

CITY OF CAMBRIDGE

Special Permit Transportation Impact Study (TIS)

Summary Sheet

Planning Board Permit Number: _____

Project Name: Courthouse Redevelopment

Address: 40 Thorndike Street

Owner/Developer Name: LMP GP Holdings LLC/Leggat McCall Properties, LLC.

Contact Person: Robert M. Dickey

Contact Address: 10 Post Office Square

Boston, MA 02109

Contact Phone: 617-422-7027

ITE sq. ft.: 500,000

Zoning sq. ft.: 500,000

Land Use Type: Office R&D Space / Retail Space / Residential Space

Existing Parking Spaces: 40 - Registered Use: Employee

New Parking Spaces: 92* Use: Employee/Residential

Date of Parking Registration Approval: _____

*420 additional parking spaces to be leased at the city-owned First Street Garage.

Trip Generation:	Daily	AM Peak Hour	PM Peak Hour
Total Trips	4,646	520	555
Vehicle	2,226	253	270
Transit	1,856	220	226
Pedestrian	474	39	53
Bicycle	256	28	30

Mode Split (person trips): Vehicle: 45/39^a/49 %

Transit: 25/24^a/40 %

(Retail/Residential/R&D use) Pedestrian: 24/22^a/6 %

Bicycle: 6/4^a/5 %

^aResidential 11% work, home, other.

Transportation Consultant: Vanasse & Associates, Inc.

Contact Name: F. Giles Ham, P.E.

Phone: 978-474-8800

Date of Building Permit Approval: _____

CITY OF CAMBRIDGE
Special Permit Transportation Impact Study (TIS)

Planning Board Criteria Performance Summary
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Planning Board Permit Number: _____

Project Name: Courthouse Redevelopment

Total Data Entries = 431

Total Number of Criteria Exceedences = 19

1. Project Vehicle Trip Generation

Weekday = 2,226 AM Peak Hour = 253 PM Peak Hour = 270 Meets Criteria? [Y/N] **N/N/N**

2. Level of Service (LOS)

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	Existing	With Project	Meets Criteria?	Existing	With Project	Meets Criteria?
Third Street at O'Brien Highway	F	F (1.1%)	Y	D	D	Y
Third Street at Cambridge Street	B	C	Y	D	D	Y
Third Street at Thorndike Street	D	D	Y	C	C	Y
Third Street at Spring Street	F	F (0%)	Y	C	C	Y
Third Street at Binney Street	E	E	Y	D	D	Y
Second Street at Cambridge Street	A	A	Y	A	B	Y
Second Street at Thorndike Street	B	B	Y	B	B	Y
Second Street at Spring Street	B	B	Y	B	B	Y
First Street at Cambridge Street	D	D	Y	D	D	Y
First Street at Thorndike Street	B	B	Y	B	C	Y
First Street at Spring Street	A	A	Y	A	A	Y
First Street at Charles Street and Cambridgeside Place	B	B	Y	B	B	Y
First Street at Binney Street	C	C	Y	C	C	Y
O'Brien Highway at Cambridge Street and East Street	C	C	Y	C	C	Y
Cambridgeside Place at Land Boulevard	C	C	Y	B	B	Y
Binney Street at Land Boulevard	C	C	Y	B	B	Y
O'Brien Highway at Land Boulevard and Charlestown Avenue	F	F (1.7%)	Y	F	F (1.7%)	Y

CITY OF CAMBRIDGE
Special Permit Transportation Impact Study (TIS)

2. Level of Service (LOS) (Continued)

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	Existing	With Project	Meets Criteria?	Existing	With Project	Meets Criteria?
Third Street at Charles Street	B	B	Y	B	B	Y
Binney Street at Second Street	B	B	Y	C	C	Y
Third Street at Broadway	C	C	Y	C	C	Y

3. Traffic on Residential Streets

Street Segment	A.M. Peak Hour			P.M. Peak Hour		
	Existing Volume	With Project	Meets Criteria?	Existing Volume	With Project	Meets Criteria?
Third Street, O'Brien Highway to Gore Street (Amount of residential = 1/2 or more)	835	851	Y	1,475	1,493	Y
Third Street, Gore Street to Otis Street (Amount of residential = 1/2 or more)	832	847	Y	893	897	Y
Third Street, Otis Street to Spring Street (Amount of residential = 1/2 or more)	994	994	Y	875	875	Y
Third Street, Spring Street to Charles Street (Amount of residential = 1/2 or more)	752	758	Y	818	821	Y
Third Street, Charles Street to Rogers Street (Amount of residential = <1/3)	763	768	Y	896	898	Y
Third Street, Rogers Street to Linksey Way (Amount of residential = >1/3 but <1/2)	797	802	Y	886	888	Y
Third Street, Linksey Way to Broadway (Amount of residential = <1/3)	822	847	Y	988	1,005	Y
O'Brien Highway, Winter Street to Gore Street (Amount of residential = <1/3)	1,952	1,966	Y	2,144	2,155	Y
O'Brien Highway, Gore Street to Land Boulevard (Amount of residential = <1/3)	1,886	1,887	Y	1,797	1,804	Y
Cambridge Street, Third Street to First Street (Amount of residential = <1/3)	594	624	Y	597	626	Y
Thorndike Street, Third Street to First Street (Amount of residential = <1/3)	100	115	Y	60	64	Y
Spring Street, Third Street to First Street (Amount of residential = < 1/3)	90	90	Y	88	90	Y

3. Traffic on Residential Streets (Continued)

Street Segment	A.M. Peak Hour			P.M. Peak Hour		
	Existing Volume	With Project	Meets Criteria?	Existing Volume	With Project	Meets Criteria?
Charles Street, Fifth Street to Second Street (Amount of residential = 1/2 or more)	124	130	Y	181	183	Y
Second Street, Gore Street to Otis Street (Amount of residential = 1/2 or more)	211	226	Y	152	158	Y
Second Street, Otis Street to Spring Street (Amount of residential = <1/3)	171	193	Y	196	210	Y
Second Street, Spring Street to Charles Street (Amount of residential = 1/2 or more)	143	160	Y	143	160	Y

4. Lane Queue

Intersection	No. of Lanes Analyzed	A.M. Peak Hour			P.M. Peak Hour		
		Existing	With Project	Meets Criteria?	Existing	With Project	Meets Criteria?
<i>Charles Street at First Street</i>	5						
Charles Street EB LT		1	1	Y	3	3	Y
Charles Street EB TH/RT		1	1	Y	3	3	Y
Charles Street WB LT/TH/RT		2	3	Y	3	3	Y
First Street NB LT/TH/RT		3	4	Y	4	4	Y
First Street SB LT/TH/RT	2	2	Y	2	3	Y	
<i>Cambridge Street at First Street</i>	6						
Cambridge Street EB LT		--	--	--	--	--	--
Cambridge Street EB TH/RT		7	8	Y	8	8	Y
Cambridge Street WB LT		4	4	Y	1	1	Y
Cambridge Street WB TH		3	3	Y	2	2	Y
First Street NB LT		1	1	Y	4	5	Y
First Street NB TH		--	--	--	--	--	--
First Street NB RT		2	2	Y	9	11	Y
MBTA Drive SB LT/TH/RT	0	0	Y	1	1	Y	
<i>Thorndike Street at First Street</i>	3						
Thorndike Street EB LT/RT		2	2	Y	3	5	Y
First Street NB TH		1	1	Y	3	6	Y
First Street SB TH	2	3	Y	1	2	Y	

4. Lane Queue (continued)

Intersection	No. of Lanes Analyzed	A.M. Peak Hour			P.M. Peak Hour		
		Existing	With Project	Meets Criteria?	Existing	With Project	Meets Criteria?
<i>Binney Street at Third Street</i>	9						
Binney Street EB LT		2	2	Y	8	8	Y
Binney Street EB TH		2	3	Y	5	5	Y
Binney Street EB TH/RT		2	3	Y	5	5	Y
Binney Street WB LT		5	5	Y	2	3	Y
Binney Street WB TH		3	3	Y	3	4	Y
Binney Street WB TH/RT		3	3	Y	3	4	Y
Third Street NB LT/TH		4	4	Y	9	9	Y
Third Street NB RT		2	3	Y	4	4	Y
Third Street SB LT/TH/RT	16	16	Y	5	5	Y	
<i>Cambridge Street at Third Street</i>	5						
Cambridge Street EB LT/TH/RT		7	7	Y	6	6	Y
Cambridge Street WB LT/TH/RT		1	1	Y	3	3	Y
Third Street NB LT/TH/RT		2	2	Y	16	16	Y
Third Street SB LT		1	1	Y	1	1	Y
Third Street SB TH/RT	16	16	Y	8	8	Y	
<i>O'Brien Highway at Third Street</i>	3						
O'Brien Highway EB TH/RT		23	23	Y	8	9	Y
O'Brien Highway WB LT/TH		2	2	Y	10	10	Y
Third Street NB LT		1	1	Y	6	6	Y
Third Street NB LT/RT		--	--	--	--	--	--
<i>Binney Street at First Street</i>	7						
Binney Street EB LT		3	3	Y	6	7	Y
Binney Street EB TH		3	3	Y	3	3	Y
Binney Street EB TH/RT		3	3	Y	3	3	Y
Binney Street WB LT		5	6	Y	3	3	Y
Binney Street WB TH/RT		5	6	Y	3	3	Y
First Street NB LT/TH/RT		1	1	Y	1	1	Y
First Street SB LT/TH		4	5	Y	6	8	Y
First Street SB RT	--	--	--	--	--	--	

4. Lane Queue (continued)

Intersection	No. of Lanes Analyzed	A.M. Peak Hour			P.M. Peak Hour		
		Existing	With Project	Meets Criteria?	Existing	With Project	Meets Criteria?
<i>O'Brien Highway at East Street/Cambridge Street</i>	13						
O'Brien Highway EB LT		2	2	Y	1	1	Y
O'Brien Highway EB TH		11	11	Y	5	5	Y
O'Brien Highway EB TH		11	11	Y	5	5	Y
O'Brien Highway EB TH		11	11	Y	5	5	Y
O'Brien Highway EB RT		11	11	Y	5	5	Y
O'Brien Highway WB LT		5	5	Y	1	1	Y
O'Brien Highway WB LT		5	5	Y	2	2	Y
O'Brien Highway WB TH		4	4	Y	9	9	Y
O'Brien Highway WB TH/RT		4	4	Y	9	9	Y
East Street SB LT/TH/RT		2	2	Y	6	7	Y
Cambridge Street NB LT		1	1	Y	6	7	Y
Cambridge Street NB RT		3	3	Y	1	1	Y
Cambridge Street NB RT		3	3	Y	1	1	Y
<i>Land Boulevard at Binney Street</i>	9						
Binney Street EB LT		2	2	Y	3	3	Y
Binney Street EB LT/RT		2	2	Y	3	3	Y
Land Boulevard NB LT		8	9	Y	5	5	Y
Land Boulevard NB TH		1	1	Y	2	2	Y
Land Boulevard NB TH		1	1	Y	2	2	Y
Land Boulevard NB TH		1	1	Y	2	2	Y
Land Boulevard SB TH		9	9	Y	8	8	Y
Land Boulevard SB TH		9	9	Y	8	8	Y
Land Boulevard SB RT		0	0	Y	0	0	Y
<i>Charles Street at Third Street</i>	4						
Charles Street EB LT/TH/RT		1	1	Y	1	1	Y
Charles Street WB LT/TH/RT		0	0	Y	1	1	Y
Third Street NB LT/TH/RT		1	1	Y	5	5	Y
Third Street SB LT/TH/RT		4	4	Y	1	1	Y
<i>Binney Street at Second Street</i>	6						
Binney Street EB LT		2	2	Y	4	4	Y
Binney Street EB TH/RT		2	2	Y	2	2	Y
Binney Street WB LT		2	2	Y	1	1	Y
Binney Street WB TH/RT		4	4	Y	3	3	Y
Third Street NB LT/TH/RT		1	1	Y	4	4	Y
Third Street SB LT/TH/RT		1	1	Y	2	2	Y
<i>Third Street at Broadway</i>	5						
Broadway EB LT		6	6	Y	6	6	Y
Broadway EB TH		3	3	Y	6	6	Y
Broadway WB TH/RT		9	9	Y	6	6	Y
Third Street SB LT		2	2	Y	10	11	Y
Third Street SB RT		1	1	Y	1	1	Y

4. Lane Queue (continued)

Intersection	No. of Lanes Analyzed	A.M. Peak Hour			P.M. Peak Hour		
		Existing	With Project	Meets Criteria?	Existing	With Project	Meets Criteria?
Land Boulevard at Cambridgeside Place	12						
Cambridgeside Place EB LT		2	2	Y	4	4	Y
Cambridgeside Place EB RT		2	2	Y	4	4	Y
Cambridgeside Place EB RT		0	0	Y	0	0	Y
Hotel Driveway WB LT/TH/RT		1	1	Y	1	1	Y
Land Boulevard NB LT		4	4	Y	2	2	Y
Land Boulevard NB TH		3	2	Y	8	8	Y
Land Boulevard NB TH		3	2	Y	8	8	Y
Land Boulevard NB TH/RT		3	2	Y	2	2	Y
Land Boulevard SB LT		1	1	Y	1	1	Y
Land Boulevard SB TH		10	10	Y	1	1	Y
Land Boulevard SB TH		10	10	Y	1	1	Y
Land Boulevard SB TH/RT		10	10	Y	1	1	Y
Land Boulevard at O'Brien Highway	15						
O'Brien Highway EB LT		4	5	Y	13	16	Y
O'Brien Highway EB TH		11	11	Y	7	7	Y
O'Brien Highway EB TH		11	11	Y	7	7	Y
O'Brien Highway EB TH		11	11	Y	7	7	Y
O'Brien Highway EB RT		11	11	Y	5	5	Y
O'Brien Highway WB LT		8	8	Y	8	8	Y
O'Brien Highway WB TH		7	7	Y	8	8	Y
O'Brien Highway WB TH		7	7	Y	8	8	Y
O'Brien Highway WB RT		4	4	Y	7	7	Y
Charlestown Avenue SB LT/TH		27	31	Y	20	20	Y
Charlestown Avenue SB TH/RT		27	31	Y	20	20	Y
Land Boulevard SB LT		3	3	Y	12	12	Y
Land Boulevard SB TH		6	6	Y	16	16	Y
Land Boulevard NB TH		6	6	Y	16	16	Y
Land Boulevard NB RT		3	3	Y	10	10	Y

5. Pedestrian and Bicycle Facilities (Pedestrian LOS)

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	Existing PLOS	With Project	Meets Criteria?	Existing PLOS	With Project	Meets Criteria?
Third Street at O'Brien Highway						
Crossing O'Brien Highway (East)	B	B	Y	B	B	Y
Crossing O'Brien Highway (West)	B	B	NA ^a	B	B	NA
Crossing Third Street (North)	D	D	NA	D	D	NA
Crossing Third Street (South)	D	D	Y	D	D	Y
Third Street at Cambridge Street						
Crossing Cambridge Street (East)	B	B	Y	B	B	Y
Crossing Cambridge Street (West)	B	B	Y	B	B	Y
Crossing Third Street (North)	B	B	Y	B	B	Y
Crossing Third Street (South)	B	B	Y	B	B	Y
Third Street at Thorndike Street						
Crossing Thorndike Street (East)	A	A	Y	A	A	Y
Crossing Thorndike Street (West)	A	A	Y	A	A	Y
Crossing Third Street (North)	F	F	N	F	F	N
Crossing Third Street (South)	F	F	N	F	F	N

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5. Pedestrian and Bicycle Facilities (Pedestrian LOS) (continued)

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	Existing PLOS	With Project	Meets Criteria?	Existing PLOS	With Project	Meets Criteria?
Third Street at Spring Street						
Crossing Spring Street (East)	A	A	Y	A	A	Y
Crossing Spring Street (West)	A	A	Y	A	A	Y
Crossing Third Street (North)	F	F	N	F	F	N
Crossing Third Street (South)	F	F	N	F	F	N
Third Street at Binney Street						
Crossing Binney Street (East)	B	B	Y	B	B	Y
Crossing Binney Street (West)	B	B	Y	B	B	Y
Crossing Third Street (North)	B	B	Y	B	B	Y
Crossing Third Street (South)	B	B	Y	B	B	Y
Second Street at Cambridge Street						
Crossing Cambridge Street (East)	B	B	Y	B	B	Y
Crossing Cambridge Street (West)	B	B	Y	B	B	Y
Crossing Second Street (North)	B	B	Y	B	B	Y
Crossing Second Street (South)	B	B	Y	B	B	Y
Second Street at Thorndike Street						
Crossing Thorndike Street (East)	A	A	Y	A	A	Y
Crossing Thorndike Street (West)	A	A	Y	A	A	Y
Crossing Second Street (North)	B	B	Y	B	B	Y
Crossing Second Street (South)	B	B	Y	B	B	Y
Second Street at Spring Street						
Crossing Spring Street (East)	A	A	Y	A	A	Y
Crossing Spring Street (West)	A	A	Y	A	A	Y
Crossing Second Street (North)	A	B	N	A	B	N
Crossing Second Street (South)	A	A	Y	A	B	N
First Street at Cambridge Street						
Crossing Cambridge Street (East)	D	D	Y	D	D	Y
Crossing Cambridge Street (West)	D	D	Y	D	D	Y
Crossing First Street (North)	D	D	Y	D	D	Y
Crossing First Street (South)	D	D	Y	D	D	Y
First Street at Thorndike Street						
Crossing Thorndike Street (West)	B	B	Y	B	B	Y
Crossing First Street (North)	C	C	Y	C	C	Y
Crossing First Street (South)	C	C	Y	C	C	Y

5. Pedestrian and Bicycle Facilities (Pedestrian LOS) (continued)

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	Existing PLOS	With Project	Meets Criteria?	Existing PLOS	With Project	Meets Criteria?
First Street at Spring Street	B	C	N	A	A	Y
Crossing Thorndike Street (West)	F	F	NA	F	F	NA
Crossing First Street (North)	E	F	NA	F	F	NA
Crossing First Street (South)						
First Street at Charles Street and Cambridgeside Place						
Crossing Charles Street (East)	D	D	Y	D	D	Y
Crossing Charles Street (West)	D	D	Y	D	D	Y
Crossing Cambridgeside Place (North)	D	D	Y	D	D	Y
Crossing Cambridgeside Place (South)	D	D	Y	D	D	Y
First Street at Binney Street						
Crossing Charles Street (East)	C	C	Y	C	C	Y
Crossing Charles Street (West)	C	C	Y	C	C	Y
Crossing Cambridgeside Place (North)	D	D	Y	D	D	Y
Crossing Cambridgeside Place (South)	D	D	Y	D	D	Y
O'Brien Highway at Cambridge Street and East Street						
Crossing O'Brien Highway (East)	D	D	Y	D	D	Y
Crossing O'Brien Highway (West)	D	D	Y	D	D	Y
Crossing Cambridge Street (North)	D	D	NA	D	D	NA
Crossing East Street (South)	D	D	Y	D	D	Y
Cambridgeside Place at Land Boulevard						
Crossing Cambridgeside Place (East)	D	D	Y	D	D	Y
Crossing Cambridgeside Place (West)	D	D	Y	D	D	Y
Crossing Land Boulevard (North)	D	D	Y	D	D	Y
Crossing Land Boulevard (South)	D	D	Y	D	D	Y
Binney Street at Land Boulevard						
Crossing Binney Street (East)	D	D	Y	D	D	Y
Crossing Binney Street (West)	D	D	Y	D	D	Y
Crossing Land Boulevard (North)	D	D	Y	D	D	Y
Crossing Land Boulevard (South)	D	D	Y	D	D	Y
O'Brien Highway at Land Boulevard and Charlestown Avenue						
Crossing O'Brien Highway (East)	E	E	N	E	E	N
Crossing O'Brien Highway (West)	E	E	N	E	E	N
Crossing Land Boulevard (North)	D	D	Y	D	D	Y
Crossing Charlestown Avenue (South)	D	D	Y	D	D	Y
Third Street at Charles Street						
Crossing Charles Street (East)	C	C	Y	C	C	Y
Crossing Charles Street (West)	C	C	Y	C	C	Y
Crossing Third Street (North)	C	C	Y	C	C	Y
Crossing Third Street (South)	C	C	Y	C	C	Y
Binney Street at Second Street						
Crossing Binney Street (East)	D	D	Y	D	D	Y
Crossing Binney Street (West)	D	D	Y	D	D	Y
Crossing Second Street (North)	A	A	Y	A	A	Y
Crossing Second Street (South)	A	A	Y	A	A	Y

5. Pedestrian and Bicycle Facilities (Pedestrian LOS) (continued)

Intersection	A.M. Peak Hour			P.M. Peak Hour		
	Existing PLOS	With Project	Meets Criteria?	Existing PLOS	With Project	Meets Criteria?
<i>Third Street at Broadway</i>	C	C	Y	C	C	Y
Crossing Third Street (South)	D	D	Y	D	D	Y
Crossing Broadway (East)	D	D	Y	D	D	Y
Crossing Broadway (West)						

*NA = Not applicable; no crosswalk at this location.

6. Pedestrian and Bicycle Facilities (Safe Pedestrian and Bicycle Facilities)

Adjacent Street or Public Right-of-Way	Sidewalks or Walkways Present?	Meets Criteria?	Bicycle Facilities or Right-of-Ways Present?	Meets Criteria?
Thorndike Street	Y	Y	Y	Y
Spring Street	Y	Y	Y	Y
Second Street	Y	Y	Y	Y
Third Street	Y	Y	Y	Y

TRANSPORTATION IMPACT STUDY

PROPOSED COURTHOUSE REDEVELOPMENT CAMBRIDGE, MASSACHUSETTS

Prepared for:

LEGGAT MCCALL PROPERTIES LLC
Boston, Massachusetts

November 2013

Prepared by:

VANASSE & ASSOCIATES, INC.
Transportation Engineers & Planners
10 New England Business Center Drive
Suite 314
Andover, MA 01810

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EXECUTIVE SUMMARY

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Study (TIS) for the proposed Cambridge Courthouse Redevelopment project, located at 40 Thorndike Street in East Cambridge. This study reviews potential transportation impacts and parking demands, defines site access conditions, and recommends mitigation measures necessary to accommodate the Project site. In addition, the study reviews the project with respect to the Article 19 Project Review Special Permit Criteria. The study was completed in accordance with the City's guidelines for TIS and follows the scoping determination issued by the Cambridge Traffic, Parking, and Transportation (TPT) Department dated July 18, 2013. The following briefly summarizes the study findings.

PROJECT DESCRIPTION

The project site is located at 40 Thorndike Street in East Cambridge and is bounded by Thorndike Street to the north, Spring Street to the south, Second Street to the east, and Third Street to the west. The proposed project would consist of the redevelopment of the existing building into approximately 460,000 square feet (sf) of R&D/office space, 15,000 sf of retail, and 24 units of residential apartments. The building is currently vacant with the exception of the four-story jailhouse on the top floors. In recent years, the courthouse building accommodated up to 500 employees with many visitors a day as part of the daily building operations. Parking accommodations are proposed to be provided by a mix of on-site spaces (92) and the existing First Street parking garage located to the east of the Project site, where an additional 420 parking spaces are expected to be leased on a long-term basis from the City of Cambridge. The on-site parking spaces will be provided below grade with access provided from Second Street.

EXISTING CONDITIONS

A field inventory of existing study area roadways was conducted to document traffic conditions in the 2013 analysis year. Items were collected regarding the study area roadways and intersections include roadway geometrics, traffic control devices, traffic signal timing plans, traffic volumes (May 2013), vehicle queues, pedestrian crossing volumes, bicycle volumes, and safety data for the roadways in the vicinity of the site. Traffic volumes were measured by means of ATR counts and substantiated by manual intersection turning-movement and vehicle-

classification counts. Other transportation-related data inventoried included on-street parking regulations; transit services; and provision of bicycle and pedestrian facilities. Public schools, colleges and universities were in regular session at the time the data was collected; therefore, in accordance with the City of Cambridge TIS Guidelines, the traffic volumes were used without adjustment.

PROJECT-GENERATED TRAFFIC

Trips for the Project are based on Institute of Transportation Engineers (ITE) trip generation statistics for R&D/office, residential, and retail space. ITE Land Use Codes (LUC), LUC 760, Research and Development (R&D) Building, LUC 220, Apartment, and LUC 820, Shopping Center, were used to estimate project traffic generation as requested in the City Scoping Letter.

On a daily basis, the site is expected to generate 2,226 vehicle trips (1,113 in and 1,113 out) on an average weekday. On an hourly basis, the site is expected to generate 253 vehicle trips (205 in and 48 out) and 270 vehicle trips (56 in and 214 out) during the weekday morning and weekday evening commuter peak hours, respectively.

The site is expected to generate approximately 1,856 transit trips (928 in and 928 out) on a daily basis, with 220 trips (179 in and 41 out) and 226 trips (43 in and 183 out) during the morning and evening peak hours, respectively.

The site is expected to generate approximately 474 pedestrian trips (237 in and 237 out) on a daily basis, with 39 trips (29 in and 10 out) and 53 trips (17 in and 36 out) during the morning and evening peak hours, respectively.

The site is expected to generate approximately 256 bicycle trips (128 in and 128 out) on a daily basis, with 28 trips (23 in and 5 out), and 30 trips (6 in and 24 out) during the morning and evening peak hours, respectively. A total of 214 bicycle spaces will be provided on-site.

The trip distribution pattern for the new site traffic was developed in consultation with the City. For the courthouse parking and First Street garage, 12 percent of project traffic was assigned to the west and 10 percent from the west on O'Brien Highway; 6 percent was assigned to the west and 12 percent from the west on Cambridge Street; 4 percent was assigned from the west on Charles Street; 9 percent was assigned from the west and 33 percent to the west on Binney Street; 25 percent was assigned from the east and 20 percent to the east on Charlestown Avenue; 4 percent was assigned from the east and 9 percent to the east from O'Brien Highway; 10 percent was assigned from the east and 6 percent from the east on Broadway; 16 percent was assigned to the south on First Street; and 24 percent was assigned from the south on Land Boulevard.

Project-related traffic-volume increases external to the study area relative to 2013 Existing conditions are anticipated to range from approximately 0.5 percent to 3.3 percent during the weekday morning and weekday evening peak hours. It is important to note that no credit was taken for the full occupancy of the prior courthouse use.

ARTICLE 19 PROJECT REVIEW SPECIAL PERMIT CRITERIA ANALYSIS

As required by the City, the project's impact has been measured against 5 criteria as indicators of the project's impact. Based upon the Project Review Special Permit Criteria Analysis, there are a total of 431 indicators which were reviewed. Of the 431 project indicators reviewed, a total of 19 were exceeded. Twelve of these exceed the City's pedestrian delay criteria under existing

conditions, with or without the project. Four indicators related to pedestrian delay at unsignalized intersections crossing is exceeded by the project, but the crossings remain at LOS C or better with the project. The remaining three indicators are related to trip generation for the project. None of the 40 indicators related to vehicular traffic were exceeded, including levels of service, lane queues and traffic on residential streets. With the majority of traffic utilizing the First Street City garage, most traffic utilizes First Street to and from the area, which minimizes the impact to residential areas.

TRAFFIC OPERATIONS ANALYSIS

In order to assess the impact of the Project on the roadway network, traffic operations and vehicle queue analyses were performed at the study intersections under 2013 Existing, 2013 Build and 2018 Build conditions. The analysis indicates that the project will not have a significant effect on operating conditions at the area intersections.

PARKING ANALYSIS

On-site below-grade parking accommodating 92 vehicles will be provided within the building with access and egress provided off Second Street. On-site parking will be provided for the residences (24 spaces) and employees including HOV spaces. An additional 420 parking spaces will be leased at the City-owned First Street garage. Dedicated parking is not provided for the retail space, the majority of which will be leased and occupied by tenants less than 2,000 square feet.

Secured bicycle racks will be provided for both residents and commuters. The project will provide a total of 216 bicycle spaces including 166 spaces in the on-site parking area and 50 short-term spaces outside the building. In addition, a bicycle hubway is also planned for outside the building.

PROJECT MITIGATION

The project's location near the Lechmere Station and Kendall Station as well as the area shuttle services significantly encourages transit use by employees, visitors, and residents to the proposed project. Mitigation is geared towards a low single occupant vehicle (SOV) mode of transportation.

Transportation Demand Management Program

The existing SOV mode split is expected to be low at 38, 34, and 42 percent for retail, apartment, and office, respectively, based on the SOV Mode Split Commitment. The following TDM measures will be implemented to reduce SOV travel and encourage the use of alternative modes of transportation:

- Charge for parking at market rates and offer discounted parking for dedicated HOV vehicles;
- Dedicated HOV parking spaces on site.
- Become a member of the CRTMA and the EZ Ride Shuttle bus;

- Provide MBTA passes on site, as well as MBTA pass subsidies;
- Promotion of commute options through companywide emails and intranet site.
- Provide information about transportation options available to employees at orientations and on a company website.
- Work with the CRTMA for a new stop location closer to the courthouse site.
- Provide on-site showers and lockers accessible to employees.
- Continue to work with the Cambridge Office of Workforce Development.
- Provide car-sharing spaces on site.
- Investigate a hubway station on-site (along Second Street) to encourage non-auto travel.

Off-Site Roadway Mitigation

The intersection of Third Street at Thorndike Street in the study area is missing or has deteriorated pedestrian accommodations. The project proponent will update pavement markings and review handicapped-accessible wheelchair ramps and crossings at this location.

CONCLUSION

Overall, the project proponent is committed to the implementation of the above project mitigation strategies to reduce the overall project impact. As required by the City, the project's impact has been measured against 5 criteria as indicators of the project's impact. A total of 431 indicators in the individual criteria were reviewed with 19 exceedences recorded. Twelve of these exceed the City's pedestrian delay criteria under existing conditions, with or without the project. Four indicators related to pedestrian delay at unsignalized intersections crossing is exceeded by the project, but the crossings remain at LOS C or better with the project. The remaining three indicators are related to trip generation for the project.

This TIS indicates that the project can be accommodated within the existing area infrastructure. With an emphasis of non-auto travel and limited parking supply, the project proponent is committed to a project which is sensitive to the area and minimizes the impact to the neighborhood.

INTRODUCTION

VAI has conducted a TIS for the proposed redevelopment of the Cambridge Courthouse to be located at 40 Thorndike Street in Cambridge. This study reviews potential transportation impacts and parking demands, defines site access conditions, and recommends mitigation measures necessary to accommodate the expansion of the Cambridge Courthouse. In addition, the study reviews the project with respect to the Article 19 Project Review Special Permit Criteria. The study was completed in accordance with the City's guidelines for TIS and follows the scoping determination issued by the Cambridge Traffic, Parking, and Transportation (TPT) Department dated July 18, 2013.

PROJECT DESCRIPTION

The project site is located at 40 Thorndike Street in East Cambridge and is bounded by Thorndike Street to the north, Spring Street to the south, Second Street to the east, and Third Street to the west. The proposed project would consist of the redevelopment of the existing building into approximately 460,000 square feet (sf) of R&D/office space, 15,000 sf of retail, and 24 units of residential apartments. The building is currently vacant with the exception of the four-story jailhouse on the top floors. In recent years, the courthouse building accommodated up to 500 employees with many visitors a day as part of the daily building operations. Parking accommodations are proposed to be provided by a mix of on-site spaces (92) and the existing First Street parking garage located to the east of the Project site, where an additional 420 parking spaces are expected to be leased on a long-term basis from the City of Cambridge. The on-site parking spaces will be provided below grade with access provided from Second Street. The site in relation to area transportation facilities is shown in Figure 1, while a preliminary site plan is depicted in Figure 2.



Figure 1

Site Location Map





Not To Scale

Figure 2
Site Plan

VAI Vanasse & Associates, Inc.
Transportation Engineers & Planners

EXISTING CONDITIONS

EXISTING TRAFFIC CONDITIONS

A field inventory of existing study area roadways was conducted to document traffic conditions in the 2013 analysis year. Items collected regarding the study area roadways and intersections include roadway geometrics, traffic control devices, traffic signal timing plans, traffic volumes, vehicle queues, pedestrian crossing volumes, bicycle volumes, and safety data for the roadways in the vicinity of the site. Traffic volumes were measured by means of ATR counts and substantiated by manual intersection turning-movement and vehicle-classification counts. Other transportation-related data inventoried included on-street parking regulations; transit services; and provision of bicycle and pedestrian facilities.

DESCRIPTION OF PROJECT STUDY AREA

The project study area was determined in consultation with City transportation officials. The study area was confirmed in the July 18, 2013 Scoping Determination from the City to VAI. The study area is listed below.

1. Third Street at O'Brien Highway
2. Third Street at Cambridge Street
3. Third Street at Thorndike Street
4. Third Street at Spring Street
5. Third Street at Binney Street
6. Second Street at Cambridge Street
7. Second Street at Thorndike Street
8. Second Street at Spring Street
9. First Street at Cambridge Street
10. First Street at Thorndike Street
11. First Street at Spring Street
12. First Street at Charles Street and Cambridgeside Place
13. First Street at Binney Street
14. O'Brien Highway at Cambridge Street and East Street
15. Cambridgeside Place at Land Boulevard
16. Binney Street at Land Boulevard
17. O'Brien Highway at Land Boulevard and Charlestown Avenue
18. Third Street at Charles Street

19. Binney Street at Second Street
20. Third Street at Broadway

Transportation Network

Access to the area is provided via McGrath O'Brien Highway and Land Boulevard, which are adjacent to the general street network connecting to the site. These roadways provide connections to regional roadways such as Massachusetts Turnpike and Interstate 93 (I-93), as well as connections into downtown Cambridge and Boston. Local access to the site is provided from Second Street and Third Street.

Geometric and Traffic Control

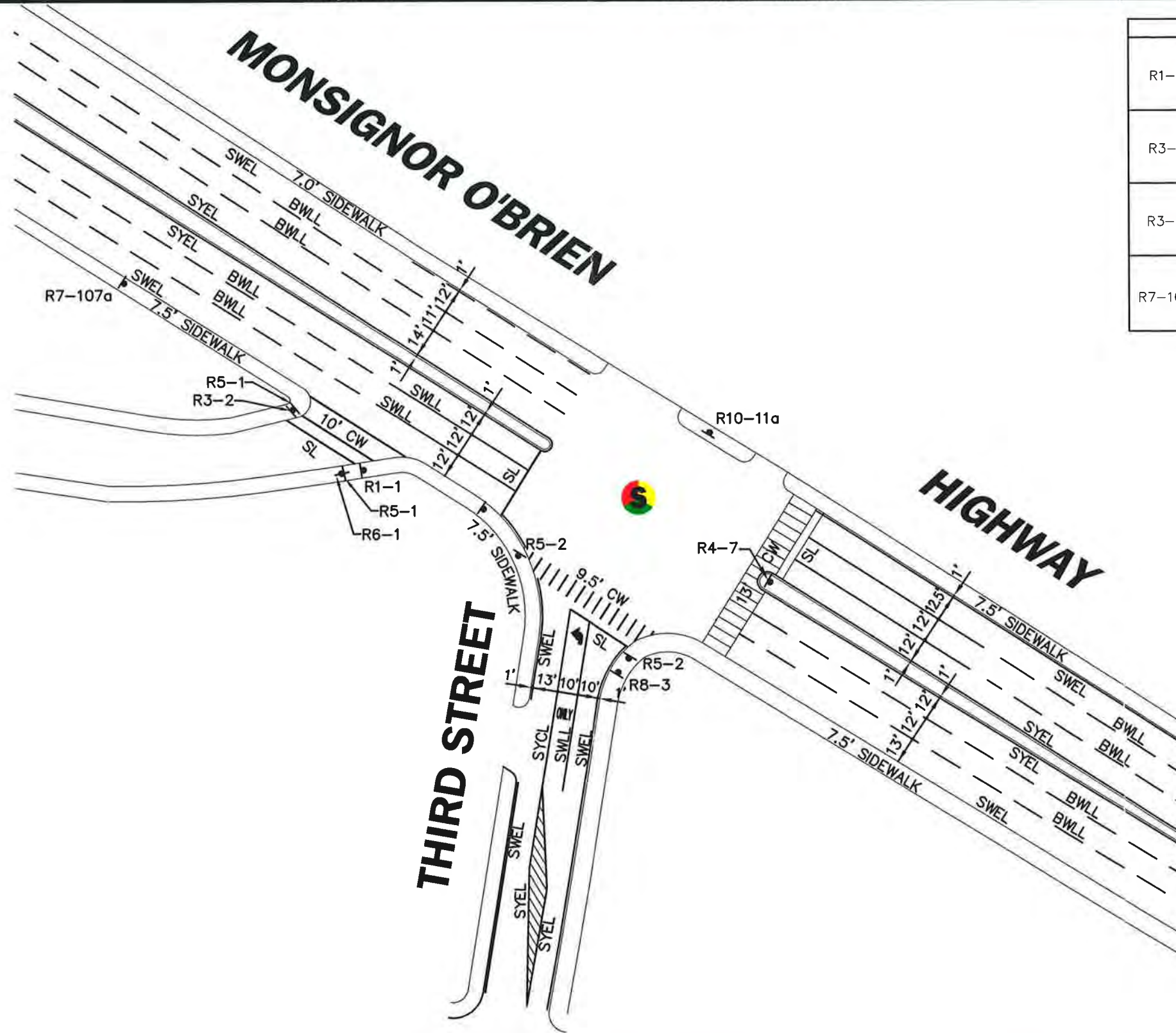
Intersection geometry and lane usage was obtained from field inventory and observations conducted by VAI in June 2013. A graphical depiction of intersection inventories for the study area intersections are provided in Figures 3 through 22. Sidewalks and wheelchair ramps along Thorndike Street, Spring Street, Third Street, and Second Street are in good condition with some locations having been upgraded within the past five years.

EXISTING TRAFFIC VOLUMES

Traffic Counts

To establish existing traffic conditions within the study area, ATR counts and manual turning movement and vehicle classification counts were conducted in May 2013. Public schools, colleges and universities were in regular session at the time the data was collected; therefore, in accordance with the City of Cambridge TIS Guidelines, the May traffic volumes were used without adjustment. Manual turning movement counts for Third Street at Charles Street, Second Street at Binney Street, and Third Street at Broadway were collected from the 2009 Alexandria Real Estate Development TIS. These traffic volumes were adjusted by a 1 percent growth rate per year and the thru volumes were balanced. The traffic count data sheets are provided in the Appendix.

The 2013 Existing weekday morning and evening peak-hour traffic-volume networks are depicted on Figures 23 and 24 and are summarized in Table 1. Table 2 summarizes the peak hour occurrence during the weekday morning and evening peak hours at the study area intersections. The average hourly directional volumes recorded at the ATR locations are summarized in Table 3.



