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# Letter of Transmittal

Date: 9/22/2022

Job No.: 325-137

Attention: Mr. Edward Adler

**To:**

The Missner Group  
1700 West Higgins Road  
Suite 400  
Des Plaines, IL 60018

**RE:**

328 West 40th Place Air Quality Impact Study

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Beth Millian

**AIR QUALITY IMPACT STUDY**

**PROPOSED PROJECT  
328 WEST 40<sup>TH</sup> PLACE  
CHICAGO, ILLINOIS**

**Prepared For:  
THE MISSNER GROUP, LLC  
DES PLAINES, ILLINOIS**

**Prepared By:  
CIVIL & ENVIRONMENTAL CONSULTANTS, INC.  
NAPERVILLE, ILLINOIS**

**CEC Project 325-137**

**SEPTEMBER 2022**



**Civil & Environmental Consultants, Inc.**

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## **1.0 INTRODUCTION**

### **1.1 BACKGROUND AND PURPOSE**

This air quality impact study (AQIS) report has been prepared to review potential impacts from a proposed industrial building project located at 328 West 40<sup>th</sup> Place in Chicago, Illinois (Project). This report is required under Chicago Air Quality Ordinance Municipal Code Section 17-9-0117-G.1.

This analysis examines Project operational impacts at on-site and off-site locations. Emission sources include on-site stationary and mobile sources and off-site mobile sources of particulate matter with an aerodynamic diameter less than or equal to 2.5 microns (PM<sub>2.5</sub>), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM<sub>10</sub>), and nitrogen dioxide (NO<sub>2</sub>). Off-site mobile sources at roadways and intersections were identified using results from a traffic impact study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA 2022). Impacts from these sources were modeled and results were examined to determine if the proposed Project has the potential to cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) for PM<sub>2.5</sub>, PM<sub>10</sub>, or NO<sub>2</sub>.

In accordance with the Chicago Air Quality Ordinance and the Chicago Department of Public Health's (CDPH) Air Quality Impact Evaluation Intern Guidance (September 2021), air quality impacts from these sources were modeled using the United States Environmental Protection Agency's (USEPA) AERMOD dispersion model.

### **1.2 DESCRIPTION OF PROPOSED PROJECT**

The proposed Project consists of a 180,900 square foot multi-tenant industrial facility on a 12.42-acre site on West 40<sup>th</sup> Place in Chicago, Illinois. The Project site is located north of West Root Street, south of a rail line and Pershing Road, east of a rail line and Normal Avenue, and west of Princeton Avenue. The Project site is in a mixed industrial and residential area of Chicago and situated near industrial businesses as well as residences.

## **2.0 METHODOLOGY AND ASSUMPTIONS**

### **2.1 MODELS**

Emissions of PM<sub>2.5</sub>, PM<sub>10</sub>, and NO<sub>x</sub> from on-site and off-site emission sources were modeled using USEPA's AERMOD air dispersion model. USEPA's Motor Vehicle Emission Simulator (MOVES) emission modeling system was used to calculate emissions from passenger cars and trucks traveling on-site and off-site on nearby roadways as well as idling at nearby intersections. Emission factors from MOVES were provided by CDPH in a lookup table.

### **2.2 AIR POLLUTANTS**

Pollutants modeled for this Project are PM<sub>2.5</sub>, PM<sub>10</sub>, and NO<sub>x</sub>, in accordance with CDPH guidance. Sources of these pollutants include natural gas-fired combustion for building comfort heat, and project-generated on-site and off-site traffic (passenger cars and trucks).

### **2.3 ASSUMPTIONS**

The following assumptions were made to model and assess potential air quality impacts due to the Project.

#### **2.3.1 On-site Equipment**

The building comfort heating system were assumed to be natural gas fired. The total heat input rating for the office heating units was assumed to be 600,000 British thermal units per hour, and the total heat input rating for the warehouse units was assumed to be 1.8 million British thermal units per hour, for a total heat input rating for the facility of 2.4 million British thermal units per hour. Emissions from the comfort heating system were calculated using AP-42 emission factors and conservatively assuming 100% rating and 8,760 hours of operation per year.

All forklifts and water heaters to be used on-site were assumed to be electric and therefore generate no emissions.

#### **2.3.2 Mobile Equipment**

Emissions from on-site and off-site mobile equipment were estimated using MOVES emission factor tables from CDPH. The following assumptions were made when selecting emission factors from these tables:

- Vehicle types assumed to operate at the Project site include “passenger car” and “combination short haul truck.”
- Fuel types assumed were based on default selections provided in CDPH guidance: gasoline for passenger cars and diesel for trucks.
- The Project is assumed to begin operation in 2022, so emission factors were selected for the year 2022.
- Road type selected was “urban unrestricted access.”
- Vehicle speed bin selections were based on information available in the Traffic Study, and where speed information was not available, conservative assumptions were made.

### 2.3.3 Emissions and AERMOD Modeling

#### 2.3.3.1 *Off-site Traffic*

- Project-generated off-site traffic was divided between Pershing Road, Normal Avenue, Princeton Avenue, and Root Street. Roadway sections and associated traffic volumes were determined based on information provided in Figures 8 and 9 of the traffic impact study.
- Roadway section lengths were determined based on information provided in the traffic impact study or estimated using Google Earth and AERMOD View.
- Off-site traffic on roadway sections were modeled as line volume sources.
- Emissions for off-site mobile traffic were calculated assuming peak hourly traffic volumes for all hours of the day. Vehicle speeds were assumed based on road type and number of lanes, as follows:
  - Traffic traveling on two-lane roads (Normal Avenue, Princeton Avenue, and Root Street) was assumed to travel at approximately 25 miles per hour, except around a curve on Princeton Avenue where there is a posted 15 miles per hour speed limit.
  - Traffic traveling on four lane roads (Pershing Road) was assumed to travel at approximately 30 miles per hour.
  - Traffic traveling on-site was assumed to travel at approximately 5 miles per hour.
  - Vehicle speeds were conservatively chosen at the lower range of expected vehicle speed for each roadway section, because at slower rates of speed (generally less than about 45 miles per hour for passenger cars), the MOVES emission factors result in higher emissions.

#### 2.3.3.2 *On-site Traffic*

- Emissions for on-site mobile traffic were calculated assuming peak hourly traffic volumes for all hours of the day. Traffic traveling on-site was assumed to travel at approximately 5 miles per hour.

- On-site traffic for passenger cars was assigned to three different routes, based on the planned three site access points for passenger cars. Lengths for each route were estimated using Google Earth and AERMOD View.
  - Route 1: Passenger cars entering the site via Root Street were assumed to travel north to the south end of the building, and then along the full lengths of the south and east sides of the building, ending at the north end of the building. Vehicles exiting the site via this route were assumed to travel this route in reverse.
  - Route 2: Passenger cars entering the site via the south access point on Princeton Avenue were assumed to travel from Princeton Avenue to the east side of the building, and then north to the north end of the building, or approximately half of the building length. Vehicles exiting the site via this route were assumed to travel this route in reverse.
  - Route 3: Passenger cars entering the site via the north access point on Princeton Avenue were assumed to travel from Princeton Avenue to the east side of the building, and then south to the middle of the parking area, or approximately half of the building length. Vehicles exiting the site via this route were assumed to travel this route in reverse.
- On-site traffic for trucks was assumed to follow one route from the north site access off Princeton Avenue, west along the north side of the property, and then south along the full length of the west side of the building to the loading docks. Trucks exiting the site via this route were assumed to travel this route in reverse. The length of the truck route was estimated using Google Earth and AERMOD View.
- On-site traffic on the routes described above were modeled as line volume sources.
- Average passenger car height was assumed to be 1.53 meters. Average truck height was assumed to be 4 meters. Vehicle heights for roadway sections with both passenger car and truck traffic were calculated by pro-rating the heights according to the percentage of each type of traffic expected to travel on that roadway section.
- Average passenger car width was assumed to be 1.98 meters. Average truck width was assumed to be 2.59 meters. Road width for Pershing Road was assumed to be 10 meters.
- Model parameters, including plume height and width, release height, and initial vertical dimension were calculated in accordance with CDPH guidance.

### 2.3.3.3 *Idling*

- Idling areas were identified using information from the traffic impact study. Traffic volumes were assigned to ten different idling areas, which consisted of nine off-site intersections, as well as on-site loading docks.
- Idling times for off-site intersections were based on level of service delays identified in the traffic impact study. Idling times at loading docks were assumed to be five minutes per truck.



- Idling areas were modeled as area or area poly sources. Sources for intersections encompassed the full width of the roadway out to approximately 25 meters from the center of the intersection in all directions that project-generated traffic is expected. Traffic volumes were based on information provided in the traffic impact study. The source for the truck loading docks covered the area as indicated in preliminary site drawings.
- It was assumed that passenger cars will not idle on-site; therefore, the only on-site idling area represented is for trucks idling at loading docks.
- Model parameters, including plume height, release height, and initial vertical dimension were calculated in accordance with CDPH guidance. Average passenger car width was assumed to be 1.98 meters. Average truck width was assumed to be 2.59 meters.

## 2.4 BACKGROUND CONCENTRATIONS

Background concentrations for each of the pollutants and associated NAAQS examined in this study were obtained from Illinois Environmental Protection Agency (IEPA) ambient air monitoring stations located near the Project site. Monitors for each NAAQS were chosen from the Chicago-Naperville-Elgin, IL-IN-WI Core Based Statistical Area (CBSA). In accordance with USEPA guidance in 40 Code of Federal Regulations (40 CFR) Part 51 Appendix W, monitors chosen were determined to have characteristics similar to the project area, and were nearby, and when possible, upwind of the Project site. The Project site is located in an area with winds typically coming from the west, so stations west of the site would be considered upwind. The most recent valid design value (2021) was used as the background concentration for each applicable NAAQS.

For PM<sub>2.5</sub>, several nearby ambient air monitoring stations with valid data were available. Multiple stations were determined to have similar characteristics to the Project site, so the closest station with valid data was chosen. Data for PM<sub>2.5</sub> was obtained from the Commonwealth Edison maintenance building station, located approximately 6.2 miles southwest of the Project site.

Data for PM<sub>10</sub> was obtained from the Northbrook water plant, which was the only nearby station with valid ambient data for the PM<sub>10</sub> 24-hour NAAQS. The Northbrook water plant station is located approximately 22.8 miles north-northwest of the Project site.

Data for NO<sub>2</sub> was obtained from the IEPA Trailer monitoring station, located approximately 16.0 miles northwest of the Project site. This was the only nearby station with valid data for the NO<sub>2</sub> 1-hour NAAQS.

Ambient air monitoring station data and background concentrations for each of the studied NAAQS are presented in Table 1.

## 2.5 AERMOD MODEL INPUTS

- Location of the Project site and location and dimensions of the building and site access points were determined from the traffic impact study, a preliminary site drawing, and Google Earth.
- Combustion sources (building comfort heating) was modeled as a single area source encompassing the entire footprint of the building.
- Mobile sources (on-site and off-site traffic) were modeled as line volume sources.
- Idling areas (intersections and on-site loading docks) were modeled as area or area poly sources.
- In accordance with CDPH guidance, urban dispersion coefficients were used. A population of 9,618,502 derived from the 2020 census for the Chicago Metropolitan Statistical Area was used.
- Building downwash was not considered as only line volume and area/area poly source types were used.
- Five years of surface meteorological data from the Chicago Midway Airport surface meteorological station were used.
- Five years of upper air meteorological data from the Davenport Municipal Airport, Iowa upper air station were used.

