



TO:	Robert France, Senate Construction	DATE:	August 3, 2021
FROM:	Keri Pyke, P.E., PTOE Christa Lucas, P.E. Emma Parisi	HSR PROJECT NO.:	2021076.00
SUBJECT:	Trip Generation Study and Transportation Demand Management Plan		

Overview

Howard Stein Hudson (HSH) has prepared this Trip Generation Study and Transportation Demand Management (TDM) Plan to satisfy the requirements of the Burlington Planning Board. Given that the Project is asking for an increase in density, there is a requirement to reduce the weekday peak hour trips by 20%. The study includes the TDM plan describing how the Project will reduce peak hour trips.

The Project includes the construction of a 15,000 square-foot (sf) addition to the existing building located at 15 Adams Street, Burlington, Massachusetts. This lot is a portion of the parcel known as Assessor Map 59 Parcel 14. This parcel is in the General Industrial District and within the Neighborhood Business Overlay District. This size addition must be sought with a Floor Area Ratio (FAR) Incentive that increases the allowed building size to increase from an FAR of 0.15 to an FAR of 0.25. This is granted by reducing the traffic generated in the morning and evening peak hours by 20% per Article 5 of the Town of Burlington Zoning Bylaws.

Project Description

Filter Sales and Services currently operates out of a 40,000-sf warehouse and has a staff of 35 employees. The site currently operates 20 small trucks or vans for customer pick-ups, 2-3 tractor trailer deliveries, 4-5 UPS and FedEx deliveries, and 8 delivery trucks. On-site operations include storage, sale, and delivery of air filters. Filter Sales and Services proposes to expand their warehouse space by 15,000 sf for a total floor space of 55,000 sf. Additional space for inventory will improve the efficiency of operations. Filter Sales and Services anticipates the hiring of 2-4 new employees; the addition will not generate an increase in daily deliveries to the site.



Existing Conditions

MASSDOT COUNT STATION 4124 (MIDDLESEX TURNPIKE)

Data was obtained from the Massachusetts Department of Transportation's (MassDOT's) count station 4124, located on the Middlesex Turnpike north of the ramp from Interstate 95 (I-95) southbound to Middlesex Turnpike. The November 2016 counts indicate that the morning peak hour for this area generally occurs between 7:45 – 8:45 a.m., and the evening peak hour is between 5:00 – 6:00 p.m. Count Station 4124 data are provided in the **Appendix**.

SITE TRAFFIC

Turning movement counts (TMCs) were conducted on Tuesday, June 8, 2021, from 7:00 a.m. – 6:00 p.m. at the site driveway on Adams Street. The TMCs included automobile, truck, pedestrian, and bicycle movements. Filter Sales and Service peak hours occur from 7:00 a.m. – 8:00 a.m. and 3:00 p.m. – 4:00 p.m. Site drive volumes are summarized by vehicle type and time of day in **Table 1**. Complete count data for the site driveway are provided in the **Appendix**.

Table 1. 2021 Site Drive Daily Volumes

Time of Day	Vehicle Counts (vph)					
	Cars/Vans		Trucks		Total	
	In	Out	In	Out	In	Out
7:00–8:00 a.m.	14	7	1	4	15	11
8:00–9:00 a.m.	6	6	1	2	7	8
9:00–10:00 a.m.	4	2	0	0	4	2
10:00–11:00 a.m.	7	5	3	3	10	8
11:00 a.m.–Noon	3	6	2	2	5	8
Noon–1:00 p.m.	8	10	3	2	11	12
1:00–2:00 p.m.	6	3	1	2	7	5
2:00–3:00 p.m.	3	5	4	2	7	7
3:00–4:00 p.m.	3	24	4	2	7	26
4:00–5:00 p.m.	2	14	2	0	4	14
5:00–6:00 p.m.	1	9	0	0	1	9
Total/Daily	57	91	21	19	78	110



TRUCK TRIPS TO/FROM THE SITE

During a typical day, approximately 36 trucks visit the site. This includes 20 small trucks for customer pick-ups, 2-3 tractor-trailer deliveries, 4-5 mail service deliveries, and 8 personal delivery trucks. With the expansion, truck volumes are not expected to increase. The site currently has four loading docks at the main building and two loading docks at the outbuilding, with one equipped with a compactor. With the expansion, two additional loading bays will be added to the main building.

SITE PARKING

Currently, there are 60 parking spaces for 35 employees and customers. With the expansion, seven additional parking spaces will be added for a total of 67 parking spaces.

