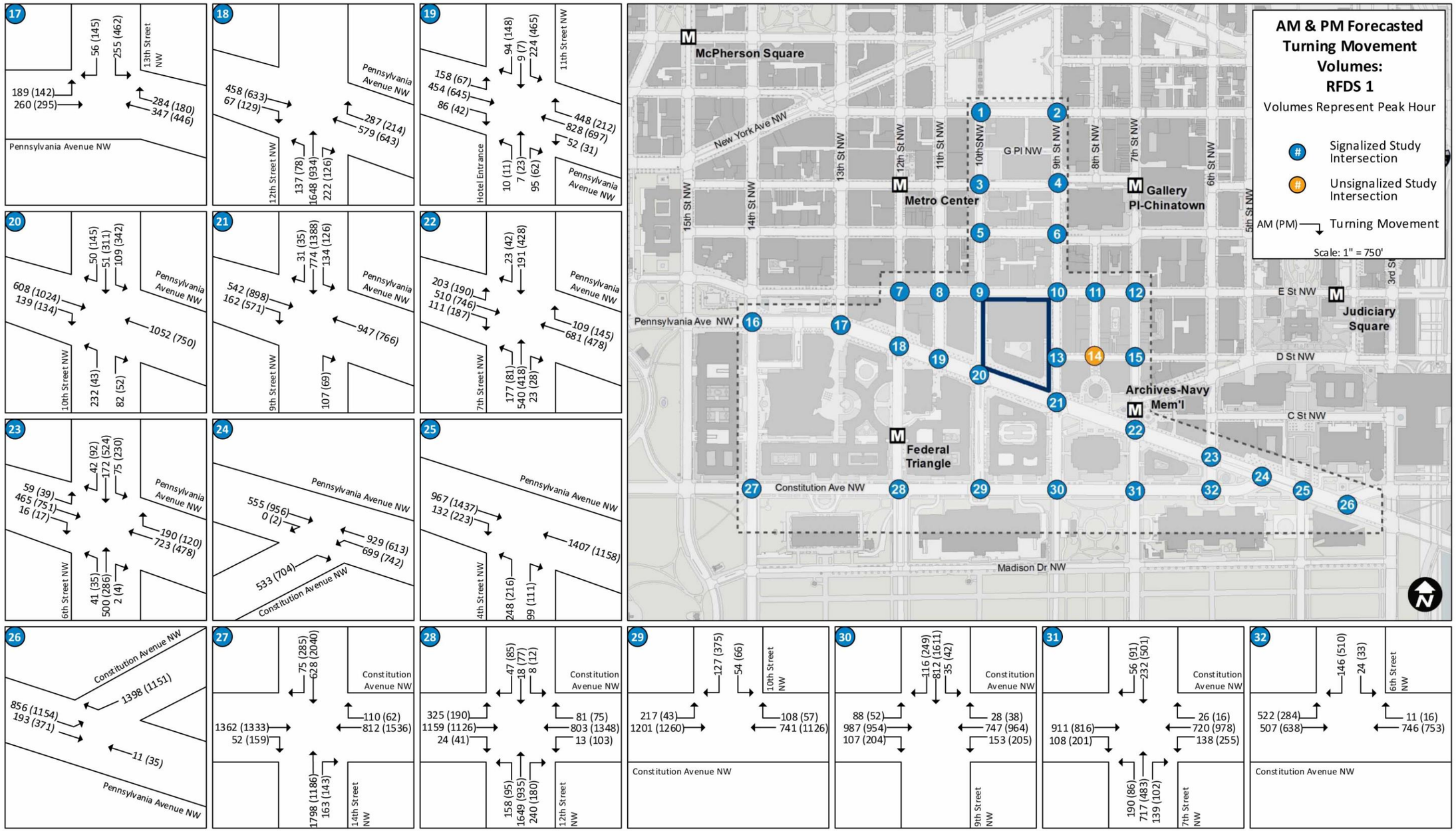
Figure 5-2: RFDS 1 AM and PM Forecasted Turning Movement Volumes (continued)



5.1.7.3 RFDS 1 Operations Analysis

Based on the Synchro™ signalized intersection analysis, the majority of the study intersections would operate at acceptable conditions during the AM and PM peak hours in 2025. However, as in the No-action Alternative, the intersection of 6th Street NW and Pennsylvania Avenue NW would operate at LOS E during the PM peak hour. Under RFDS 1, the intersection of 12th Street NW and Constitution Avenue NW would also fail, operating at LOS E during the PM peak hour. These are the only intersections within the study area that would operate under unacceptable conditions (LOS E or LOS F) during a peak hour period in 2025. None of the study area intersections would operate at LOS F during a peak hour.

The following approaches to intersections would operate at unacceptable conditions (LOS E or LOS F) during the peak hour in 2025 under RFDS 1:

- 9th Street NW and G Street NW (Intersection #4)
    - Eastbound G Street (overall) during the PM peak hour
- 9th Street NW and F Street NW (Intersection #6)
    - Southbound 9th Street (overall) during the PM peak hour
- 9th Street NW and E Street NW (Intersection #10)
    - Southbound 9th Street (overall) during the PM peak hour
- 8th Street NW and E Street NW (Intersection #11)
    - Northbound 8th Street (overall) during the AM peak hour
- 7th Street NW and D Street NW (Intersection #15)
    - Northbound 7th Street (overall) during the AM peak hour
- 13th Street NW and Pennsylvania Avenue NW (Intersection #17)
    - Eastbound Pennsylvania Avenue (overall) during the AM peak hour
- 12th Street NW and Pennsylvania Avenue NW (Intersection #18)
    - Northbound 12th Street (overall) during the AM peak hour
- 11th Street NW and Pennsylvania Avenue NW (Intersection #19)
    - Eastbound Pennsylvania Avenue (left turns), westbound Pennsylvania Avenue (right turns) and southbound 11th Street (overall) during the AM and PM peak hour
- 10th Street NW and Pennsylvania Avenue NW (Intersection #20)
    - Northbound 10th Street (overall) during the AM and PM peak hour
    - Southbound 10th Street (overall) during the PM peak hour
- 7th Street NW and Pennsylvania Avenue (Intersection #22)
    - Eastbound Pennsylvania Avenue (overall) and northbound 7th Street (left turns) during the AM peak hour
    - Eastbound Pennsylvania Avenue (left turns) and northbound 7th Street (left turns) during the PM peak hour
- 6th Street NW and Pennsylvania Avenue NW (Intersection #23)
    - Eastbound Pennsylvania Avenue (left turns) during the AM peak hour
    - Southbound 6th Street (overall) during the PM peak hour
- Constitution Avenue (WB) NW and Pennsylvania Avenue NW (Intersection #24)
    - Westbound Pennsylvania Avenue (left turns) during the PM peak hour
- 14th Street NW and Constitution Avenue NW (Intersection #27)
    - Southbound 14th Street (overall) during the PM peak hour
- 12th Street NW and Constitution Avenue NW (Intersection #28)
    - Northbound 12th Street (overall) during both the AM and PM peak hours
    - Eastbound Constitution Avenue (left turns) during the AM peak hour
- 9th Street NW and Constitution Avenue NW (Intersection #30)

    - Eastbound Constitution Avenue (overall) during the PM peak hour
- 6th Street NW and Constitution Avenue NW (Intersection #32)
    - Eastbound Constitution Avenue (left turns) during the AM peak hour

Based on the Synchro™ unsignalized intersection analysis, all the unsignalized intersections in the study area would operate at acceptable conditions during the morning and afternoon peak hours.

Complete Intersection Operations Analysis

This section summarizes the differences in LOS impacts between RFDS 1 and the No-action Alternative by quantifying the change in intersection operation failures. Following the summary, this section also includes the complete results of the operations analysis in figures and a table.

Based on the Synchro™ signalized intersection analysis, a total of 16 signalized intersections would experience an unacceptable conditions for one or more turning movements. Compared to the No-Action Alternative, RFDS 1 would have one more intersection failing during the AM peak hour and no change in the number of intersections failing during the PM peak hour. In the AM peak hour, compared to the No-action Alternative, there is one intersection that passed overall but would now fail, 31 that would not change, and zero that were failing but would now pass. In the PM peak hour, there are zero intersections that passed overall but would now fail, 32 that would not change, and zero that were failing but would now pass.

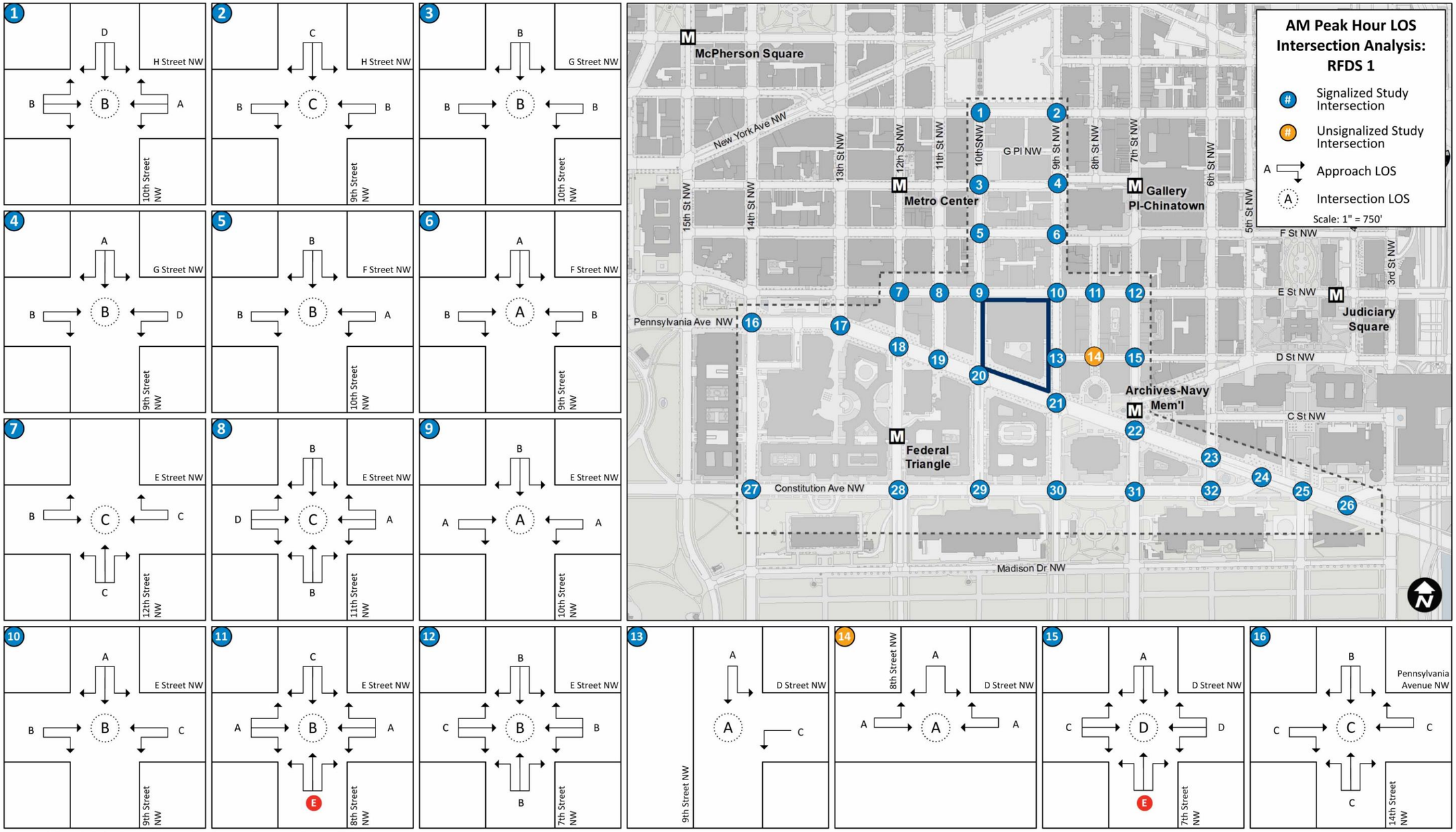
The following table, table 5-18, provides a summary of the number of intersections that meet the following criteria for the overall directional approach that would change between the No-action Alternative and RFDS 1:

Table 5-18: Intersection Operations Summary Comparing No-action Alternative and RFDS 1

Type of Change Between Conditions	AM	PM
New Failing Approach	3	1
Additional Failing Approaches	0	0
No Change	29	31
Fewer Failing Approaches	0	0
No Failing Approaches	0	0
Total Signalized and Unsignalized Intersections	**32**	**32**

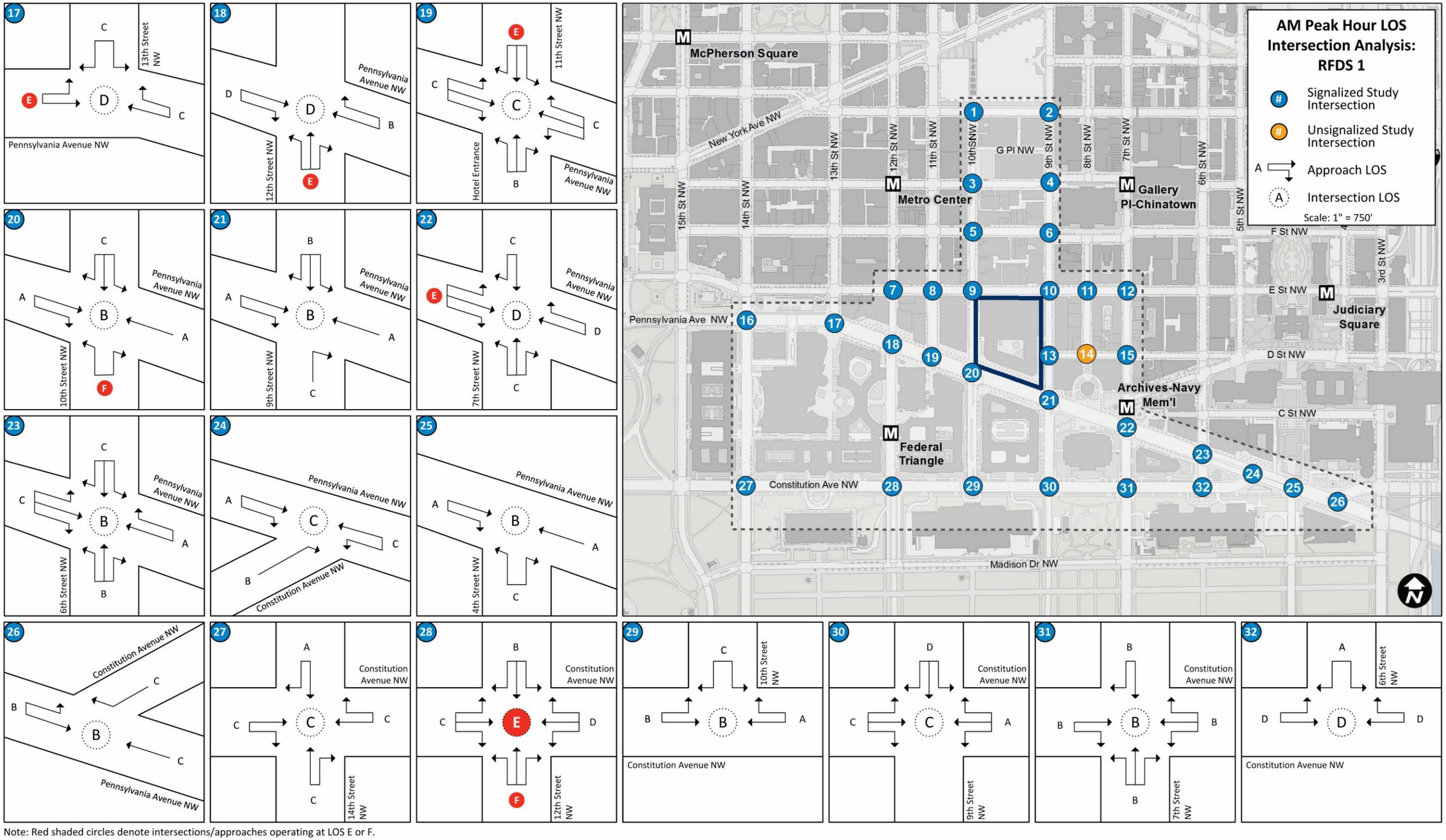
The average LOS for the various approaches to the intersections and the overall intersection LOS grades for RFDS 1 are shown in figures 5-3 and 5-4 for the AM and PM peak hours, respectively. Table 5-19 shows the LOS capacity analysis and the intersection projected delay comparison between the No-action Alternative and RFDS 1 during the AM and PM peak hours.

Figure 5-3: RFDS 1 Intersection LOS for AM Peak Hour



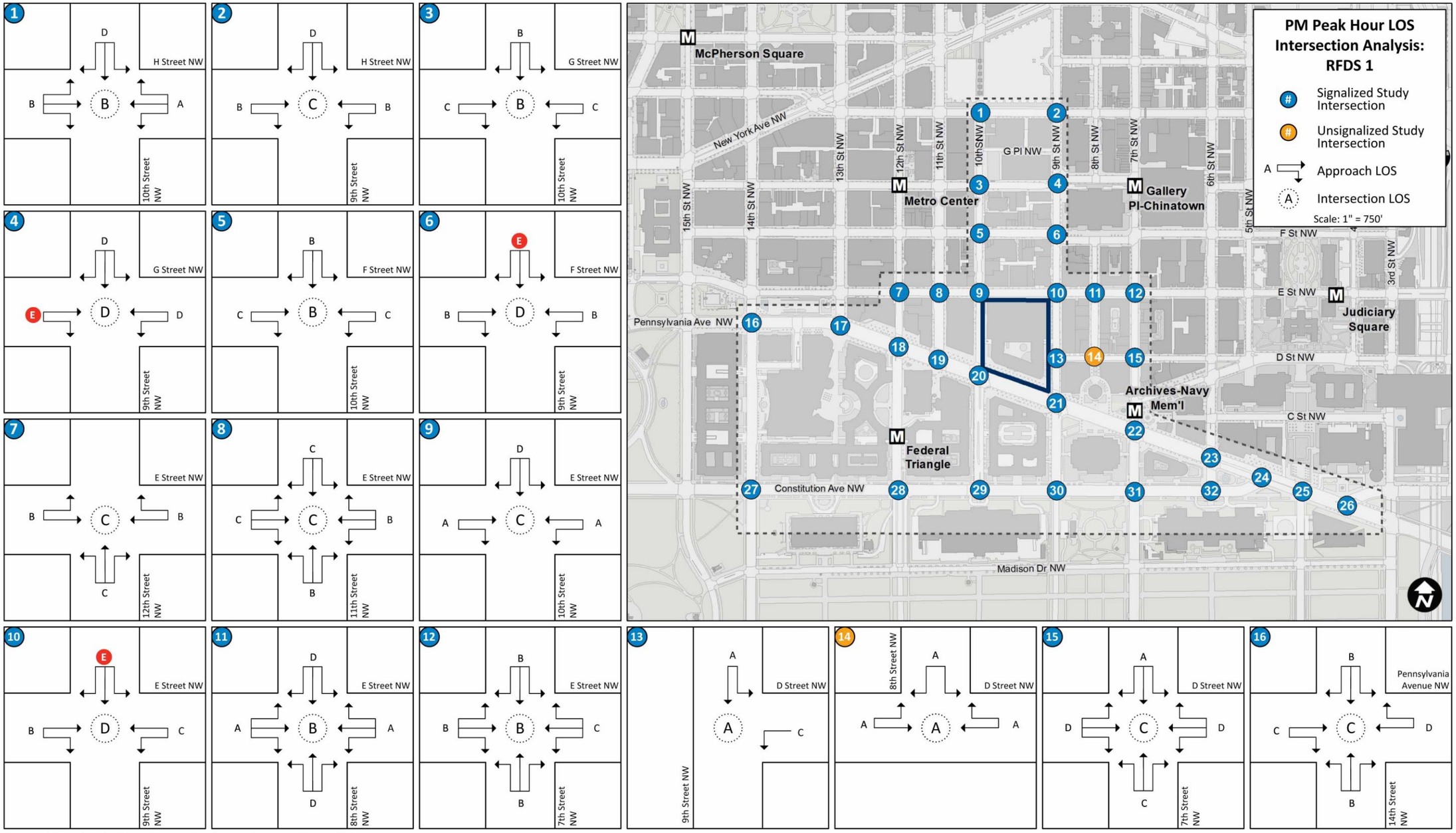
Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Figure 5-3: RFDS 1 Intersection LOS for AM Peak Hour (continued)



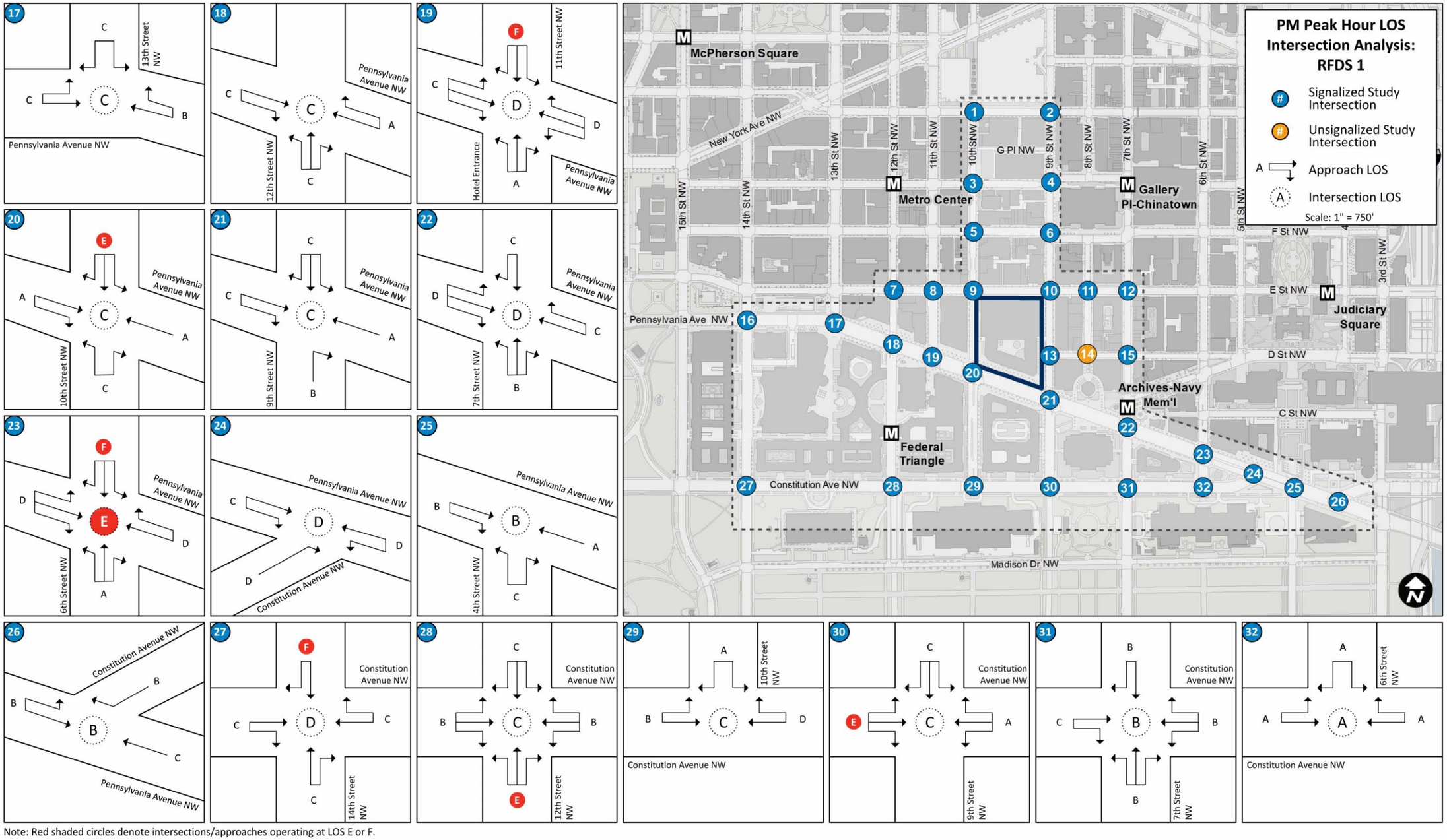
Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Figure 5-4: RFDS 1 Intersection LOS for PM Peak Hour



Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Figure 5-4: RFDS 1 Intersection LOS for PM Peak Hour (continued)



Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
1	**10th Street NW & H Street NW (Signalized)**													
	EB (H Street)	LTR	10.8	B		12.6	B		11.0	B		12.7	B	
	Eastbound (H Street)		**10.8**	**B**		**12.6**	**B**		**11.0**	**B**		**12.7**	**B**	
	WB (H Street)	LTR	3.1	A		4.9	A		3.1	A		4.9	A	
	Westbound (H Street)		**3.1**	**A**		**4.9**	**A**		**3.1**	**A**		**4.9**	**A**	
	SB (10th Street)	LTR	41.8	D		53.0	D		41.8	D		53.0	D	
	Southbound (10th Street)		**41.8**	**D**		**53.0**	**D**		**41.8**	**D**		**53.0**	**D**	
	Overall		**12.8**	**B**	**Pass**	**19.6**	**B**	**Pass**	**12.9**	**B**	**Pass**	**19.6**	**B**	**Pass**
2	**9th Street NW & H Street NW (Signalized)**													
	EB (H Street)	TR	12.7	B		12.5	B		12.7	B		12.5	B	
	Eastbound (H Street)		**12.7**	**B**		**12.5**	**B**		**12.7**	**B**		**12.5**	**B**	
	WB (H Street)	LT	19.8	B		16.3	B		19.8	B		16.3	B	
	Westbound (H Street)		**19.8**	**B**		**16.3**	**B**		**19.8**	**B**		**16.3**	**B**	
	SB (9th Street)	LT	26.3	C		38.8	D		26.3	C		38.8	D	
	SB (9th Street)	R	4.3	A		5.2	A		4.3	A		5.2	A	
	Southbound (9th Street)		**23.9**	**C**		**36.2**	**D**		**23.9**	**C**		**36.2**	**D**	
	Overall		**20.3**	**C**	**Pass**	**24.7**	**C**	**Pass**	**20.3**	**C**	**Pass**	**24.6**	**C**	**Pass**
3	**10th Street NW & G Street NW (Signalized)**													
	EB (G Street)	TR	18.0	B		27.8	C		17.6	B		28.1	C	
	Eastbound (G Street)		**18.0**	**B**		**27.8**	**C**		**17.6**	**B**		**28.1**	**C**	
	WB (G Street)	LT	10.5	B		24.2	C		10.5	B		24.4	C	
	Westbound (G Street)		**10.5**	**B**		**24.2**	**C**		**10.5**	**B**		**24.4**	**C**	
	SB (10th Street)	LTR	14.5	B		10.2	B		15.5	B		10.4	B	
	Southbound (10th Street)		**14.5**	**B**		**10.2**	**B**		**15.5**	**B**		**10.4**	**B**	
	Overall		**14.6**	**B**	**Pass**	**18.2**	**B**	**Pass**	**15.1**	**B**	**Pass**	**18.4**	**B**	**Pass**
4	**9th Street NW & G Street NW (Signalized)**													
	EB (G Street)	TR	13.7	B		72.5	E		14.1	B		72.7	E	
	Eastbound (G Street)		**13.7**	**B**		**72.5**	**E**		**14.1**	**B**		**72.7**	**E**	
	WB (G Street)	L	43.0	D		45.0	D		43.0	D		45.0	D	
	WB (G Street)	T	47.4	D		44.0	D		47.4	D		44.0	D	
	Westbound (G Street)		**46.0**	**D**		**44.5**	**D**		**46.0**	**D**		**44.5**	**D**	
	SB (9th Street)	LT	10.0	A		44.3	D		9.9	A		44.3	D	
	SB (9th Street)	R	0.6	A		1.5	A		0.6	A		1.5	A	
	Southbound (9th Street)		**9.5**	**A**		**39.8**	**D**		**9.5**	**A**		**39.8**	**D**	
	Overall		**13.0**	**B**	**Pass**	**45.7**	**D**	**Pass**	**13.0**	**B**	**Pass**	**45.7**	**D**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
5	**10th Street NW & F Street NW (Signalized)**													
	EB (F Street)	TR	12.0	B		24.1	C		12.0	B		24.1	C	
	Eastbound (F Street)		**12.0**	**B**		**24.1**	**C**		**12.0**	**B**		**24.1**	**C**	
	WB (F Street)	LT	9.1	A		21.0	C		9.1	A		21.0	C	
	Westbound (F Street)		**9.1**	**A**		**21.0**	**C**		**9.1**	**A**		**21.0**	**C**	
	SB (10th Street)	LTR	14.9	B		11.0	B		15.6	B		11.1	B	
	Southbound (10th Street)		**14.9**	**B**		**11.0**	**B**		**15.6**	**B**		**11.1**	**B**	
	Overall		**12.1**	**B**	**Pass**	**17.4**	**B**	**Pass**	**12.6**	**B**	**Pass**	**17.3**	**B**	**Pass**
6	**9th Street NW & F Street NW (Signalized)**													
	EB (F Street)	TR	13.4	B		14.2	B		13.4	B		14.2	B	
	Eastbound (F Street)		**13.4**	**B**		**14.2**	**B**		**13.4**	**B**		**14.2**	**B**	
	WB (F Street)	LT	18.6	B		19.4	B		18.6	B		19.4	B	
	Westbound (F Street)		**18.6**	**B**		**19.4**	**B**		**18.6**	**B**		**19.4**	**B**	
	SB (9th Street)	LTR	7.4	A		55.5	E		7.4	A		55.5	E	
	Southbound (9th Street)		**7.4**	**A**		**55.5**	**E**		**7.4**	**A**		**55.5**	**E**	
	Overall		**9.8**	**A**	**Pass**	**41.5**	**D**	**Pass**	**9.8**	**A**	**Pass**	**41.5**	**D**	**Pass**
7	**12th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	19.2	B		16.0	B		19.2	B		16.0	B	
	EB (E Street)	T	15.5	B		14.6	B		15.5	B		14.6	B	
	Eastbound (E Street)		**17.1**	**B**		**15.0**	**B**		**17.1**	**B**		**15.0**	**B**	
	WB (E Street)	TR	21.9	C		13.5	B		22.0	C		13.4	B	
	Westbound (E Street)		**21.9**	**C**		**13.5**	**B**		**22.0**	**C**		**13.4**	**B**	
	NB (12th Street)	LTR	22.4	C		31.9	C		23.3	C		32.4	C	
	Northbound (12th Street)		**22.4**	**C**		**31.9**	**C**		**23.3**	**C**		**32.4**	**C**	
	Overall		**21.8**	**C**	**Pass**	**26.3**	**C**	**Pass**	**22.6**	**C**	**Pass**	**26.8**	**C**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
8	**11th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	10.4	B		21.4	C		10.1	B		22.6	C	
	EB (E Street)	T	20.1	C		27.0	C		52.6	D		30.5	C	
	EB (E Street)	R	9.6	A		20.7	C		9.3	A		22.0	C	
	Eastbound (E Street)		**18.2**	**B**		**26.0**	**C**		**45.8**	**D**		**29.3**	**C**	
	WB (E Street)	L	6.3	A		16.2	B		7.4	A		16.2	B	
	WB (E Street)	T	8.1	A		21.8	C		8.9	A		21.7	C	
	WB (E Street)	R	3.6	A		14.7	B		4.3	A		14.6	B	
	Westbound (E Street)		**6.8**	**A**		**19.5**	**B**		**7.6**	**A**		**19.4**	**B**	
	NB (11th Street)	LT	13.7	B		22.0	C		13.4	B		21.0	C	
	NB (11th Street)	R	11.6	B		15.4	B		13.5	B		15.3	B	
	Northbound (11th Street)		**13.2**	**B**		**20.5**	**C**		**13.4**	**B**		**19.7**	**B**	
	SB (11th Street)	LT	23.0	C		33.3	C		23.0	C		33.3	C	
	SB (11th Street)	R	5.7	A		21.8	C		5.7	A		21.8	C	
	Southbound (11th Street)		**19.6**	**B**		**31.5**	**C**		**19.6**	**B**		**31.5**	**C**	
	Overall		**14.7**	**B**	**Pass**	**26.4**	**C**	**Pass**	**22.9**	**C**	**Pass**	**26.8**	**C**	**Pass**
9	**10th Street NW & E Street NW (Signalized)**													
	EB (E Street)	T	11.4	B		5.3	A		10.4	B		5.0	A	
	EB (E Street)	R	5.0	A		1.9	A		7.3	A		2.6	A	
	Eastbound (E Street)		**8.5**	**A**		**4.4**	**A**		**8.7**	**A**		**4.1**	**A**	
	WB (E Street)	L	2.9	A		1.2	A		6.3	A		1.3	A	
	WB (E Street)	T	3.1	A		1.5	A		5.3	A		1.4	A	
	Westbound (E Street)		**3.0**	**A**		**1.4**	**A**		**5.6**	**A**		**1.4**	**A**	
	SB (10th Street)	LTR	19.0	B		48.4	D		18.8	B		49.4	D	
	Southbound (9th Street)		**19.0**	**B**		**48.4**	**D**		**18.8**	**B**		**49.4**	**D**	
	Overall		**8.8**	**A**	**Pass**	**24.8**	**C**	**Pass**	**9.7**	**A**	**Pass**	**24.4**	**C**	**Pass**
10	**9th Street NW & E Street NW (Signalized)**													
	EB (E Street)	T	14.8	B		16.7	B		18.0	B		17.1	B	
	EB (E Street)	R	8.6	A		14.0	B		11.2	B		14.4	B	
	Eastbound (E Street)		**13.2**	**B**		**15.8**	**B**		**16.3**	**B**		**16.1**	**B**	
	WB (E Street)	L	18.8	B		22.8	C		17.7	B		22.5	C	
	WB (E Street)	T	25.8	C		24.9	C		27.4	C		25.2	C	
	Westbound (E Street)		**24.9**	**C**		**24.4**	**C**		**26.4**	**C**		**24.5**	**C**	
	SB (9th Street)	LTR	9.3	A		64.7	E		9.3	A		64.7	E	
	Southbound (9th Street)		**9.3**	**A**		**64.7**	**E**		**9.3**	**A**		**64.7**	**E**	
	Overall		**13.0**	**B**	**Pass**	**46.2**	**D**	**Pass**	**14.4**	**B**	**Pass**	**46.1**	**D**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
11	**8th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	8.2	A		2.4	A		8.5	A		2.4	A	
	EB (E Street)	T	10.7	B		3.2	A		11.1	B		3.2	A	
	EB (E Street)	R	4.9	A		0.4	A		5.1	A		0.4	A	
	Eastbound (E Street)		**9.2**	**A**		**2.9**	**A**		**9.5**	**A**		**2.9**	**A**	
	WB (E Street)	L	5.4	A		3.0	A		5.6	A		3.5	A	
	WB (E Street)	T	6.2	A		3.4	A		7.1	A		4.0	A	
	WB (E Street)	R	1.0	A		0.5	A		1.0	A		0.7	A	
	Westbound (E Street)		**5.8**	**A**		**3.2**	**A**		**6.6**	**A**		**3.8**	**A**	
	NB (8th Street)	LTR	39.6	D		44.9	D		59.6	E		45.5	D	
	Northbound (8th Street)		**39.6**	**D**		**44.9**	**D**		**59.6**	**E**		**45.5**	**D**	
	SB (8th Street)	LTR	28.7	C		42.6	D		29.3	C		42.8	D	
	Southbound (8th Street)		**28.7**	**C**		**42.6**	**D**		**29.3**	**C**		**42.8**	**D**	
	Overall		**13.7**	**B**	**Pass**	**13.5**	**B**	**Pass**	**16.6**	**B**	**Pass**	**13.7**	**B**	**Pass**
12	**7th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	20.2	C		12.9	B		20.5	C		12.9	B	
	EB (E Street)	T	23.6	C		17.2	B		23.8	C		17.2	B	
	EB (E Street)	R	9.5	A		9.9	A		9.8	A		9.9	A	
	Eastbound (E Street)		**21.8**	**C**		**14.8**	**B**		**22.0**	**C**		**14.8**	**B**	
	WB (E Street)	L	15.5	B		21.6	C		15.5	B		21.6	C	
	WB (E Street)	T	21.3	C		26.2	C		21.3	C		26.2	C	
	WB (E Street)	R	7.5	A		14.3	B		7.5	A		14.3	B	
	Westbound (E Street)		**19.6**	**B**		**24.0**	**C**		**19.6**	**B**		**24.0**	**C**	
	NB (7th Street)	LT	20.1	C		18.0	B		20.4	C		18.3	B	
	NB (7th Street)	R	10.1	B		13.5	B		10.3	B		13.7	B	
	Northbound (7th Street)		**18.7**	**B**		**17.5**	**B**		**19.0**	**B**		**17.8**	**B**	
	SB (7th Street)	LTR	18.5	B		17.8	B		16.3	B		18.2	B	
	Southbound (7th Street)		**18.5**	**B**		**17.8**	**B**		**16.3**	**B**		**18.2**	**B**	
	Overall		**19.4**	**B**	**Pass**	**18.7**	**B**	**Pass**	**19.1**	**B**	**Pass**	**18.9**	**B**	**Pass**
13	**9th Street NW & D Street NW (Signalized)**													
	WB (D Street)	L	20.3	C		26.0	C		20.3	C		26.0	C	
	Westbound (D Street)		**20.3**	**C**		**26.0**	**C**		**20.3**	**C**		**26.0**	**C**	
	SB (9th Street)	LT	5.5	A		5.8	A		5.5	A		5.8	A	
	Southbound (9th Street)		**5.5**	**A**		**5.8**	**A**		**5.5**	**A**		**5.8**	**A**	
	Overall		**7.7**	**A**	**Pass**	**8.1**	**A**	**Pass**	**7.7**	**A**	**Pass**	**8.1**	**A**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
14	**8th Street NW & D Street NW (AWSC)**													
	EB (D Street)	LT	7.8	-		8.0	-		7.8	-		8.0	-	
	Eastbound (D Street)		**7.8**	**A**		**8.0**	**A**		**7.8**	**A**		**8.0**	**A**	
	WB (D Street)	TR	8.2	-		8.6	-		8.2	-		8.6	-	
	Westbound (D Street)		**8.2**	**A**		**8.6**	**A**		**8.2**	**A**		**8.6**	**A**	
	SB (8th Street)	LR	8.3	-		8.2	-		8.3	-		8.2	-	
	Southbound (8th Street)		**8.3**	**A**		**8.2**	**A**		**8.3**	**A**		**8.2**	**A**	
	Overall		**8.2**	**A**	**Pass**	**8.4**	**A**	**Pass**	**8.2**	**A**	**Pass**	**8.4**	**A**	**Pass**
15	**7th Street NW & D Street NW (Signalized)**													
	EB (D Street)	LTR	27.0	C		38.2	D		27.0	C		38.2	D	
	Eastbound (D Street)		**27.0**	**C**		**38.2**	**D**		**27.0**	**C**		**38.2**	**D**	
	WB (D Street)	LTR	35.9	D		37.0	D		35.9	D		37.2	D	
	Westbound (D Street)		**35.9**	**D**		**37.0**	**D**		**35.9**	**D**		**37.2**	**D**	
	NB (7th Street)	LTR	52.6	D		18.4	B		59.2	E		23.3	C	
	Northbound (7th Street)		**52.6**	**D**		**18.4**	**B**		**59.2**	**E**		**23.3**	**C**	
	SB (7th Street)	LTR	1.5	A		4.7	A		2.3	A		4.7	A	
	Southbound (7th Street)		**1.5**	**A**		**4.7**	**A**		**2.3**	**A**		**4.7**	**A**	
	Overall		**38.7**	**D**	**Pass**	**18.2**	**B**	**Pass**	**43.1**	**D**	**Pass**	**20.4**	**C**	**Pass**
16	**14th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	29.7	C		32.2	C		29.7	C		32.2	C	
	Eastbound (Pennsylvania Ave)		**29.7**	**C**		**32.2**	**C**		**29.7**	**C**		**32.2**	**C**	
	WB (Pennsylvania Ave)	T	36.3	D		41.7	D		36.3	D		40.4	D	
	WB (Pennsylvania Ave)	R	28.9	C		32.9	C		29.2	C		33.5	C	
	Westbound (Pennsylvania Ave)		**34.4**	**C**		**39.7**	**D**		**34.4**	**C**		**38.7**	**D**	
	NB (14th Street)	L	25.9	C		54.9	D		25.9	C		55.0	D	
	NB (14th Street)	TR	32.7	C		16.8	B		32.7	C		16.8	B	
	Northbound (14th Street)		**32.5**	**C**		**18.8**	**B**		**32.5**	**C**		**18.8**	**B**	
	SB (14th Street)	LTR	12.1	B		14.6	B		12.1	B		14.6	B	
	Southbound (14th Street)		**12.1**	**B**		**14.6**	**B**		**12.1**	**B**		**14.6**	**B**	
	Overall		**27.3**	**C**	**Pass**	**21.3**	**C**	**Pass**	**27.3**	**C**	**Pass**	**21.2**	**C**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
17	**13th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	59.1	E		35.7	D		59.1	E		35.8	D	
	EB (Pennsylvania Ave)	T	52.3	D		34.3	C		52.3	D		34.4	C	
	Eastbound (Pennsylvania Ave)		**55.2**	**E**		**34.8**	**C**		**55.2**	**E**		**34.8**	**C**	
	WB (Pennsylvania Ave)	T	22.7	C		9.8	A		22.6	C		11.7	B	
	WB (Pennsylvania Ave)	R	23.6	C		10.1	B		23.5	C		12.0	B	
	Westbound (Pennsylvania Ave)		**23.1**	**C**		**9.9**	**A**		**23.0**	**C**		**11.8**	**B**	
	SB (13th Street)	L	35.6	D		41.0	D		35.6	D		41.0	D	
	SB (13th Street)	R	11.0	B		9.8	A		11.0	B		9.8	A	
	Southbound (13th Street)		**31.2**	**C**		**33.6**	**C**		**31.2**	**C**		**33.6**	**C**	
	Overall		**35.4**	**D**	**Pass**	**25.2**	**C**	**Pass**	**35.3**	**D**	**Pass**	**25.8**	**C**	**Pass**
18	**12th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	39.3	D		26.6	C		39.3	D		26.6	C	
	Eastbound (Pennsylvania Ave)		**39.3**	**D**		**26.6**	**C**		**39.3**	**D**		**26.6**	**C**	
	WB (Pennsylvania Ave)	T	11.3	B		5.2	A		11.5	B		5.0	A	
	WB (Pennsylvania Ave)	R	24.9	C		9.4	A		25.4	C		10.6	B	
	Westbound (Pennsylvania Ave)		**15.8**	**B**		**6.2**	**A**		**16.1**	**B**		**6.4**	**A**	
	NB (12th Street)	LTR	38.6	D		26.1	C		63.3	E		26.1	C	
	Northbound (12th Street)		**38.6**	**D**		**26.1**	**C**		**63.3**	**E**		**26.1**	**C**	
	Overall		**32.9**	**C**	**Pass**	**20.1**	**C**	**Pass**	**47.5**	**D**	**Pass**	**20.1**	**C**	**Pass**
19	**11th Street NW/Hotel Entrance & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	112.6	F		134.7	F		112.3	F		135.6	F	
	EB (Pennsylvania Ave)	TR	7.3	A		8.4	A		7.3	A		9.3	A	
	Eastbound (Pennsylvania Ave)		**31.1**	**C**		**19.7**	**B**		**31.0**	**C**		**20.5**	**C**	
	WB (Pennsylvania Ave)	LT	6.4	A		13.3	B		6.6	A		15.9	B	
	WB (Pennsylvania Ave)	R	69.9	E		104.1	F		79.2	E		110.9	F	
	Westbound (Pennsylvania Ave)		**27.5**	**C**		**34.3**	**C**		**31.1**	**C**		**37.4**	**D**	
	NB (Hotel Entrance)	LTR	11.0	B		6.4	A		11.0	B		6.4	A	
	Northbound (Hotel Entrance)		**11.0**	**B**		**6.4**	**A**		**11.0**	**B**		**6.4**	**A**	
	SB (11th Street)	L	93.3	F		137.9	F		93.4	F		137.3	F	
	SB (11th Street)	TR	6.9	A		1.2	A		7.0	A		1.1	A	
	Southbound (11th Street)		**66.0**	**E**		**103.8**	**F**		**66.1**	**E**		**103.3**	**F**	
	Overall		**32.8**	**C**	**Pass**	**48.1**	**D**	**Pass**	**34.7**	**C**	**Pass**	**49.2**	**D**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
20	**10th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	6.4	A		8.7	A		6.4	A		8.8	A	
	Eastbound (Pennsylvania Ave)		**6.4**	**A**		**8.7**	**A**		**6.4**	**A**		**8.8**	**A**	
	WB (Pennsylvania Ave)	T	3.6	A		8.2	A		3.6	A		8.2	A	
	Westbound (Pennsylvania Ave)		**3.6**	**A**		**8.2**	**A**		**3.6**	**A**		**8.2**	**A**	
	NB (10th Street)	L	126.2	F		50.5	D		132.6	F		152.2	F	
	NB (10th Street)	R	24.3	C		4.6	A		24.4	C		4.6	A	
	Northbound (10th Street)		**99.6**	**F**		**25.3**	**C**		**104.4**	**F**		**71.2**	**E**	
	SB (10th Street)	LT	34.2	C		41.6	D		34.2	C		91.7	F	
	SB (10th Street)	R	7.5	A		16.9	B		7.3	A		21.5	C	
	Southbound (10th Street)		**27.3**	**C**		**37.3**	**D**		**27.9**	**C**		**78.9**	**E**	
	Overall		**19.2**	**B**	**Pass**	**16.1**	**B**	**Pass**	**19.9**	**B**	**Pass**	**31.1**	**C**	**Pass**
21	**9th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	9.4	A		31.6	C		9.2	A		29.7	C	
	EB (Pennsylvania Ave)	R	12.8	B		47.8	D		12.8	B		49.1	D	
	Eastbound (Pennsylvania Ave)		**10.1**	**B**		**35.3**	**D**		**9.9**	**A**		**34.1**	**C**	
	WB (Pennsylvania Ave)	T	5.9	A		6.1	A		5.8	A		6.1	A	
	Westbound (Pennsylvania Ave)		**5.9**	**A**		**6.1**	**A**		**5.8**	**A**		**6.1**	**A**	
	NB (9th Street)	R	31.7	C		10.4	B		31.7	C		10.4	B	
	Northbound (9th Street)		**31.7**	**C**		**10.4**	**B**		**31.7**	**C**		**10.4**	**B**	
	SB (9th Street)	LTR	18.7	B		31.0	C		18.7	B		31.0	C	
	Southbound (9th Street)		**18.7**	**B**		**31.0**	**C**		**18.7**	**B**		**31.0**	**C**	
	Overall		**12.5**	**B**	**Pass**	**26.8**	**C**	**Pass**	**12.4**	**B**	**Pass**	**26.6**	**C**	**Pass**
22	**7th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	158.3	F		121.0	F		181.7	F		240.9	F	
	EB (Pennsylvania Ave)	TR	28.8	C		15.4	B		29.5	C		16.9	B	
	Eastbound (Pennsylvania Ave)		**59.4**	**E**		**28.6**	**C**		**67.0**	**E**		**54.8**	**D**	
	WB (Pennsylvania Ave)	T	37.3	D		20.6	C		37.5	D		20.6	C	
	WB (Pennsylvania Ave)	R	40.6	D		48.7	D		40.5	D		48.6	D	
	Westbound (Pennsylvania Ave)		**37.8**	**D**		**27.1**	**C**		**37.9**	**D**		**27.1**	**C**	
	NB (7th Street)	L	79.3	E		66.5	E		79.3	E		66.5	E	
	NB (7th Street)	TR	14.0	B		8.4	A		14.0	B		8.5	A	
	Northbound (7th Street)		**29.6**	**C**		**17.3**	**B**		**29.6**	**C**		**17.4**	**B**	
	SB (7th Street)	TR	30.3	C		24.8	C		30.5	C		25.2	C	
	Southbound (7th Street)		**30.3**	**C**		**24.8**	**C**		**30.5**	**C**		**25.2**	**C**	
	Overall		**41.8**	**D**	**Pass**	**25.2**	**C**	**Pass**	**44.4**	**D**	**Pass**	**35.9**	**D**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
23	**6th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	62.5	E		40.3	D		62.3	E		40.8	D	
	EB (Pennsylvania Ave)	TR	24.4	C		50.2	D		24.4	C		50.3	D	
	Eastbound (Pennsylvania Ave)		**28.6**	**C**		**49.7**	**D**		**28.5**	**C**		**49.8**	**D**	
	WB (Pennsylvania Ave)	T	4.3	A		35.4	D		4.4	A		35.4	D	
	WB (Pennsylvania Ave)	R	7.8	A		39.4	D		7.9	A		39.4	D	
	Westbound (Pennsylvania Ave)		**5.1**	**A**		**36.2**	**D**		**5.2**	**A**		**36.2**	**D**	
	NB (6th Street)	LTR	15.6	B		6.0	A		15.6	B		6.0	A	
	Northbound (6th Street)		**15.6**	**B**		**6.0**	**A**		**15.6**	**B**		**6.0**	**A**	
	SB (6th Street)	LTR	31.3	C		100.2	F		31.3	C		100.2	F	
	Southbound (6th Street)		**31.3**	**C**		**100.2**	**F**		**31.3**	**C**		**100.2**	**F**	
	Overall		**16.9**	**B**	**Pass**	**57.4**	**E**	**Fail**	**16.8**	**B**	**Pass**	**57.4**	**E**	**Fail**
24	**Constitution (WB) Avenue NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	T	2.5	A		31.8	C		2.5	A		31.9	C	
	EB (Pennsylvania Ave)	R	-	-		23.0	C		-	-		24.5	C	
	Eastbound (Pennsylvania Ave)		**2.5**	**A**		**31.8**	**C**		**2.5**	**A**		**31.9**	**C**	
	WB (Pennsylvania Ave)	L	21.9	C		60.3	E		21.9	C		60.6	E	
	WB (Pennsylvania Ave)	T	32.3	C		6.5	A		32.4	C		6.5	A	
	Westbound (Pennsylvania Ave)		**27.8**	**C**		**36.0**	**D**		**27.9**	**C**		**36.1**	**D**	
	NB (Constitution Ave)	R	16.6	B		44.7	D		16.7	B		44.8	D	
	Northbound (Constitution Ave)		**16.6**	**B**		**44.7**	**D**		**16.7**	**B**		**44.8**	**D**	
	Overall		**20.2**	**C**	**Pass**	**36.8**	**D**	**Pass**	**20.3**	**C**	**Pass**	**36.9**	**D**	**Pass**
25	**4th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	7.9	A		15.0	B		7.9	A		15.0	B	
	Eastbound (Pennsylvania Ave)		**7.9**	**A**		**15.0**	**B**		**7.9**	**A**		**15.0**	**B**	
	WB (Pennsylvania Ave)	T	7.1	A		7.9	A		7.2	A		7.9	A	
	Westbound (Pennsylvania Ave)		**7.1**	**A**		**7.9**	**A**		**7.2**	**A**		**7.9**	**A**	
	NB (4th Street)	L	41.1	D		33.5	C		42.7	D		33.5	C	
	NB (4th Street)	R	11.2	B		25.5	C		11.4	B		25.7	C	
	Northbound (4th Street)		**32.6**	**C**		**30.7**	**C**		**33.8**	**C**		**30.8**	**C**	
	Overall		**10.6**	**B**	**Pass**	**14.2**	**B**	**Pass**	**10.8**	**B**	**Pass**	**14.2**	**B**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
26	**Constitution (EB) Avenue NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	6.9	A		16.7	B		6.9	A		17.1	B	
	EB (Pennsylvania Ave)	T	42.0	D		20.9	C		42.0	D		20.8	C	
	Eastbound (Pennsylvania Ave)		**13.4**	**B**		**17.8**	**B**		**13.4**	**B**		**18.0**	**B**	
	WB (Pennsylvania Ave)	T	22.5	C		23.2	C		22.5	C		23.2	C	
	Westbound (Pennsylvania Ave)		**22.5**	**C**		**23.2**	**C**		**22.5**	**C**		**23.2**	**C**	
	SB (Constitution Ave)	R	22.7	C		19.1	B		23.0	C		19.2	B	
	Southbound (Constitution Ave)		**22.7**	**C**		**19.1**	**B**		**23.0**	**C**		**19.2**	**B**	
	Overall		**18.6**	**B**	**Pass**	**18.5**	**B**	**Pass**	**18.8**	**B**	**Pass**	**18.6**	**B**	**Pass**
27	**14th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	TR	28.5	C		28.7	C		28.9	C		28.9	C	
	Eastbound (Constitution Ave)		**28.5**	**C**		**28.7**	**C**		**28.9**	**C**		**28.9**	**C**	
	WB (Constitution Ave)	TR	32.1	C		19.6	B		32.2	C		20.0	C	
	Westbound (Constitution Ave)		**32.1**	**C**		**19.6**	**B**		**32.2**	**C**		**20.0**	**C**	
	NB (14th Street)	TR	23.2	C		20.8	C		23.2	C		20.8	C	
	Northbound (14th Street)		**23.2**	**C**		**20.8**	**C**		**23.2**	**C**		**20.8**	**C**	
	SB (14th Street)	TR	9.2	A		111.8	F		9.2	A		111.8	F	
	Southbound (14th Street)		**9.2**	**A**		**111.8**	**F**		**9.2**	**A**		**111.8**	**F**	
	Overall		**24.4**	**C**	**Pass**	**54.5**	**D**	**Pass**	**24.6**	**C**	**Pass**	**54.4**	**D**	**Pass**
28	**12th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	L	53.9	D		18.6	B		83.7	F		23.6	C	
	EB (Constitution Ave)	TR	4.1	A		12.4	B		4.0	A		12.3	B	
	Eastbound (Constitution Ave)		**13.6**	**B**		**13.2**	**B**		**21.2**	**C**		**13.9**	**B**	
	WB (Constitution Ave)	LTR	40.0	D		17.7	B		40.2	D		19.1	B	
	Westbound (Constitution Ave)		**40.0**	**D**		**17.7**	**B**		**40.2**	**D**		**19.1**	**B**	
	NB (12th Street)	LTR	91.6	F		68.7	E		99.4	F		72.6	E	
	Northbound (12th Street)		**91.6**	**F**		**68.7**	**E**		**99.4**	**F**		**72.6**	**E**	
	SB (12th Street)	LT	13.9	B		29.8	C		13.9	B		29.9	C	
	SB (12th Street)	R	8.4	A		11.6	B		8.4	A		11.6	B	
	Southbound (12th Street)		**10.4**	**B**		**20.9**	**C**		**10.4**	**B**		**21.0**	**C**	
	Overall		**53.7**	**D**	**Pass**	**31.7**	**C**	**Pass**	**59.5**	**E**	**Fail**	**33.6**	**C**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
29	**10th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	LT	17.6	B		12.3	B		17.4	B		12.3	B	
	Eastbound (Constitution Ave)		**17.6**	**B**		**12.3**	**B**		**17.4**	**B**		**12.3**	**B**	
	WB (Constitution Ave)	TR	8.5	A		44.1	D		8.5	A		44.2	D	
	Westbound (Constitution Ave)		**8.5**	**A**		**44.1**	**D**		**8.5**	**A**		**44.2**	**D**	
	SB (10th Street)	L	31.4	C		17.6	B		32.4	C		17.2	B	
	SB (10th Street)	R	15.3	B		4.2	A		16.5	B		4.1	A	
	Southbound (10th Street)		**20.4**	**C**		**6.4**	**A**		**21.2**	**C**		**6.1**	**A**	
	Overall		**14.8**	**B**	**Pass**	**24.7**	**C**	**Pass**	**14.7**	**B**	**Pass**	**24.4**	**C**	**Pass**
30	**9th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	LTR	34.8	C		72.1	E		34.8	C		72.1	E	
	Eastbound (Constitution Ave)		**34.8**	**C**		**72.1**	**E**		**34.8**	**C**		**72.1**	**E**	
	WB (Constitution Ave)	LTR	5.8	A		6.4	A		5.8	A		6.4	A	
	Westbound (Constitution Ave)		**5.8**	**A**		**6.4**	**A**		**5.8**	**A**		**6.4**	**A**	
	SB (9th Street)	LT	40.7	D		26.4	C		40.9	D		28.4	C	
	SB (9th Street)	R	17.6	B		9.0	A		17.5	B		9.0	A	
	Southbound (9th Street)		**37.9**	**D**		**24.0**	**C**		**38.0**	**D**		**25.9**	**C**	
	Overall		**27.3**	**C**	**Pass**	**32.8**	**C**	**Pass**	**27.3**	**C**	**Pass**	**33.6**	**C**	**Pass**
31	**7th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	TR	17.6	B		26.9	C		17.6	B		26.9	C	
	Eastbound (Constitution Ave)		**17.6**	**B**		**26.9**	**C**		**17.6**	**B**		**26.9**	**C**	
	WB (Constitution Ave)	LTR	15.8	B		12.5	B		15.8	B		12.5	B	
	Westbound (Constitution Ave)		**15.8**	**B**		**12.5**	**B**		**15.8**	**B**		**12.5**	**B**	
	NB (7th Street)	L	23.2	C		20.7	C		23.2	C		20.7	C	
	NB (7th Street)	TR	18.4	B		18.9	B		18.4	B		18.9	B	
	Northbound (7th Street)		**19.3**	**B**		**19.1**	**B**		**19.3**	**B**		**19.1**	**B**	
	SB (7th Street)	TR	11.3	B		19.1	B		11.3	B		19.3	B	
	Southbound (7th Street)		**11.3**	**B**		**19.1**	**B**		**11.3**	**B**		**19.3**	**B**	
	Overall		**17.1**	**B**	**Pass**	**19.1**	**B**	**Pass**	**17.1**	**B**	**Pass**	**19.1**	**B**	**Pass**

Table 5-19: Comparison of No-action Alternative and RFDS 1 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 1					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
32	**6th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	L	71.8	E		20.8	C		71.8	E		20.8	C	
	EB (Constitution Ave)	LT	30.9	C		3.3	A		30.9	C		3.3	A	
	Eastbound (Constitution Ave)		**41.3**	**D**		**7.5**	**A**		**41.3**	**D**		**7.5**	**A**	
	WB (Constitution Ave)	TR	53.9	D		7.2	A		53.9	D		7.2	A	
	Westbound (Constitution Ave)		**53.9**	**D**		**7.2**	**A**		**53.9**	**D**		**7.2**	**A**	
	SB (6th Street)	L	17.8	B		12.8	B		17.9	B		12.8	B	
	SB (6th Street)	R	0.2	A		1.5	A		0.2	A		1.6	A	
	Southbound (6th Street)		**2.7**	**A**		**2.2**	**A**		**2.7**	**A**		**2.2**	**A**	
	Overall		**42.6**	**D**	**Pass**	**6.1**	**A**	**Pass**	**42.6**	**D**	**Pass**	**6.1**	**A**	**Pass**

Notes:

AWSC = All-Way STOP-Controlled intersection

EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

LOS = Level of Service

LTR = left / through / right lanes

Delay is measured in Seconds Per Vehicle.

Red cells denote intersections or approaches operating at unacceptable conditions.

