



### Submittal Review Response

Project Name: Hilo WWTP Rehabilitation and Replacement Project Phase 1  
Submittal No.: 02256-001.0  
Date: 8/18/2025

Client: County of Hawai'i Carollo Project No.: 203975  
Contractor: Nan, Inc.  
Submittal Name: Probe and Grout QC Specialist Qualifications  
Reviewed By: Gavin Goo, Caleb Che

#### 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	<input checked="" type="checkbox"/>	No Exceptions
	<input type="checkbox"/>	Make Corrections Noted - See Comments
	<input type="checkbox"/>	Make Corrections Noted - Confirm
Not Approved	<input type="checkbox"/>	Correct and Resubmit
	<input type="checkbox"/>	Rejected - See Remarks
Receipt Acknowledged	<input type="checkbox"/>	Filed for Record
	<input type="checkbox"/>	With Comments - Resubmit

#### Review Comments:

1. No additional comments.

**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:**  
**Submittal Title:** For Information Only  
**TO:**  
**From:** Nan Inc.

Specification No. and Subject of Submittal / Equipment Supplier	
<b>Spec:</b>	<b>Paragraph:</b>
<b>Authored By:</b>	<b>Date Submitted:</b>

Submittal Certification	
<b>Check Either (A) or (B):</b> <div style="display: flex; flex-direction: column; gap: 10px;"> <div> <input type="checkbox"/> (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 <u>no exceptions</u>.         </div> <div> <input type="checkbox"/> (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 <u>except</u> for the deviations listed.         </div> </div>	
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.	
<b>General Contractor's Reviewer's Signature:</b>	
<b>Printed Name and Title:</b>	
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.	
<b>Firm:</b>	<b>Signature:                      Date Returned:</b>

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 \_\_\_\_\_  
 SPECIFICATION SECTION # \_\_\_\_\_  
 SPECIFICATION \_\_\_\_\_  
 PARAGRAPH \_\_\_\_\_  
 DRAWING \_\_\_\_\_  
 SUBCONTRACTOR \_\_\_\_\_  
 SUPPLIER \_\_\_\_\_  
 MANUFACTURER \_\_\_\_\_

CERTIFIED BY CQCM or Designee : \_\_\_\_\_

## SECTION 02256

### FOUNDATION PROBING AND GROUTING

#### PART 1 GENERAL

##### 1.01 SUMMARY


- A. This Section includes the minimum requirements for drilling and grouting of foundation subgrade probe holes. The work includes mobilizing equipment for drilling and grouting; developing suitable drilling methods, grouting procedures, and grout mixing parameters; furnishing, handling, transporting, storing, mixing and injecting the grouting materials; handling and disposal of drill cuttings, waste water, and waste grout; cleanup of the areas upon completion of the work; and all labor, equipment, materials, and other incidentals to complete this work as specified herein. The work consists of drilling and grouting probe holes at specified locations, to depths specified in the Contract documents, or as directed by the Engineer, below foundations to detect and properly fill subsurface cavities or voids that may be encountered during probing with grout meeting requirements specified herein.
- B. The project's "Geotechnical Data Report, Hilo WWTP Rehabilitation & Replacement Project Phase I," prepared by Yogi Kwong Engineers, LLC, dated April 2024 presents data and information on subsurface conditions. These data represent the subsurface information available; however, variations may exist in the subsurface conditions between the exploratory boring and probe locations. Anticipate potential groundwater seepage and/or perched water flowing into the foundation probe holes.
- C. All work shall be performed in accordance with all City, State, and Federal safety and environmental regulations, permits, and other environmental control requirements specified in the Contract documents for the project.

##### 1.02 REFERENCES

- A. The publications listed below form a part of this Section to the extent referenced. The commercial standards are referred to in the text by their basic designations only. The current requirements of the referenced standards and publications shall apply to this Section.
- B. Abbreviations:
  - 1. API - American Petroleum Institute.
  - 2. ASME - American Society of Mechanical Engineers.
  - 3. ASTM - American Society for Testing and Materials.
- C. Commercial Standards:
  - 1. API RP 13B-1 - Recommended Practice for Field Testing Water-based Drilling Fluids, 4th Edition.
  - 2. ASME B16.3 - Malleable Iron Threaded Fittings, Classes 150 and 300.
  - 3. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded at Seamless.

4. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  5. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  6. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
  7. ASTM C150/C150M - Standard Specification for Portland Cement.
  8. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
  9. ASTM C937 - Grout Fluidifier for Preplaced-Aggregate Concrete.
  10. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
- D. Standard Specifications:
1. Standard Specifications for Public Works Construction, City and County of Honolulu, 1986.

### 1.03 SUBMITTALS

- A. The following submittals listed below shall be submitted no later than sixty (60) calendar days after the Notice to Proceed and at least sixty (60) calendar days prior to mobilization of foundation excavation and related construction equipment, whichever comes first.
-  B. Submit the name and qualifications of the Contractor-retained QC Specialist responsible to inspect, observe, and document the following work activities: drilling and cleaning of probe holes; grout preparation; backfilling; and any other related work activities as required throughout construction. Submit sufficient information in writing to demonstrate compliance with the project qualification requirements of Article 1.04 of this Section.
- C. Probe and Grout Work Plan:
1. Submit a detailed work plan describing the proposed drilling and grouting methods and equipment to be used including at a minimum the following:
    - a. Drilling and grouting methods and procedures.
    - b. Description of drilling and grouting equipment, including manufacturer's literature describing capabilities.
    - c. Log template to be used by the QC Specialist to document grouting of probe holes.
    - d. Name and qualification of the independent testing agency.
    - e. Grout Mix Design(s).
    - f. Spoil control and disposal, including all necessary precautions to control and prevent discharge of grouting spoils and drill cuttings onto adjacent landscaped areas or properties.
    - g. Restoration plan.
- D. Reports and Records:
1. The Contractor's retained QC Specialist shall keep records of drilling and grouting operations, to include at a minimum: Individual logs of each grouted holes, probe depths and probe penetration and withdrawal rate per each foot interval during drilling and grouting, geologic characteristics of drill cuttings

return, the time of each change of grouting operation, the pressure and rate of pumping, grout mix(es) used onsite for each probe hole, grout returns, volume of grout pumped into each drilled hole, and other data as deemed by the QC Specialist to be necessary. Furnish all records to the Engineer in a report signed and stamped by the Contractor's retained QC specialist who shall certify the successful completion of the foundation drilling and grouting program.

#### 1.04 QUALITY ASSURANCE

- A. QC Specialist shall be a Civil Engineer licensed in the State of Hawaii who has worked on a minimum of 3 successfully completed projects performing inspection of foundation probing and grouting work.
- B. Foundation drilling and grouting activities shall be performed with full-time on-site observation under the supervision of the QC Specialist. The QC Specialist is responsible for ensuring the probe holes be drilled and grouted based on accepted work plans and shop drawings, updating the work plan as construction progresses with additional probe holes as needed, and submitting an updated plan if necessary.
- C. Grout Testing shall be performed by an independent testing agency or laboratory that can certify compliance with requirement of ASTM E329, or as accepted by the Engineer. The laboratory shall demonstrate experience performing the laboratory tests of grout mix(es) required herein.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS AND MIX DESIGN**

- A. Deliver all necessary ingredients for grouting in undamaged, unopened containers bearing manufacturer's original label. Store and handle grout materials in accordance with manufacturer's recommendations and in accordance with Section 03300 - Cast-in-Place Concrete and Section 03600 - Grouting.
- B. Grouting Materials: Provide grout composed of a mixture of Portland cement, water, and sand thoroughly mixed together with fluidifier and/or admixture(s), if necessary, into a uniform and balanced mixture. The grout mix(es) shall have a consistency that is fluid and pumpable. Grouting materials shall be as specified in Section 03300 - Cast-in-Place Concrete, Section 03600 - Grouting, and as specified hereinafter. Provide non-shrink, non-metallic, non-gaseous cement grout with a minimum compressive strength of 1,000 psi at 28 calendar days.
- C. Cement: Portland cement, ASTM C150, Type I or II.
- D. Fluidifier: Fluidifier shall be a compound capable of increasing the flowability of the mixture, by assisting in dispersal of the cement grains and neutralizing the setting shrinkage of the grout. The property and performance of the fluidifier shall meet the requirements specified in ASTM C937.

- E. Admixtures: Admixtures shall meet the requirements specified in ASTM C494. If 2 or more admixtures and/or fluidifier are used, all shall be compatible into a uniform and balanced mixture.
- F. Water: Potable water shall be used.

