IV G

Air Resources

IV G. AIR QUALITY

INTRODUCTION

This section of the DEIS examines the Project's impact on air quality, both during construction and upon completion. Air quality impacts can be either direct or indirect. Direct impacts stem from emissions generated by stationary sources at the Site. These emissions include fuel burned on the Site for hearting and air conditioning systems. Indirect impacts are defined as nearby existing stationary sources and the potential for emissions due to mobile sources (such as vehicles) generated by the Project.

1. EXISTING CONDITIONS

a. Background Air Quality Data

The Federal Clean Air Act (1990) as amended, requires that each state develop a State Implementation Plan (SIP) to provide the regulatory framework to implement the Act. The New York State SIP adopted a group of ambient air quality standards (AAQS) from a listing of pollutants established by the US Environmental Protection Agency. Attainment of the AAQS is required under the Act, and each state has a prescribed time period in which to bring non-conforming areas into compliance. New York State is divided into nine Air Quality Control Regions (AQCRs) based on geographic location. The New York State Department of Environmental Conservation (NYSDEC) has a network of ambient air monitoring stations located throughout the State in each of the AQCRs in order to evaluate the attainment status of each region with respect to the Ambient Air Quality Standards (AAQSs). The Town of Bedford is located in Westchester County, which lies within the NYSDEC AQC Region 3 and NYSDOT Region 8.

The Project would not be defined as a major pollution source in accordance with NYSDEC criteria. In order to be classified as a major source the facility would need to produce 50 tons per year of ozone precursors and 100 tons per year of other criteria pollutants.

The federal criteria pollutants currently monitored within the region include sulfur dioxide, ozone; total suspended particulates (TSP), inhalable particulates and lead, in

addition to several non-criteria pollutants. These pollutants are more fully described below:

- **Sulfur Dioxide – SO_2**

  SO_2 emissions are primarily associated with the combustion of sulfur containing fuels, primarily oil and coal. No significant quantities are emitted from mobile sources. Monitored SO_2 concentrations in New York City are below the national standards.

- **Lead**

  Lead emissions in the air are principally associated with industrial sources and motor vehicles that use gasoline containing lead additives. Most U.S. vehicles produced since 1975, and all produced after 1980, are designed to use unleaded fuel. As these newer vehicles replaced the older ones, motor vehicle related lead emissions have decreased. As a result, ambient concentrations of lead have declined significantly. Nationally, the average measured atmospheric lead level in 1985 was only about one-quarter of the level in 1975.

- **Nitrogen Oxides, Volatile Organic Compounds and Ozone**

  Nitrogen oxides (nitrogen oxide [NO] and nitrogen dioxide [NO_2] – together NO_x) are of principal concern because of their role, together with volatile organic compounds (VOC), as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are diffusing downwind, elevated ozone levels are often found many miles from the sources of the precursor pollutants. The effects of NO_x emissions from mobile sources are therefore generally examined on a regional basis. The change in regional mobile source emissions of these pollutants is related to the total number of vehicle trips and the vehicle miles traveled throughout the New York metropolitan area. The Project would have a nearly undetectable impact on the overall volume of vehicular traffic in the metropolitan area, and as such, would not have any measurable impact on regional NO_x emissions or on ozone levels. An analysis of project related impacts from mobile sources for these pollutants is therefore not warranted.

- **Respirable Particulate Matter – PM_{10} and PM_{25}**

  Particulate matter (PM) is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of natural organic vapors; salt particles resulting from the evaporation of sea spray; wind borne pollen, fungi, molds, algae, yeasts, rust, bacteria and material from live and decaying plant and animal life; particles eroded from beaches, soils and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Major anthropogenic sources include the combustion of fossil fuels (e.g. vehicular exhaust, power generation, boilers and engines and home heating), chemical and manufacturing processes, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. Particulate matter also acts as a substrate for the absorption of other pollutants, often toxic and some likely carcinogenic compounds.

  Fine particulate matter, or $PM_{2.5}$, are fine particles with an aerodynamic diameter of less than or equal to 2.5 micrometers. This smaller fraction of the particle size range has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that absorbed to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from the combustion of material that has volatized and then condensed to form primary particulate matter (often soon after the release from an exhaust pipe or stack) or from precursor gases reacting in the atmosphere to form secondary particulate matter. Diesel-powered vehicles, especially heavy duty trucks and buses, are a significant source or respirable PM.

- **Carbon Monoxide – CO**

  Carbon monoxide (CO) a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In New York region, approximately 80 to 90 percent of CO

emissions come from motor vehicles. CO concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near crowded intersections along heavily traveled and congested roadways. Consequently, CO concentrations must be predicted on a localized or microscale basis.

State ambient air quality monitoring data was collected in an effort to characterize the air quality at the Site. The nearest NYSDEC monitoring stations in the region are located in Wallkill (Lead), White Plains (Ozone), Mt. Ninham (Sulfur Dioxide) and Belleayre Mountain (Inhalable Particulates). Data from those stations are presented in Table IV-G-1.

TABLE IV-G-1

SUMMARY OF REGIONAL AIR QUALITY DATA

Pollutant	Monitoring Location	Air Quality Standard	Annual Concentrations												
			'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06
Sulfur Dioxide	Mt. Ninham	80mg/m³	1.9	2.0	2.3	2.6	2.5	2.3	2.3	2.6	2.2	2.4	2.2	2.2	1.7
Ozone	White Plains	---	.022	.023	.022	.024	.023	.024	.021	.021	.024	.024	.019	.025	.025
Lead	Wallkill	1.5mg/m³	.05	.04	.04	.05	.04	.05	.04	.04	.04	.05	.04	.05	.03
Inhalable Particulants	Belleayre Mt.	50mg/m³	14	13	13	13	16	12	10	10	11	13	11	N/A[1]	N/A
Inhalable Particulants Sulfate Fraction	Belleayre Mt.	---	4.6	4.0	3.5	4.5	5.0	3.6	3.5	3.5	3.3	3.0	3.3	N/A	N/A
Inhalable Particulants Nitrate Fraction	Belleayre Mt.	---	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2	N/A	N/A

Source: New York State Department of Environmental Conservation

As shown in Table IV-G-1, ambient air quality complies with State and Federal Air Quality Standards, with the exception of ozone, which is a problem throughout the entire northeast.

The existing air quality in the vicinity of the Site is acceptable for the proposed development and poses no known threat to the health or welfare of the general public. In the event of elevated ozone levels, the State has an air pollution episode monitoring plan to issue health warnings to the public to caution those prone to

[1] Data not available

health problems to remain indoors and to refrain from strenuous activities. It should be noted that high ozone levels are found throughout the northeastern United States and non-attainment of the standard is more of a regional than a local problem and cannot be resolved without coordinated regional air pollution control programs. The proposed development is consistent with all New York State Department of Transportation (NYSDOT) regional transportation control programs (no project measures are applicable), and thus, is in conformance with the State Implementation Plan that addresses on-going programs to bring the area into compliance with the ozone and CO AAQS. The NYS emission control strategies include: low emission vehicles (NYS has fully adopted the California Low Emission Vehicle Program in legislation and regulation), enhanced inspection and maintenance programs to ensure vehicles are properly maintained, reformulated gasoline, oxygenated fuels and alternative fuels for fleet purchases.

2. POTENTIAL IMPACTS

Short Term

Construction activities will result in limited short term air quality impacts. There will be some fugitive dust generated throughout the construction of the Project. This potential impact will be minimized by following the Westchester County Best Management Practices guidance. Vehicular emissions from idling vehicles, construction equipment and construction worker vehicles are anticipated to be another short term impact. None of the short term construction related impacts are expected to cause any violations of the State or Federal Ambient Air Quality Standards.

Long Term

Two types of potential long term air quality impacts have been evaluated; those emanating from the permanent operation of the new church building, and those created by new vehicle trips generated by the Project.

a. Church Facility Operation

The operation of the new church facility is not expected to result in a major source of air pollution. There will be an increase in combustion products from the building's boiler stack (number 2 fuel oil). However, the screening analysis

indicated that the comparatively small amount of emissions will not result in any significant potential for adverse air quality impacts, and no further analysis is necessary.

b. Induced Vehicle Trips

The greatest potential for air quality impacts created by the Project result from vehicles traveling to and from the Site, and associated vehicular exhaust emissions.