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5.1.7.4 RFDS 1 Queuing Analysis

Based on the Synchro™ queuing analysis, queue lengths exceeding the roadway storage capacity would occur at the following signalized intersections:

- 10th Street NW and H Street NW (Intersection #1)
  - Southbound 10th Street (all movements) during the PM peak hour
  - Eastbound H Street (all movements) during the PM peak hour
- 9th Street NW and H Street NW (Intersection #2)
  - Southbound 9th Street (left and through movements) during the PM peak hour
- 10th Street NW and G Street NW (Intersection #3)
  - Eastbound G Street (through and right movements), westbound G Street (through and left movements) and southbound 10th Street (all movements) during the PM peak hour
- 9th Street NW and G Street NW (Intersection #4)
  - Eastbound G Street (through and right movements), westbound G Street (through movements) and southbound 9th Street (right turns) during the PM peak hour
- 10th Street NW and F Street NW (Intersection #5)
  - Eastbound F Street (through and right movements) and southbound 10th Street (all lane movements) during the PM peak hour
- 9th Street NW and F Street NW (Intersection #6)
  - Southbound 9th Street (all movements) during the PM peak hour
- 12th Street NW and E Street NW (Intersection #7)
  - Westbound E Street (through and right movements) during the AM peak hour
- 11th Street NW and E Street NW (Intersection #8)
  - Eastbound on E Street (right turns), westbound on E Street (right turns) and southbound on 11th Street (all movements) during the AM peak hour
  - Eastbound on E Street (right and through movements), westbound on E Street (right and through movements) and southbound on 11th Street (all movements) during the PM peak hour
- 10th Street NW and E Street NW (Intersection #9)
  - Eastbound E Street (right turns) during the AM and PM peak hours
  - Southbound 10th Street (all movements) during the PM peak hour
- 9th Street NW and E Street NW (Intersection #10)
  - Westbound E Street (through and left movements) and southbound 9th Street (all movements) during the PM peak hour
  - Westbound E Street (left and through movements) during the AM peak hour
- 8th Street NW and E Street NW (Intersection #11)
  - Eastbound E Street (right turns) during AM peak hour and westbound E Street (right turns) during the AM and PM peak hour
- 7th Street NW and E Street NW (Intersection #12)
  - Eastbound E Street (right turns), northbound 7th Street (right turns) and westbound E Street (right turns) during the AM peak hour
  - Eastbound E Street (through and right movements), westbound E Street (left and right turns) and northbound 7th Street (right turns) during the PM peak hour
- 7th Street NW and D Street NW (Intersection #15)
  - Northbound 7th Street (all movements) during the AM and PM peak hour
- 14th Street NW and Pennsylvania Avenue NW (Intersection #16)
  - Eastbound Pennsylvania Avenue (through and right movements), westbound Pennsylvania Avenue (through movements) and northbound 14th Street (left turns) during the PM peak hour

- 13th Street NW and Pennsylvania Avenue NW (Intersection #17)
    - Eastbound Pennsylvania Avenue (through movements) and southbound 13th Street (left and right turns) during the AM and PM peak hour
- 12th Street NW and Pennsylvania Avenue NW (Intersection #18)
    - Eastbound Pennsylvania Avenue (through and right movements) during AM and PM peak hour
    - Westbound Pennsylvania Avenue (right turns) and northbound 12th Street (all movements) during AM peak hour
- 11th Street NW and Pennsylvania Avenue NW (Intersection #19)
    - Eastbound Pennsylvania Avenue (left turns), westbound Pennsylvania Avenue (all movements) and southbound 11th Street (left turns) during AM and PM peak hour
- 10th Street NW and Pennsylvania Avenue NW (Intersection #20)
    - Northbound 10th Street (left and right turns) and southbound 10th Street (right turns) during the AM peak hour
    - Northbound 10th Street (left turns) and southbound 10th Street (all movements) during the PM peak hour
- 9th Street NW and Pennsylvania Avenue NW (Intersection #21)
    - Eastbound Pennsylvania Avenue (right turns) and southbound 9th Street (all movements) during the PM peak hour
- 7th Street NW and Pennsylvania Avenue NW (Intersection #22)
    - Eastbound Pennsylvania Avenue (left turns), northbound 7th Street (left turns) and southbound 7th Street (through and right movements) during the AM peak hour
    - Eastbound Pennsylvania Avenue (left turns), westbound Pennsylvania Avenue (right turns), northbound 7th Street (left turns) and southbound 7th Street (through and right movements) during the PM peak hour
- 6th Street NW and Pennsylvania Avenue NW (Intersection #23)
    - Northbound and southbound 6th Street (all movements) during the PM peak hour
- Constitution (WB) Avenue NW and Pennsylvania Avenue NW (Intersection #24)
    - Eastbound Pennsylvania Avenue (through movements) and westbound Pennsylvania Avenue (left turns) during the PM peak hour
- 4th Street NW and Pennsylvania Avenue NW (Intersection #25)
    - Northbound 4th Street (left turns) during the AM peak hour
    - Westbound Pennsylvania Avenue (through movements) during the PM peak hour
- Constitution (EB) Avenue NW and Pennsylvania Avenue NW (Intersection #26)
    - Southbound Constitution Ave (right turns) during the AM peak hour
    - Eastbound Pennsylvania Avenue (left turns) during PM peak hour
- 14th Street NW and Constitution Avenue NW (Intersection #27)
    - Eastbound Constitution Avenue (through and right movements) during the AM and PM peak hour
    - Southbound 14th Street (through and right movements) during the PM peak hour
- 12th Street NW and Constitution Avenue NW (Intersection #28)
    - Eastbound Constitution Avenue (all movements) and northbound 12th Street (all movements) during the AM peak hour
    - Eastbound Constitution Avenue (all movements), westbound Constitution Avenue (all movements) and northbound 12th Street (all movements) during the PM peak hour
- 10th Street NW and Constitution Avenue NW (Intersection #29)
    - Eastbound Constitution Avenue (left and through movements) during PM peak hour
- 9th Street NW and Constitution Avenue NW (Intersection #30)
    - Eastbound Constitution Avenue (all movements) and southbound 9th Street (left and through movements) during the PM peak hour

- 7th Street NW and Constitution Avenue NW (Intersection #31)
    - Northbound 7th Street (left turns) during the AM peak hour
- 6th Street NW and Constitution Avenue NW (Intersection #32)
    - Eastbound Constitution Avenue (left turns) and westbound Constitution Avenue (through and right movements) during the AM peak hour

The remaining intersections in the study area would have acceptable queue lengths.

An unsignalized intersection queuing analysis was calculated using Synchro™. Based on the results, the queue lengths for all unsignalized intersections in the study area would be acceptable.

Complete Intersection Queuing Analysis

This section summarizes the differences in queuing impacts between RFDS 1 and the No-action Alternative by quantifying the change in intersection queuing failures. Following the summary, this section also includes the complete results of the queuing analysis.

Based on the Synchro™ queuing analysis, 30 signalized intersections would experience queuing lengths that would exceed the available storage capacity. The remaining intersections in the study area would provide sufficient storage for the anticipated demand. Compared to the No-action Alternative, RFDS 1 would have failing queues for four less intersections during the AM peak hour and one less intersection during the PM peak hour. In the AM peak hour in the No-action Alternative, there would be 22 intersections with a failing queue approach compared with 18 in RFDS 1, a decrease of 4. In the PM peak hour in the No-action Alternative, there would be 28 intersections with a failing queue approach compared with 27 in RFDS 1, a decrease of 1.

Table 5-20, provides a summary of the number of intersections that meet the following criteria for approach lane group in a queue:

Table 5-20: Queuing Summary Comparing No-action Alternative and RFDS 1

Type of Change Between Conditions	AM	PM
New Failing Movement	0	1
Additional Failing Movement	5	4
No Change	23	23
Fewer Failing Movements	0	2
No Failing Movements	4	2
Total Signalized and Unsignalized Intersections	**32**	**32**

The comparison between the No-action Alternative and RFDS 1 queuing analysis for both signalized and unsignalized intersections are presented in table 5-21. Note that the percentile values are expressed in feet, and a car occupies about 25 linear feet of roadway, including the space between cars.

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Table 5-21: Comparison of No-action Alternative and RFDS 1 Queuing

#	Intersection	Lane Group	Turning Bay/Link Length (feet)	No-Action Alternative						RFDS 1					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
1	**10th Street NW & H Street NW**														
	EB (H Street)	LTR	264	80	106	130	108	138	214	84	111	175	109	139	#305
	WB (H Street)	LTR	504	12	19	90	16	30	141	12	19	110	16	30	292
	SB (10th Street)	LTR	534	149	237	474	227	#346	#690	149	237	419	227	#346	#699
2	**9th Street NW & H Street NW**														
	EB (H Street)	TR	504	31	44	99	78	m92	180	31	44	92	78	m92	202
	WB (H Street)	LT	570	81	109	152	41	59	125	81	109	159	41	59	113
	SB (9th Street)	LT	333	237	304	305	346	#450	#377	237	304	315	346	#450	#410
	SB (9th Street)	R	333	0	33	70	0	32	#370	0	33	58	0	32	224
3	**10th Street NW & G Street NW**														
	EB (G Street)	TR	283	57	104	149	153	218	#374	61	111	153	156	221	#379
	WB (G Street)	LT	522	31	52	105	86	227	#683	31	52	78	86	227	#693
	SB (10th Street)	LTR	459	49	74	86	63	m81	#605	57	85	85	64	m83	#616
4	**9th Street NW & G Street NW**														
	EB (G Street)	TR	522	5	19	88	105	#273	319	5	20	64	104	#274	100
	WB (G Street)	L	244	23	54	66	56	103	83	23	54	93	56	103	84
	WB (G Street)	T	244	49	94	113	54	100	#317	49	94	138	54	100	#335
	SB (9th Street)	LT	409	74	88	121	64	m76	399	74	88	188	64	m76	404
	SB (9th Street)	R	409	0	m0	2	0	m0	#532	0	m0	2	0	m0	#529
5	**10th Street NW & F Street NW**														
	EB (F Street)	TR	273	40	55	104	122	160	#277	40	55	107	122	160	#375
	WB (F Street)	LT	537	24	m35	72	40	m72	180	24	m35	77	40	m72	173
	SB (10th Street)	LTR	293	65	83	73	92	118	#397	81	102	98	94	121	#390
6	**9th Street NW & F Street NW**														
	EB (F Street)	TR	537	27	38	67	118	167	111	27	38	63	118	167	166
	WB (F Street)	LT	505	44	68	72	50	78	122	44	68	94	50	78	114
	SB (9th Street)	LTR	281	30	36	123	440	m510	#329	30	36	227	440	m510	#325
7	**12th Street NW & E Street NW**														
	EB (E Street)	L	150	35	74	100	15	37	69	35	74	98	15	37	83
	EB (E Street)	T	356	47	82	81	36	66	106	47	82	99	36	66	100
	WB (E Street)	TR	181	195	269	#198	97	141	#189	201	276	#194	97	140	160
	NB (12th Street)	LTR	285	172	m171	222	179	220	190	179	m172	230	190	228	207

Table 5-21: Comparison of No-action Alternative and RFDS 1 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet)	No-Action Alternative						RFDS 1					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
8	**11th Street NW & E Street NW**														
	EB (E Street)	L	181	15	m22	61	10	m21	36	15	m21	44	11	m22	44
	EB (E Street)	T	181	143	m199	128	141	198	159	211	m279	171	170	233	#200
	EB (E Street)	R	50	12	m19	#60	12	m24	#58	13	m18	#61	12	m24	#61
	WB (E Street)	L	110	4	11	88	13	m31	88	4	13	85	13	m31	72
	WB (E Street)	T	215	42	69	157	132	m223	#268	47	83	161	133	m223	#219
	WB (E Street)	R	50	8	21	#90	42	m87	#97	9	28	#76	42	m88	#95
	NB (11th Street)	LT	346	87	m87	80	89	m89	122	86	m84	87	88	m88	71
	NB (11th Street)	R	346	35	m36	76	29	m32	82	52	m50	84	32	m34	84
	SB (11th Street)	LT	321	80	114	#421	242	327	#401	80	114	#427	242	327	#409
	SB (11th Street)	R	100	0	27	83	49	112	#139	0	27	#123	49	112	#155
9	**10th Street NW & E Street NW**														
	EB (E Street)	T	215	80	104	122	49	m50	213	69	99	162	47	m46	202
	EB (E Street)	R	25	17	39	#58	10	m11	#59	44	85	#59	17	m17	#60
	WB (E Street)	L	110	5	m9	57	2	m3	74	14	m30	86	2	m4	106
	WB (E Street)	T	506	23	m34	105	9	m11	164	31	m56	77	9	m11	231
	SB (10th Street)	LTR	370	33	47	72	232	#276	#457	40	53	73	237	#290	#406
10	**9th Street NW & E Street NW**														
	EB (E Street)	T	506	50	91	111	111	m151	157	65	99	96	115	m156	120
	EB (E Street)	R	100	5	17	83	43	m74	85	5	24	58	45	m78	100
	WB (E Street)	L	75	19	m43	#105	43	102	#112	18	m40	#87	42	102	#111
	WB (E Street)	T	225	154	216	214	147	269	#237	179	240	#262	150	283	#249
	SB (9th Street)	LTR	310	55	82	207	~586	#688	#354	55	82	209	~585	#688	#391
11	**8th Street NW & E Street NW**														
	EB (E Street)	L	75	11	m22	55	2	m5	41	12	m23	46	2	m5	43
	EB (E Street)	T	225	91	m139	162	23	m32	70	93	m142	148	23	m32	87
	EB (E Street)	R	50	11	m37	#70	0	m0	14	13	m37	#84	0	m0	26
	WB (E Street)	L	85	12	20	57	3	m6	39	14	24	67	4	m8	44
	WB (E Street)	T	223	53	66	107	27	39	70	82	103	128	35	50	73
	WB (E Street)	R	25	0	m2	#38	0	m0	#52	1	m2	#39	0	m1	#46
	NB (8th Street)	LTR	392	78	110	144	74	146	156	78	110	163	74	146	171
	SB (8th Street)	LTR	302	27	51	56	59	119	174	27	51	46	59	119	154

Table 5-21: Comparison of No-action Alternative and RFDS 1 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet)	No-Action Alternative						RFDS 1					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
12	**7th Street NW & E Street NW**														
	EB (E Street)	L	85	9	m30	82	7	m21	77	10	m30	35	7	m21	56
	EB (E Street)	T	223	109	182	197	128	203	193	111	182	164	128	202	#239
	EB (E Street)	R	25	1	m17	#60	10	m40	#64	2	m19	#58	10	m40	#62
	WB (E Street)	L	100	6	19	31	24	54	94	6	19	56	24	54	#133
	WB (E Street)	T	533	165	248	245	206	304	327	165	248	262	206	304	360
	WB (E Street)	R	75	4	24	70	19	53	#105	4	24	#81	19	53	#111
	NB (7th Street)	LT	402	97	m117	160	103	156	173	100	m119	171	112	177	184
	NB (7th Street)	R	75	11	m15	#94	11	m30	#101	11	m15	#101	11	m29	#102
	SB (7th Street)	LTR	314	53	83	107	95	133	149	57	92	177	101	141	172
13	**9th Street NW & D Street NW**														
	WB (D Street)	L	224	75	71	89	107	170	166	75	71	108	107	170	163
	SB (9th Street)	LT	396	32	55	132	76	m76	179	32	55	97	75	m77	128
14	**8th Street NW & D Street NW (AWSC)**														
	EB (D Street)	LT	224	-	-	50	-	-	59	-	-	54	-	-	52
	WB (D Street)	TR	229	-	-	60	-	-	67	-	-	62	-	-	90
	SB (8th Street)	LR	392	-	-	52	-	-	56	-	-	56	-	-	47
15	**7th Street NW & D Street NW**														
	EB (D Street)	LTR	229	40	71	91	91	165	188	40	71	87	91	165	170
	WB (D Street)	LTR	521	76	140	183	102	175	169	76	140	190	102	176	216
	NB (7th Street)	LTR	295	513	m#696	#303	184	m520	255	536	m#695	#321	439	m525	#310
	SB (7th Street)	LTR	402	4	11	52	27	56	103	8	14	42	27	56	108
16	**14th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	430	116	150	188	96	138	#579	116	150	187	96	138	#553
	WB (Pennsylvania Ave)	T	157	84	114	#169	125	152	#192	84	114	153	117	153	#209
	WB (Pennsylvania Ave)	R	248	39	83	79	54	89	109	42	86	73	57	103	80
	NB (14th Street)	L	1,131	23	m35	78	25	m#71	118	23	m35	84	25	m#71	103
	NB (14th Street)	TR	1,131	328	382	399	124	173	245	328	382	420	124	173	284
	SB (14th Street)	LTR	624	92	118	196	234	280	329	92	118	184	234	280	297
17	**13th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	257	143	217	233	91	153	153	143	217	197	92	153	117
	EB (Pennsylvania Ave)	T	257	103	148	#372	100	141	#287	103	148	#354	101	141	#359
	WB (Pennsylvania Ave)	T	386	79	m89	137	31	68	149	78	m88	106	39	76	144
	WB (Pennsylvania Ave)	R	386	71	m83	126	14	m35	80	70	m82	112	17	m39	86
	SB (13th Street)	L	637	81	119	#658	155	211	#740	81	119	#711	155	211	#751
	SB (13th Street)	R	637	0	33	519	0	55	#915	0	33	#715	0	55	#922

Table 5-21: Comparison of No-action Alternative and RFDS 1 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet)	No-Action Alternative						RFDS 1					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
18	**12th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	T	338	113	145	179	163	198	184	113	145	160	163	198	153
	EB (Pennsylvania Ave)	TR	150	113	145	#199	163	198	#201	113	145	#195	163	198	#198
	WB (Pennsylvania Ave)	T	168	36	51	62	30	35	41	36	50	56	30	m35	39
	WB (Pennsylvania Ave)	R	168	57	197	#185	26	m32	83	59	201	#190	28	m34	124
	NB (12th Street)	LTR	922	~274	m206	#1092	285	m284	287	~526	m213	514	294	m292	369
19	**11th Street NW/Hotel Entrance & Pennsylvania Avenue NW (Signalized)**														
	EB (Pennsylvania Ave)	L	168	109	m#196	#181	49	m#128	104	109	m#194	#200	49	m#126	95
	EB (Pennsylvania Ave)	TR	168	38	m47	47	29	36	133	38	m46	55	29	36	110
	WB (Pennsylvania Ave)	LT	192	28	m57	#240	38	46	#269	29	m60	#226	43	m53	#278
	WB (Pennsylvania Ave)	R	192	~194	m#449	#206	~158	#288	#212	~214	m#467	#209	~168	m#292	#218
	NB (Hotel Entrance)	LTR	276	9	56	94	12	40	74	9	56	86	12	40	73
	SB (11th Street)	L	346	~162	#315	#371	~435	#579	#418	~163	#314	#365	~435	#578	#412
	SB (11th Street)	TR	346	23	48	284	0	m0	114	23	48	264	0	m0	94
20	**10th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	192	20	m10	72	75	m75	74	20	m10	80	77	m77	83
	WB (Pennsylvania Ave)	T	467	61	72	393	56	m75	412	61	72	454	56	m76	364
	NB (10th Street)	L	695	~177	m#308	#859	10	m#66	130	~181	m#312	#854	~13	m#90	113
	NB (10th Street)	R	695	26	m58	#904	0	9	91	26	m58	#905	0	9	75
	SB (10th Street)	LT	469	32	61	170	194	m#238	#552	43	72	206	~270	m#364	#573
	SB (10th Street)	R	25	0	16	#75	47	m65	#68	1	m20	#69	56	m87	#67
21	**9th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	467	48	80	113	230	272	312	48	79	104	232	m258	332
	EB (Pennsylvania Ave)	R	467	37	82	51	202	m#361	305	38	86	63	203	m#360	381
	WB (Pennsylvania Ave)	T	496	48	m56	331	32	45	192	48	m56	368	32	47	83
	NB (9th Street)	R	-	56	114	-	26	m41	-	56	114	-	26	m41	-
	SB (9th Street)	LTR	235	184	242	#252	276	#451	#280	184	242	219	276	#451	#247
22	**7th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	496	~157	#303	#507	0	m#198	117	~177	#326	271	~170	m#299	410
	EB (Pennsylvania Ave)	TR	496	107	134	229	117	m150	398	108	136	228	126	m149	230
	WB (Pennsylvania Ave)	T	461	180	223	202	124	m154	102	184	227	222	125	m154	114
	WB (Pennsylvania Ave)	R	461	80	138	116	103	m#171	137	80	139	93	103	m#172	104
	NB (7th Street)	L	290	96	#235	277	57	m#140	129	96	#235	184	57	m#140	112
	NB (7th Street)	TR	290	64	81	127	29	37	118	64	81	168	29	37	135
	SB (7th Street)	TR	83	65	106	#113	87	105	#101	64	106	#109	87	110	#100

Table 5-21: Comparison of No-action Alternative and RFDS 1 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet)	No-Action Alternative						RFDS 1					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
23	**6th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	461	47	m76	59	12	m23	380	47	m76	80	12	m23	90
	EB (Pennsylvania Ave)	TR	461	131	162	148	190	233	#487	131	163	155	193	237	188
	WB (Pennsylvania Ave)	T	212	10	30	42	124	165	143	10	32	38	124	165	136
	WB (Pennsylvania Ave)	R	212	8	27	131	88	148	127	8	29	156	88	148	133
	NB (6th Street)	LTR	72	56	m56	66	18	23	69	56	m56	72	18	23	#86
	SB (6th Street)	LTR	549	85	128	326	~338	#464	#674	85	128	196	~338	#464	#582
24	**Constitution (WB) Avenue NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	T	212	19	23	38	197	m220	#290	19	23	36	201	m224	#240
	EB (Pennsylvania Ave)	R	212	-	-	-	1	m1	15	-	-	-	1	m1	15
	WB (Pennsylvania Ave)	L	283	161	235	223	258	315	#345	160	237	195	258	315	#305
	WB (Pennsylvania Ave)	T	283	281	311	#328	40	52	91	286	314	260	40	52	103
	NB (Constitution Ave)	R	232	74	75	38	210	256	102	74	75	40	211	257	88
25	**4th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	283	50	234	102	202	227	216	50	235	126	202	227	165
	WB (Pennsylvania Ave)	T	257	57	99	225	201	172	#326	58	103	210	203	172	#267
	NB (4th Street)	L	208	146	224	#219	130	195	#294	146	224	#258	130	195	190
	NB (4th Street)	R	208	15	54	121	53	98	155	16	55	91	53	99	111
26	**Constitution (EB) Avenue NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	257	27	37	78	154	229	#285	27	37	76	158	234	#284
	EB (Pennsylvania Ave)	T	257	74	110	95	125	172	112	74	110	110	125	170	129
	WB (Pennsylvania Ave)	T	335	4	7	17	12	18	87	4	7	15	12	18	89
	SB (Constitution Ave)	R	219	314	393	#298	234	294	#293	320	399	#273	234	295	173
27	**14th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	T	28	210	249	#143	245	288	#177	220	259	#149	249	292	#159
	EB (Constitution Ave)	TR	329	210	249	437	245	288	#480	220	259	#546	249	292	#537
	WB (Constitution Ave)	TR	1,005	188	m211	204	333	m365	183	191	m213	197	341	m374	175
	NB (14th Street)	TR	553	296	341	409	180	214	362	296	341	480	180	214	500
	SB (14th Street)	TR	1,131	39	49	97	~737	#833	938	39	49	101	~737	#833	941
28	**12th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	L	1,005	90	m#223	#1011	61	m86	481	~121	#298	#1352	71	m#138	449
	EB (Constitution Ave)	TR	1,005	33	39	#1051	265	321	#1155	32	37	#1371	266	322	#1272
	WB (Constitution Ave)	LTR	494	127	146	175	70	95	142	129	148	175	78	#106	176
	NB (12th Street)	LTR	534	~548	#646	#634	~336	#423	#643	~565	#664	#599	~346	#432	#648
	SB (12th Street)	LT	922	20	46	120	30	67	218	20	46	217	30	67	470
	SB (12th Street)	R	922	16	56	53	0	41	78	16	56	72	0	41	175

Table 5-21: Comparison of No-action Alternative and RFDS 1 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet)	No-Action Alternative						RFDS 1					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
29	**10th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	LT	494	125	m135	#515	89	m83	#602	121	m130	452	90	m83	#657
	WB (Constitution Ave)	TR	457	63	79	290	238	273	230	63	79	210	238	273	249
	SB (10th Street)	L	695	41	62	157	36	m55	175	42	63	128	37	m48	94
	SB (10th Street)	R	695	47	60	89	18	m35	73	51	64	111	18	m31	88
30	**9th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	LTR	457	206	246	202	~252	#325	#545	206	246	191	~252	#186	#564
	WB (Constitution Ave)	LTR	480	47	53	127	31	39	133	47	53	89	31	39	130
	SB (9th Street)	LT	502	162	204	220	371	m#488	193	165	207	198	401	m#504	190
	SB (9th Street)	R	502	13	58	87	23	m29	122	13	57	101	22	m30	139
31	**7th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	TR	480	191	212	206	96	m89	474	191	212	201	96	m89	478
	WB (Constitution Ave)	LTR	473	161	197	203	106	149	433	161	197	203	106	149	413
	NB (7th Street)	L	125	80	131	#157	33	63	109	80	131	#163	33	63	96
	NB (7th Street)	TR	495	135	172	221	132	180	421	135	172	243	132	180	380
	SB (7th Street)	TR	290	7	34	75	70	100	142	7	35	94	70	100	145
32	**6th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	L	473	148	#329	243	169	m238	134	148	#329	218	169	m238	211
	EB (Constitution Ave)	LT	473	135	181	207	11	26	119	135	181	204	11	26	128
	WB (Constitution Ave)	TR	232	198	242	#249	79	72	#301	198	242	#242	79	72	198
	SB (6th Street)	L	72	17	m34	57	16	m16	24	17	m34	64	16	m16	27
	SB (6th Street)	R	72	0	0	30	0	m1	#100	0	0	16	0	m1	58

Notes:

~ 50th percentile volume exceeds capacity, queue is theoretically infinite.

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal. Due to upstream metering, the 95th percentile queue may be less than the 50th percentile queue.

Red cells denote approaches and lane groups whose queuing length exceeds capacity.

AWSC = All-Way STOP-Controlled intersection

EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

LTR = left / through / right lanes

5.1.7.5 Overall Level of Impact

Overall, the AM peak hour would experience isolated added delays at four intersections (7th and D Street NW, 8th and E Streets NW, 12th Street and Pennsylvania Avenue NW, and 12th Street and Constitution Avenue NW) under the RFDS 1 when compared to the No-action Alternative. During the PM peak hour, two intersections would have added delays (7th Street and Pennsylvania Avenue and 10th Street and Pennsylvania Avenue NW) when compared to the No-action Alternative. Together, these conditions would result in indirect, long-term, adverse traffic impacts for RFDS 1. Additionally, redevelopment of the parcel would cause short-term delays to local traffic due to large amounts of construction truck traffic and the possible need to stage construction equipment or materials in the roadway at certain times of the day. Therefore, construction for RFDS 1 would have indirect, short-term, adverse construction impacts to the local traffic network.

5.2 RFDS 2

Under RFDS 2, the building on the JEH parcel would be demolished, and the parcel would be redeveloped. A team of urban designers and architects collaborated with the EIS team to develop a scenario that would result in the parcel being redeveloped at the highest market-reasonable density within the limitations of the development controls. The redeveloped parcel would contain three structures, one residential building, and two commercial buildings, and two 50-foot-wide streets would be introduced on the parcel to service the buildings and provide pedestrian access. There would be a mix of commercial and residential uses with ground-floor retail space, composed of a total of 750,000 GSF of residential development, 1.4 million GSA of office space, and 173,000 SF of retail space for a total gross floor area of all buildings of 2.32 million GSF. Based on the proposed D-7 zoning, there would be no minimum or maximum parking requirements; it is assumed that the exchange partner would rely on market demand to determine the number of spaces to provide. The scenario assumes a similarly sized garage as the one that currently exists, and would provide 800 spaces or 260,000 GSF of underground parking. For this analysis, it is assumed that access to the parking garage would be along 10th Street NW.

5.2.1 RFDS 2 Trip Generation and Modal Split

Trip generation for RFDS 2 is predicated on the assumed proposed land uses for the parcel: office, residential and retail. The method for quantifying the current FBI trips by peak hour are the same as described under RFDS 1 (Section 5.1.1). Trip generation for each type of potential development is derived from ITE's *Trip Generation Manual* (Ninth Edition [ITE 2012]). The selected development types (e.g., apartment and shopping center) represent the higher end of potential development scenarios. For example, condominiums and boutique specialty shops generate fewer trips than apartments and shopping centers. A total of 876 net person trips during the AM peak hour and 1,777 net person trips during the PM peak hour would be generated. Table 5-22 shows RFDS 2 person trips generated.

Table 5-22: RFDS 2 Person Trips Generated

Land Use/ ITE Code	Independent Variable	Units	AM In	AM Out	Total AM	PM In	PM Out	Total PM
Existing FBI	employees	(5,045)	(1,361)	(102)	(1,463)	(68)	(1,289)	(1,357)
Apartments/ ITE Code: 220	units	1,066	105	421	526	393	211	604
Shopping Center/ ITE Code: 820	SQ feet	172.96	135	83	218	424	441	865
General Office/ ITE Code: 710	SQ feet	1,416.35	1,404	191	1,595	283	1,382	1,665
Total Net Trips			**283**	**593**	**876**	**1,032**	**745**	**1,777**

Note: Numbers in parenthesis are negative numbers.

A mixed-use development, as proposed under RFDS 2, would result in "internal capture," where some portion of the trips would not leave the parcel (i.e., residential to retail use, residential to office use, or office to retail use). The internal capture process is based on the procedures outlined in the ITE's *Trip Generation Handbook* (Second Edition [ITE 2004]) following updated internal capture rates published in NCHRP 684 (TRB 2011). The internal capture process closely follows *An ITE Proposed Recommended Practice Trip Generation Handbook (Third Edition* [ITE 2014]) recommended internal capture procedure. The study calculated the JEH parcel internal

capture rates through interaction between the proposed residential, retail, and office uses. Appendix B9 contains the internal capture worksheets for the JEH Building.

The JEH Building is located in a dense, urban area with extensive access to many transit options as well as bicycle and pedestrian options. Therefore, the study reduced the trip generation to reflect typical vehicle use in such an urban setting. Based on discussions with DDOT through the scoping process, it was agreed for the future office modal split to follow WMATA's *2005 Development-Related Ridership Survey* (WMATA 2006) and the MWCOG 2025 Travel Demand Model (MWCOG, 2014c) mode split projections, as shown in table 5-23.

Table 5-23: RFDS 2 Mode Split Assumptions

Mode Share	FBI	Future Office	Future Residential/Retail
Single Occupancy Vehicle	13.5%	17%	10%
Carpool	8.5%	11%	11%
Bicycle	2%	3%	8%
Walk	1%	2%	12%
Transit	75%	67%	59%

5.2.2 Pedestrian Network

Without a detailed analysis of its own, there is no reliable and reasonably simple way to predict the amount of pedestrian trips from a given development site (DDOT 2014d). Therefore, given that the total development under RFDS 2 is 2.32 million GSF and the current JEH building is 2.4 million GSF, it is assumed the number of pedestrian trips would be similar due to similar overall sizes and the understanding that the scenario would add retail development which typically has higher pedestrian trip generation rates in downtown environments. Given the addition of several new land uses for RFDS 2 and an alternate site layout with additional site circulation options, it is clear that the timing, direction, and circulation patterns of pedestrians on the parcel would change. While many of the pedestrian trips would still occur on the perimeter of the block, the introduction of multiple buildings on the parcel and pathways between buildings would introduce street level pedestrian trips, and possibly elevated pedestrian trips via physical connections or walkways, to the interior of the parcel.

Based on a full redevelopment of the parcel, it is assumed that the exchange partner would upgrade the sidewalk frontages on the JEH parcel to DDOT's Downtown Streetscape Standards, including full ADA compliance at intersection crossing points on the block, and other applicable requirements in the reuse of the parcel (District Department of Public Works 2000). Given the current chasm or moat around the existing JEH building would no longer be present, there would likely be direct at-grade access to the retail on the ground floor and updated and improved pedestrian amenities, and the security guard booths and barricade planters in the public right-of-way would be removed, the overall sidewalk conditions under RFDS 2 would provide substantial improvements for pedestrians over the No-Action Alternative.

Although the proposed development is envisioned to produce a similar amount of pedestrian trips, different pedestrian circulation patterns and an improved pedestrian streetscape would result from the development of RFDS 2. The improvement is due primarily to the introduction of pathways between the buildings allowing for pedestrian access, in addition to streetscape improvements and amenities that may be required. Therefore, under RFDS 2 there would be indirect, long-term, beneficial impacts to pedestrians. Redevelopment of the parcel would

also cause indirect, short-term, adverse impacts to pedestrian circulation due to construction and/or construction staging because sidewalks may temporarily be blocked or rerouted during construction.

5.2.3 Bicycle Network

There are no additional planned bicycle facilities directly adjacent to the JEH parcel in the MoveDC plan (DDOT 2014), and therefore, no bicycle facilities would be constructed along with the parcel redevelopment. It is anticipated that a similar number or slight increase of people would travel to the parcel via bicycle given the similar amount of development on the parcel compared to the No Action Alternative and other bicycle improvements in the larger metropolitan area that are anticipated that may make bicycling more attractive to additional users. Therefore, there would be no measurable indirect impacts to bicycle facilities or the bicycle network in the study area under RFDS 2.

