

TECHNICAL MEMORANDUM

To: American University Campus Plan Team

From: Emily J. Dalphy
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Date: May 19, 2011

Subject: Addendum to Transportation Report – American University 2011 Campus Plan

Introduction

This memorandum serves as an addendum to the transportation analyses¹ supporting the American University 2011 Campus Plan. The purpose of this memo is to (1) present revised recommendations based on changes to the Campus Plan, and (2) present information requested by the District Department of Transportation (DDOT) during a meeting to discuss the plan on May 4, 2011.

The recommendations provided in the Transportation Report have been revised in conjunction with the Prehearing Statement compiled to highlight the changes and modifications to the 2011 Plan and the Further Processing applications. The revised recommendations and information requested include:

1. A list of Transportation Demand Management (TDM) commitments to be undertaken by American University
2. An updated traffic analysis based on changes to the plan
3. Revised recommendations on pedestrian crossings
4. Revised recommendations to bus stops along Nebraska Avenue
5. A detailed concept for the proposed bus depot at 40th Street/Fort Drive near the Tenleytown-AU Metrorail Station
6. A summary of on-street parking data collected near the Main Campus
7. An update on the design concept for the Tenley Campus

Changes and Modifications to the Campus Plan

The prehearing statement highlights several changes and modifications to the American University 2011 Campus Plan. This includes an updated site plan for the East Campus in response to the comments from the Advisory Neighborhood Commission (ANC) 3D and residents of the adjacent Westover Place townhome community, which contains the following changes:

- The removal of 180 beds, resulting in a total of 590 new beds on the East Campus;

¹ Exhibit 22: Transportation Report & Transportation Technical Analyses

- The reduction of the overall building square footage proposed on the East Campus by approximately 18%;
- The increase of retail square footage proposed on the East Campus to approximately 17,000 square feet;
- The removal of the proposed right-in/right-out driveway located on Massachusetts Avenue east of Ward Circle; and
- The inclusion of the existing right-in/right-out driveway located on Nebraska Avenue, with a proposed actuated signal to aid in pedestrian crossings.

The prehearing statement to the 2011 Plan also includes the following changes:

- The proposed addition to the Nebraska Hall will now add 150 beds to the existing building;
- The proposed North Hall site will include approximately 360 beds, located on the existing parking lot behind the President's Office Building;
- The university will agree to a condition in the 2011 Plan order, which will include an enrollment cap of 13,600 students and 2,900 faculty and staff; and
- The Transportation Demand Management (TDM) Plan will include the revised recommendations outlined below.

Summary

The changes to the Campus Plan do not alter the overall conclusions of the Transportation Report. The 2011 Campus Plan will not have an adverse impact on the transportation network. The changes to the Campus Plan do generate modifications to the recommendations contained in the Transportation Report as follows:

- Removing the right-in/right-out driveway to the East Campus parking lot on Massachusetts Avenue leads to design changes on the East Campus that reduces the need for a pedestrian actuated traffic signal at the location of the right-in/right-out across from the NAC driveway. This Transportation Report now recommends that the concept of adding a pedestrian actuated traffic signal at this location be incorporated into the proposed study of Ward Circle as a short-term improvement.
- The change to maintain the right-in/right-out driveway to the East Campus on Nebraska Avenue had the potential to lead to mid-block pedestrian crossings along Nebraska Avenue. To mitigate this concern, the Transportation Report is recommending construction of a pedestrian actuated traffic signal at the location of the right-in/right-out on Nebraska Ave. The addition of another crossing for pedestrians will help disperse the pedestrian impact over multiple crosswalks.
- The bus stop recommendations have been updated to reflect the access and crosswalk recommendations above. The Transportation Report now recommends that the six AU shuttle and Metrobus stops located along Nebraska Avenue and New Mexico Avenue adjacent to campus be consolidated into two stops, on opposite sides of the new pedestrian crossing on Nebraska Avenue. This will lead to a simpler routing for the campus population and fewer times when buses stop along Nebraska Avenue.

Transportation Demand Management Commitments

This section reviews the Transportation Demand Management (TDM) commitments for inclusion in the 2011 Plan.

- AU will compile annual monitoring reports, that will be made public and submitted to DDOT. The first report will be issued no later than one-year after approval of the campus plan. These reports will include the following information:
 - Mode split surveys of the campus population, broken down by students and employees
 - Current parking inventory and occupancy on a typical weekday
 - Number of parking permits sold per year
 - Parking availability on surrounding neighborhood streets
 - Statistics on the Good Neighborhood Program, such as number of tickets issued
 - Number of registered carpools
 - Zipcar and Capital Bikeshare usage data
 - Number of people signed up for SmartBenefits
 - AU Shuttle ridership
 - Inventory and occupancy of bike racks
- AU will improve marketing of alternative modes of transportation on websites, including AU specific transit and bicycle maps, and dedicated materials targeting each segment of campus population. AU will distribute the targeted information to new hires and accepted students.
- AU will market transportation information to attendees to special events on campus, and will not include parking subsidies in event or ticket costs.
- AU will include transportation information on its electronic message boards within campus.
- AU will promote the regional Guaranteed Ride Home program to all employees using alternative modes.
- AU will continue the Good Neighbor Policy directed at limiting campus population use of neighborhood on-street parking.
- AU will continue to provide discounts to carpoolers and ride-matching services (Zimride), and will extend preferred parking spaces to registered carpools.
- AU will maintain the Zipcar spaces currently on the Nebraska Avenue parking lot and Tenley campus during construction, and ensure their replacement on campus after construction.
- AU will maintain the SmartBenefits program and on-campus SmarTrip vending.
- AU will maintain the student run bike-lending program, and the bike commuter benefit.
- AU will construct 150 long-term secured and enclosed bicycle parking spaces, and 50 short-term bicycle parking spaces meeting DDOT standards on the East Campus. The use of these spaces will be monitored, and the numbers increased if the average weekday use is over 85%.

- AU will construct 30 long-term secured and enclosed bicycle parking spaces, and 10 short-term bicycle parking spaces meeting DDOT standards at Nebraska Hall. The use of these spaces will be monitored, and the numbers increased if the average weekday use is over 85%.
- AU will construct 50 long-term secured and enclosed bicycle parking spaces, and 20 short-term bicycle parking spaces meeting DDOT standards on the Tenley Campus. The use of these spaces will be monitored, and the numbers increased if the average weekday use is over 85%.
- AU will provide the funds for two Capitol Bikeshare stations, to be located on the Main or Tenley campus.
- AU will become a corporate member of Capital Bikeshare to provide memberships to employees at discounted rates.
- AU will work with DDOT and provide the funds necessary to expand the sidewalks on the northern side of Nebraska Avenue adjacent to campus to provide an off-street cycling facility, as recommended in the Transportation Report.

Revised Technical Analysis due to Campus Plan Changes

As outlined above, several changes have been made since the submittal of the Campus Plan application materials to the Zoning Commission on March 18, 2011, notably on the East Campus. These changes include a reduction in the number of beds on the East Campus (with a corresponding addition of beds across Nebraska Avenue on the central campus and at Nebraska Hall), an increase in the amount of retail, and retaining the existing right-in/right-out driveway located along Nebraska Avenue. Due to the changes to the proposed site plan, the analysis from the “Transportation Technical Analysis” performed for the 2011 Plan is revised below.

Another change to the East Campus is the reduction in the amount of parking provided on the East Campus plan from 500 to 400 spaces. This revised technical analysis does not incorporate this change as the amount of pedestrian and vehicular traffic generated by 500 spaces would be higher, and thus would result in the more conservative (“worst case”) analysis. The analysis findings and conclusions will not change when only 400 parking spaces are provided on the East Campus.

As stated in the “Transportation Technical Analysis”, the proposed transportation-related changes for the Main Campus include an overall reduction in approximately 429 parking spaces. These changes are accounted for by the vehicular following trip generation sources:

- Remove existing 903 parking spaces on Nebraska Avenue Lot;
- Remove approximately 26 parking spaces from the Main Campus due to construction of the Nebraska Hall extension; and
- Add 500 new parking spaces to the East Campus (Nebraska Avenue lot): 100 for on-campus students, 330 for commuter students, and 70 for faculty/staff.

Pedestrian trip generation sources include:

- Remove existing pedestrians crossing Nebraska Avenue at New Mexico Avenue due to existing parking spaces removed from Nebraska Avenue Lot;
- Add a total of 590 beds to the East Campus (Nebraska Avenue lot) in 3 new residence halls;

- Add 330 commuter-student spaces to the East Campus that would result in students crossing Nebraska Avenue;
- Add approximately 17,000 square feet of specialty retail to the East Campus; and
- Add a total of 150 beds to Nebraska Hall in an expansion to the existing residence hall.

The analysis presented in this addendum, in addition to examining the changes listed above, explores the concept of adding a pedestrian traffic signal at the location of the Nebraska Avenue right-in/right-out driveway. This is because the physical presence of the driveway could lead to jaywalking mid-block. A potential mitigation measure for this activity would be the addition of a pedestrian actuated signal at this location. Thus, the following analysis compares capacity analysis results with and without a signal at the right-in/right-out driveway.

Future with 2011 Campus Plan Traffic Volumes

As outlined in the “Transportation Technical Analysis”, the existing and future population projections were used to determine the potential vehicular trips generated by the changes due to the growth of population. Although multiple development changes are proposed in the 2011 Plan, these sources are not expected to generate any additional vehicular trips. Instead, any change in vehicular trip generation will be due to the proposed population growth. Although the parking inventory of the Main Campus is planned to decrease, an increase in vehicular trips is assumed due to projected population growth. In order to determine the impact of the proposed changes to the Main Campus, vehicular trips were generated based on changes due to growth of population. The future net changes to the campus vehicular trip generation were assembled by removing all the existing trips and adding back the future trips, which are equal to the existing trips plus growth generated by the proposed population increase. This was done to account for the redistribution of trips between lots and access points.

In addition to vehicular trips, the proposed 2011 Plan will generate additional pedestrian trips, as outlined in the “Transportation Technical Analysis”. The proposed development for the Main Campus will include removing the existing pedestrians crossing Nebraska Avenue at New Mexico Avenue and adding future pedestrians generated by 590 total beds, 330 commuter-student spaces, and 17,000 square-feet of student-oriented retail on the East Campus and 150 beds added to Nebraska Hall.

Pedestrian trips generated by the new residence halls were based on trip generation rates developed by observing an existing residence hall, Leonard Hall, which was counted in Fall 2010. Trips generated by the new retail uses were estimated using the methodology outlined in the Institute of Transportation Engineers’ (ITE) *Trip Generation*, 8th Edition. The retail trips were estimated using the “Specialty Retail” trip generation rates. In order to calculate the trips generated by the parking spaces located on the East Campus, it was assumed that approximately 65 percent of the vehicular trips generated would result in pedestrian trips crossing between the East and Main Campuses. This 65 percent was determined based on assumption that the pedestrian trips would be generated by the 330 spaces provided for commuter students. The 100 spaces provided for on-campus students and 70 spaces for faculty/staff were assumed to generate trips that would remain on the East Campus.

Table 1 shows the pedestrian trips added to the East Campus, and Table 2 shows the other pedestrian trips added to the study area. Trip distribution for the pedestrian trips added by the East Campus was based on an approximate 75%/25% split of pedestrians between the New Mexico Avenue and Ward Circle crossings along Nebraska Avenue, respectively, due to the layout of the site. Pedestrians added by the Nebraska Hall extension were assumed to have an approximate

60%/40% split along Massachusetts Avenue between the western crosswalk at Ward Circle and the Katzen Center crossing to travel between the residence hall and Main Campus.

Table 1: Pedestrian Trips Added to the East Campus

Pedestrian Trips Added to East Campus (2020)			
Source	Size	AM Peak Hour	PM Peak Hour
East Campus Residence Hall 1	274 Beds	66	159
East Campus Residence Hall 2	140 Beds	33	81
East Campus Residence Hall 3	176 Beds	44	106
Student-Oriented Retail	17,000 SF	16	62
East Campus Parking	330 Spaces	78	146
Total		237	554
Nebraska Lot Parking Removed	-903 Spaces	-65	-199
Net Total		172	355

Table 2: Other Pedestrian Trips Added

Other Pedestrian Trips Added (2020)			
Source	Size	AM Peak Hour	PM Peak Hour
Nebraska Hall	150 Beds	37	87
Total		37	87

The traffic volumes for the future conditions with the 2011 Plan were calculated by subtracting the existing trips generated by AU and adding the site-generated vehicular and pedestrian volumes to the future without the 2011 Plan traffic volumes. The future traffic volumes with the proposed development on the AU Main Campus are shown on Figure 6, Figure 7, Figure 8, and Figure 9 for the morning peak hour and Figure 10, Figure 11, Figure 12, and Figure 13 for the afternoon peak hour. The future pedestrian volumes added to the crosswalks affected by the 2011 Plan are shown in Table 3.

