LANGAN

Technical Memorandum

2700 Kelly Road, Suite 200 Warrington, PA 18976 T: 215.491.6500 F: 215.491.6501

To: William A. Aiello (Crossroads)

From: Brendon Blachowski, EIT (Langan)
AnnMarie Vigilante, PE (Langan)

Info: Danielle Sandella, CHMM (Langan)

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Re: Air Quality Dispersion Modeling and Analysis
Crossroads Commercial Development, LLC
Glenwood Road, Carroll & Franklin Townships, PA
Langan Project No.: 200166302

EXECUTIVE SUMMARY

Potential emissions from mobile sources (i.e., passenger vehicles and long-haul trucks) associated with the proposed warehouse development were estimated using modeling software and traffic volume projections. The air quality modeling results were compared to the National Ambient Air Quality Standards (NAAQS) to determine if there are potential air quality impacts to nearby sensitive receptors (i.e., local residential areas and schools). Based on anticipated worst-case peak hour passenger vehicle and truck traffic volumes, the proposed warehouse development project will not create any significant local air quality impacts in regards to carbon monoxide (CO), nitrogen dioxide (NO_2), and particulate matter (PM) emissions; therefore, it can be assumed that air quality impacts on the surrounding community will not be significant.

BACKGROUND

Langan Engineering and Environmental Services, Inc. (Langan) has prepared this technical memorandum to assess the potential mobile source emissions associated with the proposed warehouse development project (the "Project") located at Glenwood Road in Carroll & Franklin Townships, York County, Pennsylvania (the "Site"). It is our understanding that the potential for negative impacts to local air quality caused by Project-related traffic associated with the planned development of the Site is a concern for the local community. In response to community concerns, the owner and developer of the Site, Crossroads Commercial Development, LLC, commissioned a study (the "Study") to assess potential local air quality impacts from the Project under worst-case scenarios. The Study focused on anticipated worst-case emissions of pollutants from mobile sources (i.e., passenger vehicles and long-haul trucks) associated with the Project and compared those emissions to the existing Environmental Protection Agency (USEPA) NAAQS. This technical memorandum describes the modeling results and overall findings of the Study.

OBJECTIVE AND APPROACH

The Site is proposed for development as a warehouse facility (see Figure 1). The objective of the Study was to assess and quantify the potential impacts of anticipated traffic volumes on ambient air quality at local residential areas and schools (receptor locations) in the year 2030 using the current planned Project development assumptions. To evaluate the potential impact of anticipated traffic volumes on ambient air quality at nearby receptor locations, current projected traffic counts were evaluated using air quality models.

MODELING SCENARIOS

This Study used USEPA Motor Vehicle Emission Simulator (MOVES3), and AERMOD modeling software to calculate the projected ambient concentrations of the following criteria pollutants: CO, NO_2, PM with a diameter of 2.5 micrometers or less ($PM_{2.5}$), and PM with a diameter of 10 micrometers of less (PM_{10}). Both MOVES3 and AERMOD are USEPA-approved modeling software for estimating emissions and ambient concentrations of pollutants generated from mobile emission sources, respectively.

Concentrations of pollutants generated from these modeling scenarios were compared to the current NAAQS. The comparison of the results is presented in Table 2 of this memorandum. The NAAQS includes two "levels" of standards: primary and secondary. As defined by the USEPA, the purpose of the primary NAAQS is to provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly, while the purpose of the secondary NAAQS is to provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. These standards are routinely used to determine the overall potential for impacts to sensitive receptors.

MODELING PROCEDURES AND ASSUMPTIONS

Mobile source emission rates projected in 2030 were calculated using MOVES3 and maximum peak hour traffic counts with the purpose of providing conservative traffic estimates; and therefore providing conservative emissions estimates. Anticipated traffic counts, provided in Table 1 below, were based on the Traffic Impact Study prepared by Langan for the Site in August 2023.

TABLE 1
ANTICIPATED TRIP GENERATION - DILLSBURG WAREHOUSE

BUILDING	VEHICLE TYPE	AM PEAK HOUR			PM PEAK HOUR		
		ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Building A (360,000 SF)	Cars	47	13	60	14	45	59
	Trucks	4	3	7	6	5	11
	Total	**51**	**16**	**67**	**20**	**50**	**70**
Building B (306,000 SF)	Cars	43	11	54	13	41	54
	Trucks	3	3	6	5	4	9
	Total	**46**	**14**	**60**	**18**	**45**	**63**
Building C (210,000 SF)	Cars	36	9	45	11	35	46
	Trucks	2	2	4	3	3	6
	Total	**38**	**11**	**49**	**14**	**38**	**52**

MOVES3 calculates mobile source emissions rates for each pollutant in units of grams per hour (g/hr). The MOVES3 modeling scenarios operated under the following assumptions:

1. Starting emissions "starts" were applied to passenger vehicles and trucks leaving the facility ("exit") during evening peak hour traffic. These "starts" were conservatively assumed to be cold starts (soaking time greater than or equal to 720 minutes) at each of the respective passenger vehicle and truck parking lots.
2. Idling emissions were conservatively applied to all passenger vehicles and trucks at their assigned building parking lots and assumed to have remained idle for a period of 5 minutes based on Pennsylvania's Diesel-Powered Motor Vehicle Idling Act (Act 124 of 2008).
3. Running emissions were assumed to have occurred across the on-Site sections of roadway located at the Site at an average speed of 25 miles per hour (mph). This assumption was used to replicate the anticipated on-Site vehicle movements and speed during operation of the Site.
4. All truck traffic was assumed to consist of combination long-haul diesel trucks as these types of trucks are the highest emitting trucks.

