Chapter 21: Mitigation

A. INTRODUCTION

The preceding chapters of this final environmental impact statement (FEIS) discuss the potential for significant adverse environmental impacts to result from the proposed action. Such potential impacts were identified in the areas of shadows, traffic, pedestrians, and construction. For each of these technical areas, this chapter discusses measures that could minimize or eliminate these anticipated impacts. In addition this chapter notes where modifications to the proposed action currently being contemplated by the City Planning Commission (CPC) would mitigate, reduce, or avoid significant adverse impacts.

B. SHADOWS

DAMROSCH PARK

The analysis in Chapter 6, "Shadows," concluded that in Phase II of development (2032), the proposed action would add areas of new shadow to Damrosch Park on the March 21/September 21 and the December 21 analysis days. The additional areas of incremental shadow would fall in the late morning and early afternoon from Sites 1 and 6, affecting primarily the seating areas and vegetation on the eastern side of the park. The additional development in Phase II would not impact Damrosch Park on the May 6/August 6 or June 21 analysis days. Overall, the full 2032 buildout of the proposed action would substantially reduce sunlight to Damrosch Park in the fall, winter and early spring, resulting in a significant adverse impact to this space at these times of the year.

Changes to the maximum building envelopes with the contemplated modifications would reduce shadows during the periods when significant adverse impacts were identified on Damrosch Park. As shown in Chapter 27, "Modifications to the Proposed Action," these reductions in height and volume would reduce the incremental shadow but not eliminate the significant adverse impact. Representatives of the New York City Department of Parks and Recreation (DPR) and Fordham University have been meeting and are continuing to discuss potential mitigation measures for significant adverse shadow impact on Damrosch Park that is projected with full development of Phase II. If Fordham, DPR, and Lincoln Center do not ultimately reach agreement on implementation of mitigation measures, the increase in shadows would be considered an unavoidable significant adverse impact on Damrosch Park.

THE GROVE

In 2032 with the full buildout, incremental shadow would fall on various sections of Lincoln Center Plaza throughout the year, with durations ranging from three to four hours depending on season. These durations would be attributed in large part to proposed buildings on the eastern end of the Fordham campus (Sites 1 and 6) casting new shadow on the planned seating and landscaped area (the Grove) between the David H. Koch New York State (Koch) Theater and

Columbus Avenue. Phase II development would add approximately four hours of new shadow on this part of the Lincoln Center open space in the spring, summer and fall, and nearly two hours in the winter, and would therefore cause a significant adverse impact to this space.

As shown in Chapter 27, the contemplated modifications to proposed action would reduce the extent of the shadow falling on the Grove at certain times because the heights of the lower setbacks have been reduced but it would not necessarily eliminate the significant adverse impact. Any plant materials adversely affected by shadows from the buildings on Sites 1 and 6 (after they are built in the second phase of campus development) could be replaced with more shade tolerant species. This measure would be sufficient to mitigate the potential impact caused by the increased duration of shadows on this area that could occur as the result of the proposed project. Representatives of Lincoln Center have advised that they do not wish to address the issue of plant sensitivity at the Grove at this time, because of the long period of time that will elapse until construction of Phase II. Representatives of DPR, Fordham, and Lincoln Center have been meeting and are continuing to discuss potential mitigation measures for significant adverse shadow impact on the Grove. If ultimately there is no agreement reached on implementation of mitigation measures, the increase in shadows would be considered an unavoidable significant adverse impact on the Grove.

ST. PAUL THE APOSTLE CHURCH

Between 7:00 AM and 9:00 AM on June 21, incremental shadow would fall across some of the windows on the north façade of the Church of Saint Paul the Apostle. The total duration of incremental shadow would be two hours. For about 45 minutes of this period no sunlight would fall on the windows due to a combination of incremental and existing shadow; for an additional 30 minutes of this period only one window would receive direct sunlight. The incremental shadow would therefore cause a significant adverse impact on the north windows of the church and apse on the June 21 analysis day. On the May 6/August 6 analysis day the impact would be less substantial—only 30 minutes of incremental shadow—and on the other two analysis days there would not be any incremental shadow.

The proposed modifications to the Site 2 maximum building envelop would not remove the incremental shadow identified as having a significant adverse impact (see Chapter 27, "Modifications to the Proposed Action"). Provision of alternative lighting would be a potential mitigation measure. However, this does not seem to be a practical mitigation measure in the context of the church complex as a whole. In the absence of mitigation, this would remain an unavoidable adverse impact. See Chapter 23, "Unavoidable Significant Adverse Impacts," for additional discussion of this impact.

ILLUSTRATIVE PLAN

These shadows from the maximum building envelopes of the proposed action would result in significant adverse shadow impacts.

The buildings of the illustrative plan would be shorter and have more setbacks than the maximum envelopes analyzed in shadow study. In particular, the tower portion of the Law School, directly south across West 62nd Street from Damrosch Park, would be shorter and set substantially farther back from the street in comparison with the corresponding maximum envelope. Additional analysis was performed to determine whether the massings of the illustrative plan would reduce the extent and duration of incremental shadows on Damrosch Park and the Grove as compared with the maximum envelopes. The additional analysis concluded

that the smaller massings of the illustrative plan would reduce the extent of the incremental shadows on Damrosch Park, particularly during the mid-day and early afternoon hours of the spring, summer and fall analysis days when the potential shadow impact would be greatest. This reduction may partially reduce the adverse shadow impact on Damrosch Park. However, only a small reduction of incremental shadows would occur on the Grove with the illustrative plan, in comparison with the maximum envelopes. In addition, selecting shade-tolerant tree species for this area could reduce the impact. The illustrative plan building on Site 2 was not shown to remove the June 21 shadow impact on the Church of St. Paul the Apostle.