Table 3: Future Crosswalk Volumes

Source	AM Peak Hour	PM Peak Hour
Existing Trips Crossing Nebraska Avenue at New Mexico Avenue	65	199
Trips Added due to East Campus (75% of Total)	178	416
Trips Removed due to Nebraska Lot Parking	-65	-199
Total Crossing Nebraska Avenue at New Mexico Avenue	178	416
Existing Trips Crossing Nebraska Avenue at Ward Circle	308	351
Pedestrian Trips Added by East Campus (25% of Total)	59	138
Total Crossing Nebraska Avenue at Ward Circle	367	489
Existing Trips Crossing Massachusetts Avenue at Ward Circle	53	124
Trips Added due to Nebraska Hall (60% of Total)	22	52
Total Crossing Massachusetts Avenue at Ward Circle	75	176
Existing Trips Crossing Massachusetts Avenue at Katzen Center	31	162
Trips Added due to Nebraska Hall (40% of Total)	15	35
Total Crossing Massachusetts Avenue at Katzen Center	46	197

In addition to the analysis presented above, a second analysis was performed in order to determine the impact of a proposed traffic signal located at the existing right-in/right-out (RIRO) driveway along Nebraska Avenue. A signal is proposed at this location in order to provide an additional location for pedestrians to cross Nebraska Avenue due to the

development on the East Campus. This traffic signal would allow for vehicles to exit the East Campus, as well as allow pedestrians to cross at a signalized location, moving pedestrians away from the adjacent signalized crossings. Trip distribution for the pedestrian trips added by the East Campus was based on an approximate 50%/35%/15% split of pedestrians between the New Mexico Avenue, RIRO driveway, and Ward Circle crossings along Nebraska Avenue, respectively, due to the layout of the site. The future pedestrian volumes added to the crosswalks affected by the 2011 Plan are shown in Table 4. The future pedestrian volumes for the affected crosswalks are shown on Figure 14 and Figure 15 for the morning and afternoon peak hours, respectively.

Table 4: Future Crosswalk Volumes with Signal at Right-in/Right-out

Source	AM Peak Hour	PM Peak Hour
Existing Trips Crossing Nebraska Avenue at New Mexico Avenue	65	199
Trips Added due to East Campus (50% of Total)	119	277
Trips Removed due to Nebraska Lot Parking	-65	-199
Total Crossing Nebraska Avenue at New Mexico Avenue	119	277
Existing Trips Crossing Nebraska Avenue at RIRO Driveway	0	0
Pedestrian Trips Added by East Campus (35% of Total)	81	198
Total Crossing Nebraska Avenue at RIRO Driveway	81	198
Existing Trips Crossing Nebraska Avenue at Ward Circle	308	351
Pedestrian Trips Added by East Campus (15% of Total)	37	79
Total Crossing Nebraska Avenue at Ward Circle	345	430
Existing Trips Crossing Massachusetts Avenue at Ward Circle	53	124
Trips Added due to Nebraska Hall (60% of Total)	22	52
Total Crossing Massachusetts Avenue at Ward Circle	75	176
Existing Trips Crossing Massachusetts Avenue at Katzen Center	31	162
Trips Added due to Nebraska Hall (40% of Total)	15	35
Total Crossing Massachusetts Avenue at Katzen Center	46	197

Future with 2011 Campus Plan Vehicular Capacity Analysis

Intersection capacity analyses were performed for the future conditions with the 2011 Plan 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, as outlined previously. The LOS capacity analyses for the future conditions with development were based on: (1) the future without the 2011 Plan lane use and traffic controls; (2) the peak hour turning movement volumes described previously; and (3) the Highway Capacity Manual (HCM) methodologies (using *Synchro 7* software). Detailed LOS descriptions and the analysis worksheets are contained in the Technical Attachments from the “Transportation Technical Analysis”.

Table 5 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the revised analysis, including the inclusion of the proposed traffic signal located at the right-in/right-out (RIRO) driveway on Nebraska Avenue. The capacity analysis results are also shown on Figure 16, Figure 17, Figure 18, and Figure 19. The capacity analysis results with the proposed signal are shown on Figure 20. The capacity analyses results indicate that all study area intersections operate at acceptable levels of service during both the morning and afternoon peak hours.

Table 5: Total Future Vehicular Levels of Service

Intersection & Approach	Total Future Conditions (2020)				Total Future Conditions (2020) with Signal at right-in/right-out			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Massachusetts Ave & 46th St/Tilden St								
Overall	18.5	B	8.8	A				
Eastbound	18.2	B	8.0	A			SAME	
Westbound	14.9	B	6.5	A				
Southbound	29.5	C	34.5	C				
Massachusetts Ave & 46th St/University Ave								
Eastbound Left	0.0	A	0.2	A			SAME	
Northbound	126.4	F	23.9	C				
Massachusetts Ave & 45th St								
Eastbound Left	2.5	A	2.1	A			SAME	
Southbound	16.1	C	34.7	D				
Massachusetts Ave & Glover Gate/Katzen Arts Center								
Overall	12.8	B	14.8	B				
Eastbound	7.9	A	6.3	A				
Westbound	21.6	C	14.8	B			SAME	
Northbound	29.3	C	38.7	D				
Southbound	29.7	C	46.7	D				
Ward Circle:								
Massachusetts Ave & Ward Circle (West side)								
Eastbound Right	45.5	E	29.3	D	45.5	E	29.3	D
Nebraska Ave & Ward Circle (South side)								
Overall	26.7	C	30.5	C	27.1	C	28.6	C
Eastbound	34.4	C	40.1	D	34.4	C	40.1	D
Northbound	32.0	C	40.2	D	33.2	C	35.2	D
Southbound	3.7	A	6.8	A	3.7	A	6.8	A
Massachusetts Ave & Ward Circle (East side)								
Westbound Right	59.2	F	340.8	F	59.2	F	340.8	F
Nebraska Ave & Ward Circle (North side)								
Overall	13.5	B	24.4	C	13.6	B	24.4	C
Westbound	23.7	C	28.1	C	23.7	C	28.1	C
Northbound	6.6	A	8.0	A	6.8	A	8.1	A
Southbound	10.6	B	31.7	C	10.6	B	31.7	C
Massachusetts Ave & NAC/East Campus Driveway								
Eastbound Left	2.4	A	1.1	A			SAME	
Southbound	25.5	D	78.6	F				
Massachusetts Ave & Westover Place								
Westbound Left	0.0	A	0.6	A			SAME	
Northbound	58.1	F	62.1	F				
Nebraska Ave & RIRO Driveway								
Westbound Right	9.7	A	9.8	A				
Overall					1.1	A	4.2	A

Intersection & Approach	Total Future Conditions (2020)				Total Future Conditions (2020) with Signal at right-in/right-out			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
<i>Westbound</i>					49.1	D	45.7	D
<i>Northbound</i>					1.3	A	5.7	A
<i>Southbound</i>					0.4	A	1.5	A
Nebraska Ave & New Mexico Ave								
Overall	21.6	C	24.8	C	22.3	C	33.6	C
Eastbound	36.2	D	35.9	D	36.2	D	35.9	D
Westbound	30.2	C	29.7	C	29.7	C	29.4	C
Northbound	15.2	B	15.3	B	15.2	B	15.3	B
Southbound	24.2	C	28.7	C	25.8	C	45.4	C
New Mexico Ave & Commuter Lot								
Eastbound Left	4.1	A	3.9	A			SAME	
Southbound	13.5	B	14.3	B				
Nebraska Ave & 45th St								
Southbound Left	1.0	A	0.8	A			SAME	
Westbound	9.3	A	12.3	B				
Nebraska Ave & Rockwood Pkwy								
Overall	13.3	B	12.5	B			SAME	
Eastbound	40.5	D	38.8	D				
Westbound	38.8	D	38.6	D				
Northbound	13.7	B	11.8	B				
Southbound	2.5	A	5.7	A				
Rockwood Pkwy & Fletcher Gate								
Eastbound Left	0.6	A	1.3	A				
Southbound	11.9	B	10.5	B				
Rockwood Pkwy & Glenbrook Rd								
Overall	8.7	A	7.8	A			SAME	
Eastbound	8.7	A	7.9	A				
Westbound	7.9	A	7.7	A				
Southbound	9.2	A	7.9	A				

For the purpose of this analysis, it is desirable to achieve a level of service (LOS) of “E” or better on each approach. As stated previously, all study area intersections operate at acceptable levels of service during the morning and afternoon peak hours. However, several approaches continue (as compared to the future without the 2011 Plan analysis as shown in the “Transportation Technical Analysis”) to operate with unacceptable levels of service during one or more peak hours. The LOS results show that:

- All of the study intersections (overall LOS grade) operate at acceptable conditions during both the morning and afternoon peak hours.
- The following approaches continue to operate with unacceptable LOS during one or more peak hours:

- The northbound approach of University Avenue at Massachusetts Avenue and 46th Street continues to operate under unacceptable conditions during the morning peak period, which is seen in both the existing and future without the 2011 Plan scenarios. The vehicular traffic generated by the 2011 Plan minimally impacts the poor LOS at this intersection.
- The westbound approach of Massachusetts Avenue at Ward Circle operates above capacity during the morning and afternoon peak period, as shown in both the future without the 2011 Plan scenario as well. The vehicular traffic generated by the 2011 Plan minimally impacts the poor LOS at this intersection.
- The southbound approach of the NAC Driveway at Massachusetts Avenue and the East Campus Driveway operates at an unacceptable level of service during the afternoon peak period, which is also seen in the existing and future without the 2011 Plan scenarios. The vehicular traffic generated by the 2011 Plan minimally impacts the poor LOS at this intersection.
- The northbound approach of Westover Place at Massachusetts Avenue operates at an unacceptable level of service during the morning and afternoon peak periods, which is seen in both the existing and future without the 2011 Plan scenarios. The vehicular traffic generated by the 2011 Plan minimally impacts the poor LOS at this intersection.
- No new unacceptable LOS are observed following the addition of the vehicular and pedestrian traffic generated by the 2011 Plan.

Future with 2011 Campus Plan Pedestrian Analysis Results

Pedestrian analyses were performed for the future with the 2011 Plan conditions at the intersections contained within the study area during the morning and afternoon peak hours. The analysis was based on “Chapter 18: Pedestrians” of the Highway Capacity Manual (HCM), as outlined previously.

Table 6 and Table 7 show the results of the capacity analyses, including LOS and average delay (in seconds). The results of the capacity analysis with the proposed signal are shown shaded in grey and include the RIRO signal, as well as the two adjacent signals along Nebraska Avenue. The capacity analysis results are also shown on Figure 16, Figure 17, Figure 18, and Figure 19. The capacity analysis results with the proposed signal are shown on Figure 20.

Table 6: Total Future Pedestrian Levels of Service for Signalized Intersections

Intersection	Parallel Approach	Total Future Conditions (2020)			
		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Massachusetts Ave & 46th St/Tilden St	Eastbound	12.0	B	8.0	A
	Westbound	12.0	B	8.0	A
	Northbound	27.4	C	34.4	D
	Southbound	27.4	C	34.4	D
Massachusetts Ave & Glover Gate/Katzen Arts Center	Eastbound	7.6	A	5.8	A
	Westbound	8.0	A	6.1	A
	Northbound	35.3	D	39.6	D
	Southbound	35.3	D	39.6	D
Ward Circle:					
Nebraska Ave & Ward Circle	Eastbound	39.6	D	39.6	D

Intersection	Parallel Approach	Total Future Conditions (2020)			
		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Nebraska Ave & Ward Circle	Westbound	39.6	D	39.6	D
Nebraska Ave & RIRO Driveway <i>(Recommendation: Install signal)</i>	Eastbound	37.0	D	37.0	D
	Westbound	37.0	D	37.0	D
	Northbound	6.8	A	6.8	A
Nebraska Ave & New Mexico Ave	Eastbound	39.6	D	39.6	D
	Westbound	39.6	D	39.6	D
	Northbound	19.8	B	21.1	C
Nebraska Ave & Rockwood Pkwy	Eastbound	19.8	B	21.1	C
	Westbound	37.8	D	37.8	D
	Northbound	37.8	D	37.8	D
	Southbound	8.8	A	8.8	A

Table 7: Main Campus – Total Future Pedestrian Levels of Service for Unsignalized Intersections

Intersection	Parallel Approach	Total Future Conditions (2020)			
		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
Massachusetts Ave & 46th St/University Ave	Eastbound	N/A - Stop controlled crossing, LOS A			
	Westbound	N/A - Stop controlled crossing, LOS A			
Massachusetts Ave & 45th St	Westbound	N/A - Stop controlled crossing, LOS A			
	Southbound	54,608.4	F	58,792.9	F
Ward Circle:					
Massachusetts Ave & Ward Circle	Southbound	120.9	F	44.1	E
Massachusetts Ave & Ward Circle	Northbound	174.4	F	38.8	D
Massachusetts Ave & Ward Circle	Northbound	28.5	D	80.7	F
Massachusetts Ave & Ward Circle	Southbound	19.4	C	92.8	F
Massachusetts Ave & NAC Driveway	Westbound	N/A - Stop controlled crossing, LOS A			
Massachusetts Ave & Westover Place	Eastbound	N/A - Stop controlled crossing, LOS A			
Nebraska Ave & Commuter Lot (RIRO)	Northbound	N/A - Stop controlled crossing, LOS A			
New Mexico Ave & Commuter Lot	Westbound	N/A - Stop controlled crossing, LOS A			
Nebraska Ave & 45th St	Northbound	N/A - Stop controlled crossing, LOS A			
Rockwood Pkwy & Tilden Gate	Westbound	N/A - Stop controlled crossing, LOS A			
Rockwood Pkwy & Fletcher Gate	Westbound	N/A - Stop controlled crossing, LOS A			
	Northbound	N/A - Stop controlled crossing, LOS A			
	Southbound	N/A - Stop controlled crossing, LOS A			

The analysis results indicate that all signalized crosswalks in the study area operate at acceptable levels of service during both the morning and afternoon peak hours. This indicates a low (LOS A and B) to moderate (LOS C and D) likelihood of non-compliance by pedestrians, which is reflected by pedestrians jaywalking across the intersection.