5.2.4 Public Transit

The following sections describe the Metrorail and Metrobus modes within the study area. The other transit modes, commuter bus, shuttles, and slugging, were not analyzed as these modes do not have existing or future ridership statistics, or comprehensive planning documents. It is anticipated that a similar number or slight increase of people would commute to the parcel via commuter bus, shuttle, or slugging given the similar amount of development on the parcel compared to the No-action Alternative.

5.2.4.1 Projected Transit Growth

The projected person trips are explained in the Trip Generation and Modal Split section (see Section 5.2.1). Projected transit trips associated with the future development conditions were calculated for RFDS 2 and then added to the 2025 No-action Alternative ridership totals for the Metrobus and Metrorail modes. The transit mode was further split into Metrorail and Metrobus trips using average Metrobus/Metrorail mode splits from the 2005 WMATA Development Survey (WMATA 2006) and the MWCOG Round 8.3 Cooperative Forecasts (MWCOG 2014b). Table 5-24 summarizes these mode splits by land use.

Table 5-24: Mode Share by Land Use

Percent of Transit Mode	FBI	Future Office	Future Residential / Retail
Metrorail	84%	84%	85%
Metrobus	16%	16%	15%

Source: DDOT Scoping Form (Appendix B1); MWCOG (2014c); WMATA (2006)

The total number of trips by peak period associated with RFDS 2 were determined using general office, apartment, and shopping center trip generation rates from the ITE *Trip Generation Manual* (ITE 2012). To calculate net trips for the scenario by peak period, existing trips to and from the parcel were subtracted from the total trips calculated for the scenario. Table 5-25 summarizes the net transit trips for the scenario. Note that values listed under the *all modes* title for the RFDS 2 Trips in table 5-25 represent person trips after all internal capture trips (person trips that only travel between land uses within the JEH parcel) were removed; see section 5.2.7 for a description of the internal capture process. *RFDS 2 trips* in table 5-25 represent the number of net trips. Overall, RFDS 2 would result in approximately 309 additional AM peak transit trips and 694 additional PM peak transit trips (in and out columns combined).

Table 5-25: RFDS 2 Net Transit Trips

Use	Independent Variable	Time Period	All Modes			Transit Mode			
			IN	OUT	TOTAL	Transit Mode Split	IN	OUT	TOTAL
Existing JEH Trips to Subtract									
JEH	5,045 employees	AM Peak	1,361	102	1,463	75%	1,020	77	1,097
		PM Peak	68	1,289	1,357	75%	51	967	1,018
RFDS 2 Trips									
Residential	1,066 units	AM Peak	103	409	512	59%	61	241	302
		PM Peak	262	161	145	59%	154	95	250
Retail	172,956 square feet	AM Peak	88	57	665	59%	52	33	85
		PM Peak	348	317	665	59%	205	187	392
Office	1,416,348 square feet	AM Peak	1,372	148	1,520	67%	919	99	1,018
		PM Peak	266	1,332	1,598	67%	178	892	1,070
Total		**AM Peak**	**1,563**	**614**	**2,177**	**-**	**1,032**	**374**	**1,406**
		PM Peak	**875**	**1,810**	**2,686**	**-**	**538**	**1,175**	**1,712**
Net Trips for RFDS 2 (RFDS 2 Trips Minus JEH Trips)									
Total		**AM Peak**					**11**	**297**	**309**
		PM Peak					**487**	**208**	**694**

Note: Calculations may not appear correct due to rounding.
Source: DDOT Scoping Form (Appendix B1); MWCOG (2014c); WMATA (2006)

5.2.4.2 Metrorail Analysis

To evaluate the impact under RFDS 2 to the Metrorail system within the study area, the net transit trips calculated for the AM peak hour and PM peak hour in table 5-25 were disaggregated into Metrorail and Metrobus trips, using the transit mode splits from table 5-24. Table 5-26 summarizes net Metrorail trips generated by RFDS 2.

Table 5-26: RFDS 2 Net Metrorail Trips

Use	Independent Variable	Time Period	Transit Mode			Metrorail Mode			
			IN	OUT	TOTAL	Metrorail Mode Split	IN	OUT	TOTAL
Existing JEH Trips to Subtract									
JEH	5,045 employees	AM Peak	1,020	77	1,097	83.6%	853	64	917
		PM Peak	51	967	1,018	83.6%	43	808	851
RFDS 2 Trips									
Residential	1,066 units	AM Peak	61	241	302	84.7%	52	204	256
		PM Peak	154	95	250	84.7%	131	81	211
Retail	172,956 square feet	AM Peak	52	33	85	84.7%	44	28	72
		PM Peak	205	187	392	84.7%	174	158	332
Office	1,416,348 square feet	AM Peak	919	99	1,018	83.6%	768	83	851
		PM Peak	178	892	1,070	83.6%	149	746	895
Total		**AM Peak**	**1,032**	**374**	**1,406**	**-**	**864**	**316**	**1,180**
		PM Peak	**538**	**1,175**	**1,712**	**-**	**454**	**985**	**1,439**
Net Trips for RFDS 2 (RFDS 2 Trips Minus JEH Trips)									
Total		**AM Peak**					**11**	**252**	**262**
		PM Peak					**411**	**177**	**588**

Note: Calculations may not appear correct due to rounding.
Source: DDOT Scoping Form (Appendix B1); MWCOG (2014c); WMATA (2006)

The net Metrorail trips associated with RFDS 2 were added to the projected 2025 No-action Alternative ridership totals for each station entrance and line proportionally based on projected 2025 No-action ridership.

Metrorail Passenger Loads

Metrorail passenger loads by line within the study area were obtained from WMATA for the busiest segment of each line within the study area using forecasted ridership during the AM and PM peak periods for RFDS 2. The scenario trips were distributed to the busiest segment of each line within the study area according to each segment's proportion of ridership within the study area. No expansion of WMATA's current fleet was assumed for this analysis, in order to provide the most conservative estimate of potential capacity issues. The Momentum Plan does call for all eight-car trains on all lines during peak periods by the year 2020, however this would require significant upgrades to electrical systems and a significant expansion of WMATA's current fleet of railcars (WMATA 2014f).

WMATA has three thresholds for railcar occupancy: less than 100 passengers per car (acceptable), between 100 and 120 passengers per car (crowded), and greater than 120 passenger per car (extremely crowded). Capacity is generally considered to be 120 passengers per car. Projected passenger loads by 2025 are all below 100 passengers per car, and therefore would be considered acceptable. Loads are highest on the Red Line between Gallery Place and Metro Center during the PM peak period. Tables 5-27 and 5-28 summarize RFDS 2 passenger loads per car during the AM peak and PM peak periods.

Table 5-27: RFDS 2 AM Peak Period Projected Maximum Metrorail Passenger Loads by Line

Line	Segment	2014			2025 No-action Alternative		2025 RFDS 2	
		Passengers	Train Cars	Load	Passengers	Load	Passengers	Load
Red	Gallery Place to Metro Center	9,125	136	67.1	11,651	85.7	11,754	86.4
Orange	Smithsonian to Federal Triangle	5,870	94	62.4	7,495	79.7	7,561	80.4
Green	Mt. Vernon Square to Gallery Place	3,542	68	52.1	4,522	66.5	4,562	67.1
Yellow	L'Enfant Plaza to Archives	3,058	78	39.2	3,904	50.1	3,939	50.5
Blue	Smithsonian to Federal Triangle	1,691	44	38.4	2,159	49.1	2,178	49.5

Source: WMATA (2014i); DDOT Scoping Form (Appendix B1)

Table 5-28: RFDS 2 PM Peak Period Projected Maximum Metrorail Passenger Loads by Line

Line	Segment	2014			2025 No-action Alternative		2025 RFDS 2	
		Passengers	Train Cars	Load	Passengers	Load	Passengers	Load
Red	Metro Center to Gallery Place	10,614	142	74.7	13,605	95.8	13,835	97.4
Blue	Federal Triangle to Smithsonian	2,448	42	58.3	3,138	74.7	3,191	76.0
Green	Gallery Place to Mt Vernon Square	4,034	70	57.6	5,171	73.9	5,258	75.1
Orange	Metro Center to McPherson Square	6,417	114	56.3	8,225	72.1	8,364	73.4
Yellow	Archives to L'Enfant Plaza	3,588	78	46.0	4,599	59.0	4,677	60.0

Source: WMATA (2014i); DDOT Scoping Form (Appendix B1)

Station Capacity Analysis

A capacity analysis was conducted for the vertical elements (escalators and stairs), faregate aisles, fare vending machines, and platforms at Archives-Navy Memorial and Federal Triangle Stations, as well as the south and east entrances to Metro Center and the east and west entrances at Gallery Place-Chinatown (the closest entrances to the JEH parcel). The analysis used peak 15-minute periods of ridership (entries and exits) at each station according to projected 2025 RFDS 2 ridership. This includes additional trip associated with planned development projects, predicted regional transit growth, and the net trips calculated under RFDS 2 (distributed to each station entrance proportionally based on existing ridership). To calculate 15-minute ridership from peak hour ridership, AM and PM peak hour ridership totals were disaggregated using the average peak hour factor (PHF) in the study area (0.282 during the AM peak hour, 0.68 during the PM peak hour). A PHF is the proportion of hourly ridership that occurs during the peak 15-minute period of that hour.

Volume-to-capacity (v/c) ratios were calculated for the vertical elements and fare elements, and pedestrian LOS was calculated for platform areas. Analysis for vertical elements and faregate aisles used projected ridership from the peak exiting period at each station entrance, the time period when the highest concentration of passengers would be using each element. Table 5-29 summarizes projected ridership during the peak existing period at each station entrance under RFDS 2. Overall, there is not a significant change in ridership between No-action Alternative and RFDS 2.

Table 5-29: RFDS 2 Weekday Peak 15-Minute Exiting Period Ridership

Station	Time	2014		2025 No-action Alternative		2025 RFDS 2	
		Entries	Exits	Entries	Exits	Entries	Exits
Archives	8:45 AM – 9:00 AM	25	524	46	670	59	671
Federal Triangle	8:45 AM – 9:00 AM	15	467	28	597	36	597
Gallery Place East	6:15 PM – 6:30 PM	212	355	266	445	273	502
Gallery Place West	8:45 AM – 9:00 AM	12	301	15	378	21	378
Metro Center East	8:45 AM – 9:00 AM	44	434	55	544	76	545
Metro Center South	8:45 AM – 9:00 AM	20	427	36	546	46	546

Source: WMATA (2014c); MWCOG (2015); DDOT Scoping Form (Appendix B1)

The platform area analysis and fare vending machine analysis used projected ridership from the peak entering period at each station – the time period when the most passengers would likely use fare vending machines and the highest number of passengers would be waiting on the platform. Table 5-30 summarizes projected ridership during the peak entering period at each station platform under RFDS 2 (for peak entering period ridership by station entrance, see *Fare Vending Machine* sections in Appendix B4). Overall, there is not a significant change in ridership between No-action Alternative and RFDS 2.

Table 5-30: RFDS 2 Weekday Peak 15-Minute Entering Period Platform Ridership

Station	Time	2014		2025 No-action Alternative		2025 RFDS 2	
		Entries	Exits	Entries	Exits	Entries	Exits
Archives	5:00 PM – 5:15 PM	524	56	665	77	676	90
Federal Triangle	5:00 PM – 5:15 PM	501	38	635	55	646	62
Gallery Place Glenmont	5:00 PM – 5:15 PM	641	975	807	1,220	810	1,245
Gallery Place Shady Grove	5:00 PM – 5:15 PM	1,016	534	1,302	667	1,308	676
Gallery Place Green/Yellow	5:00 PM – 5:15 PM	1,629	1,128	2,051	1,436	2,055	1,451
Metro Center Glenmont	5:30 PM – 5:45 PM	1,171	548	1,472	680	1,477	691
Metro Center Shady Grove	5:30 PM – 5:45 PM	1,183	691	1,490	859	1,494	865
Metro Center Blue/Orange/Silver	5:30 PM – 5:45 PM	1,618	1,651	2,044	2,078	2,052	2,102

Source: WMATA (2014c); MWCOG (2015); DDOT Scoping Form (Appendix B1)

Overall, vertical elements and faregate aisles at each station are projected to operate below a v/c of 0.7, which is considered capacity. Fare vending machines are projected to operate above capacity at Archives-Navy Memorial, the east and west entrances to Gallery Place-Chinatown, and the east and south entrances to Metro Center.

Platform peak pedestrian LOS (based on the available spacing between passengers) on the busiest platform sections are projected to be at the acceptable pedestrian LOS B at Archives-Navy Memorial and Federal Triangle. The three platforms at Gallery Place-Chinatown and Metro Center are all projected to operate at a pedestrian LOS C or D. At pedestrian LOS D, passengers would likely begin to spread out farther down the platform. Further details on the station capacity analysis are found in Appendix B4.

Table 5-31 summarizes the results of RFDS 2 station capacity analysis, including the vertical elements, fare elements, and platforms.

Table 5-31: RFDS 2 Metro Station Capacity Analysis Summary

Element		Archives-Navy Memorial	Federal Triangle	Gallery Place East	Gallery Place West	Metro Center East	Metro Center South
Street/ Mezzanine v/c	Entry Escalators	0.05	0.03	0.11	0.02	0.07	0.04
	Exit Escalators	0.30	0.27	0.20	0.36	0.26	0.26
	Stairs	-	-	0.15	-	-	-
Mezzanine/ Platform 1 [a] v/c	Entry Escalators	0.05	0.03	0.13	0.01	0.03	-
	Exit Escalators	0.60	0.27	0.34	0.17	0.31	-
	Stairs	-	-	-	-	-	-
Mezzanine/ Platform 2 [a] v/c	Entry Escalators	-	-	0.18	0.01	0.04	-
	Exit Escalators	-	-	0.25	0.19	0.21	-
	Stairs	-	-	-	-	-	-
Lower Platform/ Glenmont Platform v/c	Entry Escalators	-	-	0.34	-	-	0.37
	Exit Escalators	-	-	0.19	-	-	0.55
	Stairs	-	-	0.57	-	-	0.15
Faregate Aisles		0.30	0.26	0.17	0.24	0.25	0.24
Fare Vending		**0.87**	0.60	**1.22**	**1.51**	**0.83**	**1.13**
Glenmont Platform Peak LOS		-	-	D		D	
Shady Grove Platform Peak LOS		-	-	D		D	
Green/Yellow Platform Peak LOS		B	-	C		-	
Blue/Orange/Silver Platform Peak LOS		-	B	-		C	

Notes: v/c = volume to capacity ratio; LOS = level of service
[a] For Gallery Place and Metro Center, Platform 1 = Glenmont, Platform 2 = Shady Grove
Source: WMATA (2014c); MWCOG (2015); DDOT Scoping Form (Appendix B1)

NFPA 130 Emergency Evacuation Analysis

An emergency evacuation analysis was conducted to compare evacuation capacity of each station to standards set by the NFPA 130 code (TRB 2013). NFPA 130 requires that station platforms be fully evacuated with 4 minutes and that all passengers reach a point of safety within 6 minutes. WMATA Metrorail stations, however, are not required to meet these criteria. Details on the assumptions and calculations necessitated in NFPA 130 are found in Appendix B5. A summary of the emergency evacuation analyses is included below, with further details of each entrance analysis included in Appendix B5.

The NFPA 130 analysis used the projected number of passengers waiting to board trains (entries and transfers) from the peak entering period at each station. Table 5-32 summarizes growth in passengers waiting to board trains during the peak entering period for each station platform. RFDS 2 forecasted passenger trips were added to No-action passenger volumes proportionally based on current ridership patterns. The number of passengers waiting was combined with the number of passengers on board trains to calculate the total number of passengers who would need to evacuate each station. Table 5-33 summarizes platform evacuation times and total station evacuation times (to a point of safety) in minutes for each station entrance in the study area. Appendix B5 has further details on the emergency evacuation analysis for each station.

Table 5-32: RFDS 2 Weekday Peak 15-Minute Entering Period Waiting Passenger Growth

Station	Platform	Time	Passengers Waiting on Platform		
			2014	2025 No-action Alternative	2025 RFDS 2
Archives-Navy Memorial	Green/Yellow	5:00 PM – 5:15 PM	524	665	676
Federal Triangle	Blue/Orange/Silver	5:00 PM – 5:15 PM	501	635	646
Gallery Place-Chinatown East	Glenmont	5:00 PM – 5:15 PM	320	399	401
	Shady Grove	5:00 PM – 5:15 PM	339	430	431
	Green/Yellow	5:00 PM – 5:15 PM	794	990	992
Gallery Place-Chinatown West	Glenmont	5:00 PM – 5:15 PM	320	399	401
	Shady Grove	5:00 PM – 5:15 PM	339	430	431
Metro Center East	Glenmont	5:30 PM – 5:45 PM	390	485	487
	Shady Grove	5:30 PM – 5:45 PM	394	491	493
Metro Center South	Glenmont	5:30 PM – 5:45 PM	390	485	487
	Blue/Orange/Silver	5:30 PM – 5:45 PM	807	1,009	1,013

Source: WMATA (2014c); MWCOG (2015); DDOT Scoping Form (Appendix B1)

Table 5-33: RFDS 2 NFPA 130 Evacuation Analysis Summary

Station/ Entrance	Platform Evacuation Time (minutes)	Total Station Evacuation Time (minutes)
Archives-Navy Memorial	32.9	36.2
Federal Triangle	14.4	18.1
Gallery Place-Chinatown East	30.0	33.7
Gallery Place-Chinatown West	8.6	12.2
Metro Center East	7.1	10.2
Metro Center South	3.3	16.5

Source: WMATA (2014c); TRB (2013)

Archives-Navy Memorial Station

Using the peak 15-minute ridership period and NFPA 130 assumptions and guidelines, the platform at Archives-Navy Memorial Station could be evacuated in 32.9 minutes, and the entire station could be evacuated to a point of safety within 36.2 minutes. The long evacuation time at this station is a function of the fact that there are only two platform-to-mezzanine escalators.

Federal Triangle Station

Using the peak 15-minute ridership period and NFPA 130 assumptions and guidelines, the platform at Federal Triangle Station could be evacuated in 14.4 minutes, and the entire station could be evacuated to a point of safety within 18.0 minutes.

Gallery Place-Chinatown East Entrance

Using the peak 15-minute ridership period and NFPA 130 assumptions and guidelines, the Green/Yellow and Red-Glenmont platforms at the Gallery Place-Chinatown east entrance could be evacuated in 30.0 minutes, and the entire station entrance could be evacuated to a point of safety within 33.7 minutes. The long platform evacuation time is a function of the fact that there are only two platform-to-mezzanine escalators per platform at this station entrance.

Gallery Place-Chinatown West Entrance

Using the peak 15-minute ridership period and NFPA 130 assumptions and guidelines, the two Red line platforms at the Gallery Place-Chinatown west entrance could be evacuated in 8.6 minutes and the entire station entrance could be evacuated to a point of safety within 12.2 minutes.

Metro Center East Entrance

Using the peak 15-minute ridership period and NFPA 130 assumptions and guidelines, the Red line platforms at the Metro Center east entrance could be evacuated in 7.1 minutes and the entire station entrance could be evacuated to a point of safety within 10.2 minutes.

Metro Center South Entrance

Using the peak 15-minute ridership period and NFPA 130 assumptions and guidelines, the Blue/Orange/Silver and Red line platforms at the Metro Center south entrance could be evacuated in 3.3 minutes and the entire station could be evacuated to a point of safety within 16.5 minutes.

5.2.4.3 Metrobus Analysis

To evaluate the impact of RFDS 2 on the bus network within the study area, the net transit trips calculated for the AM peak hour and PM peak hour were disaggregated into Metrorail and Metrobus trips, using the transit mode splits from table 5-24. Table 5-34 summarizes net Metrobus trips generated by RFDS 2.

Table 5-34: RFDS 2 Net Metrobus Trips

Use	Independent Variable	Time Period	Transit Mode			Bus Mode			
			IN	OUT	TOTAL	Bus Mode Split	IN	OUT	TOTAL
Existing JEH Trips to Subtract									
JEH	5,045 employees	AM Peak	1,020	77	1,097	16.4%	167	13	180
		PM Peak	51	967	1,018	16.4%	8	159	167
RFDS 2 Trips									
Residential	1,066 units	AM Peak	61	241	302	15.3%	9	37	46
		PM Peak	154	95	250	15.3%	24	15	38
Retail	172,956 square feet	AM Peak	52	33	85	15.3%	8	5	13
		PM Peak	205	187	392	15.3%	31	29	60
Office	1,416,348 square feet	AM Peak	919	99	1,018	16.4%	151	16	167
		PM Peak	178	892	1,070	16.4%	29	146	176
Total		**AM Peak**	**1,032**	**374**	**1,406**	**-**	**168**	**58**	**226**
		PM Peak	**538**	**1,175**	**1,712**	**-**	**84**	**190**	**274**
Net Trips for RFDS 2 (RFDS 2 Trips Minus JEH Trips)									
Total		**AM Peak**					**1**	**46**	**46**
		PM Peak					**76**	**31**	**107**

Note: Calculations may not appear correct due to rounding.
Source: DDOT Scoping Form (Appendix B1); MWCOG (2014c); WMATA (2006)

The net Metrobus trips associated with RFDS 2 were added to the AM peak hour and PM peak hour bus volumes calculated for the study area in the 2025 No-action Alternative. Both the AM peak hour and the PM peak hour were analyzed due to the fact that the AM peak hour had the highest No-action Alternative bus volumes but the PM peak hour had a higher number of additional RFDS 2 trips than the AM peak hour. The trips were distributed proportionally to each route and direction within the study area based on 2025 No-action ridership levels.

Overall, the RFDS 2 bus volumes are projected to be approximately 5,340 passengers during the AM peak period, and 5,085 passengers during the PM peak period. Both of these totals are well below projected capacity (see table 5-35). AM peak period volumes would be lower than No-action volumes, since the current JEH parcel generates more AM peak hour trips than the scenario.

Despite the fact that the total bus volume within the study area does not exceed the total bus capacity, several individual routes will likely experience capacity issues during peak hours. Peak volumes per hour on Routes 11Y, 32, 36, 80, and G8 are all projected to be over capacity by 2025 within the study area. WMATA has completed studies of the 30s Line (Routes 32 and 36), Route 80, and Route G8. Certain recommendations from these studies have already been implemented, and are all intended to help alleviate overcrowding on these routes. It is unclear whether all recommendations would be implemented by 2025. Further analysis would be required to determine the extent to which the recommendations would impact capacity on these routes. Appendix B7 has further details on the bus capacity analysis.

Table 5-35: RFDS 2 Bus Capacity Analysis

	2014		2025 No-action Alternative [a]		2025 RFDS 2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Total Volume	4,315	3,952	5,383	4,978	5,340	5,085
Total Capacity	11,425	10,698	11,425	10,698	11,425	10,698
Volume to Capacity Ratio (v/c)	0.38	0.37	0.47	0.47	0.48	0.48

[a] Including trips from planned development projects.
Source: WMATA (2014e); MWCOG (2015); DDOT Scoping Form (Appendix B1)

5.2.4.4 Public Transit Level of Impact

The increase in public transit trips from the future development conditions would have the following impacts on transit:

- Several Metrobus routes would continue to have capacity issues due to their capacity issues present in the No-action Alternative, given no overall projected transit service increase or changes in Metrobus service are assumed in the analysis. However, no new Metrobus capacity issues would be created as a result of RFDS 2. The overall capacity of bus services in the study area would accommodate the projected ridership.
- Metrorail passenger loads through the study area are projected to be at acceptable levels.
- Overall, Metrorail vertical elements and faregate aisles at each station are projected to operate below capacity.
- Metrorail fare vending machines are projected to operate above capacity at Archives-Navy Memorial, the east and west entrances to Gallery Place-Chinatown, and the east and south entrances to Metro Center, as they did under the No-action Alternative. No new Metrorail fare vending machines would operate above capacity as a result of RFDS 2.
- Metrorail platform peak pedestrian LOS (based on the available spacing between passengers) on the busiest platform sections are projected to be at the acceptable pedestrian LOS B at Archives-Navy Memorial and Federal Triangle. The Red line platforms at Gallery Place-Chinatown and Metro Center are all projected to operate at a pedestrian LOS D, while the lower platforms are projected to operate at pedestrian LOS C. This represents no change over the No-action Alternative.
- Platform and station evacuation times would increase slightly over the No-action Alternative, and continue to exceed NFPA 130 standards at all station entrances except the platform evacuation time at the south entrance to Metro Center. WMATA Metrorail stations, however, are not required to meet NFPA 130 standards.

Therefore, although RFDS 2 would add trips to the transit network there would be no measurable long-term impacts to transit as compared to the impacts under the No-action Alternative. The scenario would have no measurable long-term indirect impacts on public transit. RFDS 2 would result in continued indirect, long-term, major adverse impacts, as discussed under the No Action Alternative. There would be an incremental increase in

the magnitude of adverse impacts due to further impacts to bus lines and the inadequate functioning of fare vending machines.

In addition, construction of RFDS 2 would cause indirect, short-term, adverse construction impacts to public transit because some bus routes that use roadways adjacent to the JEH parcel may experience delays and congestion if traffic lanes are reduced to allow staging area for construction. Additionally, bus stops may need to be moved during the construction process, also causing adverse impacts.

5.2.5 Parking

It is unlikely redevelopment of the JEH parcel would continue to require security setbacks from the building that restrict all on-street parking. Therefore, the addition of street parking on the JEH parcel would be left to the discretion of DDOT and the exchange partner. It is assumed that at least one or more sides of the JEH parcel would be opened to on-street time-restricted parking, with time limits established based on the parking restrictions in the immediate area and the need of the traffic network to accommodate peak volumes.

The total number of off-street garage parking spaces on the parcel would be determined by the market at the time of redevelopment. Under the assumptions of RFDS 2, a similar size garage as the one that currently exists would be built providing approximately 800 parking spaces. Access to the parking garage is assumed to be on 10th Street NW, similar to the No-action Alternative. Given that the amount of parking would be "determined by the market," and given the high availability of several mass transit options in the area and trends toward less automobile use by city-dwellers, it is assumed that parking demand would stay similar to the No-action Alternative but that the concentration of peak hour vehicular trips would be more balanced or dispersed due to the introduction of additional uses that would have different inbound and outbound travel patterns and times. However, it should be noted that the attractiveness of future proposed development and retail offerings would result in increased demand for on-street parking at certain times of the day, such as evenings and nights; this demand would be consistent with other downtown parking demands and could partially be accommodated by any on-street parking that was added. It is assumed that vehicles of future residents that were not parked on the street would be stored in off-street parking facilities in the area.

Under RFDS 2, there would likely be minor increases in the amount of on-street parking supply; because no measurable changes in off-street parking or parking demand are anticipated, the scenario would have indirect, long-term, beneficial impacts to parking. This would be due to the slight increase in public on-street parking. Redevelopment of the parcel would cause indirect, short-term, adverse construction impacts to parking because there would be limited onsite parking for those employees involved in redeveloping the parcel. Construction of the building would take up the majority of the site, whether with staging, active construction, or buildings themselves, leaving little room for employee parking on site.

5.2.6 Truck Access

Redevelopment of the parcel would open up the opportunity for truck access on the parcel to be moved. As DDOT requires truck access and loading to be from an alley where feasible and the exact site design with interior street access for the onsite buildings is unknown at this time, it is not possible to predict where truck access for RFDS 2 would be located (District Department of Public Works 2000). The location and specific details of truck access would need to be determined with DDOT through the redevelopment process. If more than one truck access point was permitted with redevelopment, as would be the case if the exchange partner introduced an alley to the parcel, there could be increased conflicts between trucks and pedestrians depending on the location of the access points to the parcel. To serve the large amount of development and varied uses of RFDS 2, it is likely the exchange partner would apply for more than one vehicular access point to the site. It should be noted that according to the DDOT Design and Engineering Manual, when changes occur at a property due to

redevelopment, “all existing driveways shall be restored with new curb and gutter, tree space, and sidewalk to current DDOT standards” and that “any existing attached curb cut proposed for [a] new use shall be applied for as a new curb cut and driveway” with DDOT (DDOT 2009c, p. 31-4).

With the assumption that truck access would continue to the parcel with minimal access points, but likely more than one vehicular access location, there would be indirect, long-term, adverse impacts to truck access under RFDS 2. This includes the potential diversion of pedestrian conflicts to a different sidewalk location. Redevelopment of the parcel would cause indirect, short-term, adverse construction impacts to truck access because there would be limited areas for site access and the loading areas may shift locations during development of the parcel. Without understanding the needs of the future tenants, this study is unable to further evaluate the impacts of truck access to the parcel. It is anticipated that a future developer will need to obtain new permits and approvals related to truck access locations and possibly undertake additional truck access studies following approved DDOT methods.

5.2.7 Traffic Analysis

The future projected traffic analysis is based on RFDS 2 removing the existing building and redeveloping the parcel to the maximum extent possible. The next sections describe the process the study followed to project future traffic volumes; modal split is covered within the trip generation section.

The projected person trips are explained in RFDS 2 Trip Generation and Modal Split section (see Section 5.2.1). After establishing the proper trip rate, the internal capture procedures outlined in National Cooperative Highway Research Program (NCHRP) 684 were followed to account for existing trips that would choose to walk between nearby land uses rather than drive (TRB 2011). The NCHRP process relies on captures rates between specific land uses. It should be noted that this procedure is endorsed as the preferred procedure for handling internal capture by ITE’s Proposed Trip Generation Handbook, Third Edition (ITE 2014). Each of the three land uses under RFDS 2 required this procedure to reflect the mixed use. Appendix B9 contains the *NCHRP 684* worksheets.

After combining the trip generation, removing the internal capture trips and applying the modal split, the forecasted vehicle trips were calculated. The vehicle trips were then separated into SOV and HOV. Since the study area is located in a downtown setting, the HOV were assumed to be an average of five persons per vehicle. This resulted in 150 net AM peak hour vehicle trips and 233 net PM peak hour vehicle trips. Table 5-36 contains the vehicle trips generated under RFDS 2.

