

## TECHNICAL MEMORANDUM

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Date: September 16, 2020  
Subject: 20 Massachusetts Avenue NW – BZA Case #20303  
Transportation Statement

DDOT – PSD  
RMR Group  
Goulston & Storrs

### Introduction

This memorandum presents the findings of a Transportation Statement for the proposed redevelopment of 20 Massachusetts Avenue NW, located in downtown Washington, DC. The project requires special exception relief from the DC Board of Zoning Adjustment because it will be in excess of 90 feet in the Capitol Security Sub-Area, and it also requires a special exception to permit penthouse use for a new rooftop bar and restaurant. The purpose of this Transportation Statement is to:

- Review mode split and trip generation information for the project; and
- Provide a Transportation Demand Management (TDM) plan for the project.

Figure 1 identifies the site location within the District, and Figure 2 identifies the location of the site in relation to the local neighborhood. The site is bounded by a public alley and the 601 New Jersey Avenue NW property to the west, Massachusetts Avenue NW to the north, the 2 Massachusetts property to the east, and F Street NW to the south.

The development site is currently an existing office building containing approximately 324,108 square feet in gross floor area. The project proposes to add density to and redevelop the existing building into a mixed-use facility containing the following:

- 227,339 square feet of office space;
- 274 hotel rooms plus hotel-serving function spaces;
- 12,628 square feet of retail space; and
- 5,408 square foot restaurant.

The existing site's internal loading facilities include three (3) 30' x 12' loading berths on the building's ground (Level 1) level, accessible from a curb cut on F Street NW. Under the proposed development, the curb cut on F Street NW will be removed, and the three (3) 30' x 12' loading berths will be relocated to the building's western side, accessed from the public alley. This will enhance the F Street frontage and improve the pedestrian environment.

The existing site's vehicle parking facilities include a below-grade parking facility containing 186 spaces, which will largely remain as is. Under the proposed development, the below-grade facility would contain 186 parking spaces, including two (2) parking spaces equipped with electric vehicle charging stations.

The proposed development would include a minimum of 82 long-term and 40 short-term bicycle parking spaces, meeting or exceeding the ZR16 requirements of 82 long-term spaces and 16 short-term spaces for the project. The project will include storage for two (2) child trailers/strollers and two (2) tandem bikes, and outlets for charging electric bicycles and a bicycle repair station in the long-term bicycle storage room.

The findings of this study conclude that:

- The proposed project will not generate a significant volume of new vehicle trips in the peak direction;
- The proposed project will provide short- and long-term bicycle parking, while limiting the amount of new vehicle parking;
- The proposed project will include TDM measures that adequately promote non-vehicular modes of travel; and
- The proposed project will not have a detrimental impact on the surrounding transportation network.

## Site Trip Generation

Weekday peak hour trip generation was calculated based on the methodology outlined in ITE *Trip Generation*, 10<sup>th</sup> Edition. This methodology was supplemented to account for the urban nature of the site (ITE *Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes.

Trip generation for the office portion of the proposed development was calculated based on ITE land use 710 (General Office). This ITE land use was also used to calculate trip generation for the existing office building.

Trip generation for the hotel portion of the proposed development was calculated based on ITE land use 310 (Hotel).

Trip generation for the retail portion of the proposed development was calculated based on ITE land use 820 (Shopping Center).

Trip generation for the restaurant portion of the proposed development was calculated based on ITE land use 931 (Quality Restaurant).

Table 1 shows mode split assumptions based on census (Traffic Analysis Zone) data for people who live and work near the site, as well as survey data from the National Capital Region Transportation Planning Board's (TPB) State of the Commute survey and the WMATA Ridership Survey. As shown in Table 1, a higher auto mode split is assumed for the existing office compared with the proposed office. This is due to the proposed office having a significantly smaller parking ratio than the existing office, as well as the TDM measures for the proposed office which are not in place under existing conditions. Detailed mode split information is provided in the Technical Attachments.

