Memo

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cc: Taral Shukla (City of Mississauga)
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Date: March 7, 2023

Subject: ***Executive Summary – Clarkson Residential Development Air Quality and Human Health Assessment Studies***

Our File: 19-1221

Introduction

Dillon Consulting Limited (Dillon) was retained by the City of Mississauga (the City) through The Planning Partnership (TPP) to undertake a technical review of the air quality and human health risk assessment studies that were completed for a proposed development within the City's Clarkson GO Major Transit Station Area (MTSA). The Proposed Development consists of 4 residential towers to be located at 2077, 2087, 2097 and 2105 Royal Windsor Drive in Mississauga, Ontario. The developer is Slate Asset Management L.P. (Slate) and the consultant that completed the air quality assessment (both ambient monitoring and dispersion modelling) and human health assessment is WSP Canada Inc. (WSP). We have completed a review of the submitted material and are satisfied with the assessment methodology and the findings of the study.

This executive summary provides a high-level overview of the findings of the studies that were completed by WSP Canada Inc.

Key Highlights

- Air quality in the Clarkson MTSA has historically been impacted by a combination of vehicle exhaust, industrial emissions, and long-range transport of air contaminants from outside the airshed.
- Slate is proposing the introduction of four residential towers within the Clarkson MTSA. Slate's consultant, WSP, performed an analysis to support the development, including ambient air monitoring, air dispersion modelling, and a human health assessment.

- The City convened an expert Review Committee to review each submission from Slate and WSP prior to acceptance by the City.
- WSP's ambient air quality and dispersion modelling studies identified air contaminants which were predicted to be elevated with respect to the relevant air quality thresholds (criteria). As such, WSP performed a human health assessment to assess the potential risk to human health resulting from these elevated concentrations.
- The human health assessment found that air quality in the Clarkson MTSA is expected to pose a similar level of predicted human health risk as that of other urban centers in the Greater Toronto Area, and that the level of potential human health risk in the MTSA (due to the predicted concentrations of contaminants in ambient air) does not reach a threshold where residential development should be prohibited.

Background

Historically, air quality in the Clarkson MTSA has been compromised, as documented in the Ministry of the Environment, Conservation and Parks (MECP) *Clarkson Airshed Study* (beginning in 2003), as well as through ambient monitoring completed by the Clarkson Airshed Industrial Association (CASIA) beginning in 2012. As per the MECP's reporting, the suspected causes of compromised air quality are a combination of vehicle emissions, industrial emissions, and long-range transport of contaminants from outside of the Clarkson airshed.

Dillon's involvement in this project began in 2018 through the development of the *Clarkson Air Quality, Noise & Vibration and Radiofrequency Compatibility Overview Study*, which included a high-level assessment of the suitability of the MTSA for increased sensitive uses. This study was informed by the previous air quality work by MECP and CASIA, and re-affirmed that air quality within the MTSA was a potential concern limiting future residential development in the area.

Subsequent to Dillon's study, the City introduced an Official Plan Amendment (Amendment No. 117, December 9th, 2020) which added a policy requiring "*… a satisfactory air quality study before sensitive land uses can be considered on the lands located within the Southdown Employment Area Character Area and the Clarkson GO Major Transit Station Area (MTSA) boundary, once delineated.*" Dillon prepared a Terms of Reference (ToR) outlining the requirements of the Clarkson MTSA Air Quality Study which would meet the requirements of the Official Plan Amendment, and included specific provisions requiring an ambient air quality monitoring study, a compatibility assessment, an air dispersion modelling study, and if needed a human health risk assessment. The ToR identified the general methodologies to be used in performing the required studies and highlighted key considerations such as the inclusion of industrial, roadway, and railway emissions within the studies.

In 2020, Slate Asset Management and their consultant, WSP, submitted scopes of work to the City detailing an ambient air quality monitoring study and a dispersion modelling study intended to satisfy the ToR for a proposed development on Slate's lands located at 2077, 2087, 2097, and 2105 Royal Windsor Drive in Mississauga, Ontario (the Site). Slate's plans include the

introduction of four residential buildings on the Site, including a 23-, 25-, 27-, and 29-storey building (the Proposed Development).

The City convened a Review Committee to review and provide feedback on each submission made to the City throughout the Project. The Review Committee members included: City of Mississauga, Peel Public Health, the MECP, Dillon, and local industries (i.e., Petro-Can Lubricant Plant, CRH Canada Group Inc., and CertainTeed Canada Inc.). For each of the scopes of work, and the studies described below, each Review Committee member was provided the opportunity to review and provide feedback prior to the City's acceptance of the studies. As such, multiple rounds of feedback were considered and incorporated in preparing the final deliverables (i.e., plans and studies). The summaries below are based on the final studies and consider all Review Committee members' feedback.

Land-Use Compatibility Study

Land use compatibility studies are performed to evaluate the likelihood of nuisance impacts between industrial and sensitive uses. Within the Clarkson MTSA, the intention of a compatibility study is to maintain the viability of existing commercial and industrial land uses in the context of the introduction of new sensitive land uses to the area. WSP performed a compatibility assessment following the methods outlined in the MECP's D-6 Guideline *Compatibility between Industrial Facilities* which is the applicable guideline in Ontario. In accordance with the Guideline, WSP classified each existing industrial facility and, based on distance to the proposed sensitive use, assessed the potential for compatibility concerns. The study found that nuisance issues resulting from incompatible uses are unlikely with respect to the Proposed Development. As compatibility is based on nuisance complaints which are a matter of individual perception (i.e., each person can tolerate different levels of noise or odour for example). As such, a compatibility study cannot guarantee an absence of complaints. Dillon is satisfied that the study which was performed is in-line with industry standard practices and provides a reasonable level of assurance that compatibility issues are unlikely.

Air Quality Assessment

Ambient Air Monitoring

Ambient air quality typically refers to the concentrations of specific contaminants that may be present in the local outdoor air within an area. Ambient air quality varies widely with geography, terrain, traffic volume, presence/absence of industrial activity, wind speed and direction, temperature, the presence or absence of buildings, and numerous other factors.

Ambient air monitoring involves deploying monitoring equipment within a study area to quantify (measure) and understand the levels of contaminants in outdoor ambient air, and how these levels vary over time. Outdoor ambient air measurements represent the levels of contaminants in air that a person may be exposed to (via breathing) while present in the area.

WSP performed an ambient air monitoring study at the Site from July 8, 2020 until January 10, 2021. During this time, selected indicator compounds were monitored following MECP-approved methodologies. The indicator compounds selected were based on common air contaminants for a typical urban setting as well as those which have historically been elevated in the Clarkson Airshed. The ambient air monitoring study occurred during the COVID pandemic where many typical sources of air pollutants were operating at a reduced capacity or were shut-down altogether. For example, there was a decrease in rail activity on the nearby GO line, and roadway traffic was estimated to have been reduced by 33% to 62% in comparison to pre-pandemic levels. WSP performed an evaluation of the potential impact on the monitored values through analysis of historical data at MECP and CASIA monitoring stations. Data corrections were made to select contaminants to account for potential reductions from baseline during COVID. For some traffic-related contaminants (e.g., benzene) no correction was applied. It was WSP's opinion that including roadway and railway emissions in the air dispersion modelling assessment was sufficient to account for any variations in the baseline concentrations as the roadway model would account for peak traffic volumes in addition to background concentrations. It should be noted that reductions across multiple activity types as a result of the COVID pandemic have introduced uncertainty in the measured ambient concentrations of air contaminants (i.e., air monitoring results), however, Dillon is satisfied that a sufficient level of conservatism has been retained in the characterization of ambient concentrations through dispersion modelling assessment.

The ambient air quality study describes an airshed that is fairly typical for an industrialized urban center in Southwestern Ontario. Of the contaminants assessed, five (i.e., suspended particulate matter ($PM_{2.5}$ and PM_{10}), NO_x, acrolein, benzene, and benzo(a)pyrene) exceeded the relevant air quality thresholds. The ambient concentrations of the exceeding air contaminants are primarily related to transportation, and similar exceedances of the relevant air quality thresholds have been recorded in other urban jurisdictions of comparable size and characteristics. The Human Health Risk Assessment discussed later in this summary, evaluated the potential health implications of these exceedances.

Air Dispersion Modelling

Air dispersion modelling is a computational method of predicting how contaminant emissions from sources of emissions disperse and impact specific receptor locations based on local meteorology, topography, and nearby buildings. Air dispersion modelling estimates ambient outdoor air contaminant concentrations at key identified locations (i.e., receptors) within a given area.

WSP performed an air dispersion modelling assessment to predict the concentration of selected air contaminants at the Proposed Development. The dispersion modelling assessment considered the major industrial sources in the area, as well as those identified through the D-6 screening study, roadway emissions resulting from vehicle traffic, and railway emissions. Results of the dispersion modelling were combined with the ambient concentrations established in the ambient air monitoring study to evaluate the cumulative concentrations

which would be expected at the Development. The air dispersion modelling study was performed in accordance with the relevant MECP guidelines which represent standard industry practice in Ontario. The United States Environmental Protection Agency's (US EPA) AERMOD dispersion model was used to predict concentrations from the significant industrial facilities at all relevant points of reception on the Proposed Development. Dillon's review of the dispersion modelling files confirmed that appropriate modelling inputs were selected.

