Evaluating Turcot Alternatives: Air Quality

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Research Aims:

• To model pollutants attributed to vehicular traffic (CO, NO2, SO2 & PM 2.5) at the Turcot Interchange using the current configuration (baseline), the MTQ proposal (2016 scenario) and the Pierre Brisset/Pierre Gauthier alternative proposal.
• To extrapolate the modeling data in a geographic information system (GIS) so as to achieve a continuous field and so as to assess the magnitude and geographic extent of the different proposals.
• To better understand the association between the spatial distribution of urban pollutant levels and land use, transportation infrastructure, and daily activities of the population.

Key Results to Date:

• We have run Mobile Source Factor Emission Model to estimate the emission factors of gasoline for CO, NO2, SO2 and PM 2.5. These emissions factors were used as inputs into Caline4, an air pollution dispersion model which predicts selected pollutant concentrations at receptor points near roadways.
• Caline4 necessitated that the current configuration of the Turcot Interchange, and the MTQ and Brisset/Gauthier proposals be digitized in Arc GIS so as to establish road segments and links with x-y coordinates. Segment heights and widths were determined using 3-models of the three scenarios.
• Results from Caline4 provided up with data for receptor points which were interpolated into continuous fields using the Kriging interpolation method in ArcGIS.
• Our initial results for CO estimates (pictured below), indicate that the MTQ proposal would have a greater impact on local air quality. The MTQ proposal has a mean value of 11.6 ppm of CO at selected receptor points, versus a mean value of 8.2 ppm for the Brisset/Gauthier alternative. Our results are comparable to those achieved in last year’s study on air quality and a recent MTQ study on the impact of the MTQ Turcot proposal.
• Our next step is to continue modelling for other pollutants NO2, HC, SO2 and PM and to analyse the MOBILE/CALINE results using statistical analysis in order to assess the significance of the impacts and select a preferred alternative.
• Time permitting we would also like to compare the two scenarios using land use regression modeling (LUR) so as to yield more accurate results.

MTQ model:  Brisset/Gauthier model: