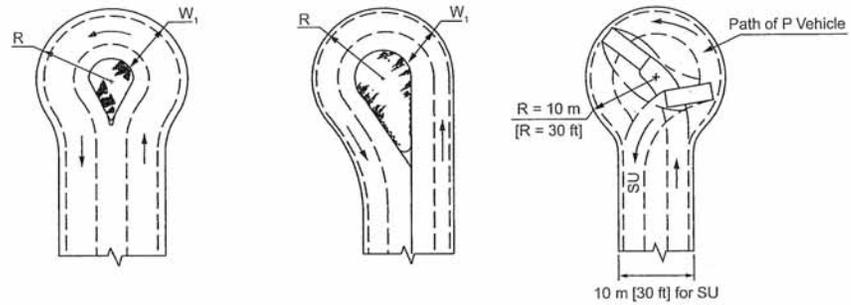
- Considered “Complete Streets” design for Independence Drive.

#33 – Hammerhead Design

- The proposed hammerhead roadway design will properly accommodate emergency vehicle maneuvering requirements and is an acceptable roadway design.
- AASHTO guidance on cul-de-sac and hammerhead design principles are applied.



Design Vehicle	Metric (m)		U.S. Customary [ft]	
	W	L	W	L
P	10	20	[30]	[60]
SU	15	30	[50]	[100]



Design Vehicle	Metric (m)		U.S. Customary [ft]	
	R	W	R	W
P	10	6	[30]	[18]
WB-12 [WB-40]	13	8	[42]	[25]
SU & WB-15 [WB-50]	15	10	[47]	[30]

