ROUX

Air Quality Impact Statement (AQIS) Report

Proposed Development
1021 – 1325 West 119th Street, Chicago, Illinois 60643

Submitted: June 27, 2023

Prepared for:

West Pullman Development Partners, LLC (DL3)
77 West Washington Street, Suite 405
Chicago, Illinois 60602

Prepared by:

Roux Associates, Inc.
233 S. Wacker Drive, Suite 4400
Chicago, Illinois 60606

4182.0001000.100.RC

Environmental Consulting
& Management
+1.800.322.ROUX
rouxinc.com

Signature Page

Air Quality Impact Statement (AQIS) Report
Proposed Development
1021 – 1325 West 119th Street
Chicago, Illinois 60643

Mir SeyedAbbasi, Ph.D., P.E.	June 23, 2023	
Technical Director	Date	Signature
Michael J. Hillebrenner, P.E.	June 23, 2023	
Principal Engineer	Date	Signature

ROUX ASSOCIATES, INC.
1200 Harger Road, Suite 800
Oak Brook, Illinois 60523

Table of Contents

Table of Contents *(Continued)*

Tables

Figures

Table of Contents *(Continued)*

Appendices

Acronym List

Acronym	Definition
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AERMAP	AERMOD Terrain Preprocessor
AERMET	AERMOD Meteorological Data Preprocessor
AGL	Above Ground Level
AMS	American Meteorological Society
AMSL	Above Mean Sea Level
AP-42	USEPA Compilation of Air Pollutant Emission Factors
AQIS	Air Quality Impact Statement
Btu	British thermal unit
°C	degrees Celsius
CDPH	Chicago Department of Public Health
cfm	cubic feet per minute
EF	Emission Factor
g	Gram
GUI	Graphical User Interface
hp	horsepower
IEPA	Illinois Environmental Protection Agency
kv	kilovolt
kW	kilowatt
LOS	Levels of Service
MBH	Million Btu-per-hour
M	Molecular weight of the gaseous pollutant
MET	Meteorological
MOVES	Motor Vehicle Emissions Simulator

Table of Contents (Continued)

Acronym	Definition
mph	mile per hour
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NEPA	National Environmental Policy Act
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (NO and NO_2)
NWS	National Weather Station
PCB	polychlorinated biphenyl
ph	phase
PM	Particulate Matter
$PM_{2.5}$	Particulate matter with aerodynamic diameter less than 2.5 microns
PM_{10}	Particulate matter with aerodynamic diameter less than 10 microns
ppb	Parts per billion
Roux	Roux Associates, Inc.
Site	Proposed Development Site, 1021 – 1325 West 119th Street, Chicago, Illinois 60643
TSCA	Toxic Substances Control Act
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	underground storage tank
VMT	Vehicle Miles Travelled
$\mu g/m^3$	micrograms per cubic meter

Executive Summary

On behalf of West Pullman Development Partners, LLC (DL3), Roux Associates, Inc. (Roux) has prepared this Air Quality Impact Statement (AQIS) report for the proposed Building development of the property located at 1021 – 1325 West 119th Street in Chicago, Illinois (Site). The purpose of this AQIS report is to present the results of an air quality impact analysis designed to evaluate the potential impact of the site remediation, construction, and operation on the ambient air quality. This air quality analysis was performed in accordance with the requirements of the Chicago Department of Public Health's Air Quality Impact Evaluation Interim Guidance publication dated September 2021 (CDPH, 2021).

The intent of the ambient air impact analysis is to evaluate whether the activities during remediation and construction phases as well as the operation of the proposed building development project at the Site will be protective of the National Ambient Air Quality Standards (NAAQS). NAAQS are maximum concentrations of criteria pollutants in the ambient air that are required by the Clean Air Act to be established by the United States Environmental Protection Agency (USEPA) under the Clean Air Act at levels that are protective of public health. Therefore, the air quality impact analysis has been broken down into three phases, as described below:

- Remediation Phase: The dispersion modeling was conducted for NAAQS compliance associated with remediation activities, including emissions from non-road and on-road engine emissions.
- Construction Phase: The dispersion modeling was conducted for NAAQS compliance depicting site clearing, grading and other earth disturbing activities and demolition of structures.
- Operation Phase: The dispersion modeling was conducted for NAAQS compliance during site operation including emissions from on-site stationary and mobile sources as well as off-site mobile sources.

For purposes of this air quality analysis, it was assumed that the proposed stationary equipment consists of sources related to typical building support functions such as steam or heat generation, fire suppression systems, or emergency power generation. Currently, six natural gas-fired space heaters with total heating value of approximately 9,600,000 Btu-per-hour, one potential 100-kW diesel emergency backup power generator, and one potential 50-hp diesel-fired fire pump as fire suppression support are assumed to be used at the Site during operation. It was conservatively assumed that the space heater operates 24 hours per day for 365 days a year, the emergency backup power system and the fire pump operate 500 hours per year. It was assumed that all potential on-Site forklifts during operation phase post 2029 will be electric-based and therefore were excluded from the on-Site emission calculations.

Remediation activities at the Site are assumed to occur prior to construction and operation phases. During the remediation phase, heavy remediation and construction equipment are expected to be used on-Site with on-Site and off-site truck travels to move soil and debris as well as fugitive dust on unpaved surfaces. The potential remediation scenario for the purpose of air quality impact analysis is assumed to be: Phase II ESA Direct Push Combo Drill Rig , removal and disposal of polychlorinated biphenyl (PCB) impacted concrete as Toxic Substances Control Act (TSCA) waste, removal and disposal of clean concrete, removal of PCB-impacted soil , removal of underground storage tanks (USTs), filling sewers with flowable fill, excavation of soils with free products, backfilling (free product soils, PCBs soils, USTs), and capping the Site with new parking lots and new buildings.

Construction activities at the Site are assumed to occur after the remediation phase and prior to the operation phase. Heavy construction is a source of dust emissions that may have substantial temporary impact on local air quality. Building and road construction are two examples of construction activities with high emission potentials. Emissions during the construction phase will be associated with land clearing, drilling and blasting, ground excavation, cut and fill operations (i.e., earth moving), and construction of a new building. The mobile source emissions during the construction phase will be similar to the remediation phase.

The on-Site and off-Site portion of the study estimates mobile-source emissions of nitrogen dioxide (NO_2), particulate matter less than 10 micrometers aerodynamic diameter (PM_{10}), and particulate matter less than 2.5-micron aerodynamic diameter ($PM_{2.5}$) associated with the proposed building development and vehicles at intersections. These estimates were identified in a completed Traffic Impact Study, prepared by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) on April 21, 2023 (KLOA, 2023). Mobile-source emissions estimates were based on EPA's Motor Vehicle Emission Simulator (MOVES) emission modeling system.

Dispersion modeling was conducted using BREEZE AERMOD model Version 10.0 that includes the latest version of the U.S. EPA-approved AERMOD dispersion modeling system (AERMOD Version 21112). American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) is a gaussian mathematical dispersion model that can predict ambient concentrations of pollutants that result from releases to the atmosphere. AERMOD uses hour-by-hour meteorological data to predict the patterns of ambient concentrations of pollutants over time.

To evaluate the potential impacts of emissions from the proposed Site development on the public, the dispersion modeling evaluation must consider the existing background concentrations of pollutants in the area where impacts are being evaluated. The background concentration of a given pollutant is added to the modeled impact from the proposed Site development, and the result is compared to the NAAQS. The NAAQS are allowable concentration limits applied at the public access boundary.

During the remediation phase, the model predicts that the highest 1-hour average NO_2 concentration reaches as high as 94.2 ppb with the seasonal hourly background concentration (below the NAAQS of 100 ppb). The highest annual average NO_2 concentration is of the order of 15.5 ppb (below the allowable NAAQS of 53 ppb). The highest 24-hour average PM_{10} concentration of 137.8 µg/m^3 is also below the NAAQS of 150 µg/m^3. The highest 24-hour average $PM_{2.5}$ concentration reaches as high as 27.4 µg/m^3 (below the NAAQS of 35 µg/m^3). The highest annual average $PM_{2.5}$ concentration is of the order of 10.6 µg/m^3 (below the allowable NAAQS of 12 µg/m^3).

During the construction phase, the model predicts that the highest 1-hour average NO_2 concentration reaches as high as 94.2 ppb with the seasonal hourly background concentration (below the NAAQS of 100 ppb). The highest annual average NO_2 concentration is of the order of 15.5 ppb (below the allowable NAAQS of 53 ppb). It should be noted that NO_2 emissions for remediation-phase and construction-phase activities were the same since on-Site and off-Site diesel-running trucks and on-Site non-road diesel-running equipment were the same for both phases. The highest 24-hour average PM_{10} concentration of 125.4 µg/m^3 is also below the NAAQS of 150 µg/m^3. The highest 24-hour average $PM_{2.5}$ concentration reaches as high as 26.1 µg/m^3 (below the NAAQS of 35 µg/m^3). The highest annual average $PM_{2.5}$ concentration is of the order of 10.4 µg/m^3 (below the allowable NAAQS of 12 µg/m^3).

During the operation phase, the model predicts that the highest 1-hour average NO_2 concentration reaches as high as 74.9 ppb with the seasonal hourly background concentration (below the NAAQS of 100 ppb). The highest annual average NO_2 concentration is of the order of 17.8 ppb (below the allowable NAAQS of 53 ppb). The highest 24-hour average PM_{10} concentration of 109.6 μg/m^3 is also below the NAAQS of 150 μg/m^3. The highest 24-hour average $PM_{2.5}$ concentration reaches as high as 27.0 μg/m^3 (below the NAAQS of 35 μg/m^3). The highest annual average $PM_{2.5}$ concentration is of the order of 11.1 μg/m^3 (below the allowable NAAQS of 12 μg/m^3).

The model predictions Indicate that the potential impacts from on-Site and off-Site sources related to the activities during remediation, construction, and operation phases will not lead to localized exceedances of the NAAQS for NO_2, PM_{10}, and $PM_{2.5}$. However, it should be noted that the temporary nature of construction and remediation activities differentiate them from other fugitive dust sources as well as constant emissions during Site operation. The remediation and construction activities for the Site are not fully designed yet. For both remediation- and construction-phase activities, it is possible that a sudden increase in number of trucks or Site activity may result in a bump in short-term concentrations (i.e., 1-hour average NO_2 concentration or 24-hour average $PM_{2.5}$ or PM_{10}). Should any changes to the modeled conditions presented here occur at the Site during the remediation and construction phases, it is suggested that appropriate control measures be implemented, such as wet suppression and wind speed reduction, to further reduce the PM emissions.

The estimates may reflect conservative assumptions regarding vehicle utilization and facility-related activities. Predicted concentrations generally decrease rapidly with distance from the Site boundary, characteristic of the dispersion of emissions from a ground-level (area) source. In addition, the AP42-based value for the space heaters assumes that the heater units operate 24 hours per day for 365 days a year, the emergency backup power systems operate 500 hours per year, and the fire pump system operates 500 hours per year. These may greatly overestimate actual emissions. It is unlikely that the heater will run all the time throughout the entire day or during certain seasons (e.g., summer).

Predicted concentrations during Site operation for each criteria pollutant were compared with Significant Impact Levels (SILs). Although the predicted concentrations exceeded the recommended SILs, the areas with significant impacts are limited to the Site and its immediate vicinity. The model results show that the predicted concentrations decrease rapidly with distance from the Site boundary. Furthermore, it does not appear that there is any other emission source with significant impacts in the vicinity of the Site in areas that Site-related impacts show potential exceedances of SILs. Therefore, it is recommended that these impacts, mainly for particulate matter, be mitigated with Site controls such as limiting the working hours in dry-season (e.g., reducing 12-hour workdays to 10- or 8-hour workdays) or by using wet suppression when heavy earth-moving equipment are in operation.

1. Introduction

On behalf of West Pullman Development Partners, LLC (DL3), Roux Associates, Inc. (Roux) has prepared this Air Quality Impact Statement (AQIS) report for the proposed building development site (Site) located at 1021 – 1325 West 119th Street in Chicago, Cook County, Illinois (**Figure 1**). The Site is located south of West 119th Street and west of South Morgan Street in Chicago, Illinois. The purpose of this AQIS report is to present the results of an air quality impact analysis designed to evaluate the potential impact of the Site remediation, construction, and operation phases on the ambient air quality.

The intent of the ambient air impact analysis is to evaluate whether the proposed building development project at the Site is protective of the National Ambient Air Quality Standards (NAAQS). NAAQS are concentrations of specific pollutants in the ambient air that are established by the USEPA under the Clean Air Act at levels that are protective of public health. When the measured concentrations of these specific pollutants in the ambient air are below the NAAQS, it is presumed that public health is protected. Large sources of air emissions that are required to undergo certain types of permitting under the Clean Air Act must conduct an ambient air impact analysis prior to implementation. For these types of sources, the analysis must demonstrate that the NAAQS will not be exceeded as a result of the additional source(s). Although the proposed development project is not subject to Clean Air Act permitting requirements, the same tools may be used to evaluate its impacts on the ambient air. The City of Chicago has requested that an air quality impact statement be submitted to demonstrate the protection of the NAAQS.

For an emission source that has not been constructed, pollutant concentrations in ambient air are predicted through the use of air dispersion models. In these circumstances, air dispersion modeling is performed to attempt to predict the impacts of the proposed source on the ambient air in the area surrounding the facility. Air dispersion models predict the concentrations of pollutants in the ambient air surrounding the Site, based on the Site's maximum emissions, for each hour of the day and year using historical local meteorological data. The pollutant concentrations predicted by the air dispersion modeling are then added to existing background concentrations (using values that have been measured over a year or more) of each pollutant. The summed results are then compared to the NAAQS. Air dispersion models are designed and rigorously tested to take into account realistic scenarios and yield conservative results when predicting ambient air quality impacts.

Air dispersion models are built using mathematical equations and algorithms that represent known atmospheric processes and incorporate empirical data. Modeling of ambient air quality impacts from the proposed development project was conducted using the latest version of the regulatory dispersion model developed by the American Meteorological Society (AMS) and the EPA, the AMS/EPA Regulatory Model, known as AERMOD. The modeling analysis used a continuous five-year record of meteorological data comprised of nearest station's temperature and wind data.

The main pollutants of concern are nitrogen dioxide (NO_2), particulate matter less than 10 micrometers aerodynamic diameter (PM_{10}), and particulate matter less than 2.5-micron aerodynamic diameter ($PM_{2.5}$) from project-generated traffic and from building sources. The NO_X emissions include NO emissions that are converted to NO_2 in the atmosphere, as well as directly emitted NO_2.

This AQIS report is organized into five sections: **Section 1.0** is an introduction to the report; **Section 2.0** provides a Site description and project background; **Section 3.0** presents an overview of air quality analysis methodology; **Section 4.0** summarizes the results of the air quality analysis; and **Section 5.0** includes a list of references used to prepare this report. A list of acronyms and abbreviations is provided following the Table of Contents.

The current site plan and the proposed building expansion are shown in **Appendix A**. Site activity emission calculations are summarized in **Appendix B**. Mobile source link emission calculations are shown in **Appendix C**. Chicago Department of Public Health (CDPH) provided Seasonal Hourly NO_2 Background Concentrations Table are presented in **Appendix D**. AERMOD Model Electronic Run Files are included in **Appendix E**.

2. Site Background and Project Overview

2.1 Proposed Development Description

The Site, which is currently vacant, is located on the south side of West 119th Street just west of South Morgan Street. As proposed, the development is to contain a single, approximately 453,600 square-foot warehouse/distribution building with loading docks and parking lots for employees, customers, and truck trailers on an approximate 22-acre parcel of land. As proposed, the development will provide 410 parking spaces for employees on the east, west, and north sides of the building, 48 truck loading bays on the south side of the building and 118 trailer storage spaces on the south side of the Site. Access to the Site will be provided via five access drives, three on West 119th Street, one on South Morgan Street, and one on the alley/roadway west of the Site.

The western access drive (west) and eastern access drive (east) will each be located on the south side of the respective street approximately 90 feet north of West 120th Street. The first northern access drive (northwest) will be located on the west side of West 119th Street approximately 50 feet from the ally/roadway west of the Site. The second northern access drive (north) will be located directly north of the Site approximately 750 feet east of northwest access drive. The third northern access drive (northeast) will be located on the east side of West 119th Street approximately 60 feet west of South Morgan Street. The access drives are proposed to provide one inbound lane and one outbound lane with the outbound lane under stop sign control.

For the purposes of this study, a theoretical warehouse/distribution configuration was assumed in order to estimate the mobile source emissions based on the potential future traffic volumes. In this case, the assumed use is a mid-stream distribution center. At facilities of this type, bulk/unsorted cargo arrives at the Site via tractor-trailer trucks, employees may or may not sort the cargo, and the cargo would leave the facility via tractor-trailer trucks. The final end user may install a different warehouse configuration. However, this use represents the configuration that is likely to produce the highest overall trip generation and result in the most conservative air quality analysis. All remediation and construction activities at the Site are anticipated to occur in 2024. The development is anticipated to open in 2024. To be consistent with the Traffic Impact Study, the air quality evaluations are completed for Year 2029.

2.2 Purpose of Air Quality Modeling and Submittal of Report

Both on-Site and off-Site activities of the proposed development at the Site will increase emissions in the area surrounding the Site. Therefore, air quality modeling was performed to identify, to the extent feasible, the impact those emissions would have on ambient air quality. The City of Chicago (City), in accordance with the Chicago Air Quality Ordinance requirements, has requested that an air quality impact analysis be submitted to demonstrate that the NAAQS will be protected. The objective of this modeling effort is to provide an assessment of pollutant concentrations in ambient air and the resulting potential impacts on the public.

Due to the size of the Site and the potential environmental issues resulting from historical activities at the Site, CDPH required additional air quality impact analyses for the activities that are anticipated to occur during the remediation and construction phases. Therefore, the air quality impact analysis has been broken down into three phases, as described below:

- Remediation Phase: The dispersion modeling was conducted for National Ambient Air Quality Standards (NAAQS) compliance associated with remediation activities, including emissions from non-road and on-road engine emissions.
- Construction Phase: The dispersion modeling was conducted for NAAQS compliance depicting clearing, grading and other earth disturbing activities and demolition of structures, including emissions from non-road and on-road engine emissions.
- Operation Phase: The dispersion modeling was conducted for NAAQS compliance during site operation including emissions from on-site stationary and mobile sources as well as off-site mobile sources.

2.3 Air Quality Regulatory Framework

The Air Quality Ordinance, approved by City of Chicago Council in March 2021, regulates the construction and expansion of certain facilities that create air pollution. For certain types of operations, the ordinance requires site plan review and approval by various departments including the CDPH. An air quality impact study, which will be reviewed by CDPH, must be included as part of the site plan submittal. The air quality impact study will model potential emissions from the business and its proposed operations using air modeling software, such as the U.S. EPA's AERMOD and EPA's Motor Vehicle Emission Simulator (MOVES), to evaluate emissions from various sources.

This document presents the methodologies that were followed for the MOVES and AERMOD modeling as requested by the City, as well as the results of that modeling. The modeling methodologies presented herein were followed to assess ambient air quality impacts from the activities during remediation and construction phases as well as the operation of the proposed building development project at the Site. This report has been developed following recommendations of the USEPA Guideline on Air Quality Models (Guidelines, 40 CFR Part 51, Appendix W, January 2017) and CDPH Air Quality Impact Evaluation Interim Guidance (CDPH, 2021).

3. Air Quality Analysis Methodology

This section describes the air dispersion modeling methods, procedures, assumptions, and datasets that were used for the air quality analyses. Since air emission sources and quantities vary during remediation, construction, and operation phases at the Site, three separate air quality impact analyses were conducted. The methodologies that were followed to calculate the pollutant emissions from each source within the Site as well as mobile-source emissions associated with the proposed facility and at off-Site intersections during remediation, construction, and operation are summarized below.

3.1 Operation Phase

Roux compiled information about proposed stationary sources of air emissions at the Site and documented the types and quantities of air contaminants expected to be generated from these sources under assumed worst-case facility operating conditions. This information was used to evaluate NO_2, $PM_{2.5}$ and PM_{10} emissions from each point source within the Site.

3.1.1 Stationary Sources

For purposes of this air quality analysis, it assumed that the proposed on-Site stationary combustion sources consist of sources related to typical building support functions such as steam or heat generation, fire suppression support, or emergency power generation. At this stage of the project the only potential stationary sources are assumed to be:

- Natural gas-fired space heaters with a total heating value of 9,600,000 British thermal unit (Btu)-per-hour;
- One 100-kilowatt (kW) diesel emergency backup power generators; and
- One 50-horsepower (hp) diesel-fired fire pump as fire suppression support;

The emissions from stationary sources were combined and modeled using a single point source input. It was assumed that all potential on-Site forklifts during operation phase post 2029 will be electric-based and therefore were excluded from the on-Site emission calculations.

Space Heaters

The natural gas-fired space heaters have a total heating value of 9,600,000 Btu-per-hour to support the approximately 450,000 square foot area of the proposed warehouse building. The space heaters for the proposed operation are assumed to be roof mounted on the building. It was conservatively assumed that all operating units run 24 hours per day for 365 days a year resulting in a total of 8,760 hours of operation per year for each unit. Emissions were estimated using USEPA Compilation of Air Pollutant Emissions Factors (AP-42) for natural gas combustion from Chapter 1.4. The average gross heating value of natural gas is assumed to be approximately 1,020 British thermal units per standard cubic foot (Btu/scf). The calculated emissions rates of each pollutant from space heaters are summarized in **Table 1**. Details of source emission calculations are presented in **Appendix B**.

Emergency Backup Power System

The backup power system is assumed to be a 100-kW diesel generator. Emission calculations utilize emission factors for criteria air pollutants provided in AP-42Section 3.3, Gasoline and Diesel Industrial Engines (EPA, 1996). Emissions calculated using AP-42 emission factors (lb/hp-hr) for a typical generator engine with less than 600 hp multiplied by the engine's power rating (hp) (based on a conversion factor of 1.34 hp/kW) and by the total annual operating hours (assumed to be 500 hours per year for the maximum allowable hours of operation for an emergency generator). The calculated emissions rates of each pollutant from the emergency backup power system are summarized in **Table 1**. Details of source emission calculations are presented in **Appendix B**.

Fire Pump (Fire Suppression Support)

The fire pump is assumed to be a 50-hp diesel-fueled fire pump. Emission calculations utilize emission factors for criteria air pollutants provided in AP-42 Section 3.3, Gasoline and Diesel Industrial Engines (EPA, 1996). Emissions calculated using AP-42 emission factors (lb/hp-hr) for a typical generator engine with less than 600 hp multiplied by the engine's power rating (hp) and by the total annual operating hours (assumed to be 500 hours per year for the maximum allowable hours of operation for a fire pump). The calculated emissions rates of each pollutant from the fire suppression support system are summarized in **Table 1**. Details of source emission calculations are presented in **Appendix B**.

Table 1: Calculated Emissions Rates from Stationary Sources for Operation Phase

Pollutant	Emission Rate				Unit
	Space Heater[1]	Emergency Backup Power[2]	Fire Pump[2]	Total	
NO_2	1.19E-01	2.99E-02	1.11E-02	**1.60E-01**	gr/sec
PM_{10}	9.01E-03	2.12E-03	7.91E-04	**1.19E-02**	gr/sec
$PM_{2.5}$	9.01E-03	2.12E-03	7.91E-04	**1.19E-02**	gr/sec

Notes:
[1] Emission factors from AP-42, Chapter 1.4
[2] Emission factors from AP-42, Chapter 3.3

3.1.2 Fugitive Dust

Atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed""fugitiv"" because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include unpaved and paved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations. The only potential fugitive dust emission expected at this Site during the operation phase is from paved roads. Particulate emissions (i.e., $PM_{2.5}$ and PM_{10}) occur whenever vehicles travel over a paved surface such as a road or parking lot. Particulate emissions from paved roads are due to direct emissions from vehicles in the form of exhaust, brake wear and tire wear emissions, and resuspension of loose material on the road surface. Emission calculations utilize emission factors for criteria air pollutants provided in EPA's AP-42 Fifth Edition, Volume I Chapter 13 Section 13.2.1 Paved Roads (USEPA, 2011). The calculated particulate emission rates from fugitive dust sources are summarized in **Table 2**. Details of source emission calculations are presented in

Appendix B.

Table 2: Calculated Fugitive Dust Emissions from Paved Roads for Operation Phase

Pollutant	Emission Rate[1]		Unit
	Passenger Cars	Trucks	
PM_{10}	1.85E-06	3.84E-07	gr/(sec.m^2)
$PM_{2.5}$	4.61E-07	9.60E-08	gr/(sec.m^2)

Notes:
[1] Emission factors calculated from AP-42, Chapter 13.2.1

3.1.3 Mobile Sources Emissions

The on-Site and off-Site portion of the study estimates mobile-source emissions of $PM_{2.5}$, PM_{10} and NO_2, associated with operation activities at the proposed facility and intersections, which was identified in a completed Traffic Impact Study, prepared by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) on April 21, 2023 (KLOA, 2023). Mobile-source emission rates were modeled using EPA's MOVES emission modeling system. Emission factor lookup tables provided by CDPH were used to prepare emissions inventories for mobile equipment. The tables were created from USEPA's most recent version of MOVES. Emission factors are based on default inputs available in MOVES as obtained directly from the USEPA as well as inputs prepared by the Chicago Metropolitan Agency for Planning (CMAP).

Traffic data was obtained from the Traffic Impact Study (KLOA, 2023) for the calendar years 2023 (actual observations) and 2029 (projections). **Table 3** shows the weekday morning and evening peak hour traffic estimated to be generated by the proposed development.

Table 3: Trip Generation Estimates from Traffic Impact Study

Vehicle Type	Weekday Morning Peak Hour		Weekday Evening Peak Hour		Daily Trips	
	In	Out	In	Out	In	Out
Passenger Cars	54	8	13	49	242	242
Trucks	6	10	10	9	136	136
Total	60	18	23	58	378	378

Notes:
- Projected volumes are estimated for a 453,600 square-foot Warehouse facility (ITE Land-Use Code 150).

Based on the traffic counts that were performed in March 2023 during the weekday morning (6:00 A.M. to 9:00 A.M.) and evening (3:00 P.M. to 6:00 P.M.) peak periods, the weekday morning peak hour generally occurs from 7:30 A.M. to 8:30 A.M. and the weekday evening peak hour generally occurs from 4:00 P.M. to 5:15 P.M.

The Microsoft Excel lookup table "*CookCountyIL_MOVES_LookupTable_2021-2030_On-Road_CDB.xlsx*" was downloaded from CDPH website (*https://www.chicago.gov/content/dam/city/sites/air-quality-zoning/air-quality-impact-study/movesTables_3-1-2022.zip*) and includes default PM_{10}, $PM_{2.5}$ and NO_x emission factors for multiple vehicle types, road types, and vehicle speeds. These specific mobile source emission factors are for Cook County using the most current USEPA MOVES modeling system (MOVES3). For all roads, it was assumed vehicles will travel at the speed limit and vehicles will travel at approximately 5 miles per hour (mph) on access road links entering and exiting the Site. **Figure 2** shows the link locations with proposed development traffic impact the operation phase.

The idling emissions are calculated based on the estimated future build traffic study Levels of Service (LOS) delay in seconds per vehicle at each modeled intersection based on traffic analysis reported in the Traffic Impact Study (KLOA, 2023). The overall intersection delays for projected conditions in Year 2029 are summarized in **Table 4**.

Table 4: Overall Intersection Delays–- Projected Conditions in Year 2029

Intersection	AM Overall Delay (sec)	PM Overall Delay (sec)	Average Overall Delay (sec)
Stop Light @ 119th Street & Marshfield Avenue	33.8	41.1	**37.45**
Stop Light @ 119th Street & Ashland Avenue	37	41.2	**39.1**
Stop Sign @ 119th Street & MIFAB and Community Center Access Drives*	11.7	12.6	**12.2**
Stop Sign @ 119th Street & Community Center Entrance & NE Entrance*	11.7	13.8	**12.7**
Stop Sign @ 119th Street and North Entrance*	13.4	14.8	**14.1**
Stop Sign @ 119th Street & NW Entrance*	13.5	11.3	**12.4**
Stop Light @ 119th Street & Morgan Street	14.9	52.5	**33.7**
Stop Light @ 119th Street & Halsted Street	24.9	3.2	**27.55**
Stop Light @ 120th Street & Halsted Street	15.4	15.8	**15.6**
Stop Sign @ East Entrance & S Morgan Street	8.0	8.1	**8.0**
Stop Sign @ 120th Street & S Morgan Street	8.5	8.6	**8.5**
Stop Sign @ 120th Street & South Entrance	9.5	9.5	**9.5**

Notes:
AM – Morning Peak Hour, PM – Evening Peak Hour
AM and PM overall delays were calculated by averaging delays from all bounds reaching the intersection.
* Average values for all bounds at the intersection
Reference: KLOA, 2023 Tables 3 through 9

Traffic emissions are calculated based on the maximum vehicle miles travelled (VMT) on each road segment. The total VMT was calculated using the traffic counts on each segment multiplied by the length of each segment to obtain an emission rate in grams/hour. These traffic emissions are then divided by 3,600 seconds/hour to obtain a modeled grams/second emission rate for input into the modeling. Finally, the emission rates were divided by each segment area (link length multiplied by the link width) to get the emission rates per unit area (g/s/m^2), which was used as an input information into AERMOD.

Idling emissions are applied at multiple intersections surrounding the Site and at vehicle idling spots on-Site at the following locations:

- Stop Light @ 11^{9t}h Street & Marshfield Avenue (Link 52)
- Stop Light @ 11^{9t}h Street & Ashland Avenue (Link 53)
- Stop Sign @ 11^{9t}h Street & MIFAB and Community Center Access Drives (Link 54)
- Stop Sign @ 11^{9t}h Street & Community Center Entrance & NE Entrance (Link 55)
- Stop Sign @ 11^{9t}h Street and North Entrance (Link 56)
- Stop Sign @ 11^{9t}h Street & NW Entrance (Link 57)
- Stop Light @ 11^{9t}h Street & Morgan Street (Link 58)
- Stop Light @ 11^{9t}h Street & Halsted Street (Link 59)
- Stop Light @ 12^{0t}h Street & Halsted Street (Link 60)
- Stop Sign @ East Entrance & S Morgan Street (Link 61)
- Stop Sign @ 12^{0t}h Street & S Morgan Street (Link 62)
- Stop Sign @ 12^{0t}h Street & South Entrance (Link 63)
- Passenger car idling in the parking lots of the Site (Link Pass-Idle)
- Trucks idling at the docks on the south side of the Site (Link Dock-Idle)

Zero idling is expected for on-Site passenger vehicles since their primary role would be employee traffic entering and parking in the designated lot(s). However, to be conservative, it was assumed that the passenger cars will idle for 3 minutes per hour on-Site. To calculate the idling and traffic emissions per road segment, the total number of vehicles for each hour were multiplied by the anticipate delay at each intersection (average of overall AM and PM delays) to arrive at a total amount of vehicle delay (minutes). This is multiplied by the grams/hour emission factor divided by 60 minutes/hour to obtain grams/hour for each hour. These emissions are divided by 3,600 seconds/hour to obtain the modeled grams/second emission rate. Finally, the emission rates were divided by each segment area (link length multiplied by the link width) to get the emission rates per unit area (g/s/m^2), which was used as an input information into AERMOD.

Overall, two types of mobile source links were evaluated including:

- 51 on-network travel links (Links 1 through 51) that were used to describe driving activities of passenger cars and trucks on-Site and on the roads surrounding the Site that will be impacted by the proposed development; and
- 14 off-network idle links (Links 52 through 63, Pass-Idle and Dock-Idle) that were used to describe areas of idling activities (i.e., idling of vehicle at intersections and exit stops as well as idling of passenger cars in parking areas and Trucks idling at the docks on-Site).

Summary of mobile source link emission calculations are shown in **Appendix C**.

3.2 Remediation Phase

Remediation activities at the Site are assumed to occur prior to construction and operation phases. During the remediation phase, heavy equipment is expected to be used on-Site with on-Site and off-Site truck travels to move soil and debris as well as fugitive dust on unpaved surfaces. The potential remediation scenario for the purpose of air quality impact analysis is assumed to be:

- Site investigation activities using a drill rig;
- Removal and disposal of polychlorinated biphenyl (PCB) impacted concrete as Toxic Substances Control Act (TSCA) waste;
- Removal and disposal of clean concrete;
- Removal of PCB-impacted soil;
- Removal of underground storage tanks (USTs);
- Filling sewers with flowable fill;
- Excavation of soils with free products;
- Backfilling (free product soils, PCBs soils, USTs); and
- Capping the site with new parking lots and new buildings.

Table 5 summarizes the estimated volumes of soil and debris as well as the total number of trucks and other heavy equipment.