The analysis results also indicate that the majority of the unsignalized crosswalks in the study area operate at unacceptable levels of service during one or more peak hours. This indicates a moderate (LOS C and D) to very high (LOS F) likelihood of

risk-taking behavior for pedestrians, which is reflected in pedestrians dashing between vehicles during short gaps in traffic. As stated previously, pedestrians have the right-of-way in all crosswalks in the District, so vehicles must yield to pedestrians in the crosswalk at the study intersections listed in Table 7. However, the LOS F calculated for the unsignalized approaches of Ward Circle and at the intersection of Massachusetts Avenue and 45th Street during the morning and afternoon peak hours indicates an unfriendly and intimidating environment for pedestrians. No new unacceptable LOS are observed for the future with the 2011 Plan scenario.

The southbound crosswalk at the intersection of Massachusetts Avenue and 45th Street continues to operate under unacceptable conditions during the morning peak period, which is seen in both the existing and future without the 2011 Plan scenarios. The vehicular traffic generated by the 2011 Plan minimally impacts the poor LOS at this intersection.

As explained in “Chapter 18: Pedestrians” of the Highway Capacity Manual (HCM), pedestrian LOS at an unsignalized location is based on the length of the crosswalk and the volume of conflicting vehicles. Thus, any short-term recommendations made for Ward Circle will not improve the pedestrian LOS because it is not affected by the volume of pedestrians. While AU recognizes that improving Ward Circle is a topic beyond the scope of its 2011 Plan, the University is willing to work with the community and District and Federal agencies towards a long-term solution to Ward Circle, to help the safety and convenience of its students and faculty/staff. Long-term options for Ward Circle should be based on a joint study of the Circle lead by AU. This study would need to include representatives from the various stakeholders with interest in Ward Circle such as AU and the surrounding community, including major parcel owners such as Department of Homeland Security, DDOT, and the National Park Service.

Revised Pedestrian Crossing Recommendations

The changes to the campus plan lead to two revised recommendations from the Transportation Report.

1. Removing the right-in/right-out driveway to the East Campus parking lot on Massachusetts Avenue leads to design changes on the East Campus that reduces the need for a pedestrian actuated traffic signal at the location of the right-in/right-out across from the NAC driveway. This Transportation Report now recommends that the concept of adding a pedestrian actuated traffic signal at this location be incorporated into the proposed study of Ward Circle as a short-term improvement.
2. The change to maintain the right-in/right-out driveway to the East Campus on Nebraska Avenue had the potential to lead to mid-block pedestrian crossings along Nebraska Avenue. To mitigate this concern, the Transportation Report is recommending construction of a pedestrian actuated traffic signal at the location of the right-in/right-out on Nebraska Ave.

The creation of third pedestrian crossing between Ward Circle and New Mexico Avenue will disperse pedestrian traffic along Nebraska Avenue, which may mitigate the impact of pedestrian crossings on Nebraska Avenue by reducing the volumes of crossing at a single location. It will also eliminate the need for barriers to prevent jaywalking by accommodating pedestrian walking routes and desire lines.

Based on a preliminary warrant analysis, the proposed traffic signal meets the Manual of Uniform Traffic Control Devices (MUTCD) Signal Warrant 4 for the pedestrian peak hour. This warrant compares the number of vehicles per hour on the major street (the total of both approaches) during the peak hour of an average day and the corresponding pedestrians per hour crossing the major street to a standard warrant curve. For a major-street volume over 1,500 vehicles per hour, the warrant is 133 pedestrians per hour crossing the roadway. The total

major street volume (north- and southbound vehicles on Nebraska Avenue) during the afternoon peak hour is approximately 2,768 vehicles. Additionally, as shown in Table 4 previously, 198 pedestrians are predicted to cross Nebraska Avenue, which meets the pedestrian peak hour warrant.

Revised Bus Stop Recommendations

The changes to the campus plan lead to revising the bus stop consolidations recommendations from the Transportation Report.

The redevelopment plan initially recommended closing the existing driveway on Nebraska Avenue located between Ward Circle and New Mexico Avenue and creating a new entrance on Massachusetts Avenue south of Ward Circle. The refined plan retains the Nebraska Avenue entrance and does not include a Massachusetts Avenue access point. The Nebraska Avenue driveway will continue to operate as right-in and right-out only for vehicle traffic. Retaining the existing driveway in conjunction with the redevelopment creates opportunities to improve the bus stop removal and relocation recommendations and to further mitigate existing pedestrian issues in this area.

The bus stop recommendations have been updated to reflect the access and crosswalk recommendations above. The Transportation Report now recommends that the six AU shuttle and Metrobus stops located along Nebraska Avenue and New Mexico Avenue adjacent to campus be consolidated into two stops, on opposite sides of the new pedestrian crossing on Nebraska Avenue. This will lead to a simpler routing for the campus population and fewer times when buses stop along Nebraska Avenue.

Retaining the site access on Nebraska minimizes infrastructure changes associated with the redevelopment and creates an opportunity to further consolidate shuttle and bus stops. Immediately west of the existing driveway location there is an existing WMATA bus stop and shelter on the south side and an AU shuttle stop but no shelter on the north side. Under the refined recommendation, existing bus stops at the intersection of Nebraska and New Mexico Avenues will be removed and relocated to the existing stops west of the driveway. This will result in the removal of three WMATA stops. Decreasing the number of stops on Nebraska and New Mexico Avenues reduces the impact of stop activity on through traffic movements. Figure 1 illustrates the updated recommendations and the locations where bus stops will be removed.

The consolidation of bus stops will increase the amount of pedestrian activity at this location. Given that jaywalking is an existing issue along Nebraska Avenue, the recommended mid-block crossing will address the jaywalking issue and provide the necessary crossing facilities to accommodate transit passengers. Landscaping will be used to direct pedestrian pathways to the crosswalk, but the need for sizeable barriers to prevent jaywalking are no longer warranted. The crossing and signal will be located west of the driveway. This signal will be a pedestrian activated traffic signal, which can also provide a green right turn arrow for traffic exiting the redeveloped site, since pedestrians and right turning vehicles would not conflict with each other.

40th Street and Fort Drive Improvements

Since the submission of the 2011 Plan, the Rock Creek West II (RCW2) Livability Study was finalized. The study was initiated by the District Department of Transportation (DDOT) to take a big picture look at the roadway network and to identify concrete actions to improve transportation conditions and address safety issues.

The RCW2 study recommends several changes to traffic patterns and transportation infrastructure near the Tenleytown Metrorail station. Improvements are recommended for 40th Street and Fort Drive between Albemarle Street and

Brandywine Street. These streets are used today by AU shuttles for passenger pick-up/drop-off and turnaround. The recommendations contained in the RCW2 Livability Study include the following:

- Paint crosswalks across the 40th Street curb cuts;
- Reverse the direction of 40th Street and Fort Drive;
- Convert the metered on-street parking on 40th Street and Fort Drive to angled on-street parking;
- Remove the U-turn break near Albemarle Street and add a new median break for the Whole Foods garage driveway;
- Convert Albemarle Street from one-way southbound to one-way northbound; and
- Convert Fort Drive from one-way northbound to one-way southbound.

The study indicates that AU shuttle stops will need to be relocated to accommodate these recommendations. This report and the RCW2 study recommend that the WMATA bus stop and AU shuttle stop maintain its high visibility and proximity to the Tenleytown Metro.

Figure 2 and Figure 3 illustrate two options for accommodating transit stops and incorporating RCW2 recommendations with some refinements. Both options incorporate all RCW2 recommendations north of the new median cut but make changes south of the median cut to better accommodate transit and pedestrian traffic.

The primary difference between the RCW2 design and Option A and Option B is the design of the bus stops and the amount of parking provided. There are several options for accommodating bus stops and pedestrians, the two presented below maximize the amount of space for pedestrians and passengers and adhere to the standards and guidelines contained in the 2008 “WMATA Bus Station Design Guidelines”. The guidelines state that sawtooth bays are the standard design for WMATA bus facilities because they require significantly less curb space than tangent bays. The figure in the RCW2 study illustrating the recommendations included tangent bays, but the ones shown do not adhere to the WMATA standards. Following the WMATA standards, it is difficult to accommodate the four bus stops south of the proposed median cut because tangent bays require much more curb length per stop (114’) than a sawtooth (70’). As result, Gorove/Slade recommends using sawtooth bays.

For both tangent and sawtooth bays, the WMATA design standards state that 30’ of roadway width per stop is required to accommodate a stopped bus and through traffic, 12’ of sidewalk width per stop to accommodate pedestrian traffic, and 6’ for a shelter. There is not sufficient width within the existing 40th Street and Fort Drive right-of-way (100’) to accommodate stops on each side, a shelter, and on-street parking on both sides of 40th Street and Fort Drive as indicated in the RCW2 study.

Design Option A maximizes the amount of space provided for pedestrian and passenger activity. If maximizing the amount of on-street parking in the area is a priority, one lane of on-street parking could be accommodated on either 40th Street or Fort Drive if the pedestrian and passenger waiting area width is reduced. Option B illustrates on-street parking along the eastern curb of Fort Drive. Given the space constraints at this location, providing parking south of the median cut is possible, but it may not be desirable from a bus operations standpoint. Cars waiting for and maneuvering in or out of a parking space are likely to impede through traffic and bus maneuvers.

The University is open to working with DDOT, WMATA and other stakeholders as needed to develop a plan that incorporates the RCW2 Livability Study recommendations and quality transit stops for WMATA and the AU shuttle.

