Federal/State/Regional Context

Air quality in the U.S. is governed primarily by the federal Clean Air Act (CAA) and is administered by the U.S. Environmental Protection Agency (USEPA). USEPA has established the National Ambient Air Quality Standards (NAAQS) for six principal air pollutants. These pollutants are: carbon monoxide, nitrogen dioxide, ozone, particulate matter ($PM_{2.5}$ and PM_{10}), sulfur dioxide, and lead.

Since 1970, significant progress has been made in reducing mobile source emissions, which includes motor vehicles. Most of these reductions have resulted from cleaner vehicles and cleaner fuels. In most urban areas though, motor vehicles are still important contributors to carbon monoxide, nitrogen dioxide, ozone, and particulate matter levels. Transportation sources account for a small percentage of regional emissions of sulfur dioxide and lead, so a detailed analysis of these pollutants is not required for transportation projects.

Areas not in NAAQS compliance for the principal air pollutants are deemed non-attainment areas. An area's designation is based on the data collected by the state monitoring network on a pollutant-by-pollutant basis. Table 1 shows the attainment status for the principal pollutants related to transportation projects for the project area, which is located in Cook County. USEPA has classified Cook County as a nonattainment area for ozone. For the 1997 annual $PM_{2.5}$ NAAQS, Cook County, which includes the I-290 project area, is classified as a maintenance area.

Table 1. Project Area Transportation Related Pollutant NAAQS Attainment Status

Pollutant	NAAQS Status
Carbon Monoxide (CO)	Attainment
Nitrogen Dioxide (NO_2)	Attainment
Ozone (O_3)	Nonattainment
Particulate Matter (PM_{10})	Attainment
Particulate Matter ($PM_{2.5}$)	Maintenance/Attainment

Source: USEPA, as of January 30, 2015

Transportation conformity, as required by the CAA, ensures that federally-funded or approved transportation plans, programs, and projects conform to the air quality objectives established in the State Implementation Plan, which each state develops to ensure that the NAAQS are met and maintained. The transportation conformity analysis for the northeastern Illinois region (Cook, DuPage, Kane, Lake, McHenry, and Will Counties, and portions of Kendall and Grundy Counties) is performed by the Metropolitan Planning Organization (MPO), the Chicago Metropolitan Agency for Planning (CMAP). CMAP typically conducts the transportation air quality conformity analysis for the Regional Transportation Plan (RTP) twice a year.

USEPA has developed the Motor Vehicle Emission Simulator (MOVES) model to estimate on-road emissions. CMAP uses the MOVES model to estimate emissions for the RTP as part of the conformity analysis. The most recent transportation air quality conformity analysis for the RTP (GO TO 2040 Update) was approved on March 12, 2015 by the CMAP MPO Policy Committee. The RTP includes the I-290 Eisenhower Expressway improvement project, as well

as all of the other capacity expansion projects in the region that are contained in the RTP. The CMAP conformity analysis found that ozone precursors (volatile organic compounds and nitrogen oxides) emissions estimates fell below the applicable budgets for the maintenance SIP, and that both the direct fine particulate matter ($PM_{2.5}$) and nitrogen oxides emissions inventories are below the budgets from the attainment SIP.[1]

In summary, CMAP's regional transportation air quality conformity analysis demonstrated the northeastern Illinois region's conformance to the mobile source emissions budgets prescribed in the SIPs to meet the air quality goals. Their conformity analysis included the I-290 Eisenhower Expressway improvements, as well as all of the other programmed and planned transportation improvements in the northeastern Illinois region that are contained in the RTP.

I-290 Eisenhower Expressway Air Quality Sensitivity Analysis

To address stakeholder comments regarding the potential effects of just the I-290 alternatives, a sensitivity analysis was performed that estimated the pollutant emissions for the I-290 improvement alternatives. Although not required by the National Environmental Policy Act (NEPA), the I-290 Phase 1 Study Round 3 alternatives were analyzed, by comparing the emissions from the four Build alternatives (GP, HOV 2+, HOT 3+, TOLL + HOT 3+) to the No Build alternative to address local stakeholder concerns.