Table 2 shows a multimodal trip generation summary for the proposed development. Detailed trip generation information is provided in the Technical Attachments. As seen on Table 2, the future total net peak period trips generated are anticipated to be less than existing uses on site.

**Table 1: Summary of Mode Split Assumptions**

Land Use	Mode			
	Auto	Transit	Bike	Walk
Existing Office	45%	47%	3%	5%
Proposed Office	35%	45%	10%	10%
Proposed Hotel	25%	40%	5%	30%
Proposed Retail	5%	40%	15%	40%
Proposed Restaurant	15%	35%	10%	40%

**Table 2: Multimodal Trip Generation Summary**

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
<b>Auto (veh/hr)</b>	Proposed Office	72	12	84	14	73	87
	Proposed Hotel	23	15	38	30	29	59
	Proposed Retail	5	3	8	3	3	6
	Proposed Restaurant	0	0	0	4	2	6
	<b>Total Proposed Development</b>	<b>100</b>	<b>30</b>	<b>130</b>	<b>51</b>	<b>107</b>	<b>158</b>
	<i>Existing Office Development</i>	128	21	149	25	132	157
	<b>Δ (Proposed Development - Existing Development)</b>	<b>-28</b>	<b>9</b>	<b>-19</b>	<b>26</b>	<b>-25</b>	<b>1</b>
<b>Transit (ppl/hr)</b>	Proposed Office	109	18	127	21	111	132
	Proposed Hotel	66	45	111	88	85	173
	Proposed Retail	71	44	115	42	44	86
	Proposed Restaurant	1	2	3	21	10	31
	<b>Total Proposed Development</b>	<b>247</b>	<b>109</b>	<b>356</b>	<b>172</b>	<b>250</b>	<b>422</b>
	<i>Existing Office Development</i>	158	26	184	31	162	193
	<b>Δ (Proposed Development - Existing Development)</b>	<b>89</b>	<b>83</b>	<b>172</b>	<b>141</b>	<b>88</b>	<b>229</b>
<b>Bike (ppl/hr)</b>	Proposed Office	24	4	28	5	24	29
	Proposed Hotel	8	6	14	11	11	22
	Proposed Retail	27	16	43	16	16	32
	Proposed Restaurant	0	1	1	6	3	9
	<b>Total Proposed Development</b>	<b>59</b>	<b>27</b>	<b>86</b>	<b>38</b>	<b>54</b>	<b>92</b>
	<i>Existing Office Development</i>	10	2	12	2	10	12
	<b>Δ (Proposed Development - Existing Development)</b>	<b>49</b>	<b>25</b>	<b>74</b>	<b>36</b>	<b>44</b>	<b>80</b>
<b>Walk (ppl/hr)</b>	Proposed Office	24	4	28	5	24	29
	Proposed Hotel	49	34	83	66	64	130
	Proposed Retail	71	44	115	42	44	86
	Proposed Restaurant	2	1	3	24	11	35
	<b>Total Proposed Development</b>	<b>146</b>	<b>83</b>	<b>229</b>	<b>137</b>	<b>143</b>	<b>280</b>
	<i>Existing Office Development</i>	17	3	20	3	18	21
	<b>Δ (Proposed Development - Existing Development)</b>	<b>129</b>	<b>80</b>	<b>209</b>	<b>134</b>	<b>125</b>	<b>259</b>

