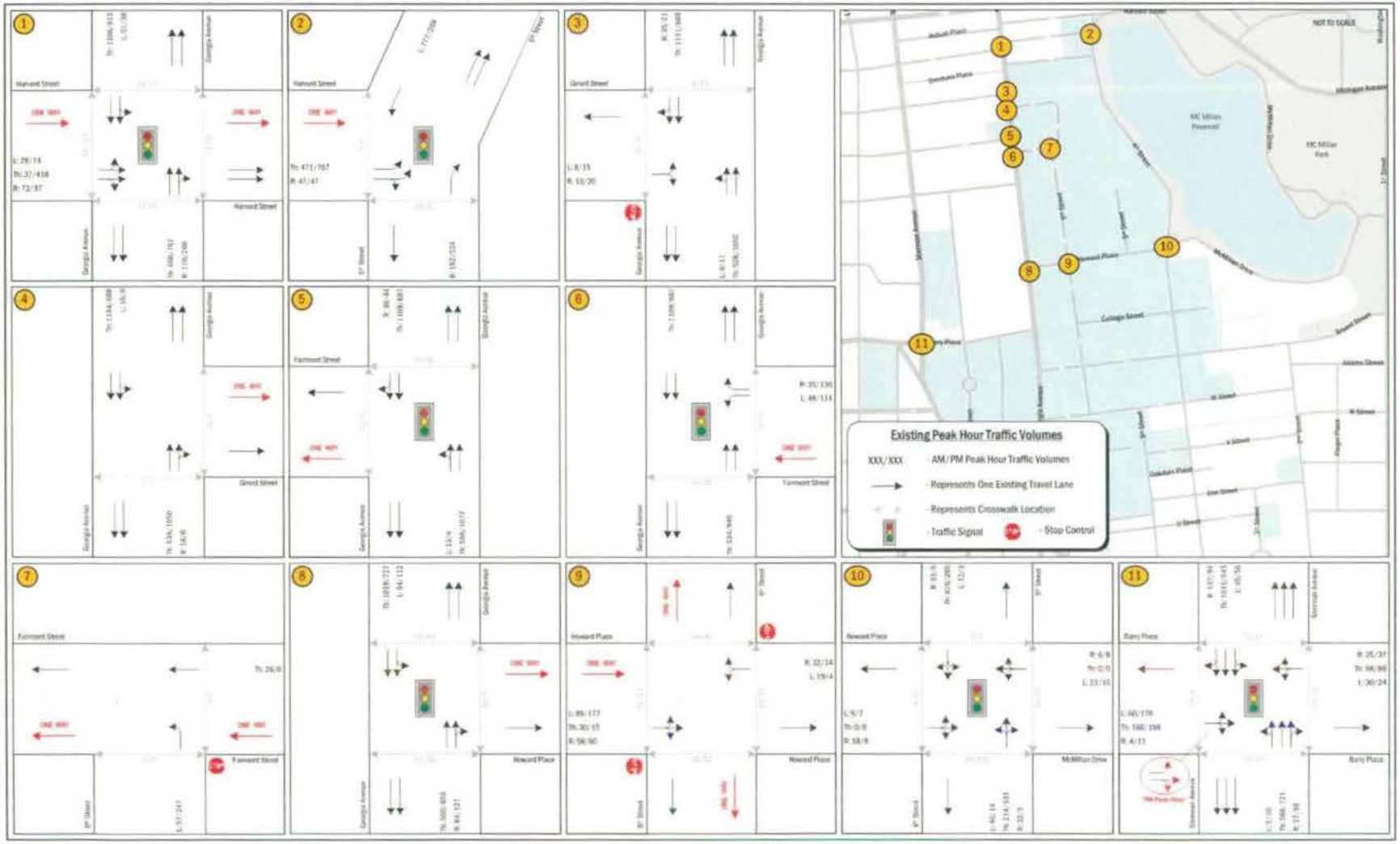


Figure 22: Traffic Controls, Lane Configurations, and Existing Peak Hour Traffic Volumes (1 of 3)

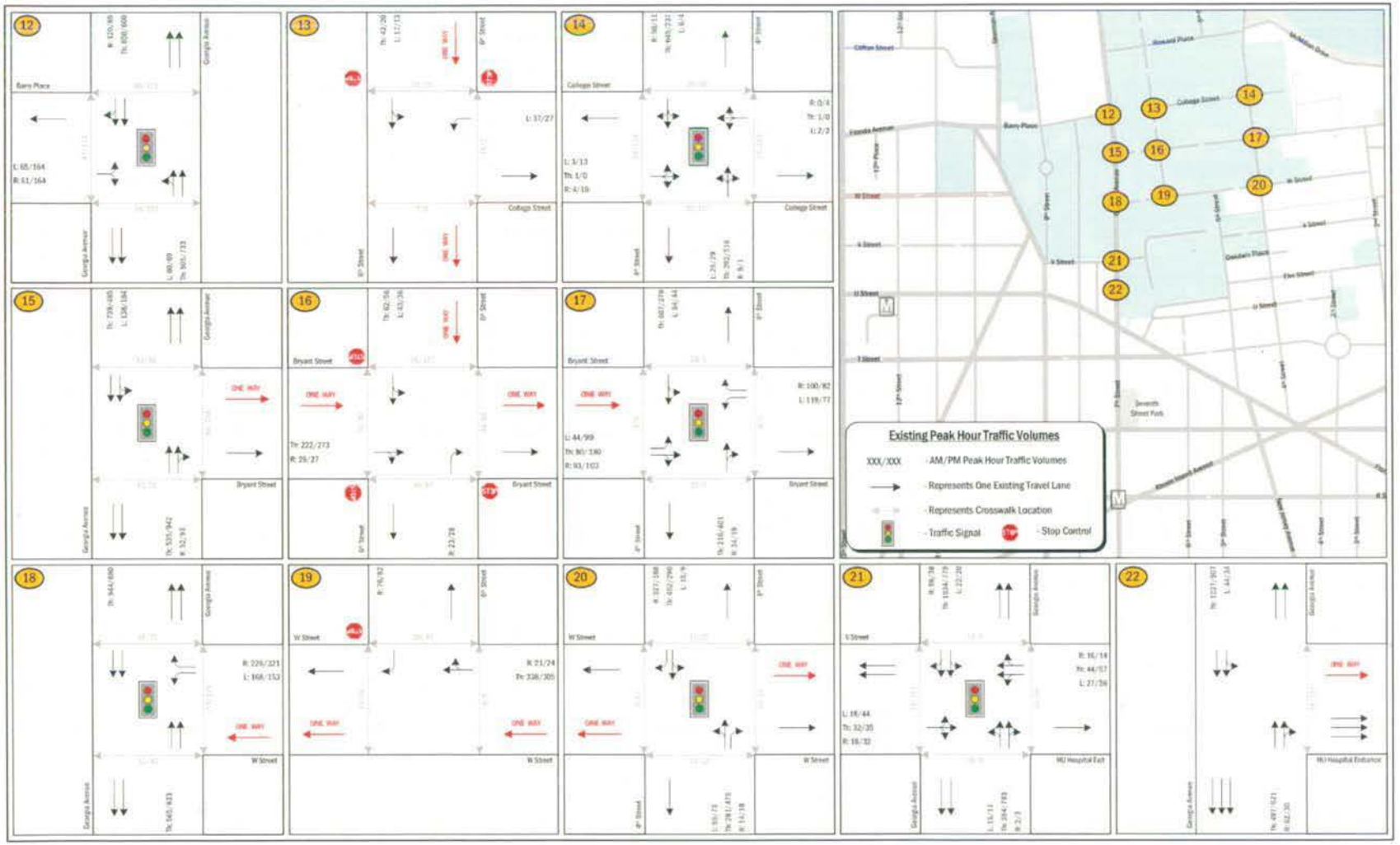


Figure 23: Traffic Controls, Lane Configurations, and Existing Peak Hour Traffic Volumes (2 of 3)

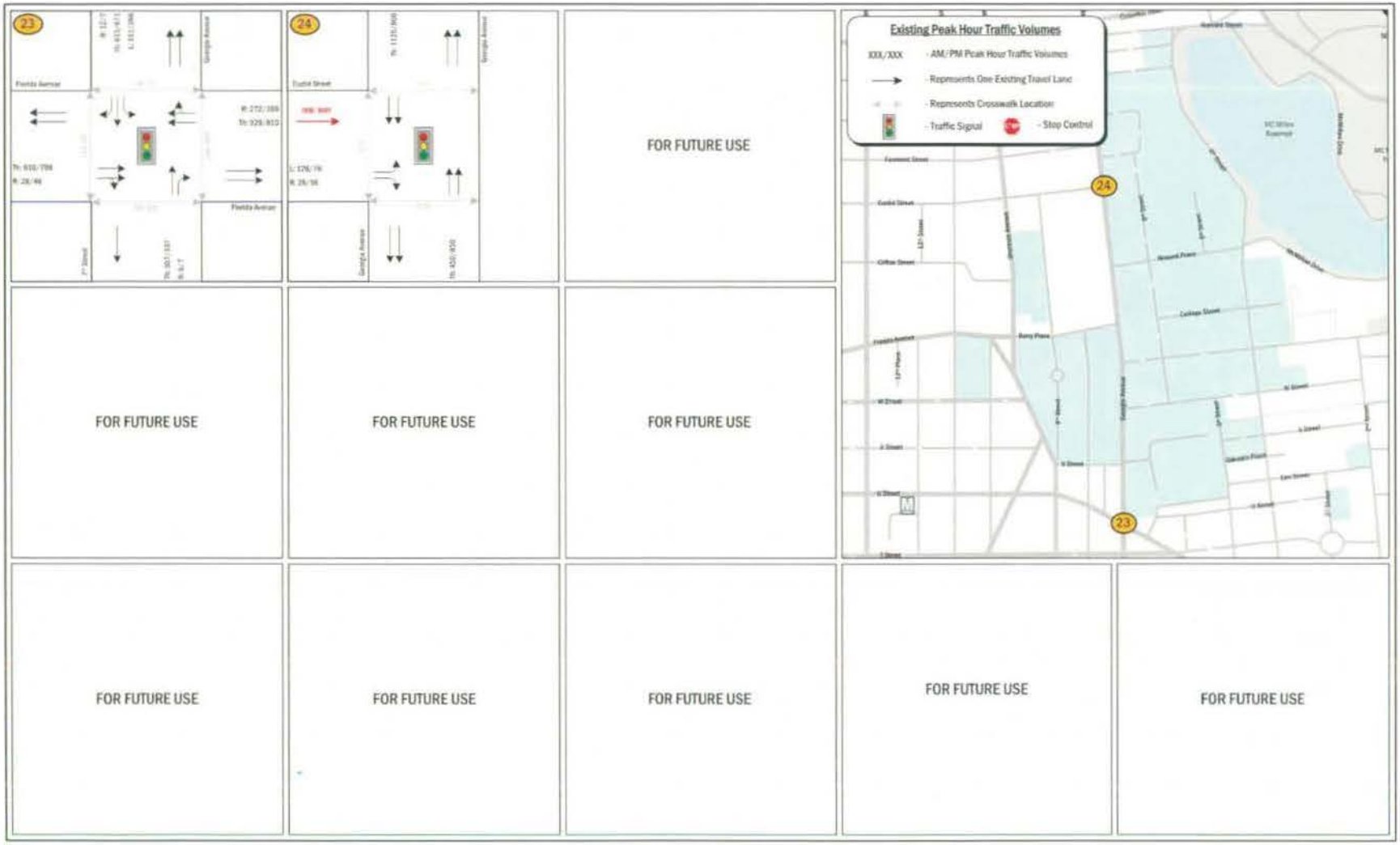


Figure 24: Traffic Controls, Lane Configurations, and Existing Peak Hour Traffic Volumes (3 of 3)

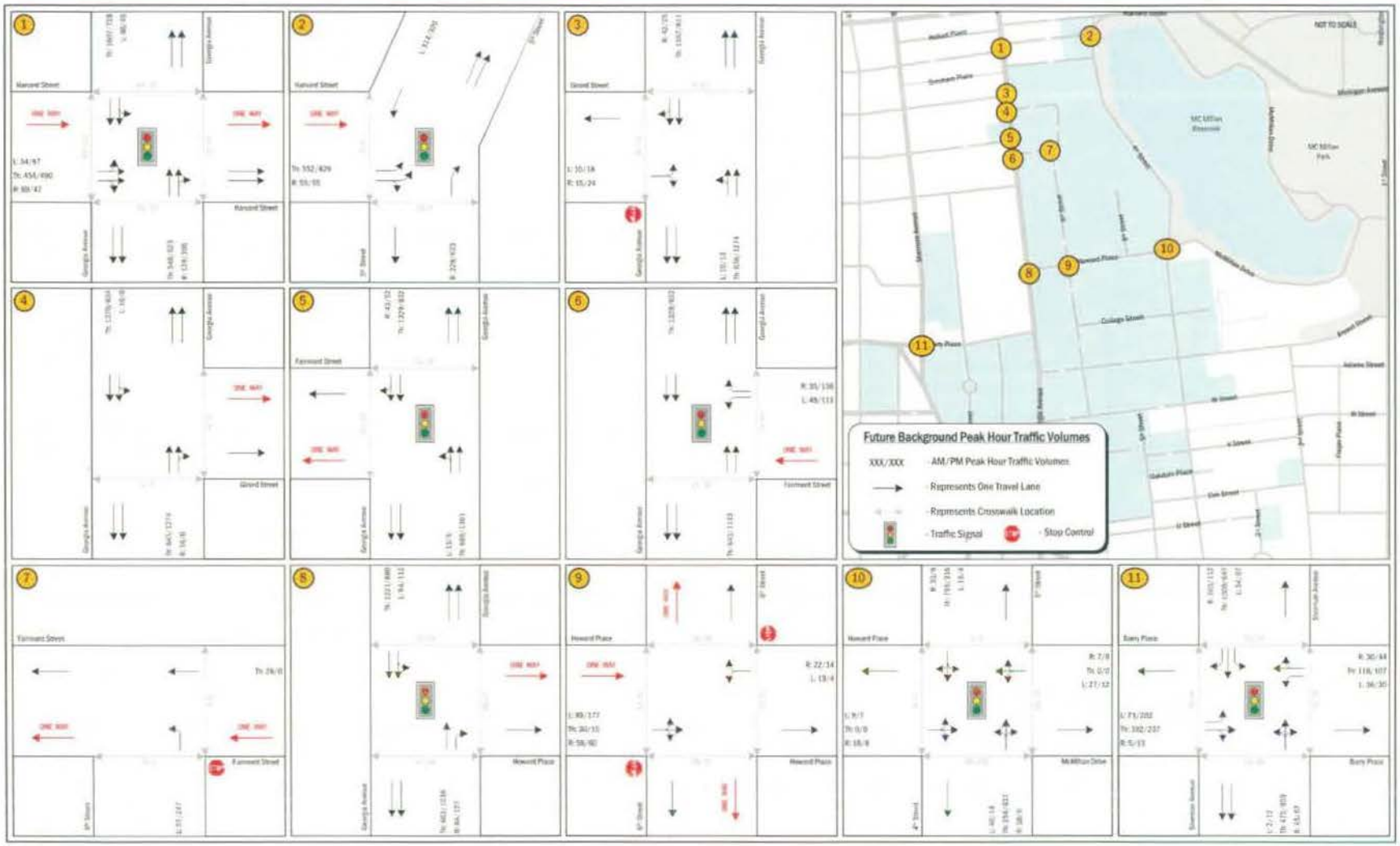


Figure 25: Traffic Controls, Lane Configurations, and Future Background Peak Hour Traffic Volumes (1 of 3)

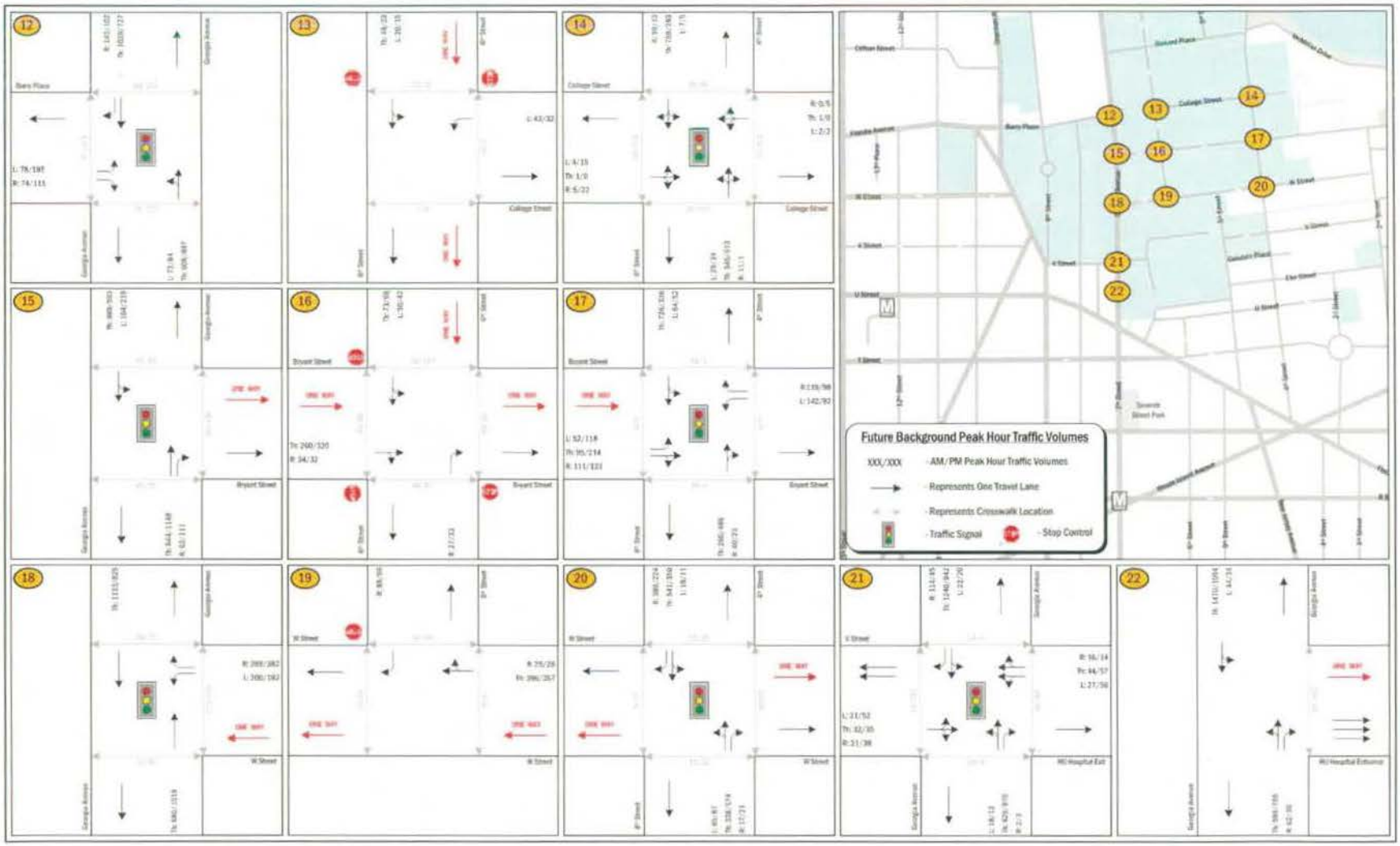


Figure 26: Traffic Controls, Lane Configurations, and Future Background Peak Hour Traffic Volumes (2 of 3)

Figure 27: Traffic Controls, Lane Configurations, and Future Background Peak Hour Traffic Volumes (3 of 3)

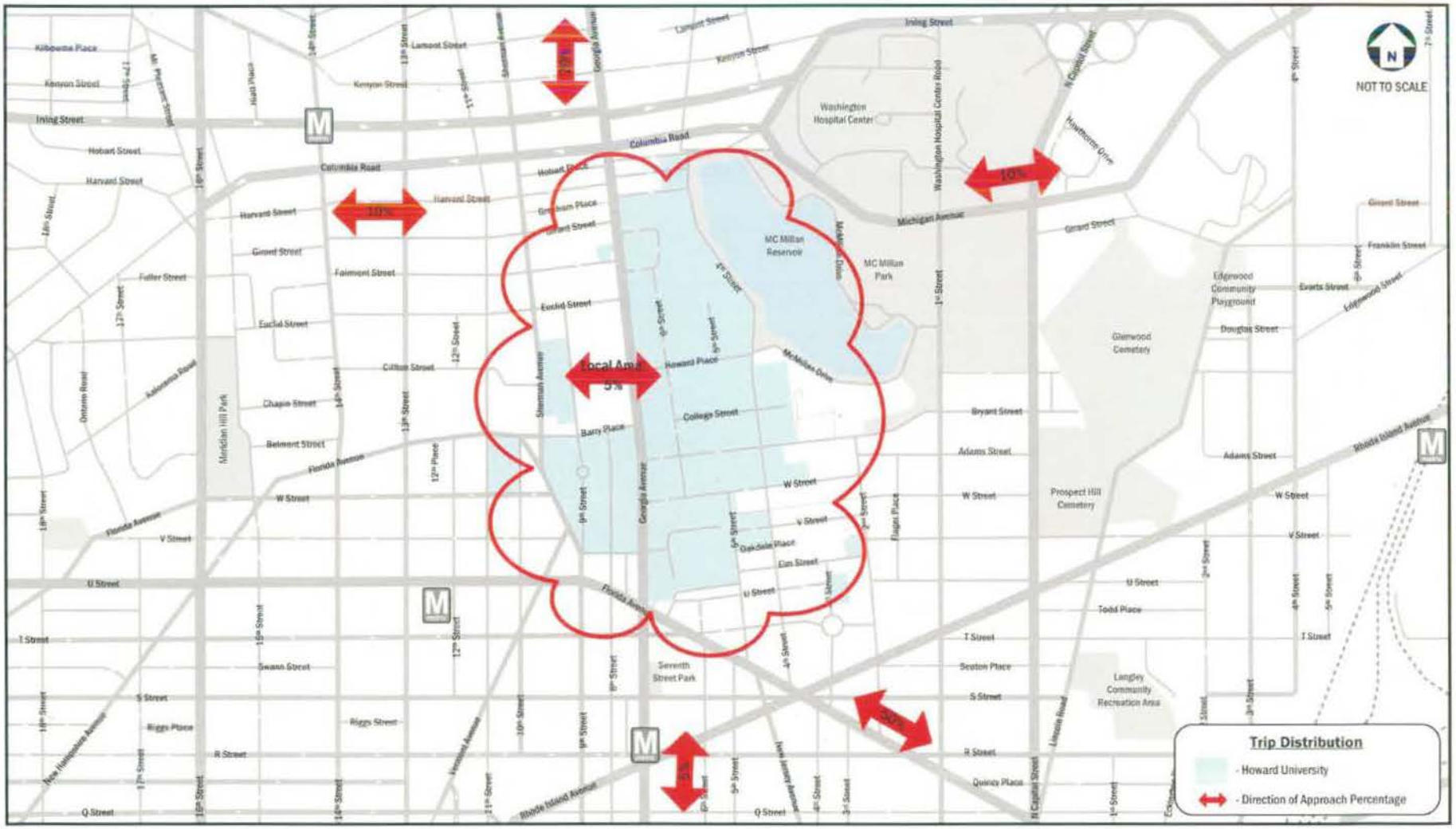


Figure 28: Trip Distribution for Site-Generated Trips

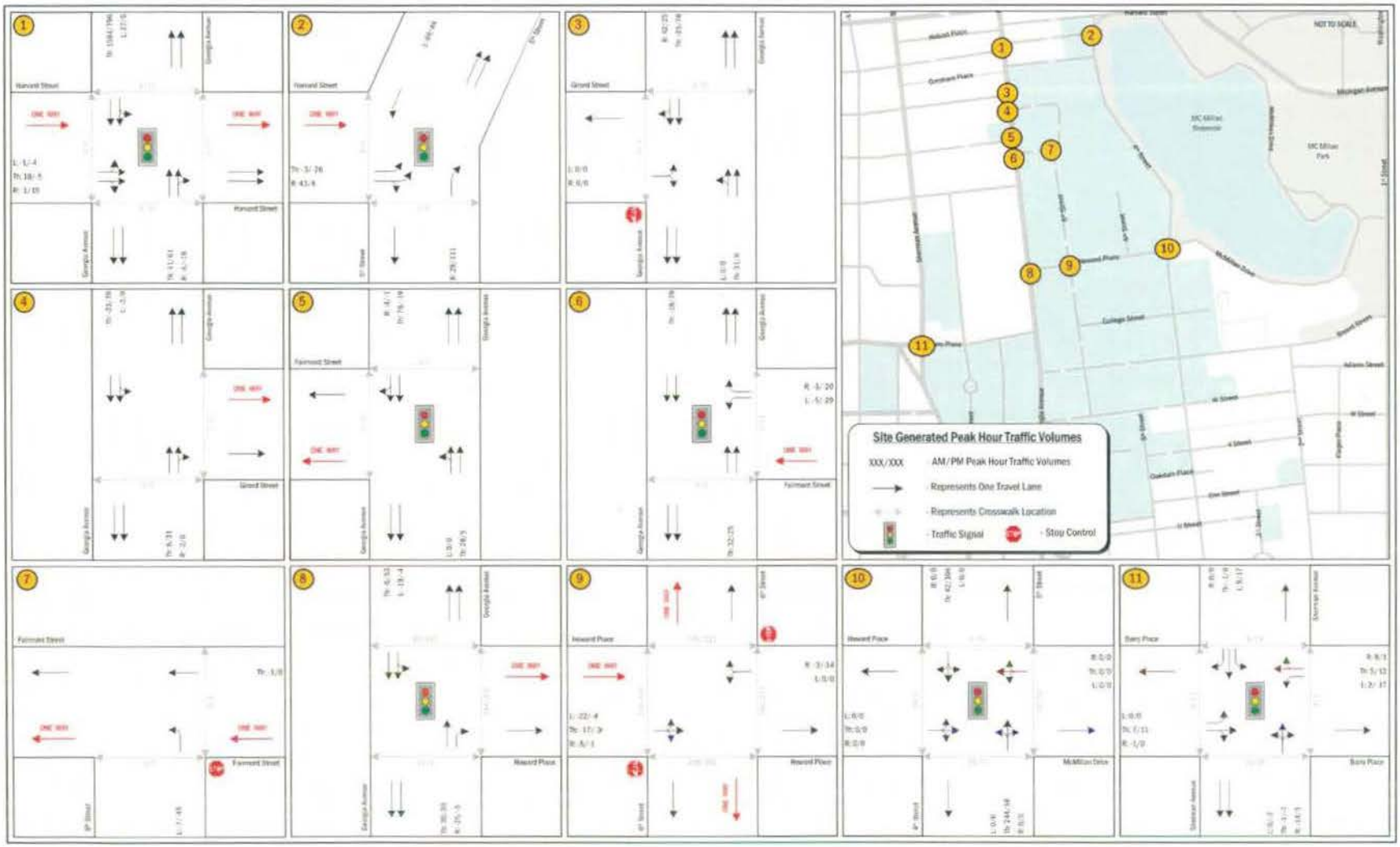


Figure 29: Traffic Controls, Lane Configurations, and Site-Generated Peak Hour Traffic Volumes (1 of 3)

