TRANSPORTATION IMPACT STUDY

CAMBRIDGESIDE THIRD FLOOR RE-TENANTING
CAMBRIDGE, MASSACHUSETTS

Prepared for:

CAMBRIDGESIDE GALLERIA ASSOCIATES TRUST
Cambridge, Massachusetts

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EXECUTIVE SUMMARY

INTRODUCTION

On behalf of Cambridgeside Galleria Associates Trust (the "Applicant"), Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Study (TIS) for the proposed re-tenanting of approximately 140,000 square feet of third floor space in the core mall building at CambridgeSide in East Cambridge (the "Site") to include office space (the "Project"). While the existing PUD Special Permit for CambridgeSide (PB #66) always allowed for a mix of uses at the Site, including office and retail uses, the location and square footage of such uses was also specified. This study reviews the potential transportation impacts, defines site access requirements, and identifies strategies to reduce traffic impacts associated with the Project. The study also reviews the Project with respect to the City of Cambridge Special Permit Criteria regarding traffic impacts, is in accordance with the City's guidelines for TIS, and follows the scoping determination dated November 5, 2018.

PROJECT DESCRIPTION

Currently, CambridgeSide provides approximately 642,500 square feet (sf) of leasable retail space, including approximately 140,000 sf of retail space on the third floor of the core mall building. The Project proposes a re-tenanting of retail space on the third floor of the core mall building from retail to office use. Note that while the Applicant is conservatively applying for relief, and has studied the potential impacts of a re-tenanting of the entire approximately 140,000 square feet of retail space on the third floor to office space, the Applicant may continue to retain some retail space on the third floor.

Two parking garages are currently located at CambridgeSide: a Lower Garage and an Upper Garage. The Lower Garage is accessed by three entrance driveways from Land Boulevard, CambridgeSide Place, and First Street, and currently one egress driveway onto CambridgeSide Place. Access to the Upper Garage is provided via separate entrance and exit driveways onto First Street. Approximately 1,695 parking spaces are provided in the Lower Garage and an additional approximately 795 parking spaces are provided in the Upper Garage. Access to the garages is not proposed to be changed in connection with the proposed re-tenanting of the third floor space.

Direct pedestrian access to the third floor will be achieved through improvements to an existing door on Cambridgeside Place, located between the current CambridgeSide entrance and the Lower Garage south entrance.

EXISTING CONDITIONS

A field inventory of existing study area roadways was conducted to document traffic conditions in the current 2018 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. Transportation information and data used in this study were collected during May 2018 and supplemented with garage data from May 2018 and August 2018. 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.

PROJECT-GENERATED TRAFFIC

The Project involves the re-tenanting of the third floor to add Office use. Office trips were calculated using Institute of Transportation Engineers (ITE) trip generation information[1] and Land Use Code (LUC) 710, Office. The use of the ITE data provides a conservative basis for generation of vehicle trips that accounts for variation in office tenant characteristics, since this data set is compiled from driveway counts of hundreds of office buildings across the United States.

The ITE data was used with mode split data from two East Cambridge-area office developments to calculate person trips among the various transport modes. This was combined with estimates of trips associated with the existing third floor retail activity. The Project is expected to generate an increase of 108 vehicle trips (52 in and 56 out) on an average weekday and a decrease of 1,228 trips on an average Saturday, due to the higher retail activity occurring during this time period. On an hourly basis, the site is expected to generate an increase of 59 vehicle trips (50 in and 9 out), 23 vehicle trips (-13 in and 36 out), and a decrease of 72 trips (-47 in and -25 out) during the respective weekday morning, weekday evening, and Saturday midday peak hours. Our analysis of anticipated trip generation concludes that the Project will not have a significant effect on the total number of trips generated by CambridgeSide.

Trip distribution for the Project was based on findings from the First Street Assemblage TIS, K2C2 study, Cambridge Courthouse TIS, a Cambridge Community Development Department (CDD) Statistical Report, and a review of local traffic patterns.

As compared with existing conditions, the Project results in a minimal increase in trip generation during an average weekday, weekday morning peak hour, and weekday evening peak hour time periods, and results in decreases during the Saturday daily and Saturday midday time periods.

[1] *Trip Generation Manual, 10th Edition;* ITE; Washington, D.C.; 2017.

ARTICLE 19 PROJECT REVIEW SPECIAL PERMIT CRITERIA ANALYSIS

As required by Section 19.20 of the Cambridge Zoning Ordinance, the Project has been evaluated against the five Project Review Special Permit Criteria indicators as measurements of the Project's expected impact on City traffic. Of the 100 measurements analyzed in connection with the five indicators, none were exceeded as a result of the Project. A total of four measurements are exceeded under existing conditions, with or without the Project. As detailed in this TIS, the Project will not exacerbate any of the pre-existing exceedances or create any new exceedances. The Applicant is also committed to the implementation of the Project mitigation strategies described in this TIS in order to lessen any potential impact of the Project on City traffic. Accordingly, the Project is not expected to have a substantial adverse impact on City traffic and issuance of a Project Review Special Permit is appropriate with respect to potential traffic impacts

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 2018 Existing, 2018 Build and 2023 Build conditions. The analysis indicates that the Project will not have a significant effect on operating conditions at the area intersections.

PARKING ANALYSIS

The garages on-site experience a typical peak utilization of 78 percent in the Lower Garage and 23 percent in the Upper Garage, which allows a total of 901 spaces available for the office use. The projected demand is expected to be 120 spaces, which when adjusted by the reduced need for parking due to the removal of the third floor retail results in a net requirement of 21 spaces. This can be accommodated in the surplus of parking spaces described above. The Applicant is committed to implementing a 0.9 space per 1,000 sf maximum parking ratio for the office tenants, which is consistent with parking ratios proposed for Kendall Square and the Volpe Center development areas for office uses. This results in 126 parking spaces for the office tenants, which is in line with the anticipated demand.

Secure bicycle parking exists at CambridgeSide for employees and customers. The Site provides a total of 146 bicycle spaces including 46 long-term spaces in the garage and 100 short-term spaces outside the buildings. The re-tenanting of existing third floor retail use sf to office use sf does not trigger compliance with the bicycle parking requirements provided in Section 6.100 of the Ordinance because, per Section 6.103.1, the re-tenanting does not result in at least a fifteen percent (15%) increase in the total number of bicycle parking spaces that would be required for the entire building. Rather, the proposed third floor re-tenanting decreases the total number of required spaces. Accordingly, there are no changes proposed for the bicycle accommodations associated with the third floor re-tenanting to office use.

PROJECT MITIGATION

As demonstrated within this TIS, the Site is currently developed and the Project is not expected to generate any substantial adverse impacts on traffic or area roadway networks. However, the Applicant is committed to implementing the mitigation efforts described below in order to improve current traffic impacts. The Project's location near Lechmere Station as well as the area

shuttle services significantly encourages transit use by employees, visitors and area residents to the proposed Project. Mitigation efforts are therefore geared towards a low single occupant vehicle (SOV) mode of transportation. The Project proposes implementation of a TDM Plan and modifications to improve roadway and pedestrian facilities and safety.

Transportation Demand Management Program

The following TDM measures will be implemented to reduce SOV travel and encourage the use of alternative modes of transportation:

- Encourage employees to obtain a Charlie card and register such card for bike parking. This allows employees the ability to use the bike cages at area MBTA stations and other areas free of charge;
- Make available public transportation schedules which will be posted in a centralized location for employees;
- Provide information on available pedestrian and bicycle facilities in the vicinity of the Site in a central location for employees;
- Charge for parking at market rates and offer discounted parking for dedicated HOV vehicles;
- Provide language in lease documents ensuring that employers are required to provide MBTA pass subsidies to employees up to the federal maximum (currently $260 per month);
- Provide information about transportation options available to employees at orientations and on a company website; and
- Encourage employers to work with the Cambridge Office of Workforce Development.

Cambridgeside Place modifications

In order to facilitate enhanced access to the third floor as well as resolve current issues related to operations on Cambridgeside Place, discussed more fully in this TIS and as shown on Figure 14.a.1, modifications including pavement markings and signage on Cambridgeside Place are proposed that include re-dedication of existing areas to accommodate taxicabs and Uber/Lyft vehicles along with a pick-up/drop-off area adjacent to the Third Floor Lobby Door. Pavement markings to provide motorist direction and encourage yielding to pedestrians in the mid-block crosswalk on Cambridgeside Place are also proposed, along with the reapplication of markings for the Cambridgeside Place approach to Land Boulevard. The improvements are subject to obtaining all necessary permits and approvals which the Applicant will coordinate with the City to acquire for this effort.

CONCLUSION

Overall, the Applicant is committed to the implementation of the above mitigation strategies to reduce the overall impact of the Project. As required by the City, the Project's impact has been measured against 5 criteria as indicators of the Project's impact. Of the 100 measurements analyzed in connection with the five Special Permit Criteria indicators, none were exceeded as a result of the Project. A total of four measurements are exceeded under existing conditions, with or without the Project.

The Project represents a re-tenanting of existing active retail space and will result in the removal of vehicle trips from the street network during some portions of the weekday and a greater reduction during the weekend days. No changes to the parking facilities are proposed with this re-tenanting, and existing data indicates the parking garages have ample surplus capacity to accommodate the proposed office uses and still maintain sufficient parking supply for the current uses. This TIS finds that the Project can be accommodated within the existing area infrastructure and on the roadway network with minimal effects, resulting in the ability to modify the uses associated with the Project as planned.

INTRODUCTION

Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Study (TIS) for the proposed re-tenanting of 140,000 square feet (sf) of third floor space in the core mall building at CambridgeSide to include office space (the "Project"). While the existing PUD Special Permit for CambridgeSide (PB #66) always allowed for a mix of uses at the site, including office and retail uses, the location and square footage of such uses was also specified. This study reviews the potential transportation impacts, defines site access requirements, and identifies strategies to reduce traffic impacts associated with the Project. The study also reviews the Project with respect to the City of Cambridge Special Permit Criteria regarding traffic impacts, is in accordance with the City's guidelines for TIS and follows the scoping determination dated November 5, 2018.

The following table outlines the existing and proposed characteristics of the Project.

Table 1.a.1
PROJECT CHARACTERISTICS

Characteristics	Existing Site	Proposed Project
Leasable Retail Space, approx. sf	642,500	502,500
Leasable Office Space, approx. sf	0	140,000
Employees		
Retail	1,272	1,011
Office	--	120 to 241
Parking Spaces	2,490	2,490
Bicycle Spaces	146	146

The Project preliminary ground floor plan with points of vehicle access are shown on Figure 1.a.1, while the preliminary ground floor plan with points of pedestrian access is depicted in Figure 1.a.2. Note that the Project facilitates access to the third floor from Cambridgeside Place to allow employees a direct connection to office space by improving an existing entrance door off Cambridgeside Place. Also note that the Project does not propose any changes to the existing site plan with respect to points of vehicular access, but rather involves interior relocation of demising walls in connection with re-tenanting of the third floor.

A survey plan is shown in Figure 1.a.3 including property lines, abutting parcels, and property ownership with easements also depicted.

1.0 EXISTING CONDITIONS

1.1 EXISTING TRAFFIC CONDITIONS

A field inventory of existing study area roadways was conducted to document traffic conditions in the current 2018 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. Transportation information and data used in this study were collected during May 2018 and supplemented with garage data from May 2018 and August 2018.

1.2 DESCRIPTION OF PROJECT STUDY AREA

The Project study area was determined in consultation with City transportation officials. The study area was confirmed in the November 5, 2018 Scoping Determination from the City to VAI. The study area is listed below.

1. Land Boulevard at Cambridgeside Place and Hotel (Sonesta) Driveway
2. First Street at Cambridgeside Place and Charles Street
3. Land Boulevard at Lower Garage East Entrance
4. Cambridgeside Place at Lower Garage South Entrance
5. Cambridgeside Place at Lower Garage South Exit
6. First Street at Lower Garage West Entrance
7. First Street at Upper Garage Entrance/Exit and Spring Street

Transportation Network

Access to the area is provided via McGrath/O'Brien Highway, Land Boulevard, and Memorial Drive, all of which connect to the general street network surrounding 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 Land Boulevard, First Street, and Cambridgeside Place.

Geometric and Traffic Control

Intersection geometry and lane usage was obtained from field inventory and observations conducted by VAI in May and September 2018. A graphical depiction of intersection inventories for the study area intersections are provided in Figure 1.b.1 through Figure 1.b.6. The Service Entrances for the site, accessed from Land Boulevard and First Street, are shown on Figure 1.b.1 and Figure 1.b.5, respectively. Sidewalks and wheelchair ramps along Cambridgeside Place and First Street are in fair to good condition. Bike lanes are present on First Street.

1.3 PARKING AND LOADING FACILITIES

Figure 1.c.1 through Figure 1.c.10 provides images of the upper and lower parking garages. Figure 1.c.11 and Figure 1.c.12 depict the Land Boulevard and First Street loading docks, respectively. Locations of short-term and long-term bicycle parking are indicated on Figure 1.c.13 and Figure 1.c.14, respectively. A bicycle route access map is provided in Figure 1.c.15, which depicts the routes to the short-term bike parking from streets and the public right-of-way. Scaled plans (1 inch = 10 feet) of the short-term bicycle parking spaces within the Project bounds are depicted in Figure 1.c.16 through Figure 1.c.20. Additional images that depict the locations of other short-term bicycle racks installed by the Applicant but not on property controlled by the Applicant are shown on Figure 1.c.21.