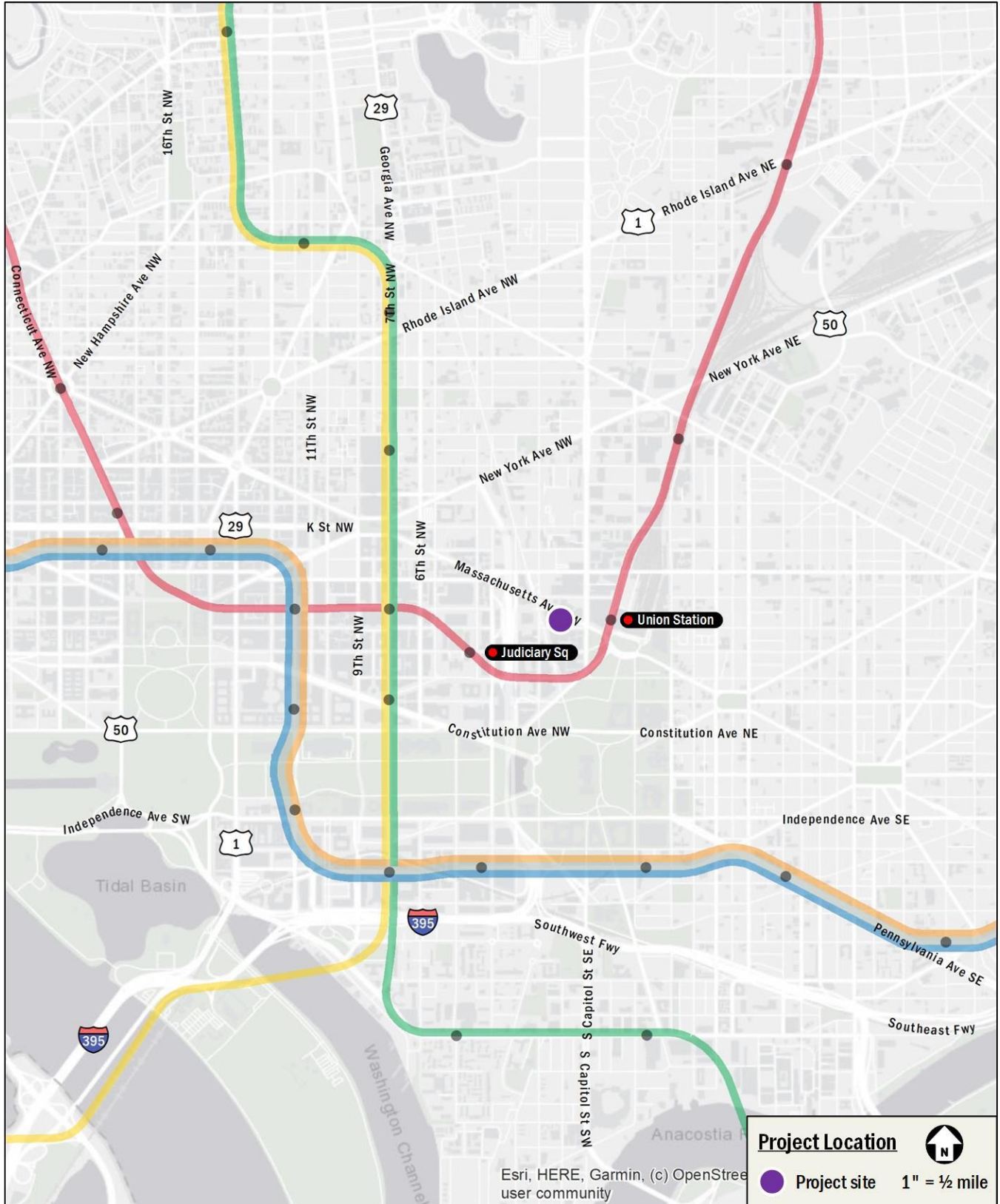


Figure 1: Regional Project Location



Figure 2: Local Project Location

## Transportation Demand Management

Transportation Demand Management (TDM) is the application of policies and strategies used to reduce travel demand or redistribute demand to other times or spaces. TDM focuses on reducing the demand of single-occupancy, private vehicles during peak period travel times or on shifting single-occupancy vehicular demand to off-peak periods.