## 3.0 EMISSIONS SOURCES AND FACTORS

### 3.1 STATIONARY SOURCES

Stationary emission sources for this Project consisted of building comfort heating. Both warehouse heating units and office heating units are planned to be installed as part of this Project. The units will be natural gas fired with an expected heat input rating of 600,000 British thermal units per hour for the office heating units and 1.8 million British thermal units per hour for the warehouse heating units for a total heat input rating of 2.4 million British thermal units per hour. Emissions from comfort heating were conservatively assumed to operate at full load for the entire year, that is, 8,760 hours for year. This assumption is conservative as the heating units will likely only operate in the cool months of the year.

Emission rates from comfort heating were calculated using AP-42 emission factors from Chapter 1.4 for Natural Gas Combustion, Tables 1.4-1 and 1.4-2. For NO<sub>x</sub> emissions, the emission factors for small boilers rated less than 100 million British thermal units per hour were used. Emission factors were converted to pound per million British thermal units assuming 1,020 British thermal units per standard cubic foot of natural gas, in accordance with footnote (a) to AP-42 Table 1.4-2.

Emission factors used for comfort heating are shown in Table 2.

### 3.2 MOBILE SOURCES

Mobile sources for this Project consisted of on-site and off-site vehicle traffic, as well as idling areas for these sources consisting of intersections and loading docks.

#### 3.2.1 Off-site Traffic

Project-generated off-site traffic was divided between Pershing Road, Normal Avenue, Princeton Avenue, and Root Street in accordance with the traffic impact study. A total of 14 different off-site roadway sections were identified:

1. Pershing Road west of Normal Avenue to approximately one-quarter mile from site boundary.
2. Pershing Road between Normal Avenue and Princeton Avenue.
3. Pershing Road between Princeton Avenue and Wells Street.
4. Pershing Road east of Wells Street to approximately one-quarter mile from site boundary.
5. Normal Avenue between Pershing Road and Root Street.
6. Princeton Avenue between Pershing Road and North Proposed Site Access Drive.
7. Princeton Avenue between North Proposed Site Access Drive and South Proposed Site Access Drive.

8. Princeton Avenue between South Proposed Site Access Drive and Root Street.
9. Root Street west of Normal Avenue to approximately one-quarter mile from site boundary.
10. Root Street between Normal Avenue and Proposed Site Access Drive.
11. Root Street between Proposed Site Access Drive and Princeton Avenue.
12. Root Street between Princeton Avenue and Wells Street.
13. Root Street east of Wells Street to approximately one-quarter mile from site boundary.
14. Princeton Avenue south of Root Street to approximately one-quarter mile from site boundary.

Roadway section lengths were determined based on information provided in the traffic impact study or using Google Earth/AERMOD View. Traffic volumes for passenger cars and trucks were determined using information provided in Figures 8 and 9 of the traffic impact study. Peak hour volumes were conservatively assumed to apply to every hour of the day.

Emissions from traffic traveling on these roadway sections were calculated using MOVES emission factors provided in lookup tables by the CDPH. Emission factors were selected based on year of operation, vehicle type, fuel type, road type, and vehicle speed. 2022 was selected as the year, as that is the expected first year of operation for the Project. Vehicle type was either passenger car or combination short haul truck. Passenger vehicles were assumed to use gasoline, and trucks were assumed to use diesel fuel. Road type for all roadway sections was urban unrestricted access. Vehicle speeds were conservatively assumed based on information provided in the traffic impact study or on road type and number of lanes. Vehicles traveling on two-lane roads (Normal Avenue, Princeton Avenue, and Root Street) were assumed to travel at approximately 25 miles per hour, except around a curve on Princeton Avenue where there is a posted 15 miles per hour speed limit. Vehicles traveling on four-lane roads (Pershing Road) were assumed to travel at approximately 30 miles per hour. Vehicle speeds were conservatively chosen at the lower range of expected vehicle speed for each roadway section, because at slower rates of speed (generally less than about 45 miles per hour for passenger cars), the MOVES emission factors result in higher emissions.

Emission factors used for off-site traffic are shown in Table 3.

### 3.2.2 On-site Traffic

Project-generated on-site traffic was divided between four separate routes in accordance with the site access roads identified in the traffic impact study:

1. Route 1, for passenger cars only, extends from the site access drive at Root Street, north to the south end of the building, and then along the full lengths of the south and east sides of the building, ending at the north end of the building.

2. Route 2, for passenger cars only, extends from the south site access drive on Princeton Avenue west to the east side of the building, and then north to the north end of the building, or approximately half of the building length.
3. Route 3, for passenger cars only, extends from the north site access drive on Princeton Avenue, west to the east side of the building, and then south to the middle of the parking area, approximately half of the building length.
4. Route 4, for trucks only, extends from the north site access drive on Princeton Avenue, west along the north end of the property, and then south along the full length of the west side of the building to the loading docks.

On-site route lengths were determined based on information provided in the traffic impact study or using Google Earth/AERMOD View. Traffic volumes for passenger cars and trucks were determined using information provided in Figures 8 and 9 of the traffic impact study. Peak hour volumes were conservatively assumed to apply to every hour of the day.

Emissions from traffic traveling on these roadway sections were calculated using MOVES emission factors provided in lookup tables by the CDPH. Emission factors were selected based on year of operation, vehicle type, fuel type, road type, and vehicle speed. 2022 was selected as the year, as that is the expected first year of operation for the Project. Vehicle type was either passenger car or combination short haul truck. Passenger vehicles were assumed to use gasoline, and trucks were assumed to use diesel fuel. Road type was urban unrestricted access. Vehicle speeds for on-site traffic was assumed to be approximately 5 miles per hour.

Emission factors used for on-site traffic are shown in Table 3.

### 3.2.3 Idling Areas

Idling areas for project generated traffic consisted of off-site intersections and the on-site loading docks area. Ten total idling areas were identified based on information provided in the traffic impact study:

1. Pershing Road and Normal Avenue intersection.
2. Pershing Road and Princeton Avenue intersection.
3. Pershing Road and Wells Street intersection.
4. Princeton Avenue and North Site Access Drive intersection.
5. Princeton Avenue and South Site Access Drive intersection.
6. Root Street and Normal Avenue intersection.
7. Root Street and Site Access Drive intersection.
8. Root Street and Princeton Avenue intersection.

9. Root Street and Wells Street intersection.
10. On-site loading docks.

Intersections were modeled as area or area poly sources encompassing the entire width of the roadway and extending to approximately 25 meters from the center of the intersection in all directions that project-generated traffic is expected. Traffic volumes were based on information provided in the traffic impact study. The source for the truck loading docks covered the area as indicated in preliminary site drawings. Idling times for intersections were based on level of service delays identified in the traffic impact study. Idling times at loading docks were assumed to be five minutes per truck.

Emissions from idling traffic were calculated using MOVES emission factors provided in lookup tables by the CDPH. Emission factors were selected based on year of operation, vehicle type and fuel type. 2022 was selected as the year, as that is the expected first year of operation for the project. Vehicle type was either passenger car or combination short haul truck. Passenger vehicles were assumed to use gasoline, and trucks were assumed to use diesel fuel.

Emission factors used for idling areas are shown in Table 3.

## 4.0 MODEL INPUTS AND PARAMETERS

### 4.1 COMFORT HEATING EMISSION SOURCE INPUTS

The comfort heating units were modeled in AERMOD as a single area source encompassing the entire footprint of the building. Release height for this emission unit was assumed to be half of the building height, or 18 feet.

### 4.2 MOBILE EMISSION SOURCE INPUTS

#### 4.2.1 On-site and Off-site Traffic

Roadway sections representing on-site and off-site traffic sources were modeled in AERMOD as line volume sources. Roadway section lengths were determined based on information provided in the traffic impact study or estimated using Google Earth and AERMOD View.

Model parameters for each source were calculated in accordance with CDPH guidance. Plume height for each source was calculated as 1.7 times the vehicle height. Plume width was calculated as vehicle width plus 6 meters for a single lane or road width plus 6 meters for two lanes. Release height was calculated as half of the plume height. Initial vertical dimension was calculated as plume height divided by 2.15. Vehicle heights were assumed to be 1.53 meters for passenger cars and 4 meters for trucks. Vehicle widths were assumed to be 1.98 meters for passenger cars and 2.59 meters for trucks. For roadway sections with both passenger car and truck traffic, a combined vehicle height and combined vehicle width was calculated for each source based on the percentage of cars and trucks expected to travel on that section of road. Pershing Road, the only roadway evaluated with more than one lane traveling in each direction, was assumed to have a width of 10 meters.

Model parameters for on-site and off-site traffic sources are shown in Table 4.

#### 4.2.2 Idling Areas

Idling areas were modeled in AERMOD as area or area poly sources. Sources for intersections encompassed the full width of the roadway out to approximately 25 meters from the center of the intersection in all directions that project-generated traffic is expected. Traffic volumes were based on information provided in the traffic impact study. The source for the truck loading docks covered the area as indicated in preliminary site drawings.

Model parameters for each source were calculated in accordance with CDPH guidance. Plume height for each source was calculated as 1.7 times the vehicle height. Release height was calculated as half of the plume height. Initial vertical dimension was calculated as plume height

divided by 2.15. Vehicle heights were assumed to be 1.53 meters for passenger cars and 4 meters for trucks. For idling areas with both passenger car and truck traffic, a combined vehicle height was calculated for each source based on the percentage of cars and trucks expected to idle in that area.

Model parameters for idling areas are shown in Table 4.

### **4.3 METEOROLOGICAL DATA**

Five years of surface and upper air meteorological data were used for modeling. Data was obtained in a preprocessed AERMOD-ready format from Lakes Environmental Consultants, Inc. for input into AERMOD View. Data was obtained for the period January 1, 2017 through December 31, 2021. Surface data was from the Chicago Midway, Illinois station (ID number 14819) and upper air data was from the Davenport Municipal Airport, Iowa station (ID number 94982).

### **4.4 TERRAIN**

The AERMOD default option of elevated terrain was assumed for modeling. NED 1 30-meter resolution terrain data was used. Elevations for sources, receptors, and the building were assigned in AERMOD using the AERMAP processing tool. Base elevation for sources in the Project ranged from 181.31 to 182.67 meters above sea level.

### **4.5 MODELING RECEPTORS**

Nested modeling receptors were used for this project. Receptors were placed at a spacing of 50 meters out to a distance of 500 meters from the center of the project, a spacing of 100 meters out to a distance of 1,500 meters from the center of the project, a spacing of 3,000 meters out to a distance of 3,000 meters from the center of the project, and a spacing of 500 meters out to a distance of 5,000 meters from the center of the project. Receptors were placed along the fence line at a spacing of 25 meters. In accordance with CDPH guidance, on-site receptors were left turned on for modeling, to ensure that all publicly accessible areas are included in the modeling in case no physical barrier exists along the edge of the property boundary. This results in a conservative modeling results in the case that a fence or other boundary is built.