Since publication of the DEIS, modifications to the proposed action have been developed (see Chapter 27, "Modifications to the Proposed Action"). These modifications would substantially reduce the bulk of the maximum building envelopes and also reduce the extent of the shadows falling on the Damrosch Park and the Grove but would not remove the significant adverse impact. Further, they would not reduce the extent of the shadows on the Church of St Paul the Apostle on June 21.

C. TRAFFIC

As discussed in Chapter 15, "Traffic and Parking," the proposed action would result in significant adverse impacts at three and six intersections during various analysis peak hours in 2014 and 2032, respectively. To mitigate these impacts, low-cost and readily implementable measures were explored, as detailed below. With these mitigation measures in place, the proposed action would not result in unmitigated significant adverse traffic impacts.

RECOMMENDED MITIGATION MEASURES FOR THE PROPOSED ACTION

Measures explored to mitigate the projected significant adverse traffic impacts involve retiming of signal controls to increase green time for impacted movements, modifying existing regulations, and daylighting curb lanes at intersection approaches to provide additional travel lanes or turn pockets. The operational changes incorporated into the mitigation analyses are presented in Table 21-1.

Operating conditions with the above measures in place and comparisons to the future 2014 and 2032 No Build and Build conditions are presented in Tables 21-2 and 21-3, respectively.

MITIGATION OF IMPACTS—2014

Midday Peak Hour

Amsterdam Avenue and West 60th Street: Impacts on the eastbound approach could be mitigated by shifting one second of green time from the northbound phase to the eastbound/westbound phase.

Ninth Avenue and West 57th Street: Parking is currently permitted on both sides of the southbound approach during the midday peak hour. The impact identified for the southbound approach could be mitigated by daylighting the west curb lane for 100 feet to create an exclusive right turn lane. This mitigation, when combined with the AM daylighting proposed in the *West 61st Street Rezoning FEIS (December 2006)* and the 4 PM to 7 PM No Standing regulations on Ninth Avenue would result in only 2 hours a day for legal parking along the west curb. It is therefore recommended that NYCDOT remove the first 5 existing parking meters along the west curb of Ninth Avenue north of West 57th Street and impose No Standing 7 AM to 8 PM regulations, except for Sunday. To minimize the loss of meter parking spaces, it is also recommended that NYCDOT consider installing muni-meter parking to govern short-term parking for the remaining approximately 150 feet of the block for days and hours that are not currently restricted.

Table 21-1
Recommended Mitigation Measures

Build Year	Intersection	Mitigation Measure			
		AM Peak Hour	**Midday Peak Hour**	**PM Peak Hour**	**Pre-Theater Peak Hour**
2014	Amsterdam Avenue & West 60th Street	Not required	Shift 1 second of green time from NB to EB/WB	Not required	Not required
	Ninth Avenue & West 57th Street	Not required	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane	Not required	Not required
	Columbus Avenue & West 60th Street	Not required	Not required	Shift 1 second of green time from SB to EB/WB	Not required
2032	Tenth Avenue & West 57th Street	Not required	Not required	Shift 1 second of green time from NB to EB/WB	Daylight north curb lane on westbound approach for 100 feet to create exclusive right-turn lane
	Amsterdam Avenue & West 60th Street	Shift 1 second of green time from NB to EB/WB	Shift 2 seconds of green time from NB to EB/WB	Not required	Not required
	Ninth Avenue & West 57th Street	Not required	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane	Shift 1 second of green time from SB to EB/WB	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane and shift 1 second of green time from SB to EB/WB
	Columbus Avenue & West 60th Street	Not required	Not required	Shift 1 second of green time from SB to EB/WB	Not required
	Columbus Avenue & West 62nd Street	Not required	Not required	Shift 1 second of green time from SB to EB/WB	Not required
	Broadway/Columbus Avenue & West 65th Street	Not required	Not required	Not required	Extend No Standing 7 AM–7 PM regulation to 8 PM along the west curb of the SB Columbus Avenue approach.

Table 21-2
Comparison of 2014 No Build, Build, and Mitigated Build Conditions Level of Service Analysis

Peak Hour	Intersection/ Approach	No Build				Build			Mitigated Build			
		Lane Group	V/C Ratio	Delay (sec)	LOS	V/C Ratio	Delay (sec)	LOS	Lane Group	V/C Ratio	Delay (sec)	LOS
Midday	**Amsterdam Avenue and West 60th Street**											
	Eastbound	LT	0.82	45.2	D	0.86	50.2	D +	LT	0.83	45.2	D
	Westbound	R	0.66	35.0-	C	0.66	35.4	D	R	0.64	33.2	C
	Northbound	TR	0.59	10.6	B	0.60	10.7	B	TR	0.61	11.5	B
	Intersection			18.4	B		19.5	B			19.1	B
	Ninth Avenue and West 57th Street											
	Eastbound	T	0.81	41.7	D	0.81	41.7	D	T	0.81	41.7	D
		R	0.79	62.5	E	0.79	62.5	E	R	0.79	62.5	E
	Westbound	DefL	1.04	79.9	E	1.04	79.9	E	DefL	1.04	79.9	E
		T	1.20	127.1	F	1.20	128.4	F	T	1.20	128.4	F
	Southbound	LTR	1.21	128.3	F	1.22	133.5	F +	LT	1.00	51.2	D
									R	1.00	91.8	F
	Intersection			107.7	F		110.7	F			70.8	E
PM	**Columbus Avenue and West 60th Street**											
	Eastbound	R	0.98	77.1	E	1.00	82.1	F +	R	0.97	72.1	E
	Westbound	L	0.66	35.5	D	0.65	34.8	C	L	0.63	32.8	C
		LT	0.67	34.0	C	0.66	33.6	C	LT	0.64	31.9	C
	Southbound	TR	0.73	11.7	B	0.74	11.9	B	TR	0.76	12.9	B
	Intersection			22.5	C		23.1	C			22.5	C

Notes: L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; + Significant Traffic Impact.

