Transportation Impact Study

1700 New York Avenue

Washington, DC

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EXECUTIVE SUMMARY

The following report presents the findings of a Transportation Impact Study (TIS) conducted for the 1700 New York Avenue office development in support of its application to the Board of Zoning Adjustment (BZA), Case Number 18227. The proposed site plan consists of a general office building located in Ward 2 in northwest Washington, DC. The subject property is located within Lot 34 in Square 171 which is currently occupied by the existing Corcoran Gallery of Art museum (Corcoran). The proposed office component would incorporate approximately 114,695 square feet of office development addition to the existing Corcoran building. A review of the proposed site area found the following:

- Traffic in the study area is heavily commuter-based as 17th and 18th Streets operate as major thoroughfares connecting office workers to the downtown business core of the District of Columbia. E Street west of the site also connects to area interstates, expressways and principal arterials contributing to this commuter traffic.
- Other roadways not utilized as thoroughfares experienced limited vehicular activity with moderate to heavy pedestrian activity.
- The pedestrian experience was observed as adequate with sidewalks and crosswalks located along all roadways and at major intersections.
- Bicycling conditions in the study area are currently fair. Several cyclists were observed using bicycle commuting to the immediate area as well as to other destinations. With no existing bike lanes or trails, these cyclists were observed along the area roadways and sidewalks.
- Multiple area and regional commuter bus routes serve the site area with regular stops along 18th Street.

The proposed development consists of a general office building totaling approximately 114,695 square feet. Site access for pedestrians will be provided from New York Avenue. Vehicular access will be provided with an entry point from E Street and an exit point along New York Avenue. Parking for the site will be provided to the existing Corcoran and the office building by incorporating 44 zoning spaces and 38 parking spaces which are comprised of tandem and vault spaces for a total of 82 underground parking spaces.

As part of coordination with District Department of Transportation (DDOT) staff, a capacity analysis was performed for the 1700 New York Avenue development which included a study area of five (5) existing intersections; with the following results:

- All study area intersections operate at acceptable levels of service in the future with the proposed development. Neither the commuter-based traffic nor the local office based traffic will be negatively affected by vehicle trips generated by the 1700 New York Avenue development.
- Pedestrian access to the site via the New York Avenue entrance and an entrance through the Corcoran are anticipated to adequately serve the occupants and visitors of the site.
- The addition of five (5) background developments included as part of this study do not adversely affect the transportation network requiring mitigation procedures at any of the study intersections.
- The 1700 New York Avenue development provides satisfactory pedestrian facilities and connectivity throughout the study area.

With the addition of the 1700 New York Avenue office traffic, the results indicate no intersections are anticipated to exceed acceptable levels of service. Further, there is anticipated to be little change to the levels of service expected throughout the study area due to the low number of future trips that are added to the road network.

INTRODUCTION

This report presents the findings of a Transportation Impact Study (TIS) conducted for the 1700 New York Avenue office development in support of its application for special exception and variance relief. The proposed site plan consists of a general office development located in Ward 2 in northwest Washington, DC. Figure 1 shows a map of the site location. The site is currently occupied by the Corcoran Gallery of Art staff parking.

The primary objectives of this study are to evaluate the transportation conditions near the 1700 New York Avenue development and to identify impacts to the transportation network due to the proposed development. This report focuses on the existing transportation network within the vicinity of the site, the transportation elements of the proposed development, and the possible impacts to the transportation network.

Gorove/Slade Associates, Inc. undertook the following steps while preparing the study:

- Performed field reconnaissance of existing roadway and intersection geometrics, traffic controls, speed limits, and operations;
- Observed traffic conditions during the morning and afternoon peak periods on a typical weekday;
- Conducted peak hour turning movement counts at study intersections;
- Analyzed the existing transportation network;
- Described and quantified the impacts of other (non-1700 New York Avenue) development and infrastructure changes on the future transportation network;
- Calculated the trip generation for the proposed development based on the Institute of Transportation Engineers' (ITE) Trip Generation, 8th Edition;
- Detailed the transportation elements of the proposed 1700 New York Avenue development, including pedestrian and vehicular access;
- Forecasted future traffic volumes with and without the proposed 1700 New York Avenue development;
- Estimated the difference in peak hour traffic with and without the proposed 1700 New York Avenue development;
- Calculated future levels of service at the study intersections with and without the proposed 1700 New York Avenue development; and
- Recommended mitigation measures, if necessary, based on the future transportation analysis.

Sources of data for this study include traffic counts and observations conducted by Gorove/Slade, plans from SmithGroup, studies by WMATA and ITE, and the files/library of Gorove/Slade.

Figure 1: Location Map

EXISTING CONDITIONS

A review of existing conditions determines if any areas of concern or opportunity exist within the transportation network. Analysis of the existing conditions also establishes a point of reference for the analysis of the future traffic conditions. Five existing study intersections were chosen for the capacity analyses based on their proximity to the proposed 1700 New York Avenue development in consultation with DDOT. As shown on Figure 2, the following intersections were identified:

- 18th Street and E Street
- 18th Street and New York Avenue
- 17th Street and New York Avenue
- 17th Street and E Street
- E Street and Red Cross Site Driveway

Roadway Network

The proposed site is bordered by New York Avenue to the north, 18th Street to the west, E Street to the south and 17th Street to the east. Heavily trafficked streets in the area include 17th and 18th Street and the western extension of E Street. Figure 3 shows the street network hierarchy and annual daily traffic volumes for the roadways in the study area.

The immediate study area of the 1700 New York Avenue development has several key local access roads. These include:

- 18th Street

  18th Street is a 4-lane arterial that runs northbound in the vicinity of the site. DDOT classifies it as a minor arterial with an average daily traffic of 15,700 vehicles between E Street and New York Avenue. Along 18th Street, private vehicles are restricted from parking on the east side of the street south of E Street during the AM peak period and north of New York Avenue during the PM peak period. The posted speed limit is 25 mph.

- New York Avenue

  New York Avenue is a 4-lane roadway that runs westbound in the vicinity of the site. DDOT classifies it as a principal arterial along the site frontage with an average daily traffic of 8,000 vehicles. Within the limits of the study area, New York Avenue runs from 17th Street to 18th Street, while west of the site, becomes the E Street Expressway. Parking restrictions along New York Avenue are present on both the north and south side of the street during the PM peak hour between 17th and 18th Street. The posted speed limit is 25 mph.

- 17th Street

  17th Street is a 4-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a principal arterial with an average daily traffic of between 14,100 and 21,200 vehicles. Within the limits of the study area, 17th Street runs from Constitution Avenue south of the site to the downtown Washington, DC business core where it becomes Connecticut Avenue. Along 17th Street, several parking restrictions exist south of E Street. In the northbound direction, parking is restricted during the AM peak period up to approximately 500 feet before the intersection with E Street. At that point, the parking restrictions convert to restrict parking during both peak periods. In the southbound direction, parking is restricted during the PM peak period. The posted speed limit is 25 mph.

- E Street

  E Street is a 4-lane roadway that runs eastbound in the vicinity of the site. DDOT classifies it as a principal arterial within the site vicinity and as an expressway immediately to the west of the site with an average daily traffic of 17,400 west of the site and 4,600 in the site vicinity. Parking restrictions along E Street are present on both the north side of the street during both peak periods and on the south side of the street during the AM peak period. The posted speed limit is 25 mph.

Gorove/Slade conducted field reconnaissance to obtain the existing lane configurations and traffic controls at the intersections within the study area, shown on Figure 4.

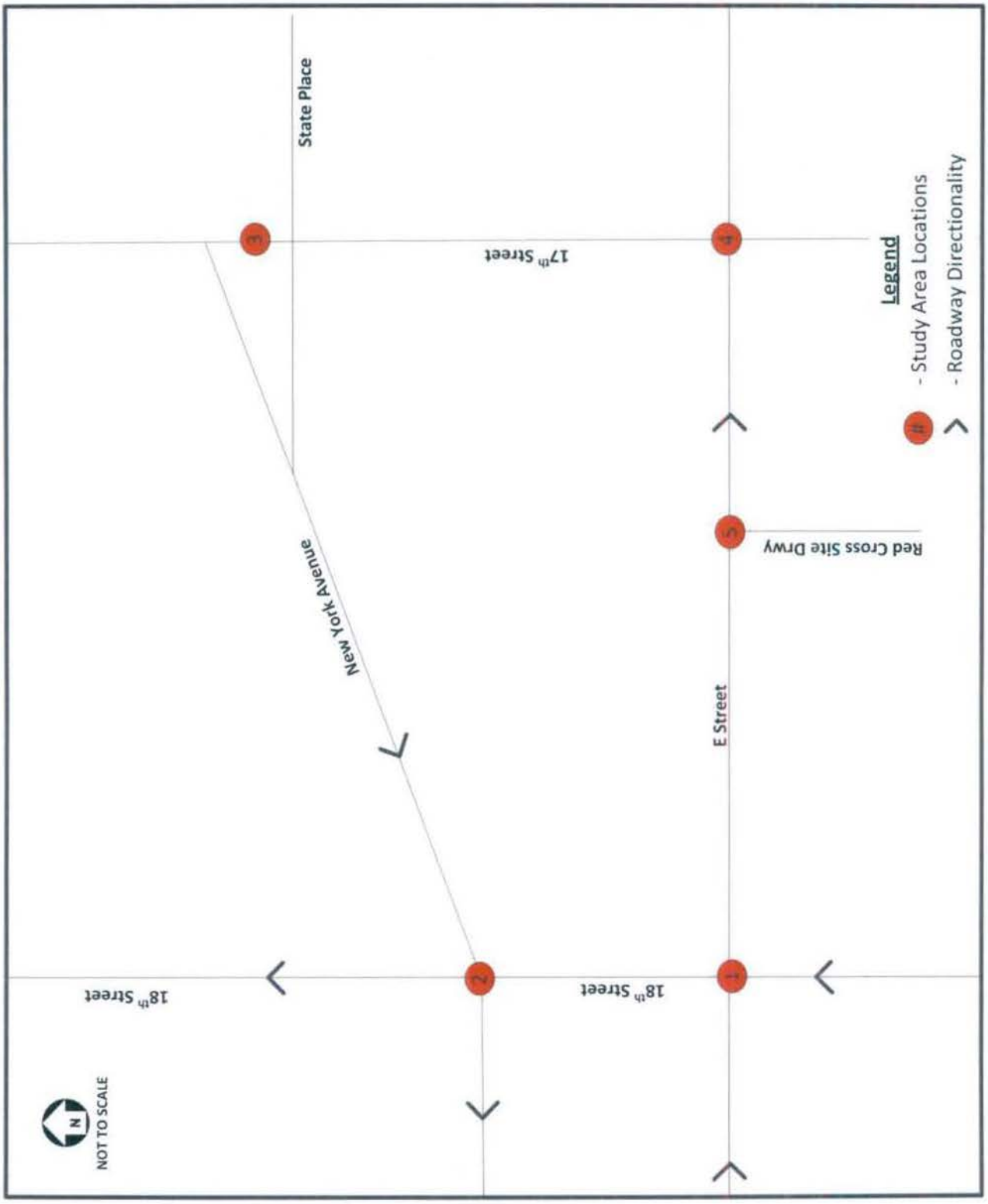


Figure 2: Study Intersections

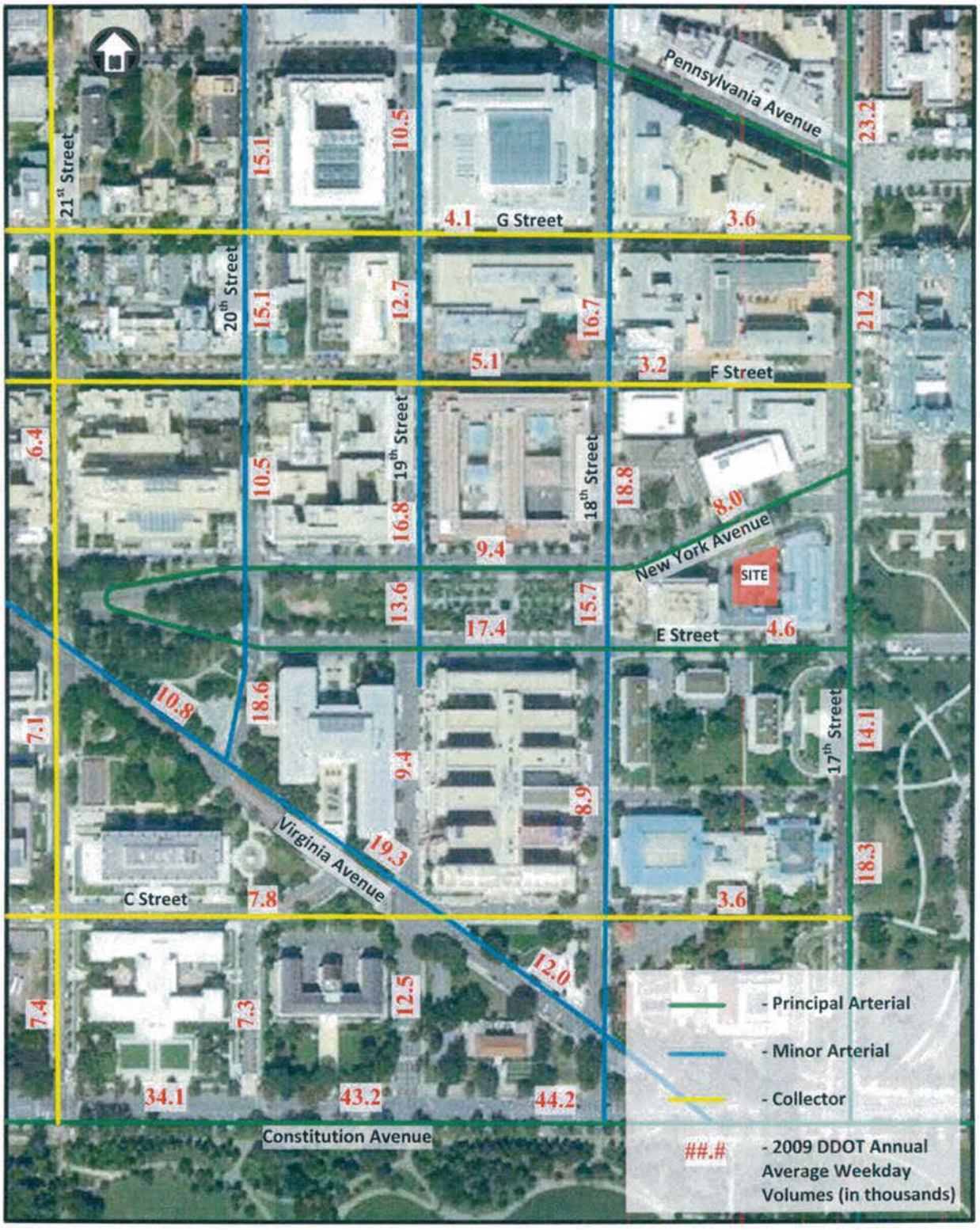


Figure 3: Roadway Classification and Average Daily Traffic

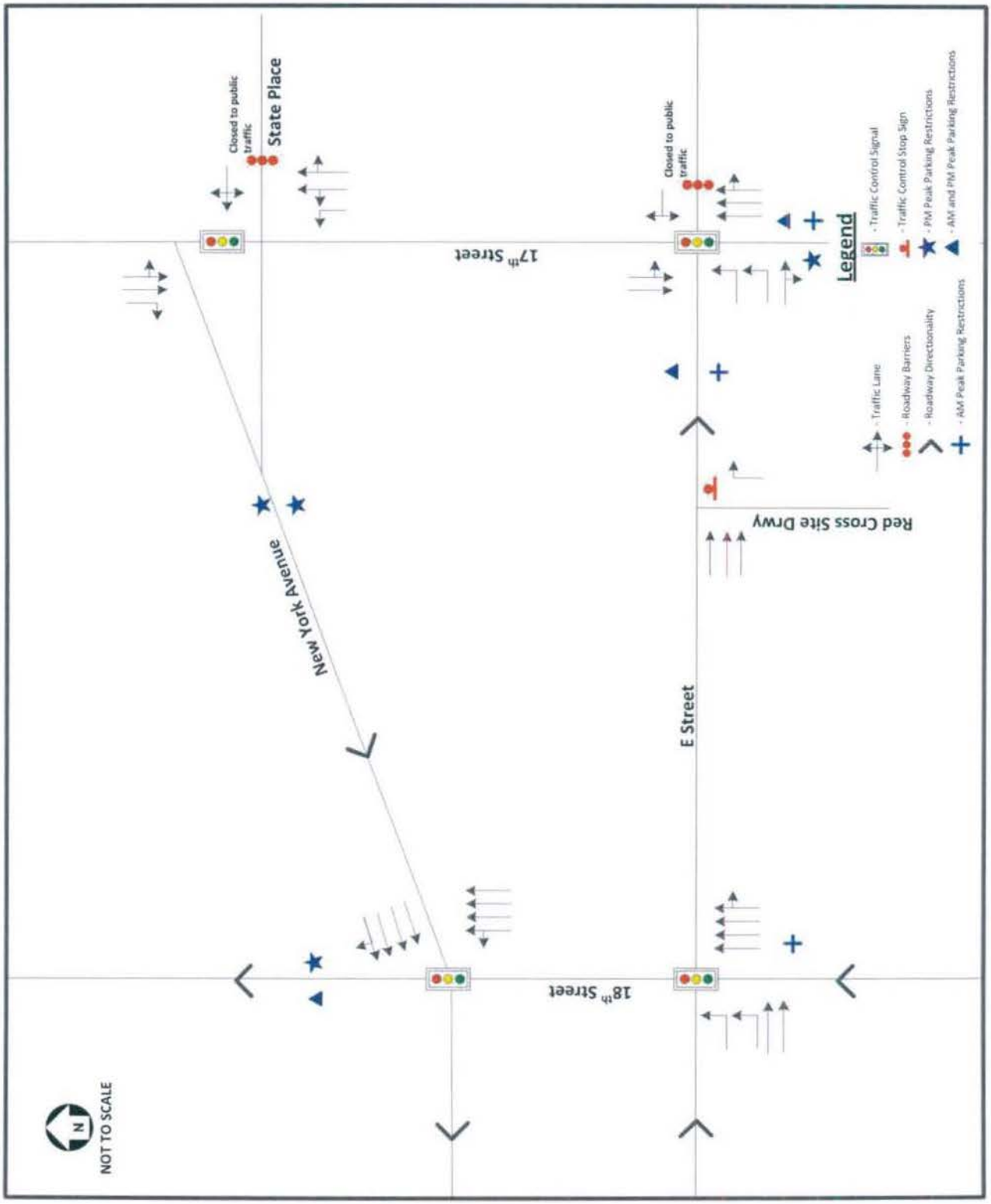


Figure 4: Existing Traffic Controls and Lane Configurations

Traffic Observations

Observations of the study intersections were performed by Gorove/Slade in order to assess the existing operations of the roadway network. During these observation periods, remarks were noted in regards to signal operation, vehicular queuing, and pedestrian activity. The study area was observed on Wednesday, April 13, 2011 between 4:30 and 5:30 PM and on Thursday, April 14, 2011 between 7:30 and 8:30 AM.

