Air Quality Impact Statement (AQIS) Report

Proposed Development
10330 S Woodlawn Avenue, Chicago, Illinois 60628

Submitted: October 12, 2023

Prepared for:

Ryan Companies US, Inc.
224 North Des Plaines Street, Suite 100
Chicago, Illinois 60661

Prepared by:

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

Environmental Consulting
& Management
+1.800.322.ROUX
rouxinc.com

3977.0003I000.100.RC

Signature Page

Air Quality Impact Statement (AQIS) Report
Proposed Development
10330 S Woodlawn Avenue
Chicago, Illinois 60628

Mir SeyedAbbasi, Ph.D., P.E.	October 12, 2023	
Technical Director	Date	Signature
Michael J. Hillebrenner, P.E.	October 12, 2023	
Principal Engineer	Date	Signature

ROUX ASSOCIATES, INC.
233 S. Wacker Drive, Suite 4400
Chicago, Illinois 60606

Table of Contents

Table of Contents *(Continued)*

Tables

Figures

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

Acronym	Definition
mph	mile per hour
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NEPA	National Environmental Policy Act
NO2	Nitrogen dioxide
NOx	Nitrogen oxides (NO and NO2)
NWS	National Weather Station
ph	phase
PM	Particulate Matter
PM2.5	Particulate matter with aerodynamic diameter less than 2.5 microns
PM10	Particulate matter with aerodynamic diameter less than 10 microns
ppb	Parts per billion
Pullman 4	Proposed Development Site, 10636 S. Woodlawn Avenue, Chicago, IL
Roux	Roux Associates, Inc.
Site	Proposed Development Site, 10330 S. Woodlawn Avenue, Chicago, IL (Pullman 3)
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VMT	Vehicle Miles Travelled
µg/m3	micrograms per cubic meter

Executive Summary

On behalf of Ryan Companies US, Inc. (Ryan Companies), Roux Associates, Inc. (Roux) has prepared this Air Quality Impact Statement (AQIS) report for the proposed development of the property located at 10330 South Woodlawn Avenue in the City of Chicago, Cook County, Illinois (Pullman 3 Site). The purpose of this AQIS report is to present the results of an air quality impact analysis designed to evaluate the potential site operation impact 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 proposed development project at the Site is 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. Ryan Companies is proposing another development at a nearby property located at 10636 South Woodlawn Avenue in the City of Chicago, Cook County, Illinois (Pullman 4 Site). Due to the location of Pullman 4 site being in close proximity to Pullman 3 Site (approximately 0.6 miles), Pullman 4 was included in the modeling process to account for the combined impact of Pullman 3 and Pullman 4 Sites' operations.

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, the only combustion sources for the proposed building are natural gas-fired space heaters with total heating value of approximately 3,300,000 Btu-per-hour, one potential 100-kW diesel emergency backup power generator, one potential 50-hp diesel-fired fire pump as fire suppression support, and eight potential 50-hp liquified petroleum gas forklifts. 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, and half the forklifts will be operating 24 hours per day for 365 days a year.

The on-Site and off-Site portion of the study estimates mobile-source emissions of Nitrogen Dioxide (NO2), particulate matter less than 10 micrometers aerodynamic diameter (PM10) and particulate matter less than 2.5-micron aerodynamic diameter (PM2.5), associated with the proposed building and intersections, which was identified in a completed Traffic Impact Study, prepared by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) on October 9, 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.

The model predictions indicate the potential impacts from stationary and mobile sources related to the Site's proposed building activities after the development project is complete will be negligible, and therefore will not lead to localized exceedances of the NAAQS for NO2, PM10, and PM2.5. The highest 1-hour average NO2 concentration reaches as high as 80.3 ppb with the seasonal hourly background concentration (below the NAAQS of 100 ppb). The highest annual average NO2 concentration is of the order of 19.4 ppb (below the allowable NAAQS of 53 ppb). The highest 24-hour average PM10 concentration of 109.0 µg/m3 is also below the NAAQS of 150 µg/m3. The highest 24-hour average PM2.5 concentration reaches as high as 25.8 µg/m3 (below the NAAQS of 35 µg/m3). The highest annual average PM2.5 concentration is of the order of 10.9 µg/m3 (below the allowable NAAQS of 12 µg/m3).

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 64.8 µg/m^3 (34.5 ppb), which exceeded the recommended SIL. The highest annual average NO_2 without including the background was 7.6 µg/m^3 (4.0 ppb), which exceeded the recommended SIL. The highest 24-hour average PM_{10} without including the background was 7.0 µg/m^3, which exceeded the recommended SIL. The highest 24-hour average $PM_{2.5}$ without including the background was 2.8 µg/m^3, which exceeded the recommended SIL. The highest annual average $PM_{2.5}$ without including the background was 0.9 µg/m^3, which exceeded the recommended SIL. The significant impacts are limited to the Site and its immediate vicinity.

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 is based on the assumption 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, and half the forklifts operate for 24 hours per day for 365 days 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).

1. Introduction

On behalf of Ryan Companies, Roux Associates, Inc. (Roux) has prepared this Air Quality Impact Statement (AQIS) report for the proposed development of the property (Pullman 3 Site) located at 10330 S. Woodlawn Avenue in the City of Chicago, Cook County, Illinois (**Figure 1**). The Site is located west of South Woodlawn Avenue and south of East 103rd 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 site operation impact on the ambient air quality. Ryan Companies is proposing another development at a nearby property located at 10636 South Woodlawn Avenue in the City of Chicago, Cook County, Illinois (Pullman 4 Site). Due to the location of Pullman 4 site being in close proximity to Pullman 3 Site (approximately 0.6 miles), Pullman 4 was included in the modeling process to account for the combined impact of Pullman 3 and Pullman 4 Sites' operations.

The intent of the ambient air impact analysis is to evaluate whether the proposed building development 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 NO2, particulate matter less than 10 micrometers aerodynamic diameter (PM10), and particulate matter less than 2.5-micron aerodynamic diameter (PM2.5) from Project-generated traffic and from proposed building stationary sources (e.g., heaters and forklifts). The NOX emissions include NO emissions that are converted to NO2 in the atmosphere, as well as directly emitted NO2.

1.1 Report Organization

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 of the proposed building is shown in **Appendix A**. Stationary Source emission calculations are summarized in **Appendix B**. Summary of mobile source link input parameters are shown in **Appendix C**. CDPH-provided Seasonal Hourly NO2 Background Concentrations Table is 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 is located on the east side of S Woodlawn Avenue just south of E 103rd Street. As proposed, the development is to contain a single, approximately 169,520 square-foot warehouse/distribution building with loading docks and car/trailer parking lots on an approximate 10-acre parcel of land with access provided via two access drives on s Woodlawn Avenue. The northern access drive will be located on the west side of the street approximately 180 feet south of E 103rd Street. The proximity to E 103rd Street should not pose any operational issue given that the northern access drive will be bound by right-turn only entry and exit, which minimizes turning conflicts at this intersection. Further, the access drive is proposed to have one inbound lane and one outbound lane with the outbound under stop sign control.

The development will provide 103 parking spaces for employees and customers on the north side of the building. The dock area will be located along the south side of the building with access via S Woodlawn Avenue with approximately 32 loading docks and 28 parking spaces for trailers on the west side of the site. The southern access way will be primary entry/exit way to the truck loading docks and is provided via full-movement access drive located on the west of S Woodlawn Ave. 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.

2.3 Air Quality Regulatory Framework

The Air Quality Ordinance, approved by the 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 Chicago Department of Public Health (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 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 proposed development project when the Site is ready for its potential operation and has excluded an evaluation of the construction of the facility. 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 Chicago Department of Public Health (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. The methodologies that were followed to calculate the pollutant emissions from each source (area and point sources are currently proposed) within the proposed project site as well as mobile-source emissions associated with the proposed facility and intersections are summarized below. Due to the location of Pullman 4 site being in close proximity to Pullman 3 Site (approximately 0.6 miles), Pullman 4 was included in the modeling process to account for the combined impact of Pullman 3 and Pullman 4 Sites' operations.

3.1 Stationary Equipment Emissions

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 NO2, PM2.5 and PM10 emissions from each point source within the proposed project at the Site.

3.1.1 Combustion 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. Subsequent information provided by the project's mechanical, electrical, and plumbing engineer indicates that at this stage of the project the only potential stationary sources are:

- Natural gas-fired space heaters with a total heating value of 3,300,000 British thermal unit (Btu)-per-hour;
- One 100-kW diesel emergency backup power generators;
- One 50-hp diesel-fired fire pump as fire suppression support;
- Eight 50-hp liquified petroleum gas forklifts;

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 3,300,000 British thermal unit (Btu)-per-hour to satisfy the 169,250 square feet area of the proposed building. The space heaters for the existing operation are either rooftop units or have vents on the roof. The space heaters for the proposed development are assumed to be roof mounted on the proposed development 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 20 British thermal units per standard cubic foot (Btu/scf). The calculated emissions rates of each pollutant from four 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 EPA's AP-42 Compilation of Air Pollutant Emission Factors (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) (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 EPA's AP-42 Compilation of Air Pollutant Emission Factors (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**.

Forklifts

The Site is proposed to have a total of eight propane forklifts, four for each tenant, and it is assumed that half of forklifts will be operating at any point in time, for total of four forklifts in operation. Emission calculations utilize emission factors for criteria air pollutants provided in CPDH's Motor Vehicle Emission Simulator (MOVES) Project Year Emission Factors lookup tables for non-road combustible emissions (DPH, 2022). Emissions calculated using MOVES Project Year Emission Factor (g/hp-hr) for a typical liquified petroleum gas forklift multiplied by the engine's power rating (hp) and by the number of forklifts in operation at any time (assumed four forklifts in operation multiplied by 50 hp per forklift to get a total of 150 hp). The calculated emissions rates of each pollutant from the forklifts are summarized in **Table 1**. Details of source emission calculations are presented in **Appendix B**.

Table 1: Calculated Emissions Rates from Stationary Sources

Pollutant	Emission Rate					Unit
	Space Heater[1]	Emergency Backup Power[2]	Fire Pump[2]	Forklift[3]	Total	
NO2	4.17E-02	2.99E-02	1.11E-02	5.13E-02	**1.34E-01**	gr/sec
PM10	3.17E-03	2.12E-03	7.91E-04	3.20E-03	**9.28E-03**	gr/sec
PM2.5	3.17E-03	2.12E-03	7.91E-04	3.20E-03	**9.28E-03**	gr/sec

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

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 "fugitive" 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 is from paved roads. For this Site it is assumed that impacts from fugitive dusts are transient as they relate to construction activities only. Therefore, the air quality impact analysis is conducted for post-development conditions only and no other type of fugitive dust emission sources are modeled.

Particulate emissions (i.e., PM2.5 and PM10) 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 C**.

Table 2: Calculated Fugitive Dust Emissions from Paved Roads

Parameter	PM2.5	PM10	Reference
Average Passenger Car Weight	2 tons		Assumed
Average Truck Weight	20 tons		Assumed
Total Number of Passenger Cars	40 cars		Traffic Study (KLOA, 2023)
Total Number of Trucks	7 trucks		Traffic Study (KLOA, 2023)
Average Vehicle Weight (W)	4.68tons		Calculated
Road Surface Silt Loading (sL)	1.18 g/m^2		Calculated[1]
Mean number of days with 0.01 inch or more of precipitation in Chicago	120 days		Figure 13.2.1-2
Particle Size Multiplier (k)	0.25 g/VMT	1.00 g/VMT	Table 13.2.1-1
Emissions (Uncontrolled)	1.29 g/VMT	5.17 g/VMT	Calculated[2]

Notes:
[1] Calculated from AP-42, Chapter 13.2.1 Table 13.2.1-2 for 240 days of Ubiquitous Baseline and 120 days of Ubiquitous Winter Baseline Multiplier during months with frozen precipitation for low volume roads (< 500 ADT)
[2] Emission factors calculated from AP-42, Chapter 13.2.1 equation (2)

3.2 Mobile Sources Emissions

The on-Site and off-Site portion of the study estimated mobile-source emissions of PM2.5, PM10 and NO2, associated with the proposed facility building development and intersections, which was identified in a completed Traffic Impact Study, prepared by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) on October 9, 2023 (KLOA, 2023). Mobile-source emission rates were modeled using EPA's Motor Vehicle Emission

Simulator (MOVES) emission modeling system. Emission factor lookup tables provided by CDPH was 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 Chicago Metropolitan Agency for Planning (CMAP).

3.2.1 Traffic Data Preparation

Traffic data was obtained from the Traffic Impact Study (KLOA, 2023) for the calendar years 2023 (actual observations) and 2029 (projections). The Traffic Impact Study evaluated the potential traffic impacts of the proposed Pullman 3 facility located west of S Woodlawn Avenue and south of E 103rd Street in Chicago, Illinois, along with the potential traffic impacts of the proposed Pullman 4 facility located west of S Woodlawn Avenue and north of Pullman Park Main Access. Due to the proximity of the Pullman 4 facility to the Pullman 3 facility, KLOA included the impact of each site on one another. Similar methodology was followed for the modeling of each site.

According to the Traffic Impact Study (KLOA, 2023), traffic counts at the existing driveways were used to calculate site-generated trips associated with the proposed site. Currently, the site is designed to be an industrial warehouse and used for supply chain warehousing. **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 Afternoon Peak Hour	
	In	Out	In	Out
Passenger Cars	32	7	9	31
Trucks	2	3	4	3

Notes:
- Projected volumes are conservatively estimated as equal to the existing trip generation associated with the current 44,187 square-foot facility.
- Truck operations on site are expected to remain consistent with existing conditions, only relocated to the east side of the building.

Based on the traffic counts that were performed in September 2023, during the weekday morning (7:00 to 9:00 A.M.) and evening (4:00 to 6:00 P.M.) peak periods, the weekday morning peak hour generally occurs from 7:45 to 8:45 A.M. and the weekday evening peak hour generally occurs from 4:00 to 5:00 P.M. The trip generation estimated for passenger cars are based on actual counts collected at the site driveways during peak hours.