Table 21-3
Comparison of 2032 No Build, Build, and Mitigated Build Conditions Level of Service Analysis

Peak Hour	Intersection/ Approach	No Build				Build			Mitigated Build			
		Lane Group	V/C Ratio	Delay (sec)	LOS	V/C Ratio	Delay (sec)	LOS	Lane Group	V/C Ratio	Delay (sec)	LOS
AM	**Amsterdam Avenue and West 60th Street**											
	Eastbound	LT	1.06	93.5	F	1.10	105.7	F +	LT	1.06	92.5	F
	Westbound	R	0.88	56.4	E	0.90	59.6	E	R	0.87	52.5	D
	Northbound	T	0.57	10.3	B	0.58	10.4	B	T	0.59	11.2	B
		R	0.57	19.0	B	0.58	19.3	B	R	0.60	20.6	C
	Intersection			30.1	C		32.8	C			30.4	C
Midday	**Amsterdam Avenue and West 60th Street**											
	Eastbound	LT	0.85	48.5	D	0.90	56.3	E +	LT	0.84	45.0	D
	Westbound	R	0.72	39.0	D	0.74	40.3	D	R	0.68	34.4	C
	Northbound	TR	0.64	11.1	B	0.65	11.3	B	TR	0.68	13.2	B
	Intersection			19.7	B		21.3	C			20.3	C
	Ninth Avenue and West 57th Street											
	Eastbound	T	0.87	46.9	D	0.87	46.9	D	T	0.87	46.9	D
		R	0.85	71.3	E	0.85	71.3	E	R	0.85	71.3	E
	Westbound	DefL	1.17	125.4	F	1.17	125.4	F	DefL	1.17	125.4	F
		T	1.27	155.9	F	1.27	158.6	F	T	1.27	158.6	F
	Southbound	LTR	1.30	166.8	F	1.31	173.8	F +	LT	1.08	74.9	E
									R	1.07	114.2	F
	Intersection			138.4	F		142.7	F			94.1	F

Table 21-3 (cont'd)
Comparison of 2032 No Build, Build, and Mitigated Build Conditions Level of Service Analysis

Peak Hour	Intersection/ Approach	No Build				Build			Mitigated Build			
		Lane Group	V/C Ratio	Delay (sec)	LOS	V/C Ratio	Delay (sec)	LOS	Lane Group	V/C Ratio	Delay (sec)	LOS
PM	**Tenth Avenue and West 57th Street**											
	Eastbound	DefL	1.44	281.1	F	1.48	296.2	F	DefL	1.48	295.7	F
		T	0.90	47.8	D	0.90	47.8	D	T	0.88	43.6	D
	Westbound	TR	1.07	75.6	E	1.08	81.0	F +	TR	1.05	69.9	E
	Northbound	L	0.58	21.4	C	0.58	21.4	C	L	0.60	22.6	C
		TR	0.85	19.7	B	0.86	19.9	B	TR	0.88	21.7	C
	Intersection			45.2	D		47.4	D			45.0	D
	Ninth Avenue and West 57th Street											
	Eastbound	T	0.89	50.4	D	0.89	50.4	D	T	0.85	45.2	D
		R	0.75	58.6	E	0.75	58.6	E	R	0.71	53.4	D
	Westbound	DefL	1.00	70.8	E	1.00	70.8	E	DefL	0.98	63.1	E
		T	1.25	147.6	F	1.26	150.6	F +	T	1.23	137.9	F
	Southbound	L	0.68	35.9	D	0.70	37.0	D	L	0.73	40.2	D
		T	0.92	36.5	D	0.94	38.0	D	T	0.97	43.7	D
		R	0.67	36.6	D	0.70	38.6	D	R	0.73	41.9	D
	Intersection			65.2	E		66.5	E			65.2	E
	Columbus Avenue and West 60th Street											
	Eastbound	R	1.05	95.6	F	1.08	104.6	F +	R	1.04	91.8	F
	Westbound	L	0.71	38.4	D	0.71	38.0	D	L	0.68	35.5	D
		LT	0.72	36.6	D	0.73	36.8	D	LT	0.70	34.5	C
	Southbound	TR	0.79	12.9	B	0.81	13.3	B	TR	0.82	14.6	B
	Intersection			25.7	C		27.0	C			26.1	C
	Columbus Avenue and West 62nd Street											
	Eastbound	R	0.67	35.0-	C	0.85	48.5	D +	R	0.81	43.3	D
	Westbound	LT	0.47	27.6	C	0.47	27.6	C	LT	0.45	26.3	C
	Southbound	TR	0.81	13.4	B	0.82	13.6	B	TR	0.84	14.9	B
	Intersection			16.2	B		18.2	B			18.7	B
Pre-Theater	**Tenth Avenue and West 57th Street**											
	Eastbound	DefL	1.46	291.7	F	1.48	296.7	F	LT	1.05	79.9	E
		T	0.99	67.1	E	0.99	67.1	E				
	Westbound	TR	1.16	111.0	F	1.17	116.4	F +	T	0.71	26.9	C
									R	0.92	58.7	E
	Northbound	LTR	1.01	38.5	D	1.01	39.5	D	LTR	1.01	39.5	D
	Intersection			68.3	E		70.6	E			44.2	D
	Ninth Avenue and West 57th Street											
	Eastbound	T	0.89	50.4	D	0.89	50.4	D	T	0.85	45.2	D
		R	0.96	95.8	F	0.96	95.8	F	R	0.92	83.3	F
	Westbound	DefL	0.94	57.6	E	0.94	57.6	E	DefL	0.92	51.2	D
		T	1.24	144.3	F	1.25	149.0	F +	T	1.22	136.8	F
	Southbound	LTR	1.20	124.2	F	1.21	129.7	F +	LT	1.01	52.7	D
									R	1.07	109.0	F
	Intersection			110.3	F		114.3	F			73.5	E
	Broadway, Columbus Avenue* and West 65th Street											
	Eastbound	TR	0.84	44.2	D	0.85	44.3	D	TR	0.85	44.3	D
		R	0.61	42.5	D	0.61	42.5	D	R	0.61	42.5	D
	Northbound	TR	1.01	65.3	E	1.01	64.7	E	TR	1.01	64.7	E
	Southbound	T	1.17	119.0	F	1.17	120.1	F	T	1.17	120.1	F
	Southbound*	L	0.72	42.7	D	0.72	42.7	D	L	0.72	42.7	D
		T	1.22	138.7	F	1.23	141.7	F +	T	1.17	115.7	F
	Intersection			98.8	F		100.1	F			91.8	F

Notes: L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; + Significant Traffic Impact.