## **2.02 EQUIPMENT**

- A. Drilling Equipment:
  - 1. Standard drilling equipment of the rotary or percussion type capable of completing the work shall be used to perform the drilling. Use air and/or water for removing cuttings from the probe holes during drilling operations. Supplies shall include all bits, drill rods, tools, casing, piping, pumps, water, and power to accomplish the required drilling. All drilling rigs and pumps shall be equipped with pressure gauges.
- B. Grouting Equipment:
  - 1. The grouting equipment shall be capable of accepting, mixing, and stirring the grout ingredients and additives into a uniform and balanced grout mixture, and shall also be capable of pumping the grout mixture into the probe holes to the specified depths and to the satisfaction of the Engineer.
    - a. Pipes and Fittings: pipes and fittings required for placing grout and providing drainage shall be furnished, cut, threaded, and fabricated by the Contractor.
      - 1) Pipes: Pipes shall be made of black steel with the specified minimum diameters and used in the locations as indicated on the drawings. The pipes shall conform to ASTM A53/A53M.
      - 2) Fittings: Fittings shall be made of black, malleable iron in conformance with ASME B16.3.
- C. Recording Equipment:
  - 1. Provide automatic recording equipment with a meter to measure the volume of grout injected into each probe hole. The meter shall be calibrated in cubic feet to the nearest one-tenth of a cubic foot.
- D. Spare parts and/or tools/equipment shall be available on-site to maintain drilling and grouting equipment in satisfactory operating conditions at all times during execution of the drilling and grouting work. Any probe hole lost or damaged as a result of mechanical failure of equipment; inadequate grout supplies; or improper drilling or grouting procedures shall be replaced and re-grouted with another hole, as approved by the Engineer, at no additional cost to the Owner.

## **PART 3 EXECUTION**

### **3.01 GENERAL DRILLING AND GROUTING PROCEDURE**

- A. Notify the Engineer at least 15 days before beginning foundation probe drilling and grouting.

B. Drilling:

1. At a minimum, drill probe holes where indicated on the contract drawings, plus any additional probe holes as directed by the Engineer. However, base the bid price on the number of probe holes and quantities indicated in the Schedule of Values provided in the Bid Documents. The number of probe holes and quantities indicated in the Schedule of Values were developed from the Foundation Probe Hole Schedule and Foundation Probe Hole Schedule for Additive Alternate No. 1 provided herein. In case of a conflict between the Schedule of Values and the schedules provided herein, base the bid price on the numbers and quantities provided in the Schedule of Values. Probe holes shall be minimum 3 inches in diameter and drilled to the depths below the foundation subgrade elevations specified in the probe hole schedule provided herein and on the contract drawings. Do not drill deeper than the specified "drilled depth below foundation" unless directed by the Engineer.
2. If cavities, voids, and/or very soft or loose zones are detected below where slabs on grade or foundations are to be constructed, additional probe holes shall be drilled to delineate their lateral extents as directed by the Engineer or the onsite designated representative of the Engineer.

Deleted as per Bid Addendum 04		<b>Foundation Probe Hole Schedule</b>	
Replacement for this table has been provided as a part of Bid Addendum 04 and is pasted after the next sheet		<b>Drilled Depth Below Foundation (ft)<sup>(1)</sup></b>	<b>Number of Probe Holes to Drill<sup>(2)</sup></b>
<b>Building/Facility/ Location</b>			<b>Estimated Injected Grout Quantity (10x Theoretical Volume of a Drilled Probe Hole) (CY)<sup>(3)</sup></b>
Septage Receiving Station	20	24	9
Septage Receiving Station - Concrete Ballast	20	10	4
Headworks	40	78	57
Headworks - Grit Pump Room	40	41	30
Headworks - Loading Bay	20	10	4
Headworks Electrical Building	20	18	7
Sludge Blending	30	29	16
Propane Tank	20	3	2
Headworks Odor Control Facility	30	42	23
Flare	20	12	5
Digester Gas Conditioning System	20	21	8
Digester 1	45	49	41
Digester 2	45	49	41
Digester Control Building 1	35	61	39
Primary Sedimentation Tanks - Stairs	20	6	3
Deleted as per Bid Addendum 04			

Deleted as per Bid Addendum 04

### Foundation Probe Hole Schedule

Replacement for this table has been provided as a part of Bid Addendum 04 and is pasted after this sheet	<b>Drilled Depth Below Foundation (ft)<sup>(1)</sup></b>	<b>Number of Probe Holes to Drill<sup>(2)</sup></b>	<b>Estimated Injected Grout Quantity (10x Theoretical Volume of a Drilled Probe Hole) (CY)<sup>(3)</sup></b>
<b>Building/Facility/ Location</b>			
Primary Sedimentation Tanks - Concrete Slab	20	12	5
Solids Handling & SCADA Buildings	40	180	131
Solids Odor Control	30	24	14
Return Flow Pump Station	20	9	4
Primary Facilities - Electrical Equipment Pads	20	14	6
Stand By Generator	20	12	5
Additional Probe Holes included in the Base Bid	40	300	219
Total Sum of the Estimated Grout Quantities			673
Notes: (1) Depth (in feet) below the footing foundation subgrade elevation. (2) Refer to Plans for drilled probe hole locations. (3) Based on 3-inch diameter drilled probe holes. Refer to Article 3.01 Paragraph C.1.d for drilled probe hole diameters larger than 3 inches selected by the Contractor.			

Deleted as per Bid Addendum 04

### Foundation Probe Hole Schedule for Additive Alternate NO. 1

<b>Building/Facility/ Location</b>	<b>Drilled Depth Below Foundation (ft)<sup>(1)</sup></b>	<b>Number of Probe Holes to Drill<sup>(2)</sup></b>	<b>Estimated Injected Grout Quantity (10x Theoretical Volume of a Drilled Probe Hole) (CY)<sup>(3)</sup></b>
Digester 3	45	49	41
Digester Control Building 2	35	54	35
Additional Probe Holes included in Additive Alternate No. 1	40	50	37
Total Sum of the Estimated Grout Quantities			113
Notes: (1) Depth (in feet) below the footing foundation subgrade elevation. (2) Refer to Plans for drilled probe hole locations. (3) Based on 3-inch diameter drilled probe holes. Refer to Article 3.01 Paragraph C.1.a.5) for drilled probe hole diameters larger than 3 inches selected by the Contractor.			



Deleted as per Bid Addendum 08

Replacement for this table has been provided as a part of Bid Addendum 08 and is pasted after the next sheet

5. **AMENDED** Section 02256 – FOUNDATION PROBING AND GROUTING:

A. REPLACE the table that follows paragraph 3.01.B.2 titled "Foundation Probe Hole Schedule" in its entirety with the following table:

<b>Foundation Probe Hole Schedule</b>			
<b>Building/Facility/ Location</b>	<b>Drilled Depth Below Foundation (ft)<sup>(1)</sup></b>	<b>Number of Probe Holes to Drill<sup>(2)</sup></b>	<b>Estimated Injected Grout Quantity (10x Theoretical Volume of a Drilled Probe Hole) (CY)<sup>(3)</sup></b>
Septage Receiving Station	20	24	9
Septage Receiving Station - Concrete Ballast	20	10	4
Headworks	40	78	57
Headworks - Grit Pump Room	40	41	30
Headworks - Loading Bay	20	10	4
Headworks Electrical Building	20	18	7
Sludge Blending	30	29	16
Propane Tank	20	3	2
Headworks Odor Control Facility	30	42	23
Flare	20	12	5
Digester Gas Conditioning System	20	21	8
Digester 1	45	49	41
Digester 2	45	49	41
Digester Control Building 1	35	61	39
Primary Sedimentation Tanks - Stairs	20	6	3
Primary Sedimentation Tanks - Concrete Slab	20	12	5
Solids Handling & SCADA Buildings	40	180	131
Solids Odor Control	30	24	14
Return Flow Pump Station	20	9	4
Primary Facilities - Electrical Equipment Pads	20	14	6
Stand By Generator	20	12	5
3W Pump Station	20	4	2
North Drainage Pump Station	30	7	4

Foundation Probe Hole Schedule			
Building/Facility/ Location	Drilled Depth Below Foundation (ft) <sup>(1)</sup>	Number of Probe Holes to Drill <sup>(2)</sup>	Estimated Injected Grout Quantity (10x Theoretical Volume of a Drilled Probe Hole) (CY) <sup>(3)</sup>
Additional Probe Holes included in the Base Bid	40	300	219
Total Sum of the Estimated Grout Quantities			679
Notes: (1) Depth (in feet) below the footing foundation subgrade elevation. (2) Refer to Plans for drilled probe hole locations. (3) Based on 3-inch diameter drilled probe holes. Refer to Article 3.01 Paragraph C.1.d for drilled probe hole diameters larger than 3 inches selected by the Contractor.			

