APPENDIX D:
CONSTRUCTION AIR QUALITY ANALYSIS METHODOLOGY MEMORANDUM

To:	Glen Price, NYCDCP
From:	WSP
Date:	July 25, 2024
Project:	Midtown South Mixed-Use Study (MSMX)
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 Midtown South Mixed-Use Study (MSMX) Environmental Impact Statement (EIS). A total of **68 development sites** (61 projected and 7 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 61 projected development sites under the With-Action condition would consist of residential, commercial (office and local retail), and community facility uses. This memorandum 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 development facilitated by the Proposed Actions would occur at different times (i.e. construction at all sites would not occur simultaneously) over period of more than two years, possibly over a 10-year period. According to the *CEQR Technical Manual* (Chapter 22, Construction), the need for and type of (i.e. qualitative or quantitative) construction air quality analysis considers several factors such as location of construction in relation to existing residential or sensitive receptors, intensity of construction activity and project commitments to use best available technology (BAT) to control emissions. As detailed information for these factors is available, 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 "Midtown South Mixed-Use Study (MSMX) – Air Quality Analysis Methodology and Assumptions" memorandum 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 MSMX EIS 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 *Atlantic Avenue Mixed-Use Plan (AAMUP) FEIS*. 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, per federal rule (2021 *CEQR Technical Manual*), for all diesel engines used in the construction under the Proposed Action, sulfur oxides (SOx) emitted from those construction activities is assumed to be negligible.

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.

Sites for Study

Per direction received from DCP in June/July of 2024, the detailed construction analysis will be performed as follows:

- The analysis will model **projected development sites #46, #49, #51, and #52.** The construction schedule and equipment received in July 2024 from DCP will be used for this analysis.

- The construction **worker and truck trips will be generated based on site total floor areas.** Trip assignments, especially truck trips, will be placed on one route for simplification, and a conservative estimate of vehicle travel speed will be used.

Modeling will include annual and 24-hour $PM_{2.5}$, 24-hour PM_{10} , and eight-hour & one-hour CO, and annual NO_2 average periods (Table 1). Emission estimating and modeling analysis will be based upon the construction equipment and schedule supplied by DCP in July 2024.

Daily and annual emission profiles of $PM_{2.5}$ will be generated for the analyzed development.

Daily and annual emission profiles of $PM_{2.5}$ will be generated for the four development sites selected for detailed analysis. For each analyzed development site, 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, exhaust emission patterns of CO, PM_{10} and NO_2 would follow $PM_{2.5}$ emissions, since their emission rates are related to the sizes of diesel engines. Fugitive dust produced during construction is an exception to this pattern, as it generally contributes to the $PM_{2.5}$ and PM_{10} emission rates for construction involving significant demolition and/or excavation and soil handling.

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 & 8-hour

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 "Midtown South Mixed-Use Study (MSMX) – Air Quality Analysis Methodology and Assumptions" memorandum. 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 will be based on peak period activity levels at each site. These emission estimates will be used to estimate short-term 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 annual emissions profiles would be prepared by multiplying the emission rates for each piece of equipment by the number of engines, and usage factor i.e., 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 based on the data supplied by DCP in July 2024. Emission factors for NOx, CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines and from construction vehicle engines will be developed using the EPA Motor Vehicle Emission Simulator (MOVES) emission model. The emission factor calculations will take into account any emissions reduction measures 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 will be 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 is 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 be 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 is typically used on NYC construction projects will use electric motors that operate on grid power instead of diesel powered engines. It is assumed that electrically powered equipment will not produce any localized on-site emissions. Emissions associated with the electricity used are produced at distant electric generation facilities away from the development area; as such, these will not be included in the analysis.
- The construction resulted worker and truck trips will be generated and estimated based on site total floor areas and placed on one route for simplification and conservatism, per direction from DCP in June/July 2024. On-road emissions by worker auto trips and truck trips 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.

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 a development 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 a construction duration of more than two years, an emissions reduction program for all construction activities would be implemented to the extent practicable.

- **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.