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Table 5-36: RFDS 2 Vehicle Trips Generated

LAND USE	UNITS/SIZE/ MODE SHARE	AM PEAK HOUR TRIPS			PM PEAK HOUR TRIPS		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Existing J Edgar Hoover Building FBI HQ (all modes)	2.1M SF	-1,361	-102	-1,463	-68	-1,289	-1,357
SOV	13.5 percent	-184	-14	-198	-9	-174	-183
HOV (5 persons per vehicle)	8.5 percent	-23	-2	-25	-1	-22	-23
Total Vehicle Trips		**-207**	**-16**	**-222**	**-10**	**-196**	**-206**
Apartments (ITE - 220)	1,066 units	105	421	526	393	211	604
Internal Capture Trips (following NCHRP 684 Tables)		-2	-12	-14	-131	-50	-181
Net External Person Trips		103	409	512	262	161	423
SOV	10 percent	10	41	51	26	16	42
HOV (5 persons per vehicle)	11 percent	2	9	11	6	4	9
Total Vehicle Trips		**13**	**50**	**62**	**32**	**20**	**52**
Shopping Center (ITE - 820)	172,956 SF	135	83	218	424	441	865
Internal Capture Trips (following NCHRP 684 Tables)		-47	-26	-73	-76	-124	-200
Net External Person Trips		88	57	145	348	317	665
SOV	10 percent	9	6	15	35	32	67
HOV (5 persons per vehicle)	11 percent	2	1	3	8	7	15
Total Vehicle Trips		**11**	**7**	**18**	**42**	**39**	**81**
General Office (ITE - 710)	1416348 SF	1,404	191	1,595	283	1,382	1,665
Internal Capture Trips (following NCHRP 684 Tables)		-32	-43	-75	-17	-50	-67
Net External Person Trips		1,372	148	1,520	266	1,332	1,598
SOV	17 percent	233	25	258	45	226	272
HOV (5 persons per vehicle)	11 percent	30	3	33	6	29	35
Total Vehicle Trips		**263**	**28**	**292**	**51**	**256**	**307**
TOTAL VEHICLE TRIPS		**80**	**70**	**150**	**115**	**118**	**233**

Notes:

SF = Square Feet

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5.2.7.1 RFDS 2 Trip Distribution/Trip Assignment

Because the proposed uses for the JEH parcel produce a different distribution pattern than the existing FBI employee trips, the new uses required a distribution pattern. Consistent with the method used for RFDS 1, current FBI employee trips were removed from the roadways based on their home zip codes and using the most likely route leaving the study area to reach that zip code.

The study used the MWCOG 2025 model (MWCOG 2014c) to establish distribution patterns for the new trips. Different trip types – in this case residential, commercial and office – all have different distribution patterns. These patterns also differ based on location. The JEH parcel is located in Zone 21 in the MWCOG model. This zone does not currently include enough residential or commercial units to establish a reliable distribution pattern. Therefore, the zone was only used for the new office trips. Zone 19, which is adjacent to Zone 21, does have a good representation of residential units; therefore the residential distribution of trips used Zone 19 distribution. Similarly, Zone 24, also adjacent to Zone 21, has a good representation of retail/ commercial trips, and was therefore used to generate the trip distribution for retail/ commercial trips. Office, retail and restaurant trip distributions are summarized in table 5-37. According to the MWCOG model, 5 percent of residential trips would remain within the study area.

Table 5-37: RFDS 2 Vehicle Trip Distribution

Destination	Road	Office (Percent)	Residential (Percent)	Retail (Percent)
East DC/MD	Constitution Ave East	4.0%	6.0%	8.0%
North DC	14th Street North	5.0%	11.0%	4.0%
Northeast DC/MD	7th Street North	26.0%	28.0%	32.0%
Northwest DC	H Street	7.0%	5.0%	11.0%
Northwest MD, Western VA	Constitution Ave West	29.0%	20.0%	22.0%
South DC, Southeast MD, Southwest VA	12th Street / 9th Street	29.0%	25.0%	23.0%
Study Area	N/A	0.0%	5.0%	0.0%
TOTAL		**100.0%**	**100.0%**	**100.0%**

The subtraction of current FBI employee trips combined with the addition of office, residential, and retail trips equals the net trip change between the No-action Alternative and RFDS 2. The total scenario net trip generation AM and PM forecasted turning movement volumes are shown in figure 5-5.

5.2.7.2 Development of RFDS 2

The planned developments, background growth, and RFDS 2 net trips (existing FBI vehicle trips minus the new trips generated by RFDS 2) were combined together to forecast conditions under RFDS 2. The total RFDS 2 net trip change AM and PM forecasted turning movement volumes are shown in figure 5-6.

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Figure 5-5: RFDS 2 Net Trip Generation AM and PM Forecasted Turning Movement Volumes

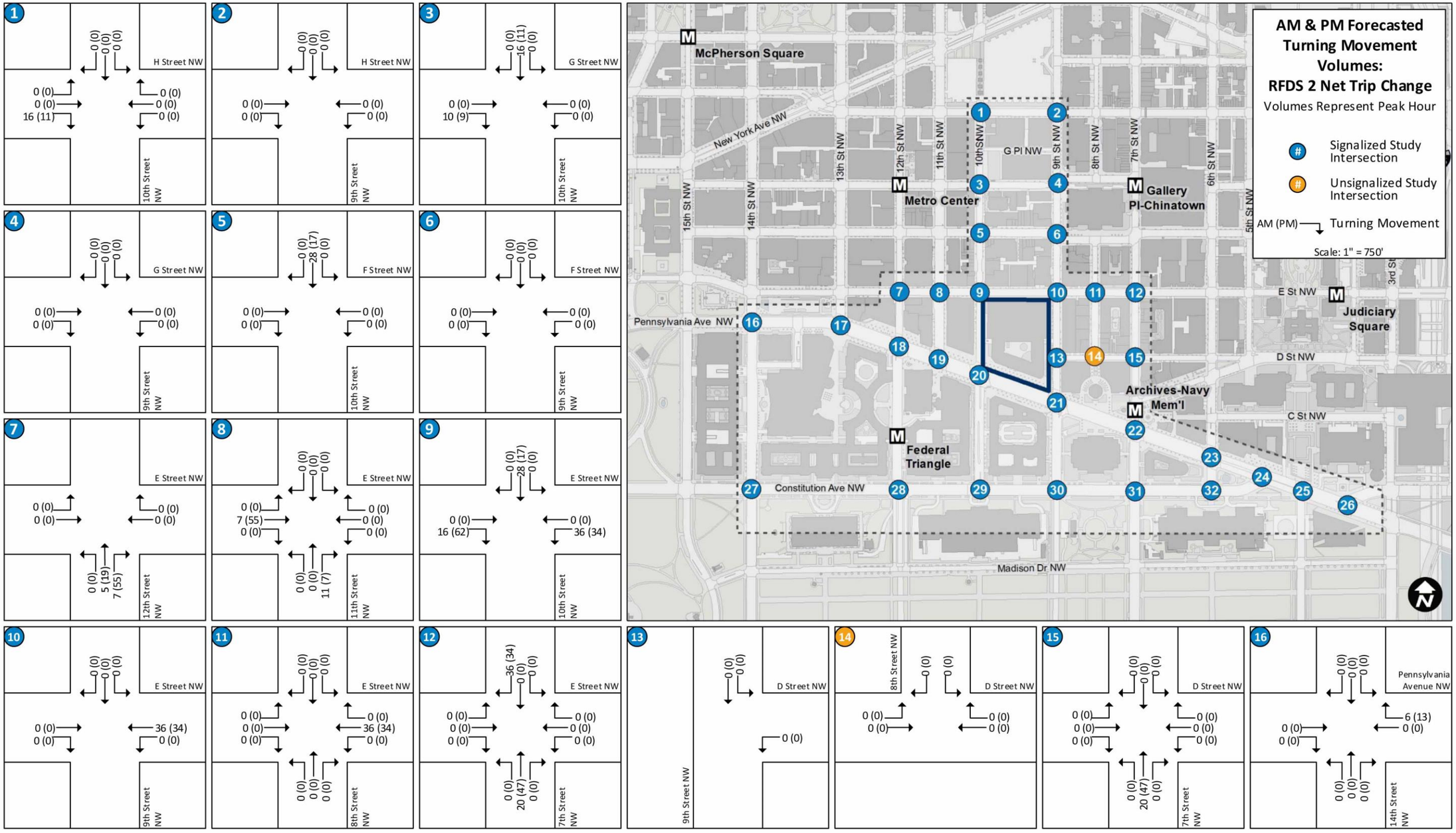


Figure 5-5: RFDS 2 Net Trip Generation AM and PM Forecasted Turning Movement Volumes (continued)

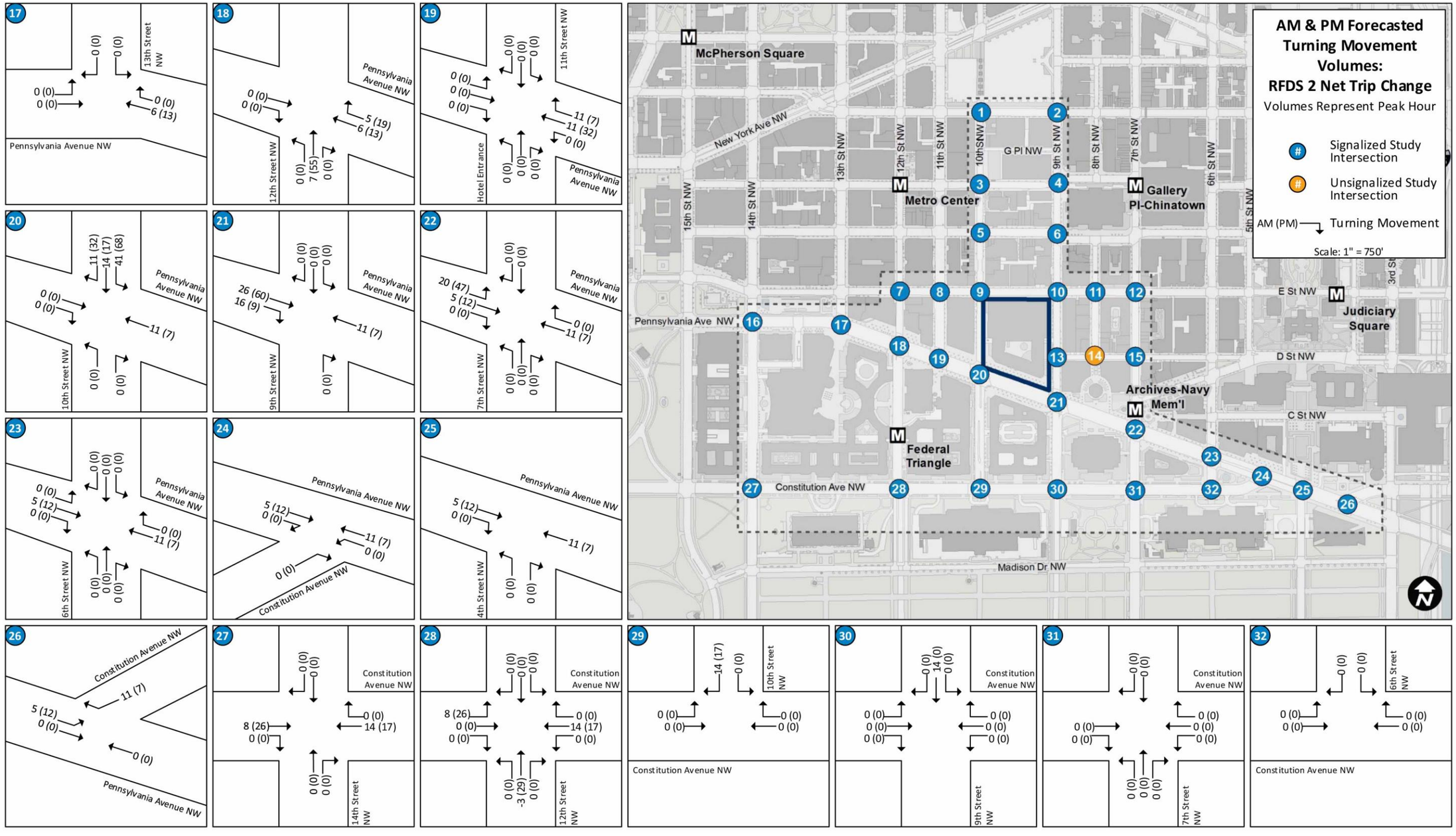


Figure 5-6: RFDS 2 AM and PM Forecasted Turning Movement Volumes

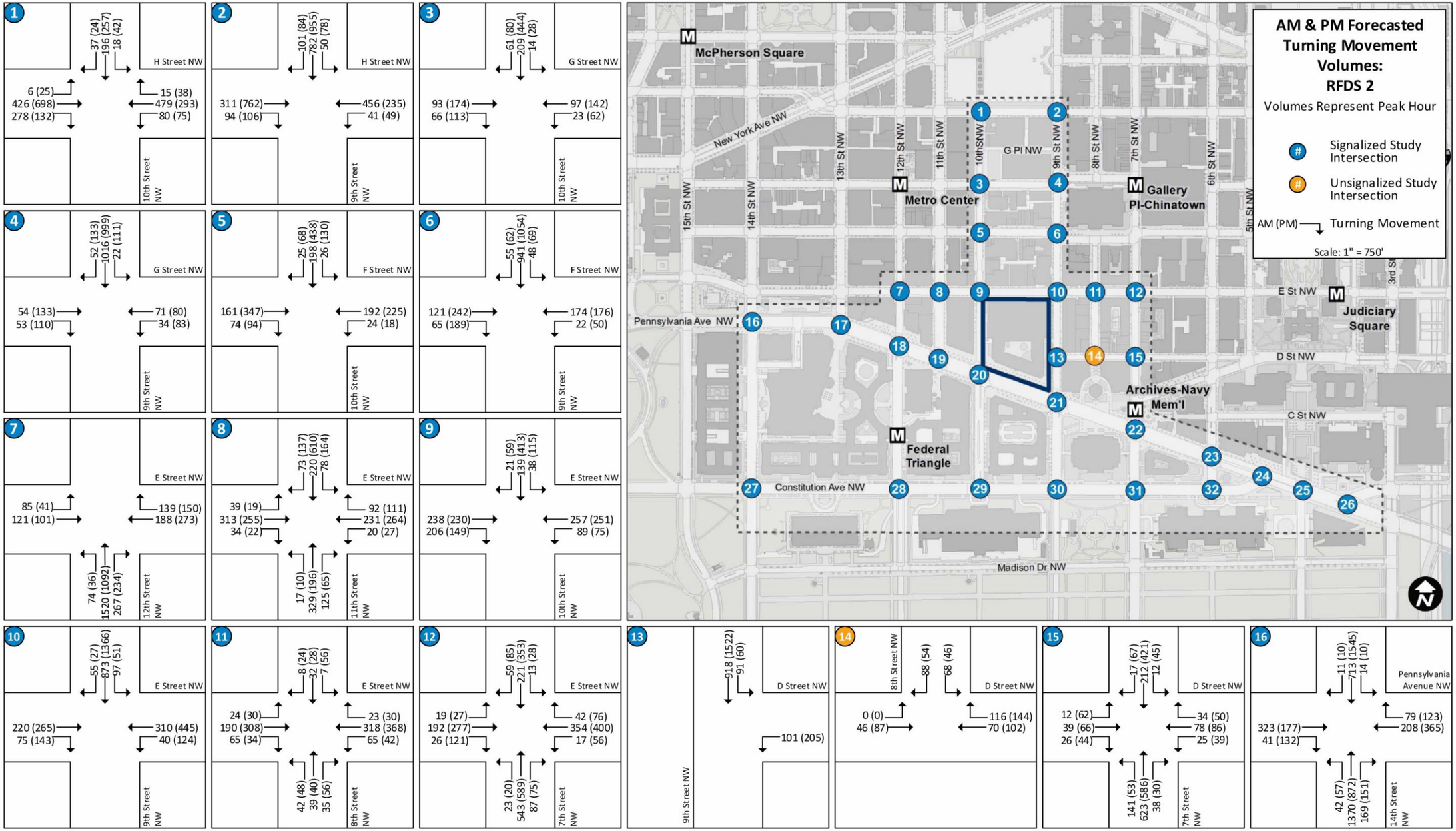
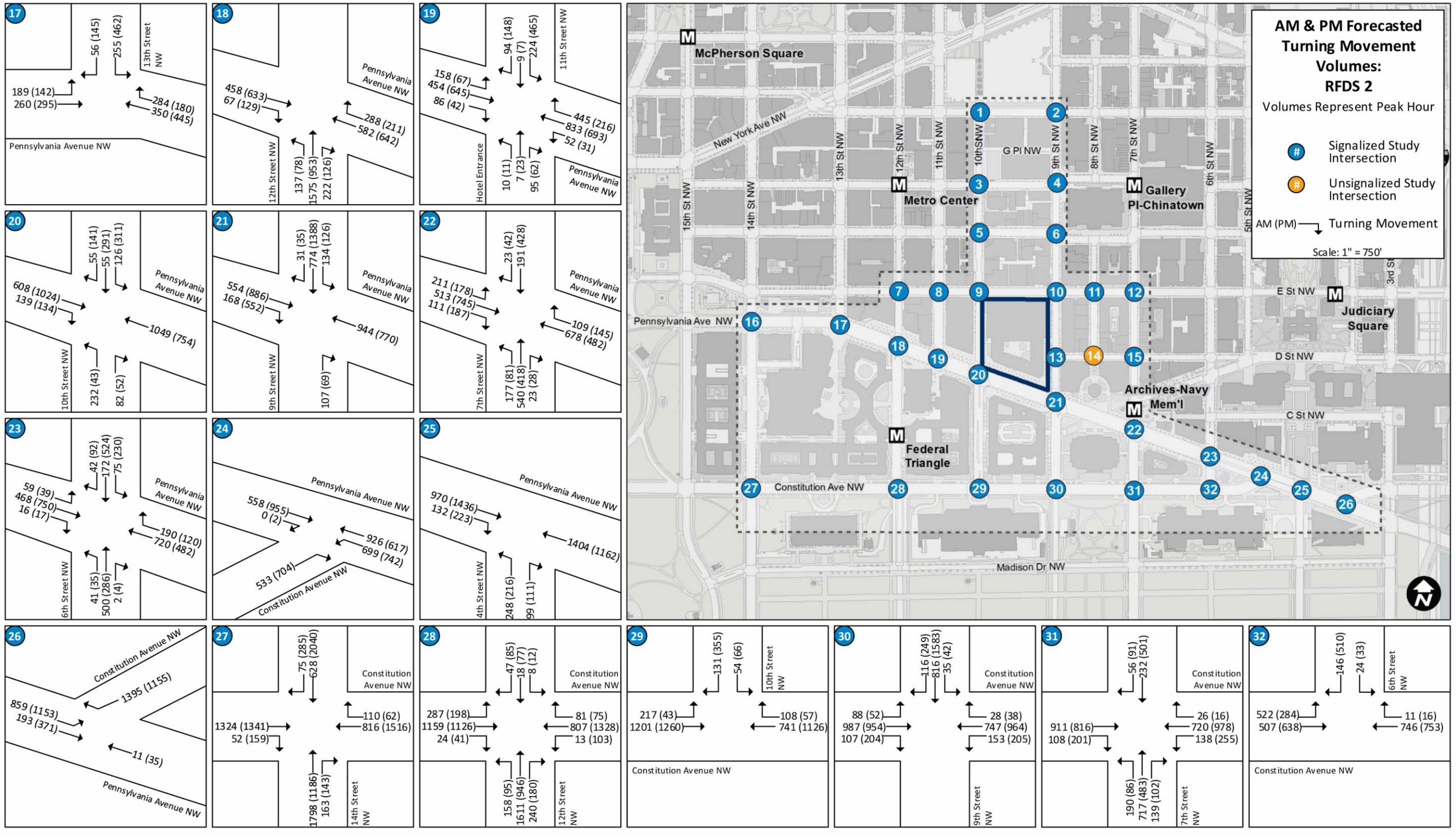


Figure 5-6: RFDS 2 AM and PM Forecasted Turning Movement Volumes (continued)



5.2.7.3 RFDS 2 Operations Analysis

Based on the Synchro™ signalized intersection analysis, the majority of the study intersections would operate at acceptable conditions during the AM and PM peak hours in 2025. However, as in the No-action Alternative, the intersection of 6th Street NW and Pennsylvania Avenue NW would operate at LOS E during the PM peak hour. This is the only intersection within the study area that would operate under unacceptable conditions (LOS E or LOS F) during a peak hour period in 2025. None of the study area intersections would operate at LOS F during a peak hour.

The following individual intersection lane groups or overall approaches would operate at unacceptable conditions (LOS E or LOS F) during the morning or afternoon peak hour in 2025 under RFDS 2. The lane group within the approach that would operate under unacceptable conditions is noted in parentheses; when "overall" is noted, the overall approach movements would operate under unacceptable conditions.

- 9th Street NW and G Street NW (Intersection #4)
    - Eastbound G Street (overall) during the PM peak hour
- 9th Street NW and F Street NW (Intersection #6)
    - Southbound 9th Street (overall) during the PM peak hour
- 9th Street NW and E Street NW (Intersection #10)
    - Southbound 9th Street (overall) during the PM peak hour
- 7th Street NW and D Street NW (Intersection #15)
- Northbound 7th Street (overall) during the AM peak hour13th Street NW and Pennsylvania Avenue NW (Intersection #17)
    - Eastbound Pennsylvania Avenue (overall) during the AM peak hour
- 11th Street NW and Pennsylvania Avenue NW (Intersection #19)
    - Eastbound Pennsylvania Avenue (left turns) and westbound Pennsylvania Avenue (right turns) during the AM and PM peak hour
    - Southbound 11th Street (overall) during the AM and PM peak hour
- 10th Street NW and Pennsylvania Avenue NW (Intersection #20)
    - Northbound 10th Street (overall) during the AM peak hour
    - Northbound 10th Street (left turns) and southbound 10th Street (overall) during the PM peak hour
- 7th Street NW and Pennsylvania Avenue (Intersection #22)
    - Eastbound Pennsylvania Avenue (overall) and northbound 7th Street (left turns) during the AM peak hour
    - Eastbound Pennsylvania Avenue (left turns) and northbound 7th Street (left turns) during the PM peak hour
- 6th Street NW and Pennsylvania Avenue NW (Intersection #23)
    - Eastbound Pennsylvania Avenue (left turns) during the AM peak hour
    - Southbound 6th Street (overall) during the PM peak hour
- Constitution Avenue (WB) NW and Pennsylvania Avenue NW (Intersection #24)
    - Westbound Pennsylvania Avenue (left turns) during the PM peak hour
- 14th Street NW and Constitution Avenue NW (Intersection #27)
    - Southbound 14th Street (overall) during the PM peak hour
- 12th Street NW and Constitution Avenue NW (Intersection #28)
    - Northbound 12th Street (overall) during both the AM and PM peak hours
    - Eastbound Constitution Avenue (left turns) during the AM peak hour
- 9th Street NW and Constitution Avenue NW (Intersection #30)
    - Eastbound Constitution Avenue (overall) during the PM peak hour

- 6th Street NW and Constitution Avenue NW (Intersection #32)
    - Eastbound Constitution Avenue (left turns) during the AM peak hour

Based on the Synchro™ unsignalized intersection analysis, all the unsignalized intersections in the study area would operate at acceptable conditions during the morning and afternoon peak hours.

Complete Intersection Operations Analysis

This section summarizes the differences in LOS impacts between RFDS 2 and the No-action Alternative by quantifying the change in intersection operation failures. Following the summary, this section also includes the complete results of the operations analysis in figures and a table.

Based on the Synchro™ signalized intersection analysis, a total of 14 signalized intersections would experience an unacceptable conditions for one or more turning movements. Compared to the No-Action Alternative, RFDS 2 would have no change in the number of intersections failing during both the AM and PM peak hours. In the AM peak hour, compared to the No-action Alternative, there are zero intersections that passed overall but would now fail, 32 that would not change, and zero that were failing but would now pass. In the PM peak hour, there are zero intersections that passed overall but would now fail, 32 that would not change, and zero that were failing but would now pass.

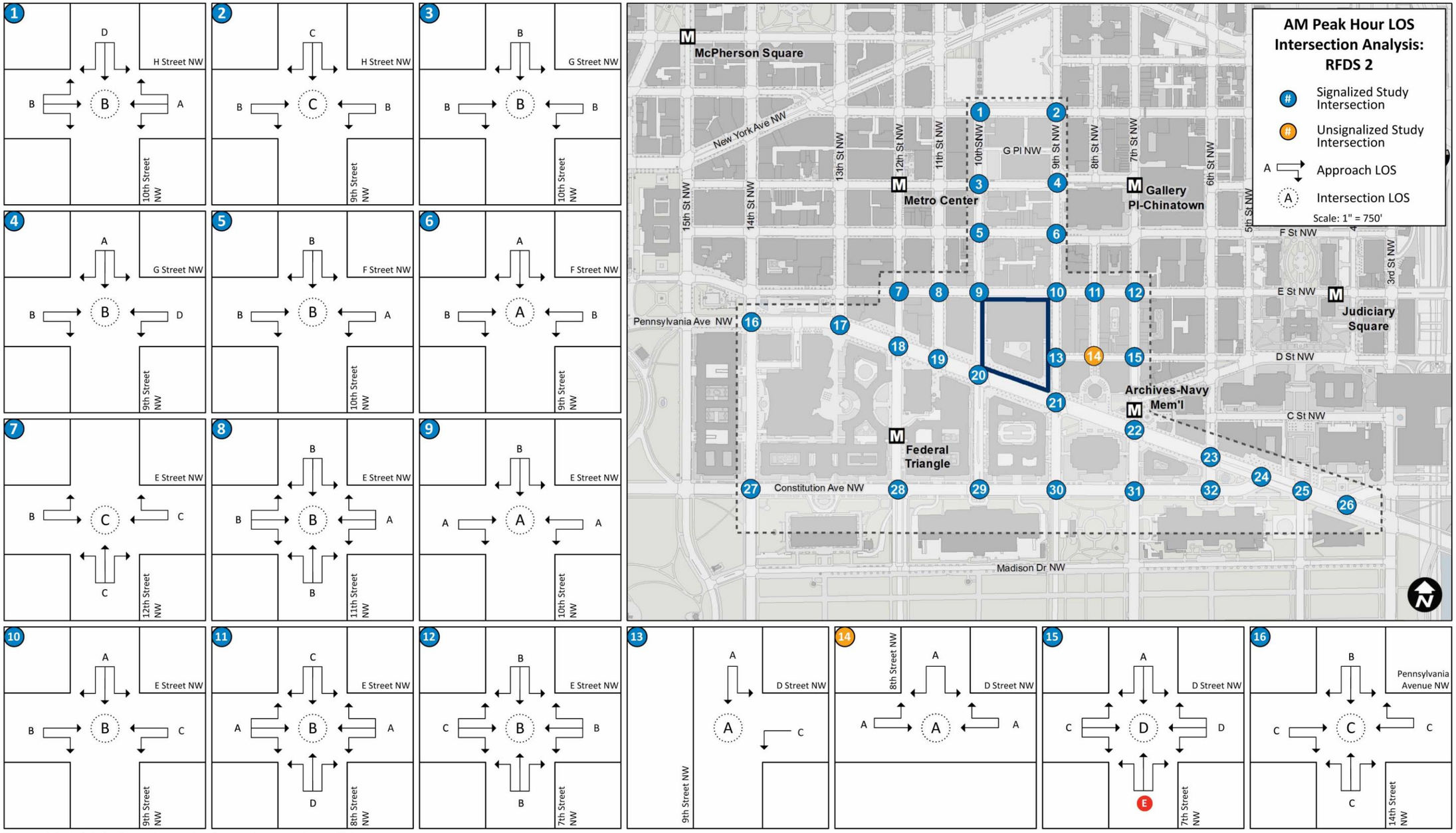
Table 5-38 provides a summary of the number of intersections that meet the following criteria for the overall directional approach that would change between the No-action Alternative and RFDS 2:

Table 5-38: Intersection Operations Summary Comparing No-action Alternative and RFDS 2

Type of Change Between Conditions	AM	PM
New Failing Approach	1	1
Additional Failing Approaches	0	0
No Change	31	31
Fewer Failing Approaches	0	0
No Failing Approaches	0	0
Total Signalized and Unsignalized Intersections	**32**	**32**

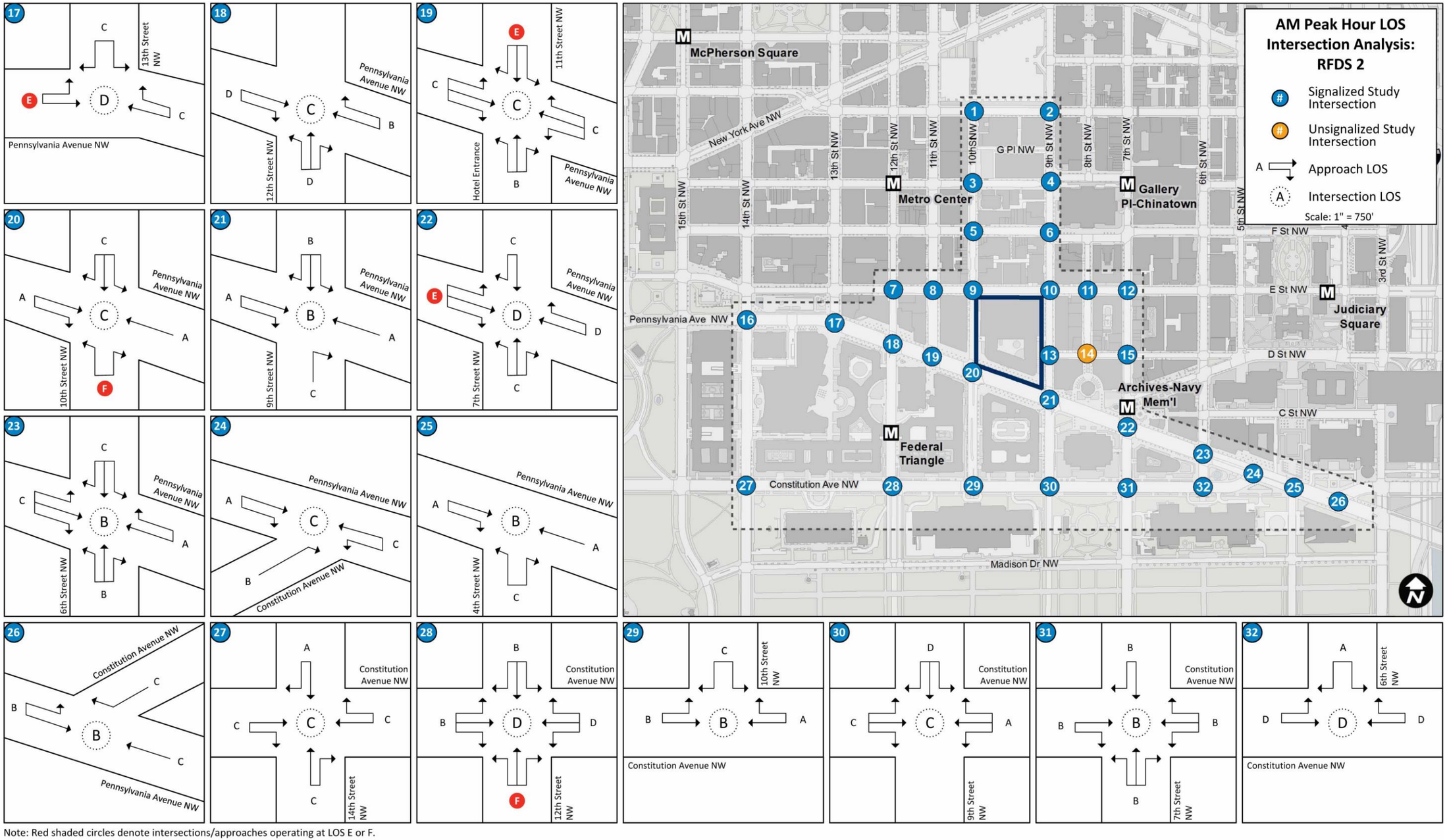
The results of the No-action Alternative compared to RFDS 2 average LOS for the various approaches to the intersections and the overall intersection LOS grades are shown in figures 5-7 and 5-8 for the AM and PM peak hours, respectively. Table 5-39 shows the results of the No-action Alternative compared to the LOS capacity analysis and the intersection projected delay under RFDS 2 during the AM and PM peak hours.

Figure 5-7: RFDS 2 Intersection LOS for AM Peak Hour



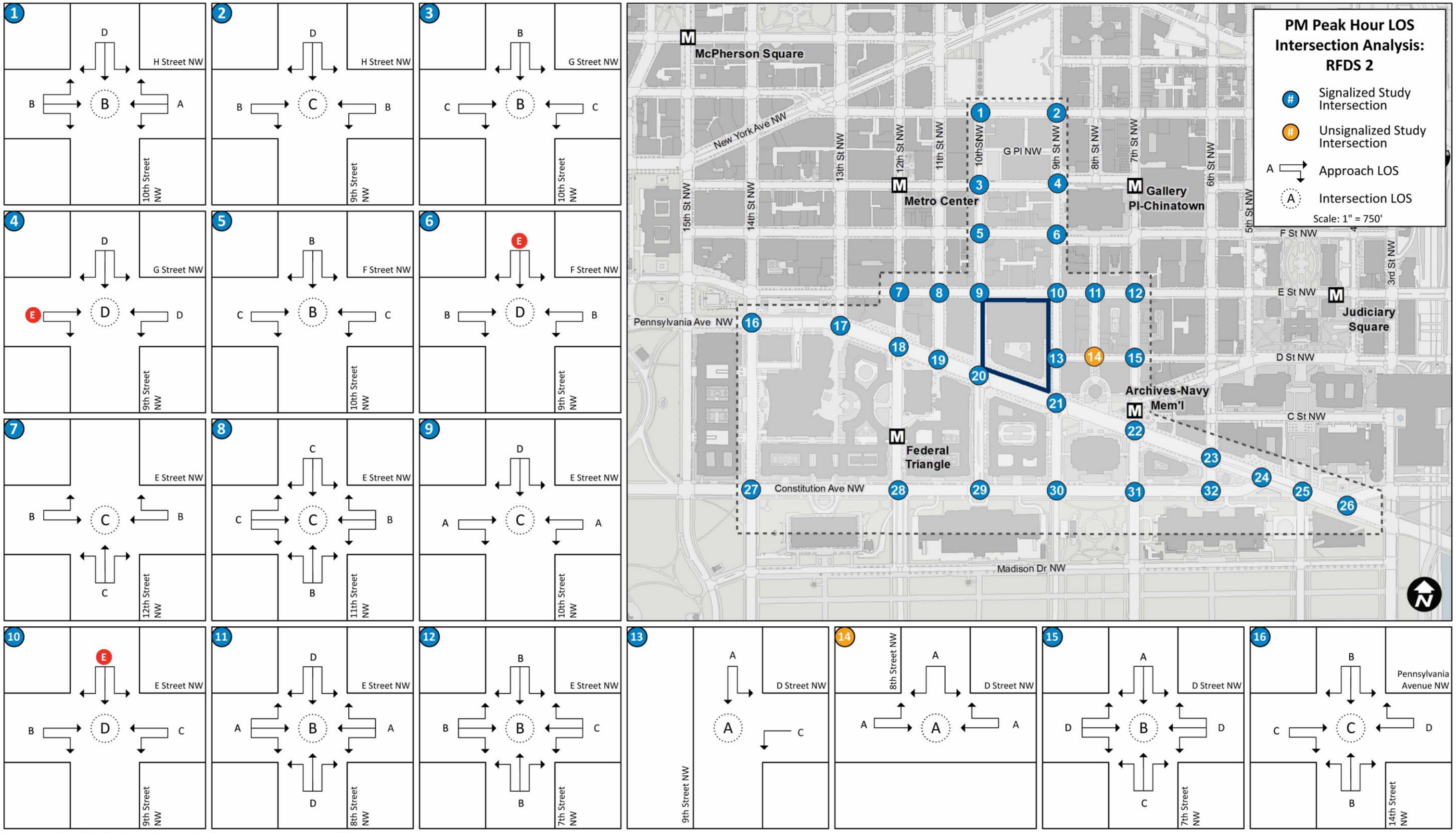
Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Figure 5-7: RFDS 2 Intersection LOS for AM Peak Hour (continued)



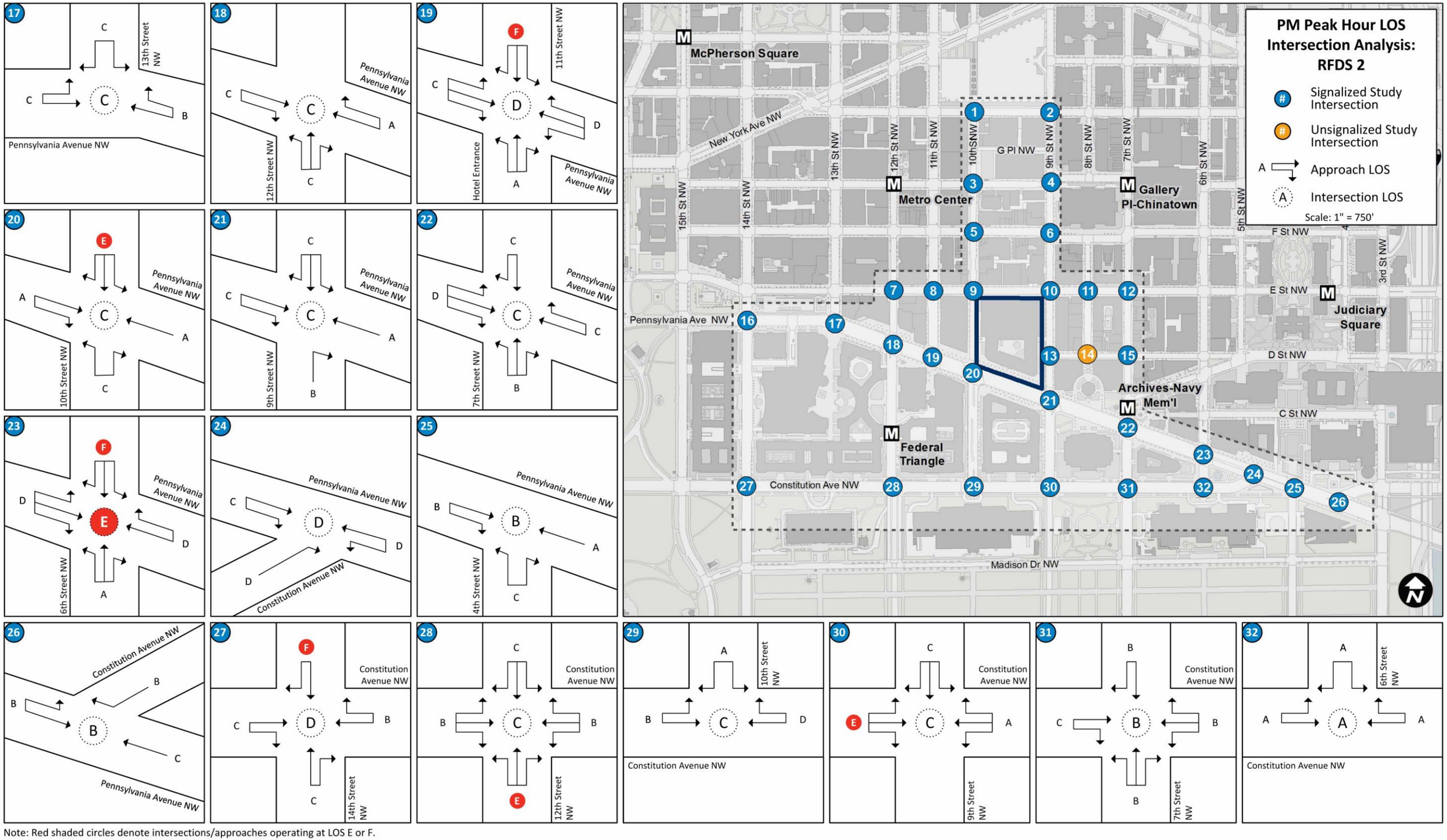
Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Figure 5-8: RFDS 2 Intersection LOS for PM Peak Hour



Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Figure 5-8: RFDS 2 Intersection LOS for PM Peak Hour (continued)



Note: Red shaded circles denote intersections/approaches operating at LOS E or F.

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
1	**10th Street NW & H Street NW (Signalized)**													
	EB (H Street)	LTR	10.8	B		12.6	B		10.9	B		12.7	B	
	Eastbound (H Street)		**10.8**	**B**		**12.6**	**B**		**10.9**	**B**		**12.7**	**B**	
	WB (H Street)	LTR	3.1	A		4.9	A		3.1	A		4.9	A	
	Westbound (H Street)		**3.1**	**A**		**4.9**	**A**		**3.1**	**A**		**4.9**	**A**	
	SB (10th Street)	LTR	41.8	D		53.0	D		41.8	D		53.0	D	
	Southbound (10th Street)		**41.8**	**D**		**53.0**	**D**		**41.8**	**D**		**53.0**	**D**	
	Overall		**12.8**	**B**	**Pass**	**19.6**	**B**	**Pass**	**12.9**	**B**	**Pass**	**19.6**	**B**	**Pass**
2	**9th Street NW & H Street NW (Signalized)**													
	EB (H Street)	TR	12.7	B		12.5	B		12.7	B		12.5	B	
	Eastbound (H Street)		**12.7**	**B**		**12.5**	**B**		**12.7**	**B**		**12.5**	**B**	
	WB (H Street)	LT	19.8	B		16.3	B		19.8	B		16.3	B	
	Westbound (H Street)		**19.8**	**B**		**16.3**	**B**		**19.8**	**B**		**16.3**	**B**	
	SB (9th Street)	LT	26.3	C		38.8	D		26.3	C		38.8	D	
	SB (9th Street)	R	4.3	A		5.2	A		4.3	A		5.2	A	
	Southbound (9th Street)		**23.9**	**C**		**36.2**	**D**		**23.9**	**C**		**36.2**	**D**	
	Overall		**20.3**	**C**	**Pass**	**24.7**	**C**	**Pass**	**20.3**	**C**	**Pass**	**24.6**	**C**	**Pass**
3	**10th Street NW & G Street NW (Signalized)**													
	EB (G Street)	TR	18.0	B		27.8	C		17.8	B		28.4	C	
	Eastbound (G Street)		**18.0**	**B**		**27.8**	**C**		**17.8**	**B**		**28.4**	**C**	
	WB (G Street)	LT	10.5	B		24.2	C		10.5	B		24.6	C	
	Westbound (G Street)		**10.5**	**B**		**24.2**	**C**		**10.5**	**B**		**24.6**	**C**	
	SB (10th Street)	LTR	14.5	B		10.2	B		15.2	B		10.6	B	
	Southbound (10th Street)		**14.5**	**B**		**10.2**	**B**		**15.2**	**B**		**10.6**	**B**	
	Overall		**14.6**	**B**	**Pass**	**18.2**	**B**	**Pass**	**14.9**	**B**	**Pass**	**18.7**	**B**	**Pass**
4	**9th Street NW & G Street NW (Signalized)**													
	EB (G Street)	TR	13.7	B		72.5	E		13.9	B		72.9	E	
	Eastbound (G Street)		**13.7**	**B**		**72.5**	**E**		**13.9**	**B**		**72.9**	**E**	
	WB (G Street)	L	43.0	D		45.0	D		43.0	D		45.0	D	
	WB (G Street)	T	47.4	D		44.0	D		47.4	D		44.0	D	
	Westbound (G Street)		**46.0**	**D**		**44.5**	**D**		**46.0**	**D**		**44.5**	**D**	
	SB (9th Street)	LT	10.0	A		44.3	D		9.9	A		44.3	D	
	SB (9th Street)	R	0.6	A		1.5	A		0.6	A		1.5	A	
	Southbound (9th Street)		**9.5**	**A**		**39.8**	**D**		**9.5**	**A**		**39.8**	**D**	
	Overall		**13.0**	**B**	**Pass**	**45.7**	**D**	**Pass**	**13.0**	**B**	**Pass**	**45.7**	**D**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
5	**10th Street NW & F Street NW (Signalized)**													
	EB (F Street)	TR	12.0	B		24.1	C		12.0	B		24.2	C	
	Eastbound (F Street)		**12.0**	**B**		**24.1**	**C**		**12.0**	**B**		**24.2**	**C**	
	WB (F Street)	LT	9.1	A		21.0	C		9.1	A		21.0	C	
	Westbound (F Street)		**9.1**	**A**		**21.0**	**C**		**9.1**	**A**		**21.0**	**C**	
	SB (10th Street)	LTR	14.9	B		11.0	B		15.4	B		11.1	B	
	Southbound (10th Street)		**14.9**	**B**		**11.0**	**B**		**15.4**	**B**		**11.1**	**B**	
	Overall		**12.1**	**B**	**Pass**	**17.4**	**B**	**Pass**	**12.4**	**B**	**Pass**	**17.3**	**B**	**Pass**
6	**9th Street NW & F Street NW (Signalized)**													
	EB (F Street)	TR	13.4	B		14.2	B		13.3	B		14.3	B	
	Eastbound (F Street)		**13.4**	**B**		**14.2**	**B**		**13.3**	**B**		**14.3**	**B**	
	WB (F Street)	LT	18.6	B		19.4	B		18.6	B		19.4	B	
	Westbound (F Street)		**18.6**	**B**		**19.4**	**B**		**18.6**	**B**		**19.4**	**B**	
	SB (9th Street)	LTR	7.4	A		55.5	E		7.4	A		56.2	E	
	Southbound (9th Street)		**7.4**	**A**		**55.5**	**E**		**7.4**	**A**		**56.2**	**E**	
	Overall		**9.8**	**A**	**Pass**	**41.5**	**D**	**Pass**	**9.8**	**A**	**Pass**	**42.0**	**D**	**Pass**
7	**12th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	19.2	B		16.0	B		19.2	B		16.0	B	
	EB (E Street)	T	15.5	B		14.6	B		15.5	B		14.6	B	
	Eastbound (E Street)		**17.1**	**B**		**15.0**	**B**		**17.1**	**B**		**15.0**	**B**	
	WB (E Street)	TR	21.9	C		13.5	B		22.0	C		13.5	B	
	Westbound (E Street)		**21.9**	**C**		**13.5**	**B**		**22.0**	**C**		**13.5**	**B**	
	NB (12th Street)	LTR	22.4	C		31.9	C		22.5	C		32.8	C	
	Northbound (12th Street)		**22.4**	**C**		**31.9**	**C**		**22.5**	**C**		**32.8**	**C**	
	Overall		**21.8**	**C**	**Pass**	**26.3**	**C**	**Pass**	**21.9**	**C**	**Pass**	**27.2**	**C**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
8	**11th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	10.4	B		21.4	C		10.3	B		23.2	C	
	EB (E Street)	T	20.1	C		27.0	C		21.1	C		32.6	C	
	EB (E Street)	R	9.6	A		20.7	C		9.6	A		22.4	C	
	Eastbound (E Street)		**18.2**	**B**		**26.0**	**C**		**19.0**	**B**		**31.2**	**C**	
	WB (E Street)	L	6.3	A		16.2	B		6.8	A		16.1	B	
	WB (E Street)	T	8.1	A		21.8	C		8.5	A		21.6	C	
	WB (E Street)	R	3.6	A		14.7	B		3.9	A		14.5	B	
	Westbound (E Street)		**6.8**	**A**		**19.5**	**B**		**7.2**	**A**		**19.3**	**B**	
	NB (11th Street)	LT	13.7	B		22.0	C		13.5	B		21.0	C	
	NB (11th Street)	R	11.6	B		15.4	B		12.0	B		16.2	B	
	Northbound (11th Street)		**13.2**	**B**		**20.5**	**C**		**13.1**	**B**		**19.8**	**B**	
	SB (11th Street)	LT	23.0	C		33.3	C		23.0	C		33.3	C	
	SB (11th Street)	R	5.7	A		21.8	C		5.7	A		21.8	C	
	Southbound (11th Street)		**19.6**	**B**		**31.5**	**C**		**19.6**	**B**		**31.5**	**C**	
	Overall		**14.7**	**B**	**Pass**	**26.4**	**C**	**Pass**	**14.9**	**B**	**Pass**	**27.1**	**C**	**Pass**
9	**10th Street NW & E Street NW (Signalized)**													
	EB (E Street)	T	11.4	B		5.3	A		11.2	B		4.8	A	
	EB (E Street)	R	5.0	A		1.9	A		4.9	A		3.0	A	
	Eastbound (E Street)		**8.5**	**A**		**4.4**	**A**		**8.2**	**A**		**4.1**	**A**	
	WB (E Street)	L	2.9	A		1.2	A		4.5	A		1.5	A	
	WB (E Street)	T	3.1	A		1.5	A		4.1	A		1.4	A	
	Westbound (E Street)		**3.0**	**A**		**1.4**	**A**		**4.2**	**A**		**1.4**	**A**	
	SB (10th Street)	LTR	19.0	B		48.4	D		18.9	B		50.7	D	
	Southbound (9th Street)		**19.0**	**B**		**48.4**	**D**		**18.9**	**B**		**50.7**	**D**	
	Overall		**8.8**	**A**	**Pass**	**24.8**	**C**	**Pass**	**9.1**	**A**	**Pass**	**24.4**	**C**	**Pass**
10	**9th Street NW & E Street NW (Signalized)**													
	EB (E Street)	T	14.8	B		16.7	B		14.9	B		17.2	B	
	EB (E Street)	R	8.6	A		14.0	B		8.7	A		14.4	B	
	Eastbound (E Street)		**13.2**	**B**		**15.8**	**B**		**13.3**	**B**		**16.2**	**B**	
	WB (E Street)	L	18.8	B		22.8	C		18.1	B		22.1	C	
	WB (E Street)	T	25.8	C		24.9	C		26.4	C		25.5	C	
	Westbound (E Street)		**24.9**	**C**		**24.4**	**C**		**25.5**	**C**		**24.7**	**C**	
	SB (9th Street)	LTR	9.3	A		64.7	E		9.3	A		64.7	E	
	Southbound (9th Street)		**9.3**	**A**		**64.7**	**E**		**9.3**	**A**		**64.7**	**E**	
	Overall		**13.0**	**B**	**Pass**	**46.2**	**D**	**Pass**	**13.4**	**B**	**Pass**	**46.0**	**D**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
11	**8th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	8.2	A		2.4	A		8.3	A		2.4	A	
	EB (E Street)	T	10.7	B		3.2	A		10.8	B		3.2	A	
	EB (E Street)	R	4.9	A		0.4	A		5.0	A		0.4	A	
	Eastbound (E Street)		**9.2**	**A**		**2.9**	**A**		**9.2**	**A**		**2.9**	**A**	
	WB (E Street)	L	5.4	A		3.0	A		5.6	A		3.9	A	
	WB (E Street)	T	6.2	A		3.4	A		6.7	A		4.6	A	
	WB (E Street)	R	1.0	A		0.5	A		1.0	A		0.9	A	
	Westbound (E Street)		**5.8**	**A**		**3.2**	**A**		**6.2**	**A**		**4.3**	**A**	
	NB (8th Street)	LTR	39.6	D		44.9	D		39.6	D		46.0	D	
	Northbound (8th Street)		**39.6**	**D**		**44.9**	**D**		**39.6**	**D**		**46.0**	**D**	
	SB (8th Street)	LTR	28.7	C		42.6	D		28.7	C		43.1	D	
	Southbound (8th Street)		**28.7**	**C**		**42.6**	**D**		**28.7**	**C**		**43.1**	**D**	
	Overall		**13.7**	**B**	**Pass**	**13.5**	**B**	**Pass**	**13.6**	**B**	**Pass**	**13.9**	**B**	**Pass**
12	**7th Street NW & E Street NW (Signalized)**													
	EB (E Street)	L	20.2	C		12.9	B		20.3	C		12.9	B	
	EB (E Street)	T	23.6	C		17.2	B		23.7	C		17.2	B	
	EB (E Street)	R	9.5	A		9.9	A		9.6	A		9.9	A	
	Eastbound (E Street)		**21.8**	**C**		**14.8**	**B**		**21.9**	**C**		**14.8**	**B**	
	WB (E Street)	L	15.5	B		21.6	C		15.5	B		21.6	C	
	WB (E Street)	T	21.3	C		26.2	C		21.3	C		26.2	C	
	WB (E Street)	R	7.5	A		14.3	B		7.5	A		14.3	B	
	Westbound (E Street)		**19.6**	**B**		**24.0**	**C**		**19.6**	**B**		**24.0**	**C**	
	NB (7th Street)	LT	20.1	C		18.0	B		20.5	C		18.1	B	
	NB (7th Street)	R	10.1	B		13.5	B		10.4	B		13.7	B	
	Northbound (7th Street)		**18.7**	**B**		**17.5**	**B**		**19.2**	**B**		**17.7**	**B**	
	SB (7th Street)	LTR	18.5	B		17.8	B		17.5	B		18.5	B	
	Southbound (7th Street)		**18.5**	**B**		**17.8**	**B**		**17.5**	**B**		**18.5**	**B**	
	Overall		**19.4**	**B**	**Pass**	**18.7**	**B**	**Pass**	**19.4**	**B**	**Pass**	**18.9**	**B**	**Pass**
13	**9th Street NW & D Street NW (Signalized)**													
	WB (D Street)	L	20.3	C		26.0	C		20.3	C		26.0	C	
	Westbound (D Street)		**20.3**	**C**		**26.0**	**C**		**20.3**	**C**		**26.0**	**C**	
	SB (9th Street)	LT	5.5	A		5.8	A		5.5	A		5.9	A	
	Southbound (9th Street)		**5.5**	**A**		**5.8**	**A**		**5.5**	**A**		**5.9**	**A**	
	Overall		**7.7**	**A**	**Pass**	**8.1**	**A**	**Pass**	**7.7**	**A**	**Pass**	**8.2**	**A**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
14	**8th Street NW & D Street NW (AWSC)**													
	EB (D Street)	LT	7.8	-		8.0	-		7.8	-		8.0	-	
	Eastbound (D Street)		**7.8**	**A**		**8.0**	**A**		**7.8**	**A**		**8.0**	**A**	
	WB (D Street)	TR	8.2	-		8.6	-		8.2	-		8.6	-	
	Westbound (D Street)		**8.2**	**A**		**8.6**	**A**		**8.2**	**A**		**8.6**	**A**	
	SB (8th Street)	LR	8.3	-		8.2	-		8.3	-		8.2	-	
	Southbound (8th Street)		**8.3**	**A**		**8.2**	**A**		**8.3**	**A**		**8.2**	**A**	
	Overall		**8.2**	**A**	**Pass**	**8.4**	**A**	**Pass**	**8.2**	**A**	**Pass**	**8.4**	**A**	**Pass**
15	**7th Street NW & D Street NW (Signalized)**													
	EB (D Street)	LTR	27.0	C		38.2	D		27.0	C		38.2	D	
	Eastbound (D Street)		**27.0**	**C**		**38.2**	**D**		**27.0**	**C**		**38.2**	**D**	
	WB (D Street)	LTR	35.9	D		37.0	D		35.9	D		37.2	D	
	Westbound (D Street)		**35.9**	**D**		**37.0**	**D**		**35.9**	**D**		**37.2**	**D**	
	NB (7th Street)	LTR	52.6	D		18.4	B		63.7	E		22.2	C	
	Northbound (7th Street)		**52.6**	**D**		**18.4**	**B**		**63.7**	**E**		**22.2**	**C**	
	SB (7th Street)	LTR	1.5	A		4.7	A		1.9	A		4.7	A	
	Southbound (7th Street)		**1.5**	**A**		**4.7**	**A**		**1.9**	**A**		**4.7**	**A**	
	Overall		**38.7**	**D**	**Pass**	**18.2**	**B**	**Pass**	**45.9**	**D**	**Pass**	**19.9**	**B**	**Pass**
16	**14th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	29.7	C		32.2	C		29.7	C		32.2	C	
	Eastbound (Pennsylvania Ave)		**29.7**	**C**		**32.2**	**C**		**29.7**	**C**		**32.2**	**C**	
	WB (Pennsylvania Ave)	T	36.3	D		41.7	D		36.4	D		40.4	D	
	WB (Pennsylvania Ave)	R	28.9	C		32.9	C		29.5	C		33.2	C	
	Westbound (Pennsylvania Ave)		**34.4**	**C**		**39.7**	**D**		**34.5**	**C**		**38.6**	**D**	
	NB (14th Street)	L	25.9	C		54.9	D		25.9	C		54.9	D	
	NB (14th Street)	TR	32.7	C		16.8	B		32.7	C		16.8	B	
	Northbound (14th Street)		**32.5**	**C**		**18.8**	**B**		**32.5**	**C**		**18.8**	**B**	
	SB (14th Street)	LTR	12.1	B		14.6	B		12.1	B		14.6	B	
	Southbound (14th Street)		**12.1**	**B**		**14.6**	**B**		**12.1**	**B**		**14.6**	**B**	
	Overall		**27.3**	**C**	**Pass**	**21.3**	**C**	**Pass**	**27.3**	**C**	**Pass**	**21.2**	**C**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
17	**13th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	59.1	E		35.7	D		59.1	E		35.7	D	
	EB (Pennsylvania Ave)	T	52.3	D		34.3	C		52.3	D		34.3	C	
	Eastbound (Pennsylvania Ave)		**55.2**	**E**		**34.8**	**C**		**55.2**	**E**		**34.8**	**C**	
	WB (Pennsylvania Ave)	T	22.7	C		9.8	A		22.6	C		11.6	B	
	WB (Pennsylvania Ave)	R	23.6	C		10.1	B		23.5	C		12.0	B	
	Westbound (Pennsylvania Ave)		**23.1**	**C**		**9.9**	**A**		**23.0**	**C**		**11.7**	**B**	
	SB (13th Street)	L	35.6	D		41.0	D		35.6	D		41.0	D	
	SB (13th Street)	R	11.0	B		9.8	A		11.0	B		9.8	A	
	Southbound (13th Street)		**31.2**	**C**		**33.6**	**C**		**31.2**	**C**		**33.6**	**C**	
	Overall		**35.4**	**D**	**Pass**	**25.2**	**C**	**Pass**	**35.3**	**D**	**Pass**	**25.8**	**C**	**Pass**
18	**12th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	39.3	D		26.6	C		39.3	D		26.6	C	
	Eastbound (Pennsylvania Ave)		**39.3**	**D**		**26.6**	**C**		**39.3**	**D**		**26.6**	**C**	
	WB (Pennsylvania Ave)	T	11.3	B		5.2	A		11.4	B		5.0	A	
	WB (Pennsylvania Ave)	R	24.9	C		9.4	A		25.4	C		10.3	B	
	Westbound (Pennsylvania Ave)		**15.8**	**B**		**6.2**	**A**		**16.0**	**B**		**6.3**	**A**	
	NB (12th Street)	LTR	38.6	D		26.1	C		41.4	D		25.8	C	
	Northbound (12th Street)		**38.6**	**D**		**26.1**	**C**		**41.4**	**D**		**25.8**	**C**	
	Overall		**32.9**	**C**	**Pass**	**20.1**	**C**	**Pass**	**34.4**	**C**	**Pass**	**20.0**	**C**	**Pass**
19	**11th Street NW/Hotel Entrance & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	112.6	F		134.7	F		112.6	F		135.7	F	
	EB (Pennsylvania Ave)	TR	7.3	A		8.4	A		7.4	A		9.2	A	
	Eastbound (Pennsylvania Ave)		**31.1**	**C**		**19.7**	**B**		**31.1**	**C**		**20.5**	**C**	
	WB (Pennsylvania Ave)	LT	6.4	A		13.3	B		6.6	A		15.6	B	
	WB (Pennsylvania Ave)	R	69.9	E		104.1	F		76.4	E		117.7	F	
	Westbound (Pennsylvania Ave)		**27.5**	**C**		**34.3**	**C**		**30.0**	**C**		**39.1**	**D**	
	NB (Hotel Entrance)	LTR	11.0	B		6.4	A		11.0	B		6.4	A	
	Northbound (Hotel Entrance)		**11.0**	**B**		**6.4**	**A**		**11.0**	**B**		**6.4**	**A**	
	SB (11th Street)	L	93.3	F		137.9	F		93.3	F		137.3	F	
	SB (11th Street)	TR	6.9	A		1.2	A		6.9	A		1.1	A	
	Southbound (11th Street)		**66.0**	**E**		**103.8**	**F**		**66.0**	**E**		**103.3**	**F**	
	Overall		**32.8**	**C**	**Pass**	**48.1**	**D**	**Pass**	**34.1**	**C**	**Pass**	**49.8**	**D**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
20	**10th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	6.4	A		8.7	A		6.4	A		8.8	A	
	Eastbound (Pennsylvania Ave)		**6.4**	**A**		**8.7**	**A**		**6.4**	**A**		**8.8**	**A**	
	WB (Pennsylvania Ave)	T	3.6	A		8.2	A		3.6	A		8.2	A	
	Westbound (Pennsylvania Ave)		**3.6**	**A**		**8.2**	**A**		**3.6**	**A**		**8.2**	**A**	
	NB (10th Street)	L	126.2	F		50.5	D		132.0	F		93.1	F	
	NB (10th Street)	R	24.3	C		4.6	A		24.3	C		4.6	A	
	Northbound (10th Street)		**99.6**	**F**		**25.3**	**C**		**104.0**	**F**		**44.5**	**D**	
	SB (10th Street)	LT	34.2	C		41.6	D		35.1	D		64.9	E	
	SB (10th Street)	R	7.5	A		16.9	B		10.0	A		20.5	C	
	Southbound (10th Street)		**27.3**	**C**		**37.3**	**D**		**29.3**	**C**		**56.5**	**E**	
	Overall		**19.2**	**B**	**Pass**	**16.1**	**B**	**Pass**	**20.1**	**C**	**Pass**	**23.0**	**C**	**Pass**
21	**9th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	9.4	A		31.6	C		9.0	A		30.1	C	
	EB (Pennsylvania Ave)	R	12.8	B		47.8	D		13.0	B		48.8	D	
	Eastbound (Pennsylvania Ave)		**10.1**	**B**		**35.3**	**D**		**9.8**	**A**		**34.4**	**C**	
	WB (Pennsylvania Ave)	T	5.9	A		6.1	A		5.8	A		6.2	A	
	Westbound (Pennsylvania Ave)		**5.9**	**A**		**6.1**	**A**		**5.8**	**A**		**6.2**	**A**	
	NB (9th Street)	R	31.7	C		10.4	B		31.7	C		10.4	B	
	Northbound (9th Street)		**31.7**	**C**		**10.4**	**B**		**31.7**	**C**		**10.4**	**B**	
	SB (9th Street)	LTR	18.7	B		31.0	C		18.7	B		31.0	C	
	Southbound (9th Street)		**18.7**	**B**		**31.0**	**C**		**18.7**	**B**		**31.0**	**C**	
	Overall		**12.5**	**B**	**Pass**	**26.8**	**C**	**Pass**	**12.3**	**B**	**Pass**	**26.6**	**C**	**Pass**
22	**7th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	158.3	F		121.0	F		198.8	F		211.6	F	
	EB (Pennsylvania Ave)	TR	28.8	C		15.4	B		29.9	C		16.4	B	
	Eastbound (Pennsylvania Ave)		**59.4**	**E**		**28.6**	**C**		**72.6**	**E**		**47.7**	**D**	
	WB (Pennsylvania Ave)	T	37.3	D		20.6	C		37.4	D		20.6	C	
	WB (Pennsylvania Ave)	R	40.6	D		48.7	D		40.5	D		48.6	D	
	Westbound (Pennsylvania Ave)		**37.8**	**D**		**27.1**	**C**		**37.9**	**D**		**27.0**	**C**	
	NB (7th Street)	L	79.3	E		66.5	E		79.3	E		66.5	E	
	NB (7th Street)	TR	14.0	B		8.4	A		14.0	B		8.4	A	
	Northbound (7th Street)		**29.6**	**C**		**17.3**	**B**		**29.6**	**C**		**17.4**	**B**	
	SB (7th Street)	TR	30.3	C		24.8	C		30.4	C		25.7	C	
	Southbound (7th Street)		**30.3**	**C**		**24.8**	**C**		**30.4**	**C**		**25.7**	**C**	
	Overall		**41.8**	**D**	**Pass**	**25.2**	**C**	**Pass**	**46.4**	**D**	**Pass**	**33.1**	**C**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
23	**6th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	62.5	E		40.3	D		62.3	E		40.8	D	
	EB (Pennsylvania Ave)	TR	24.4	C		50.2	D		24.4	C		50.3	D	
	Eastbound (Pennsylvania Ave)		**28.6**	**C**		**49.7**	**D**		**28.6**	**C**		**49.8**	**D**	
	WB (Pennsylvania Ave)	T	4.3	A		35.4	D		4.4	A		35.4	D	
	WB (Pennsylvania Ave)	R	7.8	A		39.4	D		7.9	A		39.4	D	
	Westbound (Pennsylvania Ave)		**5.1**	**A**		**36.2**	**D**		**5.1**	**A**		**36.2**	**D**	
	NB (6th Street)	LTR	15.6	B		6.0	A		15.6	B		6.0	A	
	Northbound (6th Street)		**15.6**	**B**		**6.0**	**A**		**15.6**	**B**		**6.0**	**A**	
	SB (6th Street)	LTR	31.3	C		100.2	F		31.3	C		100.2	F	
	Southbound (6th Street)		**31.3**	**C**		**100.2**	**F**		**31.3**	**C**		**100.2**	**F**	
	Overall		**16.9**	**B**	**Pass**	**57.4**	**E**	**Fail**	**16.9**	**B**	**Pass**	**57.4**	**E**	**Fail**
24	**Constitution (WB) Avenue NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	T	2.5	A		31.8	C		2.5	A		31.9	C	
	EB (Pennsylvania Ave)	R	-	-		23.0	C		-	-		24.5	C	
	Eastbound (Pennsylvania Ave)		**2.5**	**A**		**31.8**	**C**		**2.5**	**A**		**31.9**	**C**	
	WB (Pennsylvania Ave)	L	21.9	C		60.3	E		21.9	C		60.6	E	
	WB (Pennsylvania Ave)	T	32.3	C		6.5	A		32.4	C		6.5	A	
	Westbound (Pennsylvania Ave)		**27.8**	**C**		**36.0**	**D**		**27.9**	**C**		**36.0**	**D**	
	NB (Constitution Ave)	R	16.6	B		44.7	D		16.8	B		44.8	D	
	Northbound (Constitution Ave)		**16.6**	**B**		**44.7**	**D**		**16.8**	**B**		**44.8**	**D**	
	Overall		**20.2**	**C**	**Pass**	**36.8**	**D**	**Pass**	**20.3**	**C**	**Pass**	**36.9**	**D**	**Pass**
25	**4th Street NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	TR	7.9	A		15.0	B		7.9	A		15.0	B	
	Eastbound (Pennsylvania Ave)		**7.9**	**A**		**15.0**	**B**		**7.9**	**A**		**15.0**	**B**	
	WB (Pennsylvania Ave)	T	7.1	A		7.9	A		7.2	A		7.9	A	
	Westbound (Pennsylvania Ave)		**7.1**	**A**		**7.9**	**A**		**7.2**	**A**		**7.9**	**A**	
	NB (4th Street)	L	41.1	D		33.5	C		42.4	D		33.5	C	
	NB (4th Street)	R	11.2	B		25.5	C		11.5	B		25.7	C	
	Northbound (4th Street)		**32.6**	**C**		**30.7**	**C**		**33.6**	**C**		**30.8**	**C**	
	Overall		**10.6**	**B**	**Pass**	**14.2**	**B**	**Pass**	**10.8**	**B**	**Pass**	**14.2**	**B**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
26	**Constitution (EB) Avenue NW & Pennsylvania Avenue NW (Signalized)**													
	EB (Pennsylvania Ave)	L	6.9	A		16.7	B		6.9	A		17.1	B	
	EB (Pennsylvania Ave)	T	42.0	D		20.9	C		42.0	D		20.8	C	
	Eastbound (Pennsylvania Ave)		**13.4**	**B**		**17.8**	**B**		**13.4**	**B**		**18.0**	**B**	
	WB (Pennsylvania Ave)	T	22.5	C		23.2	C		22.5	C		23.2	C	
	Westbound (Pennsylvania Ave)		**22.5**	**C**		**23.2**	**C**		**22.5**	**C**		**23.2**	**C**	
	SB (Constitution Ave)	R	22.7	C		19.1	B		23.0	C		19.2	B	
	Southbound (Constitution Ave)		**22.7**	**C**		**19.1**	**B**		**23.0**	**C**		**19.2**	**B**	
	Overall		**18.6**	**B**	**Pass**	**18.5**	**B**	**Pass**	**18.7**	**B**	**Pass**	**18.6**	**B**	**Pass**
27	**14th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	TR	28.5	C		28.7	C		28.6	C		29.0	C	
	Eastbound (Constitution Ave)		**28.5**	**C**		**28.7**	**C**		**28.6**	**C**		**29.0**	**C**	
	WB (Constitution Ave)	TR	32.1	C		19.6	B		32.3	C		19.8	B	
	Westbound (Constitution Ave)		**32.1**	**C**		**19.6**	**B**		**32.3**	**C**		**19.8**	**B**	
	NB (14th Street)	TR	23.2	C		20.8	C		23.2	C		20.8	C	
	Northbound (14th Street)		**23.2**	**C**		**20.8**	**C**		**23.2**	**C**		**20.8**	**C**	
	SB (14th Street)	TR	9.2	A		111.8	F		9.2	A		111.8	F	
	Southbound (14th Street)		**9.2**	**A**		**111.8**	**F**		**9.2**	**A**		**111.8**	**F**	
	Overall		**24.4**	**C**	**Pass**	**54.5**	**D**	**Pass**	**24.5**	**C**	**Pass**	**54.4**	**D**	**Pass**
28	**12th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	L	53.9	D		18.6	B		59.3	E		26.2	C	
	EB (Constitution Ave)	TR	4.1	A		12.4	B		4.1	A		12.3	B	
	Eastbound (Constitution Ave)		**13.6**	**B**		**13.2**	**B**		**14.9**	**B**		**14.3**	**B**	
	WB (Constitution Ave)	LTR	40.0	D		17.7	B		40.3	D		18.2	B	
	Westbound (Constitution Ave)		**40.0**	**D**		**17.7**	**B**		**40.3**	**D**		**18.2**	**B**	
	NB (12th Street)	LTR	91.6	F		68.7	E		91.5	F		75.2	E	
	Northbound (12th Street)		**91.6**	**F**		**68.7**	**E**		**91.5**	**F**		**75.2**	**E**	
	SB (12th Street)	LT	13.9	B		29.8	C		13.9	B		29.9	C	
	SB (12th Street)	R	8.4	A		11.6	B		8.4	A		11.6	B	
	Southbound (12th Street)		**10.4**	**B**		**20.9**	**C**		**10.4**	**B**		**21.0**	**C**	
	Overall		**53.7**	**D**	**Pass**	**31.7**	**C**	**Pass**	**54.0**	**D**	**Pass**	**34.3**	**C**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
29	**10th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	LT	17.6	B		12.3	B		17.6	B		12.3	B	
	Eastbound (Constitution Ave)		**17.6**	**B**		**12.3**	**B**		**17.6**	**B**		**12.3**	**B**	
	WB (Constitution Ave)	TR	8.5	A		44.1	D		8.5	A		44.2	D	
	Westbound (Constitution Ave)		**8.5**	**A**		**44.1**	**D**		**8.5**	**A**		**44.2**	**D**	
	SB (10th Street)	L	31.4	C		17.6	B		32.8	C		17.3	B	
	SB (10th Street)	R	15.3	B		4.2	A		16.9	B		4.1	A	
	Southbound (10th Street)		**20.4**	**C**		**6.4**	**A**		**21.5**	**C**		**6.2**	**A**	
	Overall		**14.8**	**B**	**Pass**	**24.7**	**C**	**Pass**	**14.9**	**B**	**Pass**	**24.5**	**C**	**Pass**
30	**9th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	LTR	34.8	C		72.1	E		34.8	C		72.1	E	
	Eastbound (Constitution Ave)		**34.8**	**C**		**72.1**	**E**		**34.8**	**C**		**72.1**	**E**	
	WB (Constitution Ave)	LTR	5.8	A		6.4	A		5.8	A		6.4	A	
	Westbound (Constitution Ave)		**5.8**	**A**		**6.4**	**A**		**5.8**	**A**		**6.4**	**A**	
	SB (9th Street)	LT	40.7	D		26.4	C		40.9	D		26.1	C	
	SB (9th Street)	R	17.6	B		9.0	A		17.4	B		8.8	A	
	Southbound (9th Street)		**37.9**	**D**		**24.0**	**C**		**38.0**	**D**		**23.8**	**C**	
	Overall		**27.3**	**C**	**Pass**	**32.8**	**C**	**Pass**	**27.4**	**C**	**Pass**	**32.7**	**C**	**Pass**
31	**7th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	TR	17.6	B		26.9	C		17.6	B		26.9	C	
	Eastbound (Constitution Ave)		**17.6**	**B**		**26.9**	**C**		**17.6**	**B**		**26.9**	**C**	
	WB (Constitution Ave)	LTR	15.8	B		12.5	B		15.8	B		12.5	B	
	Westbound (Constitution Ave)		**15.8**	**B**		**12.5**	**B**		**15.8**	**B**		**12.5**	**B**	
	NB (7th Street)	L	23.2	C		20.7	C		23.2	C		20.7	C	
	NB (7th Street)	TR	18.4	B		18.9	B		18.4	B		18.9	B	
	Northbound (7th Street)		**19.3**	**B**		**19.1**	**B**		**19.3**	**B**		**19.1**	**B**	
	SB (7th Street)	TR	11.3	B		19.1	B		11.3	B		19.3	B	
	Southbound (7th Street)		**11.3**	**B**		**19.1**	**B**		**11.3**	**B**		**19.3**	**B**	
	Overall		**17.1**	**B**	**Pass**	**19.1**	**B**	**Pass**	**17.1**	**B**	**Pass**	**19.1**	**B**	**Pass**

Table 5-39: Comparison of No-action Alternative and RFDS 2 Intersection Operations for AM and PM Peak Hours (continued)

#	Intersection and Approach	Lane Group	No-Action Alternative						RFDS 2					
			AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
			Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check	Delay (sec/vehicle)	LOS	Check
32	**6th Street NW & Constitution Avenue NW (Signalized)**													
	EB (Constitution Ave)	L	71.8	E		20.8	C		71.8	E		20.8	C	
	EB (Constitution Ave)	LT	30.9	C		3.3	A		30.9	C		3.3	A	
	Eastbound (Constitution Ave)		**41.3**	**D**		**7.5**	**A**		**41.3**	**D**		**7.5**	**A**	
	WB (Constitution Ave)	TR	53.9	D		7.2	A		53.9	D		7.2	A	
	Westbound (Constitution Ave)		**53.9**	**D**		**7.2**	**A**		**53.9**	**D**		**7.2**	**A**	
	SB (6th Street)	L	17.8	B		12.8	B		17.9	B		12.8	B	
	SB (6th Street)	R	0.2	A		1.5	A		0.2	A		1.6	A	
	Southbound (6th Street)		**2.7**	**A**		**2.2**	**A**		**2.7**	**A**		**2.2**	**A**	
	Overall		**42.6**	**D**	**Pass**	**6.1**	**A**	**Pass**	**42.6**	**D**	**Pass**	**6.1**	**A**	**Pass**

Notes:

Delay is measured in Seconds Per Vehicle.

Red cells denote intersections or approaches operating at unacceptable conditions.

AWSC = All-Way STOP-Controlled intersection

EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

LOS = Level of Service

LTR = left / through / right lanes

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5.2.7.4 RFDS 2 Queuing Analysis

Synchro™ was used to calculate both the 50th and 95th percentile queue lengths, and SimTraffic™ was used to calculate the 95th percentile queue lengths. Because the SimTraffic™ simulations are unable to accurately portray vehicle conflicts with pedestrians along the Pennsylvania Avenue and Constitution Avenue corridors, one simulation was created and reported, but the Synchro 95th percent queue values provide a more accurate measure of the potential queue. Based on the Synchro™ and SimTraffic™ analysis, the following signalized intersection approaches would experience failing queue lengths in either Synchro™ or SimTraffic™. The lane group within the approach that is operating under unacceptable conditions is noted in parentheses.

- 10th Street NW and H Street NW (Intersection #1)
    - Southbound 10th Street and eastbound H Street (all movements) during the PM peak hour
- 9th Street NW and H Street NW (Intersection #2)
    - Southbound 9th Street (all movements) and westbound H Street (left and through movements) during the PM peak hour
- 10th Street NW and G Street NW (Intersection #3)
    - Eastbound G Street (through and right movements), westbound G Street (through and left movements) and southbound 10th Street (all movements) during the PM peak hour
- 9th Street NW and G Street NW (Intersection #4)
    - Eastbound G Street (through and right movements), westbound G Street (through movements), and southbound 9th Street (right turns) during the PM peak hour
- 10th Street NW and F Street NW (Intersection #5)
    - Eastbound F Street (through and right movements) and southbound 10th Street (all movements) during the PM peak hour
- 12th Street NW and E Street NW (Intersection #7)
    - Westbound E Street (through and right movements) during the AM peak hour
- 11th Street NW and E Street NW (Intersection #8)
    - Westbound on E Street (right turns), and southbound on 11th Street (all movements) during the AM peak hour
    - Eastbound on E Street (right and through movements), westbound on E Street (right and through movements), and southbound on 11th Street (all movements) during the PM peak hour
- 10th Street NW and E Street NW (Intersection #9)
    - Eastbound on E Street (right turns) during the AM peak hour
    - Eastbound on E Street (right and through movements), westbound on E Street (left turns), and southbound 10th Street (all movements) during the PM peak hour
- 9th Street NW and E Street NW (Intersection #10)
    - Westbound E Street (left turns) during the AM peak hour
    - Westbound E Street (left turns) and southbound 9th Street (all movements) during the PM peak hour
- 8th Street NW and E Street NW (Intersection #11)
    - Eastbound E Street (right turns) during AM peak hour and westbound E Street (right turns) during the AM and PM peak hour
- 7th Street NW and E Street NW (Intersection #12)
    - Eastbound E Street (right turns), westbound E Street (right turns), and northbound 7th Street (right turns) during the AM peak hour
    - Eastbound E Street (right and left turns), westbound E Street (right turns), and northbound 7th Street (right turns) during the PM peak hour
- 7th Street NW and D Street NW (Intersection #15)
    - Northbound 7th Street (all movements) during the AM peak hour

- 14th Street NW and Pennsylvania Avenue NW (Intersection #16)
    - Eastbound Pennsylvania Avenue (through and right movements), westbound Pennsylvania Avenue (through movements), and northbound 14th Street (left turns) during the PM peak hour
- 13th Street NW and Pennsylvania Avenue NW (Intersection #17)
    - Eastbound Pennsylvania Avenue (through movements) during the AM peak hour
    - Eastbound Pennsylvania Avenue (through movements) and southbound 13th Street (left and right turns) during the PM peak hour
- 12th Street NW and Pennsylvania Avenue NW (Intersection #18)
    - Eastbound Pennsylvania Avenue (through and right movements) during AM and PM peak hour
    - Northbound 12th Street (all movements) during AM peak hour
- 11th Street NW and Pennsylvania Avenue NW (Intersection #19)
    - Eastbound Pennsylvania Avenue (left turns), westbound Pennsylvania Avenue (all movements), and southbound 11th Street (left turns) during AM and PM peak hour
- 10th Street NW and Pennsylvania Avenue NW (Intersection #20)
    - Northbound 10th Street (left and right turns) and southbound 10th Street (right turns) during the AM peak hour
    - Westbound Pennsylvania Avenue (through movements), northbound 10th Street (left turns), and southbound 10th Street (all movements) during the PM peak hour
- 9th Street NW and Pennsylvania Avenue NW (Intersection #21)
    - Eastbound Pennsylvania Avenue (right turns) and southbound 9th Street (all movements) during the PM peak hour
- 7th Street NW and Pennsylvania Avenue NW (Intersection #22)
    - Eastbound Pennsylvania Avenue (left turns), northbound 7th Street (left turns), and southbound 7th Street (through and right movements) during the AM peak hour
    - Eastbound Pennsylvania Avenue (left turns), westbound Pennsylvania Avenue (right turns), northbound 7th Street (left turns), and southbound 7th Street (through and right movements) during the PM peak hour
- 6th Street NW and Pennsylvania Avenue NW (Intersection #23)
    - Southbound 6th Street (all movements) during the PM peak hour
- Constitution (WB) Avenue NW and Pennsylvania Avenue NW (Intersection #24)
    - Westbound Pennsylvania Avenue (through movements) during the AM peak hour
    - Eastbound Pennsylvania Avenue (through movements) and westbound Pennsylvania Avenue (left turns) during the PM peak hour
- 4th Street NW and Pennsylvania Avenue NW (Intersection #25)
    - Northbound 4th Street (left turns) during the AM and PM peak hour
    - Westbound Pennsylvania Avenue (through movements) during the PM peak hour
- Constitution (EB) Avenue NW and Pennsylvania Avenue NW (Intersection #26)
    - Southbound Constitution Ave (right turns) during the AM and PM peak hour
    - Eastbound Pennsylvania Avenue (left turns) during PM peak hour
- 14th Street NW and Constitution Avenue NW (Intersection #27)
    - Eastbound Constitution Avenue (through and right movements) during the AM and PM peak hour
    - Northbound 14th Street (through and right movements) during the AM peak hour
    - Southbound 14th Street (through and right movements) during the PM peak hour
- 12th Street NW and Constitution Avenue NW (Intersection #28)
    - Eastbound Constitution Avenue (all movements) and northbound 12th Street (all movements) during the AM and PM peak hours
- 10th Street NW and Constitution Avenue NW (Intersection #29)
    - Eastbound Constitution Avenue (left and through movements) during the AM and PM peak hour

- 9th Street NW and Constitution Avenue NW (Intersection #30)
    - Eastbound Constitution Avenue (all movements) and southbound 9th Street (left and through movements) during the PM peak hour
- 7th Street NW and Constitution Avenue NW (Intersection #31)
    - Northbound 7th Street (left turns) during the AM and PM peak hour
- 6th Street NW and Constitution Avenue NW (Intersection #32)
    - Eastbound Constitution Avenue (left turns) and westbound Constitution Avenue (through and right movements) during the AM peak hour

The remaining intersections in the study area would have acceptable queue lengths.

An unsignalized intersection queuing analysis was calculated using Synchro™. Based on the results, the queue lengths for all unsignalized intersections in the study area would be acceptable.

Complete Intersection Queuing Analysis

This section summarizes the differences in queuing impacts between RFDS 2 and the No-action Alternative by quantifying the change in intersection queuing failures. Following the summary, this section also includes the complete results of the queuing analysis.

Based on the Synchro™ and SimTraffic™ analysis, 29 signalized intersections would experience queuing lengths that would exceed the available storage capacity. The remaining intersections in the study area would provide sufficient storage for the anticipated demand. Compared to the No-action Alternative, RFDS 2 would have failing queues for two less intersections during the AM peak hour and two less intersections during the PM peak hour in the AM peak hour in the No-action Alternative, there would be 22 intersections with a failing queue approach compared with 20 in RFDS 2, a decrease of 2. In the PM peak hour in the No-action Alternative, there would be 28 intersections with a failing queue approach compared with 26 in the scenario, a decrease of 2.

Table 5-40 provides a summary of the number of intersections that meet the following criteria for approach lane groups in a queue:

Table 5-40: Queuing Summary Comparing No-action Alternative and RFDS 2

Type of Change Between Conditions	AM	PM
New Failing Movement	0	1
Additional Failing Movement	2	7
No Change	26	19
Fewer Failing Movements	2	2
No Failing Movements	2	3
Total Signalized and Unsignalized Intersections	**32**	**32**

The results of the No-action Alternative compared to RFDS 2 queuing analysis for both signalized and unsignalized intersections are presented in table 5-41. Note that the percentile values are expressed in feet, and a car occupies about 25 linear feet of roadway, including the space between cars.

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Table 5-41: Comparison of No-action Alternative and RFDS 2 Queuing

#	Intersection	Lane Group	Turning Bay/Link Length (feet) Group	No-Action Alternative						RFDS 2					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
1	**10th Street NW & H Street NW**														
	EB (H Street)	LTR	264	80	106	130	108	138	214	83	109	134	110	140	#340
	WB (H Street)	LTR	504	12	19	90	16	30	141	12	19	80	16	30	398
	SB (10th Street)	LTR	534	149	237	474	227	#346	#690	149	237	342	227	#346	#682
2	**9th Street NW & H Street NW**														
	EB (H Street)	TR	504	31	44	99	78	m92	180	31	44	99	78	m92	299
	WB (H Street)	LT	570	81	109	152	41	59	125	81	109	146	41	59	#593
	SB (9th Street)	LT	333	237	304	305	346	#450	#377	237	304	293	346	#450	#415
	SB (9th Street)	R	333	0	33	70	0	32	#370	0	33	52	0	32	#454
3	**10th Street NW & G Street NW**														
	EB (G Street)	TR	283	57	104	149	153	218	#374	59	108	137	158	226	#368
	WB (G Street)	LT	522	31	52	105	86	227	#683	31	52	92	87	228	#693
	SB (10th Street)	LTR	459	49	74	86	63	m81	#605	54	82	91	66	m86	#607
4	**9th Street NW & G Street NW**														
	EB (G Street)	TR	522	5	19	88	105	#273	319	5	20	55	102	#274	185
	WB (G Street)	L	244	23	54	66	56	103	83	23	54	65	56	103	92
	WB (G Street)	T	244	49	94	113	54	100	#317	49	94	127	54	100	#344
	SB (9th Street)	LT	409	74	88	121	64	m76	399	74	88	119	64	m76	293
	SB (9th Street)	R	409	0	m0	2	0	m0	#532	0	m0	3	0	m0	#576
5	**10th Street NW & F Street NW**														
	EB (F Street)	TR	273	40	55	104	122	160	#277	40	55	111	123	160	#372
	WB (F Street)	LT	537	24	m35	72	40	m72	180	24	m35	77	40	m72	182
	SB (10th Street)	LTR	293	65	83	73	92	118	#397	76	96	75	96	123	#369
6	**9th Street NW & F Street NW**														
	EB (F Street)	TR	537	27	38	67	118	167	111	27	38	56	118	167	320
	WB (F Street)	LT	505	44	68	72	50	78	122	44	68	105	50	78	127
	SB (9th Street)	LTR	281	30	36	123	440	m510	#329	30	36	102	440	m510	270
7	**12th Street NW & E Street NW**														
	EB (E Street)	L	150	35	74	100	15	37	69	35	74	0	15	37	0
	EB (E Street)	T	356	47	82	81	36	66	106	47	82	95	36	66	106
	WB (E Street)	TR	181	195	269	#198	97	141	#189	199	273	#185	97	140	153
	NB (12th Street)	LTR	285	172	m171	222	179	220	190	174	m172	206	193	233	214

Table 5-41: Comparison of No-action Alternative and RFDS 2 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet) Group	No-Action Alternative						RFDS 2					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
8	**11th Street NW & E Street NW**														
	EB (E Street)	L	181	15	m22	61	10	m21	36	15	m22	47	11	m22	40
	EB (E Street)	T	181	143	m199	128	141	198	159	148	m205	125	186	250	#205
	EB (E Street)	R	50	12	m19	#60	12	m24	#58	12	m19	41	13	m24	#67
	WB (E Street)	L	110	4	11	88	13	m31	88	4	12	62	13	m30	45
	WB (E Street)	T	215	42	69	157	132	m223	#268	42	77	149	134	m224	#217
	WB (E Street)	R	50	8	21	#90	42	m87	#97	8	25	#84	42	m88	#95
	NB (11th Street)	LT	346	87	m87	80	89	m89	122	86	m85	80	89	m87	84
	NB (11th Street)	R	346	35	m36	76	29	m32	82	44	m43	73	37	m38	88
	SB (11th Street)	LT	321	80	114	#421	242	327	#401	80	114	#428	242	327	#373
	SB (11th Street)	R	100	0	27	83	49	112	#139	0	27	#112	49	112	#127
9	**10th Street NW & E Street NW**														
	EB (E Street)	T	215	80	104	122	49	m50	213	80	100	125	46	m43	#229
	EB (E Street)	R	25	17	39	#58	10	m11	#59	22	38	#61	21	m21	#62
	WB (E Street)	L	110	5	m9	57	2	m3	74	8	m20	83	3	m4	#138
	WB (E Street)	T	506	23	m34	105	9	m11	164	23	m46	66	9	m11	125
	SB (10th Street)	LTR	370	33	47	72	232	#276	#457	37	52	79	242	#297	#441
10	**9th Street NW & E Street NW**														
	EB (E Street)	T	506	50	91	111	111	m151	157	51	92	106	117	m157	135
	EB (E Street)	R	100	5	17	83	43	m74	85	5	20	66	46	m78	97
	WB (E Street)	L	75	19	m43	#105	43	102	#112	18	m41	#95	42	103	#123
	WB (E Street)	T	225	154	216	214	147	269	#237	168	229	215	166	297	209
	SB (9th Street)	LTR	310	55	82	207	~586	#688	#354	55	82	181	~586	#689	293
11	**8th Street NW & E Street NW**														
	EB (E Street)	L	75	11	m22	55	2	m5	41	11	m22	29	2	m5	35
	EB (E Street)	T	225	91	m139	162	23	m32	70	92	m140	145	23	m32	73
	EB (E Street)	R	50	11	m37	#70	0	m0	14	12	m37	#87	0	m0	26
	WB (E Street)	L	85	12	20	57	3	m6	39	13	22	73	5	m9	50
	WB (E Street)	T	223	53	66	107	27	39	70	69	86	136	43	60	69
	WB (E Street)	R	25	0	m2	#38	0	m0	#52	0	m1	#41	0	m1	#46
	NB (8th Street)	LTR	392	78	110	144	74	146	156	78	110	118	74	146	173
	SB (8th Street)	LTR	302	27	51	56	59	119	174	27	51	69	59	119	114

Table 5-41: Comparison of No-action Alternative and RFDS 2 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet) Group	No-Action Alternative						RFDS 2					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
12	**7th Street NW & E Street NW**														
	EB (E Street)	L	85	9	m30	82	7	m21	77	10	m30	57	7	m21	#86
	EB (E Street)	T	223	109	182	197	128	203	193	110	182	170	129	204	210
	EB (E Street)	R	25	1	m17	#60	10	m40	#64	1	m18	#53	10	m40	#62
	WB (E Street)	L	100	6	19	31	24	54	94	6	19	59	24	54	98
	WB (E Street)	T	533	165	248	245	206	304	327	165	248	236	206	304	292
	WB (E Street)	R	75	4	24	70	19	53	#105	4	24	#85	19	53	#106
	NB (7th Street)	LT	402	97	m117	160	103	156	173	102	m120	145	108	173	170
	NB (7th Street)	R	75	11	m15	#94	11	m30	#101	11	m15	#91	11	m30	#97
	SB (7th Street)	LTR	314	53	83	107	95	133	149	56	88	130	105	147	172
13	**9th Street NW & D Street NW**														
	WB (D Street)	L	224	75	71	89	107	170	166	75	71	102	107	170	160
	SB (9th Street)	LT	396	32	55	132	76	m76	179	32	55	137	75	m77	231
14	**8th Street NW & D Street NW (AWSC)**														
	EB (D Street)	LT	224	-	-	50	-	-	59	-	-	53	-	-	51
	WB (D Street)	TR	229	-	-	60	-	-	67	-	-	68	-	-	87
	SB (8th Street)	LR	392	-	-	52	-	-	56	-	-	57	-	-	56
15	**7th Street NW & D Street NW**														
	EB (D Street)	LTR	229	40	71	91	91	165	188	40	71	117	91	165	146
	WB (D Street)	LTR	521	76	140	183	102	175	169	76	140	137	102	176	172
	NB (7th Street)	LTR	295	513	m#696	#303	184	m520	255	556	m#695	#306	429	m523	292
	SB (7th Street)	LTR	402	4	11	52	27	56	103	6	13	53	26	56	104
16	**14th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	430	116	150	188	96	138	#579	116	150	230	96	138	#545
	WB (Pennsylvania Ave)	T	157	84	114	#169	125	152	#192	84	114	142	118	152	#173
	WB (Pennsylvania Ave)	R	248	39	83	79	54	89	109	47	89	78	57	101	116
	NB (14th Street)	L	1,131	23	m35	78	25	m#71	118	23	m35	60	25	m#71	122
	NB (14th Street)	TR	1,131	328	382	399	124	173	245	328	382	443	124	173	214
	SB (14th Street)	LTR	624	92	118	196	234	280	329	92	118	193	234	280	253
17	**13th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	257	143	217	233	91	153	153	143	217	198	91	153	189
	EB (Pennsylvania Ave)	T	257	103	148	#372	100	141	#287	103	148	#336	100	141	#281
	WB (Pennsylvania Ave)	T	386	79	m89	137	31	68	149	79	m89	120	38	76	133
	WB (Pennsylvania Ave)	R	386	71	m83	126	14	m35	80	70	m82	140	17	m39	119
	SB (13th Street)	L	637	81	119	#658	155	211	#740	81	119	303	155	211	#723
	SB (13th Street)	R	637	0	33	519	0	55	#915	0	33	72	0	55	#883

Table 5-41: Comparison of No-action Alternative and RFDS 2 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet) Group	No-Action Alternative						RFDS 2					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
18	**12th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	T	386	113	145	179	163	198	184	113	145	178	163	198	143
	EB (Pennsylvania Ave)	TR	150	113	145	#199	163	198	#201	113	145	#206	163	198	#203
	WB (Pennsylvania Ave)	T	168	36	51	62	30	35	41	36	50	66	30	m35	40
	WB (Pennsylvania Ave)	R	168	57	197	#185	26	m32	83	60	202	116	27	m34	113
	NB (12th Street)	LTR	922	~274	m206	#1092	285	m284	287	~305	m208	822	300	m296	336
19	**11th Street NW/Hotel Entrance & Pennsylvania Avenue NW (Signalized)**														
	EB (Pennsylvania Ave)	L	168	109	m#196	#181	49	m#128	104	109	m#194	#176	49	m#126	56
	EB (Pennsylvania Ave)	TR	168	38	m47	47	29	36	133	38	m47	60	29	36	100
	WB (Pennsylvania Ave)	LT	190	28	m57	#240	38	46	#269	30	m61	#240	42	m52	#255
	WB (Pennsylvania Ave)	R	190	~194	m#449	#206	~158	#288	#212	~209	m#461	#205	~173	m#301	#214
	NB (Hotel Entrance)	LTR	260	9	56	94	12	40	74	9	56	77	12	40	67
	SB (11th Street)	L	346	~162	#315	#371	~435	#579	#418	~162	#315	#416	~435	#579	#400
	SB (11th Street)	TR	346	23	48	284	0	m0	114	23	48	110	0	m0	191
20	**10th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	190	20	m10	72	75	m75	74	19	m10	83	77	m78	85
	WB (Pennsylvania Ave)	T	467	61	72	393	56	m75	412	61	72	433	57	m77	#516
	NB (10th Street)	L	695	~177	m#308	#859	10	m#66	130	~183	m#315	#784	10	m#81	527
	NB (10th Street)	R	695	26	m58	#904	0	9	91	26	m58	#944	0	9	84
	SB (10th Street)	LT	469	32	61	170	194	m#238	#552	47	79	160	230	m#313	#571
	SB (10th Street)	R	25	0	16	#75	47	m65	#68	1	25	#62	55	m80	#67
21	**9th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	467	48	80	113	230	272	312	48	79	150	231	m263	315
	EB (Pennsylvania Ave)	R	467	37	82	51	202	m#361	305	39	88	152	203	m#363	347
	WB (Pennsylvania Ave)	T	496	48	m56	331	32	45	192	48	m56	413	32	47	145
	NB (9th Street)	R	-	56	114	-	26	m41	-	56	114	-	26	m41	-
	SB (9th Street)	LTR	235	184	242	#252	276	#451	#280	184	242	229	276	#451	#275
22	**7th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	496	~157	#303	#507	0	m#198	117	~188	#340	300	~153	m#280	210
	EB (Pennsylvania Ave)	TR	496	107	134	229	117	m150	398	109	138	207	127	m152	141
	WB (Pennsylvania Ave)	T	461	180	223	202	124	m154	102	183	226	236	126	m156	132
	WB (Pennsylvania Ave)	R	461	80	138	116	103	m#171	137	80	139	114	103	m#172	131
	NB (7th Street)	L	290	96	#235	277	57	m#140	129	96	#235	262	57	m#140	109
	NB (7th Street)	TR	290	64	81	127	29	37	118	64	81	153	29	37	111
	SB (7th Street)	TR	83	65	106	#113	87	105	#101	64	106	#105	87	113	#105

Table 5-41: Comparison of No-action Alternative and RFDS 2 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet) Group	No-Action Alternative						RFDS 2					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
23	**6th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	461	47	m76	59	12	m23	380	47	m76	86	12	m23	83
	EB (Pennsylvania Ave)	TR	461	131	162	148	190	233	#487	132	164	127	193	237	151
	WB (Pennsylvania Ave)	T	212	10	30	42	124	165	143	10	31	60	126	167	159
	WB (Pennsylvania Ave)	R	212	8	27	131	88	148	127	8	28	109	87	148	110
	NB (6th Street)	LTR	72	56	m56	66	18	23	69	56	m56	68	18	23	68
	SB (6th Street)	LTR	549	85	128	326	~338	#464	#674	85	128	196	~338	#464	#623
24	**Constitution (WB) Avenue NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	T	212	19	23	38	197	m220	#290	19	23	38	201	m224	#223
	EB (Pennsylvania Ave)	R	-	-	-	-	1	m1	15	-	-	-	1	m1	-
	WB (Pennsylvania Ave)	L	283	161	235	223	258	315	#345	160	236	208	258	315	#310
	WB (Pennsylvania Ave)	T	283	281	311	#328	40	52	91	285	314	#296	40	52	103
	NB (Constitution Ave)	R	232	74	75	38	210	256	102	75	76	31	211	257	65
25	**4th Street NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	TR	283	50	234	102	202	227	216	50	236	108	202	227	161
	WB (Pennsylvania Ave)	T	257	57	99	225	201	172	#326	58	102	212	202	172	#290
	NB (4th Street)	L	208	146	224	#219	130	195	#294	146	224	#272	130	195	#233
	NB (4th Street)	R	208	15	54	121	53	98	155	16	56	125	53	99	108
26	**Constitution (EB) Avenue NW & Pennsylvania Avenue NW**														
	EB (Pennsylvania Ave)	L	257	27	37	78	154	229	#285	27	37	91	158	234	#293
	EB (Pennsylvania Ave)	T	257	74	110	95	125	172	112	74	110	105	125	170	95
	WB (Pennsylvania Ave)	T	335	4	7	17	12	18	87	4	7	29	12	18	51
	SB (Constitution Ave)	R	219	314	393	#298	234	294	#293	319	398	#254	236	297	#255
27	**14th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	T	110	210	249	#143	245	288	#177	211	251	#178	251	294	#192
	EB (Constitution Ave)	TR	439	210	249	437	245	288	#480	211	251	#546	251	294	#553
	WB (Constitution Ave)	TR	1,005	188	m211	204	333	m365	183	191	m214	245	336	m369	174
	NB (14th Street)	TR	553	296	341	409	180	214	362	296	341	#555	180	214	318
	SB (14th Street)	TR	1,131	39	49	97	~737	#833	938	39	49	90	~737	#833	901

Table 5-41: Comparison of No-action Alternative and RFDS 2 Queuing (continued)

#	Intersection	Lane Group	Turning Bay/Link Length (feet) Group	No-Action Alternative						RFDS 2					
				AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
				50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)		50th Percentile (feet)	95th Percentile (feet)	
					Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic		Synchro	Sim-Traffic
28	**12th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	L	1,005	90	m#223	#1011	61	m86	481	97	m#240	#1017	75	m#151	353
	EB (Constitution Ave)	TR	1,005	33	39	#1051	265	321	#1155	33	38	#1336	266	322	#1165
	WB (Constitution Ave)	LTR	494	127	146	175	70	95	142	130	150	261	73	98	153
	NB (12th Street)	LTR	534	~548	#646	#634	~336	#423	#643	~547	#646	#608	~352	#439	#628
	SB (12th Street)	LT	922	20	46	120	30	67	218	20	46	219	30	67	244
	SB (12th Street)	R	922	16	56	53	0	41	78	16	56	53	0	41	71
29	**10th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	LT	494	125	m135	#515	89	m83	#602	124	m134	#510	90	m83	#606
	WB (Constitution Ave)	TR	457	63	79	290	238	273	230	63	79	177	238	273	256
	SB (10th Street)	L	695	41	62	157	36	m55	175	42	63	113	36	m50	69
	SB (10th Street)	R	695	47	60	89	18	m35	73	53	67	92	17	m32	96
30	**9th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	LTR	457	206	246	202	~252	#325	#545	206	246	192	~252	#186	#519
	WB (Constitution Ave)	LTR	480	47	53	127	31	39	133	47	53	84	31	39	140
	SB (9th Street)	LT	502	162	204	220	371	m#488	193	167	209	213	373	m#489	178
	SB (9th Street)	R	502	13	58	87	23	m29	122	13	57	93	22	m28	118
31	**7th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	TR	480	191	212	206	96	m89	474	191	212	214	96	m89	471
	WB (Constitution Ave)	LTR	473	161	197	203	106	149	433	161	197	222	106	149	409
	NB (7th Street)	L	125	80	131	#157	33	63	109	80	131	#156	33	63	#140
	NB (7th Street)	TR	495	135	172	221	132	180	421	135	172	224	132	180	333
	SB (7th Street)	TR	290	7	34	75	70	100	142	7	34	87	71	100	150
32	**6th Street NW & Constitution Avenue NW**														
	EB (Constitution Ave)	L	473	148	#329	243	169	m238	134	148	#329	310	169	m238	140
	EB (Constitution Ave)	LT	473	135	181	207	11	26	119	135	181	224	11	26	122
	WB (Constitution Ave)	TR	232	198	242	#249	79	72	#301	198	242	#253	79	72	207
	SB (6th Street)	L	72	17	m34	57	16	m16	24	17	m34	30	16	m16	23
	SB (6th Street)	R	72	0	0	30	0	m1	#100	0	0	16	0	m1	55

Notes:

~ 50th percentile volume exceeds capacity, queue is theoretically infinite.

95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal. Due to upstream metering, the 95th percentile queue may be less than the 50th percentile queue.

AWSC = All-Way STOP-Controlled intersection

LTR = left / through / right lanes

Red cells denote approaches and lane groups whose queuing length exceeds capacity.

5.2.7.5 Overall Traffic Impact Assessment

Overall, the AM peak hour would experience isolated added delays at three intersections (7th and D Street NW, 7th Street and Pennsylvania Avenue NW, and 12th Street and Constitution Avenue NW). During the PM peak hour, two intersections would have added delays (7th Street and Pennsylvania Avenue NW and 10th Street and Pennsylvania Avenue NW), Together, this results in indirect, long-term, adverse impacts to traffic under RFDS 2.

Additionally, redevelopment of the parcel would cause short-term delays to local traffic from large amounts of construction truck traffic and the possible need to stage construction equipment or materials in the roadway at certain times of the day. There would also be additional short-term truck traffic impacts as a result of the demolition of the existing JEH building requiring dump trucks to haul the debris away on a continual basis until the parcel is clear of existing building materials. Therefore, construction under RFDS 2 would likely have indirect, short-term, adverse impacts to the local traffic network.

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6.0 Mitigation Measures

To reduce impacts on the transportation system caused as a result of developing RFDS 1 and RFDS 2, mitigation measures are recommended in this section for each mode of transportation analyzed. Also included are a sample of TDM measures to encourage non-SOV travel. Overall, the two scenarios require minimal mitigation to reduce indirect impacts.

6.1 Pedestrian Network

No mitigation is proposed for the pedestrian network for either scenario.

Therefore, the pedestrian impacts of RFDS 1 and RFDS 2 with Mitigation Condition would be the same impacts as those of RFDS 1 and RFDS 2, respectively.

- RFDS 1 with Mitigation Condition would have no measurable indirect impacts on the pedestrian environment and no indirect construction impacts unless sidewalk and public space improvements were required by DDOT.
- RFDS 2 with Mitigation Condition would have indirect minor long-term beneficial impacts to the pedestrian network. Construction would cause indirect minor short-term adverse impacts to pedestrian circulation.

6.2 Bicycles

No mitigation is proposed for bicycles for either scenario.

Therefore, the bicycle impacts of RFDS 1 and RFDS 2 with Mitigation Condition would be the same impact as RFDS 1 and RFDS 2, respectively. Both RFDS 1 and RFDS 2 with Mitigation Conditions would have no measurable indirect impacts to bicycle facilities or the bicycle network.

6.3 Public Transit

6.3.1 Metrorail Capacity Analysis

No mitigation is recommended at any Metrorail station for either scenario, because there were no additional capacity issues identified as compared to No-action Alternative.

6.3.2 Metrorail Emergency Evacuation Analysis

No mitigation is recommended at any Metrorail station to improve emergency evacuation, because WMATA is not required by law to meet NFPA 130 standards. Further, the additional RFDS 1 or RFDS 2 forecasted transit trips do not substantially increase platform evacuation times or point of safety evacuation times over the No-action Alternative.

6.3.3 Bus Capacity Analysis

Overall, RFDS 1 forecasted bus volumes are projected to be approximately 5,400 passengers during the AM peak period, and approximately 5,100 passengers during the PM peak period; both of these totals are well below projected capacity. For RFDS 2, overall bus volumes are forecasted to exceed 5,300 passengers during the AM peak period, and 5,000 passengers during the PM peak period; both of these totals are also well below the forecasted capacity. Note that for RFDS 2, the AM peak period volumes would be lower than the No-action Alternative volumes, since the current JEH parcel generates more AM peak hour trips than forecasted for RFDS

2. Furthermore, all of the bus routes that are over capacity in either scenario are also over capacity in the No-action Alternative.

Therefore, no mitigation is recommended for the overall bus system either scenario.

6.3.4 Level of Impact

Because no mitigation is recommended for either scenario, the public transit impacts of RFDS 1 and RFDS 2 with Mitigation Conditions would be the same impacts as those of RFDS 1 and RFDS 2, respectively. Therefore, both the scenarios would result in continued major impacts, as discussed under the No-action Alternative. There would be an incremental increase in the magnitude of adverse impacts to public transit based on the increase in public transit trips. Compared to the No-action Alternative, there would have no measurable indirect impacts on the public transit network but would cause indirect, short-term, adverse construction impacts to public transit.

6.3.5 Overall Public Transit Recommendations

Although the analysis revealed that no public transit mitigation was expressly required for RFDS 1 or RFDS 2, recommendations in table 6-1 are provided to address the proposed transit impacts of the No-action Alternative. Table 6-1 contains the public transit recommendations.

Table 6-1: JEH Action Alternative Public Transit Recommendations

Impact	Recommendation (not mitigation)
Metrobus Route 11Y will be over capacity during peak hours. The other over-capacity bus lines have recently been studied and recommended improvements are yet to be completed (see Appendix B7).	WMATA should perform a study of Metrobus Route 11Y and develop recommendations to improve capacity.
Fare vending machines at Archives-Navy Memorial, the east and west entrances to Gallery Place-Chinatown, and the east and south entrances to Metro Center will be over capacity during peak 15-minute periods.	WMATA should perform a study at these stations to address this issue.
The Red line platforms at Gallery Place-Chinatown and Metro Center will operate at a pedestrian level of service D, while the lower platforms will operate at pedestrian level of service C.	WMATA should finalize the Gallery Place-Chinatown Capacity Improvement Study and perform a similar study at Metro Center to recommend improvements to station platform capacity.

6.4 Parking

No mitigation is proposed for the parking network for either scenario.

The impacts of RFDS 1 and RFDS 2 with Mitigation Condition would be the same parking impacts as those of the RFDS 1 and RFDS 2, respectively. Therefore, both RFDS 1 and RFDS 2 with Mitigation Conditions would have indirect, long-term, beneficial impacts to parking due to a minor increase in the on-street parking supply surrounding the JEH parcel. RFDS 1 with Mitigation Condition would have no measurable indirect construction impacts to parking based on construction activities contained to the parcel and closest travel lane along adjacent streets surrounding the JEH parcel. RFDS 2 with Mitigation Condition would have indirect, short-term, adverse impacts to parking based on the construction activities requiring intermittent road closures during demolition and construction.

6.5 Truck Access

Prior to construction, it is recommended that the exchange partner create a truck access management plan in coordination with DDOT to ensure minimal impacts from trucks accessing the parcel under ether scenario. For the RFDS 2, it is recommended the exchange partner also create a truck access management plan for post construction normal operation of the development in coordination with DDOT to ensure minimal impacts from trucks accessing the parcel.

Compared to RFDS 1, there would be no changes in overall indirect impacts to truck access to the parcel; therefore, there would continue to be no measurable indirect impacts. With the proposed mitigation, compared to the RFDS 1, the construction impacts to truck access would change from indirect, short-term, impacts to no measurable indirect impacts under RFDS 1 with Mitigation Condition.

Compared to RFDS 2, the overall impacts to truck access would change from indirect, long-term, adverse impacts to no measurable indirect impacts under RFDS 2 with Mitigation Condition. With the proposed mitigation, compared to RFDS 2, the construction impacts from truck access would change from indirect, short-term, adverse impacts to no measurable indirect impacts under RFDS 2 with Mitigation Condition.

6.6 Traffic Analysis

Under the RFDS 1, the 12th Street and Constitution Avenue NW intersection would experience a degradation of the LOS from LOS D to LOS E during the AM peak hour. Four other intersections (8th Street and E Street NW, 7th and D Street NW, and 12th and Pennsylvania Avenue NW during the AM peak hour and 10th and Pennsylvania Avenue NW during the PM peak hour) would experience a lane group LOS degradation from a passing LOS to a failing LOS. There would also be two intersections (7th Street and Pennsylvania Avenue NW and 10th Street and Pennsylvania Avenue NW) where the difference in the 95th percentile queue lengths would exceed 150 feet during the PM peak hour.

Under the RFDS 2, there would be no intersections that would experience an overall LOS degradation. Four other intersections (7th and D Street NW, 12th and Pennsylvania Avenue NW, and 12th and Constitution Avenue NW during the AM peak hour, and 10th and Pennsylvania Avenue NW during the PM peak hour) would experience a lane group LOS degradation from a passing LOS to a failing LOS. There would be no intersections where the difference in the 95th percentile queue lengths would exceed 150 feet.

DDOT has an ongoing citywide traffic signal optimization initiative covering the study area intersections. Based on tests using Synchro™, optimizing and or changing the traffic signals to actuated (timing adjusts to the volume demand) at each of the intersections mentioned above would improve the operations to LOS D or better and reduce queues to within 150 feet of the No-action Alternative. This traffic signal optimization initiative should therefore sufficiently address the traffic impacts caused by either scenario. However, given that the traffic signal optimization may be complete before 2025, it is recommended that further signal optimization be initiated if there are substantial traffic delays after construction.

6.6.1 RFDS 1 with Mitigation Condition Traffic Impacts

When compared with RFDS 1, the traffic signal optimization improvements that are currently underway and would result in changing the traffic impacts from indirect, long-term, adverse impacts to indirect, long-term, beneficial impacts under RDFS 1 with Mitigation Condition. There would be no change in the construction impacts compared to RFDS 1 because construction would still cause indirect, short-term, adverse impacts that would not be mitigated by the traffic signal optimization.

6.6.2 RFDS 2 with Mitigation Traffic Impacts

When compared with RFDS 2, the traffic signal optimization improvements that are currently underway and would result in changing the traffic impacts from indirect, long-term, adverse impacts to indirect, long-term beneficial impacts under RFDS 2 with Mitigation. There would be no change in the construction impacts compared to the RFDS 2 because construction would still cause indirect, short-term, adverse impacts that would not be mitigated by the traffic signal optimization.

6.6.3 Overall Traffic Recommendations

Although the analysis revealed that no public transit mitigation was expressly required for the RFDS 1 or RFDS 2, recommendations in table 6-2 are provided to address the proposed transit impacts of the No-action Alternative. Table 6-2 contains the public transit recommendations

Table 6-2: JEH Action Alternative Traffic Recommendations

Impact	Recommendation (not mitigation)
Under RFDS 1 one intersection (12th Street and Constitution Avenue NW) would operate above capacity (LOS E) overall, four intersections would have lane groups that would operate above capacity, and two intersections would have failing queue lengths	DDOT should implement the ongoing traffic signal optimization initiative covering the JEH parcel study area.
Under RDFS 2 four intersections would have lane groups that would operate above capacity	DDOT should implement the ongoing traffic signal optimization initiative covering the JEH parcel study area.

6.7 Summary and Conclusions

The following summarizes the conclusions of the transportation evaluation:

A total of 959 AM peak hour and 964 PM peak hour person trips under RDFS 1 and 876 AM peak hour and 1,777 PM peak hour person trips under RFDS 2 are projected to be added to all modes of transportation. Total Metrorail transit trips results in 525 AM peak hour and 537 PM peak hour trips under RFDS 1 and 308 AM peak hour and 694 PM peak hour trips under RFDS 2. Total vehicle trips results in 241 AM peak hour and 239 PM peak hour trips under RFDS 1 and 150 AM peak hour and 233 PM peak hour trips under RFDS 2 are projected to be transit trips. Most retail trips occur during the PM peak hour; thereby, reflecting the large increase between AM and PM peak hour trips under RFDS 2.

The pedestrian network would remain the same as the Existing Condition and would be reconstructed following JEH parcel construction. The pedestrian network would allow for the same connections as the existing network along Pennsylvania Avenue NW, E Street NW, and 9th and 10th Streets NW. It would be assumed that all sidewalk curb ramps located adjacent to the parcel would be brought up to ADA compliance during reconstruction if required by DDOT.

The bicycle network would not be affected under either RFDS, but would continue to serve bicycle trips serving the JEH parcel. It is assumed that an equal or greater number of bicyclists would access the parcel than present based on an equal or greater number forecasted in planning documents. Bicyclists would continue to use the existing bicycle facilities that surround the JEH parcel on all sides. Access to the Capital Bikeshare network would continue to encourage the use of bicycles as a daily commute option, especially with a station located within a tenth of a mile.

After accounting for background growth and planned developments, the transit network (Metrorail and Metrobus) would not be noticeably affected under either RFDS. While the background growth along the bus and rail network would cause facilities to operate at capacity, many of these facilities would operate at capacity without either RFDS (under No-action Alternative). These over-capacity elements include the Metrorail fare vending machines at Archives-Navy Memorial, Gallery Place-Chinatown, and Metro Center Metro Stations. It also includes Metrobus Routes 11Y, 32, 36, 80, and G8. It is assumed that WMATA would implement recommendations from bus route studies and follow their long-term plan to address growth-related capacity issues for both bus and Metrorail operations.

Parking availability would not be affected under RFDS 1. For RFDS 2, parking availability would be improved along E, 9th, and 10th Streets NW surrounding the JEH parcel because it is assumed the new occupants would not require security setbacks. This new lane space would allow DDOT to create new on-street parking spaces. In addition, under RFDS 2 a new off-street parking facility would be constructed that could be larger than the existing facility and could offer more off-street public parking than the present conditions.

Truck access from 10th Street NW would need to be maintained for RFDS 1, but the site could require additional access points from E or 9th Streets NW to allow enough access to meet the demand. RFDS 2 truck access locations would be dependent on the design and future discussions with DDOT, but there would be a need for more truck access locations than RFDS 1 given RFDS 2's mixed-use development scenario. The exchange partner would have to work with DDOT to establish the best access points to handle the projected truck delivery demands.

All intersections currently operate at an acceptable level of service under the Existing Condition. Once the background growth and planned developments are added, one intersection would degrade from a passing LOS to a failing LOS (6th Street and Pennsylvania Avenue NW) under the No-Action Alternative. There were no planned roadway improvements within the JEH study area to compensate for the added vehicle trips.

The traffic operation under the RDFS 1 would result in overall level of service degradation at intersections from a passing LOS to a failing LOS at one intersection (12th Street and Independence Avenue NW) during the AM peak hour. Under both RFDS 1 and RFDS 2, four other intersections would experience a LOS degradation from a passing LOS to a failing LOS for specific movements through the intersection (left, through, or right). The DDOT traffic signal optimization initiative should sufficiently address the traffic impacts caused by either scenario.

6.8 Transportation Demand Management

"Transportation Demand Management is a set of strategies, programs, services, and physical elements that influence travel behavior by mode, frequency, time, route, or trip length in order to help achieve highly efficient and sustainable use of transportation facilities" (DDOT 2010, p.5). Although the District has a desire to encourage a sustainable use of its transportation facilities, the District's redevelopment permit process does not have a systematic and coordinated process within DDOT and across District agencies for implementing TDM. Rather, TDM is handled on a project-by-project basis, and TDM measures are mainly developed in coordination with development applications of projects that are "large, complex, and precedent-setting in their potential to change the character of the area." More specifically, TDM measures are typically developed in the process of approving Planned Unit Development (PUD) and special/variance development applications.

The introduction of TDM measures in either the RFDS 1 or RFDS 2 would serve to ensure the transportation mode splits assumed in this study were achieved as well as serve to mitigate travel mode, frequency, time, route, and/or trip length associated with future trips to the redeveloped JEH parcel.

6.8.1 RFDS 1 – Transportation Demand Management

RFDS 1 would be a Matter of Right development application, if an application was required by the District Office of Planning, because it meets the use and form of the Zoning Regulations. Matter of Right projects are not anticipated to substantially affect the District's transportation system, therefore the District does not usually require TDM measures from these projects–except for the zoning requirements related to bicycle parking. Therefore it is believed that this scenario, a scenario in which there would be no use changes or form changes to the building, would not be required to develop TDM measures to encourage its users to use alternate forms of transportation besides SOVs. However, in the case that RFDS 1 would be required to develop TDM measures, the RFDS 2 TDM section would apply to the RFDS 1. Furthermore, if TDM measures were implemented for this scenario, they would cause indirect minor long-term beneficial impacts to the overall transportation network around the JEH parcel. The duration of the impacts would be dependent on the TDM measures implemented.

6.8.2 RFDS 2 – Transportation Demand Management

Given the design complexity of the RFDS 2 and the likelihood that the scenario would be developed as a PUD to allow the exchange partner greater flexibility in site planning and building design, it is assumed DDOT would work with the exchange partner to create tailored TDM measures. Due to the anticipated impacts and added trips under this scenario, a moderate to full range of TDM measures would likely be required from any exchange partner of the JEH parcel. The TDM measures include required and potential substitute measures, as noted in table 6-3.

Implementation of the TDM measures would cause indirect long-term minor to moderate beneficial impacts to the overall transportation network surrounding the JEH parcel. This scenario's TDM measures would cause a greater intensity or extent of impacts because more TDM measures would be required for a full site redevelopment than for a building rehabilitation. The duration of the impacts would be dependent on the TDM measures implemented.

Table 6-3: Example TDM Measures Extracted from TDM Guidelines for the District of Columbia

TDM Option	Measure
During construction, maintain or coordinate relocation of any existing bus stops at the exchange partner's expense.	E
Comply with zoning requirements to provide bicycle parking/storage facilities.	E
Require all parking costs be unbundled from the cost of lease or purchase. Parking costs must be set at no less than the charges of the lowest fee garage, located within 0.25 mile.	E
Post all TDM commitments on-line, publicize availability, and allow the public to see what commitments have been promised.	E
Identify a project's TDM Leader (for planning, construction, and operations). Provide DDOT/zoning enforcement with annual TDM Leader contact updates.	E
Install a Transportation Information Center Display (kiosk) containing printed materials related to local transportation alternatives and maintain a stock of materials at all times.	e
Provide website links to CommuterConnections.com and goDCgo.com on developer and property management websites.	e
At no cost, dedicate spaces in the garage for car sharing services to use with right of first refusal. Locate spaces that are convenient to the garage entrance, available to the members of the car sharing service, 24 hours a day, 7 days a week, without restrictions (the garage may be gated—members of the service would have access to the spaces via a key pad combination to a pass code system, or other similar device). Count the car sharing spaces towards the project's parking requirements.	e (2 spaces required)
Provide reserved spaces for carpools and vanpools that are conveniently located with respect to the elevators serving the buildings. Oversee a program to provide carpools and vanpools with a parking subsidy.	e
Provide secured bicycle parking/storage facilities (lockers, bicycle valet parking, etc.).	e
Contribute funding to available, non-exclusive Shuttle Service to Metro or DC Circulator (based on total number of trips generated). Only applies to developments not considered Transit Oriented Developments by DDOT.	e*
Provide an on-site business center to residents with access to copier, fax, and internet services.	e
Provide location for Bikeshare Program station/kiosk.	e
Provide ongoing funding for on-site Bikeshare Program.	e
Provide each new resident with 1-year subscription to DC Bikesharing Program.	e
Provide residents with $75 mail-in refund on bicycle purchases.	e
Provide SmarTrip cards plus $100.00 Metro fare media per person, for free, one time, per employee, to each of the tenants' employees and each on-site employee of the property management company and/or building operator.	e (30 year commitment)
Provide SmarTrip cards plus $100.00 Metro fare media per person, for free, one time, per resident.	e (30 year commitment)
Provide a one-time membership fee subsidy in a car sharing program for each residential unit.	e
Locate and furnish an on-site Transit Store free of charge.	e
Make a 30-year commitment to operate an on-site Transit Store.	e
Operate a shuttle service to Metro (or other appropriate destinations) specific to the site/development.	e*
Install and maintain new bus stop infrastructure.	e
Construct new Metro stations connection (entrance, escalator, fare array).	e*
* Shuttles and direct access to Metro stations are site specific. DDOT expectations for these measures would depend on the practicality of adopting them at a specific location.	

Guide: E – Expected TDM Measure e – Expected TDM Measure (Option to Substitute) S – Potential Substitute/Optional Measure

Note to Users: Use the above guide to identify the category that best describes the development proposal, the minimal TDM measures expected are indicated in column below along with others that may be used as substitutes and/or above and beyond the minimum requirements. These expected measures were developed by reviewing TDM programs in other locations both in the greater Washington, D.C., region and nationally. DDOT encourages the adoption of measures above the minimum expected and reserves the right to require additional measures beyond these minimal expectations as warranted.

Source: DDOT (2010

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8.0 Acronyms and Abbreviations

A

AADT Annual average daily traffic

ADA Americans with Disabilities Act

ADT Average daily traffic

C

CEQ Council on Environmental Quality

CFR Code of Federal Regulations

D

DCOP District of Columbia Office of Planning

DDOT District Department of Transportation

E

EIS Environmental Impact Statement

F

FBI Federal Bureau of Investigation

FHWA Federal Highway Administration

G

GIS Geographic Information Systems

GSA General Services Administration

GSF Gross Square Feet

H

HCM Highway Capacity Manual

HOV High Occupancy Vehicle

HQ Headquarters

I

ISC Interagency Security Committee

J

JEH	J. Edgar Hoover

L

LCT	Loudoun County Transit
LOS	Level of Service

M

MEV	million entering vehicles
mph	miles per hour
MTA	Maryland Transit Administration
MWCOG	Metropolitan Washington Council of Governments

N

NCPC	National Capital Planning Commission
NCR	National Capital Region
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association

O

OPO	Old Post Office

P

PADC	Pennsylvania Avenue Development Corporation
PHF	peak hour factor
PRTC	Potomac and Rappahannock Transportation Commission\
PUD	Planned Unit Development

R

RFDS	Reasonably Foreseeable Development Scenario

S

SF	Square Foot

T

TIA Transportation Impact Assessment

TWSC Two-way STOP-Controlled

U

U.S. United States

USDOJ U.S. Department of Justice

V

v/c volume-to-capacity ratio

VHT Vehicle hours of travel

W

WMATA Washington Metropolitan Area Transit Authority