Submittal Review Response

Project Name:	***Hilo WWTP Rehabilitation and Replacement Project Phase 1***
Submittal No.:	***02260-002.0***
Date:	***8/25/2025***

Client:	County of Hawai‘i	**Carollo Project No.:**	203975
Contractor:	Nan, Inc.		
Submittal Name:	Vibration Monitoring Baseline Data-Submitted		
Reviewed By:	Jim Ewing		

SUBMITTAL REVIEW		
Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically addressed in these review comments. Refer to Section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements.		
Approved	☒	No Exceptions
	☐	Make Corrections Noted - See Comments
	☐	Make Corrections Noted - Confirm
Not Approved	☐	Correct and Resubmit
	☐	Rejected - See Remarks
Receipt Acknowledged	☐	Filed for Record
	☐	With Comments - Resubmit

Review Comments:

1. We accept the baseline data report as submitted; however, we may require additional baseline monitoring if baseline conditions appear to change or if baseline monitoring at other locations becomes necessary.

☐ High Priority

CONTRACTOR SUBMITTAL TRANSMITTAL FORM REV. A

Owner:	County of Hawaii		
Contractor:	Nan, Inc.	**Project No.:**	WW-4705R
Project Name:	Hilo WWTP Phase 1	**Submittal Number:**	02260-002.0
Submittal Title:	Vibration Monitoring Baseline Data Report	☑ For Information Only	
TO:	County		
From:	Nan Inc.		

Specification No. and Subject of Submittal / Equipment Supplier			
Spec:	02260	**Paragraph:** 1.04 D-3	
Authored By:	Hayes McElroy & Associates	**Date Submitted:**	08/04/2025

Submittal Certification

Check Either (A) or (B):

☑ (A) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with no exceptions.

☐ (B) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings except for the deviations listed.

Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

General Contractor's Reviewer's Signature:

Printed Name and Title: Matthew Chun, QC Engineer

In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.

Firm: **Signature:** **Date Returned:**

PM/CM Office Use

Date Received GC to PM/CM:

Date Received PM/CM to Reviewer:

Date Received Reviewer to PM/CM:

Date Sent PM/CM to GC:

Nan, Inc

PROJECT: HILO WWTP REHABILITATION AND REPLACEMENT PROJECT - PHASE 1

JOB NO. WW-4705R

THIS SUBMITTAL HAS BEEN CHECKED BY THIS CONTRACTOR. IT IS CERTIFIED CORRECT, COMPLETE, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL (UPON APPROVAL) INTO THEIR OWN WORK.

DATE RECEIVED 8/4/2025
SPECIFICATION SECTION # 02260
SPECIFICATION Excavation Support and Prot
PARAGRAPH 1.04 D-3
DRAWING N/A
SUBCONTRACTOR N/A
SUPPLIER N/A
MANUFACTURER N/A

CERTIFIED BY CQCM or Designee :_____

Baseline Vibration Monitoring Data Report

for the

Job No. WW-4705R
Hilo WWTP Rehabilitation and Replacement

Hilo, Hawaii

Revision 01 | 31-Jul-2025

Submitted by:

Hayre McElroy & Associates, LLC
2045 Lauwiliwili Street, #1301
Kapolei, HI 96707

Revision Number	Revision Date	Description of Changes
01	31-Jul-2025	Correction of photo figures

Prepared by: _____ Date: 31-Jul-2025

Jim McElroy, PE
Vibration Consultant

Table of Contents

1.Introduction

Hayre McElroy & Associates, LLC (HMA) conducted a Baseline Vibration Monitoring Study (Study) for the construction of the Hilo WWTP Rehabilitation and Replacement project.

Our baseline study utilized two (2) Svantec SV 803 Vibration Monitors at locations shown in Figure 1 to evaluate non-construction impacts on site vibrations. The Study evaluated near-site vibrations for a period of approximately 72 hours. Note that due to early configuration challenges with the software interface, the time shown for data in this report is based on Greenwich Mean Time (GMT). To correct to Hawaii Standard Time (HST), 10 hours should be subtracted from the time shown. As an example, data showing a time of 18:00:00 should be corrected to 08:00:00 to reflect HST.