PM Peak Hour

Columbus Avenue and West 60th Street: Impacts on the eastbound approach could be mitigated by shifting one second of green time from the southbound phase to the eastbound/westbound phase.

MITIGATION OF IMPACTS—2032

AM Peak Hour

Amsterdam Avenue and West 60th Street: Impacts on the eastbound approach could be mitigated by shifting one second of green time from the northbound phase to the eastbound/westbound phase.

Midday Peak Hour

Amsterdam Avenue and West 60th Street: Impacts on the eastbound approach could be mitigated by shifting two seconds of green time from the northbound phase to the eastbound/westbound phase.

Ninth Avenue and West 57th Street: Parking is currently permitted on both sides of the southbound approach during the midday peak hour. The impact identified for the southbound approach could be mitigated by daylighting the west curb lane for 100 feet to create an exclusive right turn lane. As noted above in the discussion of 2014 mitigation measures, it is recommended that NYCDOT impose No Standing 7 AM to 8 PM regulations at this location to minimize motorist confusion and facilitate enforcement. Furthermore, the number of parking spaces loss from the daylighting mitigation could be minimized via the installation of muni-meter parking.

PM Peak Hour

Tenth Avenue and West 57th Street: Impacts on the westbound approach could be mitigated by shifting one second of green time from the northbound phase to the eastbound/westbound phase.

Ninth Avenue and West 57th Street: Impacts on the westbound approach could be mitigated by shifting one second of green time from the southbound phase to the eastbound/westbound phase.

Columbus Avenue and West 60th Street: Impacts on the eastbound approach could be mitigated by shifting one second of green time from the southbound phase to the eastbound/westbound phase.

Columbus Avenue and West 62nd Street: Impacts on the eastbound approach could be mitigated by shifting one second of green time from the southbound phase to the eastbound/westbound phase.

Pre-Theater Peak Hour

Tenth Avenue and West 57th Street: Parking is currently permitted on the north side of the westbound approach during the pre-theater peak hour. The impact identified for the westbound approach could be mitigated by daylighting the north curb lane for 100 feet to create an exclusive right turn lane.

Ninth Avenue and West 57th Street: Impacts on the westbound approach could be mitigated by shifting one second of green time from the southbound phase to the eastbound/westbound phase. Parking is currently permitted on both sides of the southbound approach during the pre-theater peak hour. The impact identified for the southbound approach could be mitigated by daylighting the west curb lane for 100 feet to create an exclusive right turn lane.

Broadway/Columbus Avenue and West 65th Street: Impacts on the southbound Columbus Avenue approach could be mitigated by eliminating parking on the west curb of Columbus Avenue. This would necessitate extending the existing No Standing 7 AM–7 PM regulation by one hour to 8 PM.

MITIGATION MEASURES FOR THE MODIFIED PROJECT

As described in Chapter 27, "Modifications to the Proposed Action," due to the modified project's lower auto share—which would result in lower incremental traffic volumes and vehicle delays than the proposed action—impacts with the modified project are expected to be lower in magnitude or eliminated. The 2014 midday peak hour impacts identified under the proposed action would be eliminated due to increments below CEQR thresholds under the modified project. During the other time periods (2014 PM, and 2032 AM, midday, PM, and pre-theater peak hours), projected impacts would be reduced or eliminated. Unlike the proposed action, the modified project would not have the following significant adverse impacts: at Amsterdam Avenue and West 60th Street or at Ninth Avenue and West 57th Street in the 2014 midday peak hour; at Amsterdam Avenue and West 60th Street in the 2032 midday peak hour; and Tenth Avenue and West 57th Street and Columbus Avenue and West 62nd Street in the 2032 PM peak hour. However, at Amsterdam Avenue and West 60th Street in the 2032 AM peak hour (where an eastbound impact has been identified for the proposed action) there would also be a westbound right-turn impact with the modified project. This westbound impact would not occur under the proposed action.

The mitigation measures recommended for the proposed action would similarly mitigate the significant adverse impacts of the modified project. Table 21-4 presents the No Build, Build, and mitigated Build levels of service analysis results at intersections where the modified project is expected to result in significant adverse traffic impacts and Table 21-5 summarizes the recommended mitigation measures for the modified project.

Table 21-4
Comparison of No Build, Build, and Mitigated Build Conditions Level of Service Analysis for the Modified Project