Future Conditions

Filter Sales and Services proposes to expand their warehouse space by 15,000 sf for a total floor space of 55,000 sf. Filter Sales and Services anticipates the hiring of 2-4 new employees; the addition will not generate an increase in daily deliveries to the site. The addition is proposed to be used for storage of additional product and will not result in additional office space or a significant increase in workforce. Additional space for inventory will improve the efficiency of operations.

ITE TRIP GENERATION

To estimate the trip reduction necessary to satisfy the provision of the Planning Board, trips generated by industrial land use based on data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*¹ were calculated.

The following ITE land use code (LUC) was used based on the average rate per 1,000 sf:

- **Land Use Code 110 – General Light Industrial.** A light industrial facility is a free-standing facility devoted to a single use. The facility has an emphasis on activities other than manufacturing and typically has minimal office space. Typical light industrial activities include printing, material testing, and assembly of data processing equipment. Industrial Park and Manufacturing are related uses. The overall highest vehicle volumes during the a.m. and p.m. peak hours on a weekday were counted between 7:30 – 8:30 a.m. and 4:30 – 5:30 p.m.

¹ *Trip Generation Manual, 10th Edition; Institute of Transportation Engineers; Washington, D.C.; 2017.*



- **Land Use Code 150 – Warehousing.** A warehouse is primarily devoted to the storage of materials, but it may also include office and maintenance areas. The overall highest vehicle volumes during the a.m. and p.m. peak hours on a weekday were counted between 11:30 a.m. – 12:30 p.m. and 3:00 – 4:00 p.m.

Table 2 summarizes the peak hour ITE trip generation estimate using the ITE Trip Generation rate for a 40,000-sf industrial project per the zoning district for the daily and adjacent roadway peak hours (8 – 9 a.m. and 5 – 6 p.m.).

Table 2. ITE Estimate and Existing Trips

		ITE LUC 110 Gen. Light Industrial (40 ksf)	Existing 15 Adams Street (40 ksf)
Daily	In	99	78
	Out	99	110
	Total	198	188
a.m. Peak Hour (8 – 9 a.m.)	In	25	7
	Out	3	8
	Total	28	15
p.m. Peak Hour (5 – 6 p.m.)	In	3	1
	Out	22	9
	Total	25	10

The existing 40,000-sf warehouse site generates fewer trips than the trip generation forecasted for General Light Industrial use by the most recent ITE Trip Generation Manual: 13 fewer trips during the a.m. peak hour and 15 fewer trips during the p.m. peak hour. Detailed trip generation data is included in the **Appendix**.

NEW TRIPS

New peak hour trips associated with the addition were estimated using ITE rates based on the square footage of the addition and the number of new employees using both General Light Industrial and Warehouse land use codes. Estimates of new peak hour trips are summarized in **Table 3**.



Table 3. New Trips

		LUC 110 Light Industrial		LUC 150 Warehousing	
		15 ksf	3 employees	15 ksf	3 employees
a.m. Peak Hour (7 – 8 a.m.)	In	9	1	2	1
	Out	1	0	1	1
	Total	10	1	3	2
p.m. Peak Hour (4 – 5 p.m.)	In	1	1	1	1
	Out	8	0	2	1
	Total	9	1	3	2

ITE data indicate that the addition will conservatively generate an additional 3 trips during the a.m. peak hour (2 in and 1 out) and an additional 3 trips during the p.m. peak hour (1 in and 2 out). The 2 – 3 peak hour trips are consistent with the expectation of Filter Sales and Service for the additional 2- 4 employees that will be associated with the additional warehouse space. Detailed trip generation data is included in the **Appendix**.

FLOOR AREA RATIO INCENTIVE

The Town of Burlington Zoning Bylaw allows owner(s) in General Industrial (IG) or High-rise Industrial (IH) districts to increase the Maximum FAR requirement if the owner(s)/operator reduces 20% of the estimated ITE trip generation rate for both the a.m. and p.m. peak hours. The additional trips were added to the existing peak hour volumes to estimate the proposed peak hour volumes.

Table 4 summarizes the ITE trip generation for the Project with a 20% reduction as well as the proposed a.m. and p.m. peak hour site trips.