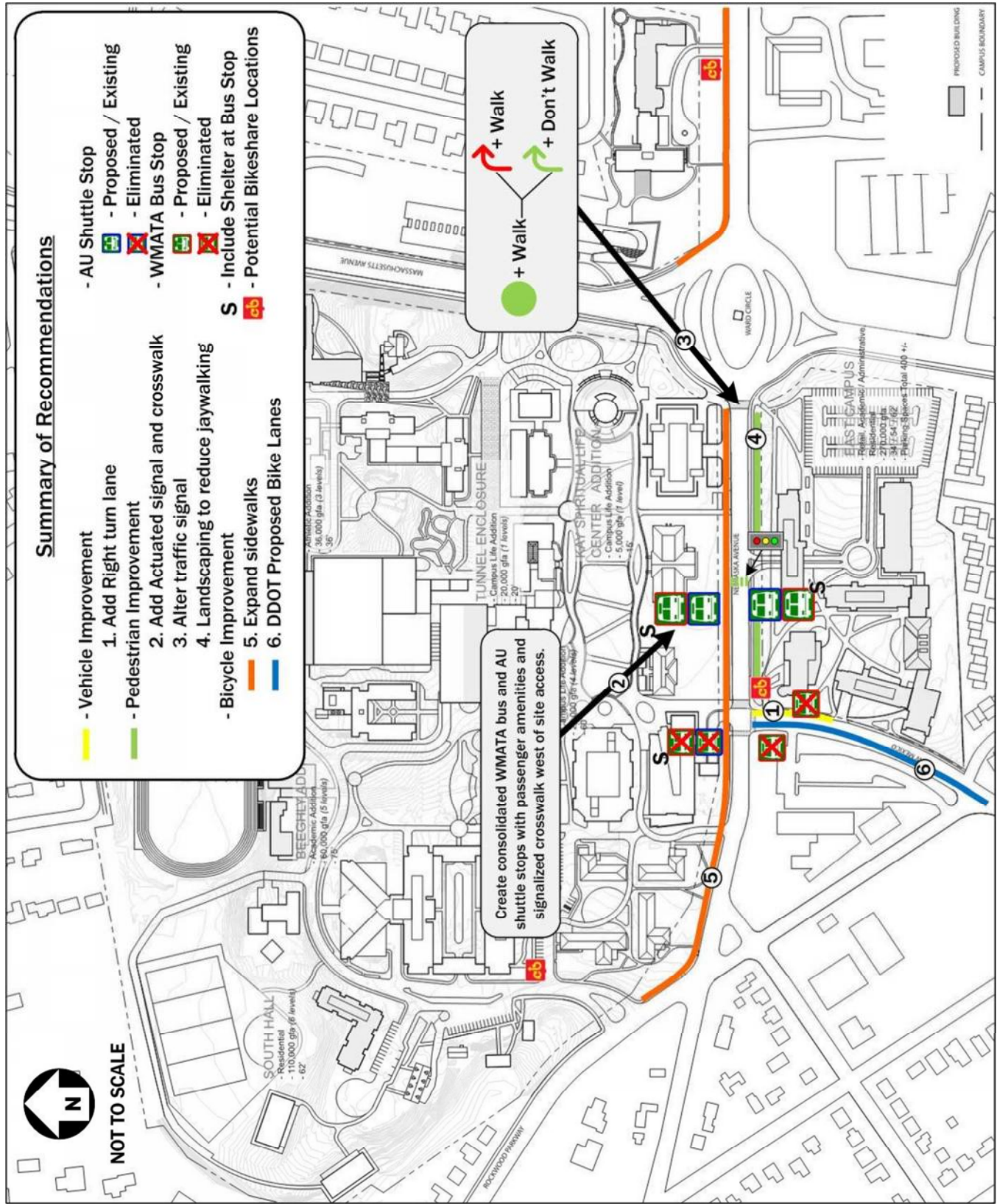


Figure 1: Summary of Recommendations

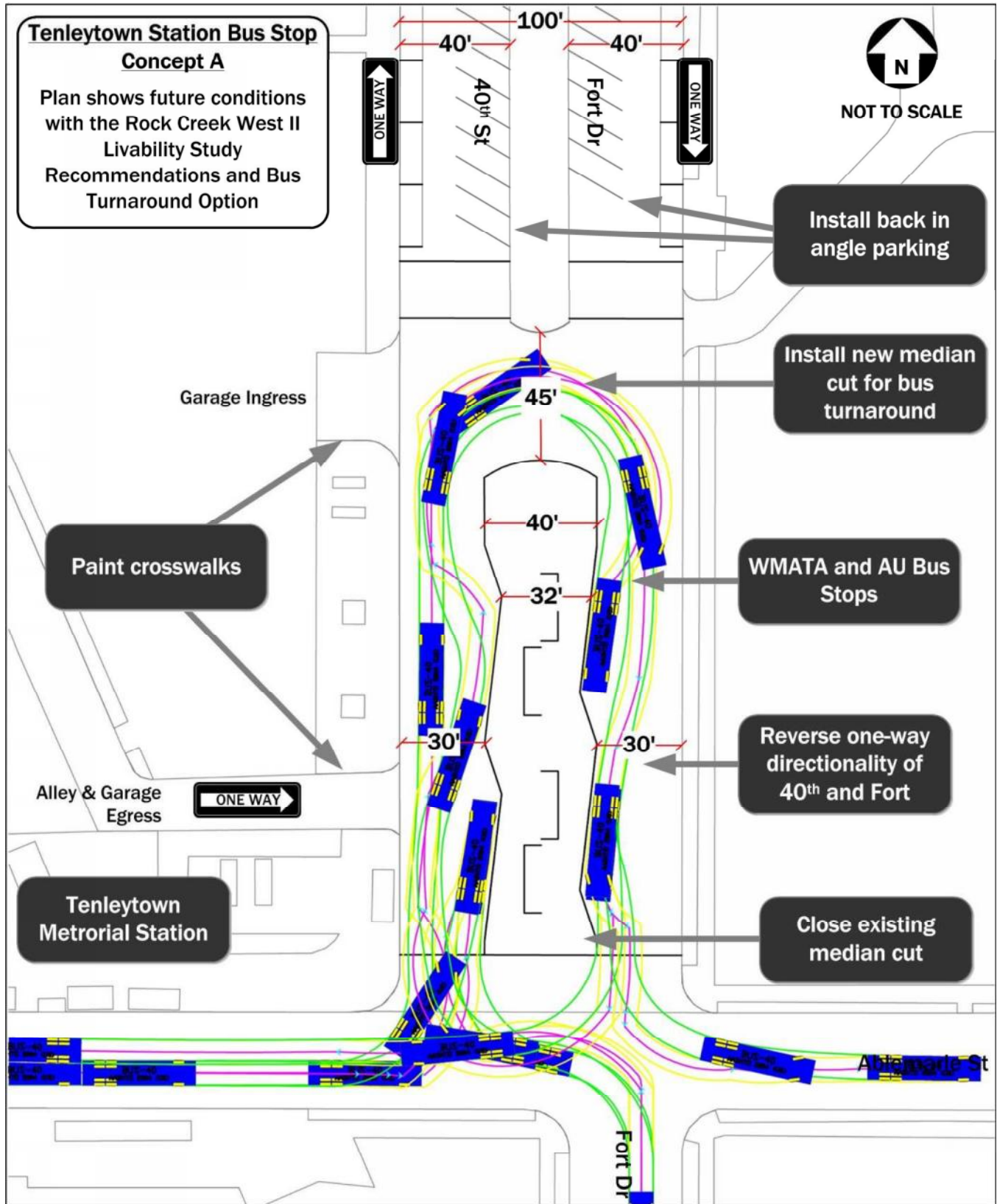


Figure 2: 40th Street and Fort Drive RCW2 Recommendations and Bus Stop Option A

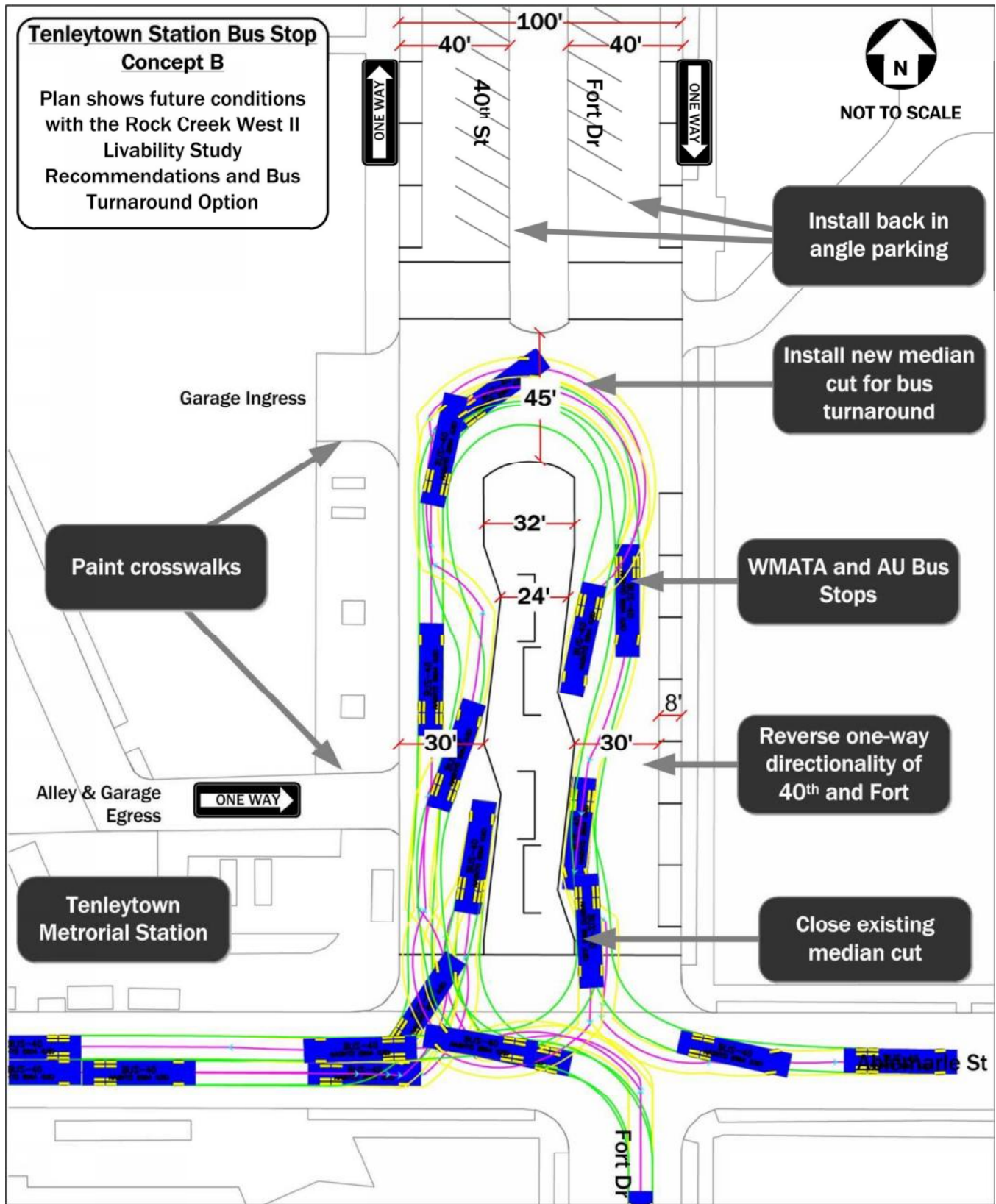


Figure 3: 40th Street and Fort Drive RCW2 Recommendations and Bus Stop Option B

On Street Parking Data

During the data collection portion of the planning process, information on the availability of on-street parking in the neighborhoods adjacent to Main Campus was collected. This section of the report describes and presents this information.

At the request of AU, Gorove/Slade conducted on-street parking counts at two specific dates and times, the afternoons of April 20, 2010 and May 11, 2010. These two dates correspond to the highest and lowest total population on campus, when classes are highest during the week in the typical semester, and the day in the summer before summer activities begin. The amount of spaces and vehicles parked were collected in areas surrounding campus, distinguishing between vehicles with and without Ward 3 parking tags.

The results of the counts are shown in Figure 4 and Figure 5.

The counts show that of the over 1,500 on-street parking spaces surveyed, 68% of those on-street parking spaces were available when the campus activity was at its highest and 77% of those on-street parking spaces were available when the campus activity was at its lowest. Because there are so many factors involved in on-street parking demand, it is difficult to state that the difference in counts is due to the changes in campus population, but it is likely that if there was an impact, it would be greatest between these two times. Thus, the 9% difference in on-street parking occupancy could be the result of campus population parking on-street. Due to the significant amount of on-street parking available in the neighborhoods adjacent to the Main Campus, the Transportation Report concludes that AU does not create adverse impacts on the availability of on-street parking.

