APPENDIX I

AIR QUALITY

A. PROCEDURES AND ASSUMPTIONS FOR THE STATIONARY SOURCE ANALYSIS

INTRODUCTION

As described in Chapter 19, "Air Quality," a detailed stationary source analysis was conducted using the U.S. Environmental Protection Agency (EPA) AERMOD dispersion model. The analysis was conducted to assess potential air quality impacts due to the Proposed Actions from heating, ventilation, and air-conditioning (HVAC) systems within the Academic Mixed-Use Area on receptor locations, as well as potential cumulative impacts from the Proposed Actions and nearby HVAC emission sources. Presented below is a description of the procedures used in the modeling and the assumptions and data used. A more general description of the stationary source analyses performed and the results obtained are presented in this Final Environmental Impact Statement (FEIS).

MODELING APPROACH

As described in this FEIS, modeling was performed with the AERMOD model using five years of meteorology. For determining annual average impacts, the AERMOD model was run for each of the five years; however, for the short-term impacts, a combined five-year set of meteorology was used and the highest overall impacts were extracted. As per the *City Environmental Quality Review (CEQR) Technical Manual*, modeling was performed both with and without building downwash to determine impacts under worst-case conditions. Buildings that could potentially cause wake effects due to building downwash were surveyed using Geographic Information Systems (GIS) and Sanborn Maps, as well as information on proposed developments in the project study area. EPA's Building Profile Input Program (BPIP) program, which is described in the *User's Guide to the Building Profile Input Program* (EPA, Research Triangle Park, North Carolina), was used to determine the projected building dimensions for the AERMOD modeling with the building downwash algorithm enabled. For both the with and without downwash cases, the Proposed Actions' emission sources were modeled at 25 percent, 50 percent, 75 percent, and 100 percent operating capacity to simulate a full range of potential operations.

A comprehensive receptor network (i.e., off-site locations with continuous public access) was developed for the modeling analyses. The receptor network included regularly spaced ground-level receptors and numerous discrete receptors on nearby sensitive uses and tall buildings. Receptors were placed on nearby existing and proposed buildings that could potentially be affected by the Proposed Actions, as well as the project itself.

To examine impacts at ground level, the receptor network included a polar grid centered on Site 2, extending out to 5 kilometers (km), at 10 degree radials in all directions. The receptors were placed initially at 50 meters, and at 100-meter intervals out to 2 km and 500-meter intervals from 2 km to 5 km. Additional receptors were placed at sidewalk locations around the Academic

Mixed-Use Area in order to predict pollutant concentrations at locations where the contribution from project-generated traffic to air quality would be greatest, to predict potential cumulative impacts from mobile and stationary sources of air emissions. Ground level locations were modeled as flagpole receptors set at pedestrian height, consistent with guidance criteria in the *CEQR Technical Manual*. A total of 1,657 ground-level receptors were modeled.

Source and receptor elevations were determined using surveys conducted for the Proposed Actions and 7-Minute Digital elevation model (DEM) files. A terrain pre-processor program was used to process the DEMs and determine the representative elevations for each receptor.

Receptors were also placed at sensitive sites, such as residences, schools, and recreational facilities. These included the Manhattanville Houses and the Riverside Park Community apartment complex, I.S. 195, and locations in the Academic Mixed-Use Area that would be developed as University housing under the reasonable worst-case development scenario for the air quality analysis. Receptors were modeled at various elevations to represent operable windows, ventilation intakes, etc. A total of 42 off-site buildings were modeled out to a distance of up to 600 meters from the Academic Mixed-Use Area (with a total of 2,347 sensitive elevated receptors). In addition, a total of 372 receptors were placed at sensitive elevated locations on the Proposed Actions' buildings, with additional receptors placed on other projected development sites. Receptors were placed at various building elevations on all façades to ensure that potential worst-case project-on-project impacts would be identified.