This baseline Study is organized to present a summary describing monitoring locations, baseline data obtained, and conclusions regarding a recommended vibration baseline value.

2. Vibration Monitor Locations

Vibration monitors were placed at the digesters (Hilo 1) and bar screens (Hilo 2) as shown in Figures 1 and 2. Each monitor was placed on a flat surface and anchored in place with a mechanical anchor drilled into concrete. Figures 3 and 4 show the exact locations for each of the two monitoring locations.

Figure 1. Vibration Monitor Hilo 1 Location

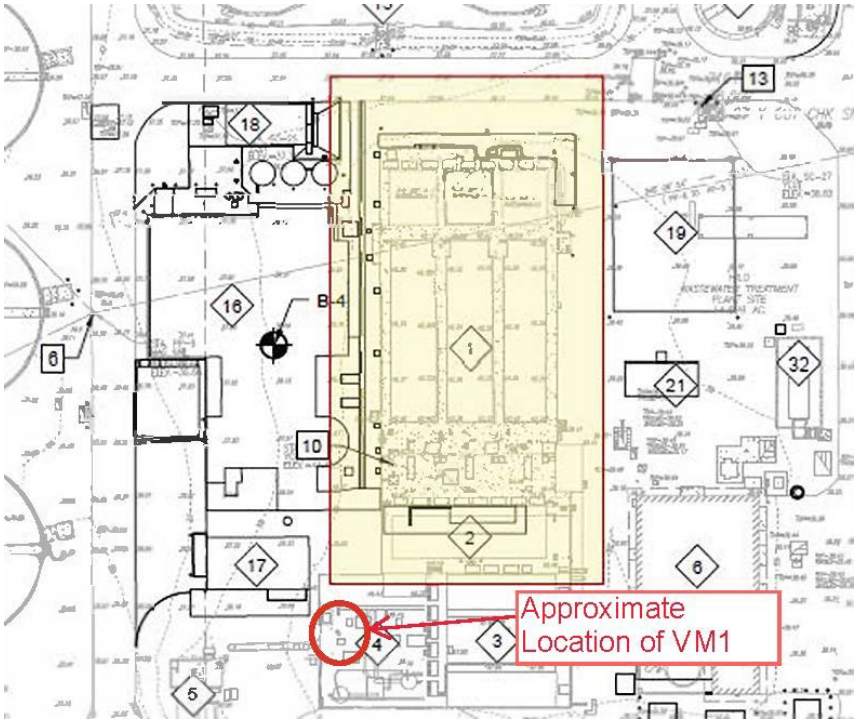


Figure 2. Vibration Monitor Hilo 2 Location

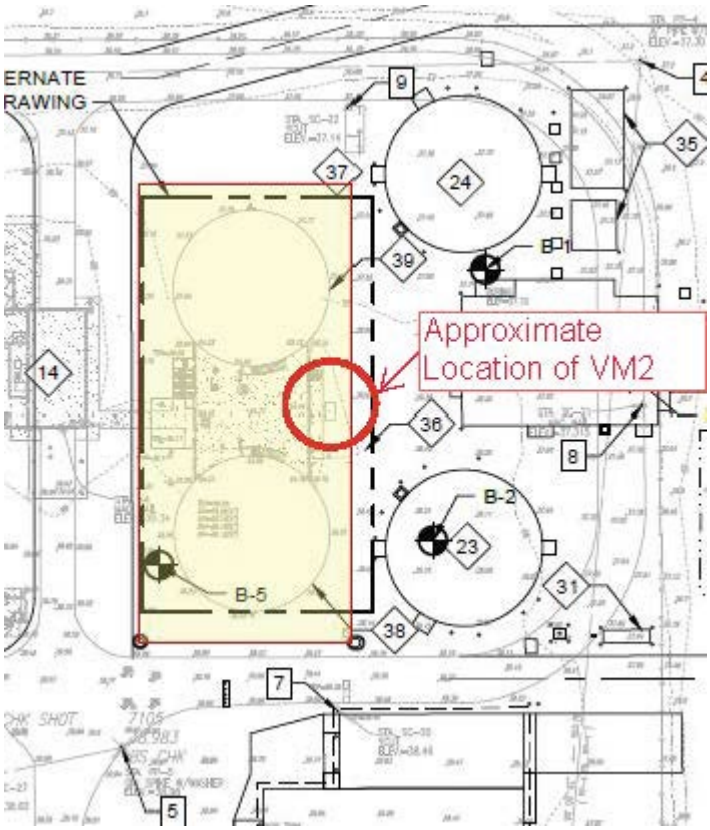


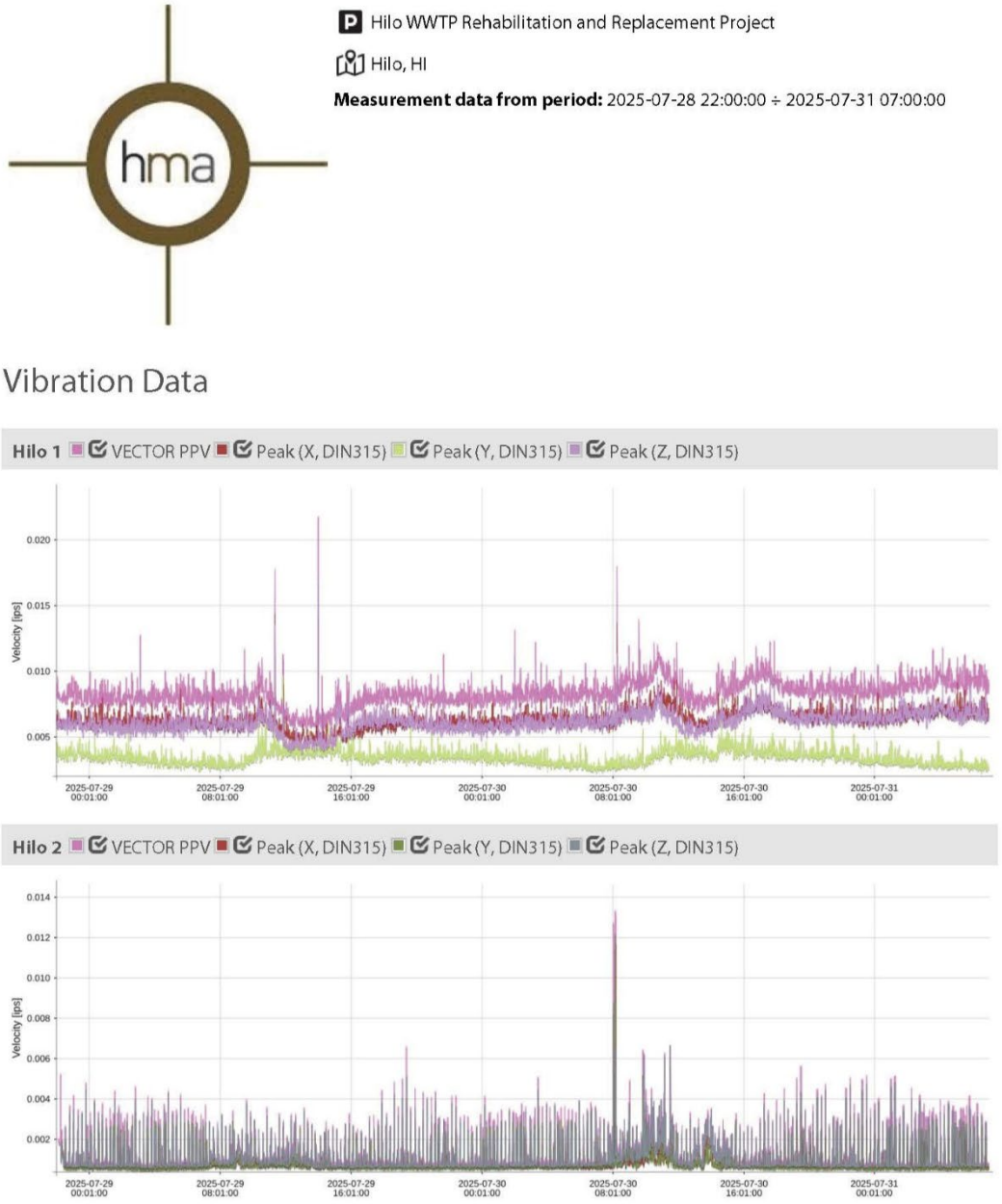
Figure 3. Photo of Hilo 1

Figure 4. Photo of Hilo 2

3. Vibration Baseline Data and Conclusions

Figure 5 provides baseline data graphically. This data is available in detail by accessing the SvanNet portal operated by HMA.

Figure 5. Baseline Data



Some minor site activity was ongoing, primarily at the location of Hilo 1, throughout the baseline study; however, looking at data outside of site working hours shows minor external vibration influences not related to construction. The baseline data shows vibration influences within the site ranging from approximately

0 inch/sec to 0.01 inch/sec. During active work hours, we maximum vibration values of 0.02 inch/sec were observed.