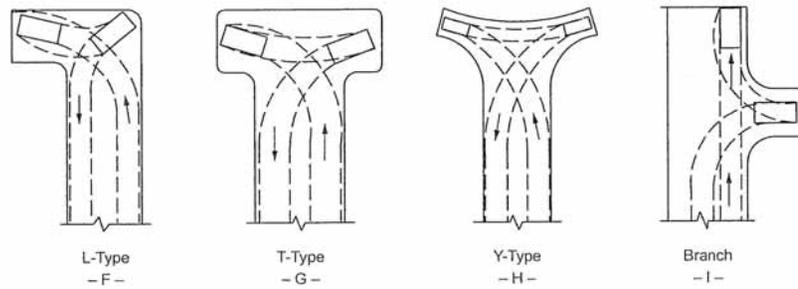


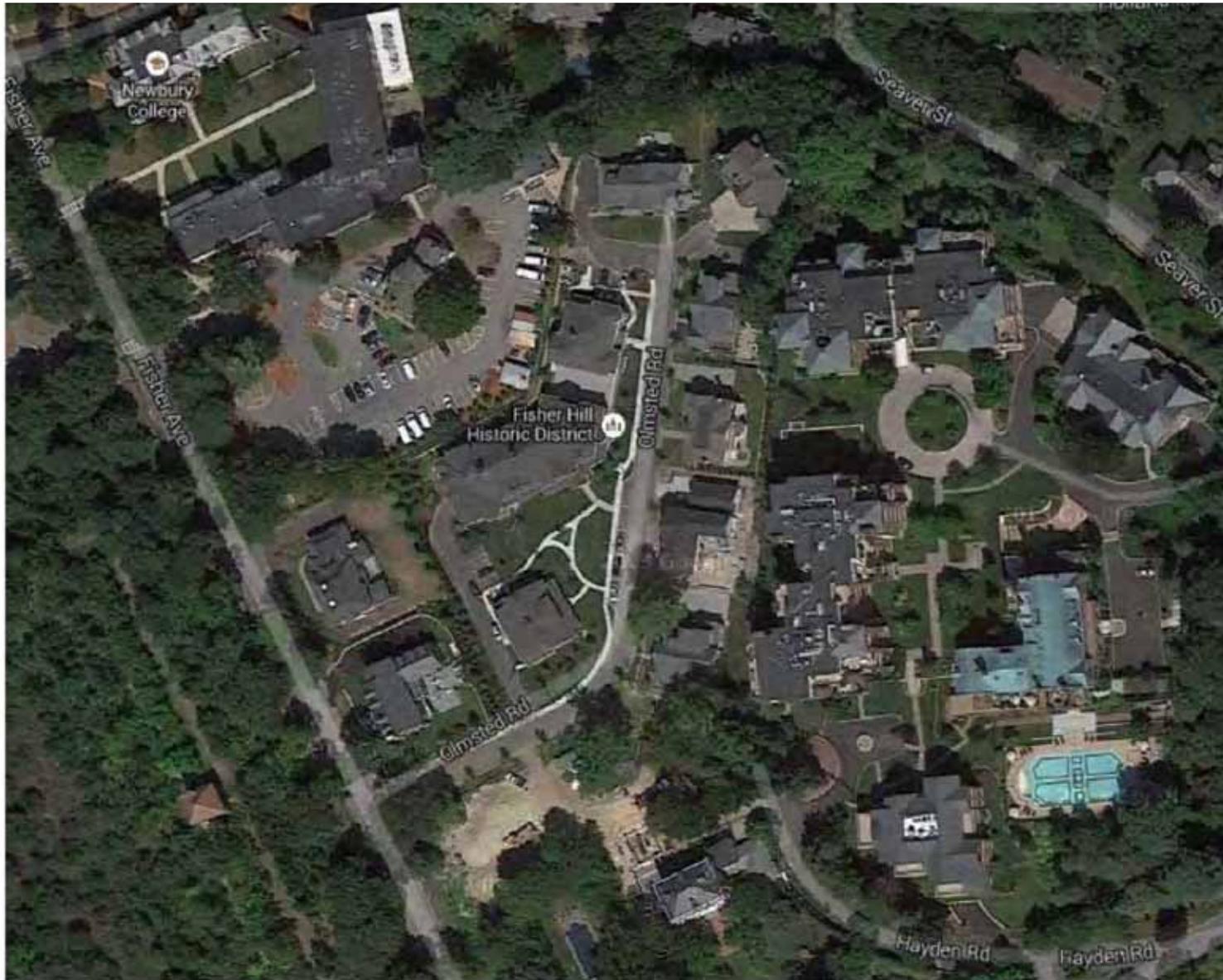
Figure 5-1. Types of Cul-de-Sacs and Dead-End Streets