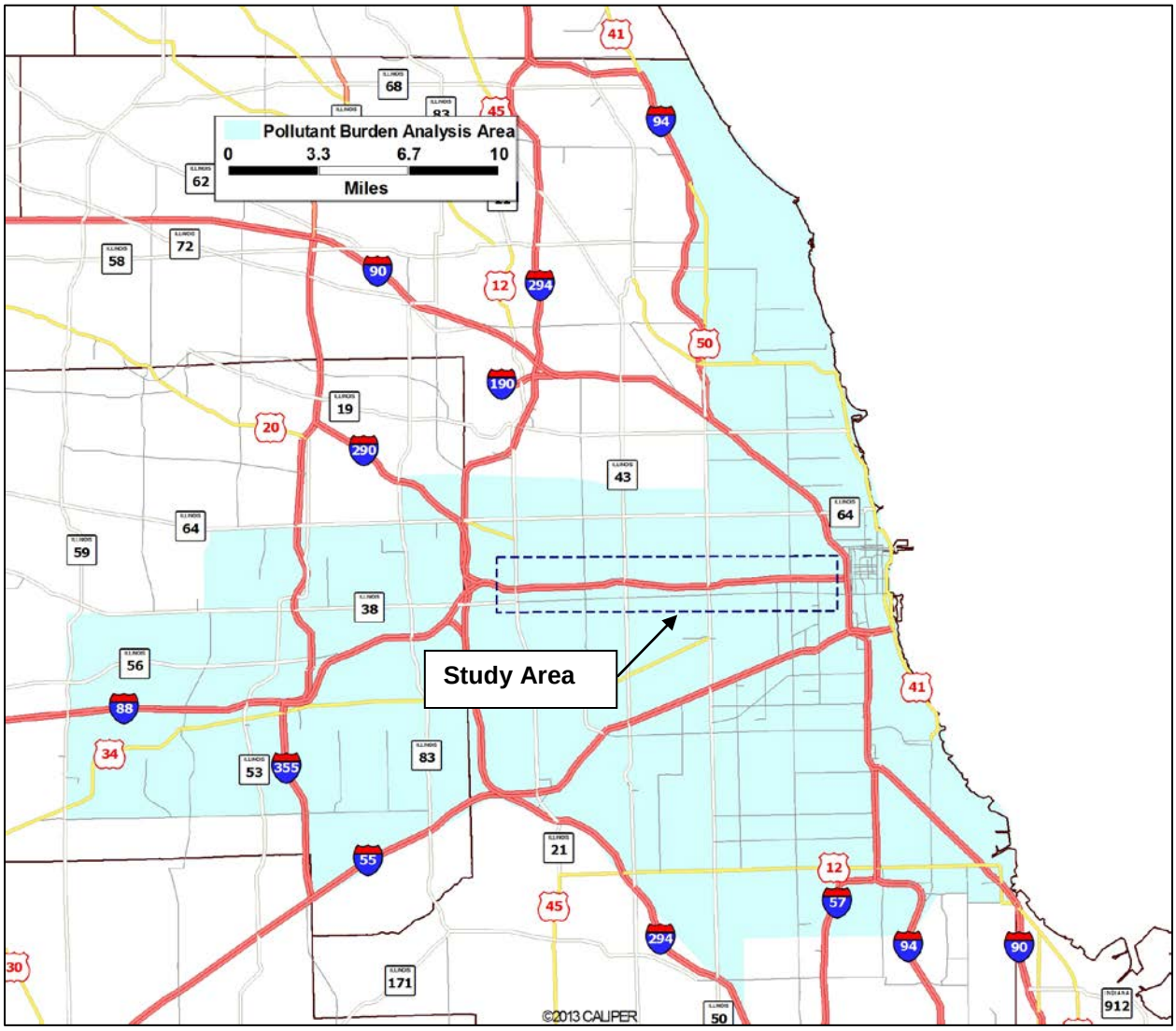
The air quality analysis area is shown in Figure 1. This analysis area represents the general geographic area where changes in traffic volumes are expected to occur as a result of the Round 3 Build alternatives. The I-290 regional travel demand forecasting model was used to define the areas where changes in traffic volumes between the Round 3 Build alternatives and the No Build alternative in 2040 are expected to occur. As seen in Figure 1, the analysis area encompasses portions of Cook and DuPage Counties, as roads that lead directly to/from I-290 and those roads where traffic is diverted or attracted are included.