Based on the data observed, we recommend assuming a baseline vibration of 0.01 inch/sec for the site.

SECTION 02260

EXCAVATION SUPPORT AND PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for designing, providing, maintaining, and removing excavation support and protection.

1.02 REFERENCES

A. American Society of Civil Engineers (ASCE):
   1. Guidelines of Engineering Practice for Braced and Tied-Back Excavations.

B. Department of the Navy Naval Facilities Engineering Command (NAVFAC):
   1. Design Manual 7.2 - Foundations and Earth Structures.
   2. Design Manual 7.3 - Soil Dynamics and Special Design Aspects.

1.03 DEFINITIONS

A. General Engineering Design Practice: General engineering design practice in area of the Project, performed in accordance with recent engineering literature on subject of shoring and stability of excavations.

B. Shoring: A temporary structural system designed to support vertical faces, or nearly vertical faces, of soil or rock for purposes of excavation. Shoring includes soldier piles and lagging, and other similar shoring systems. Sloping of the excavated face or use of slurry walls is not shoring.

C. Support Levels: Level of tiebacks, wales, rakers, bottom of excavation, and other types of support.

1.04 SUBMITTALS

A. Shop drawings and calculations:
   1. Calculations for different load, support, and other conditions that occur during the sequence of installation of shoring, construction of facilities protected by shoring, and sequence of removal of shoring.
   2. Sketches showing the condition at various stages of installation and removal of shoring.
   3. Show on plan shoring, structures, pipelines, and other improvements located near shoring.
   4. When utilities penetrate shoring, show location of penetrations on elevation of sides of shoring.
   5. Show details for ground support and sealing around utility penetrations.
   6. Indicate method used for installing driven shoring.

B. Control points, settlement markers, and schedule of measurements:
   1. Submit location and details of control points and method and schedule of measurements.
   2. Survey data.

C. Detailed sequence of installation and removal of shoring:
   1. Consider effects of ground settlement in sequence of installation and removal of shoring.
   2. Provide sketches showing conditions at various stages in sequence of installation and removal of shoring.

D. Vibration monitoring:
   1. Vibration monitoring program as specified in Section 02238 - Rock Removal.
   2. Manufacturer's literature on vibration monitoring instrumentation.
   3. Vibration monitoring data.

E. Submittals for excavation support and protection as complete package shall include items required in this Section:
   1. Incomplete submittals will not be reviewed and will be returned for resubmittal as complete package.