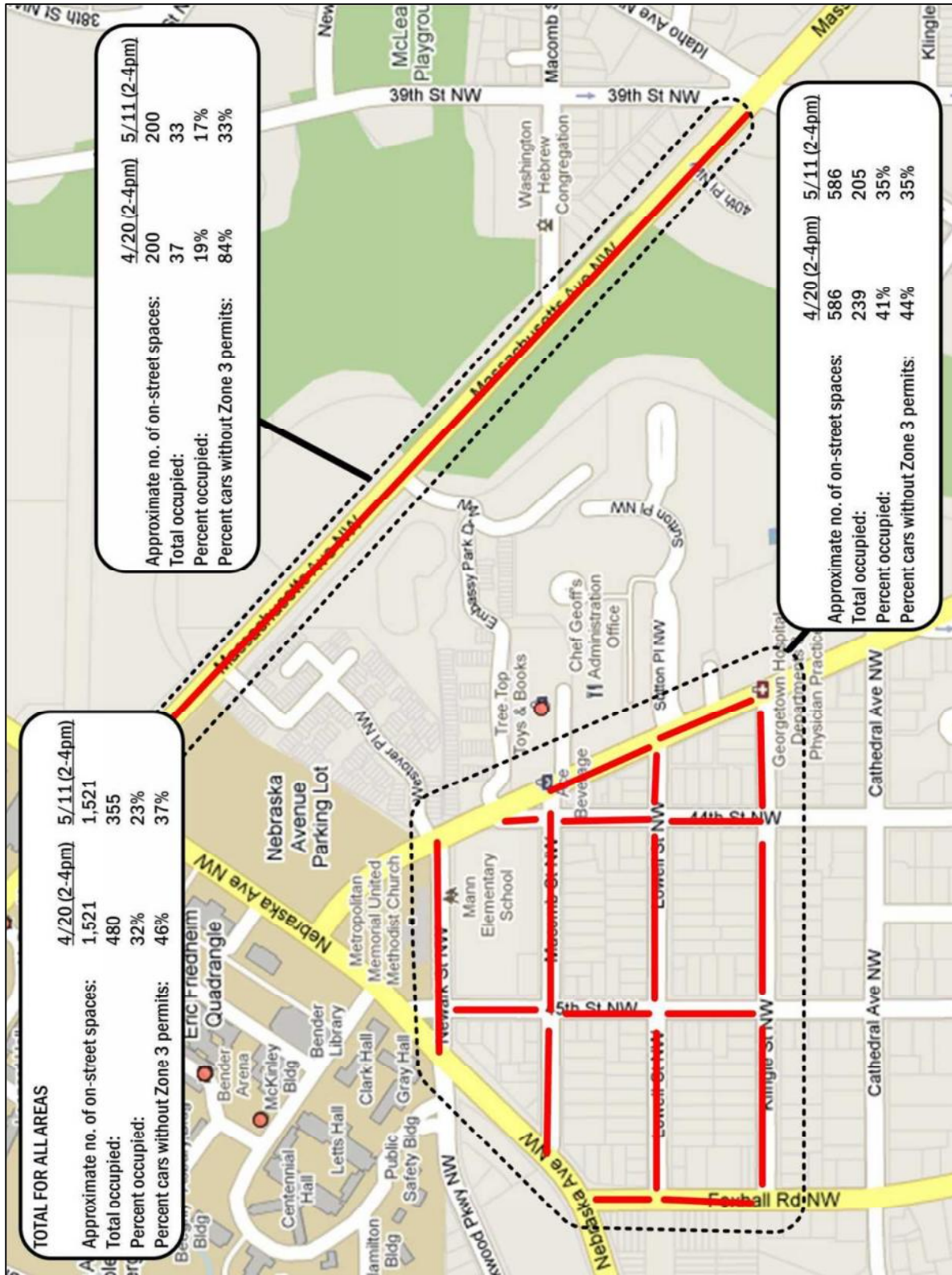


Figure 4: On-Street Parking Counts (1 of 2)

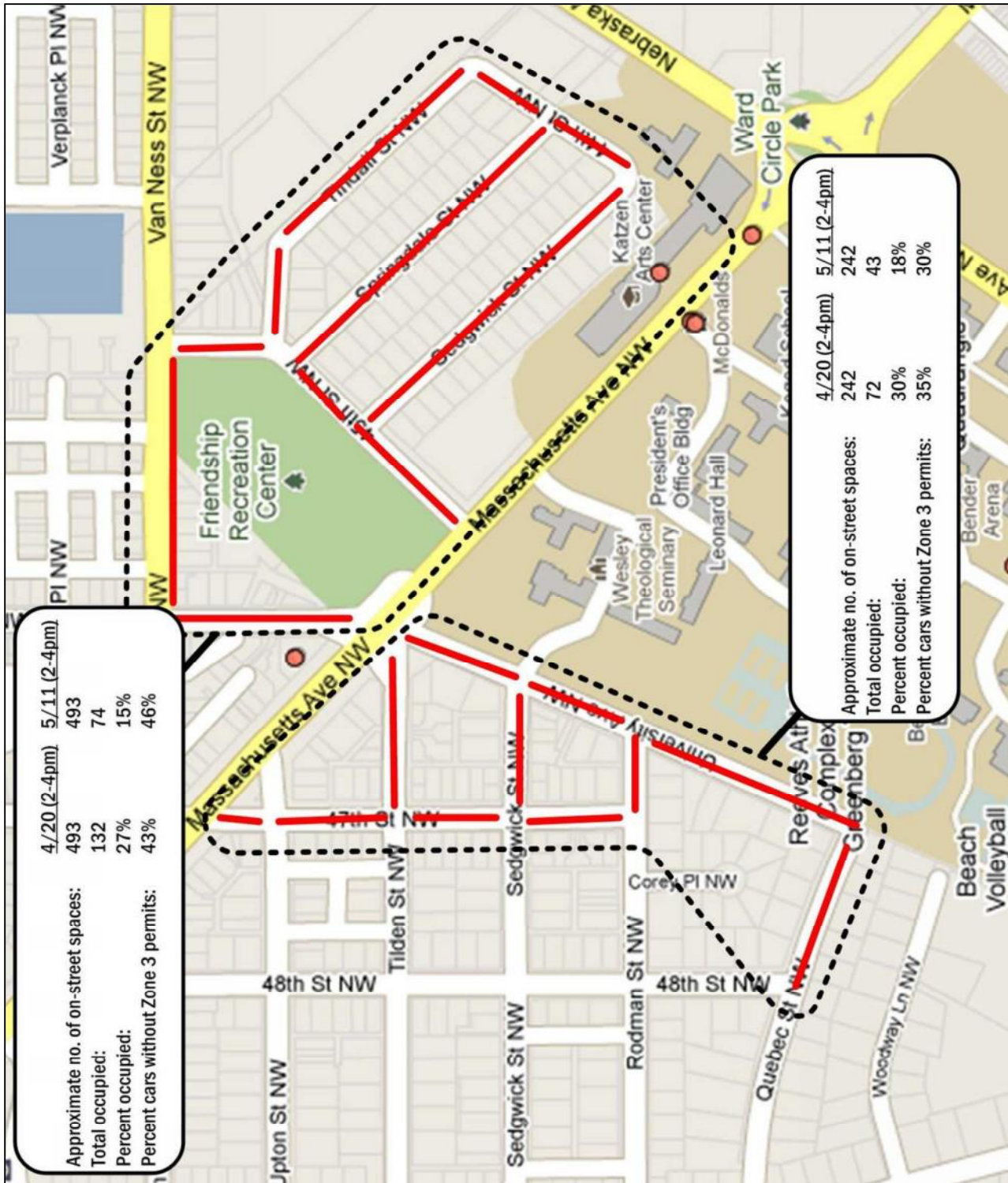


Figure 5: On-Street Parking Counts (2 of 2)

Tenley Campus Update

This section provides an update on the proposed access for the Tenley Campus, although final details, including a final transportation report, will be submitted in a Further Processing application to be filed in the summer of 2011. Since the submittal of the Campus Plan application, the design of the Tenley Campus has progressed. From a transportation standpoint, the most significant design refinement has been selection of an access point for the parking garage. The current design includes a full-access driveway to the Tenley Campus parking garage along Nebraska Avenue, north of its intersection with Warren Street.

The design team asked Gorove/Slade for thoughts on the potential traffic impacts of placing the garage driveway at this location. The following are a preliminary set of conclusions based on traffic modeling of the new driveway. A full study will be included in the Further Processing application.

- The conclusions noted within the Transportation Report filed with the Zoning Commission on March 18, 2011 will remain the same; the Tenley Campus will not lead to an adverse impact on roadway or pedestrian capacity. The operational recommendations included in the report will remain the same.
- The amount of traffic generated by the parking garage will lead to minimal impact on nearby intersections
- The preliminary traffic model results show that the driveway will work as a stop-controlled intersection and that a traffic signal would not be warranted.
- The driveway would work with one lane in and one lane out of the garage but having a separate right- and left-turn lane outbound would help vehicles exiting and allow right-turns to exit while left-turns waited for acceptable gaps. With one-lane outbound and stop-control, the inbound left-turn from Nebraska Avenue operates at LOS A and the driveway operates at LOS C (during both peak hours).
- To help reduce the impact to Nebraska Avenue, a short northbound left turn lane can be constructed, although the capacity and queuing analyses show that it is not necessary to avoid poor LOS grades in the peak hours. The average queue length on the northbound left turn was approximately 1 car in the AM and PM peak hours. The average queue length in the driveway was approximately 1 car in the AM and 2 cars in the PM.

The Further Processing application for the Tenley Campus will also include details on the number of vehicular and bicycle parking spaces provided, AU shuttle access, pedestrian accommodations, and other aspects of the transportation system.

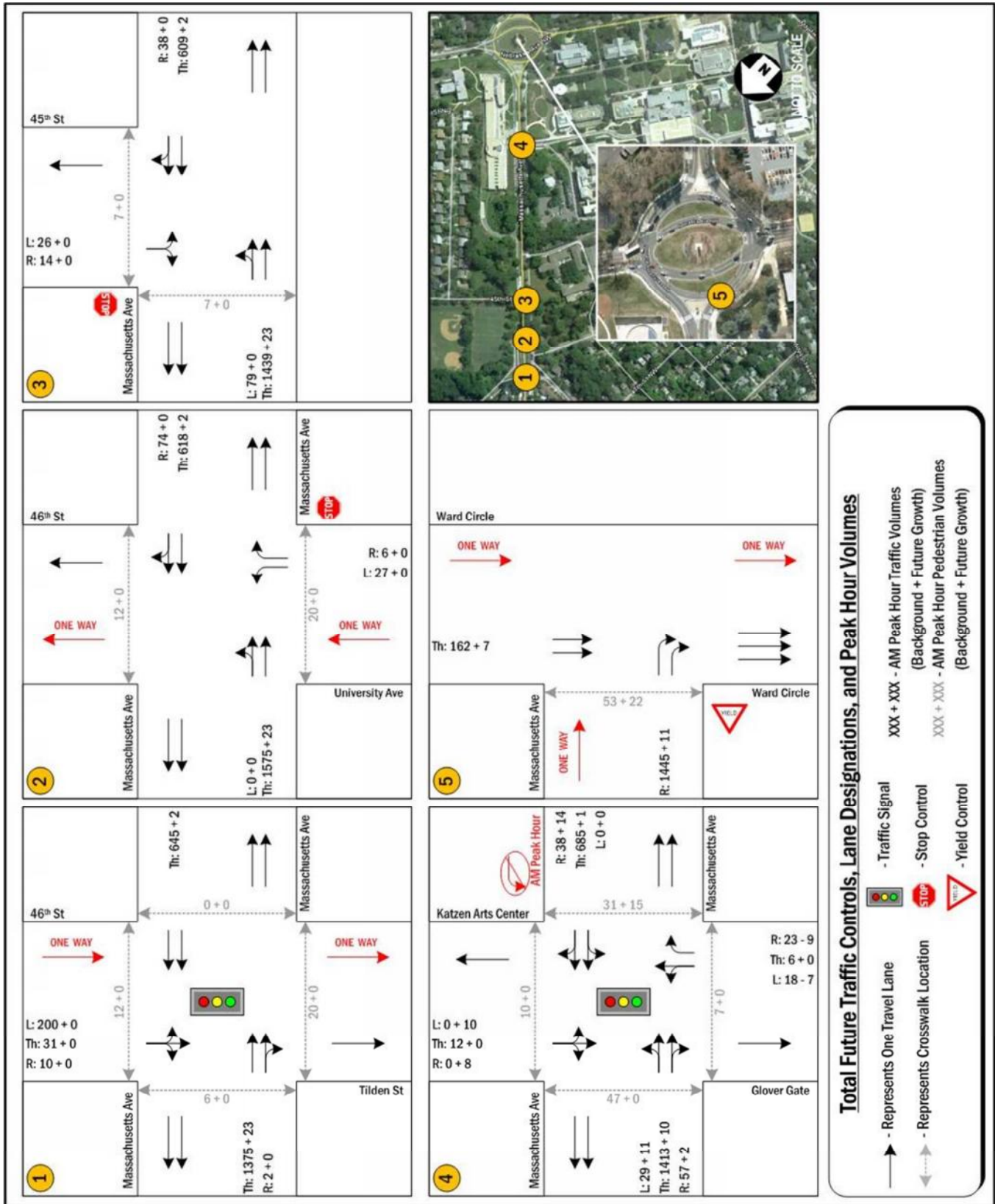


Figure 6: Total Future Traffic Controls, Lane Designations, and AM Traffic Volumes (1 of 4)



Figure 7: Total Future Traffic Controls, Lane Designations, and AM Traffic Volumes (2 of 4)

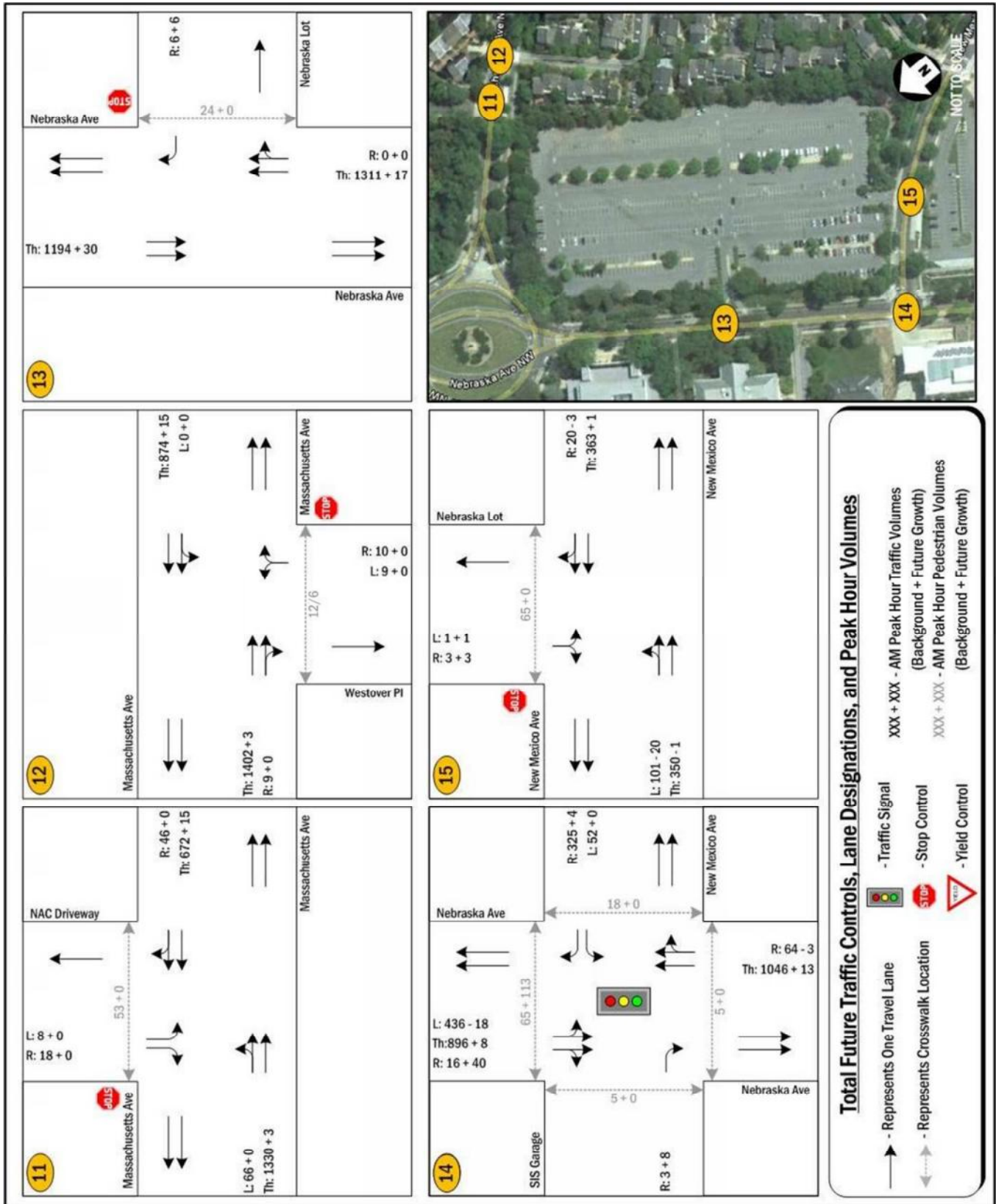


Figure 8: Total Future Traffic Controls, Lane Designations, and AM Traffic Volumes (3 of 4)

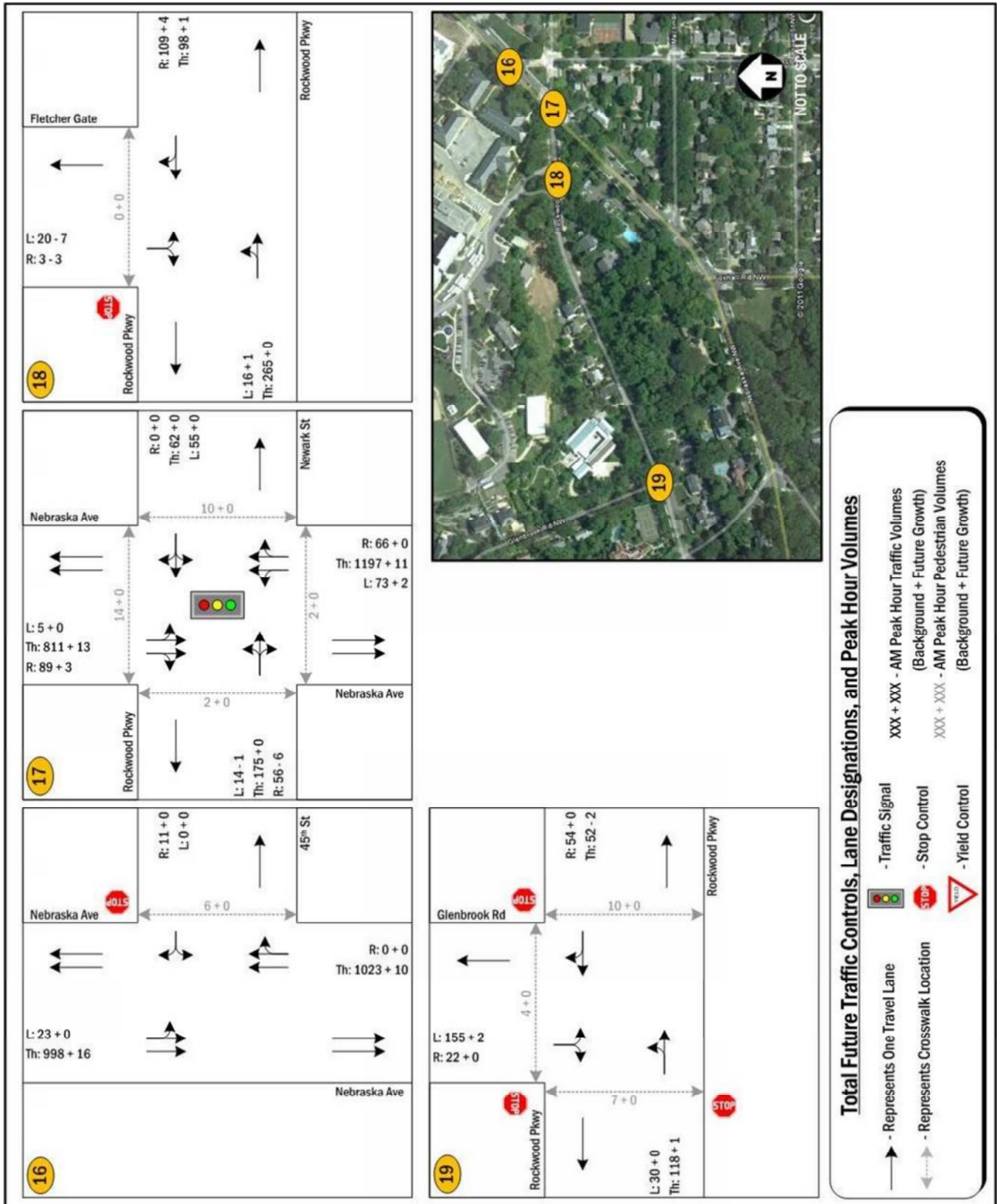


Figure 9: Total Future Traffic Controls, Lane Designations, and AM Traffic Volumes (4 of 4)

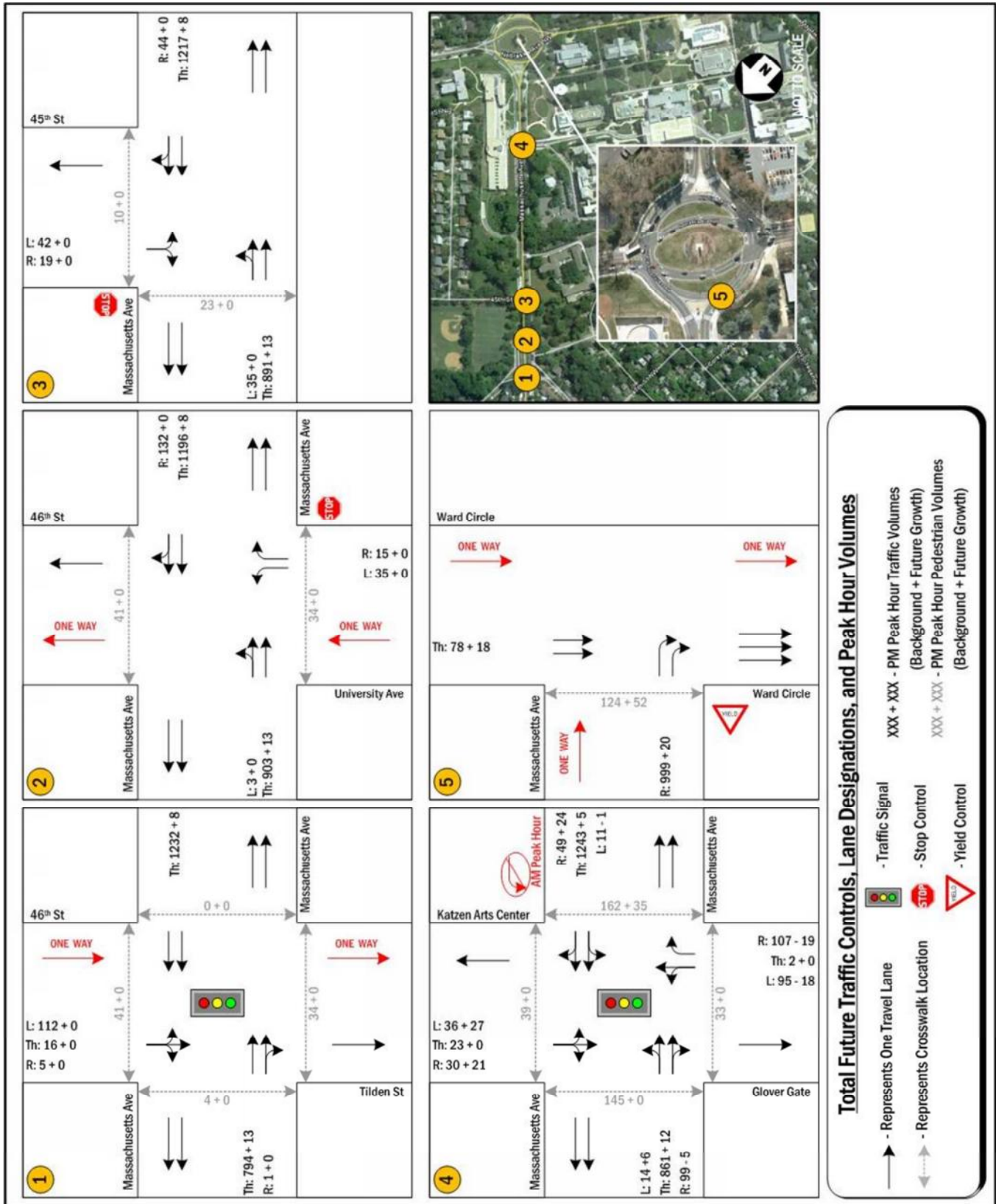


Figure 10: Total Future Traffic Controls, Lane Designations, and PM Traffic Volumes (1 of 4)



Figure 11: Total Future Traffic Controls, Lane Designations, and PM Traffic Volumes (2 of 4)