The following is a list of TDM strategies the Applicant proposes for the 20 Massachusetts Avenue NW development. For the overall project, the Applicant proposes the following:

- The Applicant will identify Transportation Coordinators for the planning, construction, and operations phases of development. There will be a Project Transportation Coordinator as well as a Transportation Coordinator for each site use (office, hotel, and retail). The Transportation Coordinators will act as points of contact with DDOT, goDCgo, and Zoning Enforcement.
- The Applicant will provide Transportation Coordinators' contact information to goDCgo, conduct an annual commuter survey of employees on-site, and report TDM activities and data collection efforts to goDCgo once per year. All employer tenants must survey their employees and report back to the Transportation Coordinator.
- The Applicant will ensure Transportation Coordinators develop, distribute, and market various transportation alternatives and options to employees and patrons, including promoting transportation events (i.e., Bike to Work Day, National Walking Day, Car Free Day) on the property website and in any internal building newsletters or communications.
- The Applicant will ensure Transportation Coordinators receive TDM training from goDCgo to learn about the TDM conditions for this project and available options for implementing the TDM Plan.
- The Applicant will ensure Project Transportation Coordinators require by lease or other agreement that tenants with 20 or more employees on-site comply with the DC Commuter Benefits Law and participate in at least one of the three transportation benefits outlined in the law (employee-paid pre-tax benefit, employer-paid direct benefit, or shuttle service), as well as any other commuter benefits related laws that may be implemented in the future.
- The Applicant will provide a minimum of six (6) showers and 46 lockers for use by employees, complying with the ZR16 requirements for this project, based on its gross floor area and minimum required number of long-term bicycle parking spaces.
- The Applicant will provide 82 long-term and up to 40 short-term bicycle parking spaces free of charge to employees. This meets or exceeds the ZR16 requirements of 82 long-term spaces and 16 short-term spaces for this project.
- The Applicant will provide storage for two (2) child trailers/strollers and two (2) tandem bikes in the long-term bicycle storage room.
- The Applicant will provide outlets for charging electric bicycles and a bicycle repair station in the long-term bicycle storage room.

For the office portion of the project, the Applicant proposes the following:

- The Applicant will unbundle the cost of parking from the cost to lease an office unit.
- The Applicant will notify goDCgo each time a new office tenant occupying more than 15% of the leasable area of the project moves in and provide TDM information to each tenant as they move in.
- The Applicant will provide links to [CommuterConnections.com](http://CommuterConnections.com) and [goDCgo.com](http://goDCgo.com) on property websites.

- The Applicant will ensure the Transportation Coordinator implements a carpooling system such that individuals working in the building who wish to carpool can easily locate other employees who live nearby.
- The Applicant will distribute information on the Commuter Connections Guaranteed Ride Home (GRH) program, which provides commuters who regularly carpool, vanpool, bike, walk, or take transit to work with a free and reliable ride home in an emergency.
- The Applicant will provide employees who wish to carpool with detailed carpooling information and will be referred to other carpool matching services sponsored by the Metropolitan Washington Council of Governments (MWCOG) or other comparable service if MWCOG does not offer this in the future.
- The Applicant will designate up to five (5) of the total 186 proposed parking spaces as preferential carpooling spaces in a convenient location within the parking garage for employee use.

For the retail portion of the project, the Applicant proposes the following:

- The Applicant will unbundle the cost of parking from the cost to lease an office unit.
- The Applicant will post “getting here” information in a visible and prominent location on the website with a focus on non-automotive travel modes. Also, links will be provided to goDCgo.com, CommuterConnections.com, transit agencies around the metropolitan area, and instructions for customers, attendees, and patrons discouraging parking on-street in Residential Permit Parking (RPP) zones.
- The Applicant will provide employees who wish to carpool with detailed carpooling information and will be referred to other carpool matching services sponsored by MWCOG or other comparable service if MWCOG does not offer this in the future.

For the hotel portion of the project, the Applicant proposes the following:

- The Applicant will require front office and customer-facing staff are provided training by goDCgo (either in-person or webinar) to learn of the non-automotive options for traveling to the property.
- The Applicant will provide guests with goDCgo’s Get Around Guide by making it available on the property website and in printed format for front office or customer-facing staff.
- The Applicant will ensure the Transportation Coordinator subscribes to goDCgo’s hospitality newsletter.
- The Applicant will post “getting here” information in a visible and prominent location on the website with a focus on non-automotive travel modes. The Applicant will also provide links to goDCgo.com, CommuterConnections.com, transit agencies around the metropolitan area, and instructions for patrons discouraging parking on-street in RPP zones.
- The Applicant will provide comprehensive transportation information and directions on the hotel website, including promoting the use of non-automotive modes of transportation and links to website for goDCgo, Capital Bikeshare, DC Circulator, and the Washington Metropolitan Area Transit Authority (WMATA).
- The Applicant will provide brochures with information on non-automotive options for traveling to the property, available at all times in a visible location in the lobby.
- The Applicant will provide employees who wish to carpool with detailed carpooling information and refer them to other carpool matching services sponsored by MWCOG or other comparable service if MWCOG does not offer this in the future.

## Summary and Conclusions

The findings of this study conclude that:

- The proposed project will not generate a significant volume of new vehicle trips in the peak direction;
- The proposed project will provide short- and long-term bicycle parking, while limiting the amount of new vehicle parking;
- The proposed project will include TDM measures that adequately promote non-vehicular modes of travel; and
- The proposed project will not have a detrimental impact on the surrounding transportation network.



## **TECHNICAL ATTACHMENTS**

### Mode Split Assumptions

#### Office Component

##### Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
CTPP - TAZ Employees (TAZ 10200)	35%	8%	48%	3%	5%	0%	1%
CTPP - Adjacent TAZ Employees (TAZ 20201)	37%	6%	47%	2%	4%	2%	2%
State of the Commute 2019 (of DC Workers)	32%	6%	53%	7%		---	
WMATA Ridership Survey Table 3 (U Street - Reeves Center Office)	58%		35%	7%		---	
WMATA Ridership Survey Table 3 (Crystal City - Crystal Park IV Office)	81%		14%	5%		---	
WMATA Ridership Survey Table 3 (Crystal City - Crystal Square 2 Office)	58%		42%	1%		---	
WMATA Ridership Survey Table 4 (Office Mode Share: Inside the Beltway)	66%		30%	6%		---	
WMATA Ridership Survey Table 4 (Office Mode Share: CBD)	21%		75%	5%		---	

##### Mode Split assumed in TIS:

Land Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Existing Office	45%	47%	3%	5%	---
Proposed Office	35%	45%	10%	10%	---

#### Hotel Component

##### Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
CTPP - TAZ Employees (TAZ 10200)	35%	8%	48%	3%	5%	0%	1%
CTPP - Adjacent TAZ Employees (TAZ 20201)	37%	6%	47%	2%	4%	2%	2%
WMATA Ridership Survey Table 15 (Crystal City - Hyatt Regency)	21%		51%	28%		---	
WMATA Ridership Survey Table 15 (Holiday Inn Arlington)	67%		17%	17%		---	
WMATA Ridership Survey Table 15 (Holiday Inn - Silver Spring)	54%		12%	33%		---	
WMATA Ridership Survey Table 15 (Hotel Site Average)	38%		31%	31%		---	

##### Mode Split assumed in TIS:

Land Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Hotel	25%	40%	5%	30%	---

#### Retail & Restaurant Components

##### Pertinent Mode Split data from other sources:

Information Source	Mode						
	SOV	Carpool	Transit	Bike	Walk	Telecommute	Other
CTPP - TAZ Employees (TAZ 10200)	35%	8%	48%	3%	5%	0%	1%
CTPP - Adjacent TAZ Employees (TAZ 20201)	37%	6%	47%	2%	4%	2%	2%
WMATA Ridership Survey Table 15 (U Street Main Street Retail) <sup>2</sup>	19%		57%	25%		---	
WMATA Ridership Survey Table 15 (Crystal City - Crystal Plaza Shops) <sup>2</sup>	24%		41%	36%		---	
WMATA Ridership Survey Table 15 (Retail Site Average) <sup>2</sup>	36%		37%	27%		---	