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 Table 3 and Table 6 of the Traffic 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 @ 103rd St / Woodlawn Ave	15.2	14.2	**14.7**
Stop Sign @ Pullman 3 N Entrance / Woodlawn Ave	9.7	10.4	**10.1**
Stop Sign @ Pullman 3 S Entrance / Woodlawn Ave	11.6	12.1	**11.9**
Stop Sign @ Amazon N access drive & Woodlawn Ave	8.4	12.6	**10.5**
Stop Sign @ Amazon middle N access drive & Woodlawn Ave	9.1	10.2	**9.6**
Stop Sign @ Amazon middle S access drive & Woodlawn Ave	7.1	9.8	**8.5**
Stop Sign @ South Community Center Access & Woodlawn Ave	1	0	**1**
Stop Sign @ Gotham Greens access & Woodlawn Ave	9.0	10.9	**9.9**
Stop Sign @ Pullman 4 N Entrance & Woodlawn Ave	11	12.2	**11.6**
Stop Sign @ Pullman 4 S Entrance & Woodlawn Ave	10.2	11.0	**10.6**
Stop Sign @ Pullman Park Main Access & Doty Ave	9.7	10.6	**10.1**

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
Reference: KLOA, 2023 Capacity Analysis Summary Sheets - Projected Weekday Morning and Evening Peak Hour Conditions

3.2.2 Mobile Sources Emissions

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*) includes default PM10, PM2.5 and NOx 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). All major roads were assumed to have either a 30-mph or 35-mph speed limit. Vehicles will travel on Site Access roads at approximately 5 miles per hour (mph) in links entering and exiting the Site. **Figure 2** shows the links locations with proposed development traffic impact.

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 segments 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 @ 103rd St & Woodlawn Ave (Link 35)

- Stop Sign @ Pullman 3 N Entrance & Woodlawn Ave (Link 36)
- Stop Sign @ Pullman 3 S Entrance & Woodlawn Ave (Link 37)
- Stop Sign @ Amazon N access drive & Woodlawn Ave (Link 38)
- Stop Sign @ Amazon middle N access drive & Woodlawn Ave (Link 39)
- Stop Sign @ Amazon middle S access drive & Woodlawn Ave (Link 40)
- Stop Sign @ South Community Center Access & S Doty Ave (Link 41)
- Stop Sign @ Gotham Greens access & Woodlawn Ave (Link 42)
- Stop Sign @ Pullman 4 N Entrance & Woodlawn Ave (Link 43)
- Stop Sign @ Pullman 4 S Entrance & Woodlawn Ave (Link 44)
- Stop Sign @ Pullman Park Main Access & Doty Ave (Link 45)
- Passenger car idling in the parking lot on the Pullman 3 Site (Link Pass-Idle3)
- Trucks idling at the docks on the Pullman 3 Site (Link Dock-Idle3)
- Passenger car idling in the parking lot on the Pullman 4 Site (Link Pass-Idle4)
- Trucks idling at the docks on the Pullman 4 Site (Link Dock-Idle4)

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 5 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 segments 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:

- 38 on-network travel links (Links 1 through 34, PassPark3 and DockTravel3 for Pullman 3 site, PassPark4 and DockTravel4 for Pullman 4 site) that were used to describe driving activities of passenger cars on-Site and on the roads surrounding the Site that will be impacted by the proposed development; and
- 15 off-network idle links (Links 35 through 45, Pass-Idle3 and Dock-Idle3 for Pullman 3 site, Pass-Idle4 and Dock-Idle4 for Pullman 4 site) 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).

Details of source emission calculations are presented in **Appendix B**. Summary of mobile source link input parameters are shown in **Appendix C**. Emission rates were then used for AERMOD dispersion modeling, which is further described in following Section.

3.3 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

3.3.1 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_n42w088.tif*" that covered the Site in southeast 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 the hill heights.

3.3.2 Regional Climatology

The Site is located within Cook County, Illinois. The county receives, on average, 42 inches of precipitation annually and approximately 100 days with measurable precipitation. The average wind speed is 8 mph. Long-term climatological data is summarized in **Table 5** below for the Cook County region calculated over a period of 10 years from 2013 through 2023. While regionally representative, the climatology data can be assumed to differ slightly from that at the Site.

Table 5: Cook County Monthly Averages of Climatology Parameters

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temp. (F)	Hi 30° Lo 19°	Hi 33° Lo 20°	Hi 46° Lo 32°	Hi 57° Lo 41°	Hi 69° Lo 52°	Hi 79° Lo 62°	Hi 82° Lo 66°	Hi 82° Lo 66°	Hi 76° Lo 60°	Hi 62° Lo 48°	Hi 48° Lo 35°	Hi 37° Lo 26°
Avg. Wind Speed (mph)	10	10	9	9	8	7	6	6	7	9	10	9
Avg. Precip. (in)	2.3	2.7	3.5	5.4	6.1	6.5	4.7	4.4	3.5	4.5	2.4	2.6
Average Humidity (%)	82	82	73	72	74	74	76	74	71	69	71	78
Avg. Cloud Cover (%)	61	58	51	49	43	34	32	30	30	41	42	56
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	18	16	21	20	20	19	22	22	23	23	24	22
Avg. Precip. Days	8	7	8	9	11	11	9	9	7	8	6	7
Average Snow Days	5	5	3	1	0	0	0	0	0	0	1	3
Average Fog Days	0	0	0	0	0	0	0	0	1	0	0	0
Average UV Index	1	2	2	3	5	5	6	5	5	2	1	1
Avg. Hours of Sun	115	113	144	144	184	219	229	239	231	186	176	127

Notes:

Averages are based on historical weather data from the past 10 years (2013-2023).

Source: https://www.weatherwx.com/hazardoutlook/il/cook+county.html

3.3.3 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 the base elevation of 188.4 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 43,848 available hourly measurements from 1/1/2016 through 12/31/2020 timeframe was 4.7 mph with a maximum wind speed of 16.4 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.

3.3.4 Pollutants and Averaging Periods

Modeling was conducted for emissions of NO2, PM10 and PM2.5 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 were used for compliance demonstration (i.e., comparison with NAAQS).

- NO2 – Annual and 1-hour averaging period
- PM10 –24-hour averaging period
- PM2.5 - 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 NO2/NOx ratio (i.e., the maximum allowed ratio) was set to 0.9.

3.3.5 Emission Sources and Rates

AERMOD has the capability of modeling various types of stationary and mobile sources that include point sources, 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 point source was used for modeling of the emissions from on-Site stationary sources (e.g., space heaters). The on-network and off-network mobile sources were modeled using area sources. The following release heights above ground level (AGL) for each source type were assumed:

- Stationary Sources: The space heaters, emergency backup power system, Fire Pump (Fire Suppression Support), and forklifts were modeled as a point source located in the approximate center of the Warehouse building with a stack release heights equal to 9.6 meters AGL (using a 30 foot building height), based on the assumption that the average diffuse release will be spread uniformly over the entire area of the Warehouse footprint.
- On-Network Mobile Sources: An average release height of 1.7 m AGL was assumed for all on-network links where passenger cars and trucks contribute to the emissions. An average release height of 1.3 m AGL (for passenger car links) and 3.4 m AGL (for truck links) were assumed for on-network links where only passenger car or only trucks contribute to the emissions.
- Off-Network Idle Mobile Sources: The parking lots were modeled as area sources with the horizontal dimensions of the parking lot and dock lengths, width of 8 meters, and an average release height of 1.3 m AGL (for passenger car links) and 3.4 m AGL (for truck links) were assumed for on-network links where only passenger car or only trucks contribute to the emissions.

Following 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 6:**

- *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 6: Vehicle Release Parameters

Parameter	Passenger	Truck	Weighted Value
Daily Passenger Car/Truck Percentage	81%	19%	
Vehicle Height (m) - assumed	1.5	4.0	**2.0**
Top of Plume Height (m)	2.6	6.8	**3.4**
Release Height (m)	1.3	3.4	**1.7**
Initial Vertical Dimension (m)	1.2	3.2	**1.6**

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

One point source was used to represent all stationary sources emissions (i.e., space heaters, emergency backup power system, fire suppression support, and on-site forklifts). The building height is assumed to be 30 ft, so a stack height of 32 ft was assumed. An initial vertical dimension of 13.95 ft (building height divided by 2.15 for a surface-based source) was assumed. **Table 7** provides the modeling design parameters of each source of emissions.

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** and **Figure 6**. The emissions sources were input to AERMOD with the calculated emission rates in gram/(second.m^2) multiplied by the emission factors. 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, and half of the forklifts operate for 24 hours per day for 365 days a year. For mobile sources, it was conservatively assumed that the peak volumes from the traffic study (KLOA, 2023) occurred throughout the entire 24 hours of the day. AERMOD model input information is presented in **Appendix E**.

Table 7: AERMOD Modeling Design Parameters

Modeling Parameters	Stationary Source(s)	Mobile Source(s)
AERMOD Executable	EPA Version 21112	
Regulatory Templates	Concentration only, with no depletion options	
Receptor Heights (AGL)	Flagpole receptors at 1.8 m (assumed average breathing height)	
Meteorology Options	Merged 5-year (1/1/2016 through 12/31/2020) surface and upper air data	

Modeling Parameters	Stationary Source(s)	Mobile Source(s)
Output Options	Receptor, day, and maximum tables, Contour plots, Summary reports and Post files	
Source Type	Point	Area
Emission Rates	NO_2: 1.34E-01 gr/sec PM10: 9.28E-03 gr/sec PM2.5: 9.28E-03 gr/sec	Variable[1]
Release Height	4.6 m	1.7 m
Initial Vertical Dimension	4.3 m	1.6 m

Notes:
[1] See section 3.2.2 and Appendix C for mobile source emission rates

3.3.6 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 PM2.5 and PM10 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 6**. The grid consists of approximately 550 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 37 receptors.
- 50-m spacing out to approximately 250 meters from the Fenceline receptors;
- 100-m spacing between 0.25 and 0.5 km from sources;
- 250-m spacing between 0.5 and 1 km from sources; and
- 500-m spacing between 1 and 2 km from sources;

3.3.7 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, $PBW = \mathrm{sqrt}(length^2 + width^2)$. 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.

3.3.8 Design Values and Applicable Standards

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.

Only criteria air pollutant impacts were assessed as part of the modeling analysis. The criteria air pollutants which are particulate matter less than or equal in diameter to ten microns (PM10), particulate matter less than or equal in diameter to 2.5 microns (PM2.5), and nitrogen dioxide (NO2). 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 7**). 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 NO2 Concentrations for use with Southwestern Chicago 1-Hour NO2 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
NO2	1-Hour	CDPH Table*	100	4.0	ppb
	Annual	15.4	53	0.5	ppb
PM10	24-Hour	102	150	5	µg/m³
PM2.5	24-Hour	23	35	1.2	µg/m³
	Annual	10	12	0.2	µg/m³

Notes:
* CDPH-provided Table of Seasonal Hourly Ambient NO2 Concentrations for use with Southwestern Chicago 1-Hour NO2 Modeling
- NO2 annual data from Com Ed Maintenance Bldg (2018-2020) Monitor ID 17-031-0076
- PM10 data from Village Hall (2018-2020) Monitor ID 17-031-1016
- PM2.5 data from Village Hall (2018-2020) Monitor ID 17-031-1016

3.3.9 Post-Development Impact

Post-Development Impacts were calculated by adding modeled receptor values to the design values. The resulting Post-Development Impact concentration was then compared to the NAAQS. The Post-Development Impact concentrations for each pollutant and averaging period are summarized in **Table 8** compared with NAAQS.

- **1-hour NO2**. The 1-hour NO2 Post-Development 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 NO2 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.
- **Annual NO2**. The annual NO2 Post-Development 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 and compared to the NAAQS.
- **24-hour PM10**. The 24-hour PM10 Post-Development 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 and compared to the NAAQS.
- **24-hour PM2.5**. The 24-hour PM2.5 Post-Development 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 and compared to the NAAQS.
- **Annual PM2.5**. The annual PM2.5 Post-Development 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 and compared to the NAAQS.

AERMOD output concentrations were reported in μg/m³ units for all pollutants. However, NO2 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 NO2). Assuming an ambient pressure of 1 atmosphere and a temperature of 25 degrees Celsius, the conversion factor for NO2 concentrations is C(ppb) = C(μg/m³) / 1.88

3.4 Assumptions

3.4.1 Facility and Equipment Operating Hours

The operating hours of the facility were assumed conservatively to be 24 hours a day and seven days a weeks. 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-hour during each day. On-site combustion emissions from natural gas sources could occur at any time during a 24-hour day.

3.4.2 On-site Emissions

- Heater emissions during all hours of the 24-hour day will occur up to the full MMBtu/hr rating assumed for emissions (i.e., 1.69 MMBtu/hr). This assumption is very conservative because space heaters will not be operating at full rating all of the time.
- For the worst-case scenario modeled here it is assumed that the emissions from space heaters, emergency backup power generators, fire pumps, and forklifts are running at the same time which is very unlikely.
- Since Table 3.3.1 in AP-42 Section 3.3 only provides PM10 emission factors for fire pump and emergency backup power system, it was assumed that PM2.5 and PM10 emission factors were equal.
- Forklift emissions will occur during all hours of the 24-hour day for half of the total number of forklifts on-site (i.e., 150 hp/day).
- 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.
- 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 40 passenger cars and 7 trucks travel on paved roads of the Site per hour. A road surface silt loading of 1.18 gr/m2 was calculated as a worse case for a low average daily traffic (ADT) volume (i.e., ADT<500).

3.4.3 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 81% passenger – 19% 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 5 minutes on-Site.
- It was assumed that 7 out of total 32 docks are filled with trucks at all times and trucks will idle at the docks for a maximum of 3 minutes per hour during 24 hours of the day and 7 days a week.
- It was conservatively assumed that the peak hour inbound and outbound vehicles from Table 1 of Traffic Study exist on-site during the peak hour and therefore, the sum of inbound and outbound vehicles was used to generate the peak-hour vehicle traffic volumes.
- Trucks traffic was assumed conservatively to be 7 trucks per hour entering and exiting the driveway for AM and PM peak hours and every ther hour during the day.