#33 – Hammerhead Design

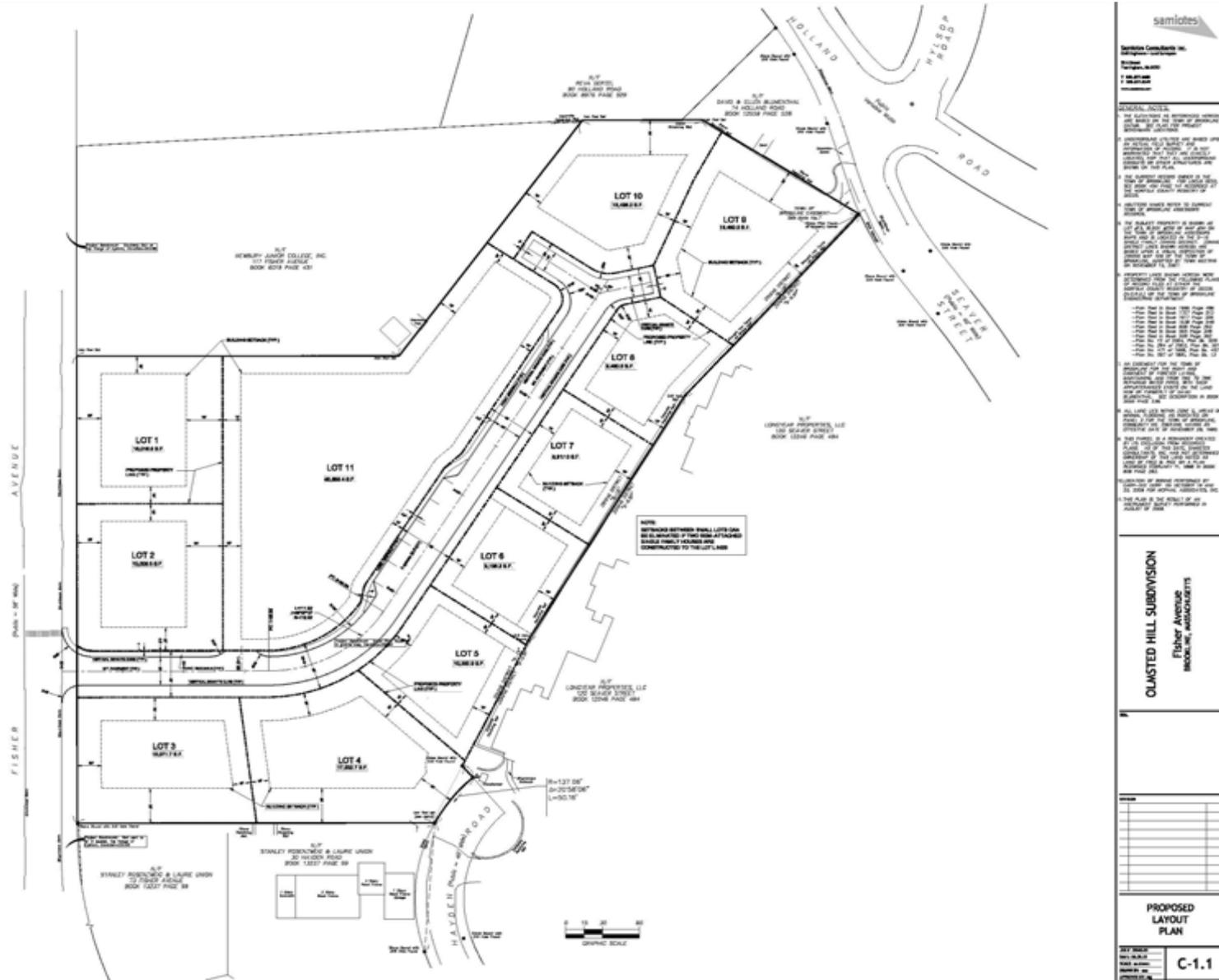
Local Examples – “Hammerhead” Emergency Access Designs