Build Year / Peak Hour	Intersection/ Approach	No Build				Build			Mitigated Build			
		Lane Group	V/C Ratio	Delay (sec)	LOS	V/C Ratio	Delay (sec)	LOS	Lane Group	V/C Ratio	Delay (sec)	LOS
2014 PM	**Columbus Avenue and West 60th Street**											
	Eastbound	R	0.98	77.1	E	1.00	82.1	F +	R	0.97	72.1	E
	Westbound	L	0.66	35.5	D	0.66	35.1	D	L	0.63	33.0	C
		LT	0.67	34.0	C	0.66	33.6	C	LT	0.64	31.8	C
	Southbound	TR	0.73	11.7	B	0.74	11.8	B	TR	0.75	12.8	B
	Intersection			22.5	C		23.1	C			22.5	C
2032 AM	**Amsterdam Avenue and West 60th Street**											
	Eastbound	LT	1.06	93.5	F	1.08	98.5	F+	LT	1.04	85.4	F
	Westbound	R	0.88	56.4	E	0.93	63.7	E+	R	0.89	55.7	E
	Northbound	T	0.57	10.3	B	0.58	10.3	B	T	0.59	11.1	B
		R	0.57	19.0	B	0.58	19.3	B	R	0.60	20.6	C
	Intersection			30.1	C		32.0	C			29.6	C
2032 Midday	**Ninth Avenue and West 57th Street**											
	Eastbound	T	0.87	46.9	D	0.87	46.9	D	T	0.87	46.9	D
		R	0.85	71.3	E	0.85	71.3	E	R	0.85	71.3	E
	Westbound	DefL	1.17	125.4	F	1.17	125.4	F	DefL	1.17	125.4	F
		T	1.27	155.9	F	1.27	158.6	F	T	1.27	158.6	F
	Southbound	LTR	1.30	166.8	F	1.30	170.2	F +	LT	1.07	73.1	E
									R	1.06	109.7	F
	Intersection			138.4	F		140.8	F			93.1	F
2032 PM	**Ninth Avenue and West 57th Street**											
	Eastbound	T	0.89	50.4	D	0.89	50.4	D	T	0.85	45.2	D
		R	0.75	58.6	E	0.75	58.6	E	R	0.71	53.4	D
	Westbound	DefL	1.00	70.8	E	1.00	70.8	E	DefL	0.98	63.1	E
		T	1.25	147.6	F	1.26	150.0	F +	T	1.23	137.3	F
	Southbound	L	0.68	35.9	D	0.71	37.2	D	L	0.73	40.4	D
		T	0.92	36.5	D	0.93	37.4	D	T	0.96	42.8	D
		R	0.67	36.6	D	0.69	37.6	D	R	0.71	40.6	D
	Intersection			65.2	E		66.1	E			64.6	E
	Columbus Avenue and West 60th Street											
	Eastbound	R	1.05	95.6	F	1.08	104.6	F +	R	1.04	91.8	F
	Westbound	L	0.71	38.4	D	0.72	38.7	D	L	0.69	36.1	D
		LT	0.72	36.6	D	0.74	37.8	D	LT	0.72	35.4	D
	Southbound	TR	0.79	12.9	B	0.80	13.2	B	TR	0.82	14.4	B
	Intersection			25.7	C		27.1	C			26.2	C
2032 Pre-Theater	**Tenth Avenue and West 57th Street**											
	Eastbound	DefL	1.46	291.7	F	1.48	296.7	F	LT	1.05	79.9	E
		T	0.99	67.1	E	0.99	67.1	E				
	Westbound	TR	1.16	111.0	F	1.17	115.0	F +	T	0.71	26.9	C
									R	0.91	58.2	E
	Northbound	LTR	1.01	38.5	D	1.01	39.4	D	LTR	1.01	39.4	D
	Intersection			68.3	E		70.2	E			44.1	D
	Ninth Avenue and West 57th Street											
	Eastbound	T	0.89	50.4	D	0.89	50.4	D	T	0.85	45.2	D
		R	0.96	95.8	F	0.96	95.8	F	R	0.92	83.3	F
	Westbound	DefL	0.94	57.6	E	0.94	57.6	E	DefL	0.92	51.2	D
		T	1.24	144.3	F	1.25	148.3	F +	T	1.22	136.2	F
	Southbound	LTR	1.20	124.2	F	1.21	128.9	F +	LT	1.01	52.4	D
									R	1.07	107.7	F
	Intersection			110.3	F		113.7	F			73.2	E
	Broadway, Columbus Avenue* and West 65th Street											
	Eastbound	TR	0.84	44.2	D	0.85	44.3	D	TR	0.85	44.3	D
		R	0.61	42.5	D	0.61	42.5	D	R	0.61	42.5	D
	Northbound	TR	1.01	65.3	E	1.01	64.7	E	TR	1.01	64.7	E
	Southbound	T	1.17	119.0	F	1.17	120.1	F	T	1.17	120.1	F
	Southbound*	L	0.72	42.7	D	0.72	42.7	D	L	0.72	42.7	D
		T	1.22	138.7	F	1.23	141.7	F +	T	1.17	115.7	F
	Intersection			98.8	F		100.1	F			91.8	F

Notes: L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; + Significant Traffic Impact.

Table 21-5
Recommended Mitigation Measures for the Modified Project

Build Year	Intersection	Mitigation Measure			
		AM Peak Hour	Midday Peak Hour	PM Peak Hour	Pre-Theater Peak Hour
2014	Columbus Avenue & West 60th Street	Not required	Not required	Shift 1 second of green time from SB to EB/WB	Not required
2032	Tenth Avenue & West 57th Street	Not required	Not required	Not required	Daylight north curb lane on westbound approach for 100 feet to create exclusive right-turn lane
	Amsterdam Avenue & West 60th Street	Shift 1 second of green time from NB to EB/WB	Not required	Not required	Not required
	Ninth Avenue & West 57th Street	Not required	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane	Shift 1 second of green time from SB to EB/WB	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane and shift 1 second of green time from SB to EB/WB
	Columbus Avenue & West 60th Street	Not required	Not required	Shift 1 second of green time from SB to EB/WB	Not required
	Broadway/Columbus Avenue & West 65th Street	Not required	Not required	Not required	Extend No Standing 7 AM–7 PM regulation to 8 PM along the west curb of the SB Columbus Avenue approach.

D. TRANSIT AND PEDESTRIANS

As discussed in Chapter 16 "Transit and Pedestrians" the proposed action would result in significant adverse pedestrian impacts in the 2032 Build condition at the north crosswalk of Columbus Avenue and West 60th Street during the PM and pre-theater peak periods. Measures that could be implemented to mitigate these impacts are discussed below. With these mitigation measures in place, the proposed action would not result in unmitigated significant adverse pedestrian impacts.