USEPA's MOVES2014 emissions model was used for the air quality analysis. MOVES2014 represents a major new model revision, and includes new and updated emissions data from a wide range of test programs and other sources, new effects of fuel properties, new data on evaporative emissions, new analyses of particulate matter data, and new default data based on more recent inventories. MOVES2014 input factors were obtained from CMAP.

MOVES2014 incorporates forecasted vehicle miles of travel (VMT) and travel speeds (obtained from the I-290 Phase 1 Study travel demand model), as well as specific MOVES2014 input factors, such as inspection and maintenance programs, fleet mix, and travel speed profiles, for the traffic network being analyzed. In general, increased VMT results in increased emissions, while increased travel speeds lower emissions.

[1] See http://www.cmap.illinois.gov/documents/10180/394290/CmteMemo--TIPAmendment%2BReport03-05-2015.pdf/5c1ea799-a10e-4d2f-9eb6-12a109ad0827

Figure 1. I-290 Eisenhower Expressway Improvement Air Quality Analysis Area



The air quality sensitivity analysis estimated the daily pollutant emissions levels (in tons) for each of the Round 3 Build alternatives, as well as the No Build Alternative, in order to provide a basis of comparison. The results are summarized in Table 2. It should be noted that Table 2 summarizes the pollutant burden of all roads in the analysis area, reflecting regional changes in traffic due to the I-290 Build Alternatives, and therefore isolates the effects of the I-290 project.

Table 2. Air Quality Sensitivity Analysis (daily tons)

Air Pollutant	2040 No Build	2040 GP (Change from NB)	2040 HOV 2+ (Change from NB)	2040 HOT 3+ (Change from NB)	2040 HOT 3+ & TOLL (Change from NB)
Carbon Monoxide (CO)	64.777	65.250 (+0.73%)	64.448 (-0.51%)	64.554 (-0.34%)	64.552 (-0.35%)
Nitrogen Oxides (NOx)	7.584	7.600 (+0.21%)	7.575 (-0.12%)	7.579 (-0.07%)	7.538 (-0.61%)
Hydrocarbon (HC)	3.469	3.472 (+0.09%)	3.469 (0.0%)	3.464 (-0.14%)	3.468 (-0.03%)
Particulate Matter (PM10)	4.953	4.950 (-0.06%)	4.951 (-0.04%)	4.938 (-0.30%)	4.931 (-0.44%)
Particulate Matter (PM2.5)	0.892	0.893 (+0.11%)	0.891 (-0.11%)	0.889 (-0.34%)	0.888 (-0.45%)

As shown in Table 2, the pollutant emissions for the 2040 Round 3 Build alternatives are all within one percent of the 2040 No Build alternative for each pollutant. The Round 3 Build alternatives all exhibited very minor increases (+0.3% to +0.5%) in VMT in the analysis area, but increases in travel speed offset the VMT changes, resulting in overall emissions reductions for three out of the four Build alternatives. Both the HOT 3+ and HOT 3+ & TOLL alternatives result in minor decreases in all five air pollutants, as compared to the No Build alternative. The HOV 2+ alternative result in minor decreases in four out of the five pollutants. The GP Lane alternative results in minor increases in four out of the five pollutants as compared to the No Build alternative in part due to the additional capacity for truck traffic in the form of the general purpose lane addition in each direction, which is not present in the managed lane alternatives.

Conclusion

This sensitivity analysis shows that there is no substantial change in pollutant emissions resulting from the Round 3 Build alternatives. Thus, this sensitivity analysis will not influence the selection of a preferred alternative. It will be used for information purposes.