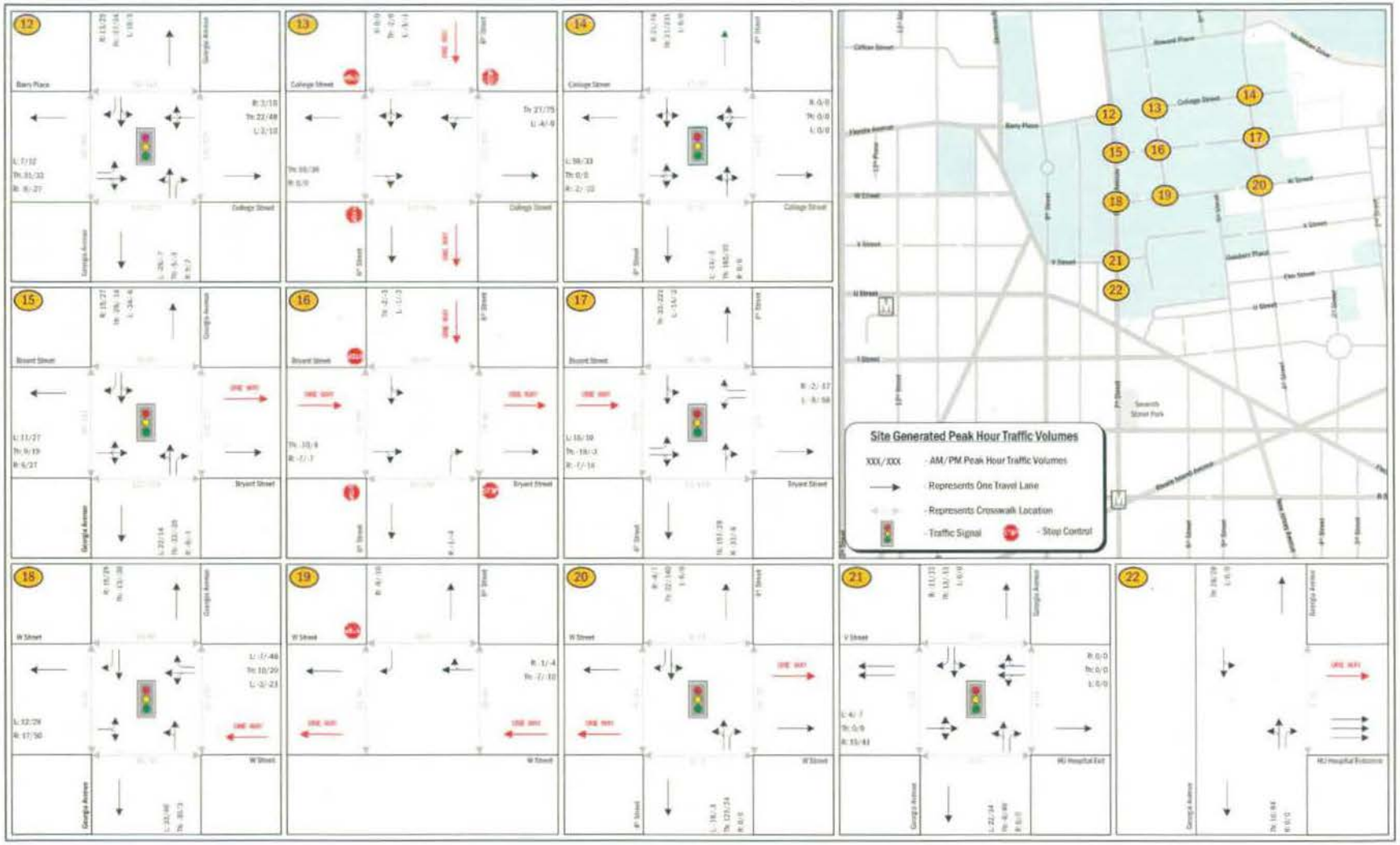


Figure 30: Traffic Controls, Lane Configurations, and Site-Generated Peak Hour Traffic Volumes (2 of 3)

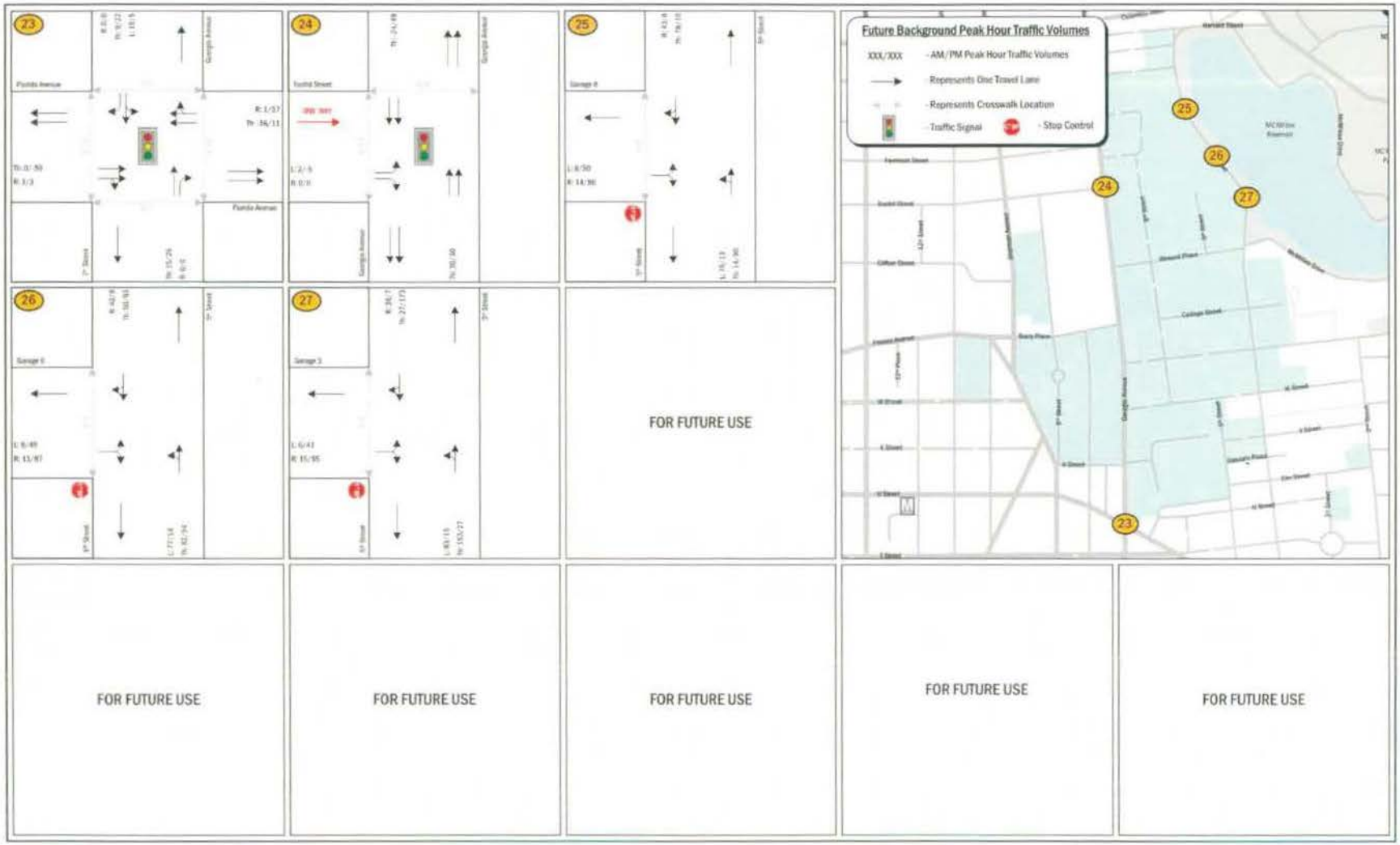


Figure 31: Traffic Controls, Lane Configurations, and Site-Generated Peak Hour Traffic Volumes (3 of 3)

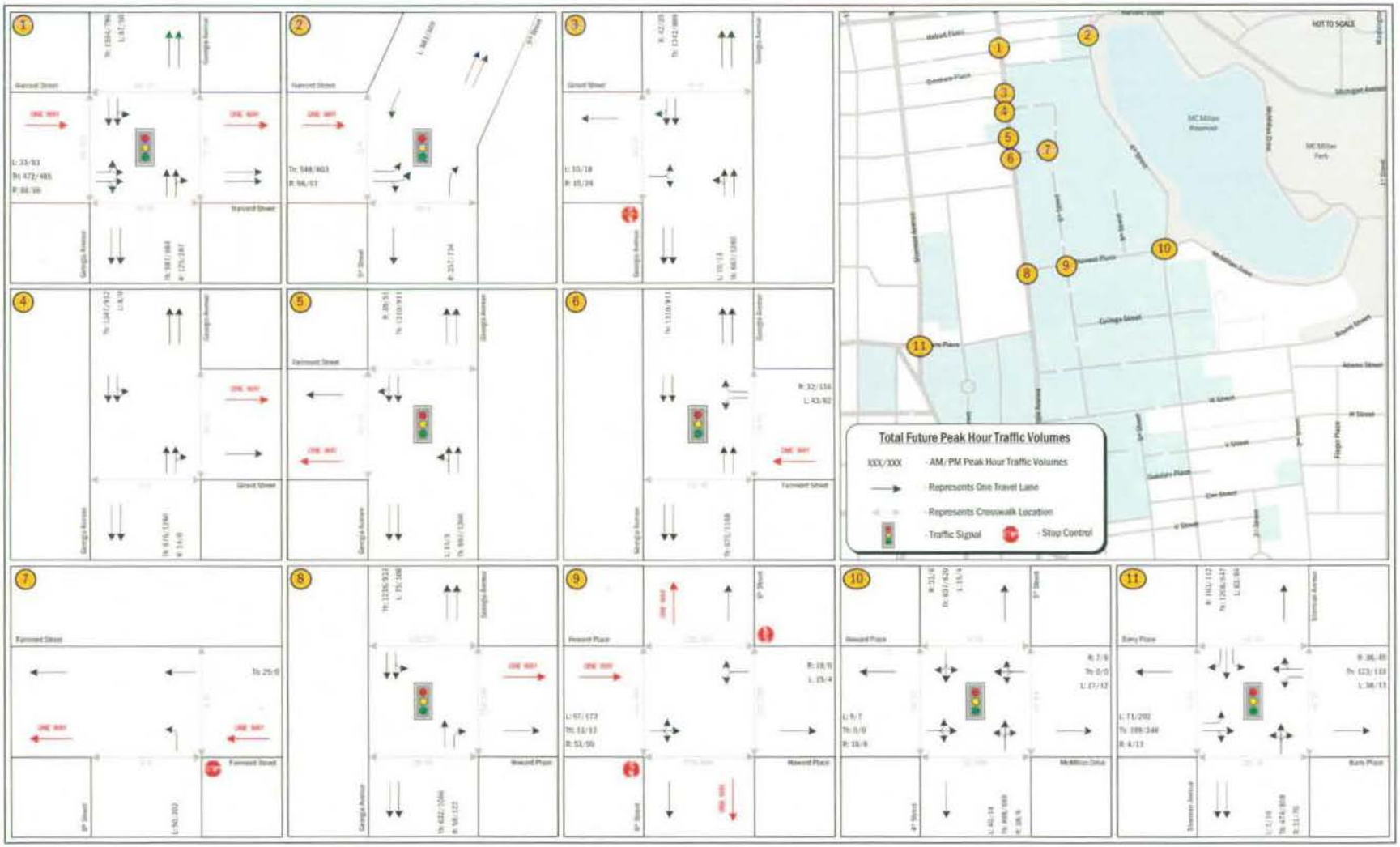


Figure 32: Traffic Controls, Lane Configurations, and Total Future Peak Hour Traffic Volumes (1 of 3)

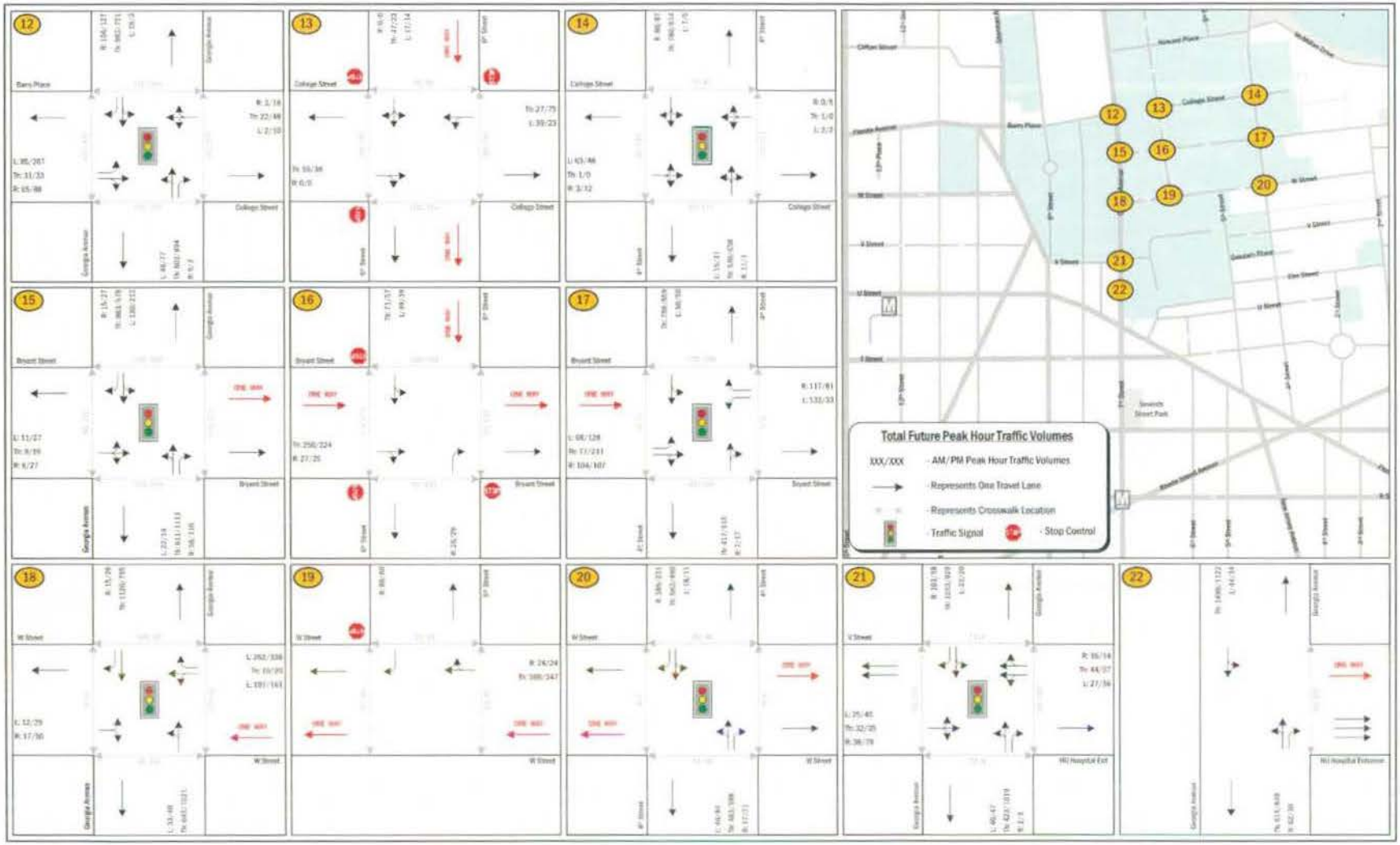


Figure 33: Traffic Controls, Lane Configurations, and Total Future Peak Hour Traffic Volumes (2 of 3)

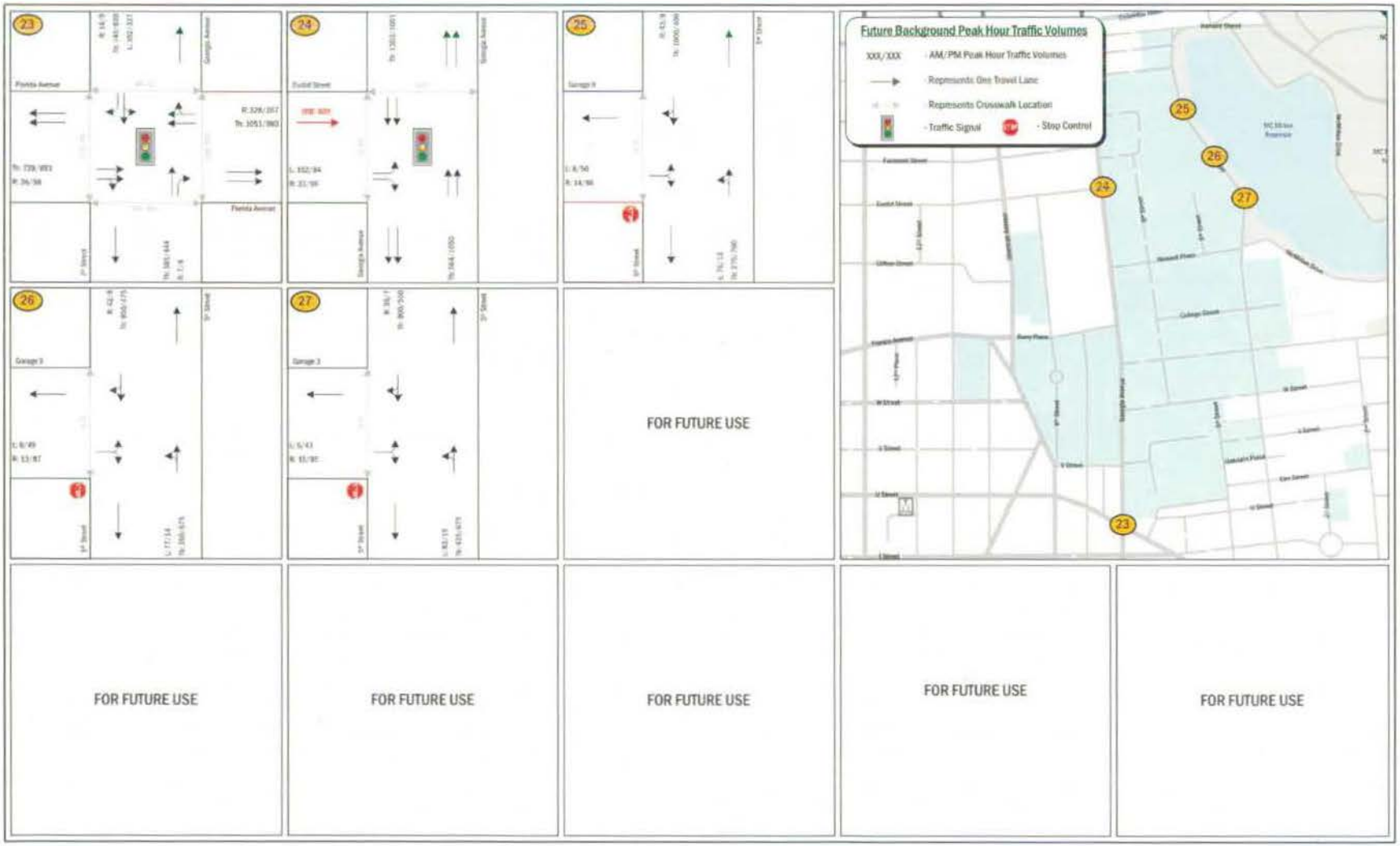


Figure 34: Traffic Controls, Lane Configurations, and Total Future Peak Hour Traffic Volumes (3 of 3)

Table 17: Vehicular Level of Service Results

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Harvard Street & Georgia Avenue	**Overall**	**20.1**	**C**	**15.7**	**B**	**37.8**	**D**	**17.5**	**B**	**53.0**	**D**	**18.1**	**B**
	Eastbound	41.8	D	39.4	D	50.6	D	39.3	D	51.1	D	39.5	D
	Northbound	11.0	B	7.5	A	7.4	A	10.2	B	7.5	A	11.0	B
	Southbound	16.5	B	7.9	A	44.2	D	10.3	B	69.7	E	11.5	B
Harvard Street & 5th Street	**Overall**	**35.0**	**D**	**25.9**	**C**	**71.6**	**E**	**27.1**	**C**	**91.2**	**F**	**28.5**	**C**
	Eastbound	28.1	C	28.5	C	42.9	D	30.3	C	42.7	D	29.6	C
	Westbound	47.2	D	10.8	B	105.8	F	11.5	B	142.7	F	12.1	B
	Northbound	0.4	A	29.7	C	0.4	A	30.4	C	0.1	A	35.3	C
Girard Street & Georgia Avenue (North)	Eastbound	19.5	C	28.9	D	23.8	C	41.4	E	23.0	C	44.5	E
	Northbound Left	0.7	A	0.7	A	0.7	A	0.9	A	0.7	A	1.0	A
Girard Street & Georgia Avenue (South)	Southbound Left	0.4	A	0.0	A	0.4	A	0.0	A	0.3	A	0.0	A
Fairmont Street & Georgia Avenue (North)	**Overall**	**1.9**	**A**	**3.3**	**A**	**1.4**	**A**	**3.4**	**A**	**1.2**	**A**	**3.1**	**A**
	Northbound	0.5	A	1.8	A	0.9	A	2.1	A	0.8	A	1.8	A
	Southbound	2.5	A	5.4	A	1.6	A	5.5	A	1.5	A	5.1	A
Fairmont Street & Georgia Avenue (South)	**Overall**	**4.1**	**A**	**7.4**	**A**	**3.1**	**A**	**7.0**	**A**	**2.9**	**A**	**5.9**	**A**
	Westbound	38.7	D	43.7	D	39.8	D	44.3	D	40.4	D	44.0	D
	Northbound	2.0	A	1.5	A	1.8	A	2.3	A	1.5	A	2.2	A
	Southbound	2.0	A	1.5	A	1.0	A	1.7	A	1.0	A	1.8	A
Fairmont Street & 6th Street	Northbound Left	8.9	A	9.8	A	8.9	A	9.8	A	8.9	A	9.5	A
Euclid Street & Georgia Avenue	**Overall**	**13.0**	**B**	**8.5**	**A**	**8.4**	**A**	**7.9**	**A**	**8.0**	**A**	**8.1**	**A**
	Eastbound	17.9	B	25.0	C	36.1	D	30.8	C	36.2	D	30.7	C
	Northbound	5.0	A	7.0	A	7.7	A	8.2	A	6.5	A	9.1	A
	Southbound	15.6	B	7.4	A	4.9	A	3.7	A	4.6	A	3.7	A
Howard Place & Georgia Avenue	**Overall**	**0.3**	**A**	**0.4**	**A**	**0.4**	**A**	**0.8**	**A**	**0.9**	**A**	**1.8**	**A**
	Northbound	0.2	A	0.3	A	0.1	A	0.9	A	1.7	A	2.6	A
	Southbound	0.4	A	0.5	A	0.6	A	0.6	A	0.5	A	0.7	A
Howard Place & 6th Street	Eastbound	10.9	B	12.4	B	10.9	B	12.4	B	19.8	C	856.8	F
	Westbound	9.8	A	9.2	A	9.8	A	9.2	A	18.5	C	44.8	E
Howard Place & 5th Street/4th Street	**Overall**	**45.2**	**D**	**33.4**	**C**	**92.8**	**F**	**60.1**	**E**	**184.4**	**F**	**162.0**	**F**
	Eastbound	37.5	D	37.5	D	34.5	D	37.5	D	37.6	D	37.8	D
	Westbound	40.7	D	38.7	D	42.0	D	39.3	D	42.7	D	40.2	D
	Northbound	44.2	D	37.0	D	51.0	D	78.4	E	260.4	F	116.0	F
	Southbound	46.2	D	25.9	C	114.5	F	29.9	C	149.4	F	219.6	F
Barry Place & Sherman Avenue	**Overall**	**19.0**	**B**	**18.3**	**B**	**131.8**	**F**	**80.8**	**F**	**137.7**	**F**	**74.0**	**E**
	Eastbound	43.1	D	37.7	D	153.9	F	33.5	C	179.3	F	34.8	C
	Westbound	46.6	D	35.4	D	40.3	D	22.3	C	67.6	E	23.3	C
	Northbound	9.9	A	10.6	B	26.1	C	163.4	F	23.6	C	144.4	F
	Southbound	13.2	B	10.8	B	189.8	F	32.3	C	190.5	F	33.1	C

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Barry Place & Georgia Avenue	**Overall**	**3.4**	**A**	**8.1**	**A**	272.0	F	**65.0**	E	164.0	F	121.0	F
	Eastbound	24.5	C	31.0	C	41.3	D	122.0	F	62.6	E	526.8	F
	Westbound	--	--	--	--	--	--	--	--	34.3	C	31.4	C
	Northbound	2.3	A	0.1	A	827.8	F	109.5	F	397.4	F	113.6	F
	Southbound	1.7	A	8.6	A	59.2	E	4.1	A	81.8	F	8.9	A
College Street & 6th Street	**Overall**	**7.6**	**A**	**7.4**	**A**	**7.7**	**A**	**7.5**	**A**	**7.8**	**A**	**7.7**	**A**
	Eastbound	--	--	--	--	--	--	--	--	7.6	A	7.4	A
	Westbound	7.6	A	7.5	A	7.7	A	7.5	A	7.9	A	7.8	A
	Southbound	7.5	A	7.4	A	7.6	A	7.4	A	7.8	A	7.7	A
College Street & 4th Street	Eastbound	36.2	E	19.9	C	59.9	F	22.8	C	**	F	216.2	F
	Westbound	57.7	F	26.4	C	94.2	F	29.8	D	109.0	F	55.1	F
	Northbound	1.5	A	0.9	A	2.0	A	1.0	A	1.2	A	1.8	A
	Southbound	0.2	A	0.3	A	0.2	A	0.4	A	0.4	A	0.4	A
Bryant Street & Georgia Avenue	**Overall**	**13.6**	**A**	**18.1**	**B**	**39.9**	**D**	**55.4**	**E**	**57.3**	**E**	290.6	F
	Eastbound	--	--	--	--	--	--	--	--	47.8	D	49.7	D
	Northbound	34.0	C	27.3	C	9.6	A	2.1	A	8.5	A	9.5	A
	Southbound	0.8	A	4.3	A	58.9	E	135.2	F	88.6	F	723.1	F
Bryant Street & 6th Street	**Overall**	**9.1**	**A**	**9.8**	**A**	**9.8**	**A**	**10.9**	**B**	**9.6**	**A**	**10.7**	**B**
	Eastbound	9.5	A	10.4	B	10.3	B	11.7	B	10.1	B	11.5	B
	Northbound	7.4	A	7.6	A	7.6	A	7.8	A	7.6	A	7.8	A
	Southbound	8.8	A	8.8	A	9.3	A	9.2	A	9.1	A	9.0	A
Bryant Street & 4th Street	**Overall**	**15.1**	**B**	**13.3**	**B**	**19.9**	**B**	**14.8**	**B**	**22.2**	**C**	**15.6**	**B**
	Eastbound	27.3	C	28.5	C	28.4	C	30.5	C	29.1	C	35.9	D
	Westbound	29.4	C	25.9	C	33.2	C	28.9	D	34.6	C	25.1	C
	Northbound	12.3	A	0.3	A	12.6	B	0.5	A	14.8	B	0.7	A
	Southbound	7.9	A	6.6	A	15.5	B	9.0	A	20.0	C	12.4	B
W Street & Georgia Avenue	**Overall**	**18.0**	**B**	**15.6**	**B**	**33.9**	**C**	**44.2**	**D**	87.4	F	110.5	F
	Eastbound	--	--	--	--	--	--	--	--	37.0	D	23.8	C
	Westbound	32.2	C	43.2	D	81.1	F	86.3	F	179.8	F	65.0	E
	Northbound	12.4	B	2.1	A	7.1	A	38.5	D	136.4	F	213.9	F
	Southbound	15.6	B	10.5	B	31.1	C	18.9	B	24.2	C	18.2	B
W Street & 6th Street	Southbound Right	12.3	B	12.6	B	13.5	B	13.8	B	13.3	B	13.7	B
W Street & 4th Street	**Overall**	**29.1**	**C**	**49.8**	**D**	**35.6**	**D**	86.3	F	**62.0**	**E**	85.7	F
	Northbound	42.7	D	59.9	E	58.4	E	125.7	F	128.6	F	140.6	F
	Southbound	23.1	C	36.2	D	25.5	C	33.5	C	25.7	C	25.1	C

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Georgia Avenue & V Street/Howard University Hospital	**Overall**	**13.6**	**B**	**18.8**	**B**	**117.0**	**F**	**40.0**	**D**	**248.8**	**F**	**191.1**	**F**
	Eastbound	29.9	C	23.0	C	41.9	D	45.9	D	46.5	D	48.8	D
	Westbound	27.1	C	21.4	C	34.6	C	37.0	D	34.7	C	37.8	D
	Northbound	14.6	B	23.5	C	135.9	F	17.6	B	630.6	F	185.1	F
	Southbound	10.8	B	12.6	B	121.0	F	63.8	E	127.3	F	248.9	F
Georgia Avenue & Howard University Hospital	Southbound Left	1.7	A	1.6	A	0.3	A	2.7	A	0.3	A	3.5	A
Georgia Avenue & Florida Avenue	**Overall**	**50.0**	**D**	**69.2**	**E**	**316.1**	**F**	**323.6**	**F**	**325.4**	**F**	**361.8**	**F**
	Eastbound	24.6	C	35.0	C	38.6	D	78.3	E	38.9	D	62.5	E
	Westbound	77.0	E	139.7	F	324.8	F	340.0	F	297.4	F	387.2	F
	Northbound	45.3	D	41.6	D	12.9	B	12.4	B	13.1	B	12.7	B
	Southbound	34.6	C	20.4	C	587.2	F	610.3	F	646.7	F	679.2	F
5th Street & Garage 8	Eastbound	--	--	--	--	--	--	--	--	30.7	D	23.4	C
	Northbound Left	--	--	--	--	--	--	--	--	4.1	A	0.3	A
5th Street & Garage 9	Eastbound	--	--	--	--	--	--	--	--	30.8	D	26.2	D
	Northbound Left	--	--	--	--	--	--	--	--	3.7	A	0.4	A
5th Street & Garage 3	Eastbound	--	--	--	--	--	--	--	--	33.4	D	40.4	E
	Northbound Left	--	--	--	--	--	--	--	--	3.6	A	0.4	A

Table 18: Roadway Capacity Results Review

Intersection	Locations & Scenarios with LOS F *EX = 2009/2011 Existing Conditions* *BG = 2021 Background (without HUCMP)* *TF = 2021 Total Future (with HUCMP)*	Percent of Future Vehicular Traffic Attributable to HUCMP (in TF scenario)		Discussion & Recommendations
		AM Peak	*PM Peak*	
Harvard Street & 5th Street	WB Harvard Street AM Peak: FB, TF Overall Intersection AM Peak: TF	7.4%	7.3%	The westbound delays are due to the additional background and site traffic turning left from Harvard Street to 5th Street. Shifting approximately 10 seconds of green time from the eastbound through approach (ϕ 4) to the westbound left and northbound right approaches (ϕ 2 + ϕ 6) and optimizing the signal timing offset alleviates the westbound delays. The results of this signal timing adjustment are shown in Table 19. This report recommends that DDOT consider this signal timing change.
Howard Place & 6th Street	EB Howard Place PM Peak: TF	-27.5%	-11.6%	The significant westbound delay at this intersection in the afternoon peak hour is due to the addition of the HUCMP-related pedestrian volumes. No mitigation is recommended as the impact at this intersection is primarily seen to University-related traffic.
Howard Place & 5th Street/4th Street	SB 5th Street AM Peak: FB, TF NB 4th Street AM Peak: TF NB & SB 4th Street/5th Street PM Peak: TF Overall Intersection AM Peak: FB, TF Overall Intersection PM Peak: TF	18.8%	26.3%	The north- and southbound delays at this intersection are due to the existing split-phase signal timing. Removing this split phase to allow the north- and southbound phases to operate simultaneously, as well as retiming the intersection and adjusting the offsets, allows the intersection to operate under acceptable conditions during both the morning and afternoon peak periods for all scenarios. The results of this signal timing adjustment are shown in Table 19. This report recommends that DDOT consider this signal timing change.
Barry Place & Sherman Avenue	EB Barry Place AM Peak: FB, TF SB Sherman Avenue AM Peak: FB, TF Overall Intersection AM Peak: FB, TF NB Sherman Avenue PM Peak: FB, TF Overall Intersection PM Peak: FB	0.7%	1.0%	The eastbound delays in the morning peak period are due to the high volume of left-turn vehicles conflicting with the westbound vehicles. Restricting the on-street parking along the approach during the morning peak period would allow for a separate left-turn lane for queuing vehicles. Also, restriping the westbound approach from 1 approach lane and 2 receiving lanes to 2 approach lanes and 1 receiving lane would allow for a separate westbound right-turn lane. Additionally removing approximately 2 or 3 on-street parking spaces along the southbound approach could allow for a small right-turn lane at the intersection. Following these improvements, retiming the intersection and adjusting the signal offsets are also recommended. The results of these improvements are shown in Table 19. This report recommends that DDOT consider these changes.
Barry Place & Georgia Avenue	NB Georgia Avenue AM/PM Peak: FB, TF EB Barry Place PM Peak: FB, TF SB Georgia Avenue PM Peak: TF Overall Intersection AM Peak: FB, TF Overall Intersection PM Peak: TF	1.4%	6.0%	The eastbound delays in the afternoon peak period are due to the high volume of turning vehicles. Removing 2 or 3 on-street parking spaces along the eastbound approach could allow for a separate left-turn lane. In the total future scenario, a protected left-turn turn is recommended for the eastbound approach. Following these improvements, retiming the intersection and adjusting the signal offsets are also recommended. The results of these improvements are shown in Table 19. This report recommends that DDOT consider this change. The delays along Georgia Avenue are further investigated in Section 3.2.6.
College Street & 4th Street	WB College Street AM Peak: EX, FB, TF WB College Street PM Peak: TF EB College Street AM Peak: FB, TF EB College Street PM Peak: TF	18.0%	26.0%	The east- and westbound delays during the morning and afternoon peak periods are due to the side street traffic having difficulty entering/crossing 4th Street. These delays are present in existing and future background conditions. Based on the volumes contained in the analysis, a traffic signal would not be warranted at this intersection in the existing and future background conditions. The addition of the pedestrians generated by the HUCMP may trigger the pedestrian signal warrant, so a signal is recommended in the total future scenario. The results of constructing a signal are shown in Table 19.
Bryant Street & Georgia Avenue	SB Georgia Avenue PM Peak: FB, TF SB Georgia Avenue AM Peak: TF Overall Intersection PM Peak: TF	-2.1%	2.7%	The delays along Georgia Avenue are further investigated in Section 3.2.6.
W Street & Georgia Avenue	WB W Street AM/PM Peak: FB, TF NB Georgia Avenue AM/PM Peak: TF Overall Intersection AM/PM Peak: TF	1.2%	2.9%	The delays along Georgia Avenue are further investigated in Section 3.2.6.
W Street & 4th Street	NB 4th Street PM Peak: FB, TF NB 4th Street AM Peak: TF Overall Intersection PM Peak: FB, TF	8.3%	11.7%	The north- and southbound delays at this intersection are due to the existing split-phase signal timing. Removing this split phase to allow the north- and southbound phases to operate simultaneously, as well as retiming the intersection and adjusting the offsets, allows the intersection to operate under acceptable conditions during both the morning and afternoon peak periods for all scenarios. The results of this signal timing adjustment are shown in Table 19. This report recommends that DDOT consider this signal timing change.

Intersection	Locations & Scenarios with LOS F *EX = 2009/2011 Existing Conditions* *BG = 2021 Background (without HUCMP)* *TF = 2021 Total Future (with HUCMP)*	Percent of Future Vehicular Traffic Attributable to HUCMP (in TF scenario)		Discussion & Recommendations
Georgia Avenue & V Street/Howard University Hospital	NB Georgia Avenue AM Peak: FB, TF NB Georgia Avenue PM Peak: TF SB Georgia Avenue AM Peak: FB, TF SB Georgia Avenue PM Peak: TF Overall Intersection AM Peak: FB, TF	1.8%	4.9%	The delays along Georgia Avenue are further investigated in Section 3.2.6.
Georgia Avenue & Florida Avenue	WB Florida Avenue PM Peak: EX, FB, TF WB Florida Avenue AM Peak: FB, TF SB Georgia Avenue AM/PM Peak: FB, TF Overall Intersection AM/PM Peak: FB, TF	-0.2%	1.8%	The delays along Georgia Avenue are further investigated in Section 3.2.6

Table 19: Vehicular Level of Service Results with Proposed Improvements

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Harvard Street & 5th Street	**Overall**	**35.0**	**D**	**25.9**	**C**	**71.6**	**E**	**27.1**	**C**	**91.2**	**F**	**28.5**	**C**
	Eastbound	28.1	C	28.5	C	42.9	D	30.3	C	42.7	D	29.6	C
	Westbound	47.2	D	10.8	B	105.8	F	11.5	B	142.7	F	12.1	B
	Northbound	0.4	A	29.7	C	0.4	A	30.4	C	0.1	A	35.3	C
Improvement: Retime intersection	***Overall***	--	--	--	--	***30.9***	***C***	--	--	***43.6***	***D***	--	--
	Eastbound	--	--	--	--	*21.1*	*C*	--	--	*24.4*	*C*	--	--
	Westbound	--	--	--	--	*40.2*	*D*	--	--	*61.9*	*E*	--	--
	Northbound	--	--	--	--	*17.1*	*B*	--	--	*16.1*	*B*	--	--
Howard Place & 5th Street/4th Street	**Overall**	**45.2**	**D**	**33.4**	**C**	**92.8**	**F**	**60.1**	**E**	**184.4**	**F**	**162.0**	**F**
	Eastbound	37.5	D	37.5	D	34.5	D	37.5	D	37.6	D	37.8	D
	Westbound	40.7	D	38.7	D	42.0	D	39.3	D	42.7	D	40.2	D
	Northbound	44.2	D	37.0	D	51.0	D	78.4	E	260.4	F	116.0	F
	Southbound	46.2	D	25.9	C	114.5	F	29.9	C	149.4	F	219.6	F
Improvement: Remove NB/SB split phase, retime intersection	***Overall***	--	--	--	--	***4.2***	***A***	***6.4***	***A***	***4.6***	***A***	***7.9***	***A***
	Eastbound	--	--	--	--	*38.5*	*D*	*37.5*	*D*	*38.6*	*D*	*37.8*	*D*
	Westbound	--	--	--	--	*43.7*	*D*	*39.3*	*D*	*44.6*	*D*	*40.2*	*D*
	Northbound	--	--	--	--	*1.6*	*A*	*3.3*	*A*	*3.0*	*A*	*3.6*	*A*
	Southbound	--	--	--	--	*1.4*	*A*	*6.9*	*A*	*2.0*	*A*	*9.7*	*A*
Barry Place & Sherman Avenue	**Overall**	**19.0**	**B**	**18.3**	**B**	**131.8**	**F**	**80.8**	**F**	**137.7**	**F**	**74.0**	**E**
	Eastbound	43.1	D	37.7	D	153.9	F	33.5	C	179.3	F	34.8	C
	Westbound	46.6	D	35.4	D	40.3	D	22.3	C	67.6	E	23.3	C
	Northbound	9.9	A	10.6	B	26.1	C	163.4	F	23.6	C	144.4	F
	Southbound	13.2	B	10.8	B	189.8	F	32.3	C	190.5	F	33.1	C
Improvement: Change on-street parking restrictions on eastbound approach, restripe westbound approach, remove on-street parking on southbound approach, retime intersection	***Overall***	--	--	--	--	***50.9***	***D***	***30.3***	***C***	***51.2***	***D***	***33.2***	***C***
	Eastbound	--	--	--	--	*51.4*	*D*	*58.0*	*E*	*54.3*	*D*	*69.4*	*E*
	Westbound	--	--	--	--	*34.4*	*C*	*24.0*	*C*	*39.4*	*D*	*29.9*	*C*
	Northbound	--	--	--	--	*19.1*	*B*	*30.7*	*C*	*17.6*	*B*	*30.7*	*C*
	Southbound	--	--	--	--	*68.0*	*E*	*13.4*	*B*	*67.3*	*E*	*13.5*	*B*
Barry Place & Georgia Avenue	**Overall**	**3.4**	**A**	**8.1**	**A**	**272.0**	**F**	**65.0**	**E**	**164.0**	**F**	**121.0**	**F**
	Eastbound	24.5	C	31.0	C	41.3	D	122.0	F	62.6	E	526.8	F
	Westbound	--	--	--	--	--	--	--	--	34.3	C	31.4	C
	Northbound	2.3	A	0.1	A	827.8	F	109.5	F	397.4	F	113.6	F
	Southbound	1.7	A	8.6	A	59.2	E	4.1	A	81.8	F	8.9	A
Improvement: Remove on-street parking on eastbound approach, add permitted + protected left-turn on eastbound approach, retime intersection	***Overall***	--	--	--	--	***241.6***	***F***	***17.1***	***B***	***134.9***	***F***	***82.4***	***F***
	Eastbound	--	--	--	--	*26.4*	*C*	*26.3*	*C*	*29.2*	*C*	*65.8*	*E*
	Westbound	--	--	--	--	--	--	--	--	*46.5*	*D*	*48.8*	*D*
	Northbound	--	--	--	--	*752.8*	*F*	*28.2*	*C*	*346.2*	*F*	*151.8*	*F*
	Southbound	--	--	--	--	*46.6*	*D*	*3.5*	*A*	*61.7*	*E*	*27.0*	*C*

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
College Street & 4th Street	Eastbound	36.2	E	19.9	C	59.9	F	22.8	C	**	F	216.2	F
	Westbound	57.7	F	26.4	C	94.2	F	29.8	D	109.0	F	55.1	F
	Northbound	1.5	A	0.9	A	2.0	A	1.0	A	1.2	A	1.8	A
	Southbound	0.2	A	0.3	A	0.2	A	0.4	A	0.4	A	0.4	A
Improvement: Construct signal	*Eastbound*	--	--	--	--	--	--	--	--	***11.9***	***B***	***6.9***	***A***
	Westbound	--	--	--	--	--	--	--	--	*66.9*	*E*	*43.3*	*D*
	Northbound	--	--	--	--	--	--	--	--	*34.0*	*C*	*34.1*	*C*
	Southbound	--	--	--	--	--	--	--	--	*4.7*	*A*	*3.7*	*A*
W Street & 4th Street	**Overall**	**29.1**	**C**	**49.8**	**D**	**35.6**	**D**	**86.3**	**F**	**62.0**	**E**	**85.7**	**F**
	Northbound	42.7	D	59.9	E	58.4	E	125.7	F	128.6	F	140.6	F
	Southbound	23.1	C	36.2	D	25.5	C	33.5	C	25.7	C	25.1	C
Improvement: Remove NB/SB split phase, retime intersection	***Overall***	--	--	--	--	***4.2***	***A***	***5.6***	***A***	***3.8***	***A***	***7.7***	***A***
	Northbound	--	--	--	--	*5.0*	*A*	*7.9*	*A*	*5.5*	*A*	*8.6*	*A*
	Southbound	--	--	--	--	*3.9*	*A*	*2.4*	*A*	*2.9*	*A*	*6.6*	*A*

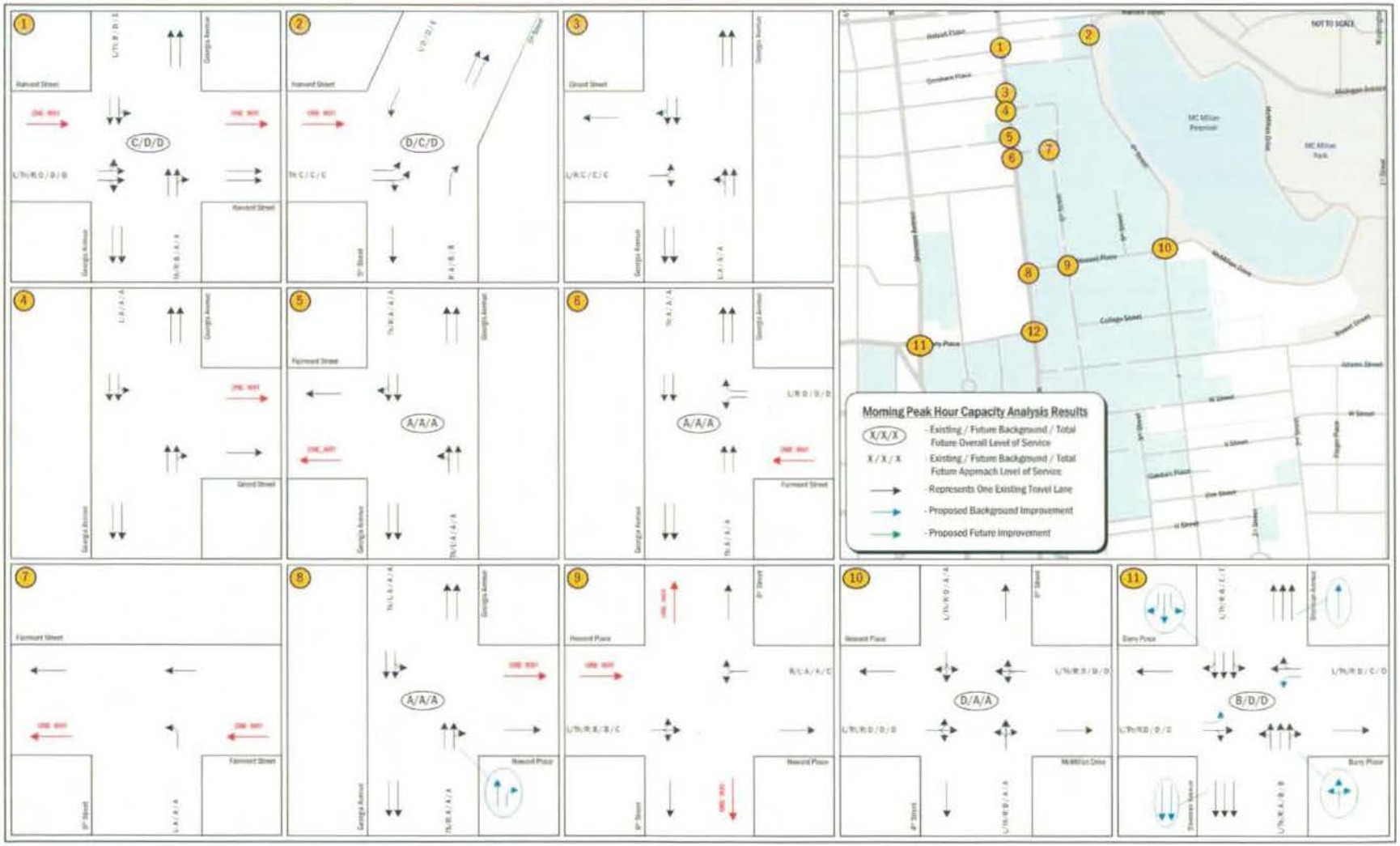


Figure 35: Lane Configurations and Morning Peak Hour Capacity Analysis Results (1 of 3)