COLUMBUS AVENUE AND 60TH STREET

- The north crosswalk at this intersection would deteriorate within LOS E with a reduction in average pedestrian space from 11.8 square feet per pedestrian (SFP) to 10.7 SFP during the PM peak period and from 12.7 SFP to 11.5 SFP during the pre-theater evening peak period.

These impacts could be mitigated by shifting 3 seconds of green time from the southbound phase to the eastbound/westbound phase to allow for more time to cross Columbus Avenue. Since the traffic impact analysis for this location already indicated the need for a one-second mitigation during the PM peak hour, a shift of two additional seconds, for a total shift of 3 seconds of green time from the southbound to the eastbound/westbound phase, would be required in mitigating the PM peak period crosswalk impact. The three-second signal timing shift could also be extended into the pre-theater peak period to mitigate the crosswalk impact during this time period. The mitigation analysis results are shown in Table 21-6.

Table 21-6
2032 Mitigated Build Conditions: Pedestrian LOS Analysis for Crosswalks

Location	Crosswalk	Street Width (feet)	Crosswalk Width (feet)	Conditions with Conflicting Vehicles			
				PM		Pre-theater	
				SFP	LOS	SFP	LOS
Columbus Avenue and W.60th Street	North	67.0	15.0	12.3	E	13.1	E
	East	49.0	19.5	76.6	A	76.9	A
	South	60.5	12.0	11.8	E	11.9	E
	West	51.5	13.0	46.2	B	25.4	C

Note: SFP = square feet per pedestrian

The above pedestrian mitigation measures were evaluated for their effects on traffic operations. As shown in Table 21-7, the resulting traffic operations with the above pedestrian mitigation measures would be further improved during the PM and pre-theater analysis time periods.

Table 21-7
Comparison of 2032 No Build, Build, and Mitigated Build Conditions Level of Service Analysis with Pedestrian Mitigation

Peak Hour	Intersection/ Approach	No Build				Build			Mitigated Build (Including Pedestrian Mitigation)			
		Lane Group	V/C Ratio	Delay (sec)	LOS	V/C Ratio	Delay (sec)	LOS	Lane Group	V/C Ratio	Delay (sec)	LOS
PM	**Columbus Avenue and West 60th Street**											
	Eastbound	R	1.05	95.6	F	1.08	104.6	F +	R	0.97	70.5	E
	Westbound	L	0.71	38.4	D	0.71	38.0	D	L	0.64	31.5	C
		LT	0.72	36.6	D	0.73	36.8	D	LT	0.66	30.8	C
	Southbound	TR	0.79	12.9	B	0.81	13.3	B	TR	0.86	17.4	B
	Intersection			25.7	C		27.0	C			25.3	C
Pre-Theater	**Columbus Avenue and West 60th Street**											
	Eastbound	R	0.85	51.9	D	0.86	54.1	D	R	0.78	41.1	D
	Westbound	L	0.62	33.6	C	0.62	33.5	C	L	0.56	28.5	C
		LT	0.60	31.2	C	0.60	31.3	C	LT	0.54	27.1	C
	Southbound	TR	0.69	11.1	B	0.70	11.2	B	TR	0.75	14.2	B
	Intersection			18.6	B		18.9	B			19.1	B

Notes: L = Left Turn; T = Through; R = Right Turn; DefL = Defacto Left Turn; + Significant Traffic Impact.

E. CONSTRUCTION

HISTORIC RESOURCES DURING CONSTRUCTION

During construction of the Master Plan, a Construction Protection Plan would be implemented to protect resources such as the Lincoln Center for the Performing Arts and the Church of St. Paul the Apostle, which are located within 90 feet of the proposed construction activities. The Construction Protection Plan would be developed in consultation with and approved by New York State Office of Parks, Recreation, and Historic Preservation (SHPO) and the New York City Landmarks Preservation Commission (LPC). The Construction Protection Plan would conform with the requirements of New York City Department of Buildings' Technical Policy and Procedure Number 10/88 and LPC's Guidelines for Construction Adjacent to a Historic Landmark.

CONSTRUCTION TRAFFIC

As detailed in Chapter 19, "Construction," during Phase I construction in 2011, significant adverse traffic impacts were identified at one study area intersection during the 3–4 PM analysis

hour. During Phase II construction on Site 1 in 2021, significant adverse traffic impacts were identified at one study area intersection during the 3–4 PM analysis hour and five study area intersections during the 5–6 PM analysis hour. During Phase II construction on Site 6 in 2031, significant adverse traffic impacts were identified at two study area intersections during the 3–4 PM analysis hour and five study area intersections during the 5–6 PM analysis hour. All projected impacts in 2011, 2021, and 2031 could be mitigated with either an early implementation of the Build condition mitigation strategies described above, or variations of these strategies, such as different signal timing shifts. The need for these variations on proposed mitigation measures to address the projected construction traffic impacts in 2011, 2021, and 2031 would be determined by NYCDOT during those years.

As described in Chapter 27. "Modifications to the Proposed Action," unlike the proposed action the modified project would not require mitigation measures for the 2014 midday peak hour. It would also not require mitigation measures at a few intersections during the 2032 midday and PM peak hours that would otherwise be required with the proposed action. Therefore, mitigating the construction-related traffic impacts would require an early implementation of either mitigation measures recommended for the modified project or those previously identified under the proposed project. In addition, as with the proposed project, variations of these measures, such as the additional two or three-second shift in green time at two locations during the 2021 and 2031 construction analysis years, have been identified. The need for these variations on proposed mitigation measures would be determined by NYCDOT during those years. Table 21-8 summarizes the mitigation measures recommended for the construction-related traffic impacts under the modified project.

