APPENDIX G

Air Quality Study
By: CMX
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AIR QUALITY STUDY

The Four Seasons at Orangetown
Town of Orangetown
New York

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AIR QUALITY

A. INTRODUCTION

This section of the DEIS addresses the Project's impact on air quality, both during construction and upon completion of the project. Air quality impacts from the Project can be classified as either direct or indirect. Direct air quality impacts result from emissions generated by stationary sources at a project or potential development site such as emissions from fuel burned at a site for heating and air conditioning systems. Indirect air quality impacts result from emissions from offsite stationary sources and mobile sources generated by the project.

B. EXISTING CONDITIONS

Ambient Air Quality Standards

The U.S. Environmental Protection Agency (USEPA) has promulgated National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. The NAAQS includes primary standards that are designed to be protective of human health including the health of sensitive subpopulations such as children or those with chronic respiratory diseases. Secondary standards are set to protect welfare values such as vegetation, visibility, property values, and other non-health related concerns.

NAAQS have been established for each of the following six major criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), respirable particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). Individual states are free to adopt standards more stringent than the federal NAAQS. The New York State Department of Environmental Conservation (NYSDEC) has established Ambient Air Quality Standards (AAQS) for New York that are listed in Part 257, *Air Quality Standards*, of the NYSDEC regulations. In some cases, the New York AAQS are more stringent than the NAAQS. The NAAQS and New York AAQS criteria are presented in Table 11-1.

Table 11-1
National and New York Ambient Air Quality Standards (AAQS)

Pollutant	Averaging Period	New York AAQS (ug/m^3)		National AAQS (ug/m^3)	
		Primary	Secondary	Primary	Secondary
Sulfur Dioxide (SO_2)	3-Hour	1,300	750	n/a	1,300
	24-Hour	365	260	365	n/a
	Annual	80	n/a	80	n/a
Particulate Matter (PM_{10})	24-Hour	150	150	150	150
	Annual	50	50	50	50
Particulate Matter ($PM_{2.5}$)	24-Hour	35	35	35	35
	Annual	15	15	15	15
Carbon Monoxide (CO)	1-Hour	40,000	40,000	40,000	40,000
	8-Hour	10,000	10,000	10,000	10,000
Ozone (O_3)	1-Hour	120	120	n/a	n/a
	8-Hour	n/a	n/a	120	120
Nitrogen Dioxide (NO_2)	Annual	100	100	100	100
Lead (Pb)	Quarterly	n/a	n/a	1.5	1.5

Background Air Quality

The Federal Clean Air Act (CAA) of 1990 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 the National and New York AAQS listed in Table 11-1. Attainment of the AAQS is required under the CAA and each state has a prescribed amount of time in which to bring non-compliant areas into compliance. New York State is divided into nine Air Quality Control Regions (AQCRs) based on geographic location. The NYSDEC operates a network of ambient air quality 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 respective AAQS. The hamlet of Orangeburg is located in Rockland County which lies within the NYSDEC AQC Region 3. The pollutants currently monitored in or near this region include sulfur dioxide, respirable particulate matter, carbon monoxide, ozone, nitrogen oxides and lead. A summary of the characteristics of these pollutants follows:

- **Sulfur Dioxide (SO_2)**

  SO_2 emissions are primarily associated with the combustion of sulfur containing fuels, such as oil and coal. No significant quantities are emitted from mobile sources.

- **Respirable Particulate Matter – PM_{10} and $PM_{2.5}$**

  Particulate Matter (PM) is a class of air pollutants that includes airborne particles of a wide range of sizes and chemical composition and can exist as either a liquid droplet (aerosols) or solids suspended in the atmosphere. PM is emitted into the atmosphere from a wide variety of sources including both natural and anthropogenic. Natural sources include such things as salt particles resulting from evaporation of sea spray, wind borne pollen, molds, bacteria, particles eroded from beaches, soil and rock; and particles from forest fires. Major anthropogenic sources include combustion of fossil fuels (e.g. power generation, vehicular exhaust, boilers, engines and home heating), construction activities, agricultural activities and wood-burning fireplaces.

  Respirable particulate matter includes both particles that are less than 10 microns in diameter (PM_{10}) and "fine" particles less than 2.5 microns in diameter ($PM_{2.5}$). Both PM_{10} and $PM_{2.5}$ can affect human respiratory functions and are a cause of concern. $PM_{2.5}$ is of particular concern in that these smaller particles have the ability to penetrate and remain in the deepest passages of the lungs. Gasoline-powered vehicles (such as passenger automobiles and SUVs) produce relatively small quantities of respirable particulate but diesel-powered vehicles, especially heavy trucks and buses, emit significant amounts of respirable particulates. The proposed Project, over the long term, is not anticipated to induce any significant amount of bus or heavy truck trips and as a result a PM mobile source analysis is not required.

- **Carbon Monoxide (CO)**

  Carbon monoxide is colorless, odorless gas that is produced primarily from the incomplete combustion of gasoline and other fossil fuels. In the region of the Project the vast majority of CO emissions come from motor vehicles. CO concentrations can vary greatly over relatively short distances and elevated concentrations are usually limited to locations near crowded intersections and along heavily traveled and congested roadways. CO is the principal pollutant of concern for this Project.

- **Nitrogen Oxides and Ozone**

  Nitrogen oxides (NO_x) are produced when fuels are burned at high temperatures. Although there are a number of individual compounds that are considered to be nitrogen oxides, only the compounds nitric oxide (NO) and nitrogen dioxide (NO_2) are released by motor vehicles into the atmosphere in significant quantities. Nitrogen oxides are of concern due to their role in the formation of photochemical oxidants, commonly referred to as ozone. Ozone is formed through a series of chemical reactions which occur in the presence of sunlight. Because these chemical reactions are slow and occur as the pollutant is diffusing downwind the resulting elevated ozone levels are often found many miles from the sources of

the precursor pollutants. The effects of NO_x emissions from sources are therefore generally examined on a regional basis. The change in regional mobile source emissions of NO_x is directly related to the type of vehicles, the total number of vehicle trips and the vehicle miles traveled through the local metropolitan area. The Project will have a nearly undetectable impact on overall traffic in the metropolitan area and as a result will not have an impact on regional NO_x or ozone levels. Therefore an analysis of project related NO_x impacts from mobile sources is not warranted.

In addition to the motor vehicle related indirect NO_x emissions from the Project, the use of gas-fired boilers for the proposed residences will result in some direct emissions of NO_x. However the proposed residences would be considered representative of small, insignificant stationary sources and emissions from them are not considered sufficient to require an analysis.

- **Lead**

  Lead emissions are associated with industrial sources and motor vehicles that use gasoline containing lead additives. Most U.S. vehicles available since 1975 and all vehicles available after 1980 are designed to use unleaded fuel. As these newer vehicles replaced the older ones, motor vehicle related lead emissions have decreased and, as a result, ambient concentrations of lead have declined significantly.

Ambient air quality monitoring data collected by the NYSDEC was reviewed in an effort to characterize the existing air quality at the Project site. The NYSDEC operates a network of monitoring stations throughout the state to measure ambient air quality and the results are published on an annual basis. For the Project, existing background concentrations of criteria pollutants were determined based on data from monitoring stations nearest the proposed project. Table 11-2 summarizes the measured ambient concentrations that are most representative of the Project area. The table lists the maximum annual concentration and second-highest short-term concentration (except for ozone, for which the fourth-highest 8-hour concentration is listed) in each of the last three years of available data from the NYSDEC.

The data in Table 11-2 indicates that existing air quality levels in the vicinity of the Project site are well below the NAAQS and the New York AAQS.

Table 11-2
Existing Ambient Air Quality Monitoring Data Representative of the Project Area

Pollutant	Location	Period	Units	Monitored Concentrations 2005	2006	2007	*AAQS*
NO_2	Bronx Botanical Gardens	Annual	ppm	.027	.025	.024	***0.05***
CO	Bronx Botanical Gardens	1-Hour	ppm	3.5	2.6	3.1	***35.0***
		8-Hour	ppm	2.2	1.9	2.0	***9.0***
SO_2	Mt. Ninham (Carmel, NY)	3-Hour	ppb	21.8	18.6	19.0	***500***
		24-Hour	ppb	9.9	11.0	9.0	***140***
		Annual	ppb	2.2	1.7	1.5	***30***
PM_{10}	PS59 (Manhattan, NY)	24-Hour	ug/m^3	-	67	57	***150***
		Annual	ug/m^3	-	23	25	***50***
$PM_{2.5}$	White Plains	24-Hour	ug/m^3	27.6	32.2	27.6	***35***
		Annual	ug/m^3	11.0	12.1	9.4	***15***
O_3	White Plains	8-Hour	ppm	.095	.083	.095	***0.08***

Note: PM_{10} data was not available for 2005 for the PS59 monitor.

As shown in Table 11-2, ambient air quality complies with the New York and Federal AAQS, with the exception of ozone, which is regional problem through the entire northeastern U.S.

The existing air quality in the vicinity of the Project is acceptable for the proposed residential development and poses no known threat to either the health or welfare of the general population. With regard to elevated ozone levels, the NYSDEC has established an air pollution episode monitoring plan to issue health warnings to the general public to caution those prone to health problems to remain indoors and restrain from strenuous activities on days where ozone levels are predicted to be elevated. It should also be noted that high ozone levels are found throughout the northeastern United States and non-attainment of the ozone standard is more of a regional problem than a local problem and cannot be resolved without coordinated regional air pollution programs. The proposed Project is consistent with all New York State Department of Transportation (NYSDOT) regional transportation programs, and thus, is in conformance with the portions of the SIP designed to bring the region into compliance with the ozone AAQS.

C. ANTICIPATED IMPACTS

Short-Term

Construction activities related to the Project will result in limited short-term air quality impacts. There will be fugitive dust generated during the site preparation and construction phases of the Project. The potential impact from these fugitive dust emissions will be minimized by following the established Rockland County Best Management Practices guidance. Vehicular emissions from construction equipment and construction worker vehicles are anticipated to have very minimal short-term impacts. None of the short-term construction related impacts are expected to cause any violations of the State or Federal AAQS.

Long Term

The only long term air quality impact that may be created by the Project results from the potential increase in project-related vehicular exhaust emissions. The primary pollutants associated with vehicular exhaust emissions are NO_x and CO.

The concern with NO_x emissions is their role in the photochemical reactions that lead to the formation of ozone. Since the chemical reaction to produce ozone is a slow process the effects of NO_x emissions from a source are only reviewed on a regional (mesoscale) and not a local (microscale) basis.

The principal pollutant of concern associated with vehicular emissions is CO. Vehicular CO emissions tend to increase as vehicle speeds decrease and are maximized during periods of vehicle idling and acceleration. CO emissions also increase as ambient temperatures decrease. Therefore, roadway intersections characterized by vehicular deceleration, queuing at idle and acceleration during winter temperature regimes represent the area where vehicular CO emissions (and potential impacts) are highest.

A traffic analysis was prepared by Adler Consulting to evaluate the impact of the Project on the surrounding roadway network. The results of this traffic analysis were utilized to evaluate the potential for adverse air quality impacts.

Screening Analysis

In January of 2001, the NYSDOT Environmental Analysis Bureau (EAB), in conjunction with the NYSDEC, released a revised version of their Environmental Procedures Manual (EPM) for Air Quality Analysis. For air quality issues, the revised EPM addressed changes in mobile source emission factors, analysis screening criteria and conformity to the SIP.

Chapter 1.1, Section 9 (I-1 and I-2) of the NYSDOT EPM provides criteria for screening free-flowing roadways and intersections to determine the need for a microscale air quality analysis. The guidelines in the EPM for an air quality modeling analysis provide the

following criteria for determining when a microscale air quality modeling analysis may be needed for new developments:

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

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

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

If none of the criteria are met, then the proposed project does not need to conduct a microscale air quality analysis. The traffic study for the Project identified the following six intersections as having a projected LOS of D, E or F at the build year:

- Gilbert Avenue at Old Middletown Road
- Veterans Memorial Drive at Blue Hill Plaza (West)
- Veterans Memorial Drive at Blue Hill South
- Orangeburg Road at Blaisdell Road
- Orangeburg Road at Lester Drive/Edgewood Road
- Orangeburg Road at Western Highway

The results of the traffic study concluded that none of these intersections will experience an increase in traffic greater than 10%, an increase in vehicle emissions greater than 10% or a reduction in existing speeds to such a degree as to require a microscale modeling analysis. The traffic study did identify the following two intersections where it was recommended that new turning lanes be constructed to improve traffic flow:

- Orangeburg Road at Blaisdell Road
- Orangeburg Road at Lester Drive/Edgewood Road

The recommendation to add turning lanes at these two intersections would result in an increase in the amount of queued lanes and potentially reduce the source-receptor distance by more than 10% and therefore would not automatically be exempt from requiring a microscale air quality analysis.

For these two intersections, Chapter 1.1, Section 9.A (I-3) of the NYSDOT EPM states that a traffic volume threshold should then be considered to further determine the need for a microscale modeling analysis. For this analysis Table 3c of Chapter 1.1, Section 9.A was utilized to determine the appropriate volume threshold for these intersections. The volume threshold represents the total number of vehicles of any single approach to

the intersection for the build year. If the project does not meet this applicable volume threshold, no microscale air quality analysis is necessary. For the Project build year of 2013 the calculated volume threshold, based on NYSDOT published vehicle and emissions profiles for Rockland County in 2013, would be 3800 vehicles per hour at any single approach to the intersections. The maximum predicted volume for the Project for any single approach for either intersection for the build year of 2013 is 1715 vehicles per hour during the AM peak at the westbound intersection of Orangeburg Road and Blaisdell Road. Since this volume is well below the calculated volume threshold of 3800 vehicles per hour no microscale air quality analysis is required for these intersections.

In conclusion an air quality analysis is not necessary since this Project will not increase traffic volumes, reduce source-receptor distances or change other existing conditions to such a degree as to jeopardize attainment of the National Ambient Air Quality Standards.

D. RESULTS AND MITIGATION

Stationary source impacts from the Project are limited to the natural gas fired boilers used to meet the residences heating and hot-water needs. The air quality impacts from these sources are negligible and will have no perceptible affect on local air quality. The conclusion of the air quality screening analysis of potential long-term traffic impacts on local air quality is that the Project-related traffic will not adversely affect long term air quality and will not jeopardize attainment of the AAQS. As a result no mitigation measures are necessary in addressing long-term air quality impacts from the Project.

Short-term air quality impacts associated with construction of the Project will be mitigated by following the Rockland County Best Management Practices guidance and by maintaining all construction equipment in good working condition.