### **4.6 OPERATING SCHEDULE**

All sources were conservatively modeled to operate for twenty-four hours each day, including weekends.



#### **4.7 BUILDING DOWNWASH**

Building downwash was not considered in modeling because the only source types used were line volume and area or area poly sources. No point sources were considered.

## 5.0 RESULTS

Emissions of PM<sub>2.5</sub>, PM<sub>10</sub>, and NO<sub>x</sub> from the proposed Project were modeled and evaluated for their impact on the respective NAAQS for each pollutant. NAAQS examined for each of these pollutants, including the applicable threshold limit and design value basis, are shown in Table 5.

AERMOD runs for each of these pollutants estimated the impacts that Project emission sources will have on the surrounding area. Modeled concentrations added to the existing background concentrations as discussed in Section 2.4. The total concentration consists of modeled concentrations plus the background concentrations. Total concentrations for each pollutant and averaging period were compared to the NAAQS threshold limit values. Table 6 shows the modeled concentrations, the background concentrations, and the total concentrations for each pollutant and averaging time, and comparison to the NAAQS. Total concentrations for each pollutant were below the applicable NAAQS threshold limit.

The highest modeled concentrations for 24-hour PM<sub>2.5</sub> were located along the northern and western fence lines of the property.

The highest modeled concentrations for Annual PM<sub>2.5</sub> were located generally evenly distributed over the site property, extending slightly to the north of the property over the nearby rail line.

The highest modeled concentrations for 24-hour PM<sub>10</sub> were located along the center of the northern fence line of the property.

The highest modeled concentrations for 1-hour NO<sub>2</sub> were located generally over the main part of the property, around the footprint of the building, and extending just past the northern fence line over the nearby rail line.

## 6.0 CONCLUSIONS

The AQIS reviewed the modeled concentrations of PM<sub>2.5</sub>, PM<sub>10</sub>, and NO<sub>2</sub> from Project generated emissions, including building comfort heating and on-site and off-site traffic from passenger cars and trucks. When added to background concentrations of each pollutant in the ambient air, total concentrations are below the application NAAQS thresholds for all pollutants. The proposed 328 West 40<sup>th</sup> Place Project is not expected to cause or contribute to an exceedance of any NAAQS for PM<sub>2.5</sub>, PM<sub>10</sub>, or NO<sub>2</sub>.

## 7.0 REFERENCES

Chicago DPH 2021. *AIR QUALITY IMPACT EVALUATION Interim Guidance* and accompanying Excel Tables, Chicago Department of Public Health, September 2021.

KLOA 2022. *Traffic Impact Study, 328 West 40<sup>th</sup> Place, Chicago, Illinois*, Kenig, Lindgren, O'Hara, Aboona, Inc., July 20, 2022.

USEPA 1998. *AP-42: Compilation of Air Emissions Factors, Fifth Edition, Volume I, Chapter 1, Section 1.4: External Combustion Sources - Natural Gas Combustion*, US Environmental Protection Agency, July 1998. Available at: [https://www.epa.gov/sites/default/files/2020-09/documents/1.4\\_natural\\_gas\\_combustion.pdf](https://www.epa.gov/sites/default/files/2020-09/documents/1.4_natural_gas_combustion.pdf)

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

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## **TABLES**

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**AIR QUALITY IMPACT STUDY**  
**328 WEST 40TH PLACE, CHICAGO, ILLINOIS**

**Table 1: Ambient Air Monitoring Stations Selected for Background Concentrations**

<b>Pollutant</b>	<b>NAAQS Averaging Period</b>	<b>Air Monitoring Station Name</b>	<b>Site ID</b>	<b>Approx. Distance from Site (miles)</b>	<b>Direction from Site</b>	<b>2019-2021 Design Value for Modeling (<math>\mu\text{g}/\text{m}^3</math>)</b>
PM2.5	24-Hour	Com Ed Maintenance Bldg	170310076	6.2	SW	20
PM2.5	Annual	Com Ed Maintenance Bldg	170310076	6.2	SW	8.5
PM10	24-Hour	Northbrook Water Plant	170314201	22.8	NNW	0
NO2	1-Hour	IEPA Trailer	170313103	16.0	NW	53

**AIR QUALITY IMPACT STUDY**  
**328 WEST 40TH PLACE, CHICAGO, ILLINOIS**

**Table 2: Emission Factors - Warehouse and Office Comfort Heating**

Pollutant	Emission Factor	Units	Emission Factor Source
NO <sub>x</sub>	100	lb/10 <sup>6</sup> scf	AP-42 Table 1.4-1, for small boilers <100 MMBtu/hr, uncontrolled
	0.10	lb/MMbtu	Converted assuming 1020 btu/scf per note (a) to Table 1.4-1
PM <sub>10</sub>	7.6	lb/10 <sup>6</sup> scf	AP-42 Table 1.4-2, PM-Total
	0.01	lb/MMbtu	Converted assuming 1020 btu/scf per note (a) to Table 1.4-2
PM <sub>2.5</sub>	7.6	lb/10 <sup>6</sup> scf	AP-42 Table 1.4-2, PM-Total
	0.01	lb/MMbtu	Converted assuming 1020 btu/scf per note (a) to Table 1.4-2

**AIR QUALITY IMPACT STUDY**  
**328 WEST 40TH PLACE, CHICAGO, ILLINOIS**

**Table 3: Emission Factors - On-site and Off-site Vehicles**

Emission Source Type	Vehicle Type	Speed Bin	NOx EF (g/mi)	PM10 EF (g/mi)	PM2.5 EF (g/mi)
On-site Travel	Passenger Car	2.5 <= speed < 7.5 mph	0.090	0.005	0.004
On-site Travel	Combination Short-haul Truck	2.5 <= speed < 7.5 mph	26.041	0.591	0.543
Off-site Travel	Passenger Car	12.5 <= speed < 17.5 mph	0.076	0.003	0.002
Off-site Travel	Passenger Car	22.5 <= speed < 27.5 mph	0.071	0.002	0.002
Off-site Travel	Passenger Car	27.5 <= speed < 32.5 mph	0.064	0.002	0.001
Off-site Travel	Combination Short-haul Truck	12.5 <= speed < 17.5 mph	12.588	0.338	0.311
Off-site Travel	Combination Short-haul Truck	22.5 <= speed < 27.5 mph	9.401	0.280	0.257

Emission Source Type	Vehicle Type	Speed Bin	NOx EF (g/hr)	PM10 EF (g/hr)	PM2.5 EF (g/hr)
Idling	Passenger Car	speed = 0 (idle) (g/hr)	0.2355	0.01829	0.016184
Idling	Combination Short-haul Truck	speed = 0 (idle) (g/hr)	59.424	1.88751	1.736506



**AIR QUALITY IMPACT STUDY**  
**328 WEST 40TH PLACE, CHICAGO, ILLINOIS**

**Table 4: AERMOD Model Source Parameters**

Source ID	Description	Source Type	Plume Height (m)	Release Height (m)	$\sigma_z$ (m)	Plume Width (m)	Max Hourly Emission Rate		
							NO <sub>x</sub> (g/s)	PM <sub>10</sub> (g/s)	PM <sub>2.5</sub> (g/s)
HTRS	NG-Fired Combustion (Comfort Heating - Office & Warehouse)	Area	-	5.49	-	-	2.97E-02	2.26E-03	2.26E-03
ROAD1	Roadway - Pershing Rd. west of Normal Ave. to 1/4 mile from site boundary	Line Volume	2.60	0.00	1.21	16.00	5.15E-05	1.31E-06	1.16E-06
ROAD2	Roadway - Pershing Rd. between Normal Ave & Princeton Ave	Line Volume	2.60	0.00	1.21	16.00	8.45E-05	2.16E-06	1.91E-06
ROAD3	Roadway - Pershing Rd. between Princeton Ave & Wells St.	Line Volume	2.60	0.00	1.21	16.00	2.85E-05	7.28E-07	6.44E-07
ROAD4	Roadway - Pershing Rd. east of Wells St. to 1/4 mile from site boundary	Line Volume	2.60	0.00	1.21	16.00	1.68E-04	4.28E-06	3.78E-06
ROAD5	Roadway - Normal Ave. between Pershing Rd. & Root St.	Line Volume	2.60	0.00	1.21	7.98	4.93E-05	1.24E-06	1.10E-06
ROAD6	Roadway - Princeton Ave. between Pershing Rd. & North Proposed Site Access Dr.	Line Volume	2.60	0.00	1.21	7.98	1.65E-04	4.17E-06	3.69E-06
ROAD7	Roadway - Princeton Ave. between North Proposed Site Access Dr. & South Proposed Site Access Dr.	Line Volume	2.94	0.00	1.37	8.03	6.12E-04	1.80E-05	1.65E-05
ROAD8	Roadway - Princeton Ave. between South Proposed Site Access Dr. & Root St.	Line Volume	3.25	0.00	1.51	8.07	1.79E-03	4.85E-05	4.46E-05
ROAD9	Roadway - Root St. west of Normal Ave to 1/4 mile from site boundary	Line Volume	2.60	0.00	1.21	7.98	5.88E-05	1.48E-06	1.31E-06
ROAD10	Roadway - Root St. between Normal Ave & Proposed Site Access Dr.	Line Volume	2.60	0.00	1.21	7.98	1.02E-04	2.57E-06	2.27E-06
ROAD11	Roadway - Root St. between Proposed Site Access Dr. & Princeton Ave	Line Volume	2.60	0.00	1.21	7.98	4.38E-05	1.10E-06	9.77E-07
ROAD12	Roadway - Root St. between Princeton Ave & Wells St.	Line Volume	3.18	0.00	1.48	8.07	1.16E-03	3.43E-05	3.15E-05
ROAD13	Roadway - Root St. east of Wells St. to 1/4 mile from site boundary	Line Volume	3.18	0.00	1.48	8.07	1.57E-03	4.65E-05	4.27E-05
ROAD14	Roadway - Princeton Ave. south of Root St. to 1/4 mile from site boundary	Line Volume	2.60	0.00	1.21	7.98	3.46E-05	8.72E-07	7.71E-07
ROAD15	Roadway - Passenger Vehicle Route 1 to Parking Lot, entrance from Root St Proposed Site Access Dr	Line Volume	2.60	0.00	1.21	7.98	2.44E-04	1.25E-05	1.10E-05
ROAD16	Roadway - Passenger Vehicle Route 2 to Parking Lot, entrance from Princeton Ave, South Proposed Site Access Dr	Line Volume	2.60	0.00	1.21	7.98	1.78E-04	9.09E-06	8.04E-06
ROAD17	Roadway - Passenger Vehicle Route 3 to Parking Lot, entrance from Princeton Ave, North Proposed Site Access Dr	Line Volume	2.60	0.00	1.21	7.98	5.81E-05	2.97E-06	2.63E-06
ROAD18	Roadway - Truck Route to Loading Docks, Entrance from Princeton Ave North Proposed Site Access Dr	Line Volume	6.80	0.00	3.16	8.59	7.37E-03	1.67E-04	1.54E-04
IDLE1	Idling - Pershing Rd/Normal Ave Intersection	Area Poly	2.60	1.30	1.21	-	4.38E-06	3.41E-07	3.01E-07
IDLE2	Idling - Pershing Rd/Princeton Ave Intersection	Area Poly	2.60	1.30	1.21	-	1.55E-05	1.20E-06	1.06E-06
IDLE3	Idling - Pershing Rd/Wells St Intersection	Area Poly	2.60	1.30	1.21	-	1.54E-05	1.19E-06	1.06E-06
IDLE4	Idling - Princeton Ave/North Site Access Dr Intersection	Area Poly	2.85	1.43	1.33	-	1.63E-04	5.49E-06	5.03E-06
IDLE5	Idling - Princeton Ave/South Site Access Dr Intersection	Area Poly	2.84	1.42	1.32	-	7.28E-05	2.61E-06	2.38E-06
IDLE6	Idling - Root St/Normal Ave Intersection	Area Poly	2.60	1.30	1.21	-	5.52E-06	4.29E-07	3.79E-07
IDLE7	Idling - Root St/Site Access Dr Intersection	Area Poly	2.60	1.30	1.21	-	5.20E-06	4.04E-07	3.58E-07
IDLE8	Idling - Root St/Princeton Ave Intersection	Area Poly	3.01	1.51	1.40	-	1.74E-04	5.82E-06	5.34E-06
IDLE9	Idling - Root St/Wells St Intersection	Area Poly	3.18	1.59	1.48	-	1.45E-04	4.76E-06	4.37E-06
IDLE10	Idling Area - Loading Docks	Area	6.80	3.40	3.16	-	5.50E-03	1.75E-04	1.61E-04