CONSTRUCTION AIR QUALITY

To prevent potential significant adverse impacts on air quality from construction equipment and truck emissions, the following measures would be implemented:

- *Diesel Equipment Reduction.* The construction of the Fordham University development sites would minimize the use of diesel engines, using electric engines operating on grid power instead, to the extent practicable. To that end, Fordham University has contacted Con Edison to seek the early connection of grid power to the sites by the start of construction. Construction contracts would specify the use of electric engines and ensure the distribution of power connections as needed. Equipment that would use grid power instead of diesel engines would include, but not be limited to, welders, water pumps, bench saws, table saws, and material/personnel hoists. Other items of equipment could be electric powered where available and practicable. This use of electrically driven equipment would also eliminate generators that would normally be needed for construction equipment.
- *Clean Fuel.* Ultra-low sulfur diesel fuel (ULSD) would be used exclusively for all diesel engines throughout the Fordham University development sites. This would enable the use of tailpipe reduction technologies (see below) and would directly reduce diesel particulate matter (DPM) and sulfur oxides (SO_x) emissions.

Table 21-8
Recommended Traffic Mitigation Measures for Construction of the Modified Project

Build Year	Intersection	Mitigation Measure		
		6–7 AM Peak Hour	3–4 PM Peak Hour	5–6 PM Peak Hour
2011	Ninth Avenue & West 57th Street	Not required	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane	Not required
2021	Tenth Avenue & West 57th Street	Not required	Not required	Shift 1 second of green time from northbound to eastbound/westbound
	Amsterdam Avenue & West 62nd Street	Not required	Not required	Shift 1 second of green time from northbound to westbound
	Ninth Avenue & West 57th Street	Not required	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane	Shift 1 second of green time from southbound to eastbound/westbound
	Columbus Avenue & West 60th Street	Not required	Not required	Shift 1 second of green time from southbound to eastbound/westbound
	Columbus Avenue & West 62nd Street	Not required	Not required	Shift 4 seconds of green time from southbound to eastbound/westbound
2031	Tenth Avenue & West 57th Street	Not required	Not required	Shift 3 seconds of green time from northbound to eastbound/westbound
	Amsterdam Avenue & West 62nd Street	Not required	Not required	Shift 2 seconds of green time from northbound to westbound
	Ninth Avenue & West 57th Street	Not required	Daylight west curb lane on southbound approach for 100 feet to create exclusive right-turn lane; shift 1 second of green time from southbound to eastbound/westbound	Shift 1 second of green time from southbound to eastbound/westbound
	Columbus Avenue & West 60th Street	Not required	Shift 1 second of green time from southbound to eastbound/westbound	Shift 1 second of green time from southbound to eastbound/westbound
	Columbus Avenue & West 62nd Street	Not required	Not required	Shift 4 seconds of green time from southbound to eastbound/westbound

- *Best Available Tailpipe Emissions Reduction Technologies.* Nonroad diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract, such as concrete mixing and pumping trucks) would utilize the best available tailpipe technology for reducing DPM emissions. Diesel particle filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Fordham University's construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs, either original equipment manufacturer (OEM) or retrofit technology that would result in emission reductions of DPM of at least 90 percent (when compared with normal private construction practices). Ninety percent reduction has been verified by a study of actual reductions of

$PM_{2.5}$ emissions from comparable engines used at a New York City construction site. Controls may include active DPFs,[1] if necessary.

- *Utilization of Tier 2 or Newer Equipment.* In addition to the tailpipe controls commitments, Fordham's construction program would mandate the use of Tier 2[2] or later construction equipment for nonroad diesel engines greater than 50 hp. The use of "newer" engines, such as Tier 2, is expected to reduce the likelihood of DPF plugging due to soot loading (i.e., clogging of DPF filters by accumulating particulate matter); the more recent the "Tier," the cleaner the engine for all criteria pollutants, including PM. Additionally, while all engines undergo some deterioration over time, "newer" as well as better maintained engines will emit less PM than their older Tier or unregulated counterparts. Therefore, restricting site access to equipment with lower engine-out PM emission values would enhance this emissions reduction program and implementation of DPF systems as well as reduce maintenance frequency due to soot loading (i.e., less downtime for construction equipment to replace clogged DPF filters).
- In addition, to reduce the resulting concentration increments at residential and school locations, large emissions sources and activities, such as concrete trucks and pumps, would be located away from residential buildings and playgrounds, to the extent practicable. Fugitive dust control plans will be required as part of contract specifications. For example, stabilized truck exit areas would be established for washing off the wheels of all trucks that exit the large construction sites. Trucks entering and leaving the site with excavated or other materials would be covered. Truck routes within the sites would be either watered as needed or, in cases where such routes would remain in the same place for an extended duration, the routes would be stabilized, covered with gravel, or temporarily paved to avoid the resuspension of dust. In addition to regular cleaning by the City, area roads would be cleaned as frequently as needed. The fugitive emissions reduction program would reduce $PM_{2.5}$ emissions by 50 percent for stockpiles and handling of excavated materials.
- Additional measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These include the restriction of on-site vehicle idle time to three minutes for all vehicles that are not using the engine to operate a loading, unloading, or processing device (e.g., concrete mixing trucks).

Overall, these measures would be expected to reduce DPM emissions to a greater degree than the measures required by New York City Local Law 77 alone.

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[1] There are two types of DPFs currently in use: passive and active. Most DPFs currently in use are the "passive" type, which means that the heat from the exhaust is used to regenerate (burn off) the PM to eliminate the buildup of PM in the filter. Some engines do not maintain temperatures high enough for passive regeneration. In such cases, "active" DPFs can be used (i.e., DPFs that are heated either by an electrical connection from the engine, by plugging in during periods of inactivity, or by removal of the filter for external regeneration).

[2] The first federal regulations for new nonroad diesel engines were adopted in 1994, and signed by EPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 and Tier 3 standards for equipment manufactured in 2000 through 2008. The Tier 1 through 3 standards regulate the EPA criteria pollutants, including particulate matter (PM), hydrocarbons (HC), oxides of nitrogen (NO_x) and carbon monoxide (CO). Prior to 1998, emissions from nonroad diesel engines were unregulated. These engines are typically referred to as Tier 0.