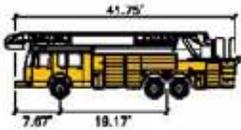
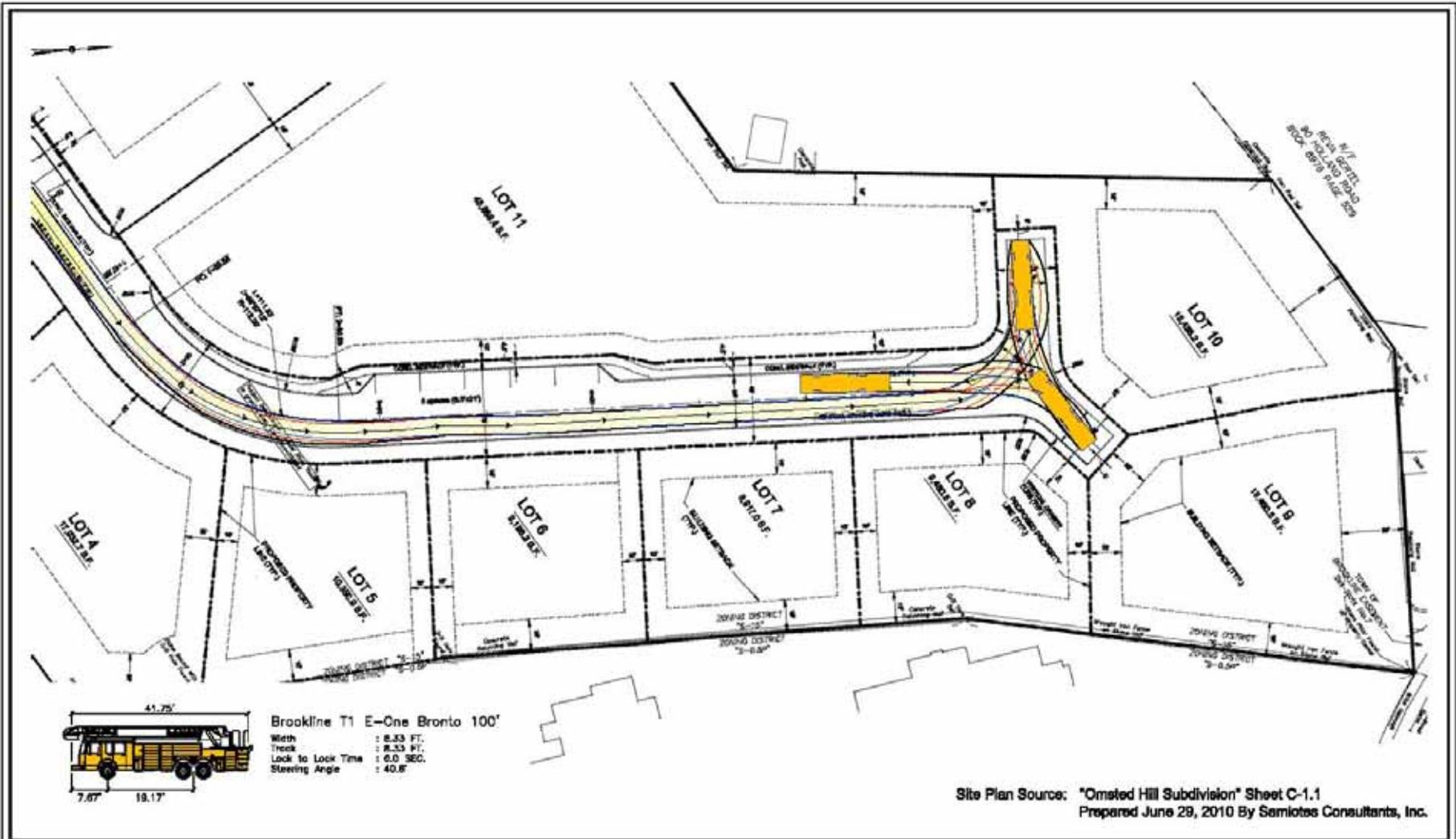
- ❖ Olmsted Hill Development – Brookline
- ❖ Greendale Avenue - Needham
- ❖ 110-116 Dedham Street – Newton
- ❖ Hammondswood - Brookline

Olmsted Hill Project (Fisher Hill)



Olmsted Hill Project (Fisher Hill)





Brookline T1 E-One Bronco 100'
 Width : 8.33 FT.
 Track : 8.33 FT.
 Lock to Lock Time : 6.0 SEC.
 Steering Angle : 40.8°

MDM TRANSPORTATION CONSULTANTS, INC.
 Planning & Engineering

20 Lord Street, Suite 200
 Marlborough, MA 01752

Olmsted Hill Subdivision
 Brookline, Massachusetts

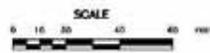
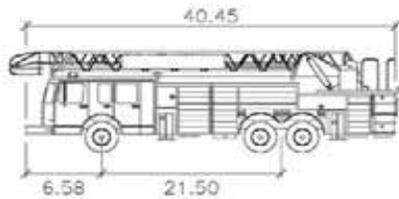


Exhibit 1
 AutoTurn Analysis
 Fire Truck

Greendale Avenue, Needham



Needham Sutphen Aerial Tower
Width : 7.83 FT.
Track : 7.83 FT.
Lock to Lock Time : 6.0 SEC.
Steering Angle : 36.9°

Hammondswood



#34 – Revised Capacity Analysis

- Revised capacity analyses are not warranted – the analyses presented in the November 2013 TIA are valid and somewhat conservative as previously discussed.