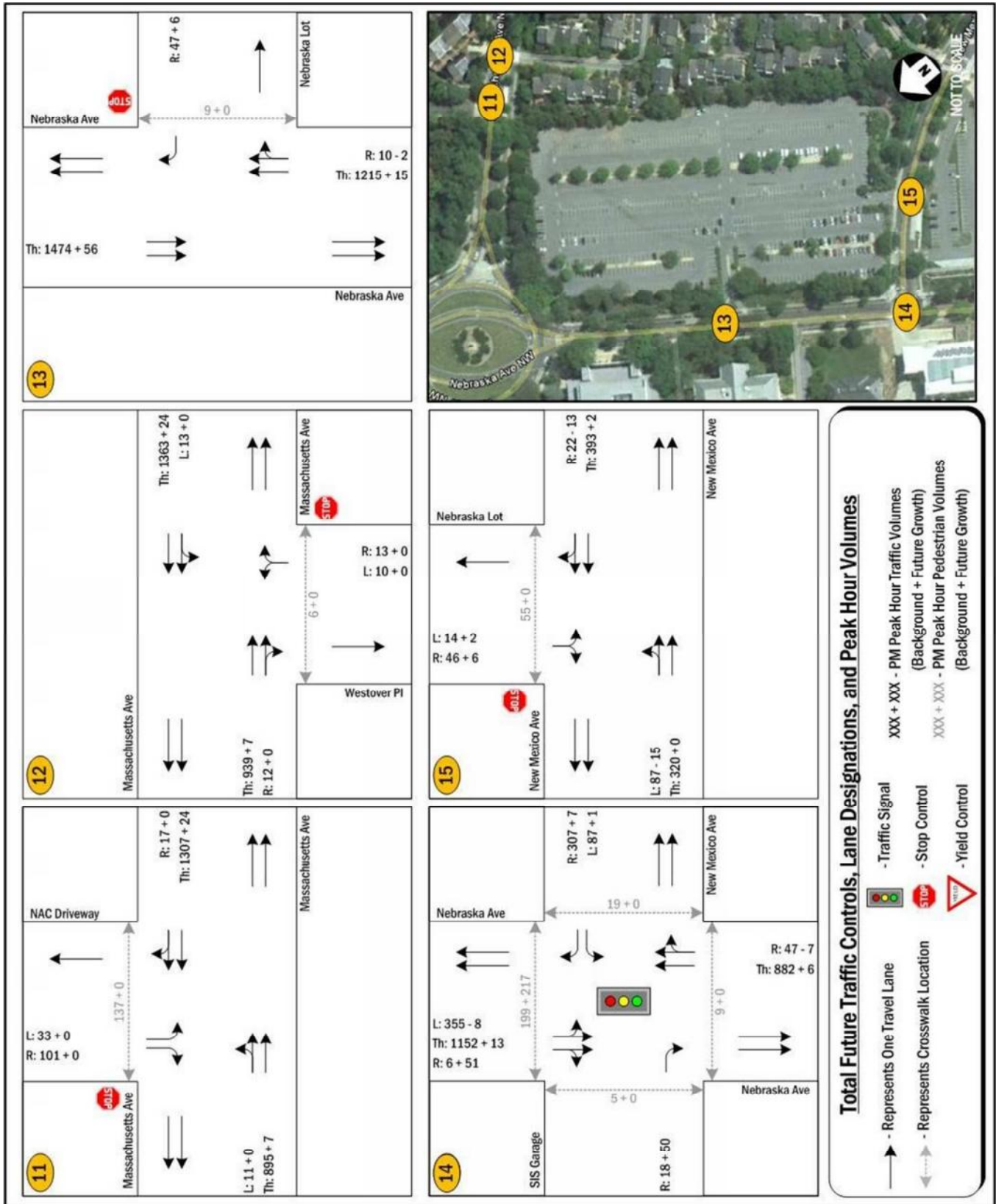


Figure 12: Total Future Traffic Controls, Lane Designations, and PM Traffic Volumes (3 of 4)

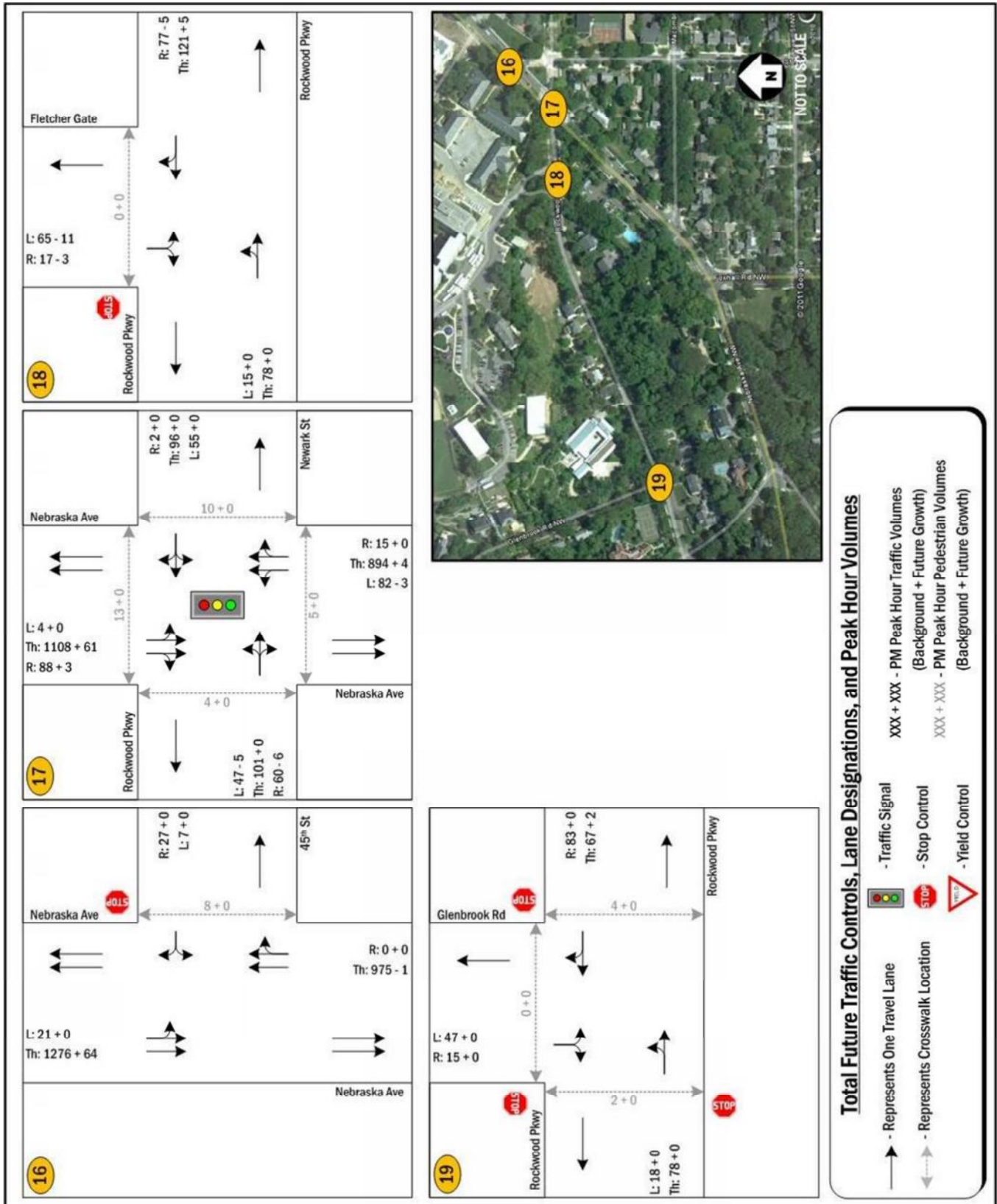


Figure 13: Total Future Traffic Controls, Lane Designations, and PM Traffic Volumes (4 of 4)

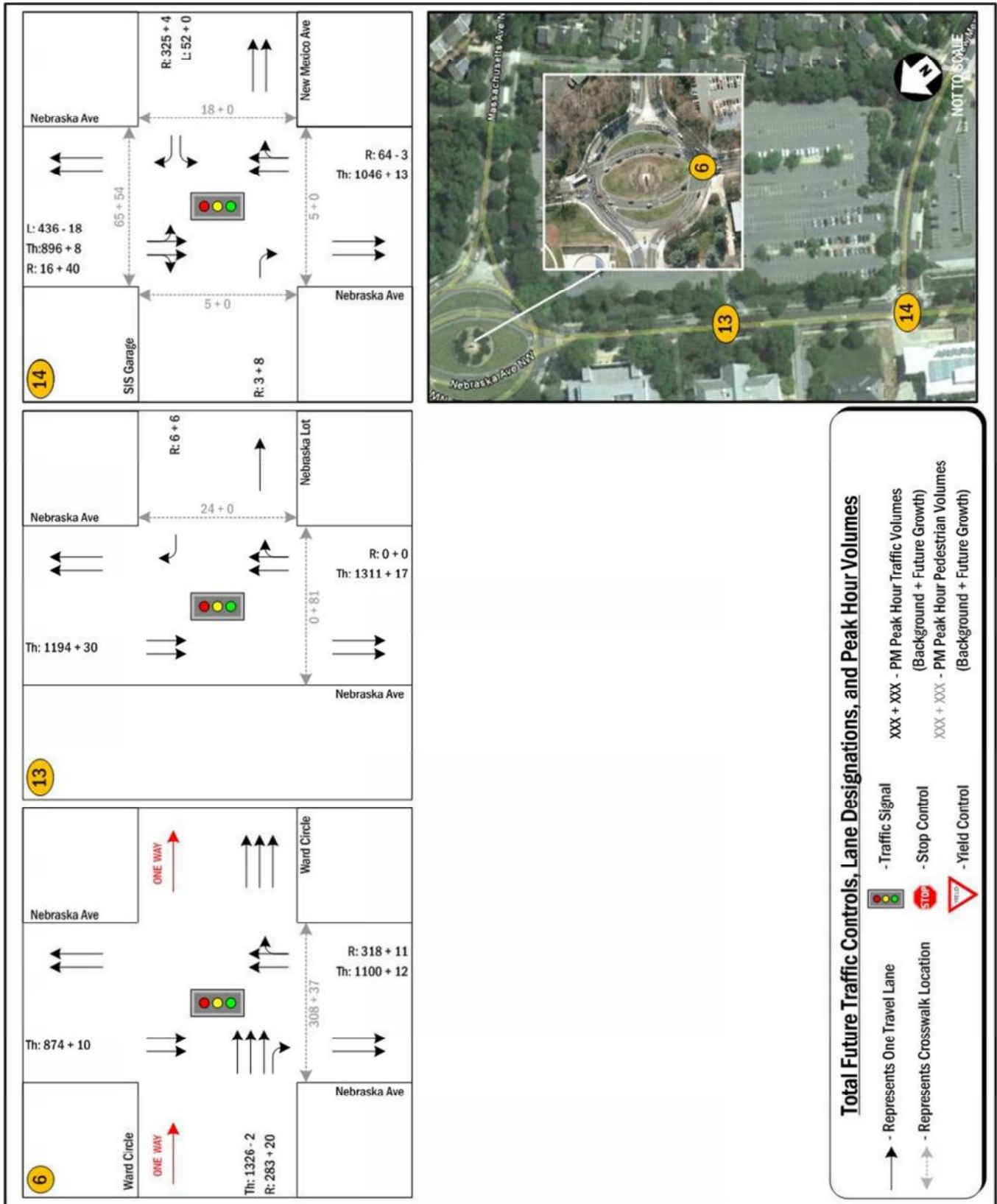


Figure 14: Total Future Traffic Controls, Lane Designations, and AM Traffic Volumes with Proposed Signal

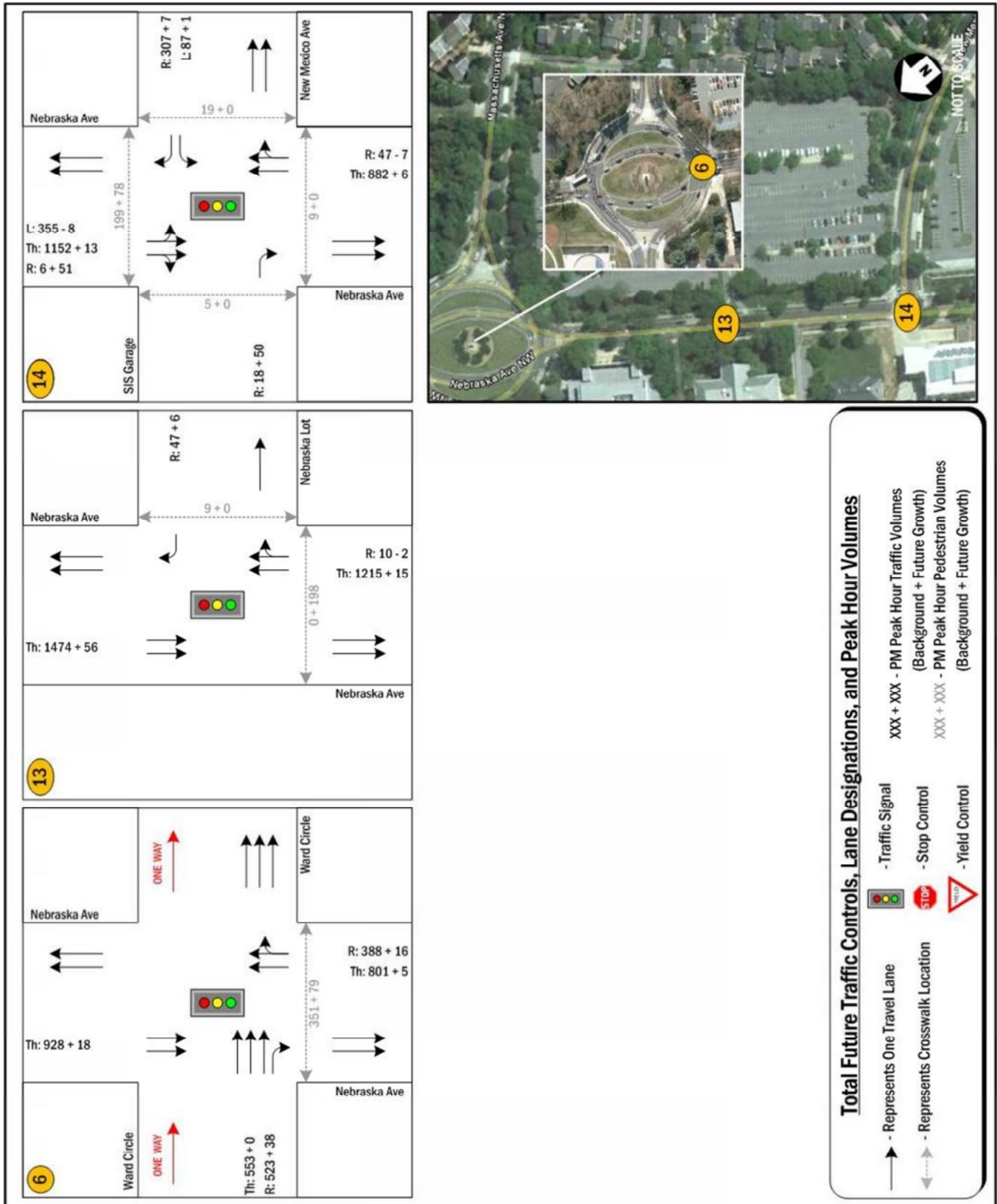


Figure 15: Total Future Traffic Controls, Lane Designations, and PM Traffic Volumes with Proposed Signal