Table 4. ITE Estimate (20% Reduction) and Proposed Trips

		ITE LUC 110 Gen. Light Industrial (32 ksf)	Proposed 15 Adams Street (Existing Trips + New Trips)
a.m. Peak Hour (8 – 9 a.m.)	In	20	9
	Out	3	9
	Total	23	18
p.m. Peak Hour (5 – 6 p.m.)	In	3	2
	Out	18	11
	Total	21	13



Transportation Demand Management Plan

Although the Project will have negligible transportation impacts to local roadways during the a.m. and p.m. peak hours, the following transportation commitments and improvements are recommended for the Project:

- Filter Sales and Service should avoid deliveries during the a.m. peak hour (7:00– 9:00 a.m.) and the p.m. peak hour (4:00– 6:00 p.m.). Currently the site’s p.m. peak hour is outside of this timeframe.
- Filter Sales and Service should offer staff the option to telecommute or allow alternative work schedules, as appropriate. Telecommute programs allow employees to work from home or another off-site location part-time or full-time. Alternative work schedules (flextime, staggered work hours, compressed work weeks) allow companies to reduce congestion and minimize operating costs while offering employees more flexibility in when they work.
- Filter Sales and Service should encourage alternate forms of transportation and carpooling for employees.

Conclusion

The observed peak hours of the project site (7:00 – 8:00 a.m. and 3:00 – 4:00 p.m.) mostly do not overlap during the peak hours of the area (7:45 – 8:45 a.m. and 5:00 – 6:00 p.m.) The proposed 15,000 sf addition to the warehouse has been determined not to incur significant roadway impacts during the a.m. and p.m. peak hours. The project will consider implementing TDM strategies to further minimize peak hour impacts. However, with the addition, the warehouse project will continue to generate fewer trips during the peak hours even if a 20% reduction is applied to the forecasted trip generation for a general industrial land use.



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Appendix

MassDOT Count Station 4124 Data

Location Info		Count Data Info	
Location ID	4124	Start Date	11/7/2016
Type	I-SECTION	End Date	11/8/2016
Functional Class	4	Start Time	12:00 PM
Located On	MIDDLESEX TURNPIKE	End Time	12:00 PM
NORTH OF	RAMP-RT 95 SB TO MIDDLESEX TURNPIKE	Direction	
Direction	2-WAY	Notes	
Community	Burlington	Count Source	693
MPO_ID		File Name	
HPMS ID	48000502050	Weather	
Agency	Massachusetts Highway Department	Study	
		Owner	mhdds
		QC Status	Accepted

Interval: 15 mins					
Time	15 Min				Hourly Count
	1st	2nd	3rd	4th	
00:00 - 01:00	48	42	28	29	147
01:00 - 02:00	29	19	13	12	73
02:00 - 03:00	11	9	8	8	36
03:00 - 04:00	12	6	22	9	49
04:00 - 05:00	20	28	34	63	145
05:00 - 06:00	64	102	138	227	531
06:00 - 07:00	239	335	364	454	1392
07:00 - 08:00	486	519	597	636	2238
08:00 - 09:00	663	638	624	600	2525
09:00 - 10:00	562	563	609	600	2334
10:00 - 11:00	561	596	606	630	2393
11:00 - 12:00	648	738	765	851	3002
12:00 - 13:00	868	808	884	884	3444
13:00 - 14:00	779	776	748	748	3051
14:00 - 15:00	778	713	707	727	2925
15:00 - 16:00	710	645	709	694	2758
16:00 - 17:00	754	745	778	796	3073
17:00 - 18:00	905	948	923	804	3580
18:00 - 19:00	794	835	712	662	3003
19:00 - 20:00	647	557	565	486	2255
20:00 - 21:00	433	402	378	371	1584
21:00 - 22:00	394	320	294	194	1202
22:00 - 23:00	174	143	122	94	533
23:00 - 24:00	104	93	56	53	306
TOTAL					42579

Location Info	
Location ID	4124
Type	I-SECTION
Functional Class	4
Located On	MIDDLESEX TURNPIKE
NORTH OF	RAMP-RT 95 SB TO MIDDLESEX TURNPIKE
Direction	2-WAY
Community	Burlington
MPO_ID	
HPMS ID	48000502050
Agency	Massachusetts Highway Department

Count Data Info	
Start Date	11/8/2016
End Date	11/9/2016
Start Time	12:00 PM
End Time	12:00 PM
Direction	
Notes	
Count Source	693
File Name	
Weather	
Study	
Owner	mhdds
QC Status	Accepted

