

SITE PLAN APPLICATION
383 COMMERCIAL STREET
WRITTEN SUBMISSION J – TRAFFIC STUDY

THE APPLICANT HAS COMPLETED A TRIP GENERATION BASED UPON THE ITE TRIP GENERATION MANUAL, WHICH IS ATTACHED. THE PROJECT WILL REQUIRE A TRAFFIC MOVEMENT PERMIT IN THE 100 TO 200 TRIP CATEGORY.

ONCE THE PROJECT HAS BEEN ASSIGNED THE APPLICANT WILL MEET WITH APPROPRIATE CITY STAFF TO DEVELOP THE DATA REQUESTED PRIOR TO A FORMAL SCOPING MEETING.

SEBAGO

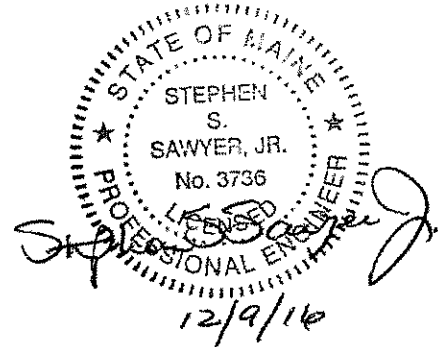
T E C H N I C S

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Memorandum

16324

To: Will Conway
From: Steve Sawyer/Derek Caldwell
Date: December 9, 2016
Subject: Trip Generation
383 Commercial Street Development



Per your request, we have completed Trip Generation calculations for the proposed retail and condominium project located at 383 Commercial Street in Portland, Maine. It is our understanding that the proposed development will include 22,691 square feet of retail at ground level on Commercial Street and a total of 275 condominium units on the second thru fifth floors. The project will also include a 390-space parking garage. 197 of these spaces will be accessed by an entrance on Maple Street and 193 will be accessed by an entrance on York Street.

Trip Generation

Using the 9th Edition of ITE's Trip Generation Manual we have estimated the following trip generation shown within Tables 1 and 2 located on the following page. The retail spaces and condominiums have ITE land uses of 826 – Specialty Retail Center and 230 – Residential Condominium/Townhouse, respectively. The proposed full build development includes 22,691 square feet of retail space and 275 condominium units.

Table 1: Trip Generation
Land Use 826 – Specialty Retail Center
(22,691 Square Feet)

Time Period	Trip Generation Rate (trips/ 1,000 square feet)	Total Trips	Entering	Exiting
Weekday (Daily)	44.32/KSF	1006	503	503
AM Peak Hour of Adjacent Street (7-9 AM)	0/KSF ^A	0	0	0
PM Peak Hour of Adjacent Street (4-6 PM)	2.71/KSF	61	27	34
AM Peak Hour of Generator	6.84/KSF	155	68	87
PM Peak Hour of Generator	5.02/KSF	114	50	64
Saturday (Daily)	42.04/KSF	954	477	477
Saturday Peak Hour of Generator	6.49/KSF ^B	147	65	82
Sunday (Daily)	20.43/KSF	464	232	232
Sunday Peak Hour of Generator	3.32/KSF ^B	72	36	36

- A. Trip generation estimate not available for AM Hour of Adjacent Street. It is assumed that this land use will not produce trips during this time period.
- B. Trip Generation data for Saturday Peak and Sunday Peak is not provided. Rate calculated by a ratio of the weekend and weekday daily rates to find peak hourly rate

Table 2: Trip Generation
Land Use 230 – Residential Condominium/Townhouse
(275 Units)

Time Period	Trip Generation Formula	Total Trips	Entering	Exiting
Weekday (Daily)	$\ln(T) = 0.87 \ln(X) + 2.46$	1550	775	775
AM Peak Hour of Adjacent Street (7-9 AM)	$\ln(T) = 0.80 \ln(X) + 0.26$	116	20	96
PM Peak Hour of Adjacent Street (4-6 PM)	$\ln(T) = 0.82 \ln(X) + 0.15$	138	92	45
AM Peak Hour of Generator	$\ln(T) = 0.82 \ln(X) + 0.32$	116	22	94
PM Peak Hour of Generator	$T = 0.34 (X) + 35.87$	129	83	47
Saturday (Daily)	$T = 3.62(X) + 427.93$	1424	712	712
Saturday Peak Hour of Generator	$T = 0.29(X) + 42.63$	122	66	56
Sunday (Daily)	$T = 3.13(X) + 357.26$	1218	609	609
Sunday Peak Hour of Generator	$T = 0.23(X) + 50.01$	113	55	58

- T=No. of Trips, X=No. of Dwelling Units (275)

Due to the downtown location of this development, we believe a number of the new external trips will be taken by walking and public transit to and from the development. We calculated the amount of expected external trips to be made by these modes of transportation using two methods. The first method used was the Environmental Protection Agency (EPA) Mixed-Use Trip Generation Model. This model utilizes data from the land use of the development and employment data of the surrounding area to arrive at a percentage of trips to be made by walking as well as public transit. In tangent with the report a Microsoft Excel file was developed by the firm Fehr & Peers that calculates the internal capture, walking, and public transit use data for the subject project using the EPA Model. A copy of this spreadsheet is attached. For this project, the estimated external trips taken by walking is 15% and the amount by public transit to be 2%, for a total reduction in external trips of 17%. The second method was to use data from the U.S. Census Bureau's American Community Survey 2009-2013 5 Year Estimates (census tract geography). This data lists the percentage each mode of transportation used for commuting in each respective census tract. In this data, it is seen that the project site is on the border between two tracts. The tract the project site is located in lists the percentage of commuters walking to work as 45.9% and the adjacent tract lists the percentage as 23.8%.

Based on this information and the above mentioned EPA Model, we applied a reduction of 20% in external trips due to walking and transit. Table 3 shows the resulting external trips generated by the proposed development. These values are calculated by summing of the trip generation values of each land use found in Tables 1 and 2. This value is then reduced by 20% to account for the external trips to be completed by walking and transit.

**Table 3: Trip Generation
Gross External Vehicle Trips**

Time Period	Total Trips	Entering	Exiting
Weekday (Daily)	2046	1023	1023
AM Peak Hour of Adjacent Street (7-9 AM)	93	16	77
PM Peak Hour of Adjacent Street (4-6 PM)	159	96	64
AM Peak Hour of Generator	217	72	145
PM Peak Hour of Generator	195	106	88
Saturday (Daily)	1902	951	951
Saturday Peak Hour of Generator	216	105	111
Sunday (Daily)	1346	673	673
Sunday Peak Hour of Generator	148	73	75

Furthermore, we calculated the existing trips from the former Rufus Deering Lumber site in order to establish a trip credit. This trip credit is subtracted from the above calculated gross external vehicle trips in order to establish the Net External Vehicle Trips for the proposed development. ITE Land use 812 – Building Materials and Lumber Store was used for this calculation. The gross floor area of the former building was found to be 6,028 square feet. Table 4 shows the results of the prior site use trip generation calculation.

Table 4: Trip Generation
Land Use 812 –Building Materials and Lumber Store
(6,028 Sq. Ft.)

Time Period	Trip Generation Rate (trips/ 1,000 square feet)	Total Trips	Entering	Exiting
Weekday (Daily)	45.16/KSF	274	137	137
AM Peak Hour of Adjacent Street (7-9 AM)	2.60/KSF	16	11	5
PM Peak Hour of Adjacent Street (4-6 PM)	4.49/KSF	27	13	14
AM Peak Hour of Generator	4.16/KSF	25	14	11
PM Peak Hour of Generator	5.56/KSF	34	17	17
Saturday (Daily)	51.60/KSF	313	156	156
Saturday Peak Hour of Generator	9.58/KSF	58	30	28
Sunday (Daily)	24.50/KSF	148	74	74
Sunday Peak Hour of Generator	4.57/KSF	28	12	15

Conclusions

Table 5 shows the Total Net External Trips expected from the development. These totals are calculated by subtracting the estimated trip generation for the prior land use found in Table 4 from the gross external trips shown in Table 3. The AM Peak Hour of the Generator is shown to have the highest value of external trips with 192. We believe this is a conservative number as the AM Peak Hour of the condominiums and the AM Peak Hour of the retail are not expected to occur simultaneously. The Peak Hour of traffic associated with the condominium land use is expected to occur during the Peak Hour of the adjacent roadways. Regardless, though, it appears from our calculations that the Project will require a MaineDOT Traffic Movement Permit in the 100 to 200 trip category.

