Appendix F: Construction Air Quality

To:	NYCDCP
From:	WSP/CSA
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Project:	Atlantic Avenue Mixed-Use Plan
Reference:	Construction-Related Air Quality Analysis Methodology and Assumptions

The purpose of this memorandum is to describe the construction related air quality analysis approach for the Atlantic Avenue Mixed-Use Plan (AAMUP) Environmental Impact Statement (EIS). A total of 70 development sites (54 projected and 16 potential) have been identified in the plan's project area. Under the reasonable worst case development scenario (RWCDS) for the Proposed Actions, by the analysis year 2034, the total development expected to occur on the 54 projected development sites under the With Action condition would consist of residential, commercial, industrial, and community facility uses, as well as parking. This following presents a summary of the methodology and assumptions to be used for the construction air quality analysis of the Proposed Actions.

Construction Air Quality

It is anticipated that construction activities for the new developments made possible by the proposed rezoning would last for more than two years. Therefore, a quantitative assessment of construction-related air quality will be conducted. Emissions of air quality pollutants from construction would result from on-site construction machinery and activity as well as the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the surrounding roadways. The analysis will be based on the reasonable worst-case for the conceptual schedule of construction activities and phases which will be provided by the New York City Department of City Planning (DCP). The general methodology for modeling analysis (regarding model selection, receptor placement, and meteorological data) presented in the "Atlantic Avenue Mixed-Use Plan – Air Quality Analysis Methodology and Assumptions" memo will be followed for modeling dispersion of pollutants from on-site and vehicular sources during the construction period. Additional details relevant only to the construction air quality analysis methodology are presented in the following section.

Detailed Analysis Procedures and Assumptions

The air quality construction analyses for the AAMUP will be conducted in a manner that is generally consistent with the air quality construction analyses conducted for the other city planning rezoning projects such as the *East New York* and *Jerome Avenue Rezoning FEIS's*. Below is a list of the relevant procedures and assumptions that will be applicable to the analysis:

Pollutants of concern

Pollutants of concern with respect to construction emissions include nitrogen oxides (NOx), particulate matter (PM) and CO. Most heavy equipment used in construction is powered by diesel engines that have

the potential to produce relatively high levels of nitrogen oxides (NOx) and particulate matter (PM). Fugitive dust generated by construction activities is also a source of PM. Gasoline engines produce high levels of carbon monoxide (CO). Since ultra-low-sulfur diesel (ULSD) fuel would be used for all diesel engines used in the construction under the Proposed Actions, sulfur oxides (SOx) emitted from those construction activities is assumed to be negligible.

Construction Periods for Study

The pollutant $PM_{2.5}$ will be utilized for determining the worst-case periods, because the ratio of predicted $PM_{2.5}$ incremental concentrations to impact criteria due to construction activities is higher than for other pollutants. Generally, emission patterns of PM_{10} and NO_2 would follow $PM_{2.5}$ emissions, since their emission rates are related to the sizes of diesel engines. CO emissions may have a somewhat different pattern but generally would also be highest during periods when the most construction activity would occur. Emission profiles of PM2.5 daily emission and annual emission will be generated for development sites that are relatively big in scale, in proximity, and have overlapping construction activities. The worst-case short-term periods and annual periods would be identified as when the highest $PM_{2.5}$ daily emission and annual emission occur as the result of one development site or multiple development sites in proximity under construction simultaneously. In addition to emission intensity, the distance to nearby sensitive receptors will also be considered to guarantee that the highest potential air quality impact is captured and evaluated. Table 1 shows the pollutants to be analyzed in the construction air quality analysis and the corresponding averaging periods.

Table 1: Pollutant for Analysis and Averaging Periods

Pollutant	Averaging Period
$PM_{2.5}$	24-hour
	Annual Local
PM_{10}	24-hour
NO_2	Annual
CO	1-hour

Selection of Sites for Study

The identified worst-case short-term and annual periods for construction will be used for dispersion modeling of annual and short-term (i.e., 24-hour and eight-hour) averaging periods, including annual and 24-hour $PM_{2.5}$, 24-hour PM_{10} , and eight-hour CO, and annual NO_2 average periods. All work is contingent upon the receipt of the preliminary construction schedule. The consultant team will work closely with DCP during this process.

The construction-related air quality assessment will be conducted for two peak short-term periods and two peak annual periods. No more than two worst-case individual or clustered (group of projected

development sites in close proximity to one another with a similar construction time periods) locations will be analyzed for each of the peak periods identified.