CONSTRUCTION NOISE

A number of construction noise reduction measures were used in the noise analysis. These measures would be described in the noise mitigation plan required as part of the New York City Noise Control Code and include the following source and path controls:

In terms of source controls (i.e., reducing noise levels at the source or during most sensitive time periods), the following measures for construction would be implemented:

- Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code would be utilized from the start of construction activities, along with a wide range of equipment, including construction trucks, which produce lower noise levels than typical construction.
- Where feasible and practicable, construction procedures that reduce noise levels and quieter equipment (such as concrete trucks, delivery trucks, and trailers) than that required by the New York City Noise Control Code would be used.
- As early in the construction period as practicable, diesel or gas-powered equipment would be replaced with electric-powered equipment, such as welders, water pumps, bench saws, and table saws (i.e., early electrification).
- Where practicable and feasible, construction sites would be configured to minimize back-up alarm noise. In addition, no trucks would be allowed to idle longer than three minutes at the construction site based upon New York City Local Law.
- The number of pieces of construction equipment on-site would be limited to the extent feasible.
- Contractors and subcontractors would be required to properly maintain their equipment and have well-functioning mufflers installed.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures for construction, which go beyond typical construction techniques, would be implemented to the extent feasible:

- Noisy equipment, including cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations, such as residential buildings. For example, during the early construction phases of work, delivery and dump trucks, as well as many construction equipment operations, would be located and take place below grade to take advantage of shielding benefits. Once building foundations are completed, delivery trucks would operate behind noise barriers.
- Noise barriers would be utilized to provide shielding (e.g., the construction sites would have a minimum 8-foot barrier, with a 16-foot barrier adjacent to residential and other sensitive locations, and truck deliveries would take place behind these barriers once building foundations are completed).
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) would be used for certain dominant noise equipment, i.e., asphalt pavers, tower cranes, drill rigs, excavators with ram hoe, hoists, impact wrenches, jack hammers, power trowels, powder actuated devices, rivet busters, rock drills, concrete saws, and sledge hammers. The details to construct portable noise barriers, enclosures, tents, etc.

are based upon the instructions of New York City Department of Environmental Protection (DEP) Citywide Construction Noise Mitigation.[1]

- All trucking operations associated with construction activities for the construction on Site 2 would take place on Columbus Avenue rather than on West 60th Street, and all trucking operations associated with construction activities for the construction on Site 3 take place on Amsterdam Avenue rather than on West 60th Street.
- Acoustical curtains would be used and were assumed for internal construction activities on Sites 2, 3, and 3a, to break the line-of-sight and provide acoustical shielding between noise sources and sensitive receptors.

In spite of implementation of all of the measures discussed above, significant adverse noise impacts during construction are predicted to occur.

During Phase I, construction activities would be expected to result in significant noise impacts at the following locations:

- Receptor A1 (the north façade of The Alfred) at locations that have a direct line-of-sight to construction sites, from the 10th floor to the top residential floor during the years 2009 through 2010. The maximum predicted increase in noise levels at Receptor A1 was 12.8 dBA and would be expected to occur at the fifth floor in 2009;
- Receptor A2 (the east façade of The Alfred) at locations that have a direct line-of-sight to construction sites, from the third floor to the 30th floor during the years 2009 through 2010. The maximum predicted increase in noise levels at Receptor A2 was 16.7 dBA and would be expected to occur at the 15th floor in 2010;
- Receptor A3 (the north façade of The Alfred) at locations that have a direct line-of-sight to construction sites, from the third floor to the top residential floor during the years 2009 through 2010. The maximum predicted increase in noise levels at Receptor A3 was 14.0 dBA and would be expected to occur at the fifth floor in 2009; and
- Receptor A4 (the north façade of The Alfred) at locations that have a direct line-of-sight to the construction sites, from the third floor to the top residential floor during the years 2009 through 2010 and from the third floor through the 25th floor during the years 2009 through 2011. The maximum predicted increase in noise levels at Receptor A4 was 14.5 dBA and would be expected to occur at the 20th floor in 2010.

During Phase II, construction activities would not be expected to result in significant noise impacts at any sensitive receptor locations.

The only residential location where significant noise impacts are predicted to occur is at the Alfred, which has double-glazed windows and central air conditioning (i.e., alternative ventilation). Consequently, even during warm weather conditions, interior noise levels would be approximately 30-35 dBA less than exterior noise levels. The double-glazed windows and alternative ventilation at this residential structure would provide a significant amount of sound attenuation, and would result in interior noise levels during much of the time that are below 45 dBA L_{10} (the CEQR acceptable interior noise level criteria). However, at the terraces on all four façades of The Alfred, the highest $L_{10(1)}$ noise levels would range from approximately 76 to 82 dBA during some peak periods of

[1] *Citywide Construction Noise Mitigation*, Chapter 28, Department of Environmental Protection of New York City, 2007.

construction activity. Even though this residence has double-glazed windows and alternative ventilation (i.e., central air conditioning) which would reduce interior noise levels by approximately 30-35 dBA, during some limited daytime time periods construction activities would result in interior noise levels that would be above the 45 dBA L_{10} noise level recommended by CEQR for residences and result in significant adverse noise impacts.

In addition, while noise levels at the residential terraces at The Alfred currently exceed the CEQR acceptable range (55 dBA L_{10}) for an outdoor area requiring serenity and quiet (see the Construction Noise Appendix for existing noise levels at Receptors A, A1, A2, A3, and A4), during the weekday daytime time periods identified above when construction activities are predicted to significantly increase noise levels, construction activities would exacerbate these exceedances and result in significant adverse noise impacts at the terraces at The Alfred.

Consequently, the proposed action would have unmitigated significant noise impacts at the locations specified above for limited periods of time. ✷