Table 5: Estimated Soil/Debris Volumes and Number of Trucks during Remediation Phase

Remediation/Site Prep Feature	Area (acres)	Volume (Yd^3)	Volume (Tons)	Total # of Trucks	Trucks per Day	Number of Truck Days	Total # of Drill Rig Days	Total Excavator Days
Concrete (clean and PCB impacted)	18.6	30,077	42,108	2,005	10	201		401
Concrete (clean)	0.9	1,522	2,131	101	20	5		10
Free Product Soils	0.6	9,259	12,963	617	20	31		31
PCB Soils (>50 ppm)	0.2	3,704	5,185	247	20	12		12
USTs		115	161	15	2	7		7
Backfilling (free product soils, PCBs soils, USTs)		13,078	18,309	879	20	44		44
Wastewater/Debris Trucks						37		

Notes:
Concrete thickness ranged from absent to 3 feet; typically, about 1 ft per Weston boring logs. Assumed 10 feet of soil removal.
15 cubic yards per truck
Assumed 1 UST removal per day; one truck for soil, one truck for shell.
Assumed one wastewater/debris disposal truck per week of operations.
Assumed up to three weeks of Phase II ESA drilling.
Assumed no backfilling for concrete floor removal.
Assumed two 80,000 lb Excavators with tools; one 4 CY Loader with tools.

The dust-generating activities during the remediation activities can be estimated from AP-42 Section 13.2.3 “Heavy Construction Operations” and Section 13.2.4 “Aggregate Handling and Storage Piles”. These dust-generating activities include drilling, bulldozing, and scraping, loading of soil and debris into trucks, unloading and compacting of fill material, vehicular traffic of trucks and other equipment on unpaved surfaces, etc. The emissions from on-site activities were combined into one area source assuming that the activities would occur consecutively within a year. Details of dust-generating activities and emission factors are presented in **Appendix B**.

The total number of trucks are estimated to be 3,864 trucks per year. For 260 weekdays and 12 hours of working hours per workday, it is estimated to have 2 trucks traveling into and out of the Site per hour. It is conservatively assumed that there will be one truck in each mobile link surrounding the Site at every business hour. The mobile source emissions during remediation phase will include:

- 42 on-network travel links (Links 1 through 41 and Truck Travel link) that were used to describe driving activities of trucks on-Site and on the roads surrounding the Site that will be impacted by the proposed remediation; and
- 14 off-network idle links (Links 42 through 49, Truck-Idle) that were used to describe areas of idling activities (i.e., idling of vehicle at intersections as well as idling of trucks on-Site).

Summary of mobile source link emission calculations are shown in **Appendix C**.

3.3 Construction Phase

Heavy construction is a source of dust emissions that may have substantial temporary impact on local air quality. Building and road construction are two examples of construction activities with high emissions potential. Emissions during the construction of a building or road can be associated with land clearing, drilling and blasting, ground excavation, cut and fill operations (i.e., earth moving), and construction of the facility itself. The dust-generating activities during the construction activities can be estimated from AP-42 Section 13.2.3 “Heavy Construction Operations” and Section 13.2.4 “Aggregate Handling and Storage Piles”. The dust-generating activities during construction phase will be similar to remediation. Details of dust-generating activities and emissions are presented in **Appendix B**.

The mobile source emissions during construction phase will be similar to remediation phase. The total number of trucks are estimated to be 3,000 trucks per year according to the construction contractor’s estimates with approximately 80,000 cubic yards of earth moving activities. For 260 weekdays and 12 hours of working hours per workday, it is estimated to have 2 trucks traveling into and out of the Site per hour. Similar to the remediation phase, it is conservatively assumed that there will be one truck in each mobile link surrounding the Site at every business hour.

In addition to emissions from heavy construction operations (AP-42 Chapter 13.2.3), it was assumed that other diesel running equipment and machinery will be used. These emissions were estimated using the Microsoft Excel lookup table “CDPH_MOVES_LookupTable_Non-Road.xlsx” that was downloaded from CDPH website (https://www.chicago.gov/content/dam/city/sites/air-quality-zoning/air-quality-impact-study/movesTables_3-1-2022.zip). All non-road equipment and machinery that was anticipated to be related to either construction- or remediation-phase activities were included in the emission calculations. The non-road equipment considered are “*Bore/Drill Rigs, Concrete/Industrial Saws, Crawler Tractor/Dozers, Crushing/Proc. Equipment, Excavators, Forklifts, Other General Industrial Eqp, Pumps, Rough Terrain Forklifts, Scrapers, Surfacing Equipment, Tractors/Loaders/Backhoes*”. It was conservatively assumed that all non-road equipment and machinery will be used simultaneously. Summary of mobile source link emission calculations are shown in **Appendix C**.

3.4 Dispersion Modeling

Dispersion modeling was conducted using BREEZE AERMOD Version 10.0 that includes the latest version of the USEPA-approved AERMOD dispersion modeling system (AERMOD Version 21112). AERMOD is a computer-based mathematical dispersion model that can predict ambient concentrations of pollutants that result from releases to the atmosphere. AERMOD uses hour-by-hour meteorological data to predict the patterns of ambient concentrations of pollutants over time.

AERMOD's three models and required model inputs, are described as follows:

- AERMET: calculates boundary layer parameters for input to AERMOD
  - Model inputs: wind speed; wind direction; cloud cover; ambient temperature; morning sounding; albedo; surface roughness; Bowen ratio; and
  - Model outputs for AERMOD: wind speed; wind direction; ambient temperature; lateral turbulence; vertical turbulence; sensible heat flux; friction velocity; Monin-Obukhov Length.
- AERMAP: calculates terrain heights and receptor grids for input to AERMOD
  - Model inputs: DEM data [x,y,z]; design of receptor grid (pol., cart., disc.); and
  - Model outputs for AERMOD: [x,y,z] and hill height scale for each receptor.
- AERMOD: calculates temporally averaged air pollution concentrations at receptor locations for comparison to the NAAQS
  - Model inputs: source parameters, boundary layer meteorology (from AERMET), and receptor data (from AERMAP); and
  - Model outputs: temporally averaged air pollutant concentrations

3.4.1 Regional and Local Topography

The landforms of Cook County are mostly the result of depositional glacial processes. The significant topographic features include broad almost level plains that were once lake beds; concentric, subparallel ridges formed as moraines marking the outer margins of continental glaciers, and gentle, elongate sandy spits, bars and beach ridges formed along the shore of glacial Lake Chicago and other ancestors of present-day Lake Michigan.

The highest point in Cook County is at the northwest corner and is almost 1,000 feet above sea level. For most of the county the topography slopes gradually toward Lake Michigan to the east and is dissected by north-south trending stream-cut valleys. Most of the central and southeastern portion of Cook County is composed of a low flat plain. **Figure 3** shows the local topography of the area surrounding the Site.

The A 1/3 arc-sec (approximately 10-meter) resolution United States Geological Survey (USGS) National Elevation Dataset (NED) file "*USGS_NED_13_n42w089.tif*" that covered the Site in southwest Chicago Area was downloaded from CDPH website (https://www.chicago.gov/content/dam/city/sites/air-quality-zoning/resources-for-applicants/AERMAPData.zip). The 18081 version of the AERMOD terrain preprocessor, AERMAP, was used to develop hill heights.

3.4.2 Regional Climatology

The Site is located within Cook County, Illinois. The county receives, on average, 34 inches of precipitation annually and approximately 178 days with measurable precipitation. The average wind speed is 9 mph. Longterm climatological data is summarized in **Table 6** below for the Cook County region calculated over a period of 10 years from 2011 through 2020. While regionally representative, the climatology data can be assumed to differ slightly from that at the Site.

Table 6: Cook County Monthly Averages of Climatology Parameters

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temp. (F)	Hi 29° Lo 20°	Hi 31° Lo 21°	Hi 44° Lo 33°	Hi 54° Lo 41°	Hi 66° Lo 52°	Hi 75° Lo 62°	Hi 80° Lo 68°	Hi 80° Lo 67°	Hi 74° Lo 61°	Hi 61° Lo 49°	Hi 47° Lo 37°	Hi 36° Lo 28°
Avg. Wind Speed (mph)	11	10	10	10	9	8	7	7	8	10	10	10
Avg. Precip. (in)	1.5	1.6	2.0	3.0	4.0	4.9	4.4	3.8	2.6	2.6	1.4	1.5
Average Humidity (%)	82	82	74	73	75	77	77	75	72	70	71	77
Avg. Cloud Cover (%)	60	58	49	48	40	30	25	24	27	40	42	55
Barometric Pressure (in)	30.1	30.1	30.1	30.0	30.0	29.9	30.0	30.0	30.0	30.0	30.1	30.1
Average Dry Days	12	12	19	22	24	23	25	25	27	26	21	15
Avg. Precip. Days	5	4	6	6	7	7	6	6	3	5	4	5
Average Snow Days	14	13	6	2	0	0	0	0	0	0	5	10
Average Fog Days	1	1	1	1	2	2	1	1	0	0	0	1
Average UV Index	1	2	2	3	5	6	6	5	4	3	1	1
Avg. Hours of Sun	202	187	256	249	292	319	344	351	321	282	266	227

Notes:
Averages are based on historical weather data from the past 10 years (2012-2021).
Source: https://www.weatherwx.com/hazardoutlook/il/cook+county.html

3.4.3 Meteorological Data and Land Use

AERMOD requires an input of hourly meteorological data to estimate pollutant concentrations in ambient air resulting from modeled source emissions. The USEPA's Guideline on Air Quality Models states that "*5 years of NWS meteorological data or at least 1 year of site-specific data is required*" for an air quality modeling analysis (40 CFR 51, Appendix W, 8.3.1.2 b.). The use of 5 years of meteorological data allows for an assessment of conditions that occur at both the Site location as well as at the surface meteorological data collection location, even if they occur at differing times. AERMOD requires upper air and surface characteristic data.

In accordance with the Chicago Air Quality Ordinance, upper air sounding data were obtained from the upper air monitoring station most geographically proximate to the surface station site. The nearest upper air data collection site, relative to the Project Area, which is located greater than 4 miles from the lakeshore and south of the Eisenhower Expressway, is Chicago Midway with a base elevation of 188 meters above mean sea level (AMSL). This station is the nearest and most representative surface station to the Site. The 5 years (i.e., 2016 through 2020) of AERMOD-ready data processed using data for Chicago Midway was obtained from CDPH website.

The meteorological data is summarized in the wind rose shown in **Figure 4**. Winds most commonly originate from the southwest and westerly directions in general, though winds originate from all directions for at least some percentage of time. The average wind speed over the 43,841 available hourly measurements from 1/1/2016 through 12/31/2020 timeframe was 10.5 mph with a maximum wind speed of 36.8 mph.

The 18081 version of the AERMOD terrain preprocessor, AERMAP, was used to develop the receptor elevations and hill heights. A 1/3 arc-sec (10-m) resolution United States Geological Survey (USGS) National Elevation Dataset (NED) file was used for this processing.

Modeling was conducted for emissions of NO_2, PM_{10} and $PM_{2.5}$ from on-Site stationary and mobile sources as well as off-Site on-road vehicle activities. The air quality analysis includes dispersion modeling for the pollutants and averaging periods presented below and was used for compliance demonstration (i.e., comparison with NAAQS).

- NO_2 – Annual and 1-hour averaging period;
- PM_{10} –24-hour averaging period; and
- $PM_{2.5}$ - Annual and 24-hour averaging period.

Particulate matter deposition using particle size data was not considered for any modeling runs, resulting in no removal of mass from the plume, and hence likely more conservative predictions of impacts to ambient air. USEPA recommended default value of ambient equilibrium NO_2/NO_x ratio (i.e., the maximum allowed ratio) was set to 0.9.

