March 2, 2021

InterRent No. 3 Limited Partnership
485 Bank Street, Suite 207
Ottawa, ON  K2P 1Z2

Attn: Curt Millar

Dear Mr. Millar:

Re: Ground Vibration Memo
473 Albert Street, Ottawa
Gradient Wind File 19-215-Memo

## 1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by InterRent No. 3 Limited Partnership to undertake a transportation noise and vibration assessment for the proposed redevelopment at 473 Albert Street in Ottawa, Ontario, for which Gradient Wind prepared an environmental noise and vibration assessment report (GWE19-215 – Transportation Noise & Vibration Final, dated December 5, 2019). This memo is to summarize gradient wind's conclusions and recommendations as they relate to ground vibration impacts from the Confederation Line LRT, located below Queen Street to the north of the study site, to supplement the requirements of the City of Ottawa Confederation Line Proximity Study Guidelines.

## 2. GROUND VIBRATION & GROUND-BORNE NOISE

The North American vibration criteria for transit systems in proximity to residential buildings is 0.10 mm/s Root Mean Square (RMS). For main line railways, a document titled Guidelines for New Development in Proximity to Railway Operations[1], indicates that vibration conditions should not exceed 0.14 mm/s RMS averaged over a one second time-period at the first floor and above of the proposed building. As the main vibration source is due to the LRT line, which will have frequent events, the 0.10 mm/s RMS (72 dBV) vibration criteria and 35 dBA ground borne noise criteria were adopted for this study.

[1] Dialog and J.E. Coulter Associates Limited, prepared for The Federation of Canadian Municipalities and The Railway Association of Canada, May 2013

### 2.1 Field Measurement Assessment Procedure

Existing levels of ground vibrations due to the Confederation Line LRT were determined by field measurements using Instantel model MiniMate Plus and MicroMate seismographs capable of recording three components of ground velocity: one vertical and two horizontal. Two measurement sites were selected along the northern foundation edge of the basement, nearest to the Confederation Line, as identified in Table 3. At the measurement locations, the seismograph was installed approximately 50-55 metres from the Confederation Line centerline and left for a period of 24 hours. Seismograph measurements were set to a minimum trigger level of 0.14 mm/s peak partial velocity (ppv).

**TABLE 3: VIBRATION MEASUREMENT LOCATIONS**

| Receptor | Location Description | Placement of Seismographs from the Rail centerline (m) |
|---|---|---|
| V1 | Northeast Generator Room | 50 |
| V2 | West Storage Room | 55 |

## 3. RESULTS AND CONCLUSIONS

Results of vibration monitoring for a period of 24 hours found vibration levels from more than 200 LRT train passes at a distance of 50-55 metres from the rail centreline were below the minimum trigger level for the seismograph units, therefore below 0.14 mm/s PPV. In all cases, the measured vibration levels fall below the criterion of 0.1 mm/s RMS (72 dBV).

According to the United States Federal Transit Authority's vibration assessment protocol, ground borne noise can be estimated by subtracting 35 dB from the velocity vibration level in dBV. Since measured vibration levels were found to be less than 0.14 mm/s PPV, ground borne noise levels are also expected to be below the ground borne noise criteria of 35 dB.

The vibration results meet the current Proximity Guidelines set out by the City and no further investigation or reports are required to satisfy the City. Other proximity issues, such as impacts on the tunnel structure and construction techniques around the system, will be addressed by other consultants, such as structural and geotechnical engineers.

Should you have any questions, or wish to discuss our findings further, please call us (613) 836-0934 or contact us by e-mail at joshua.foster@gradientwind.com. In the interim, we thank you for the opportunity to be of service.

Sincerely,

***Gradient Wind Engineering Inc.***


Michael Lafortune, C.E.T.
Environmental Scientist

Joshua Foster, P.Eng.
Principal

*Gradient Wind File #19-215-Memo*