MEA Clarification
June 2023
AIR QUALITY IMPACT ASSESSMENTS (AQIA)

In recent years, there has become an expectation to include consideration of air quality with a complex quantitative Air Quality Impact Assessment (AQIA) and, for many MCEA projects, MECP typically distributes the following narrative to proponents when they submit their Notice of Commencement.

If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern. ***Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.***

• If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:

- *o A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;*
- *o A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;*
- *o A discussion of local air quality impacts that could arise from this project during both construction and operation; and*
- *o A discussion of potential mitigation measures.*

• As a common practice, "air quality" should be used an evaluation criterion for all road projects.

• Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.

• The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities report prepared for Environment Canada. March 2005.

Also, MECP has often recommended that the following items be included in a typical quantitative AQIA:

- Provide background on Federal and Provincial short-term and long-term goals to control GHG and Net Zero Emissions in Transportation.
- Description of the study area and proposed undertaking.
- Description of the sensitive receptors in the study area.

- List of Parameters of Concern.
- Applicable air quality criteria (MECP ambient air quality criteria (AAQCs) and Canadian Ambient Air Quality Standards (CAAQs)).
- Background ambient monitoring data representative of the study area (3-5 years of data / 90th percentile; note that in some cases the proponent may need to undertake an air monitoring program to collect ambient data), along with five years of recent representative meteorological data.
- Emission estimates for the current and future scenarios under maximum capacity or worst-case emissions. The development of the emission estimates should follow guidance provided in Guideline A-10 “Procedure for Preparing an Emission Summary and Dispersion Modelling Report” and/or “Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects”.
- Dispersion modelling for the current and future scenarios. The model should follow guidance provided in Guideline A-11 “Air Dispersion Modelling Guideline for Ontario” and/or “Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects”, depending on the sources modelled.
- If applicable, frequency of exceedances is recommended particularly for facilities that are regulated under O.Reg.419/05 and for odour assessments following guidance in the technical bulletin “Methodology for Modeling Assessments of Contaminants with 10-minute Average Standards and Guidelines under O. Reg.419/05”.
- Cumulative impacts (all sources - modelled and background) for the current and future scenario compared against the air quality criteria.
- Mitigation measures and or best management practices for odour and dust should be considered.
- Regional impacts and climate change (proposed greenhouse emissions compared against the provincial sector totals).
- Brief discussion on the potential construction impacts and what mitigation measures will be in place to minimize off-site impacts.

For MCEA projects that will generate odour (wastewater treatment facilities), quantitative analysis of the impacts of any odours on nearby properties/uses is important. This will provide useful information that can be used to identify appropriate mitigation measures (capture and treat odours). However, it is important that design work has progressed sufficient to provide realistic/accurate predictions of future impacts. The MCEA may identify this and commit to completing the AQIA and implementing mitigation measures during detailed design.

As stated above, “*The scope of the assessment can be determined based on the potential effects of the proposed alternatives*”. For other routine MCEA projects that do not include a point source that generates odour (roads, bridges, other water/wastewater projects), MEA’s review of past road projects has demonstrated there is little value in completing a quantitative AQIA as described above and MEA recommends that a qualitative analysis would be appropriate.

MEA has analyzed recently completed MCEA road projects (see attached Case Studies) that included a quantitative AQIA and found that, in all cases:

- The AQIA was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design.
- The AQIA concluded that the project's impact on air quality was not significant, and therefore the AQIA did not contribute to or recommend any mitigation measures even when there were sensitive uses adjacent to the project.
- The AQIA consistently demonstrated that there were no significant differences in air quality between the analyzed alternatives. In more general terms, air quality remains the same regardless how traffic is distributed among roads in an area.

Air quality is a "big picture" issue. In the transportation sector, Provincial and Municipal policies that promote the use of electric vehicles, active transportation, transit and greening the community have the potential to significantly improve air quality. However, as demonstrated in the Case Studies, the impact to air quality from an individual road project is not significant. A Project's contribution to air quality and the background concentrations will vary from day to day, depending upon meteorological conditions and operational characteristics.

It is our understanding that many MCEA practitioners understand that there is really very little value added by a quantitative AQIA but yet there continues to be an expectation that the completion of a quantitative AQIA is a box that should be checked during the MCEA process. MEA does not support allocating time, funds and effort unless the result adds value to the MCEA process.