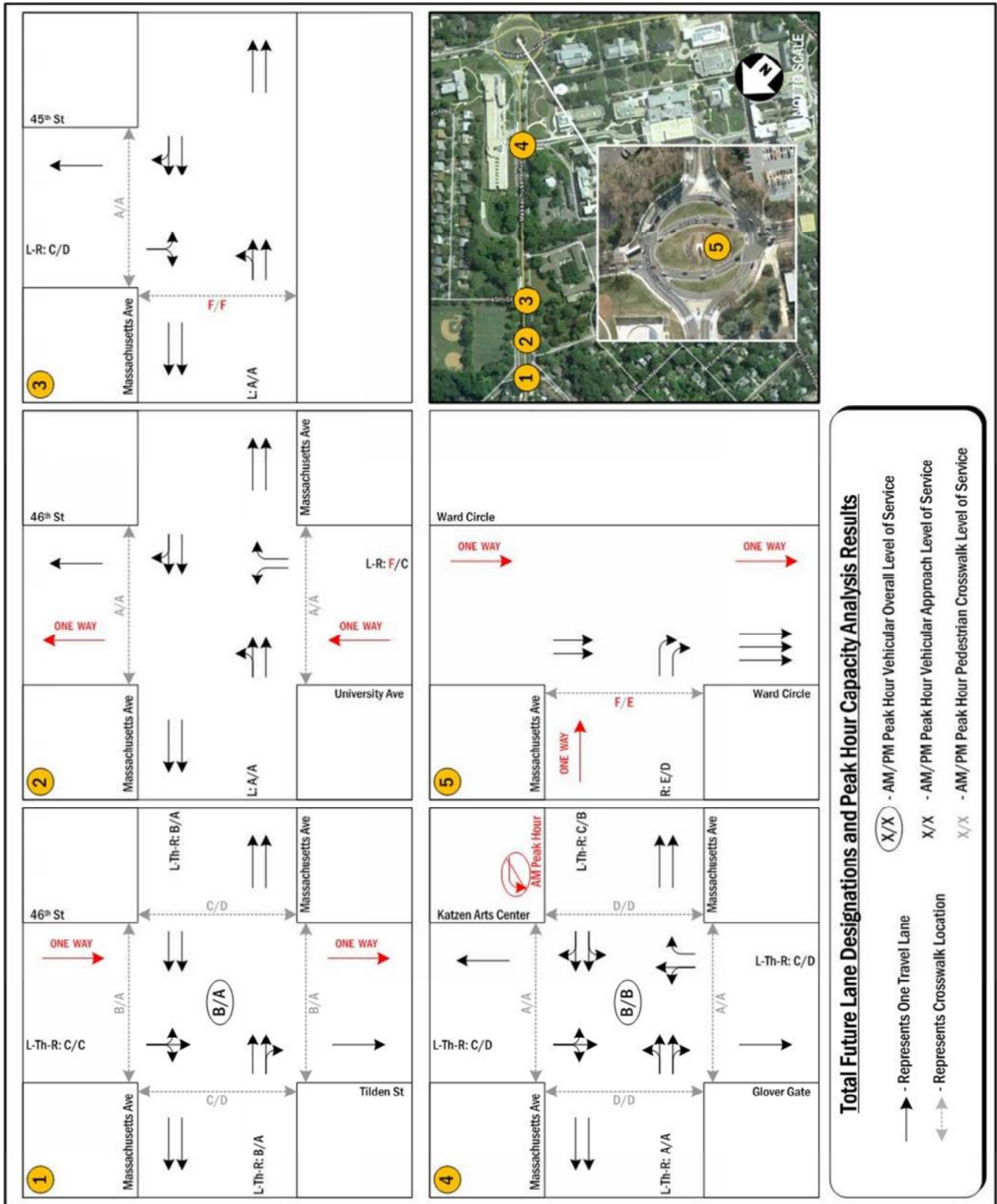


Figure 16: Total Future Lane Configurations and Capacity Analysis Results (1 of 4)

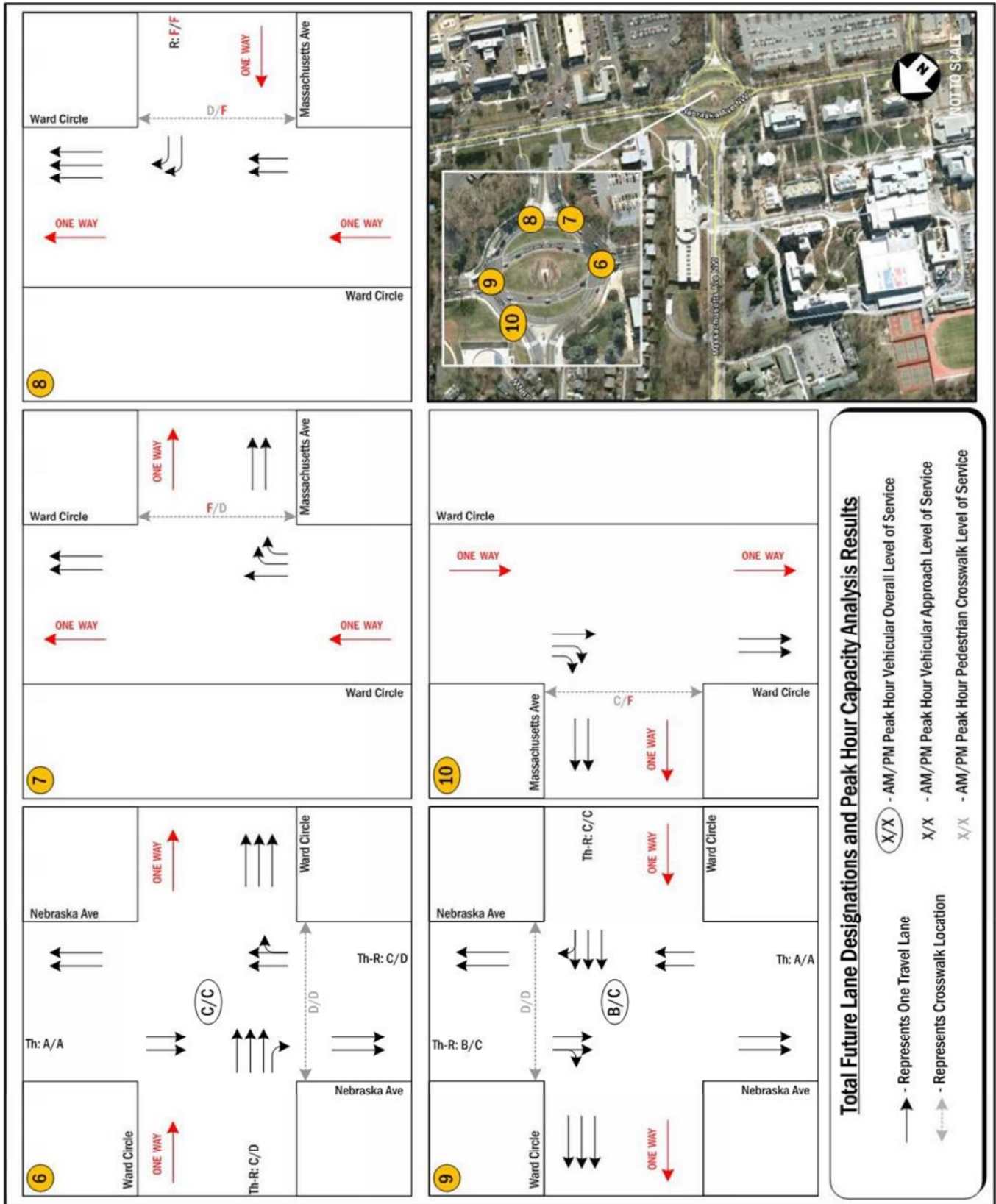


Figure 17: Total Future Lane Configurations and Capacity Analysis Results (2 of 4)



Figure 18: Total Future Lane Configurations and Capacity Analysis Results (3 of 4)



Figure 19: Total Future Lane Configurations and Capacity Analysis Results (4 of 4)

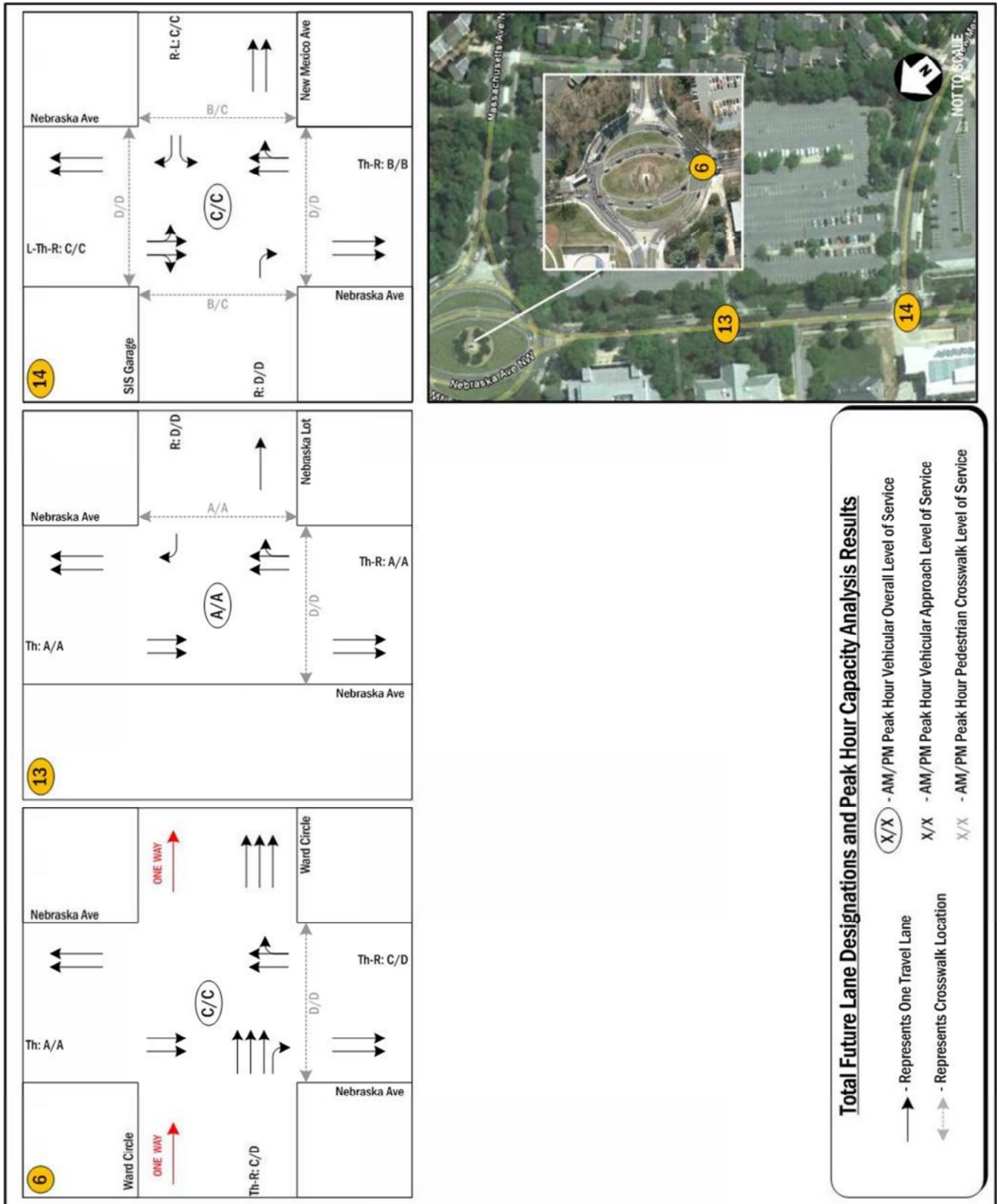


Figure 20: Total Future Lane Configurations and Capacity Analysis Results with Proposed Signal