3.4.4 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 for 0.5 mile.
- On-Site travel of passenger vehicles will occur over the full east-west length of the north side of the property and is over approximately 468 feet. On-Site travel of trucks will occur over approximately 642 feet of the east-west length of the south and west sides of the property.
- Ten 15m-by-15m area sources were used to model off-network idle links that represent vehicle idling emissions from passenger cars. These links were located at Woodlawn Avenue / Pullman 3 North Entrance; Woodlawn Avenue / Pullman 3 North Entrance; Amazon North Access Drive / Woodlawn Avenue; Amazon Middle North Access Drive / Woodlawn Avenue; Amazon Middle South Access Drive / Woodlawn Avenue; South Community Center Access / Woodlawn Avenue; Gotham Greens Access / Woodlawn Avenue; Woodlawn Avenue / Pullman 4 North Entrance; and Woodlawn Avenue / Pullman 4 South Entrance. One 25m-25m area source was used to model the multilane off-network idle link located at Woodlawn Avenue / E 103rd Street.
- 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). These area source links have a total area of approximately 1141 m^2 for Pullman 3 and a total area of approximately 2433 m^2 for Pullman 4.
- For NO2 modeling, the ARM2 option was chosen with a default NO2/NOX in-stack ratio (ISR) of minimum 0.5 and maximum 0.9 following USEPA guidance (USEPA 2017).
- For mobile sources, the estimated 24-hour site generated traffic from Table 2 of the traffic study (KLOA, 2023) was used to generate daily variable emission rates. It was conservatively assumed that the site activities occurred 7 days a week.
- The average passenger vehicle height will be 1.5 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).

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 NO2 concentrations, the maximum 24-hour average and the maximum annual-average PM10 concentrations, and 24-hour average and maximum annual-average PM2.5 concentrations. The modeling results are presented in the following sections.

4.1 Modeling Results

The air dispersion modeling results and corresponding figures that graphically summarize the modeling results are described below. **Table 9** summarizes the modeled value and Post-Development Impact concentrations for each pollutant and averaging period compared with NAAQS. As Shown in **Table 9**, predicted concentrations as a result of Site operation are relatively small compared to the background concentrations and the pollutant concentrations do not exceed National Ambient Air Quality Standards (NAAQSs). Among the pollutants and averaging periods, the highest 1-hour average NO2 concentration had the highest increase, but still well below the NAAQS.

Figure 8 through **Figure 13** show the contour maps of predicted highest pollutant concentrations for each averaging period. 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 Sites. However, these higher predicted impacts rapidly drop off within a few meters further away from the Site perimeter. Since both the Pullman 3 Site and the Pullman 4 site were modeled simultaneously, the results show the highest concentration increase to be located along the perimeter of the Pullman 4 site. However, it can be noted that the highest concentration increases along the Pullman 3 perimeter are less than the highest concentration values in the rest of this section. AERMOD Model Electronic Run Files are included in **Appendix G**.

Table 9 Post-Development Impact for each Pollutant and Averaging Period compared with NAAQS

Pollutant	Averaging Period	Modeled Value	Design Values	Post-Development Impact		NAAQS	Unit
NO2	1-Hour	80.3	CDPH Table	**80.3**	<	**100**	ppb
	Annual	4.0	15.4	**19. 4**	<	**53**	ppb
PM10	24-Hour	7.0	102.0	**109.0**	<	**150**	µg/m^3
PM2.5	24-Hour	2.8	23	**25.8**	<	**35**	µg/m^3
	Annual	0.9	10	**10.9**	<	**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 Post-Development Impact values are rounded to nearest 0.1 µg/m^3 for PM10 and PM2.5 or ppb for NO2 (USEPA, 2015)

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

4.1.1 1-hour NO2

Figure 8 shows the highest 1-hour average NO2 concentration predictions resulted from the proposed development project (i.e., modeled receptor value) with seasonal background. With the CDPH-provided seasonal hourly background concentrations entered in the model, the modeled values include the background concentrations (i.e., design values) and therefore the 1-hour NO2 Post-Development Impact was equal to the modeled receptor value. The resulting 1-hour NO2 Post-Development Impact concentration was then rounded to the nearest 0.1 µg/m^3 (USEPA, 2015). 1-hour NO2 Post-Development Impact of 80.3 ppb is less than the 1-hour NO2 NAAQS (100 ppb). This demonstrates that the proposed development project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the NO2 NAAQS. Therefore, the proposed development project will not cause an exceedance of the 1-hour NO2 NAAQS.

Figure 9 shows the highest 1-hour average NO2 concentration predictions resulted from the proposed development project (i.e., modeled receptor value) without the seasonal background. The highest 1-hour average NO2 concentration of 64.8 µg/m^3 (34.5 ppb) was only used to be compared with the recommended SIL for 1-hour NO2.

4.1.2 Annual NO2

Figure 10 shows the highest annual average NO2 concentration predictions resulted from the proposed development project (i.e., modeled receptor value). The annual NO2 Post-Development Impact was calculated by adding the modeled receptor value to the design value (USEPA, 2015). The resulting annual NO2 Post-Development Impact concentration was then rounded to the nearest 0.1 µg/m^3 (USEPA, 2015). The annual NO2 Post-Development Impact of 19.4 ppb is less than the annual NO2 NAAQS (53 ppb). This demonstrates that the proposed development project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the NO2 NAAQS. Therefore, the proposed development project will not cause an exceedance of the NO2 NAAQS.

4.1.3 24-hour PM10

Figure 11 shows the highest 24-hour average PM10 concentration predictions resulted from the proposed development project (i.e., modeled receptor value). The 24-hour PM10 Post-Development Impact was calculated by adding the modeled receptor value to the design value (USEPA, 2015). The resulting 24-hour PM10 Post-Development Impact concentration was then rounded to the nearest 10 micrograms per cubic meter (µg/m^3) (USEPA, 2015). The 24-hour PM10 Post-Development Impact of 109 µg/m^3 are less than the 24-hour PM10 NAAQS (150 µg/m^3). This demonstrates that the proposed development project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the PM10 NAAQS. Therefore, the proposed development project will not cause an exceedance of the PM10 NAAQS.

4.1.4 24-hour PM2.5

Figure 12 shows the highest 24-hour average PM2.5 concentration predictions resulted from the proposed development project (i.e., modeled receptor value). The 24-hour PM2.5 Post-Development Impact was calculated by adding the modeled receptor value to the design value (USEPA, 2015). The resulting 24-hour PM2.5 Post-Development Impact concentration was then rounded to the nearest 0.1 µg/m^3 (USEPA, 2015). The 24-hour PM2.5 Post-Development Impact of 25.8 µg/m^3 are less than the 24-hour PM2.5 NAAQS (35 μg/m^3). This demonstrates that the proposed development project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the 24-hour PM2.5 NAAQS. Therefore, the proposed development project will not cause an exceedance of the 24-hour PM2.5 NAAQS.

4.1.5 Annual PM2.5

Figure 13 shows the highest annual average PM2.5 concentration predictions resulting from the proposed development project (i.e., modeled receptor value). The annual PM2.5 Post-Development Impact was calculated by adding the modeled receptor value to the design value (USEPA, 2015). The resulting annual PM2.5 Post-Development Impact concentration was then rounded to the nearest 0.1 μg/m^3 (USEPA, 2015). The annual PM2.5 Post-Development Impact of 10.9 μg/m^3 is less than the annual PM2.5 NAAQS (12 μg/m^3). This demonstrates that the proposed development project would not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the annual PM2.5 NAAQS. Therefore, the proposed development project will not cause an exceedance of the annual PM2.5 NAAQS.

4.1.6 Modeling Results Compared with SILs

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 64.8 μg/m^3 (34.5 ppb), which exceeded the recommended SIL. The highest annual average NO_2 without including the background was 7.6 μg/m^3 (4.0 ppb), which exceeded the recommended SIL. The highest 24-hour average PM_{10} without including the background was 7.0 μg/m^3, which exceeded the recommended SIL. The highest 24-hour average $PM_{2.5}$ without including the background was 2.8 μg/m^3, which exceeded the recommended SIL. The highest annual average $PM_{2.5}$ without including the background was 0.9 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 Interpretation of Model Predictions

The model predictions indicate the potential impacts from stationary and mobile sources related to the activities 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 NO2, PM10 and PM2.5. The estimates may reflect conservative assumptions regarding vehicle utilization and facility-related activities.

Chicago, like many urban areas, has many emission sources of air pollutants that contribute to significant background concentrations of NO2, PM10 and PM2.5. 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).

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 certain seasons (e.g., summer).

The highest 1-hour average NO_2 concentration reaches as high as 80.3 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 19.4 ppb (below the allowable NAAQS of 53 ppb). The highest 24-hour average PM_{10} concentration of 109.0 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 25.8 µg/m^3 (below the NAAQS of 35 µg/m^3). The highest annual average $PM_{2.5}$ concentration is of the order of 10.9 µg/m^3 (below the allowable NAAQS of 12 µg/m^3).

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.

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.

KLOA, 2023. Traffic Impact Study, 10330 S. Woodlawn Avenue Industrial Development, Chicago, Illinois, prepared by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.), prepared for Ryan Companies, Inc., October 9, 2023

USEPA 1998. 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 2011. AP-42, Fifth Edition, Volume I, Chapter 13, Miscellaneous Sources Section 13.2.1: 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

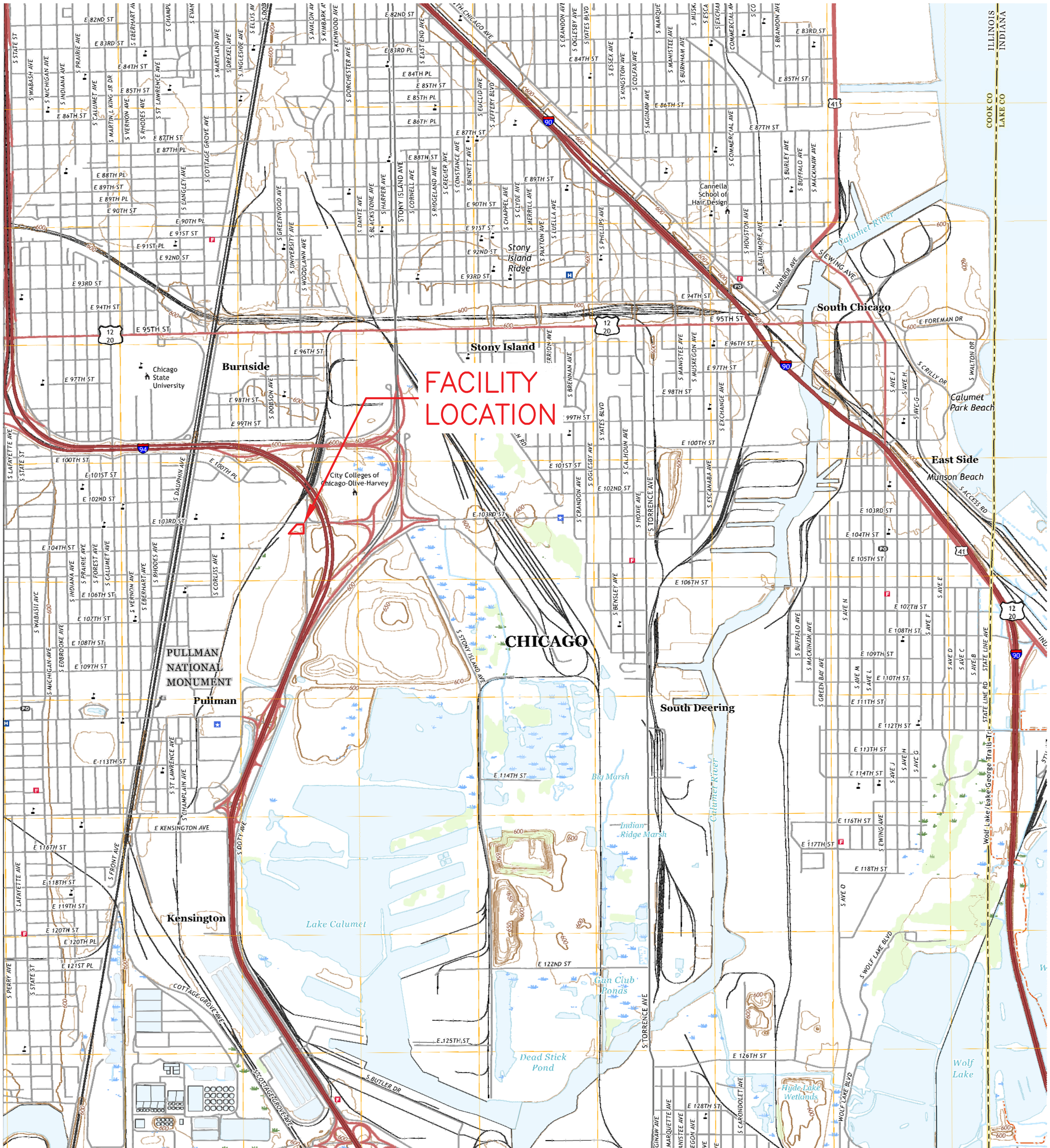
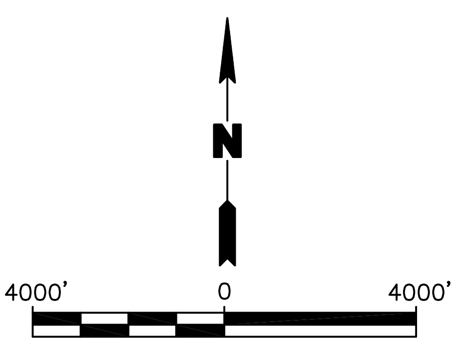


IMAGE SOURCE: USGS US TOPO 7.5-MINUTE MAP FOR LAKE CALUMET, IL,IN 2021: USGS – NGTOC.