##### Mode Split assumed in TIS:

Land Use	Mode				
	Drive	Transit	Bike	Walk	Telecommute/Other
Retail	5%	40%	15%	40%	---
Restaurant	15%	35%	10%	40%	---

<sup>2</sup> The WMATA Ridership Survey for retail sites interviewed both patrons and employees; therefore these sources were given more weight than the CTPP employee data in estimating retail and restaurant mode splits.

### Trip Generation - Existing Office

324,108 SF of office space

Step 1: Base trip generation using ITEs' *Trip Generation* 10th Edition

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Office	710	324,108 sf	285 veh/hr	46 veh/hr	331 veh/hr	56 veh/hr	292 veh/hr	348 veh/hr
<i>Calculation Details:</i>			86%	14%	$=0.94(X/1000)+26.49$	16%	84%	$Ln(T)=0.95Ln(X/1000)+0.36$

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Office	1.18 ppl/veh	336 ppl/hr	55 ppl/hr	391 ppl/hr	66 ppl/hr	345 ppl/hr	411 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Office	Auto	45%	151 ppl/hr	25 ppl/hr	176 ppl/hr	30 ppl/hr	155 ppl/hr	185 ppl/hr
Office	Transit	47%	158 ppl/hr	26 ppl/hr	184 ppl/hr	31 ppl/hr	162 ppl/hr	193 ppl/hr
Office	Bike	3%	10 ppl/hr	2 ppl/hr	12 ppl/hr	2 ppl/hr	10 ppl/hr	12 ppl/hr
Office	Walk	5%	17 ppl/hr	3 ppl/hr	20 ppl/hr	3 ppl/hr	18 ppl/hr	21 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Office	1.18 ppl/veh	128 veh/hr	21 veh/hr	149 veh/hr	25 veh/hr	132 veh/hr	157 veh/hr

#### Trip Gen Summary for Existing Office

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	128 veh/hr	21 veh/hr	149 veh/hr	25 veh/hr	132 veh/hr	157 veh/hr
Transit	158 ppl/hr	26 ppl/hr	184 ppl/hr	31 ppl/hr	162 ppl/hr	193 ppl/hr
Bike	10 ppl/hr	2 ppl/hr	12 ppl/hr	2 ppl/hr	10 ppl/hr	12 ppl/hr
Walk	17 ppl/hr	3 ppl/hr	20 ppl/hr	3 ppl/hr	18 ppl/hr	21 ppl/hr

**Trip Generation - Proposed Office**

**227,339 SF of office space**

Step 1: Base trip generation using ITEs' *Trip Generation* 10th Edition

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Office	710	227,339 sf	206 veh/hr	34 veh/hr	240 veh/hr	40 veh/hr	208 veh/hr	248 veh/hr
<i>Calculation Details:</i>			86%	14%	$=0.94(X/1000)+26.49$	16%	84%	$Ln(T)=0.95Ln(X/1000)+0.36$

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Office	1.18 ppl/veh	243 ppl/hr	40 ppl/hr	283 ppl/hr	47 ppl/hr	246 ppl/hr	293 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Office	Auto	35%	85 ppl/hr	14 ppl/hr	99 ppl/hr	16 ppl/hr	87 ppl/hr	103 ppl/hr
Office	Transit	45%	109 ppl/hr	18 ppl/hr	127 ppl/hr	21 ppl/hr	111 ppl/hr	132 ppl/hr
Office	Bike	10%	24 ppl/hr	4 ppl/hr	28 ppl/hr	5 ppl/hr	24 ppl/hr	29 ppl/hr
Office	Walk	10%	24 ppl/hr	4 ppl/hr	28 ppl/hr	5 ppl/hr	24 ppl/hr	29 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Office	1.18 ppl/veh	72 veh/hr	12 veh/hr	84 veh/hr	14 veh/hr	73 veh/hr	87 veh/hr

**Trip Gen Summary for Office**

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	72 veh/hr	12 veh/hr	84 veh/hr	14 veh/hr	73 veh/hr	87 veh/hr
Transit	109 ppl/hr	18 ppl/hr	127 ppl/hr	21 ppl/hr	111 ppl/hr	132 ppl/hr
Bike	24 ppl/hr	4 ppl/hr	28 ppl/hr	5 ppl/hr	24 ppl/hr	29 ppl/hr
Walk	24 ppl/hr	4 ppl/hr	28 ppl/hr	5 ppl/hr	24 ppl/hr	29 ppl/hr

### Trip Generation - Proposed Hotel

#### 274 hotel rooms

Step 1: Base trip generation using ITEs' *Trip Generation* 10th Edition

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Hotel	310	274 rooms	78 veh/hr	54 veh/hr	132 veh/hr	105 veh/hr	101 veh/hr	206 veh/hr
<i>Calculation Details:</i>			59%	41%	=0.5X/1000-5.34	51%	49%	=0.75X

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Hotel	2.10 ppl/veh	164 ppl/hr	113 ppl/hr	277 ppl/hr	221 ppl/hr	212 ppl/hr	433 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Hotel	Auto	25%	41 ppl/hr	28 ppl/hr	69 ppl/hr	55 ppl/hr	53 ppl/hr	108 ppl/hr
Hotel	Transit	40%	66 ppl/hr	45 ppl/hr	111 ppl/hr	88 ppl/hr	85 ppl/hr	173 ppl/hr
Hotel	Bike	5%	8 ppl/hr	6 ppl/hr	14 ppl/hr	11 ppl/hr	11 ppl/hr	22 ppl/hr
Hotel	Walk	30%	49 ppl/hr	34 ppl/hr	83 ppl/hr	66 ppl/hr	64 ppl/hr	130 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Hotel	1.82 ppl/veh	23 veh/hr	15 veh/hr	38 veh/hr	30 veh/hr	29 veh/hr	59 veh/hr

#### Trip Gen Summary for Hotel

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	23 veh/hr	15 veh/hr	38 veh/hr	30 veh/hr	29 veh/hr	59 veh/hr
Transit	66 ppl/hr	45 ppl/hr	111 ppl/hr	88 ppl/hr	85 ppl/hr	173 ppl/hr
Bike	8 ppl/hr	6 ppl/hr	14 ppl/hr	11 ppl/hr	11 ppl/hr	22 ppl/hr
Walk	49 ppl/hr	34 ppl/hr	83 ppl/hr	66 ppl/hr	64 ppl/hr	130 ppl/hr

**Trip Generation - Proposed Retail**

**12,628 SF of neighborhood serving retail space**

Step 1: Base trip generation using ITEs' *Trip Generation* 10th Edition

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Shopping Center	820	12,628 sf	98 veh/hr	60 veh/hr	158 veh/hr	57 veh/hr	61 veh/hr	118 veh/hr
<i>Calculation Details:</i>			62%	38%	=0.5(X/1000)+151.78	48%	52%	$Ln(T)=0.74Ln(X/1000)+2.89$