Ambient concentrations of CO, NO_2, $PM_{2.5}$, and PM_{10} at receptors were calculated using AERMOD software. Receptors were placed in a grid at 100-meter intervals to a distance of 1-mile from the Site as well as along the Site fenceline at 25-meter intervals (see Figures 3 through 6). A grid of receptors was used to capture estimated concentrations at sensitive receptors located within 1-mile of the proposed Site, such as nearby residential areas and the Northern York County School District schools (i.e., Northern Middle School and Northern High School) located east of the Site. This modeling scenario incorporated mobile source emission rates generated from MOVES3 as well as background concentrations obtained from the Pennsylvania

Department of Environmental Protection (PADEP). Background concentrations were obtained from the Arendtsville, Carlisle, and Hershey monitoring stations. The AERMOD modeling scenario operated under the following assumptions:

1. Roadways were modeled using a LINE source, which is used to model low-level or ground-level releases with no plume rise and recommended for modeling roadways as described in the USEPA PM Hot-Spot Guidance (October 2021).
2. Parking lots were modeled using an AREA source for starts and idling, as recommended in the USEPA PM Hot-Spot Guidance (October 2021).
3. A release height of 3.4 meters was used for heavy-duty vehicles and a release height of 1.3 meters was used for passenger vehicles, as described in the USEPA PM Hot-Spot Guidance (October 2021).
4. Five years of the most recent meteorological data (2018 through 2022) was used and obtained from Lakes Environmental Software. Meteorological data was obtained from the Harrisburg, PA monitoring station for surface meteorological data and the Sterling, VA monitoring station for upper air meteorological data.
5. Receptors were placed in a 1-mile grid at 100-meter intervals as well as along the Site fenceline at 25-meter intervals.

FINDINGS AND CONCLUSIONS

The Study found projected emissions associated with the increased traffic in 2030 from the proposed Project, added to background concentrations, would not result in an exceedance of the applicable NAAQS for CO, NO_2, $PM_{2.5}$, or PM_{10} at any modeled receptor locations. Table 2 below represents the highest projected pollutant concentrations generated from mobile source emissions in 2030.

TABLE 2
2030 AMBIENT AIR QUALITY MODELING SUMMARY - DILLSBURG WAREHOUSE

POLLUTANT	AVERAGING PERIOD	PREDICTED DOWNSTREAM CONC.	PADEP BACKGROUND CONC.	TOTAL CONC.	PRIMARY NAAQS	SECONDARY NAAQS
		UG/M^3				
CO	1-hour	12.14	1,832.0	1,844.1	40,075	–
	8-hour	5.04	572.5	577.5	10,305	–
NO_2	1-hour	8.59	25.0	33.6	188	–
	Annual	0.88	5.6	6.5	100	–
$PM_{2.5}$	24-hour	2.63	24.1	26.7	35	35
	Annual	0.88	8.0	8.8	12	15
PM_{10}	24-hour	2.97	52	55.0	150	150

[1] To compare the results to the EPA NAAQS, the 8th high concentration for 1-hr NO_2 and 24-hr $PM_{2.5}$, and the 6th high concentration for 24-hr PM_{10} are presented above in Table 2.

As shown in Table 2 above, background concentrations contribute a majority of the total pollutant concentrations at the receptor locations, while Project-generated concentrations contribute a smaller portion in relation to background concentrations to the projected total concentrations. Figures 3 through 6 provide a visual representation of the air quality modeling results compared to the primary NAAQS. As shown in Attachment B, the highest predicted pollutant concentrations occur along the fenceline near the entrance/exit of the proposed Site. Pollutant concentrations decrease with distance from the proposed Site. Since the modeling results show pollutant concentrations from the proposed Project are below both the primary and secondary NAAQS, it can be assumed that air quality impacts on the surrounding community will not be significant.

Attachments

Figure 1	Overall Site Plan
Figure 2	AERMOD Configuration
Figure 3	CO Air Quality Modeling Results
Figure 4	NO_2 Air Quality Modeling Results
Figure 5	$PM_{2.5}$ Air Quality Modeling Results
Figure 6	PM_{10} Air Quality Modeling Results
Attachment A	Supporting Emission Calculations
Attachment B	AERMOD Results