F. Dewatering submittals as specified in Section 02240 - Dewatering, with submittals for excavation support and protection.

1.05 SEQUENCING

A. Do not begin construction of any shoring or excavation operations until:
   1. Submittals for shoring and dewatering have been accepted.
   2. Control points as specified in this Section and on existing structures and other improvements as indicated on the Drawings have been established and surveyed to document initial elevations and locations.
   3. Materials necessary for installation are on site.

B. Submit submittals minimum of 45 days prior to scheduled date to begin excavation support installation.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Where general engineering design practice is specified, provide drawings and calculations that are performed and signed by a registered/licensed civil or structural engineer and a registered/licensed civil (geotechnical) engineer in the State of Hawaii with minimum 5 years of experience in ground stability evaluation, groundwater control, and excavation support design and prior successful experience in installing excavation support next to existing utilities and structures.
   1. Clearly disclose assumptions made, criteria followed, and stress values used for materials being used in design calculations.

2. Submit list of references acceptable to Engineer that substantiates appropriateness of design assumptions, criteria, and stress values.
3. Sheet piling is not allowed.

B. Design requirements:
   1. General:
      a. Dewatering:
         1) Dewater inside shoring as specified in Section 02240 - Dewatering.
         2) Do not lower groundwater outside of shoring.
         3) Recharge groundwater outside shoring to prevent groundwater draw down outside of shoring.
         4) Dewatering by lowering of the groundwater level outside of the shoring is not permitted.
      b. All necessary precautions must be planned and implemented to avoid damaging adjacent existing utilities, roadways, facilities, and structures.
      c. When electing to design with material stresses for temporary construction higher than allowable stresses prescribed in building code as specified in Section 01410 - Regulatory Requirements, increase in such stresses shall not exceed 10 percent of value of prescribed stresses.
      d. Minimum safety factor used for design shall not be less than 1.5.
      e. The calculated minimum depth of penetration of shoring below bottom of excavation shall be increased by not less than 30 percent if full value of allowable passive earth pressure is used in design.
      f. Maximum height of cantilever shoring above bottom of excavation shall not exceed 15 feet. Use braced shoring when height of shoring above bottom of excavation exceeds 15 feet.
      g. The location of point of fixity for shoring measured from bottom of excavation shall not be less than half calculated minimum embedment depth below bottom of excavation.
      h. Generally acceptable references for design of shoring and excavations are as follows:
         1) ASCE Guidelines of Engineering Practice for Braced and Tied-Back Excavations.
         2) Caltrans California Trenching and Shoring Manual.
         3) NAVFAC Design Manual 7.2.
         4) NAVFAC Design Manual 7.3.
      i. Maximum total deflection of shoring at any point on shoring shall not be more than 1/2 inch.
      j. Include cost for shoring design in bid.
      k. Geotechnical report for shoring design shall be performed by a qualified, licensed civil (geotechnical) engineer in the State of Hawaii. Include cost for shoring geotechnical report in bid.
      l. Shoring engineering firm shall obtain and maintain errors and omissions insurance for Project for an amount of not less than 1,000,000 dollars.
      m. Shoring geotechnical firm shall obtain and maintain errors and omission insurance for Project for an amount of not less than 1,000,000 dollars.
   2. Soldier piles and lagging:
      a. Soldier piles and pre-cast concrete lagging (if used) installed as a part of the excavation support systems may be left in-place, except within the top 5 feet of the finished ground surface. Except for pre-cast concrete lagging,

all other lagging shall be completely removed from open excavations prior to restoration.