Air Quality should still be a consideration and addressed during the MCEA process. However, for typical road projects, similar to the Case Studies, rather than commissioning a new quantitative AQIA, the proponent may wish to rely on the results of previously completed AQIA reports for these similar projects and include qualitative statements to discuss the points identified by MECP as below:

o A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
The proponent should gather existing available information and explain how earlier quantitative AQIA for other similar projects have consistently demonstrated that there were no significant differences in air quality between Future No-Build (do nothing) and Future Build (Preferred/Considered Alternatives). In more general terms, air quality remains the same regardless how traffic is distributed among roads in an area. If relevant, the proponent could include that earlier quantitative AQIAs for other similar projects have demonstrated that doubling the heavy truck volumes would not significantly impact air quality.

o A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
The proponent should identify nearby receptors and explain how earlier quantitative

AQIA for other similar projects with sensitive receptors have consistently demonstrated that there were no significant impacts to these sensitive receptors.

o A discussion of local air quality impacts that could arise from this project during both construction and operation; and
The proponent should identify local air quality impacts that could arise and score each alternative in the decision-matrix as one of the factors impacting the selection of a preferred solution (Phase 2 of the Municipal Class EA) and/or preferred project design option (Phase 3 of the Municipal Class EA). Alternatives could be ranked with criteria such as poor, acceptable, good or best based on community information and conclusions from past AQIA reports.

o A discussion of potential mitigation measures.
Even though past quantitative AQIA reports have not identified the need for mitigation, the proponent should consider including the following in the EA documentation;

- *Outline existing policies that will improve air quality such as promoting the use of electric vehicles, active transportation, transit and greening the community.*
- *Consider design options that inherently mitigate air quality such as a roundabout that reduces vehicle idling time at an intersection.*
- *Adding streetscaping/trees where possible along the project. It is commonly understood that trees and other planting can improve air quality and provide other benefits such as storing excess carbon. The inclusion of trees and other plantings may mitigate the perceived (but not actual) impact of the road project.*
- *Typical best practices (such as dust control) during construction to mitigate impacts to air quality*

Air Quality Impact Assessment (AQIA) Case Studies

Case Study 1 - Class Environmental Assessment New East-West Road Corridor (Highway 6 to Brant Street) Air Quality Assessment Final Report August 2009

Project – New arterial road and widening of existing arterial roads to six lanes

EA material
https://www.hamilton.ca/city-planning/master-plans-class-eas/waterdownaldershot-transportation-master-plan
Please see the tab called “Study documents and project reports” for the ESR and Appendices for this Schedule C project.
- AQIA is in Appendix D.

Air Quality Impact Assessment Report Details
See attached Case Study 1
Length – 132 pages

Excerpts from AQIA

The Executive Summary includes;
Maximum concentrations of nitrogen oxides (NOx), carbon monoxide (CO) and fine particulate matter with aerodynamic diameter 2.5 microns and less (PM2.5) related to road traffic were estimated at selected existing and potential future receptors that were expected to be most impacted (i.e., closest to the roadway). In order to determine the impact of the proposed road redevelopment, the following three scenarios were modelled:
• Scenario 1 – Existing 2008 configuration, based on current traffic data;
• Scenario 2 – Future 2021 "no road-build" option, based on forecasted traffic volumes under the existing roadway configuration. This scenario assumes that anticipated future land development in Waterdown would be in place; and
• Scenario 3 – Future 2021 Mature State of Development based on forecasted traffic volumes with the proposed new land development and proposed road improvements in place.

For the receptors selected for the purposes of this assessment, the future build scenario resulted in changes in the predicted air quality that was not considered to be significant when compared to the air quality impacts predicted for the future no-build scenario. Due to concerns expressed by residents regarding the potential for increase use of the road by heavy trucks, a sensitivity analysis was conducted on pollutant concentrations resulting from increasing the volume of heavy-truck traffic along the section of Parkside Drive that is to be improved. For this sensitivity analysis, the impact on the air quality of doubling the heavy truck volumes on the new East-West Road was investigated. The impact of doubling the heavy truck volumes on the air quality of the selected receptors was not predicted to be significant.

Conclusions
1) The Air Quality Assessment was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design.
2) The Air Quality Assessment did not contribute or recommend any mitigation measures.
3) The Air Quality Assessment demonstrated that there were no significant differences in air quality between Scenario 2 (do nothing) and Scenario 3 (Preferred Alternative). In more general terms, air quality remains the same regardless how traffic is distributed among roads in an area.
4) The Air Quality Assessment demonstrated that doubling the heavy truck volumes would not significantly impact air quality.