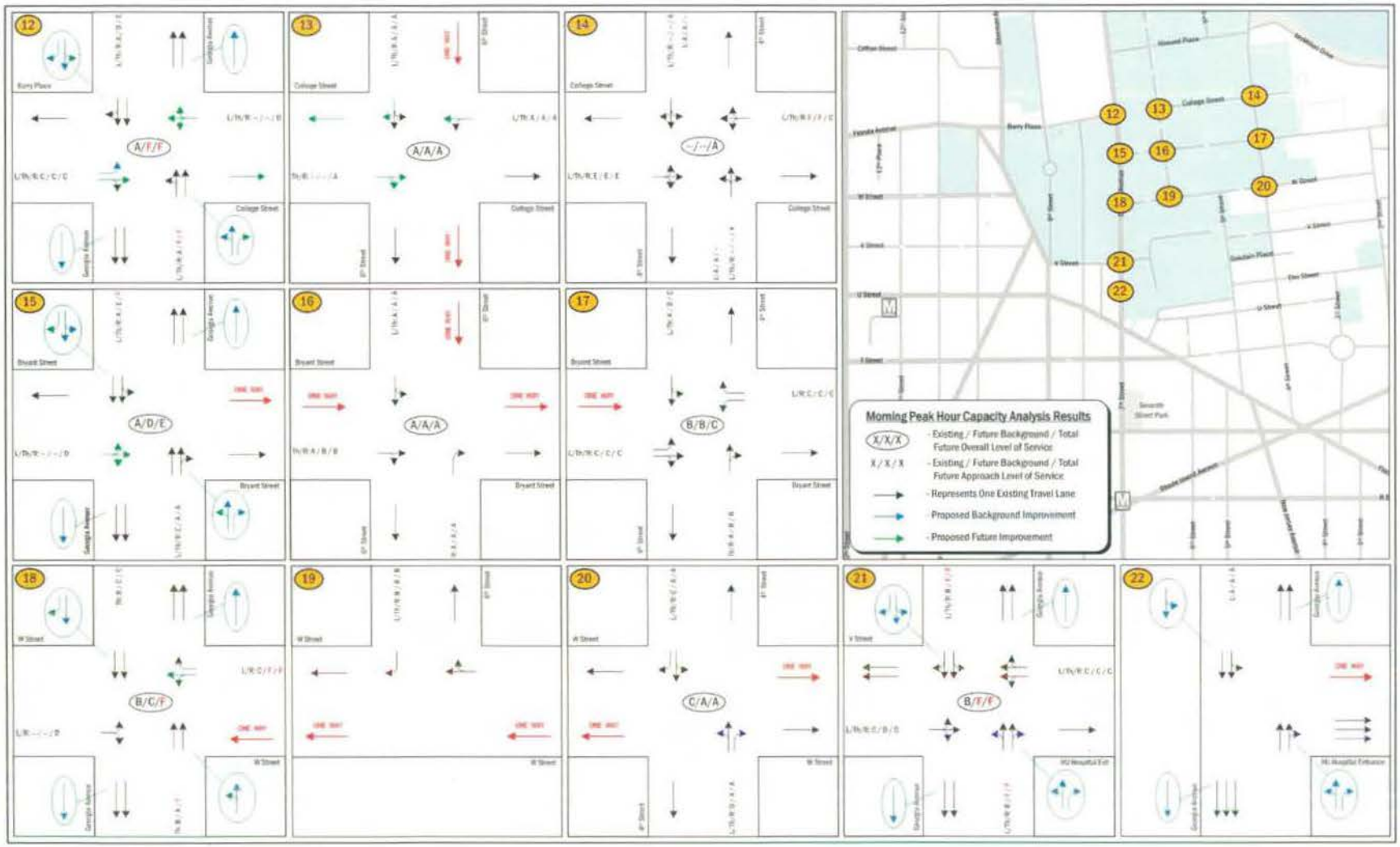


Figure 36: Lane Configurations and Morning Peak Hour Capacity Analysis Results (2 of 3)

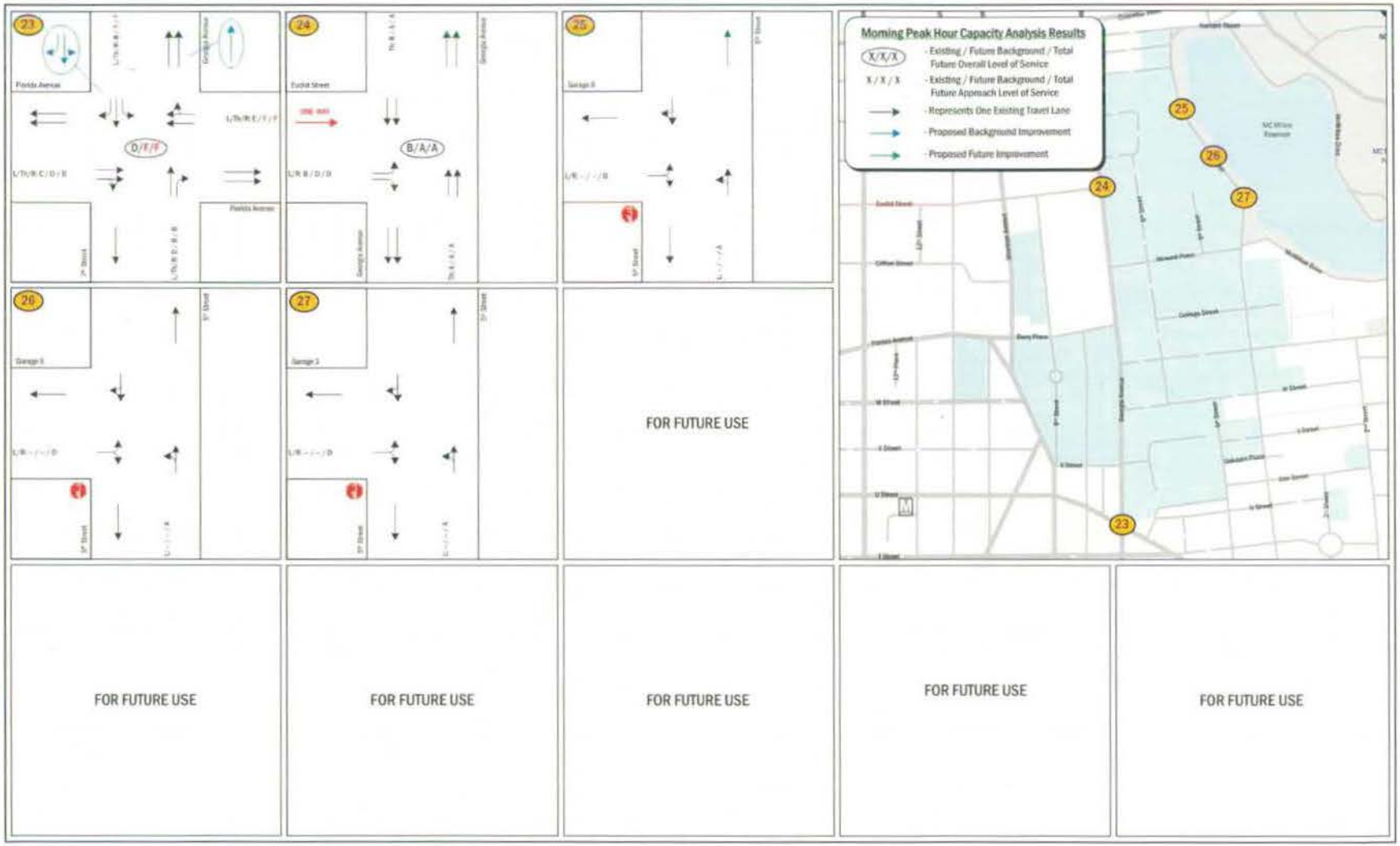


Figure 37: Lane Configurations and Morning Peak Hour Capacity Analysis Results (3 of 3)

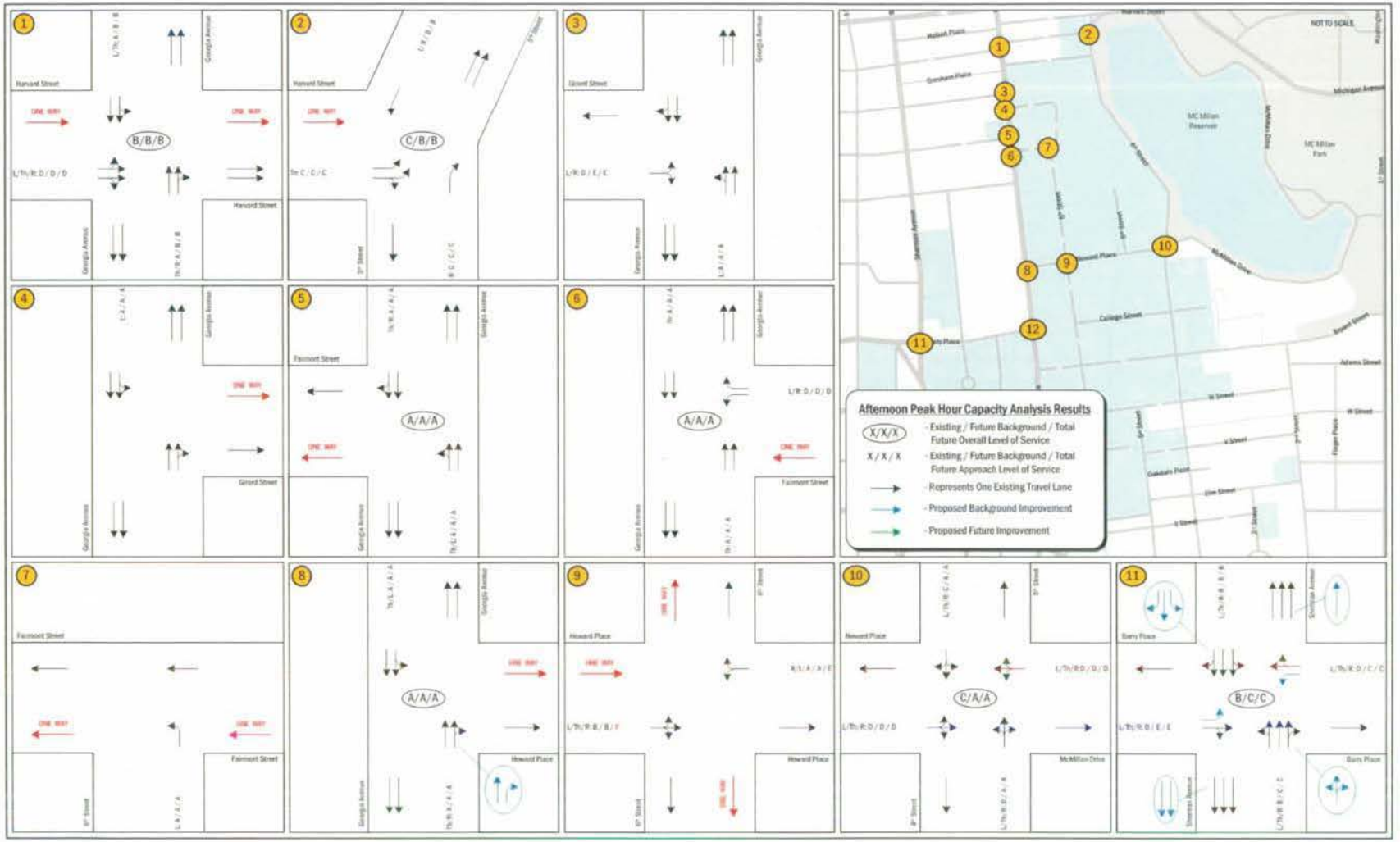


Figure 38: Lane Configurations and Afternoon Peak Hour Capacity Analysis Results (1 of 3)

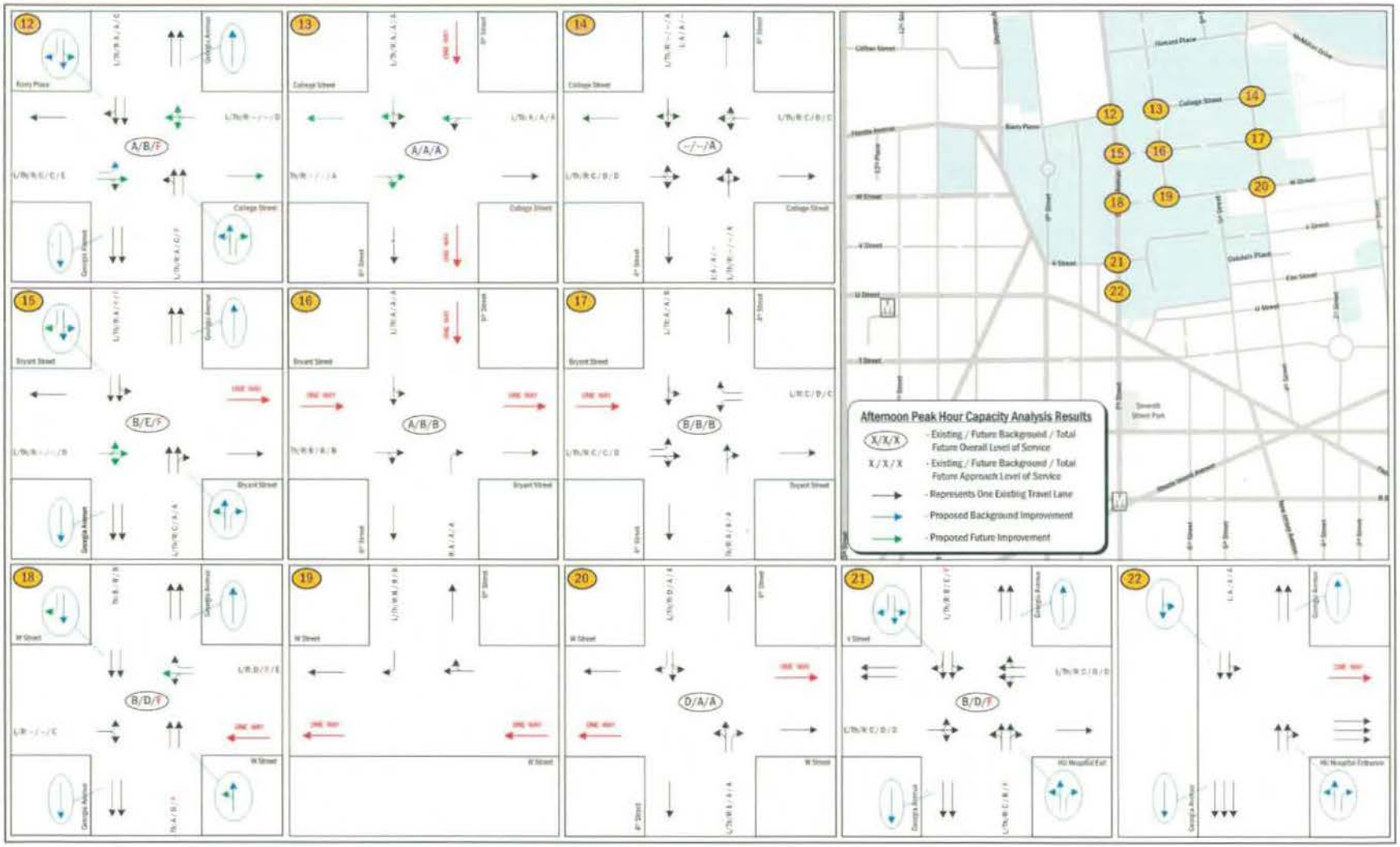


Figure 39: Lane Configurations and Afternoon Peak Hour Capacity Analysis Results (2 of 3)

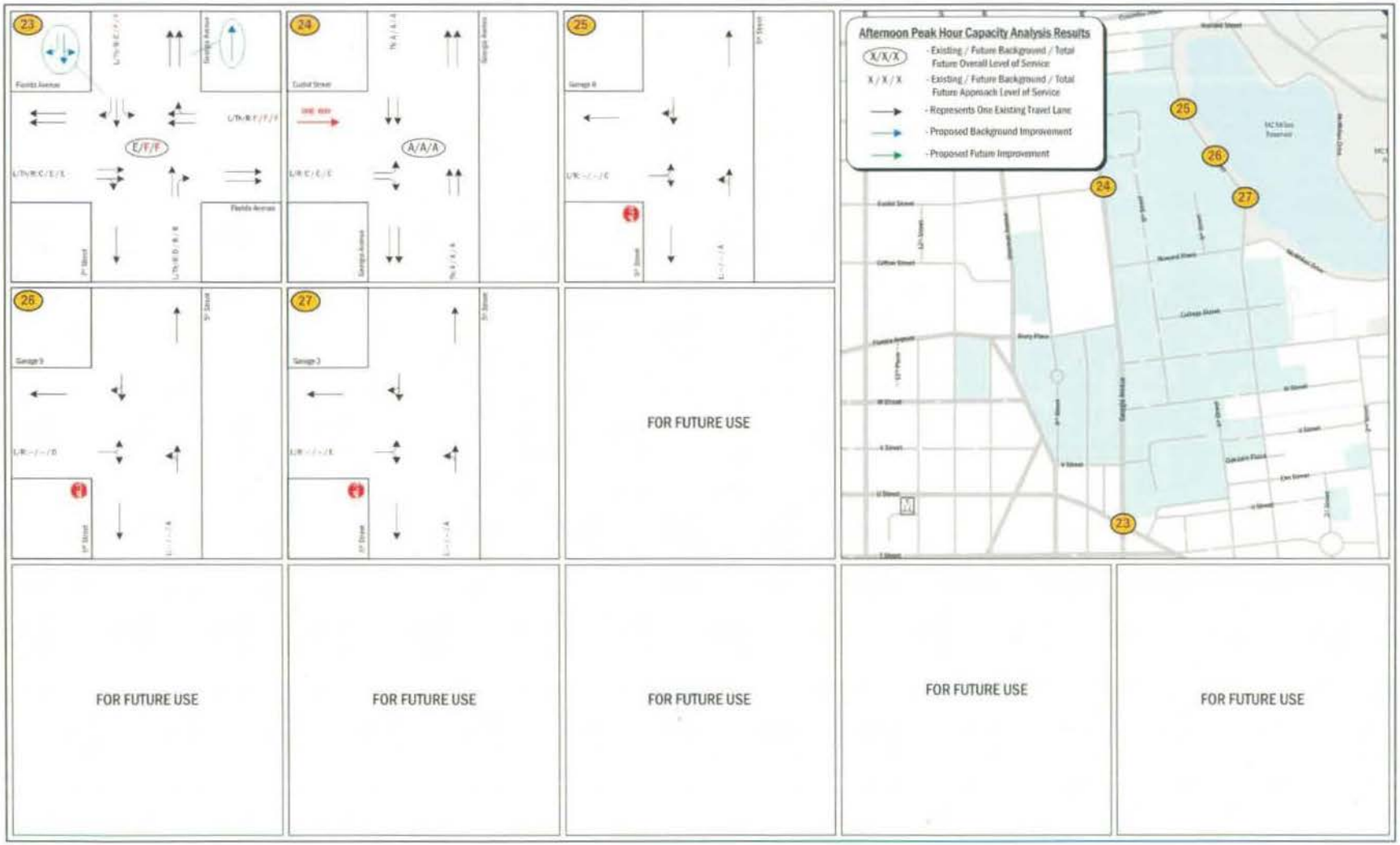


Figure 40: Lane Configurations and Afternoon Peak Hour Capacity Analysis Results (3 of 3)

Table 20: Vehicular Level of Service Results – Great Streets Analysis

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Howard Place & Georgia Avenue	**Overall**	**0.3**	**A**	**0.4**	**A**	**0.4**	**A**	**0.8**	**A**	**0.9**	**A**	**1.8**	**A**
	Northbound	0.2	A	0.3	A	0.1	A	0.9	A	1.7	A	2.6	A
	Southbound	0.4	A	0.5	A	0.6	A	0.6	A	0.5	A	0.7	A
Alternative – No Transit Lanes	***Overall***	--	--	--	--	***0.5***	***A***	***0.5***	***A***	***0.4***	***A***	***0.6***	***A***
	Northbound	--	--	--	--	*0.2*	*A*	*0.4*	*A*	*0.2*	*A*	*0.4*	*A*
	Southbound	--	--	--	--	*0.6*	*A*	*0.7*	*A*	*0.6*	*A*	*0.8*	*A*
Alternative – 9' Lanes with Left-Turn Lanes & Median	***Overall***	--	--	--	--	***0.6***	***A***	***1.2***	***A***	***0.9***	***A***	***1.2***	***A***
	Northbound	--	--	--	--	*0.6*	*A*	*1.7*	*A*	*1.4*	*A*	*1.6*	*A*
	Southbound	--	--	--	--	*0.6*	*A*	*0.6*	*A*	*0.5*	*A*	*0.7*	*A*
Barry Place & Georgia Avenue	**Overall**	**3.4**	**A**	**8.1**	**A**	272.0	F	**65.0**	**E**	164.0	F	121.0	F
	Eastbound	24.5	C	31.0	C	41.3	D	122.0	F	62.6	E	526.8	F
	Westbound	--	--	--	--	--	--	--	--	34.3	C	31.4	C
	Northbound	2.3	A	0.1	A	827.8	F	109.5	F	397.4	F	113.6	F
	Southbound	1.7	A	8.6	A	59.2	E	4.1	A	81.8	F	8.9	A
Alternative – No Transit Lanes	***Overall***	--	--	--	--	***6.6***	***A***	***7.5***	***A***	***8.0***	***A***	***8.6***	***A***
	Eastbound	--	--	--	--	*66.2*	*E*	*37.4*	*D*	*52.7*	*D*	*37.3*	*D*
	Westbound	--	--	--	--	--	--	--	--	*46.4*	*D*	*47.8*	*D*
	Northbound	--	--	--	--	*2.0*	*A*	*2.3*	*A*	*0.4*	*A*	*2.1*	*A*
	Southbound	--	--	--	--	*2.4*	*A*	*3.3*	*A*	*5.0*	*A*	*2.7*	*A*
Alternative – 9' Lanes with Left-Turn Lanes & Median	***Overall***	--	--	--	--	***58.9***	***E***	***13.7***	***B***	***94.7***	***F***	***30.6***	***C***
	Eastbound	--	--	--	--	*41.0*	*D*	*42.4*	*D*	*33.0*	*C*	*47.7*	*D*
	Westbound	--	--	--	--	--	--	--	--	*46.5*	*D*	*48.8*	*D*
	Northbound	--	--	--	--	*5.6*	*A*	*10.3*	*B*	*3.1*	*A*	*15.3*	*B*
	Southbound	--	--	--	--	*83.3*	*F*	*8.3*	*A*	*141.0*	*F*	*38.0*	*D*
Bryant Street & Georgia Avenue	**Overall**	**13.6**	**A**	**18.1**	**B**	**39.9**	**D**	**55.4**	**E**	**57.3**	**E**	290.6	F
	Eastbound	--	--	--	--	--	--	--	--	47.8	D	49.7	D
	Northbound	34.0	C	27.3	C	9.6	A	2.1	A	8.5	A	9.5	A
	Southbound	0.8	A	4.3	A	58.9	E	135.2	F	88.6	F	723.1	F
Alternative – No Transit Lanes	***Overall***	--	--	--	--	***1.3***	***A***	***2.8***	***A***	***3.2***	***A***	***9.5***	***A***
	Eastbound	--	--	--	--	--	--	--	--	*47.7*	*D*	*47.0*	*D*
	Northbound	--	--	--	--	*1.1*	*A*	*4.1*	*A*	*2.7*	*A*	*12.3*	*B*
	Southbound	--	--	--	--	*1.4*	*A*	*0.8*	*A*	*2.5*	*A*	*2.3*	*A*
Alternative – 9' Lanes with Left-Turn Lanes & Median	***Overall***	--	--	--	--	***1.6***	***A***	***6.5***	***A***	***4.5***	***A***	***27.5***	***C***
	Eastbound	--	--	--	--	--	--	--	--	*47.8*	*D*	*49.7*	*D*
	Northbound	--	--	--	--	*3.9*	*A*	*3.3*	*A*	*6.7*	*A*	*19.1*	*B*
	Southbound	--	--	--	--	*0.2*	*A*	*11.2*	*B*	*2.1*	*A*	*38.0*	*D*