Deleted as per Bid Addendum 08

Replacement for this table has been provided as a part of Bid Addendum 08 and is pasted after the next sheet

**New Table for foundation probe hole schedule has been added as part of bid addendum 08.**

11. **AMENDED** Section 02256 – FOUNDATION PROBING AND GROUTING:

- A. **REPLACE** the table that follows paragraph 3.01.B.2 titled "Foundation Probe Hole Schedule" in its entirety with the following table:

<b>Foundation Probe Hole Schedule</b>			
<b>Building/Facility/ Location</b>	<b>Drilled Depth Below Foundation (ft)<sup>(1)</sup></b>	<b>Number of Probe Holes to Drill<sup>(2)</sup></b>	<b>Estimated Injected Grout Quantity (10x Theoretical Volume of a Drilled Probe Hole) (CY)<sup>(3)</sup></b>
Septage Receiving Station	20	24	9
Septage Receiving Station - Concrete Ballast	20	10	4
Headworks	40	78	57
Headworks - Grit Pump Room	40	41	30
Headworks - Loading Bay	20	10	4
Headworks Electrical Building	20	18	7
Sludge Blending	30	29	16
Propane Tank	20	3	2
Headworks Odor Control Facility	30	42	23
Flare	20	12	5

**New Table for foundation probe hole schedule  
has been added as part of bid addendum 08.**

<b>Foundation Probe Hole Schedule</b>			
<b>Building/Facility/ Location</b>	<b>Drilled Depth Below Foundation (ft)<sup>(1)</sup></b>	<b>Number of Probe Holes to Drill<sup>(2)</sup></b>	<b>Estimated Injected Grout Quantity (10x Theoretical Volume of a Drilled Probe Hole) (CY)<sup>(3)</sup></b>
Digester Gas Conditioning System	20	21	8
Digester 1	45	49	41
Digester 2	45	49	41
Digester Control Building 1	35	61	39
Primary Sedimentation Tanks - Stairs	20	6	3
Primary Sedimentation Tanks - Concrete Slab	20	12	5
Solids Handling & SCADA Buildings	40	180	131
Solids Odor Control	30	24	14
Return Flow Pump Station	20	9	4
Primary Facilities - Electrical Equipment Pads	20	14	6
Stand By Generator	20	12	5
3W Pump Station	20	4	2
North Drainage Pump Station	30	7	4
Dumpster Concrete Loading Pad	30	20	11
Warehouse Building	20	64	23
Additional Probe Holes included in the Base Bid	40	350	255
<b>Total Sum of the Estimated Grout Quantities</b>			<b>749</b>
Notes: (1) Depth (in feet) below the footing foundation subgrade elevation. (2) Refer to Plans for drilled probe hole locations. (3) Based on 3-inch diameter drilled probe holes. Refer to Article 3.01 Paragraph C.1.d for drilled probe hole diameters larger than 3 inches selected by the Contractor.			