SIGN LEGEND					
R1-1		R4-7		R6-1	
R3-1		R5-1		R8-3	
R3-2		R5-2		R10-11a	
R7-107a		SPEC. 8A			KENDALL SQUARE

SIGN LEGEND	
BWLL	BROKEN WHITE LANE LINE
DYCL	DOUBLE YELLOW CENTER LINE
SYCL	SOLID YELLOW CENTER LINE
DYL	DOUBLE YELLOW LINE
SWEL	SOLID WHITE EDGE LINE
SYEL	SOLID YELLOW EDGE LINE
SYLL	SOLID YELLOW LANE LINE
SWLL	SOLID WHITE LANE LINE
SYGL	SOLID YELLOW GORE LINE
SL	STOP LINE
CW	CROSS WALK

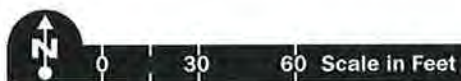
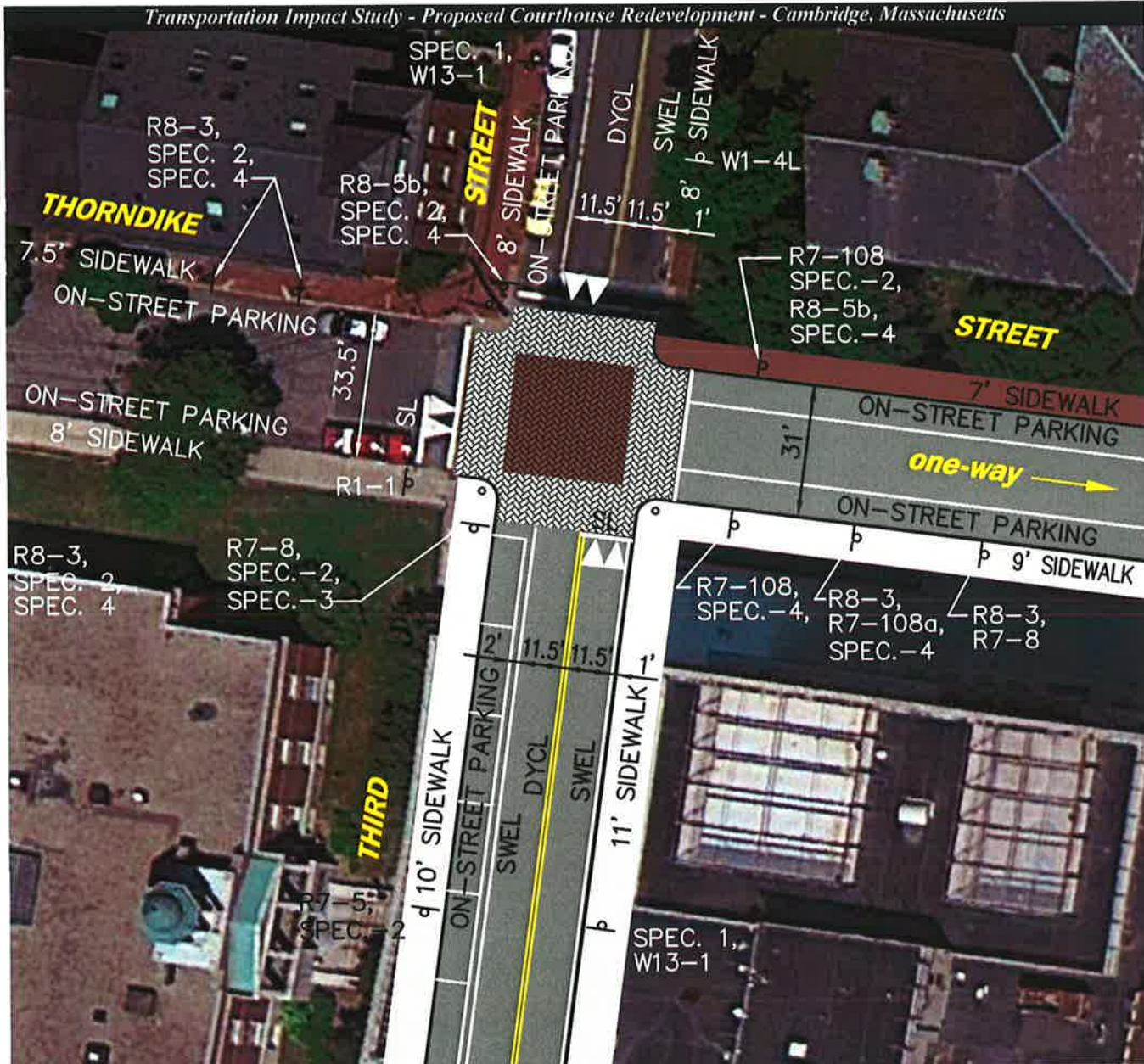


Figure 3
Intersection Inventories
O'Brien Highway at Third Street



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC-1		SPEC-2		SPEC.-3		SPEC. 4		R1-1		R7-5	
R7-8		R7-108a		R8-3		R8-5a		R8-5b		W13-1	

MARKING LEGEND

DYCL — DOUBLE YELLOW CENTER LINE
 SWEL — SOLID WHITE EDGE LINE
 SL — STOP LINE



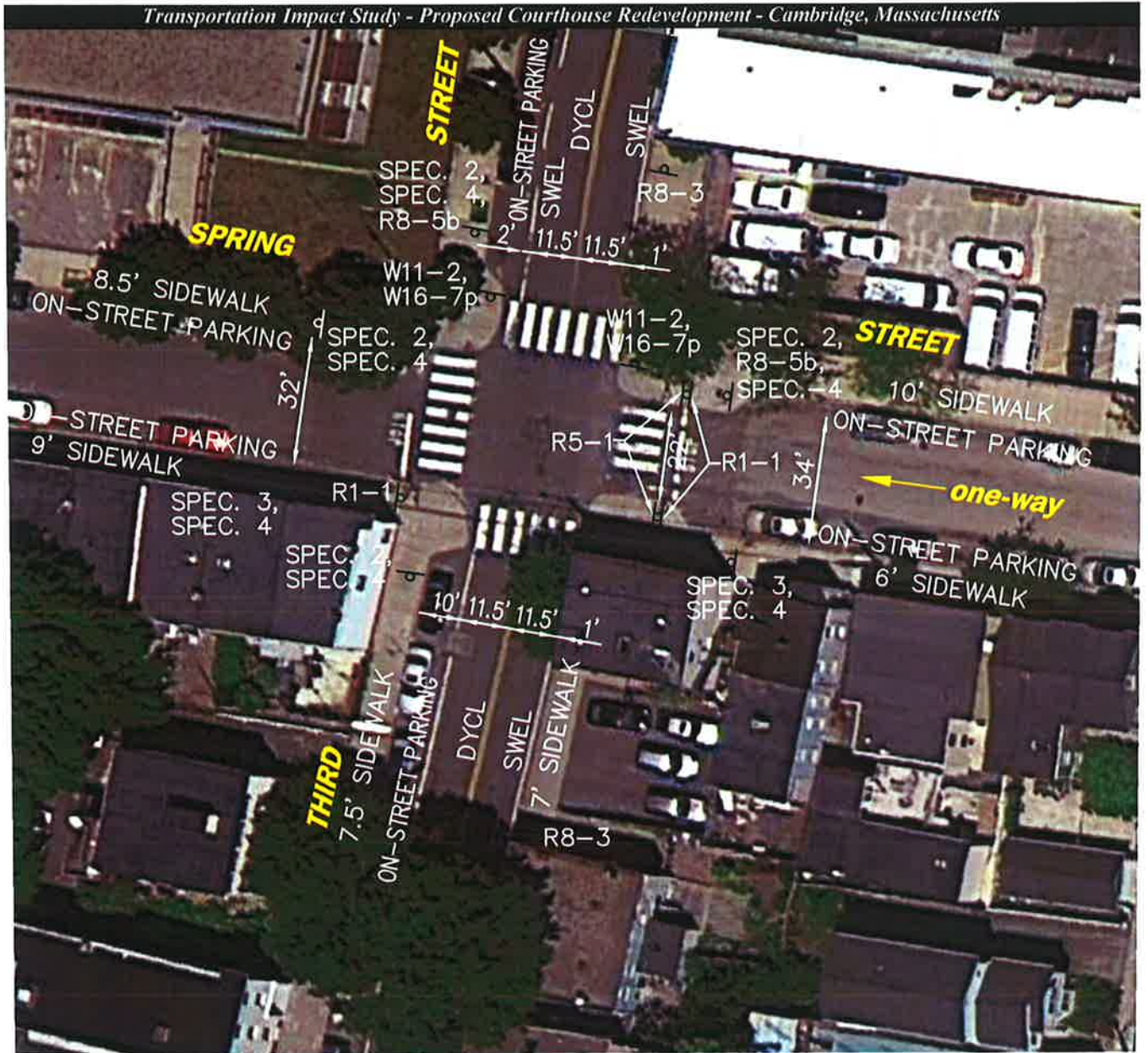
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.

0 20 40 Scale in Feet

Figure 5



Intersection Inventories
 Third Street at Thorndike Street



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC-2		SPEC.-3		SPEC. 4		R1-1		R8-3		R8-5b	
			R5-1		W11-2		W16-7P				

MARKING LEGEND

DYCL — DOUBLE YELLOW CENTER LINE
 SWEL — SOLID WHITE EDGE LINE
 SL — STOP LINE

Source: Cambridge Development Map and Field Inventory conducted by VAI, July, 2013.



Figure 6



Intersection Inventories
 Third Street at Spring Street



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

R3-4		R3-7L	LEFT LANE MUST TURN LEFT	R4-7		R5-2		R7-1	TOW ZONE NO PARKING	R8-5a	TOW ZONE NO STOPPING
				R10-11a	NO TURN ON RED						

MARKING LEGEND

- DYCL — DOUBLE YELLOW CENTER LINE
- SWEL — SOLID WHITE EDGE LINE
- SWLL — SOLID WHITE LANE LINE
- SYEL — SOLID YELLOW EDGE LINE
- SL — STOP LINE

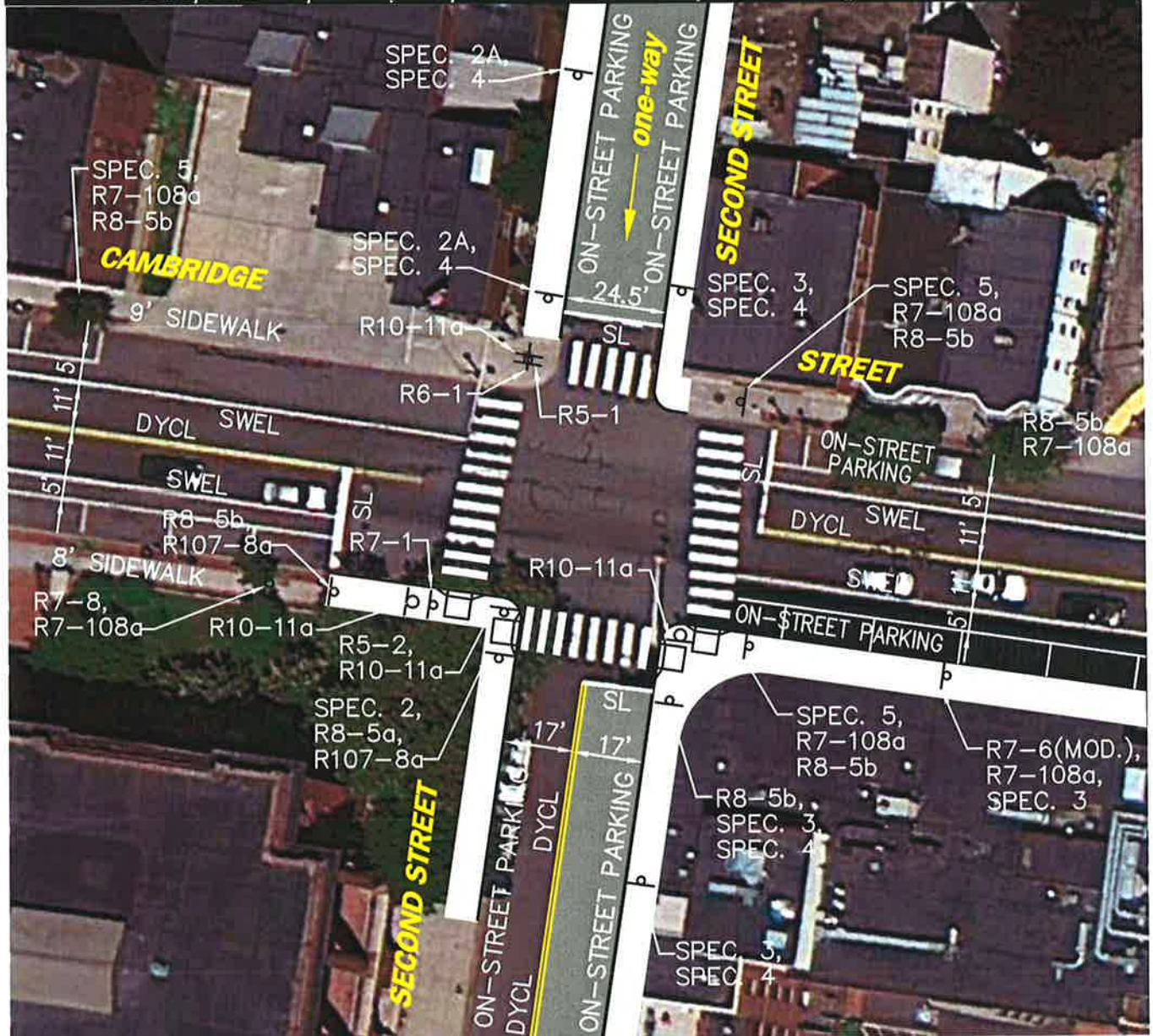
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.



Figure 7



Intersection Inventories
Binney Street at Third Street



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 2		SPEC. 2A		SPEC. 3		SPEC. 5		SPEC. 6B		R5-2	
R7-6 (MOD.)		R7-8		R7-108a		R8-5a		R8-5b		R10-11a	

MARKING LEGEND

- DYCL — DOUBLE YELLOW CENTER LINE
- SWEL — SOLID WHITE EDGE LINE
- SWLL — SOLID WHITE LANE LINE
- SL — STOP LINE



Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.



Figure 8



**Intersection Inventories
Cambridge Street at Second Street**

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SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 2		SPEC. 3		SPEC. 4		SPEC. 7		R7-2a		R1-1	
R5-1		R6-1		R8-3		R8-5a		R8-5b		R7-5	

MARKING LEGEND

SL ——— STOP LINE



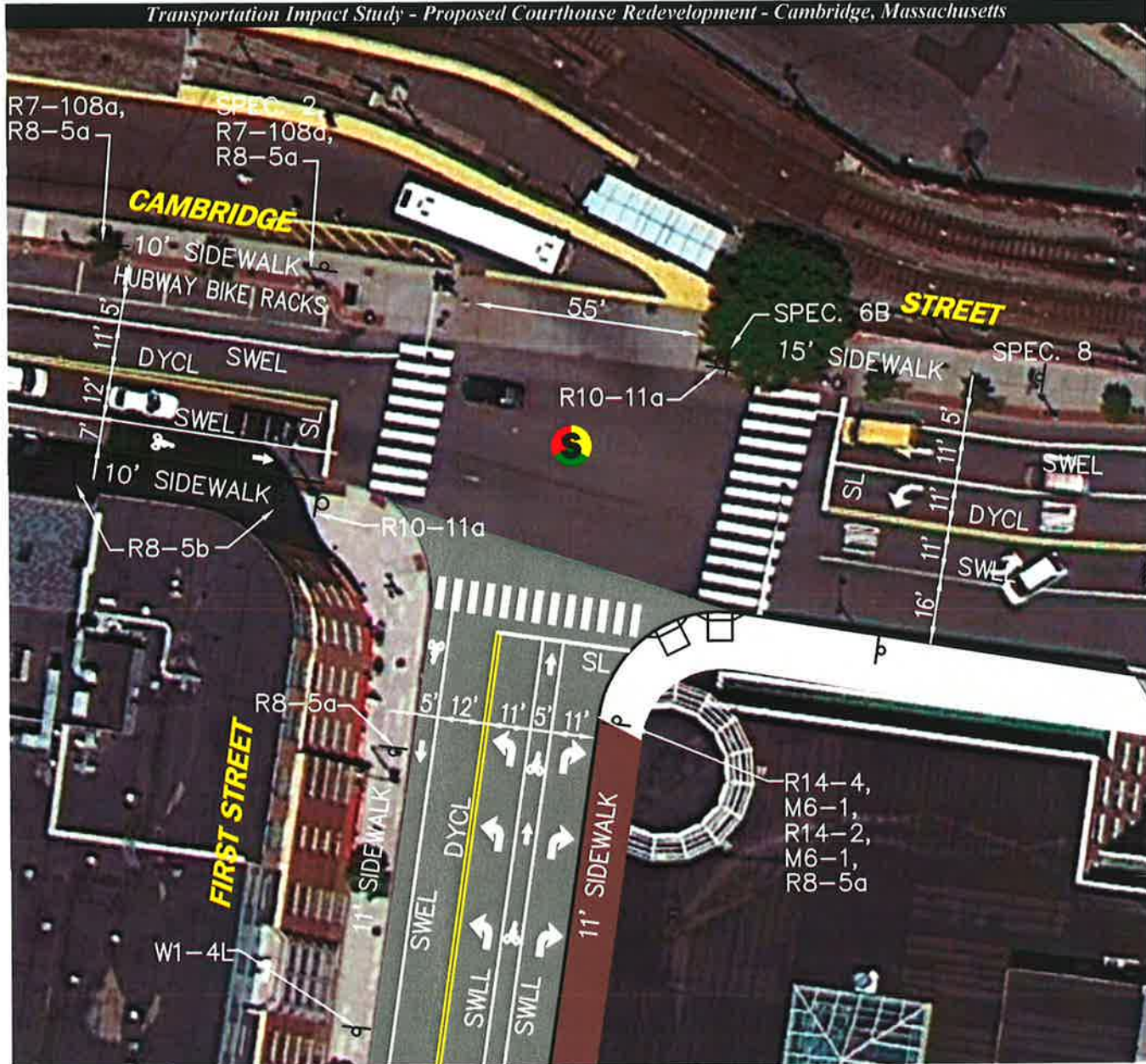
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.

0 20 40 Scale in Feet

Figure 10



Intersection Inventories
Second Street at Spring Street



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 2 (MOD.)		SPEC. 5		SPEC. 6A		M6-1		R1-1		R7-7	
R7-108a		R8-5a		R8-5b		R10-11a		R14-2		R14-4	
W1-4L		SPEC. 8	 		<p>MARKING LEGEND</p> <p>DYCL — DOUBLE YELLOW CENTER LINE SWEL — SOLID WHITE EDGE LINE SWLL — SOLID WHITE LANE LINE SL — STOP LINE</p>						

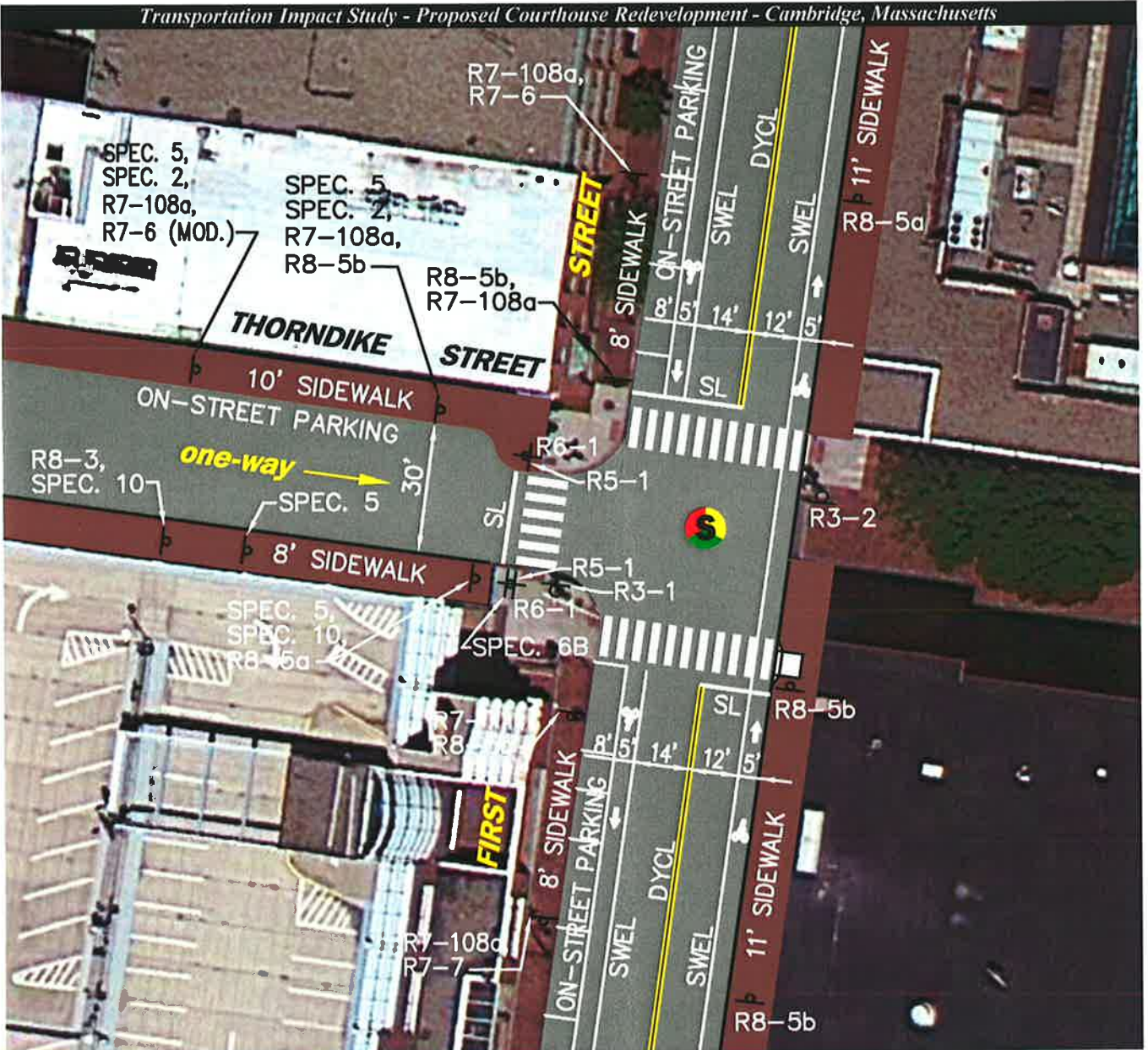
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.
 0 20 40 Scale in Feet

Figure 11



Intersection Inventories
 Cambridge Street at First Street

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SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 2		SPEC. 3		SPEC. 4		SPEC. 5		SPEC. 6B		SPEC. 10	
R1-1		R3-1		R3-2		R5-1		R6-1		R7-6	
R7-6 (MOD.)		R7-7		R7-108a		R8-3		R8-5a		R8-5b	

MARKING LEGEND

DYCL—DOUBLE YELLOW CENTER LINE SWEL—SOLID WHITE EDGE LINE SL—STOP LINE

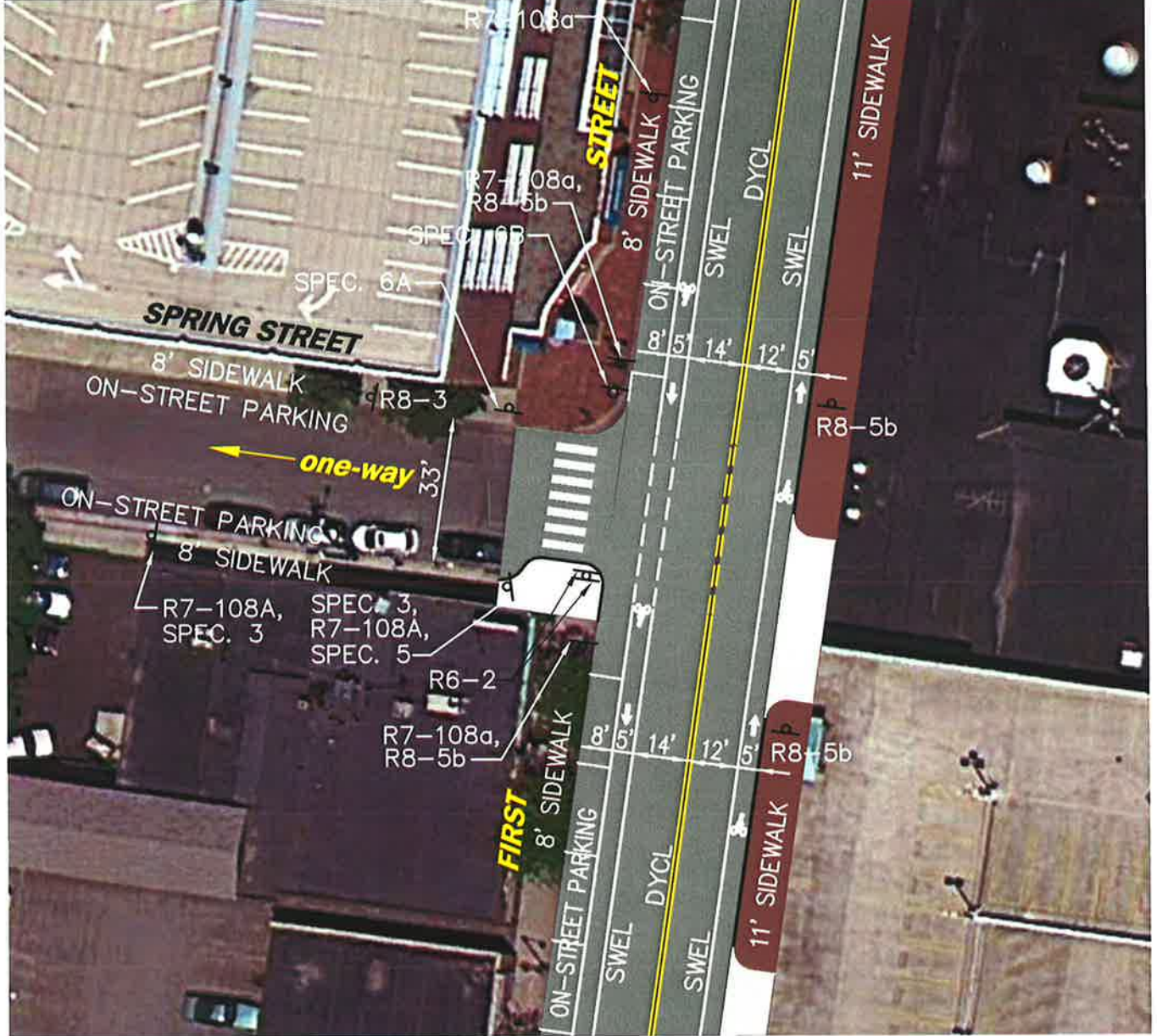
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.



Figure 12



Intersection Inventories
First Street at Thorndike Street



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 3		SPEC. 5		SPEC. 6A		SPEC. 6B		R6-1		R6-2	
		R7-108a		R8-3		R8-5b					

MARKING LEGEND	
DYCL	— DOUBLE YELLOW CENTER LINE
SWEL	— SOLID WHITE EDGE LINE



Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.

Figure 13



**Intersection Inventories
First Street at Spring Street**

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SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 2		SPEC. 5		R3-1		R3-2		R6-1		R7-2	
R7-5		R7-6		R7-8		R7-108a		R7-108b		R8-3	
R8-5a		R8-5b		R10-11a		W1-4L		<p style="text-align: center;">MARKING LEGEND</p> DYCL — DOUBLE YELLOW CENTER LINE SWEL — SOLID WHITE EDGE LINE			

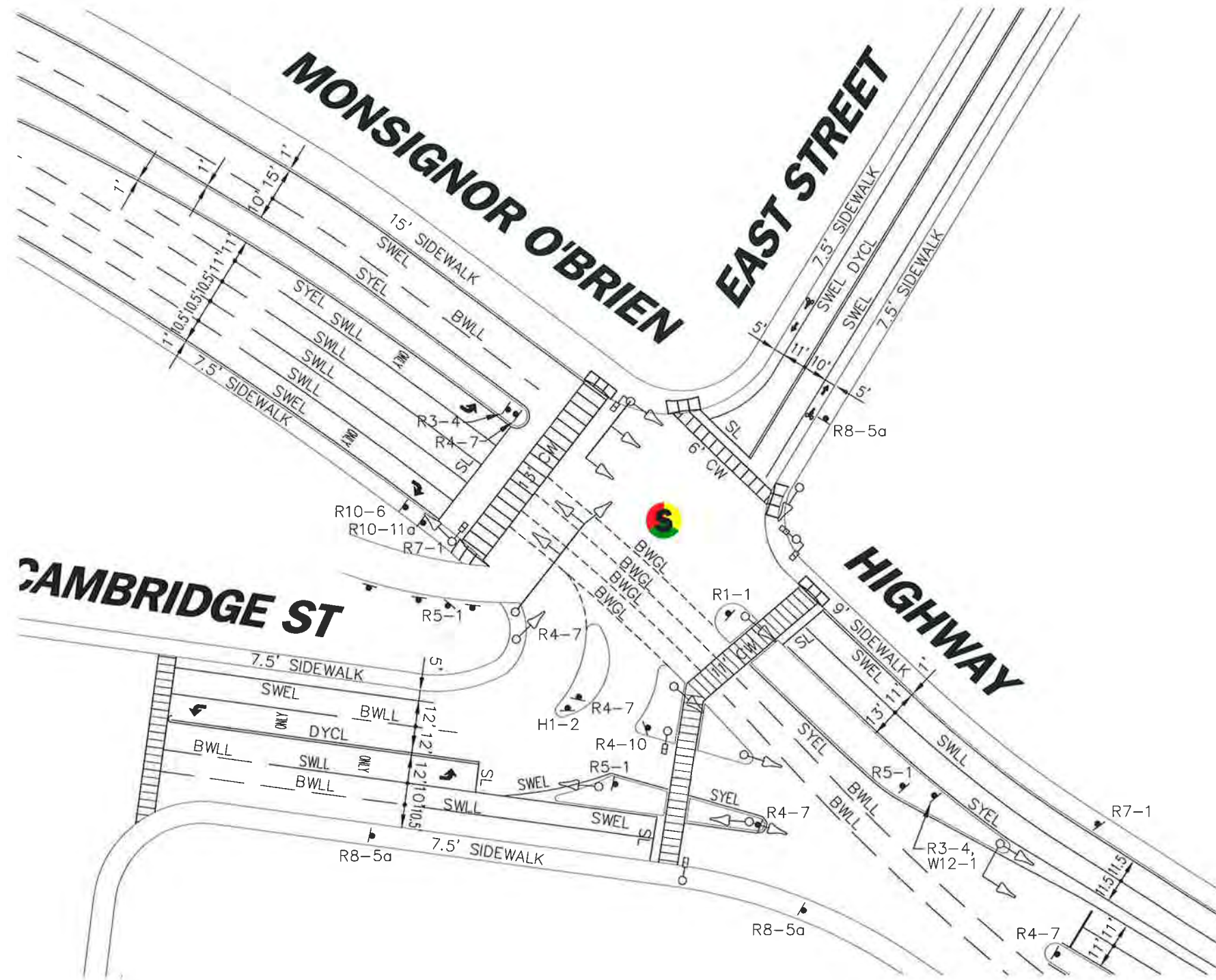
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.
 0 20 40 Scale in Feet

Figure 14



**Intersection Inventories
 First Street at Cambridgeside
 Place and Charles Street**

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SIGN LEGEND			
R3-1		R10-6	
R3-4		R10-11a	
R4-7		R7-1	
R4-10		R8-5a	
R5-1		H1-2	
W12-1			

SIGN LEGEND	
BWGL	BROKEN WHITE GUIDE LINE
BWLL	BROKEN WHITE LANE LINE
DYCL	DOUBLE YELLOW CENTER LINE
SYCL	SOLID YELLOW CENTER LINE
DYL	DOUBLE YELLOW LINE
SWEL	SOLID WHITE EDGE LINE
SYEL	SOLID YELLOW EDGE LINE
SYLL	SOLID YELLOW LANE LINE
SWLL	SOLID WHITE LANE LINE
SYGL	SOLID YELLOW GORE LINE
SL	STOP LINE
CW	CROSS WALK

SIGNAL EQUIPMENT LEGEND	
	TRAFFIC SIGNAL MAST ARM OR PEDESTRIAN SIGNAL BASE
	TRAFFIC SIGNAL HEAD
	PEDESTRIAN SIGNAL

NOTE: 1. BASE PLAN INFORMATION OBTAINED FROM CAMBRIDGE. G.I.S. AND FIELD INVENTORIES CONDUCTED BY VAI.

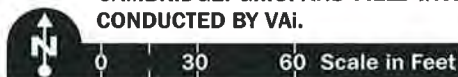
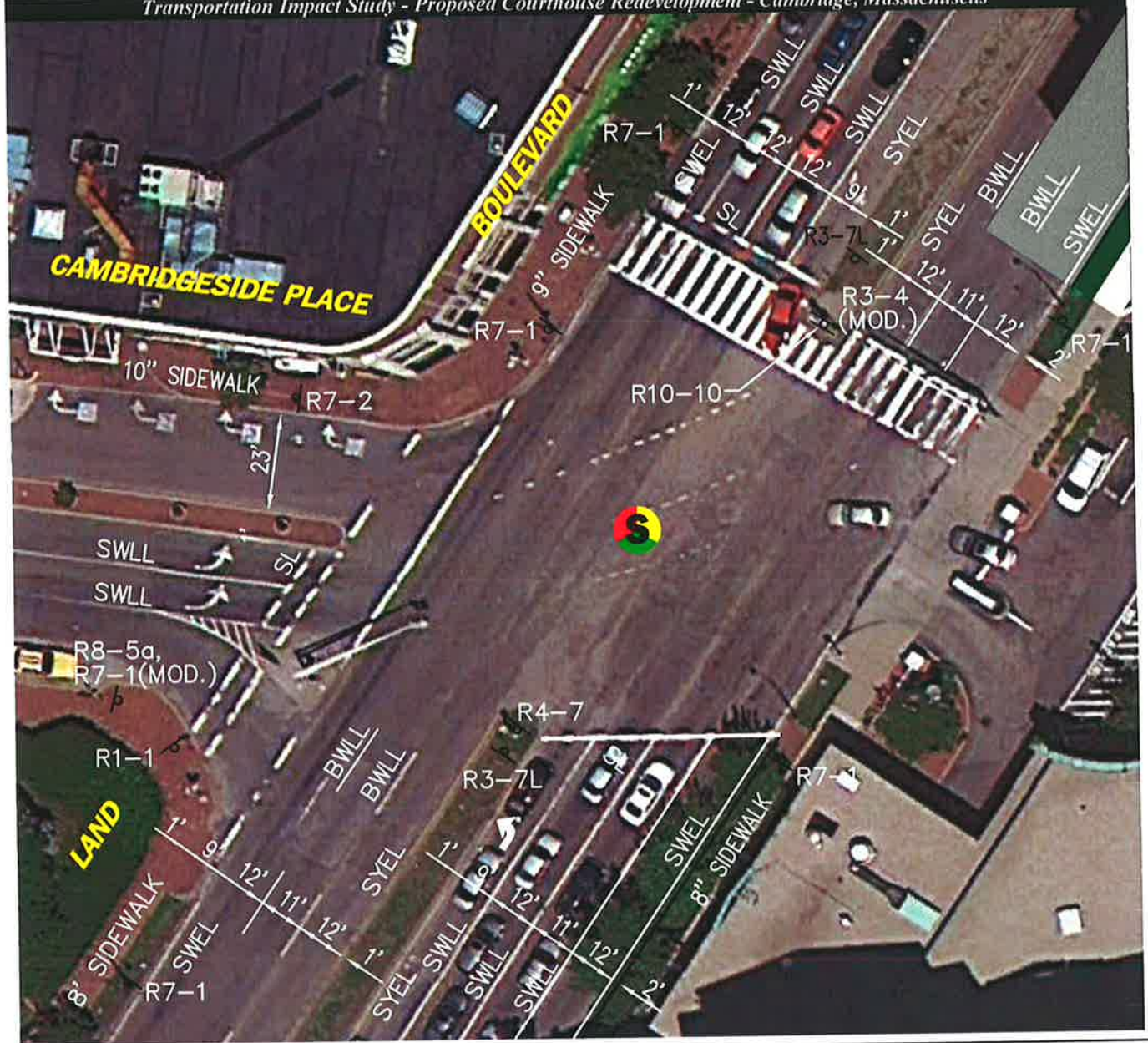


Figure 16
Intersection Inventory
O'Brien Highway at Cambridge Street
and East Street



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

R1-1		R3-4		R4-7		R3-7L	LEFT LANE MUST TURN LEFT	R7-1		R7-2	
		R7-1 (MOD. 1)		R8-5a		R10-10	LEFT TURN SIGNAL				

MARKING LEGEND

- SWEL — SOLID WHITE EDGE LINE
- SWLL — SOLID WHITE LANE LINE
- SYEL — SOLID YELLOW EDGE LINE
- SL — STOP LINE

Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.



Figure 17



Intersection Inventories
Land Boulevard at
Cambridgeside Place



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

R2-1		R3-4		R4-7		R7-1		R8-5a		R8-5b	
		R12-5		R14-2		M6-1		SPEC. 11			

MARKING LEGEND

- DYCL — DOUBLE YELLOW CENTER LINE
- SWEL — SOLID WHITE EDGE LINE
- SWLL — SOLID WHITE LANE LINE
- SYEL — SOLID YELLOW EDGE LINE
- SL — STOP LINE

Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.