Case Study 2 - Class Environmental Assessment Langstaff Road York Region - Air Quality Assessment Final Report January 2020

Project – Widen/improve existing arterial road up to six lanes and new grade separation connection

Air Quality Impact Assessment Report Details
See attached Case Study 2

Length – 24 pages
Cost - $15,000
Time to Complete – 1-3 months

Excerpts from AQIA
The Executive Summary includes:
The emission modelling was based on the U.S Environmental Protection Agency's roadway traffic emissions model, MOVES version 2014b, and the dispersion modelling was based on the US EPA's dispersion model AERMOD version 16216r. The background concentrations were estimated using air quality monitoring data collected by Environment and Climate Change Canada (ECCC). A Future No-Build and Future-Build scenario were considered. The differences between the two scenarios represent the change in air quality due to the project. The No-Build scenario represents Langstaff Road without the improvements, and the Future-Build scenario represents it with improvements. For both the Future No-Build and Future Build scenario, vehicle emissions were represented using projected 2041 traffic volumes and 2041 vehicle emission factors. Three worst-case air contaminants were chosen to assess the effects of the project on the surrounding air quality: NO2, PM2.5 and benzene.
The proposed project is expected to increase local air contaminant levels. PM2.5 and benzene exceed their thresholds for the annual averaging time, at the most impacted receptor location for both the Future Build and Future No-Build scenarios. Predicted exceedances of the threshold is caused by the elevated background concentrations in the study area. PM2.5 background accounts for 94% of the concentration at the worst-case receptor. The background concentration for benzene exceeds the threshold without contributions from the roadway.
Through the comparison of the Future No-Build and the Future Build scenarios it is evident that the proposed improvements to Langstaff Road have insignificant impacts on nearby receptors.

Conclusions

1) The Air Quality Assessment was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design.
2) The Air Quality Assessment did not contribute or recommend any mitigation measures.
3) The Air Quality Assessment demonstrated that there were no significant differences in air quality between Future No-Build (do nothing) and Future Build (Preferred Alternative). In more general terms, air quality remains the same regardless how traffic is distributed among roads in an area.

Case Study 3 – York Region Bayview Avenue Class Environmental Assessment Study between Steeles Avenue and Elgin Mills Road (ESR August 2017)

Project – Widening existing arterial road to six lanes including transit lanes

EA material

The Executive Summary of the Environmental Study Report can be found here (please obtain full ESR from York Region):
https://www.york.ca/wps/wcm/connect/yorkpublic/07edb959-9eeb-4c42-8e6d-934f23291a14/1+Bayview+Ave+Class+EA+ESR+Executive+Summary.pdf?MOD=AJPERESPlease

- Under Chapter 8 Proposed Mitigation and Commitments to Further Work, Section 8.1.4 documents the Region's approach to Climate Change, Regional Air Quality and a summary of the scoped local Air Quality Assessment.
- While the study limits extended between Steeles Avenue and Elgin Mills Road (~10 km), through discussion with MECP during the EA Study, the Air Quality Assessment completed was scoped between John Street and Proctor Avenue (~1km), located in the southern portion of the study area. This is the section of Bayview Avenue where the highest potential for bottlenecking may occur and is an older neighborhood where residences are located closer to the road. There are also critical receptors such as senior's residences and places of worship. It was agreed that this section of Bayview Avenue is a representation of "worst case" impacts for the air quality study.
- As documented in the ESR, MECP recognized the broader regional initiatives that York Region is undertaking regarding air quality, as well as the proposed improvements as part of the EA Study (i.e. widening for transit/HOV lanes, addition/enhancement of multi-use path and sidewalks); therefore, a localized area has been identified for the Air Quality Assessment.
- The Scoped Air Quality Assessment can be found in the Appendix of the ESR.