**AIR QUALITY IMPACT STUDY**  
**328 WEST 40TH PLACE, CHICAGO, ILLINOIS**

**Table 5: NAAQS Threshold Limits and Design Value Basis**

<b>Pollutant</b>	<b>Averaging Time</b>	<b>Threshold Limit (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Design Value Basis</b>
PM <sub>2.5</sub>	24-Hour	35	98 <sup>th</sup> percentile (H8H) 5-year average
	Annual	12	Annual average (H1H) 5-year average
PM <sub>10</sub>	24-Hour	150	H6H 5-year average
NO <sub>2</sub>	1-Hour	188	98 <sup>th</sup> percentile (H8H) 1-hour daily maximum 5-year average

**AIR QUALITY IMPACT STUDY**  
**328 WEST 40TH PLACE, CHICAGO, ILLINOIS**

**Table 6: Project Modeled Impacts Plus Background**

Pollutant	Averaging Period	Modeled Impact Concentration ( $\mu\text{g}/\text{m}^3$ )	Ambient Background ( $\mu\text{g}/\text{m}^3$ )	Total Concentration ( $\mu\text{g}/\text{m}^3$ )	NAAQS ( $\mu\text{g}/\text{m}^3$ )	Exceed NAAQS?
PM <sub>2.5</sub>	24-Hour	0.49	20.00	20.49	35	No
	Annual	0.18	8.50	8.68	12	No
PM <sub>10</sub>	24-Hour	0.66	0.00	0.66	150	No
NO <sub>2</sub>	1-Hour	28.02	53.00	81.02	188	No

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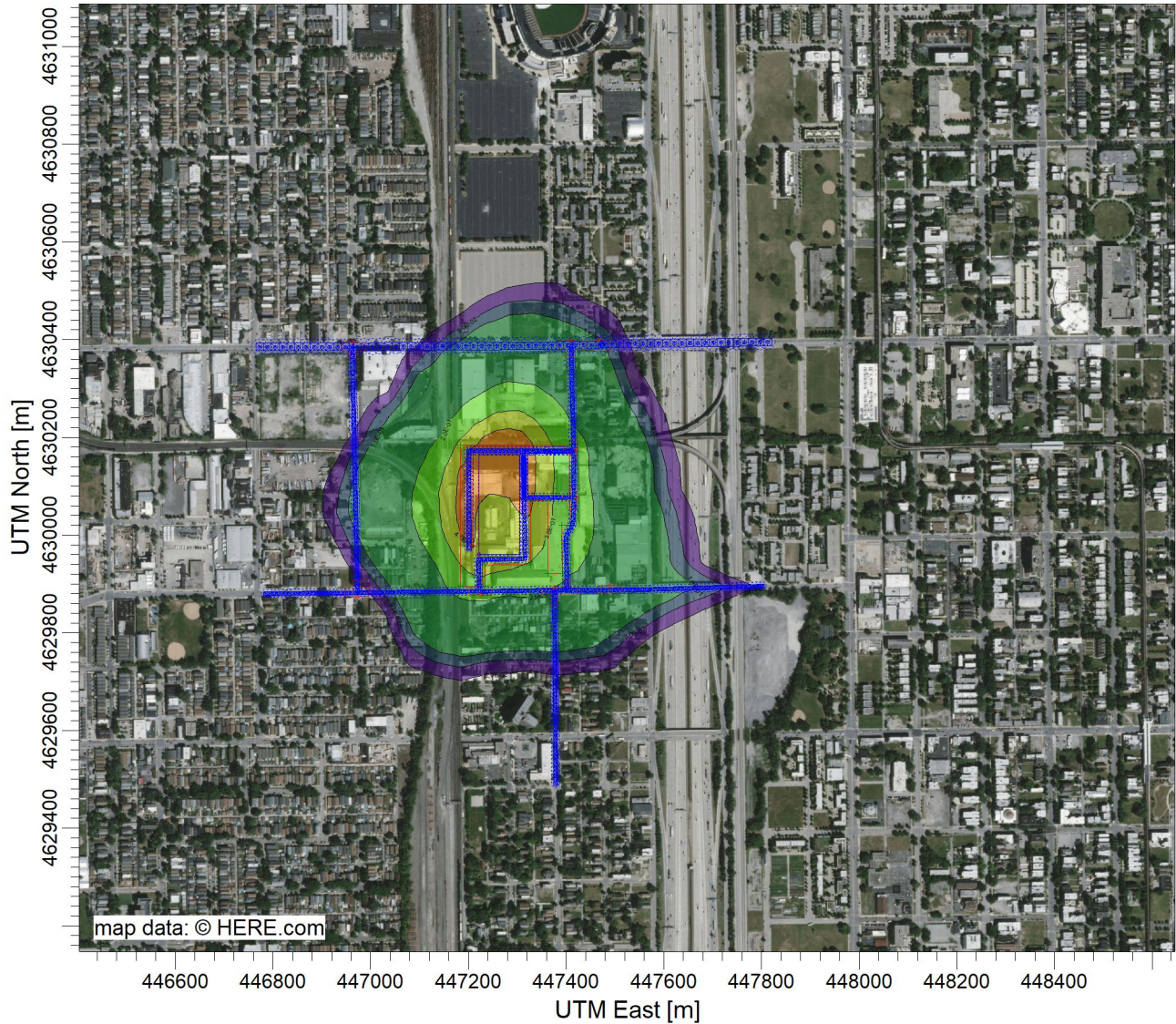
**APPENDIX A**

**MODELED CONCENTRATIONS**

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PROJECT TITLE:

**The Missner Group 328 W. 40th Place PM2.5 24-Hr**



PLOT FILE OF 8TH-HIGHEST MAX DAILY 24-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ug/m<sup>3</sup>  
 Max: 4.9E-01 [ug/m<sup>3</sup>] at (447284.00, 4630174.00)

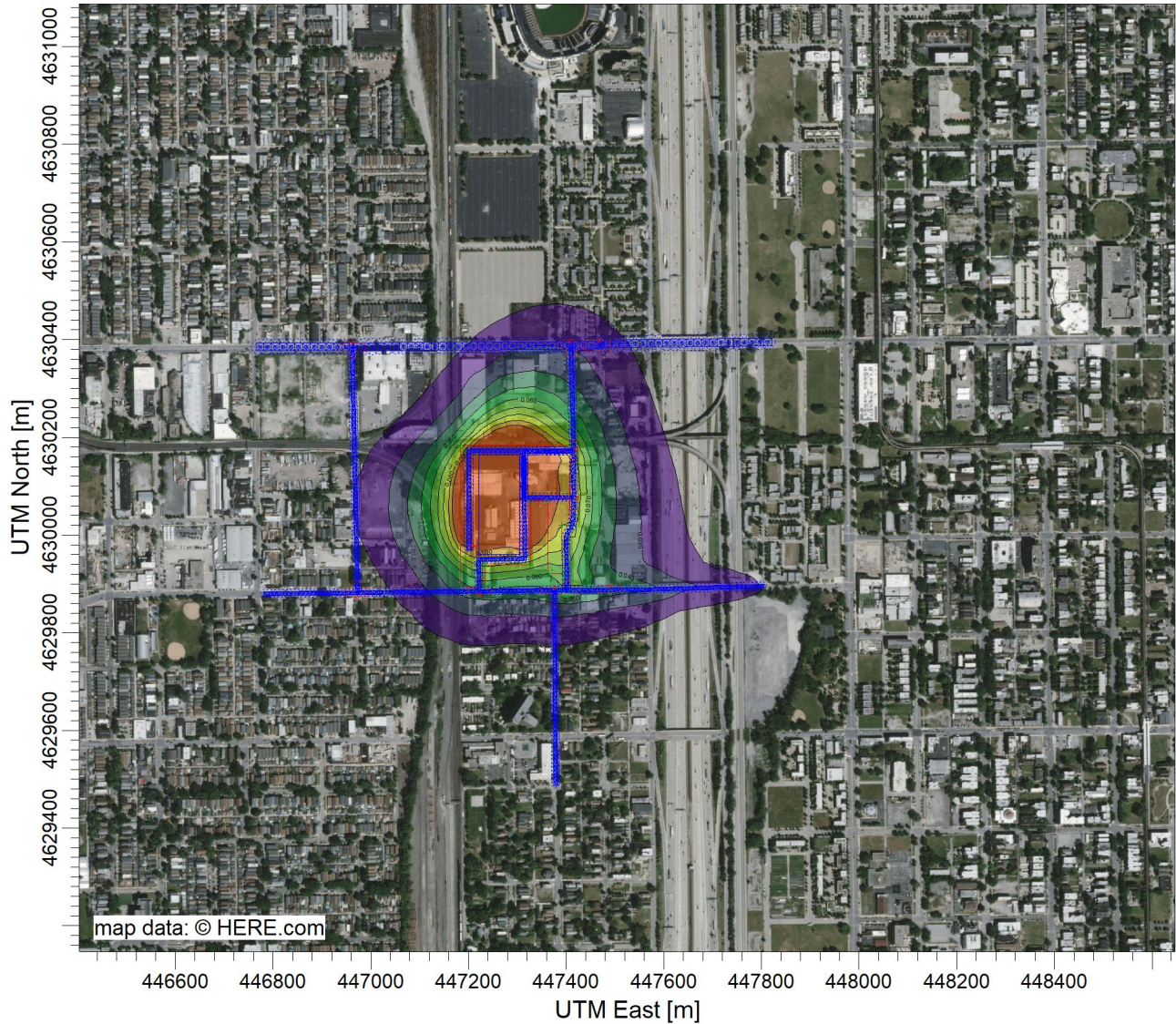


COMMENTS:	SOURCES: <b>29</b>	COMPANY NAME:	
	RECEPTORS: <b>2755</b>	MODELER:	
	OUTPUT TYPE: <b>Concentration</b>	SCALE: 1:14,111 0  0.5 km	
	MAX: <b>4.9E-01 ug/m<sup>3</sup></b>	DATE: <b>9/9/2022</b>	PROJECT NO.: <b>325-137</b>