Interval: 15 mins					
Time	15 Min				Hourly Count
	1st	2nd	3rd	4th	
00:00 - 01:00	50	45	26	26	147
01:00 - 02:00	25	20	11	13	69
02:00 - 03:00	10	8	11	11	40
03:00 - 04:00	4	10	14	14	42
04:00 - 05:00	16	24	37	58	135
05:00 - 06:00	69	99	143	224	535
06:00 - 07:00	249	308	363	532	1452
07:00 - 08:00	484	568	602	665	2319
08:00 - 09:00	602	638	605	659	2504
09:00 - 10:00	630	542	558	597	2327
10:00 - 11:00	571	520	536	579	2206
11:00 - 12:00	644	672	740	780	2836
12:00 - 13:00	916	980	963	935	3794
13:00 - 14:00	903	791	760	793	3247
14:00 - 15:00	779	733	700	820	3032
15:00 - 16:00	724	778	733	733	2968
16:00 - 17:00	762	713	823	855	3153
17:00 - 18:00	892	900	861	783	3436
18:00 - 19:00	805	793	653	652	2903
19:00 - 20:00	648	565	535	454	2202
20:00 - 21:00	442	422	372	311	1547
21:00 - 22:00	351	311	221	171	1054
22:00 - 23:00	146	135	104	81	466
23:00 - 24:00	115	90	69	49	323
TOTAL					42737



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Appendix

Driveway Counts

Client: Christa Lucas, P.E.
 Project #: 724_2C2_HSH
 BTD #: Location 1
 Location: Burlington, MA
 Street 1: Adams Street
 Street 2: Cypress Drive
 Count Date: 6/8/2021
 Day of Week: Tuesday
 Weather: Clouds & Sun, 90°F



PASSENGER CARS & HEAVY VEHICLES COMBINED

Start Time	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	24	0	0	0	31	8	0	2	0	0	0	0	0	0
7:15 AM	0	0	34	0	0	0	63	3	0	2	0	0	0	0	0	0
7:30 AM	0	0	28	0	0	0	56	2	0	5	0	0	0	0	0	0
7:45 AM	0	0	48	0	0	0	46	2	0	2	0	0	0	0	0	0
8:00 AM	0	0	45	0	0	0	65	1	0	1	0	0	0	0	0	0
8:15 AM	0	0	37	0	0	0	51	4	0	4	0	0	0	0	0	0
8:30 AM	0	0	54	0	0	0	46	1	0	1	0	0	0	0	0	0
8:45 AM	0	0	57	0	0	0	61	1	0	2	0	0	0	0	0	0
9:00 AM	0	0	59	0	0	0	52	1	0	0	0	0	0	0	0	0
9:15 AM	0	0	39	0	0	0	40	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	34	0	0	0	43	2	0	0	0	0	0	0	0	0
9:45 AM	0	1	54	0	0	0	37	0	0	2	0	0	0	0	0	0
10:00 AM	0	1	43	0	0	0	38	3	0	2	0	1	0	0	0	0
10:15 AM	0	0	57	0	0	0	30	5	0	4	0	0	0	0	0	0
10:30 AM	0	0	42	0	0	0	49	1	0	1	0	0	0	0	0	0
10:45 AM	0	0	59	0	0	0	46	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	60	0	0	0	64	0	0	2	0	0	0	0	0	0
11:15 AM	0	0	59	0	0	0	46	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	59	0	0	0	67	3	0	0	0	2	0	0	0	0
11:45 AM	0	0	73	0	0	0	71	2	0	3	0	1	0	0	0	0
12:00 PM	0	1	76	0	0	0	73	1	0	3	0	0	0	0	0	0
12:15 PM	0	0	64	0	0	0	68	5	0	3	0	1	0	0	0	0
12:30 PM	0	1	52	0	0	0	67	1	0	2	0	1	0	0	0	0
12:45 PM	0	0	47	0	0	0	67	2	0	1	0	1	0	0	0	0
1:00 PM	0	0	55	0	0	0	76	1	0	1	0	0	0	0	0	0
1:15 PM	0	1	55	0	0	0	64	4	0	0	0	0	0	0	0	0
1:30 PM	0	1	57	0	0	0	60	0	0	4	0	0	0	0	0	0
1:45 PM	0	0	59	0	0	0	67	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	58	0	0	0	64	1	0	2	0	0	0	0	0	0
2:15 PM	0	1	60	0	0	0	71	4	0	0	0	0	0	0	0	0
2:30 PM	0	0	65	0	1	0	55	0	0	3	0	0	0	0	0	0
2:45 PM	0	0	73	0	0	0	58	1	0	2	0	0	0	0	0	0
3:00 PM	0	0	87	0	0	0	62	3	0	8	0	0	0	0	0	0
3:15 PM	0	0	73	0	0	0	74	1	0	3	0	0	0	0	0	0
3:30 PM	0	1	103	0	0	0	52	1	0	5	0	1	0	0	0	0
3:45 PM	0	0	83	0	0	0	65	1	0	7	0	2	0	0	0	0
4:00 PM	0	0	70	0	0	0	54	3	0	2	0	1	0	0	0	0
4:15 PM	0	0	85	0	0	0	50	0	0	8	0	1	0	0	0	0
4:30 PM	0	0	69	0	0	0	56	0	0	1	0	0	0	0	0	0
4:45 PM	0	0	83	0	0	0	70	1	0	1	0	0	0	0	0	0
5:00 PM	0	0	64	0	0	0	70	0	0	3	0	1	0	0	0	0
5:15 PM	0	1	68	0	0	0	66	0	0	3	0	0	0	0	0	0
5:30 PM	0	0	82	0	0	0	61	0	0	2	0	0	0	0	0	0
5:45 PM	0	0	71	0	0	0	72	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	193	0	0	0	223	7	0	8	0	0	0	0	0	0
<i>PHF</i>	0.85				0.87				0.50				0.00			
<i>HV %</i>	0.0%	0.0%	2.6%	0.0%	0.0%	0.0%	5.4%	14.3%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