Air Quality Impact Assessment Report Details
See attached Case Study 3
Length – 34 pages + Appendix of Receptor Specific Modelling Results
Cost - $ (to be provided by York Region)
Time to Complete – Approximately 3 months including completion of technical work, review of draft reports and revisions by the Project Team

Summary of Air Quality Assessment per Bayview Avenue ESR (2014) Section 8.1.4.2.1 (note: content of the ESR refers to the former name of the Ministry - MOECC)
The project includes widening Bayview Avenue to include a single Transit/HOV lane in both directions, for a total of six lanes. The Transit/HOV lanes will be located in the outermost lane in both the northbound and southbound directions. This local air quality assessment examines the impacts of the roadway widening at nearby sensitive receptors. The results of the assessment are as follows:

- The maximum combined concentrations for the future build scenario were all below their respective MOECC guidelines or Canada-wide Standard, with exception of annual PM2.5, PM10, TSP and annual benzene. Note that for each of these contaminants, background concentrations alone were 100% of the guideline or more.
- Frequency Analysis determined that there were no additional days on which exceedances occurred for PM10 and 2 additional days on which exceedances

occurred for TSP when compared to background concentrations, which is less than 1% of the time.

- Mitigation measures are not warranted, due to the small number of days which are expected to exceed the guideline.
- Section 8.1.4.3 of the ESR and the Air Quality Assessment Report also note air quality during construction. “During construction of the roadway, dust is the primary contaminant of concern. Other contaminants including NOx and VOX’s may be emitted from equipment used during construction activities. Due to the temporary nature of construction activities, there are no air quality criteria specific to construction activities. However, the Environment Canada “Best Practices for Reduction of Air Emissions from Construction and Demolition Activities” document provides several mitigation measures for reducing emissions during construction activities.” Some of the mitigation techniques were mentioned in the ESR and in the Air Quality Assessment Report.

Conclusions

1) The Air Quality Assessment was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design. The Air Quality Assessment completed as part of the Bayview Avenue EA was based on the preferred design. During the EA Study, MECP recognized the overall regional approach to climate change and air quality and the Project Team proceeded with a scoped air quality assessment.
2) The Air Quality Assessment demonstrated that there were no significant differences in air quality as a result of the proposed improvements on Bayview Avenue.
3) The Air Quality Assessment did not contribute or recommend any mitigation measures. However, typical best practices such as dust control should be implemented during construction.

C**ase Study 4 -** McCowan Road EA between Steeles Avenue and Major Mackenzie Drive (City of Markham) York Region May 2021

Project – Widening of existing arterial road to six lanes including HOV lanes and active transportation facilities.

EA Material

Website (AQIA provided in Appendix O):
https://www.york.ca/wps/portal/yorkhome/transportation/McCowan-Road-EA/!ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfljo8zivTwNnA0dvQ283J3NXA0czYOCLS1DLUz9fcz1w8EKDHAARwP9KGL041EQhd_4cP0osBIjIxMzD0NnAy8DD38LA0838wBTFwsPQwMjcwIKvI2gCvBYUpAbGmGQ6akIAIkMRWc!/dz/d5/L2dBISEvZ0FBIS9nQSEh/#.YNs3o_IKjIU

Air Quality Impact Assessment Report Details

See attached Case Study 4

Length – 132 pages plus six files of appendices

Excerpts from AQIA

The closing paragraphs of the report shown below demonstrate that this complex and expensive study is another example that confirms the widening an arterial road produces a negligible impact on air quality.

The proposed Project aims to minimize the air quality impact associated with the projected increased traffic for the Study Area through improved traffic flows within the local vicinity of the proposed Project and reduced queuing times at other roads surrounding the proposed Project. Emissions from the proposed Project within the Study Area do not represent a significant contribution to local air quality. As a result, the proposed Project is necessary to help alleviate congestion and the proposed Project will minimize the air quality impact. The Project will introduce HOV lanes which will encourage the use of carpooling and Transit vehicles. Additionally, this assessment is considered to be conservative as transit vehicles currently use a diesel/gasoline fuel, which was included in the emission estimates, however, in the future, there is potential for these vehicles to be electric.

Overall, the proposed Project itself is therefore anticipated to be a relatively minor source of emissions, and the impact on overall air quality in the region is expected to be negligible.

Conclusions

1) The Air Quality Assessment was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design.
2) The Air Quality Assessment did not contribute or recommend any mitigation measures.

Case Study 5 - Mid-Block Arterial Road (Town of Whitby) March 2021

Project – Construct a new east-west arterial road, from Cochrane Street to Thornton Road

EA Material

Website (AQIA provided in Appendix N): https://www.midblockea.ca/

Air Quality Impact Assessment Report Details

See Attached Case Study 5
Length – 51 pages
Cost - $15,000
Time to Complete – 1-3 months

Excerpts from AQIA

The closing paragraph of the Executive Summary shown below demonstrates that this complex and expensive study is another example that confirms the widening an arterial road produces a negligible impact on air quality.