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
W Street & Georgia Avenue	**Overall**	**18.0**	**B**	**15.6**	**B**	**33.9**	**C**	**44.2**	**D**	**87.4**	**F**	**110.5**	**F**
	Eastbound	--	--	--	--	--	--	--	--	37.0	D	23.8	C
	Westbound	32.2	C	43.2	D	81.1	F	86.3	F	179.8	F	65.0	E
	Northbound	12.4	B	2.1	A	7.1	A	38.5	D	136.4	F	213.9	F
	Southbound	15.6	B	10.5	B	31.1	C	18.9	B	24.2	C	18.2	B
Alternative – No Transit Lanes	***Overall***	--	--	--	--	***18.2***	***B***	***24.9***	***C***	***18.3***	***B***	***28.9***	***C***
	Eastbound	--	--	--	--	--	--	--	--	*22.3*	*C*	*13.5*	*B*
	Westbound	--	--	--	--	*21.6*	*C*	*15.4*	*B*	*23.9*	*C*	*15.9*	*B*
	Northbound	--	--	--	--	*16.5*	*B*	*27.1*	*C*	*17.9*	*B*	*35.0*	*C*
	Southbound	--	--	--	--	*17.9*	*B*	*29.5*	*C*	*16.2*	*B*	*31.9*	*C*
Alternative – 9' Lanes with Left-Turn Lanes & Median	***Overall***	--	--	--	--	***51.4***	***D***	***54.5***	***D***	***66.7***	***E***	***43.1***	***D***
	Eastbound	--	--	--	--	--	--	--	--	*37.0*	*D*	*25.3*	*C*
	Westbound	--	--	--	--	*72.5*	*E*	*102.6*	*F*	*169.0*	*F*	*75.7*	*E*
	Northbound	--	--	--	--	*7.4*	*A*	*55.9*	*E*	*7.9*	*A*	*50.8*	*D*
	Southbound	--	--	--	--	*68.6*	*E*	*15.9*	*B*	*61.4*	*E*	*12.0*	*B*
Georgia Avenue & V Street/Howard University Hospital	**Overall**	**13.6**	**B**	**18.8**	**B**	**117.0**	**F**	**40.0**	**D**	**248.8**	**F**	**191.1**	**F**
	Eastbound	29.9	C	23.0	C	41.9	D	45.9	D	46.5	D	48.8	D
	Westbound	27.1	C	21.4	C	34.6	C	37.0	D	34.7	C	37.8	D
	Northbound	14.6	B	23.5	C	135.9	F	17.6	B	630.6	F	185.1	F
	Southbound	10.8	B	12.6	B	121.0	F	63.8	E	127.3	F	248.9	F
Alternative – No Transit Lanes	***Overall***	--	--	--	--	***7.6***	***A***	***8.7***	***A***	***8.0***	***D***	***9.7***	***A***
	Eastbound	--	--	--	--	*41.6*	*D*	*35.3*	*D*	*45.8*	*C*	*36.5*	*D*
	Westbound	--	--	--	--	*34.6*	*C*	*30.9*	*C*	*34.7*	*A*	*31.1*	*C*
	Northbound	--	--	--	--	*0.5*	*A*	*5.8*	*A*	*0.6*	*A*	*6.6*	*A*
	Southbound	--	--	--	--	*5.9*	*A*	*4.4*	*A*	*5.4*	*A*	*4.8*	*A*
Alternative – 9' Lanes with Left-Turn Lanes & Median	***Overall***	--	--	--	--	***106.3***	***F***	***24.8***	***C***	***110.3***	***F***	***29.7***	***C***
	Eastbound	--	--	--	--	*41.9*	*D*	*45.9*	*D*	*46.5*	*D*	*48.8*	*D*
	Westbound	--	--	--	--	*34.6*	*C*	*37.0*	*D*	*34.7*	*C*	*37.8*	*D*
	Northbound	--	--	--	--	*8.8*	*A*	*30.7*	*C*	*11.6*	*B*	*40.4*	*D*
	Southbound	--	--	--	--	*154.6*	*F*	*13.2*	*B*	*162.0*	*F*	*12.3*	*B*
Georgia Avenue & Howard University Hospital	Southbound Left	1.7	A	1.6	A	0.3	A	2.7	A	0.3	A	3.5	A
Alternative – No Transit Lanes	Southbound Left	--	--	--	--	*1.8*	*A*	*1.7*	*A*	*1.9*	*A*	*1.8*	*A*
Alternative – 9' Lanes with Left-Turn Lanes & Median	Southbound Left	--	--	--	--	*10.0*	*A*	*12.1*	*B*	*10.1*	*B*	*13.1*	*B*

Intersection	Approach	Existing Conditions (2009/2011)				Future without HUCMP (2021)				Future with HUCMP (2021)			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Georgia Avenue & Florida Avenue	**Overall**	**50.0**	**D**	**69.2**	**E**	316.1	F	323.6	F	325.4	F	361.8	F
	Eastbound	24.6	C	35.0	C	38.6	D	78.3	E	38.9	D	62.5	E
	Westbound	77.0	E	139.7	F	324.8	F	340.0	F	297.4	F	387.2	F
	Northbound	45.3	D	41.6	D	12.9	B	12.4	B	13.1	B	12.7	B
	Southbound	34.6	C	20.4	C	587.2	F	610.3	F	646.7	F	679.2	F
Alternative – No Transit Lanes	**Overall**	--	--	--	--	***90.6***	***F***	***93.2***	***F***	***94.0***	***F***	***112.6***	***F***
	Eastbound	--	--	--	--	*21.4*	*C*	*25.9*	*C*	*21.4*	*C*	*24.9*	*C*
	Westbound	--	--	--	--	*91.1*	*F*	*96.5*	*F*	*74.8*	*E*	*125.9*	*F*
	Northbound	--	--	--	--	*100.8*	*F*	*88.8*	*F*	*115.2*	*F*	*110.5*	*F*
	Southbound	--	--	--	--	*131.8*	*F*	*142.7*	*F*	*155.8*	*F*	*159.0*	*F*
Alternative – 9' Lanes with Left-Turn Lanes & Median	**Overall**	--	--	--	--	***104.8***	***F***	***110.1***	***F***	***106.8***	***F***	***132.7***	***F***
	Eastbound	--	--	--	--	*23.1*	*C*	*28.3*	*C*	*23.2*	*C*	*27.1*	*C*
	Westbound	--	--	--	--	*121.2*	*F*	*12.4*	*F*	*102.5*	*F*	*154.8*	*F*
	Northbound	--	--	--	--	*86.4*	*F*	*77.0*	*E*	*98.6*	*F*	*95.5*	*F*
	Southbound	--	--	--	--	*144.0*	*F*	*170.5*	*F*	*168.4*	*F*	*194.6*	*F*

3.3 Review of Non-Auto Modes

This section of the report reviews the impacts of the HUCMP and outlines recommendations for each mode of transportation. The end of this section provides a summary of the Transportation Demand Management (TDM) recommendations. Figure 1 identifies the location of the HU Central Campus.

3.3.1 Transit Service

Impact of Campus Plan

An increase in TDM measures, including transit incentives and increasing parking fees will lead to an increase in both Metrorail and Metrobus demand. The development sites in the HUCMP along Georgia Avenue provide opportunities to enhance transit stations on Georgia Avenue with more queuing room and space for shelters.

Recommendations

This Transportation Report makes the following recommendations to increase transit usage:

- Maintain the existing SmartBenefits program, and investigate implementing transit subsidies to encourage ridership, possible funded through an increase in parking fees on campus
- Promote the Guaranteed Ride Home Program to all transit users
- Work with DDOT to implement the Lower Georgia Avenue Great Streets recommendations to increase Metrobus efficiency and quality in the corridor
- Work with DDOT on future streetcar and other long-term transit improvements including those initiatives featured in the *Development Framework for a Cultural Destination District within Washington, DC's Greater Shaw / U Street* (DUKE Plan).
- During Further Processing of development parcels along Georgia Avenue, review transit stations for potential improvements and consolidation.

3.3.2 Howard University Shuttle Service

Impact of Campus Plan

An increase in TDM measures, including transit incentives and increasing parking fees, will lead to an increase in HU Shuttle demand to and from the Metrorail system. The increase in on-campus student housing will decrease the need for HU shuttles to travel to and from off-campus housing locations. Thus, there will be a decrease in HU Shuttle demand for these routes.

Recommendations

This Transportation Report makes the following recommendations to the HU Shuttle service:

- Increase the marketing of the HU Shuttle service, including creating maps and timetables of routes to be placed at Shuttle stops and on a website.
- Examine the spot removal of on-street parking on campus to assist in HU Shuttle operations

- Perform a detailed operational and financial study of the HU Shuttle system to increase efficiency of operations with the goal of simplifying the routes and changing them to reflect the shift in demand from between campus and off-campus housing to servicing campus population using the Metrorail system.

3.3.3 Bicycle Facilities

Impacts of Campus Plan

There are good cycling facilities throughout the study area, including on-street bike lanes, signed bike routes, and several Capitol Bikeshare stations, but there are gaps between these bicycle facilities and campus and limited or missing amenities on-campus. These conditions reduce the attractiveness of cycling. The remainder of this section discusses future bicycle conditions and mitigation measures to minimize impacts.

Bicycle impacts include the following:

- Increased cycling demand is likely to occur in conjunction with the growing visibility and awareness of cycling as an attractive travel option, in particular for trips to the south, southwest and west. This will increase bicycle activity along Georgia Avenue, W Street, V Street and 11th Street. Currently, these routes have several issues that reduce the attractiveness of cycling, such as a limited connectivity between the campus and bike lanes west of Florida Avenue, traffic volumes and speeds along Georgia Avenue, and limited connectivity between existing facilities and campus residential and academic uses.
- Increased demand is likely to occur to the northeast along Warder Street and Park Place if commuting increases by campus employees and students living off campus who commute from the north and east.
- Bicycle parking and storage demands will increase in conjunction with the growing number of bicycle trips. Existing parking is limited and the parking that is available does not comply with DDOT standards. Demand for parking, storage and changing facilities will increase as facilities are improved and more trips are made by bicycle.
- Increase in Bikeshare usage and the development of new activity centers and residential nodes will increase demand for Bikeshare bicycles and docks.

Figure 41 identifies bicycle routes that surround campus and the barriers and issues under existing conditions and those that may arise with implementation of the Campus Plan.

Recommendations

A goal of the Campus Plan is to improve bicycle conditions on campus and work with DDOT to improve cycling conditions between campus and off-campus facilities.

- Recommend bicycle facilities be extended by the District to the Campus edge.
- Use 10th Street and Barry Place to connect bike lanes on W and V Streets with campus. The intersection of 10th Street/Barry Place & Florida Avenue is an all-way stop, which makes it one of the few quality places for bicycle to cross Georgia Avenue and access campus.
- The plan proposes that W Street be extended to connect between Florida Avenue and Georgia Avenue. This proposed connection would be a two-way street, with a potential traffic signal at its intersection with Florida Avenue to facilitate turns and pedestrian/bicycle crossings. Since Howard University does not control all of the

parcels needed to complete this extension, this report assumes that W Street is constructed between Georgia Avenue and 9th Street. Figure 21 shows a concept of the W Street extension.

- Create a bicycle facility on 8th Street between R Street and Barry Place, which would require a bicycle-actuated traffic signal to cross Florida Avenue. This would connect the 7th Street bike lanes and the T and R Streets bike lanes to the south while bypassing the poor cycling conditions present along Georgia Avenue north of Florida Avenue that stem from high traffic volumes and narrow travel lanes.
- Alternatively, re-construct Georgia Avenue to include bicycle facilities by implementing the Georgia Avenue Great Streets plan. This plan includes a shared bus and bike lane for north and southbound traffic between Florida Avenue and Howard Place. Connection at Howard place provides good connectivity to the campus because of the direct access it provides to 6th Street, which has north and south access at this location, and to the campus quad.
- Locate an enclosed and secure bicycle parking facility on campus (possibly in a parking garage in the first phase), targeted to commuters (faculty/staff and off-campus student). Make shower facilities available to commuters. The proposed Recreation Center building will have shower facilities, and is a potential location for an underground parking facility. If a parking facility were constructed at this parcel, it would provide an excellent opportunity to create a centralized long-term, commuter-based bicycle parking facility on campus that can accommodate most commuters with direct access to shower facilities.
- Consider installing a cycle track along 6th Street to provide for north-south connection within campus if demand warrants additional facilities.
- Add Capital Bikeshare station to the southern side of campus aligned with the new bicycle routes. Three locations for additional Bikeshare stations are identified in Figure 42 and are near the intersection of W Street and Georgia Avenue, the intersection of Bryant Street and 4th Street, and the intersection of Howard Place and 6th Street. These locations were recommended because of their proximity to major activity centers, residential halls and proximity to the campus academic core on the south side of campus. Providing Bikeshare stations on both the north and south sides campus minimizes the need to bicycle through campus, which helps mitigate pedestrian bicycle conflicts and the limitations created by one-way streets.
- Add bike racks outside of major campus buildings, focusing on those closest to bike routes and residence halls. Figure 42 identifies recommended locations for short-term bicycle parking racks that meet DDOT standards.
- Provide the bicycle commuter benefit to faculty/staff.
- Require further processing applications to include details on short and long term bicycle parking. Residence halls in particular should incorporate a significant amount of long-term storage for students who wish to bring bicycles to campus.

Figure 42 identifies bicycle recommendations that will reduce barriers and mitigate issues identified in the Campus Plan.

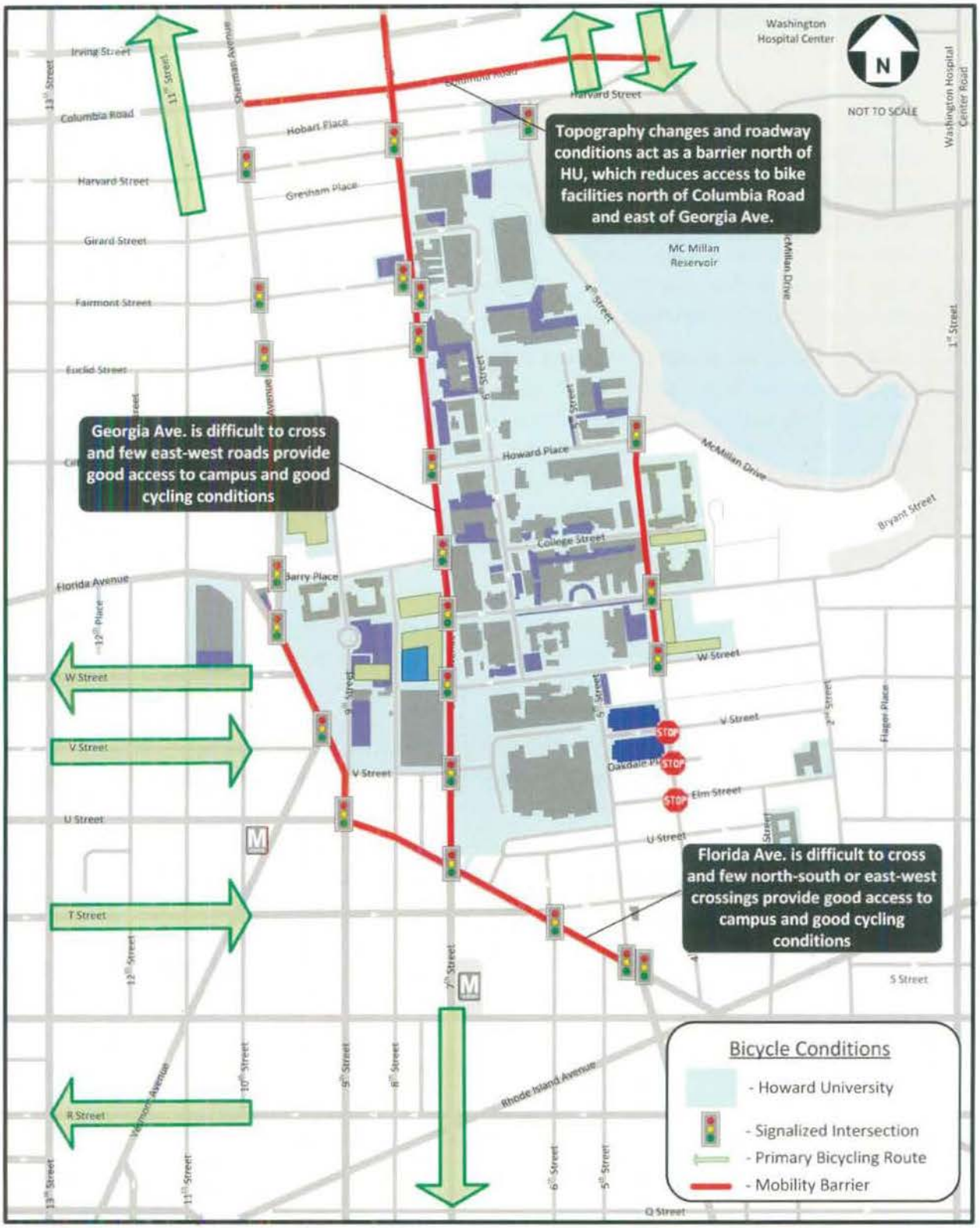


Figure 41: Bicycle Conditions & Concerns

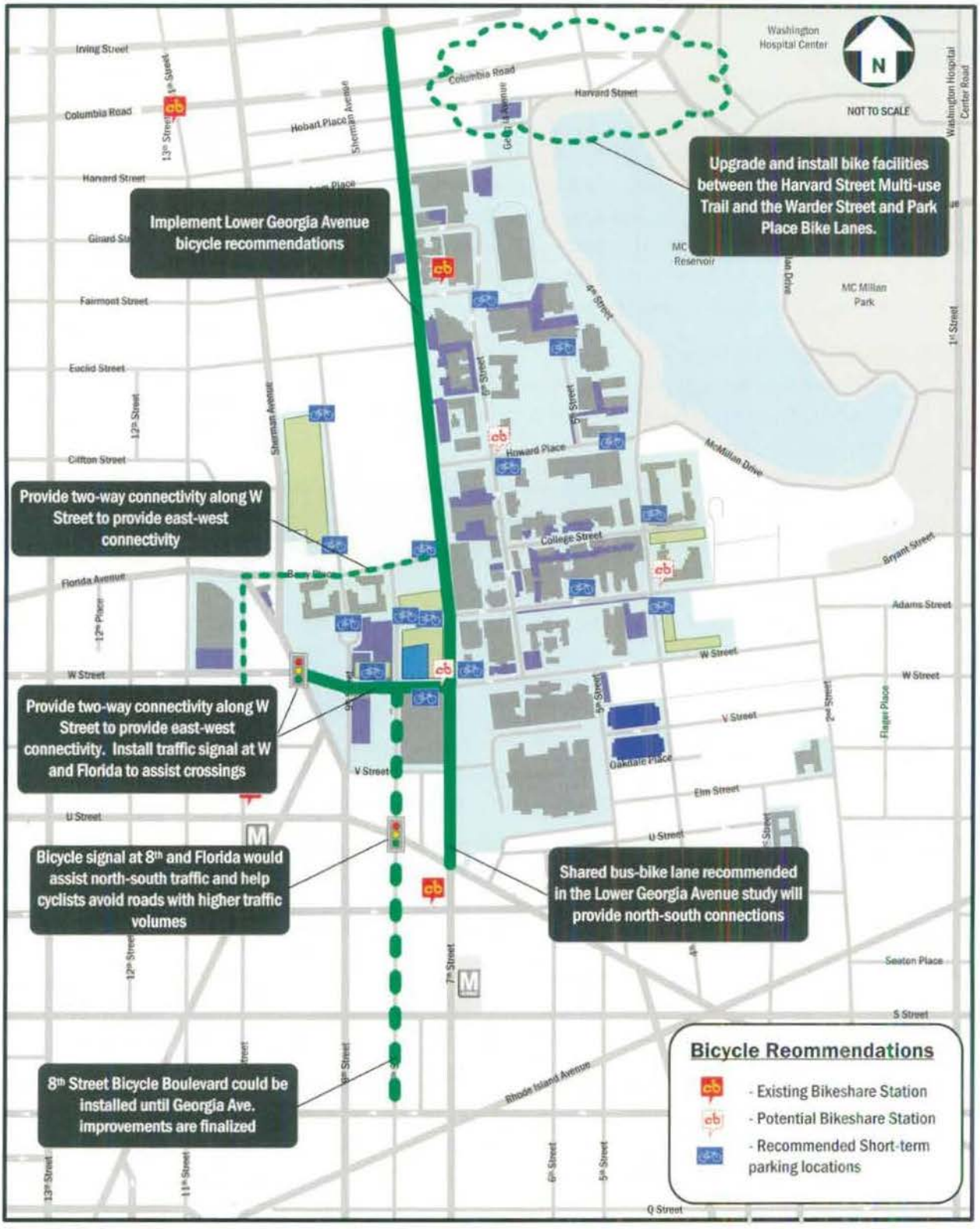


Figure 42: Bicycle Recommendations

3.3.4 Pedestrian Facilities

Impacts of Campus Plan

Howard University is a compact campus with good pedestrian walkways throughout. Within campus, walking is the primary mode for moving between uses. Campus housing, transit stops and stations, and neighborhood commercial and recreational uses located on the periphery of the central campus are the primary sources of pedestrian traffic. There are pedestrian deficiencies that reduce the quality of walking conditions and may impact the attractiveness of walking between campus and off-campus destinations, including transit stations and stops. As components of the Campus Plan are implemented, existing pedestrian issues and impacts may increase due to location of new buildings. Addressing pedestrian issues will help mitigate potential pedestrian impacts that may result. The remainder of this section discusses future pedestrian conditions and mitigation measures to minimize impacts.

Pedestrian Impacts include the following:

- Development east of 4th Street and west of Georgia Avenue will result in increased east-west pedestrian traffic on College Street, Barry Place, Bryant Street, and W Street. These streets are the primary east-west access routes to the campus quad.
- Pedestrian volumes are likely to increase along north-south streets such as 4th Street, 6th Street, Georgia Avenue, and 8th Street because these link commercial and residential uses south of Howard Place with academic uses located north of Howard Place and commercial and residential uses north of Fairmont Street on Georgia Avenue and beyond.
- Increased volumes along east-west and north-south streets may impact pedestrian conditions along sidewalks and at intersections where pedestrian crossings are concentrated. Sidewalk impacts may include crowding at locations where sidewalks are narrow or contain obstructions. Intersection impacts may occur along primary east-west routes where they cross Georgia Avenue, 6th Street, and 4th Street. These impacts could be to both pedestrian and vehicle traffic; pedestrians may be impacted where there is limited queuing area on sidewalks at intersections, and vehicles may be impacted where crossing volumes and the amount of time required to accommodate crossings increase, which reduces the amount of time reserved for through traffic.
- Increased pedestrian demand within campus may warrant removing or reducing on-street parking located inside the campus core because the parking generates vehicle demand and results in traffic circulation along major pedestrian corridors, which may result in increased pedestrian-vehicle conflicts if volumes increase. Minimizing pedestrian-vehicle conflicts is a priority of the Campus Plan.
- Development along Georgia Avenue between Barry Place and Florida Avenue will attract additional pedestrian traffic to this area. This will increase the number of pedestrian crossings north-south and east-west at several intersections along Georgia Avenue and Florida Avenue.
- Increased pedestrian activity along sidewalks and at intersections may warrant upgrades or changes to existing facilities to mitigate impacts. These changes may include expanding sidewalks, removing obstructions on sidewalks, increasing crossing times, and adding controlled crossings at intersections that may experience increased demand or that are located along preferred walking routes.
- Increased campus, recreation, and commercial activity may lead to increased pedestrian volumes between the campus and primary transit stops and the nearest Metrorail station portals. Bus stops are located along Georgia

Avenue and Florida Avenue and Metrorail portals are located near the intersection of 7th Street and S Street and 10th Street and U Street. The 7th Street portal is located 1,600 feet from the intersection of Georgia Avenue and W Street and the 10th Street portal is 1,800 feet from the same intersection. The 7th Street portal is the more direct route and has better walking conditions. The route to the 10th Street portal is indirect and the shortest route includes the intersection of Florida Avenue, 9th Street and V Street, which can be a challenging intersection for pedestrians to navigate. Providing good stop and station access routes is critical to maintaining mode share and attracting new riders in the future because most transit users are also pedestrians.

- The HU recreational center planned for W Street and Georgia Avenue and the privately developed Howard Town Center planned for V Street and Georgia Avenue are likely to increase the number of neighborhood pedestrian trips made between Georgia Avenue and residential and transit stops and stations located within walking distance. This will increase pedestrian demand along campus access routes and at intersections located along those routes.

Figure 43 identifies pedestrian movements that are likely to increase with the implementation of the Campus Plan and barriers and issues under existing conditions and those that may arise with the implementation of the Campus Plan.

Recommendations

Campus Plan recommendations were developed to address existing issues and mitigate impacts that may arise with the implementation of the Campus Plan or the completion of other developments in the study area. The goal of these recommendations is to maximize the attractiveness of walking and to minimize potential negative impacts of pedestrian activity. The remainder of this section describes the Campus Plan pedestrian recommendations.

- Improve pedestrian conditions along east-west and north-south pedestrian routes. Recommended improvements include expanding sidewalk widths, removing obstructions, installing and upgrading crosswalks at intersections, and installing traffic calming measures, such as speed tables, decretive pavers, bulb outs at intersections and mid-block crossings, etc.

- Minimize on-street parking impacts within the campus core by implementing performance parking on metered streets to reduce traffic circulation, minimize visitor parking within the campus core by locating it on the periphery along pedestrian access routes, and remove on-street parking at major pedestrian crossing locations to provide additional space for pedestrian amenities, such as bulb-outs and buffers.

- Calm traffic on 4th Street beginning at Howard Place until W Street. There are currently speed tables located south of W Street at each intersection until Florida Avenue. Speed tables could be installed at additional intersections to calm traffic and enhance walking conditions. Generally, conditions on east-west routes west of 4th Street and south of W Street are good and volumes are not expected to increase significantly.

- Add a traffic control device in the form of a traffic signal or stop sign at 4th Street and College Street to accommodate increased pedestrian activity anticipated between the campus quad and planned campus housing east of 4th Street. Traffic controls would minimize pedestrian-vehicle conflicts at this location and provide similar facilities and traffic controls as those located at intersections to the north and south.

- Work with DDOT to implement Lower Georgia Avenue recommendations that improve pedestrian conditions along the Georgia Avenue corridor. These improvements include adding a bulb-out on southbound Georgia Avenue at Howard Place and making other improvements to sidewalks, including new and wider planted buffers between the cartway and sidewalk and enhanced pedestrian crossing facilities.