MID PEAK HOUR 11:30 AM to 12:30 PM	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	1	272	0	0	0	279	11	0	9	0	4	0	0	0	0
<i>PHF</i>	0.89				0.98				0.81				0.00			
<i>HV %</i>	0.0%	0.0%	5.1%	0.0%	0.0%	0.0%	4.7%	36.4%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%

PM PEAK HOUR 3:00 PM to 4:00 PM	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	1	346	0	0	0	253	6	0	23	0	3	0	0	0	0
<i>PHF</i>	0.83				0.86				0.72				0.00			
<i>HV %</i>	0.0%	0.0%	1.7%	0.0%	0.0%	0.0%	1.6%	66.7%	0.0%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Client: Christa Lucas, P.E.
 Project #: 724_2C2_HSH
 BTD #: Location 1
 Location: Burlington, MA
 Street 1: Adams Street
 Street 2: Cypress Drive
 Count Date: 6/8/2021
 Day of Week: Tuesday
 Weather: Clouds & Sun, 90°F



HEAVY VEHICLES

Start Time	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	5	0	0	0	5	1	0	0	0	0	0	0	0	0
7:15 AM	0	0	3	0	0	0	12	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	4	0	0	0	4	0	0	3	0	0	0	0	0	0
7:45 AM	0	0	5	0	0	0	1	0	0	1	0	0	0	0	0	0
8:00 AM	0	0	1	0	0	0	7	0	0	1	0	0	0	0	0	0
8:15 AM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	3	0	0	0	10	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	5	0	0	0	3	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	1	0	0	0	2	1	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	2	1	0	2	0	0	0	0	0	0
10:30 AM	0	0	3	0	0	0	2	1	0	1	0	0	0	0	0	0
10:45 AM	0	0	5	0	0	0	6	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	3	0	0	0	5	0	0	1	0	0	0	0	0	0
11:15 AM	0	0	7	0	0	0	5	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	3	0	0	0	5	2	0	0	0	1	0	0	0	0
12:00 PM	0	0	6	0	0	0	3	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0
12:30 PM	0	0	3	0	0	0	7	0	0	1	0	1	0	0	0	0
12:45 PM	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0
1:00 PM	0	0	3	0	0	0	3	0	0	1	0	0	0	0	0	0
1:15 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
1:30 PM	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0
1:45 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	2	0	0	0	1	1	0	1	0	0	0	0	0	0
2:15 PM	0	1	2	0	0	0	3	2	0	0	0	0	0	0	0	0
2:30 PM	0	0	1	0	1	0	3	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	1	0	0	0	2	0	0	1	0	0	0	0	0	0
3:00 PM	0	0	3	0	0	0	0	2	0	1	0	0	0	0	0	0
3:15 PM	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
3:30 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	3	1	0	1	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
4:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:00 AM to 8:00 AM PHF	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	17	0	0	0	22	1	0	4	0	0	0	0	0	0
	0.85				0.48				0.33				0.00			

MID PEAK HOUR 10:30 AM to 11:30 AM PHF	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	18	0	0	0	18	1	0	2	0	0	0	0	0	0
	0.64				0.79				0.50				0.00			

