

SUMMARY OF ILLUSTRATIVE ANALYSIS – AIR QUALITY

The air quality analysis for the Illustrative Phase of the project was completed via an emissions burden analysis from vehicular traffic for the Windsor area. An emissions burden analysis is an accounting of the total loading to the airshed of specific pollutants in a given area. The percent change in the burden is used to assess the overall impact of a proposed undertaking, such as a modified or new traffic route. The emissions burden was calculated for the Canadian side only.

The following air contaminants were assessed:

- Particulate Matter (PM)
- Particulate Matter Less than 10 microns (PM₁₀)
- Particulate Matter Less than 2.5 microns (PM_{2.5})
- Oxides of Nitrogen (NO_x)
- Sulfur Dioxide (SO₂)
- Carbon Monoxide (CO)
- Carbon Dioxide (CO₂)
- Methane (CH₄)
- Total Volatile Organic Compounds (VOCs)
- Benzene
- Acetaldehyde
- Formaldehyde
- 1,3-Butadiene
- Acrolein

The assessment used emission factors developed from the U.S. EPA MOBILE 6.2 and the Canadian MOBILE6.2C emissions models. Due to differences in vehicle emissions between domestic (i.e. Canadian) vehicles and U.S. vehicles, emission factors based on the Canadian fleet were applied to domestic traffic, and emission factors based on the U.S. fleet were applied to vehicles that crossed the border from the U.S.

The analysis was conducted for three time periods, 2004, 2015, and 2025. Growth that is expected to occur in the area throughout the duration of the study was considered in the study traffic data.

Six figures are presented that illustrate the results of the emissions burden analysis for PM, PM₁₀, PM_{2.5}, NO_x, SO₂, and CO. The results show that total vehicular emissions decrease over time for some contaminants, due to technological modifications expected in the vehicle fleet, but increase for other contaminants, due to the expected growth in traffic. However, comparison of the results for each proposed route alternative (X1 through X15) relative to the “no build” X0 (i.e. baseline) option shows little to no difference in the total burden for each alternative (i.e. the percent change over baseline is very small). **This indicates that, from a total regional burden perspective, there is essentially no difference between each of the proposed routes.**

Figure 7 presents the breakdown of emissions in the Windsor area for PM, NO_x, VOC and CO. Transportation related emissions from VOC and PM are small in relation to the other sources, whereas emissions of NO_x and CO from transportation sources comprise a much larger fraction of the total emissions.

Figure 1 – Burden Analysis Results for Particulate Matter (PM)

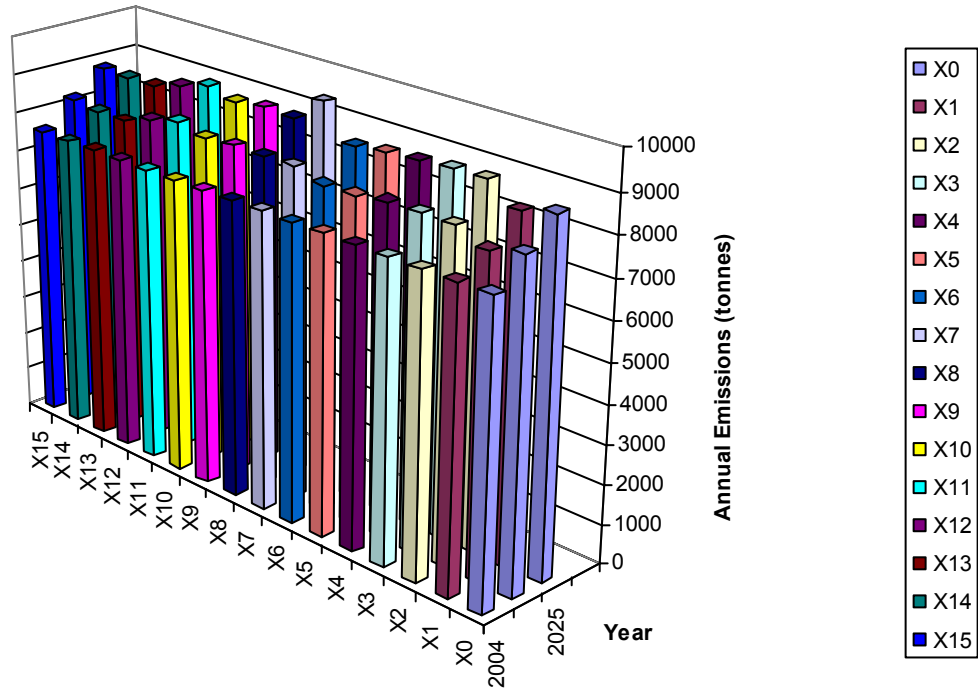


Figure 2 – Burden Analysis Results for Particulate Matter <10 Microns (PM₁₀)

