patersongroup memorandum

consulting engineers

re:	**Vibration Monitoring and Criteria for Adjacent Watermain** **Proposed Multi-Storey Building** **797 Richmond Road - Ottawa**
to:	Dentech Holdings - **Mr. Joe Tallis -** tallisje@gmail.com
date:	June 14, 2021
file:	PG5719-MEMO.01

Paterson Group Inc. (Paterson) has prepared the current memo to provide vibration monitoring details and criteria for the watermain located in an easement adjacent to the northern site boundary. This memo should be read in conjunction with the Geotechnical Investigation Report (Paterson Group Report PG5719-1 dated April 26, 2021).

Based on the available drawings, it is understood that the watermain is located approximately 3 m to the north of the subject site boundary and has a diameter of 1200 mm.

The purpose of the vibration monitoring and control program provided herein is to establish acceptable vibration monitoring procedures and limits for the existing 1200 mm watermain. The vibration monitoring and control program also provides protocols in the event that vibration exceedance is measured.

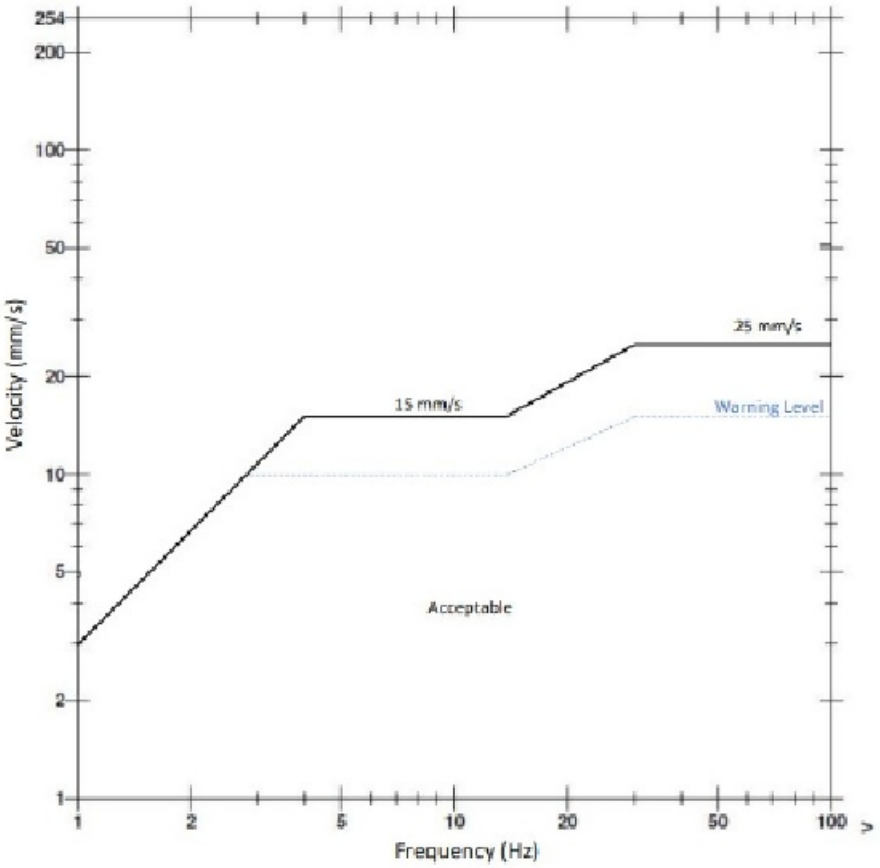
The monitoring program will incorporate real time results at the existing watermain segment adjacent to the subject site. The monitoring equipment should consist of tri-axial seismographs, capable of measuring vibration intensities up to 254 mm/s at frequencies of 2 to 250 Hz. At least 2 vibration monitoring devices should be placed adjacent to the existing watermain. It is recommended that the vibration monitoring devices be installed near the obvert level of the existing watermain and periodically inspected during the construction program.

The VMCP, should be provided to all parties involved with the construction for review. A meeting between Paterson and the site contractor should be conducted prior to any excavation or construction of the subject site to review the following:

1. Review the pre-condition/pre-construction survey;
2. Control measures (i.e vibrations, noise);
3. Monitoring locations;
4. Tracking and reporting of excavation progress, and;
5. Review procedure for exceedances (i.e vibrations, noise), complaints, evaluation and corrective measures.

When an event is triggered, Paterson will review the results and provide any necessary feedback. Otherwise, the vibration results will be summarized in a weekly report. The following figure illustrates the vibration limits for the adjacent watermain segment.

Figure 1 - Vibration Crtieria for the 1200 mm Watermain



Weekly reporting of the monitoring program and recommendations will be provided to the owner and the City of Ottawa. If the recommended vibration limit is exceeded, Paterson will notify the site superintendent and construction operations will be stopped.

The monitoring protocol should include the following information:

Warning Level Event

- ❏ Paterson will review all vibrations over the established warning level, illustrated by the blue line in the above figure, and;
- ❏ Paterson will notify the contractor if any vibrations occur due to construction activities and are close to exceedance level.

Exceedance Level Event

- ❏ Paterson will notify all the relevant stakeholders via email if any vibrations surpass the exceedance level, illustrated by the black line in the above figure.
- ❏ Ensure monitors are functioning
- ❏ Issue the vibration exceedance result

The data collected should include the following:

- ❏ Measured vibration levels
- ❏ Distance from the construction activity to monitoring location
- ❏ Vibration type

Monitoring should be compliant with all related regulations.

Incidence & Exceedance Reporting

In case a vibration incident/exceedance occurs from construction activities, the Senior Project Management and any relevant personnel should be notified immediately. A report should be completed which contains the following:

- ❏ Identify the location of vibration exceedance
- ❏ The date, time and nature of the exceedance/incident
- ❏ Purpose of the exceeded monitor and current vibration criteria
- ❏ Identify the likely cause of the exceedance/incident
- ❏ Describe the response action that has been completed to date
- ❏ Describe the proposed measures to address the exceedance/incident.

The contractor should implement mitigation measures for future excavation or any construction activities as necessary and provide updates on the effectiveness of the improvement. Response actions should be pre-determined prior to excavation, depending on the approach provided to protect elements. Processes and procedures should be in-place prior to completing any vibrations to identify issues and react in a quick manner in the event of an exceedance.

We trust that this information satisfies your immediate requirements.

Paterson Group Inc.

Nicole R.L. Patey, B.Eng.

Scott S. Dennis, P.Eng.