1.4 TRANSIT SERVICES

Figure 1.d.1 provides a graphical depiction of the regional public and private transportation services available in the area, including the Cambridgeside Shuttle Bus service. Figure 1.d.2 depicts the proposed First Street Extension across Cambridge Street and Monsignor O'Brien Highway to the North Point site and the proposed location of the new Lechmere Station. Figure 1.d.3 provides a Carsharing and Ridesharing Services Map highlighting nearby locations of taxi stands and carsharing services such as Zipcar. Figure 1.d.4 provides a Bikesharing Station Map that identifies locations of BLUEbikes stations in the area.

1.5 LAND USE

Land uses in the vicinity of the site were researched and inventoried in October 2018 and are shown in Figure 1.e.1.

2.0 DATA COLLECTION

2.1 AUTOMATIC TRAFFIC RECORDER COUNTS

To establish existing traffic conditions within the study area, ATR counts and manual turning movement and vehicle classification counts were conducted in May 2018. This allowed for public schools to be in regular session at the time the data was collected. The traffic count data sheets are provided in the Appendix. A summary of the ATR data is provided in Table 2.a.1, while the average hourly directional volumes recorded at the ATR locations are summarized in Table 2.a.2.

Table 2.a.1
2018 BASELINE TRAFFIC VOLUMES

Location	Weekday ADT[a]	Morning Peak Hour			Evening Peak Hour			Saturday ADT	Saturday Midday Peak Hour		
		Vehicles Per Hour	K Factor[b]	Directional Distribution[c]	Vehicles Per Hour	K Factor	Directional Distribution		Vehicles Per Hour	K Factor	Directional Distribution
Land Boulevard, north of Cambridgeside Place	38,000	2,333	6.1	71%, SB	2,377	6.3	58%, NB	31,100	1,894	6.1	52%, SB
Cambridgeside Place, west of Land Boulevard	6,310	442	7.0	76%, WB	723	11.5	69%, EB	6,830	647	9.5	55% WB
First Street, south of Spring Street	7,040	507	7.2	57% NB	577	8.2	62% NB	5,600	399	7.1	68% NB

[a]Average daily traffic in vehicles per day (vpd) based on ATR counts collected by VAI in May 2018.
[b]Percent of daily volume in peak hour.
[c]Percent traveling in the peak direction.

Table 2.a.2
AVERAGE HOURLY TRAFFIC VOLUMES AT ATR LOCATIONS[a]

	Land Boulevard, North of Cambridgeside Place						Cambridgeside Place, West of Land Boulevard						First Street, South of Spring Street					
	Weekday			Saturday			Weekday			Saturday			Weekday			Saturday		
Start Time	NB	SB	Total	NB	SB	Total	EB	WB	Total	EB	WB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	287	152	439	381	218	599	30	18	48	28	22	50	16	12	28	30	16	46
1:00	147	96	243	225	143	368	12	7	19	14	17	31	18	13	31	18	13	31
2:00	114	62	176	196	103	299	6	10	16	8	5	13	11	3	14	15	6	21
3:00	61	98	159	87	85	172	6	8	14	7	3	10	12	8	20	4	9	13
4:00	104	268	372	97	142	239	7	10	17	2	4	6	11	8	19	11	6	17
5:00	226	1022	1248	157	480	637	17	39	56	10	19	29	31	39	70	14	7	21
6:00	445	1376	1821	225	492	717	42	75	117	35	35	70	94	73	167	44	17	61
7:00	689	1564	2253	350	517	867	90	78	168	44	44	88	154	163	317	57	29	86
8:00	728	1607	2335	515	633	1148	110	160	270	51	55	106	258	192	450	73	48	121
9:00	845	1480	2325	613	743	1356	106	148	254	59	94	153	267	197	464	128	69	197
10:00	876	1159	2035	725	811	1536	132	153	285	117	178	295	220	153	373	193	93	286
11:00	906	1060	1966	793	898	1691	161	185	346	185	216	401	221	110	331	229	124	353
12:00 PM	1069	970	2039	1027	977	2004	206	150	356	261	225	486	248	153	401	216	127	343
1:00	1221	876	2097	1065	1027	2092	267	158	425	293	210	503	259	132	391	282	138	420
2:00	1328	933	2261	1182	1005	2187	279	148	427	321	194	515	418	124	542	314	156	470
3:00	1231	1102	2333	1249	1060	2309	267	153	420	352	214	566	479	119	598	287	156	443
4:00	1258	1092	2350	1061	1025	2086	355	147	502	355	185	540	337	241	578	321	145	466
5:00	1154	945	2099	1027	969	1996	435	110	545	317	189	506	210	225	435	266	176	442
6:00	1317	913	2230	1021	938	1959	373	164	537	317	227	544	389	204	593	266	168	434
7:00	1233	766	1999	961	825	1786	288	164	452	343	222	565	262	144	406	283	140	423
8:00	1055	582	1637	797	649	1446	292	133	425	363	190	553	219	126	345	249	137	386
9:00	987	518	1505	806	536	1342	253	102	355	299	142	441	188	81	269	185	82	267
10:00	742	411	1153	755	487	1242	117	68	185	149	76	225	73	50	123	104	41	145
11:00	645	267	912	643	366	1009	43	25	68	84	43	127	47	23	70	57	23	80
Total[b]	18668	19319	37987	15958	15129	31087	3894	2413	6307	4014	2809	6823	4442	2593	7035	3646	1926	5572

[a]Volumes based on ATR counts conducted by VAI in May 2018; expressed in vph.
[b]Daily volumes expressed in vpd.

2.2 PEDESTRIANS

Pedestrian and bicycle counts for the study area intersections were collected during the vehicle count periods of 2018 described above. The twelve-hour pedestrian counts were performed on Cambridgeside Place, First Street, and Land Boulevard at the ATR locations with the twelve-hour average hourly pedestrian summaries provided in Table 2.b.1 through Table 2.b.3 for the respective locations. All counts were conducted in clear weather. The counts indicate that the majority of the pedestrians on Cambridgeside Place use the north side during both the weekday and Saturday time periods. Counts of First Street indicate the majority of pedestrians use the east side of First Street for both time periods. Counts of Land Boulevard indicate a more balanced distribution except for pedestrians traveling southbound during the weekday time period when most use the west side of the street.

In the vicinity of the Site, all study streets provide 7- to 12-foot wide concrete sidewalks on both sides of the roadway. At intersections where crosswalks are marked, wheelchair ramps are provided at each crosswalk located across each leg of the intersection.

Table 2.b.1
AVERAGE HOURLY PEDESTRIAN VOLUMES[a]
CAMBRIDGESIDE PLACE

	Weekday						Saturday					
	Eastbound		Westbound		Northbound	Southbound	Eastbound		Westbound		Northbound	Southbound
Time	North Side	South Side	North Side	South Side	Crossing Cambridgeside Place	Crossing Cambridgeside Place	North Side	South Side	North Side	South Side	Crossing Cambridgeside Place	Crossing Cambridgeside Place
7:00 AM	17	1	29	7	15	116	19	0	20	0	10	16
8:00	41	0	104	8	41	255	26	0	26	3	13	12
9:00	45	2	62	11	49	203	78	4	47	2	23	18
10:00	33	3	67	7	68	119	51	2	106	0	29	24
11:00	44	2	69	0	128	108	55	2	173	2	39	37
12:00 PM	95	6	127	3	279	313	61	8	137	2	45	44
1:00	76	2	154	2	166	292	136	11	196	3	65	92
2:00	105	11	121	5	100	155	165	34	211	4	71	134
3:00	77	4	93	3	88	105	156	37	189	4	83	101
4:00	108	8	118	6	178	77	154	13	225	3	50	108
5:00	192	12	133	1	264	92	165	17	212	14	26	112
6:00	171	5	125	5	114	108	176	20	199	9	64	101
Total	1004	56	1202	58	1490	1824	1242	148	1741	46	518	799

[a]Based on counts conducted by VAI; May 2018.

Table 2.b.2
AVERAGE HOURLY PEDESTRIAN VOLUMES[a]
FIRST STREET

	Weekday						Saturday					
	Northbound		Southbound		Eastbound	Westbound	Northbound		Southbound		Eastbound	Westbound
Time	East Side	West Side	East Side	West Side	Crossing First Street	Crossing First Street	East Side	West Side	East Side	West Side	Crossing First Street	Crossing First Street
7:00 AM	14	12	40	32	3	7	9	1	4	2	2	0
8:00	46	23	81	42	0	3	7	8	17	1	3	1
9:00	40	10	76	46	3	5	30	21	24	11	3	2
10:00	37	13	44	26	10	5	27	15	32	14	5	4
11:00	43	36	49	51	1	3	25	15	67	23	4	3
12:00 PM	118	62	100	99	7	4	51	16	46	11	9	11
1:00	116	51	104	27	10	4	31	13	32	25	5	2
2:00	69	22	72	31	5	0	56	21	55	18	3	7
3:00	83	52	66	22	5	1	61	10	50	24	5	7
4:00	110	60	56	24	5	9	67	14	32	18	2	9
5:00	143	83	84	62	6	1	52	13	30	9	6	6
6:00	87	45	89	56	3	4	54	8	36	10	3	0
Total	906	469	861	518	58	46	470	155	425	166	50	52

[a]Based on counts conducted by VAI; May 2018.

Table 2.b.3
AVERAGE HOURLY PEDESTRIAN VOLUMES[a]
LAND BOULEVARD

	Weekday						Saturday					
	Northbound		Southbound		Eastbound	Westbound	Northbound		Southbound		Eastbound	Westbound
Time	East Side	West Side	East Side	West Side	Crossing Land Boulevard	Crossing Land Boulevard	East Side	West Side	East Side	West Side	Crossing Land Boulevard	Crossing Land Boulevard
7:00 AM	40	35	23	68	1	3	5	15	4	13	1	2
8:00	36	38	78	141	2	5	29	21	11	30	2	2
9:00	18	23	28	89	0	8	79	59	8	44	5	0
10:00	18	14	19	36	0	2	27	31	23	30	0	2
11:00	15	20	16	32	4	2	26	15	117	79	0	5
12:00 PM	16	41	46	75	4	4	20	17	43	31	2	1
1:00	38	30	49	66	2	5	49	24	60	38	3	3
2:00	43	34	31	31	4	5	52	32	29	32	0	2
3:00	46	40	52	29	1	0	23	22	42	42	6	4
4:00	88	85	49	51	3	2	12	27	53	55	1	7
5:00	114	125	61	93	6	2	13	26	35	36	1	0
6:00	54	113	52	70	1	3	20	20	22	25	0	0
Total	526	598	504	781	28	41	355	309	447	455	21	28

[a]Based on counts conducted by VAI; May 2018.

2.3 BICYCLES

As with the pedestrian counts, bicycle counts for the study area intersections were collected during the peak-hour vehicle count periods of 2018 described above. Twelve-hour bicycle counts were also collected at the ATR locations on Cambridgeside Place, First Street, and Land Boulevard with the twelve-hour average hourly bicycle summaries provided in Table 2.b.4 through Table 2.b.6 for the respective locations. The counts were conducted in clear weather.

Of the three streets, First Street carries the highest number of bicycles with most traveling the street during the weekday period.

Table 2.b.4
AVERAGE HOURLY BICYCLE VOLUMES[a]
CAMBRIDGESIDE PLACE

	Weekday				Saturday			
			Crossing Cambridgeside Place				Crossing Cambridgeside Place	
Time	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound
7:00 AM	1	3	0	0	0	3	0	0
8:00	1	9	0	5	0	0	0	0
9:00	7	3	0	3	0	2	0	0
10:00	1	1	0	1	1	0	0	0
11:00	0	2	4	2	0	0	1	0
12:00 PM	7	6	1	3	3	1	1	0
1:00	1	6	0	0	0	1	0	0
2:00	4	3	0	0	0	1	0	0
3:00	5	1	1	1	0	0	0	0
4:00	7	7	0	0	0	0	0	0
5:00	9	8	3	2	0	0	0	0
6:00	6	4	0	0	0	3	0	0
Total	49	53	9	17	4	11	2	0

[a]Based on counts conducted by VAI; May 2018.

Table 2.b.5
AVERAGE HOURLY BICYCLE VOLUMES[a]
FIRST STREET

	Weekday				Saturday			
			Crossing First Street				Crossing First Street	
Time	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
7:00 AM	8	10	0	1	1	0	0	0
8:00	19	35	0	0	1	2	0	0
9:00	15	25	0	0	0	3	0	0
10:00	7	4	0	0	4	4	0	0
11:00	7	6	0	0	3	0	0	0
12:00 PM	4	13	0	0	1	8	0	0
1:00	7	5	0	0	1	2	0	0
2:00	5	7	0	0	0	0	0	0
3:00	6	11	0	0	0	3	0	0
4:00	9	14	0	0	0	2	0	0
5:00	26	19	0	0	2	1	0	0
6:00	11	17	0	0	2	0	0	0
Total	124	166	0	1	15	25	0	0

[a]Based on counts conducted by VAI; May 2018.