C. Grouting:

1. All grouting operations shall be performed under the supervision of the Contractor's retained QC Specialist and in the presence of the Engineer or an onsite designated representative of the Engineer. The Contractor shall notify the Engineer at least 1 week prior to starting or resuming probing and grouting at each site.
  - a. Grouting Injection:
    - 1) Grout each probe hole through a minimum 1.5-inch or suitable larger diameter pipe inserted to the bottom of the probe hole.
    - 2) At a minimum, the volume of grout to be pumped successively into each probe hole shall be equal to at least the theoretical volume of the probe hole.
    - 3) The grouting of any probe hole shall not be considered complete until that hole refuses to take any more grout with grout overflowing top of the hole.
    - 4) Grout used during the drilling procedure for lubrication shall not be counted toward the volume of grout injected into the probe hole. Grout used to fill the probe hole shall be monitored after reaching the specified depth below foundation.
    - 5) Grout quantities that are injected due to the difference in size between a 3-inch diameter probe hole and a larger diameter probe hole drilled by the Contractor will not be considered as part of the measured grout for payment.
    - 6) If it is found impracticable to complete grouting after pumping up to 1 cubic yard, pumping shall be stopped temporarily and, as directed by the Engineer or the onsite designated representative of the Engineer, intermittent grouting shall be performed into the hole, allowing sufficient time between grout injections for the grout to stiffen. If the desired result is not obtained, grouting shall be discontinued at the probe hole when directed. In such an event, the hole shall be cleaned, the grout allowed to set, and additional probing of minimum 3-inch diameter probe hole and grouting shall then be performed in the partially grouted holes or in the adjacent areas as directed, until the desired grout intake at each hole is achieved, to the satisfaction of the Engineer.
    - 7) Grout that cannot be placed, for any reason, into a probe hole within 2 hours after mixing, or a shorter time as specified by the grout manufacturer, shall be properly disposed of and is not considered as part of the measured grout for payment.
  - b. Equipment Capability and Operation:
    - 1) The grouting equipment and system shall be capable of providing a continuous circulation of grout throughout the system and permitting accurate pressure control by operation of a valve on the grout return line, regardless of how small the grout intake may be. The equipment and lines shall be prevented from becoming fouled by constant circulation of grout and periodic flushing out of the system with water. Flushing shall be done with the grout intake valve closed, the water supply valve opened, and the pump running at full speed.
  - c. When authorized by the Engineer, the Contractor shall backfill encountered cavities and/or voids as directed by the Engineer or the onsite designated representative of the Engineer. The Contractor shall

perform the work in accordance with accepted submittals. The Contractor shall provide all necessary labor, equipment, and materials to fill the encountered cavities and/or voids. Excavations or boreholes shall be supported with suitable shoring provisions to avoid loss of ground and ground movements that could damage adjacent utilities, structures, or improvements, in accordance with Section 02300 - Earthwork. Backfill materials to fill cavities and/or voids, when authorized by the Engineer, shall consist of self-compacting sands and/or gravels, controlled low strength material (CLSM), and/or concrete. Any damage caused by excavation and backfill to fill cavities and/or voids shall be immediately repaired at no additional cost to the Owner.

D. Protection of Work and Cleanup:

1. The Contractor shall furnish pumps and other equipment necessary to handle and properly dispose of drill spoils, and waste grout from all drilling, grouting, and related operations. Upon completion of these operations, clean up all wastes resulting from the operations that are unsightly or would interfere with foundation or other construction. Discharge of all wastes shall be performed in accordance with all applicable government requirements.
2. Roadways shall be cleaned by the Contractor as required to prevent excessive dusting or dirt accumulation, at a minimum, on a daily basis. Vehicles shall be washed prior to exiting the project site and the disposal or stockpiling sites and entering public roadways, as required. The Contractor is responsible to immediately contain and remove all washing or cleaning water from the sites, and discharge or dispose of them properly in accordance with all applicable government requirements.

E. Communications:

1. When, for its own convenience, the Contractor has the individual elements of the plant so located that communication by normal voice between these elements is not satisfactory, the Engineer may require the Contractor to provide a satisfactory means of communications, such as a mobile telephone or other suitable device, at no additional cost to the Owner.

### **3.02 QUALITY CONTROL**

A. All quality control (QC) testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Owner.

B. Grout Mix:

1. During the execution of the foundation probing and grouting, the unit weight or specific gravity shall be measured on liquid samples of grout taken from the grout return line, to verify grout mix uniformity.
2. Testing shall be performed in accordance with API RP 13B-1 test method. Testing frequency shall be at least 1 test for every two (2) hours that grout is mixed and pumped. Complete and accurate records shall be kept to verify that grout mix is as accepted.

- C. Grout Samples:
1. For every 10 probe holes, 2 sets of 4 samples (8 samples total) of the cement grout used for grouting the probe holes shall be collected and fabricated in accordance with ASTM C31/C31M or C109/C109M.
  2. Each of these samples shall be stored in a damp environment at constant temperature in accordance with applicable ASTM procedures.
  3. After the samples have cured sufficiently, they shall be taken to an independent qualified laboratory, accepted by the Engineer, for testing.
  4. Two grout samples shall be subjected to compressive strength tests at 7 days in accordance with ASTM C39/C39M or C109/C109M. The remaining samples shall be subjected to compressive strength test at 28 days following the same ASTM testing procedures.

