Appendix G
Air Quality

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Memorandum

To: Olga Abinader, Mauricio Garcia (DCP)

From: Hillel Hammer

Subject: Rockefeller University: Effect of Changes in Acoustic Barrier Height on Air Quality

Date: January 31, 2014; Revised February 12, 2014; March 11, 2014; March 12, 2014.

cc: Robert Dobruskin (DCP)

The proposed design for the Rockefeller University New River Building and Fitness Center Project, described and analyzed in the DEIS, includes an approximately 930-foot long, 5-foot-tall sound barrier which would be constructed along the eastern edge of the FDR Drive (between the FDR Drive and the East River Esplanade) that would extend the entire length of the platform structure. Community Board 8 requested that the height of the barrier be increased to 8 feet so that additional noise reductions would be achieved for users of the Esplanade. This memorandum summarizes the air quality implications of a taller sound barrier.

The design of the deck over the FDR Drive provides a vertical opening towards the Esplanade between the bottom of the Deck, at an elevation of 18' above local grade, and the top of the acoustical barrier. The change described above would reduce that vertical opening from 13' to 10'.

The primary air quality consideration in analyzing the effect of the project on air quality due to the construction of the deck, as analyzed in the air quality chapter, is the effect of the deck on dispersion of air pollutant from the FDR and the resulting pollutant concentrations on the Esplanade. The air quality analysis conservatively did not include the effect of the 5' barrier; this is conservative because studies have shown that barriers along roadways serve to increase turbulence and force the plume upward, resulting in lower pollutant concentrations downwind of the barrier.[1,2,3,4] Increasing the height of the barrier from 5' to 8' would force the plume upward,

[1] FHWA/Caltrans. 1984. Carbon Monoxide Concentrations Adjacent to Sound Barriers. FHWA/CA/TL-84/04.

[2] Gallagher, J., Gill, L.W., McNabola, A. 2011. Optimizing the use of on-street car parking system as a passive control of air pollution exposure in street canyons by large eddy simulation. Atmospheric Environment, doi:10.1016/j.atmosenv.2010.12.059.

[3] Gallagher, J., Gill, L.W., McNabola, A. 2013. *The passive control of air pollution exposure in Dublin, Ireland: A combined measurement and modelling case study.* Science of the Total Environment, doi:10.1016/j.scitotenv.2013.03.079.

[4] Finn et al. 2010. Tracer studies to characterize the effects of roadside noise barriers on near-road pollutant dispersion under varying atmospheric stability conditions. Atmospheric Environment, doi:10.1016/j.atmosenv.2009.10.012.

further above the breathing zone of nearby pedestrians, and reduce the average concentrations on the esplanade. Note that the plume over the esplanade would not have a defined high concentration at the top of the barrier because the mixing zone over the roadway, caused by the movement of vehicles, results in initial mixing under the deck (EPA models often estimate the height of the mixing zone at 10 meter) so the initial plume would be well mixed. Therefore, the only effect of the change in barrier height would be to increase turbulence and mixing prior to the advection of pollutants from the FDR towards the Esplanade.

The analysis was prepared using EPA's Cal3qhc mobile-source dispersion model, with some adjustments to account for the covered roadway (see the EIS air quality chapter for details). Since the impact of the 'reflected plume' (*i.e.*, the fact that air cannot flow out of the west side of the covered roadway area, and is therefore assumed to be reflected out towards the esplanade) is much higher than the effect of the reduced vertical dispersion due to the deck 'roof', the center of the deck area would represent the area with the highest projected impact. While there may be some increase in the amount of pollutant pushed towards the ends of the deck area by piston effect due to the acoustic barrier, the effect of the deck 'roof' and 'reflected' concentrations would be much smaller in those areas than in the center of the deck because they only occur in the area of the deck and not the adjacent area of the open road. In addition, the piston effect on this roadway would be substantially reduced due to the two-way traffic (pushing air in both directions) and the open eastern side, allowing for less restrictive air movement than that found in enclosed tunnels even with the noise barrier. Overall, maximum concentration increments in the areas at the end of the Deck would be lower than the maximums reported in the central area. Furthermore, the modeling conservatively assumes that the acoustic wall does not reduce concentrations at all in the central area, and is therefore conservative.

Therefore, the change in barrier height would not affect the analysis presented in the air quality chapter, which already represents the reasonable worst-case air quality scenario, and no further analysis is necessary. ✷