3.4.5 Emission Sources and Rates

AERMOD has the capability of modeling various types of stationary and mobile sources that include area sources, volume sources, and line sources as line volume sources. Both volume sources and area sources could be used to represent roads according to CDPH Air Quality Impact Evaluation Interim Guidance (CDPH, 2021). In BREEZE AERMOD, a single point source was used for modeling of the emissions from the combined on-Site stationary sources (i.e., space heaters, emergency backup power generator, and fire pump). Area sources were used for on-network and off-network mobile sources. The following release heights above ground level (AGL) for each source type were assumed:

- Stationary Sources: The space heaters, emergency backup power system, and Fire Pump (Fire Suppression Support) were modeled as a single point source on the roof of the Warehouse building and release height equal to 36 feet AGL based on building height.
- Fugitive Dust Sources: The fugitive dust for the paved roads were modeled as area sources. The paved parking areas were modeled with the horizontal dimensions of the paved parking lot areas, with a release height equal to half the design height of the vehicles (i.e., 1.3 meters AGL for Passenger Cars and 3.4 meters AGL for Trucks).
- On-Network Mobile Sources: An average release height of 1.9 m AGL was assumed for all on-network links where passenger cars and trucks contribute to the emissions.
- Off-Network Idle Mobile Sources: The parking lots and loading docks were modeled as area sources with the horizontal dimensions of the parking lot and dock lengths, width of 8 meters, and a release height equal to half the design height of the vehicles (i.e., 1.3 meters AGL for Passenger Cars and 3.4 meters AGL for Trucks).

Following the CDPH Air Quality Impact Evaluation Interim Guidance, roads were modeled as area sources where ambient receptors are located within source dimensions or where other mechanical sources are emitting in the general vicinity of the road. For each link, an area source was located at the centerline of the road in each direction. The following input parameters were calculated and summarized in **Table 7:**

- *Top of Plume Height = 1.7 × (vehicle height)*
- *Release Height = 0.5 × (top of plume height)*
- *Initial vertical dimension = (top of plume height) / 2.15*

Table 7: Vehicle Release Parameters

Parameter	Passenger	Truck	Weighted Value
Daily Passenger Car/Truck Percentage	100%	0%	
Vehicle Height (m) - assumed	1.5	4.0	**2.3**
Top of Plume Height (m)	2.6	6.8	**3.9**
Release Height (m)	1.3	3.4	**1.9**
Initial Vertical Dimension (m)	1.2	3.2	**1.8**

Notes:
Overall Daily Passenger Cars and Truck percentages were used to calculate the weighted values.

An approximately 4 km x 4 km AERMOD modeling area was selected as the AERMOD modeling domain. AERMOD Modeling Domain and Source Layout is shown in **Figure 5**. The emissions sources were input to AERMOD with the calculated emission rates in gram/second for the point source and gram/(second.m^2) for area sources multiplied by the emission factors.

3.4.6 Receptors

A series of non-uniform receptor points centered on the on-Site stationary and off-Site mobile sources were used for this analysis to estimate ambient pollutant concentrations resulting from the potential emissions. According to USEPA's guidance on Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (USEPA, 2015):

> "*Receptor spacing in the vicinity of the source should be of sufficient resolution to capture the concentration gradients around the locations of maximum modeled concentrations. The majority of emissions from a highway or transit project will occur within several meters of the ground, and concentrations are likely to be greatest in proximity of near-ground sources. As such, receptors should be placed with finer spacing (e.g., 25 meters) closer to a near-ground source, and with wider spacing (e.g., 100 meters) farther from such a source. While prevailing wind directions may influence where maximum impacts are likely to occur, receptors should also be placed in all directions surrounding a project.*"

The AERMOD receptor network is presented in **Figure 5**. The grid consists of approximately 510 discrete and fence receptors each assumed to be at breathing-level (1.8 meters high). The following receptor spacing and extents around the facility and roads, in accordance with USEPA's guidance, were used for this analysis:

- Fenceline receptors were also included in the model and located approximately every 25 meters along the virtual property boundary for a total of 50 receptors.

- 50-meter (m) spacing along the perimeter of the Site and along roads with mobile sources out to approximately 50 meters from sources;
- 100-m spacing out to approximately 100 meters from sources;
- 250-m spacing between 1 km from sources;
- 250-m spacing between 2 km from sources; and
- Additional receptors of interest, as appropriate, on the boundaries or within the 1.5-km radius from Site.

3.4.7 Building Downwash

Buildings and other structures near a relatively short stack can have a substantial effect on plume transport and dispersion, and on the resulting ground-level concentrations. Building downwash for the point source that is within the area of influence of a building was considered when running AERMOD. A building is considered sufficiently close to a stack to cause wake effects when the distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the building height or the projected building width (i.e., $D <= 5L$), where D is the shortest distance from the exhaust stack to the building, L is the = lesser of the building height and projected building width (PBW), and *PBW* is the maximum cross-sectional length of the building. For rectangular buildings, $PBW = \text{sqrt}(length^2 + width^2)$. The *PBW* is the maximum length of a building that could affect air flow around and over the structure.

AERMOD requires the user to input the UTM coordinates for all building corners and the height of each building. For buildings with more than one height or roofline, the UTM coordinates and height are required for each building tier. U.S. EPA Building Profile Input Program (BPIP) building pre-processor program was used using the information form the point source and warehouse building and were specified for the point source. No other building on-site or off-site was within the *5L* distance of the stack.

3.4.8 Design Values and Applicable Standards

To evaluate the potential impacts of emissions from the proposed Site development on the public during remediation, construction, and operation, the dispersion modeling evaluation must consider the existing background concentrations of pollutants in the area where impacts are being evaluated. The background concentration of a given pollutant is added to the modeled impact from the proposed Site development, and the result is compared to the NAAQs. The NAAQS are allowable concentration limits applied at the public access boundary.

Only the criteria air pollutant (PM_{10}, $PM_{2.5}$, and NO_2) impacts were assessed as part of the modeling analysis. The background design values were obtained from the latest available Illinois Annual Air Quality Report – Air Quality Index for 2020 reporting year (IEPA, 2020). Monitoring stations were selected based on proximity to the Site (i.e., the station closest to the Site with the appropriate criteria pollutant monitoring capability).

The Illinois Environmental Protection Agency (IEPA) operates a network of ambient air monitoring stations throughout Cook County, Illinois (see **Figure 6**). The purpose of the monitoring stations is to measure ambient concentrations of pollutants, including criteria pollutants, to determine whether or not the NAAQS are met or exceeded. Monitoring stations within the Cook County area were evaluated to find a station that best represents the background concentrations for the project site. Without a clear distinction in the topologic and meteorological conditions among these sites, the most representative single monitoring station was selected based on data completeness and the shortest distance to the project site.

Significant impact levels, or SILs, are defined concentrations of criteria pollutants in the ambient air that are considered inconsequential in comparison to the NAAQS. It should be noted that impacts from nearby and other background sources, including background concentrations, are not considered in the significant impact analysis (SIA) and recommended SILs for each criteria pollutant and averaging period are summarized in **Table 8**.

Ambient air background concentrations were obtained from the table provided by CDPH for the project located in Southwest Chicago (i.e., 4 miles or greater from the lakeshore and south of the Eisenhower Expressway). The 3-year ambient design values for each criteria pollutant and averaging period are presented in **Table 8**. Additionally, CDPH has recently provided a Table of Seasonal Hourly Ambient NO_2 Concentrations for use with Southwestern Chicago 1-Hour NO_2 Modeling (see **Appendix D**).

Table 8: Summary of Design Values, NAAQSs, and SILs used for the Modeling Analysis

Pollutant	Averaging Period	Design Values	NAAQS	SIL	Unit
NO_2	1-Hour	CDPH Table*	100	4.0	ppb
	Annual	15.4	53	0.5	ppb
PM_{10}	24-Hour	102	150	5	µg/m^3
$PM_{2.5}$	24-Hour	23	35	1.2	µg/m^3
	Annual	10	12	0.2	µg/m^3

Notes:
* CDPH-provided Table of Seasonal Hourly Ambient NO_2 Concentrations for use with Southwestern Chicago 1-Hour NO_2 Modeling
- NO_2 annual data from Com Ed Maintenance Bldg (2018-2020)
- PM_{10} and $PM_{2.5}$ data from Village Hall (2018-2020)

3.4.9 Impact due to Site Activities

Impacts from Site activities (i.e., Remediation, Construction, and Operation) were calculated by adding modeled receptor values to the design values. The resulting Site-Activity concentration was then compared to the NAAQS. The Site-Activity Impact concentrations for each pollutant and averaging period are summarized in **Table 8** compared with NAAQS.

- **1-hour NO_2.** The 1-hour NO_2 Site-Activity Impact was calculated by first identifying the receptor with the highest 5-year 1-hour average concentration at each receptor across 5 years of meteorological data (as done by AERMOD). The AERMOD model was created for 1-hour NO_2 with CDPH-provided seasonal hourly background concentrations. For this model run seasonal hourly background concentrations were entered into the AERMOD model and the modeled values include the background concentrations (i.e., design values) and therefore should directly be compared with NAAQS. The resulting 1-hour NO_2 Site-Activity Impact concentration was then rounded to the nearest 0.1 µg/m3 (USEPA, 2015) and compared to the NAAQS.
- **Annual NO_2.** The annual NO_2 Site-Activity Impact was calculated directly by AERMOD by the model averaging the 5 years of annual averages for each receptor and reporting the highest receptor. The receptor with the highest modeled 5-year average concentration was identified, and this value was then added to the design value. The resulting annual NO_2 Site-Activity Impact concentration was then rounded to the nearest 0.1 µg/m^3 (USEPA, 2015) and compared to the NAAQS.

- **24-hour PM_{10}.** The 24-hour PM_{10} Site-Activity Impact was calculated by first identifying the receptor with the highest 5-year 24-hour average concentration at each receptor across 5 years of meteorological data (as done by AERMOD). The receptor with the highest modeled concentration for a 24-hour period was then added to the design value. The resulting 24-hour PM_{10} Site-Activity Impact concentration was then rounded to the nearest 10 micrograms per cubic meter ($\mu g/m^3$) (USEPA, 2015) and compared with NAAQS.
- **24-hour $PM_{2.5}$.** The 24-hour $PM_{2.5}$ Site-Activity Impact was calculated by identifying the receptor with the highest 5-year 24-hour average concentration (as done by AERMOD). The receptor with the highest modeled concentration for a 24-hour period was then added to the design value. The resulting 24-hour $PM_{2.5}$ Site-Activity Impact concentration was then rounded to the nearest 1 $\mu g/m^3$ (USEPA, 2015) and compared with NAAQS.
- **Annual $PM_{2.5}$.** The annual $PM_{2.5}$ Site-Activity Impact was calculated directly by AERMOD by the model averaging the 5 years of annual averages for each receptor and reporting the highest receptor. The receptor with the highest modeled 5-year average concentration was identified, and this value was then added to the design value. The resulting annual $PM_{2.5}$ Site-Activity Impact concentration was then rounded to the nearest 0.1 $\mu g/m^3$ (USEPA, 2015) and compared to the NAAQS.

AERMOD output concentrations were reported in $\mu g/m^3$ units for all pollutants. However, NO_2 concentrations must be converted to the units of parts per billion (ppb) in order to be added to design values and compared with NAAQS values. The general conversion equation is

$$\mu g/m^3 = (ppb) * (12.187) * (M) / (273.15 + °C)$$

where *M* is the molecular weight of the gaseous pollutant (i.e., 46 gr/mol for NO_2). Assuming an ambient pressure of 1 atmosphere and a temperature of 25 degrees Celsius, the conversion factor for NO_2 concentrations is $C(ppb) = C(\mu g/m^3) / 1.88$

3.5 Assumptions

3.5.1 Facility and Equipment Operating Hours

The operating hours of the facility were assumed conservatively to be 24 hours a day and seven days a week. While a few vehicle trips could occur outside the business hours period, the peak-hour mobile source emissions were assumed, very conservatively, to occur for the entire 24-hours during each day. On-Site combustion emissions from natural gas sources could occur at any time during a 24-hour day.

3.5.2 On-site Emissions During Site Operation

- Heater emissions during all hours of the 24-hour day will occur up to the full MMBtu/hr rating assumed for emissions (i.e., 1.6 MMBtu/hr). This assumption is very conservative because space heaters will not be operating at full rating all of the time.
- Since Table 3.3.1 in AP-42 Section 3.3 only provides PM_{10} emission factors for fire pump and emergency backup power system, it was assumed that $PM_{2.5}$ and PM_{10} emission factors were equal.
- The building heating, ventilation, and air-conditioning (HVAC) units will be natural gas-fired and will generate on-site emissions due to the burning of natural gas.
- It was assumed that all potential on-Site forklifts during operation phase post 2029 will be electric-based and therefore were excluded from the on-Site emission calculations.
- For particulate matter emissions from fugitive dust it was assumed that average passenger car weight is 4,000 lbs and average truck weight is 40,000 lbs. It was also assumed that 10 passenger cars and 2 trucks travel on paved roads of the Site per hour. A road surface silt loading of 1.2 gr/m^2

was calculated as a worse case (i.e., 120 days of freezing conditions per year with x4 multiplier contributions from anti-skid abrasives) for a low average daily traffic (ADT) volume (i.e., ADT<500).

- Moving cars and trucks conservatively assumed to be on on-site paved road at all times.

3.5.3 Mobile-Source Emissions

- Based on the Trip Generation estimates in the Traffic Impact Study and the conservative assumptions made on the number of truck operations, an average 69% passenger – 31% truck configuration was used.
- MOVES source types "Passenger Car" and "Single Unit Long-haul Truck" accurately represent Project passenger car and truck sources, respectively.
- Workers and visitors were assumed to drive gasoline-powered passenger cars traveling on unrestricted urban roads in Project year 2029 and later.
- Trucks were assumed to be diesel-powered Single Unit Long-haul Trucks traveling on unrestricted urban roads in Project year 2029 and later.
- Passenger cars will idle for a maximum of 3 minutes per hour on-Site.
- It was assumed that 11 docks are filled with trucks at all times and trucks will idle at the docks for a maximum of 3 minutes per hour during business hours the weekdays.

3.5.4 AERMOD

- Roadway link lengths were based on distances in Site Plan and Google Earth. It was also assumed that roadway links going outside the Site Plan are extended by 0.5 mile.
- On-Site travel of passenger vehicles will occur over the full east-west length of the north side of the property as well as the full north-south length of the east and west sides of the property. On-Site travel of trucks will occur over the full east-west length of the south side of the property is over approximately 2,560 feet. On-Site travel of trucks will occur only over approximately 1,670 feet of the east-west length of the parking lot on the south side of the property.
- Twelve area sources were used to model off-network idle links that represent vehicle idling emissions from passenger cars and trucks at stop signs and stop lights on roads surrounding the site.
- Area sources were used to model off-network idle links that represent on-Site off-network idling of passenger cars in the parking lot(s) (930 meters length and 8 meters width) and idling of trucks on the south parking lot/loading docks (485 meters length and 8 meters width).
- Two area sources were added to model the particulate matter (PM_{10} and $PM_{2.5}$) emissions from fugitive sources from Paved Road on the passenger cars parking lots (PassPave) and truck parking lot (TruckPave). Calculated $PM_{2.5}$ and PM_{10} emissions were added to these two area sources for 12 hours per day similar to other mobile links.
- For NO_2 modeling, the ARM2 option was chosen with a default NO_2/NOX in-stack ratio (ISR) of minimum 0.5 and maximum 0.9 following USEPA guidance (USEPA 2017).
- For stationary sources it was conservatively assumed that the space heaters operate 24 hours per day for 365 days a year, emergency generators and fire pump each operate 500 hours per year for the maximum allowable hours of operation.
- For mobile sources, it was conservatively assumed that the site activities occurred for 12 hours of the day and 7 days a week with peak volumes from the traffic study (KLOA, 2023) occurred from 7:00-8:00 A.M. and 3:00-4:00 P.M. and lower traffic volumes assumed for the rest of the 12-hour day at 75% of the peak-hour volumes during operation phase.
- The average passenger vehicle height will be 1.5 meters and truck vehicle height will be 4.0 meters.

- Mobile vehicle emissions while traveling and while idling were modeled as area sources in AERMOD.
- Urban dispersion coefficient with a population of 2,700,000 was chosen (US Census 2019).

3.5.5 Remediation and Construction Phases

- Off-Ssite vehicle volumes during remediation and construction phases were assumed conservatively to be one truck in each off-Site mobile source link per hour for 12 hours a day for the 5 workdays per week.
- The total number of trucks during the remediation phase is estimated to be approximately 3,800 over the period of 12 months. This will result in less than 2 trucks per hour for 12-hour workdays.
- The total number of trucks during the construction phase is estimated to be approximately 3,000 over the period of 12 months. This will result in less than one truck per hour for 12-hour workdays.
- All trucks unloading debris and soil will occur off-Site during both remediation and construction phases. During construction, it was assumed that all concrete batching will occur off-Site.
- All fugitive dust emissions during remediation and construction phases were conservatively assumed to be from unpaved surfaces throughout the Site.
- To use CDPH lookup table for non-road equipment, it was conservatively assumed that all equipment will be diesel fuel type, and a mid-range diesel equipment horsepower will be used. All non-road equipment was assumed to be used for 30 days.

4. Results and Discussion

AERMOD was setup to allow the evaluation of stationary sources on-Site and vehicle activity-related emissions for the maximum 1-hour average and the maximum annual-average NO_2 concentrations, the maximum 24-hour average and the maximum annual-average PM_{10} concentrations, and 24-hour average and maximum annual-average $PM_{2.5}$ concentrations. The modeling results from each Site activity (Remediation, Construction, and Operation phases) are presented in the following sections.

4.1 Remediation Phase

The air dispersion modeling results and corresponding figures that graphically summarize the modeling results of remediation activities are described below. **Table 9** summarizes the modeled value and remediation-phase impact concentrations for each pollutant and averaging period compared with NAAQS. As Shown in **Table 9**, predicted concentrations as a result of remediation activities are relatively small compared to the background concentrations and the pollutant concentrations do not exceed NAAQS. Among the pollutants and averaging periods, the 1-hour average NO_2 concentration and the 24-hour average PM_{10} had the highest increase, but still below the NAAQS.

Table 9: Remediation-Phase Impact for each Pollutant and Averaging Period compared to NAAQS

Pollutant	Averaging Period	Modeled Value	Design Values	Remediation-Phase Impact		NAAQS	Unit
NO_2	1-Hour	50.6*	CDPH Table	**50.6**	<	**100**	ppb
	Annual	0.1	15.4	**15.5**	<	**53**	ppb
PM_{10}	24-Hour	35.8	102	**137.8**	<	**150**	μg/m^3
$PM_{2.5}$	24-Hour	4.4	23	**27.4**	<	**35**	μg/m^3
	Annual	0.6	10	**10.6**	<	**12**	μg/m^3

Notes:
- Modeled values were derived from AERMOD and are reported to one decimal place beyond the NAAQS value.
- Background concentrations are reported to one decimal place beyond the NAAQS value.
- Design values and Site-Activity Impact values are rounded to nearest 0.1 μg/m3 for PM_{10} and $PM_{2.5}$ or ppb for NO_2 (USEPA, 2015)

* Modeled value includes background concentrations (Design Values) and should be directly compared with NAAQS.

The highest 1-hour average NO_2 concentration reaches as high as 50.6 ppb with the seasonal hourly background concentration (below the NAAQS of 100 ppb). The highest annual average NO_2 concentration is of the order of 15.5 ppb (below the allowable NAAQS of 53 ppb). The highest 24-hour average PM_{10} concentration of 137.8 μg/m^3 is also below the NAAQS of 150 μg/m^3. The highest 24-hour average $PM_{2.5}$ concentration reaches as high as 27.4 μg/m^3 (below the NAAQS of 35 μg/m^3). The highest annual average $PM_{2.5}$ concentration is of the order of 10.6 μg/m^3 (below the allowable NAAQS of 12 μg/m^3).

Figure 7a through **Figure 7f** show the contour maps of predicted highest pollutant concentrations for each averaging period during the remediation phase. The location and value of the highest predicted concentration is shown in each figure. In terms of the location of the highest predicted concentration increase, as expected, the highest increase in the pollutant concentrations would occur along the perimeter of the Site. However, these higher predicted impacts rapidly drop off within a few meters further away from the Site perimeter. AERMOD Model Electronic Run Files are included in **Appendix E**.

Predicted concentrations during Remediation for each criteria pollutant were compared with the SILs. The highest 1-hour average NO_2 without including the background was 14.1 μg/m^3 (7.5 ppb), which exceeded the recommended SIL. The highest annual average NO_2 without including the background was 0.12 μg/m^3 (0.06 ppb) below the SIL. The highest 24-hour average PM_{10} without including the background was 35.8 μg/m^3, which exceeded the recommended SIL. The highest 24-hour average $PM_{2.5}$ without including the background was 4.4 μg/m^3, which exceeded the recommended SIL. The highest annual average $PM_{2.5}$ without including the background was 0.6 μg/m^3, which exceeded the recommended SIL. The area outside Site fence boundary with concentrations higher than the SILs are shown in the figures. As shown in the figures, the significant impacts are limited to the Site and its immediate vicinity. The model results show that the predicted concentrations decrease rapidly with distance from the Site boundary.

4.2 Construction Phase

The air dispersion modeling results and corresponding figures that graphically summarize the modeling results of construction activities are described below. **Table 10** summarizes the modeled value and construction-phase impact concentrations for each pollutant and averaging period compared with NAAQS. As Shown in **Table 10**, predicted concentrations as a result of Site operation are relatively small compared to the background concentrations and the pollutant concentrations do not exceed NAAQSs. Among the pollutants and averaging periods, the 1-hour average NO_2 concentration and the 24-hour average PM_{10} had the highest increase, but still below the NAAQS.

Table 10: Construction-Phase Impact for each Pollutant and Averaging Period compared to NAAQS

Pollutant	Averaging Period	Modeled Value	Design Values	Construction-Phase Impact		NAAQS	Unit
NO_2	1-Hour	50.6*	CDPH Table	**50.6**	<	**100**	ppb
	Annual	0.1	15.4	**15.5**	<	**53**	ppb
PM_{10}	24-Hour	23.4	102	**125.4**	<	**150**	μg/m^3
$PM_{2.5}$	24-Hour	3.1	23	**26.1**	<	**35**	μg/m^3
	Annual	0.4	10	**10.4**	<	**12**	μg/m^3

Notes:
- Modeled values were derived from AERMOD and are reported to one decimal place beyond the NAAQS value.
- Background concentrations are reported to one decimal place beyond the NAAQS value.
- Design values and Site-Activity Impact values are rounded to nearest 0.1 μg/m3 for PM_{10} and $PM_{2.5}$ or ppb for NO_2 (USEPA, 2015)

* Modeled value includes background concentrations (Design Values) and should be directly compared with NAAQS.