PROJECT TITLE:

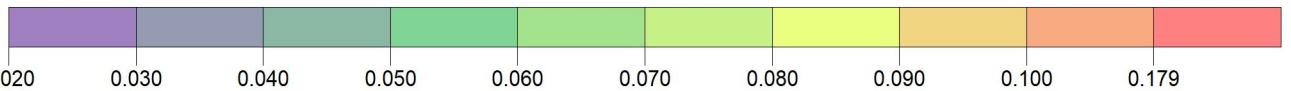
**The Missner Group 328 W. 40th Place PM2.5 Annual**



PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: ALL

ug/m<sup>3</sup>

Max: 0.179 [ug/m<sup>3</sup>] at (447304.00, 4630114.00)

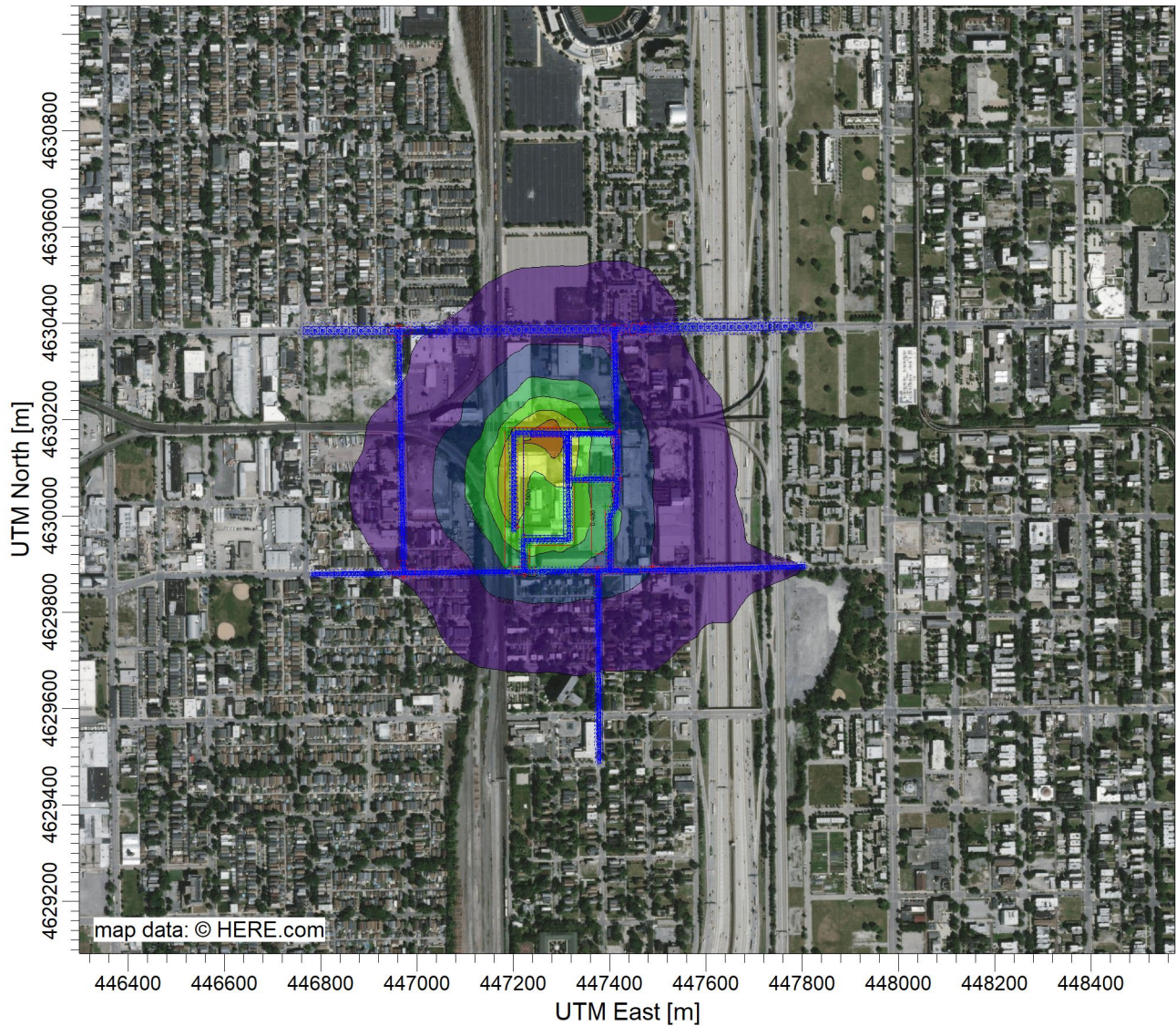


COMMENTS:	SOURCES: <b>29</b>	COMPANY NAME:	
	RECEPTORS: <b>2755</b>	MODELER:	
	OUTPUT TYPE: <b>Concentration</b>	SCALE: 1:14,113	
	MAX: <b>0.179 ug/m<sup>3</sup></b>	DATE: <b>9/9/2022</b>	PROJECT NO.: <b>325-137</b>



PROJECT TITLE:

**The Missner Group 328 W 40th Place PM10**

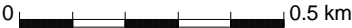


PLOT FILE OF HIGH 6TH HIGH 24-HR VALUES FOR SOURCE GROUP: ALL

ug/m<sup>3</sup>

Max: 0.657 [ug/m<sup>3</sup>] at (447264.00, 4630174.00)

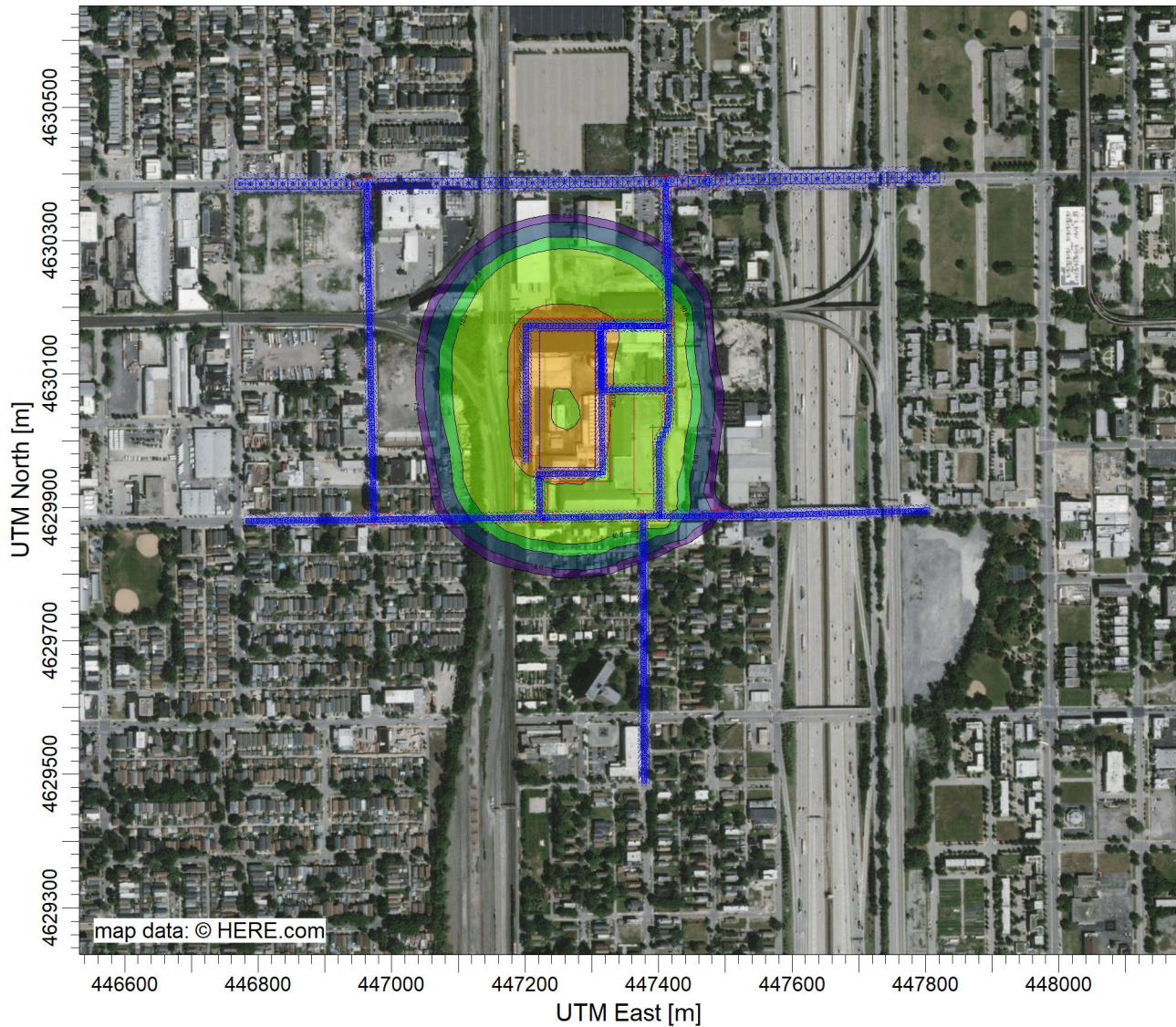


COMMENTS:	SOURCES: <b>29</b>	COMPANY NAME:	
	RECEPTORS: <b>2755</b>	MODELER:	
	OUTPUT TYPE: <b>Concentration</b>	SCALE: 1:14,315 0  0.5 km	
	MAX: <b>0.657 ug/m<sup>3</sup></b>	DATE: <b>9/9/2022</b>	PROJECT NO.: <b>325-137</b>



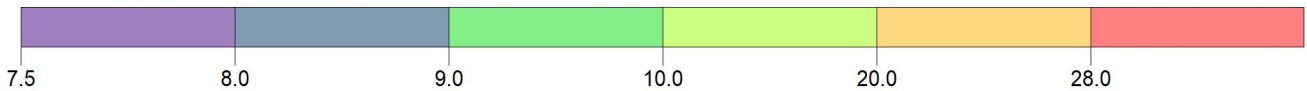
PROJECT TITLE:


**The Missner Group 328 W 40th Place NO2**



PLOT FILE OF 8TH-HIGHEST MAX DAILY 1-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ug/m<sup>3</sup>

Max: 28.0 [ug/m<sup>3</sup>] at (447204.00, 4630114.00)



COMMENTS:	SOURCES: <b>29</b>	COMPANY NAME:	
	RECEPTORS: <b>2755</b>	MODELER:	
	OUTPUT TYPE: <b>Concentration</b>	SCALE: 1:10,344 0  0.3 km	
	MAX: <b>28.0 ug/m<sup>3</sup></b>	DATE: <b>9/8/2022</b>	PROJECT NO.: <b>325-137</b>



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**APPENDIX B**

**EMISSION CALCULATIONS**

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**Appendix B**  
**Emission Calculations**  
**Natural Gas Combustion - Comfort Heating**

**Emission Source: Natural Gas Combustion (Comfort Heating)**

Assumed 8,760 hr/yr operation.

Spread emissions over entire footprint of the building.