Morning Peak Hour

During the morning peak hour observations, all study intersections appeared to operate at acceptable conditions. The majority of vehicles were observed traveling in a general northbound direction toward the Washington, DC downtown business core. Moderate queues were observed for the northbound approaches along 18th and 17th Street and on the eastbound approach at the intersection of 18th Street and E Street. These queues were adequately served during the green time provided by the traffic signal. There appeared to be little delay realized for any of these movements or for other movements experiencing little to no queuing.

Afternoon Peak Hour

During the afternoon peak hour observations, all study intersections appeared to operate at acceptable conditions. The majority of vehicles were generally observed traveling southbound and westbound in the site vicinity, opposite the traffic pattern observed during the morning peak hour. Since several of intersections studied have one-way roads, those roadways which are one-way in the direction of the downtown core experienced significantly fewer vehicles during the PM peak period than observed during the AM peak. Queue lengths appeared to be acceptable at all intersections and were accommodated by the green time provided for each approach. Instances of double parking were observed along New York Avenue and 18th Street for use in picking up office workers in the area. These did not appear to impact the flow of traffic through the area.

Pedestrian Facilities

The 1700 New York Avenue development provides satisfactory pedestrian facilities and connectivity throughout the study area. Sidewalks are located along all roadway networks with crosswalks linking segments at intersections within the study area. Adequate crosswalks are provided at each study intersection. Controlled crosswalks are provided at all intersections where traffic signals exist to help control the flow of vehicles. Moderate pedestrian activity was observed at all study area intersections during the peak periods and were accommodated by the crosswalks and timings provided at the intersections.

With the proximity to the Farragut West Metrorail station, several bus lines along 18th Street and generally slow speeds of traffic by commuters, pedestrian activity is strong encouraged and realized under existing conditions.

Bicycle Facilities

According to DDOT's March 2009 Bicycle Map, bicycling conditions in the study area are fair. Some local streets provide adequate cycling conditions but there do not appear to be any dedicated bicycle lanes or trails in the vicinity of the site. Office commuters who travel by bicycle were observed using the area roadways and sidewalks with several options for bicycle parking along New York Avenue and E Street. Figure 5 depicts the existing conditions for bicycle travel within the site area under existing conditions. In addition to the existing bicycle conditions on the surrounding roadways, a Capital

Bikeshare (CaBi) station currently exists on the southwest corner of the intersection of 19th Street and E Street, approximately 1,000 feet from the site.

DDOT's proposed bicycle infrastructure for northwest, DC includes several multi-use trails, on-street bike lanes, and several signed bicycle routes. The facilities will help bicycle travel in the area improve and become safer. Specific improvements in the area of the site are proposed bicycle lanes along New York Avenue and E Street on the northern and southern boundary of the site, respectively. Figure 6 illustrates proposed bicycle conditions.

Transit Network

The Metrobus and Metrorail systems provide public transportation access to the vicinity of the 1700 New York Avenue site. The nearest Metrorail station is Farragut West, located approximately 1,900 feet from the proposed development. The orange and blue lines serve the Farragut West station running approximately every 6 minutes during the morning and afternoon peak periods and every 15 to 20 minutes during the weekday off-peak periods and on weekends.

Metrobus service is more accessible to the site, with regular stops south of the intersection of 18th Street and E Street. The routes serving this area connect the site to various commuter buses as well as the Metrorail system with some service continuing through to the downtown business core. Table 1 shows a summary of the bus route information for the lines that serve the site vicinity, including service hours and the headways. Figure 7 shows the existing bus service.

Table 1: Bus Route Information

Route Number	Route Name	Service Hours	Headway
3Y	Lee Highway-Farragut Square Line	Weekdays 6:30-9:30 am, 4:15-7:45 pm	25-30 minutes
11Y	Mt Vernon Express Line	Weekdays 6:30-9:00 am, 4:00-7:30 pm	15-30 minutes
16Y	Columbia Pike-Farragut Square Line	Weekdays 6:00-9:30 am, 3:30-7:30 pm	5-15 minutes
80	North Capitol Street Line	Weekdays 4:30 am-2:15 am Weekends 5:00 am-2:15 am	10-20 minutes on weekdays 20-30 minutes on weekends
H1	Brookland-Potomac Park Line	Weekdays 6:00-10:00 am, 4:15-7:00 pm	15-30 minutes
L1	Connecticut Avenue Line	Weekdays 5:00 am-1:00 am Weekends 6:00 am-1:00 am	5-25 minutes weekdays 20-30 minutes on weekends
N3	Massachusetts Avenue Line	Weekdays 6:00 am-8:30 pm	15-30 minutes
P1	Anacostia-Eckington Line	Weekdays 6:30-9:45 am, 4:00-6:15 pm	20 minutes
S1	16th Street-Potomac Park Line	Weekdays 5:45-10:00 am, 4:00-7:45 pm	15 minutes
X1	Benning Road Line	Weekdays 6:00-9:30 am, 3:30-7:00 pm	15-25 minutes

During site observations, a significant number of transit riders were seen using the stops adjacent to 18th Street. Most of the riders were observed riding north and south, concurrent with commuting traffic. These buses appeared regularly and allowed many passengers to exit the bus in the AM peak while having adequate room to accommodate all riders waiting to board in the PM peak.

Figure 5: Existing Bicycle Conditions (DDOT Bike Map March 2009)

Figure 6: Proposed Bicycle Conditions (DDOT Bike Map April 2005)

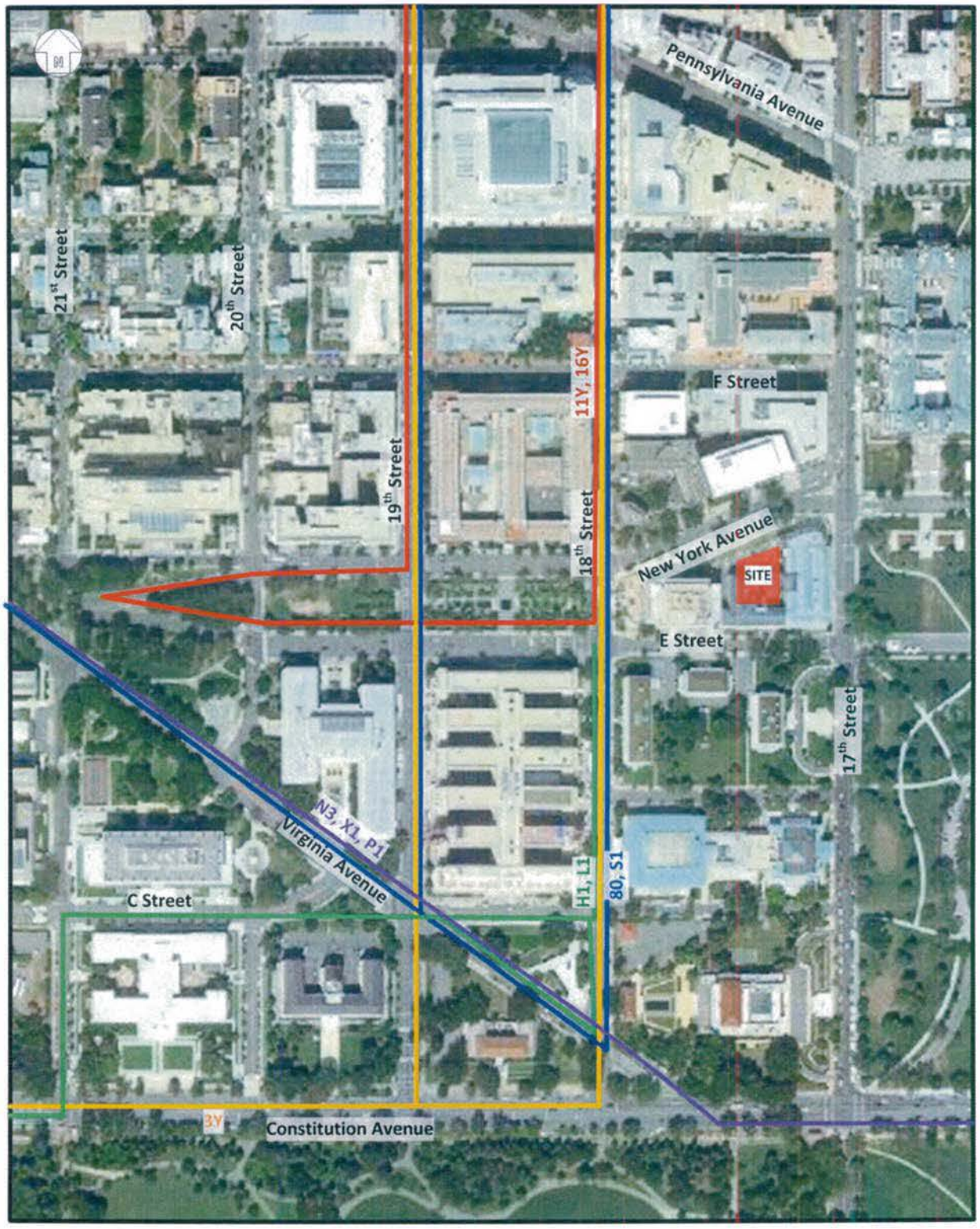


Figure 7: Existing Transit Service

Summary

A review of the proposed development site found the following:

- Traffic in the study area is heavily commuter-based as 17th and 18th Streets operate as major thoroughfares connecting office workers to the downtown business core of the District of Columbia. E Street west of the site also connects to area interstates, expressways and principal arterials contributing to this commuter traffic.
- Other roadways not utilized as a thoroughfare experienced limited vehicular activity with moderate to heavy pedestrian activity.
- The pedestrian experience was observed as adequate with sidewalks and crosswalks located along all roadways and at major intersections.
- Bicycling conditions in the study area are currently fair. Several cyclists were observed using bicycle commuting to the immediate area as well as to other destinations. With no existing bike lanes or trails, these cyclists were observed along the area roadways and sidewalks.
- Multiple area and regional commuter bus routes serve the site area with regular stops along 18th Street.
- Significant portions of office developments in the area incorporate offices with a large federal government worker population which is generally more likely to utilize mass transit options compared to a standard office tenant.
- The 1700 New York Avenue development provides satisfactory pedestrian facilities and connectivity throughout the study area.

Based on these findings, it appears that most of the vehicular traffic through the area road network is associated with commuters destined for other locations outside of the study area. Also, those occupants of buildings surrounding the site are able to take advantage of the multiple opportunities to utilize modes of transportation other than private vehicle due to the ease of access and variety of non-auto options.

DESCRIPTION OF BACKGROUND DEVELOPMENTS AND GROWTH

Background Developments

As part of future conditions without the proposed 1700 New York Avenue development, other area developments that have previously been approved, but not yet constructed were considered as these would impact the area roadways. There are a total of five (5) developments in the vicinity of the site which are expected to impact these roads and are shown on Figure 8. The trip generation for each of these sites was calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 8th Edition. For the development of 2200 Pennsylvania Ave NW, an internal synergy was expected due to the sharing of trips between the uses. This reduction is based on the ITE *Trip Generation Manual*, 7th Edition, which calculates an average AM and PM peak hour reduction of trips between uses mixed use developments. It was calculated that an internal reduction of approximately 15% in the AM peak hour and 25% in the PM peak hour would be realized for the site. Once the internal synergy of the 2200 Pennsylvania Ave NW development was applied, an additional reduction for non-auto modes was applied to each of the sites due to their proximity to Metrorail. The mode split percentage was developed using the WMATA's *Ridership Survey* as guidance. Through the report, regression equations were provided for various land uses in close proximity to Metrorail and other mass transit facilities. These equations calculated the approximate percentage of persons who would utilize non-auto modes of transportation to access the site. By studying the mode split assumptions based on WMATA, observations of existing traffic, and the type and density of surrounding land uses, an overall percent reduction of site trips were removed from each site. With the combination of the internal synergy and mode share reductions, the total number of trips expected to be generated by the background development can be found in Table 2.

The trips associated with the background developments were distributed to the surround road network based on their location and existing travel patterns. Based on this information, the traffic associated with these developments can be found in Figure 9 and indicates that there would be limited traffic added to the study intersections due to these developments.

Background Growth

In addition to background developments, traffic generated by inherent growth on the roadways within the study area must be accounted for in the traffic projections. These traffic increases were accounted for with a one (1) percent growth rate compounded annually over a two-year period for the traffic movements used by commuting regional traffic. This growth rate represents commuting traffic traversing the study area and nearby developments and is compounded for two years to reflect the anticipated occupancy date of 2013.

Table 2: Trip Generation for Background Developments

Development	Land Use	Size	Units	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
US Dept. of Commerce	Office	246,813	SF	340	46	386	60	295	355
	30%	*Non-Auto Reduction*		*-102*	*-14*	*-116*	*-18*	*-89*	*-107*
	Total Trips			**238**	**32**	**270**	**42**	**206**	**248**
2021 K St. NW	Office	57,000	SF	106	14	120	24	119	143
	20%	*Non-Auto Reduction*		*-21*	*-3*	*-24*	*-5*	*-24*	*-29*
	Total Trips			**85**	**11**	**96**	**19**	**95**	**114**
515 20th St. NW	Hotel	147	Rooms	40	26	66	46	41	87
	15%	*Non-Auto Reduction*		*-6*	*-4*	*-10*	*-7*	*-6*	*-13*
	Total Trips			**34**	**22**	**56**	**39**	**35**	**74**
2201 M St. NW	Hotel	148	Rooms	40	26	66	46	41	87
	25%	*Non-Auto Reduction*		*-10*	*-7*	*-17*	*-12*	*-10*	*-22*
	Total Trips			**30**	**19**	**49**	**34**	**31**	**65**
2200 Pennsylvania Ave NW	Office	433,000	SF	533	73	606	96	468	564
	15%/25%	*Internal Synergy*		-80	-11	-91	-24	-117	-141
	55%	*Non-Auto Reduction*		-249	-34	-283	-40	-193	-233
	Residential	333	DU	33	134	167	131	70	201
	15%/25%	*Internal Synergy*		-5	-20	-25	-33	-18	-50
	70%	*Non-Auto Reduction*		-20	-80	-99	-69	-36	-106
	Retail	110,000	SF	99	64	163	332	346	678
	15%/25%	*Internal Synergy*		-15	-10	-24	-83	-87	-170
	80%	*Non-Auto Reduction*		-67	-43	-111	-199	-207	-406
	Total Trips			**229**	**73**	**303**	**111**	**226**	**337**
	Overall Total			**616**	**157**	**774**	**245**	**593**	**838**