Table 2.b.6
AVERAGE HOURLY BICYCLE VOLUMES[a]
LAND BOULEVARD

	Weekday				Saturday			
			Crossing Land Boulevard				Crossing Land Boulevard	
Time	Northbound	Southbound	Eastbound	Westbound	Northbound	Southbound	Eastbound	Westbound
7:00 AM	3	11	0	0	1	3	0	0
8:00	4	35	0	0	2	1	0	0
9:00	6	8	0	0	2	5	0	0
10:00	4	1	0	0	2	1	0	0
11:00	1	6	0	0	6	3	0	0
12:00 PM	5	2	0	0	1	2	0	0
1:00	2	3	0	0	1	3	0	0
2:00	6	6	0	0	1	4	0	0
3:00	10	5	0	0	1	0	0	0
4:00	17	6	0	0	0	2	0	0
5:00	21	10	0	0	0	0	0	0
6:00	14	13	0	0	1	1	0	0
Total	93	106	0	0	18	25	0	0

[a]Based on counts conducted by VAI; May 2018.

2.4 INTERSECTION TURNING MOVEMENT COUNTS

Intersection turning movement counts were conducted at the study area intersections for the weekday morning (7:30 to 9:30 AM), weekday evening (4:30 to 6:30PM), and Saturday midday (11:00AM to 1:00PM) time periods. Total cars, trucks, buses, pedestrians by movement, bicycles, and vehicle queues were recorded. The 2018 Existing weekday morning, weekday evening, and Saturday midday peak-hour traffic-volume networks are depicted on Figure 2.c.1 through Figure 2.c.3. The pedestrian volumes are depicted in Figure 2.c.4 through Figure 2.c.6 for the weekday morning, weekday evening, and Saturday midday peak-hour periods. Bicycle volumes include both bicycles traveling on and off the sidewalks, and are provided in Figure 2.c.7 through Figure 2.c.9 for the weekday morning, weekday evening, and Saturday midday peak-hour periods.

2.5 EXISTING VEHICLE QUEUES

Vehicle queues were observed at the signalized intersections within the study area. Table 2.c.1 summarizes the vehicle queue observations by intersection approach and lane.

Table 2.c.1
EXISTING QUEUE OBSERVATIONS

	Weekday Morning Peak Hour		Weekday Evening Peak Hour		Saturday Midday Peak Hour	
Intersection/Lane[b]	Average Queue	Maximum Queue	Average Queue	Maximum Queue	Average Queue	Maximum Queue
First Street at Cambridgeside Place and Charles Street:						
Charles Street EB LT/TH/RT	3	6	3	7	2	5
Cambridgeside Place WB LT/RT	2	6	7	11	8	12
First Street NB TH/RT	4	10	6	9	3	6
First Street SB LT/TH	4	7	5	10	2	4
Land Boulevard at Cambridgeside Place and Hotel Driveway:						
Cambridgeside Place EB LT	3	6	9	12	1	2
Cambridgeside Place EB LT/TH	3	4	8	12	3	7
Cambridgeside Place EB RT	0	0	0	0	3	9
Hotel Driveway WB LT/TH/RT	1	3	2	5	1	3
Land Boulevard NB LT	2	6	9	16	3	7
Land Boulevard NB TH	3	5	12	18	3	8
Land Boulevard NB TH	3	6	11	18	4	7
Land Boulevard NB TH/RT	2	6	3	6	3	6
Land Boulevard SB LT	9	16	4	8	2	6
Land Boulevard SB TH	10	14	8	13	4	8
Land Boulevard SB TH	9	14	8	12	5	10
Land Boulevard SB TH/RT	2	6	3	5	5	12

[a]Source: Based upon observations conducted by VAI in May 2018.
[b]EB = eastbound; WB = westbound; NB = northbound; SB = southbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

2.6 MOTOR VEHICLE CRASH DATA

Motor vehicle crash data was obtained from the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2012-2016) in order to examine motor vehicle crash trends occurring within the study area. This data is summarized in Table 2.d.1. Separate tables are provided that identify summaries of crashes between vehicles and pedestrians in Table 2.d.2 and crashes between vehicles and bicyclists in Table 2.d.3. Intersections where no pedestrian or bicyclist involvement with vehicles was recorded are not shown in Table 2.d.2 or Table 2.d.3.

The crash summary indicates the intersection of Land Boulevard with Cambridgeside Place and the Royal Sonesta hotel driveway has the highest crash total of the locations in the study area with an average of 6.0 crashes per year over the five-year study period. Approximately 50 percent of these crashes were rear-end type crashes, typically consistent with highly congested locations. The involvement of two pedestrians and zero bicyclists was noted in the crash data at this location, which is under the jurisdiction of the DCR. The intersection of First Street with Cambridgeside Place and Charles Street was noted to have an average of 2.0 crashes per year. The involvement of one pedestrian and zero bicyclists was noted in the crash data at this location, which is under the jurisdiction of the City of Cambridge. The crash data indicates a total of 21 crashes at 100 Cambridgeside Place but zero crashes at the Lower Garage South Entrance or Exit Driveways. It is likely that some of these crashes take place at the driveways; however, 43 percent of the crashes were noted as sideswipes which typically occur on a street setting as opposed to an intersection setting. The involvement of two pedestrians and zero bicyclists was noted in the crash data.

None of the intersections were noted to have a crash rate higher than the Massachusetts Department of Transportation (MassDOT) District 6 average for intersections, currently noted at 0.71 crashes per million entering vehicles (mev) for signalized intersections and 0.52 crashes per mev for unsignalized intersections.

Table 2.d.1
VEHICLE CRASH DATA SUMMARY[a]

	Land Boulevard at Cambridgeside Place and Hotel Driveway	First Street at Cambridgeside Place and Charles Street	Land Boulevard at Lower Garage East Entrance	Cambridgeside Place at Lower Garage South Entrance	Cambridgeside Place at Lower Garage South Exit	100 Cambridgeside Place	First Street at Lower Garage West Entrance	First Street at Upper Garage and Spring Street
Year:								
2012	2	4	0	0	0	2	0	1
2013	8	1	0	0	0	2	1	1
2014	7	1	0	0	0	4	1	0
2015	4	1	0	0	0	2	0	1
2016	7	1	0	0	0	9	0	1
Total	28	8	0	0	0	19	2	4
Average[a]	5.6	1.6	0.0	0.0	0.0	3.8	0.2	0.8
Crash Rate[b]	0.39	0.48	--	--	--	--	0.15	0.24
Significant[c]	No/No	No/No	--	--	--	--	No/No	No/No
Type:								
Angle	8	0	0	0	0	1	1	2
Rear-End	15	2	0	0	0	1	0	0
Head-On	0	1	0	0	0	0	0	0
Sideswipe	2	3	0	0	0	9	0	1
Fixed Object	1	1	0	0	0	0	0	0
Other/Unknown	2	1	0	0	0	8	1	1
Total	28	8	0	0	0	19	2	4
Time:								
Weekday 7 to 9 AM	0	0	0	0	0	0	0	0
Weekday 4 to 6 PM	6	2	0	0	0	7	0	0
Remainder of Day	22	6	0	0	0	12	2	4
Total	28	8	0	0	0	19	2	4
Pavement Conditions:								
Dry	21	7	0	0	0	12	1	2
Wet	4	1	0	0	0	1	1	0
Snow	1	0	0	0	0	0	0	0
Icy	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Unknown	2	0	0	0	0	6	0	2
Total	28	8	0	0	0	19	2	4
Day of Week:								
Monday through Friday	27	6	0	0	0	13	2	2
Saturday and Sunday	1	2	0	0	0	6	0	2
Total	28	8	0	0	0	19	2	4
Severity:								
Property Damage Only	19	3	0	0	0	5	1	1
Personal Injury	7	1	0	0	0	0	0	1
Fatal Crashes	0	0	0	0	0	0	0	0
Other/Unknown	2	4	0	0	0	14	1	2
Total	28	8	0	0	0	19	2	4

[a]Source: MassDOT Crash Data.
[b]Average crashes over five-year period.
[c]Crash Rate in crashes per million entering vehicles (mev). Includes crashes with pedestrian and/or bicyclist involvement shown in Table 2.d.2 and Table 2.d.3.
dCrash Rate noted as significant if rate exceeds 2018 MassDOT District 6/statewide averages for intersection of 0.71 and 0.52 for signalized and unsignalized intersections, respectively.

Table 2.d.2
CRASH DATA SUMMARY: VEHICLE TO PEDESTRIAN[a]

	Land Boulevard at Cambridgeside Place and Hotel Driveway	First Street at Cambridgeside Place and Charles Street	100 Cambridgeside Place
Year:			
2012	0	0	0
2013	0	0	0
2014	0	1	0
2015	0	0	0
2016	2	0	2
Total	2	1	2
Average[a]	0.40	0.2	0.4
Time:			
Weekday 7 to 9 AM	0	1	0
Weekday 4 to 6 PM	0	0	0
Remainder of Day	2	0	2
Total	2	1	2
Pavement Conditions:			
Dry	1	1	1
Wet	1	0	0
Snow	0	0	0
Icy	0	0	0
Other	0	0	0
Unknown	0	0	1
Total	2	1	2
Day of Week:			
Monday through Friday	1	1	1
Saturday and Sunday	1	0	1
Total	2	1	2
Severity:			
Property Damage Only	0	0	0
Personal Injury	2	0	2
Fatal Crashes	0	0	0
Other/Unknown	0	1	0
Total	2	1	2

[a]Source: MassDOT Crash Data.
[b]Average crashes over five-year period.

Table 2.d.3
CRASH DATA SUMMARY:
VEHICLE TO BICYCLIST[a]

	First Street at Cambridgeside Place and Charles Street
Year:	
2012	0
2013	0
2014	0
2015	0
2016	1
Total	1
Average[a]	0.2
Time:	
Weekday 7 to 9 AM	1
Weekday 4 to 6 PM	0
Remainder of Day	0
Total	1
Pavement Conditions:	
Dry	1
Wet	0
Snow	0
Icy	0
Other	0
Unknown	0
Total	1
Day of Week:	
Monday through Friday	1
Saturday and Sunday	0
Total	1
Severity:	
Property Damage Only	1
Personal Injury	0
Fatal Crashes	0
Other/Unknown	0
Total	1

[a]Source: MassDOT Crash Data.
[b]Average crashes over five-year period.

2.7 EXISTING PUBLIC TRANSIT SYSTEM

The Site is located near Lechmere Station on the MBTA Green Line subway system. The Green Line currently terminates at Lechmere Station but construction is underway on an extension into Medford. Groundbreaking for the Green Line Extension (GLX) Project was held on June 25, 2018, with opening of the GLX scheduled for late 2021. Construction has also started on the new Lechmere Station which will be relocated to the north side of O'Brien Highway. It is expected that the new Lechmere Station will open with the GLX in 2021.

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 2.e.1 summarizes the most recent Green Line headway and boarding data for the Lechmere Square station available from the MBTA.

Table 2.e.1
MBTA GREEN LINE SERVICE SUMMARY

Station	Rush Hour Headways (minutes)[b]	Daily Line Flow	Boarding Counts[a]			
			Weekday Morning Peak Hour		Weekday Evening Peak Hour	
			Boarding	Alighting	Boarding	Alighting
Lechmere	6-7	9,793	647	403	677	488

[a]Source: MBTA composite of station passenger entry and ridership data, 2016 to 2018.
[b]Based on MBTA schedule.

Table 2.e.2 summarizes the most recent Red Line headway and boarding data for the Kendall Square station available from the MBTA.

Table 2.e.2
MBTA RED LINE SERVICE SUMMARY

Station	Rush Hour Headways (minutes)[b]	Daily Line Flow	Boarding Counts[a]			
			Weekday Morning Peak Hour		Weekday Evening Peak Hour	
			Boarding	Alighting	Boarding	Alighting
Kendall/MIT	2-6	102,981	563	3,940	3,435	838

[a]Source: MBTA composite of station passenger entry and ridership data, 2016 to 2018.
[b]Based on MBTA schedule.

Table 2.e.3 summarizes the peak-hour headways and capacity information for the four bus routes servicing the Lechmere Station supplied by the MBTA.

Table 2.e.3
MBTA BUS SERVICE SUMMARY[a]

Route No.	Route	Hours of Operation	Peak-Hour Headway (minutes)	Peak-Hour Peak-Direction Planning Capacity[b]	Daily Ridership	Estimated Daily Capacity
69	Harvard Square to Lechmere Station via Cambridge Street	5:25 AM to 1:11 AM	10-20	180-360	2,555	6,360
80	Arlington Center to Lechmere Station via Medford Hillside	5:00 AM to 1:22 AM	15-30	120-240	2,126	5,160
87	Arlington Center or Clarendon Hill to Lechmere Station via Somerville Avenue	5:10 AM to 1:18 AM	16-30	120-225	3,640	5,760
88	Clarendon Hill to Lechmere Station via Highland Avenue	5:16 AM to 1:14 AM	8-25	144-450	3,972	6,480

[a]Source: MBTA composite of station entry and ridership data, 2016 to 2018.
[b]Planning capacity is 60 passengers per bus.