**Combustion Units:**

Office heating units: 600000 btu/hr  
 Warehouse heating units: 1,800,000 btu/hr  
 Total heating for building: 2,400,000 btu/hr  
 2.4 MMBtu/hr

**Natural Gas Usage:**

NG Usage: 57,600,000 btu/day  
 NG Usage<sup>3</sup>: 0.002 MMscf/hr  
 NG Usage: 0.056 MMscf/day

**Notes:**

[1] Office heating units = 2 5-ton RTUs, 300,000 btu/hr per unit

[2] Warehouse heating units = 2 80/20 units, 900,000 btu/hr per unit

[3] Assume 1020 btu/scf based on footnote (1) to AP-42 Table 1.4-1

[4] Water heaters will be electric

**Emission Factors:**

Pollutant	Emission		EF Source
	Factor	Units	
NOx:	100 lb/10 <sup>6</sup> scf		AP-42 Table 1.4-1, for small boilers <100 MMBtu/hr, uncontrolled
	0.10 lb/MMbtu		Converted assuming 1020 btu/scf per note (a) to Table 1.4-1
PM10:	7.6 lb/10 <sup>6</sup> scf		AP-42 Table 1.4-2, PM-Total
	0.01 lb/MMbtu		Converted assuming 1020 btu/scf per note (a) to Table 1.4-2
PM2.5:	7.6 lb/10 <sup>6</sup> scf		AP-42 Table 1.4-2, PM-Total
	0.01 lb/MMbtu		Converted assuming 1020 btu/scf per note (a) to Table 1.4-2

Source ID	Emission Unit	Hours of Operation (hr/yr)	Heat Input Rating (MMbtu/hr)	Potential Emissions								
				NOx			PM10			PM2.5		
				(lb/hr)	(ton/yr)	(g/s)	(lb/hr)	(ton/yr)	(g/s)	(lb/hr)	(ton/yr)	(g/s)
HTRS	NG-Fired Combustion (Comfort Heating)	8,760	2.4	0.24	1.03	2.97E-02	0.02	0.08	2.26E-03	0.02	0.08	2.26E-03

Unit conversions:  
 1020 btu/scf  
 454.59 g/lb  
 60 min/hr  
 60 s/min

**Appendix B**  
**Emission Calculations**  
**Mobile Emissions - Off-site Travel**

Emission Source: Mobile Emissions - Off-site Travel

Passenger Cars

Source ID	Roadway Section Description	Distance <sup>[2]</sup> (m)	AM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	PM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	Volume Peak Hour <sup>[1]</sup> (# of Vehicles)	Miles per Peak Hour (miles)	Year	Vehicle Type	Fuel <sup>[5]</sup>	Road Type	Speed Limit (mph)	Speed Bin <sup>[3]</sup>	NOx EF (g/mi)	PM10 EF (g/mi)	PM2.5 EF (g/mi)	Hourly NOx Rate (g/hr)	Hourly PM10 Rate (g/hr)	Hourly PM2.5 Rate (g/hr)	Hourly NOx Rate (g/s)	Hourly PM10 Rate (g/s)	Hourly PM2.5 Rate (g/s)
ROAD1	Roadway - Pershing Rd. W of Normal Ave. to 1/4 mile from site boundary	185.8	25	25	25	2.89	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	27.5 <= speed < 32.5 mph	0.064	0.002	0.001	0.185	0.005	0.004	5.15E-05	1.31E-06	1.16E-06
ROAD2	Roadway - Pershing Rd. btw Normal Ave & Princeton Ave	448.0	17	17	17	4.74	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	27.5 <= speed < 32.5 mph	0.064	0.002	0.001	0.304	0.008	0.007	8.45E-05	2.16E-06	1.91E-06
ROAD3	Roadway - Pershing Rd. btw Princeton Ave & Wells St.	58.5	43	44	44	1.60	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	27.5 <= speed < 32.5 mph	0.064	0.002	0.001	0.103	0.003	0.002	2.85E-05	7.28E-07	6.44E-07
ROAD4	Roadway - Pershing Rd. E of Wells St. to 1/4 mile from site boundary	343.8	43	44	44	9.40	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	27.5 <= speed < 32.5 mph	0.064	0.002	0.001	0.604	0.015	0.014	1.68E-04	4.28E-06	3.78E-06
ROAD5	Roadway - Normal Ave. btw Pershing Rd. & Root St.	502.3	8	8	8	2.50	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.178	0.004	0.004	4.93E-05	1.24E-06	1.10E-06
ROAD6	Roadway - Princeton Ave. btw Pershing Rd. & North Proposed Site Access Dr.	221.0	60	61	61	8.38	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.596	0.015	0.013	1.65E-04	4.17E-06	3.69E-06
ROAD7	Roadway - Princeton Ave. btw North Proposed Site Access Dr. & South Proposed Site Access Dr.	86.9	44	45	45	2.43	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.173	0.004	0.004	4.80E-05	1.21E-06	1.07E-06
ROAD8	Roadway - Princeton Ave. btw South Proposed Site Access Dr. & Root St.	184.7	20	22	22	2.73	2022	Passenger Car	Gasoline	Urban Unrestricted	15	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0.206	0.007	0.006	5.73E-05	1.96E-06	1.73E-06
ROAD9	Roadway - Root St. W of Normal Ave to 1/4 mile from site boundary	191.7	24	25	25	2.98	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.212	0.005	0.005	5.88E-05	1.48E-06	1.31E-06
ROAD10	Roadway - Root St. btw Normal Ave & Proposed Site Access Dr.	251.5	32	33	33	5.16	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.367	0.009	0.008	1.02E-04	2.57E-06	2.27E-06
ROAD11	Roadway - Root St. btw Proposed Site Access Dr. & Princeton Ave	178.3	19	20	20	2.22	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.158	0.004	0.004	4.38E-05	1.10E-06	9.77E-07
ROAD12	Roadway - Root St. btw Princeton Ave & Wells St.	170.7	24	25	25	2.65	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.189	0.005	0.004	5.24E-05	1.32E-06	1.17E-06
ROAD13	Roadway - Root St. E of Wells St. to 1/4 mile from site boundary	231.6	24	25	25	3.60	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.256	0.006	0.006	7.11E-05	1.79E-06	1.59E-06
ROAD14	Roadway - Princeton Ave. S of Root St. to 1/4 mile from site boundary	402.3	7	7	7	1.75	2022	Passenger Car	Gasoline	Urban Unrestricted	Unknown	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.124	0.003	0.003	3.46E-05	8.72E-07	7.71E-07

**Notes**

- [1] Information from Figure 8 of KLOA Traffic Study. Volume Peak Hour is the maximum # of vehicles from either the AM Peak Hour or the PM Peak Hour.
- [2] Distances based on Figure 7 of KLOA Traffic Study or estimated when drawn in AERMOD View where distances not provided in traffic study.
- [3] Vehicle speeds assumed as follows, based on road type: 30MPH for Pershing Rd (4 lane road), 25MPH for Root St, 25MPH for Normal Ave, 25MPH for Princeton (except around curve where posted 15MPH limit)
- [4] Emission Factors from MOVES Table provided by CDPH (On-Network 2021-2030)
- [5] Fuel type based on defaults given in CDPH guidance document "Air Quality Impact Evaluation Interim Guidance" dated September 2021

**Appendix B**  
**Emission Calculations**  
**Mobile Emissions - Off-site Travel**

Emission Source: Mobile Emissions - Off-site Travel

**Trucks**

Source ID	Roadway Section Description	Distance (m)	AM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	PM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	Volume Peak Hour <sup>[2]</sup> (# of Vehicles)	Miles per Peak Hour (miles)	Year	Vehicle Type	Fuel <sup>[5]</sup>	Road Type	Speed Limit (mph)	Speed Bin <sup>[3]</sup>	NOx EF (g/mi)	PM10 EF (g/mi)	PM2.5 EF (g/mi)	Hourly NOx Rate (g/hr)	Hourly PM10 Rate (g/hr)	Hourly PM2.5 Rate (g/hr)	Hourly NOx Rate (g/s)	Hourly PM10 Rate (g/s)	Hourly PM2.5 Rate (g/s)
ROAD7	Princeton Ave. btw North Proposed Site Access Dr. & South Proposed Site Access Dr.	86.9	4	2	4	0.22	2022	Combination Short-haul Truck	Diesel Fuel	Unrestricted	Unknown	22.5 <= speed < 27.5 mph	9.401	0.280	0.257	2.030	0.060	0.056	5.64E-04	1.68E-05	1.54E-05
ROAD8	Princeton Ave. btw South Proposed Site Access Dr. & Root St.	199.6	4	2	4	0.50	2022	Combination Short-haul Truck	Diesel Fuel	Unrestricted	15	12.5 <= speed < 17.5 mph	12.588	0.338	0.311	6.246	0.168	0.154	1.74E-03	4.66E-05	4.29E-05
ROAD12	Root St. btw Princeton Ave & Wells St.	170.7	4	2	4	0.42	2022	Combination Short-haul Truck	Diesel Fuel	Unrestricted	Unknown	22.5 <= speed < 27.5 mph	9.401	0.280	0.257	3.988	0.119	0.109	1.11E-03	3.30E-05	3.03E-05
ROAD13	Root St. E of Wells St. to 1/4 mile from site boundary	231.6	4	2	4	0.58	2022	Combination Short-haul Truck	Diesel Fuel	Unrestricted	Unknown	22.5 <= speed < 27.5 mph	9.401	0.280	0.257	5.412	0.161	0.148	1.50E-03	4.47E-05	4.11E-05

**Notes**

- [1] Information from Figure 9 of KLOA Traffic Study. Volume Peak Hour is the maximum # of vehicles from either the AM Peak Hour or the PM Peak Hour.
- [2] Distances estimated based on drawing sources in AERMOD View
- [3] Vehicle speeds assumed as follows, based on road type: 30MPH for Pershing Rd (4 lane road), 25MPH for Root St, 25MPH for Normal Ave, 25MPH for Princeton (except around curve where posted 15MPH limit)
- [4] Emission Factors from MOVES Table provided by CDPH (On-Network 2021-2030)
- [5] Fuel type based on defaults given in CDPH guidance document "Air Quality Impact Evaluation Interim Guidance" dated September 2021