PM PEAK HOUR 2:15 PM to 3:15 PM PHF	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	1	7	0	1	0	8	4	0	2	0	0	0	0	0	0
	0.67				0.65				0.50				0.00			

Client: Christa Lucas, P.E.
 Project #: 724_2C2_HSH
 BTD #: Location 1
 Location: Burlington, MA
 Street 1: Adams Street
 Street 2: Cypress Drive
 Count Date: 6/8/2021
 Day of Week: Tuesday
 Weather: Clouds & Sun, 90°F

BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701
 Office: 978-746-1259
 DataRequest@BostonTrafficData.com
 www.BostonTrafficData.com

PEDESTRIANS & BICYCLES

Start Time	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MID PEAK HOUR 11:30 AM to 12:30 PM	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PEAK HOUR 3:00 PM to 4:00 PM	Adams Street Northbound				Adams Street Southbound				Cypress Drive Eastbound				Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.



HOWARD STEIN HUDSON

Engineers + Planners

Appendix

Trip Generation Worksheets

2021076 - 15 Adams Street

Trip Generation Assessment: Existing Trip Generation (40 ksf)

HOWARD STEIN HUDSON

7-Jun-2021

	per 1000 SF				
Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips
Daily Peak Hour					
General Light Industrial ¹	40	Total		4.960	198
	ksf	In	50%	2.480	99
		Out	50%	2.480	99
Warehouse ²	40	Total		1.74	70
	ksf	In	50%	0.870	35
		Out	50%	0.870	35
AM Peak Hour					
General Light Industrial ¹	40	Total		0.700	28
	KSF	In	88%	0.616	25
		Out	12%	0.084	3
Warehouse ²	40	Total		0.17	7
	ksf	In	77%	0.131	5
		Out	23%	0.039	2
PM Peak Hour					
General Light Industrial ¹	40	Total		0.630	25
	KSF	In	13%	0.082	3
		Out	87%	0.548	22
Warehouse ²	40	Total		0.19	8
	ksf	In	27%	0.051	2
		Out	73%	0.139	6

Based on ITE Trip Generation Handbook, 10th Edition (February 2020)

1. ITE Trip Generation Manual, 10th Edition, LUC 110 (General Light Industrial), average rate
2. ITE Trip Generation Manual, 10th Edition, LUC 150 (Warehouse), average rate

2021076 - 15 Adams Street

Trip Generation Assessment: Net New Trips

HOWARD STEIN HUDSON

7-Jun-2021

Land Use	per 1000 SF					per employee				
	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips
AM Peak Hour										
General Light Industrial ¹	15	Total		0.700	10	3	Total		0.520	1
	KSF	In	88%	0.616	9	employees	In	83%	0.432	1
		Out	12%	0.084	1		Out	17%	0.088	0
Warehouse ²	15	Total		0.17	3	3	Total		0.61	2
	ksf	In	77%	0.131	2	employees	In	72%	0.439	1
		Out	23%	0.039	1		Out	28%	0.171	1
PM Peak Hour										
General Light Industrial ¹	15	Total		0.630	9	3	Total		0.490	1
	KSF	In	13%	0.082	1	employees	In	22%	0.108	0
		Out	87%	0.548	8		Out	78%	0.382	1
Warehouse ²	15	Total		0.19	3	3	Total		0.66	2
	ksf	In	27%	0.051	1	employees	In	36%	0.238	1
		Out	73%	0.139	2		Out	64%	0.422	1

Based on ITE Trip Generation Handbook, 10th Edition (February 2020)

1. ITE Trip Generation Manual, 10th Edition, LUC 110 (General Light Industrial), average rate

2. ITE Trip Generation Manual, 10th Edition, LUC 150 (Warehouse), average rate

2021076 - 15 Adams Street

Trip Generation Assessment: Existing Trip Generation (20% reduction of 40ksf = 32 ksf)

HOWARD STEIN HUDSON

7-Jun-2021

	per 1000 SF				
Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips
AM Peak Hour					
General Light Industrial ¹	32	Total		0.700	23
	KSF	In	88%	0.616	20
		Out	12%	0.084	3
PM Peak Hour					
General Light Industrial ¹	32	Total		0.630	21
	KSF	In	13%	0.082	3
		Out	87%	0.548	18

Based on ITE Trip Generation Handbook, 10th Edition (February 2020)

1. ITE Trip Generation Manual, 10th Edition, LUC 110 (General Light Industrial), average rate



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