SPECIAL PROVISION

PROJECT #
PIN #

SECTION 02498S

VIBRATION MONITORING DURING CONSTRUCTION

Add Section 02498:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Monitoring vibrations for susceptible facilities adjacent to the project site that arise from pile driving, soil compaction and other vibration-producing activities.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES Not Used

1.4 DEFINITIONS

A. Vibration-producing activity – A construction-related activity in which high to relatively high magnitudes of vibration are generated from performing specific high-intensity activities, such as pile driving (including driving of sheet piles), operating heavy compaction equipment, or demolition.

1.5 SUBMITTALS

A. Seismograph Location Plan for review

1. Provide a comprehensive plan for monitoring construction-related vibration-producing activities.

a. Locate at least one seismograph between the source of vibration (within 50 ft of the source) and the closest monitored facility as shown, and at least one seismograph on the ground at the designated facility location as shown.

b. Provide multiple seismographs along the route of the vibration-producing activity and on the ground at the designated facility locations where the source of vibration is not at a discrete place, for example soil compaction.

2. Include parameters and conditions for vibration-producing construction activities to determine when vibration monitoring is no longer necessary.

B. Calibration data and machine documentation for each seismograph used, for review

1. Calibrate each seismograph according to the Manufacturer's recommendations.

2. Furnish records of seismograph characteristics and calibration conducted within 1 year of submittal. Refer to this Section, Paragraph 2.1 A.

C. Vibration monitoring records for review, signed by the Vibration Monitoring specialist. Refer to this Section, Paragraph 3.2 A.

D. Excessive vibration remediation plan for review, if vibration exceeds specified limits.

1. Developed and signed by the Vibration Monitoring Specialist

2. Includes specific measures for consistently and reliably limiting vibrations to not exceed the specified limits

E. Qualifications of Vibration Monitoring Specialist, for review

1. Minimum five years of relevant vibration monitoring experience.

a. Provide list of relevant projects to verify this experience.

1.6 VIBRATION MONITORING SPECIALIST

A. Provide a Vibration Monitoring Specialist who is experienced in vibration monitoring techniques, preparation of vibration monitoring and instrumentation plans, and interpretation and use of vibration records for similar civil and geotechnical work.

1. Responsible to notify Contractor where field vibration-producing operations exceed specified project limits.

PART 2 PRODUCTS

2.1 SEISMOGRAPHS

A. Records real-time, permanent time histories of vibration measurements of longitudinal, transverse and vertical component of Peak Particle Velocity (PPV).

B. Detects PPV of 0.02 inch/sec or less and having a resolution of 0.01 inch/sec or greater.

C. Calibrated with internal calibration and triaxial orthogonal transducers with a flat frequency response between 2 to 200 hz.

PART 3 EXECUTION

3.1 GENERAL

A. Place seismographs according to the authorized Seismograph Location Plan.

3.2 MONITORING VIBRATIONS

A. Continuously monitor vibrations when conducting vibration-producing activities for which ground motions may exceed 0.02 inch/sec at the adjacent facility.
   1. Record real-time, permanent time histories of the vibration measurements in terms of the longitudinal, transverse and vertical components of peak particle velocity.
   2. Determine and report the peak vector sum of the PPV components for the recorded maximum velocity readings for each time history.
   3. Submit weekly vibration monitoring records no later than the following Wednesday after the week in which the vibration measurements are taken.
   4. Submit complete vibration monitoring records no later than 7 calendar days after the final vibration measurements are taken.
      a. Provide parameters and conditions for vibration-producing construction activities to determine when vibration monitoring is no longer necessary.

B. The Vibration Monitoring Specialist notifies the Engineer where vibration-producing operations approach or exceed specified project limits.

C. Stop work immediately and notify the Engineer if vibrations measured at the monitored facility are greater than the limits specified in Table 1.

1. Work may resume upon verification that the requirements of the authorized excessive vibration remediation plan are implemented.

Table 1

Vibration Limits*		
Vibration Source	**Non-Sensitive Facilities**	**Sensitive Facilities****
Steady State Vibrations	0.20 in/sec	0.10 in/sec
Impact Vibrations	2.0 in/sec	1.0 in/sec

* In terms of the peak vector sum of the longitudinal, transverse and vertical vibration components.
** Defined as shown.

END OF SECTION