- Install Leading Pedestrian Intervals (LPIs) at signalized crossings along Georgia Avenue and 4th Street to assist east-west pedestrian crossings.
- Add east-west pedestrian connections between Georgia Avenue and Florida Avenue along W Street and Bryant Street in the form of new streets or pedestrian only pathways. These connections will provide better access and routing between campus, new uses planned for this area, and destinations located west of Florida Avenue, such as the Metrorail portal at 10th and U Street and commercial uses located along the U Street corridor. New routing options and crossing locations will help disperse pedestrian traffic along various routes, which will mitigate the impact of increased pedestrian volumes to any one intersection or sidewalk segment. It will also reduce the need to make significant changes to intersections that would attract additional pedestrian volumes warranting new traffic control devices or changes to intersection geometry, such as the intersection of W Street, Vermont Avenue and V Street.
- Improve intersection facilities for pedestrian along Florida Avenue at W Street, Vermont Avenue and V Street to accommodate increased activity through this area. This includes traffic controls, marked crosswalks and traffic calming features where warranted.
- Improve sidewalk conditions on Florida Avenue between Sherman Avenue and V Street to accommodate increased demand along this route. Improvements to consider include widening sidewalks, installing or increasing buffers between the sidewalk and cartway, and removing barriers locate on or immediately adjacent to sidewalks.

Figure 44 identifies several of the pedestrian recommendations that will reduce barriers and mitigate issues identified in the Campus Plan.

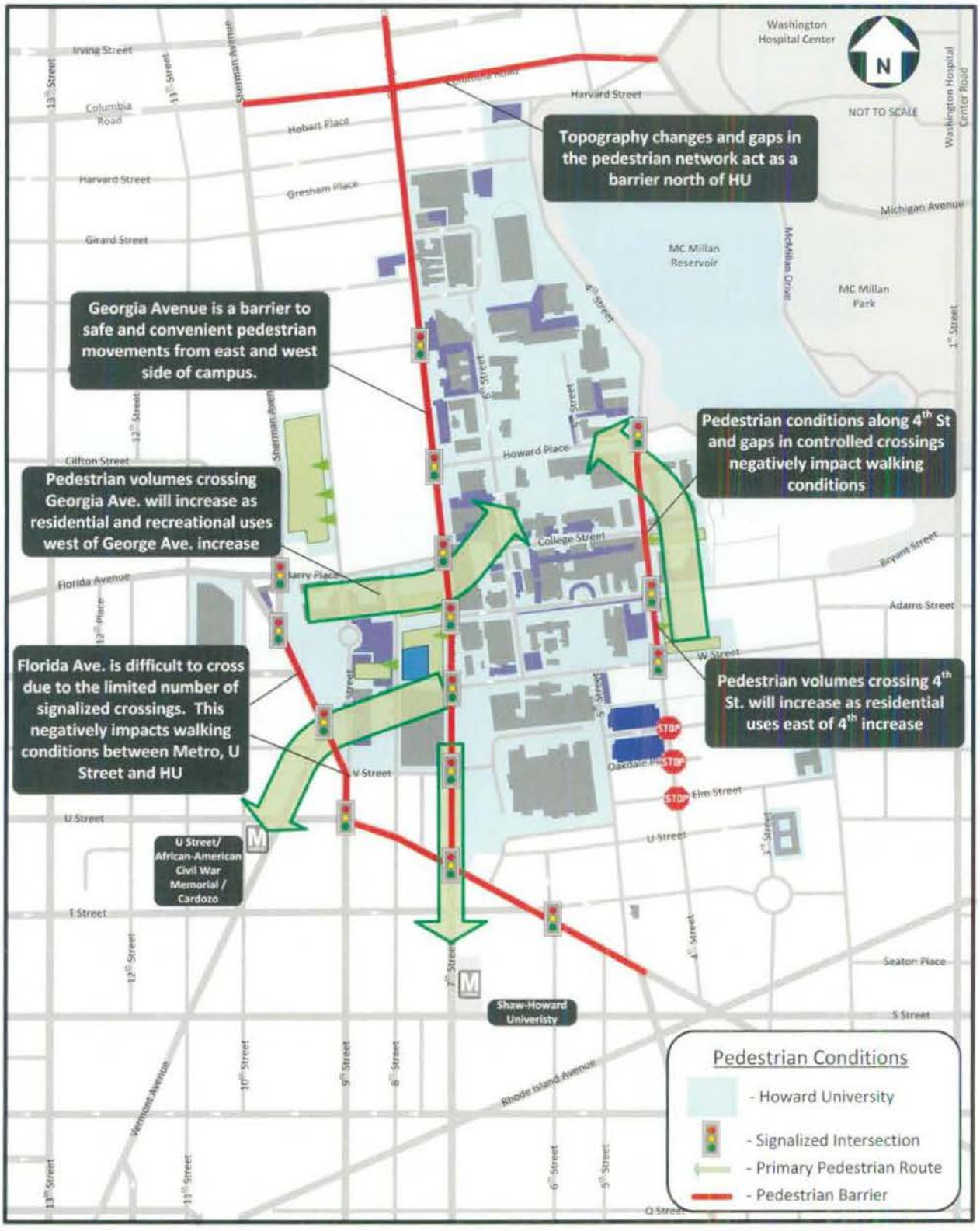


Figure 43: Pedestrian Conditions & Concerns

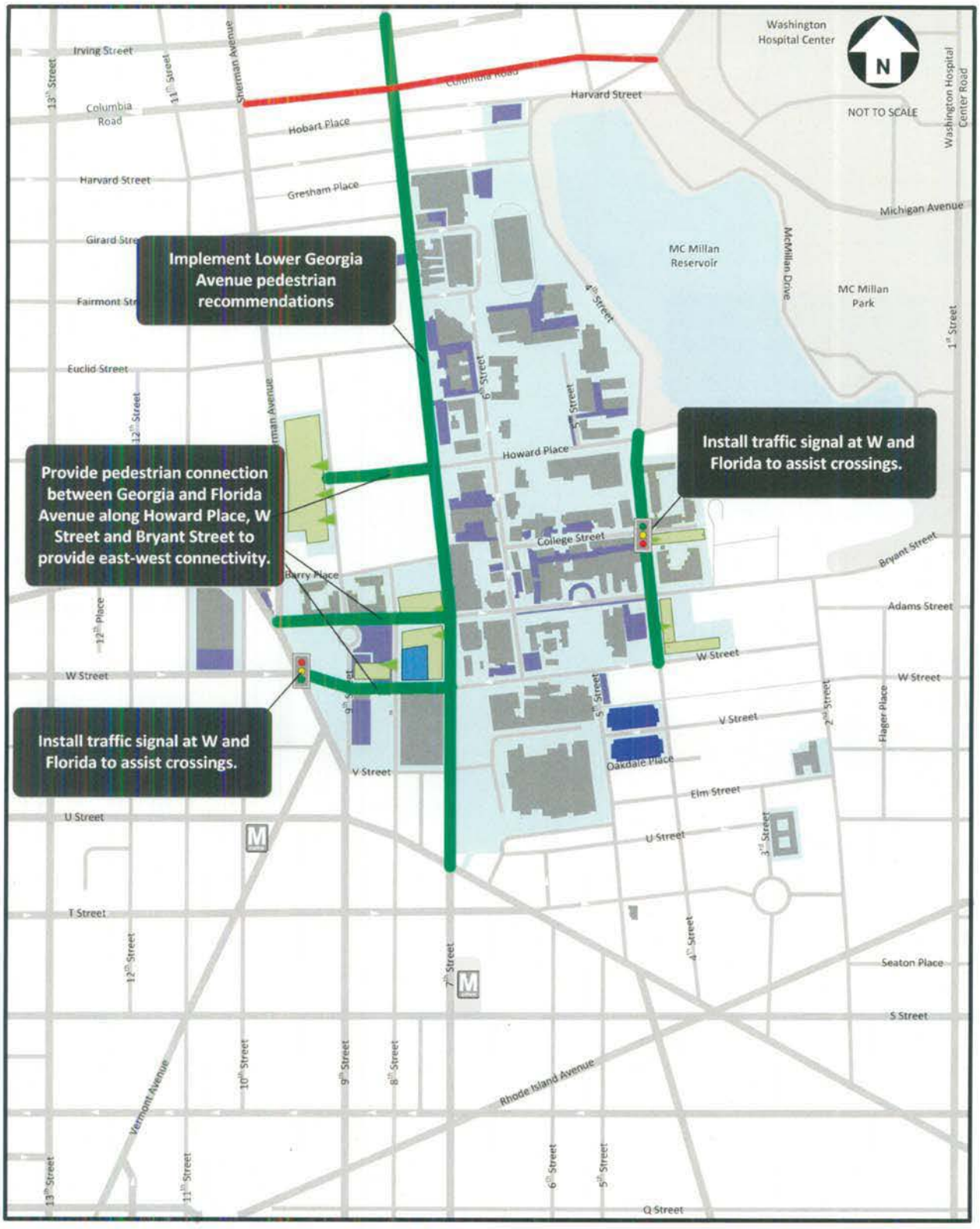


Figure 44: Pedestrian Recommendations

3.4 Crash Analysis

This section of the report reviews available crash data within the study area and reviews potential impacts of the Campus Plan on crash rates and makes recommendations for mitigation measures where needed.

3.4.1 Summary of Available Crash Data

A safety analysis was performed to determine if there was an abnormally high accident rate at any study area intersection. The District Department of Transportation (DDOT) provided the last three years of intersection accident data; from 2008 to 2010. This data set included all intersections adjacent to Howard University except for intersections at University gates and parking lot entrances.

This data was reviewed and analyzed to determine the accident rate at each location. For intersections, the accident rate is measured in accidents per million-entering vehicles (MEV). The accident rates per intersection are shown in Table 21.

According to the Institute of Transportation Engineer's *Transportation Impact Analysis for Site Development*, an accident rate of 1.0 or higher is an indication that further study is required. Several intersections in the study area meet this criterion (as shown in red in Table 21 and detailed in Table 22). The Central Campus Master Plan needs to be developed in a manner to help alleviate, or at minimum not add to, the conflicts at these intersections.

Table 21: Intersection Crash Rates

Intersection	Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
Georgia Avenue & Harvard Street	27	0	1	**1.05**
5th Street & Harvard Street	15	0	2	0.89
Georgia Avenue & Girard Street	15	0	0	**1.07**
Georgia Avenue & Fairmont Street	10	0	0	0.49
Georgia Avenue & Howard Place	13	2	0	**1.07**
6th Street & Howard Place	4	1	0	**1.41**
5th Street/4th Street & Howard Place	4	0	1	0.37
Sherman Avenue & Barry Place	19	0	0	0.85
Georgia Avenue & Barry Place	41	3	5	**3.76**
6th Street & College Street	1	0	0	**1.09**
4th Street & College Street	7	0	0	0.67
Georgia Avenue & Bryant Street	22	4	0	**1.26**
6th Street & Bryant Street	3	0	0	0.68
4th Street & Bryant Street	13	1	1	0.88
Georgia Avenue & W Street	17	3	0	0.80
6th Street & W Street	2	0	0	0.41
4th Street & W Street	10	0	0	0.82
Georgia Avenue & V Street/HUH Exit	33	2	1	**1.44**
Georgia Avenue/7th Street & Florida Avenue	79	3	2	**2.26**
Georgia Avenue & Euclid Street	17	3	1	0.82

** - Million Entering Vehicles; volumes estimated based on turning movement count data*

The crash summary data in Table 21 shows 9 intersections with a Crash Rate over 1.0 crashes per million entering vehicles – the rate which is considered a threshold for further analysis. A rate over 1.0 does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have higher crash rates due to operational, geometric, or other issues.

For these 9 intersections, the crash type information from the DDOT crash data was reviewed to see if there is a high percentage of certain crash types. Generally, the reasons for why an intersection has a high crash rate cannot be derived from crash data, as the exact details of each crash are not represented. However, some summaries of crash data can be used to develop general trends or eliminate some possible causes.

Table 22**Error! Reference source not found.** contains a breakdown of crash types reported for the 9 intersections with a crash rate over 1.0 per MEV.

Table 22: High Crash Rate Intersections by Crash Type

Intersection	Rate per MEV	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Ped. Involved	Backing	Unspecified	Total
Georgia Avenue & Harvard Street	**1.05**	5 *19%*	4 *15%*	1 *4%*	5 *19%*	7 *26%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	2 *7%*	0 *0%*	3 *11%*	**27**
Georgia Avenue & Girard Street	**1.07**	0 *0%*	3 *20%*	1 *7%*	3 *20%*	3 *20%*	0 *0%*	1 *7%*	0 *0%*	1 *7%*	1 *7%*	1 *7%*	1 *7%*	**15**
Georgia Avenue & Howard Place	**1.07**	0 *0%*	0 *0%*	0 *0%*	3 *23%*	7 *54%*	0 *0%*	1 *8%*	0 *0%*	0 *0%*	2 *15%*	0 *0%*	0 *0%*	**13**
6th Street & Howard Place	**1.41**	0 *0%*	0 *0%*	0 *0%*	0 *0%*	1 *25%*	0 *0%*	2 *50%*	1 *25%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	**4**
Georgia Avenue & Barry Place	**3.76**	0 *0%*	2 *5%*	2 *5%*	9 *22%*	16 *39%*	0 *0%*	3 *7%*	1 *2%*	0 *0%*	5 *12%*	0 *0%*	3 *7%*	**41**
6th Street & College Street	**1.09**	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	0 *0%*	1 *100%*	**1**
Georgia Avenue & Bryant Street	**1.26**	0 *0%*	2 *9%*	0 *0%*	2 *9%*	7 *32%*	0 *0%*	4 *18%*	1 *5%*	0 *0%*	5 *23%*	1 *5%*	0 *0%*	**22**
Georgia Avenue & V Street/HUH Exit	**1.44**	3 *9%*	3 *9%*	1 *3%*	7 *21%*	12 *36%*	0 *0%*	2 *6%*	2 *6%*	0 *0%*	2 *6%*	1 *3%*	0 *0%*	**33**
Georgia Avenue/7th Street & Florida Avenue	**2.26**	6 *8%*	9 *11%*	6 *8%*	24 *30%*	16 *20%*	2 *3%*	3 *4%*	1 *1%*	0 *0%*	4 *5%*	4 *5%*	4 *5%*	**79**

3.4.2 Potential Campus Plan Impacts

This section reviews the 9 locations with existing crash rates over 1.0 MEV and reviews potential impacts of the Campus Plan.

- *Georgia Avenue & Harvard Street*

  This intersection is just over the threshold of 1.0 crashes per MEV, with 27 crashes over a 3-year period. The types of crashes reported do not show an obvious pattern, although the high number of sideswipe and rear end crashes could be the result of cars switching lanes to avoid turning traffic, as Georgia Avenue does not have separate turning lanes at this intersection. The addition of Leading Pedestrian Intervals (LPI) to this intersection as a safety improvement is discussed below. Otherwise, this report does not recommend mitigation measures at this intersection as the Campus Plan is not projected to make significant changes to the commuting patterns, operations or geometry of this intersection.

- *Georgia Avenue & Girard Street*

  This intersection is just over the threshold of 1.0 crashes per MEV, with 15 crashes over a 3-year period. The crash types reported at this location show a high percentage of left turn, rear end, and sideswipe crashes. Sideswipe crashes can often occur when a vehicle going straight through an intersection makes a last-second lane change to get around a vehicle waiting for a gap to make a left turn from a shared through/left lane, as is the case in this location since this section of Georgia Avenue does not have separate turning lanes at this intersection. Another contributing cause to the accident rate at this intersection could be that the intersection is unsignalized and drivers traveling unabated along Georgia Avenue may not be expecting side street traffic from Girard Street. This report does not recommend mitigation measures at this intersection as the Campus Plan is not projected to make significant changes to the commuting patterns, operations or geometry of this intersection.

- *Georgia Avenue & Howard Place*

  This intersection is just over the threshold of 1.0 crashes per MEV, with 13 crashes over a 3-year period. The majority of crashes at this intersection were sideswipes, with 7 of the reported crashes being classified in this way. Sideswipe crashes can often occur when a vehicle going straight through an intersection makes a last-second lane change to get around a vehicle waiting for a gap to make a left turn from a shared through/left lane, as is the case in this location since this section of Georgia Avenue does not have separate turning lanes at this intersection. The addition of Leading Pedestrian Intervals (LPI) to this intersection as a safety improvement is discussed below. Otherwise, this report does not recommend mitigation measures at this intersection as the Campus Plan is not projected to make significant changes to the commuting patterns, operations or geometry of this intersection.

- *6th St & Howard Place*

  This intersection was found to have a moderately elevated crash rate of 1.41 crashes per MEV. The majority of crashes at this intersection involved parked vehicles, which suggests that the narrow geometries at this intersection of two internal campus roadways, both featuring on-street parking, are a contributing factor to the elevated crash rate. This report does not recommend mitigation measures for this intersection.

- *Georgia Avenue & Barry Place*

  This intersection has a significantly high crash rate, with 3.76 crashes per MEV over the course of the 3-year study period. The crash report data shows a high amount of rear end and sideswipe crashes, with a significant percentage involving pedestrians as well. Potential reasons for these crashes are the high amount of vehicular and pedestrian activity at this intersection, the high amount of turning traffic from Barry Place onto Georgia Avenue and vice versa, the lack of turn lanes on Georgia Avenue, and the presence of the McDonald's curb cut close to the intersection. Elevated rear-end collision rates are typical at intersections controlled by a traffic signal, and sideswipe crashes can often occur when a vehicle going straight through an intersection makes a last-second lane change to get around a vehicle waiting for a gap to make a left turn from a shared through/left lane. The high volume of pedestrian traffic at this intersection can be partially attributed to the popularity of the McDonald's at this intersection as an alternative to on-campus dining for the University's student population, which in turn contributes to the high percentage of crashes that involve pedestrians. The addition of Leading Pedestrian Intervals (LPI) to this intersection as a safety improvement is discussed below. Otherwise, this report recommends that when the connection of College Street to this intersection is designed and implemented by the University, it be carefully designed with these safety concerns in mind.

- *6th St & College Street*

  Only one crash was reported during the 3-year study period; however, because of the low traffic volumes that exist at this intersection the calculated crash rate was determined to be 1.0 crashes per MEV, just over the threshold limit. Report data shows this crash as being of an unspecified nature, so few conclusions can be drawn about the contributing factors to the slightly elevated crash rate at this intersection. Field observations indicate that although the streets at this location both feature narrow cross-sections, the intersection is served sufficiently by the existing all-way stop control. This report does not recommend mitigation measures at this intersection.

- *Georgia Avenue & Bryant Street*

  This intersection was found to have a moderately elevated crash rate of 1.26 crashes per MEV. The crash report data shows a high amount of sideswipe crashes, with a significant percentage involving parked vehicles or pedestrians as well. Potential reasons for these crashes are the high amount of vehicular and pedestrian activity at this intersection, the high amount of turning traffic from Georgia Avenue onto Bryant Street, and the lack of turn lanes on Georgia Avenue. Sideswipe crashes and collisions with parked cars can often occur when a vehicle going straight through an intersection makes a last-second lane change to get around a vehicle waiting for a gap to make a left turn from a shared through/left lane. The presence of on-street parking on Bryant Street could also contribute to the number of collisions involving parked cars if drivers turning off of Georgia Avenue at speed failed to notice or avoid vehicles parked on-street in this location. This report recommends that DDOT consider restricting on-street parking for a few car lengths on Bryant Street approaching Georgia Avenue to remove the physical impediments and increase sight distance. The addition of Leading Pedestrian Intervals (LPI) to this intersection as a safety improvement is discussed below. Otherwise, this report recommends that when the connection of College Street to this intersection is designed and implemented by the University, it be carefully designed with these safety concerns in mind.

- *Georgia Avenue & V Street/Howard University Hospital Exit*

  This intersection was found to have a moderately elevated crash rate of 1.44 crashes per MEV. Crash data shows that the majority of crashes at this location involved rear-end or sideswipe collisions. These types of crashes could be the result of cars switching lanes to avoid turning traffic since Georgia Avenue does not have separate turning lanes at this intersection. This report does not recommend mitigation measures at this intersection, as the Campus Plan is not projected to make significant changes to the commuting patterns, operations or geometry of this intersection.

- *Georgia Avenue/7th Street & Florida Avenue*

  This intersection has a significantly high crash rate, with 2.26 crashes per MEV over the course of the 3-year study period. The crash report data shows a high amount of left turn, rear end, and sideswipe crashes. Potential reasons for these crashes include the high amount of vehicular and pedestrian activity at this intersection, the high amount of turning traffic from Barry Place onto Georgia Avenue and vice versa, and the lack of turn lanes on Georgia Avenue. Elevated rear-end collision rates are typical at intersections controlled by a traffic signal, and sideswipe crashes can often occur when a vehicle going straight through an intersection makes a last-second lane change to get around a vehicle waiting for a gap to make a left turn from a shared through/left lane. The addition of Leading Pedestrian Intervals (LPI) to this intersection as a safety improvement is discussed below. Otherwise, this report does not recommend mitigation measures at this intersection, as the Campus Plan is not projected to make significant changes to the commuting patterns, operations or geometry of this intersection.

3.4.3 Leading Pedestrian Intervals

The HUCMP will not have a significant effect on many of these intersections, as it will not directly influence commuter traffic patterns, or change operations and geometry at most intersections. The construction of new east-west roadways will have an impact and this report recommends that these safety concerns be taken into account during design and implementation of the east-west roadways. Howard University and the changes introduced by the HUCMP will have a significant impact on pedestrian crossings of Georgia Avenue. As the crash data shows pedestrian crashes at most intersections on Georgia Avenue, this report recommends that DDOT consider adding Leading Pedestrian Intervals (LPI) to the signalized intersections within the study area on Georgia Avenue.

LPIs are a signal timing based pedestrian safety measure. Intersections with pedestrian and car traffic often experience conflict between these two groups, with potentially dangerous consequences for the pedestrians. The term LPI refers to when the 'walk' signal appears three or more seconds before the green traffic signal. The 'walk' signal then remains active for the duration of the green signal. This brief timing adjustment allows pedestrians more time to cross the street, and increases their visibility to drivers, especially those making turns[1].

[1] http://www.walkinginfo.org/engineering/crossings-signals.cfm

4: SUMMARY OF RECOMMENDATIONS

Table 23 summarizes the report recommendations. Each recommendation is listed as a general recommendation for: 1) the campus plan to implement to mitigate impacts, 2) tied to a specific further processing site to mitigate specific impacts of that site, or 3) listed as a consideration for DDOT to implement. The summary of recommendations contains the significant recommendations from the report and does not reflect all of the items discussed within the main body of the report. Figure 45 identifies the development sites using the numbers assigned to them in the HUCMP documentation for reference.

