

Tomlinson Napanee Asphalt Plant

Golder Responses to Air Quality Impact Assessment Inquiries

March 25, 2022

Responses provided to questions and comments received by the Town of Greater Napanee regarding the Air Quality Impact Assessment (refer to email from Michael Nobes dated March 15, 2022).

Question 1: Was a preliminary air quality screening study (2) completed using SCREEN3 (or for Golder's own purposes perhaps AERSCREEN was used) and if so what were the results? If such a study wasn't attempted, why not?

The SCREEN3 and AERSCREEN models were not used as they are not able to consider more refined data such as regional meteorology, local land use and terrain as per the Air Dispersion Modelling Guideline for Ontario (ADMGO). They are single source models and are not capable of simultaneously modelling multiple sources of emissions such as crushers, stockpiles, exhaust stacks, vehicle traffic, etc., that would be in operation at the asphalt plant property.

Question 2: Did the modelling team consider that Napanee is essentially situated in a valley with steeper slopes rising in the east up to the proposed plant site and gentler slopes rising to the north and west of the town, i.e did the modelling team consider gravity flow along the Napanee River valley and that particular micro-climates and local weather phenomena are prevalent? These could affect not only pollutant concentrations in air, but deposition rates on the river itself.

Yes, local terrain features and meteorology were considered in the modelling assessment in accordance with the ADMGO. Terrain elevations and five-year regional meteorology data sets were obtained directly from the Ontario Ministry of the Environment, Conservation and Parks (Ministry) website and are appropriate to use for the Napanee area.

Question 3: AERMOD can underestimate concentrations where terrain slopes downward from the base of the pollution source and this is also pertinent to gravity flow (3). While the plant location may be considered to be far away from the slope start, it would certainly apply to pollution generated by traffic along Palace Road. The EPA AERMOD Implementation Guide suggests that the non-

DFAULT (for terrain) option may need to assume flat these instances. The table of modelling options and pre-processors in the report (pg 29) suggests that terrain data were used for the whole study, but perhaps a flat option exists in AERMAP itself? So were (or could) the appropriate receptor locations be designated for flat terrain?

Vehicle emissions along public roads are included in the evaluation of existing air quality completed as part of the Air Quality Impact Assessment (AQIA).

The flat terrain option was not selected in the AERMOD model as terrain elevation data obtained directly from the Ministry was used in the AQIA in accordance with the ADMGO.

Comment 1: Model predictions are arguably only as good as the input data. It's a glib statement but high values of uncertainty can be generated when data are not representative of the situation being modelled. Even with excellent data inputs, acceptable levels of uncertainty are often set at 50% (0.5 to 2X for comparisons of observed to predicted data). The accuracy of AERMOD in particular is highly dependent on the meteorological data set used (SCREEN3 is not dependent on this data). Regional meteorological data (East "Ottawa" Crops) were used for this assessment being clearly the best data available, but it is arguable that Napanee weather especially in summer can often differ from even Kingston and Belleville, let alone what is happening at the Ottawa Experimental Farms (site of much comprehensive data collection). Local weather data should be considered if this model is used for the assessment. Doubtless, it would take considerable time and possibly prohibitive resources to acquire a more appropriate (and approved) data set.

To avoid under predicting the air quality concentrations, inputs for the dispersion modelling assessment were developed using conservative assumptions that are discussed in the AQIA.

It is acknowledged that there is uncertainty associated with predictions from any air quality dispersion model. However, dispersion modelling is accepted practice for predicting air quality concentrations and the modelling methodology used in the AQIA, including the sources of the meteorological data sets, is based on guidance from the ADMGO. In addition, all facilities applying for an Environmental Compliance Approval in Ontario are required to follow the guidance in the ADMGO.

Question 4: AERMOD is known to underestimate pollution concentrations particularly under low wind, stable or stagnant atmospheric conditions. Given low winds and calm conditions would be particularly relevant to the odour study,

were any adjustments made to the modelling of Naphthalene dispersion to address this?

Any five-year regional meteorological data set obtained from the Ministry, including the East "Ottawa" Crops data used for the AQIA, contains a wide range of wind and atmospheric conditions, including low wind speeds and calm conditions. As per the ADMGO, the regional data sets shall not be modified. The AQIA was completed following this guidance and no adjustments were made to the meteorology data or AERMOD model options.

Comment 2: The odour assessment took account of only one compound and current consensus would indicate that this is inadequate as may be the model itself because it uses hourly averages (4, 5). The use of naphthalene is also curious given it is one of the most tricky PAH's to measure because of volatility; if one wished to ever validate the accuracy of the modelling, there's another probable 50% uncertainty associated with the measurement, because these measured concentrations are often biased low (personal experience).

The odour assessment was conducted using naphthalene as a representative odour compound as there is no publicly available odour data in odour units (OU), which is required for a dispersion modelling assessment. Therefore, naphthalene was chosen as it has an odour based limiting effect as per the Ministry's Air Contaminants Benchmarks List, which lists standards, guidelines and screening levels for assessing point of impingement concentrations of air contaminants. Naphthalene is also known to be one of the main contaminants emitted from asphalt plants as per the US EPA AP-42: Compilation of Air Emissions Factors Chapter 11.1 Hot Mix Asphalt Plants.

One-hour average concentration results from the AERMOD model were converted to 10-minute concentrations following guidance in the Ministry's Technical Bulletin – Methodology for Modelling Assessments of Contaminants with 10-minute Average Standards and Guidelines for Odour Under O. Reg. 419/05.

Comment 3: While acknowledging that odour studies are currently not required by MECP, the town should have a keen interest in them. Everyone is familiar with what happens when the farmer(s) up on the elevated area in the west part of town spreads liquid manure, and the pungent (but at least not hazardous) odour drifts down into town and lingers especially in the morning and evening when those calm conditions and gentle winds prevail. Farmers only spread a few times a year, whereas the proposed asphalt plant is planned to operate 160 days per year. Any similar calm and gentle winds from the east, northeast and even southeast would likely bring the essence of asphalt wafting into town where it will also linger. The only good news is the citizens would not likely smell manure and asphalt at the same time!

Please see the response to Comment 2 regarding the odour assessment completed for the asphalt plant.

An Odour Best Management Practices Plan has been developed to control potential odorous emissions from the asphalt plant.

Final comment: The Ontario standard governing asphalt plants (6) has an item in it that should give pause. While in Section III the standard specifies that for the worst toxins, namely VOCs, benzo(a)pyrene and metals, an asphalt plant shall have abatement (scavenging) technology in place, this clause only becomes applicable for plants built in 2024 or thereafter. So perhaps its best not to rush any kind of approval for rezoning if the town opts for it (which I dearly hope the town does not).

The Ontario industry standards or technical standards are alternative environmental permitting options for facilities that cannot demonstrate compliance with one or more Ontario Regulation 419/05 Section 20 air quality standards through the standard Environmental Compliance Approval permitting process, as per the Ministry's Technical Standards to Manage Air Pollution document.

As Tomlinson is able to demonstrate that the asphalt plant will be in compliance with Section 20 air quality standards, the Asphalt Mix – Industry Standard for asphalt plants is not applicable.