0 20 40 Scale in Feet

Figure 18

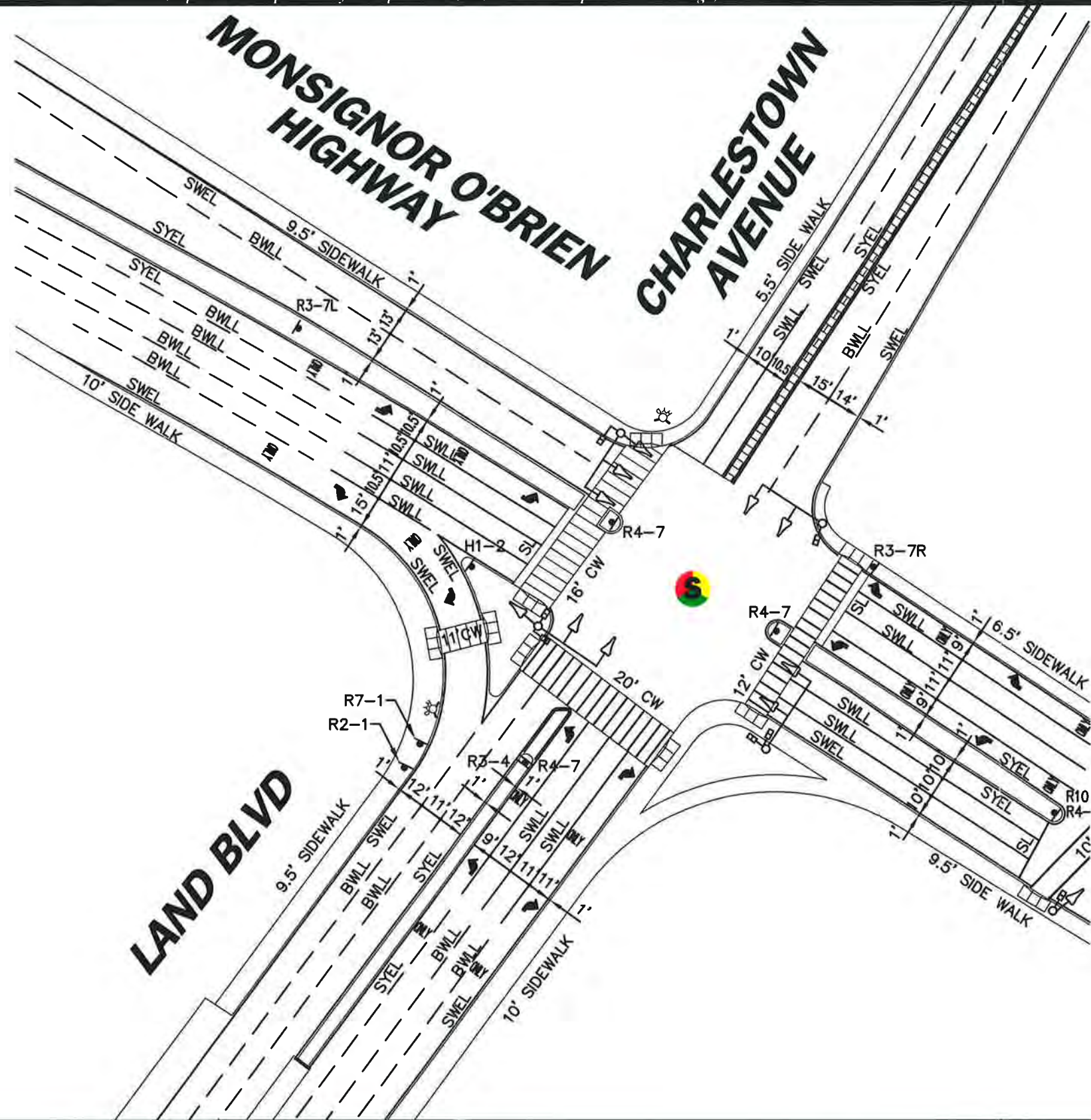


Intersection Inventories
Land Boulevard at Binney Street

SIGN LEGEND	
BWL	BROKEN WHITE LANE LINE
DYCL	DOUBLE YELLOW CENTER LINE
SYCL	SOLID YELLOW CENTER LINE
DYL	DOUBLE YELLOW LINE
SWEL	SOLID WHITE EDGE LINE
SYEL	SOLID YELLOW EDGE LINE
SYLL	SOLID YELLOW LANE LINE
SWLL	SOLID WHITE LANE LINE
SYGL	SOLID YELLOW GORE LINE
SL	STOP LINE
CW	CROSS WALK

SIGN LEGEND			
R2-1		R3-7L	LEFT LANE MUST TURN LEFT
R3-4		R3-7R	RIGHT LANE MUST TURN RIGHT
R3-5L		R4-7	
R3-5R		R7-1	
H1-2			

SIGNAL EQUIPMENT LEGEND	
	TRAFFIC SIGNAL MAST ARM OR PEDESTRIAN SIGNAL BASE
	TRAFFIC SIGNAL HEAD
	PEDESTRIAN SIGNAL

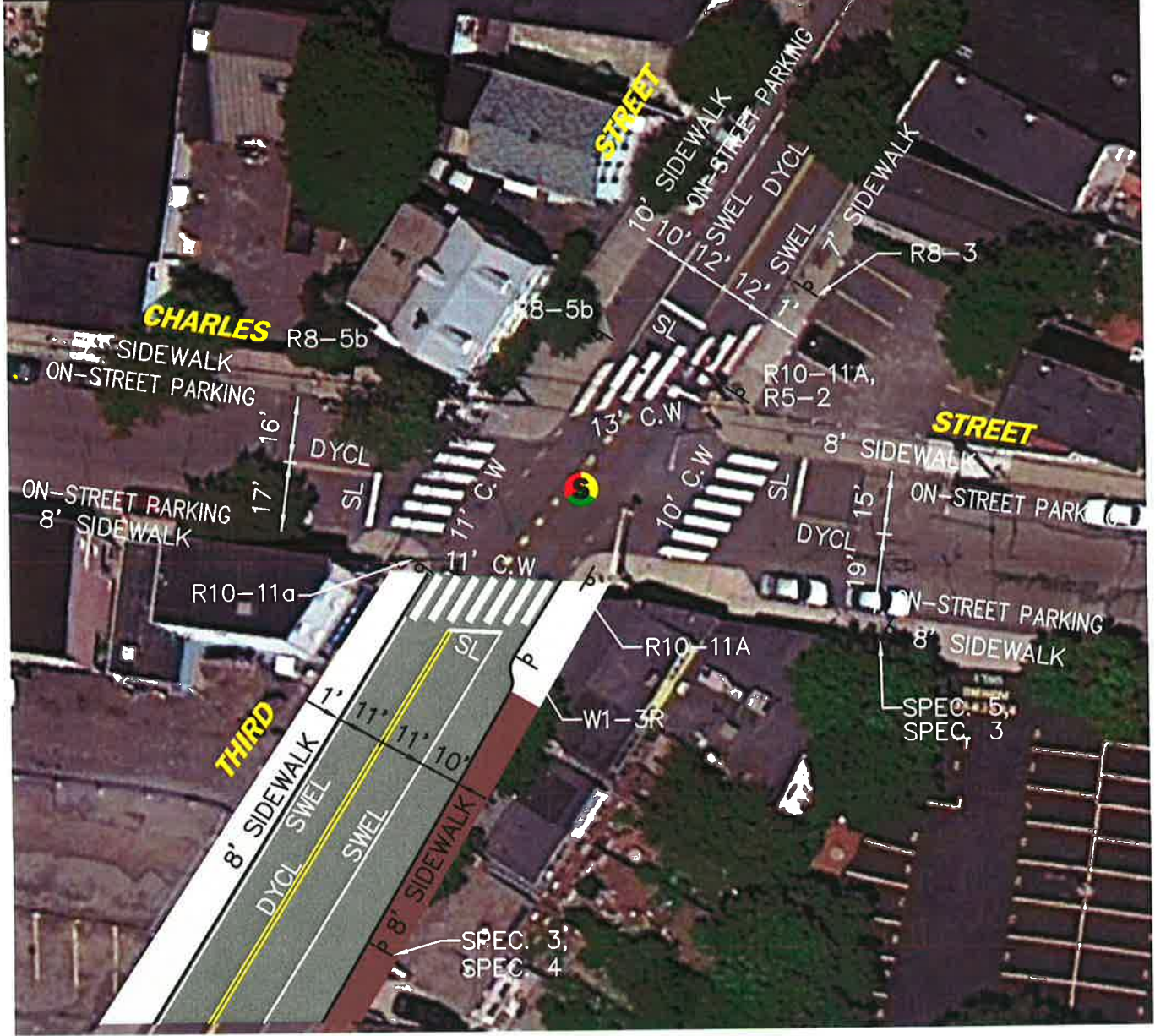


NOTE: 1. BASE PLAN INFORMATION OBTAINED FROM CAMBRIDGE. G.I.S. AND FIELD INVENTORIES CONDUCTED BY VAI.



Figure 19

Intersection Inventory
O'Brien Highway at Land Boulevard
and Charlestown Avenue



SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 3		SPEC. 4		SPEC. 5		R5-2		R8-3		R8-5b	
---------	--	---------	--	---------	--	------	--	------	--	-------	--

R10-11a		W1-3R	
---------	--	-------	--

MARKING LEGEND	
DYCL	DOUBLE YELLOW CENTER LINE
SWEL	SOLID WHITE EDGE LINE
SWLL	SOLID WHITE LANE LINE
SYEL	SOLID YELLOW EDGE LINE
SL	STOP LINE



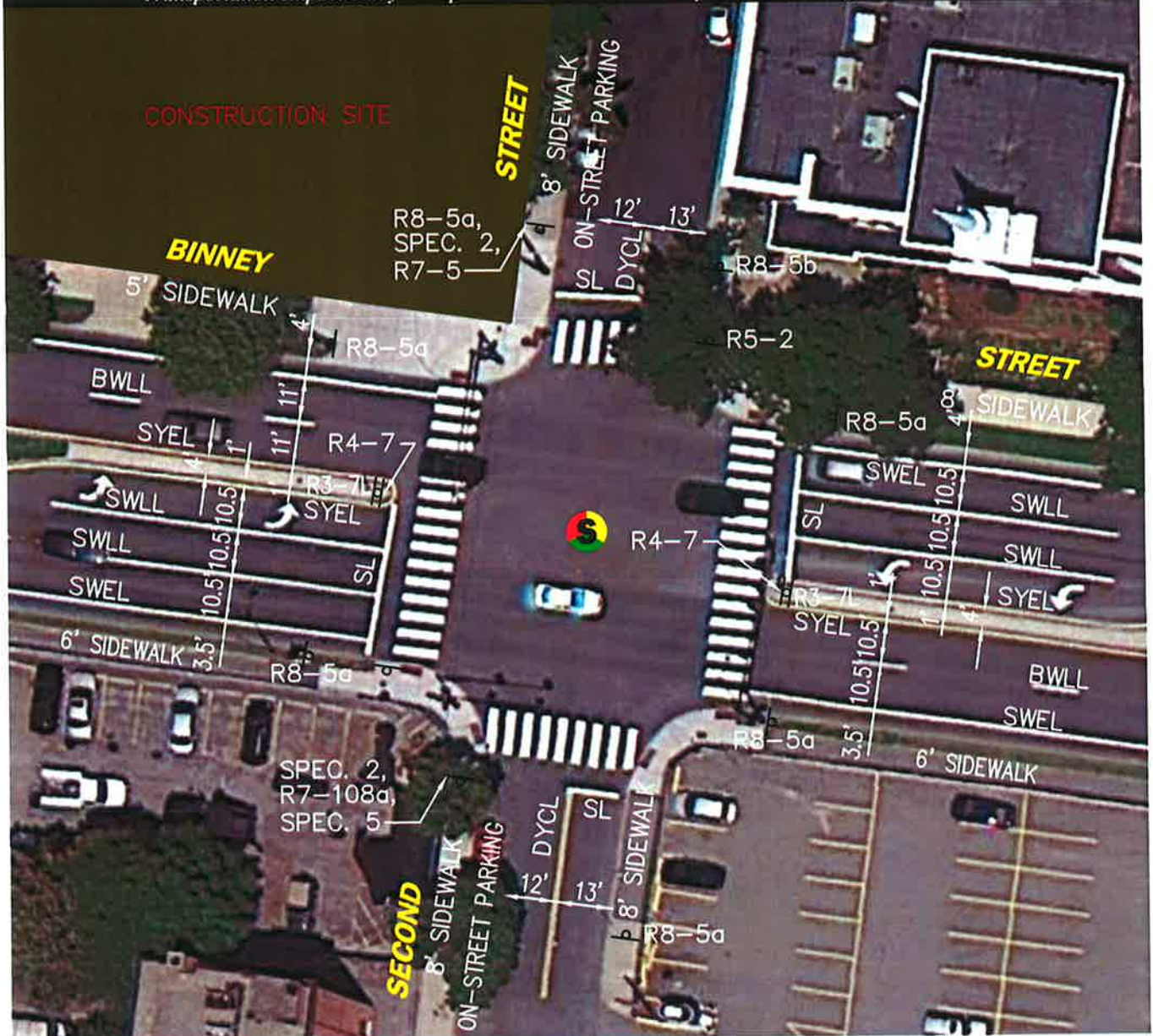
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.

Figure 20



**Intersection Inventories
Third Street at Charles Street**

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SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

SPEC. 2		SPEC. 5		R3-7L		R4-7		R5-2		R7-5	
		R7-108a		R8-5a		R8-5b					

MARKING LEGEND

- DYCL — DOUBLE YELLOW CENTER LINE
- SWEL — SOLID WHITE EDGE LINE
- SWLL — SOLID WHITE LANE LINE
- SYEL — SOLID YELLOW EDGE LINE
- SL — STOP LINE

Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.
 0 20 40 Scale in Feet

Figure 21



Intersection Inventories
 Binney Street at Second Street
 (Currently Under Construction)

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SIGN LEGEND (ARROW DIRECTION ON SIGNAGE VARIES BASED ON LOCATION)

R3-4		R4-7		R7-8		R7-108a		R8-5a		R8-5b	
		R10-10		R10-11a		SPEC. 3		SPEC. 5			

MARKING LEGEND

- DYCL — DOUBLE YELLOW CENTER LINE
- SWEL — SOLID WHITE EDGE LINE
- SWLL — SOLID WHITE LANE LINE
- SYEL — SOLID YELLOW EDGE LINE
- SL — STOP LINE

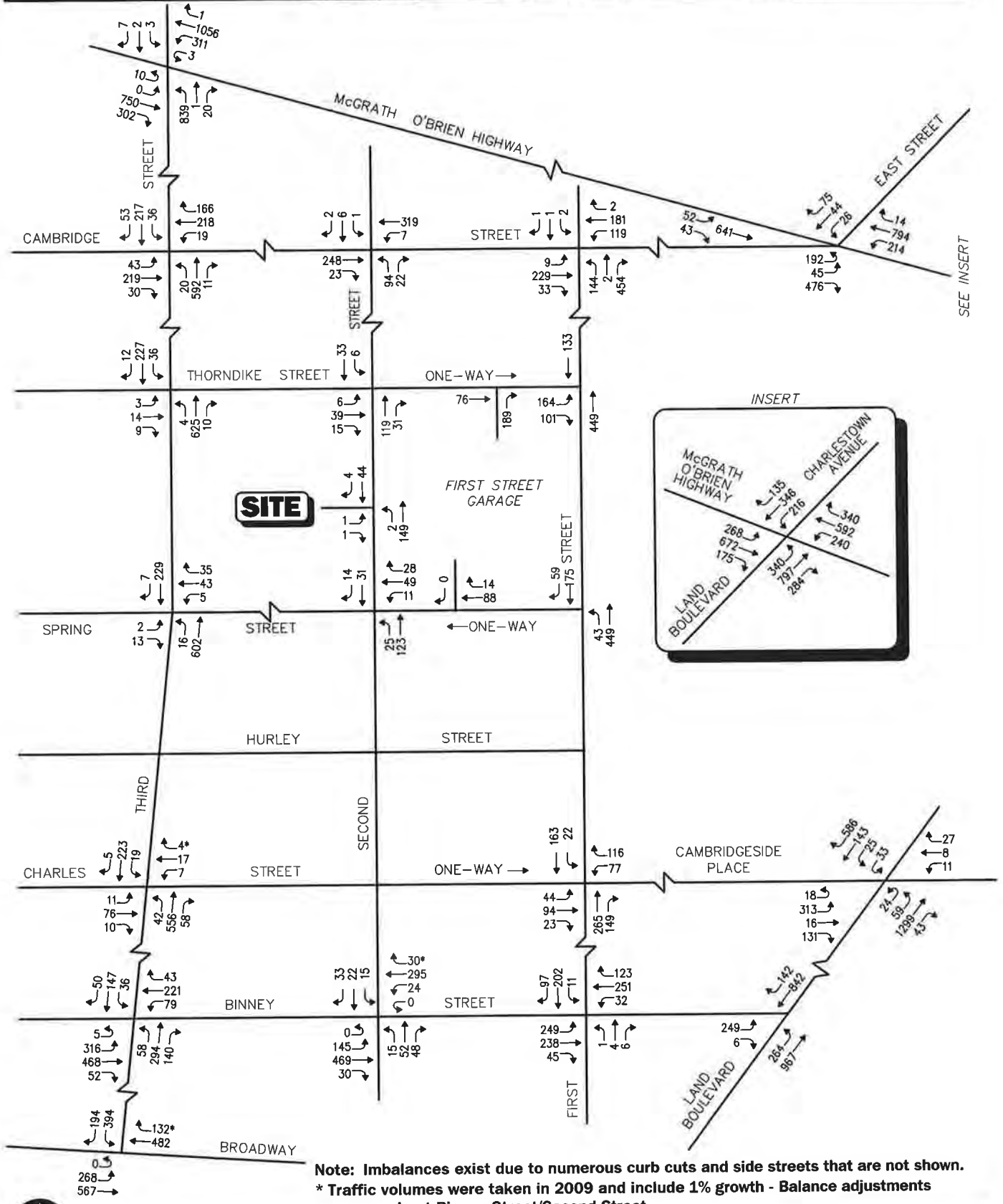
Source: Cambridge Development Map and Field Inventory conducted by VAI, July 2013.



Figure 22



Intersection Inventories
Broadway at Third Street



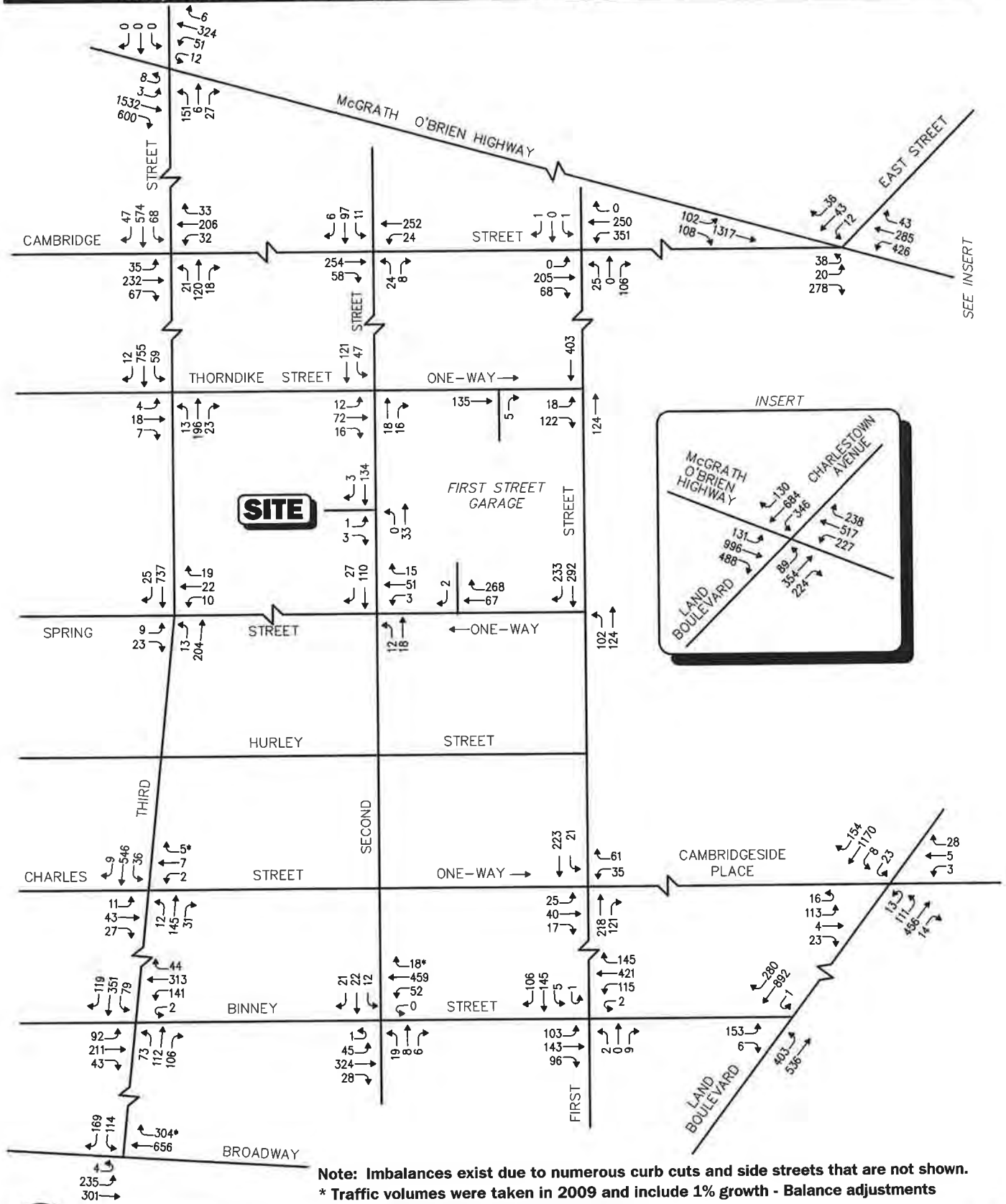
Not To Scale



Vanasse & Associates, Inc.

Figure 24

2013 Existing
Weekday Evening
Peak Hour Traffic Volumes



Not To Scale



Vanasse & Associates, Inc.

Figure 23

2013 Existing
Weekday Morning
Peak Hour Traffic Volumes

Table 1
2013 BASELINE TRAFFIC VOLUMES

Location	ADT ^a	Morning Peak Hour			Evening Peak Hour		
		Vehicles Per Hour	K Factor ^b	Directional Distribution ^c	Vehicles per Hour	K Factor	Directional Distribution
Thorndike Street, west of First Street	2,897	140	4.8	100% EB	265	9.1	100% EB
Spring Street, west of First Street	2,114	335	15.8	100% WB	102	4.8	100% WB
First Street, north of Thorndike Street	7,883	545	6.9	73.9% SB	746	9.5	82.2% NB
Second Street, south of Thorndike Street	2,105	171	8.1	80.1% SB	198	9.4	75.8% NB
First Street, north of Charles Street	8,427	548	6.5	55.5% NB	610	7.2	69.7% NB
Second Street, north of Charles Street	1,874	N/A	N/A	N/A	N/A	N/A	N/A
Third Street, north of Charles Street	9,164	752	8.2	78.6% SB	818	8.9	69.8% NB

^aAverage daily traffic in vehicles per day (vpd) based on ATR counts collected by VAI in May 2013.

^bPercent of daily volume in peak hour.

^cPercent traveling in the peak direction.

N/A = Not available.

Table 2
SUMMARY OF PEAK-HOUR INTERSECTION CHARACTERISTICS^a

Location	Morning Peak Hour	Evening Peak Hour
Third Street at O'Brien Highway	8:00 – 9:00 AM	4:45 – 5:45 PM
Third Street at Cambridge Street	8:30 – 9:30 AM	4:45 – 5:45 PM
Third Street at Thorndike Street	8:30 – 9:30 AM	4:45 – 5:45 PM
Third Street at Spring Street	8:30 – 9:30 AM	4:45 – 5:45 PM
Third Street at Binney Street	8:00 – 9:00 AM	5:00 – 6:00 PM
Second Street at Cambridge Street	8:30 – 9:30 AM	5:00 – 6:00 PM
Second Street at Thorndike Street	8:30 – 9:30 AM	5:00 – 6:00 PM
Second Street at Spring Street	8:15 – 9:15 AM	5:00 – 6:00 PM
First Street at Cambridge Street	8:30 – 9:30 AM	4:45 – 5:45 PM
First Street at Thorndike Street	8:15 – 9:15 AM	4:45 – 5:45 PM
First Street at Spring Street	8:15 – 9:15 AM	4:45 – 5:45 PM
First Street at Charles Street and Cambridgeside Place	8:15 – 9:15 AM	5:00 – 6:00 PM
First Street at Binney Street	8:00 – 9:00 AM	5:00 – 6:00 PM
O'Brien Highway at Cambridge Street and East Street	8:00 – 9:00 AM	4:45 – 5:45 PM
Cambridgeside Place at Land Boulevard	7:45 – 8:45 AM	5:00 – 6:00 PM
Binney Street at Land Boulevard	8:00 – 9:00 AM	5:00 – 6:00 PM
O'Brien Highway at Land Boulevard and Charlestown Avenue	8:00 – 9:00 AM	5:15 – 6:15 PM
Third Street at Charles Street ^b	N/A	N/A
Binney Street at Second Street ^b	N/A	N/A
Third Street at Broadway ^b	N/A	N/A

^aCounted by VAI in May 2013.

^bCounted by VHB in May 2009.

N/A = not available.

**Table 3
AVERAGE HOURLY TRAFFIC VOLUMES AT ATR LOCATIONS^a**

Start Time	Thordike Street, west of First Street		Spring Street, west of First Street		First Street, north of Thordike Street		Second Street, south of Thordike Street		First Street, north of Charles Street		Second Street, north of Charles Street		Third Street, north of Charles Street		Total				
	EB	Total	WB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB		SB			
12:00 AM	14	14	4	4	35	10	45	9	1	10	28	24	52	7	2	9	53	28	81
1:00	4	4	4	4	13	8	21	1	1	2	19	14	33	5	1	6	24	16	40
2:00	2	2	0	0	9	4	13	2	2	4	9	7	16	2	1	3	14	12	26
3:00	0	0	2	2	6	4	10	1	1	2	9	6	15	2	1	3	19	12	31
4:00	2	2	6	6	17	11	28	1	4	5	20	13	33	2	11	13	3	27	30
5:00	20	20	30	30	16	46	62	10	11	21	28	48	76	9	4	13	27	180	207
6:00	61	61	104	104	57	118	175	21	30	51	65	99	164	12	27	39	45	403	448
7:00	122	122	202	202	111	238	349	27	52	79	157	185	342	15	50	65	117	457	574
8:00	170	170	336	336	133	341	474	45	121	166	261	238	499	25	114	139	142	515	657
9:00	161	161	269	269	167	295	462	34	98	132	244	200	444	37	83	120	175	445	620
10:00	154	154	162	162	227	217	444	52	57	109	277	211	488	16	43	59	158	307	465
11:00	182	182	123	123	253	159	412	57	64	121	339	209	548	32	39	71	171	207	378
12:00 PM	162	162	108	108	278	156	434	62	47	109	329	167	496	22	50	72	207	207	414
1:00	156	156	110	110	297	152	449	64	45	109	364	153	517	38	64	102	251	189	440
2:00	168	168	107	107	386	143	529	86	60	146	380	141	521	25	54	79	383	179	562
3:00	226	226	88	88	433	110	543	68	57	125	398	156	554	61	48	109	537	200	737
4:00	302	302	86	86	505	138	643	92	56	148	509	167	676	147	64	211	437	203	640
5:00	350	350	98	98	535	135	670	159	53	212	345	277	622	340	104	444	404	237	641
6:00	278	278	102	102	356	162	518	105	37	142	393	274	667	169	88	257	462	241	703
7:00	174	174	68	68	310	123	433	76	27	103	295	166	461	38	63	101	286	163	449
8:00	89	89	54	54	407	122	529	52	22	74	401	97	498	45	36	81	219	133	352
9:00	54	54	26	26	392	59	451	49	16	65	386	85	471	33	14	47	180	97	277
10:00	30	30	14	14	130	33	163	17	8	25	155	37	192	31	8	39	136	72	208
11:00	16	16	11	11	65	15	80	11	10	21	58	22	80	5	3	8	124	60	184
Total ^b	2,897	2,897	2,114	2,114	5,138	2,799	7,937	1,101	880	1,981	5,469	2,996	8,465	818	972	2,090	4,574	4,590	9,164

^aVolumes based on ATR counts conducted by VAI in May 2013, expressed in vph.

^bDaily volumes expressed in vpd.

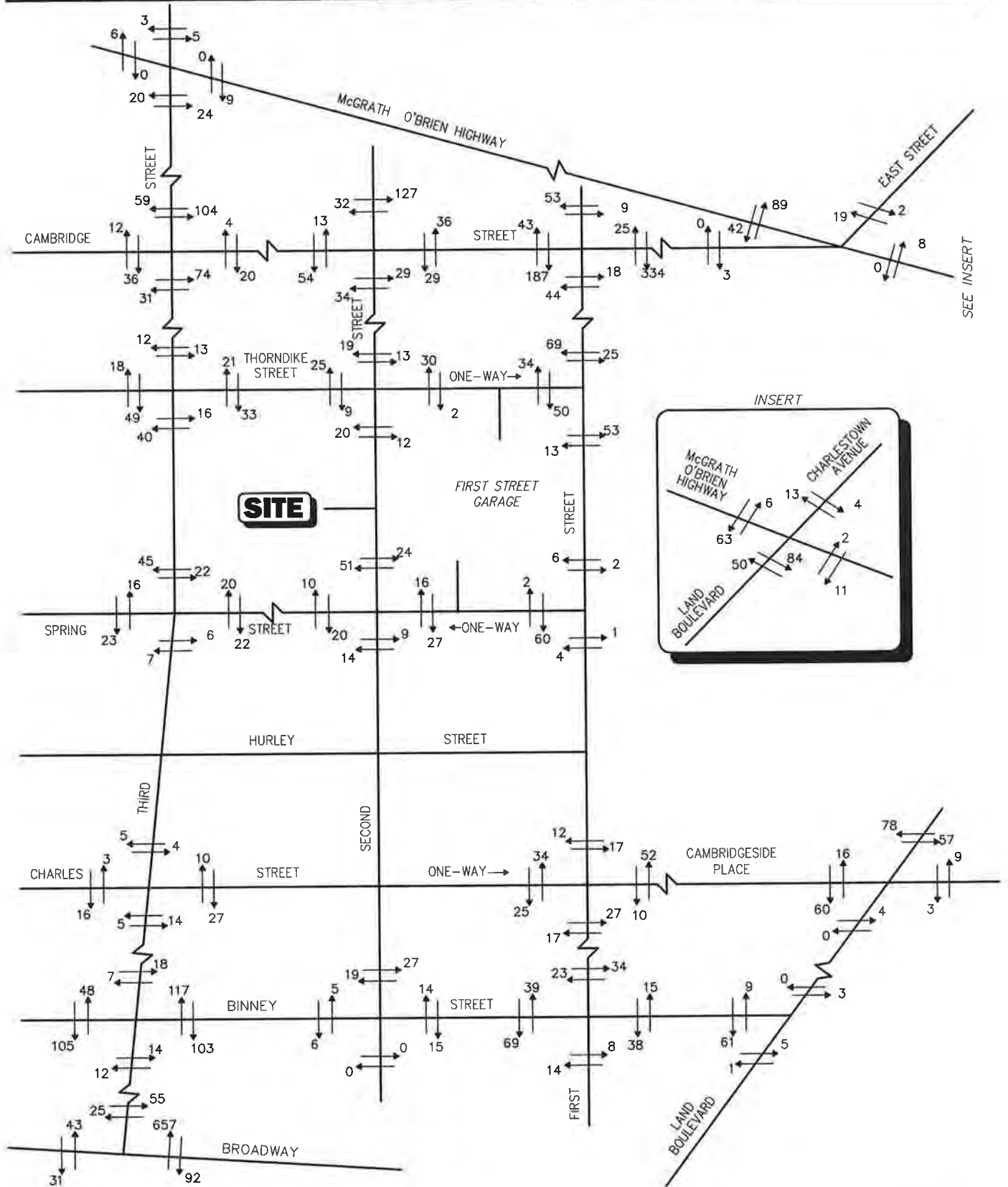
PEDESTRIANS

Pedestrian and bicycle counts for the study area intersections were collected during the vehicle count periods of 2013 described above. The twelve-hour pedestrian counts on First Street and Second Street were conducted in May 2013 in clear weather. The pedestrian volumes are depicted in Figure 25 for the weekday morning peak hour and Figure 26 for the weekday evening peak hour. The twelve-hour hourly pedestrian summary is provided in Table 4 for First Street and Table 5 for Second Street.

**Table 4
AVERAGE HOURLY PEDESTRIAN VOLUMES^a
FIRST STREET**

Time	First Street					
	Eastbound		Westbound		Northbound	Southbound
	North Side	South Side	North Side	South Side	Crossing First Street	Crossing First Street
7:00 AM	35	55	37	23	3	0
8:00	15	97	116	65	10	0
9:00	20	115	60	62	8	0
10:00	44	113	95	89	1	0
11:00	62	83	69	122	5	0
12:00 PM	77	106	191	174	16	0
1:00	103	136	140	85	11	0
2:00	134	174	104	96	12	0
3:00	113	1825	57	47	4	0
4:00	196	169	72	66	6	0
5:00	213	200	90	71	11	0
<u>6:00</u>	<u>174</u>	<u>130</u>	<u>101</u>	<u>78</u>	<u>20</u>	<u>0</u>
Total	1,186	1,560	1,132	978	107	0

^aBased on counts conducted by VAI; May 2013.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

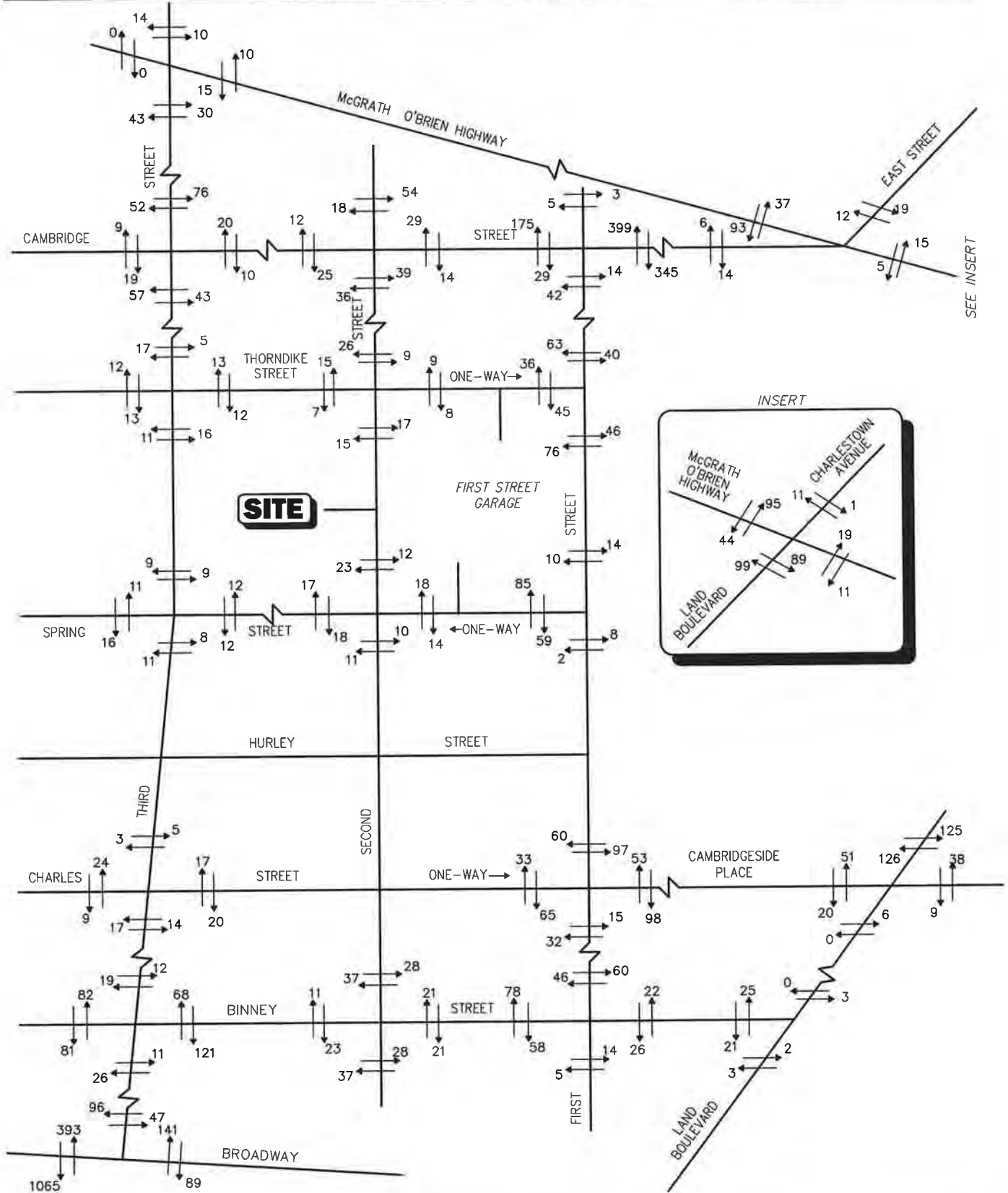
Not To Scale

Figure 25



Vanasse & Associates, Inc.

2013 Existing
Weekday Morning
Peak Hour Pedestrian Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 26



Vanasse & Associates, Inc.

2013 Existing
Weekday Evening
Peak Hour Pedestrian Volumes

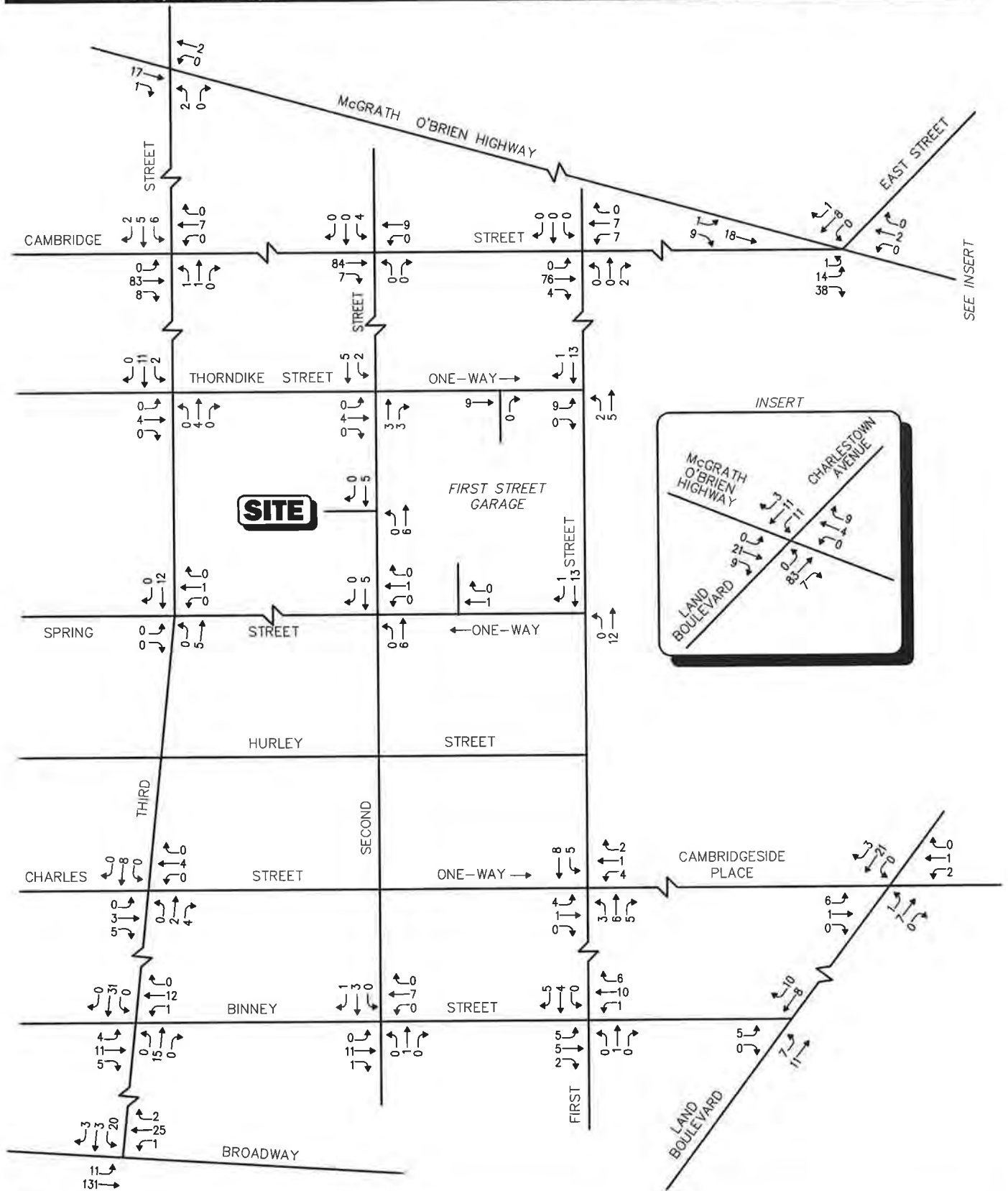
**Table 5
AVERAGE HOURLY PEDESTRIAN VOLUMES^a
SECOND STREET**

Time	Second Street					
	Eastbound		Westbound		Northbound	Southbound
	North Side	South Side	North Side	South Side	Crossing Second Street	Crossing Second Street
7:00 AM	32	15	31	12	0	10
8:00	45	18	27	21	0	14
9:00	48	22	20	10	0	12
10:00	41	25	32	20	0	10
11:00	29	31	19	25	0	8
12:00 PM	33	53	29	43	0	12
1:00	50	48	17	8	0	8
2:00	33	52	15	13	0	5
3:00	28	57	20	10	0	10
4:00	17	51	12	11	0	10
5:00	23	46	17	22	0	7
6:00	16	20	16	10	0	4
Total	395	438	255	205	0	110

^aBased on counts conducted by VAI; May 2013.