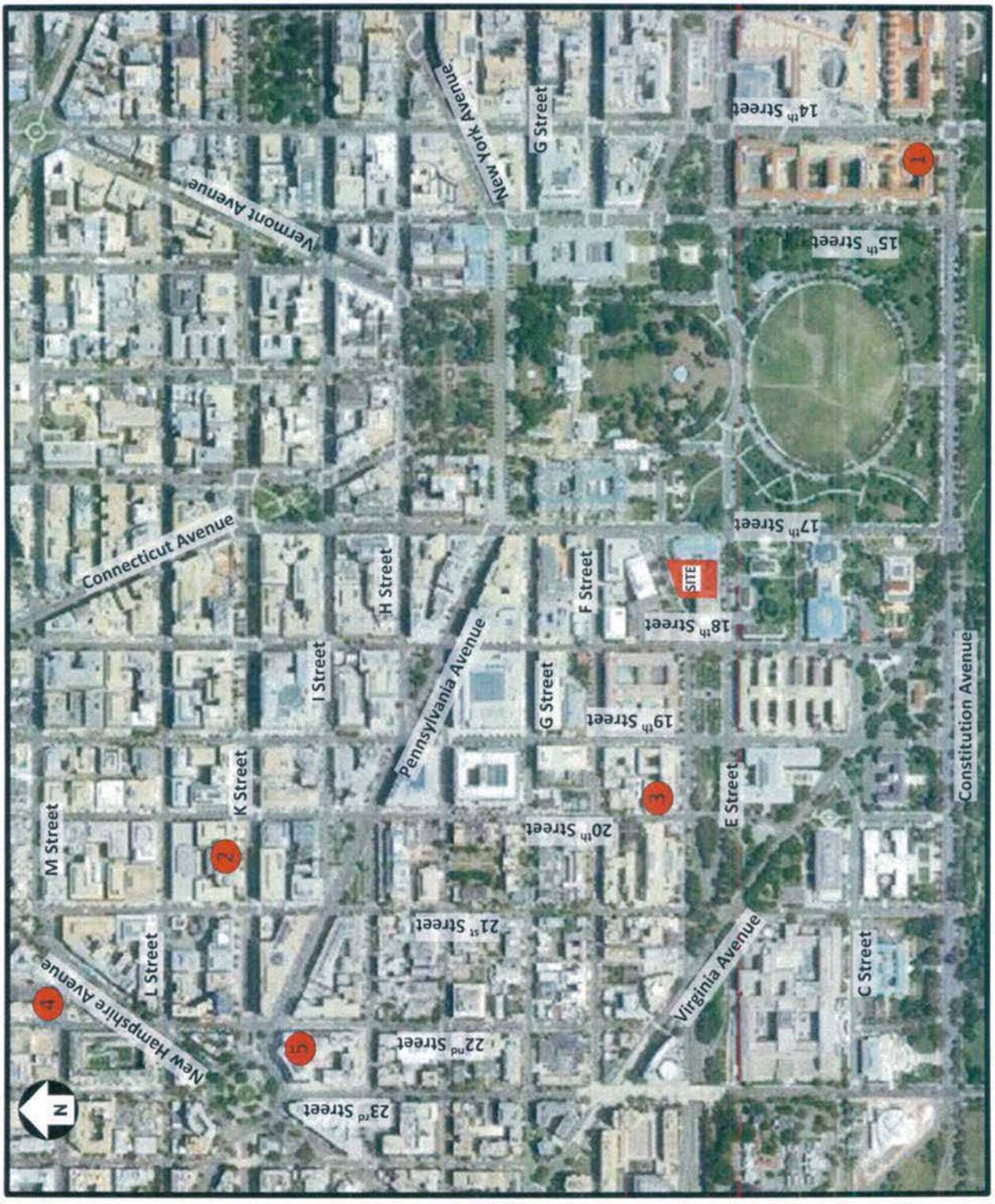


Figure 8: Background Development Locations

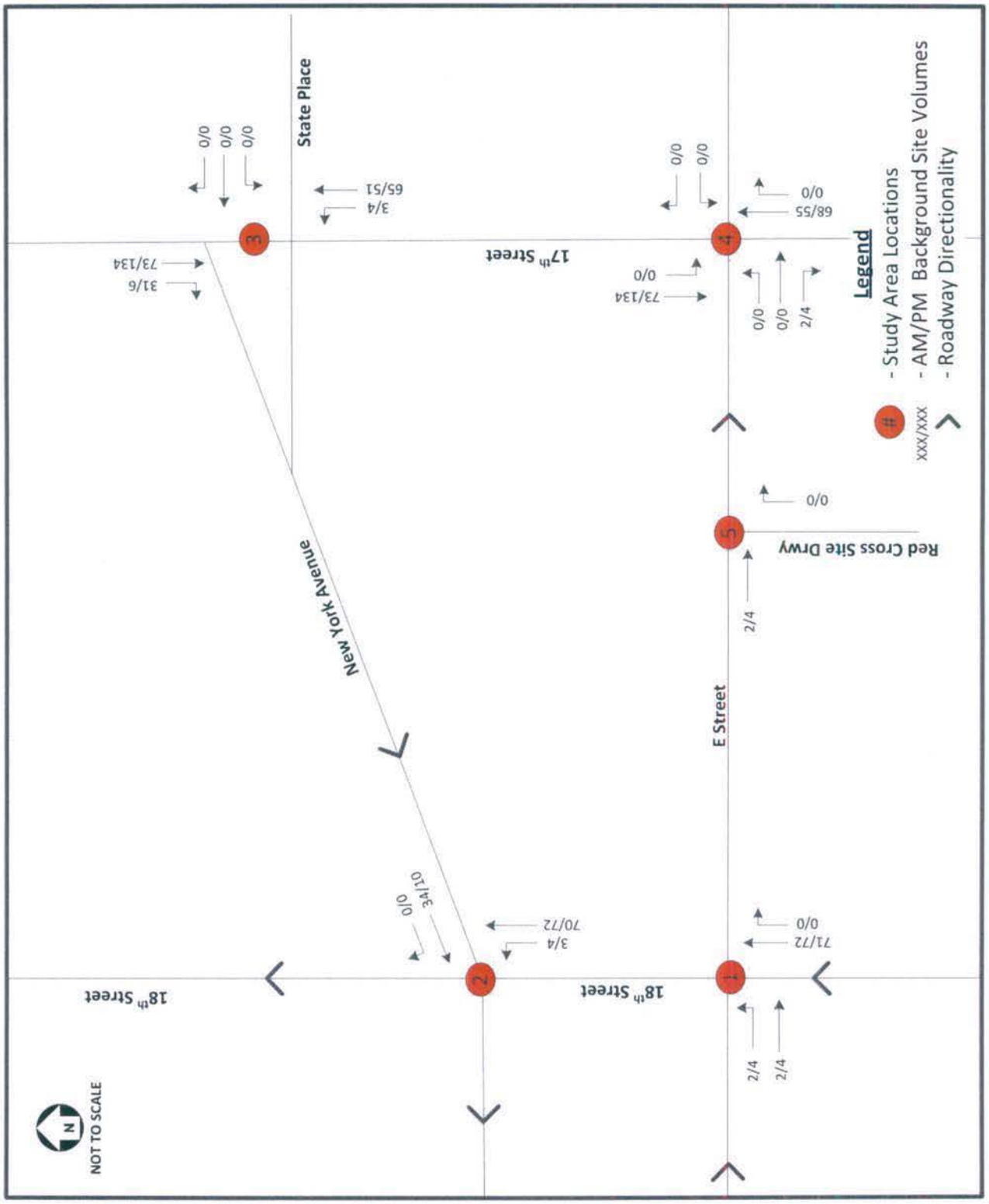


Figure 9: Background Development Site Traffic

DESCRIPTION OF PROPOSED DEVELOPMENT

Site Access and Circulation

Site access for pedestrians visiting or working at the proposed 1700 New York Avenue development will be provided from New York Avenue directly beside the Corcoran, while vehicular access will be provided by entry and exit points along E Street and New York Avenue, respectively. An additional entry point to the site by pedestrians is also proposed through the Corcoran with access from E Street. The entry point to the site for private vehicles is proposed utilizing an existing curb cut along E Street which currently provides access to the parking facility for Corcoran staff. The exit point for the site is proposed via a future curb cut along New York Avenue directly across from the American Institute of Architecture. These access points and their location result in a beneficial method for distributing traffic through the road network. E Street is one-way eastbound and provides the only entrance into the parking and New York Avenue is one-way westbound and provides the only exit from the parking. Therefore, all of the site traffic is required to access the site from the west making it reasonable to assume that limited site traffic would utilize the intersections along 17th Street. Figure 10 shows a schematic of site access and circulation.

Loading and unloading for 1700 New York Avenue would be accommodated via the existing curb cut along E Street and would operate similarly to existing conditions with the Corcoran. Trash receptacles would be stored on site and would be moved to E Street for proper disposal on the appropriate day(s) for pickup. The pedestrian access points discussed above will be placed along the perimeter of the site, allowing for pedestrian access from the sidewalks bordering the site and through the Corcoran. Crosswalks will be provided along both site driveways.

Parking

The site will be served by approximately 82 parking spaces comprised of 44 spaces that meet the zoning requirement and an additional 38 parking spaces that are tandem parking spaces and/or located in vault space within two levels of below grade parking. This parking supply is one (1) space below the zoning requirement of 83 spaces. The proposed parking supply is projected to adequately serve the demands of the site due to various considerations. The site is well-situated to be served by two Metrorail stations within walking distance of the site that include the Farragut West and Farragut North Metrorail stations. The site is also served by 10 Metrobus routes that are within close walking distance of the site. Capital Bikeshare and proposed bicycle racks and spaces within the site help to promote bicycling as an alternative mode to support the site. It is anticipated that of these 82 parking spaces, three (3) spaces will be designed as car charging locations for electric vehicles while five (5) others will be reserved for low-emission, fuel efficient vehicles.

Access points for the parking garage are shown on Figure 10. In addition to the parking proposed for private vehicles, the 1700 New York Avenue development is proposing the installation of 17 bicycle spaces within the property. While only 4 spaces are required as part of zoning requirements, the development is seeking LEED Gold Core+Shell Certification and will install 17 spaces in an effort to meet various LEED credits.

Trip Generation and Mode Split

The proposed 1700 New York Avenue development consists of approximately 114,695 square feet of general office space. Trip generation for a proposed development was calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 8th Edition. In addition to the trip generation provided by ITE, a mode split reduction was applied to the site due to the proximity to Metrorail. The mode split percentage for the site was developed using the WMATA's *Ridership Survey* as guidance. Through the report, regression equations were provided for general

office buildings in close proximity to Metrorail. This regression equation calculated the approximate percentage of persons who would utilize non-auto modes of transportation to access the site. The mode split assumptions based on WMATA, observations of existing traffic, and the type and density of surrounding land uses an overall percent reduction of site trips were removed from the trips associated with the site. The overall percent reduction can be found in Table 3 and is assumed as a conservative reduction that could realize a higher non-auto ridership given the site's proximity to various alternative modes of transportation.

Table 3: Trip Generation for Proposed Development

		Trip Generation						
		AM Peak Hour			PM Peak Hour			Daily
	Land-Use	In	Out	Total	In	Out	Total	Total
1700 New York Avenue								
General Office	710	184	25	209	35	172	207	1,483
Non-Auto Reduction	*25%*	*-46*	*-6*	*-52*	*-9*	*-43*	*-52*	*-371*
Total Vehicular Trips		**138**	**19**	**157**	**26**	**129**	**155**	**1,112**

Figure 11 depicts the expected directional distribution of these site trips and the proposed site traffic volumes.

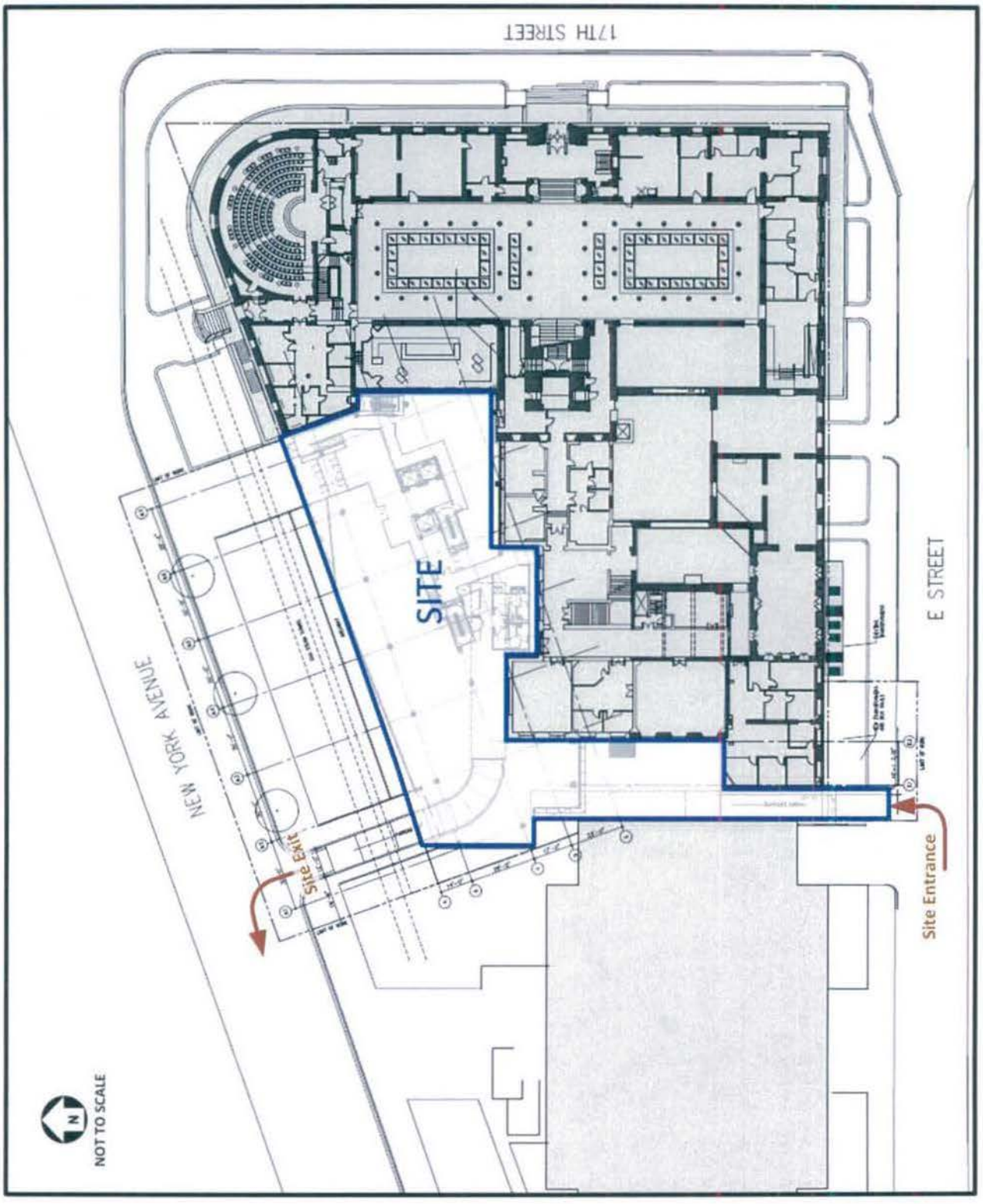


Figure 10: Site Access and Circulation

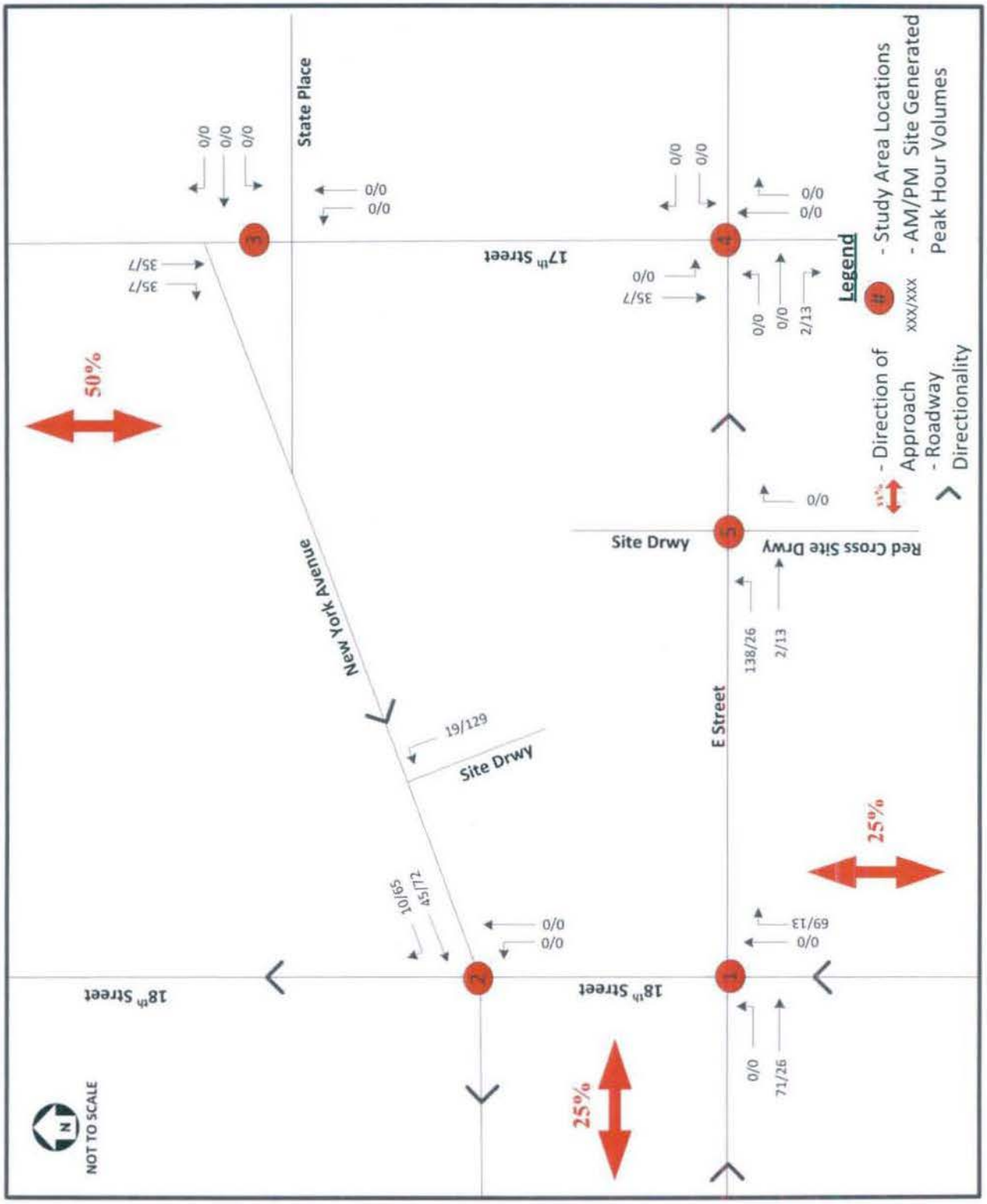


Figure 11: Proposed Site Traffic Volumes and Directional Distribution

CAPACITY ANALYSIS

Intersection capacity analyses were performed for the existing conditions, future conditions without development, and future conditions with development at the intersections contained within the study area during the morning and afternoon peak hours. *Synchro, Version 7.0* was used to analyze the study intersections based on the Highway Capacity Manual (HCM) methodology.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. An average delay (of each approach) and LOS for the signalized intersections is also shown for an overall intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. The detailed analysis worksheets are contained in the Appendix.

Existing Conditions Capacity Analysis

Traffic Volumes

In order to determine the peak hour turning movement traffic volumes, traffic counts were performed on Wednesday, March 2, 2011 from 6:30 to 9:30 AM and from 4:00 to 7:00 PM. The existing traffic volumes for the intersections contained within the study area are shown on Figure 12. Analysis of the existing traffic data determined that morning peak hour is from 7:15 to 8:15 AM, and the afternoon peak hour is from 4:45 to 5:45 PM. The existing turning movement counts are included in the Appendix.

Capacity Analysis Results

The existing capacity analysis is based on the roadway network as shown in Figure 4 and the traffic volumes described above and shown previously on Figure 12. The results of the intersection capacity analyses are presented in Table 4.

For the purpose of this analysis, it is desirable to achieve a level of service (LOS) of "E" or better on each approach. As shown in Table 4, all study intersections currently operate at acceptable conditions, which generally confirm the field observations noted previously.

Future Conditions without Development Capacity Analysis

Traffic Volumes

The traffic volumes generated by the growth rate and nearby developments were applied to the existing (2011) traffic volumes in order to establish the future (2013) traffic volumes without the proposed developments. The traffic volumes for the future conditions without development are shown on Figure 13.

Capacity Analysis Results

The capacity analysis for the future conditions without development is based on the existing roadway network and the traffic volumes shown on Figure 13. The results of the intersection capacity analyses are presented in Table 4.

For the purpose of this analysis, it is desirable to achieve a level of service (LOS) of "E" or better on each approach. As shown, all of the study intersections are expected to continue to operate at acceptable levels of service with area growth compiled for two (2) years and the five (5) area background developments.

Future Conditions with Development Capacity Analysis

Traffic Volumes

The trips generated by the development of the 1700 New York Avenue site were calculated by the methods previously discussed utilizing ITE trip generate rates and the proposed reduction in these trips based on non-auto commuters.

The traffic volumes for the total future scenario were generated by adding the site generated traffic volumes (as shown on Figure 11) to the 2013 future background traffic volumes. The traffic volumes for the total future scenario are shown on Figure 14.

Capacity Analysis Results

The future roadway network is based on the existing configuration of the roadways in the study area with the addition of the site access points previously described. The configuration of the future roadways is expected to be identical to those under current conditions with the exception of the new curb cut along E Street for site traffic entering the proposed 1700 New York Avenue site.

The capacity analysis for the future conditions with development of 1700 New York Avenue is based on the roadway network outlined above and the traffic volumes shown previously on Figure 14. The results of the intersection capacity analyses are presented in Table 4.

For the purpose of this analysis, it is desirable to achieve a level of service (LOS) of "E" or better for the overall intersection and individual approach grades. All study intersection LOS grades are expected to operate at acceptable levels for the total future scenario.

Capacity Analysis Findings

The capacity analysis results were as follows:

- All study area intersections operate at acceptable levels of service in the future with the proposed development. Neither the commuter-based traffic nor the local office based traffic will be negatively affected by vehicle trips generated by the 1700 New York Avenue development.
- Pedestrian access to the site via the New York Avenue entrance and an entrance through the Corcoran are anticipated to adequately serve the occupants and visitors of the site.
- The addition of five (5) background developments included as part of this study do not adversely affect the transportation network requiring mitigation procedures at any of the study intersections.
- While all intersections are expected to operate at acceptable levels under all conditions, it should also be noted that the anticipated change in LOS with the 1700 New York Avenue development, is very minimal.

Since all study intersections are expected to operate under acceptable conditions during both the AM and PM peak periods with the proposed 1700 New York Avenue development, no traffic management measures are needed to mitigate impacts of site generated traffic. This is also due to the low number of future trips that are added to the road network.

Table 4: Results of Capacity Analyses

Intersection	Existing Conditions				Future Conditions without Development				Future Conditions with Development			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*
18th Street and E Street	**20.9**	**C**	**14.9**	**B**	**21.3**	**C**	**15.6**	**B**	**21.8**	**C**	**15.6**	**B**
Eastbound	18.4	B	11.3	B	18.5	B	11.4	B	18.7	B	11.5	B
Northbound	23.3	C	21.5	C	23.9	C	21.9	C	24.6	C	22.0	C
18th Street and New York Avenue	**11.3**	**B**	**13.9**	**B**	**11.3**	**B**	**14.1**	**B**	**11.7**	**B**	**14.2**	**B**
Westbound	32.3	C	11.8	B	31.8	C	11.1	B	31.9	C	11.7	B
Northbound	6.2	A	16.7	B	6.1	A	17.7	B	6.0	A	17.9	B
17th Street and New York Avenue	**10.9**	**B**	**29.1**	**C**	**11.9**	**B**	**31.7**	**C**	**12.6**	**B**	**34.5**	**C**
Westbound	36.0	D	36.4	D	36.0	D	36.4	D	36.0	D	36.4	D
Northbound	6.6	A	12.3	B	7.0	A	12.2	B	7.3	A	12.5	B
Southbound	22.6	C	36.8	D	23.3	C	40.6	D	23.6	C	44.6	D
17th Street and E Street	**18.8**	**B**	**11.3**	**B**	**18.5**	**B**	**10.9**	**B**	**18.8**	**B**	**11.5**	**B**
Eastbound	15.4	B	22.1	C	14.6	B	21.7	C	16.2	B	23.0	C
Westbound	18.2	B	25.4	C	18.2	B	25.4	C	18.2	B	25.4	C
Northbound	28.1	C	18.3	B	28.9	C	18.6	B	28.9	C	18.7	B
Southbound	0.8	A	0.8	A	0.8	A	1.0	A	0.9	A	1.0	A
E Street and Red Cross Site Driveway												
Northbound	9.7	A	9.7	A	9.8	A	9.7	A	9.7	A	9.7	A
New York Avenue and Site Driveway												
Northbound	----	----	----	----	----	----	----	----	10.5	B	11.4	B

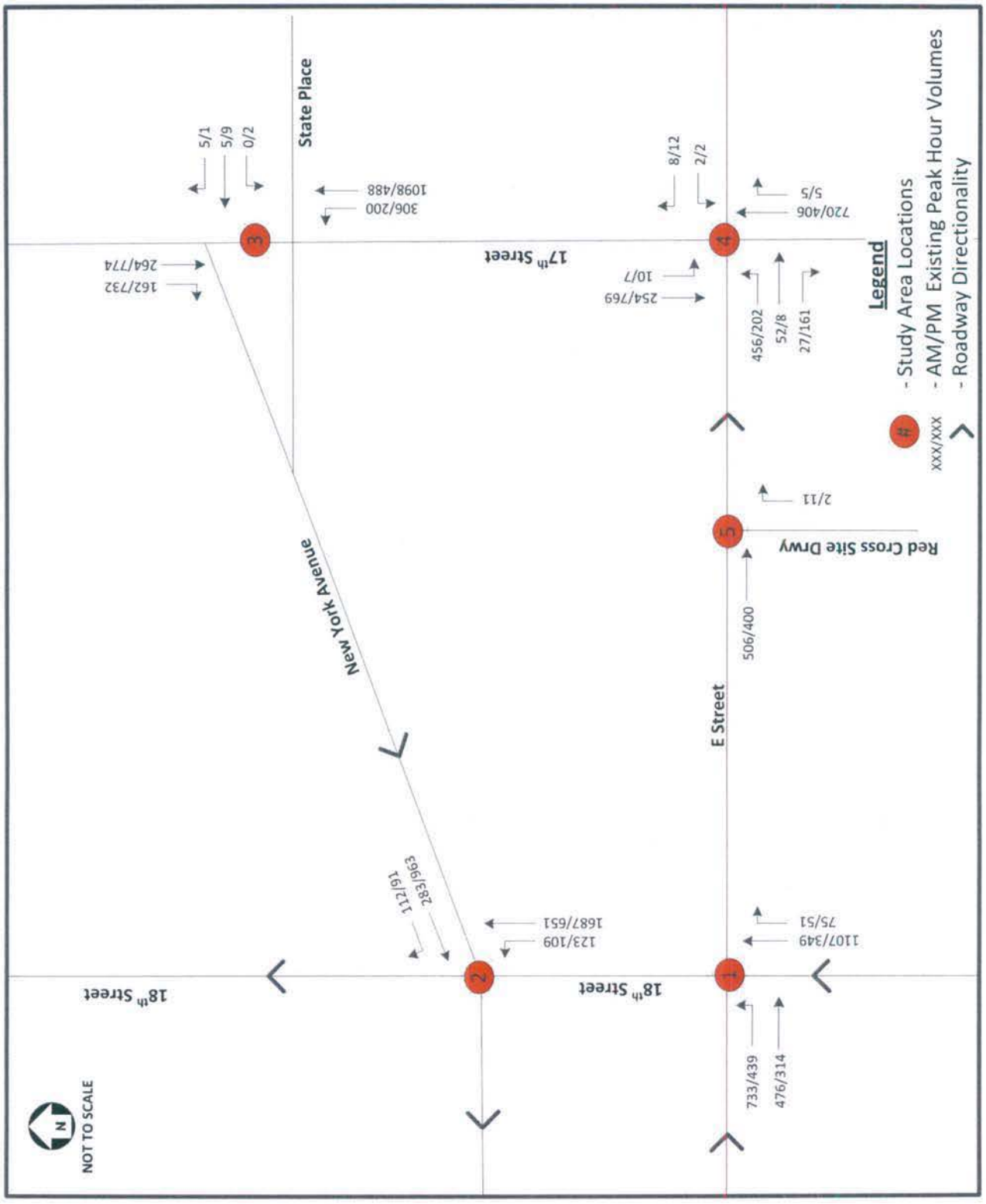


Figure 12: Existing Traffic Volumes

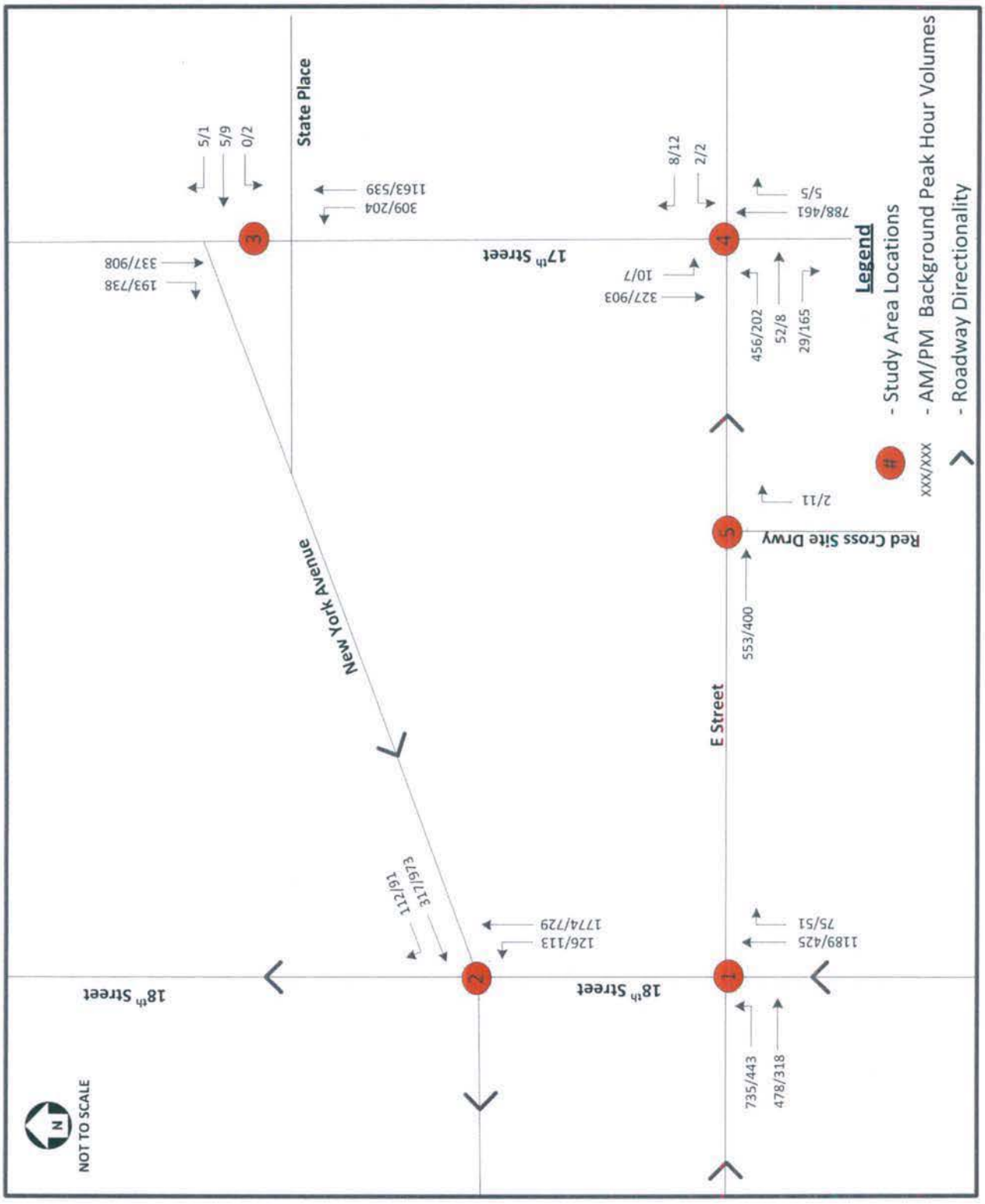


Figure 13: Future without Development Traffic Volumes

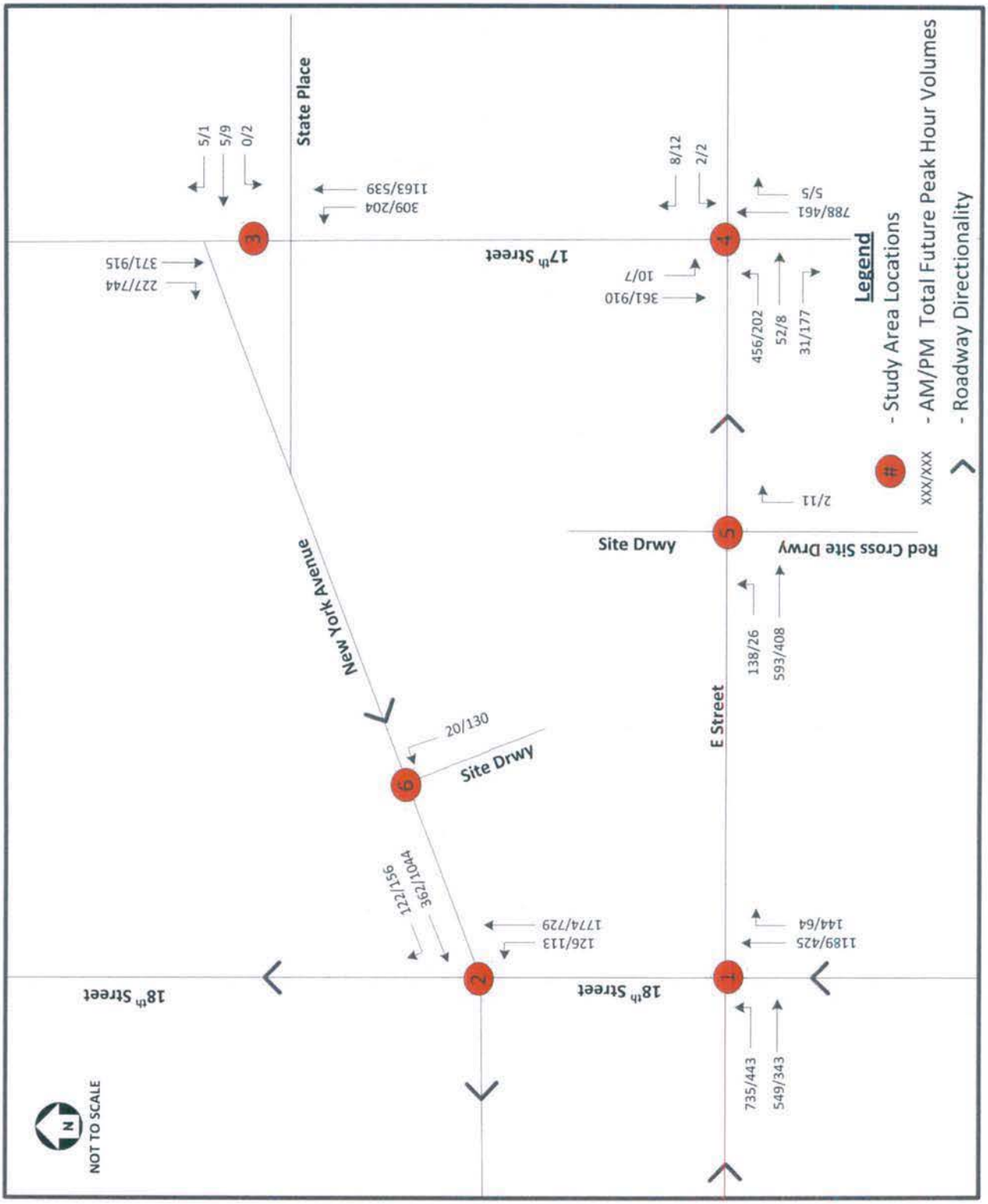


Figure 14: Future with Development Traffic Volumes

TRANSPORTATION DEMAND MANAGEMENT

The section contains a proposed set of Transportation Demand Management (TDM) strategies for the proposed 1700 New York Avenue development. The goal of TDM strategies are to minimize the impact of site traffic on the transportation network and promote the efficient use of transportation resources. TDM strategies are specifically tailored to promote travel modes that have the least impact on the transportation network and other resources, such as the environment, and discourage those that have the greatest impact. Private vehicle congestion, parking demand, and service and loading activities are the primary transportation issues in the District, along the 18th and 17th Street corridors and within the neighborhood surrounding the site. To address these issues, this report recommends TDM strategies that promote walking, cycling, and transit use as well as strategies that manage and minimize the impact of site generated vehicle traffic.