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.

In addition, the CambridgeSide shuttle bus provides free shuttle service from the Kendall Square T stop to the Project between the hours of 9:00 AM and 8:00 PM Monday through Friday, between the hours of 9:00 AM and 9:00 PM on Saturday, and between the hours of 10:00 AM and 7:00 PM on Sunday.

2.8 EXISTING PARKING UTILIZATION

A review of parking utilization of the existing garages was conducted. Cambridgeside has agreements with certain nearby property owners to provide approximately 370 assigned parking spaces on a long-term basis. These spaces are located in the Lower Garage and are separated out of any utilization counts. Cambridgeside also provides monthly parking to other users including mall employees and commuter parking for employers in the area.

Cambridgeside has the ability to track vehicles by type, specifically with regard to monthly or short-term transient users. A summary of the utilization data is provided in Table 2.f.1 for the Lower Garage and Table 2.f.2 for the Upper Garage, with charts documenting the use on Figure 2.f.1 and Figure 2.f.2, respectively.

Table 2.f.1
LOWER GARAGE PARKING UTILIZATION SUMMARY[a]

	Weekday[b]				Saturday[c]			
Start Time	Transient	Monthly	Total	Utilization	Transient	Monthly	Total	Utilization
Midnight-1am	20	38	58	4%	50	72	122	9%
1am-2am	19	33	52	4%	44	67	111	9%
2am-3am	18	25	43	3%	44	63	107	8%
3am-4am	18	25	43	3%	42	62	104	8%
4am-5am	18	25	43	3%	42	62	104	8%
5am-6am	20	26	46	4%	44	68	112	9%
6am-7am	29	52	81	6%	46	76	122	9%
7am-8am	52	103	155	12%	46	90	136	11%
8am-9am	76	217	293	23%	54	104	158	12%
9am-10am	115	405	520	40%	89	122	211	16%
10am-11am	171	575	746	58%	167	138	305	24%
11am-Noon	238	633	871	67%	219	147	366	28%
Noon-1pm	280	655	935	72%	300	155	455	35%
1pm-2pm	338	661	999	77%	360	165	525	41%
2pm-3pm	332	673	1005	78%	368	173	541	42%
3pm-4pm	318	641	959	74%	377	168	545	42%
4pm-5pm	292	583	875	68%	405	162	567	44%
5pm-6pm	296	450	746	58%	406	148	554	43%
6pm-7pm	286	287	573	44%	376	134	510	39%
7pm-8pm	277	169	446	34%	369	120	489	38%
8pm-9pm	259	128	387	30%	267	104	371	29%
9pm-10pm	166	86	252	19%	171	61	232	18%
10pm-11pm	88	44	132	10%	113	46	159	12%
11pm-Midnight	65	24	89	7%	104	30	134	10%
Max Percent Utilization				78%				44%
Surplus Spaces at Peak			288				726	

[a]Based on counts provided by Cambridgeside for Thursday August 23, 2018 and Saturday August 25, 2018 with utilization based on 1,293 spaces available.
[b]Based on 23 transient spaces and 49 monthly spaces occupied at beginning of count period.
[c]Based on 42 transient spaces and 63 monthly spaces occupied at beginning of count period.

Table 2.f.2
UPPER GARAGE PARKING UTILIZATION SUMMARY[a]

	Weekday[b]				Saturday[c]			
Start Time	Transient	Monthly	Total	Utilization	Transient	Monthly	Total	Utilization
Midnight-1am	1	3	4	1%	0	3	3	0%
1am-2am	1	3	4	1%	0	3	3	0%
2am-3am	1	3	4	1%	0	3	3	0%
3am-4am	1	3	4	1%	0	3	3	0%
4am-5am	1	3	4	1%	0	3	3	0%
5am-6am	1	3	4	1%	0	3	3	0%
6am-7am	3	4	7	1%	0	5	5	1%
7am-8am	10	9	19	2%	1	8	9	1%
8am-9am	18	27	45	6%	3	13	16	2%
9am-10am	26	44	70	9%	9	24	33	4%
10am-11am	44	66	110	14%	50	25	75	9%
11am-Noon	68	71	139	17%	70	25	95	12%
Noon-1pm	87	73	160	20%	96	29	125	16%
1pm-2pm	101	81	182	23%	117	33	150	19%
2pm-3pm	91	79	170	21%	112	35	147	18%
3pm-4pm	94	75	169	21%	125	31	156	20%
4pm-5pm	82	72	154	19%	109	30	139	17%
5pm-6pm	85	56	141	18%	98	26	124	16%
6pm-7pm	79	38	117	15%	80	21	101	13%
7pm-8pm	67	28	95	12%	77	20	97	12%
8pm-9pm	55	23	78	10%	36	15	51	6%
9pm-10pm	22	16	38	5%	6	7	13	2%
10pm-11pm	6	8	14	2%	3	2	5	1%
11pm-Midnight	3	5	8	1%	3	2	5	1%
Max Percent Utilization				23%				20%
Surplus Spaces at Peak			613				639	

[a]Based on counts provided by Cambridgeside for Thursday August 23, 2018 and Saturday August 25, 2018 with utilization based on 795 spaces available.
[b]Based on2 transient spaces and 3 monthly spaces occupied at beginning of count period.
[c]Based on 0 transient spaces and 4 monthly spaces occupied at beginning of count period.

2.9 BICYCLE PARKING

Bicycle parking is also provided on and around the site. Short-term bicycle parking for 100 bicycles have been provided by CambridgeSide. This includes racks located in the Canal Park area, along Cambridgeside Place, and the CambridgeSide-sponsored BLUEbikes station located on Cambridgeside Place that provides 15 bikes for general public use. Within the garage, 46 long-term (weather-protected) bicycle spaces are provided on the first level of the Lower Garage. This results in a total of 146 bicycle spaces for the site, with locations shown on Figure 1.c.13 and Figure 1.c.14. A map depicting routes to the bike parking from the public

right-of-way is shown on Figure 1.c.15, with detailed plans (1 inch = 10 feet) for short-term bike parking shown in Figures 1.c.16 through 1.c.20. Other short-term bike parking locations are shown in Figure 1.c.21, which are locations not within the site boundaries but that have been installed by CambridgeSide per request of the City.

Anecdotal information indicates that the short-term bicycle spaces get used frequently; however the long-term spaces in the garage are seldom used. Other locations that get used for short-term bicycle parking include sign posts on Cambridgeside Place, and railings along Canal Park. Short-term bicycle racks are the DERO post-and-ring bike hitch, model number BH-FT-EPX-X, powder coated in black or silver which accommodate two bikes each. Long-term racks are the wave-rack type, painted white or black.

2.10 EXISTING PARKING OPERATIONS AND CURRENT RATE SCHEDULE

LAZ Parking currently manages the operations in the parking garages. The current rate schedule is shown below in Table 2.f.3 and may be subject to change.

Table 2.f.3
CAMBRIDGESIDE CURRENT PARKING RATES[a]

Time Period	Cost
Short-Term Rates	
0-1 hour	$3
1-2 hours	$4
2-3 hours	$6
3-4 hours	$8
4-5 hours	$10
5-6 hours	$15
6-12 hours	$25
12-24 hours	$30
Monthly Charges	
Range	$125 - $225
HOV	$150

[a]Source: CambridgeSide.

2.11 EXISTING LOADING AND TRASH OPERATIONS

The Site is presently serviced through two loading areas, accessed from Land Boulevard and First Street. No changes are proposed to these areas as a result of the third floor re-tenanting. There are trash dumpsters located in each loading area that are emptied on Mondays and Fridays, typically prior to 5AM. There are separate cardboard dumpsters in each loading area that are emptied every 5 days. Recycling is also removed from the site on a weekly basis. There are no time restrictions on deliveries to the mall; however, deliveries to any stores that are made through the common area must be made before or after mall hours.

2.12 EAST CAMBRIDGE OFFICE DEVELOPMENTS

Information was requested from the Cambridge Community Development Department (CDD) regarding East Cambridge-area office developments that are located in the vicinity of the Project in order to obtain mode split data for sites comparable to the Project. These sites are shown on Figure 2.g.1. Additional information on these sites is provided in following sections of this TIS.

3.0 PROJECT TRAFFIC

3.1 OFFICE TRIP GENERATION

The Project involves the re-tenanting of the third floor from Retail to Office use. Office trips were calculated using Institute of Transportation Engineers (ITE) trip generation information[2] and Land Use Code (LUC) 710, Office. The use of the ITE data provides a conservative basis for generation of vehicle trips that accounts for variation in office tenant characteristics, since this data set is compiled from driveway counts of hundreds of office buildings across the United States.

Based on ITE guidance, the office trips were calculated using the fitted-curve equations with the independent variable size set to 140,000 sf. These baseline office trips were then adjusted to Cambridge-specific trips using mode split, vehicle occupancy, and census data from two nearby East Cambridge-area office developments. Cambridge CDD provided the 2017 Parking and Transportation Demand Management (PTDM) monitoring reports that were prepared for the Two Canal Park[3] and One Rogers Street/ One Charles Park[4] office buildings near CambridgeSide. The locations of these office buildings in relation to CambridgeSide are shown on Figure 2.g.1. Characteristics of the two office developments obtained from the PTDM reports along with the mode-split data are provided in Table 3.a.1.

[2] *Trip Generation Manual, 10th Edition;* ITE; Washington, D.C.; 2017.
[3] *2017(PTDM) Report for Two Canal – PB-125;* TransAction Associates; Woburn, MA; November 22, 2017.
[4] *One Rogers Street/One Charles Park – TDM Monitoring Update Report;* TransAction Associates; Woburn, MA; December 8, 2017.

Table 3.a.1
EAST CAMBRIDGE-AREA OFFICE DEVELOPMENTS CHARACTERISTICS

Characteristics/Mode Split	Two Canal Park[a]	One Rogers Street/ One Charles Park[b]	Average
Building Characteristics			
Total Space, sf	206,313	372,226	--
Occupancy, percent	67	94	81
Employees	545	1,179	--
Total Parking Spaces	127	656	--
Leased Parking Spaces	86	626	--
Bicycle Spaces, long-term/short-term	42/5	75/0	--
Mode Split Characteristics			
Single Occupancy Vehicle (SOV)	39.4	42.4	40.9
High Occupancy Vehicle (HOV)	3.6	4.3	3.95
Transit	36.8	34.4	35.6
Pedestrian	4.3	5.5	4.9
Bicycle	7.1	4.0	5.55
Other	8.8	9.4	9.1
TOTAL	100	100	100

[a]Based on 2017 PTDM report prepared by TransAction Associates for the Two Canal Park office development.
[b]Based on 2017 PTDM report prepared by TransAction Associates for the One Rogers Street/One Charles Park office development.

The SOV and HOV categories for the two office sites account for an average of 40.9 and 3.95 percent of person trips. The values from the PTDM reports for the "Other" category include telecommuting/worked at home trips as a relatively high percentage of the total split for the category (9.0). Uber/Lyft splits averaged 0.5 percent for each of SOV and HOV categories and were added to these categories as suggested by to the PTDM survey guidelines.

National census data from the American Community Survey[5] (ACS) was used to identify Average Vehicle Occupancy (AVO) to convert the ITE vehicle trips into person trips. Mode splits from Table 3.a.1 were then applied to calculate the appropriate share for each transportation mode. Transportation-related (SOV and HOV) person trips were then converted back to vehicle trips using the ACS data for census tract 3521.02 where the site is located.

The resulting office trips by mode are provided in Table 3.a.2. Spreadsheets documenting these calculations are provided in the Appendix.

[5] *2012-2016 American Community Survey, 5-year Estimates.*

Table 3.a.2
OFFICE TRIP GENERATION SUMMARY

Time Period/ Directional Distribution	ITE Vehicle Trips[a]	Person Trips[b]							
	Office	Office Total Trips[c]	SOV (40.9%)	HOV (3.95%)	Transit (35.6%)	Pedestrian (4.9%)	Bicycle (5.55%)	Other (9.1%)	Proposed Vehicle Trips[d]
Weekday Daily:									
Entering	740	784	321	31	279	38	44	71	329
Exiting	740	784	321	31	279	38	44	71	329
Total	1480	1568	642	62	558	76	88	142	658
Weekday Morning Peak Hour:									
Entering	136	144	59	6	51	7	8	13	61
Exiting	22	24	10	1	9	1	1	2	10
Total	158	168	69	7	60	8	9	15	71
Weekday Evening Peak Hour:									
Entering	25	27	11	1	10	1	1	3	11
Exiting	132	140	57	6	50	7	8	12	59
Total	157	167	68	6	60	8	9	15	70
Saturday Daily:									
Entering	160	170	69	7	61	8	10	15	71
Exiting	160	170	69	7	61	8	10	15	71
Total	320	340	138	14	122	16	20	30	142
Saturday Midday Peak Hour:									
Entering	40	42	17	2	15	2	2	4	18
Exiting	34	36	15	1	13	2	2	3	15
Total	74	78	32	3	28	4	4	7	33

[a]Based on ITE LUC 710 – Office, 140 ksf.
[b]Mode splits based on 2017 PTDM reports for Two Canal Park and One Rogers/One Charles Park.
[c]ITE vehicle trips converted to person trips based on rate of 1.06 persons per vehicle, from the 2012-2016 American Community Survey 5-Year Estimates for the United States.
[d]SOV and HOV person trips converted to vehicle trips based on rate of 1.07 persons per vehicle, from the 2012-2016 American Community Survey 5-Year Estimates for Census Tract 3521.02.

It should be noted that the above office trip methodology was applied to the Two Canal Park and One Rogers/One Charles Park office developments as a test to compare a calculated trip total to an actual trip total. The ITE-calculated vehicle trips were compared with the observed vehicle trips (adjusted for off-site parking) and were found to be within 12 percent of the weekday morning peak hour trips and within 24 percent of the weekday evening peak hour trips, with the ITE-trips providing a higher trip total than the observed trips. A spreadsheet is attached in the Appendix that provides these calculations. Use of ITE-calculated vehicle trips therefore presents a worst-case scenario for the calculation of the office trips and accounts for variation in tenant characteristics that may occur as compared with the observed sites.

Retail Trip Calculations

Since the third floor retail is proposed to be re-tenanted with office uses, estimates of existing retail vehicle trips were developed so that these trips may be removed from the street network for purposes of scoping a study area and in order to conduct the traffic analysis in the TIS. The following paragraphs describe this process.

The CambridgeSide parking garages have a counter system that can provide counts of vehicles entering and exiting the Upper or Lower Garage on regular intervals. The system is able to distinguish between vehicles that park monthly (since Cambridgeside has several agreements to provide spaces on a monthly basis) and vehicles that park on a short-term or transient basis. In order to utilize this data to develop estimates of retail trips, the following steps were performed, using 2018 year to date garage data provided by Cambridgeside:

- Monthly parkers were removed from the total garage counts; this resulted in isolation of the transient parked vehicles;
- The counts of transient parked vehicles were then limited to hours that the retail stores are open (10:00 AM to 9:00 PM) to derive the count of vehicles likely associated with retail activity;
- The counts of these remaining vehicles were further refined to exclude the counts of vehicles parked longer than eight hours, which would represent vehicles parked by employees or visitors parking for the day;
- The resulting counts were divided by the original entering volumes to derive a percentage that represented the amount of retail vehicles occurring on a weekday and weekend basis. The process resulted in adjustments that indicated 68.4 percent of the weekday traffic and 86.7 percent of the weekend traffic were related to retail activity.
- These percentages were then applied to the May 2018 counted garage volumes during the weekday morning, weekday evening, and Saturday midday peak hour time periods. A spreadsheet is attached that documents these calculations.

Once the retail traffic was separated from the total count volume, retail traffic associated with the third floor was then calculated. This was done using two known factors:

- The third floor provides approximately 140,000 sf of leasable floor area, which is approximately 21 percent of the total 642,500 sf occupied floor area of CambridgeSide;
- The third floor tenants employ approximately 261 employees, which is approximately 21 percent of the total 1,272 employees employed by CambridgeSide.

The above relationships were used to determine that 21 percent of the counted retail vehicle trips were associated with the third floor. The estimated trips resulting from this empirically-based trip generation method are shown in Table 3.a.3.

Table 3.a.3
EMPIRICAL THIRD FLOOR RETAIL TRIP GENERATION

Time Period/ Directional Distribution	Counted Transient Vehicle Trips[a]	Total Retail Vehicle Trips[b]	Third Floor Retail Vehicle Trips[c]
Weekday:			
Entering	1,930	1,320	277
Exiting	1,900	1,300	273
Total	3,830	2,620	550
Weekday Morning Peak Hour:			
Entering	75	51	11
Exiting	4	3	1
Total	79	54	12
Weekday Evening Peak Hour:			
Entering	170	116	24
Exiting	158	108	23
Total	328	224	47
Saturday:			
Entering	3,792	3,288	691
Exiting	3,728	3,232	679
Total	7,520	6,520	1,370
Saturday Midday Peak Hour:			
Entering	355	308	65
Exiting	218	189	40
Total	573	497	105

[a]Based on CambridgeSide garage counts provided by Cambridgeside during May 2018 count period.
[b]Based on information provided by Cambridgeside. Net result of 68.4 percent (weekday) and 86.7 percent (weekend) reductions applied to counted transient vehicle trips to account for retail activity.
[c]Based on 21 percent of total retail trips.

While it is true that the third floor has a higher vacancy rate than the rest of the core retail area, it is not completely vacant, and currently generates a level of activity from employees and customers that will be removed as a consequence of the re-tenanting, justifying the removal of these trips. Although some customers that currently frequent the third floor may continue to shop at the shopping center if the third floor retail is removed, it is also true that the foot traffic at CambridgeSide has steadily declined over the past decade, and will continue to decline with or without the presence of retail on the third floor. Based on our review, use of this method to calculate the trips associated with the third floor retail activity is conservative and appropriate.

The third floor trips shown in Table 3.a.3 were subtracted from the proposed office trips shown in Table 3.a.2. The resulting net new traffic trips due to the third floor re-tenanting are shown in Table 3.a.4.

Table 3.a.4
THIRD FLOOR NET TRIP GENERATION

Time Period/ Directional Distribution	Proposed Office Vehicle Trips[a]	Third Floor Retail Vehicle Trips[b]	Net New Vehicle Trips
Weekday:			
Entering	329	277	52
Exiting	329	273	56
Total	658	550	108
Weekday Morning Peak Hour:			
Entering	61	11	50
Exiting	10	1	9
Total	71	12	59
Weekday Evening Peak Hour:			
Entering	11	24	-13
Exiting	59	23	36
Total	70	47	23
Saturday:			
Entering	71	691	-620
Exiting	71	679	-608
Total	142	1,370	-1228
Saturday Midday Peak Hour:			
Entering	18	65	-47
Exiting	15	40	-25
Total	33	105	-72

[a]From Table 3.a.2.
[b]From Table 3.a.3.

3.2 TRIP DISTRIBUTION

The office trips were distributed using a blend of trip distribution information from other area traffic studies including the office component of the First Street Assemblage project, the Courthouse project, the K2C2 Office distributions and the 2010 PTDM Employee distribution study. Calculation worksheets for the distribution are provided in the Appendix. Retail trips to be removed from the network were distributed based on existing traffic patterns and movements at the site driveways. The office trip distribution is shown in Table 3.b.1.

Table 3.b.1
OFFICE TRIP-DISTRIBUTION SUMMARY

Route	Direction	Percentage From Direction to Site	Percentage To Direction from Site
Land Boulevard	North	12	12
First Street	North	22	36
Charles Street	West	18	0
Spring Street	West	0	4
First Street	South	12	19
Land Boulevard	West/South	36	29
TOTAL		100	100

The trip distribution is also shown on Figure 3.a.1. The retail trips for the respective weekday morning, weekday evening, and Saturday midday peak-hour time periods are shown on Figure 3.a.2 through Figure 3.a.4. The office trips for the same time periods are shown on Figure 3.a.5 through Figure 3.a.7, and the resulting Net New Third Floor Site Generated vehicle trips are shown on Figure 3.a.8 through Figure 3.a.10, for the same respective time periods.

3.3 PROJECT SERVICE AND LOADING

The two existing loading areas are expected to be able to accommodate the deliveries to and from the office uses and no changes are proposed to these areas as a result of the third floor re-tenanting. Daily office truck trips are typically limited to package pickup and delivery carried out using single-unit or delivery trucks. These trips are expected to total less than ten vehicles per day (less than 20 daily truck trips), accounting for the various courier and delivery services expected. Trash is expected to be accommodated within the existing pickup schedule of twice weekly for CambridgeSide.

4.0 BACKGROUND TRAFFIC

Traffic volumes in the study area were projected to the year 2023, which reflects a five-year planning horizon consistent with City traffic study guidelines and the traffic study scope issued by the City TPT Department. Traffic volume conditions would include increases due to development projects approved or under construction and not yet occupied and increases to general background traffic levels, assumed to increase at 0.5 percent per year.

As indicated in the Scoping Letter, the following projects were identified for inclusion in the Future 2023 condition:

- ***First Street Mixed-Use project***
- ***Cambridge Courthouse Redevelopment***
- ***Cambridge Crossing***
- ***Alexandria Binney Street development***
- ***240 Third Street***
- ***MIT Kendall Square development***
- ***Kendall Square Urban Renewal Plan (KSURP) Infill Development Concept Plan***

4.1 FIRST STREET EXTENSION AND LECHMERE STATION RELOCATION

A review of traffic patterns in the context of the projected Lechmere Station relocation and subsequent First Street extension to O'Brien Highway was conducted. It was determined that since access is not being changed for the Site, changes to traffic entering the Site are likely to be limited to traffic arriving from the north and west via O'Brien Highway. Site traffic traveling these routes may be less likely to use Third Street and Cambridge Street to travel to and from this general area, but will still use First Street to access the Site. Motorists traveling to/from Land Boulevard and to/from the south on First Street or the west on Charles Street/Spring Street are not likely to change their routes.

4.2 ROADWAY IMPROVEMENT PROJECTS

The MassDOT/DCR Longfellow Bridge Rehabilitation Project reached substantial completion in May 2018 and final completion is expected at the end of 2018.

No other roadway projects are currently proposed for the study area.

5.0 TRAFFIC ANALYSIS

5.1 SITE ASSIGNMENT

Existing Condition (2018) traffic volumes were combined with the Net New Third Floor Site Generated traffic levels to derive the 2018 Build condition networks, shown on Figure 5.b.1 through Figure 5.b.3 for the weekday morning, weekday evening, and the Saturday midday peak hour time periods. Figure 5.b.4 through Figure 5.b.6 represent the projected 2018 Build weekday morning, weekday evening, and Saturday midday peak-hour pedestrian volumes.

The Future 2023 traffic volume condition includes the traffic volumes from the identified background developments, the increases resulting from the 0.5 percent per year annual growth rate that were applied to the 2018 Existing conditions traffic volumes, and the net new traffic associated with the Project. These traffic volume networks are shown on Figure 5.d.1 through Figure 5.d.3 for the weekday morning, weekday evening, and Saturday midday peak-hour traffic volumes.

6.0 CAPACITY ANALYSIS

Using the 2018-and 2023-year traffic-volume networks, Vehicle Level-of-Service (LOS) analyses were conducted for the 2018 Existing, 2018 Build, and 2023 Future conditions with the results shown in Tables 6.1 and 6.2 for signalized and unsignalized intersections, respectively. These analyses were conducted using Synchro analysis software, calibrated to match the vehicle queue observations which affect the intersection models. The analysis worksheets are contained in the Appendix.

Table 6.1
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2018 Existing V/C[a]	2018 Existing Delay[b]	2018 Existing LOS	2018 Build V/C	2018 Build Delay	2018 Build LOS	Delay Increase	2023 Future V/C	2023 Future Delay	2023 Future LOS
Land Boulevard at Cambridgeside Place and Hotel Driveway										
Weekday Morning Peak Hour:										
Cambridgeside Place EB	0.41	45	D	0.41	44	D	--	0.43	45	D
Hotel Driveway WB	0.28	32	C	0.28	32	C	--	0.28	32	C
Land Boulevard NB	0.82	26	C	0.94	32	C	--	1.20	48	D
Land Boulevard SB	0.58	20	C	0.58	20	C	--	0.71	23	C
Overall	--	**24**	**C**	--	**26**	**C**	2	--	**32**	**C**
Weekday Evening Peak Hour:										
Cambridgeside Place EB	1.25	150	F	1.22	142	F	--	1.29	157	F
Hotel Driveway WB	0.42	37	D	0.41	36	D	--	0.44	37	D
Land Boulevard NB	0.63	24	C	0.62	24	C	--	0.54	23	C
Land Boulevard SB	0.68	23	C	0.68	23	C	--	0.69	23	C
Overall	--	**46**	**D**	--	**45**	**D**	-1[d]	--	**47**	**D**
Saturday Midday Peak Hour:										
Cambridgeside Place EB	0.61	47	D	0.57	45	D	--	0.71	54	D
Hotel Driveway WB	0.21	23	C	0.22	23	C	--	0.19	22	C
Land Boulevard NB	0.74	24	C	0.70	23	C	--	0.72	24	C
Land Boulevard SB	0.41	19	B	0.41	19	B	--	0.41	20	B
Overall	--	**24**	**C**	--	**23**	**C**	-1[d]	--	**26**	**C**

See notes at end of table.

Table 6.1 (Continued)
VEHICLE LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Peak Hour/Movement	2018 Existing V/C[a]	2018 Existing Delay[b]	2018 Existing LOS[c]	2018 Build V/C	2018 Build Delay	2018 Build LOS	Delay Increase	2023 Future V/C	2023 Future Delay	2023 Future LOS
First Street at Cambridgeside Place and Charles Street										
Weekday Morning Peak Hour:										
Charles Street EB	0.41	20	C	0.46	22	C	--	0.66	29	C
Cambridgeside Place WB	0.61	18	B	0.62	18	B	--	0.50	11	B
First Street NB	0.39	18	B	0.39	18	B	--	0.55	24	C
First Street SB	0.39	19	B	0.39	19	B	--	0.57	25	C
Overall	--	**18**	**B**	--	**19**	**B**	1	--	**22**	**C**
Weekday Evening Peak Hour:										
Charles Street EB	0.55	24	C	0.51	23	C	--	0.73	32	C
Cambridgeside Place WB	0.81	30	C	0.82	31	C	--	0.79	28	C
First Street NB	0.54	23	C	0.56	23	C	--	0.68	28	C
First Street SB	0.61	28	C	0.67	31	C	--	1.18	129	F
Overall	--	**27**	**C**	--	**28**	**C**	1	--	**61**	**E**
Saturday Midday Peak Hour:										
Charles Street EB	0.49	26	C	0.51	27	C	--	0.64	30	C
Cambridgeside Place WB	0.71	18	B	0.70	17	B	--	0.56	11	B
First Street NB	0.20	16	B	0.19	16	B	--	0.25	18	B
First Street SB	0.25	19	B	0.25	19	B	--	0.40	21	C
Overall	--	**19**	**B**	--	**19**	**B**	0	--	**19**	**B**

[a]Volume to capacity ratio. Highest lane use V/C value for each approach.
[b]Average control delay per vehicle (in seconds) for the critical movements.
[c]Level of service.
[d]Decreases due to removal of retail trips during this time period.

Table 6.2
VEHICLE LEVEL-OF-SERVICE SUMMARY - UNSIGNALIZED INTERSECTIONS

Unsignalized Intersection/	2018 Existing			2018 Build			Delay	2023 Future		
Critical Movement/Peak Hour[a]	Demand[b]	Delay[c]	LOS[d]	Demand	Delay	LOS	Increase	Demand	Delay	LOS
Cambridgeside Place at Lower Garage South Exit										
All movements from Lower Garage South Exit SB:										
Weekday Morning	9	10	B	18	10	B	--	18	10	B
Weekday Evening	338	14	B	374	14	B	--	374	15	C
Saturday Midday	162	13	B	137	12	B	--	137	13	B
First Street at Upper Garage and Spring Street										
All movements from Upper Garage WB:										
Weekday Morning	2	19	C	2	20	C	--	2	56	F
Weekday Evening	67	15	B	67	15	B	--	67	27	D
Saturday Midday	61	12	B	61	12	B	--	61	14	B

[a]Critical movement changes depending on time period.
[b]Demand (in vehicles per hour) for the critical movements.
[c]Average control delay per vehicle (in seconds) for the critical movements.
[d]Level of service.
NB = northbound; SB = southbound; WB = westbound; SB = southbound

Figure 6.a.1 through Figure 6.a.3 depict the vehicle LOS summaries in a graphical map format for the weekday morning, weekday evening, and Saturday midday peak hours. Figure 6.b.1 through Figure 6.b.3 provide graphical maps of vehicle delay changes at the study area intersections for the weekday morning, weekday evening, and Saturday midday peak hours. These delay change maps depict the change in delay from Existing to Build and from Existing to Future conditions.

7.0 QUEUE ANALYSIS

Vehicle queues were calculated for each approach of the signalized study area intersections using Synchro analysis software. The analyses were calibrated in an attempt to match the results of the queue observations. Table 7 summarizes the 2018 Existing observed, 2018 Existing calculated, 2018 Build calculated, and 2023 Future calculated vehicle queues.

Table 7
QUEUE ANALYSIS RESULTS[a]

Intersection/Lane	Weekday Morning Peak Hour					Weekday Evening Peak Hour					Saturday Midday Peak Hour				
	2018 Observed	2018 Existing Calculated	2018 Build Calculated	Increase	2023 Future Calculated	2018 Observed	2018 Existing Calculated	2018 Build Calculated	Increase	2023 Future Calculated	2018 Observed	2018 Existing Calculated	2018 Build Calculated	Increase	2023 Future Calculated
First Street at Charles Street and Cambridgeside Place															
Charles Street EB LT/TH/RT	3	2	2	0	4	5	4	4	0	5	3	3	3	0	3
Cambridgeside Place WB LT/ RT	2	2	2	0	1	8	4	5	1	4	8	2	2	0	1
First Street NB TH/RT	4	4	4	0	6	6	6	6	0	8	3	2	2	0	2
First Street SB LT/TH	3	3	4	1	6	6	6	6	0	14	2	2	2	0	4
Land Boulevard at Cambridgeside Place and Hotel Driveway															
Cambridgeside Place EB LT	3	2	2	0	2	10	9	9	0	9	1	3	3	0	4
Cambridgeside Place EB LT/TH	3	2	2	0	2	8	9	9	0	10	4	3	3	0	4
Cambridgeside Place EB RT	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
Hotel Driveway WB LT/TH/RT	1	1	1	0	1	2	2	2	0	2	1	1	1	0	1
Land Boulevard NB LT	2	5	6	1	9	11	3	3	0	2	3	4	4	0	4
Land Boulevard NB TH	3	4	4	0	5	13	10	10	0	10	4	5	5	0	6
Land Boulevard NB TH	4	4	4	0	5	13	10	10	0	10	4	5	5	0	6
Land Boulevard NB TH/RT	3	4	4	0	5	4	10	10	0	10	3	5	5	0	6
Land Boulevard SB LT	9	2	2	0	2	4	4	4	0	4	2	2	2	0	2
Land Boulevard SB TH	10	12	12	0	17	6	7	7	0	9	5	6	6	0	8
Land Boulevard SB TH	10	12	12	0	17	8	7	7	0	9	6	6	6	0	8
Land Boulevard SB TH/RT	2	12	12	0	17	3	7	7	0	9	6	6	6	0	8

[a]All queues calculated using Synchro methodology. Queue in vehicles per lane.

8.0 RESIDENTIAL STREET VOLUME ANALYSIS

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 8.

Table 8
TRAFFIC ON RESIDENTIAL STREETS

Roadway	Reviewed Segment	Amount of Residential	Existing Two-Way Traffic	Increase due to Project
Morning Peak Hour:				
Charles Street	Second Street to First Street	<1/3	104	11
Evening Peak Hour:				
Charles Street	Second Street to First Street	<1/3	224	2
Saturday Peak Hour:				
Charles Street	Second Street to First Street	<1/3	122	3

9.0 PARKING ANALYSIS

9.1 PROJECTED PARKING DEMAND

A parking analysis was conducted to determine future parking demands consistent with vehicle-trip generation assumptions and modal split assumptions for Project traffic. On a zoning basis, the office and retail uses have identical parking requirements; therefore with no change in building area, no additional parking spaces would be required. The demand analysis is based upon existing transient parking demand rates at CambridgeSide modified for duration of stay along with expected employee population and mode split assumptions from the trip generation analysis.

Table 9.1
PARKING ANALYSIS

	Use	Size	Rate	Demand (spaces)
Demand	Office Population[a]	280 emp. to 560 emp.	0.43[b]	120 to 241
	Retail			
	Employees	121 emp.[c]	0.28[d]	-34
	Shopping	140,000 sf	0.47 sp/1,000 sf[e]	-65
	SubTotal			-99
Required Spaces				21 to 142
Surplus Parking Capacity from Lower and Upper Garages[f]				901
Net Remaining Capacity				880 to 759

[a]Based on a range of 2.0 – 4.0 employees/1,000 sf applied to 140,000 sf.
[b]Calculated as SOV rate (40.9 percent) plus ½ of HOV rate (3.95 percent).
[c]As defined previously in this TIS, based on 21 percent of existing employee total for Cambridgeside.
[d]Calculated as SOV rate (26 percent) plus ½ of HOV rate (4 percent).
[e]Based on observed transient parking demand across both garages from August 2018 adjusted for duration of stay consistent with retail trip generation assumptions.
[f]From Tables 2.f.1 and 2.f.2.

It should be noted that while the typical range for employee density used in the calculation is between 2.0 and 4.0 employees per 1,000 sf, the Applicant's expectation is that density is more likely to be 2.0 employees per 1,000 sf, resulting in a demand of 120 spaces. Moreover, the Applicant is committed to implementing a parking ratio consistent with parking ratios proposed for Kendall Square and the Volpe Center development areas. Therefore a maximum parking rate of 0.9 parking spaces per 1,000 sf for the office use is proposed, which would result in a total parking supply of 126 spaces for the 140,000 sf office space. This total is within the typical range noted above and such a rate would encourage the use of alternative transportation modes. By providing this total of spaces for the Project, and using the parking space utilization data from August, the following surplus would result:

901 surplus spaces – 126 office use spaces = 775 remaining surplus spaces

9.2 CAMBRIDGESIDE COMMERCIAL PARKING REQUIREMENTS

As previously discussed in Section 2.8 (Existing Parking Utilization), there are more than adequate spaces available at all times to accommodate parking demands for the proposed re-tenanting, We anticipate that parking demand in the weekday morning peak hour will be between 61 and 120 spaces. As discussed in the section on Existing Parking Utilization, we have at that time in excess of 1000 available spaces. Therefore, we anticipate no issues with respect to the Commercial Parking Permit or Major Amendment No. 5.

9.3 PARKING ACCOMMODATIONS

Parking is proposed to be accommodated through the use of the existing Upper and Lower Garages, with no changes in parking supply proposed. While the above analysis indicates a decrease in parking demand following the re-tenanting from retail to office, it is also clear that sufficient supply currently exists to accommodate the office use. It should be noted that the Applicant is committed to implementing typical TDM measures to further reduce the demand for parking. This is discussed in following sections of the TIS.

9.4 SEASONAL PARKING CONSIDERATIONS

A review of peak seasonal parking demands was conducted to determine the ability of the site to accommodate the Project parking needs. Data were reviewed for December 2017 weekday and weekend and the August 2018 Thursday and Saturday time periods used elsewhere in this report. The December 2017 data was further refined to the week 4 time period (week before Christmas), which was observed to have the highest number of garage entries of the other weeks in December.

This review focused on the Lower Garage as not all data is available for the Upper Garage for this time period. However, the Lower Garage receives the highest utilization, particularly for retail activities.

The data indicated that while garage entries were higher during the peak December time period and a slight shift in the occurrence of peak utilization occurred as compared with the August data, garage utilization was not substantially greater during the times that the office parking demand would be at its peak, typically 11AM during weekdays. The weekday utilization was noted at

79 percent in the December weekday data and at 78 percent in the August weekday data, although the August peak occurred at a later time. This is shown in Table 9.2 below.

Table 9.2
LOWER GARAGE SEASONAL PARKING COMPARISON

Time Period	December Weekday[a] (Percent Utilization)	August Weekday[b] (Percent Utilization)
6am-7am	13	6
7am-8am	22	12
8am-9am	39	23
9am-10am	53	40
10am-11am	63	58
11am-Noon	72	67
Noon-1pm	79	72
1pm-2pm	78	77
2pm-3pm	74	78
3pm-4pm	71	74
4pm-5pm	63	68
5pm-6pm	53	58
6pm-7pm	50	44
7pm-8pm	47	34

[a]Based on Lower Garage counts from week 4 of December 2017 for weekday days only.
[b]Based on Lower Garage count from Thursday August 23 2018.

Based on the data in Table 9.2, there were still approximately 272 parking spaces (1,293 spaces *21 percent space capacity) available in the Lower Garage at this time. Therefore, we have concluded that sufficient capacity will exist to accommodate the Project parking demands even during this peak shopping season. A slightly higher utilization of 57 percent was observed in the December weekend data as compared with the August peak utilization of 44 percent on a Saturday; however this occurs when office parking demand would be negligible.

Discussions with Cambridgeside garage operations staff confirm the conclusion that ample parking exists during the holiday shopping season. Cambridgeside staff noted that they have not experienced parking constraints during the holiday season in the last 8-10 years.

9.5 BICYCLE PARKING

The re-tenanting of existing third floor retail use sf to office use sf does not trigger compliance with the bicycle parking requirements provided in Section 6.100 of the Ordinance because, per Section 6.103.1, the re-tenanting does not result in at least a fifteen percent (15%) increase in the total number of bicycle parking spaces that would be required for the entire building. Rather, the proposed third floor re-tenanting decreases the total number of required spaces. Accordingly, there are no changes proposed for the bicycle accommodations associated with the third floor re-tenanting to office use.

10.0 TRANSIT ANALYSIS

10.1 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 two subway lines that are available for employees at the Site. The distribution on the transit routes is shown in Table 10.1.