The highest 1-hour average NO_2 concentration reaches as high as 50.6 ppb with the seasonal hourly background concentration (below the NAAQS of 100 ppb). The highest annual average NO_2 concentration is of the order of 15.5 ppb (below the allowable NAAQS of 53 ppb). It should be noted that NO2 emissions for remediation-phase and construction-phase activities were the same since on-site and off-site diesel-running trucks and on-site non-road diesel-running equipment were the same for both phases. The highest 24-hour average PM_{10} concentration of 125.4 μg/m^3 is also below the NAAQS of 150 μg/m^3. The highest 24-

hour average $PM_{2.5}$ concentration reaches as high as 26.1 µg/m^3 (below the NAAQS of 35 µg/m^3). The highest annual average $PM_{2.5}$ concentration is of the order of 10.4 µg/m^3 (below the allowable NAAQS of 12 µg/m^3).

Figure 8a through **Figure 8f** show the contour maps of predicted highest pollutant concentrations for each averaging period during the construction phase. The location and value of the highest predicted concentration is shown in each figure. In terms of the location of the highest predicted concentration increase, as expected, the highest increase in the pollutant concentrations would occur along the perimeter of the Site. However, these higher predicted impacts rapidly drop off within a few meters further away from the Site perimeter. AERMOD Model Electronic Run Files are included in **Appendix E**.

Predicted concentrations during Construction for each criteria pollutant were compared with the SILs. The highest 1-hour average NO_2 without including the background was 14.1 µg/m^3 (7.5 ppb), which exceeded the recommended SIL. The highest annual average NO_2 without including the background was 0.12 µg/m^3 (0.06 ppb) below the SIL. The highest 24-hour average PM_{10} without including the background was 23.4 µg/m^3, which exceeded the recommended SIL. The highest 24-hour average $PM_{2.5}$ without including the background was 3.1 µg/m^3, which exceeded the recommended SIL. The highest annual average $PM_{2.5}$ without including the background was 0.4 µg/m^3, which exceeded the recommended SIL. The area outside Site fence boundary with concentrations higher than the SILs are shown in the figures. As shown in the figures, the significant impacts are limited to the Site and its immediate vicinity. The model results show that the predicted concentrations decrease rapidly with distance from the Site boundary.

4.3 Operation Phase

The air dispersion modeling results and corresponding figures that graphically summarize the modeling results of operation activities are described below. **Table 11** summarizes the modeled value and operation-phase impact concentrations for each pollutant and averaging period compared with NAAQS. As Shown in **Table 11**, predicted concentrations as a result of remediation activities are relatively small compared to the background concentrations and the pollutant concentrations do not exceed NAAQS.

Table 11: Operation-Phase Impact for each Pollutant and Averaging Period compared to NAAQS

Pollutant	Averaging Period	Modeled Value	Design Values	Operation-Phase Impact		NAAQS	Unit
NO_2	1-Hour	74.9*	CDPH Table	**74.9**	<	**100**	ppb
	Annual	2.4	15.4	**17.8**	<	**53**	ppb
PM_{10}	24-Hour	7.6	102	**109.6**	<	**150**	µg/m^3
$PM_{2.5}$	24-Hour	4.0	23	**27.0**	<	**35**	µg/m^3
	Annual	1.1	10	**11.1**	<	**12**	µg/m^3

Notes:
- Modeled values were derived from AERMOD and are reported to one decimal place beyond the NAAQS value.
- Background concentrations are reported to one decimal place beyond the NAAQS value.
- Design values and Site-Activity Impact values are rounded to nearest 0.1 µg/m3 for PM_{10} and $PM_{2.5}$ or ppb for NO_2 (USEPA, 2015)

* Modeled value includes background concentrations (Design Values) and should be directly compared with NAAQS.

The highest 1-hour average NO_2 concentration reaches as high as 74.9 ppb with the seasonal hourly background concentration (below the NAAQS of 100 ppb). The highest annual average NO_2 concentration is of the order of 17.8 ppb (below the allowable NAAQS of 53 ppb). The highest 24-hour average PM_{10} concentration of 109.6 μg/m^3 is also below the NAAQS of 150 μg/m^3. The highest 24-hour average $PM_{2.5}$ concentration reaches as high as 27.0 μg/m^3 (below the NAAQS of 35 μg/m^3). The highest annual average $PM_{2.5}$ concentration is of the order of 11.1 μg/m^3 (below the allowable NAAQS of 12 μg/m^3).

Figure 9a through **Figure 9f** show the contour maps of predicted highest pollutant concentrations for each averaging period during the operation phase. The location and value of the highest predicted concentration is shown in each figure. In terms of the location of the highest predicted concentration increase, as expected, the highest increase in the pollutant concentrations would occur along the perimeter of the Site. However, these higher predicted impacts rapidly drop off within a few meters further away from the Site perimeter. AERMOD Model Electronic Run Files are included in **Appendix E**.

Predicted concentrations during Site Operation for each criteria pollutant were compared with the SILs. The highest 1-hour average NO_2 without including the background was 52.6 μg/m^3 (28.0 ppb), which exceeded the recommended SIL. The highest annual average NO_2 without including the background was 4.5 μg/m^3 (2.4 ppb) below the SIL. The highest 24-hour average PM_{10} without including the background was 7.6 μg/m^3, which exceeded the recommended SIL. The highest 24-hour average $PM_{2.5}$ without including the background was 4.0 μg/m^3, which exceeded the recommended SIL. The highest annual average $PM_{2.5}$ without including the background was 1.1 μg/m^3, which exceeded the recommended SIL. The area outside Site fence boundary with concentrations higher than the SILs are shown in the figures. As shown in the figures, the significant impacts are limited to the Site and its immediate vicinity. The model results show that the predicted concentrations decrease rapidly with distance from the Site boundary.

4.4 Interpretation of Model Predictions

The model predictions indicate the potential impacts from on-site stationary and mobile sources as well as off-site mobile sources after the proposed development project is completed and the Site is operational will be negligible and therefore will not lead to localized exceedances of the NAAQS for NO_2, PM_{10} and $PM_{2.5}$. The estimates may reflect conservative assumptions regarding vehicle utilization and facility-related activities.

The model predictions indicate the potential impacts from on-Site stationary and mobile sources as well as off-Site mobile sources related to the activities during remediation and construction-phases will not lead to localized exceedances of the NAAQS for NO_2, PM_{10} and $PM_{2.5}$. However, it should be noted that the temporary nature of construction and remediation activities differentiate them from other fugitive dust sources as well as constant emissions during Site operation. Construction consists of a series of different operations, each with its own duration and potential for dust generation. In other words, emissions from any single construction site can be expected to have a definable beginning and an end and to vary substantially over different phases of the remediation/construction process. This is in contrast to most other fugitive dust and operation-phase sources, where emissions are either relatively steady or follow a discernable annual cycle.

The remediation and construction activities for the Site are not fully designed yet and therefore, all emission sources, quantities and activities are estimated based on the reviewed documents regarding the Site's historical environmental conditions and anticipated proposed remediations. The construction activities are also based on construction contractor's estimation of the overall number of trucks and earth-moving activities.

For both remediation- and construction-phase activities, it is possible that a sudden increase in number of trucks or Site activity may result in a bump in short-term concentrations (i.e., 1-hour average NO_2 concentration or 24-hour average $PM_{2.5}$ or PM_{10}). Should any changes to the modeled conditions presented here occur at the Site during the remediation and construction phases, it is suggested that appropriate control measures be implemented.

Because of the relatively short-term nature of remediation and construction activities, some control measures are more cost effective than others. Wet suppression and wind speed reduction are two common methods used to control open dust sources at remediation and construction sites, because a source of water and material for wind barriers tend to be readily available on a construction site. However, several other forms of dust control are available. It is recommended that wet suppression be used during remediation and construction phases to further reduce the PM emissions.

Chicago, like many urban areas, has many emission sources of air pollutants that contribute to significant background concentrations of NO_2, PM_{10} and $PM_{2.5}$. Data from the 2020 Illinois Air Quality Report (IEPA, 2020) indicates background concentrations are close to the levels of the National Ambient Air Quality Standards (NAAQS). In all modeled cases, predicted concentrations generally decrease rapidly with distance from the Site boundary, a characteristic of the dispersion of emissions from a ground-level source. The AP42-based value for the space heaters is based on assumption that the heater units run 24 hours per day for 365 days a year and may greatly overestimate actual emissions. The heaters may not run all the time throughout the entire day or in certain seasons (e.g., summer).

Predicted concentrations during Site operation for each criteria pollutant were compared with the SILs. Although the predicted concentrations exceeded the recommended SILs, the areas with significant impacts are limited to the Site and its immediate vicinity. The model results show that the predicted concentrations decrease rapidly with distance from the Site boundary. Furthermore, it does not appear that there is any other emission source with significant impacts in the vicinity of the Site in areas that Site-related impacts show potential exceedances of SILs. Therefore, it is recommended that these impacts, mainly for particulate matter, be mitigated with Site controls such as limiting the working hours in dry-season (e.g., reducing 12-hour workdays to 10- or 8-hour workdays) or by using wet suppression when heavy earth-moving equipment are in operation.

References

CDPH, 2021. Air Quality Impact Evaluation Interim Guidance, prepared by Chicago Department of Public Health (CDPH), September 2021

DPH, 2022. Procedure for Calculating Emissions Using the MOVES Lookup Tables and accompanying Excel Tables, Chicago Department of Public Health, March 2022.

IEPA, 2020. Illinois Annual Air Quality Report, Air Quality Index 2020, prepared by State of Illinois Environmental Protection Agency, Bureau of Air.

Kimley-Horn, 2022. Traffic Impact Study, Chicago Beverage Systems Expansion, Chicago, Illinois, prepared by Kimley-Horn and Associates, Inc. (Kimley-Horn) on, prepared for Reyes Holdings, LLC, September 15, 2022

USEPA 1985. AP-42, Fifth Edition, Volume I, Chapter 11, Section 11.19 Introduction to Construction and Aggregate Processing, US Environmental Protection Agency, September 1985. Available at: https://www.epa.gov/sites/production/files/2020-10/documents/c11s19.pdf.

USEPA 1995. AP-42, Fifth Edition, Volume I, Chapter 13, Section 13.2.3 Heavy Construction Operations, US Environmental Protection Agency, January 1995. Available at: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.3_heavy_construction_operations.pdf.

USEPA 1998a. AP-42, Fifth Edition, Volume I, Chapter 1, Section 1.4: External Combustion Sources – Natural Gas Combustion, US Environmental Protection Agency, July 1998. Available at: www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf.

USEPA 1998b. AP-42, Fifth Edition, Volume I, Chapter 1, Section 11.9: Western Surface Coal Mining, US Environmental Protection Agency, October 1998. Available at: https://www.epa.gov/sites/production/files/2020-10/documents/c11s09.pdf.

USEPA 2006a. AP-42, Fifth Edition, Volume I, Chapter 13, Section 13.2.2 Miscellaneous Sources: Unpaved Roads, US Environmental Protection Agency, November 2006. Available at: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.2_unpaved_roads.pdf.

USEPA 2006b. AP-42, Fifth Edition, Volume I, Chapter 13, Section 13.2.4 Aggregate Handling and Storage Piles, US Environmental Protection Agency, November 2006. Available at: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.4_aggregate_handling_and_storage_piles.pdf.

USEPA 2011. AP-42, Fifth Edition, Volume I, Chapter 13, Section 13.2.1 Miscellaneous Sources: Paved Roads, US Environmental Protection Agency, January 2011. Available at: https://www.epa.gov/sites/production/files/2020-10/documents/13.2.1_paved_roads.pdf.

USEPA, 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas, Transportation and Climate Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, EPA-420-B-15-084, November 2015

USEPA 2017. Guideline on Air Quality Models, "Appendix W" to 40 CFR Part 51, US Environmental Protection Agency, January 17, 2017. Available at: www.epa.gov/scram/clean-air-act-permit-modeling-guidance.

USEPA 2020. Air Quality Design Value Reports, US Environmental Protection Agency, 2020. Available at: www.epa.gov/air-trends/air-quality-design-values.

USEPA 2021a. MOVES3 Motor Vehicle Emissions Model for Emissions Inventories in SIP and Transportation Conformity, US Environmental Protection Agency, January 7, 2021. Available at: www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves#guidance.

USEPA 2021b. AERMOD Modeling System, US Environmental Protection Agency, Version 21112.

USEPA 2021c. AQS Monitor Value Reports, US Environmental Protection Agency, Accessed Sept. 2021. Available at: www.epa.gov/outdoor-air-quality-data/monitor-values-report.

FIGURES

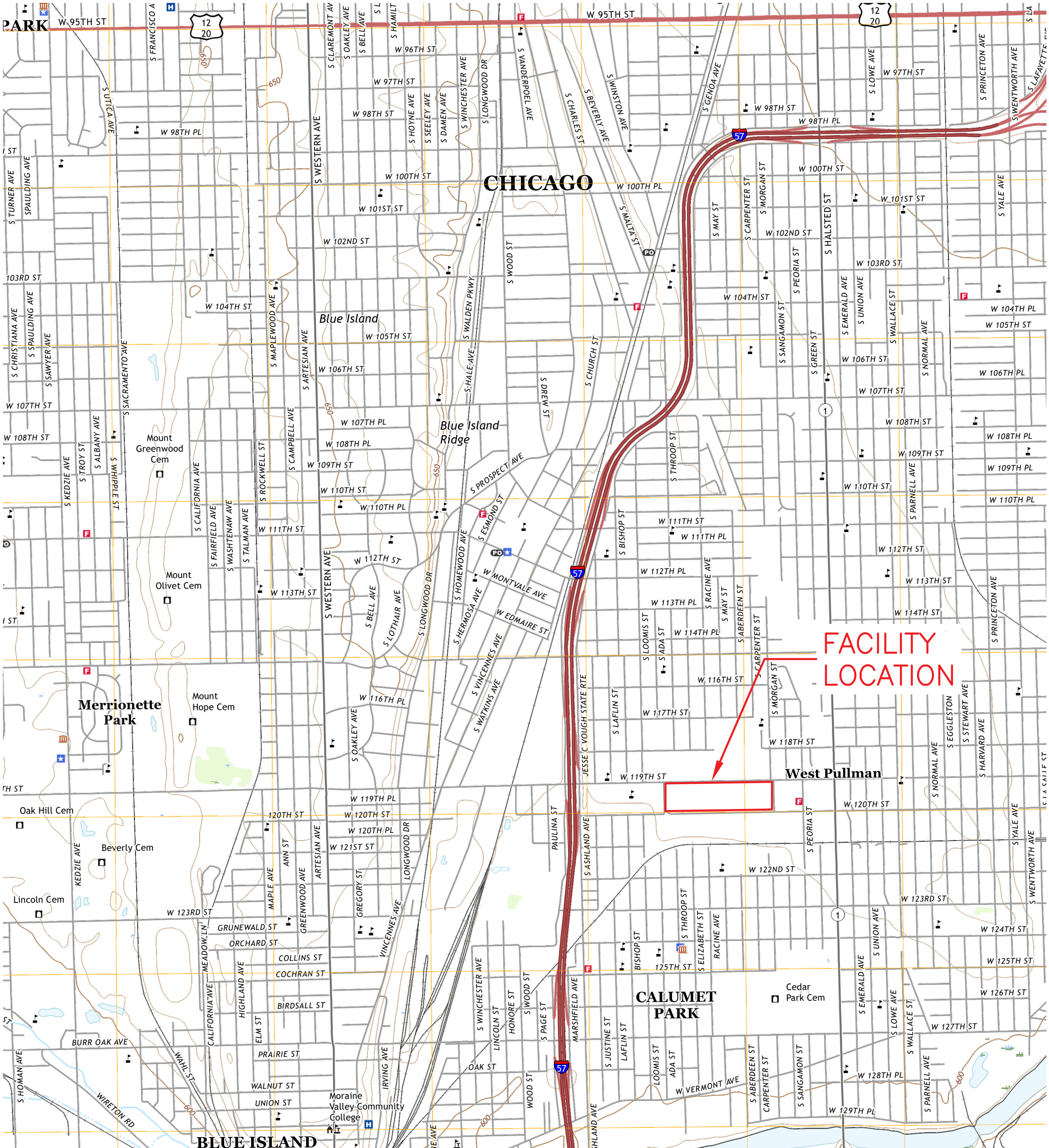
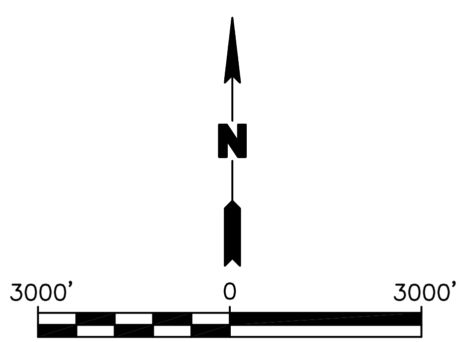


IMAGE SOURCE: USGS US TOPO 7.5-MINUTE MAP FOR BLUE ISLAND, IL 2021: USGS – NGTOC.



Title:

Site Location Map

1021 - 1325 West 119th Street, Chicago, Illinois 60643

Prepared for:

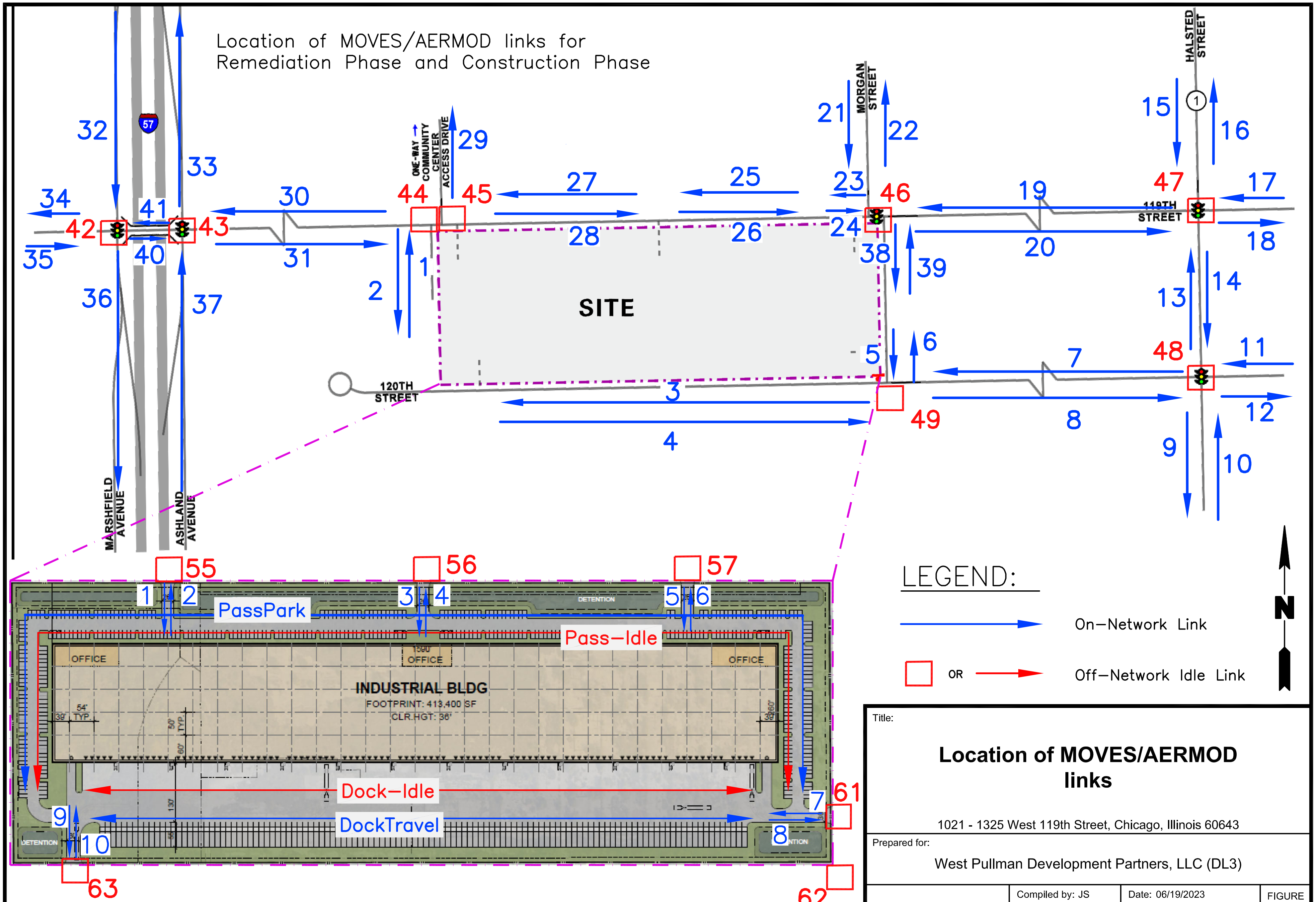
West Pullman Development Partners, LLC (DL3)

ROUX

Compiled by: JS	Date: 06/19/2023	FIGURE
Prepared by: JS	Scale: AS SHOWN	1
Project Mgr: MS	Project: 4182.0001I000	
File: INGERSOLL SITE_FIGURES.DWG		

T:\DL3 REALTY\INGERSOLL SITE\AQIS\CAD\INGERSOLL SITE_FIGURES.DWG

T:\DL3 REALTY\INGERSOLL SITE\AQIS\CAD\INGERSOLL SITE_FIGURES.DWG



NOTE: Inlay shows location of additional MOVES/AERMOD links required for Operation Phase.

Title:

Location of MOVES/AERMOD links

1021 - 1325 West 119th Street, Chicago, Illinois 60643

Prepared for:

West Pullman Development Partners, LLC (DL3)

ROUX	Compiled by: JS	Date: 06/19/2023	FIGURE
	Prepared by: JS	Scale: NOT TO SCALE	2
	Project Mgr: MS	Project: 4182.0001I000	
	File: INGERSOLL SITE_FIGURES.DWG		