BICYCLES

As with the pedestrian counts, bicycle counts for the study area intersections were collected during the peak-hour vehicle count periods described above. Twelve-hour bicycle counts were also collected on First Street and Second Street at the locations of the ATRs. The bicycle volumes are depicted in Figure 27 for the weekday morning peak hour and Figure 28 for the weekday evening peak hour. The twelve-hour hourly bicycle summary is provided in Table 6 for First Street and Table 7 for Second Street.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

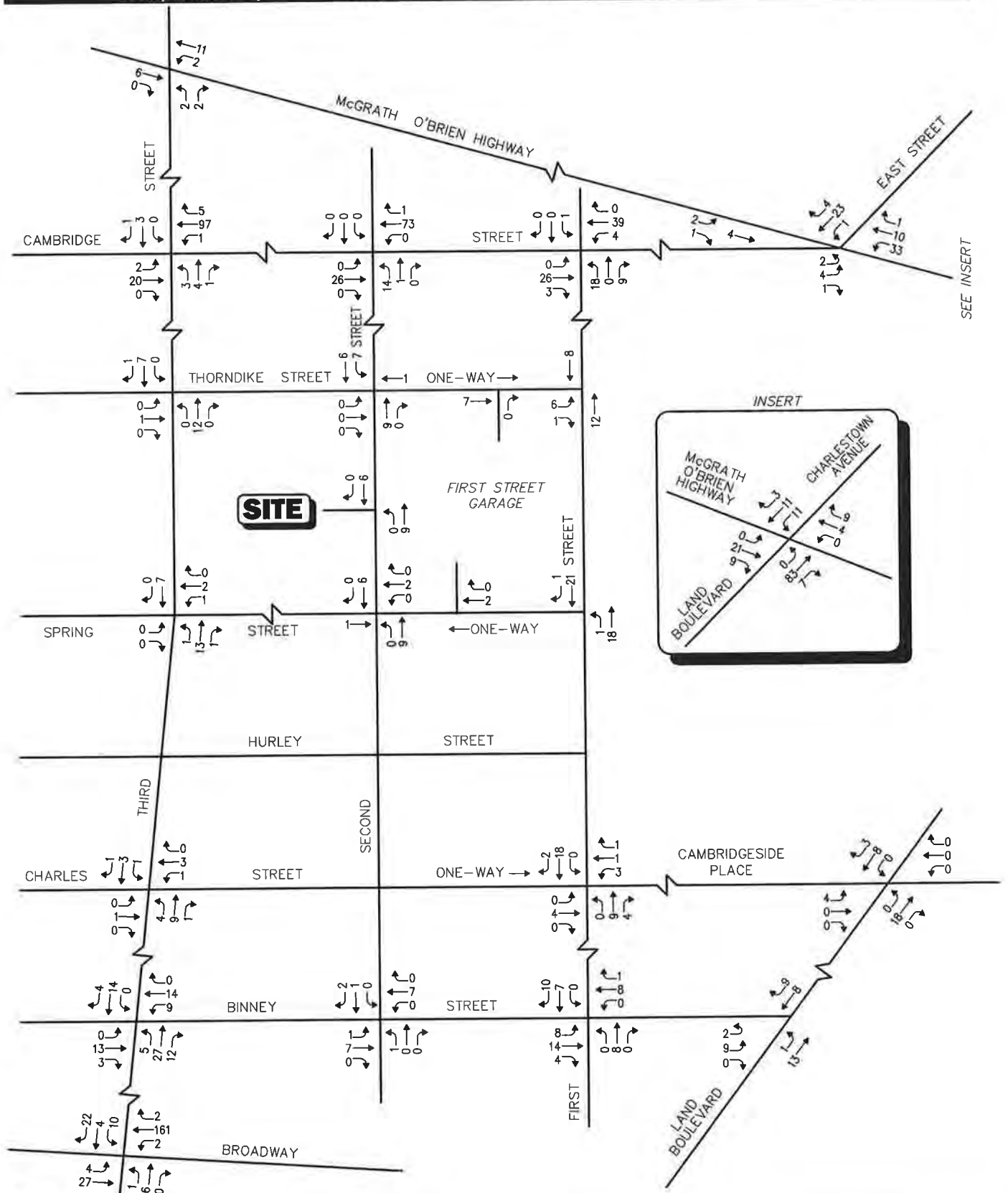
Not To Scale

Figure 27



Vanasse & Associates, Inc.

2013 Existing
Weekday Morning
Peak Hour Bicycle Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 28



Vanasse & Associates, Inc.

2013 Existing
Weekday Evening
Peak Hour Bicycle Volumes

Table 6
AVERAGE HOURLY BICYCLE VOLUMES^a
FIRST STREET

Time	First Street	
	Northbound	Southbound
7:00 AM	2	8
8:00	5	14
9:00	6	11
10:00	1	7
11:00	4	3
12:00 PM	2	4
1:00	4	4
2:00	1	4
3:00	3	4
4:00	6	1
5:00	18	6
<u>6:00</u>	<u>17</u>	<u>6</u>
Total	69	72

^aBased on counts conducted by VAI; May 2013.

Table 7
AVERAGE HOURLY BICYCLE VOLUMES^a
SECOND STREET

Time	Second Street	
	Northbound	Southbound
7:00 AM	2	2
8:00	2	4
9:00	5	6
10:00	0	0
11:00	1	1
12:00 PM	4	0
1:00	0	2
2:00	1	3
3:00	0	2
4:00	0	3
5:00	6	8
<u>6:00</u>	<u>6</u>	<u>2</u>
Total	27	33

^aBased on counts conducted by VAI; May 2013.

EXISTING VEHICLE QUEUES

Vehicle queues were observed at the signalized intersections within the study area. Table 8 summarizes the vehicle queue observations by intersection approach and lane.

Table 8
EXISTING QUEUE OBSERVATIONS

Intersection/Lane ^b	Morning Peak Hour		Evening Peak Hour	
	Average Queue	Maximum Queue	Average Queue	Maximum Queue
<i>Charles Street at First Street:</i>				
Charles Street EB LT	1	2	1	4
Charles Street EB TH/RT	1	4	2	7
Charles Street WB LT/TH/RT	2	7	5	10
First Street NB LT/TH/RT	2	8	2	8
First Street SB LT/TH/RT	2	7	2	10
<i>Cambridge Street at First Street:</i>				
Cambridge Street EB TH/RT	1	3	9	17
Cambridge Street WB LT	1	3	5	12
Cambridge Street WB TH	1	9	2	8
First Street NB LT	1	4	3	9
First Street NB RT	2	8	6	14
<i>Thorndike Street at First Street:</i>				
Thorndike Street EB LT/RT	1	3	2	7
First Street NB TH	2	10	17	20
First Street SB TH	5	16	5	12
<i>Cambridge Street at Second Street:</i>				
Cambridge Street EB TH/RT	1	4	2	10
Cambridge Street WB LT/TH	3	6	4	8
Second Street NB LT/TH/RT	1	3	2	6
Second Street SB LT/TH/RT	2	3	2	2
<i>Binney Street at Third Street:</i>				
Binney Street EB LT	2	6	6	12
Binney Street EB TH	2	5	4	11
Binney Street EB TH/RT	2	4	3	12
Binney Street WB LT	3	8	2	8
Binney Street WB TH	3	7	3	7
Binney Street WB TH/RT	3	10	3	8
Third Street NB LT/TH	2	11	8	16
Third Street NB RT	2	5	2	6
Third Street SB LT/TH/RT	13	18	7	15
<i>Cambridge Street at Third Street:</i>				
Cambridge Street EB LT/TH/RT	6	11	7	14
Cambridge Street WB LT/TH/RT	3	8	5	11
Third Street NB LT/TH/RT	3	4	15	26
Third Street SB LT	1	4	1	3
Third Street SB TH/RT	12	16	6	12
<i>O'Brien Highway at Third Street:</i>				
O'Brien Highway EB TH/RT	18	30	6	18
O'Brien Highway WB LT/TH	1	4	7	11
Third Street NB LT	2	21	9	12
Third Street NB LT/RT	1	4	6	11

See notes at end of table.

Table 8 (Continued)
EXISTING QUEUE OBSERVATIONS

Intersection/Lane ^b	Morning Peak Hour		Evening Peak Hour	
	Average Queue	Maximum Queue	Average Queue	Maximum Queue
<i>Binney Street at First Street:</i>				
Binney Street EB LT	1	7	0	2
Binney Street EB TH	7	14	2	5
Binney Street EB TH/RT	1	5	1	6
Binney Street WB LT	3	9	12	20
Binney Street WB TH/RT	4	9	7	12
First Street NB LT/TH/RT	0	2	1	5
First Street SB LT/TH	0	2	1	5
First Street SB RT	7	14	10	21
<i>O'Brien Highway at East Street/Cambridge Street:</i>				
O'Brien Highway EB LT	2	4	2	3
O'Brien Highway EB TH	8	13	5	9
O'Brien Highway EB TH	11	14	7	11
O'Brien Highway EB TH	12	15	8	13
O'Brien Highway EB RT	2	5	1	3
O'Brien Highway WB LT	5	12	3	9
O'Brien Highway WB LT	5	18	2	6
O'Brien Highway WB TH	3	7	6	10
O'Brien Highway WB TH	2	6	7	11
East Street SB LT/TH/RT	2	4	2	4
Cambridge Street NB LT	4	8	1	3
Cambridge Street NB RT	5	7	3	5
Cambridge Street NB RT	3	4	2	6
<i>Land Boulevard at Binney Street:</i>				
Binney Street EB LT	--	--	--	--
Binney Street EB LT/RT	2	6	7	9
Land Boulevard NB LT	10	18	5	12
Land Boulevard NB TH	--	--	--	--
Land Boulevard NB TH	--	--	--	--
Land Boulevard NB TH	--	--	--	--
Land Boulevard SB TH	15	23	4	10
Land Boulevard SB TH	15	28	4	13
Land Boulevard N RT	5	17	1	4
<i>Land Boulevard at Cambridgeside Place:</i>				
Cambridgeside Place EB LT	3	6	9	12
Cambridgeside Place EB LT	2	4	8	10
Cambridgeside Place EB RT	0	0	0	0
Hotel Driveway WB LT/TH/RT	1	3	2	4
Land Boulevard NB LT	2	5	3	6
Land Boulevard NB TH	3	7	11	18
Land Boulevard NB TH	3	6	12	17
Land Boulevard NB TH/RT	2	5	10	17
Land Boulevard SB LT	1	5	3	5
Land Boulevard SB TH	9	16	8	11
Land Boulevard SB TH	9	14	8	13
Land Boulevard SB TH/RT	9	16	4	7

See notes at end of table.

Table 8 (Continued)
EXISTING QUEUE OBSERVATIONS

Intersection/Lane ^b	Morning Peak Hour		Evening Peak Hour	
	Average Queue ^c	Maximum Queue	Average Queue	Maximum Queue
<i>Land Boulevard at O'Brien Highway:</i>				
O'Brien Highway EB LT	7	13	6	9
O'Brien Highway EB TH	13	20	7	10
O'Brien Highway EB TH	13	20	8	13
O'Brien Highway EB RT	11	19	7	10
O'Brien Highway WB LT	8	10	5	10
O'Brien Highway WB TH	8	12	8	12
O'Brien Highway WB TH	7	10	7	12
O'Brien Highway WB RT	1	6	4	8
Charlestown Avenue SB LT	2	5	9	14
Charlestown Avenue SB TH	4	7	11	11
Charlestown Avenue SB TH	5	10	18	22
Charlestown Avenue SB RT	2	9	7	15
Land Boulevard NB LT/TH	16	24	21	23
Land Boulevard NB TH/RT	16	26	22	23
<i>Charles Street at Third Street^c:</i>				
Charles Street EB LT/TH/RT	1	--	2	--
Charles Street WB LT/TH/RT	0	--	0	--
Third Street NB LT/TH/RT	2	--	7	--
Third Street SB LT/TH/RT	1	--	1	--
<i>Binney Street at Second Street (unsignalized during observations)^c:</i>				
Binney Street EB LT	--	--	--	--
Binney Street EB TH	--	--	--	--
Binney Street EB TH/RT	--	--	--	--
Binney Street WB LT	--	--	--	--
Binney Street WB TH	--	--	--	--
Binney Street WB TH/RT	--	--	--	--
Second Street NB LT/TH/RT	--	--	--	--
Second Street SB LT/TH/RT	--	--	--	--
<i>Third Street at Broadway^c:</i>				
Broadway EB LT	4	--	6	--
Broadway EB TH	2	--	4	--
Broadway WB TH/RT	6	--	5	--
Third Street SB LT	2	--	6	--
Third Street SB RT	1	--	1	--

^aSource: Based upon observations conducted by VAI in May 2013.

^bEB = eastbound; WB = westbound; NB = northbound; SB = southbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

^cBased upon observations conducted by VHB in May 2009.

EXISTING PUBLIC TRANSIT SYSTEM

The project site is located near Lechmere Station on the MBTA Green Line subway system. The Green Line currently terminates at Lechmere Station but eventually is proposed to extend into Medford and the existing station will be relocated to the north side of O'Brien Highway by December 2014. The Green Line continues to North Station, where connections to the Orange Line and Commuter Rail routes can be made, and also to Park Street where connections to the Red Line are possible. The Lechmere station is also the terminating bus station for MBTA Bus Route 69, 80, 87 and 88. Table 9 summarizes the most recent Green Line headway and boarding data for the Lechmere Square station available from the MBTA. Table 10 summarizes the peak-hour headways and capacity information for the four bus routes supplied by the MBTA.

Table 9
MBTA GREEN LINE SERVICE SUMMARY

Station	MBTA Line	Rush Hour Headways (minutes) ^b	Boarding Counts ^a				
			Daily ^c	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
				Inbound	Outbound	Inbound	Outbound
Lechmere	Green	10	13,290	555	461	570	628

^aSource: MBTA ridership count results.

^bBased on MBTA schedule.

^c6:00 AM to 11:00 PM counts.

Table 10
MBTA BUS SERVICE

Route No.	Route	Hours of Operation	Peak-Hour Headway (minutes) ^a	Peak-Hour Peak-Direction Planning Capacity ^b	Daily Ridership ^c	Estimated Daily Capacity
69	Harvard/Holyoke Gate to Lechmere Station via Cambridge Street	5:25 AM to 1:11 AM	6-17	210-600	2,985	6,480
80	Arlington Center to Lechmere Station via Medford Hillside	5:05 AM to 1:21 AM	15	240	1,872	5,280
87	Arlington Center or Clarendon Hill to Lechmere Station via Somerville Avenue	5:10 AM to 1:18 AM	15-16	240	3,373	6,300
88	Clarendon Hill to Lechmere Station via Highland Avenue	5:16 AM to 1:14 AM	6-10	180-600	3,785	7,260

^aBased on current MBTA schedule.

^bPlanning capacity is 60 passengers per bus.

^cBased on most recent MBTA ridership data.

Other Transit Services

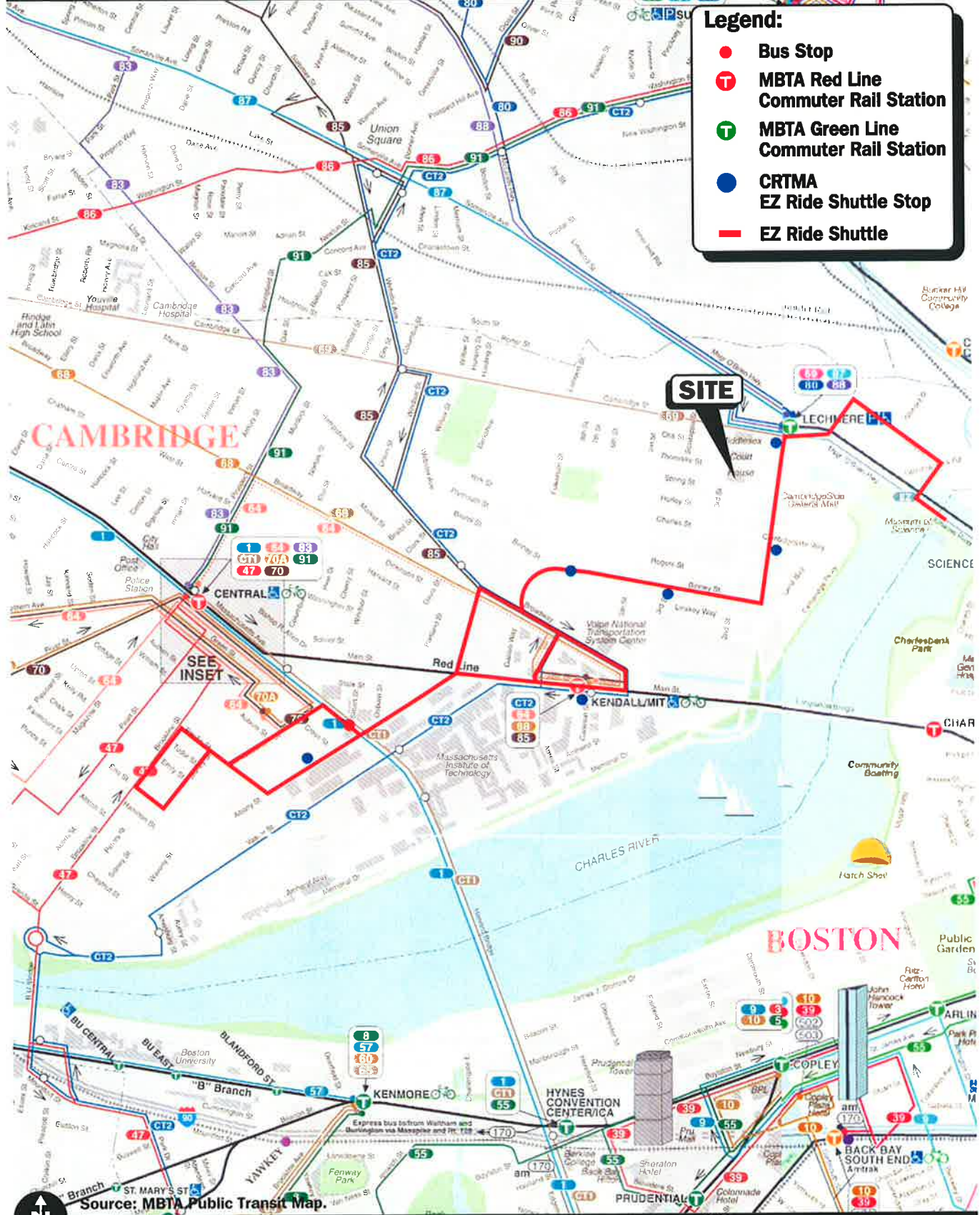
In addition to the MBTA, the Charles River Transportation Management Association (CRTMA) provides the EZRide Shuttle Bus that circulates between Cambridgeport and North Station in Boston via the Kendall Square Red Line station. The EZRide Shuttle operates on weekdays between 6:20 AM and 10:50 AM during the morning time period; 10:44 AM to 3:02 PM during the midday time period; and 3:02 PM and 8:00 PM during the evening time period, on a 12 minute frequency. At this time, the midday service runs between Pacific Street and Kendall Square only. The shuttle route and schedule is provided in the Appendix.

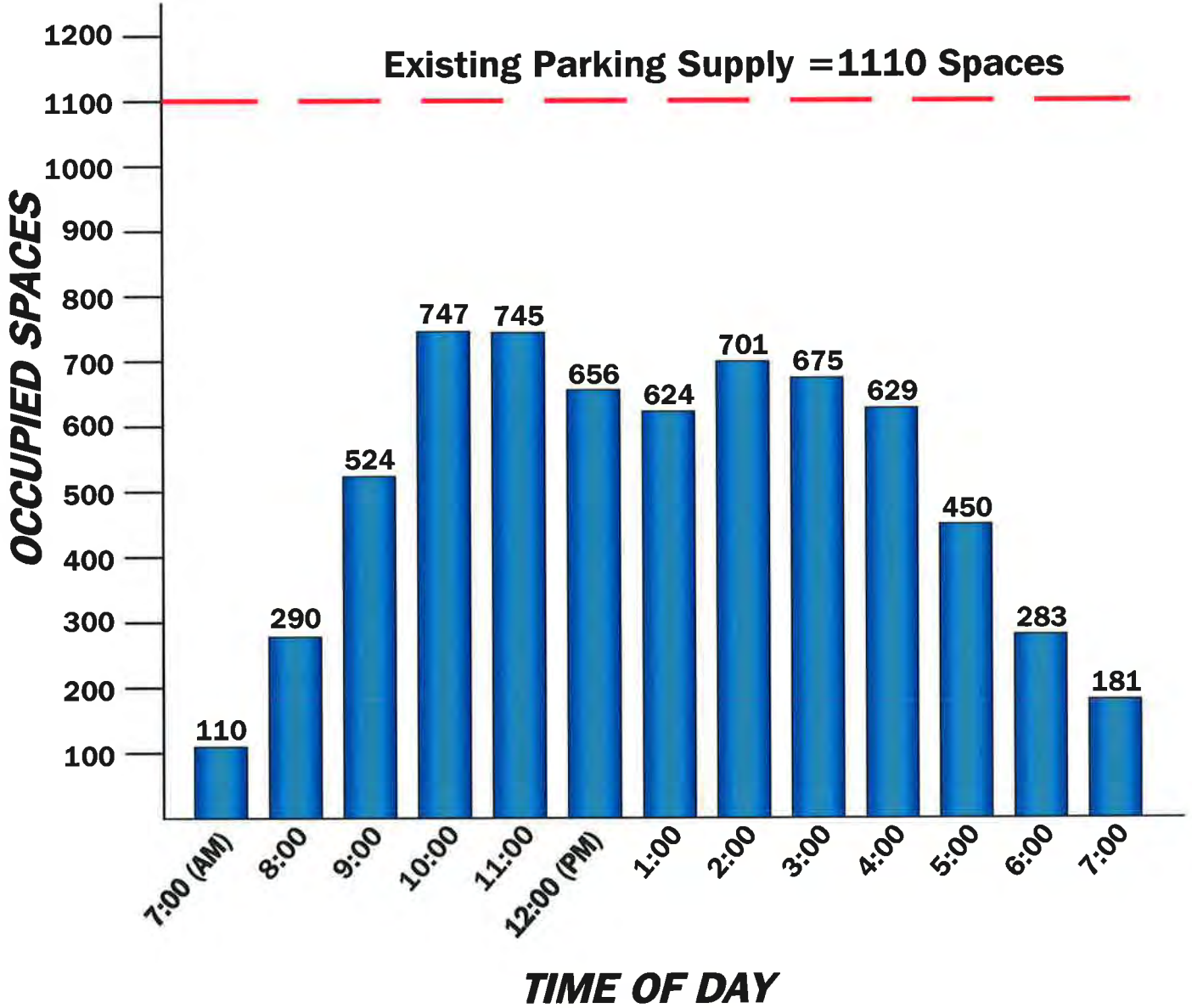
Figure 29 provides a graphical depiction of the regional public transportation services available in the area.

Area Parking Facilities

There are two parking garages, the First Street Garage and the Cambridgeside Galleria Mall Garage, located close to the project site. Utilization of First Street Garage was examined as required by the City scoping letter.

The first street Garage is located off First Street between Spring Street and Thorndike Street and owned by the city of Cambridge. Access to the garage is via spring Street and egress via Thorndike Street. The garage capacity is approximately 1110 parking spaces. A parking accumulation survey was conducted on Wednesday, September 4, 2013 between 7:00 AM and 7:00 PM. As shown in Figure 30, the peak parking accumulation occurred at 10:00 AM when 747 of the 1,100 parking spaces were occupied.





R:\64355\6435chr11.dwg, 9/10/2013 12:06:07 PM

Figure 30



**First Street Garage
Parking Accumulation Survey
Wednesday, September 4, 2013**

LAND USE

Land uses in the vicinity of the site were researched and inventoried in June 2013 and are shown in Figure 31.

MOTOR VEHICLE CRASH DATA

Motor vehicle crash data was obtained from the MassDOT Safety Management/Traffic Operations Unit for the most recent three-year period available (2008 through 2010) in order to examine motor vehicle crash trends occurring within the study area. This data is summarized in Table 11.

Table 11
CRASH DATA SUMMARY^a

	Third St/ O'Brien Hwy	Third St/ Cambridge St	Third St/ Thorndike St	Third St/ Spring St	Third St/ Binney St	Second St/ Cambridge St	Second St/ Thorndike St	Second St/ Spring St	First St/ Cambridge St	First St/ Thorndike St	First St/ Spring St	First St/ Charles St/ Cambridgeside Pl	First St/ Binney St	O'Brien Hwy/ Cambridge St/ East St	Cambridgeside Pl/ Land BI	Binney St/ Land BI	O'Brien Hwy/ Land BI/ Charlestown Ave	Third St/ Charles St	Binney St/ Second St	Third St/ Broadway
<i>Year:</i>																				
2008	4	11	0	5	8	3	3	0	0	0	0	3	1	4	4	2	16	1	1	2
2009	4	9	0	1	3	1	2	0	4	1	3	1	1	1	2	1	8	0	0	2
2010	1	1	0	2	6	0	0	0	1	0	0	1	5	0	4	3	8	0	1	2
Total	9	21	0	8	17	4	5	0	5	1	3	5	7	5	10	6	32	1	2	6
Average	3.00	7.00	0.00	2.67	5.67	1.33	1.67	0.00	1.67	0.33	1.00	1.67	2.33	1.67	3.33	2.00	10.67	0.33	0.67	2.00
Crash Rate	0.22	1.06	0.00	0.69	0.73	0.46	1.65	0.00	0.35	0.10	0.34	0.43	0.46	0.16	0.31	0.20	0.60	0.08	0.14	0.24
<i>Type:</i>																				
Angle	5	7	0	6	3	0	3	0	1	0	2	2	2	0	3	3	10	0	0	1
Rear-End	1	2	0	0	5	1	0	0	1	0	0	0	2	2	4	1	13	0	1	4
Head-On	0	2	0	0	1	2	0	0	0	0	0	0	1	0	0	1	1	0	0	0
Sideswipe	3	3	0	0	3	0	0	0	3	1	0	1	1	2	1	1	3	0	0	0
Hit Fixed Object	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Other	0	7	0	2	5	1	2	0	0	0	0	2	1	1	0	5	1	1	1	6
Total	9	21	0	8	17	4	5	0	5	1	3	5	7	5	10	6	32	1	2	6
<i>Time:</i>																				
Weekday 7 to 9 AM	3	4	0	0	5	0	1	0	1	0	0	1	0	0	2	2	4	1	0	0
Weekday 4 to 6 PM	1	2	0	2	2	1	0	0	3	0	1	0	1	0	1	0	4	0	1	1
Remainder of Day	5	15	0	6	10	3	4	0	1	1	2	4	6	5	7	4	24	0	1	5
Total	9	21	0	8	17	4	5	0	5	1	3	5	7	5	10	6	32	1	2	6
<i>Pavement Conditions:</i>																				
Dry	7	11	0	4	10	3	2	0	5	1	2	3	4	2	7	4	24	1	0	3
Wet	0	3	0	4	4	1	1	0	0	0	0	1	3	2	3	1	7	0	2	0
Snow	2	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2
Icy	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	5	0	0	2	0	1	0	0	0	1	0	0	0	0	0	1	0	0	1
Total	9	21	0	8	17	4	5	0	5	1	3	5	7	5	10	6	32	1	2	6
<i>Day of Week:</i>																				
Monday through Friday	6	18	0	6	13	4	4	0	4	1	2	5	6	4	8	6	27	1	2	6
Saturday and Sunday	3	3	0	2	4	0	1	0	1	0	1	0	1	1	2	0	5	0	0	0
Total	9	21	0	8	17	4	5	0	5	1	3	5	7	5	10	6	32	1	2	6
<i>Severity:</i>																				
Property Damage Only	8	9	0	3	12	2	2	0	2	1	3	2	4	4	6	3	24	0	2	3
Personal Injury	0	4	0	4	2	0	2	0	1	0	0	1	1	1	3	2	7	1	0	3
Fatal Crashes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Hit and Run	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	1	8	0	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9	21	0	8	17	4	5	0	5	1	3	5	7	5	10	6	32	1	2	6

^aSource: MassDOT Crash Data.

^bAverage crashes over three-year period.

^cCrash Rate in crashes per million entering vehicles (mev).

PROJECT – GENERATED TRAFFIC

PROPOSED SITE TRAFFIC

Traffic volumes expected to be generated by the proposed project are based on Institute of Transportation Engineers (ITE) trip generation statistics for apartment, retail, and R&D/office space. The appropriate Land Use Codes (LUC), LUC 220, *Apartment*, LUC 820, *Shopping Center*, and LUC 760, *Research and Development (R&D) Building*, were used to estimate project traffic generation as requested in the City Scoping Letter.

PTDM Data

Trips associated with the proposed uses of the building are based on Institute of Transportation Engineers (ITE) trip generation statistics for the land uses and mode split assumptions outlined in the July 18, 2013 Scoping Letter. These mode splits were based on PTDM data and census data for Tract 3521 for the residential and retail uses, and result in a combined Single-Occupant Vehicle (SOV) and carpool employee percentage of 49 percent for automobile mode share. A summary of the mode split data for the project is shown below in Table 12.

Table 12
MODE SPLIT DATA^a

Survey Characteristic	Response		
	R&D/Office	Retail	Residential
Mode of Travel			
Drive Alone	42	38	34
Rideshare/Carpool	7	7	5
Transit	40	25	24
Bicycle	5	6	4
Walking	6	24	22
<u>Work at Home/Other</u>	<u>0</u>	<u>0</u>	<u>11</u>
Total	100	100	100

^aBased on Binney Street TIS, PTDM data, and US census Tract 3521.

Table 13 summarizes the project trip generation by travel mode, using the mode split data.

**Table 13
PROJECT TRIP GENERATION SUMMARY**

Time Period/ Directional Distribution	ITE Vehicle Trips				Person Trips ^a				Proposed Automobile Trips ^k			
	Retail Trips ^b	Apartment Trips ^c	R&D Trips ^d	Total Trips ^e	Drive Alone Trips ^f	Ridesharing Trips ^g	Transit Trips ^h	Pedestrian Trips ⁱ	Bicycle Trips ^j	Total Trips	Courthouse Trips	Garage Trips
Daily	644	270	3,732	4,646	2,057	345	1,856	474	256	2,226	--	--
<i>Weekday Morning:</i>												
Entering	9	3	407	419	190	32	179	29	23	205	32	173
Exiting	<u>6</u>	<u>12</u>	<u>83</u>	<u>101</u>	<u>45</u>	<u>7</u>	<u>41</u>	<u>10</u>	<u>5</u>	<u>48</u>	<u>8</u>	<u>40</u>
Total	15	15	490	520	235	39	220	39	28	253	40	213
<i>Weekday Evening:</i>												
Entering	27	20	70	117	51	9	43	17	6	56	8	48
Exiting	<u>29</u>	<u>11</u>	<u>398</u>	<u>438</u>	<u>196</u>	<u>33</u>	<u>183</u>	<u>36</u>	<u>24</u>	<u>214</u>	<u>32</u>	<u>182</u>
Total	56	31	468	555	247	42	226	53	30	270	40	230

^aMode splits based on Binney Street TIS using PTDM Journey to Work data and Census data from Tract 3521.

^bBased on ITE LUC 820, Shopping Center rates and 15,000 sf.

^cBased on ITE LUC 220, Apartments and 24 units.

^dBased on ITE LUC 760, Research and Development Center and 460,000 sf.

^eMultiply ITE vehicle trips by Average Vehicle Occupancy of 1.08 persons/vehicle per national census data.

^fAssume 38/34/42 percent of total person trips for retail, apartment, and Office trips, respectively.

^gAssume 7/5/7 percent of total person trips.

^hAssume 25/24/40 percent of total person trips.

ⁱAssume 24/22/6 percent of total person trips.

^jAssume 6/4/5 percent of total person trips.

^kDrive-alone plus rideshare person trips divided by local Average Vehicle Occupancy of 1.08 persons per vehicle per local census data.

On a daily basis, the site is expected to generate 2,226 vehicle trips (1,113 in and 1,113 out) on an average weekday. On an hourly basis, the site is expected to generate 253 vehicle trips (205 in and 48 out) and 270 vehicle trips (56 in and 214 out) during the weekday morning and weekday evening commuter peak hours, respectively.

The site is expected to generate approximately 1,856 transit trips (928 in and 928 out) on a daily basis, with 220 trips (179 in and 41 out) and 226 trips (43 in and 183 out) during the morning and evening peak hours, respectively.

The site is expected to generate approximately 474 pedestrian trips (237 in and 237 out) on a daily basis, with 39 trips (29 in and 10 out) and 53 trips (17 in and 36 out) during the morning and evening peak hours, respectively.

The site is expected to generate approximately 256 bicycle trips (128 in and 128 out) on a daily basis, with 28 trips (23 in and 5 out), and 30 trips (6 in and 24 out) during the morning and evening peak hours, respectively.

TRAFFIC DISTRIBUTION AND ASSIGNMENT

Based on comments from the City of Cambridge, using various travel paths along with a review of existing travel patterns, a trip distribution pattern was developed for the new site traffic for the courthouse and garage.

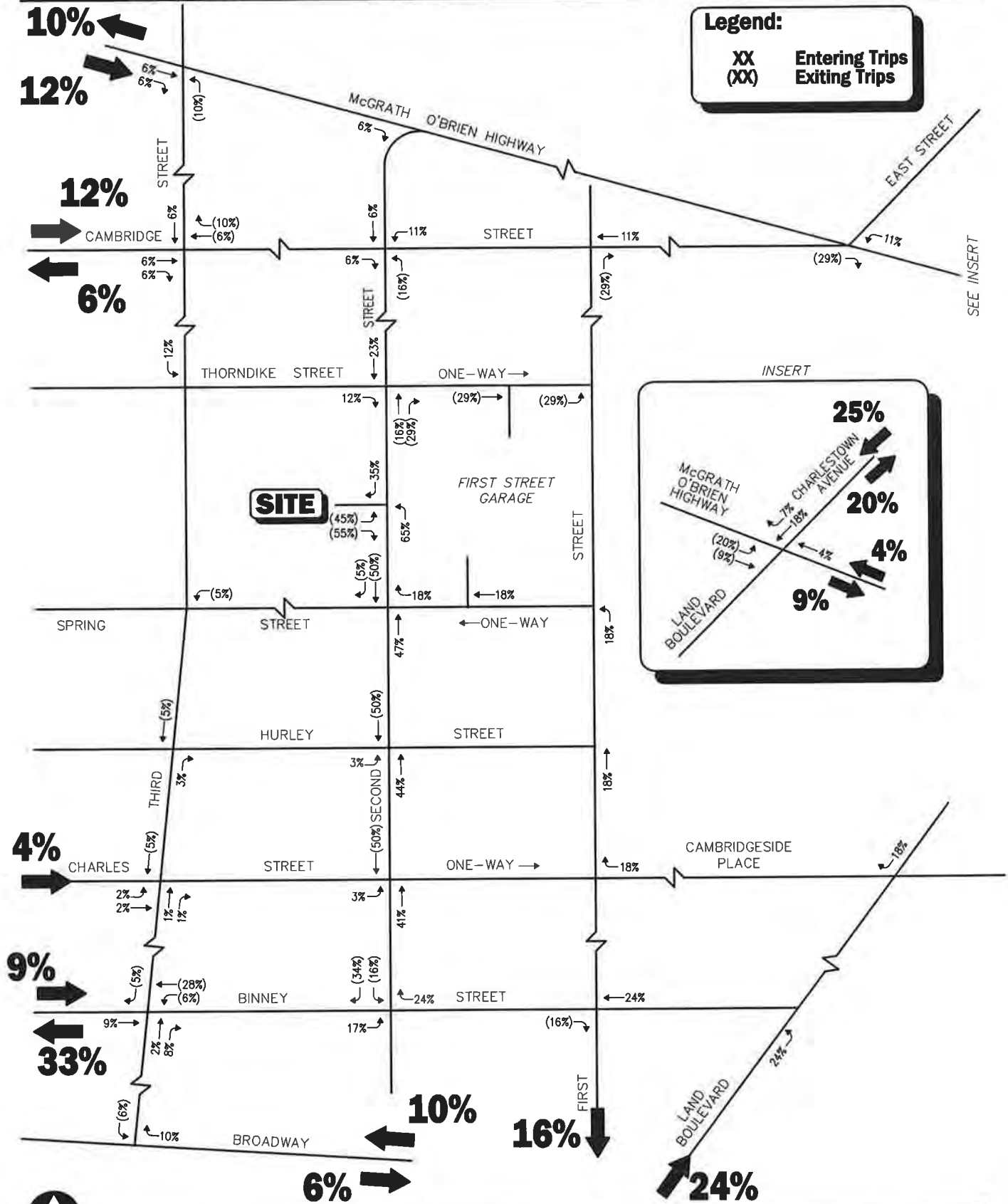
Based upon this data, the trip-distribution pattern for the project is summarized in Tables 14 and 15 for the courthouse and garage, respectively. A graphical depiction appears on Figures 32, 33 and 33A for the courthouse and garage, respectively and regionally.

**Table 14
PROJECT TRIP DISTRIBUTION SUMMARY- COURTHOUSE**

Roadway	Direction (To/From)	Percent (Entering)	Percent (Exiting)
O'Brien Highway	East	4	9
O'Brien Highway	West	12	10
Cambridge Street	West	12	6
Charles Street	West	4	0
Binney Street	West	9	33
Charlestown Avenue	North-East	25	20
Land Boulevard	South-West	24	0
First Street	South	0	16
Broadway	East	10	0
Broadway	West	0	0
TOTAL		100	100

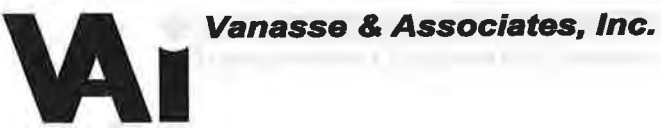
Table 15
PROJECT TRIP DISTRIBUTION SUMMARY- GARAGE

Roadway	Direction (To/From)	Percent (Entering)	Percent (Exiting)
O'Brien Highway	East	4	9
O'Brien Highway	West	12	10
Cambridge Street	West	12	6
Charles Street	West	4	0
Binney Street	West	9	33
Charlestown Avenue	North-East	25	20
Land Boulevard	South-West	24	0
First Street	South	0	16
Broadway	East	10	6
Broadway	West	0	0
TOTAL		100	100

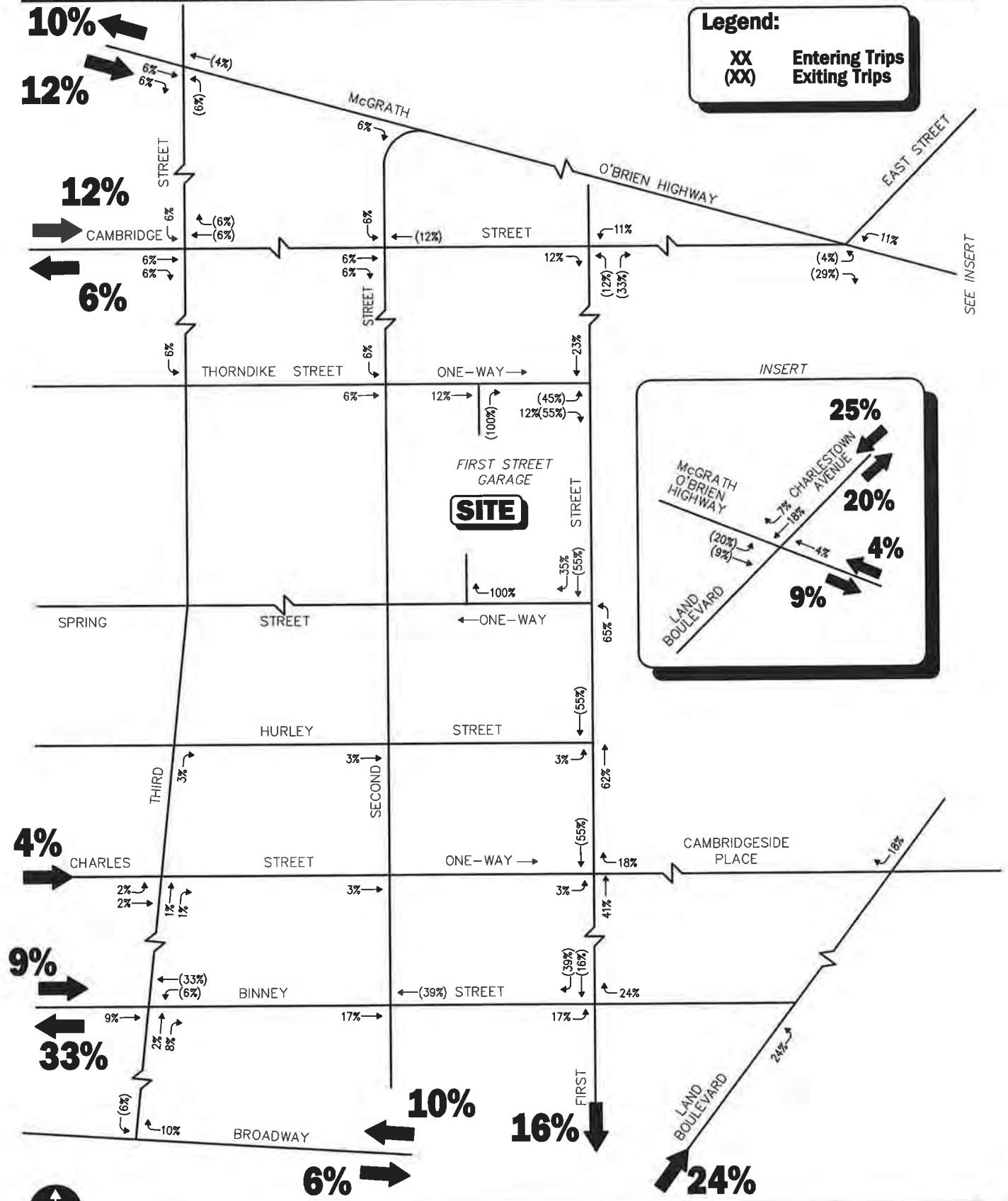


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Figure 32



Trip Distribution Map Courthouse



Not To Scale



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Figure 33

Trip Distribution Map Garage

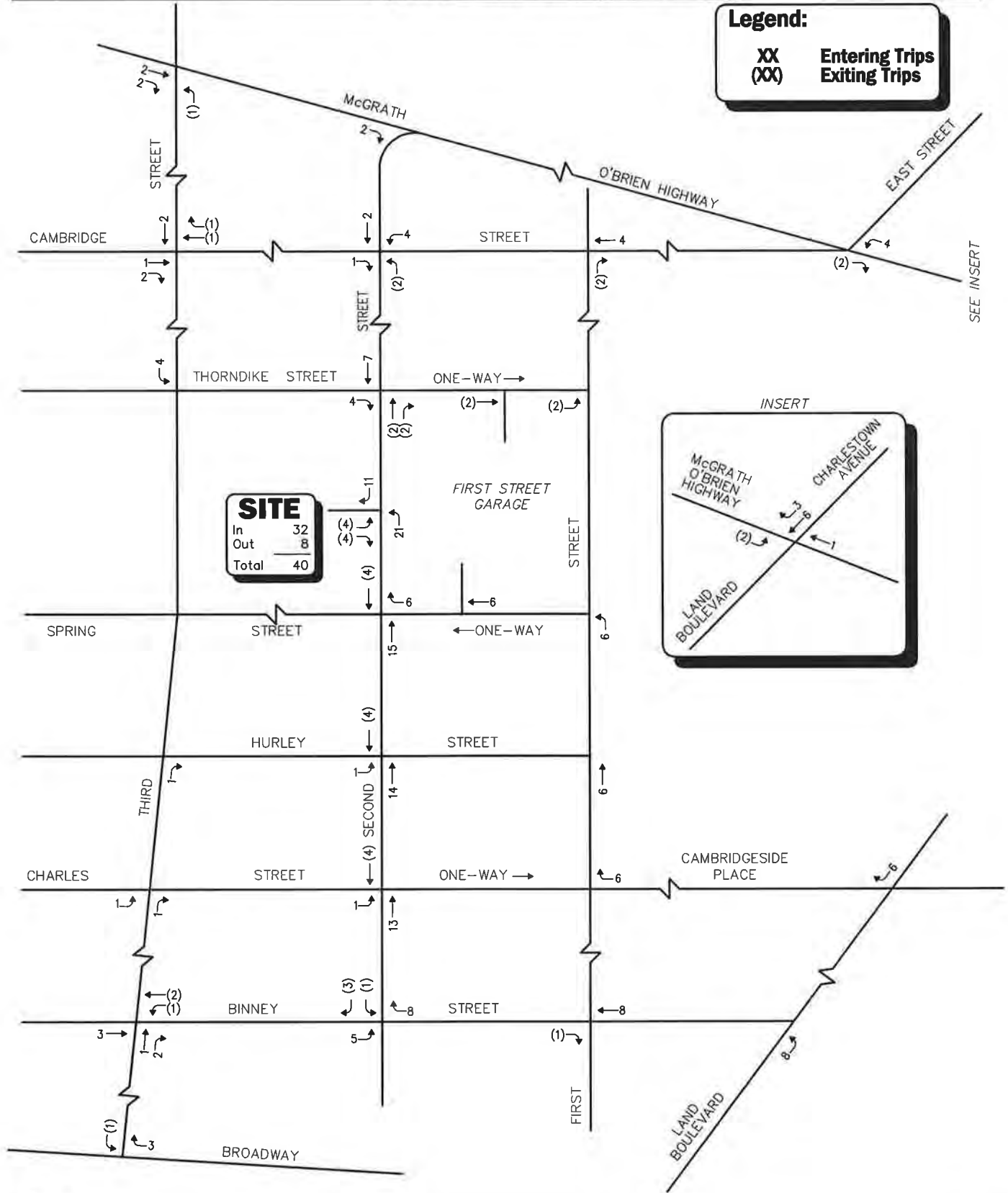


Figure 33A

Trip Distribution Map

The distribution shown in Tables 14 and 15 and in Figures 32 and 33 were used to distribute the project trips onto the area road network. Figures 34 to 37 depict the weekday morning and weekday evening site-generated traffic volume flow networks for the courthouse and garage. These volumes were then added to the 2013 Existing condition traffic flow networks to derive the 2013 Build condition networks, shown on Figure 38 for the weekday morning peak hour and Figure 39 for the weekday evening peak hour. Figures 40 and 41 represent the projected 2013 Build weekday morning and weekday evening peak hour pedestrian volumes, respectively. It should be noted that the existing trips that enter/exit the site (7AM trips/8PM trips) were subtracted out from the new trips.

Legend:
XX Entering Trips
(XX) Exiting Trips



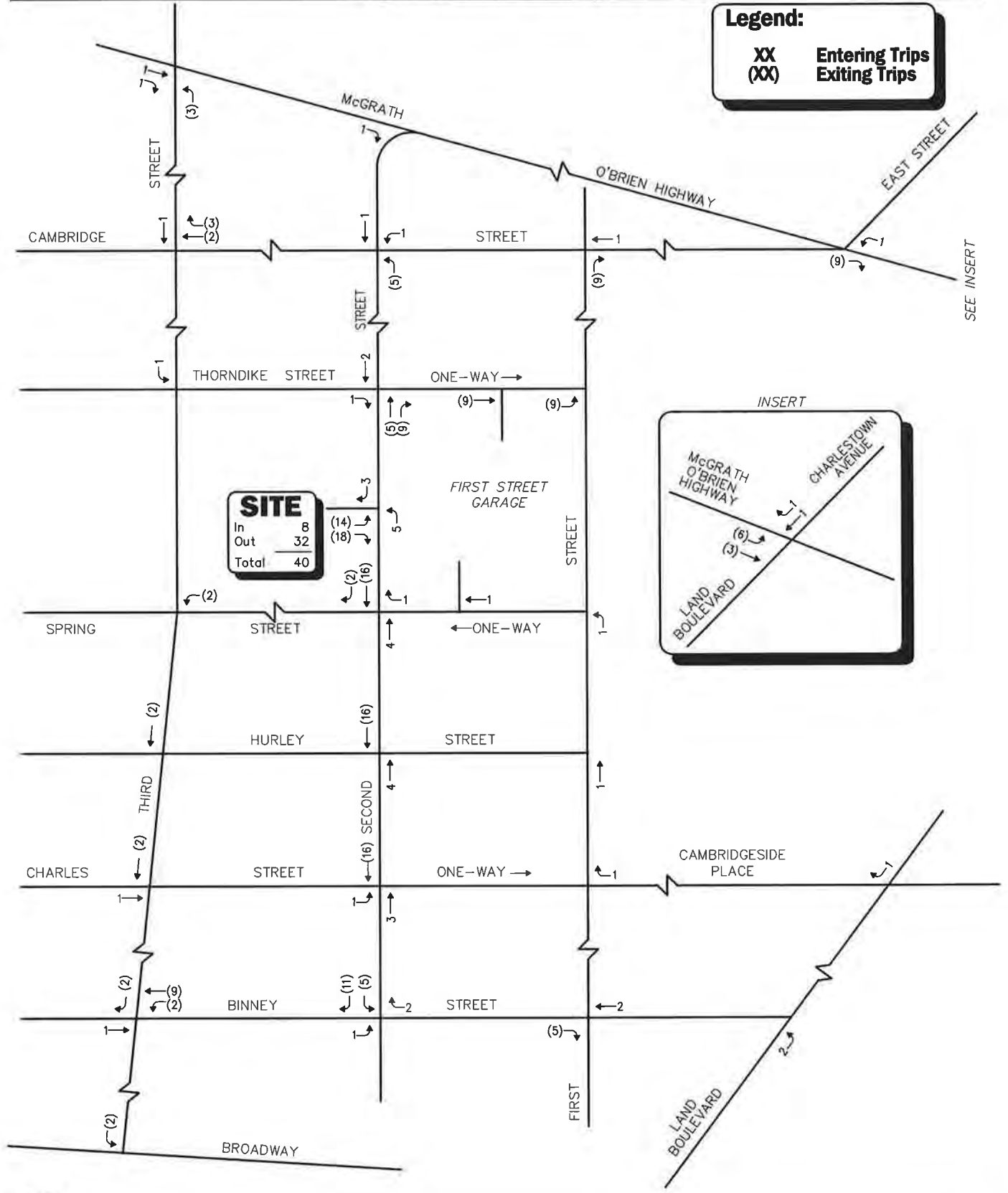
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Figure 34



**Courthouse
 Project-Generated
 Weekday Morning
 Peak Hour Traffic Volumes**

Legend:
XX Entering Trips
(XX) Exiting Trips



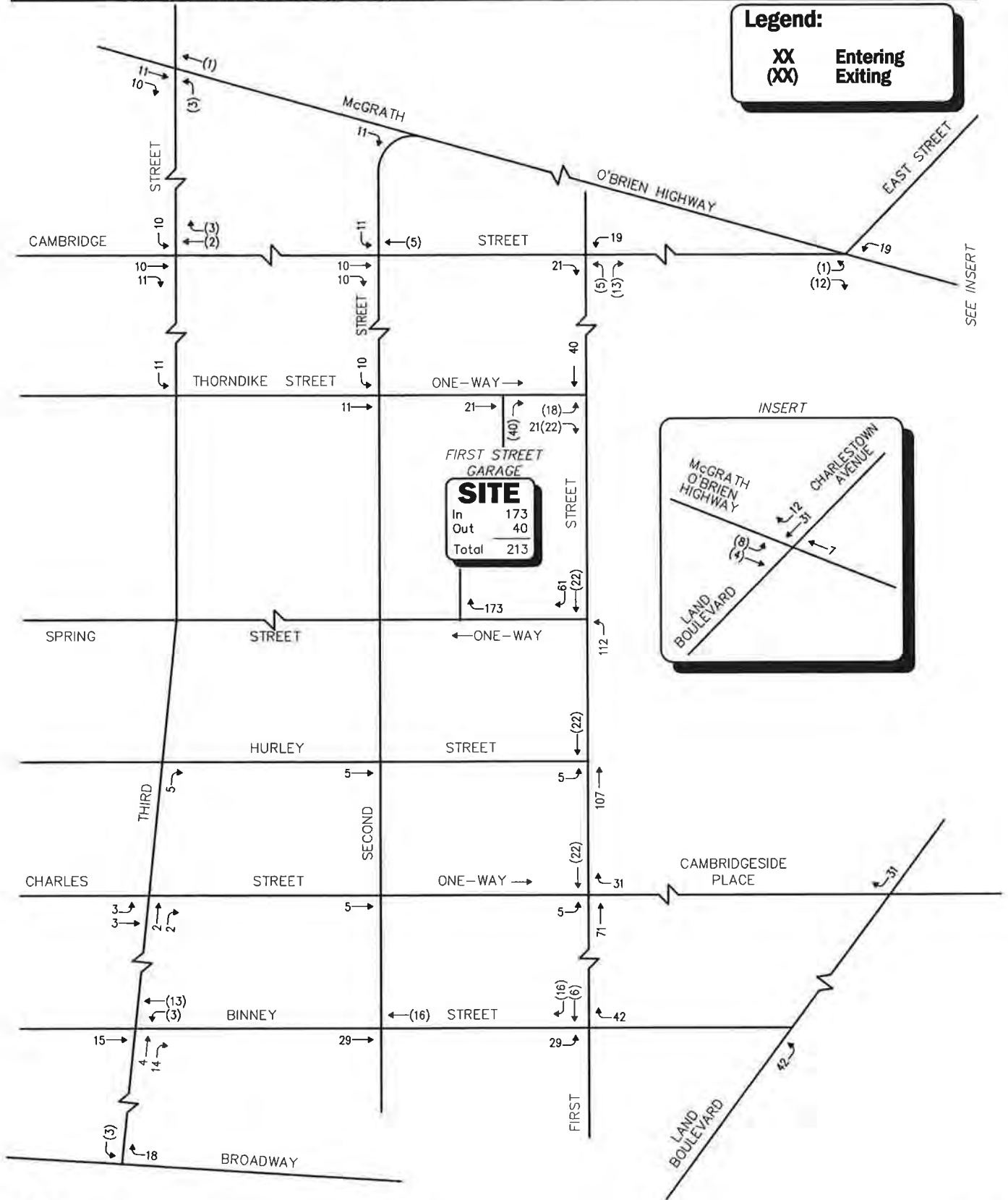
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Figure 35

**Courthouse
 Project-Generated
 Weekday Evening
 Peak Hour Traffic Volumes**

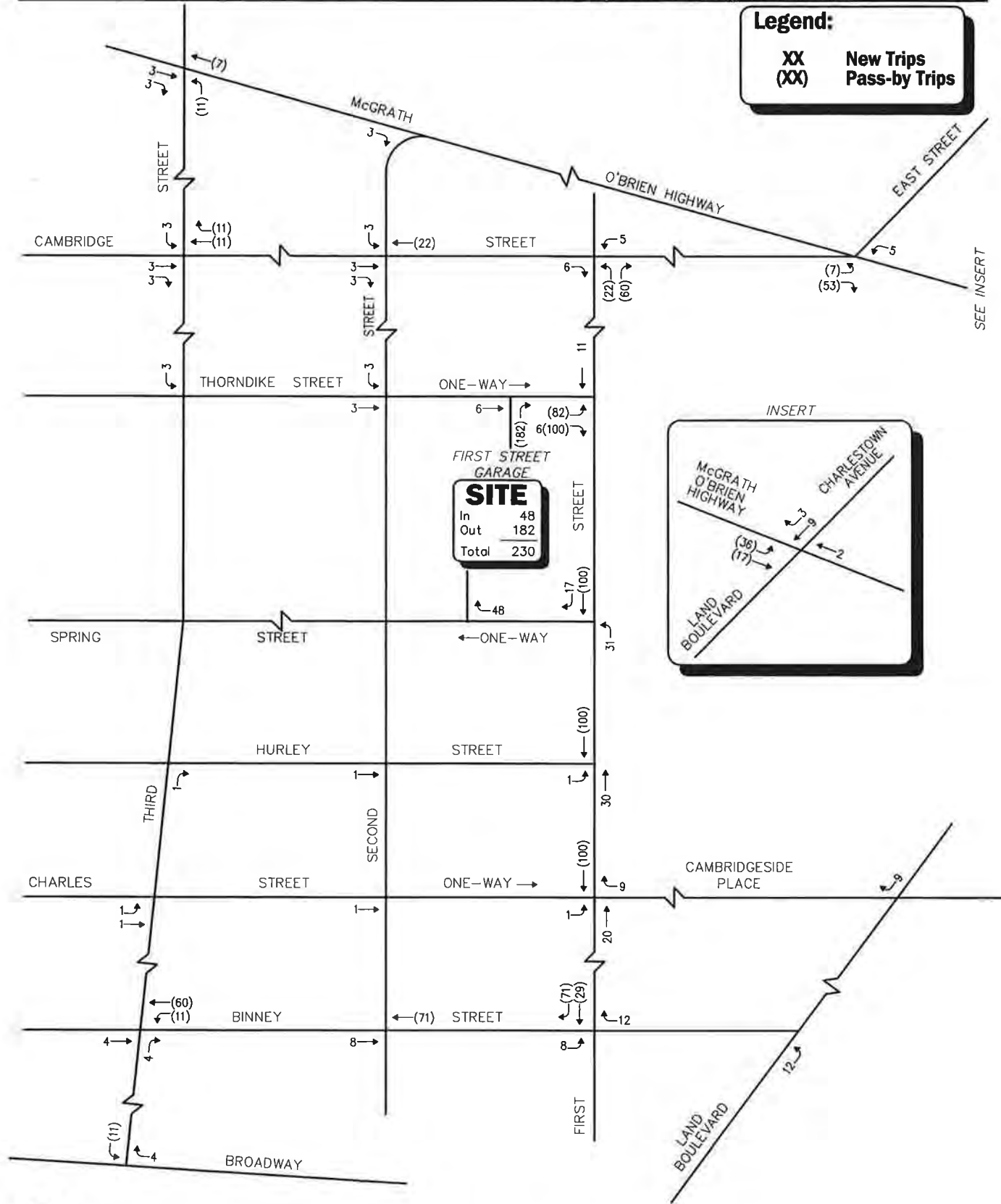


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Figure 36



Garage
 Project-Generated
 Weekday Morning
 Peak Hour Traffic Volumes

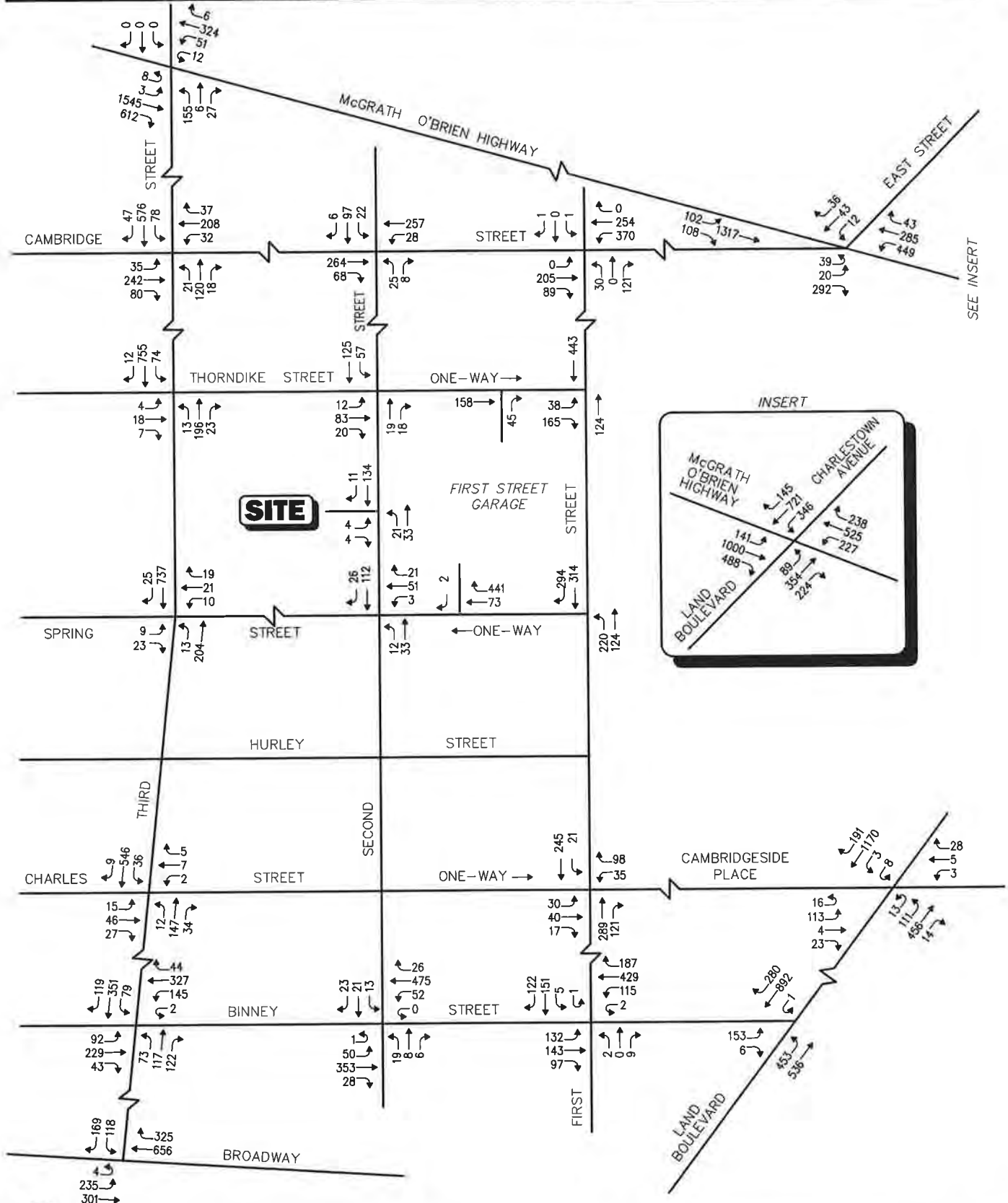


North arrow icon
 Not To Scale

Figure 37



**Garage
 Project-Generated
 Weekday Evening
 Peak Hour Traffic Volumes**



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

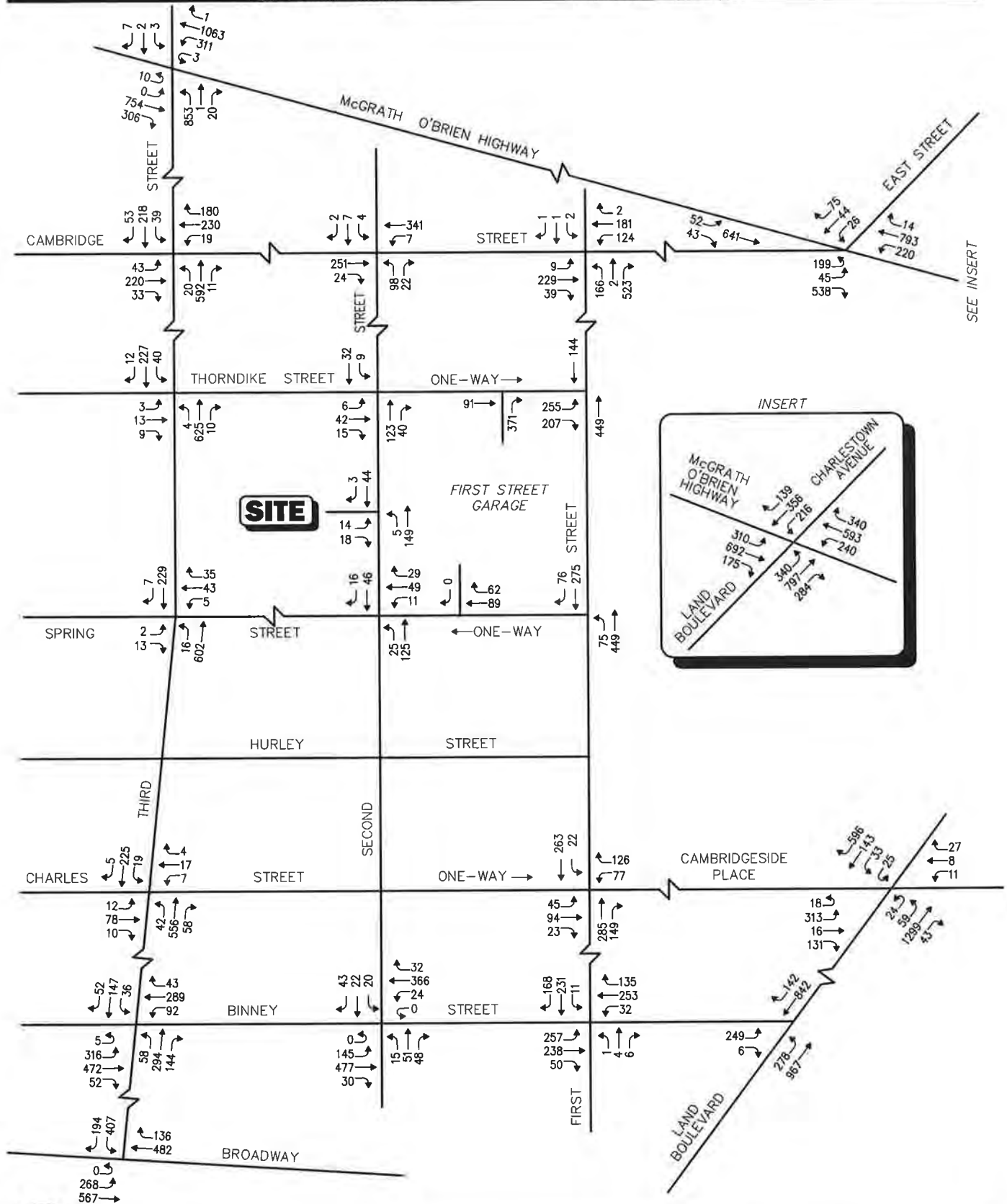
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Figure 38



Vanasse & Associates, Inc.

2013 Build
Weekday Morning
Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

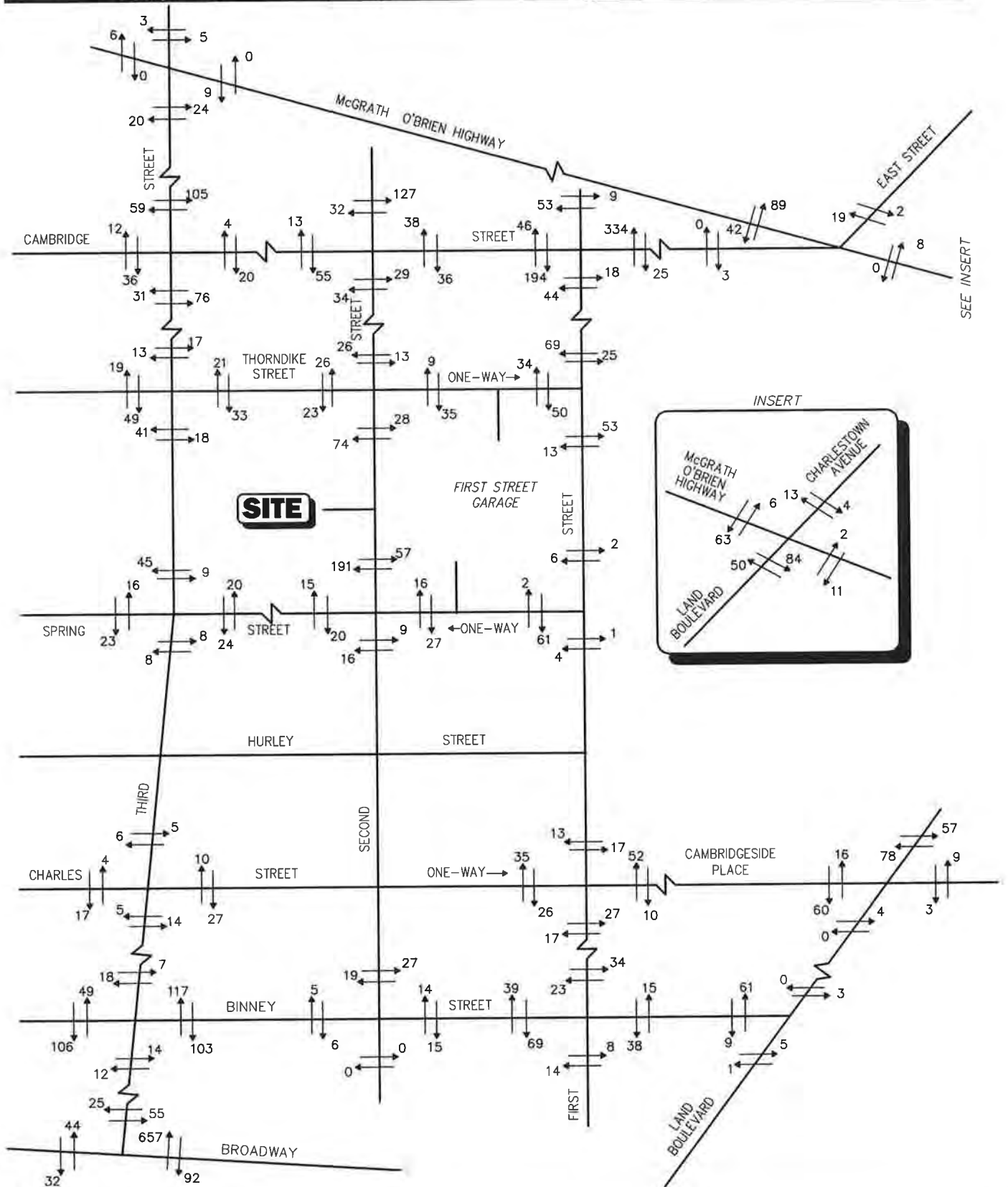
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Figure 39



Vanasse & Associates, Inc.

2013 Build
Weekday Evening
Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

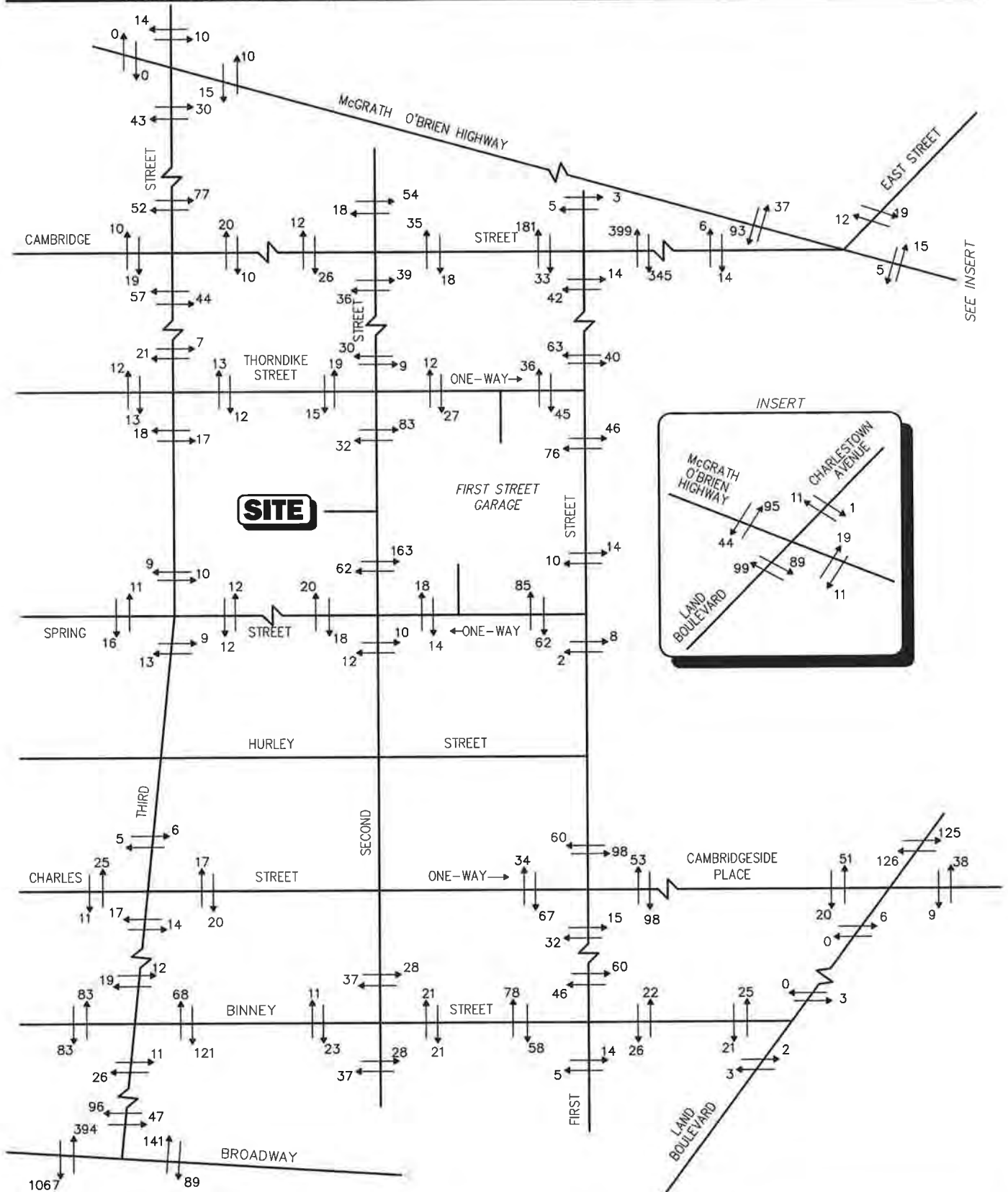
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Figure 40



Vanasse & Associates, Inc.

2013 Build
Weekday Morning
Peak Hour Pedestrian Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 41



Vanasse & Associates, Inc.

2013 Build
Weekday Evening
Peak Hour Pedestrian Volumes

A summary of the peak-hour projected traffic-volume changes in the vicinity of the site is shown in Table 16. These volumes are based on the expected increases from the project traffic volumes.

Table 16
2013 PEAK-HOUR TRAFFIC-VOLUME INCREASES^a

Location	2013 Existing	2013 Build	Volume Difference	Percent Increase
<i>O'Brien Highway, west of Third Street:</i>				
Weekday Morning	2,618	2,648	30	1.1
Weekday Evening	2,964	2,993	29	1.0
<i>Broadway, east of Third Street:</i>				
Weekday Morning	1,375	1,400	25	1.8
Weekday Evening	1,575	1,592	17	1.1
<i>Land Boulevard, south of Binney Street:</i>				
Weekday Morning	1,837	1,887	50	2.7
Weekday Evening	2,079	2,093	14	0.7
<i>O'Brien Highway, east of Charlestown Avenue and Land Boulevard:</i>				
Weekday Morning	2,548	2,560	12	0.5
Weekday Evening	2,344	2,365	21	0.9
<i>Charlestown Avenue, north of O'Brien Highway:</i>				
Weekday Morning	1,883	1,945	62	3.4
Weekday Evening	2,102	2,158	56	2.7

^aTwo-way volume.

As shown in Table 16, project-related traffic-volumes external to the study area relative to 2013 Existing conditions are anticipated to range from 0.5 to 3.4 percent during the weekday morning peak hour and the weekday evening peak hour.

FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2018, which reflects a five-year planning horizon consistent with city traffic study guidelines and the traffic study scope issued by the City TPT Department. Independent of the proposed project, traffic volumes on the roadway network in the year 2018 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated project-generated traffic volumes superimposed upon this 2018 No-Build traffic network reflect the 2018 Build conditions with the project.

FUTURE TRAFFIC GROWTH

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

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

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

Specific Development by Others

The TPT Department of the City of Cambridge was contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on these discussions, the following projects were identified:

- ***Broad Project at 75 Ames.*** This project consists of the development of approximately 246,000 sf of R&D lab space with 4,000 sf of retail space proposed for construction over an existing parking garage located within the Cambridge Center commercial complex located at the intersection of Ames Street and Main Street. Projections of vehicle trips

were obtained from ITE LUC 760, *Research and Development*, applied to the mode splits used for this project, and were developed using the trip distribution from this project.

- **Cambridge Center Residences.** This proposed project consists of the construction of up to 200 residential units at 75 Ames Street with 3,000 sf of retail space. Projections of vehicle trips were obtained from the TIS prepared for the project.
- **Biogen.** This proposed project consists of the construction of 188,000 sf of office and research and development space to be located at 17 Cambridge Center. Projections of vehicle trips were obtained from ITE LUC 760, *Research and Development*, applied to the mode splits used for this project, and were developed using the trip distribution from this project.
- **1-25 East Street Residential Development.** This proposed project consists of the construction of up to 341 residential units along East Street. Projections of vehicle trips were obtained from the TIS prepared for the project.
- **23 East Street Residential Development.** This proposed project consists of the residential conversion of the existing Maple Leaf office building into 104 residential apartment units with an address of 23 East Street in the North Point Section of East Cambridge. Projections of vehicle trips were obtained from the TIS prepared for the project.
- **1 Education St.** This proposed project consists of the construction of a 226,000 sf mixed-use office and education space to be located at 1 Education Street on property owned by the Commonwealth of Massachusetts that is being made available for development. Projections of vehicle trips were obtained from the TIS prepared for the project.
- **159 First Street.** This proposed project consists of the redevelopment of several properties into distinct commercial and residential uses which include: 115 units residential, 10,000 sf of retail, and a 120,000 sf commercial laboratory building to be located at 159 First Street. Projections of vehicle trips were obtained from the TIS prepared for the project.
- **Cambridge Research Park.** This proposed project consists of the construction of 144 residential units at 250 Kendall Street. Projections of vehicle trips were obtained from ITE LUC 220, *Apartment*, applied to the mode splits used for this project, and were developed using the trip distribution from this project.
- **262 O'Brien Highway.** This proposed project is currently under construction and consists of the development of 56 residential units. Due to the small projections of vehicle trips, this project is assumed to be included in the background traffic growth rate.
- **North Point Building "N" Residential Project.** This proposed project consists of the development of over 5 million square feet of office and residential development located west of the Education First Campus site. Two residential condominium buildings have been constructed, with plans to develop Building "N", located along North Point Boulevard adjacent to the Gilmore Bridge. Discussion with the TPT department indicated approximately 270 residential units may be expected. Projections of vehicle trips were developed using a trip distribution from the TIS for the overall

North Point development; expectations of mode split from that TIS; and ITE trip generation statistics for residential apartments.

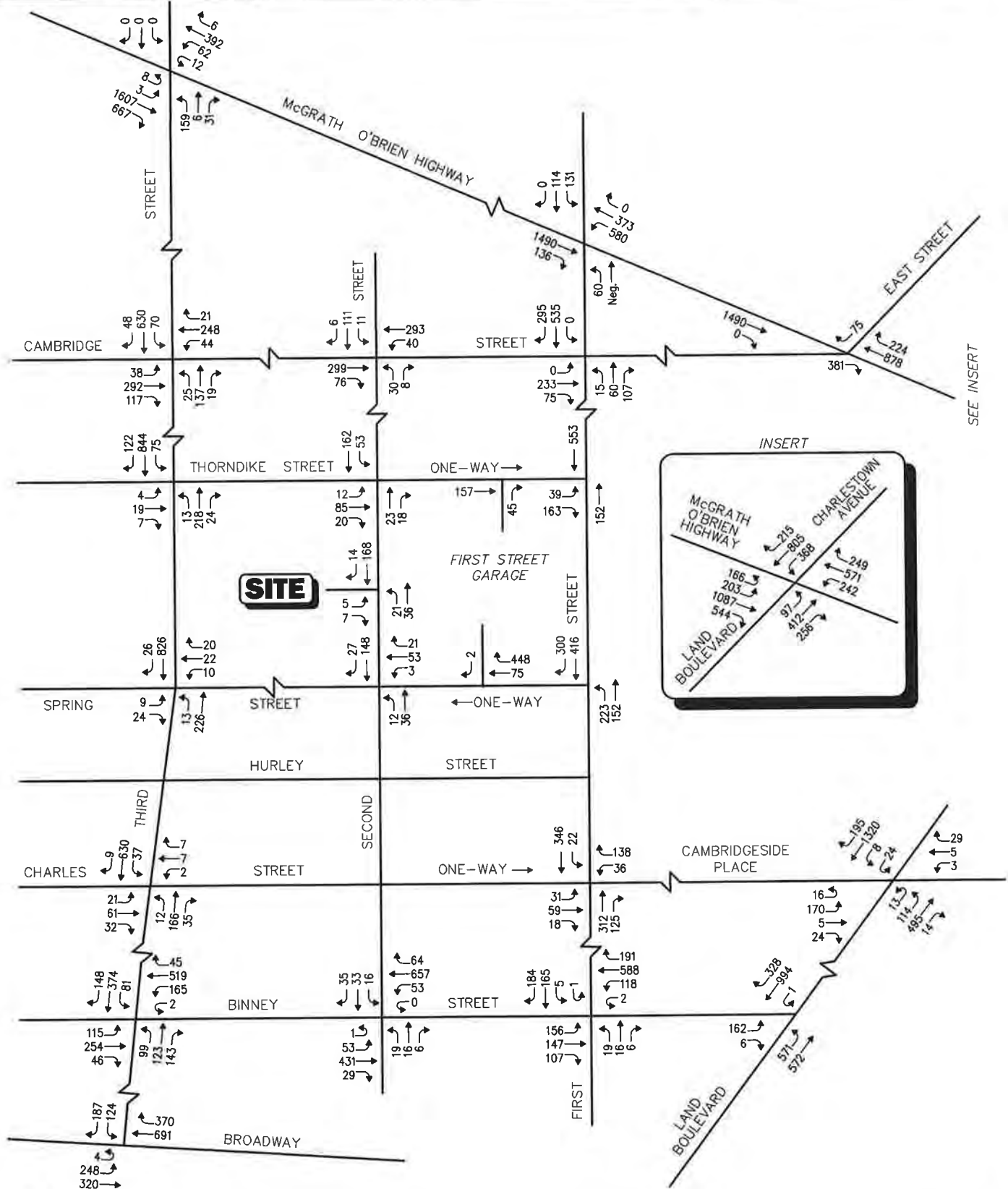
- **22 Water Street Residential Project.** This proposed project consists of the development of 392 residential units at the current end of Water Street, located further west of the Education First site but still within the North Point planning district. Access will be via Water Street and additional roadways within the North Point district that are proposed to be constructed by either the Massachusetts Executive Office of Transportation (EOT) through their relocation of the Lechmere MBTA Green Line station or the North Point development. Projections of vehicle trips were obtained from the TIS prepared for the project.
- **Alexandria Real Estate Phase 1 Redevelopment Project.** This proposed project consists of the construction of 5 new commercial buildings, 2 new residential buildings, and renovation of 4 existing buildings containing a total of 1.7 million square feet of development along Binney Street. The first phase, expected to be constructed and occupied by 2014, includes new construction of 552,800 sf and 814 parking spaces. Projections of vehicle trips were obtained from the TIS and EIR documents prepared for the project.

General Background Traffic Growth

A 0.5 percent compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area. This was applied to the 2013 Existing traffic volume conditions to adjust volumes to 2018 conditions.

2018 FUTURE TRAFFIC VOLUMES

The 2018 Build condition networks consist of the 2013 Existing condition volumes plus the 0.5 percent compounded annual growth rate and the peak hour traffic volumes associated with the identified background projects. In order to account for the First Street punch-through connection to O'Brien Highway in the 2018 Build year, 2013 Existing and project-generated traffic volumes were re-routed accordingly. Figures 42 and 43 depict the 2018 Build weekday morning and evening peak-hour traffic-volume networks.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.
Neg. = Negligible

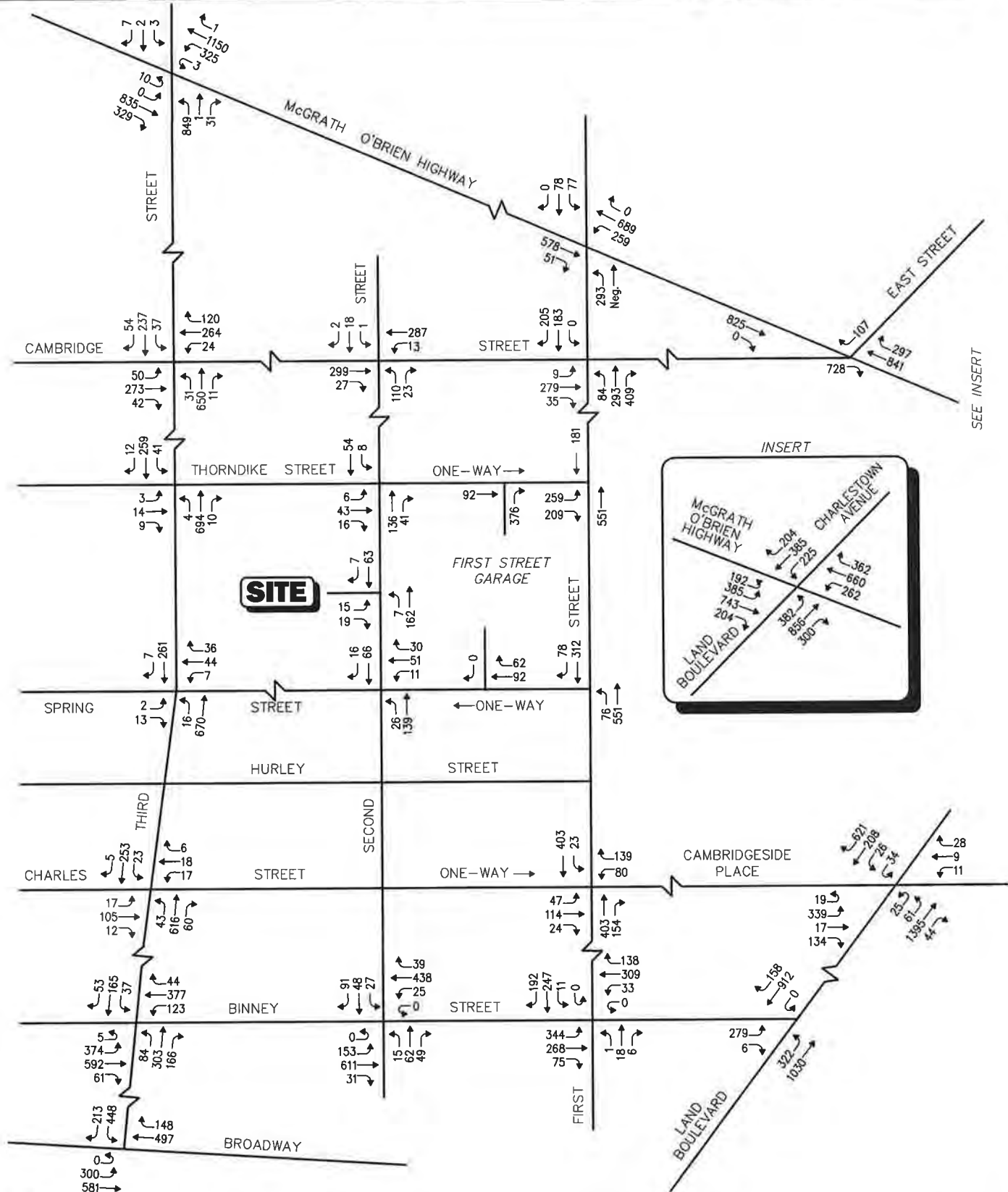
Not To Scale

Figure 42



Vanasse & Associates, Inc.

2018 Build
Weekday Morning
Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.
 Neg. = Negligible

Not To Scale

Figure 43



Vanasse & Associates, Inc.

2018 Build
 Weekday Evening
 Peak Hour Traffic Volumes

A summary of the peak-hour future year 2018 traffic-volume changes in the vicinity of the site is shown in Table 17. These volumes are based on the expected increases from the project traffic volumes.

Table 17
2018 PEAK-HOUR TRAFFIC-VOLUME INCREASES^a

Location	2018 No Build	2018 Build	Volume Difference	Percent Increase
<i>O'Brien Highway, west of Third Street:</i>				
Weekday Morning	2,821	2,836	30	1.1
Weekday Evening	3,229	3,180	29	0.9
<i>Broadway, east of Third Street:</i>				
Weekday Morning	1,480	1,505	25	1.7
Weekday Evening	1,657	1,674	17	1.0
<i>Land Boulevard, south of Binney Street:</i>				
Weekday Morning	2,093	2,143	50	2.4
Weekday Evening	2,256	2,270	14	0.6
<i>O'Brien Highway, east of Charlestown Avenue and Land Boulevard:</i>				
Weekday Morning	2,761	2,773	12	0.4
Weekday Evening	2,530	2,552	22	0.9
<i>Charlestown Avenue, north of O'Brien Highway:</i>				
Weekday Morning	2,190	2,252	62	2.8
Weekday Evening	2,361	2,417	56	2.4

^aTwo-way volume.

As shown in Table 17, project-related traffic-volume increases external to the study area relative to 2018 No-Build conditions are anticipated to range between approximately 0.6 percent and 2.8 percent during the weekday morning and weekday evening peak hours.

ROADWAY IMPROVEMENT PROJECTS

There are a number of roadway improvement projects planned for the area. As part of the Accelerated Bridge Program, MassDOT and DCR are collaborating in the rehabilitation of the Longfellow Bridge, which includes repairing the deteriorated parts of the bridge as well as improve the ramped approaches to keep the bridge consistent with its historical character. Construction is scheduled to be completed by 2014.

The Broadway Intersection and Signal Improvement project consists of the reconstruction of Broadway from Ames Street to Third Street. Improvements will include cold planning and hot mix asphalt overlay of Broadway, reconstruction of sidewalks on both sides of the street, geometric improvements to modify lane configurations, increased green space, minor drainage improvements, new pavement markings and traffic signs, installation of new pedestrian signals, planting areas, bicycle parking areas, pedestrian amenities and other major improvements. The improvements are under design and have not been put out to bid.

The Galileo Galilei Way Streetscape project consists of streetscape and pedestrian improvements between Main Street and Binney Street on Galileo Galilei Way. The construction of the project is to begin in Winter 2013/2014.

Several geometric changes are assumed to take place during the 2018 Build Condition. The City of Cambridge plans to reconfigure First Street between Binney Street and Cambridge Street to include on-street parking and a bicycle lane in either direction. Currently there are two general purpose travel lanes and in the future, there will be a general purpose travel lane and one exclusive right-turn only lane with a bicycle lane approaching Binney Street. Due to the Green Line Extension project, the O'Brien Highway/Cambridge Street/East Street intersection will be reconfigured. In the future, East Street and Cambridge Street will be separated into two unsignalized intersections, and First Street will be extended to O'Brien Highway to form a four-legged signalized intersection. In addition, Binney Street at the Land Boulevard/Binney Street intersection will be reconfigured from one northbound left-turn lane to two northbound left-turn lanes. Finally, O'Brien Highway at the Land Boulevard intersection was reconstructed to add a second westbound left-turn lane and to permit eastbound left-turns to be made from the inside through lane on O'Brien highway. These changes were implemented for the 2018 future conditions analysis.

TRAFFIC OPERATIONS AND ARTICLE 19 SPECIAL PERMIT CRITERIA ANALYSIS

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity analyses were conducted for 2013 Existing, 2013 Build, and 2018 Future Build conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them.

The Article 19 Project Review Special Permit Criteria (SPC) consists of five measures as indicators to evaluate project impacts. The methodology for the analysis is from the Cambridge “Guidelines for Presenting Information to the Planning Board”, approved November 27, 2001, and revised in 2004. Referenced in the guidelines are capacity analysis procedures presented in the *Highway Capacity Manual* (HCM) and summarized in the Appendix. Based upon the SPC and study area intersections, there are a total of 431 indicators reviewed. A total of 19 indicators were exceeded; three under trip generation, and the rest due to pedestrian crossing delay at unsignalized intersections. A summary is provided below.

PROJECT VEHICLE – TRIP GENERATION-SPECIAL PERMIT CRITERIA 1

The SPC indicators for vehicle trip-generation are summarized in Table 18. As shown, none of the three indicators is satisfied for the project.

Table 18
SPECIAL PERMIT CRITERIA 1
PROJECT VEHICLE-TRIP GENERATION

<u>Time Period</u>	<u>Threshold</u>	<u>Project</u>	<u>Exceeds Indicator?</u>
Weekday Daily	2,000	2,226	Yes
Weekday Morning Peak Hour	240	253	Yes
Weekday Evening Peak Hour	240	270	Yes

Table 19
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
Third Street at O'Brien Highway										
<i>Weekday Morning Peak Hour:</i>										
O'Brien Highway EB	1.38	206.5	F	1.40	213.7	F	--	1.48	248.7	F
O'Brien Highway WB	0.27	17.7	B	0.27	17.7	B	--	0.33	18.3	B
Third Street NB	0.19	11.9	B	0.20	11.9	B	--	0.21	11.5	B
Overall	0.67	166.5	F	0.67	172.3	F	No	0.70	196.7	F
<i>Weekday Evening Peak Hour:</i>										
O'Brien Highway EB	0.76	30.3	C	0.76	30.5	C	--	0.84	33.3	C
O'Brien Highway WB	1.86	48.9	D	1.86	50.2	D	--	1.95	70.9	E
Third Street NB	0.91	30.2	C	0.93	31.7	C	--	0.94	32.5	C
Overall	0.95	38.1	D	0.96	39.1	D	No	1.00	49.0	D
Third Street at Cambridge Street										
<i>Weekday Morning Peak Hour:</i>										
Cambridge Street EB	0.56	24.8	C	0.59	25.8	C	--	0.74	31.0	C
Cambridge Street WB	0.46	5.6	A	0.47	5.7	A	--	0.56	15.2	B
Third Street NB	0.24	12.5	B	0.24	12.5	B	--	0.30	13.3	B
Third Street SB	0.78	25.2	C	0.79	25.0	C	--	0.85	27.3	C
Overall	0.69	19.8	B	0.70	20.0	C	No	0.81	24.3	C
<i>Weekday Evening Peak Hour:</i>										
Cambridge Street EB	0.78	38.8	D	0.79	39.6	D	--	0.98	68.0	E
Cambridge Street WB	0.64	12.5	B	0.68	13.4	B	--	0.65	22.4	C
Third Street NB	1.04	69.8	E	1.06	74.8	E	--	1.16	110.4	F
Third Street SB	0.37	23.1	C	0.38	23.1	C	--	0.41	23.0	C
Overall	0.93	40.2	D	0.94	41.9	D	No	1.08	64.0	E

See notes at end of table.

Table 19 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
Third Street at Binney Street										
<i>Weekday Morning Peak Hour:</i>										
Binney Street EB	0.27	19.4	B	0.27	19.4	B	--	0.34	20.2	C
Binney Street WB	1.32	87.2	F	1.35	91.3	F	--	1.54	109.9	F
Third Street NB	0.81	31.4	C	0.82	32.9	C	--	1.21	96.8	F
Third Street SB	1.14	115.0	F	1.15	118.5	F	--	1.35	200.2	F
Overall	0.79	71.6	E	0.80	73.3	E	No	1.00	114.5	F
<i>Weekday Evening Peak Hour:</i>										
Binney Street EB	0.89	33.1	C	0.89	33.0	C	--	1.05	46.5	D
Binney Street WB	0.72	47.6	D	0.84	50.7	D	--	1.12	69.3	E
Third Street NB	0.86	44.8	D	0.86	45.5	D	--	1.03	68.9	E
Third Street SB	0.56	28.8	C	0.56	28.9	C	--	0.66	33.0	C
Overall	0.76	38.2	D	0.76	39.4	D	No	0.91	55.5	E
Second Street at Cambridge Street										
<i>Weekday Morning Peak Hour:</i>										
Cambridge Street EB	0.37	10.0	B	0.39	10.7	B	--	0.44	9.8	A
Cambridge Street WB	0.34	3.0	A	0.36	3.4	A	--	0.43	14.3	B
Second Street NB	0.06	18.1	B	0.07	18.1	B	--	0.08	18.3	B
Second Street SB	0.21	19.7	B	0.24	20.1	C	--	0.24	20.0	C
Overall	0.30	9.2	A	0.33	9.9	A	No	0.36	13.4	B
<i>Weekday Evening Peak Hour:</i>										
Cambridge Street EB	0.30	7.1	A	0.31	7.3	A	--	0.36	6.6	A
Cambridge Street WB	0.35	8.1	A	0.37	8.9	A	--	0.32	12.7	B
Second Street NB	0.22	19.9	B	0.23	20.1	C	--	0.26	20.5	C
Second Street SB	0.03	17.7	B	0.04	17.8	B	--	0.06	18.0	B
Overall	0.30	9.7	A	0.31	10.3	B	No	0.32	11.6	B

See notes at end of table.

**Table 19 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS**

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
First Street at Cambridge Street										
<i>Weekday Morning Peak Hour:</i>										
Cambridge Street EB	0.75	31.4	C	0.82	38.1	D	--	0.74	47.8	D
Cambridge Street WB	1.00	45.8	D	1.05	55.4	E	--	--	--	--
First Street NB	0.24	20.6	C	0.23	21.3	C	--	0.16	7.0	A
First Street SB	0.03	34.2	C	0.27	34.2	C	--	2.62	757.9	F
Overall	0.75	38.4	D	0.81	45.5	D	No	2.17	656.5	F
<i>Weekday Evening Peak Hour:</i>										
Cambridge Street EB	0.84	40.3	D	0.87	43.6	D	--	0.81	50.3	D
Cambridge Street WB	0.42	16.0	B	0.42	15.8	B	--	--	--	--
First Street NB	0.90	44.4	D	1.04	61.0	E	--	1.89	215.1	F
First Street SB	0.05	34.4	C	0.05	34.4	C	--	0.97	45.8	D
Overall	0.81	36.1	D	0.89	45.9	D	No	1.52	88.8	F
First Street at Thorndike Street										
<i>Weekday Morning Peak Hour:</i>										
Thorndike Street EB	0.57	20.3	C	0.60	18.1	B	--	0.60	18.1	B
First Street NB	0.19	7.2	A	0.23	9.7	A	--	0.28	10.1	B
First Street SB	0.53	10.6	B	0.68	16.5	B	--	0.84	24.4	C
Overall	0.54	12.2	B	0.65	15.8	B	No	0.72	20.5	C
<i>Weekday Evening Peak Hour:</i>										
Thorndike Street EB	0.64	18.9	B	0.84	26.0	C	--	0.84	25.7	C
First Street NB	0.70	17.7	B	0.44	30.0	C	--	1.03	63.5	E
First Street SB	0.25	10.3	B	0.17	15.3	B	--	0.41	16.7	B
Overall	0.67	13.0	B	0.65	26.0	C	No	0.90	40.9	D

See notes at end of table.

Table 19 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
First Street at Charles Street and Cambridgeside Place										
<i>Weekday Morning Peak Hour:</i>										
Charles Street EB	0.38	22.4	C	0.29	19.3	B	--	0.32	18.7	B
Cambridgeside Place WB	0.55	23.4	C	0.56	20.9	C	--	0.65	22.7	C
First Street NB	0.44	8.5	A	0.59	13.3	B	--	0.65	16.4	B
First Street SB	0.31	7.3	A	0.38	10.4	B	--	0.55	14.4	B
Overall	0.47	12.1	B	0.58	14.6	B	No	0.65	17.4	B
<i>Weekday Evening Peak Hour:</i>										
Charles Street EB	0.54	21.4	C	0.53	21.2	C	--	0.58	22.2	C
Cambridgeside Place WB	0.62	22.2	C	0.63	22.5	C	--	0.67	23.9	C
First Street NB	0.57	14.1	B	0.60	14.9	B	--	0.78	21.4	C
First Street SB	0.26	10.0	B	0.40	11.7	B	--	0.61	15.8	B
Overall	0.59	16.5	B	0.61	16.7	B	No	0.73	20.3	C
First Street at Binney Street										
<i>Weekday Morning Peak Hour:</i>										
Binney Street EB	0.44	18.7	B	0.59	21.6	C	--	0.84	31.7	C
Binney Street WB	0.43	9.7	A	0.46	10.1	B	--	0.56	11.5	B
First Street NB	0.07	40.1	D	0.07	40.1	D	--	0.29	44.4	D
First Street SB	0.59	49.6	D	0.65	51.5	D	--	1.00	83.7	F
Overall	0.50	20.4	C	0.59	21.8	C	No	0.83	32.4	C
<i>Weekday Evening Peak Hour:</i>										
Binney Street EB	0.67	23.1	C	0.70	24.1	C	--	1.00	46.5	D
Binney Street WB	0.24	7.9	A	0.25	7.9	A	--	0.28	8.2	A
First Street NB	0.06	40.0	D	0.06	40.0	D	--	0.13	41.0	D
First Street SB	0.66	51.4	D	0.90	68.6	E	--	0.94	84.0	F
Overall	0.63	25.6	C	0.71	33.0	C	No	0.87	45.8	D

See notes at end of table.

Table 19 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
O'Brien Highway at Cambridge Street and East Street										
<i>Weekday Morning Peak Hour:</i>										
O'Brien Highway EB	0.80	34.0	C	0.80	34.0	C	--			
O'Brien Highway WB	0.54	30.4	C	0.56	31.3	C	--			
Cambridge Street NB	0.54	21.5	C	0.56	23.5	C	--			
East Street SB	0.29	28.2	C	0.29	28.2	C	--			
Overall	0.75	31.0	C	0.77	31.5	C	No			Unsignalized Under 2018 Build Conditions
<i>Weekday Evening Peak Hour:</i>										
O'Brien Highway EB	0.68	26.6	C	0.67	26.5	C	--			
O'Brien Highway WB	0.77	30.6	C	0.77	30.6	C	--			
Cambridge Street NB	1.05	32.9	C	1.08	33.9	C	--			
East Street SB	0.43	30.9	C	0.43	31.1	C	--			
Overall	0.74	30.0	C	0.77	30.4	C	No			
Cambridgeside Place at Land Boulevard										
<i>Weekday Morning Peak Hour:</i>										
Cambridgeside Place EB	0.29	27.6	C	0.29	28.6	C	--	0.41	29.3	C
Cambridgeside Place WB	0.05	25.2	C	0.05	26.1	C	--	0.05	25.2	C
Land Boulevard NB	0.78	21.5	C	0.80	20.6	C	--	0.80	21.6	C
Land Boulevard SB	0.64	20.7	C	0.64	20.3	C	--	0.73	22.6	C
Overall	0.55	21.6	C	0.55	21.2	C	No	0.64	23.1	C
<i>Weekday Evening Peak Hour:</i>										
Cambridgeside Place EB	0.52	27.7	C	0.52	27.7	C	--	0.57	28.6	C
Cambridgeside Place WB	0.10	23.3	C	0.10	23.3	C	--	0.10	23.4	C
Land Boulevard NB	0.61	19.4	B	0.61	19.4	B	--	0.63	20.0	C
Land Boulevard SB	0.47	15.9	B	0.47	15.9	B	--	0.50	16.2	B
Overall	0.53	20.0	B	0.53	20.0	B	No	0.61	20.4	C

See notes at end of table.

Table 19 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
Binney Street at Land Boulevard										
<i>Weekday Morning Peak Hour:</i>										
Binney Street EB	0.41	29.6	C	0.41	29.6	C	--	0.43	29.6	C
Land Boulevard NB	0.78	16.1	B	0.88	20.8	C	--	0.57	13.1	B
Land Boulevard SB	0.78	25.4	C	0.78	25.4	C	--	0.87	29.2	C
Overall	0.71	21.9	C	0.75	23.8	C	No	0.66	22.3	C
<i>Weekday Evening Peak Hour:</i>										
Binney Street EB	0.49	29.7	C	0.49	29.7	C	--	0.53	29.9	C
Land Boulevard NB	0.54	8.7	A	0.51	8.4	A	--	0.33	8.3	A
Land Boulevard SB	0.75	26.1	C	0.75	26.1	C	--	0.82	28.9	C
Overall	0.61	18.0	B	0.60	17.8	B	No	0.56	18.9	B
O'Brien Highway at Land Boulevard and Charlestown Avenue										
<i>Weekday Morning Peak Hour:</i>										
O'Brien Highway EB	0.68	38.1	D	0.69	39.0	D	--	0.89	60.2	E
O'Brien Highway WB	0.54	42.3	D	0.54	42.4	D	--	0.80	87.1	F
Land Boulevard NB	0.50	36.3	D	0.50	36.4	D	--	0.86	72.9	E
Charlestown Avenue SB	1.46	258.9	F	1.61	324.5	F	--	1.37	211.4	F
Overall	0.95	97.9	F	0.99	117.9	F	No	1.16	109.0	F
<i>Weekday Evening Peak Hour:</i>										
O'Brien Highway EB	0.73	104.0	F	0.83	138.0	F	--	0.80	59.9	E
O'Brien Highway WB	0.59	42.9	D	0.59	42.9	D	--	1.03	145.9	F
Land Boulevard NB	0.92	63.0	E	0.92	63.0	E	--	0.84	49.5	D
Charlestown Avenue SB	2.36	670.1	F	2.40	691.2	F	--	1.60	328.8	F
Overall	1.20	162.5	F	1.24	175.2	F	No	1.14	118.6	F

See notes at end of table.

Table 19 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
Third Street at Charles Street										
<i>Weekday Morning Peak Hour:</i>										
Charles Street EB	0.18	20.4	C	0.21	20.7	C	--	0.30	21.9	C
Charles Street WB	0.03	18.8	B	0.03	18.8	B	--	0.03	18.8	B
Third Street NB	0.19	6.1	A	0.20	6.1	A	--	0.22	6.2	A
Third Street SB	0.60	10.3	B	0.60	10.3	B	--	0.69	12.1	B
Overall	0.49	10.5	B	0.50	10.5	B	No	0.55	12.1	B
<i>Weekday Evening Peak Hour:</i>										
Charles Street EB	0.27	21.4	C	0.28	21.6	C	--	0.38	23.1	C
Charles Street WB	0.08	19.2	B	0.08	19.2	B	--	0.12	19.7	B
Third Street NB	0.68	11.9	B	0.68	11.9	B	--	0.74	13.7	B
Third Street SB	0.26	6.5	A	0.26	6.6	A	--	0.30	6.9	A
Overall	0.57	11.7	B	0.57	11.7	B	No	0.61	13.4	B
Binney Street at Second Street										
<i>Weekday Morning Peak Hour:</i>										
Binney Street EB	0.49	18.3	B	0.42	15.6	B	--	0.43	18.0	B
Binney Street WB	0.45	14.0	B	0.46	14.9	B	--	0.47	15.7	B
Second Street NB	0.11	27.0	C	0.11	27.0	C	--	0.13	27.3	C
Second Street SB	0.16	27.7	C	0.17	27.8	C	--	0.25	28.9	C
Overall	0.26	16.9	B	0.29	16.3	B	No	0.40	17.7	B
<i>Weekday Evening Peak Hour:</i>										
Binney Street EB	0.63	17.2	B	0.63	17.6	B	--	0.64	16.0	B
Binney Street WB	0.43	17.2	B	0.43	17.4	B	--	0.44	18.0	B
Second Street NB	0.55	35.4	D	0.55	35.3	D	--	0.61	37.2	D
Second Street SB	0.23	28.8	C	0.28	29.6	C	--	0.55	35.8	D
Overall	0.44	20.7	C	0.42	20.8	C	No	0.50	21.4	C

See notes at end of table.

Table 19 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	V/C ^a	Delay ^b	LOS ^c	V/C	Delay	LOS		V/C	Delay	LOS
Third Street at Broadway										
<i>Weekday Morning Peak Hour:</i>										
Broadway EB	0.68	27.5	C	0.68	27.5	C	--	0.72	28.4	C
Broadway WB	0.69	23.1	C	0.69	23.4	C	--	0.75	25.1	C
Third Street NB	0.32	19.1	B	0.33	19.9	B	--	0.35	20.5	C
Overall	0.59	23.8	C	0.60	24.1	C	No	0.64	25.3	C
<i>Weekday Evening Peak Hour:</i>										
Broadway EB	0.70	29.2	C	0.70	29.2	C	--	0.78	31.3	C
Broadway WB	0.53	24.7	C	0.53	24.8	C	--	0.56	25.2	C
Third Street NB	0.88	44.4	D	0.91	46.8	D	--	1.00	58.7	E
Overall	0.68	32.2	C	0.69	33.0	C	No	0.76	37.8	D

^aVolume to capacity ratio.

^bAverage control delay per vehicle (in seconds) for the critical movements.

^cLevel of service.

^dSpecial Permit Criteria 2 – Level of Service.

Table 20
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY - UNSIGNALIZED INTERSECTIONS

Unsignalized Intersection/ Critical Movement/Peak Hour	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	Demand ^a	Delay ^b	LOS ^c	Demand	Delay	LOS		Demand	Delay	LOS
Thorndike Street at Third Street										
<i>All movements from Thorndike Street EB:</i>										
Weekday Morning	29	26.8	D	29	28.1	D	No	29	28.1	D
Weekday Evening	26	18.9	C	25	18.9	C	No	26	21.7	C
Thorndike Street at Second Street										
<i>All movements from Thorndike Street EB:</i>										
Weekday Morning	100	12.1	B	115	12.8	B	No	117	13.5	B
Weekday Evening	60	10.4	B	63	10.7	B	No	65	11.0	B
Spring Street at Third Street										
<i>All movements from Spring Street EB:</i>										
Weekday Morning	32	58.5	F	32	56.9	F	No	32	56.9	F
Weekday Evening	15	12.4	B	15	12.4	B	No	15	13.4	B
<i>All movements from Spring Street WB:</i>										
Weekday Morning	51	103.8	F	50	99.0	F	No	50	99.0	F
Weekday Evening	83	21.8	C	83	21.8	C	No	87	26.4	D
Spring Street at Second Street										
<i>All movements from Spring Street WB:</i>										
Weekday Morning	69	10.9	B	75	11.1	B	No	75	11.1	B
Weekday Evening	88	10.9	B	89	11.0	B	No	92	11.5	B
Spring Street at First Street										
<i>All movements from Spring Street NB:</i>										
Weekday Morning	226	4.7	A	344	7.7	A	No	344	7.7	A
Weekday Evening	492	1.2	A	524	2.1	A	No	627	2.1	A
Second Street at Site Drive										
<i>All movements from Site Drive EB:</i>										
Weekday Morning	4	10.9	B	8	11.4	B	No	8	11.4	B
Weekday Evening	2	9.5	A	32	9.8	A	No	34	10.2	B

See notes at end of table.

Table 20 (Continued)
SPECIAL PERMIT CRITERIA 2
VEHICLE LEVEL-OF-SERVICE SUMMARY - UNSIGNALIZED INTERSECTIONS

Unsignalized Intersection/ Critical Movement/Peak Hour	2013 Existing			2013 Build			Exceeds SPC 2 Indicator ^d	2018 Build		
	Demand ^a	Delay ^b	LOS ^c	Demand	Delay	LOS		Demand	Delay	LOS
Thorndike Street at First Street Garage Driveway										
<i>All movements from First Street Garage NB:</i>										
Weekday Morning	5	9.0	A	45	9.4	A	No	45	9.4	A
Weekday Evening	189	9.7	A	371	11.5	B	No	376	11.6	B
Spring Street at First Street Garage										
<i>All movements from First Street Garage SB:</i>										
Weekday Morning	2	9.5	A	2	10.2	B	No	2	10.2	B
Weekday Evening	0	0.0	A	0	0.0	A	No	0	0.0	A

^aDemand (in vehicles per hour) for the critical movements.

^bAverage control delay per vehicle (in seconds) for the critical movements.
^cLevel of service.

^dSpecial Permit Criteria 2 – Level of Service.

NB = northbound; SB = southbound; WB = westbound; SEB = southbound.

TRAFFIC VOLUME INCREASE ON RESIDENTIAL STREETS – SPECIAL PERMIT CRITERIA 3

The project is located in an area of both residential and commercial/retail uses. Residential streets will be subject to some measure of traffic to and from the project. These locations and the indicators for the increases in traffic on residential streets are summarized in Table 21.

**Table 21
SPECIAL PERMIT CRITERIA 3
TRAFFIC ON RESIDENTIAL STREETS**

Roadway	Reviewed Segment	Amount of Residential	Existing Two-Way Traffic	Increase due to Project	Above Criteria
<i>Morning Peak Hour:</i>					
Third Street	O'Brien Highway to Gore Street	1/2 or more	835	16	No
Third Street	Gore Street to Otis Street	1/2 or more	832	15	No
Third Street	Otis Street to Spring Street	1/2 or more	994	0	No
Third Street	Spring Street to Charles Street	1/2 or more	752	6	No
Third Street	Charles Street to Rogers Street	<1/3	763	5	No
Third Street	Rogers Street to Linksey Way	>1/3 but <1/2	797	5	No
Third Street	Linksey Way to Broadway	<1/3	822	25	No
O'Brien Highway	Winter Street to Gore Street	<1/3	1,952	14	No
O'Brien Highway	Gore Street to Land Boulevard	1/2 or more	1,886	1	No
Cambridge Street	Third Street to First Street	<1/3	594	30	No
Thorndike Street	Third Street to First Street	<1/3	100	15	No
Spring Street	Third Street to First Street	<1/3	90	0	No
Charles Street	Fifth Street to Second Street	1/2 or more	124	6	No
Second Street	Gore Street to Otis Street	1/2 or more	211	15	No
Second Street	Otis Street to Spring Street	<1/3	171	22	No
Second Street	Spring Street to Charles Street	1/2 or more	143	17	No
<i>Evening Peak Hour:</i>					
Third Street	O'Brien Highway to Gore Street	1/2 or more	1,475	18	No
Third Street	Gore Street to Otis Street	1/2 or more	893	4	No
Third Street	Otis Street to Spring Street	1/2 or more	875	0	No
Third Street	Spring Street to Charles Street	1/2 or more	818	3	No
Third Street	Charles Street to Rogers Street	<1/3	896	2	No
Third Street	Rogers Street to Linksey Way	>1/3 but <1/2	886	2	No
Third Street	Linksey Way to Broadway	<1/3	988	17	No
O'Brien Highway	Winter Street to Gore Street	<1/3	2,144	11	No
O'Brien Highway	Gore Street to Land Boulevard	1/2 or more	1,797	7	No
Cambridge Street	Third Street to First Street	<1/3	597	29	No
Thorndike Street	Third Street to First Street	<1/3	60	4	No
Spring Street	Third Street to First Street	<1/3	88	2	No
Charles Street	Fifth Street to Second Street	1/2 or more	181	2	No
Second Street	Gore Street to Otis Street	1/2 or more	152	6	No
Second Street	Otis Street to Spring Street	<1/3	196	20	No
Second Street	Spring Street to Charles Street	1/2 or more	143	17	No

As shown, the residential street criteria are not exceeded by the project.

QUEUE ANALYSES – SPECIAL PERMIT CRITERIA 4

Vehicle queues were calculated for each approach of the signalized study area intersections using Synchro analysis software. Table 22 summarizes the 2013 Existing observed, 2013 Existing calculated, 2013 Build calculated, relationship to the SPC indicators, and 2018 Build calculated. As shown in Table 22 all indicators are satisfied for the 2013 Build condition.

Table 22
SPECIAL PERMIT CRITERIA 4 – QUEUE ANALYSIS RESULTS^a

Intersection/Lane	Weekday Morning Peak Hour				Weekday Evening Peak Hour					
	2013 Observed ^b	2013 Existing Calculated	2013 Build Calculated	Exceeds SPC 4 Indicator ^c	2018 Build Calculated	2013 Observed ^b	2013 Existing Calculated	2013 Build Calculated	Exceeds SPC 4 Indicator ^c	2018 Build Calculated
<i>Charles Street at First Street</i>										
Charles Street EB LT	1	1	1	No	2	1	3	3	No	3
Charles Street EB TH/RT	1	1	1	No	2	2	3	3	No	3
Charles Street WB LT/TH/RT	2	2	3	No	4	5	3	3	No	4
First Street NB LT/TH/RT	2	3	4	No	5	2	4	4	No	6
First Street SB LT/TH/RT	2	2	2	No	4	2	2	3	No	4
<i>Cambridge Street at First Street</i>										
Cambridge Street EB LT	--	--	--	--	10	--	--	--	--	1
Cambridge Street EB TH/RT	1	7	8	No	1	9	8	8	No	12
Cambridge Street WB LT	1	4	4	No	--	5	1	1	No	--
Cambridge Street WB TH	1	3	3	No	--	2	2	2	No	--
First Street NB LT	1	1	1	No	--	3	4	5	No	--
First Street NB TH	2	2	2	No	1	6	9	11	No	11
First Street NB RT	--	--	--	--	2	--	--	--	--	6
MBTA Drive SB LT/TH/RT	--	0	0	No	172	--	1	1	No	34
<i>Thorndike Street at First Street</i>										
Thorndike Street EB LT/RT	1	2	2	No	2	2	3	5	No	5
First Street NB TH	2	1	1	No	1	17	3	6	No	8
First Street SB TH	5	2	3	No	4	5	1	2	No	2
<i>Cambridge Street at Second Street</i>										
Cambridge Street EB TH/RT	1	3	3	No	3	2	2	2	No	2
Cambridge Street WB LT/TH	3	1	2	No	5	4	4	7	No	4
Second Street NB LT/TH/RT	1	1	1	No	1	2	2	2	No	2
Second Street SB LT/TH/RT	2	2	3	No	3	2	1	1	No	1

See notes at end of table.

**Table 22 (continued)
SPECIAL PERMIT CRITERIA 4 – QUEUE ANALYSIS RESULTS^a**

Intersection/Lane	Weekday Morning Peak Hour					Weekday Evening Peak Hour				
	2013 Observed ^b	2013 Existing Calculated	2013 Build Calculated	Exceeds SPC 4 Indicator ^c	2018 Build Calculated	2013 Observed ^b	2013 Existing Calculated	2013 Build Calculated	Exceeds SPC 4 Indicator ^c	2018 Build Calculated
	<i>Binney Street at Third Street</i>									
Binney Street EB LT	2	2	2	No	3	6	8	8	No	11
Binney Street EB TH	2	2	3	No	3	4	5	5	No	6
Binney Street EB TH/RT	2	2	3	No	3	3	5	5	No	6
Binney Street WB LT	3	5	5	No	6	2	3	3	No	4
Binney Street WB TH	3	3	3	No	6	3	4	4	No	5
Binney Street WB TH/RT	3	3	3	No	6	3	3	4	No	5
Third Street NB LT/TH	2	4	4	No	7	8	9	9	No	11
Third Street NB RT	2	2	3	No	3	2	4	4	No	5
Third Street SB LT/TH/RT	13	16	16	No	20	7	5	5	No	6
<i>Cambridge Street at Third Street</i>										
Cambridge Street EB LT/TH/RT	6	7	7	No	10	7	6	6	No	9
Cambridge Street WB LT/TH/RT	3	1	1	No	3	5	3	3	No	9
Third Street NB LT/TH/RT	3	2	2	No	3	15	16	16	No	20
Third Street SB LT	1	1	1	No	1	1	1	1	No	1
Third Street SB TH/RT	12	16	16	No	18	6	8	8	No	9
<i>O'Brien Highway at Third Street</i>										
O'Brien Highway EB TH/RT	18	23	23	No	25	6	8	9	No	10
O'Brien Highway WB LT/TH	1	2	2	No	3	7	10	10	No	11
Third Street NB LT	2	1	1	No	1	9	6	6	No	6
Third Street NB LT/RT	1	--	--	--	--	6	--	--	--	--
<i>Binney Street at First Street</i>										
Binney Street EB LT	1	3	3	No	5	0	6	7	No	11
Binney Street EB TH	7	3	3	No	3	2	3	3	No	4
Binney Street EB TH/RT	1	3	3	No	3	1	3	3	No	4
Binney Street WB LT	3	5	6	No	7	12	3	3	No	3
Binney Street WB TH/RT	4	5	6	No	7	7	3	3	No	3
First Street NB LT/TH/RT	0	1	1	No	2	1	1	1	No	2
First Street SB LT/TH	7	4	5	No	6	10	8	8	No	9
First Street SB RT	--	--	--	--	7	--	--	--	--	--

See notes at end of table.

**Table 22 (continued)
SPECIAL PERMIT CRITERIA 4 – QUEUE ANALYSIS RESULTS^a**

Intersection/Lane	Weekday Morning Peak Hour				Weekday Evening Peak Hour					
	2013 Observed ^b	2013 Existing Calculated	2013 Build Calculated	2018 Build Calculated	2013 Observed ^b	2013 Existing Calculated	2013 Build Calculated	2018 Build Calculated	Exceeds SPC 4 Indicator ^c	2018 Build Calculated
<i>O'Brien Highway at East Street/Cambridge Street</i>										
O'Brien Highway EB LT	2	2	2	-- ^d	2	1	1	--	No	--
O'Brien Highway EB TH	8	11	11	--	5	5	5	--	No	--
O'Brien Highway EB TH	11	11	11	--	7	5	5	--	No	--
O'Brien Highway EB TH	12	11	11	--	8	5	5	--	No	--
O'Brien Highway EB RT	2	11	11	--	1	1	1	--	No	--
O'Brien Highway WB LT	5	5	5	--	3	2	2	--	No	--
O'Brien Highway WB LT	5	5	5	--	2	9	9	--	No	--
O'Brien Highway WB TH	3	4	4	--	6	9	9	--	No	--
O'Brien Highway WB TH/RT	2	4	4	--	7	9	9	--	No	--
East Street SB LT/TH/RT	2	2	2	--	2	6	7	--	No	--
Cambridge Street NB LT	4	1	1	--	1	6	7	--	No	--
Cambridge Street NB RT	5	3	3	--	3	1	1	--	No	--
Cambridge Street NB RT	3	3	3	--	2	1	1	--	No	--
<i>Land Boulevard at Binney Street</i>										
Binney Street EB LT	--	2	2	2	--	3	3	3	No	3
Binney Street EB LT/RT	2	2	2	2	7	3	3	3	No	3
Land Boulevard NB LT	10	8	9	5	5	5	5	3	No	3
Land Boulevard NB TH	--	1	1	1	--	2	2	2	No	2
Land Boulevard NB TH	--	1	1	1	--	2	2	2	No	2
Land Boulevard NB TH	--	1	1	1	--	2	2	2	No	2
Land Boulevard SB TH	15	9	9	10	4	8	8	9	No	9
Land Boulevard SB TH	15	9	9	10	4	8	8	9	No	9
Land Boulevard SB RT	5	0	0	0	1	0	0	0	No	0
<i>Charles Street at Third Street</i>										
Charles Street EB LT/TH/RT	1	1	1	1	2	1	1	2	No	2
Charles Street WB LT/TH/RT	0	0	0	0	0	1	1	1	No	1
Third Street NB LT/TH/RT	2	1	1	1	7	5	5	5	No	5
Third Street SB LT/TH/RT	1	4	4	5	1	1	1	2	No	2

See notes at end of table.

**Table 22 (continued)
SPECIAL PERMIT CRITERIA 4 – QUEUE ANALYSIS RESULTS^a**

Intersection/Lane	Weekday Morning Peak Hour					Weekday Evening Peak Hour				
	2013 Observed ^b	2013		Exceeds SPC 4 Indicator ^c	2018 Build Calculated	2013 Observed ^b	2013		Exceeds SPC 4 Indicator ^c	2018 Build Calculated
		Existing Calculated	Build Calculated				Existing Calculated	Build Calculated		
<i>Binney Street at Second Street</i>										
Binney Street EB LT	--	2	2	No	2	--	4	No	4	4
Binney Street EB TH/RT	--	2	2	No	3	--	2	No	2	2
Binney Street WB LT	--	2	2	No	2	--	1	No	1	1
Binney Street WB TH/RT	--	4	4	No	6	--	3	No	3	4
Second Street NB LT/TH/RT	--	1	1	No	1	--	4	No	4	5
Second Street SB LT/TH/RT	--	1	1	No	2	--	2	No	2	4
<i>Third Street at Broadway</i>										
Broadway EB LT	4	6	6	No	6	6	6	No	6	7
Broadway EB TH	2	3	3	No	3	4	6	No	6	6
Broadway WB TH/RT	6	9	9	No	10	5	6	No	6	7
Third Street SB LT	2	2	2	No	2	6	10	No	11	12
Third Street SB RT	1	1	1	No	1	1	1	No	1	2

See notes at end of table.

**Table 22 (continued)
SPECIAL PERMIT CRITERIA 4 – QUEUE ANALYSIS RESULTS^a**

Intersection/Lane	Weekday Morning Peak Hour				Weekday Evening Peak Hour					
	2013 Observed ^b	2013		Exceeds SPC 4 Indicator ^c	2018 Build Calculated	2013 Observed ^b	2013		Exceeds SPC 4 Indicator ^c	2018 Build Calculated
		Existing Calculated	Build Calculated				Existing Calculated	Build Calculated		
<i>Land Boulevard at Cambridgeside Place</i>										
Cambridgeside Place EB LT	3	2	2	No	3	9	4	No	4	4
Cambridgeside Place EB LT	2	2	2	No	3	8	4	No	4	4
Cambridgeside Place EB RT	0	0	0	No	0	0	0	No	0	0
Hotel Driveway WB LT/TH/RT	1	1	1	No	1	2	1	No	1	1
Land Boulevard NB LT	2	4	4	No	4	3	2	No	2	2
Land Boulevard NB TH	3	3	2	No	3	11	8	No	8	9
Land Boulevard NB TH	3	3	2	No	3	12	8	No	8	9
Land Boulevard NB TH/RT	2	3	2	No	1	10	2	No	2	2
Land Boulevard SB LT	1	1	1	No	12	3	1	No	1	1
Land Boulevard SB TH	9	10	10	No	12	8	1	No	1	1
Land Boulevard SB TH	9	10	10	No	12	8	1	No	1	1
Land Boulevard SB TH/RT	9	10	10	No	12	4	1	No	1	1
<i>Land Boulevard at O'Brien Highway</i>										
O'Brien Highway EB LT	7	4	5	No	13	6	13	No	16	13
O'Brien Highway EB TH	13	11	11	No	15	7	7	No	7	13
O'Brien Highway EB TH	13	11	11	No	15	7	7	No	7	13
O'Brien Highway EB TH	13	11	11	No	15	8	7	No	7	13
O'Brien Highway EB RT	11	11	11	No	18	7	5	No	5	6
O'Brien Highway WB LT	8	8	8	No	4	5	8	No	8	4
O'Brien Highway WB TH	8	7	7	No	11	8	8	No	8	15
O'Brien Highway WB TH	7	7	7	No	11	7	8	No	8	15
O'Brien Highway WB TH/RT	1	4	4	No	5	4	7	No	7	8
Charlestown Avenue SB LT	2	3	3	No	4	9	12	No	12	13
Charlestown Avenue SB TH	4	6	6	No	8	11	16	No	16	16
Charlestown Avenue SB TH	5	6	6	No	8	18	16	No	16	16
Charlestown Avenue SB RT	2	3	3	No	5	7	10	No	10	4
Land Boulevard NB LT/TH	16	27	31	No	33	21	20	No	21	20
Land Boulevard NB TH/RT	16	27	31	No	33	22	20	No	21	20

^aAll queues calculated using Synchro methodology. Queue in vehicles per lane.

^bAverage observed queues on in May 2013.

^cSpecial Permit Criteria 4 – Lane Queue.

^dDoes not exist under 2018 Build Conditions.

^eUnsignalized during observations.

PEDESTRIAN AND BICYCLE FACILITIES – SPECIAL PERMIT CRITERIA 5

Criteria 1 – Pedestrian Level of Service

A pedestrian impact analysis was conducted at the study area intersections under 2013 Existing and 2013 Build conditions, as required in the scoping letter. For signalized intersections, the pedestrian level-of-service (PLOS) calculations measure the adequacy of the pedestrian phases (exclusive or concurrent) for sufficient time to cross major or minor streets. The unsignalized analysis relies on a critical gap procedure. The analysis methodology was based on procedures outlined in the 2000 HCM for signalized and unsignalized intersections, and is provided in the Appendix. Table 23 summarizes the results of the pedestrian analysis at the signalized intersections, while Table 24 presents a summary of the pedestrian analysis at the unsignalized intersections. Overall, 128 of 144 indicators were satisfied for the 2013 Build condition. It should be noted that twelve indicators that were not satisfied were exceeded under existing conditions (LOS F), without the project. Only four indicators were directly exceeded by the project as a result of additional walk trips to the project.

**Table 23
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY^a
SIGNALIZED INTERSECTIONS**

Intersection/Time Period/Crossing Path	2013 Existing			2013 Build			2018 Build				
	Demand ^b	Delay ^c	LOS ^d	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS
Third Street at O'Brien Highway											
<i>Weekday Morning:</i>											
Crossing O'Brien Highway (East)	9	16.2	B	9	16.2	B	0.0	No	9	16.2	B
Crossing O'Brien Highway (West)	6	16.2	B	6	16.2	B	0.0	NA ^e	6	16.2	B
Crossing Third Street (North)	8	36.5	D	8	36.5	D	0.0	NA	8	36.5	D
Crossing Third Street (South)	44	36.5	D	44	36.5	D	0.0	No	44	36.5	D
<i>Weekday Evening:</i>											
Crossing O'Brien Highway (East)	25	16.2	B	25	16.2	B	0.0	No	25	16.2	B
Crossing O'Brien Highway (West)	0	16.2	B	0	16.2	B	0.0	NA	0	16.2	B
Crossing Third Street (North)	24	36.5	D	24	36.5	D	0.0	NA	24	36.5	D
Crossing Third Street (South)	73	36.5	D	73	36.5	D	0.0	No	73	36.5	D
Third Street at Cambridge Street											
<i>Weekday Morning:</i>											
Crossing Cambridge Street (East)	24	12.3	B	24	12.3	B	0.0	No	24	12.3	B
Crossing Cambridge Street (West)	48	12.3	B	48	12.3	B	0.0	No	48	12.3	B
Crossing Third Street (North)	163	19.3	B	164	19.3	B	0.0	No	164	19.3	B
Crossing Third Street (South)	105	19.3	B	107	19.3	B	0.0	No	107	19.3	B
<i>Weekday Evening:</i>											
Crossing Cambridge Street (East)	30	12.3	B	30	12.3	B	0.0	No	30	12.3	B
Crossing Cambridge Street (West)	28	12.3	B	29	12.3	B	0.0	No	29	12.3	B
Crossing Third Street (North)	128	19.3	B	129	19.3	B	0.0	No	129	19.3	B
Crossing Third Street (South)	100	19.3	B	101	19.3	B	0.0	No	101	19.3	B
Third Street at Binney Street											
<i>Weekday Morning:</i>											
Crossing Binney Street (East)	220	15.0	B	220	15.0	B	0.0	No	220	15.0	B
Crossing Binney Street (West)	153	15.0	B	155	15.0	B	0.0	No	155	15.0	B
Crossing Third Street (North)	25	15.6	B	25	15.6	B	0.0	No	25	15.6	B
Crossing Third Street (South)	26	15.6	B	26	15.6	B	0.0	No	26	15.6	B
<i>Weekday Evening:</i>											
Crossing Binney Street (East)	189	15.0	B	189	15.0	B	0.0	No	189	15.0	B
Crossing Binney Street (West)	163	15.0	B	166	15.0	B	0.0	No	166	15.0	B
Crossing Third Street (North)	31	15.6	B	31	15.6	B	0.0	No	31	15.6	B
Crossing Third Street (South)	37	15.6	B	37	15.6	B	0.0	No	37	15.6	B

See notes at end of table.

Table 23 (Continued)
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY^a
SIGNALIZED INTERSECTIONS

Intersection/Time Period/Crossing Path	2013 Existing			2013 Build			SPC 5 ^a			2018 Build		
	Demand ^b	Delay ^c	LOS ^d	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS	
Second Street at Cambridge Street												
<i>Weekday Morning:</i>												
Crossing Cambridge Street (East)	65	18.1	B	74	18.1	B	0.0	No	74	18.1	B	
Crossing Cambridge Street (West)	67	18.1	B	68	18.1	B	0.0	No	68	18.1	B	
Crossing Second Street (North)	159	17.4	B	159	17.4	B	0.0	No	159	17.4	B	
Crossing Second Street (South)	63	17.4	B	63	17.4	B	0.0	No	63	17.4	B	
<i>Weekday Evening:</i>												
Crossing Cambridge Street (East)	43	18.1	B	53	18.1	B	0.0	No	53	18.1	B	
Crossing Cambridge Street (West)	37	18.1	B	38	18.1	B	0.0	No	38	18.1	B	
Crossing Second Street (North)	72	17.4	B	72	17.4	B	0.0	No	72	17.4	B	
Crossing Second Street (South)	75	17.4	B	75	17.4	B	0.0	No	75	17.4	B	
First Street at Cambridge Street												
<i>Weekday Morning:</i>												
Crossing Cambridge Street (East)	359	32.1	D	359	32.1	D	0.0	No	359	46.8	E	
Crossing Cambridge Street (West)	230	32.1	D	240	32.1	D	0.0	No	240	46.8	E	
Crossing MBTA Drive (North)	62	32.1	D	62	32.1	D	0.0	No	62	46.8	E	
Crossing First Street (South)	62	32.1	D	62	32.1	D	0.0	No	62	46.8	E	
<i>Weekday Evening:</i>												
Crossing Cambridge Street (East)	744	32.1	D	744	32.1	D	0.0	No	744	46.8	E	
Crossing Cambridge Street (West)	204	32.1	D	214	32.1	D	0.0	No	214	46.8	E	
Crossing MBTA Drive (North)	8	32.1	D	8	32.1	D	0.0	No	8	46.8	E	
Crossing First Street (South)	56	32.1	D	56	32.1	D	0.0	No	56	46.8	E	
First Street at Thorndike Street												
<i>Weekday Morning:</i>												
Crossing Thorndike Street (West)	84	15.1	B	84	15.1	B	0.0	No	84	15.1	B	
Crossing First Street (North)	94	26.6	C	94	26.6	C	0.0	No	94	26.6	C	
Crossing First Street (South)	66	26.6	C	66	26.6	C	0.0	No	66	26.6	C	
<i>Weekday Evening:</i>												
Crossing Thorndike Street (West)	81	15.1	B	81	15.1	B	0.0	No	81	15.1	B	
Crossing First Street (North)	103	26.6	C	103	26.6	C	0.0	No	103	26.6	C	
Crossing First Street (South)	122	26.6	C	122	26.6	C	0.0	No	122	26.6	C	

See notes at end of table.

**Table 23 (Continued)
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY^a
SIGNALIZED INTERSECTIONS**

Intersection/Time Period/Crossing Path	2013 Existing				2013 Build				SPC 5 ^a			2018 Build		
	Demand ^b	Delay ^c	LOS ^d	Delay	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS		
First Street at Charles Street and Cambridge Street														
<i>Weekday Morning:</i>														
Crossing Charles Street (East)	62	33.7	D	33.7	62	33.7	D	0.0	No	62	33.7	D		
Crossing Charles Street (West)	59	33.7	D	33.7	61	33.7	D	0.0	No	61	33.7	D		
Crossing Cambridge Street (North)	29	33.7	D	33.7	30	33.7	D	0.0	No	30	33.7	D		
Crossing Cambridge Street (South)	44	33.7	D	33.7	44	33.7	D	0.0	No	44	33.7	D		
<i>Weekday Evening:</i>														
Crossing Charles Street (East)	151	33.7	D	33.7	151	33.7	D	0.0	No	151	33.7	D		
Crossing Charles Street (West)	98	33.7	D	33.7	101	33.7	D	0.0	No	101	33.7	D		
Crossing Cambridge Street (North)	157	33.7	D	33.7	158	33.7	D	0.0	No	158	33.7	D		
Crossing Cambridge Street (South)	47	33.7	D	33.7	47	33.7	D	0.0	No	47	33.7	D		
First Street at Binney Street														
<i>Weekday Morning:</i>														
Crossing Binney Street (East)	53	26.0	C	26.0	53	26.0	C	0.0	No	53	26.0	C		
Crossing Binney Street (West)	108	26.0	C	26.0	108	26.0	C	0.0	No	108	26.0	C		
Crossing First Street (North)	57	36.0	D	36.0	57	36.0	D	0.0	No	57	36.0	D		
Crossing First Street (South)	22	36.0	D	36.0	22	36.0	D	0.0	No	22	36.0	D		
<i>Weekday Evening:</i>														
Crossing Binney Street (East)	48	26.0	C	26.0	48	26.0	C	0.0	No	48	26.0	C		
Crossing Binney Street (West)	136	26.0	C	26.0	136	26.0	C	0.0	No	136	26.0	C		
Crossing First Street (North)	106	36.0	D	36.0	106	36.0	D	0.0	No	106	36.0	D		
Crossing First Street (South)	19	36.0	D	36.0	19	36.0	D	0.0	No	19	36.0	D		
O'Brien Highway at Cambridge Street and East Street														
<i>Weekday Morning:</i>														
Crossing O'Brien Highway (East)	8	33.8	D	33.8	8	33.8	D	0.0	No	8	33.8	D		
Crossing O'Brien Highway (West)	131	33.8	D	33.8	131	33.8	D	0.0	No	131	33.8	D		
Crossing Cambridge Street (North)	21	33.8	D	33.8	21	33.8	D	0.0	NA	21	33.8	D		
Crossing East Street (South)	3	33.8	D	33.8	3	33.8	D	0.0	No	3	33.8	D		
<i>Weekday Evening:</i>														
Crossing O'Brien Highway (East)	20	33.8	D	33.8	20	33.8	D	0.0	No	20	33.8	D		
Crossing O'Brien Highway (West)	130	33.8	D	33.8	130	33.8	D	0.0	No	130	33.8	D		
Crossing Cambridge Street (North)	31	33.8	D	33.8	31	33.8	D	0.0	NA	31	33.8	D		
Crossing East Street (South)	20	33.8	D	33.8	20	33.8	D	0.0	No	20	33.8	D		

See notes at end of table.

Table 23 (Continued)
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY
SIGNALIZED INTERSECTIONS

Intersection/Time Period/Crossing Path	2013 Existing			2013 Build			SPC 5 ^a			2018 Build		
	Demand ^b	Delay ^c	LOS ^d	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS	
Cambridgeside Place at Land Boulevard												
<i>Weekday Morning:</i>												
Crossing Cambridgeside Place (East)	12	38.3	D	12	38.3	D	0.0	No	12	38.3	D	
Crossing Cambridgeside Place (West)	76	38.3	D	76	38.3	D	0.0	No	76	38.3	D	
Crossing Land Boulevard (North)	135	38.3	D	135	38.3	D	0.0	No	135	38.3	D	
Crossing Land Boulevard (South)	4	38.3	D	4	38.3	D	0.0	No	4	38.3	D	
<i>Weekday Evening:</i>												
Crossing Cambridgeside Place (East)	47	38.3	D	47	38.3	D	0.0	No	47	38.3	D	
Crossing Cambridgeside Place (West)	71	38.3	D	71	38.3	D	0.0	No	71	38.3	D	
Crossing Land Boulevard (North)	251	38.3	D	251	38.3	D	0.0	No	251	38.3	D	
Crossing Land Boulevard (South)	6	38.3	D	6	38.3	D	0.0	No	6	38.3	D	
Binney Street at Land Boulevard												
<i>Weekday Morning:</i>												
Crossing Binney Street (West)	70	34.7	D	70	34.7	D	0.0	No	70	34.7	D	
Crossing Land Boulevard (North)	3	34.7	D	3	34.7	D	0.0	No	3	34.7	D	
Crossing Land Boulevard (South)	6	34.7	D	6	34.7	D	0.0	No	6	34.7	D	
<i>Weekday Evening:</i>												
Crossing Binney Street (West)	46	34.7	D	46	34.7	D	0.0	No	46	34.7	D	
Crossing Land Boulevard (North)	3	34.7	D	3	34.7	D	0.0	No	3	34.7	D	
Crossing Land Boulevard (South)	5	34.7	D	5	34.7	D	0.0	No	5	34.7	D	
O'Brien Highway at Land Boulevard and Charlestown Avenue												
<i>Weekday Morning:</i>												
Crossing O'Brien Highway (East)	13	49.5	E	13	49.5	E	0.0	Yes	13	49.5	E	
Crossing O'Brien Highway (West)	69	49.5	E	69	49.5	E	0.0	Yes	69	49.5	E	
Crossing Land Boulevard (North)	17	34.5	D	17	34.5	D	0.0	No	17	34.5	D	
Crossing Charlestown Avenue (South)	134	34.5	D	134	34.5	D	0.0	No	134	34.5	D	
<i>Weekday Evening:</i>												
Crossing O'Brien Highway (East)	30	49.5	E	30	49.5	E	0.0	Yes	30	49.5	E	
Crossing O'Brien Highway (West)	139	49.5	E	139	49.5	E	0.0	Yes	139	49.5	E	
Crossing Land Boulevard (North)	12	34.5	D	12	34.5	D	0.0	No	12	34.5	D	
Crossing Charlestown Avenue (South)	188	34.5	D	188	34.5	D	0.0	No	188	34.5	D	

See notes at end of table.

Table 23 (Continued)
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY
SIGNALIZED INTERSECTIONS

Intersection/Time Period/Crossing Path	2013 Existing			2013 Build			SPC 5 ^a			2018 Build		
	Demand ^b	Delay ^c	LOS ^d	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS	
Third Street at Charles Street												
<i>Weekday Morning:</i>												
Crossing Charles Street (East)	37	27.3	C	37	27.3	C	0.0	No	37	27.3	C	
Crossing Charles Street (West)	19	27.3	C	21	27.3	C	0.0	No	21	27.3	C	
Crossing Third Street (North)	9	27.3	C	11	27.3	C	0.0	No	11	27.3	C	
Crossing Third Street (South)	19	27.3	C	19	27.3	C	0.0	No	19	27.3	C	
<i>Weekday Evening:</i>												
Crossing Charles Street (East)	37	27.3	C	37	27.3	C	0.0	No	37	27.3	C	
Crossing Charles Street (West)	33	27.3	C	36	27.3	C	0.0	No	36	27.3	C	
Crossing Third Street (North)	8	27.3	C	11	27.3	C	0.0	No	11	27.3	C	
Crossing Third Street (South)	31	27.3	C	31	27.3	C	0.0	No	31	27.3	C	
Binney Street at Second Street												
<i>Weekday Morning:</i>												
Crossing Binney Street (East)	29	36.5	D	29	36.5	D	0.0	No	29	36.5	D	
Crossing Binney Street (West)	11	36.5	D	11	36.5	D	0.0	No	11	36.5	D	
Crossing Second Street (North)	46	5.7	A	46	5.7	A	0.0	No	46	5.7	A	
Crossing Second Street (South)	0	5.7	A	0	5.7	A	0.0	No	0	5.7	A	
<i>Weekday Evening:</i>												
Crossing Binney Street (East)	42	36.5	D	42	36.5	D	0.0	No	42	36.5	D	
Crossing Binney Street (West)	34	36.5	D	34	36.5	D	0.0	No	34	36.5	D	
Crossing Second Street (North)	65	5.7	A	65	5.7	A	0.0	No	65	5.7	A	
Crossing Second Street (South)	65	5.7	A	65	5.7	A	0.0	No	65	5.7	A	

See notes at end of table.

Table 23 (Continued)
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY
SIGNALIZED INTERSECTIONS

Intersection/Time Period/Crossing Path	2013 Existing			2013 Build			2018 Build				
	Demand ^b	Delay ^c	LOS ^d	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS
Third Street at Broadway											
<i>Weekday Morning:</i>											
Crossing Third Street (South)	80	29.6	C	80	29.6	C	0.0	No	80	29.6	C
Crossing Broadway (East)	749	36.5	D	749	36.5	D	0.0	No	749	36.5	D
Crossing Broadway (West)	74	36.5	D	76	36.5	D	0.0	No	76	36.5	D
<i>Weekday Evening:</i>											
Crossing Third Street (South)	143	39.6	C	143	39.6	C	0.0	No	143	39.6	C
Crossing Broadway (East)	230	36.5	D	230	36.5	D	0.0	No	230	36.5	D
Crossing Broadway (West)	1,458	36.5	D	1,461	36.5	D	0.0	No	1,461	36.5	D

^aSpecial Permit Criteria 5 – Pedestrian Level of Service.

^bDemand in pedestrians per hour.

^cAverage delay per pedestrian (in seconds).

^dPedestrian Level of Service.

^eNA = No crosswalk present, therefore no exceedance exists.

Table 24
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY^a
UNSIGNALIZED INTERSECTIONS

Intersection/Time Period/Crossing Path	2013 Existing			2013 Build			SPC 5 ^a			2018 Build		
	Demand ^b	Delay ^c	LOS ^d	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS	
Third Street at Thorndike Street												
<i>Weekday Morning:</i>												
Crossing Thorndike Street (East)	54	2.4	A	54	2.8	A	0.4	No	54	2.9	A	
Crossing Thorndike Street (West)	67	1.3	A	68	1.3	A	0.0	No	68	1.3	A	
Crossing Third Street (North)	25	214.3	F	30	225.5	F	11.2	Yes	30	639.9	F	
Crossing Third Street (South)	56	148.7	F	59	269.2	F	120.5	Yes	59	405.8	F	
<i>Weekday Evening:</i>												
Crossing Thorndike Street (East)	25	1.4	A	25	1.5	A	0.1	No	25	1.5	A	
Crossing Thorndike Street (West)	25	1.0	A	25	1.0	A	0.0	No	25	1.0	A	
Crossing Third Street (North)	22	80.1	F	28	81.0	F	0.9	Yes	28	202.3	F	
Crossing Third Street (South)	27	57.5	F	35	57.5	F	0.0	Yes	35	140.4	F	
Third Street at Spring Street												
<i>Weekday Morning:</i>												
Crossing Spring Street (East)	42	0.6	A	44	0.6	A	0.0	No	44	0.7	A	
Crossing Spring Street (West)	39	2.1	A	39	2.1	A	0.0	No	39	2.2	A	
Crossing Third Street (North)	67	345.4	F	54	345.4	F	0.0	Yes	54	1,004.6	F	
Crossing Third Street (South)	13	102.7	F	16	102.7	F	0.0	Yes	16	274.5	F	
<i>Weekday Evening:</i>												
Crossing Spring Street (East)	24	1.1	A	24	1.1	A	0.0	No	24	1.1	A	
Crossing Spring Street (West)	27	1.8	A	27	1.8	A	0.0	No	27	0.8	A	
Crossing Third Street (North)	18	73.6	F	19	73.6	F	0.0	Yes	19	99.4	F	
Crossing Third Street (South)	19	71.4	F	22	71.4	F	0.0	Yes	22	96.8	F	
Second Street at Thorndike Street												
<i>Weekday Morning:</i>												
Crossing Thorndike Street (East)	32	3.1	A	44	3.7	A	0.6	No	44	3.8	A	
Crossing Thorndike Street (West)	34	2.2	A	49	2.6	A	0.4	No	49	2.6	A	
Crossing Second Street (North)	32	5.7	B	39	6.3	B	0.6	No	39	7.9	B	
Crossing Second Street (South)	32	4.7	A	102	5.1	B	0.4	No	102	6.6	B	
<i>Weekday Evening:</i>												
Crossing Thorndike Street (East)	17	1.6	A	39	2.0	A	0.4	No	39	2.0	A	
Crossing Thorndike Street (West)	22	1.3	A	34	1.3	A	0.0	No	34	1.4	A	
Crossing Second Street (North)	35	4.5	A	39	4.7	A	0.2	No	39	6.0	B	
Crossing Second Street (South)	32	5.7	B	116	6.1	B	0.4	No	116	7.6	B	

See notes at end of table.

Table 24 (Continued)
SPECIAL PERMIT CRITERIA 5 – PEDESTRIAN LEVEL-OF-SERVICE SUMMARY^a
UNSIGNALIZED INTERSECTIONS

Intersection/Time Period/Crossing Path	2013 Existing			2013 Build			SPC 5 ^a			2018 Build		
	Demand ^b	Delay ^c	LOS ^d	Demand	Delay	LOS	Delay Increase	Exceeds Indicator	Demand	Delay	LOS	
Second Street at Spring Street												
<i>Weekday Morning:</i>												
Crossing Spring Street (East)	43	1.6	A	43	1.8	A	0.2	No	43	1.8	A	
Crossing Spring Street (West)	30	2.3	A	35	2.2	A	-0.1	No	35	2.3	A	
Crossing Second Street (North)	75	4.7	A	248	5.5	B	0.8	Yes	248	6.1	B	
Crossing Second Street (South)	23	3.6	A	25	4.2	A	0.6	No	25	5.4	B	
<i>Weekday Evening:</i>												
Crossing Spring Street (East)	32	2.1	A	32	2.1	A	0.0	No	32	2.2	A	
Crossing Spring Street (West)	35	2.2	A	38	2.3	A	0.1	No	38	2.3	A	
Crossing Second Street (North)	35	5.6	A	225	6.4	B	0.8	Yes	225	7.8	B	
Crossing Second Street (South)	21	5.1	A	22	5.7	B	0.6	No	22	7.0	B	
First Street at Spring Street												
<i>Weekday Morning:</i>												
Crossing Spring Street (West)	62	8.2	B	63	15.7	C	7.5	Yes	63	16.1	C	
Crossing First Street (North)	8	70.8	F	8	96.2	F	25.4	NA	8	157.4	F	
Crossing First Street (South)	5	42.8	E	5	50.1	F	7.3	NA	5	119.2	F	
<i>Weekday Evening:</i>												
Crossing Spring Street (West)	144	1.9	A	147	3.0	A	1.1	No	147	3.1	A	
Crossing First Street (North)	24	80.3	F	24	199.7	F	119.4	NA	24	614.1	F	
Crossing First Street (South)	10	75.7	F	10	121.8	F	46.1	NA	10	203.2	F	

^aSpecial Permit Criteria 5 – Pedestrian Level of Service.

^bDemand in pedestrians per hour.

^cAverage delay per pedestrian (in seconds).

^dPedestrian Level of service.

^eNA = No crosswalk present, therefore no exceedence exists.

Criteria 2 – Safe Pedestrian Facilities

Thorndike Street, Spring Street, Second Street, and Third Street all provide concrete sidewalks between 4 and 16 feet in width. The intersections adjacent to the site have pedestrian crosswalks with wheelchair ramps with the exception of Thorndike Street at Third Street. Access to the site has been designed to encourage pedestrian use and activity. These criteria are therefore met for all four streets abutting the project.

Criteria 3 – Safe Bicycle Facilities

None of the four streets abutting the project have bicycle lanes present; however all of these streets carry relatively low traffic volumes so bicycles and vehicles can share the existing travel lanes without significant conflict. There are no improvements proposed that will constrict the travel lanes on these streets; therefore, these criteria are therefore met for the four streets abutting the Project.

SPECIAL PERMIT CRITERIA SUMMARY

As required by the City, the project's impact has been measured against 5 criteria as indicators of the project's impact. A total of 431 indicators in the individual criteria were reviewed with 19 exceedences recorded. Twelve of these exceed the City's criteria under existing conditions, with or without the project. Four indicators related to pedestrian delay at unsignalized intersections crossing is exceeded by the project, but the crossings remain at LOS C or better with the project. The remaining three indicators are related to trip generation for the project.

BICYCLE ANALYSIS

EXISTING CONDITIONS

A review of bicycle conditions was conducted at the affected intersections and street segments. Currently, First Street, Cambridge Street, East Street, Third Street, and Binney Street provide dedicated lanes for bicyclists; the other streets in the study area are wide enough to permit bicycle travel without exclusive bicycle lanes. Most travel occurs on major streets, with relatively low turning movements from major streets.

VEHICLE TURNING VOLUME CONFLICTS

City guidelines require identification of conflicting vehicle-turning volumes at intersections impacted by the project where bicycle facilities are present or where peak-hour bicycle volumes exceed 10 bicycles on any approach. Almost every intersection in the study area meets these criteria during the weekday morning and weekday evening peak hours. Currently, there are no procedures available in the HCM to analyze the effect that turning vehicles have on bicyclists. The locations meeting these criteria are listed in Table 25 for Build conditions. No mitigation measures are proposed at these locations that would impact the ability of bicyclists to safely traverse the study area roadways or intersections.

Table 25
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build	
		Conflicting Vehicles Turning Volume	
		Advancing Volume	Opposing Volume
<i>O'Brien Highway at Third Street</i>			
Weekday Morning	EB LT - 0	3	382
	EB TH - 17	1,545	51
	EB RT - 1	612	--
	WB LT - 0	51	2,160
	WB TH - 2	325	3
	WB RT - 0	6	--
	NB LT - 2	155	0
	NB TH - 0	6	0
	NB RT - 0	27	--
	SB LT - 0	0	188
	SB TH - 0	0	155
	SB RT - 0	0	--
	Weekday Evening	EB LT - 0	0
EB TH - 6		754	311
EB RT - 0		306	--
WB LT - 2		311	1,060
WB TH - 11		1063	0
WB RT - 0		1	--
NB LT - 2		853	12
NB TH - 0		1	3
NB RT - 2		20	--
SB LT - 0		3	874
SB TH - 0		2	853
SB RT - 0		7	--
<i>Cambridge Street at Third Street</i>			
Weekday Morning	EB LT - 0	35	277
	EB TH - 83	242	32
	EB RT - 8	80	--
	WB LT - 0	32	357
	WB TH - 7	208	35
	WB RT - 0	37	--
	NB LT - 1	21	701
	NB TH - 1	120	78
	NB RT - 0	18	--
	SB LT - 6	78	159
	SB TH - 5	576	21
	SB RT - 2	47	--
	Weekday Evening	EB LT - 2	43
EB TH - 20		220	19
EB RT - 0		33	--
WB LT - 1		19	293
WB TH - 97		230	43
WB RT - 5		180	--
NB LT - 3		20	310
NB TH - 4		592	39
NB RT - 1		11	--
SB LT - 0		39	623
SB TH - 3		218	20
SB RT - 1		53	--

Table 25 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build	
		Conflicting Vehicles Turning Volume	
		Advancing Volume	Opposing Volume
<i>Thorndike Street at Third Street</i>			
Weekday Morning	EB LT - 0	4	0
	EB TH - 4	18	0
	EB RT - 0	7	--
	WB LT - 0	0	29
	WB TH - 0	0	4
	WB RT - 0	0	--
	SB LT - 2	74	232
	SB TH - 11	755	13
	SB RT - 0	12	--
	NB LT - 0	13	841
	NB TH - 4	196	74
	NB RT - 0	23	--
	Weekday Evening	EB LT - 0	3
EB TH - 1		13	0
EB RT - 0		9	--
WB LT - 0		0	25
WB TH - 5		0	3
WB RT - 0		0	--
SB LT - 0		40	639
SB TH - 7		227	4
SB RT - 1		12	--
NB LT - 0		4	279
NB TH - 12		625	40
NB RT - 0		10	--
<i>Spring Street at Third Street</i>			
Weekday Morning	EB LT - 0	9	50
	EB TH - 0	0	10
	EB RT - 0	23	--
	WB LT - 0	10	32
	WB TH - 1	21	9
	WB RT - 0	19	--
	NB LT - 0	13	762
	NB TH - 5	204	13
	NB RT - 0	0	--
	SB LT - 0	0	217
	SB TH - 12	737	0
	SB RT - 0	25	--
	Weekday Evening	EB LT - 0	2
EB TH - 0		13	5
EB RT - 0		0	--
WB LT - 1		5	15
WB TH - 2		43	2
WB RT - 0		35	--
NB LT - 1		16	236
NB TH - 13		602	0
NB RT - 1		0	--
SB LT - 0		0	618
SB TH - 7		229	16
SB RT - 0		7	--

Table 25 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build	
		Conflicting Vehicles Turning Volume	
		Advancing Volume	Opposing Volume
<i>Binney Street at Third Street</i>			
Weekday Morning	EB LT - 4	92	515
	EB TH - 11	229	145
	EB RT - 5	43	--
	WB LT - 1	145	364
	WB TH - 12	326	92
	WB RT - 0	44	--
	NB LT - 0	73	549
	NB TH - 15	117	79
	NB RT - 0	122	--
	SB LT - 0	79	312
	SB TH - 31	351	36
	SB RT - 0	119	--
	Weekday Evening	EB LT - 0	316
EB TH - 13		472	92
EB RT - 3		52	--
WB LT - 9		92	840
WB TH - 14		289	316
WB RT - 0		43	--
NB LT - 5		58	235
NB TH - 27		294	36
NB RT - 12		144	--
SB LT - 0		36	496
SB TH - 14		147	58
SB RT - 4		52	--
<i>Binney Street at Second Street</i>			
Weekday Morning	EB LT - 0	50	553
	EB TH - 11	353	52
	EB RT - 1	28	--
	WB LT - 0	52	431
	WB TH - 7	475	50
	WB RT - 0	26	--
	NB LT - 0	19	58
	NB TH - 1	8	13
	NB RT - 0	6	--
	SB LT - 0	13	33
	SB TH - 3	21	13
	SB RT - 1	24	--
Weekday Evening	EB LT - 1	145	422
	EB TH - 7	477	24
	EB RT - 0	30	--
	WB LT - 0	24	652
	WB TH - 7	366	145
	WB RT - 0	32	--
	NB LT - 1	15	85
	NB TH - 0	51	20
	NB RT - 0	48	--
	SB LT - 0	20	114
	SB TH - 1	22	15
	SB RT - 2	43	--

Table 25 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build	
		Conflicting Vehicles Turning Volume	
		Advancing Volume	Opposing Volume
<i>Cambridge Street at Second Street</i>			
Weekday Morning	EB LT - 0	0	285
	EB TH - 84	264	28
	EB RT - 7	68	--
	WB LT - 0	28	332
	WB TH - 9	257	0
	WB RT - 0	0	--
	NB LT - 0	25	125
	NB TH - 0	0	22
	NB RT - 0	8	--
	SB LT - 4	22	33
	SB TH - 0	97	25
	SB RT - 0	6	--
	Weekday Evening	EB LT - 0	0
EB TH - 26		251	7
EB RT - 0		24	--
WB LT - 0		7	275
WB TH - 73		241	0
WB RT - 1		0	--
NB LT - 14		98	13
NB TH - 1		0	4
NB RT - 0		22	--
SB LT - 0		4	120
SB TH - 0		7	98
SB RT - 0		2	--
<i>Thorndike Street at Second Street</i>			
Weekday Morning	EB LT - 0	12	0
	EB TH - 4	83	0
	EB RT - 0	20	--
	WB LT - 0	0	115
	WB TH - 0	0	12
	WB RT - 0	0	--
	NB LT - 3	0	182
	NB TH - 3	19	57
	NB RT - 0	18	--
	SB LT - 2	57	37
	SB TH - 5	125	0
SB RT - 0	0	--	
Weekday Evening	EB LT - 0	6	0
	EB TH - 0	42	0
	EB RT - 0	15	--
	WB LT - 0	0	63
	WB TH - 1	0	6
	WB RT - 0	0	--
	NB LT - 0	0	41
	NB TH - 9	123	9
	NB RT - 0	40	--
	SB LT - 7	9	163
	SB TH - 6	32	0
SB RT - 0	0	--	

Table 25 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build	
		Conflicting Vehicles Turning Volume	
		Advancing Volume	Opposing Volume
<i>Third at Broadway</i>			
Weekday Morning	EB LT - 11	235	981
	EB TH - 131	301	0
	EB RT - 0	0	--
	WB LT - 1	0	536
	WB TH - 25	656	235
	WB RT - 2	325	--
	SB LT - 20	118	0
	SB TH - 3	0	0
	SB RT - 3	169	--
	Weekday Evening	EB LT - 4	268
EB TH - 27		567	0
EB RT - 0		0	--
WB LT - 2		0	835
WB TH - 161		482	268
WB RT - 2		136	--
SB LT - 10		407	0
SB TH - 4		0	0
SB RT - 22		194	--
<i>Cambridge Street at First Street</i>			
Weekday Morning	EB LT - 0	0	624
	EB TH - 76	205	370
	EB RT - 4	89	--
	WB LT - 7	370	294
	WB TH - 7	254	0
	WB RT - 0	0	--
	NB LT - 0	30	2
	NB TH - 0	0	1
	NB RT - 2	121	--
	SB LT - 0	1	151
	SB TH - 0	0	30
SB RT - 0	1	--	
Weekday Evening	EB LT - 0	9	307
	EB TH - 26	229	124
	EB RT - 3	39	--
	WB LT - 4	124	277
	WB TH - 39	181	9
	WB RT - 0	2	--
	NB LT - 18	166	4
	NB TH - 0	2	2
	NB RT - 9	523	--
	SB LT - 1	2	691
	SB TH - 0	1	166
	SB RT - 0	1	--

Table 25 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build	
		Conflicting Vehicles Advancing Volume	Turning Volume Opposing Volume
<i>Spring Street at First Street</i>			
Weekday Morning	EB LT - 0	0	0
	EB RT - 0	0	--
	NB LT - 0	220	608
	NB TH - 12	124	0
	SB TH - 13	314	220
	SB RT - 1	294	--
Weekday Evening	EB LT - 0	0	0
	EB RT - 0	0	--
	NB LT - 1	75	349
	NB TH - 18	449	0
	SB TH - 21	273	75
	SB RT - 1	76	--
<i>Charles Street at First Street</i>			
Weekday Morning	EB LT - 4	30	133
	EB TH - 1	40	35
	EB RT - 0	17	--
	WB LT - 4	35	87
	WB TH - 1	0	30
	WB RT - 2	98	--
	NB LT - 3	0	266
	NB TH - 6	289	21
	NB RT - 5	121	--
	SB LT - 5	21	410
	SB TH - 8	245	0
	SB RT - 0	0	--
Weekday Evening	EB LT - 0	45	202
	EB TH - 4	94	77
	EB RT - 0	23	--
	WB LT - 3	77	162
	WB TH - 1	0	45
	WB RT - 1	125	--
	NB LT - 0	0	285
	NB TH - 9	285	22
	NB RT - 4	149	--
	SB LT - 0	22	434
	SB TH - 18	263	22
	SB RT - 2	0	--

Table 25 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build		
		Advancing Volume	Opposing Volume	
<i>Binney Street at First Street</i>				
Weekday Morning	EB LT - 5	132	731	
	EB TH - 5	141	115	
	EB RT - 2	97	--	
	WB LT - 1	115	370	
	WB TH - 10	429	132	
	WB RT - 6	187	--	
	NB LT - 0	2	278	
	NB TH - 1	0	5	
	NB RT - 0	9	--	
	SB LT - 0	5	11	
	SB TH - 4	151	1	
	SB RT - 5	122	--	
	Weekday Evening	EB LT - 8	257	420
		EB TH - 14	238	32
EB RT - 4		50	--	
WB LT - 0		32	545	
WB TH - 8		253	257	
WB RT - 1		135	--	
NB LT - 0		1	410	
NB TH - 8		4	11	
NB RT - 0		6	--	
SB LT - 0		11	11	
SB TH - 7		231	1	
SB RT - 10	168	--		
<i>Cambridgeside Place at Charles Street</i>				
Weekday Morning	EB LT - 0	113	0	
	EB RT - 6	23	--	
	NB LT - 1	11	1,361	
	NB TH - 7	456	0	
	SB TH - 21	1,170	111	
	SB RT - 3	191	--	
Weekday Evening	EB LT - 4	313	0	
	EB RT - 0	131	--	
	NB LT - 0	59	739	
	NB TH - 18	1,299	0	
	SB TH - 8	143	59	
	SB RT - 3	596	--	

Table 25 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/ Intersecting Street/Time Period	Approach Bicycle Volume	2013 Build	
		Advancing Volume	Opposing Volume
<i>Binney Street at Land Boulevard</i>			
Weekday Morning	EB LT - 5	149	0
	EB RT - 0	6	--
	NB LT - 7	453	1,172
	NB TH - 11	536	0
	SB TH - 8	892	453
	SB RT - 10	280	--
Weekday Evening	EB LT - 9	249	0
	EB RT - 0	6	--
	NB LT - 1	278	984
	NB TH - 13	967	0
	SB TH - 8	842	278
	SB RT - 9	142	--
<i>Cambridgeside Place at Land Boulevard</i>			
Weekday Morning	EB LT - 6	113	36
	EB TH - 1	4	3
	EB RT - 0	23	--
	WB LT - 2	3	140
	WB TH - 1	5	113
	WB RT - 0	28	--
	NB LT - 1	111	1,384
	NB TH - 7	456	23
	NB RT - 0	14	--
	SB LT - 0	23	581
	SB TH - 21	1170	111
	SB RT - 3	191	--
	Weekday Evening	EB LT - 4	313
EB TH - 0		16	11
EB RT - 0		131	--
WB LT - 0		11	460
WB TH - 0		8	313
WB RT - 0		27	--
NB LT - 0		59	772
NB TH - 18		1,299	33
NB RT - 0		43	--
SB LT - 0		33	1,401
SB TH - 8		143	59
SB RT - 3		596	--

NOTE: NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; LT = Left Turn movement; TH = Through movement; RT = Right Turn movement.

Site access for bicycles is currently expected via a dedicated connection to Second Street. This would permit bicyclists access into a bicycle storage area. The surrounding network of streets provides access from the north and south to Cambridge Street, O'Brien Highway, Binney Street, and Broadway.

A dedicated bicycle area will be provided in the building with separate access from Second Street. At least 146 bicycles will be able to be parked in the area. The bicycle parking calculations are provided in the Appendix. The PTDM data indicate that 6, 4, and 5 percent of people bicycle to work, retail, and apartment, respectively.

PARKING ANALYSIS

PARKING DEMAND

As required in the City guidelines, a parking analysis was conducted to determine future parking demands consistent with vehicle-trip generation assumptions and modal split assumptions for project traffic. Table 26 summarizes the minimum parking requirement for the project, as well as the estimated parking demand. The demand analysis is based upon the City of Cambridge requirements for the residential use and expected employee population and the mode split assumptions.

**Table 26
PARKING DEMAND ANALYSIS^a**

ZONING			
Use	Size	Zoning Requirements	Required Spaces
Residential	±24 Units	1.0 space/unit	= 24
Office/R&D	460,000 sf	1.0 space/1,340 sf	= 343
Retail	15,000 sf	1.0 space/900 sf	= <u>17</u>
			384
ESTIMATED DEMAND			
Residential	Units	Required Spaces/Unit	Demand
	24	1.0 - 1.05 spaces per unit	= 24
Expected Employee Population^b		Auto Access Percentage^c	Total Spaces Required
1,150	x	0.46	= 529

^aBased on City of Cambridge methodology.

^bBased on a range of 2.0-3.0 employees/1,000 sf assume 2.5 employees/1,000 sf

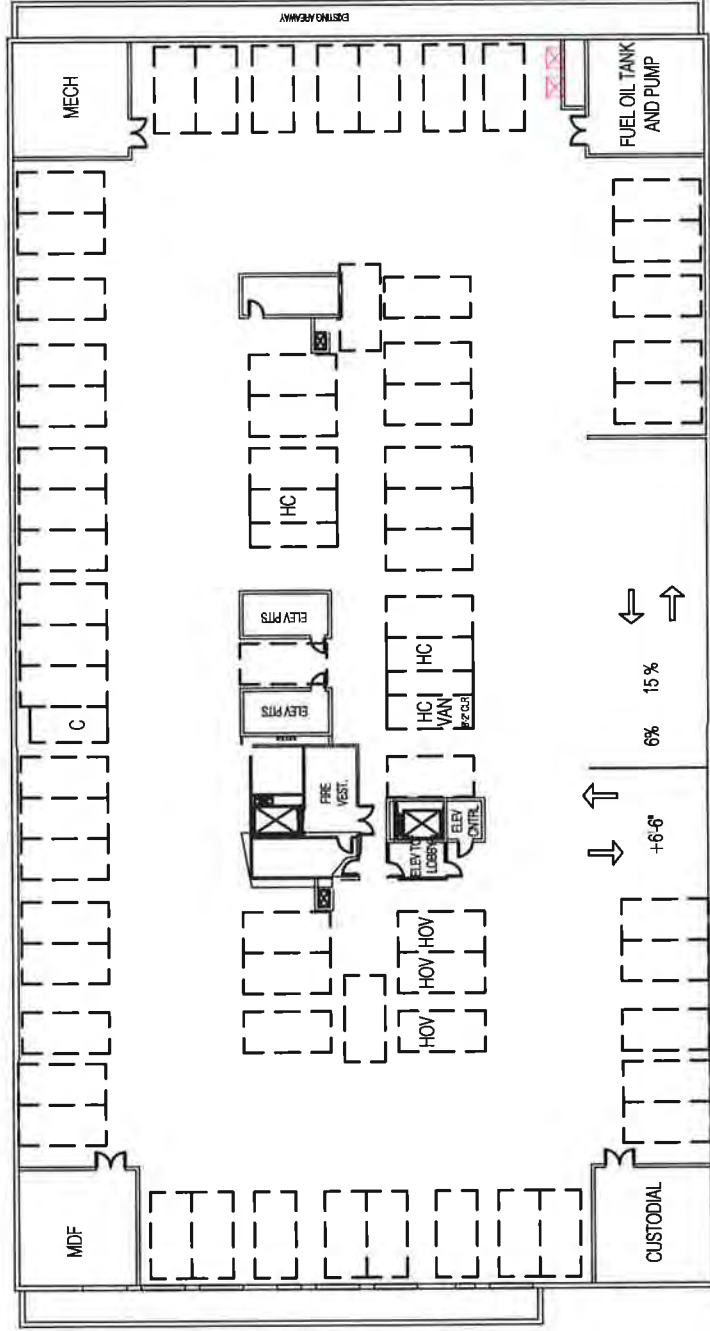
^cCalculated as SOV rate (42 percent) + ½ of HOV rate (7/2 percent, rounded to 4 percent).

The total parking demand is estimated to be 553 spaces, which is greater than the minimum parking requirement of 384 spaces.

PARKING ANALYSIS

On-site below-grade parking accommodating 92 vehicles will be provided within the building with access and egress provided off Second Street. On-site parking will be provided for the residences (24 spaces) and employees including HOV spaces. An additional 420 parking spaces will be leased from the City-owned First Street garage. Dedicated parking is not provided for the retail space, the majority of which will be leased and occupied by tenants less than 2,000 square feet. Employees and residents will be charged market rates for parking. The on-site parking is depicted in Figures 44 and 45. Additional parking is available at the First Street Garage and Galleria Garage.

Secured bicycle racks will be provided for both residents and commuters. The project will provide a total of 216 bicycle spaces including 166 spaces in the on-site parking area and short-term spaces outside the building. In addition to the hubway, there will be 50 spaces outside the project site. The on-site bicycle parking is depicted in Figure 46A – 46D, with on-street bicycle spaces depicted in Figure 46E.



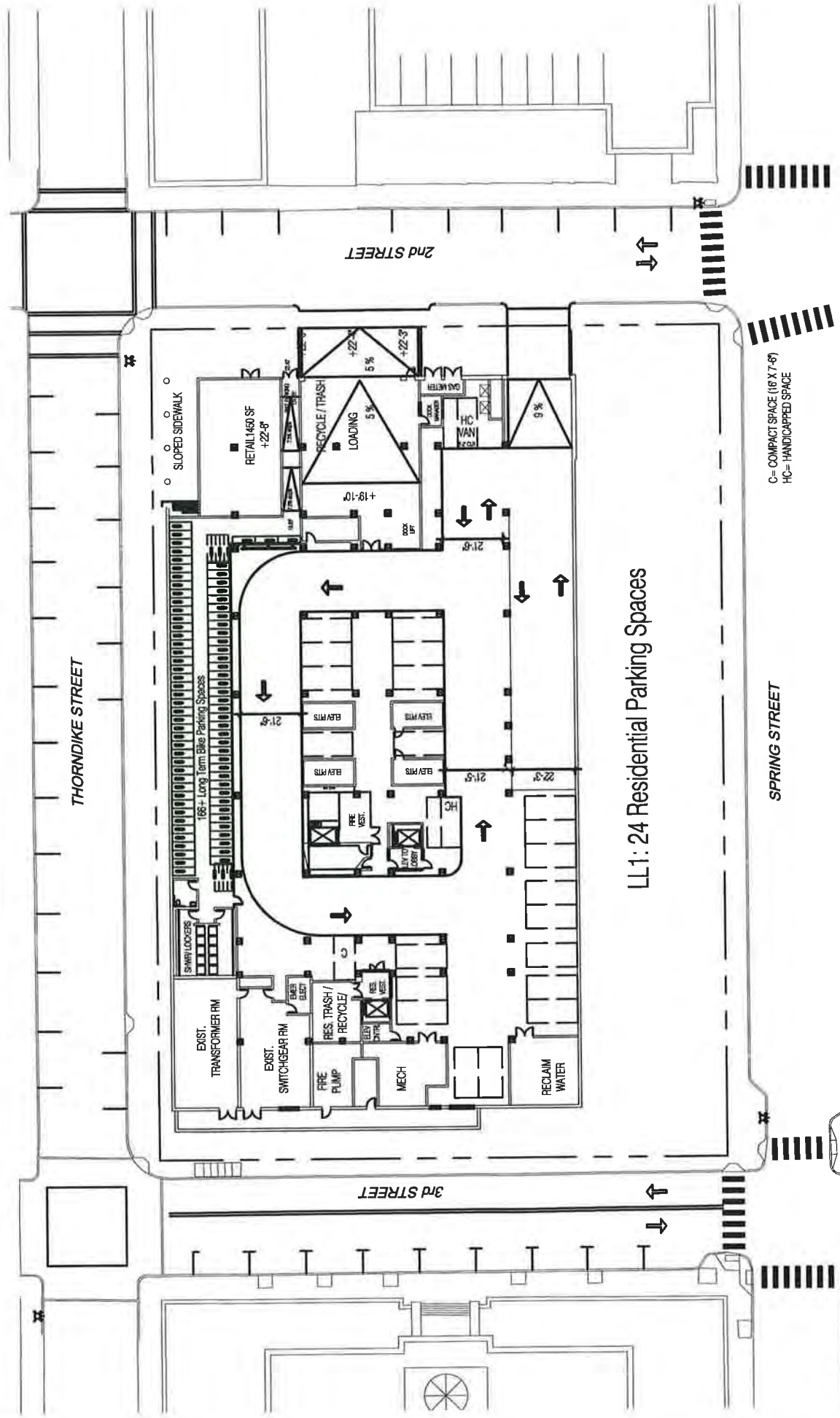
LL2: 68 Office Parking Spaces

Source: Elkus-Manfredi.
 0 20 40 Scale in Feet

VAI Vanasse & Associates, Inc.

Figure 44

Parking Garage Layout
 Level 1



Source: Elkus-Manfredi.

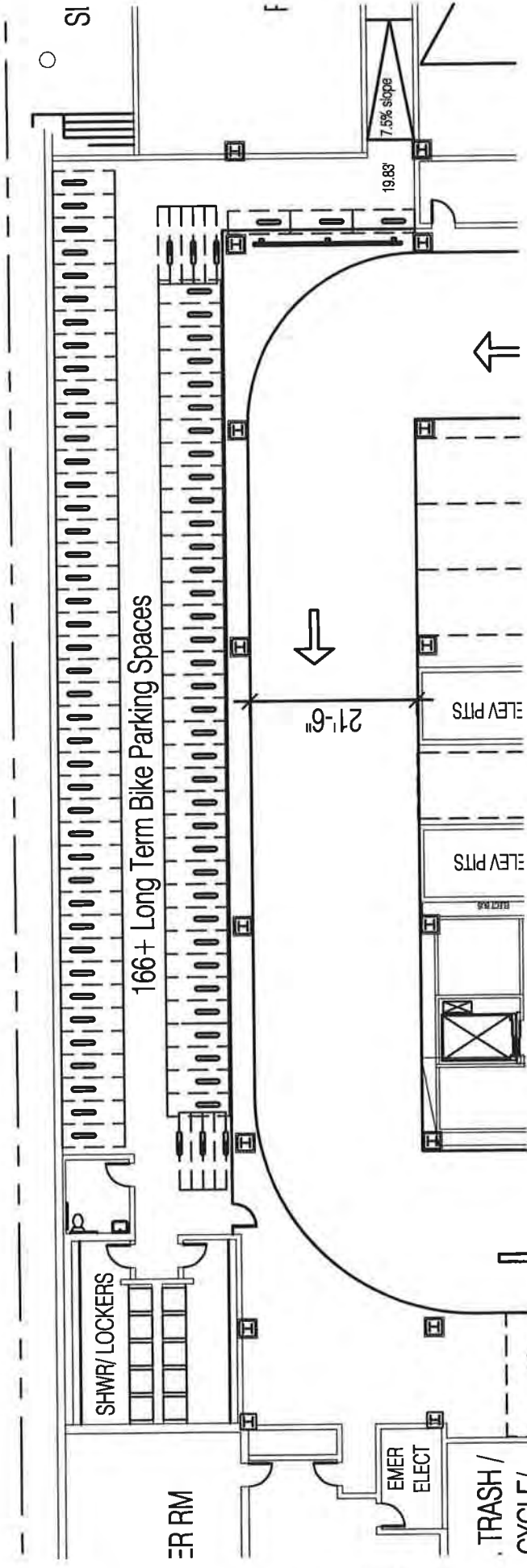
0 25 50 Scale in Feet

V **A** **I**
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Figure 45

Parking Garage Layout
 Level 2

THORNDIKE STREET

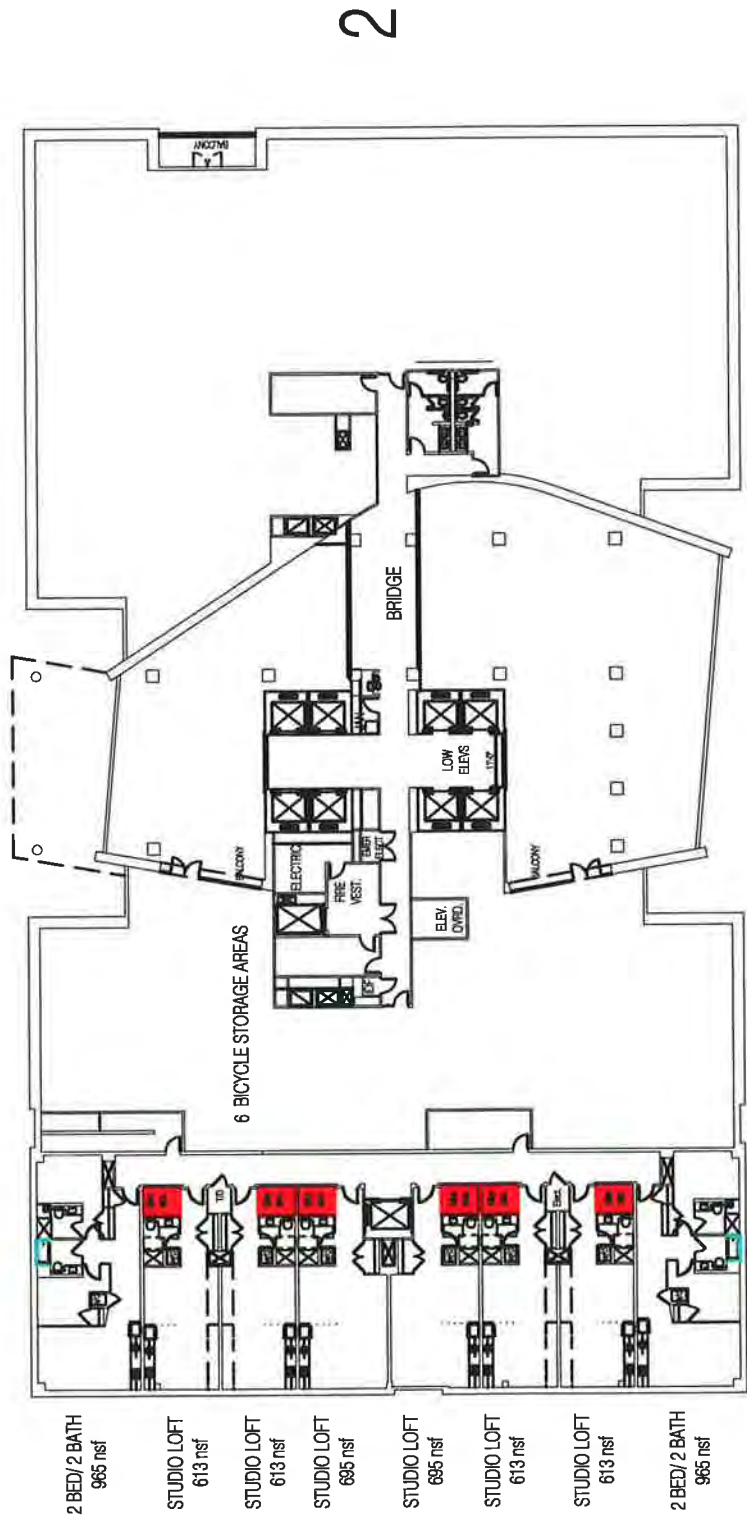


Source: Elkus-Manfredi.
0 10 20 Scale in Feet

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Figure 46A
Bicycle Parking Facilities in
Parking Garage

Legend:
 Bicycle Storage Area

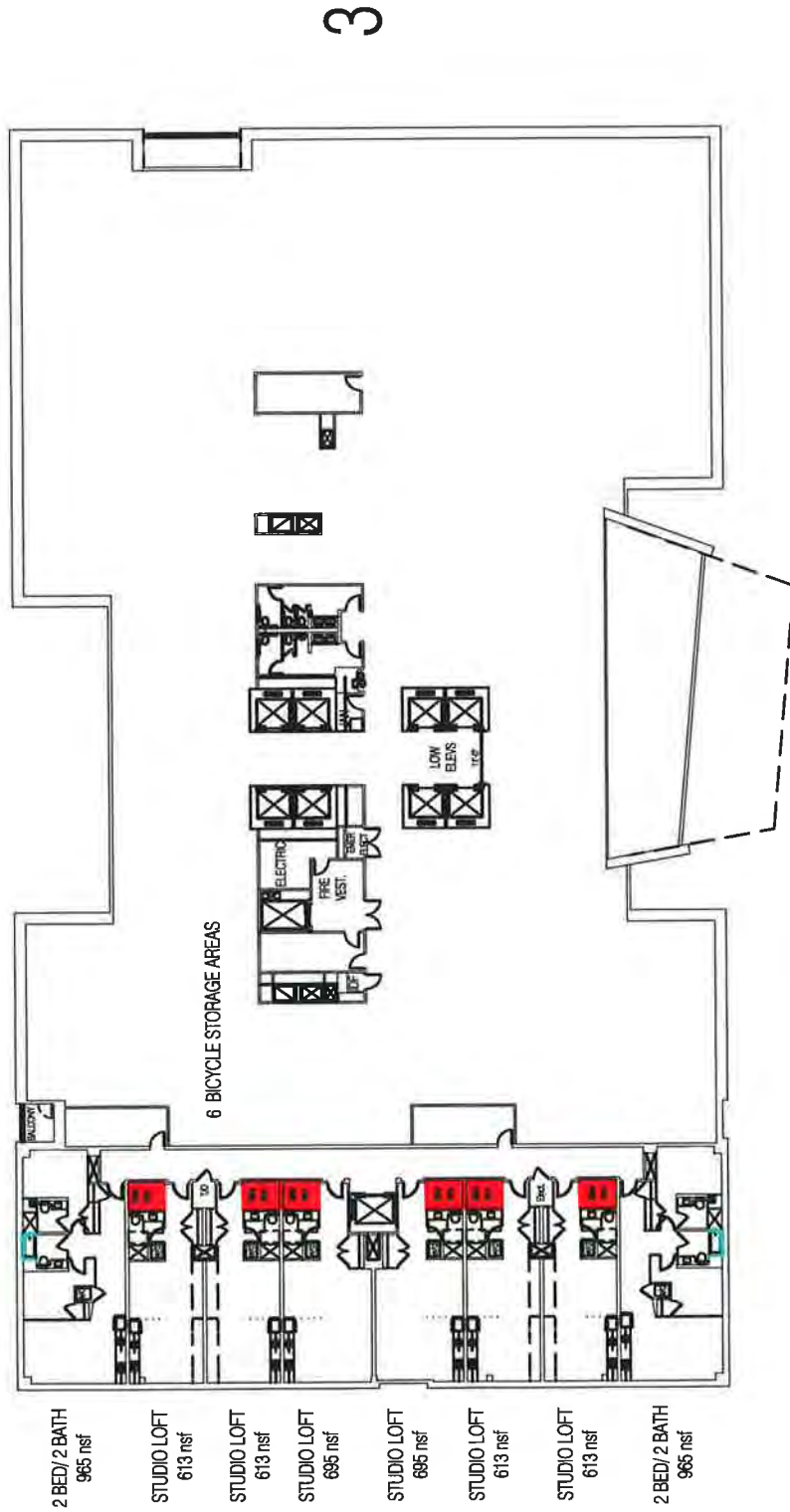


Source: Eikus-Manfredi.
 0 10 20 Scale in Feet



Figure 46B
Bicycle Parking Facilities on
Floor 2

Legend:
 Bicycle Storage Area

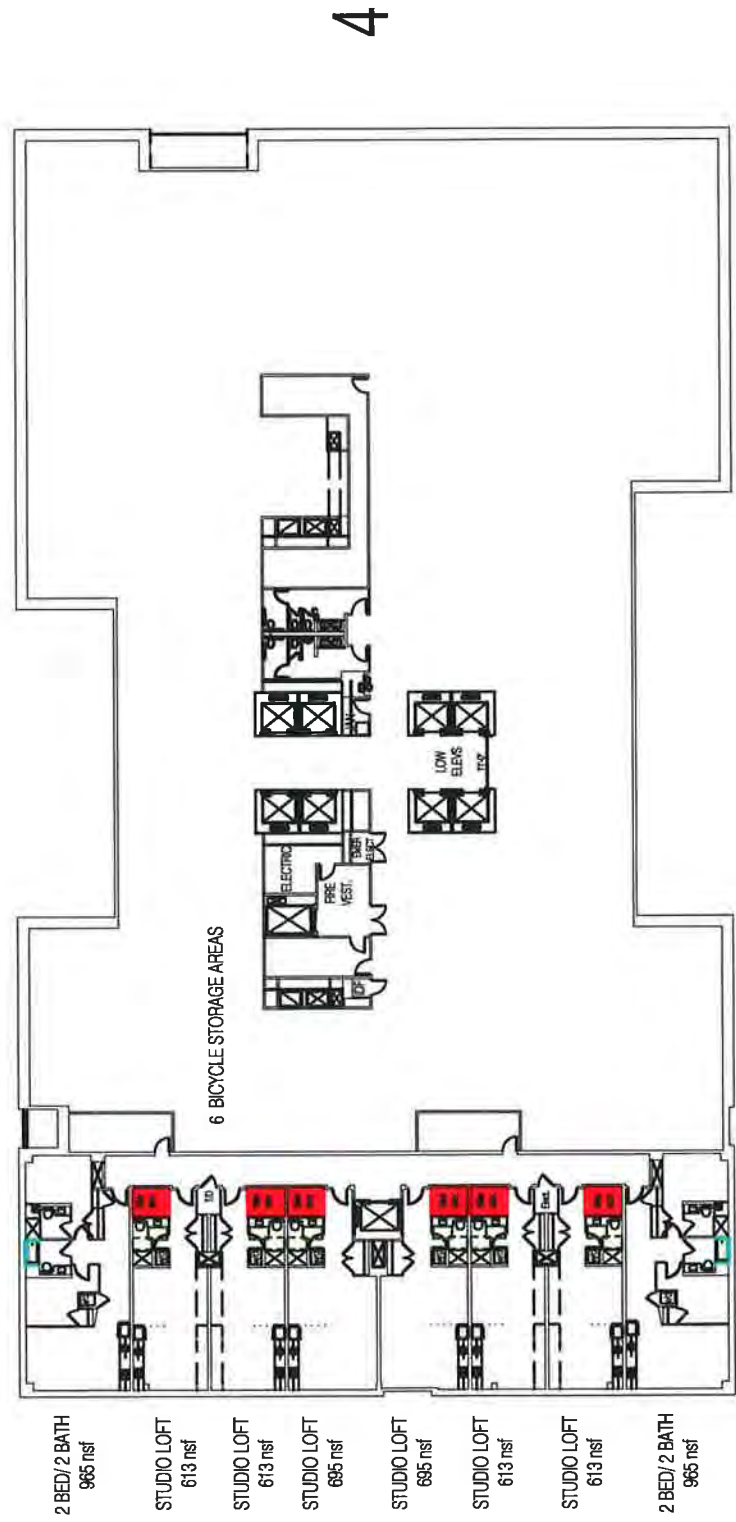


Source: Elkus-Manfredi.
 0 10 20 Scale in Feet



Figure 46C
Bicycle Parking Facilities
Floor 3

Legend:
 Bicycle Storage Area



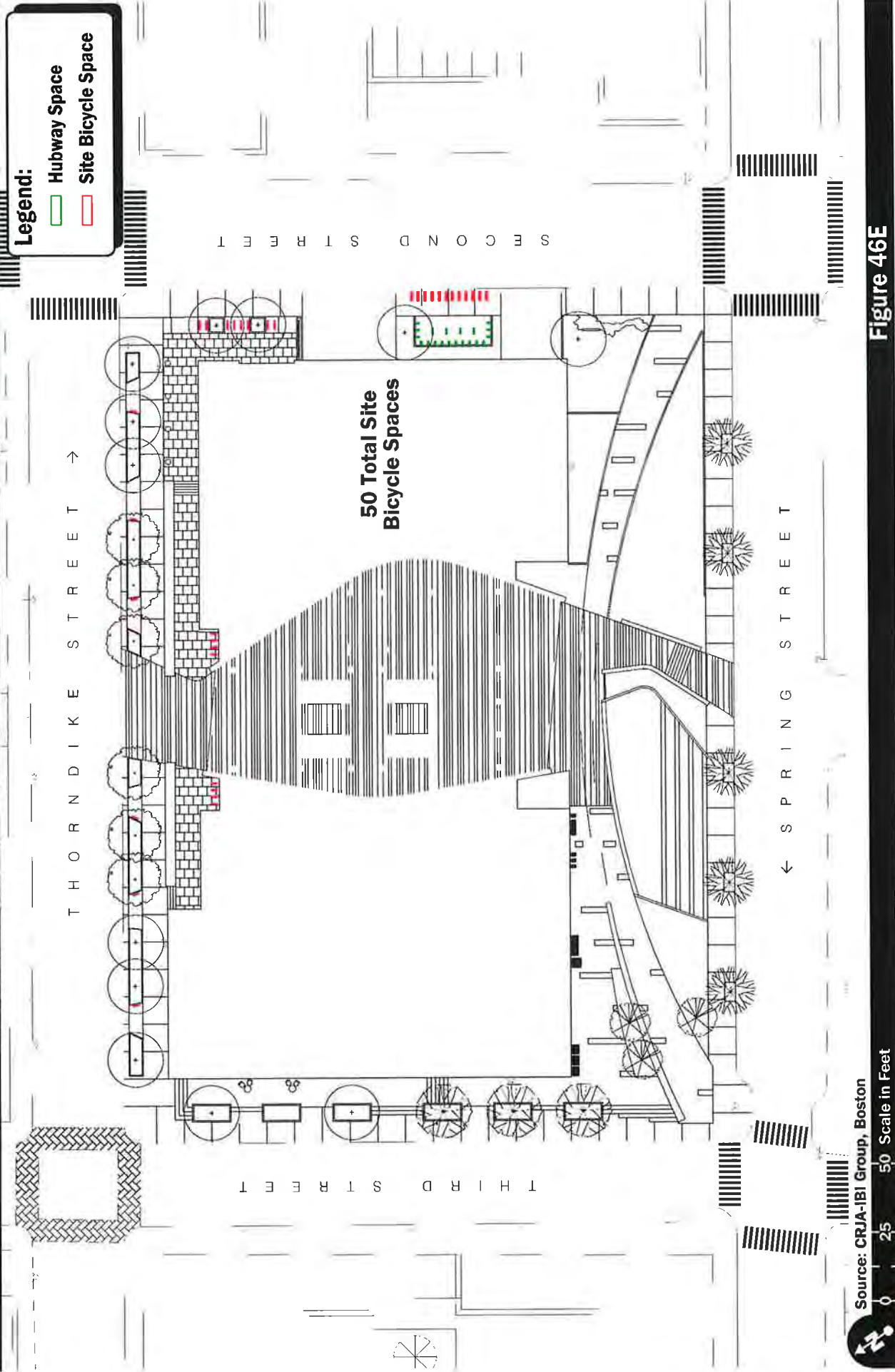
Source: Elkus-Manfredi.

0 10 20 Scale in Feet

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Figure 46D

**Bicycle Parking Facilities
Floor 4**



Legend:
Hubway Space
Site Bicycle Space

50 Total Site Bicycle Spaces

Source: CRJA-IBI Group, Boston
25 50 Scale in Feet

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Figure 46E
On-Street Bicycle Spaces

LOADING AND DELIVERY

Loading and delivery access will occur via Second Street. The current design is for three loading bays. Approximately 20 trucks per day are associated at the office R&D facility. Most of these trucks are small box trucks and include courier deliveries and pick-ups. Retail deliveries are more difficult to determine as tenants have not yet been identified, but are expected at the rate of two to five small box trucks per day. Trash and recycling will be removed daily. The proposed loading areas are depicted in Figure 47.

TRANSIT ANALYSIS

PROJECT TRANSIT DISTRIBUTION

An analysis of transit usage was conducted to determine impacts that might be recognized under Build conditions. There are a total of four bus routes and the closest subway line at Lechmere are available for residents and employees at the project site, the project ridership should be well distributed.

Due to the four local bus (69, 80, 87, and 88) routes that stop at the Lechmere Station, only a minor effect of the additional commuters from the proposed development is expected. Ridership on the Green Line rapid transit train is also expected to experience minor increases due to the project. Rush-hour headways are five minutes, which would result in only a few commuters riding each train during the peak hours. The distribution on the transit routes are shown in Table 27.

Table 27
TRANSIT SYSTEM TRIP DISTRIBUTION

Time Period/Directional Distribution	Project Transit Trips	Subway Distribution ^a	Bus Distribution ^b
<i>Daily:</i>			
Entering	928	742	186
<u>Exiting</u>	<u>928</u>	<u>742</u>	<u>186</u>
Total	1,856	1,484	372
Peak Hour Headways (Minutes)		5	15
<i>Weekday Morning:</i>			
Entering	179	143	36
<u>Exiting</u>	<u>41</u>	<u>33</u>	<u>8</u>
Total	220	176	44
<i>Weekday Evening:</i>			
Entering	43	34	9
<u>Exiting</u>	<u>183</u>	<u>146</u>	<u>37</u>
Total	226	180	46

^a80 percent assignment. – Mostly Lechmere Station – Some trips may utilize Kendall Station.

^b20 percent assignment, distributed among all 4 bus routes.

The peak-hour headways listed in Table 27 indicates approximately twelve trains arrive/depart the Lechmere Square station during the peak hours. The peak-hour passenger loading from the proposed project of 176 to 180 peak-hour person trips directed towards the Green Line can easily be accommodated without a noticeable increase in operating characteristics. Detailed analysis of transit ridership impacts due to the project is provided in Table 28 for the subway loadings, and Table 29 for the bus loadings, respectively. Relevant capacity information was obtained from the MBTA for the Green Line and Bus Routes 69, 80, 87, and 88.

SUMMARY OF ANALYSIS RESULTS

Tables 28 and 29 demonstrate that sufficient capacity exists on the bus routes and subway lines to accommodate the expected ridership increases due to the project. Increases in volume-to-capacity (v/c) ratios pertaining to line volume are at or below 0.06 for all affected bus routes, with the highest v/c ratio of the Green Line at 0.56 including the project volume.

Given the above transit characteristics and projected ridership information, the existing transit services available to the proposed project are sufficient to address the expected slight increase in demand.

Provision of Transit Amenities

Seating and lighted shelters are available at the Lechmere Square subway and bus station. No benches or shelters are provided for at any other locations along the other bus routes in proximity to the project site.

**Table 28
MBTA SUBWAY RIDERSHIP IMPACTS**

Train Line	Train Headway ^a	No. of Trains	No. of Cars per Train	Max. Load per Car ^b	Hourly Capacity	Existing		Proposed with Project		Ridership Increase	
						Ridership ^c	V/C ^d	Ridership	V/C	Percent	V/C
Green Line	Morning Peak Hour ^e	12	2	110	2,640	1,248	0.47	1,424	0.54	14.1	0.07
	Evening Peak Hour ^e	12	2	110	2,640	1,308	0.50	1,488	0.56	13.8	0.06

^aBased on current MBTA schedule.

^bDefined on the basis of MBTA design standards.

^cFrom MBTA ridership surveys at Lechmere Station stop for the Green Line - 2012

^dVolume-to-capacity ratio.

^eBased on scheduled rush-hour headway values of 6 minutes.

Table 29
MBTA BUS ROUTE PEAK HOUR RIDERSHIP IMPACTS

<i>Weekday Morning Peak Hour:</i>									
Route No.	Route Headway ^a	Maximum Load ^b	Hourly Capacity	Existing		Proposed with Project		Ridership Increase	
				Ridership ^c	V/C ^d	Ridership	V/C	Percent	V/C
69	10 minutes	60	360	105	0.29	116	0.32	10.5	0.03
80	15 minutes	60	240	65	0.27	76	0.32	16.9	0.05
87	15 minutes	60	240	120	0.50	131	0.55	9.1	0.05
88	15 minutes	60	240	130	0.54	141	0.59	8.5	0.05

<i>Weekday Evening Peak Hour:</i>									
Route No.	Route Headway ^a	Maximum Load ^b	Hourly Capacity	Existing		Proposed with Project		Ridership Increase	
				Ridership ^c	V/C ^d	Ridership	V/C	Percent	V/C
69	15 minutes	60	240	135	0.56	146	0.61	8.1	0.05
80	15 minutes	60	240	85	0.35	96	0.40	12.9	0.05
87	15 minutes	60	240	150	0.63	161	0.67	7.3	0.04
88	15 minutes	60	240	170	0.71	183	0.76	7.6	0.06

^aBased on current MBTA schedule.

^bDefined on the basis of MBTA design standards.

^cBased on ratio of peak hour to daily ridership levels of several Cambridge area bus routes.

^dVolume-to-capacity ratio.

PROJECT MITIGATION AND CONCLUSION

PROJECT MITIGATION

The project's location near the Lechmere Station and Kendall Station as well as the area shuttle services significantly encourages transit use by employees, visitors, and residents to the proposed project. Mitigation is geared towards a low single occupant vehicle (SOV) mode of transportation.

Transportation Demand Management Program

The existing SOV mode split is expected to be low at 38, 34, and 42 percent for retail, apartment, and office, respectively, based on the SOV Mode Split Commitment. The following TDM measures will be implemented to reduce SOV travel and encourage the use of alternative modes of transportation:

- Charge for parking at market rates and offer discounted parking for dedicated HOV vehicles;
- Dedicated HOV parking spaces on site.
- Become a member of the CRTMA and the EZ Ride Shuttle bus;
- Provide MBTA passes on site, as well as MBTA pass subsidies;
- Promotion of commute options through companywide emails and intranet site.
- Provide information about transportation options available to employees at orientations and on a company website.
- Work with the CRTMA for a new stop location closer to the courthouse site.
- Provide showers and lockers accessible to employees.
- Continue to work with the Cambridge Office of Workforce Development.
- Provide car-sharing spaces on site.
- Investigate a hubway station on-site to encourage non-auto travel.

Off-Site Roadway Mitigation

The intersection of Third Street at Thorndike Street in the study area is missing or has deteriorated pedestrian accommodations. The project proponent will update pavement markings and review handicapped-accessible wheelchair ramps and crossings at this location.

CONCLUSION

Overall, the project proponent is committed to the implementation of the above project mitigation strategies to reduce the overall project impact. As required by the City, the project's impact has been measured against 5 criteria as indicators of the project's impact. A total of 431 indicators in the individual criteria were reviewed with 19 exceedences recorded. Twelve of these exceed the City's pedestrian delay criteria under existing conditions, with or without the project. Four indicators related to pedestrian delay at unsignalized intersections crossing is exceeded by the project, but the crossings remain at LOS C or better with the project. The remaining three indicators are related to trip generation for the project.

This TIS indicates that the project can be accommodated within the existing area infrastructure. With an emphasis of non-auto travel and limited parking supply, the project proponent is committed to a project which is sensitive to the area and minimizes the impact to the neighborhood.