Title:

Site Location Map

10330 S Woodlawn Avenue, Chicago, IL

Prepared for:

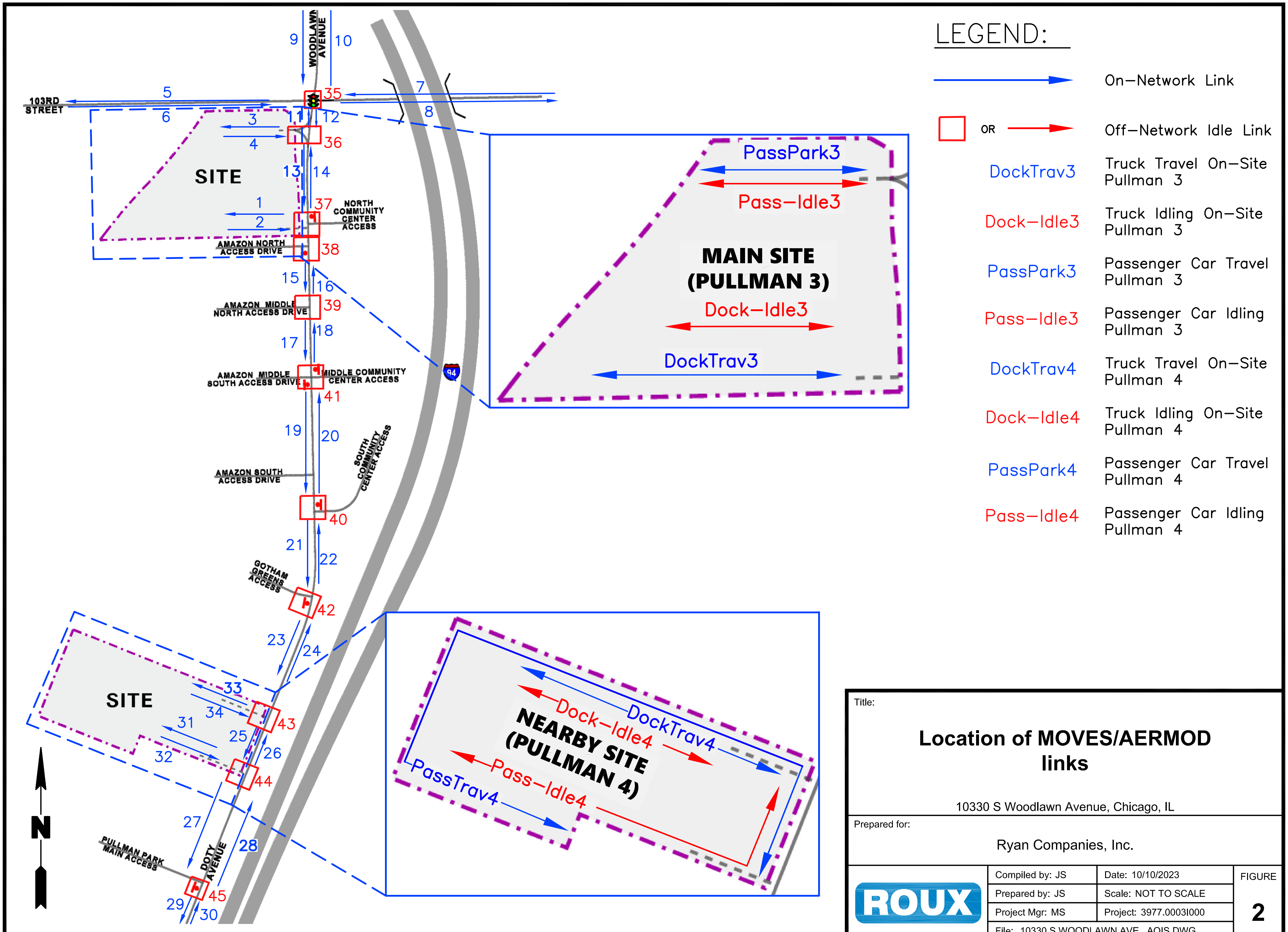
Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE
Prepared by: JS	Scale: AS SHOWN	1
Project Mgr: MS	Project: 3977.0003I000	
File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



Title:

Location of MOVES/AERMOD links

10330 S Woodlawn Avenue, Chicago, IL

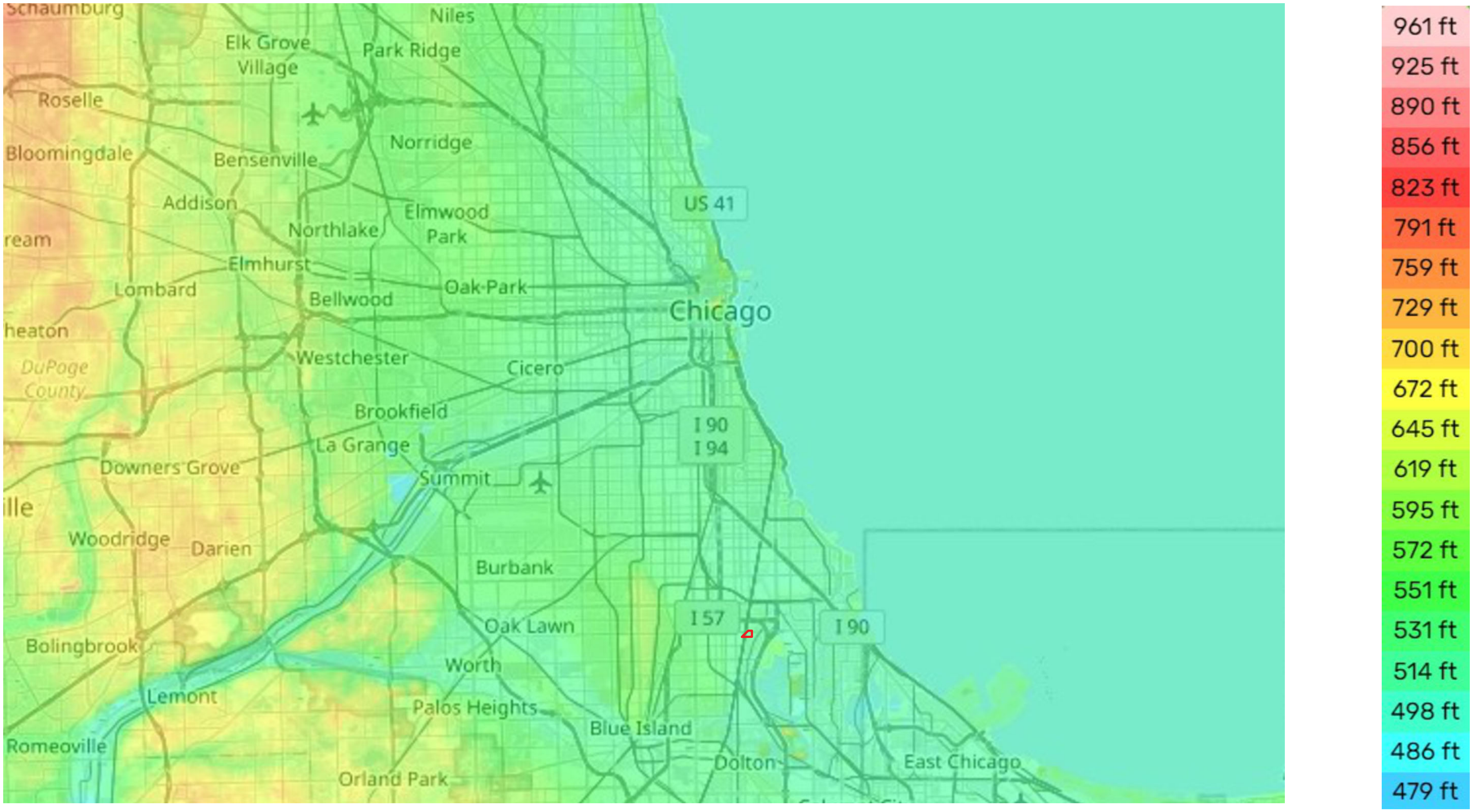
Prepared for:

Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE	
Prepared by: JS	Scale: NOT TO SCALE	2	
Project Mgr: MS	Project: 3977.0003I000		
File: 10330 S WOODLAWN AVE_ AQIS.DWG			

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



Chicago, Cook County, Illinois, United States

N

Title:

Local Topography of the Area Surrounding the Site

10330 S Woodlawn Avenue, Chicago, IL

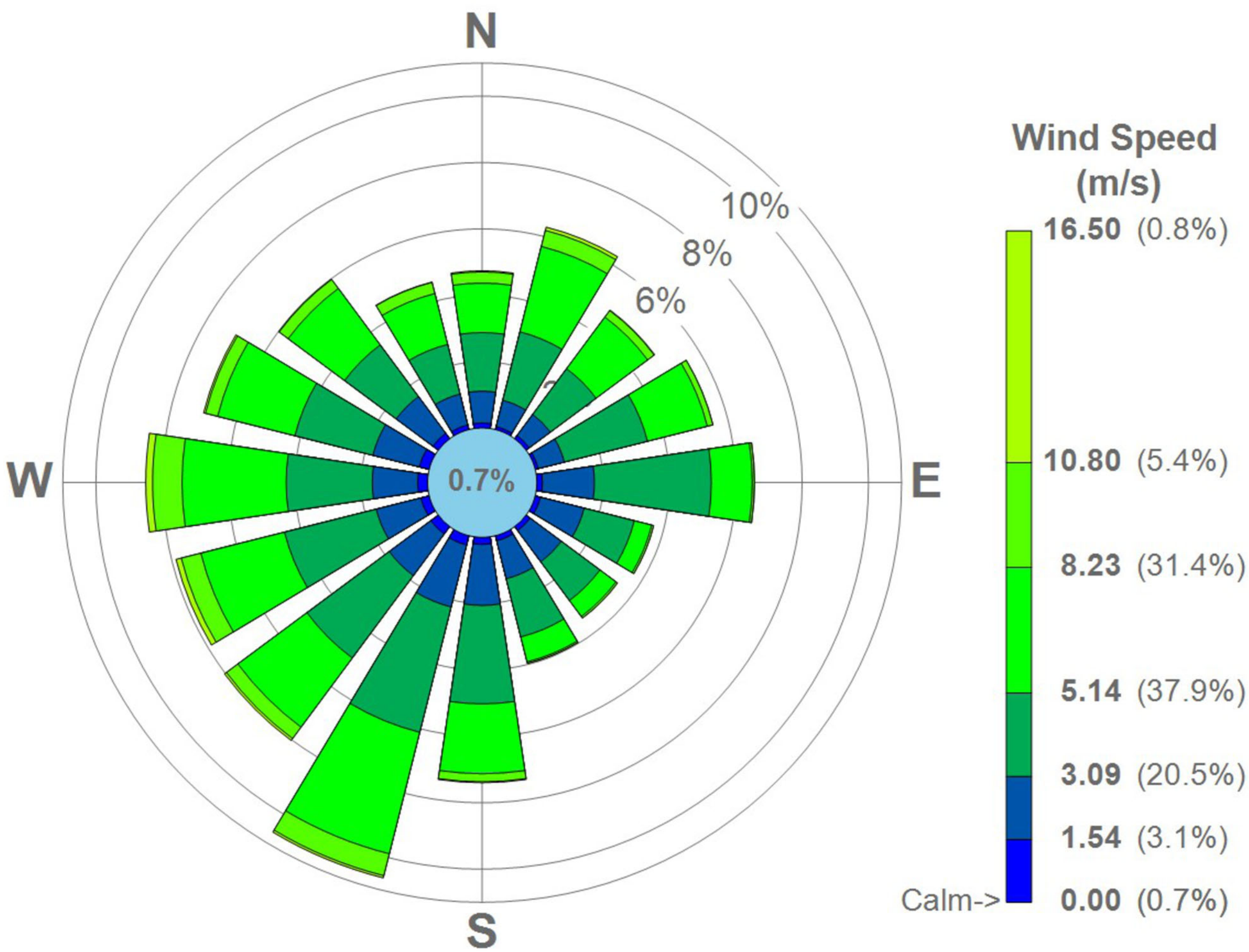
Prepared for:

Ryan Companies, Inc.

ROUX	Compiled by: JS	Date: 10/10/2023	FIGURE
	Prepared by: JS	Scale: NOT TO SCALE	3
	Project Mgr: MS	Project: 3977.0003I000	
	File: 10330 S WOODLAWN AVE_ AQIS.DWG		

Source: https://en-us.topographic-map.com/maps/ncg/Chicago/

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



N

Title:

Windrose for Midway Chicago IL Station for the Time Period January 1, 2016 - December 31, 2020

10330 S Woodlawn Avenue, Chicago, IL

Prepared for:

Ryan Companies, Inc.