b. Provide lagging over full face of excavation. Joints between pieces of lagging shall be tight to prevent loss of soil.
c. Provide full face lagging all around penetrations through lagging.
d. Soldier piles shall be installed in predrilled holes. For soldier piles that are not concrete encased, fill predrilled holes with controlled low strength material as specified in Section 02312 - Controlled Low Strength Material (CLSM) after soldiers piles are installed. Do not use gravel or granular material to fill the hole.
e. Assumed effective width for passive soil resistance:
    1) Effective width of CLSM encased soldier piles in drilled holes shall not exceed 2 times width of pile.
    2) Effective width of concrete encased soldier piles in drilled holes shall not exceed 2 times width of concrete encasement.
f. Fill voids behind lagging with gravel or other material acceptable to Engineer.
g. Apply loads from tie back soil, rock, or deadman anchors concentrically to soldier piles or wales spanning between soldier piles:
    1) Wales shall be back-to-back double channels or other members acceptable to Engineer.
    2) Do not eccentrically load structural section of soldier piles or wales.
h. Design soldier piles for downward loads including vertical loads from tieback anchors.
i. Shop fabricate soldier piles such that no field welding is required.
    1) Contractor shall attach suitable bracing or supports to maintain the position of a soldier pile within the open excavation such that the final location will satisfy the tolerances as indicated in the accepted shop drawings for the excavation support system.
    2) Bracing or supports shall remain in place until the concrete for encasement of a soldier pile has reached a minimum compressive strength of 1,500 psi.

3. Soil anchors, rock anchors, and deadman anchors:
    a. Design tieback anchors for a safety factor of not less than 2 times calculated load from shoring.
    b. Proof load production anchors to 150 percent of calculated load from shoring.
    c. Lock off production anchors at calculated load from shoring.
    d. Length of soil anchors used to calculate resistance to load from shoring shall not include any length within potential active pressure soil failure zone behind face of shoring.
    e. Design tie rods for tieback anchors for 130 percent of calculated load from shoring.
    f. Design tie rods for tieback anchors for 150 percent of the calculated load from shoring when tie rod couplers are used and for other conditions where stress concentrations can develop.
4. Set inside face of shoring back from structure not less than greater of following:
    a. 5 feet from face of wall.
    b. 2 foot 6 inches from edge of foundation.
    c. Depth of excavation below bottom of foundation.

C. Performance requirements:
    1. General:
        a. Support faces of excavations and protect structures and improvements in vicinity of excavations from damage and loss of function due to settlement or movement of earth mass, alterations in ground water level caused by such excavations, and related operations.
        b. Specified provisions:
            1) Complement, but do not substitute or diminish, obligations of Contractor for furnishing of safe place of work pursuant to provisions of the Occupational Safety and Health Act of 1970 and the provisions of the current State of Hawaii Occupational Safety and Health Division of the Department of Labor and Industrial Relations (HIOSH) for protection of Work, structures, and other improvements.
            2) Represent minimum requirement for:
                a) Number and types of means needed to maintain soil or rock stability.
                b) Strength of such required means.
                c) Methods and frequency of maintenance and observation of means used for maintaining soil or rock stability.
    2. Provide safe and stable excavations by means of shoring, bracing, and other means and procedures, such as draining and recharging groundwater and routing and disposing of surface runoff, required to maintain stability of soils and rock.
    3. Provide support for trench excavations for protection of workers from hazard of caving ground.
    4. Provide shoring:
        a. Where, as result of excavation work and analysis performed pursuant to general engineering design practice, as defined in this Section:
            1) Excavated face or surrounding earth mass may be subject to slides, caving, or other types of failures.
            2) Stability and integrity of structures and other improvements may be compromised by settlement or movement of soils or rock, or changes in soil or rock load on structures and other improvements.
        b. For trenches 5 feet and deeper.
        c. For trenches less than 5 feet in depth, when there is potential for cave-in.
        d. Where indicated on the Drawings.
    5. For safe and stable excavations, use appropriate design, construction, and maintenance procedures to minimize settlement of supported ground and to prevent damage to structures and other improvements, including:
        a. Using stiff shoring systems.
        b. Following appropriate construction sequence.
        c. Using shoring system that is tight enough to prevent ground loss through the shoring.
        d. Using shoring system that extends far enough below bottom of excavation to prevent piping, heave, or flow of earth under shoring.
        e. Design for safety factor of not less than 1.50.
        f. Providing surface runoff routing and discharge away from excavations.
        g. Where dewatering inside shoring is necessary, recharge groundwater outside shoring as necessary to prevent settlement in area surrounding shored excavation.

h. Not applying shoring loads to existing structures and other improvements.
i. Not changing existing earth loading on existing structures and other improvements.