Table 5: Trip Generation
Total Net External Trips

Time Period	Total Trips	Entering	Exiting
Weekday (Daily)	1772	886	886
AM Peak Hour of Adjacent Street (7-9 AM)	77	5	72
PM Peak Hour of Adjacent Street (4-6 PM)	132	83	50
AM Peak Hour of Generator	192	58	134
PM Peak Hour of Generator	161	90	71
Saturday (Daily)	1590	795	795
Saturday Peak Hour of Generator	158	75	83
Sunday (Daily)	1196	598	598
Sunday Peak Hour of Generator	1201	61	60

Attachments:

EPA Model Spreadsheet

MIXED USE TRIP GENERATION MODEL V4 - RESULTS



MODEL APPLICATION - ALL TRIPS

	Daily			AM Peak Hour			PM Peak Hour			Total
	HBW	HBO	NHB	HBW	HBO	NHB	HBW	HBO	NHB	
Baseline # of External Trips (ITE Model)	854	1025	387	149	69	8	117	80	41	238
% External Trip Reduction (predicted by MXD Model)										
Internal Capture	3.42%	1.96%	2.34%	3.42%	1.96%	2.34%	3.42%	1.96%	2.34%	2.74%
Walking External	3.53%	24.69%	19.08%	3.53%	24.69%	19.08%	3.53%	24.69%	19.08%	13.39%
Transit External	3.23%	1.82%	2.86%	3.23%	1.82%	2.86%	3.23%	1.82%	2.86%	2.69%
# of Trips Reduced (predicted by MXD Model)										
Internal Capture	29	20	9	5	1	0	4	2	1	7
Walking External	29	248	72	5	17	1	4	19	8	31
Transit External	27	18	11	5	1	0	4	1	1	6
MXD Model # of Vehicle Trips	769	738	295	134	49	6	105	58	31	194

Results

	External Vehicle Trips			Total Trips Reduced			
	Baseline	Adjusted	Reduction %	HBW	HBO	NHB	Total
Daily	2,266	1,803	20%	85	286	92	463
AM Peak Hour	225	189	16%	15	19	2	36
PM Peak Hour	238	194	18%	12	22	10	44

MODEL APPLICATION - TRIP ENDS ASSOCIATED WITH HOUSES IN THE PROJECT ONLY

	Daily			AM Peak Hour			PM Peak Hour			Total
	HBW	HBO	NHB	HBW	HBO	NHB	HBW	HBO	NHB	
Baseline # of External Trips (ITE Model)	259	819	182	49	56	4	31	61	17	109
% External Trip Reduction (predicted by MXD Model)										
Internal Capture	3.42%	1.96%	2.34%	3.42%	1.96%	2.34%	3.42%	1.96%	2.34%	2.43%
Walking External	3.53%	24.69%	19.08%	3.53%	24.69%	19.08%	3.53%	24.69%	19.08%	17.92%
Transit External	3.23%	1.82%	2.86%	3.23%	1.82%	2.86%	3.23%	1.82%	2.86%	2.37%
# of Trips Reduced (predicted by MXD Model)										
Internal Capture	9	16	4	2	1	0	1	1	0	3
Walking External	9	198	34	2	14	1	1	15	3	19
Transit External	8	15	5	2	1	0	1	1	0	3
Adjusted # (MXD Model) of Vehicle Trips generated by Project Residences	233	580	139	44	40	3	28	44	13	85

Results

	External Vehicle Trips		
	Baseline	Adjusted	Reduction %
Daily	1,260	962	24%
AM Peak Hour	109	87	20%
PM Peak Hour	109	85	22%