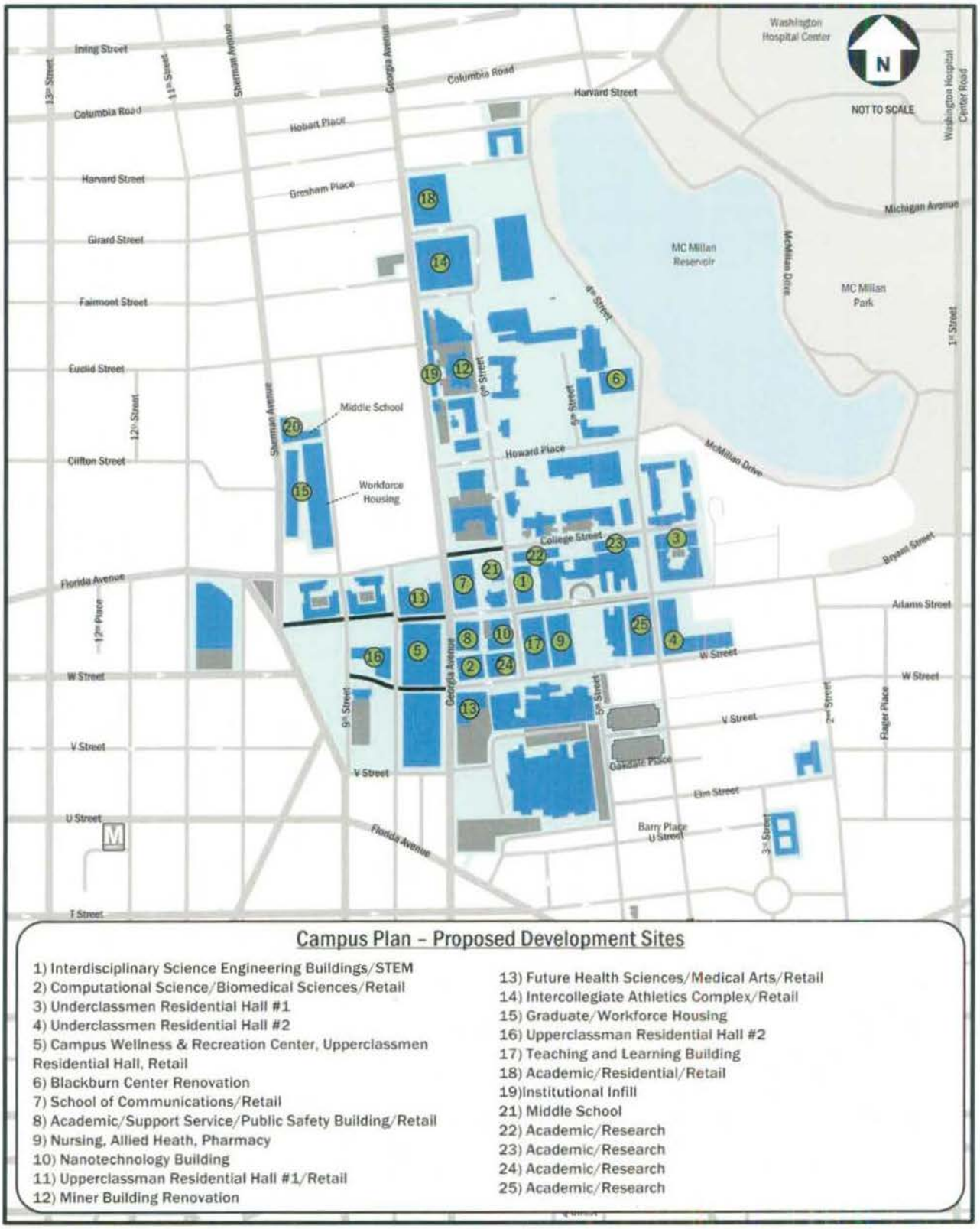
Table 23: Summary of Recommendations

Recommendation	Implementation
Parking Recommendations	
The HUCMP should not have a net increase in parking supply, and should have the goal of reducing demand to approximately 1,400 spaces in 2021, not including the demand associated with the Howard University Town Center, residents of the workforce housing, and non-campus use of the recreation center and ground floor retail spaces. A strong TDM plan should be used to reduce parking demand to accomplish this goal.	A TDM plan will be submitted separately by Nelson\Nygaard. Monitoring of parking demand will occur annually. When individual parcels are up for development on campus, during the Further Processing design and approval process, the monitoring of parking demand should be used to determine if the potential parking facilities identified in the HUCMP should be constructed.
The new garages should have access points that minimize conflicts with vehicles and pedestrians. This report contains recommendations on which of the potential new garages should be given priority.	When each parking facility is presented for Further Processing, an updated traffic impact study should be submitted focusing on access and conflicts.
Locate a primary visitor parking facility somewhere on campus. This report recommends garage #1, underneath the proposed wellness and recreation center. A public, cash parking facility could be constructed on one of the parking levels of the garage to serve visitors, retail patrons, and community recreation center users. If such a facility were constructed, this report recommends that prices be set to market rate or higher to not induce parking and traffic demand within campus.	As each parking facility is constructed, it should be reviewed for shared parking opportunities within its traffic study for Further Processing. The Further Processing Applications for the site with ground floor retail, and the wellness/recreation center will need to address the issue of patron parking.
East-West Connectivity Recommendations	
Howard Place: The plan proposes extending Howard Place between Georgia Avenue and Sherman Avenue as a pedestrian-oriented east-west connection.	This is a general recommendation to be implemented over the course of the Campus Plan.
Barry Place/College Street: The plan proposes constructing a section of College Street between Georgia Avenue and 6th Street when the current building occupying the potential street right-of-way is demolished as part of the Campus Plan.	To be studied and potential designed and implemented during the Further Processing of site 21.

Recommendation	Implementation
Bryant Street: The plan proposes that Bryant Street be extended to connect between Florida Avenue and Georgia Avenue. This proposed connection would be a two-way street.	From Georgia Ave to 9th Street: To be studied and potentially designed and implemented during the Further Processing of sites 5 and 11. From Georgia Ave to 8th Street: To be studied and potentially designed and implemented during the Further Processing of site 16.
W Street: The plan proposes that W Street be extended to connect between Florida Avenue and Georgia Avenue. This proposed connection would be a two-way street.	From Georgia Ave to 9th Street: To be studied and potentially designed and implemented during the Further Processing of site 5 and the Howard University Town Center. From Georgia Ave to 8th Street: To be studied and potentially designed and implemented during the Further Processing of site 16.
Transit, Pedestrian, & Bicycling Recommendations	
During Further Processing of development parcels along Georgia Avenue, review transit stations for potential improvements and consolidation.	Study during Further Processing applications for sites 5, 11, 13, 2, 8, 7, 19, 14, 18, and the Howard University Town Center.
Bring bicycle facilities closer to campus: Use 10th Street and Barry Place to connect bike lanes on W and V Streets with campus. Create a bicycle facility on 8th Street between R Street and Barry Place, which would require a bicycle-actuated traffic signal to cross Florida Avenue. Reconstruct Georgia Avenue to include bicycle facilities by implementing the Georgia Avenue Great Streets Plan, which includes a shared bus and bike lane for north and southbound traffic between Florida Avenue and Howard Place	These recommendations are all for DDOT to consider as they implement improved bicycle connections throughout the District.
Improve bicycle parking on campus Locate an enclosed and secure bicycle parking facility on campus (possibly in a parking garage in the first phase), targeted to commuters (faculty/staff and off-campus student). Make shower facilities available to commuters. The proposed Recreation Center building will have shower facilities, and is a potential location for an underground parking facility. If a parking facility were constructed at this parcel, it would provide an excellent opportunity to create a centralized long-term, commuter-based bicycle parking facility on campus that can accommodate most commuters with direct access to shower facilities. Add a Capital Bikeshare station to the southern side of campus aligned with the new bicycle routes.	Each parking garage constructed should be reviewed for bicycle parking opportunities during its Further Processing application. All new buildings constructed should be reviewed for potential short and long term bicycle parking facilities including showers. Details should be incorporated into their Further Processing applications. New bike racks should be installed over the course of the campus plan and their usage monitored as part of the TDM monitoring program. Racks that regularly get full should be expanded.

Recommendation	Implementation
Add bike racks outside of major campus buildings, focusing on those closest to bike routes and residence halls.	
Pedestrian Traffic Signals Add a traffic control device in the form of a traffic signal or stop sign at 4th Street and College Street to accommodate increased pedestrian activity anticipated between the campus quad and planned campus housing east of 4th Street. Consider a traffic signal at the potential future intersection of Florida Avenue and W Street to facilitate pedestrian and bicycle crossings of Florida Avenue and campus.	College & 4th Street: Perform a signal warrant analysis and constructed new signal if needed during Further Processing and construction of site 3. Florida & W Street: This is a general recommendation for DDOT to consider if the future section of W Street between 9th Street and Florida Avenue is constructed.
Add Leading Pedestrian Intervals (LPI) to traffic signals along Georgia Avenue in the study area to help facilitate pedestrian crossings and improve pedestrian safety.	This is a general recommendation for DDOT to consider.
Roadway Capacity and Operations	
Operational Changes (Signal Timings & On-Street Parking) The technical analysis of this report identified several areas where slight changes to signal timings and on-street parking regulations (removal of spaces to create turn lanes) could alleviate delays at the following intersections (details can be found in Table 19 within the report). • Harvard St/5th St • Howard Place/5th St/4th Street • Barry Pl/Sherman Ave • Barry Pl/Georgia Ave • W St/4th St In all of these intersections, unacceptable levels of delay occur in future scenarios regardless of implementation of the HUCMP.	These slight changes to operations and parking regulations are presented in the report for DDOT's consideration, as unacceptable delays are generated regardless of implementation of the HUCMP. When new parking facilities are proposed for the Howard Campus, the traffic studies performed for the Further Processing application should revisit these improvements to see if they should be incorporated into those site developments, if DDOT has not already implemented them.
Potential Need for Traffic Signal at College & 4th The roadway capacity analysis shows the potential for a large increase in delays at this intersection due to pedestrians generated by the new underclassmen residential halls east of 4th Street.	During the Further Processing of site 3, perform a signal warrant analysis for this intersection. If necessary, construct is as part of the site development.
Georgia Avenue Between Barry Place & Florida Avenue The Lower Georgia Avenue Great Streets preferred alternative converts general travel lanes in this stretch of Georgia Avenue into transit-only lanes, leaving one general travel lane in each direction. In all future scenarios studied in the roadway capacity analyses, this report found significant delays at these intersections, mostly associated with left turning traffic especially at the intersection of Georgia Avenue and Florida Avenue.	The ultimate decision on the configuration of Georgia Avenue will be made by DDOT. The benefits of transit-only lanes could outweigh delays to traffic, although severe traffic delays will generate illegal use of the transit lanes and could lead to safety concerns. The analysis and comparisons of different configurations of Georgia Avenue are presented for DDOT's review. A potential ultimate solution could entail using a

Recommendation	Implementation
Additional analyses contained in this report show that removing the transit-only lanes from the preferred alternative, or adding in left turn lanes (which would necessitate 9 to 10 foot wide lanes) could alleviate delays. An operational solution would be to not permit left turns at these intersections, but that would come at the cost of limiting local access and making drivers go around blocks searching for a path to their destination.	combination of the potential configurations.



Campus Plan – Proposed Development Sites

1) Interdisciplinary Science Engineering Buildings/STEM
2) Computational Science/Biomedical Sciences/Retail
3) Underclassmen Residential Hall #1
4) Underclassmen Residential Hall #2
5) Campus Wellness & Recreation Center, Upperclassmen Residential Hall, Retail
6) Blackburn Center Renovation
7) School of Communications/Retail
8) Academic/Support Service/Public Safety Building/Retail
9) Nursing, Allied Heath, Pharmacy
10) Nanotechnology Building
11) Upperclassman Residential Hall #1/Retail
12) Miner Building Renovation
13) Future Health Sciences/Medical Arts/Retail
14) Intercollegiate Athletics Complex/Retail
15) Graduate/Workforce Housing
16) Upperclassman Residential Hall #2
17) Teaching and Learning Building
18) Academic/Residential/Retail
19)Institutional Infill
21) Middle School
22) Academic/Research
23) Academic/Research
24) Academic/Research
25) Academic/Research

Figure 45: Campus Development Sites by Number


50.0'
50.0'
W STREET EXTENSION
55'-11"
BRYANT STREET EXTENSION
50.0'
50.0'
Bryant Street Center Line
Proposed ROW
Existing ROW
Existing Alley to be Closed
N
November 14, 2011
0
50
100
200 FT

NELSON
NYGAARD

MEMORANDUM

To: DDOT

From: Nelson\Nygaard Project Team

Date: October 12, 2011

Subject: Howard University TDM Plan: Responses to DDOT Questions

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The following memo summarizes the content of the TDM Plan that directly addresses the questions submitted by DDOT to Howard University regarding its draft HUCMP.

Questions Addressed by Nelson\Nygaard

Additional Details on HU Shuttle Services

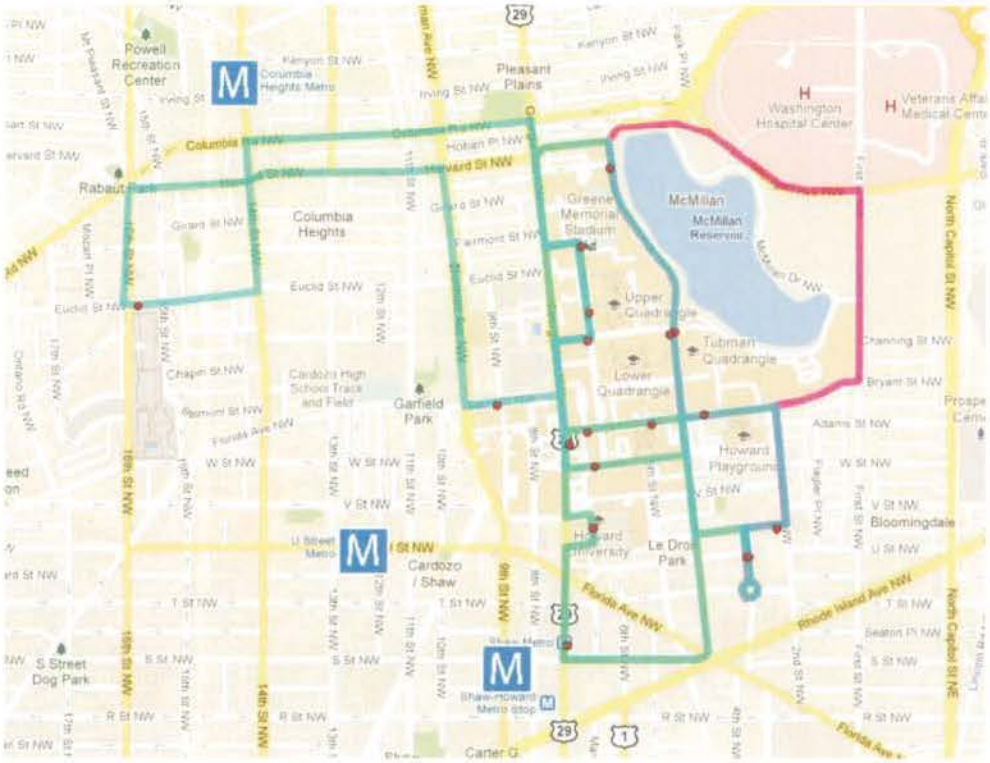
- *HU Shuttle Service data should be more comprehensive. "Ridership data provided by the University shows that approximately 962,500 riders utilized the HU shuttle system between January and October 2009." (p.22) Of the 962,500 riders, is it all students using this transportation service? When does the shuttle service operate? Is it 24/7? Do certain routes have more trips due to popularity or demand?*

Operations

Howard University Shuttle Bus Service (HUBS) is provided for the University's faculty, staff, students, and visitors to and from the Central Campus, various parking lots, dormitories, the School of Divinity, the School of Law, and other University based locations. Service to and from the Shaw/Howard University and Brookland/CUA Metro stations is also provided by HUBS. In addition, HUBS provides service to University Town Center (UTC) in Hyattsville, Maryland. This privately managed residential tower houses Howard University students, among other area university students. HUBS routes are organized as North Campus, North Express, South Campus, South Express, Divinity/East Campus, Law/West Campus, and University Town Center. Hybrid routes are operated on weekends and during the summer. The shuttles are free, but all patrons must present a valid ID card (validated Capstone ID cards for HU faculty/staff/students; passes are available from the Office of Parking & Shuttle Operations for visitors).

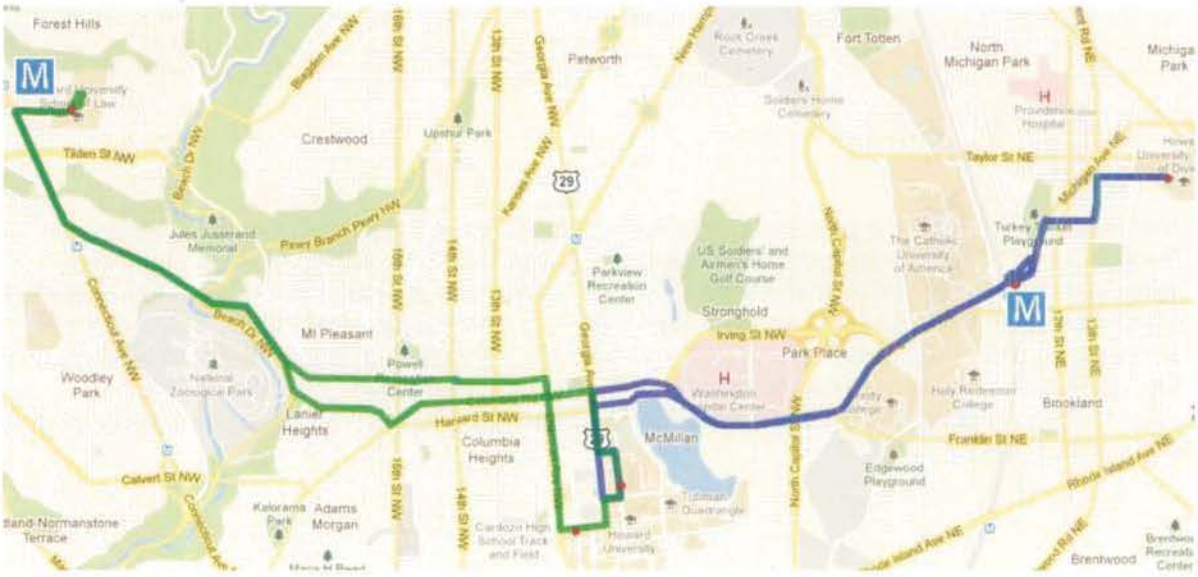
The North and South routes operate every 15-20 minutes from 7AM to 12:20AM on weekdays and until 3:00AM on Friday nights. The Divinity/East Campus route operates every 35 minutes weekdays from 8:00AM to 1:00PM and 4:00PM to 10:30PM. On Saturdays, the Divinity/East Campus route operates every 35 minutes from 10:00AM to 2:30PM. The Law/West Campus route operates every 50 minutes weekdays from 8:00AM to 6:00PM and 8:00PM to 11:30PM. The University Town Center route operates every 30 minutes weekdays from 7:00AM to 11:00AM and 7:30 to 11:30PM. The Weekend route operates every 20 minutes from 8:50AM to 12:30AM (Sunday night) and until 3:00AM (Saturday night).

Figure 1: Central Campus Shuttles



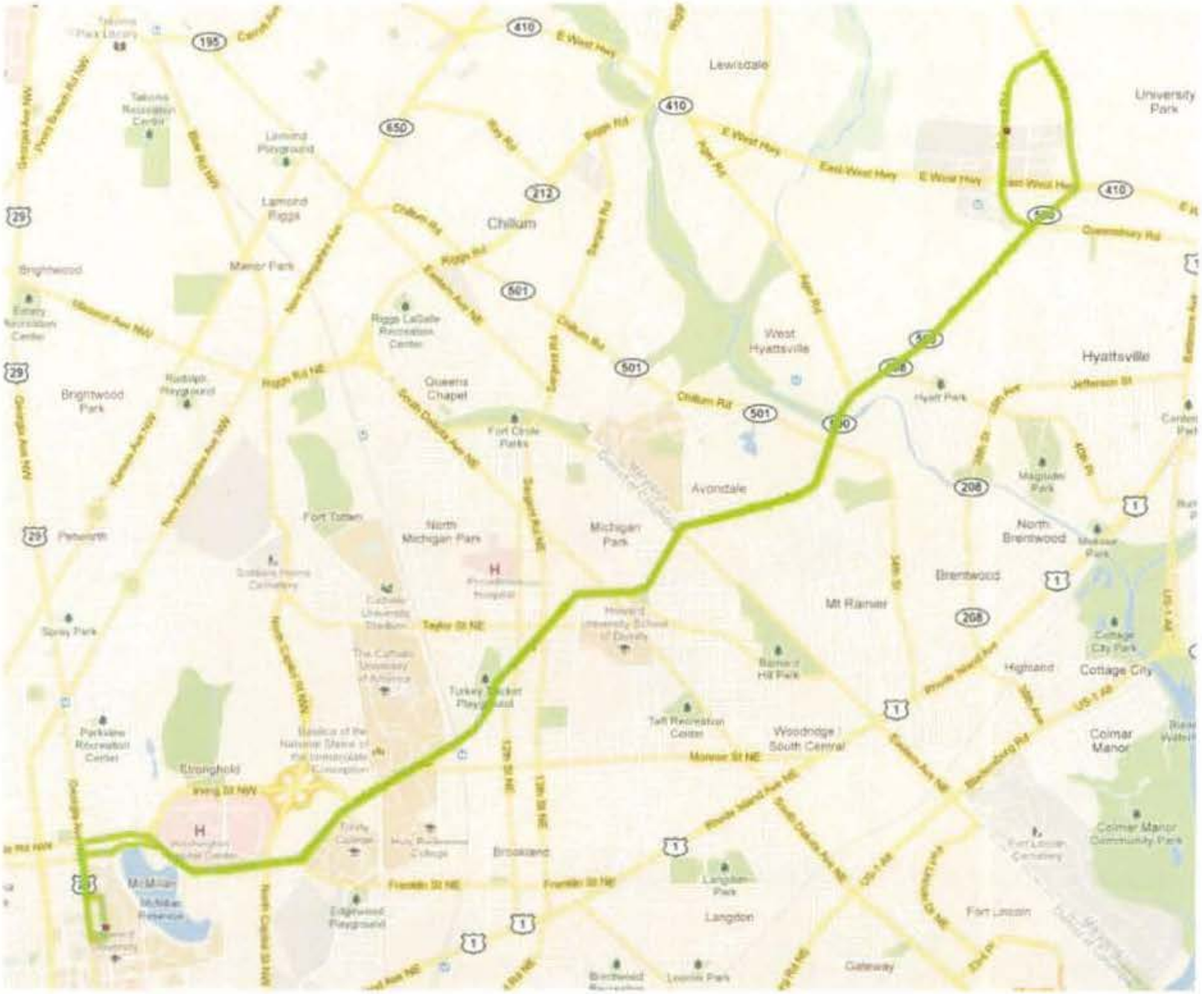
http://www.howardshuttle.com/

Figure 2: Law and Divinity School Connectors



http://www.howardshuttle.com/

Figure 3: Law and Divinity School Connectors



http://www.howardshuttle.com/

Ridership

Shuttle utilization over the past year has varied from a high of almost 5,000 riders per day in September 2010 to approximately 800 riders per day in May 2011 (aside from summer-only service months); see Figure 4 and Figure 5[1]. As is common at many universities, ridership starts high at the beginning of each semester, then generally decreases each month. This pattern is attributable to new students, faculty, and staff who are interested in using the transit system, but who find other more convenient options as the semester progresses. This indicates an opportunity to improve the shuttle system to hold on to more of the riders served at the beginning of the school year.

[1] Average daily ridership is based on calendar days, however not every route operates every day.

Figure 4: Average Daily Shuttle Ridership per Month

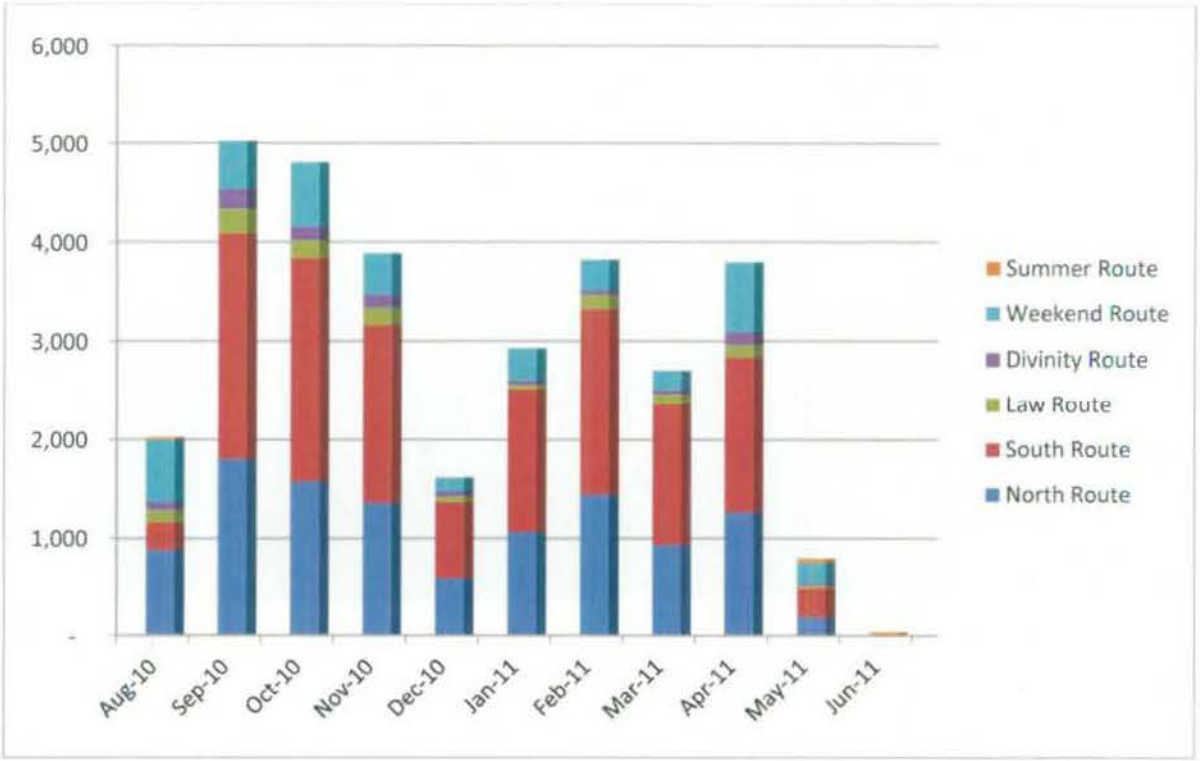


Figure 5: Average Daily Shuttle Ridership per Month

	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11
North Route	883	1,800	1,580	1,363	591	1,065	1,444	937	1,266	194	-
South Route	280	2,288	2,261	1,801	780	1,457	1,875	1,433	1,578	298	-
Law Route	123	241	173	165	56	44	148	99	117	27	-
Divinity Route	84	208	137	138	51	45	47	44	127	21	-
Weekend Route	629	490	657	421	136	319	309	198	709	213	-
Summer Route	28	-	-	-	8	2	-	-	-	45	44
Total Passengers/ Day	**2,027**	**5,027**	**4,808**	**3,887**	**1,621**	**2,931**	**3,823**	**2,711**	**3,797**	**798**	**44**

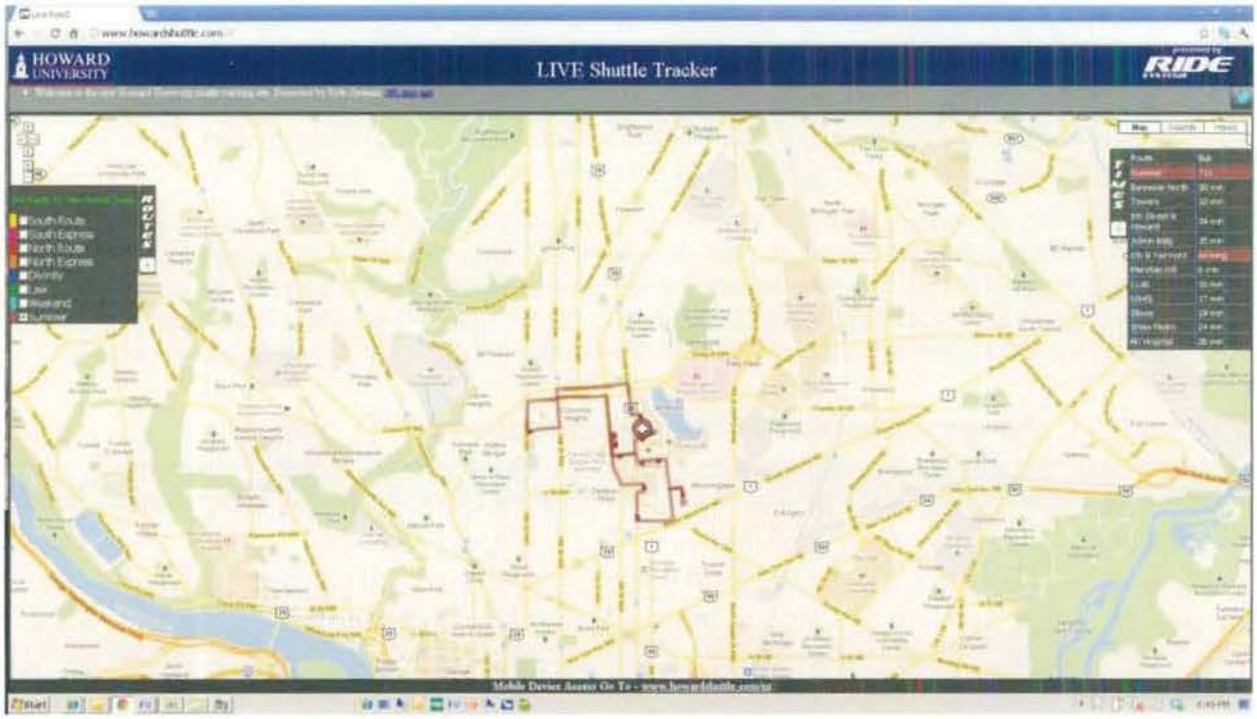
Bus Stops

Bus stop infrastructure to support the Howard University shuttle system generally consists of a post and sign. All stops include a text number to receive real time bus arrival information, while some locations also include printed schedule information.

Marketing and Information

Howard University implemented a GPS-based "Live Shuttle Tracker System provided by Ride Systems. The system tracks the location of vehicles on a map that can be accessed on the web or by mobile phone; vehicles report their location through a GPS transponder, and the feed is updated regularly. Figure 5 displays what users saw on a typical summer weekday; the arrow moves around the map in almost real-time (with a few seconds of delay possible). In addition to the Live Shuttle Tracker, Howard University's website provides complete schedule information.

Figure 6: Live Shuttle Tracker



Cost

Total HUBS costs for the 2010-11 school year were $1,328,000. Including the costs of adding the UTC shuttle in the fall of 2011, total 2011-12 HUBS costs are forecasted to roughly $1.5 million,

Suggestion to Expand Freshman Parking Ban

- *DDOT would prefer to see the University ban First Time and Sophomore students from bringing vehicles to campus, since parking is very limited. That would relieve the University of parking inventory. The University should also consider banning Junior class students from bringing vehicles to campus. Not having to build more parking to accommodate these students means those funds allocated for campus parking spaces could be used for a HU car sharing service.*

Students drive to campus at a significantly lower rate than do faculty/ staff members. In part, this may be due to the current ban on Freshman purchasing Central Campus parking permits. This is a common TDM and Parking Management strategy that forces most new students to become accustomed to commuting via non-driving modes. By design, it results in many students becoming familiar with modes, such as transit, carpooling, and cycling, to which they had little to no previous exposure as viable commute options. This long-exposure to modal alternatives has been shown to increase the likelihood that many will continue to use non-driving modes long after parking becomes an option.

The TDM Plan will consider the expansion of this ban to all new students and perhaps second-year students as a medium- to long-term TDM strategy, linked to how effectively immediate and short-term measures achieve the TDM Plan's goals and objectives.

Mode Splits

- *The report does not have a multi-modal split analysis to demonstrate to DDOT, or any reader, what the existing transportation choices may be. Please provide this analysis.*
- *"Parking is very limited and students are encouraged to rideshare or use alternatives to driving to campus." (p. 34) How many students opt to rideshare or use alternatives to driving to campus? Please provide this data.*

To assess current mode split conditions among Central Campus commuters, an online survey of student, faculty, and staff members was conducted. This survey included questions designed to develop a comprehensive understanding of the current mode choices being made, and the preferences and perspectives underlying those choices. Figure 6 provides rough population estimates for these three groups, along with the number of surveys completed by members of each.

Figure 7: Population and Sample Size Comparison

Population Category	Population	Number Surveyed	Proportion of Population Surveyed
Students	11,000	343	3%
Faculty	1,000	109	11%
Staff	2,300	236	10%
All	14,300	688	5%

To estimate the current mode split conditions within these groups, the survey contained the following question:

How do you most frequently travel to the Howard University Central Campus? (Please tell us the mode you use for the longest part of your trip. For example, if you walk to Metrorail and drive to Campus, please respond that you use Metrorail.)

The table and graphs below provide a summary of responses received from each group.

Figure 8: Mode Split Findings

Primary Central Campus Commute Mode	Faculty	Staff	Students
HU Shuttle Bus	2%	7%	35%
Metrobus	6%	6%	7%
Metrorail	11%	12%	17%
Private Vehicle (alone)	64%	57%	9%
Private Vehicle (as passenger)	3%	8%	1%
Bike	4%	1%	1%
Walking	10%	9%	31%

Note: Percentages may not total to 100% due to rounding.

Figure 9 - Faculty Mode Splits

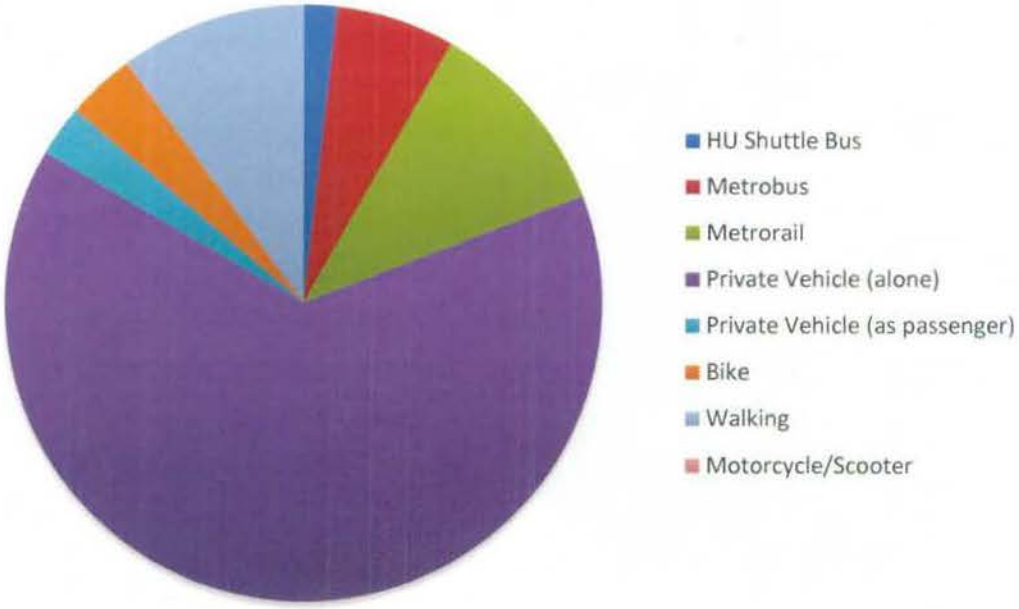


Figure 10 - Staff Mode Splits

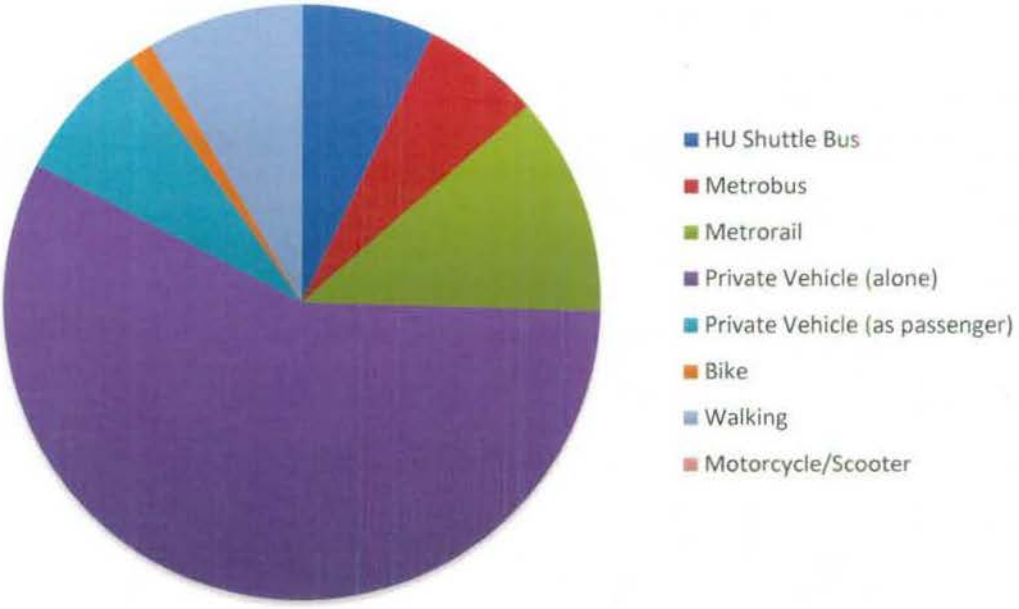
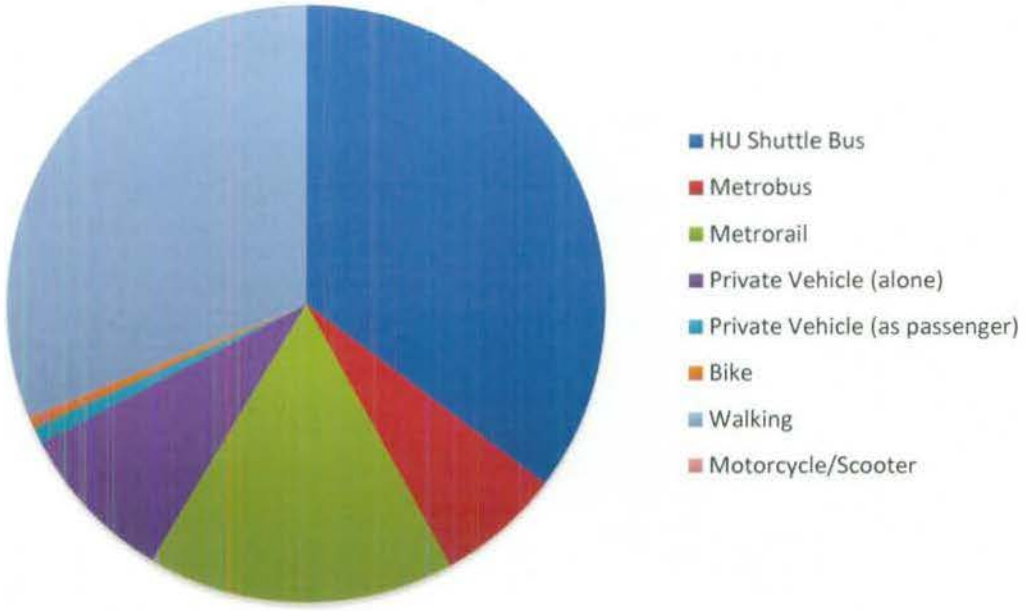


Figure 11 - Student Mode Splits



These findings are consistent with data on parking permit sales from 2010, which indicate that about 10% of students purchased an annual parking permit last year, while just over half of faculty and staff members did the same.[2]

Figure 12: 2010 Parking Permit Sales Data

Population Category	Population	Permits Purchased (2010)	% of Population with Permit (2010)
Students	11,000	1,053	10%
Faculty & Staff	3,300	1,779	54%

Employees Without a Parking Permit

- *"Employees who are unable to obtain a parking assignment must find alternatives to driving to campus." (p. 31) How many employees do not have a parking assignment? What is their mode of choice to travel to and from HU? Please provide this information.*

According to the Office of Parking and Shuttle Operations, the University has sufficient supply to offer a permit to every faculty/ staff member and eligible student who requests one, although not always at the lot of their preference. In all, 1,779 faculty/staff permits were sold in 2010 — representing just over half of the Central Campus faculty/staff population. Survey findings indicate that about 1,960 faculty and staff members drive to work, so 90% of drivers received permits. That leaves roughly 180 driving commuters who chose not to obtain a University parking permit. Figure 9 provides a summary of survey responses indicating where these drivers may be parking.

[2] Permit sales data disaggregated between faculty and staff was not available at the time of this study.

Figure 10: Stated Faculty/ Staff Auto Parking Locations

Where do you (driving commuters only) most frequently park?	Percent Response	Estimated Peak Daily Vehicle Count
A Howard University parking lot	91%	1,784
A non-Howard University parking lot or garage	1%	12
On-Street (metered)	7%	131
On-Street (non-metered, residential permit area)	1%	22
On-Street (non-metered, non-permit-area)	1%	12

From these survey responses, it can be estimated that around 160 employees are parking along local streets on most days, with the remaining non-permit drivers parking in non-HU lots or garages.

Among non-permit-holder University Employees who do not drive to work, survey responses indicate that Metrorail and Walking predominate among the range of mode choices — see Figure 7.

Current TDM Plan

- *The proposed TDM plan is inside of the report. Please explain what the current TDM plan (for the last 10 years) has been so we can understand what changes are being made to it. It will be best if you can provide a table/graph of existing TDM practices and compare directly against those being proposed.*

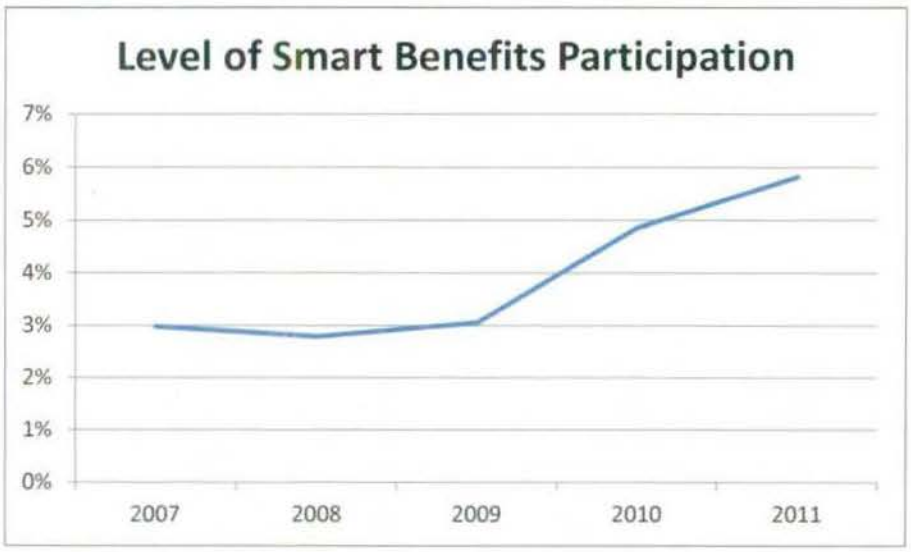
In addition to the campus shuttle services outlined above, — themselves, direct TDM investments designed to facilitate campus access — Howard University is committed to a series of investments and services that have proven success in reducing vehicle travel and parking demand in campus settings, including:

- On-campus housing - Howard's Residence Life system is currently capable of housing 45% of the total University enrollment.
- Bicycle parking — see below;
- Parking restrictions - Freshman students are ineligible to purchase annual parking permits;
- Parking charges - while most forms of parking are subsidized (user rates are kept below market value), none are free — see below;
- Car-share parking - Car-sharing (membership-based, short-term car rentals) has been shown to significantly reduce parking demand among participating members by allowing households to reduce their level of car ownership, and encouraging transit use among commuters who occasionally need to use a car during the work day. On-campus opportunities to access car-share vehicles can, therefore, be expected to reduce parking demand among campus residents as well as University faculty and staff. ZipCar, the nation's largest car-share organization, currently has nine vehicles located within the boundaries of the HUCMP, including seven within a short walk of the Lower Quadrangle. This is three times the number originally located on campus in 2007, and Zipcar is

currently discussing placing up to three more vehicles in University facilities. Howard faculty/ staff and students can join Zipcar for a discounted $15.3 Access to these cars is promoted to new students via student orientation materials and the University's Parking and Shuttle webpage.[4]

- WMATA SmartBenefits - The Washington Metropolitan Area Transit Authority's SmartBenefits program is a Web-based program that allows employers to provide transit-commuting benefits by directly adding value to employees' SmarTrip® cards, or into other transit or vanpool operator accounts via the Internet. The University's initiated its participation in the program in 2007. Since then, enrollment among eligible Howard University staff (all full-time University and Hospital employees) has nearly doubled; from 109 participants in 2007 to 191 in 2011. The participation rate among eligible employees, nonetheless remains just below 6%.

Figure 13: Smart Benefits Participation Trend



Existing Bike Parking Locations

- *Please provide a map showing existing bike parking (location, quantity, covered bike parking, etc) on the campus. I have reviewed the proposed bike parking map and it shows the proposed short term locations but it does not inform of the number of bicycle parking spaces and whether they are covered.*

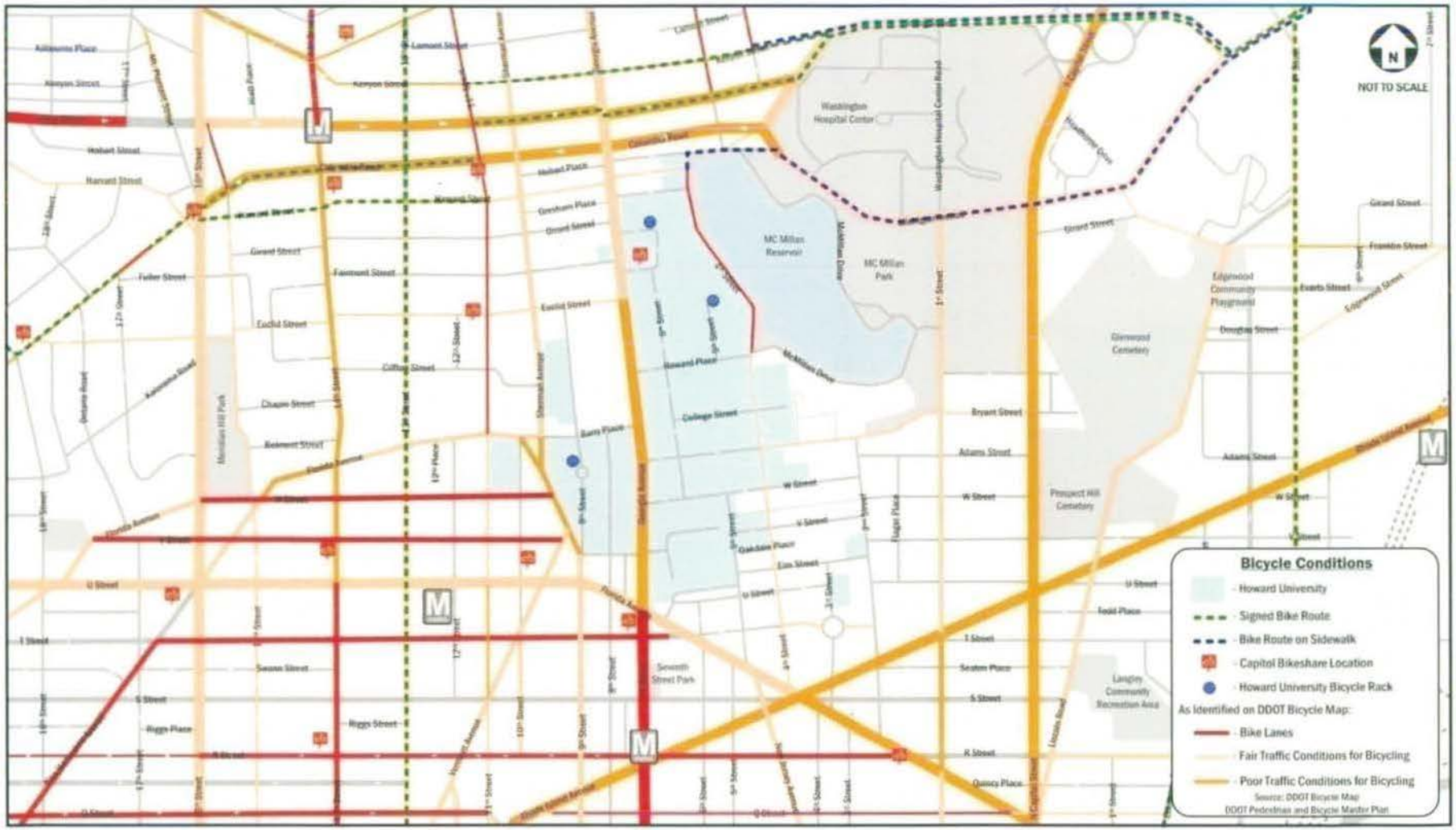
[3] http://www.zipcar.com/howard/
[4] http://auxiliary.howard.edu/parking--shuttle.html

Figure 14: Capital BikeShare Station at Georgia Avenue and Fairmount Street

There are several cycling facilities surrounding the Central Campus, including on-street bike lanes, signed bike routes, and three Capitol Bikeshare stations (see Figure 12). However, gaps between these bicycle facilities and the Central Campus, as well as limited or missing amenities on-campus (particularly secure, sheltered parking opportunities) limit the potential of this network to serve Central Campus access needs.

The following map identifies the locations of University bike racks and Capital BikeShare facilities.

Figure 15: Area Bicycle Infrastructure and Campus Bike Parking Locations



Map: Gorove/Slade

There are currently no formal, covered bike parking facilities on campus. However, findings from the online survey noted above indicate that faculty and staff bicycle commuters are parking their bikes indoors, likely within non-specified areas of the building in which they work.

Figure 16: Bike Parking Locations

Where do you (bike commuters only) most frequently park your bike?	Faculty	Staff	Students
At a rack, at or within a 5 minute walk of my primary destination.	25%	0%	0%
At a rack, more than a 5 minute walk away from my primary destination	0%	0%	0%
Outside, not at a rack, at or within a 5 minute walk of my primary destination	25%	0%	0%
Outside, not at a rack, more than a 5 minute walk away from my primary destination	0%	0%	0%
Inside a building, at my primary destination	50%	100%	0%
Inside another building (please specify where)	0%	0%	0%
Other (please specify)	0%	0%	100%

These responses indicate that the lack of on campus bike parking limits the appeal of bike commuting to those with building-interior space for storing their bikes during the work day.

Questions to be Addressed by Others

Removal of On-Street Parking

- *"Examine the spot removal of on-street parking on campus to assist in HU Shuttle operations." (p. 29) Any parking removal for HU Shuttle operations should be better diagrammed before the public hearing. Please provide that map.*

Gorove/Slade suggested that some removal of on-street parking may be warranted to accommodate "increased pedestrian demand". Nelson\Nygaard will not be including any recommendations to remove on-street parking in its TDM Plan. DDOT's request to map and diagram suggested space removal is therefore not addressed.

Growth Rate Assumptions for Traffic Model

- *I will defer to DDOT engineers to provide comment on the .5% background growth rate. However, that growth rate may pose a problem as has been discussed with previous campus plans. "In addition to the background developments, other traffic increased due to inherent growth on the study area roadways were accounted for with a 0.5% per year growth rate compounded annually over the study period (2009/2011-2020)." (p. 6)*

Gorove/Slade will work with DDOT to determine the appropriate growth rate for their traffic assessment. This rate will have no bearing on the findings or recommendations of the TDM Report.