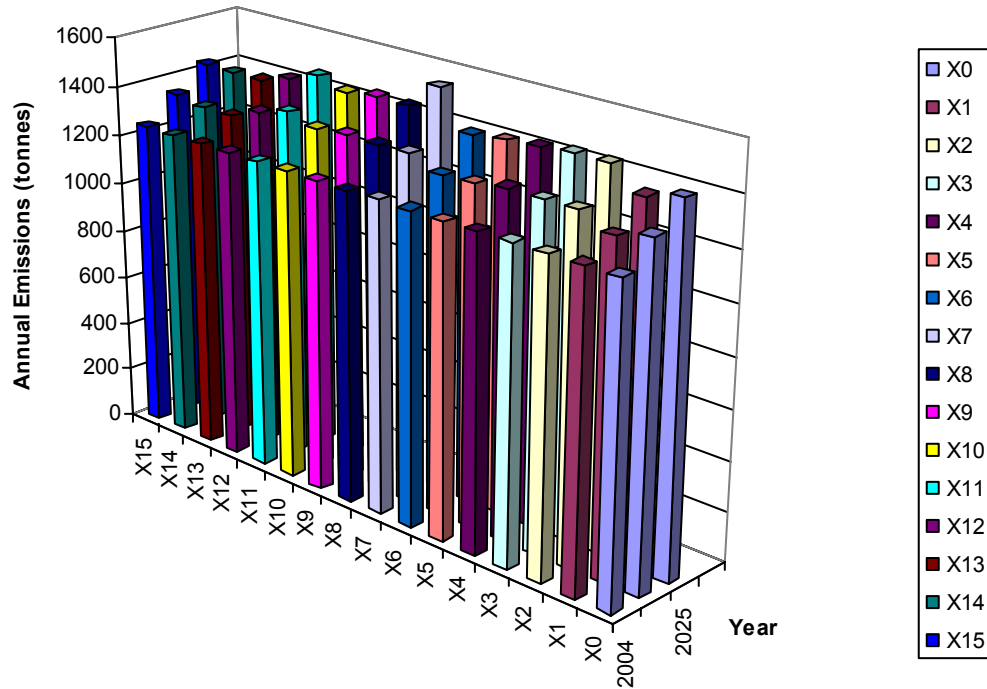


Figure 3 – Burden Analysis Results for Particulate Matter <2.5 Microns (PM_{2.5})

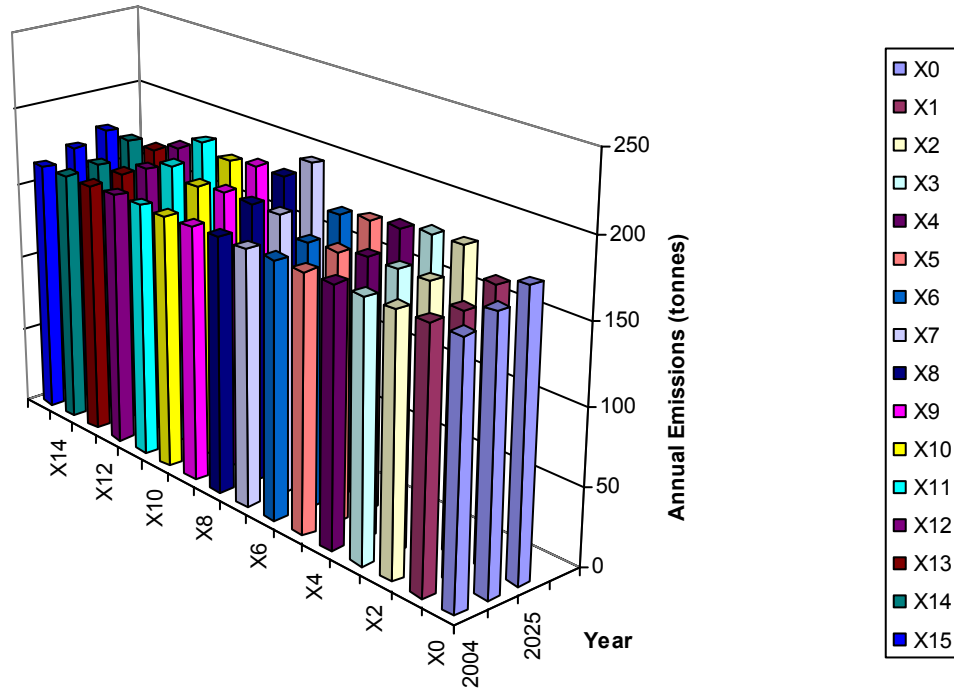


Figure 4 – Burden Analysis Results for Oxides of Nitrogen (NO_x)

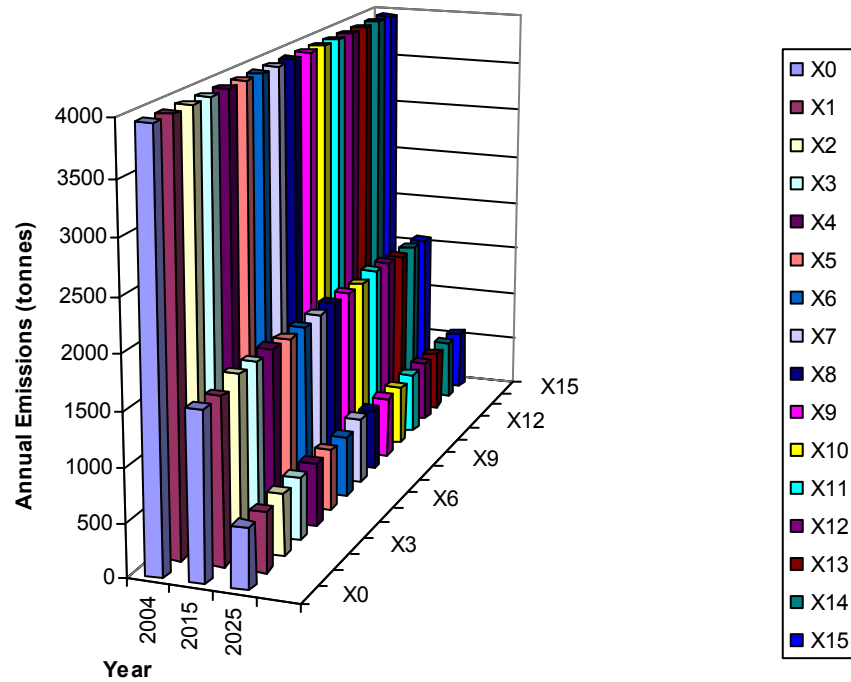


Figure 5 – Burden Analysis Results for Sulfur Dioxide (SO₂)

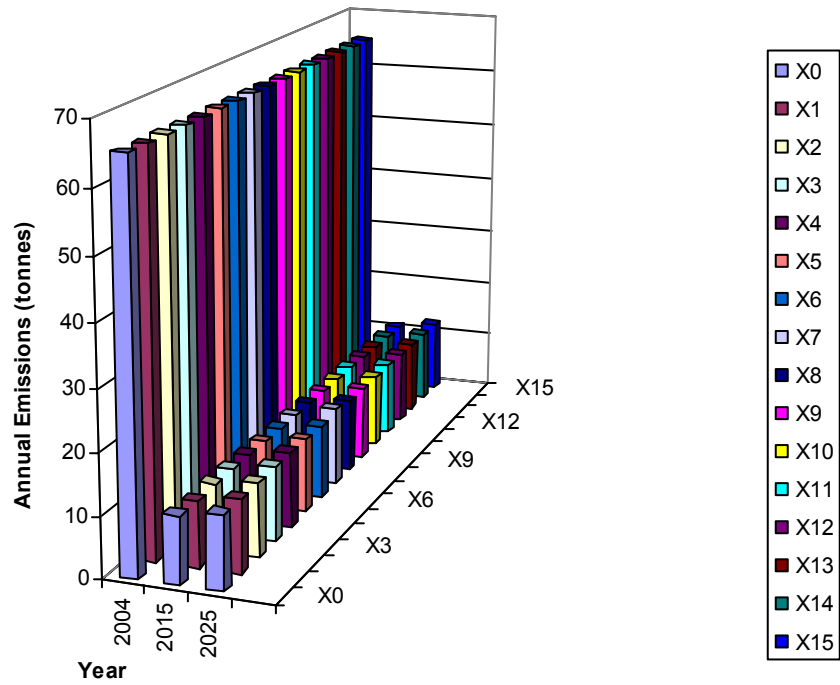


Figure 6 – Burden Analysis Results for Carbon Monoxide (CO)