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Shopping Center	1.82 ppl/veh	178 ppl/hr	110 ppl/hr	288 ppl/hr	104 ppl/hr	111 ppl/hr	215 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Shopping Center	Auto	5%	9 ppl/hr	5 ppl/hr	14 ppl/hr	5 ppl/hr	6 ppl/hr	11 ppl/hr
Shopping Center	Transit	40%	71 ppl/hr	44 ppl/hr	115 ppl/hr	42 ppl/hr	44 ppl/hr	86 ppl/hr
Shopping Center	Bike	15%	27 ppl/hr	16 ppl/hr	43 ppl/hr	16 ppl/hr	16 ppl/hr	32 ppl/hr
Shopping Center	Walk	40%	71 ppl/hr	44 ppl/hr	115 ppl/hr	42 ppl/hr	44 ppl/hr	86 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Shopping Center	1.82 ppl/veh	5 veh/hr	3 veh/hr	8 veh/hr	3 veh/hr	3 veh/hr	6 veh/hr

**Trip Gen Summary for Retail**

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	5 veh/hr	3 veh/hr	8 veh/hr	3 veh/hr	3 veh/hr	6 veh/hr
Transit	71 ppl/hr	44 ppl/hr	115 ppl/hr	42 ppl/hr	44 ppl/hr	86 ppl/hr
Bike	27 ppl/hr	16 ppl/hr	43 ppl/hr	16 ppl/hr	16 ppl/hr	32 ppl/hr
Walk	71 ppl/hr	44 ppl/hr	115 ppl/hr	42 ppl/hr	44 ppl/hr	86 ppl/hr

### Trip Generation - Proposed Restaurant

5,408 SF restaurant

Step 1: Base trip generation using ITEs' *Trip Generation* 10th Edition

Land Use	Land Use Code	Quantity (x)	AM Peak Hour			PM Peak Hour		
			In <sup>1</sup>	Out <sup>1</sup>	Total	In	Out	Total
Restaurant	820	5,408 sf	2 veh/hr	2 veh/hr	4 veh/hr	28 veh/hr	14 veh/hr	42 veh/hr
<i>Calculation Details:</i>			NA	#VALUE!	=0.73(X/1000)	67%	33%	=7.8(X/1000)

Step 2: Convert to people per hour, before applying mode splits

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Restaurant	2.10 ppl/veh	4 ppl/hr	4 ppl/hr	8 ppl/hr	59 ppl/hr	29 ppl/hr	88 ppl/hr

Step 3: Split between modes, per assumed Mode Splits

Land Use	Mode	Split	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Restaurant	Auto	15%	1 ppl/hr	0 ppl/hr	1 ppl/hr	9 ppl/hr	4 ppl/hr	13 ppl/hr
Restaurant	Transit	35%	1 ppl/hr	2 ppl/hr	3 ppl/hr	21 ppl/hr	10 ppl/hr	31 ppl/hr
Restaurant	Bike	10%	0 ppl/hr	1 ppl/hr	1 ppl/hr	6 ppl/hr	3 ppl/hr	9 ppl/hr
Restaurant	Walk	40%	2 ppl/hr	1 ppl/hr	3 ppl/hr	24 ppl/hr	11 ppl/hr	35 ppl/hr

Step 4: Convert auto trips back to vehicles/hour

Land Use	People/Car (from 2017 NHTS, Table 16)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Restaurant	2.10 ppl/veh	0 veh/hr	0 veh/hr	0 veh/hr	4 veh/hr	2 veh/hr	6 veh/hr

#### Trip Gen Summary for Restaurant

Mode	AM Peak Hour			PM Peak Hour		
	In <sup>1</sup>	Out <sup>1</sup>	Total	In	Out	Total
Auto	0 veh/hr	0 veh/hr	0 veh/hr	4 veh/hr	2 veh/hr	6 veh/hr
Transit	1 ppl/hr	2 ppl/hr	3 ppl/hr	21 ppl/hr	10 ppl/hr	31 ppl/hr
Bike	0 ppl/hr	1 ppl/hr	1 ppl/hr	6 ppl/hr	3 ppl/hr	9 ppl/hr
Walk	2 ppl/hr	1 ppl/hr	3 ppl/hr	24 ppl/hr	11 ppl/hr	35 ppl/hr