Generally, this study found that while the project is anticipated to cause an increase in most of the target parameters compared to the no-build scenario. All concentrations were predicted to be in compliance with the relevant criteria with the exception of the current scenario's 1-hour averaged NOx impact and benzene nini all scenarios where the PIO is dominated by elevated ambient concentrations. It is Cambium's opinion that the proposed project will not have negative impact on the study area for the build 2031 scenario.

Conclusions

1) The Air Quality Assessment was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design.
2) The Air Quality Assessment did not contribute or recommend any mitigation measures.

Case Study 6 - Burnhamthorpe Road West Improvements – City of Mississauga January 2020

Project – Widen existing arterial road to four lanes.

EA Material

Project Website here

Air Quality Impact Assessment Report Details

See attached Case Study 1
Length – 57 pages

Excerpts from AQIA

Section 6.0 Conclusions and Recommendations shown below demonstrates that this complex and expensive study is another example that confirms the widening an arterial road produces a negligible impact on air quality.

The potential impact of the proposed project infrastructure on local air quality has been assessed and the results are summarized in Table 25. An assessment of GHG emissions was also conducted. The following conclusions and recommendations are a result of this assessment.

- *The maximum combined concentrations for the future build scenario were all below their respective MOECC guidelines or CAAQS, with the exception of*

annual PM2.5, 24-hr PM10, 24- hr TSP and annual benzene. Note that for each of these contaminants, background concentrations alone exceeded the guideline.

- *Frequency Analysis determined that there were no additional days on which exceedances of PM10 or TSP occurred between the 2017 Existing and 2041 Future Build scenarios. For both PM10 and TSP, exceedances of the guideline occurred less than 1% of the time.*
- *Overall, maximum predicted concentrations are similar between the 2017 Existing and 2041 Future Build scenarios, with little or no increase occurring as a result of the project.*
- *Mitigation measures are not warranted, due to the small number of days which are expected to exceed the guideline.*
- *Total GHG emissions were predicted to decrease in the study area. Overall, there was a 15% decrease in total GHG emissions predicted between the Existing and Future Build scenarios.*

Conclusions

1) The Air Quality Assessment was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design.
2) The Air Quality Assessment did not contribute or recommend any mitigation measures.

Case Study 7 - Ninth Line from Eglinton Avenue West to Derry Road West – City of Mississauga April 2021

Project – Widen existing arterial road

EA Material
Project Website here

Air Quality Impact Assessment Report Details
See attached Case Study 7
Length – 53 pages

Project Summary
The AQIA is in Appendix Q. The main objective of the study was to assess the local air quality impacts due to the proposed Ninth Line widening from Derry Road to Eglinton Avenue. The study also includes an overview of construction impacts and a screening level assessment of greenhouse gases. Given the nature of the roadway improvements and location of sensitive receptors within the study area, HDR Inc. requested a “hotspot analysis” be performed. Rather than assessing the total length of the roadway, the air quality assessment focused on one hotspot within the study area where worst-case impacts are likely to occur.

Excerpts from AQIA
Section 6.0 Conclusions shown below demonstrates that this complex and expensive study

is another example that confirms the widening an arterial road produces a negligible impact on air quality.

Presented in Table 27 is a summary of the worst-case modelling results for the 2041 Future Build based on 5-years of meteorological data. For each contaminant, combined concentrations are presented as a percentage of the applicable guideline.

The maximum combined concentrations for the Future Build were all below their respective MECP guidelines or CAAQS, with the exception of the 1-hr and annual NO2 CAAQ, annual PM2.5, 24-hr PM10, 24- hr TSP, 24-hour benzene and annual benzene. Note that background concentrations exceeded the guideline for all of these contaminant averaging periods as well. The contribution from the roadway emissions to the combined concentrations was small.

Mitigation measures are not warranted, due to the small number of days which are expected to exceed the guideline. Greenhouse gas assessment and air quality impacts during construction are discussed in Section 4 and Section 5

Conclusions

1) The Air Quality Assessment was not a factor that contributed to the selection of the Preferred Solution or the Preferred Design.
2) The Air Quality Assessment did not contribute or recommend any mitigation measures.