PART 3 EXECUTION

3.01 CONSTRUCTION

A. Installation of shoring:
1. Install means for providing safe and stable excavations as indicated in submittals.

B. Removal of shoring:
1. Remove at least the top 5 feet of shoring by completion of Work.
2. Select shoring system and method of removal, which will minimize earth that sticks to shoring creating voids and causing settlement.
3. To prevent settlement caused by removing shoring, fill voids with pressure injected grout:
   a. Inject grout starting at bottom of void and progressively fill void to grade.
   b. Minimize length of shoring removed ahead of grouting operation and limit time void is left ungrouted to prevent void from closing up before being grouted.
4. Where the upper portion of the excavation support system can be removed without disturbing the adjacent ground, utilities, and facilities, the corresponding bracing system can be removed after backfill is placed and compacted to a level adequate to support the excavation walls or faces.
5. Minimize potential voids between excavation walls or faces and the compacted backfill:
   a. Compact backfill throughout the shoring removal process.
   b. To avoid damage to existing adjacent utilities and/or facilities, the lower support system may be left in-place if acceptable to Engineer, provided the upper 5 feet is removed as required above.
   c. Pressure preservative treated wood lagging except the top 5 feet may be left in place if acceptable to Engineer.

C. Control points (settlement markers):
1. Establish control points on shoring and on structures and other improvements in vicinity of excavation for measurement of horizontal and vertical movement:
   a. Set control points on shoring support system:
      1) Set points at distances not exceeding 25 feet at each support level.
2. Promptly upon completion of construction of control points survey control points. Submit copy of field notes with measurement.
3. Perform horizontal and vertical survey and measurement of control points at least once every week.
   a. Field notes shall show current measurement and change in measurement from first measurement taken.
   b. Tabulate all measured data to show trend of movement.
4. ~~Set control points on corners of existing structures and on curbs, manholes, and other improvements at the locations indicated on the Drawings.~~

4. Set control points on corners of existing structures and on curbs, manholes, and other improvements within 50 feet of the excavation.

Replaced as per Bid Addendum 08

5. Provide plumb bobs with horizontal targets indicating original position of plumb bobs in relation to shoring at control points.
6. Surveyor qualifications: Installation and monitoring of control points shall be performed by a land surveyor licensed in the State of Hawaii with previous experience surveying for the detection of structural deformations and surface movements.

Added as per Bid Addendum 03

"The horizontal and vertical survey and measurement of control points shall be performed by the licensed land surveyor at least once per month. The Contractor may use trained and qualified personnel under the supervision of the licensed land surveyor to perform the horizontal and vertical survey and measurement of control points on the other required weekly measurements."

D. Vibration monitoring: Provide as specified in Section 02238 - Rock Removal.
1. Measure vibration due to installation and removal of shoring involving ripping, percussion, or vibratory methods.
2. Do not exceed the vibration limits specified in Section 02238 - Rock Removal for installation and removal of shoring.
3. Perform vibration monitoring continuously during installation and removal of shoring.
4. Submit vibration monitoring program including information on vibration monitoring instrumentation.
5. Submit vibration monitoring data daily.

E. Maintenance:
1. Where loss of earth occurs, plug gap in shoring and replace lost earth with fill material acceptable to Engineer.
2. Where measurements and observations indicate possibility of failure or excessive movement of excavation support, determined in accordance with general engineering design practice.
3. Report movement to the Engineer.
4. Take appropriate action immediately.

END OF SECTION