Dispersion Modeling

Dispersion modeling for construction emissions at selected locations will be conducted utilizing the USEPA AERMOD model. In general, parameters governing the use of the model will be similar to those described in the "Atlantic Avenue Mixed-Use Plan – Air Quality Analysis Methodology and Assumptions" memo which has already been submitted to DCP. Specific assumptions tailored for the construction-related dispersion modeling of the relevant air pollutants are listed below:

- Emission rates of each pollutant from relevant sources will be estimated for each type of construction activity. Short-term emission estimates were based on peak period activity levels at each site. These emission estimates will be used to estimate short-term (i.e., 8-hours, 24-hours) pollutant concentrations (for comparison to short-term NAAQS). Annual average activity levels would be used to estimate annual concentrations (for comparison to annual NAAQS). Engine emissions profiles would be prepared by multiplying the emission rates for each piece of equipment by the number of engines, the work hours per day, and fraction of the day each engine would be expected to work during each month of construction.
- The sizes, types, and number of units of construction equipment will be estimated based on the conceptual construction activity schedule developed for the Projected Development Sites. Emission factors for NOx, CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines and from truck engines will be developed using the EPA Motor Vehicle Emission Simulator (MOVES3) emission model. The emission factor calculations will take into account any emissions reduction measures that is required for the projected development sites.
- For the short-term model scenarios (predicting concentration averages for periods of 24 hours or less), all stationary sources, such as cranes, concrete pumps, or generators, which would idle in a single known location while unloading, will be simulated as point sources. However, if their specific location would not be known, they were modeled as area sources. Other engines, which would move around the site on any given day, will be simulated as area sources. For periods of eight hours or less (less than the length of a shift), it was assumed that all engines would be active simultaneously. For the annual emissions analysis, all sources would move around the site throughout the year and will therefore modeled as area sources;
- Sensitive receptors identified for analysis will include locations where the maximum concentration is likely to occur and where the general public is likely to have access. As a result, receptors will be distributed along sidewalks spaced 25 feet apart with a height of 1.8 meters (6 feet) and at elevated building façade locations representative of intake vents, operable windows and or balconies;
- The most recent five-year period available of representative hourly meteorological data from La Guardia Airport (LGA) will be used in the analysis along with upper air data from Brookhaven, NY;
- Fugitive dust emission factors for demolition, excavation, truck loading, and re-entrained dust will be based on the equations and factors recommended in EPA's AP-42 Report "Compilation of Air

Pollutant Emission Factors" Sections 13.2.3.1/2/3, and it will be assumed that the planned control of fugitive emissions, discussed later in this memo, would reduce PM emissions from such operations by 50 percent.

- Small equipment that are typically used on NYC construction projects will use electric engines that operate on grid power instead of diesel power engines. It is assumed that electrically powered equipment will not produce any localized on-site emissions. Emissions are only produced as a result of the existing Con Ed grid system. The portion of which is related to this project would be too small to quantify.
- During construction, the proposed action may result in off-site mobile source emissions resulting from increases in traffic and/or the redistribution of traffic. However, peak hour traffic increments during construction would generally be lower than the operational traffic increments for the full build-out of the proposed project. As a result, impacts related to mobile sources would not be significant and a standalone mobile-source analysis is not required. Nevertheless, on-road emissions adjacent to the construction sites will be included with the on-site dispersion analysis in order to address all local project-related emissions cumulatively.
- Applicable background concentrations from the New York State Department of Environmental Conservation (NYSDEC) will be added to the modeling results to obtain the total pollutant concentrations at each receptor site.
- If necessary, site cluster selection for dispersion modeling will be based on the construction schedule and the proximity of the sites relative to the nearest sensitive receptors.

Emission Reductions Assumptions

In accordance with all applicable laws, regulations, and building codes, several emissions reduction measures would be applied to reduce pollutant emissions during construction. These include the following dust suppression measures and the idling restriction for on-road vehicles:

- **Dust Control.** All necessary measures will be implemented to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions is followed. For example, truck routes within the site would be watered as needed to avoid the re-suspension of dust. All trucks hauling loose material will be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the construction site. Water sprays will be used to ensure that materials are dampened as necessary to avoid the suspension of dust into the air.
- **Idling Restriction.** In addition to adhering to the local law restricting unnecessary idling on roadways, onsite vehicle idle time will also be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine. Additional emissions reduction measures are available to minimize air pollutant emissions during construction in addition to the required laws and regulations, for projected development sites with construction durations of more than two years, an emissions reduction program for all construction activities would be implemented

to the extent practicable, consisting of the following components (commitments relating to the items set forth below will be included as part of construction contract specifications):

- **Utilization of Newer Equipment.** The United States Environmental Protection Agency (EPA)'s Tier 1 through 4 standards for nonroad engines regulate the emission of criteria pollutants from new engines, including PM, CO, NOx, and hydrocarbons (HC). All non-road construction equipment with a power rating of 50 horsepower (hp) or greater would meet at least the Tier 3 emissions standards. Tier 3 NOx emissions range from 40 to 60 percent lower than Tier 1 emissions and considerably lower than uncontrolled engines. Given the timeframe of the construction of the Proposed Actions, equipment meeting the more restrictive Tier 4 (model year 2008 or newer) would be common and in wide use and is expected to be a significant part of the contractor's fleet.

Impact Criteria

The 2021 CEQR Technical Manual states that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected. In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS would be deemed to have a potential significant adverse impact. In addition, to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted.