change and not only offer visual amenity; they also serve ecological and recreational purposes, such as habitat and wildlife corridors and trails.

Determining the potential effects of the project's visual resources requires identification of the visual quality of the study area and an understanding of potential viewers, the infrastructure to be installed, and the alteration such infrastructure has on the various levels of view, both near and far.

The degree to which viewers can be affected by changes to the visual environment varies with their financial and emotional investment in the aesthetic quality of the land and their urban surroundings. For example, people who reside or work near the project corridor may be affected to a greater degree by changes in visual character than people who spend very little time in and have little connection to that area. Even though a project may not alter the basic view within an urban environment, a change in distance of view length could change a viewer's perception, from open to enclosed space.

## 2.9 Air Quality

Chicago is the third largest metropolitan area in the nation, with a large number of both industrial and vehicle air emission sources. The USEPA National Ambient Air Quality Standards (NAAQS) set maximum allowable concentration limits for six criteria air pollutants. Table 2-23 lists the NAAQS. The primary standards are established at levels that are intended to protect the public health. Secondary standards are required to protect the public welfare from any known or anticipated adverse effects of a pollutant.
One exceedance of the 24-hour standard for $PM_{2.5}$[31] was recorded in the study area, while no exceedances or violations within the study area were recorded for carbon monoxide, lead, and nitrogen dioxide. Ozone, $PM_{10}$, and sulfur dioxide were not monitored in the study area.[32]

TABLE 2-23
National Ambient Air Quality Standards

| | Primary Standards | | Secondary Standards | |
|---|---|---|---|---|
| **Pollutant** | **Level** | **Averaging Time** | **Level** | **Averaging Time** |
| Carbon monoxide | 9 ppm (10 $mg/m^3$) | 8-hour[a] | None | |
| | 35 ppm (40 $mg/m^3$) | 1-hour[a] | | |
| Lead | 0.15 $\mu g/m^3$ [b] | Rolling 3-month average | Same as primary | |
| | 1.5 $\mu g/m^3$ | Quarterly average | Same as primary | |
| Nitrogen dioxide | 0.053 ppm (100 $\mu g/m^3$) | Annual (arithmetic mean) | Same as primary | |
| Particulate matter ($PM_{10}$) | 150 $\mu g/m^3$ | 24-hour[c] | Same as primary | |

[31] $PM_{2.5}$ is particulate matter 2.5 micrometers or smaller.

[32] $PM_{10}$ is particulate matter 10 micrometers or smaller.

TABLE 2-23
National Ambient Air Quality Standards

| Pollutant | Primary Standards | | Secondary Standards | |
|---|---|---|---|---|
| | Level | Averaging Time | Level | Averaging Time |
| Particulate matter ($PM_{2.5}$) | 15.0 µg/$m^3$ | Annual[d] (arithmetic mean) | Same as primary | |
| | 35 µg/$m^3$ | 24-hour[e] | Same as primary | |
| Ozone | 0.075 ppm (2008 std) | 8-hour[f] | Same as primary | |
| Sulfur dioxide | 0.03 ppm | Annual (arithmetic mean) | 0.5 ppm (1300 µg/$m^3$) | 3-hour [a] |
| | 0.14 ppm | 24-hour[a] | | |

*Source:* USEPA, 2009a.

[a] Not to be exceeded more than once per year.
[b] Final rule signed October 15, 2008.
[c] Not to be exceeded more than once per year on average over three years.
[d] To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/$m^3$.
[e] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/$m^3$ (effective December 17, 2006).
[f] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).

Areas in which air pollution levels persistently exceed the NAAQS may be designated "nonattainment" areas. The study area is located within Cook and DuPage counties, which are included in the moderate nonattainment area for the 8-hour ozone standard. Due to the nonattainment status of the area, the State of Illinois has developed a State Implementation Plan identifying programs intended to reduce emission of ozone precursors.

In addition, USEPA has designated Cook and DuPage counties as not attaining the $PM_{2.5}$ standard (70 Code of Federal Regulations [CFR] 944, 968). The designations became effective April 5, 2005.

Illinois EPA publishes air quality information for the state in its *Annual Air Quality Report*. Table 2-24 summarizes the 2008 status (the latest Air Quality Report available) for each air quality pollutant sampled in the study area.

TABLE 2-24
2008 Status on Air Quality Pollutants

| Pollutant Name | Status (2008) |
|---|---|
| Carbon monoxide | No exceedances of the 1-hour standard of 35 ppm or the 8-hour standard of 9 ppm. |
| Lead | No violations of the 3-month maximum mean standard of 0.15 µg/$m^3$. |
| Nitrogen dioxide | No violations of the annual arithmetic mean standard of 0.053 ppm. |
| $PM_{10}$ | Not evaluated in the study area. However, no exceedances of the 24-hour standard of 150 µg/$m^3$ were recorded statewide. |

TABLE 2-24
2008 Status on Air Quality Pollutants

| Pollutant Name | Status (2008) |
|---|---|
| $PM_{2.5}$ | One exceedance of the 24-hour standard of 35 µg/$m^3$; no exceedances of the annual arithmetic mean of 15.0 µg/$m^3$. |
| Ozone | Not evaluated in the study area. However, no exceedances of the former 1-hour, former 8-hour, or current 8-hour standards were recorded in the Metropolitan Chicago Area. |
| Sulfur dioxide | Not evaluated in the study area. However, no exceedances of the annual arithmetic mean standard of 0.03 ppm, the 24-hour standard of 0.14 ppm, or the 3-hour standard of 0.5 ppm were recorded statewide. |

*Source:* IEPA, 2009.

The Tier One analysis is exempt from conformity because it is a planning level study that would not directly involve construction or physical impacts and there would be no generation of pollutants that would substantially impact air quality. The federal regulations pertaining to this issue are contained in 40 CFR 93.126, which lists projects that are exempt from air quality conformity. These include specific activities that do not involve or lead directly to construction, such as planning and technical studies. During the Tier Two environmental studies, the preferred alternative must be included in a conforming RTP and Transportation Improvement Plan (TIP)and the design concept and scope must not change significantly from what was included in the regional emissions analysis for the conforming RTP and TIP ; any analysis will use the latest planning assumptions and emissions model; a $PM_{2.5}$ hot spot analysis will be completed if the project is determined to be of air quality concern; and compliance with any control measures in the $PM_{2.5}$ state air quality implementation plan will occur. Because conformity is a Tier Two issue, it is not discussed further in this Tier One document.

Carbon monoxide levels are not permitted to exceed the 8-hour NAAQS of nine parts per million and the one-hour NAAQS of 35 parts per million. IDOT uses the computer screening model *Illinois Carbon Monoxide Screen for Intersection Modeling* (COSIM) to estimate worst-case carbon monoxide concentrations for proposed roadway projects affecting signalized intersections with a sensitive receptor within 1,000 feet of the intersection. A COSIM analysis will be performed during Tier Two to determine whether the proposed improvements have the potential to violate the 8-hour standard, and so is not discussed further in this Tier One document.

In addition to criteria air pollutants for which there are NAAQS, USEPA regulates air toxics. Mobile source air toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and nonroad equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics result from engine wear or from impurities in oil or gasoline. FHWA's Interim Guidance on Air Toxics Analysis in NEPA Documents suggests a tiered approach for addressing MSATs in NEPA documents. In this approach, projects with no potential for meaningful MSAT effects do not need an analysis, including those exempt under the Clean Air Act Conformity Rule

section 93.126. Therefore, no MSAT analysis will be completed at this time. Rather, it will be undertaken during Tier Two and is not discussed further in this Tier One document.

# 2.10 Noise

Sound is caused by the vibration of air molecules and is measured on a logarithmic scale with units of decibels (dB). Sound is composed of a wide range of frequencies, but the ear is not sensitive to all frequencies. The "A" weighted scale was devised to correspond with the ear's sensitivity, and sound levels are measured as dBA on this scale. Highway agencies use a one-hour equivalent sound level, Leq(h), as a descriptor of traffic noise levels. Studies show that a change of three dBA is a barely perceivable change in noise, whereas a change of 10 dBA is perceived as being twice or half as loud.

Title 23 CFR 772 has developed noise abatement criteria (NAC) for assessing potential noise impacts (see Table 2-25). The criteria set forth in the regulations consider appropriate noise levels based upon land use activity. A traffic noise impact occurs when traffic noise levels approach (in Illinois this means within one dBA), meet or exceed the NAC for the associated land use activity, or if a substantial increase (in Illinois this means an increase of more than 14 dBA over existing noise levels) in predicted traffic noise level occurs over existing traffic generated noise levels even though the applicable NAC has not been reached.

TABLE 2-25
Noise Abatement Criteria Hourly A-Weighted Sound Level

| Activity Category | $L_{eq}$ (h) [a] | Description of Activity Category |
|---|---|---|
| A | 57 (exterior) | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if they are to continue to serve their intended purpose. |
| B | 67 (exterior) | Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals. |
| C | 72 (exterior) | Developed lands, properties or activities not included in Categories A and B. |
| D | — | Undeveloped lands. |
| E | 52 (interior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. |

*Source:* FHWA. April 1992. Code of Federal Regulations. Title 23 CFR 772: Procedures for Abatement of Highway Traffic Noise and Construction Noise.

[a] Considered a noise impact if the traffic noise level approaches (within one dBA), meets, or exceeds the NAC, or increases more than 14 dBA above existing traffic noise levels.

## 2.10.1 Noise Sources and Existing Conditions

Noise monitoring or modeling to determine traffic noise impacts was not conducted for the Tier One analysis. Existing noise sources and conditions are described below, and potentially affected noise-sensitive receptors (e.g., residences, churches, schools, parks) located adjacent to the proposed improvements have been identified (see subsection 2.10.2 regarding their locations.) A detailed noise analysis will be undertaken in Tier Two to