Table 10.1
TRANSIT SYSTEM TRIP DISTRIBUTION

Time Period/Directional Distribution	Project Transit Trips	Green Line Distribution[a]	Red Line /CambridgeSide Shuttle Bus Distribution[b]	Lechmere Bus Distribution[c]
Weekday Daily:				
Entering	279	201	50	28
Exiting	279	201	50	28
Total	558	402	100	56
Peak Hour Headways (Minutes)	--	6	9	8-30
Weekday Morning:				
Entering	51	37	9	5
Exiting	9	6	2	1
Total	60	43	11	6
Weekday Evening:				
Entering	10	7	2	1
Exiting	50	36	9	5
Total	60	43	11	6
Saturday Daily:				
Entering	61	44	11	6
Exiting	61	44	11	6
Total	122	88	22	12
Saturday Midday:				
Entering	15	10	3	2
Exiting	13	10	2	1
Total	28	20	5	3

[a] 72 percent assignment.
[b] 18 percent assignment. Total of subway assignment = 90 percent.
[c] 10 percent assignment, distributed among all 4 bus routes.

The peak-hour headways listed in Table 10.1 indicate approximately ten trains arrive/depart the Lechmere Square station during the peak hours. The peak-hour passenger loading from the proposed project of 37 to 44 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 10.2 for the Green Line subway loadings, Table 10.3 for the Red Line subway loadings, and Table 10.3 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.

10.2 SUMMARY OF ANALYSIS RESULTS

Tables 10.2 through 10.4 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 0.01 for all affected bus routes, the Green Line, and the Red Line subway systems.

Seating and lighted shelters are available at the Lechmere Square and Kendall Square stations. No benches or shelters are provided for at any other locations along the other bus routes in proximity to the Site.

10.3 FUTURE TRANSIT CONDITIONS

The MBTA is in the process of introducing 24 new cars on the Green Line as part of its broader Green Line expansion project. The cars will be able to accommodate a 10 percent increase in passengers as compared with the existing cars. The MBTA is also considering a larger upgrade in trolley cars that would potentially double the Green Line capacity; however this upgrade is not funded.

The GLX project is an extension of the Green Line service out to Medford using existing MBTA Commuter Rail rights-of-way. Five new stations will be built in Somerville with the last at College Avenue built near Tufts University in Medford. Service is expected to see an increase of 30,700 boardings with a total weekday ridership of 52,000 riders.

The MBTA is also in the process of replacing the cars on the Red Line, with plans to replace all cars by 2023. This is expected to increase overall capacity by 50 percent by raising the current number of trains per hour from 13 to 20 and allowing a three-minute headway for trains, which is a reduction from the current four-and-a-half minute headway. It should be noted that the ridership data from the MBTA are based on aggregated counts from Fall of 2016 which may not reflect peak train ridership occurring during one or two specific hours of one day.

Additional transit improvements were identified in the Kendall Square Mobility Task Force Report[6]. These include the potential for bus priority lanes on First Street, Binney Street, and Third Street, as well as the possible implementation of a new CT4 bus. This would connect Sullivan Square and Kenmore Square via Lechmere and Kendall Square through the Inner Belt Road proposed through Cambridge Crossing. These are noted as potential options, as MBTA has stated that no funding has been identified for the CT4 bus and the Report notes that more work is needed to understand the impacts of the bus priority lanes.

[6] *Kendall Square Mobility Task Force Final Report;* City of Cambridge; Cambridge, MA; 2017.

Table 10.2
MBTA GREEN LINE SUBWAY PEAK HOUR 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]	17	2	110	3,740	1,050	0.28	1,093	0.29	4.1	0.01
	Evening Peak Hour[e]	17	2	110	3,740	1,165	0.31	1,208	0.32	3.7	0.01

[a]Based on current MBTA schedule.
[b]Defined on the basis of MBTA design standards.
[c]From MBTA ridership count results
[d]Volume-to-capacity ratio.
[e]Based on scheduled rush-hour headway values of 6 minutes.

Table 10.3
MBTA RED LINE SUBWAY PEAK HOUR RIDERSHIP IMPACTS

Train Line	Time Period	Directional Flow	No. of Trains[a]	No. of Cars per Train	Standard Load per Car[b]	Hourly Capacity[c]	Existing		Proposed with Project		Ridership Increase	
							Line Flow[d]	V/C[e]	Line Flow	V/C	Percent	V/C
Red Line	Morning Peak Hour[e]	Outbound	13	6	167	13,026	3,003	0.23	3,006	0.23	0.1	0.00
		Inbound	13	6	167	13,026	8,189	0.63	8,197	0.63	0.1	0.00
	Evening Peak Hour[e]	Outbound	13	6	167	13,026	8,318	0.64	8,325	0.64	0.1	0.00
		Inbound	13	6	167	13,026	5,588	0.43	5,592	0.43	0.1	0.00

[a]Based on average headway of 4.5 minutes over one hour.
[b]Defined on the basis of MBTA design standards.
[c]Based on standard passenger load per car, number of cars per trains, and number of trains per hour.
[d]From MBTA ridership count results fall 2016.
[e]Volume-to-capacity ratio.

Table 10.4
MBTA BUS ROUTE PEAK HOUR RIDERSHIP IMPACTS

Weekday Morning Peak Hour:

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	129	0.36	130	0.36	0.8	0.00
80	20 minutes	60	180	125	0.69	126	0.70	0.8	0.01
87	20 minutes	60	180	139	0.77	141	0.78	1.4	0.01
88	18 minutes	60	200	186	0.93	188	0.94	1.1	0.01

Weekday Evening Peak Hour:

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	20 minutes	60	180	106	0.59	107	0.59	0.9	0.00
80	20 minutes	60	180	134	0.74	135	0.75	0.7	0.01
87	20 minutes	60	180	153	0.85	155	0.86	1.3	0.01
88	20 minutes	60	180	153	0.85	155	0.86	1.3	0.01

Saturday Midday Peak Hour:

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	22 minutes	60	164	78	0.48	79	0.48	1.3	0.00
80	35 minutes	60	103	56	0.54	56	0..54	0.0	0.00
87	30 minutes	60	120	62	0.52	63	0.53	1.6	0.01
88	20 minutes	60	180	66	0.37	67	0.37	1.5	0.00

[a]Based on current MBTA schedule.
[b]Defined on the basis of MBTA design standards.
[c]Based on MBTA Ridership Data for composite year 2017.
[d]Volume-to-capacity ratio.

11.0 PEDESTRIAN ANALYSIS

A pedestrian impact analysis was conducted at the study area intersections under 2018 Existing, 2018 Build, and 2023 Future 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 11.1 summarizes the results of the pedestrian analysis at the signalized intersections, while Table 11.2 presents a summary of the pedestrian analysis at the unsignalized intersections. The PLOS ratings for the intersections are shown graphically on Figure 6.c.1 for the weekday morning peak hour; Figure 6.c.2 for the weekday evening peak hour; and Figure 6.c.3 for the Saturday midday peak hour. It should be noted that the delay calculated for the Cambridgeside Place mid-block crosswalk does not resemble actual conditions due to slow speeds on the street and consistent yielding of motorists to pedestrians in the crosswalk.

The Project does not change the PLOS of any of the crosswalks studied. Delay is added to the Cambridgeside Place mid-block crosswalk during the weekday morning peak hour and weekday evening peak hour, but decreased during the Saturday midday peak hour due to a projected reduction in site traffic volume. Mitigation is proposed to increase motorist awareness of the pedestrian crossing and is intended to offset the delay increases.

Table 11.1
PEDESTRIAN LEVEL-OF-SERVICE SUMMARY – SIGNALIZED INTERSECTIONS

Intersection/Time Period/Crossing Path	2018 Existing			2018 Build			Delay Increase	2023 Build		
	Demand[a]	Delay[b]	LOS[c]	Demand	Delay	LOS		Demand	Delay	LOS
First Street at Charles Street and Cambridgeside Place										
Weekday Morning:										
Crossing Cambridgeside Place	111	18	B	111	18	B	0	111	18	B
Crossing Charles Street	33	18	B	33	18	B	0	33	18	B
Crossing First Street (North)	119	18	B	127	18	B	0	127	18	B
Crossing First Street (South)	27	18	B	27	18	B	0	27	18	B
Weekday Evening:										
Crossing Cambridgeside Place	195	18	B	195	18	B	0	195	18	B
Crossing Charles Street	74	18	B	74	18	B	0	74	18	B
Crossing First Street (North)	291	18	B	299	18	B	0	299	18	B
Crossing First Street (South)	54	18	B	54	18	B	0	54	18	B
Saturday Midday:										
Crossing Cambridgeside Place	97	18	B	97	18	B	0	97	18	B
Crossing Charles Street	16	18	B	16	18	B	0	16	18	B
Crossing First Street (North)	159	18	B	175	18	B	0	175	18	B
Crossing First Street (South)	30	18	B	30	18	B	0	30	18	B
Land Boulevard at Cambridgeside Place and Hotel Driveway										
Weekday Morning:										
Crossing Cambridgeside Place	74	37	D	74	37	D	0	74	37	D
Crossing Land Boulevard (North)	148	37	D	148	37	D	0	148	37	D
Weekday Evening:										
Crossing Cambridgeside Place	59	37	D	59	37	D	0	59	37	D
Crossing Land Boulevard (North)	306	37	D	306	37	D	0	306	37	D
Saturday Midday:										
Crossing Cambridgeside Place	17	37	D	17	37	D	0	17	37	D
Crossing Land Boulevard (North)	169	37	D	469	37	D	0	469	37	D

[a]Demand in pedestrians per hour.
[b]Average delay per pedestrian (in seconds).
[c]Pedestrian Level of Service.
See notes at end of table.

Table 11.2
PEDESTRIAN LEVEL-OF-SERVICE SUMMARY – UNSIGNALIZED INTERSECTIONS

	2018 Existing			2018 Build				2023 Build		
Intersection/Time Period/Crossing Path	Demand[b]	Delay[c]	LOS[d]	Demand	Delay	LOS	Delay Increase	Demand	Delay	LOS
Cambridgeside Place at Mid-Block Crossing										
Weekday Morning:										
Crossing Cambridgeside Place	319	22	D	319	23	D	1	319	40	E
Weekday Evening:										
Crossing Cambridgeside Place	342	2407	F	342	2614	F	207	342	7237	F
Saturday Midday:										
Crossing Cambridgeside Place	88	76	F	88	70	F	-6[e]	88	80	F
First Street at Spring Street and Upper Garage Entrance/Exit										
Weekday Morning:										
Crossing Spring Street	73	9	B	73	9	B	0	73	18	C
Weekday Evening:										
Crossing Spring Street	137	3	A	137	3	A	0	137	4	A
Saturday Midday:										
Crossing Spring Street	25	2	A	25	2	A	0	25	3	A

[a]Special Permit Criteria 5 – Pedestrian Level of Service.
[b]Demand in pedestrians per hour.
[c]Average delay per pedestrian (in seconds).
[d]Pedestrian Level of service.
[e]Due to a decrease in vehicular volume on Cambridgeside Place from the 2018 Existing to 2018 Build condition, the pedestrian delay improved.

12.0 BICYCLE ANALYSIS

A review of bicycle conditions was conducted at the affected intersections and street segments. Currently, First Street provides dedicated lanes for bicyclists; the other streets in the study area are wide enough to permit bicycle travel but do not provide exclusive bicycle lanes.

12.1 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. The locations meeting these criteria are listed in Table 12.1 for Existing and Build conditions. The mitigation measures proposed at these locations would not impact the ability of bicyclists to safely traverse the study area roadways or intersections.

Table 12.1
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/Intersecting Street/Time Period	Approach Bicycle Volume	Conflicting Vehicles Turning Volume			
		2018 Existing		2018 Build	
		Advancing Volume	Opposing Volume	Advancing Volume	Opposing Volume
Land Boulevard at Lower Garage East Entrance					
Weekday Morning	SB -- 24	1662	80	1664	81
Weekday Evening	SB -- 14	1001	9	993	7
Saturday Midday	SB -- <10	--	--	--	--
Land Boulevard at Cambridgeside Place					
Weekday Morning	SB -- 19	1452	161	1452	163
Weekday Evening	SB -- <10	--	--	--	--
Saturday Midday	SB -- <10	--	--	--	--
Cambridgeside Place at Lower Garage South Entrance					
Weekday Morning	EB – 10	161	189	161	210
	WB -- <10	--	--	--	--
Weekday Evening	EB – <10	--	--	--	--
	WB -- 10	496	0	506	0
Saturday Midday	EB – <10	--	--	--	--
	WB -- <10	--	--	--	--
Cambridgeside Place at Lower Garage South Exit					
Weekday Morning	EB – 10	161	9	161	18
	WB -- <10	--	--	--	--
Weekday Evening	EB – <10	--	--	--	--
	WB -- 10	267	229	267	239
Saturday Midday	EB – <10	--	--	--	--
	WB -- <10	--	--	--	--
First Street at Cambridgeside Place and Charles Street					
Weekday Morning	NB -- 11	190	46	195	46
	SB -- 32	164	0	164	0
Weekday Evening	NB -- 26	183	130	180	130
	SB -- 24	161	0	161	0
Saturday Midday	NB -- 2	83	101	76	101
	SB -- 7	41	0	41	0
First Street at Lower Garage West Entrance					
Weekday Morning	NB -- 20	287	57	291	85
	SB -- 36	190	0	190	0
Weekday Evening	NB -- 26	355	38	373	37
	SB -- 19	219	0	219	0
Saturday Midday	NB -- 1	271	51	266	46
	SB -- 8	120	0	120	0

See notes at end of table.

Table 12.1 (Continued)
BICYCLE-VEHICLE VOLUME CONFLICTS

Roadway/Intersecting Street/Time Period	Approach Bicycle Volume	Conflicting Vehicles Turning Volume			
		2018 Existing		2018 Build	
		Advancing Volume	Opposing Volume	Advancing Volume	Opposing Volume
First Street at Upper Garage Entrance/Exit					
Weekday Morning	NB -- 19	145	34	149	34
	SB -- 36	219	349	231	349
Weekday Evening	NB -- 34	293	131	308	131
	SB -- 29	201	127	2001	130
Saturday Midday	NB -- 2	190	176	184	176
	SB -- 9	110	115	109	116

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

13.0 ARTICLE 19 SPECIAL PERMIT CRITERIA ANALYSIS

Under Section 19.25.1, the Planning Board shall only grant a Section 19.20 Project Review Special Permit upon finding that the Project will have no substantial adverse impact on City traffic within the study area analyzed in the TIS. Substantial adverse impact is measured by reference to the Special Permit Criteria, which consist of five traffic impact indicators used to evaluate Project impacts. The indicators are: (1) project vehicle trip generation weekdays and weekends for a twenty-four hour period and AM and PM peak vehicle trips generated; (2) change in level of service at identified signalized intersections; (3) increased volume of trips on residential streets; (4) increase of length of vehicle queues at identified signalized intersections; and (5) lack of sufficient pedestrian and bicycle facilities. The methodology for the analysis of the traffic impact indicators 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. Exceedance of one or more indicators suggests a potentially substantial adverse impact on City traffic; however, the Planning Board should also consider proposed Project mitigation in making its finding. The following section summarizes the 100 measurements analyzed in applying the five indicators to the proposed Project and the proposed Project mitigation. As demonstrated below, our analysis shows that while the existing conditions at CambridgeSide produce minimal measurements under Indicator 5 that exceed City standards, the Project itself is not expected to exceed any indicators or exacerbate the pre-existing exceedances. Therefore, the Project is not expected to have a substantial adverse impact on City traffic.

Indicator 1: Project Vehicle – Trip Generation

As shown on Table 13.a, the Project satisfies the City standards for Indicator 1 regarding vehicle trip-generation as demonstrated by the 5 measurements detailed below.

Indicator 2: Project Vehicle – Level-Of-Service

As shown on Table 13.b, the Project satisfies the City standards for Indicator 2 regarding vehicle LOS as demonstrated by the 12 measurements detailed below.

Indicator 3: Traffic On Residential Streets

As shown on Table 13.c, the Project satisfies the City standards for Indicator 3 regarding traffic on residential streets as demonstrated by the 3 measurements detailed below.

Indicator 4: Lane Queue

As shown on Table 13.d, the Project satisfies the City standards for Indicator 4 regarding lane queues as demonstrated by the 48 measurements detailed below.

Indicator 5: Lack Of Sufficient Pedestrian And Bicycle Facilities

As shown on Tables 13.e.1 and 13.e.2, the Project satisfies the City standards for Special Permit Criteria 5 regarding pedestrian and bicycle facilities. Of the 32 measurements analyzed in connection with Criteria 5, none were exceeded as a result of the Project. A total of four measurements are exceeded under existing conditions, with or without the Project. The Project itself neither exacerbates the existing exceedances nor makes any changes to the relevant areas.

Table 13.a
INDICATOR 1
PROJECT VEHICLE-TRIP GENERATION

Weekday =	108	AM Peak Hour =	59	PM Peak Hour =	21	Exceeds Criteria? [Y/N]	N/N/N
Saturday =	-1,228	Midday Peak Hour =		-72		Exceeds Criteria? [Y/N]	N/N

Table 13.b
INDICATOR 2
PROJECT VEHICLE-LEVEL-OF-SERVICE

Intersection	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Existing	With Project	Exceeds Criteria?	Existing	With Project	Exceeds Criteria?	Existing	With Project	Exceeds Criteria?
Land Boulevard at Cambridgeside Place and Hotel Driveway	C	C	N	D	D	N	C	C	N
First Street at Charles Street and Cambridgeside Place	B	B	N	C	C	N	B	B	N
Cambridgeside Place at Garage South Exit	B	B	N	B	B	N	B	B	N
First Street at Upper Garage/Spring Street	C	C	N	B	B	N	B	B	N

Table 13.c
INDICATOR 3 – TRAFFIC VOLUME INCREASE ON RESIDENTIAL STREETS –

Street Segment	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Existing Volume	With Project	Exceeds Criteria?	Existing Volume	With Project	Exceeds Criteria?	Existing Volume	With Project	Exceeds Criteria?
Charles Street, Second Street to First Street (Amount of residential = <1/3)	104	115	N	224	226	N	122	125	N

Table 13.d
INDICATOR 4 – QUEUE ANALYSES

Intersection	No. of Lanes Analyzed	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
		Existing	With Project	Exceeds Criteria?	Existing	With Project	Exceeds Criteria?	Existing	With Project	Exceeds Criteria?
First Street at Charles Street and Cambridgeside Place	4									
Charles Street EB LT/TH/RT		2	2	N	4	4	N	3	3	N
Cambridgeside Place WB LT/ RT		2	2	N	4	5	N	2	2	N
First Street NB TH/RT		4	4	N	6	6	N	2	2	N
First Street SB LT/TH		3	4	N	6	6	N	2	2	N
Land Boulevard at Cambridgeside Place and Hotel Driveway	12									
Cambridgeside Place EB LT		2	2	N	9	9	N	3	3	N
Cambridgeside Place EB LT/TH		2	2	N	9	9	N	3	3	N
Cambridgeside Place EB RT		0	0	N	0	0	N	0	0	N
Hotel Driveway WB LT/TH/RT		1	1	N	2	2	N	1	1	N
Land Boulevard NB LT		5	6	N	3	3	N	4	4	N
Land Boulevard NB TH		4	4	N	10	10	N	5	5	N
Land Boulevard NB TH		4	4	N	10	10	N	5	5	N
Land Boulevard NB TH/RT		4	4	N	10	10	N	5	5	N
Land Boulevard SB LT		2	2	N	4	4	N	2	2	N
Land Boulevard SB TH		12	12	N	7	7	N	6	6	N
Land Boulevard SB TH		12	12	N	7	7	N	6	6	N
Land Boulevard SB TH/RT		12	12	N	7	7	N	6	6	N

Table 13.e.1
INDICATOR 5A – PEDESTRIAN LEVEL OF SERVICE

Intersection	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Midday Peak Hour		
	Existing PLOS	With Project	Exceeds Criteria?	Existing PLOS	With Project	Exceeds Criteria?	Existing PLOS	With Project	Exceeds Criteria?
First Street at Charles Street and Cambridgeside Place									
Crossing Cambridgeside Place	B	B	N	B	B	N	B	B	N
Crossing Charles Street	B	B	N	B	B	N	B	B	N
Crossing First Street (North)	B	B	N	B	B	N	B	B	N
Crossing First Street (South)	B	B	N	B	B	N	B	B	N
Land Boulevard at Cambridgeside Place and Hotel Driveway									
Crossing Cambridgeside Place	D	D	N	D	D	N	D	D	N
Crossing Land Boulevard (North)	D	D	N	D	D	N	D	D	N
Cambridgeside Place at Mid-Block Crossing									
Crossing Cambridgeside Place	D	D	N	F	F	**Y**	F	F	**Y**
First Street at Spring Street and Upper Garage Entrance/Exit									
Crossing Spring Street (West)	B	B	N	A	A	N	A	A	N

Table 13.e.2
INDICATOR 5B AND 5C – PEDESTRIAN AND BICYCLE FACILITIES

Adjacent Street or Public Right-of-Way	Sidewalks or Walkways Present?	Exceeds Criteria?	Bicycle Facilities or Right-of-Ways Present?	Exceeds Criteria?
Cambridgeside Place	Y	N	N	**Y**
Land Boulevard	Y	N	N	**Y**
First Street	Y	N	Y	N

14.0 PROJECT MITIGATION AND CONCLUSION

14.1 PROJECT MITIGATION

Generally, the Project's location near Lechmere Station as well as the area shuttle services significantly encourages transit use by employees, visitors, and residents to the proposed Project. Mitigation efforts are therefore geared towards a low single occupant vehicle (SOV) mode of transportation. As detailed below, the Project proposes implementation of a TDM Plan and modifications to improve roadway and pedestrian facilities and safety. The Project is not expected to have a substantial impact on traffic on residential streets.

14.2 TRANSPORTATION DEMAND MANAGEMENT PROGRAM

CambridgeSide currently provides a number of TDM measures consistent with Conditions 7 and 8 of the original PUD Decision along with Minor Amendment No. 6 that were intended to reduce SOV travel and encourage the use of alternative modes of transportation. The measures are provided below in italics with the current status also provided.

- *Provide details of a shuttle bus system including routes, schedules, frequency and capacity serving the development, other developments and the East Cambridge transit stations* – Currently implemented through both the Charles River TMA EZ Ride shuttle bus system providing service between Kendall Square and North Station as well as the CambridgeSide Shuttle Bus that provides service between CambridgeSide and Kendall Square free of charge.

- *Implement a computer based ride sharing information bank to assist commuters seeking van pool and car pool arrangements* – Currently implemented through membership in the Charles River TMA.

- *Plan for participation in the MBTA commuter pass program for all employees and tenants of this development* – Previously implemented with employees, tenants, and visitors able to purchase MBTA passes at the CambridgeSide information desk. The MBTA is in the process of revising their technology for point of sale pass purchase and this service is temporarily unavailable.

- *Provide details of an on-going program to survey customers and employees (including tenants) to determine travel modes, times of arrival and departure, home location, and*

preferences for ride sharing among other information – Currently implemented as the Annual Transportation Monitoring Report.

- *Allow for up to 50 percent of the bicycle parking facilities required by Article 6.000 to be located elsewhere in the East Cambridge riverfront district in public parks and other suitable locations* – Currently implemented through short-term bicycle parking spaces located around Canal Park and on Cambridgeside Place.

In addition to these ongoing commitments, CambridgeSide will implement the following TDM measures to supplement the existing program and encourage alternatives to SOV use by the new office employees:

- Encourage employees to obtain a Charlie card and register it for bike parking, allowing employees the ability to use the bike cages at area MBTA stations and other areas free of charge;
- Make available public transportation schedules, which will be posted in a centralized location for employees;
- Provide information on available pedestrian and bicycle facilities in the vicinity of the project site in a central location for employees;
- Charge for parking at market rates and offer discounted parking for dedicated HOV vehicles;
- Provide language in lease documents ensuring that employers are required to provide MBTA pass subsidies to employees up to the federal maximum (currently $260 per month);
- Provide information about transportation options available to employees at orientations and on a company website; and
- Encourage employers to work with the Cambridge Office of Workforce Development.

14.3 CAMBRIDGESIDE PLACE MODIFICATIONS

In order to facilitate enhanced access to the third floor as well as resolve current issues related to operations on Cambridgeside Place, discussed more fully in this TIS and as shown on Figure 14.a.1, modifications are proposed that include re-dedication of existing areas to accommodate taxicabs and Uber/Lyft vehicles along with a pick-up/drop-off area adjacent to the Third Floor Lobby Door. Pavement markings to provide motorist direction and encourage yielding to pedestrians in the mid-block crosswalk on Cambridgeside Place are also proposed, along with the reapplication of markings for the Cambridgeside Place approach to Land Boulevard. The improvements are subject to obtaining all necessary permits and approvals which the Applicant will coordinate with the City to acquire for this effort.

14.4 CONCLUSION

As required by Section 19.20, the Project has been evaluated against the five indicators as measurements of the Project's expected impact on City traffic. Of the 100 measurements analyzed in connection with the five indicators, none were exceeded as a result of the Project. A total of four measurements are exceeded under existing conditions, with or without the Project. As detailed above, the Project will not exacerbate any of the pre-existing exceedances or create any new exceedances. The Applicant is also committed to the implementation of the above Project mitigation strategies in order to lessen any potential impact of the Project on City traffic. Accordingly, the Project is not expected to have a substantial adverse impact on City traffic such that issuance of a Project Review Special Permit is appropriate with respect to potential traffic impacts.

The previous sections of this TIS have documented what is in effect, a small change in the attributes of a development with multiple pedestrian and vehicle access points and ample parking supply. CambridgeSide maintains sufficient parking to accommodate the current uses as well as those under the proposed re-tenanting. CambridgeSide also has committed to many of the TDM measures currently in effect for developments across the city, which is expected to mitigate the Project's impact on the road network.

The Project represents a re-tenanting of existing active retail space and will result in the removal of vehicle trips from the street network during some portions of the weekday and a greater reduction during the weekend days. No changes to the parking facilities are proposed with this re-tenanting, and existing data indicates the parking garages have ample surplus capacity to accommodate the proposed office uses and still maintain sufficient parking supply for the current uses. This TIS finds that the Project can be accommodated within the existing area infrastructure and on the roadway network with minimal effects, resulting in the ability to modify the uses associated with the Project as planned.