The remainder of this section summarizes site features that will impact traffic patterns and recommends strategies to maximize existing transportation resources and minimize site impacts.

Site Plan TDM Strategies

This section reviews the TDM strategies directly accommodated in the physical elements of the site plan. Site location and design elements form the foundation of and influence the selection of TDM strategies. The site is situated in a primarily general office based neighborhood with good walking, cycling and transit options. The roadway network of principal arterials and local roads provide for vehicle circulation and access. The neighborhood transportation features, which are described in greater detail in the Existing Conditions section, provide a broad range of travel options. The neighborhood has several employment and retail options within walking and bicycling distance of the site. This may reduce site vehicle trips because retail and employment options are within comfortable walking and cycling distance.

Proposed site design elements include a general office use, vehicle and bicycle parking, service and loading facilities, site pedestrian access at various locations, and sidewalks and pedestrian amenities consistent with District standards.

- General Office Land-use
  The site will consist of a general office use. The site will be accessible to pedestrians and cyclists, and provide on-site parking, reducing the number of vehicle trips and minimizing the impact of those that do drive on the available supply of neighborhood parking.

- Vehicle Parking
  Approximately 82 parking spaces will be provided in a below grade parking facility of which 44 will meet District of Columbia zoning requirements and 38 will be vault and/or tandem parking spaces. The number of parking spaces will provide on-site parking that is one space less than required by District of Columbia regulations. However, due to the proximity of various non-auto ridership options, it is anticipated that the parking supply provided by the developer will sufficiently accommodate the demand of the proposed development.

- Bicycle Parking
  Bicycle parking will be provided within the site. Secure and convenient parking increases the attractiveness and ease of cycling, so emphasis will be placed on providing this parking within secure areas of the site. Per the zoning requirements of the District of Columbia, the total number of bicycle parking spaces must equal or exceed 5% of the total number of private vehicle spaces provided on the site. Based on these regulations, a minimum of 4 bicycle parking spaces would be required. While 4 spaces are required based on zoning regulations, additional bicycle parking spaces have been proposed along with the site's intention to obtain LEED Gold Certification for Core+Shell.

- Pedestrian Facilities and Amenities

  A high quality pedestrian network is essential to a vibrant, multi-modal urban neighborhood. There is a broad range of planning principles, best practices and DDOT standards that guided the design of the site's pedestrian network. The sidewalk and other pedestrian amenities are detailed in the site plan and include wide sidewalk widths, street lights, trees, plant beds, a large green space between the building and sidewalks, a buffer zone between the sidewalk and roadway, and curb ramps, and ladder striped crosswalks. These design elements increases the attractiveness and ease of walking.

Operational TDM Strategies

This section summarizes the operational TDM strategies recommended for the site, which were developed based on TDM best practices and the opportunities created by the site's location and design. The recommendations promote travel modes that will have the least impact on the transportation network and discourage those that have the greatest impact.

- Transportation Services Coordinator

  Effective TMPs require a coordinator to implement and manage TDM strategies. A member of the property management group would be a point of contact and would be responsible for coordinating, implementing and monitoring the TMP strategies. This would include the development and distribution of informational and promotional brochures to visitors, patrons and employees regarding transit facilities and services, walk and bicycle facilities and linkages, ridesharing (carpool and vanpool) and car sharing.

- Marketing Program

  The Transportation Services Coordinator will establish a TDM marketing program that provides detailed transportation information and promotes walking, cycling and transit. An effective marketing strategy should consist of a multi-modal access guide that provides comprehensive transportation information. This information will be included as part of a prominent tenant directory located in the lobby of the building. The marketing program should also utilize existing resources such as www.GODCGO.com, which provides transportation information and options for getting around the District.

- Bicycle Amenities

  The developer will encourage all alternative transportation modes including bicycling. Bicycling will be promoted with the provision of 17 on-site bicycle parking spaces described above as well as on-site showers for bicyclists. The marketing program will include brochures on bicycling in the District and for Capital Bikeshare.

- Ride-matching/Ridesharing Program

  Employees who wish to carpool would be provided detailed carpooling information as part of the marketing effort, and will also be referred to other carpool matching services sponsored by the Metropolitan Washington Council of Governments.

It should be noted that while these operational strategies would be beneficial for the site, they would not be required in order to achieve the non-auto reductions included within this document. These TDM strategies could result in additional traffic reductions beyond what has previously been assumed.

CONCLUSIONS

This report presents the findings of a traffic impact study conducted for the 1700 New York Avenue development in support of its application to the Board of Zoning Adjustment (BZA), Case Number 18227. A review of the proposed development site found the following:

- Traffic in the study area is heavily commuter-based as 17th and 18th Streets operate as major thoroughfares connecting office workers to the downtown business core of the District of Columbia. E Street west of the site also connects to area interstates, expressways and principal arterials contributing to this commuter traffic.
- Other roadways not utilized as thoroughfares experienced limited vehicular activity with moderate to heavy pedestrian activity.
- The pedestrian experience was observed as adequate with sidewalks and crosswalks located along all roadways and at major intersections.
- Bicycling conditions in the study area are currently fair. Several cyclists were observed using bicycle commuting to the immediate area as well as to other destinations. With no existing bike lanes or trails, these cyclists were observed along the area roadways and sidewalks.
- Multiple area and regional commuter bus routes serve the site area with regular stops along 18th Street.

The proposed development plan consists of an 114,695 square feet general office space addition to the existing Corcoran Gallery of Art museum. Site access for the development will be provided by one access point along E Street via an existing curb cut for entering traffic and by one access point along New York Avenue via a proposed curb cut for exiting traffic. Parking for the site will be provided to the existing Corcoran and the office building by incorporating 44 zoning spaces and 38 parking spaces which are comprised of tandem and vault spaces for a total of 82 underground parking spaces.

A capacity analysis was performed within the six (6) study area intersections, with the following results:

- All study area intersections operate at acceptable levels of service in the future with the proposed development. Neither the commuter-based traffic nor the local office based traffic will be negatively affected by vehicle trips generated by the 1700 New York Avenue development.
- Pedestrian access to the site via the New York Avenue entrance and an entrance through the Corcoran are anticipated to adequately serve the occupants and visitors of the site.
- The addition of five (5) background developments included as part of this study do not adversely affect the transportation network requiring mitigation procedures at any of the study intersections.
- The 1700 New York Avenue development provides satisfactory pedestrian facilities and connectivity throughout the study area.

With the addition of the 1700 New York Avenue office traffic, the results indicate no intersections are anticipated to exceed acceptable levels of service. Further, there is anticipated to be little change to the levels of service expected throughout the study area due to the low number of future trips that are added to the road network.

TECHNICAL APPENDIX

APPENDIX A

Peak Hour Turning Movement Counts

Gorove/Slade Associates

Project Name :	New York Avenue
Project # :	0
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Intersection:			18th Street at New York Avenue Northwest															
AM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	One Way				New York Ave.				18th St.				One Way			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	0	15	19	36	0	3	0	200	19	5	0	1	0	3
6:45 AM	to	7:00 AM	0	0	0	30	32	42	0	3	0	294	24	7	0	0	0	3
7:00 AM	to	7:15 AM	0	0	0	28	22	52	0	6	0	350	27	7	0	0	0	4
7:15 AM	to	7:30 AM	0	0	0	39	27	63	0	4	0	415	19	3	0	0	0	4
7:30 AM	to	7:45 AM	0	0	0	52	17	59	0	8	0	399	38	7	0	0	0	5
7:45 AM	to	8:00 AM	0	0	0	43	39	80	0	21	0	421	28	6	0	0	0	3
8:00 AM	to	8:15 AM	0	0	0	63	29	81	0	16	0	452	38	2	0	0	0	8
8:15 AM	to	8:30 AM	0	0	0	20	12	38	0	6	0	260	13	2	0	0	0	3
8:30 AM	to	8:45 AM	0	0	0	15	13	25	0	3	0	195	11	3	0	0	0	5
8:45 AM	to	9:00 AM	0	0	0	63	32	63	0	14	0	436	31	13	0	0	0	8
9:00 AM	to	9:15 AM	0	0	0	59	32	77	0	8	1	391	27	12	0	0	0	3
9:15 AM	to	9:30 AM	0	0	0	53	40	63	0	7	0	405	20	9	0	0	0	23
PM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	One Way				New York Ave.				18th St.				One Way			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	0	0	4	7	127	0	7	0	97	7	4	0	0	0	5
4:15 PM	to	4:30 PM	0	0	0	4	17	182	0	9	0	161	22	15	0	0	0	3
4:30 PM	to	4:45 PM	0	0	0	4	27	240	0	9	0	158	23	39	0	0	0	16
4:45 PM	to	5:00 PM	0	0	0	1	24	227	0	5	0	170	30	20	0	0	0	20
5:00 PM	to	5:15 PM	0	0	0	11	24	248	0	14	0	136	25	44	0	0	0	31
5:15 PM	to	5:30 PM	0	0	0	2	25	259	0	9	0	170	23	29	0	0	0	25
5:30 PM	to	5:45 PM	0	0	0	5	18	229	0	11	0	175	31	31	0	0	0	16
5:45 PM	to	6:00 PM	0	0	0	6	18	219	0	15	0	138	20	19	0	0	0	11
6:00 PM	to	6:15 PM	0	0	0	6	29	232	0	9	0	143	17	17	0	0	0	8
6:15 PM	to	6:30 PM	0	0	0	3	19	247	0	11	0	150	22	8	0	0	0	6
6:30 PM	to	6:45 PM	0	0	0	3	12	194	0	6	0	148	13	11	0	0	0	10
6:45 PM	to	7:00 PM	0	0	0	1	5	204	0	2	0	139	19	1	0	0	0	8
PEAK HOURS																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	One Way				New York Ave.				18th St.				One Way			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:15 AM	to	8:15 AM	0	0	0	197	112	283	0	49	0	1687	123	18	0	0	0	20
PM INTERSECTION PEAK HOUR																		
4:45 PM	to	5:45 PM	0	0	0	19	91	963	0	39	0	651	109	124	0	0	0	92
AM SYSTEM PEAK HOUR																		
7:15 AM	to	8:15 AM	0	0	0	197	112	283	0	49	0	1687	123	18	0	0	0	20
PM SYSTEM PEAK HOUR																		
4:45 PM	to	5:45 PM	0	0	0	19	91	963	0	39	0	651	109	124	0	0	0	92

PEAK HOUR FACOTRS	Southbound				Westbound				Northbound				Eastbound			
	One Way				New York Ave.				18th St.				One Way			
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.72	0.87	0.00	**0.83**	0.00	0.93	0.81	**0.92**	0.00	0.00	0.00	**#DIV/0!**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.91	0.93	0.00	**0.93**	0.00	0.93	0.88	**0.92**	0.00	0.00	0.00	**#DIV/0!**

Overall AM PEAK HOUR FACTOR = **0.92**

Overall PM PEAK HOUR FACTOR = **0.95**

AM Period Intersection Volume: 5508

PM Period Intersection Volume: 4870

Gorove/Slade Associates

Project Name:	New York Avenue
Project # :	0
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Intersection:			18th Street at E Street Northwest															
AM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	One Way				One Way				18th St.				E St.			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	0	12	0	0	0	1	11	121	0	4	0	73	100	10
6:45 AM	to	7:00 AM	0	0	0	20	0	0	0	1	13	162	0	20	0	89	171	4
7:00 AM	to	7:15 AM	0	0	0	22	0	0	0	1	16	208	0	12	0	131	174	10
7:15 AM	to	7:30 AM	0	0	0	24	0	0	0	4	21	257	0	10	0	114	190	16
7:30 AM	to	7:45 AM	0	0	0	36	0	0	0	2	13	247	0	11	0	116	202	12
7:45 AM	to	8:00 AM	0	0	0	33	0	0	0	1	14	275	0	11	0	137	175	20
8:00 AM	to	8:15 AM	0	0	0	38	0	0	0	9	27	328	0	12	0	109	166	25
8:15 AM	to	8:30 AM	0	0	0	40	0	0	0	4	31	335	0	22	0	134	170	28
8:30 AM	to	8:45 AM	0	0	0	42	0	0	0	7	33	368	0	16	0	143	195	24
8:45 AM	to	9:00 AM	0	0	0	42	0	0	0	1	30	336	0	20	0	145	180	27
9:00 AM	to	9:15 AM	0	0	0	43	0	0	0	0	21	293	0	30	0	172	145	31
9:15 AM	to	9:30 AM	0	0	0	38	0	0	0	0	18	278	0	21	0	174	173	27
PM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	One Way				One Way				18th St.				E St.			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	0	0	15	0	0	0	9	16	93	0	10	0	65	98	25
4:15 PM	to	4:30 PM	0	0	0	21	0	0	0	3	11	100	0	15	0	62	96	25
4:30 PM	to	4:45 PM	0	0	0	26	1	1	0	6	9	73	0	22	0	64	107	60
4:45 PM	to	5:00 PM	0	0	0	19	0	0	0	6	15	88	0	20	0	84	98	49
5:00 PM	to	5:15 PM	0	0	0	32	0	0	0	8	11	90	0	27	0	69	103	42
5:15 PM	to	5:30 PM	0	0	0	25	0	0	0	7	12	71	0	22	0	79	112	36
5:30 PM	to	5:45 PM	0	0	0	25	0	0	0	8	13	100	0	25	0	82	126	34
5:45 PM	to	6:00 PM	0	0	0	24	0	0	0	4	8	82	0	14	0	86	95	37
6:00 PM	to	6:15 PM	0	0	0	15	0	0	0	6	9	108	0	22	0	87	93	16
6:15 PM	to	6:30 PM	0	0	0	23	0	0	0	5	14	91	0	12	0	82	101	26
6:30 PM	to	6:45 PM	0	0	0	12	0	0	0	3	7	76	0	4	0	53	100	17
6:45 PM	to	7:00 PM	0	0	0	10	0	0	0	3	6	86	0	9	0	43	86	30
PEAK HOURS																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	One Way				One Way				18th St.				E St.			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:15 AM	to	9:15 AM	0	0	0	167	0	0	0	12	115	1332	0	88	0	594	690	110
PM INTERSECTION PEAK HOUR																		
5:30 PM	to	6:30 PM	0	0	0	87	0	0	0	23	44	381	0	73	0	337	415	113
AM SYSTEM PEAK HOUR																		
7:15 AM	to	8:15 AM	0	0	0	131	0	0	0	16	75	1107	0	44	0	476	733	73
PM SYSTEM PEAK HOUR																		
4:45 PM	to	5:45 PM	0	0	0	101	0	0	0	29	51	349	0	94	0	314	439	161

PEAK HOUR FACOTRS		Southbound				Westbound				Northbound				Eastbound			
		One Way				One Way				18th St.				E St.			
AM Peak Hour		Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR		0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**	0.69	0.84	0.00	**0.83**	0.00	0.87	0.91	**0.95**
		Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR		0.00	0.00	0.00	**#DIV/0!**	0.00	0.00	0.00	**#DIV/0!**	0.85	0.87	0.00	**0.88**	0.00	0.93	0.87	**0.91**

Overall AM PEAK HOUR FACTOR = **0.95** **Overall PM PEAK HOUR FACTOR** = **0.90**

AM Period Intersection Volume: 7034 **PM Period Intersection Volume:** 3262

Gorove/Slade Associates

Project Name :	New York Avenue
Project # :	0
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Intersection:			17th Street at White House Grounds Access and New York Avenue Northwest															
AM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	17th St.				White House Access				17th St.				One Way			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	23	38	0	6	0	0	0	2	0	165	45	17	0	0	0	1
6:45 AM	to	7:00 AM	23	64	0	6	0	0	0	0	0	200	53	24	0	0	0	1
7:00 AM	to	7:15 AM	42	92	0	1	0	0	0	0	0	182	57	23	0	0	0	3
7:15 AM	to	7:30 AM	28	77	0	11	4	0	0	3	0	248	64	8	0	0	0	2
7:30 AM	to	7:45 AM	32	51	0	8	0	0	0	1	0	278	64	18	0	0	0	0
7:45 AM	to	8:00 AM	51	75	0	20	0	3	0	3	0	296	87	19	0	0	0	4
8:00 AM	to	8:15 AM	51	61	0	17	1	2	0	4	0	276	91	13	0	0	0	7
8:15 AM	to	8:30 AM	42	45	0	14	0	0	0	2	0	292	94	25	0	0	0	5
8:30 AM	to	8:45 AM	26	60	0	29	0	1	0	2	0	296	79	18	0	0	0	6
8:45 AM	to	9:00 AM	15	52	0	24	0	1	0	7	0	306	67	30	0	0	0	10
9:00 AM	to	9:15 AM	51	65	0	35	0	1	0	3	0	170	37	9	0	0	0	4
9:15 AM	to	9:30 AM	52	100	0	18	0	1	0	3	0	265	67	18	0	0	0	4
PM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	17th St.				White House Access				17th St.				One Way			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	159	176	0	54	1	2	0	1	0	131	56	83	0	0	0	15
4:15 PM	to	4:30 PM	200	154	0	30	2	2	0	0	0	126	46	85	0	0	0	10
4:30 PM	to	4:45 PM	175	177	0	39	0	1	0	1	0	124	50	54	0	0	0	9
4:45 PM	to	5:00 PM	175	191	0	30	0	1	0	3	0	133	46	55	0	0	0	10
5:00 PM	to	5:15 PM	178	169	0	25	1	3	2	0	0	114	56	42	0	0	0	10
5:15 PM	to	5:30 PM	197	197	0	32	0	1	0	10	0	133	59	79	0	0	0	20
5:30 PM	to	5:45 PM	182	217	0	32	0	4	0	3	0	108	39	78	0	0	0	13
5:45 PM	to	6:00 PM	169	182	0	41	0	2	0	14	0	110	51	46	0	0	0	5
6:00 PM	to	6:15 PM	211	216	0	38	2	4	0	7	0	109	54	69	0	0	0	14
6:15 PM	to	6:30 PM	221	245	0	37	3	2	0	2	0	117	27	48	0	0	0	4
6:30 PM	to	6:45 PM	295	176	0	74	2	1	0	0	0	104	44	53	0	0	0	6
6:45 PM	to	7:00 PM	146	163	0	6	2	2	0	0	0	81	26	37	0	0	0	4
PEAK HOURS																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	17th St.				White House Access				17th St.				One Way			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:45 AM	to	8:45 AM	170	241	0	80	1	6	0	11	0	1160	351	75	0	0	0	22
PM INTERSECTION PEAK HOUR																		
5:45 PM	to	6:45 PM	896	819	0	190	7	9	0	23	0	440	176	216	0	0	0	29
AM SYSTEM PEAK HOUR																		
7:15 AM	to	8:15 AM	162	264	0	56	5	5	0	11	0	1098	306	58	0	0	0	13
PM SYSTEM PEAK HOUR																		
4:45 PM	to	5:45 PM	732	774	0	119	1	9	2	16	0	488	200	254	0	0	0	53

PEAK HOUR FACOTRS	Southbound				Westbound				Northbound				Eastbound			
	17th St.				White House Access				17th St.				One Way			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.79	0.86	0.00	**0.85**	0.31	0.42	0.00	**0.63**	0.00	0.93	0.84	**0.92**	0.00	0.00	0.00	**#DIV/0!**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.93	0.89	0.00	**0.94**	0.25	0.56	0.25	**0.50**	0.00	0.92	0.85	**0.90**	0.00	0.00	0.00	**#DIV/0!**

Overall AM PEAK HOUR FACTOR = **0.90** **Overall PM PEAK HOUR FACTOR** = **0.94**

AM Period Intersection Volume: 5009 **PM Period Intersection Volume:** 6555

Gorove/Slade Associates

Project Name :	New York Avenue
Project # :	0
Location	DC
Data Source:	Gorove/Slade Associates, Inc.