Technical Background

The primary pollutants associated with vehicular exhaust emissions are nitrogen dioxide (NO2), hydrocarbons (HC) and carbon monoxide (CO). Since short term exposure to elevated CO concentrations can have acute health impacts, state and federal Ambient Air Quality Standards (AAQS) have been developed for ambient CO concentrations requisite to protect the health and welfare of the general public with an adequate margin of safety. There are no short term health standards (currently enforced) for NO2 and HC, since the primary concern with these pollutants is their role in the photochemical reactions that lead to the formation of secondary pollutants such as ozone and "smog" which are known lung and eye irritants. Since ozone and smog formation is a slow process, these pollutants are only reviewed on a regional (mesoscale) and not a local (microscale) basis.

The principal pollutant associated with vehicular emissions is carbon monoxide (CO). Approximately 80% of atmospheric CO emissions are attributable to vehicular sources. These emissions, associated with the incomplete combustion of fossil fuel, tend to increase as vehicle speeds decrease and are maximized during idling and acceleration modes. CO emissions also increase as temperatures lower. Therefore, roadway intersections characterized by vehicular deceleration, queuing at idle and acceleration during winter temperature regimes represent the area where vehicular CO emissions are highest.

A traffic analysis was prepared to evaluate the impact of the Project on the surrounding roadway network. The results of that analysis have been utilized to evaluate the potential for adverse air quality impacts.

Screening Analysis

In April 1998, the New York State Department of Transportation (NYSDOT) Environmental Analysis Bureau (EAB) in conjunction with NYSDEC developed a revised version of their Environmental Procedures Manual (EPM) for Air Quality Analysis. This revised document became available to the public in September 1998. It supersedes and replaces all previous EPMs, PEGs and NYSDOT Technical Memorandums. For air quality issues, this EPM has addressed changes in mobile emission factors (introduction of reformulated fuels, changes in I/M strategies, etc.), analysis screening criteria and conformity to the State Implementation Plan (SIP).

Within Chapter 1.A (Air Quality) of the NYSDOT EPM, is Section 9, which addresses "Projects Needing Air Quality Analysis". This section includes many of the previous criteria for screening free-flowing roadways and intersections for microscale air quality analysis, but includes an additional "step" (I-3, Volume Threshold Screening). This additional step utilizes vehicle threshold tables which tie a volume threshold with emission factors. The advantage of this approach is that emission factors determined by project area specific vehicle speeds, thermal states and emission control strategies are used in the determination of vehicle volume thresholds. These thresholds establish traffic volumes below which a violation of the NAAQS for carbon monoxide is so unlikely that a Level 1 modeling analysis is not required.

The above referenced NYSDOT EPM was used to calculate the appropriate emission source strengths or emission factors for the individual vehicle mixes under evaluation. These emission factors, representative vehicular volumes and worst case meteorological parameters were then incorporated into the traffic volume threshold tables to further determine the need for a microscale air quality analysis

The guidelines in the EPM for air quality analysis provide the following criteria for determining when a microscale air quality analysis may be required for new developments.

- For intersections with a Level of Service (LOS) of A, B or C no air quality analysis is required.

- For intersections with a LOS D, E or F, the following criteria are applied to make the determination for the necessity of a microscale air quality analysis.

    - 10% or greater reduction in the source receptor distance;
    - 10% or greater increase in traffic volume;
    - 10% or greater increase in vehicle emissions;
    - Any increase in the amount of queued lanes.
    - A 20% reduction in speed, when build estimated average speed is at 30 mph or less.

If none of the criteria above are met, then the proposed project does not need a microscale air quality analysis. The Project will not increase traffic volumes at the surrounding intersections by more than 10%, will not reduce source-receptor distances, add new queue lanes or reduce existing speeds to such a degree as to jeopardize attainment of the NAAQS. As a result, a separate microscale air quality analysis is not required. Additionally, the most significant factor influencing air quality in the vicinity of the Site are vehicle emissions from traffic traveling along I-684. This Project will have no impact on that preexisting condition.

3. MITIGATION MEASURES

On the basis of the data contained in Section IV-I – Traffic & Transportation, it is clear that none of the thresholds that would trigger a microscale air quality analysis have been met or were exceeded.

The conclusion of this air quality screening is that the proposed Project will not adversely impact long term air quality and will not result in any new violations of the NAAQS. No mitigation measures are necessary.

Short term air quality impacts associated with the construction of the Project will be mitigated by following Westchester County Best Management Practices guidance, by

maintaining all construction equipment in good condition and sound working order and by complying with the construction mitigation measures called for in Section IV-M 3. Additionally, the recently adopted County Ordinance dealing with vehicle idling shall be complied with.