Since the receptors used in the modeling included locations with emission sources (e.g., at proposed University housing sites), additional modeling and post-processing of the model output was necessary to exclude certain receptors when determining maximum pollutant concentrations on the Proposed Actions. This is because the AERMOD model assumes the stack plume travels directly toward the elevated receptor, which is unrealistic when the source and receptors are located on the same building because the stack plume would be greatly influenced by the project building's own roof structure. Therefore, to analyze pollutant concentrations at elevated receptors on project buildings, source groups were created consisting of all of the Proposed Actions' sources except within each source group, one building's source(s) was excluded. For example, to examine impacts from the Proposed Actions on Site 14, a source group was created which contained all of the Proposed Actions' stationary sources except the boiler source for Site 14. Next, the model output file created with each source group was reviewed. Receptors at the building for which the source was excluded were reviewed to determine the maximum overall concentration, and receptors at other locations were ignored. For example, the output file for the source group containing all sources except Site 14 examined the receptors at Site 14, and ignored all other receptors. This process was performed for each of the project buildings that are proposed to have an HVAC system. For buildings on the project site that would not have an HVAC system, but rather would be served by a central energy plant (e.g., Site 7), the maximum pollutant concentrations were determined by modeling all of the Proposed Actions' sources, as with off-site receptors.

The maximum predicted concentrations were obtained from the plot files and were added to the background concentrations to estimate the ambient air quality at potential elevated receptor locations near the project site. The results of this analysis are presented in Chapter 19.

B. EFFECTS OF TRAFFIC MITIGATION MEASURES ON AIR QUALITY

Chapter 19 showed the maximum predicted carbon monoxide (CO) and particulate matter (PM_{10} and $PM_{2.5}$) concentrations for the Proposed Actions, and concluded that the Proposed Actions would not result in any significant adverse air quality impacts. Therefore, no air quality mitigation is required. This section considers the effects on air quality of the Proposed Actions with implementation of the traffic mitigation measures discussed in Chapter 23, “Mitigation.”

The tables presented below illustrate the effect that proposed traffic mitigation measures, developed as part of the traffic analysis for the Proposed Actions (see Chapter 17, “Traffic and Parking”), would have on maximum predicted pollutant concentrations with the Proposed Actions. Tables I-1 and I-2 summarize the maximum CO build and build with mitigation concentrations for the 2015 and 2030 analysis years, respectively. Neither of the intersections analyzed for PM_{10} and $PM_{2.5}$ impacts are affected by the proposed mitigation measures.

The values shown are the highest predicted concentrations for the analyzed receptor locations. The results shows that with the proposed traffic mitigation measures, future concentrations of pollutants with the Proposed Actions would be below the National Ambient Air Quality Standards (NAAQS) and would not result in any significant adverse air quality impacts using the *de minimis* criteria for CO impacts.

Table I-1
Future (2015) Maximum Predicted 8-Hour Average Carbon Monoxide Build and Build with Mitigation Concentrations (parts per million)

Receptor Site	Location	Time Period	8-Hour Concentration (ppm) [1]	
			Build	Build with Mitigation
3	Broadway and West 125th Street	PM	3.9	3.9
4	Amsterdam Avenue and West 125th Street	PM	3.7	3.6
5	Second Avenue and East 125th Street	PM	4.8	4.8
7	Madison Avenue and East 125th Street	PM	3.6	2.5

Note: [1] 8-hour standard is 9 ppm.

Table I-2
Future (2030) Maximum Predicted 8-Hour Average Carbon Monoxide Build and Build with Mitigation Concentrations (parts per million)

Receptor Site	Location	Time Period	8-Hour Concentration (ppm) [1]	
			Build	Build with Mitigation
3	Broadway and West 125th Street	PM	4.0	4.0
4	Amsterdam Avenue and West 125th Street	PM	3.6	3.6
5	Second Avenue and East 125th Street	PM	5.1	5.1
7	Madison Avenue and East 125th Street	PM	3.4	3.4

Note: [1] 8-hour standard is 9 ppm.

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