**Appendix B**  
**Emission Calculations**  
**Mobile Emissions - On-site Travel**

**Emission Source: Mobile Emissions - On-site Travel**

**All Vehicles**

Source ID	Roadway Section Description	Distance <sup>[2]</sup> (m)	AM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	PM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	Volume Peak Hour <sup>[1]</sup> (# of Vehicles)	Miles per Peak Hour (miles)	Year	Vehicle Type	Fuel <sup>[5]</sup>	Road Type	Speed Bin <sup>[3]</sup>	NOx EF (g/mi)	PM10 EF (g/mi)	PM2.5 EF (g/mi)	Hourly NOx Rate (g/hr)	Hourly PM10 Rate (g/hr)	Hourly PM2.5 Rate (g/hr)	Hourly NOx Rate (g/s)	Hourly PM10 Rate (g/s)	Hourly PM2.5 Rate (g/s)
ROAD15	Roadway - Passenger Vehicle Route 1 to Parking Lot, entrance from Root St Proposed Site Access Dr	366.6	43	43	43	9.80	2022	Passenger Car	Gasoline	Urban Unrestricted	2.5 <= speed < 7.5 mph	0.090	0.005	0.004	0.878	0.045	0.040	2.44E-04	1.25E-05	1.10E-05
ROAD16	Roadway - Passenger Vehicle Route 2 to Parking Lot, entrance from Princeton Ave, South Proposed Site Access Dr	182.6	60	63	63	7.15	2022	Passenger Car	Gasoline	Urban Unrestricted	2.5 <= speed < 7.5 mph	0.090	0.005	0.004	0.641	0.033	0.029	1.78E-04	9.09E-06	8.04E-06
ROAD17	Roadway - Passenger Vehicle Route 3 to Parking Lot, entrance from Princeton Ave, North Proposed Site Access Dr	187.9	20	20	20	2.34	2022	Passenger Car	Gasoline	Urban Unrestricted	2.5 <= speed < 7.5 mph	0.090	0.005	0.004	0.209	0.011	0.009	5.81E-05	2.97E-06	2.63E-06
ROAD18	Roadway - Truck Route to Loading Docks, Entrance from Princeton Ave North Proposed Site Access Dr	410.1	4	2	4	1.02	2022	Combination Short-haul Truck	Diesel Fuel	Urban Unrestricted	2.5 <= speed < 7.5 mph	26.041	0.591	0.543	26.543	0.602	0.554	7.37E-03	1.67E-04	1.54E-04

**Notes**

- [1] Vehicle volume information from Figures 8 and 9 of KLOA Traffic Study. Volume Peak Hour is the maximum # of vehicles from either the AM Peak Hour or the PM Peak Hour.
- [2] Routes estimated based on site plan and distances estimated in AERMOD View as follows:
  - Passenger Vehicle Route 1: north from Root St to S end of building, east to east end of building, north to north end of building/parking lot. Conservatively assumed passenger cars drive all the way to the north end of the parking lot for maximum distance traveled.
  - Passenger Vehicle Route 2: west from Princeton Ave to east side of building, north to north end of parking lot - approx half of building length
  - Passenger Vehicle Route 3: west from Princeton Ave to east side of building, south to middle parking area - approx half of building length
  - Truck Route: west from Princeton Ave to west property boundary, south along building to south end of loading docks
- [3] Assume onsite speed of ~ 5mph for both passenger cars and trucks.
- [4] Emission Factors from MOVES Table provided by CDPH (On-Network 2021-2030)
- [5] Fuel type based on defaults given in CDPH guidance document "Air Quality Impact Evaluation Interim Guidance" dated September 2021

**Appendix B  
Emission Calculations  
Mobile Emissions - Idling Areas**

**Idling Areas - Intersections & Loading Docks**

**Idling - Passenger Cars**

Source ID	Intersection Description	AM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	PM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	Volume Peak Hour [1] (# of Vehicles)	Idle Time <sup>[2]</sup> (Minutes/hr/Vehicle)	Total Idle Time (Minutes/Hr)	Year	Vehicle Type	Fuel	Road Type	Speed Bin	NOx EF (g/hr)	PM10 EF (g/hr)	PM2.5 EF (g/hr)	Hourly NOx Rate (g/hr)	Hourly PM10 Rate (g/hr)	Hourly PM2.5 Rate (g/hr)	Hourly NOx Rate (g/s)	Hourly PM10 Rate (g/s)	Hourly PM2.5 Rate (g/s)
IDLE1	Idling - Pershing Rd/Normal Ave Intersection	25	25	25	0.16	4.02	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.016	0.001	0.001	4.38E-06	3.41E-07	3.01E-07
IDLE2	Idling - Pershing Rd/Princeton Ave Intersection	60	61	61	0.23	14.18	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.056	0.004	0.004	1.55E-05	1.20E-06	1.06E-06
IDLE3	Idling - Pershing Rd/Wells St Intersection	43	44	44	0.32	14.10	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.055	0.004	0.004	1.54E-05	1.19E-06	1.06E-06
IDLE4	Idling - Princeton Ave/North Site Access Dr Intersection	62	63	63	0.10	5.99	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.023	0.002	0.002	6.53E-06	5.07E-07	4.48E-07
IDLE5	Idling - Princeton Ave/South Site Access Dr Intersection	62	65	65	0.09	5.83	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.023	0.002	0.002	6.36E-06	4.94E-07	4.37E-07
IDLE6	Idling - Root St/Normal Ave Intersection	32	33	33	0.15	5.06	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.020	0.002	0.001	5.52E-06	4.29E-07	3.79E-07
IDLE7	Idling - Root St/Site Access Dr Intersection	44	48	48	0.10	4.77	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.019	0.001	0.001	5.20E-06	4.04E-07	3.58E-07
IDLE8	Idling - Root St/Princeton Ave Intersection	35	37	37	0.15	5.59	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.022	0.002	0.002	6.09E-06	4.73E-07	4.19E-07
IDLE9	Idling - Root St/Wells St Intersection	24	25	25	0.13	3.21	2022	Passenger Car	Gasoline	Off-Network Idle	speed = 0 (idle) (g/hr)	0.235	0.018	0.016	0.013	0.001	0.001	3.50E-06	2.72E-07	2.40E-07

**Notes**

- [1] Vehicle volume information from Figure 8 KLOA Traffic Study. Volume Peak Hour is the maximum # of vehicles from either the AM Peak Hour or the PM Peak Hour.
- [2] Idle time based on information in tables above and on Tables 3 and 5 of KLOA Traffic Study. Used LOS delay for 2028 Projected Conditions. Only considered idling times for directions which had projected site-generated traffic. Idle times averaged for each intersection.
- [3] Emission Factors from MOVES Table provided by CDPH (Off-Network Idle 2021-2030)

**Appendix B  
Emission Calculations  
Mobile Emissions - Idling Areas**

**Idling - Trucks**

Source ID	Intersection/Area Description	AM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	PM Peak Hour Volume <sup>[1]</sup> (# of Vehicles)	Volume Peak Hour <sup>[1]</sup> (# of Vehicles)	Idle Time <sup>[2]</sup> (Minutes/hr/Vehicle)	Total Idle Time (Minutes/Hr)	Year	Vehicle Type	Fuel	Road Type	Speed Bin	NOx EF (g/hr)	PM10 EF (g/hr)	PM2.5 EF (g/hr)	Hourly NOx Rate (g/hr)	Hourly PM10 Rate (g/hr)	Hourly PM2.5 Rate (g/hr)	Hourly NOx Rate (g/s)	Hourly PM10 Rate (g/s)	Hourly PM2.5 Rate (g/s)
IDLE4	Idling - Princeton Ave/North Site Access Dr Intersection	4	2	4	0.14	0.57	2022	Combination Short-haul Truck	Diesel Fuel	Off-Network Idle	speed = 0 (idle) (g/hr)	59.424	1.888	1.737	0.565	0.018	0.016	1.57E-04	4.98E-06	4.58E-06
IDLE5	Idling - Princeton Ave/South Site Access Dr Intersection	4	2	4	0.06	0.24	2022	Combination Short-haul Truck	Diesel Fuel	Off-Network Idle	speed = 0 (idle) (g/hr)	59.424	1.888	1.737	0.239	0.008	0.007	6.65E-05	2.11E-06	1.94E-06
IDLE8	Idling - Root St/Princeton Ave Intersection	4	2	4	0.15	0.61	2022	Combination Short-haul Truck	Diesel Fuel	Off-Network Idle	speed = 0 (idle) (g/hr)	59.424	1.888	1.737	0.606	0.019	0.018	1.68E-04	5.35E-06	4.92E-06
IDLE9	Idling - Root St/Wells St Intersection	4	2	4	0.13	0.51	2022	Combination Short-haul Truck	Diesel Fuel	Off-Network Idle	speed = 0 (idle) (g/hr)	59.424	1.888	1.737	0.508	0.016	0.015	1.41E-04	4.49E-06	4.13E-06
IDLE10	Idling Area - Loading Docks	4	2	4	5.00	20.00	2022	Combination Short-haul Truck	Diesel Fuel	Off-Network Idle	speed = 0 (idle) (g/hr)	59.424	1.888	1.737	19.808	0.629	0.579	5.50E-03	1.75E-04	1.61E-04

- Notes**
- [1] Assumed # of trucks idling at loading docks in peak hour equal to total # of trucks entering/leaving site during that peak hour
  - [2] Idle time based on information in tables above and on Tables 3 and 5 of KLOA Traffic Study. Used LOS delay for 2028 Projected Conditions. Only considered idling times for directions which had projected site-generated traffic. Idle times averaged for each intersection. Assumed 5 minutes idling time per truck at loading docks (not addressed in traffic study).
  - [3] Emission Factors from MOVES Table provided by CDPH (Off-Network Idle 2021-2030)

**Appendix B**  
**Emission Calculations**  
**Mobile Emissions - Idling Areas**

**Idling times - Passenger Cars**

Use LOS delay for 2028 Projected Conditions from Tables 3 and 5 of KLOA Traffic Study  
 Only considered idling times for directions which had projected site-generated traffic

**Pershing Rd/Normal Ave**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	8.6
PM Eastbound	6.8
AM Westbound	11.9
PM Westbound	13.3
AM Northbound	8.1
PM Northbound	9.2
<b>Average</b>	<b>9.7</b>

**Pershing Rd/Princeton Ave**

Traffic Time/Direction	Idle Time (seconds)
AM Westbound	9.5
PM Westbound	8.7
AM Northbound	17.4
PM Northbound	20.2
<b>Average</b>	<b>14.0</b>

**Pershing Rd/Wells St**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	22.5
PM Eastbound	20.7
AM Westbound	14.7
PM Westbound	19
<b>Average</b>	<b>19.2</b>

\*Northbound approach had no projected site-generated traffic, so did not consider idle time from that direction

**Princeton Ave/North Site Access Dr**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	9.3
PM Eastbound	8.9
AM Northbound	7.8
PM Northbound	8.2
AM Southbound	0
PM Southbound	0
<b>Average</b>	<b>5.7</b>

\*No idle time given for southbound approach, assumed zero because this would be a right turn into the site with no stop sign

**Princeton Ave/South Site Access Dr**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	8.9
PM Eastbound	8.9
AM Northbound	7.3
PM Northbound	7.2
AM Southbound	0
PM Southbound	0
<b>Average</b>	<b>5.4</b>

\*No idle time given for southbound approach, assumed zero because this would be a right turn into the site with no stop sign



**Appendix B**  
**Emission Calculations**  
**Mobile Emissions - Idling Areas**

**Idling times - Passenger Cars (continued)**

Use LOS delay for 2028 Projected Conditions from Tables 3 and 5 of KLOA Traffic Study  
 Only considered idling times for directions which had projected site-generated traffic

**Root St/Normal Ave**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	9
PM Eastbound	9.6
AM Westbound	9
PM Westbound	10.2
AM Southbound	8.4
PM Southbound	9
<b>Average</b>	<b>9.2</b>

\*Northbound approach had no projected site-generated traffic, so did not consider idle time from that direction

**Root St/Site Access Dr**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	7.7
PM Eastbound	7.7
AM Westbound	0
PM Westbound	0
AM Southbound	9.9
PM Southbound	10.5
<b>Average</b>	<b>6.0</b>