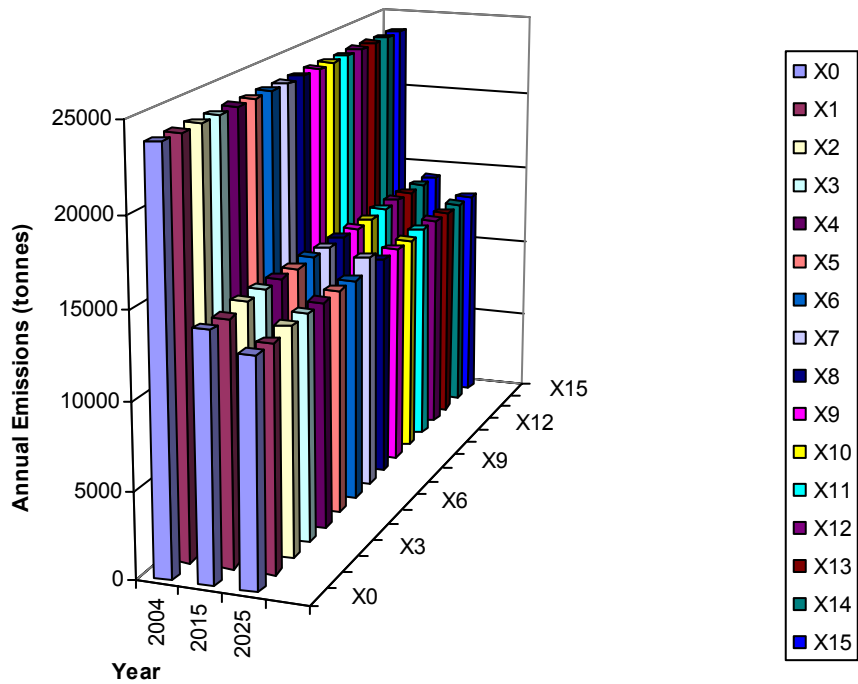


Figure 7 – Distribution of Selected Air Contaminant Emissions in the Windsor Area

| Category | Kilograms per Year |
|------------------------------------|--------------------|
| NOx | |
| Transportation | 4,515,000 |
| Stationary Fuel Combustion | 2,697,000 |
| Open Sources | 12,000 |
| Consumer Products/Solvents | 0 |
| Commercial/Industrial Area Sources | 0 |
| Miscellaneous Area Sources | 71,000 |
| Point Sources | 2,399,000 |
| Total | 9,694,000 |

| Category | Kilograms per Year |
|------------------------------------|--------------------|
| VOC | |
| Transportation | 4,103,000 |
| Stationary Fuel Combustion | 1,113,000 |
| Open Sources | 72,000 |
| Consumer Products/Solvents | 648,000 |
| Commercial/Industrial Area Sources | 576,000 |
| Miscellaneous Area Sources | 87,000 |
| Point Sources | 10,646,000 |
| Total | 17,245,000 |

| Category | Kilograms per Year |
|------------------------------------|--------------------|
| PM | |
| Transportation | 594,000 |
| Stationary Fuel Combustion | 1,497,000 |
| Open Sources | 10,039,000 |
| Consumer Products/Solvents | 0 |
| Commercial/Industrial Area Sources | 0 |
| Miscellaneous Area Sources | 3,000 |
| Point Sources | 1,619,000 |
| Total | 13,752,000 |

| Category | Kilograms per Year |
|------------------------------------|--------------------|
| CO | |
| Transportation | 26,906,000 |
| Stationary Fuel Combustion | 5,563,000 |
| Open Sources | 185,000 |
| Consumer Products/Solvents | 0 |
| Commercial/Industrial Area Sources | 0 |
| Miscellaneous Area Sources | 14,000 |
| Point Sources | 2,620,000 |
| Total | 35,288,000 |