Intersection:			17th Street at White House Grounds Access and E Street Northwest															
AM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	17th St.				White House Grounds Access				17th St.				E St.			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	0	1	4	0	0	1	0	139	0	4	8	2	66	0
6:45 AM	to	7:00 AM	0	0	1	0	1	0	0	0	1	153	0	0	6	6	92	2
7:00 AM	to	7:15 AM	0	0	4	0	2	0	0	0	1	147	0	0	9	3	90	4
7:15 AM	to	7:30 AM	0	0	4	0	2	0	0	0	3	176	0	1	6	10	111	0
7:30 AM	to	7:45 AM	0	0	3	4	2	0	0	4	0	172	0	1	7	7	142	0
7:45 AM	to	8:00 AM	0	0	0	0	3	0	0	4	0	211	0	1	9	7	118	0
8:00 AM	to	8:15 AM	0	1	45	1	1	0	2	1	2	161	0	1	5	28	85	0
8:15 AM	to	8:30 AM	6	3	101	0	0	0	6	1	1	92	0	1	4	81	29	0
8:30 AM	to	8:45 AM	0	0	2	0	1	0	0	2	1	204	0	5	10	7	114	3
8:45 AM	to	9:00 AM	0	0	0	0	1	0	0	5	3	216	0	2	13	6	110	0
9:00 AM	to	9:15 AM	0	0	1	0	2	0	0	2	0	198	0	0	6	3	107	0
9:15 AM	to	9:30 AM	0	0	1	2	2	0	0	0	1	156	0	0	8	3	116	0
PM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	17th St.				White House Grounds Access				17th St.				E St.			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	0	4	13	2	0	0	1	1	117	0	9	31	1	53	3
4:15 PM	to	4:30 PM	0	0	1	8	4	0	1	3	0	96	0	12	57	4	61	7
4:30 PM	to	4:45 PM	0	0	0	1	1	0	0	1	0	132	0	5	39	2	52	1
4:45 PM	to	5:00 PM	0	0	0	5	1	0	0	0	0	97	0	3	39	4	62	2
5:00 PM	to	5:15 PM	0	0	2	1	5	0	1	0	5	96	0	6	42	1	63	0
5:15 PM	to	5:30 PM	0	0	5	0	2	0	1	0	0	124	0	7	50	1	38	0
5:30 PM	to	5:45 PM	0	0	0	0	4	0	0	0	0	89	0	0	30	2	39	1
5:45 PM	to	6:00 PM	0	0	1	0	5	0	0	0	1	81	0	2	33	1	56	1
6:00 PM	to	6:15 PM	0	0	3	11	2	0	0	1	0	90	0	2	29	1	57	4
6:15 PM	to	6:30 PM	0	0	1	15	4	0	0	0	1	92	0	2	30	0	48	1
6:30 PM	to	6:45 PM	0	0	1	8	4	0	1	3	0	100	0	0	21	1	37	3
6:45 PM	to	7:00 PM	0	0	2	0	1	0	0	0	0	86	0	0	2	0	36	0
PEAK HOURS																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	17th St.				White House Grounds Access				17th St.				E St.			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	6	4	148	1	3	0	8	9	7	673	0	9	32	122	338	3
PM INTERSECTION PEAK HOUR																		
4:15 PM	to	5:15 PM	0	0	3	15	11	0	2	4	5	421	0	26	177	11	238	10
AM SYSTEM PEAK HOUR																		
7:15 AM	to	8:15 AM	0	1	52	5	8	0	2	9	5	720	0	4	27	52	456	0
PM SYSTEM PEAK HOUR																		
4:45 PM	to	5:45 PM	0	0	7	6	12	0	2	0	5	406	0	16	161	8	202	3

PEAK HOUR FACOTRS	Southbound				Westbound				Northbound				Eastbound			
	17th St.				White House Grounds Access				17th St.				E St.			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.25	0.29	**0.29**	0.67	0.00	0.25	**0.83**	0.42	0.85	0.00	**0.86**	0.75	0.46	0.80	**0.86**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.35	**0.35**	0.60	0.00	0.50	**0.58**	0.25	0.82	0.00	**0.83**	0.81	0.50	0.80	**0.88**

Overall AM PEAK HOUR FACTOR = **0.95** **Overall PM PEAK HOUR FACTOR** = **0.91**

AM Period Intersection Volume: 3673 **PM Period Intersection Volume:** 2290

APPENDIX B

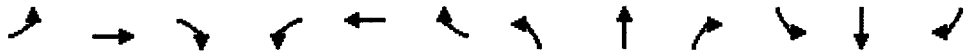
Existing Synchro Capacity Analysis

Lane Configurations												
Volume (vph)	733	476	0	0	0	0	0	1107	75	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0						6.0				
Lane Util. Factor	0.97	0.95						0.86				
Frpb, ped/bikes	1.00	1.00						0.99				
Flpb, ped/bikes	1.00	1.00						1.00				
Frt	1.00	1.00						0.99				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	3433	3539						6289				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	3433	3539						6289				
Peak-hour factor, PHF	0.91	0.87	0.92	0.92	0.92	0.92	0.92	0.84	0.69	0.92	0.92	0.92
Adj. Flow (vph)	805	547	0	0	0	0	0	1318	109	0	0	0
RTOR Reduction (vph)	14	0	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	791	547	0	0	0	0	0	1414	0	0	0	0
Confl. Peds. (#/hr)			73			16			44			131
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)	47.0	47.0						41.0				
Effective Green, g (s)	47.0	47.0						41.0				
Actuated g/C Ratio	0.47	0.47						0.41				
Clearance Time (s)	6.0	6.0						6.0				
Lane Grp Cap (vph)	1614	1663						2578				
v/s Ratio Prot		0.15						c0.22				
v/s Ratio Perm	c0.23											
v/c Ratio	0.49	0.33						0.55				
Uniform Delay, d1	18.2	16.6						22.5				
Progression Factor	1.00	1.00						1.00				
Incremental Delay, d2	1.1	0.5						0.8				
Delay (s)	19.3	17.1						23.3				
Level of Service	B	B						C				
Approach Delay (s)		18.4			0.0			23.3			0.0	
Approach LOS		B			A			C			A	

HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	283	112	123	1687	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0			6.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.97			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.95			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					5894			6383				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					5894			6383				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.87	0.72	0.81	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	325	156	152	1814	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	14	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	467	0	0	1953	0	0	0	0
Confl. Peds. (#/hr)			20			49			18			197
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					26.0			62.0				
Effective Green, g (s)					26.0			62.0				
Actuated g/C Ratio					0.26			0.62				
Clearance Time (s)					6.0			6.0				
Lane Grp Cap (vph)					1532			3957				
v/s Ratio Prot					c0.08							
v/s Ratio Perm								0.31				
v/c Ratio					0.30			0.49				
Uniform Delay, d1					29.7			10.4				
Progression Factor					1.07			0.56				
Incremental Delay, d2					0.5			0.4				
Delay (s)					32.3			6.2				
Level of Service					C			A				
Approach Delay (s)		0.0			32.3			6.2			0.0	
Approach LOS		A			C			A			A	

HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations												
Volume (vph)	0	0	0	0	5	5	306	1098	0	0	264	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0		4.5	5.0			5.0	5.0
Lane Util. Factor					1.00		0.91	0.91			0.95	1.00
Frpb, ped/bikes					0.98		1.00	1.00			1.00	0.89
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.92		1.00	1.00			1.00	0.85
Flt Protected					1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1687		1610	3385			3539	1401
Flt Permitted					1.00		0.55	0.95			1.00	1.00
Satd. Flow (perm)					1687		927	3204			3539	1401
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.42	0.31	0.84	0.93	0.92	0.92	0.86	0.79
Adj. Flow (vph)	0	0	0	0	12	16	364	1181	0	0	307	205
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	0	131
Lane Group Flow (vph)	0	0	0	0	15	0	328	1217	0	0	307	74
Confl. Peds. (#/hr)			13			11			58			56
Turn Type				Perm			pm+pt			Perm		Perm
Protected Phases					8		5	2			6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)					16.0		74.5	74.5			36.0	36.0
Effective Green, g (s)					16.0		74.5	74.5			36.0	36.0
Actuated g/C Ratio					0.16		0.74	0.74			0.36	0.36
Clearance Time (s)					5.0		4.5	5.0			5.0	5.0
Lane Grp Cap (vph)					270		919	2448			1274	504
v/s Ratio Prot					c0.01		0.12	c0.17			0.09	
v/s Ratio Perm							0.15	c0.20				0.05
v/c Ratio					0.05		0.36	0.50			0.24	0.15
Uniform Delay, d1					35.6		5.5	5.2			22.4	21.6
Progression Factor					1.00		1.14	1.11			1.00	1.00
Incremental Delay, d2					0.4		1.0	0.6			0.4	0.6
Delay (s)					36.0		7.2	6.4			22.9	22.2
Level of Service					D		A	A			C	C
Approach Delay (s)		0.0			36.0			6.6			22.6	
Approach LOS		A			D			A			C	

HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations												
Volume (vph)	456	52	27	2	0	8	0	720	5	10	254	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	0.97	1.00			1.00			0.91			0.95	
Frt	1.00	0.96			0.92			1.00			1.00	
Flt Protected	0.95	1.00			0.98			1.00			0.99	
Satd. Flow (prot)	3433	1795			1678			5075			3520	
Flt Permitted	0.74	1.00			0.92			1.00			0.86	
Satd. Flow (perm)	2690	1795			1583			5075			3028	
Peak-hour factor, PHF	0.80	0.46	0.75	0.25	0.92	0.67	0.92	0.85	0.42	0.29	0.92	0.92
Adj. Flow (vph)	570	113	36	8	0	12	0	847	12	34	276	0
RTOR Reduction (vph)	0	11	0	0	7	0	0	1	0	0	0	0
Lane Group Flow (vph)	570	138	0	0	13	0	0	858	0	0	310	0
Turn Type	Perm			Perm						pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	40.0	40.0			40.0			33.0			52.0	
Effective Green, g (s)	40.0	40.0			40.0			33.0			52.0	
Actuated g/C Ratio	0.40	0.40			0.40			0.33			0.52	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	1076	718			633			1675			1648	
v/s Ratio Prot		0.08						c0.17			c0.03	
v/s Ratio Perm	c0.21				0.01						0.07	
v/c Ratio	0.53	0.19			0.02			0.51			0.19	
Uniform Delay, d1	22.8	19.5			18.1			27.0			12.8	
Progression Factor	0.63	0.60			1.00			1.00			0.04	
Incremental Delay, d2	1.8	0.6			0.1			1.1			0.2	
Delay (s)	16.2	12.2			18.2			28.1			0.8	
Level of Service	B	B			B			C			A	
Approach Delay (s)		15.4			18.2			28.1			0.8	
Approach LOS		B			B			C			A	

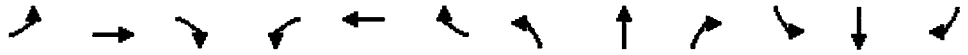
Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations	↑↑↑					↱
Volume (veh/h)	506	0	0	0	0	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.92	0.92	0.92	0.92	0.25
Hourly flow rate (vph)	538	0	0	0	0	8
Pedestrians					27	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	398			252		
pX, platoon unblocked						
vC, conflicting volume			565		565	206
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			565		565	206
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			980		445	782

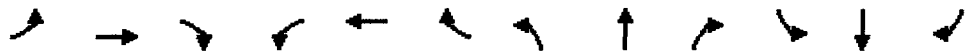
Volume Total	179	179	179	8		
Volume Left	0	0	0	0		
Volume Right	0	0	0	8		
cSH	1700	1700	1700	782		
Volume to Capacity	0.11	0.11	0.11	0.01		
Queue Length 95th (ft)	0	0	0	1		
Control Delay (s)	0.0	0.0	0.0	9.7		
Lane LOS				A		
Approach Delay (s)	0.0			9.7		
Approach LOS				A		

Average Delay	0.1		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		



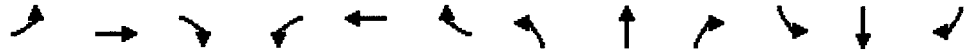
Lane Configurations												
Volume (vph)	439	314	0	0	0	0	0	349	51	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0				
Lane Util. Factor	0.97	0.95						0.86				
Frpb, ped/bikes	1.00	1.00						0.98				
Flpb, ped/bikes	1.00	1.00						1.00				
Frt	1.00	1.00						0.98				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	3433	3539						6132				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	3433	3539						6132				
Peak-hour factor, PHF	0.87	0.93	0.92	0.92	0.92	0.92	0.92	0.87	0.85	0.92	0.92	0.92
Adj. Flow (vph)	505	338	0	0	0	0	0	401	60	0	0	0
RTOR Reduction (vph)	227	0	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	278	338	0	0	0	0	0	434	0	0	0	0
Confl. Peds. (#/hr)			161			29			94			101
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)	55.0	55.0						37.0				
Effective Green, g (s)	55.0	55.0						37.0				
Actuated g/C Ratio	0.55	0.55						0.37				
Clearance Time (s)	4.0	4.0						4.0				
Lane Grp Cap (vph)	1888	1946						2269				
v/s Ratio Prot		c0.10						c0.07				
v/s Ratio Perm	0.08											
v/c Ratio	0.15	0.17						0.19				
Uniform Delay, d1	11.0	11.2						21.4				
Progression Factor	1.00	1.00						1.00				
Incremental Delay, d2	0.2	0.2						0.2				
Delay (s)	11.2	11.4						21.5				
Level of Service	B	B						C				
Approach Delay (s)		11.3			0.0			21.5			0.0	
Approach LOS		B			A			C			A	

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations												
Volume (vph)	0	0	0	0	963	91	109	651	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6277			6360				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6277			6360				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.93	0.91	0.88	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1035	100	124	700	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	12	0	0	32	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1123	0	0	792	0	0	0	0
Confl. Peds. (#/hr)			92			39			124			19
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					57.0			35.0				
Effective Green, g (s)					57.0			35.0				
Actuated g/C Ratio					0.57			0.35				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					3578			2226				
v/s Ratio Prot					c0.18							
v/s Ratio Perm								0.12				
v/c Ratio					0.31			0.36				
Uniform Delay, d1					11.3			24.1				
Progression Factor					1.03			0.67				
Incremental Delay, d2					0.2			0.4				
Delay (s)					11.8			16.7				
Level of Service					B			B				
Approach Delay (s)		0.0			11.8			16.7			0.0	
Approach LOS		A			B			B			A	

HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

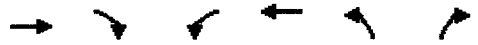


Lane Configurations												
Volume (vph)	0	0	0	2	9	1	200	488	0	0	774	732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					1.00		0.91	0.91			0.95	1.00
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.77
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.98		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1790		1610	3373			3539	1218
Flt Permitted					0.99		0.19	0.85			1.00	1.00
Satd. Flow (perm)					1790		327	2869			3539	1218
Peak-hour factor, PHF	0.92	0.92	0.92	0.25	0.56	0.25	0.85	0.92	0.92	0.92	0.89	0.93
Adj. Flow (vph)	0	0	0	8	16	4	235	530	0	0	870	787
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	391
Lane Group Flow (vph)	0	0	0	0	25	0	176	589	0	0	870	396
Confl. Peds. (#/hr)			53			16			254			119
Turn Type				Perm			pm+pt			Perm		Perm
Protected Phases					8		5	2			6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)					16.0		76.0	76.0			38.0	38.0
Effective Green, g (s)					16.0		76.0	76.0			38.0	38.0
Actuated g/C Ratio					0.16		0.76	0.76			0.38	0.38
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					286		685	2352			1345	463
v/s Ratio Prot							0.09	c0.09			0.25	
v/s Ratio Perm					0.01		0.11	0.11				c0.33
v/c Ratio					0.09		0.26	0.25			0.65	0.86
Uniform Delay, d1					35.8		12.4	3.6			25.5	28.5
Progression Factor					1.00		2.34	1.90			1.00	1.00
Incremental Delay, d2					0.6		0.9	0.3			2.4	18.1
Delay (s)					36.4		29.9	7.0			27.9	46.6
Level of Service					D		C	A			C	D
Approach Delay (s)		0.0			36.4			12.3			36.8	
Approach LOS		A			D			B			D	

HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations												
Volume (vph)	202	8	161	2	0	12	0	406	5	7	769	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	0.97	1.00			1.00			0.91			0.95	
Frpb, ped/bikes	1.00	0.98			1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.86			0.89			0.99			1.00	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	3433	1578			1640			5042			3535	
Flt Permitted	0.74	1.00			0.96			1.00			0.94	
Satd. Flow (perm)	2680	1578			1594			5042			3340	
Peak-hour factor, PHF	0.80	0.50	0.81	0.50	0.92	0.60	0.92	0.82	0.25	0.35	0.92	0.92
Adj. Flow (vph)	252	16	199	4	0	20	0	495	20	20	836	0
RTOR Reduction (vph)	0	132	0	0	14	0	0	4	0	0	0	0
Lane Group Flow (vph)	252	83	0	0	10	0	0	511	0	0	856	0
Confl. Peds. (#/hr)			3						16			6
Turn Type	Perm			Perm						pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	29.0	29.0			29.0			43.0			63.0	
Effective Green, g (s)	29.0	29.0			29.0			43.0			63.0	
Actuated g/C Ratio	0.29	0.29			0.29			0.43			0.63	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	777	458			462			2168			2135	
v/s Ratio Prot		0.05						0.10			c0.06	
v/s Ratio Perm	c0.09				0.01						c0.19	
v/c Ratio	0.32	0.18			0.02			0.24			0.40	
Uniform Delay, d1	27.8	26.6			25.4			18.1			9.2	
Progression Factor	0.81	0.73			1.00			1.00			0.04	
Incremental Delay, d2	1.1	0.9			0.1			0.3			0.4	
Delay (s)	23.7	20.3			25.4			18.3			0.8	
Level of Service	C	C			C			B			A	
Approach Delay (s)		22.1			25.4			18.3			0.8	
Approach LOS		C			C			B			A	

HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations	↑↑↑					↱
Volume (veh/h)	400	0	0	0	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.92	0.92	0.92	0.92	0.55
Hourly flow rate (vph)	488	0	0	0	0	20
Pedestrians					35	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					3	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	385			265		
pX, platoon unblocked						
vC, conflicting volume			523		523	198
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			523		523	198
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1010		470	787

Volume Total	163	163	163	20		
Volume Left	0	0	0	0		
Volume Right	0	0	0	20		
cSH	1700	1700	1700	787		
Volume to Capacity	0.10	0.10	0.10	0.03		
Queue Length 95th (ft)	0	0	0	2		
Control Delay (s)	0.0	0.0	0.0	9.7		
Lane LOS				A		
Approach Delay (s)	0.0			9.7		
Approach LOS				A		

Average Delay	0.4		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C

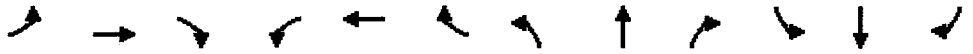
Future Background Synchro Capacity Analysis

Lane Configurations												
Volume (vph)	735	478	0	0	0	0	0	1189	75	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0						6.0				
Lane Util. Factor	0.97	0.95						0.86				
Frpb, ped/bikes	1.00	1.00						0.99				
Flpb, ped/bikes	1.00	1.00						1.00				
Frt	1.00	1.00						0.99				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	3433	3539						6297				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	3433	3539						6297				
Peak-hour factor, PHF	0.91	0.87	0.92	0.92	0.92	0.92	0.92	0.84	0.69	0.92	0.92	0.92
Adj. Flow (vph)	808	549	0	0	0	0	0	1415	109	0	0	0
RTOR Reduction (vph)	10	0	0	0	0	0	0	12	0	0	0	0
Lane Group Flow (vph)	798	549	0	0	0	0	0	1512	0	0	0	0
Confl. Peds. (#/hr)			73			16			44			131
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)	47.0	47.0						41.0				
Effective Green, g (s)	47.0	47.0						41.0				
Actuated g/C Ratio	0.47	0.47						0.41				
Clearance Time (s)	6.0	6.0						6.0				
Lane Grp Cap (vph)	1614	1663						2582				
v/s Ratio Prot		0.16						c0.24				
v/s Ratio Perm	c0.23											
v/c Ratio	0.49	0.33						0.59				
Uniform Delay, d1	18.3	16.6						22.9				
Progression Factor	1.00	1.00						1.00				
Incremental Delay, d2	1.1	0.5						1.0				
Delay (s)	19.4	17.2						23.9				
Level of Service	B	B						C				
Approach Delay (s)		18.5			0.0			23.9			0.0	
Approach LOS		B			A			C			A	

HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	317	112	126	1774	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0			6.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.97			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.95			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					5932			6384				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					5932			6384				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.87	0.72	0.81	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	364	156	156	1908	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	509	0	0	2051	0	0	0	0
Confl. Peds. (#/hr)			20			49			18			197
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					26.0			62.0				
Effective Green, g (s)					26.0			62.0				
Actuated g/C Ratio					0.26			0.62				
Clearance Time (s)					6.0			6.0				
Lane Grp Cap (vph)					1542			3958				
v/s Ratio Prot					c0.09							
v/s Ratio Perm								0.32				
v/c Ratio					0.33			0.52				
Uniform Delay, d1					29.9			10.6				
Progression Factor					1.04			0.53				
Incremental Delay, d2					0.5			0.4				
Delay (s)					31.8			6.1				
Level of Service					C			A				
Approach Delay (s)		0.0			31.8			6.1			0.0	
Approach LOS		A			C			A			A	

HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



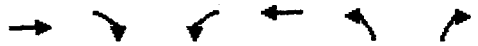
Lane Configurations												
Volume (vph)	0	0	0	0	5	5	309	1163	0	0	337	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0		4.5	5.0			5.0	5.0
Lane Util. Factor					1.00		0.91	0.91			0.95	1.00
Frpb, ped/bikes					0.98		1.00	1.00			1.00	0.89
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.92		1.00	1.00			1.00	0.85
Flt Protected					1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1687		1610	3385			3539	1401
Flt Permitted					1.00		0.48	0.94			1.00	1.00
Satd. Flow (perm)					1687		811	3197			3539	1401
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.42	0.31	0.84	0.93	0.92	0.92	0.86	0.79
Adj. Flow (vph)	0	0	0	0	12	16	368	1251	0	0	392	244
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	0	156
Lane Group Flow (vph)	0	0	0	0	15	0	331	1288	0	0	392	88
Confl. Peds. (#/hr)			13			11			58			56
Turn Type				Perm			pm+pt			Perm		Perm
Protected Phases					8		5	2			6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)					16.0		74.5	74.5			36.0	36.0
Effective Green, g (s)					16.0		74.5	74.5			36.0	36.0
Actuated g/C Ratio					0.16		0.74	0.74			0.36	0.36
Clearance Time (s)					5.0		4.5	5.0			5.0	5.0
Lane Grp Cap (vph)					270		872	2445			1274	504
v/s Ratio Prot					c0.01		0.13	c0.18			0.11	
v/s Ratio Perm							0.16	c0.22				0.06
v/c Ratio					0.05		0.38	0.53			0.31	0.17
Uniform Delay, d1					35.6		6.6	5.4			23.0	21.9
Progression Factor					1.00		1.18	1.09			1.00	1.00
Incremental Delay, d2					0.4		1.1	0.7			0.6	0.8
Delay (s)					36.0		8.9	6.6			23.7	22.6
Level of Service					D		A	A			C	C
Approach Delay (s)		0.0			36.0			7.0			23.3	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations												
Volume (vph)	456	52	29	2	0	8	0	788	5	10	327	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	0.97	1.00			1.00			0.91			0.95	
Frt	1.00	0.96			0.92			1.00			1.00	
Flt Protected	0.95	1.00			0.98			1.00			1.00	
Satd. Flow (prot)	3433	1791			1678			5076			3524	
Flt Permitted	0.74	1.00			0.92			1.00			0.86	
Satd. Flow (perm)	2690	1791			1582			5076			3050	
Peak-hour factor, PHF	0.80	0.46	0.75	0.25	0.92	0.67	0.92	0.85	0.42	0.29	0.92	0.92
Adj. Flow (vph)	570	113	39	8	0	12	0	927	12	34	355	0
RTOR Reduction (vph)	0	13	0	0	7	0	0	1	0	0	0	0
Lane Group Flow (vph)	570	139	0	0	13	0	0	938	0	0	389	0
Turn Type	Perm			Perm						pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	40.0	40.0			40.0			33.0			52.0	
Effective Green, g (s)	40.0	40.0			40.0			33.0			52.0	
Actuated g/C Ratio	0.40	0.40			0.40			0.33			0.52	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	1076	716			633			1675			1657	
v/s Ratio Prot		0.08						c0.18			c0.04	
v/s Ratio Perm	c0.21				0.01						0.09	
v/c Ratio	0.53	0.19			0.02			0.56			0.23	
Uniform Delay, d1	22.8	19.5			18.1			27.5			13.1	
Progression Factor	0.60	0.55			1.00			1.00			0.04	
Incremental Delay, d2	1.8	0.6			0.1			1.4			0.3	
Delay (s)	15.4	11.4			18.2			28.9			0.8	
Level of Service	B	B			B			C			A	
Approach Delay (s)		14.6			18.2			28.9			0.8	
Approach LOS		B			B			C			A	

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

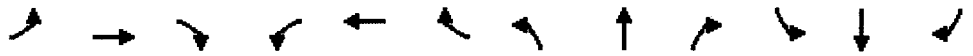
c Critical Lane Group



Lane Configurations	↑↑↑					↱
Volume (veh/h)	553	0	0	0	0	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.92	0.92	0.92	0.92	0.25
Hourly flow rate (vph)	588	0	0	0	0	8
Pedestrians					27	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	398			252		
pX, platoon unblocked						
vC, conflicting volume			615		615	223
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			615		615	223
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			939		413	763

Volume Total	196	196	196	8		
Volume Left	0	0	0	0		
Volume Right	0	0	0	8		
cSH	1700	1700	1700	763		
Volume to Capacity	0.12	0.12	0.12	0.01		
Queue Length 95th (ft)	0	0	0	1		
Control Delay (s)	0.0	0.0	0.0	9.8		
Lane LOS				A		
Approach Delay (s)	0.0			9.8		
Approach LOS				A		

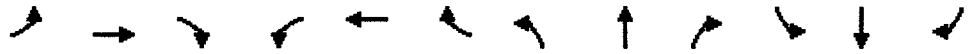
Average Delay	0.1		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Configurations												
Volume (vph)	443	318	0	0	0	0	0	425	51	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0				
Lane Util. Factor	0.97	0.95						0.86				
Frpb, ped/bikes	1.00	1.00						0.98				
Flpb, ped/bikes	1.00	1.00						1.00				
Frt	1.00	1.00						0.98				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	3433	3539						6176				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	3433	3539						6176				
Peak-hour factor, PHF	0.87	0.93	0.92	0.92	0.92	0.92	0.92	0.87	0.85	0.92	0.92	0.92
Adj. Flow (vph)	509	342	0	0	0	0	0	489	60	0	0	0
RTOR Reduction (vph)	169	0	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	340	342	0	0	0	0	0	528	0	0	0	0
Confl. Peds. (#/hr)			161			29			94			101
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)	55.0	55.0						37.0				
Effective Green, g (s)	55.0	55.0						37.0				
Actuated g/C Ratio	0.55	0.55						0.37				
Clearance Time (s)	4.0	4.0						4.0				
Lane Grp Cap (vph)	1888	1946						2285				
v/s Ratio Prot		0.10						c0.09				
v/s Ratio Perm	c0.10											
v/c Ratio	0.18	0.18						0.23				
Uniform Delay, d1	11.2	11.2						21.7				
Progression Factor	1.00	1.00						1.00				
Incremental Delay, d2	0.2	0.2						0.2				
Delay (s)	11.4	11.4						21.9				
Level of Service	B	B						C				
Approach Delay (s)		11.4			0.0			21.9			0.0	
Approach LOS		B			A			C			A	

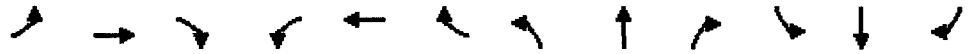
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	973	91	113	729	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6278			6363				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6278			6363				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.93	0.91	0.88	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1046	100	128	784	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	29	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1137	0	0	883	0	0	0	0
Confl. Peds. (#/hr)			92			39			124			19
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					57.0			35.0				
Effective Green, g (s)					57.0			35.0				
Actuated g/C Ratio					0.57			0.35				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					3578			2227				
v/s Ratio Prot					c0.18							
v/s Ratio Perm								0.14				
v/c Ratio					0.32			0.40				
Uniform Delay, d1					11.3			24.5				
Progression Factor					0.97			0.70				
Incremental Delay, d2					0.2			0.5				
Delay (s)					11.1			17.7				
Level of Service					B			B				
Approach Delay (s)		0.0			11.1			17.7			0.0	
Approach LOS		A			B			B			A	

HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations												
Volume (vph)	0	0	0	2	9	1	204	539	0	0	908	738
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					1.00		0.91	0.91			0.95	1.00
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.77
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.98		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1790		1610	3376			3539	1218
Flt Permitted					0.99		0.13	0.84			1.00	1.00
Satd. Flow (perm)					1790		223	2831			3539	1218
Peak-hour factor, PHF	0.92	0.92	0.92	0.25	0.56	0.25	0.85	0.92	0.92	0.92	0.89	0.93
Adj. Flow (vph)	0	0	0	8	16	4	240	586	0	0	1020	794
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	376
Lane Group Flow (vph)	0	0	0	0	25	0	187	639	0	0	1020	418
Confl. Peds. (#/hr)			53			16			254			119
Turn Type				Perm			pm+pt			Perm		Perm
Protected Phases					8		5	2			6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)					16.0		76.0	76.0			38.0	38.0
Effective Green, g (s)					16.0		76.0	76.0			38.0	38.0
Actuated g/C Ratio					0.16		0.76	0.76			0.38	0.38
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					286		641	2337			1345	463
v/s Ratio Prot							c0.10	0.09			0.29	
v/s Ratio Perm					0.01		0.12	0.11				c0.34
v/c Ratio					0.09		0.29	0.27			0.76	0.90
Uniform Delay, d1					35.8		15.6	3.6			27.0	29.3
Progression Factor					1.00		1.92	1.75			1.00	1.00
Incremental Delay, d2					0.6		1.1	0.3			4.0	23.6
Delay (s)					36.4		31.1	6.7			31.1	52.8
Level of Service					D		C	A			C	D
Approach Delay (s)		0.0			36.4			12.2			40.6	
Approach LOS		A			D			B			D	

Intersection Summary			
HCM Average Control Delay	31.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations												
Volume (vph)	202	8	165	2	0	12	0	461	5	7	903	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	0.97	1.00			1.00			0.91			0.95	
Frpb, ped/bikes	1.00	0.98			1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.86			0.89			0.99			1.00	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	3433	1578			1640			5047			3536	
Flt Permitted	0.74	1.00			0.96			1.00			0.94	
Satd. Flow (perm)	2680	1578			1593			5047			3341	
Peak-hour factor, PHF	0.80	0.50	0.81	0.50	0.92	0.60	0.92	0.82	0.25	0.35	0.92	0.92
Adj. Flow (vph)	252	16	204	4	0	20	0	562	20	20	982	0
RTOR Reduction (vph)	0	97	0	0	14	0	0	4	0	0	0	0
Lane Group Flow (vph)	252	123	0	0	10	0	0	578	0	0	1002	0
Confl. Peds. (#/hr)			3						16			6
Turn Type	Perm			Perm						pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	29.0	29.0			29.0			43.0			63.0	
Effective Green, g (s)	29.0	29.0			29.0			43.0			63.0	
Actuated g/C Ratio	0.29	0.29			0.29			0.43			0.63	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	777	458			462			2170			2136	
v/s Ratio Prot		0.08						0.11			c0.08	
v/s Ratio Perm	c0.09				0.01						c0.22	
v/c Ratio	0.32	0.27			0.02			0.27			0.47	
Uniform Delay, d1	27.8	27.3			25.4			18.3			9.7	
Progression Factor	0.81	0.66			1.00			1.00			0.05	
Incremental Delay, d2	1.1	1.4			0.1			0.3			0.5	
Delay (s)	23.6	19.4			25.4			18.6			1.0	
Level of Service	C	B			C			B			A	
Approach Delay (s)		21.7			25.4			18.6			1.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations						
Volume (veh/h)	400	0	0	0	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.82	0.92	0.92	0.92	0.92	0.55
Hourly flow rate (vph)	488	0	0	0	0	20
Pedestrians					35	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					3	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	385			265		
pX, platoon unblocked						
vC, conflicting volume			523		523	198
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			523		523	198
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1010		470	787

Volume Total	163	163	163	20
Volume Left	0	0	0	0
Volume Right	0	0	0	20
cSH	1700	1700	1700	787
Volume to Capacity	0.10	0.10	0.10	0.03
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	9.7
Lane LOS				A
Approach Delay (s)	0.0			9.7
Approach LOS				A

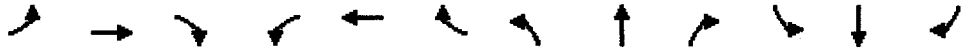
Average Delay	0.4		
Intersection Capacity Utilization	21.6%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX D

Total Future Synchro Capacity Analysis

Lane Configurations												
Volume (vph)	735	549	0	0	0	0	0	1189	144	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0						6.0				
Lane Util. Factor	0.97	0.95						0.86				
Frpb, ped/bikes	1.00	1.00						0.99				
Flpb, ped/bikes	1.00	1.00						1.00				
Frt	1.00	1.00						0.98				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	3433	3539						6209				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	3433	3539						6209				
Peak-hour factor, PHF	0.91	0.87	0.92	0.92	0.92	0.92	0.92	0.84	0.69	0.92	0.92	0.92
Adj. Flow (vph)	808	631	0	0	0	0	0	1415	209	0	0	0
RTOR Reduction (vph)	10	0	0	0	0	0	0	27	0	0	0	0
Lane Group Flow (vph)	798	631	0	0	0	0	0	1597	0	0	0	0
Confl. Peds. (#/hr)			73			16			44			131
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)	47.0	47.0						41.0				
Effective Green, g (s)	47.0	47.0						41.0				
Actuated g/C Ratio	0.47	0.47						0.41				
Clearance Time (s)	6.0	6.0						6.0				
Lane Grp Cap (vph)	1614	1663						2546				
v/s Ratio Prot		0.18						c0.26				
v/s Ratio Perm	c0.23											
v/c Ratio	0.49	0.38						0.63				
Uniform Delay, d1	18.3	17.1						23.4				
Progression Factor	1.00	1.00						1.00				
Incremental Delay, d2	1.1	0.7						1.2				
Delay (s)	19.4	17.8						24.6				
Level of Service	B	B						C				
Approach Delay (s)		18.7			0.0			24.6			0.0	
Approach LOS		B			A			C			A	

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	362	122	126	1774	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					6.0			6.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.97			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.96			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					5949			6384				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					5949			6384				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.87	0.72	0.81	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	416	169	156	1908	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	11	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	574	0	0	2051	0	0	0	0
Confl. Peds. (#/hr)			20			49			18			197
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					26.0			62.0				
Effective Green, g (s)					26.0			62.0				
Actuated g/C Ratio					0.26			0.62				
Clearance Time (s)					6.0			6.0				
Lane Grp Cap (vph)					1547			3958				
v/s Ratio Prot					c0.10							
v/s Ratio Perm								0.32				
v/c Ratio					0.37			0.52				
Uniform Delay, d1					30.3			10.6				
Progression Factor					1.03			0.52				
Incremental Delay, d2					0.6			0.4				
Delay (s)					31.9			6.0				
Level of Service					C			A				
Approach Delay (s)		0.0			31.9			6.0			0.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations												
Volume (vph)	0	0	0	0	5	5	309	1163	0	0	371	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0		4.5	5.0			5.0	5.0
Lane Util. Factor					1.00		0.91	0.91			0.95	1.00
Frpb, ped/bikes					0.98		1.00	1.00			1.00	0.89
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.92		1.00	1.00			1.00	0.85
Flt Protected					1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1687		1610	3385			3539	1401
Flt Permitted					1.00		0.45	0.94			1.00	1.00
Satd. Flow (perm)					1687		762	3194			3539	1401
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.42	0.31	0.84	0.93	0.92	0.92	0.86	0.79
Adj. Flow (vph)	0	0	0	0	12	16	368	1251	0	0	431	287
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	0	184
Lane Group Flow (vph)	0	0	0	0	15	0	331	1288	0	0	431	103
Confl. Peds. (#/hr)			13			11			58			56
Turn Type				Perm			pm+pt			Perm		Perm
Protected Phases					8		5	2			6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)					16.0		74.5	74.5			36.0	36.0
Effective Green, g (s)					16.0		74.5	74.5			36.0	36.0
Actuated g/C Ratio					0.16		0.74	0.74			0.36	0.36
Clearance Time (s)					5.0		4.5	5.0			5.0	5.0
Lane Grp Cap (vph)					270		852	2444			1274	504
v/s Ratio Prot					c0.01		0.13	c0.18			0.12	
v/s Ratio Perm							0.16	c0.22				0.07
v/c Ratio					0.05		0.39	0.53			0.34	0.20
Uniform Delay, d1					35.6		7.2	5.4			23.3	22.1
Progression Factor					1.00		1.24	1.11			1.00	1.00
Incremental Delay, d2					0.4		1.2	0.7			0.7	0.9
Delay (s)					36.0		10.1	6.6			24.0	23.0
Level of Service					D		B	A			C	C
Approach Delay (s)		0.0			36.0			7.3			23.6	
Approach LOS		A			D			A			C	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations												
Volume (vph)	456	52	31	2	0	8	0	788	5	10	361	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	0.97	1.00			1.00			0.91			0.95	
Frt	1.00	0.96			0.92			1.00			1.00	
Flt Protected	0.95	1.00			0.98			1.00			1.00	
Satd. Flow (prot)	3433	1788			1678			5076			3525	
Flt Permitted	0.74	1.00			0.92			1.00			0.87	
Satd. Flow (perm)	2690	1788			1581			5076			3069	
Peak-hour factor, PHF	0.80	0.46	0.75	0.25	0.92	0.67	0.92	0.85	0.42	0.29	0.92	0.92
Adj. Flow (vph)	570	113	41	8	0	12	0	927	12	34	392	0
RTOR Reduction (vph)	0	13	0	0	7	0	0	1	0	0	0	0
Lane Group Flow (vph)	570	141	0	0	13	0	0	938	0	0	426	0
Turn Type	Perm			Perm						pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	40.0	40.0			40.0			33.0			52.0	
Effective Green, g (s)	40.0	40.0			40.0			33.0			52.0	
Actuated g/C Ratio	0.40	0.40			0.40			0.33			0.52	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	1076	715			632			1675			1664	
v/s Ratio Prot		0.08						c0.18			c0.04	
v/s Ratio Perm	c0.21				0.01						0.09	
v/c Ratio	0.53	0.20			0.02			0.56			0.26	
Uniform Delay, d1	22.8	19.5			18.1			27.5			13.3	
Progression Factor	0.67	0.63			1.00			1.00			0.04	
Incremental Delay, d2	1.8	0.6			0.1			1.4			0.4	
Delay (s)	17.0	12.9			18.2			28.9			0.9	
Level of Service	B	B			B			C			A	
Approach Delay (s)		16.2			18.2			28.9			0.9	
Approach LOS		B			B			C			A	

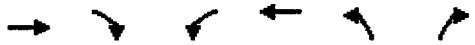
Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Configurations												
Volume (veh/h)	138	555	0	0	0	0	0	0	2	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.25	0.92	0.92	0.92
Hourly flow rate (vph)	150	590	0	0	0	0	0	0	8	0	0	0
Pedestrians								27				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								2				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		398			252							
pX, platoon unblocked				1.00			1.00	1.00	1.00	1.00	1.00	
vC, conflicting volume	0			617			917	917	224	505	917	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			613			913	913	219	500	913	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			100			100	100	99	100	100	100
cM capacity (veh/h)	1622			940			204	241	767	410	241	1084

Volume Total	268	236	236	8
Volume Left	150	0	0	0
Volume Right	0	0	0	8
cSH	1622	1700	1700	767
Volume to Capacity	0.09	0.14	0.14	0.01
Queue Length 95th (ft)	8	0	0	1
Control Delay (s)	4.5	0.0	0.0	9.7
Lane LOS	A			A
Approach Delay (s)	1.6			9.7
Approach LOS				A

Average Delay	1.7			
Intersection Capacity Utilization	23.5%	ICU Level of Service		A
Analysis Period (min)	15			



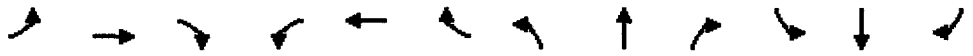
Lane Configurations				↑↑	↖	
Volume (veh/h)	0	0	0	541	20	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	588	22	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	303			381		
pX, platoon unblocked						
vC, conflicting volume			0		294	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		294	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1622		673	1084

Volume Total	294	294	22			
Volume Left	0	0	22			
Volume Right	0	0	0			
cSH	1700	1700	673			
Volume to Capacity	0.17	0.17	0.03			
Queue Length 95th (ft)	0	0	3			
Control Delay (s)	0.0	0.0	10.5			
Lane LOS			B			
Approach Delay (s)	0.0		10.5			
Approach LOS			B			

Average Delay	0.4		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

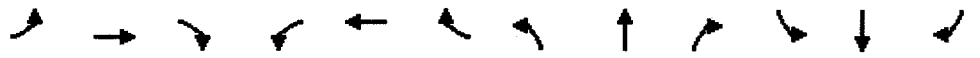
Lane Configurations												
Volume (vph)	443	343	0	0	0	0	0	425	64	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0				
Lane Util. Factor	0.97	0.95						0.86				
Frpb, ped/bikes	1.00	1.00						0.98				
Flpb, ped/bikes	1.00	1.00						1.00				
Frt	1.00	1.00						0.98				
Flt Protected	0.95	1.00						1.00				
Satd. Flow (prot)	3433	3539						6126				
Flt Permitted	0.95	1.00						1.00				
Satd. Flow (perm)	3433	3539						6126				
Peak-hour factor, PHF	0.87	0.93	0.92	0.92	0.92	0.92	0.92	0.87	0.85	0.92	0.92	0.92
Adj. Flow (vph)	509	369	0	0	0	0	0	489	75	0	0	0
RTOR Reduction (vph)	169	0	0	0	0	0	0	28	0	0	0	0
Lane Group Flow (vph)	340	369	0	0	0	0	0	536	0	0	0	0
Confl. Peds. (#/hr)			161			29			94			101
Turn Type	Perm											
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)	55.0	55.0						37.0				
Effective Green, g (s)	55.0	55.0						37.0				
Actuated g/C Ratio	0.55	0.55						0.37				
Clearance Time (s)	4.0	4.0						4.0				
Lane Grp Cap (vph)	1888	1946						2267				
v/s Ratio Prot		c0.10						c0.09				
v/s Ratio Perm	0.10											
v/c Ratio	0.18	0.19						0.24				
Uniform Delay, d1	11.2	11.3						21.7				
Progression Factor	1.00	1.00						1.00				
Incremental Delay, d2	0.2	0.2						0.2				
Delay (s)	11.4	11.5						22.0				
Level of Service	B	B						C				
Approach Delay (s)		11.5			0.0			22.0			0.0	
Approach LOS		B			A			C			A	

HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations					↑↑↑↑			↑↑↑↑				
Volume (vph)	0	0	0	0	1044	156	113	729	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					0.99			1.00				
Flpb, ped/bikes					1.00			1.00				
Frt					0.98			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6211			6363				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6211			6363				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.93	0.91	0.88	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1123	171	128	784	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	9	0	0	29	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1285	0	0	883	0	0	0	0
Confl. Peds. (#/hr)			92			39			124			19
Turn Type							Perm					
Protected Phases					8			2				
Permitted Phases							2					
Actuated Green, G (s)					57.0			35.0				
Effective Green, g (s)					57.0			35.0				
Actuated g/C Ratio					0.57			0.35				
Clearance Time (s)					4.0			4.0				
Lane Grp Cap (vph)					3540			2227				
v/s Ratio Prot					c0.21							
v/s Ratio Perm								0.14				
v/c Ratio					0.36			0.40				
Uniform Delay, d1					11.7			24.5				
Progression Factor					0.98			0.71				
Incremental Delay, d2					0.2			0.5				
Delay (s)					11.7			17.9				
Level of Service					B			B				
Approach Delay (s)		0.0			11.7			17.9			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

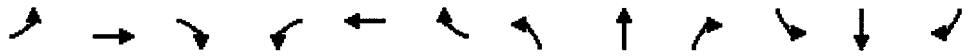


Lane Configurations												
Volume (vph)	0	0	0	2	9	1	217	539	0	0	908	751
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					1.00		0.91	0.91			0.95	1.00
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.77
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.98		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					1790		1610	3374			3539	1218
Flt Permitted					0.99		0.13	0.78			1.00	1.00
Satd. Flow (perm)					1790		223	2634			3539	1218
Peak-hour factor, PHF	0.92	0.92	0.92	0.25	0.56	0.25	0.85	0.92	0.92	0.92	0.89	0.93
Adj. Flow (vph)	0	0	0	8	16	4	255	586	0	0	1020	808
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	367
Lane Group Flow (vph)	0	0	0	0	25	0	191	650	0	0	1020	441
Confl. Peds. (#/hr)			53			16			254			119
Turn Type				Perm			pm+pt			Perm		Perm
Protected Phases					8		5	2			6	
Permitted Phases				8			2			6		6
Actuated Green, G (s)					16.0		76.0	76.0			38.0	38.0
Effective Green, g (s)					16.0		76.0	76.0			38.0	38.0
Actuated g/C Ratio					0.16		0.76	0.76			0.38	0.38
Clearance Time (s)					4.0		4.0	4.0			4.0	4.0
Lane Grp Cap (vph)					286		641	2253			1345	463
v/s Ratio Prot							0.10	c0.10			0.29	
v/s Ratio Perm					0.01		0.13	0.12				c0.36
v/c Ratio					0.09		0.30	0.29			0.76	0.95
Uniform Delay, d1					35.8		15.6	3.7			27.0	30.1
Progression Factor					1.00		1.93	1.83			1.00	1.00
Incremental Delay, d2					0.6		1.2	0.3			4.0	31.5
Delay (s)					36.4		31.2	7.1			31.1	61.6
Level of Service					D		C	A			C	E
Approach Delay (s)		0.0			36.4			12.5			44.6	
Approach LOS		A			D			B			D	

HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Configurations												
Volume (vph)	209	8	197	2	0	12	0	467	5	7	903	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	0.97	1.00			1.00			0.91			0.95	
Frpb, ped/bikes	1.00	0.98			1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.86			0.89			0.99			1.00	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	3433	1574			1640			5048			3536	
Flt Permitted	0.74	1.00			0.96			1.00			0.94	
Satd. Flow (perm)	2680	1574			1588			5048			3341	
Peak-hour factor, PHF	0.80	0.50	0.81	0.50	0.92	0.60	0.92	0.82	0.25	0.35	0.92	0.92
Adj. Flow (vph)	261	16	243	4	0	20	0	570	20	20	982	0
RTOR Reduction (vph)	0	97	0	0	14	0	0	3	0	0	0	0
Lane Group Flow (vph)	261	162	0	0	10	0	0	587	0	0	1002	0
Confl. Peds. (#/hr)			3						16			6
Turn Type	Perm			Perm						pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8						6		
Actuated Green, G (s)	29.0	29.0			29.0			43.0			63.0	
Effective Green, g (s)	29.0	29.0			29.0			43.0			63.0	
Actuated g/C Ratio	0.29	0.29			0.29			0.43			0.63	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)	777	456			461			2171			2136	
v/s Ratio Prot		c0.10						0.12			c0.08	
v/s Ratio Perm	0.10				0.01						c0.22	
v/c Ratio	0.34	0.36			0.02			0.27			0.47	
Uniform Delay, d1	27.9	28.1			25.4			18.4			9.7	
Progression Factor	0.82	0.70			1.00			1.00			0.05	
Incremental Delay, d2	1.2	2.2			0.1			0.3			0.5	
Delay (s)	24.1	21.9			25.4			18.7			1.0	
Level of Service	C	C			C			B			A	
Approach Delay (s)		23.0			25.4			18.7			1.0	
Approach LOS		C			C			B			A	

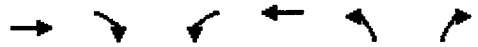
Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Configurations												
Volume (veh/h)	26	408	0	0	0	0	0	0	11	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.82	0.92	0.92	0.92	0.92	0.92	0.92	0.55	0.92	0.92	0.92
Hourly flow rate (vph)	28	498	0	0	0	0	0	0	20	0	0	0
Pedestrians								35				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								3				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		385			265							
pX, platoon unblocked												
vC, conflicting volume	0			533			589	589	201	242	589	0
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0			533			589	589	201	242	589	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	97	100	100	100
cM capacity (veh/h)	1622			1001			367	400	783	650	400	1084

Volume Total	128	199	199	20
Volume Left	28	0	0	0
Volume Right	0	0	0	20
cSH	1622	1700	1700	783
Volume to Capacity	0.02	0.12	0.12	0.03
Queue Length 95th (ft)	1	0	0	2
Control Delay (s)	1.7	0.0	0.0	9.7
Lane LOS	A			A
Approach Delay (s)	0.4			9.7
Approach LOS				A

Average Delay		0.8		
Intersection Capacity Utilization		21.8%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Configurations				↑↑↑↑	↰	
Volume (veh/h)	0	0	0	977	130	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1062	141	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	384			284		
pX, platoon unblocked						
vC, conflicting volume			0		265	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		265	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		80	100
cM capacity (veh/h)			1622		701	1084

Volume Total	265	265	265	265	141	
Volume Left	0	0	0	0	141	
Volume Right	0	0	0	0	0	
cSH	1700	1700	1700	1700	701	
Volume to Capacity	0.16	0.16	0.16	0.16	0.20	
Queue Length 95th (ft)	0	0	0	0	19	
Control Delay (s)	0.0	0.0	0.0	0.0	11.4	
Lane LOS					B	
Approach Delay (s)	0.0				11.4	
Approach LOS					B	

Average Delay	1.3		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		