\*No idle time given for westbound approach, assumed zero because this would be a right turn into the site with no stop sign

**Root St/Princeton Ave**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	8.8
PM Eastbound	9.7
AM Westbound	9.1
PM Westbound	9.5
AM Northbound	8.5
PM Northbound	8.8
AM Southbound	9.5
PM Southbound	8.6
<b>Average</b>	<b>9.1</b>

**Root St/Wells St**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	7.8
PM Eastbound	7.8
AM Westbound	7.5
PM Westbound	7.7
<b>Average</b>	<b>7.7</b>

\*Northbound and southbound approaches had no projected site-generated traffic, so did not consider idle time from those directions

**Appendix B**  
**Emission Calculations**  
**Mobile Emissions - Idling Areas**

**Idling times - Trucks**

Use LOS delay for 2028 Projected Conditions from Tables 3 and 5 of KLOA Traffic Study  
 Only considered idling times for directions which had projected site-generated traffic

**Princeton Ave/North Site Access Dr**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	9.3
PM Eastbound	8.9
AM Northbound	7.8
PM Northbound	8.2
<b>Average</b>	<b>8.6</b>

\*Southbound approach had no projected site-generated traffic for trucks, so did not consider idle time from that direction

**Princeton Ave/South Site Access Dr**

Traffic Time/Direction	Idle Time (seconds)
AM Northbound	7.3
PM Northbound	7.2
AM Southbound	0
PM Southbound	0
<b>Average</b>	<b>3.6</b>

\*No idle time given for southbound approach, assumed zero because this would be a right turn into the site with no stop sign

\*Eastbound approach had no projected site-generated traffic for trucks, so did not consider idle time from that direction

**Root St/Princeton Ave**

Traffic Time/Direction	Idle Time (seconds)
AM Westbound	9.1
PM Westbound	9.5
AM Southbound	9.5
PM Southbound	8.6
<b>Average</b>	<b>9.2</b>

\*Northbound and Eastbound approaches had no projected site-generated traffic for trucks, so did not consider idle time from those directions

**Root St/Wells St**

Traffic Time/Direction	Idle Time (seconds)
AM Eastbound	7.8
PM Eastbound	7.8
AM Westbound	7.5
PM Westbound	7.7
<b>Average</b>	<b>7.7</b>

\*Northbound and southbound approaches had no projected site-generated traffic for trucks, so did not consider idle time from that direction

**Appendix B**  
**Emission Calculations**  
**Combined Mobile Emissions Model Parameters**

**Mobile Emissions Combined for Source IDs**

Source ID	Source Category	Source Description	Vehicle Type(s)	Source Type in Model	Hourly NOx Rate (g/s)	Hourly PM10 Rate (g/s)	Hourly PM2.5 Rate (g/s)	Vehicle Height (m)	Plume Height (m)	Release Height (m)	Initial Vertical Dimension [oz] (m)	# of Lanes	Plume Width (m)
ROAD1	Offsite Roadway Section	Pershing Rd. W of Normal Ave. to 1/4 mile from site boundary	Cars Only	Line Volume	5.15E-05	1.31E-06	1.16E-06	1.53	2.60	1.30	1.21	2	16.00
ROAD2	Off-site Roadway Section	Pershing Rd. btw Normal Ave & Princeton Ave	Cars Only	Line Volume	8.45E-05	2.16E-06	1.91E-06	1.53	2.60	1.30	1.21	2	16.00
ROAD3	Off-site Roadway Section	Pershing Rd. btw Princeton Ave & Wells St.	Cars Only	Line Volume	2.85E-05	7.28E-07	6.44E-07	1.53	2.60	1.30	1.21	2	16.00
ROAD4	Off-site Roadway Section	Pershing Rd. E of Wells St. to 1/4 mile from site boundary	Cars Only	Line Volume	1.68E-04	4.28E-06	3.78E-06	1.53	2.60	1.30	1.21	2	16.00
ROAD5	Off-site Roadway Section	Normal Ave. btw Pershing Rd. & Root St.	Cars Only	Line Volume	4.93E-05	1.24E-06	1.10E-06	1.53	2.60	1.30	1.21	1	7.98
ROAD6	Off-site Roadway Section	Princeton Ave. btw Pershing Rd. & North Proposed Site Access Dr.	Cars Only	Line Volume	1.65E-04	4.17E-06	3.69E-06	1.53	2.60	1.30	1.21	1	7.98
ROAD7	Off-site Roadway Section	Princeton Ave. btw North Proposed Site Access Dr. & South Proposed Site Access Dr.	Cars & Trucks	Line Volume	6.12E-04	1.80E-05	1.65E-05	1.73	2.94	1.47	1.37	1	8.03
ROAD8	Off-site Roadway Section	Princeton Ave. btw South Proposed Site Access Dr. & Root St.	Cars & Trucks	Line Volume	1.79E-03	4.85E-05	4.46E-05	1.91	3.25	1.62	1.51	1	8.07
ROAD9	Off-site Roadway Section	Root St. W of Normal Ave to 1/4 mile from site boundary	Cars Only	Line Volume	5.88E-05	1.48E-06	1.31E-06	1.53	2.60	1.30	1.21	1	7.98
ROAD10	Offsite Roadway Section	Root St. btw Normal Ave & Proposed Site Access Dr.	Cars Only	Line Volume	1.02E-04	2.57E-06	2.27E-06	1.53	2.60	1.30	1.21	1	7.98
ROAD11	Off-site Roadway Section	Root St. btw Proposed Site Access Dr. & Princeton Ave	Cars Only	Line Volume	4.38E-05	1.10E-06	9.77E-07	1.53	2.60	1.30	1.21	1	7.98
ROAD12	Off-site Roadway Section	Root St. btw Princeton Ave & Wells St.	Cars & Trucks	Line Volume	1.16E-03	3.43E-05	3.15E-05	1.87	3.18	1.59	1.48	1	8.07
ROAD13	Off-site Roadway Section	Root St. E of Wells St. to 1/4 mile from site boundary	Cars & Trucks	Line Volume	1.57E-03	4.65E-05	4.27E-05	1.87	3.18	1.59	1.48	1	8.07
ROAD14	Off-site Roadway Section	Princeton Ave. S of Root St. to 1/4 mile from site boundary	Cars Only	Line Volume	3.46E-05	8.72E-07	7.71E-07	1.53	2.60	1.30	1.21	1	7.98
ROAD15	On-site Roadway Section	Passenger Vehicle Route 1 to Parking Lot, entrance from Root St Proposed Site Access Dr	Cars Only	Line Volume	2.44E-04	1.25E-05	1.10E-05	1.53	2.60	1.30	1.21	1	7.98
ROAD16	On-site Roadway Section	Passenger Vehicle Route 2 to Parking Lot, entrance from Princeton Ave, South Proposed Site Access Dr	Cars Only	Line Volume	1.78E-04	9.09E-06	8.04E-06	1.53	2.60	1.30	1.21	1	7.98
ROAD17	On-site Roadway Section	Passenger Vehicle Route 3 to Parking Lot, entrance from Princeton Ave, North Proposed Site Access Dr	Cars Only	Line Volume	5.81E-05	2.97E-06	2.63E-06	1.53	2.60	1.30	1.21	1	7.98
ROAD18	On-site Roadway Section	Truck Route to Loading Docks, Entrance from Princeton Ave North Proposed Site Access Dr	Trucks Only	Line Volume	7.37E-03	1.67E-04	1.54E-04	4.00	6.80	3.40	3.16	1	8.59
IDLE1	Idling Area -	Pershing Rd/Normal Ave	Cars Only	Area	4.38E-06	3.41E-07	3.01E-07	1.53	2.60	1.30	1.21	N/A	N/A
IDLE2	Idling Area -	Pershing Rd/Princeton Ave	Cars Only	Area	1.55E-05	1.20E-06	1.06E-06	1.53	2.60	1.30	1.21	N/A	N/A
IDLE3	Idling Area -	Pershing Rd/Wells St	Cars Only	Area	1.54E-05	1.19E-06	1.06E-06	1.53	2.60	1.30	1.21	N/A	N/A
IDLE4	Idling Area -	Princeton Ave/North Site Access Dr	Cars & Trucks	Area	1.63E-04	5.49E-06	5.03E-06	1.68	2.85	1.43	1.33	N/A	N/A
IDLE5	Idling Area -	Princeton Ave/South Site Access Dr	Cars & Trucks	Area	7.28E-05	2.61E-06	2.38E-06	1.67	2.84	1.42	1.32	N/A	N/A
IDLE6	Idling Area -	Root St/Normal Ave	Cars Only	Area	5.52E-06	4.29E-07	3.79E-07	1.53	2.60	1.30	1.21	N/A	N/A
IDLE7	Idling Area -	Root St/Proposed Site Access Dr	Cars Only	Area	5.20E-06	4.04E-07	3.58E-07	1.53	2.60	1.30	1.21	N/A	N/A
IDLE8	Idling Area -	Root St/Princeton Ave	Cars & Trucks	Area	1.74E-04	5.82E-06	5.34E-06	1.77	3.01	1.51	1.40	N/A	N/A
IDLE9	Idling Area -	Root St/Wells St	Cars & Trucks	Area	1.45E-04	4.76E-06	4.37E-06	1.87	3.18	1.59	1.48	N/A	N/A
IDLE10	Idling Area -	Loading Docks	Trucks Only	Area	5.50E-03	1.75E-04	1.61E-04	4.00	6.80	3.40	3.16	N/A	N/A

**Appendix B**  
**Emission Calculations**  
**Combined Mobile Emissions Model Parameters**

**Notes**

[1] Vehicle height assumed as follows:

Passenger Car= 1.53 m

Truck= 4 m

Vehicle width assumed as follows:

Passenger Car= 6.5 ft 1.98 m

Truck= 8.5 ft 2.59 m

Vehicle heights and widths for roadway sections with both passenger car and truck traffic were calculated according to % of each type of vehicle on that roadway section as follows:

Source ID	# Cars Peak Hour	# Trucks Peak Hour	% Cars	% Trucks	Combined Vehicle Height (m)	Combined Vehicle Width (m)
ROAD7	45	4	92%	8%	1.73	2.03
ROAD8	22	4	85%	15%	1.91	2.07
ROAD12	25	4	86%	14%	1.87	2.07
ROAD13	25	4	86%	14%	1.87	2.07
IDLE4	63	4	94%	6%	1.68	2.02
IDLE5	65	4	94%	6%	1.67	2.02
IDLE8	37	4	90%	10%	1.77	2.04
IDLE9	25	4	86%	14%	1.87	2.07

[2] Model parameters, including plume height, release height, and initial vertical dimension calculated according to CDPH guidance document:

Top of plume height = 1.7 x (vehicle height)

Release height = 0.5 x (top of plume height)

Plume width = (vehicle width) + (6 meters for single lane) or (road width + 6 meters for two lane) Assumed road width of 10 m for Pershing Rd., which is the only 4 lane road being considered (2 lanes in each direction)

Initial horizontal dimension = (width of plume)/2.15

Initial vertical dimension = (top of plume height)/2.15

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**APPENDIX C**

**AERMOD MODELING FILES**

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Appendix C consists of files contained on the enclosed USB drive.