The MECP's Guideline A-11 *Air Dispersion Modelling Guideline for Ontario* provides a description of the approved methodologies for incorporating an effect known as shoreline fumigation into air dispersion modelling studies. Shoreline fumigation is a phenomenon which occurs when tall stacks are located close to a large body of water. Temperature differentials between air masses over land and over water can generate convective air currents which can result in contaminant plumes from tall stacks being brought down to ground-level rapidly. The AERMOD dispersion model cannot account for shoreline fumigation. Guideline A-11 details acceptable methodologies to be used for assessment of shoreline fumigation. WSP used the SCREEN3 model to evaluate the potential for shoreline fumigation from some of the large industrial stacks along Lake Ontario to the south of the Proposed Development. This screening-level model showed that shoreline fumigation could occur and that further detailed modelling was justified. WSP performed additional modelling using the Shoreline Dispersion Model (SDM) to assess the predicted impacts during fumigation events, which showed that fumigation was not expected to result in increased impacts from the industrial facilities. This approach to modelling is aligned with MECP requirements as stated in Guideline A-11. During stakeholder review, nearby industries raised concerns with this approach, stating that they are using the more advanced CALPUFF dispersion model to estimate concentrations during normal operations and under shoreline fumigation conditions. CALPUFF is considered a more accurate model in many situations and may be better suited to predicting impacts from the existing industry at the Proposed Development, however, as previously stated, the approach used by WSP follows guidance from the MECP. Dillon contacted the MECP to discuss the modelling approach selected by WSP, and it was confirmed that the use of SCREEN3, SDM, and AERMOD is in line with MECP requirements. While Dillon acknowledges industries' ongoing concerns, Dillon is satisfied that the dispersion modelling was conducted in alignment with the current acceptable standard industry practice in Ontario.

WSP combined the results of the dispersion modelling study with the ambient air quality concentrations to represent cumulative concentrations at the Proposed Development. This is considered to be a conservative approach. Of the 18 air contaminants of concern that WSP modelled, 12 were below the applicable air quality threshold at all times. Of the contaminants which were predicted to exceed the applicable air quality threshold (benzene, acrolein, $PM_{2.5}$, PM_{10}, NO_x, and benzo(a)pyrene), three were predicted to exceed based solely on ambient background (baseline) conditions (benzene, acrolein, and benzo(a)pyrene). In other words, ambient concentrations of these air contaminants within the MTSA exceeded their respective air quality thresholds independent of the Proposed Development, and entirely due to existing urban air pollution sources within the MTSA. $PM_{2.5}$, PM_{10}, and NO_x were predicted to exceed

when the modelled industrial and transportation sources were added on. This finding indicates that air quality in the area *may* be impacted (on the basis of measured and predicted air concentrations being compared against stringent and protective air quality thresholds (criteria)) Whenever air quality is predicted to be impacted due to exceedance of ambient air concentrations over applicable air quality criteria, the appropriate next step is to perform a Human Health Assessment to quantify the expected degree of risk (if any) to human health.

Human Health Assessment

A Human Health Risk Assessment (also called a Human Health Assessment) is typically required for any contaminants for which the cumulative air concentrations were predicted to exceed the relevant air quality thresholds. Dillon's review of the Human Health Assessment (HHA) found that the overall methodology (including the approach to estimating cumulative air concentrations of the air contaminants of concern) that was used is appropriate and standard for an air quality-based HHA. The air quality thresholds applied by WSP (e.g., inhalation toxicity reference values, ambient air quality criteria) were appropriate and adequately protective of human health. The HHA was also a conservative (protective) assessment in which the approaches and assumptions that were applied tend to overestimate the potential for human exposure to air contaminants.

The HHA provided important context on relative source contributions of the air contaminants of interest. The cumulative air concentration exceedances over applicable air quality thresholds were generally due to elevated urban background (or baseline) concentrations of air contaminants. The HHA also found that cumulative air concentrations for the modelled air contaminants were typical of urban areas of similar size and characteristics (i.e., in proximity of industries and major arterial roads). All of the assessed air contaminants are known to be associated with different types of effects in exposed people and are unlikely to interact with each other in a manner that would increase or otherwise exacerbate potential health effects of the air contaminants.

The overall conclusion of the HHA, and Dillon's review of the HHA, was that air quality in the area is expected to pose a similar level of predicted human health risk as that of other urban centers within the Greater Toronto Area (GTA), that are also influenced by industrial air emissions, traffic air emissions and other common sources of urban air pollutants. While there is a quantifiable increase in predicted potential risk as a result of elevated concentrations of certain air contaminants at the Proposed Development, the level of potential risk is not significantly different than what would be predicted at other comparable urban areas within the GTA. Dillon agrees with WSPs conclusion that the level of potential human health risk related to air quality at the Proposed Development does not reach a threshold where residential development should be prohibited.

WSP discussed mitigation measures for the Proposed Development. It is noted that the proposed mitigation measures are intended to *improve* indoor air quality for the residences of

the Proposed Development and as such are not considered to be a necessary requirement for the Development to proceed. It is also noted that the identified mitigation measures do not mitigate exposure to air contaminants if windows are opened, or when in the outdoor areas such as balconies, terraces or other outdoor amenities.

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