ROUX	Compiled by: JS	Date: 10/10/2023	FIGURE
	Prepared by: JS	Scale: NOT TO SCALE	4
	Project Mgr: MS	Project: 3977.0003I000	
	File: 10330 S WOODLAWN AVE_ AQIS.DWG		

LEGEND:

Area Source

Point Source

N

600' 0 600'

Title:

AERMOD Source Layout

10330 S Woodlawn Avenue, Chicago, IL

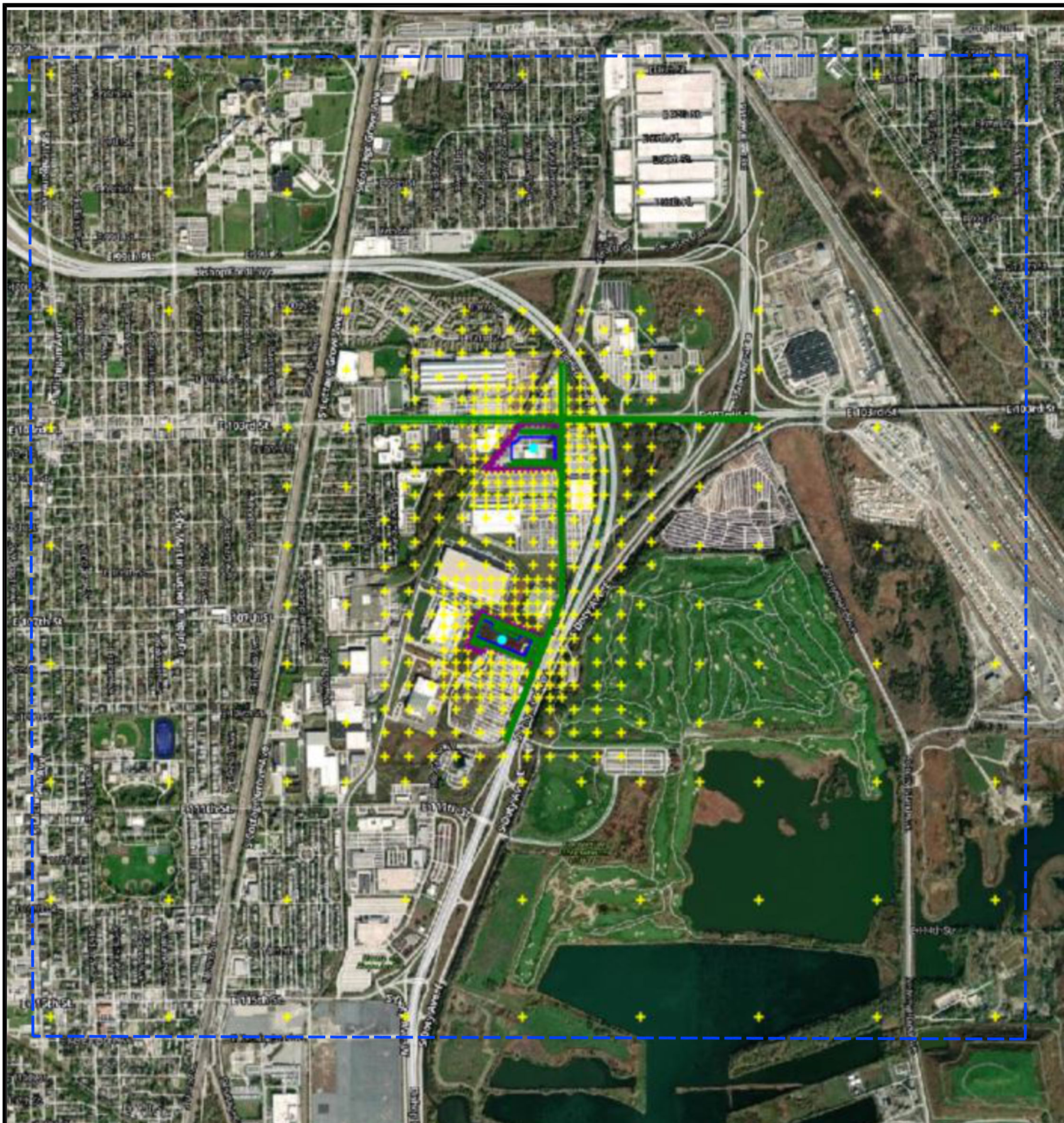
Prepared for:

Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE
Prepared by: JS	Scale: AS SHOWN	5
Project Mgr: MS	Project: 3977.0003I000	
File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



2000' 0 2000'

LEGEND:

- AERMOD Discrete Receptors
- AERMOD Boundary Receptors
- AERMOD Modeling Domain
- Area Source
- Point Source

N

Title:

AERMOD Modeling Domain and Receptor Network

10330 S Woodlawn Avenue, Chicago, IL

Prepared for:

Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE
Prepared by: JS	Scale: AS SHOWN	6
Project Mgr: MS	Project: 3977.0003I000	
File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG

LEGEND:

Monitoring Site

Pullman 3 Project Site

Pullman 4 Project Site

Cook County Boundary

N

32000' 0 32000'

Title:

Cook County Monitoring Site Locations - 2020

10330 S Woodlawn Avenue

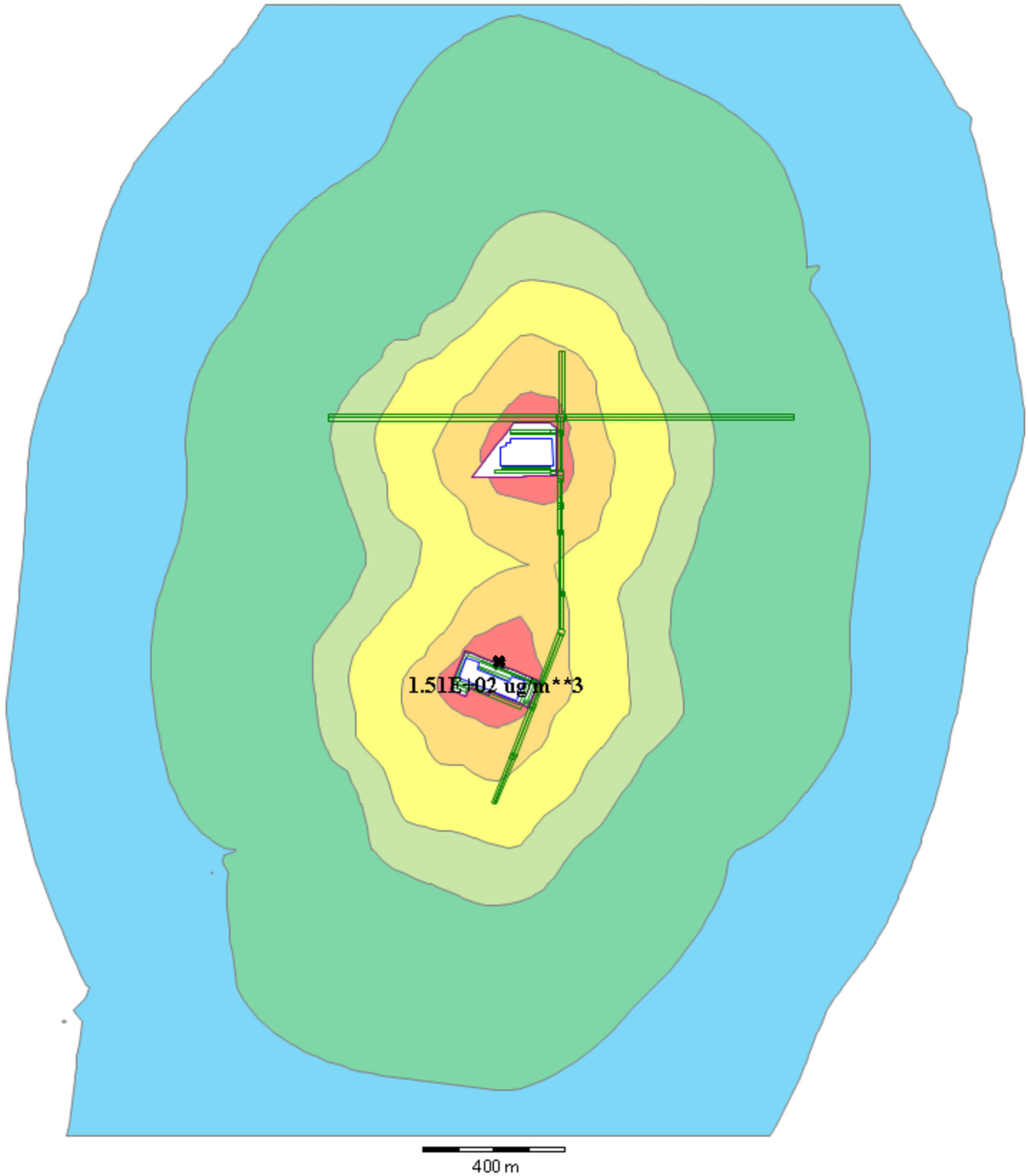
Prepared for:

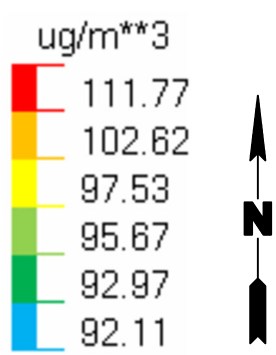
Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE
Prepared by: JS	Scale: AS SHOWN	7
Project Mgr: MS	Project: 3977.0003I000	
File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG





Title:

Highest 1-Hour Average NO2 Concentration Predictions with Seasonal Hourly Background

10330 S Woodlawn Avenue, Chicago, IL

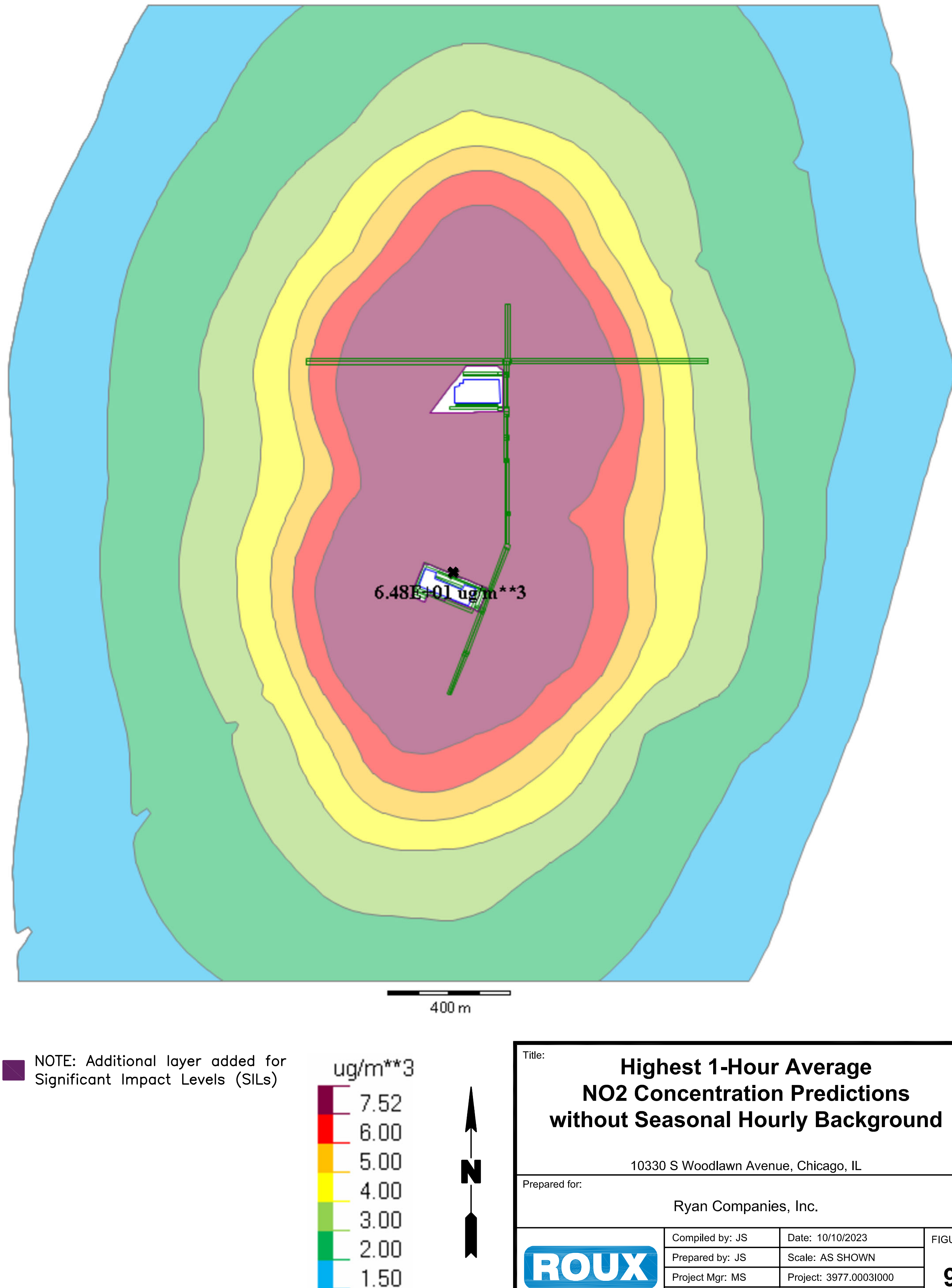
Prepared for:

Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE
Prepared by: JS	Scale: AS SHOWN	8
Project Mgr: MS	Project: 3977.0003I000	
File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



Title:

Highest 1-Hour Average NO_2 Concentration Predictions without Seasonal Hourly Background

10330 S Woodlawn Avenue, Chicago, IL

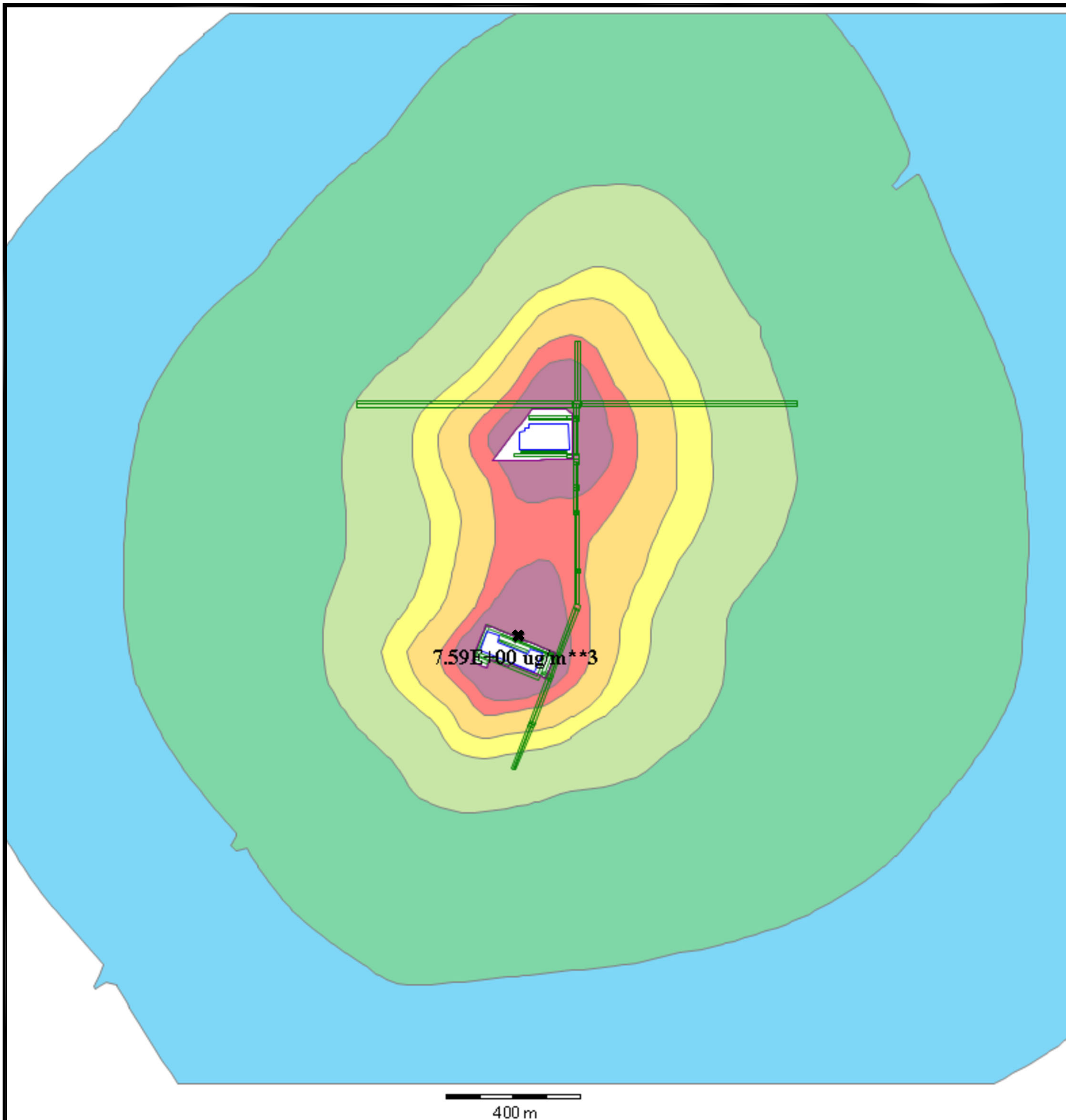
Prepared for:

Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE	
Prepared by: JS	Scale: AS SHOWN	9	
Project Mgr: MS	Project: 3977.0003I000		
File: 10330 S WOODLAWN AVE_ AQIS.DWG			

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



NOTE: Additional layer added for Significant Impact Levels (SILs)

ug/m**3

- 0.94
- 0.70
- 0.50
- 0.40
- 0.25
- 0.10
- 0.05

N

Title:

Highest Annual Average NO2 Concentration Predictions (Without Background)

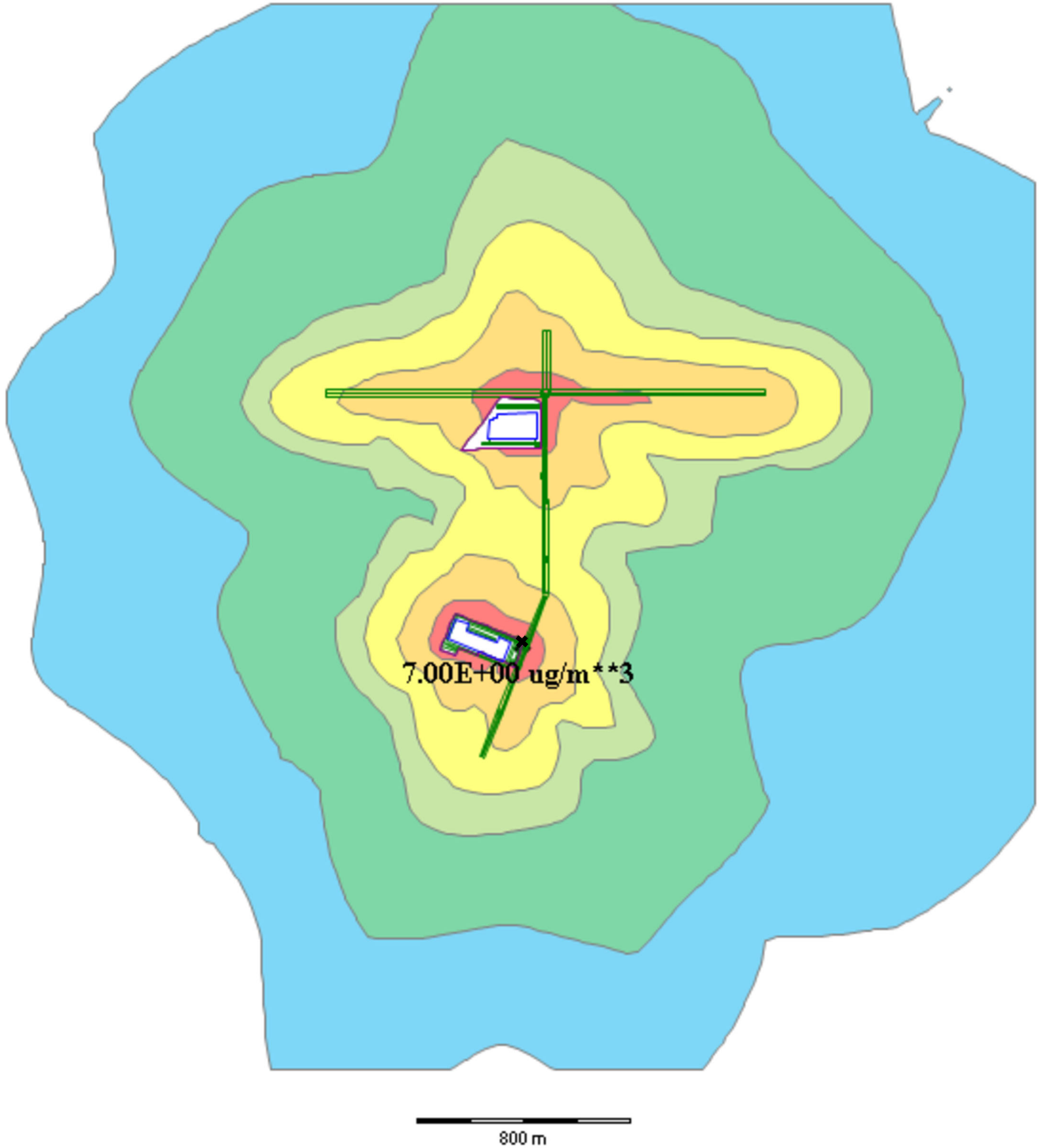
10330 S Woodlawn Avenue, Chicago, IL

Prepared for:

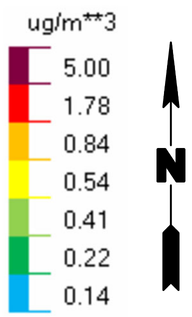
Ryan Companies, Inc.

ROUX	Compiled by: JS	Date: 10/10/2023	FIGURE
	Prepared by: JS	Scale: AS SHOWN	10
	Project Mgr: MS	Project: 3977.0003I000	
	File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



NOTE: Additional layer added for Significant Impact Levels (SILs)



Title:

Highest 24-Hour Average
PM10 Concentration Predictions

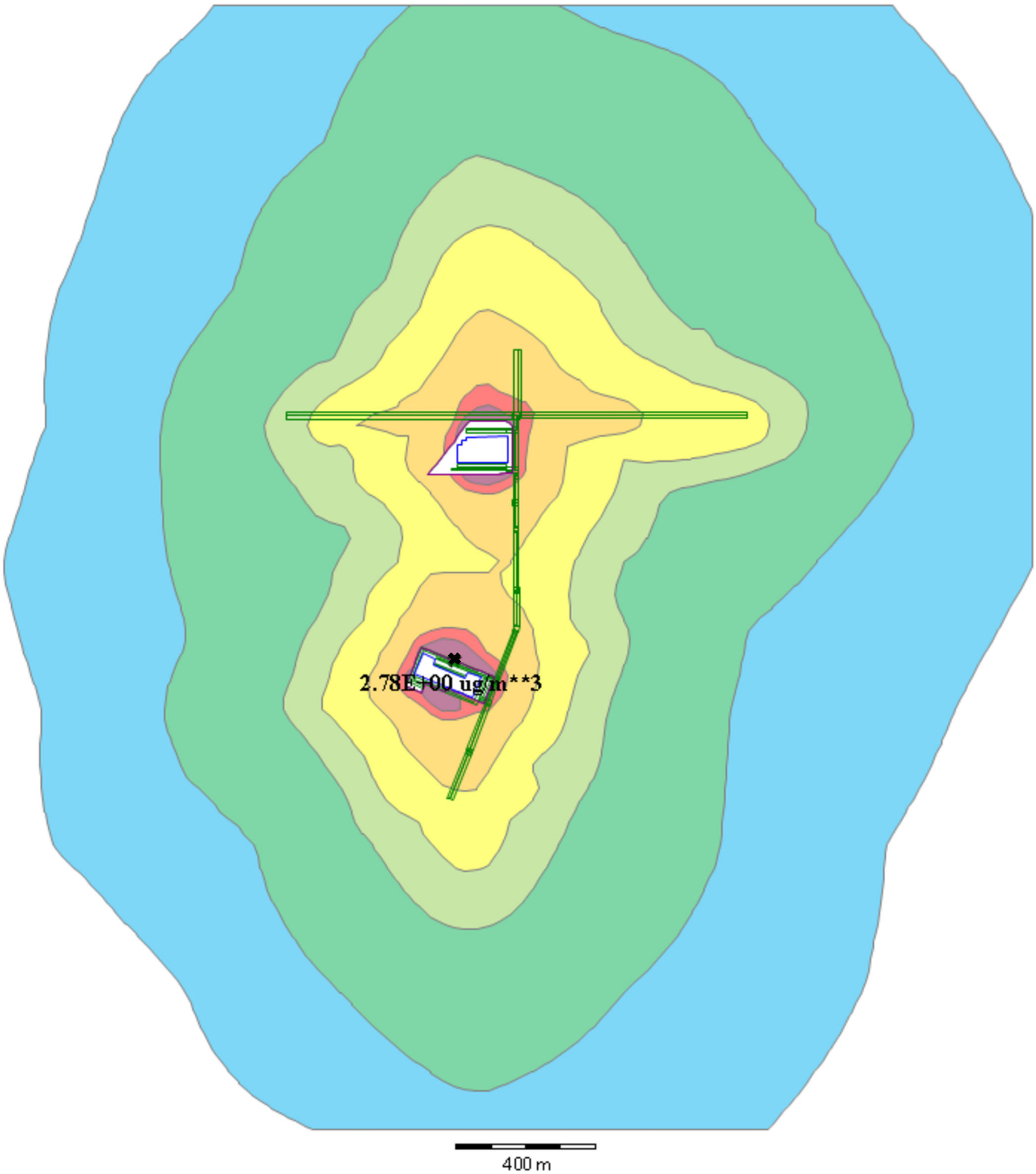
10330 S Woodlawn Avenue, Chicago, IL

Prepared for:

Ryan Companies, Inc.

ROUX	Compiled by: JS	Date: 10/10/2023	FIGURE
	Prepared by: JS	Scale: AS SHOWN	
	Project Mgr: MS	Project: 3977.0003I000	11
	File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



NOTE: Additional layer added for Significant Impact Levels (SILs)

ug/m**3

1.20
0.83
0.41
0.25
0.19
0.10
0.06

N

Title:

Highest 24-Hour Average PM2.5 Concentration Predictions

10330 S Woodlawn Avenue, Chicago, IL

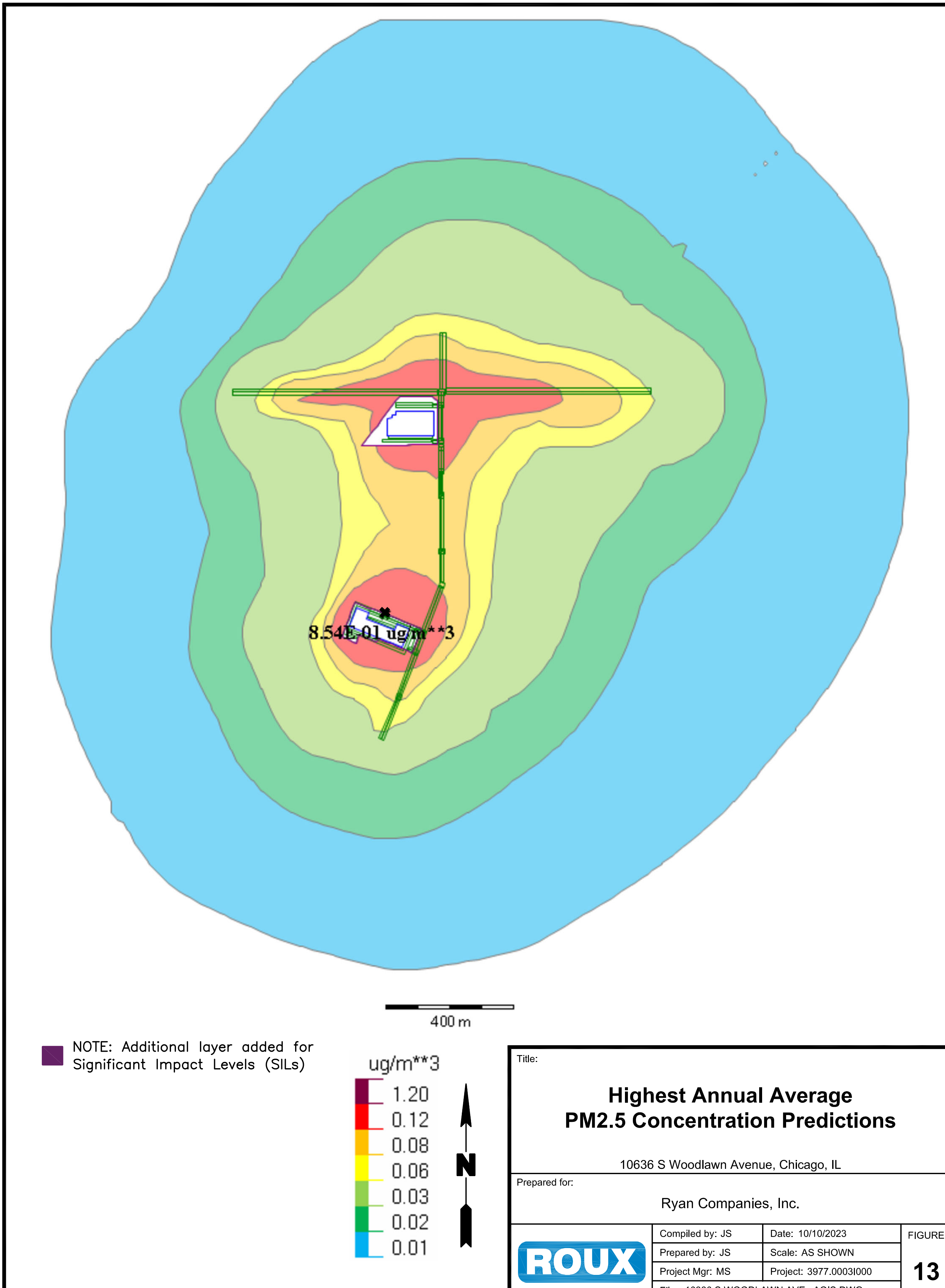
Prepared for:

Ryan Companies, Inc.

ROUX

Compiled by: JS	Date: 10/10/2023	FIGURE
Prepared by: JS	Scale: AS SHOWN	
Project Mgr: MS	Project: 3977.0003I000	12
File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG



Title:

Highest Annual Average PM2.5 Concentration Predictions

10636 S Woodlawn Avenue, Chicago, IL

Prepared for:

Ryan Companies, Inc.

ROUX	Compiled by: JS	Date: 10/10/2023	FIGURE
	Prepared by: JS	Scale: AS SHOWN	13
	Project Mgr: MS	Project: 3977.0003I000	
	File: 10330 S WOODLAWN AVE_ AQIS.DWG		

T:\RYAN COMPANIES\PULLMAN 3 - E 103RD ST & S WOODLAWN AVE, CHICAGO IL\AQIS\CAD\10330 S WOODLAWN AVE_ AQIS.DWG

APPENDICES

A. Proposed Site Plan

B. Site Activity Emission Calculations

C. Summary of Mobile Source Link Emission Calculations

D. CDPH-provided Seasonal Hourly NO_2 Background Concentrations

E. AERMOD Model Electronic Run Files

APPENDIX A

Proposed Site Plan

APPLICANT: RYAN COMPANIES
ADDRESS: 103RD & WOODLAWN
CHICAGO,IL 60628
INTRODUCED: 10.04.2023
PLAN COMMISSION: TBD

RYAN

PROPOSED SITE PLAN

WARE MALCOMB

APPENDIX B

Site Activity Emission Calculations

Parameter	Value	Units	Reference
Space Heater	1.69	MMBTU/hr	-
Facility Area	169,520	ft2	Site Plan
# of Space Heaters	2	-	-
Heating requirement for space	3.3765375	MMBTU/hr	-
Heating requirement for space	0.00331	MMSCF/hr	-
NOx Emission Factor (Uncontrolled)	100	lb/MMSCF	Table 1.4.1
PM10 Emission Factor (Uncontrolled)	7.6	lb/MMSCF	Table 1.4.2
PM2.5 Emission Factor (Uncontrolled)	7.6	lb/MMSCF	Table 1.4.2

Note:

MM = million

1 SCF = 1020 BTU

Combustor Type = Small Boiler (<100 MMBtu/hr Heat Input)

Parameter	Units	Nox	PM10	PM2.5
EF (Uncontrolled)	lb/MMSCF	100	7.6	7.6
Emissions (Uncontrolled)	lb/hr	3.31E-01	2.52E-02	2.52E-02
Emissions (Uncontrolled)	gr/sec	4.17E-02	3.17E-03	3.17E-03

Note:

EF = Emission Factor

Assumptions:

100% heater rating usage for 24/7, 365 days/yr

Climate zone 5:

https://basc.pnnl.gov/images/iecc-climate-zonemap

https://www.energy.gov/sites/default/files/2015/10/f27/ba_climate_region_guide_7.3.pdf

PM2.5 and PM10 emission factors were assumed to be equal to toal PM

Parameter	Value	Units	Reference
Emergency backup power generator	100	KW	-
# of emergency backup power generators	1	-	-
Total emergency backup power	100	KW	-
Total emergency backup power	134.00	hp	-
Running time	500	hr/year	-
NOx Emission Factor (Uncontrolled)	0.031	lb/(hp-hr)	Table 3.3.1
PM10 Emission Factor (Uncontrolled)	2.20E-03	lb/(hp-hr)	Table 3.3.1
PM2.5 Emission Factor (Uncontrolled)	2.20E-03	lb/(hp-hr)	Table 3.3.1

Note:

1 KW = 1.34 hp

Parameter	Units	Nox	PM10	PM2.5
EF (Uncontrolled)	lb/(hp-hr)	3.10E-02	2.20E-03	2.20E-03
Emissions (Uncontrolled)	lb/yr	2.08E+03	1.47E+02	1.47E+02
Emissions (Uncontrolled)	gr/yr	9.42E+05	6.69E+04	6.69E+04
Emissions (Uncontrolled)	gr/sec	2.99E-02	2.12E-03	2.12E-03

Note:

EF = Emission Factor

Assumptions:

Total annual operating hours = 500 hrs/yr for the maximum allowable hours of operation for an emergency generator

PM2.5 and PM10 emission factors were assumed to be equal to toal PM

Engines < 600 Hp

Parameter	Value	Units	Reference
Fire pumps	50	hp	-
# of fire pumps	1	-	-
Total fire pumps power	50	hp	-
Running time	500	hr/year	-
NOx Emission Factor (Uncontrolled)	0.031	lb/(hp-hr)	Table 3.3.1
PM10 Emission Factor (Uncontrolled)	2.20E-03	lb/(hp-hr)	Table 3.3.1
PM2.5 Emission Factor (Uncontrolled)	2.20E-03	lb/(hp-hr)	Table 3.3.1

Parameter	Units	Nox	PM10	PM2.5
EF (Uncontrolled)	lb/(hp-hr)	3.10E-02	2.20E-03	2.20E-03
Emissions (Uncontrolled)	lb/yr	7.75E+02	5.50E+01	5.50E+01
Emissions (Uncontrolled)	gr/yr	3.52E+05	2.49E+04	2.49E+04
Emissions (Uncontrolled)	gr/sec	1.11E-02	7.91E-04	7.91E-04

Note:

EF = Emission Factor

Assumptions:

Total annual operating hours = 500 hrs per year for the maximum allowable hours of operation for fire pump

PM2.5 and PM10 emission factors were assumed to be equal to toal PM

Engines < 600 Hp

Parameter	Value	Units	Reference
Forklift hp	50	hp	assumed
Total # of Forklifts	8	-	assumed
# of Forklifts in operation	4	-	assumed 50% operation
Total hp	200	hp	-
Project Year	2029	-	-
NOx Emission Factor	0.923964	g/hp-hr	Project Year Emission Facto
PM10 Emission Factor (Uncontrolled)	0.057541	lb/MMSCF	Project Year Emission Facto
PM2.5 Emission Factor (Uncontrolled)	0.057541	lb/MMSCF	Project Year Emission Facto

Note:

MM = million

1 SCF = 1020 BTU

Combustor Type = Small Boiler (<100 MMBtu/hr Heat Input)

Parameter	Units	Exhaust NOx EF	Exhaust PM10 EF	Exhaust PM2.5 EF
EF	g/hp-hr	0.9239636	0.05754121	0.0575412
Emissions	g/hr	184.7927	11.5082	11.5082
Emissions	gr/sec	5.13E-02	3.20E-03	3.20E-03

Note:

EF = Emission Factor

Assumptions:

100% heater rating usage for 24/7, 365 days/yr

50% of forklifts are beign operated at any given time

APPENDIX C

Summary of Mobile Source Link Emission Calculations

On-Network Emission Rates

LinkID	Link Description (Road Name, Direction)	Link Length (ft)	Link Width (m)	yearID	sourceTypeName	fuelTypeDesc	Volume (Peak Hour)	Average Spreed (mph)	NOx EF (g/mi)	PM10 EF (g/mi)	PM2.5 EF (g/mi)	Fugitive Dust PM10 EF (g/s/m2)	Fugitive Dust PM2.5 EF (g/s/m2)	NOx EF (g/s/m2)	PM10 EF (g/s/m2)	PM2.5 EF (g/s/m2)
1	Pullman 3 North Site Entrance WB	60	8	2029	Passenger Car	Gasoline	9	5	0.029	0.004	0.003	1.23E-06	3.06E-07	3.04E-07	1.23E-06	3.09E-07
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	2	5	6.901	0.047	0.044					
2	Pullman 3 North Site Entrance EB	60	8	2029	Passenger Car	Gasoline	24	5	0.029	0.004	0.003	3.23E-06	8.08E-07	7.60E-07	3.24E-06	8.14E-07
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	5	5	6.901	0.047	0.044					
3	Pullman 3 South Site Entrance WB	60	8	2029	Passenger Car	Gasoline	19	5	0.029	0.004	0.003	2.56E-06	6.41E-07	6.08E-07	2.57E-06	6.46E-07
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	4	5	6.901	0.047	0.044					
4	Pullman 3 South Site Entrance EB	60	8	2029	Passenger Car	Gasoline	4	5	0.029	0.004	0.003	5.57E-07	1.39E-07	1.51E-07	5.59E-07	1.41E-07
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	1	5	6.901	0.047	0.044					
5	103rd Street WB west of Woodlawn Ave	2640	12	2029	Passenger Car	Gasoline	9	35	0.019	0.001	0.001	1.23E-06	3.06E-07	4.04E-08	1.23E-06	3.07E-07
		2640		2029	Single Unit Long-haul Truck	Diesel Fuel	2	35	1.318	0.013	0.012					
6	103rd Street EB west of Woodlawn Ave	2640	12	2029	Passenger Car	Gasoline	10	35	0.019	0.001	0.001	1.34E-06	3.34E-07	4.06E-08	1.34E-06	3.35E-07
		2640		2029	Single Unit Long-haul Truck	Diesel Fuel	2	35	1.318	0.013	0.012					
7	103rd Street WB east of Woodlawn Ave	2640	12	2029	Passenger Car	Gasoline	12	35	0.019	0.001	0.001	1.67E-06	4.18E-07	6.02E-08	1.67E-06	4.19E-07
		2640		2029	Single Unit Long-haul Truck	Diesel Fuel	3	35	1.318	0.013	0.012					
8	103rd Street EB east of Woodlawn Ave	2640	12	2029	Passenger Car	Gasoline	13	35	0.019	0.001	0.001	1.78E-06	4.46E-07	6.04E-08	1.78E-06	4.46E-07
		2640		2029	Single Unit Long-haul Truck	Diesel Fuel	3	35	1.318	0.013	0.012					
9	Woodlawn Ave SB north of 103rd Street	730	12	2029	Passenger Car	Gasoline	1	30	0.018	0.001	0.001	1.11E-07	2.79E-08	2.62E-10	1.11E-07	2.79E-08
		730		2029	Single Unit Long-haul Truck	Diesel Fuel	0	30	1.686	0.017	0.015					
10	Woodlawn Ave NB north of 103rd Street	730	12	2029	Passenger Car	Gasoline	1	30	0.018	0.001	0.001	1.11E-07	2.79E-08	2.62E-10	1.11E-07	2.79E-08
		730		2029	Single Unit Long-haul Truck	Diesel Fuel	0	30	1.686	0.017	0.015					
11	Woodlawn Ave SB south of 103rd Street	170	8	2029	Passenger Car	Gasoline	22	30	0.018	0.001	0.001	3.01E-06	7.52E-07	1.91E-07	3.01E-06	7.54E-07
		170		2029	Single Unit Long-haul Truck	Diesel Fuel	5	30	1.686	0.017	0.015					
12	Woodlawn Ave NB south of 103rd Street	170	8	2029	Passenger Car	Gasoline	22	30	0.018	0.001	0.001	3.01E-06	7.52E-07	1.91E-07	3.01E-06	7.54E-07
		170		2029	Single Unit Long-haul Truck	Diesel Fuel	5	30	1.686	0.017	0.015					
13	Woodlawn Ave SB b/w Pullman 3 N Entrance and S Entrance	465	8	2029	Passenger Car	Gasoline	9	30	0.018	0.001	0.001	1.23E-06	3.06E-07	7.63E-08	1.23E-06	3.07E-07
		465		2029	Single Unit Long-haul Truck	Diesel Fuel	2	30	1.686	0.017	0.015					
14	Woodlawn Ave NB b/w Pullman 3 N Entrance and S Entrance	465	8	2029	Passenger Car	Gasoline	22	30	0.018	0.001	0.001	3.01E-06	7.52E-07	1.91E-07	3.01E-06	7.54E-07
		465		2029	Single Unit Long-haul Truck	Diesel Fuel	5	30	1.686	0.017	0.015					
15	Woodlawn Ave SB b/w Amazon north & middle north access drive	320	8	2029	Passenger Car	Gasoline	2	30	0.018	0.001	0.001	3.34E-07	8.36E-08	3.72E-08	3.35E-07	8.40E-08
		320		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
16	Woodlawn Ave NB b/w Amazon north & middle north access drive	320	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		320		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
17	Woodlawn Ave SB b/w Amazon middle north & middle south access drive	320	8	2029	Passenger Car	Gasoline	2	30	0.018	0.001	0.001	2.23E-07	5.57E-08	7.85E-10	2.23E-07	5.58E-08
		320		2029	Single Unit Long-haul Truck	Diesel Fuel	0	30	1.686	0.017	0.015					
18	Woodlawn Ave NB b/w Amazon middle north & middle south access drive	320	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		320		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
19	Woodlawn Ave SB b/w Amazon middle south access drive & South Community Center Access	700	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		700		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
20	Woodlawn Ave NB b/w Amazon middle south access drive & South Community Center Access	700	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		700		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
21	Woodlawn Ave SB b/w South Community Center Access & Gotham Greens access	400	8	2029	Passenger Car	Gasoline	7	30	0.018	0.001	0.001	1.00E-06	2.51E-07	7.55E-08	1.00E-06	2.52E-07
		400		2029	Single Unit Long-haul Truck	Diesel Fuel	2	30	1.686	0.017	0.015					
22	Woodlawn Ave NB b/w South Community Center Access & Gotham Greens access	400	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		400		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
23	Doty Ave SB b/w Gotham Greens access & Pullman 4 North Site Entrance	750	8	2029	Passenger Car	Gasoline	5	30	0.018	0.001	0.001	6.69E-07	1.67E-07	3.83E-08	6.69E-07	1.68E-07
		750		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
24	Doty Ave NB b/w Gotham Greens access & Pullman 4 North Site Entrance	750	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		750		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
25	Doty Ave SB b/w Pullman 4 North Site Entrance & South Access Drive	305	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		305		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
26	Doty Ave NB b/w Pullman 4 North Site Entrance & South Access Drive	305	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		305		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
27	Doty Ave SB b/w Pullman 4 South Access Drive & Pullman Park Main Access	595	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		595		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
28	Doty Ave NB b/w Pullman 4 South Access Drive & Pullman Park Main Access	595	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		595		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
29	Doty Ave SB south of Pullman Park Main Access	1320	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		1320		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
30	Doty Ave NB south of Pullman Park Main Access	1320	8	2029	Passenger Car	Gasoline	6	30	0.018	0.001	0.001	7.80E-07	1.95E-07	3.87E-08	7.81E-07	1.95E-07
		1320		2029	Single Unit Long-haul Truck	Diesel Fuel	1	30	1.686	0.017	0.015					
31	Pullman 4 South Access Drive WB	60	8	2029	Passenger Car	Gasoline	30	5	0.029	0.004	0.003	4.12E-06	1.03E-06	1.06E-06	4.13E-06	1.04E-06
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	7	5	6.901	0.047	0.044					
32	Pullman 4 South Access Drive EB	60	8	2029	Passenger Car	Gasoline	17	5	0.029	0.004	0.003	2.34E-06	5.85E-07	6.06E-07	2.35E-06	5.90E-07
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	4	5	6.901	0.047	0.044					
33	Pullman 4 North Site Entrance WB	60	8	2029	Passenger Car	Gasoline	3	5	0.029	0.004	0.003	4.46E-07	1.11E-07	1.51E-07	4.47E-07	1.13E-07
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	1	5	6.901	0.047	0.044					
34	Pullman 4 North Site Entrance EB	60	8	2029	Passenger Car	Gasoline	2	5	0.029	0.004	0.003	3.34E-07	8.36E-08	1.50E-07	3.36E-07	8.47E-08
		60		2029	Single Unit Long-haul Truck	Diesel Fuel	1	5	6.901	0.047	0.044					
PassPark3	Passenger Car Travel to Parking	468	8	2029	Passenger Car	Gasoline	40	5	0.029	0.004	0.003	4.46E-06	1.11E-06	1.27E-08	4.46E-06	1.12E-06
DockTrav3	Truck Travel to Dock or Parking	642	8	2029	Single Unit Long-haul Truck	Diesel Fuel	7	5	6.901	0.047	0.044	7.80E-07	1.95E-07	5.21E-07	7.84E-07	1.98E-07
PassPark4	Passenger Car Travel to Parking	1413	8	2029	Passenger Car	Gasoline	39	5	0.029	0.004	0.003	4.35E-06	1.09E-06	1.24E-08	4.35E-06	1.09E-06
DockTrav4	Truck Travel to Dock or Parking	624	8	2029	Single Unit Long-haul Truck	Diesel Fuel	7	5	6.901	0.047	0.044	7.80E-07	1.95E-07	5.21E-07	7.84E-07	1.98E-07

Off-Network Idle Emission Rates

LinkID	Link Description (Road Name, Direction)	Idle Link Area (m2)	yearID	sourceTypeName	fuelTypeDesc	Volume (Peak Hour)	Idle minutes per hour per vehicle	Idle minutes/ hr	Speed Bin	NOx EF (g/hr)	PM10 EF (g/hr)	PM2.5 EF (g/hr)	NOx EF (g/s/m2)	PM10 EF (g/s/m2)	PM2.5 EF (g/s/m2)
35-Idle	Stop Light @ Woodlawn Ave & 103rd St	625	2029	Passenger Car	Gasoline	57	0.245	13.965	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	4.93E-07	5.52E-09	5.02E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	13	0.245	3.185	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
36-Idle	Stop Sign @ Woodlawn Ave & Pullman 3 N Entrance	225	2029	Passenger Car	Gasoline	19	0.168	3.1825	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	3.59E-07	3.87E-09	3.52E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	5	0.168	0.8375	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
37-Idle	Stop Sign @ Woodlawn Ave & Pullman 3 S Entrance	225	2029	Passenger Car	Gasoline	33	0.198	6.53125	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	6.80E-07	7.48E-09	6.81E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	8	0.198	1.583333333	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
38-Idle	Stop Sign @ Amazon middle N access drive & Woodlawn Ave	225	2029	Passenger Car	Gasoline	9	0.175	1.575	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.50E-07	1.70E-09	1.54E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.175	0.35	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
39-Idle	Stop Sign @ Amazon middle S access drive & Woodlawn Ave	225	2029	Passenger Car	Gasoline	7	0.160416667	1.122916667	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.37E-07	1.45E-09	1.32E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.160416667	0.320833333	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
40-Idle	Stop Sign @ South Community Center Access & Woodlawn Ave	225	2029	Passenger Car	Gasoline	11	0.140833333	1.549166667	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.22E-07	1.46E-09	1.32E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.140833333	0.281666667	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
41-Idle	Stop Sign @ Gotham Greens access & Woodlawn Ave	225	2029	Passenger Car	Gasoline	8	0.016666667	0.133333333	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.43E-08	1.56E-10	1.42E-10
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.016666667	0.033333333	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
42-Idle	Stop Sign @ Pullman 4 N Entrance & Woodlawn Ave	225	2029	Passenger Car	Gasoline	7	0.165416667	1.157916667	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.42E-07	1.50E-09	1.36E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.165416667	0.330833333	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
43-Idle	Stop Sign @ Pullman 4 S Entrance & S Doty Ave	225	2029	Passenger Car	Gasoline	8	0.1925	1.54	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.65E-07	1.80E-09	1.64E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.1925	0.385	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
44-Idle	Stop Sign @ Pullman 4 S Entrance & S Doty Ave	225	2029	Passenger Car	Gasoline	8	0.17625	1.41	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.51E-07	1.65E-09	1.50E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.17625	0.3525	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
45-Idle	Stop Sign @ Pullman Park Main Access & S Doty Ave	225	2029	Passenger Car	Gasoline	8	0.16875	1.35	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.45E-07	1.58E-09	1.44E-09
			2029	Single Unit Long-haul Truck	Diesel Fuel	2	0.16875	0.3375	speed = 0 (idle) (g/hr)	20.553	0.164	0.151			
Pass-Idle3	Passenger car idling on site	1141.1	2029	Passenger Car	Gasoline	40	3	120	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	3.63776E-08	7.70121E-09	6.81261E-09
Dock-Idle3	Truck idling at a dock	1394.7	2029	Single Unit Long-haul Truck	Diesel Fuel	7	3	21	speed = 0 (idle) (g/hr)	20.553	0.164	0.151	1.43E-06	1.15E-08	1.05435E-08
Pass-Idle4	Passenger car idling on site	2433.4	2029	Passenger Car	Gasoline	39	3	117	speed = 0 (idle) (g/hr)	0.075	0.016	0.014	1.66324E-08	3.5211E-09	3.11482E-09
Dock-Idle4	Truck idling at a dock	887.5	2029	Single Unit Long-haul Truck	Diesel Fuel	7	3	21	speed = 0 (idle) (g/hr)	20.553	0.164	0.151	2.25E-06	1.80E-08	1.65683E-08

APPENDIX D

CDPH-provided Seasonal Hourly NO2 Background Concentrations

Seasonal Hourly Ambient NO2 Concentrations, for use with Southwestern Chicago 1-Hour NO2 Modeling:

Hour of Day		NO_2 Ambient Background 98th% (ppb)				NO_2 Ambient Background 98th% (µg/m³)			
Start Time	**End Time**	**Winter**	**Spring**	**Summer**	**Fall**	**Winter**	**Spring**	**Summer**	**Fall**
0:00	1:00	41.67	46.87	34.40	29.63	78.33	88.11	64.67	55.71
1:00	2:00	40.53	44.40	33.40	28.23	76.20	83.47	62.79	53.08
2:00	3:00	38.77	48.23	33.10	28.00	72.88	90.68	62.23	52.64
3:00	4:00	41.07	47.43	31.27	27.63	77.21	89.17	58.78	51.95
4:00	5:00	42.43	45.13	31.67	27.00	79.77	84.85	59.53	50.76
5:00	6:00	40.43	44.53	30.60	29.33	76.01	83.72	57.53	55.15
6:00	7:00	42.60	46.83	30.17	29.57	80.09	88.05	56.71	55.59
7:00	8:00	43.63	38.07	27.27	29.20	82.03	71.57	51.26	54.90
8:00	9:00	36.07	29.97	20.70	26.47	67.81	56.34	38.92	49.76
9:00	10:00	32.33	26.07	16.33	23.90	60.79	49.01	30.71	44.93
10:00	11:00	28.50	21.87	15.37	19.60	53.58	41.11	28.89	36.85
11:00	12:00	26.63	19.70	13.27	18.40	50.07	37.04	24.94	34.59
12:00	13:00	23.47	21.23	12.63	18.33	44.12	39.92	23.75	34.47
13:00	14:00	21.93	22.43	12.03	20.23	41.23	42.17	22.62	38.04
14:00	15:00	24.17	21.97	14.40	19.17	45.43	41.30	27.07	36.03
15:00	16:00	26.20	21.60	13.97	21.03	49.26	40.61	26.26	39.54
16:00	17:00	30.00	23.77	14.20	25.77	56.40	44.68	26.70	48.44
17:00	18:00	32.67	27.00	17.50	27.63	61.41	50.76	32.90	51.95
18:00	19:00	34.60	30.33	16.17	29.30	65.05	57.03	30.39	55.08
19:00	20:00	35.97	36.40	21.80	31.20	67.62	68.43	40.98	58.66
20:00	21:00	37.20	40.97	27.03	33.13	69.94	77.02	50.82	62.29
21:00	22:00	35.77	43.47	26.83	33.60	67.24	81.72	50.45	63.17
22:00	23:00	36.87	42.37	32.63	31.77	69.31	79.65	61.35	59.72
23:00	0:00	41.33	46.60	36.60	31.67	77.71	87.61	68.81	59.53

*Based on AQS Monitor ID 17-031-0076. Average of years 2018, 2019, and 2020 for Winter, Spring, and Fall; 2016, 2017, and 2019 for Summer.

Ambient Air Background Concentrations
City of Chicago Department of Public Health

Project Location	Pollutant	Averaging Period	3-year Ambient Design Value (ug/m3)	Monitor ID	Monitor Name	Latitude/Longitude
NORTHWEST -4 miles or greater from the lakeshore and north of the Eisenhower Expressway	NO_2	Annual	34	17-031-3103	IEPA Trailer (2018-2020)	41.965193, -87.876265
	PM_{10}	24-hour	102	17-031-1016	Village Hall (2018-2020)	41.80118, -87.832349
	$PM_{2.5}$	24-hour	24	17-031-3103	IEPA Trailer (2018-2020)	41.965193, -87.876265
		Annual	10	17-031-3103	IEPA Trailer (2017, 2019, 2020)	41.965193, -87.876265
NORTHEAST -Within 4 miles of the lakeshore and north of East	NO_2	Annual	31	17-031-0219 and 17-031-0063	Kennedy Near Road 2 (2019-2020) and CTA Building (2017)	41.920009, -87.672995 (Kennedy); 41.7514, -87.635027 (CTA Bldg)
	PM_{10}	24-hour	102	17-031-1016	Village Hall (2018-2020)	41.80118, -87.832349
and West 63rd Street	$PM_{2.5}$	24-hour	22	17-031-0057	Springfield Pump Station (2018-2020)	41.912739, -87.722673
		Annual	9	17-031-0057	Springfield Pump Station (2016, 2017, 2018)	41.912739, -87.722673
SOUTHWEST -4 miles or greater from the lakeshore and south of the Eisenhower Expressway	NO_2	Annual	29	17-031-0076	Com Ed Maintenance Bldg (2018-2020)	41.7514, -87.713488
	PM_{10}	24-hour	102	17-031-1016	Village Hall (2018-2020)	41.80118, -87.832349
	$PM_{2.5}$	24-hour	23	17-031-1016	Village Hall (2018-2020)	41.80118, -87.832349
		Annual	10	17-031-1016	Village Hall (2018-2020)	41.80118, -87.832349
SOUTHEAST Within 4 miles of the lakeshore and south of East and West 63rd Street	NO_2	Annual	19	18-089-0022	Gary, IN (2018-2020)	41.687165, -87.539315
	PM_{10}	24-hour	61	17-031-0022	Washington HS (2018-2020)	41.687165, -87.539315
	$PM_{2.5}$	24-hour	25	17-031-0022	Washington HS (2018-2020)	41.687165, -87.539315
		Annual	9	17-031-0022	Washington HS (2017, 2019, 2020)	41.687165, -87.539315

APPENDIX E

AERMOD Model Electronic Run Files