### **3.03 MEASUREMENT AND PAYMENT**

- A. The project Contract Price shall be adjusted based on the variance in total length of drilled probe holes (i.e. actual total length of drilled probe holes minus the total length of drilled probe holes listed in the Schedule of Values) and the Contractor's unit price listed for this item at bid time in the Schedule of Values.
1. Adjustment in the Contract Price shall be in accordance with the 1972 General Requirements and Covenants (GRC), Section 4.2-Changes, Article (a)-Increased or Decreased Quantities, Item 1-Unit Price Work and the Special Provisions.
- B. The project Contract Price shall be adjusted based on the variance in grout volume (i.e. actual permissible measured grout volume injected in the probe holes minus the total grout volume listed in the Schedule of Values) and the Contractor's unit price listed for this item at bid time in the Schedule of Values.
1. Adjustment in the Contract Price shall be in accordance with the 1972 General Requirements and Covenants (GRC), Section 4.2-Changes, Article (a)-Increased or Decreased Quantities, Item 1-Unit Price Work and the Special Provisions.
- C. Payment for additional excavation and backfill to fill cavities and/or voids, directed by the Engineer or the onsite designated representative of the Engineer as specified in Article 3.01 Paragraph C.1.c, including all standby and direct costs related to drilling, excavations, fill, compaction, labor, materials, equipment, and all other incidentals, shall be paid from the allowance for other cavity and/or void backfill as described in Section 01210 - Allowances.

END OF SECTION





**DANIEL SHINSATO, PE**

Senior Project Manager, Geotechnical Engineer

**EDUCATION**

B.S., Civil and Environmental Engineering, University of Hawaii at Manoa

**PROFESSIONAL REGISTRATIONS**

2008/ HI: Professional Engineer (Reg. No. 13211)

**SPECIAL STUDIES AND COURSES**

8-Hour OSHA HAZWOPER Refresher Training

American Red Cross First Aid Training and CPR Course

Daniel is a geotechnical engineer with over 20 years of experience driving hundreds of projects per year to completion. He is skilled in overseeing and training technical and field staff and ensuring that projects are completed on schedule, within budget, and according to specifications. As a senior project engineer, he has coordinated project communications, staffing, permitting, equipment, and scheduling. He has also overseen laboratory operations, including scheduling laboratory tests, and maintaining equipment and supplies. He collaborates closely with other engineering and project teams. His prior fieldwork included construction inspection, conducting engineering design and analysis, and writing reports.

**RELEVANT PROJECT EXPERIENCE**

**Kona International Airport Air Traffic Control Tower, Kailua-Kona, HI.** In the role of Geotechnical Senior Project Engineer, Dan led the proposal development and oversaw drilling, laboratory work, foundation design, probe and grout design, and monitoring. The project involved constructing a new Air Traffic Control Tower (ATCT). The basalt below had clinker zones that required filling, with approximately 200 probe holes.

**Hilo Safeway Fuel Center, Hilo, HI.** In the role of Geotechnical Senior Project Engineer, Dan led the proposal development and oversaw drilling, laboratory work, foundation design, probe and grout design, and monitoring. The project involved constructing a new fuel tank foundation. The basalt below had clinker zones that required filling, with approximately 35 probe holes.

**Warehouse 91-150 Hanua Street, Kapolei, HI.** As the Geotechnical Senior Project Engineer, Dan led the proposal development and oversaw drilling, laboratory work, foundation design, probe and grout design, and monitoring. The project involved constructing a new warehouse building over a 9-acre area, where the coral below had void zones that required filling.

**Kaimuki Gateway Plaza Parking Development, Honolulu, HI.** Geotechnical Senior Project Engineer for a three-story office building in Honolulu. The parking lot development project involved excavating three stories into the Basalt subgrade to create below street level parking. The project required hundreds of probe and grout holes to fill potential voids in the basalt. Micropiles were used to temporarily retain the basement soils before the walls could be constructed. Dan managed proposal development, indoor drilling, soil laboratory testing, design, and oversaw probe and grout inspection.

**Hale Makana O Moiliili Senior Apartment Building, Honolulu, HI.** In the role of Geotechnical Senior Project Engineer, Dan led the proposal development and oversaw drilling, laboratory work, foundation design, probe and grout design, and monitoring. The project involved constructing a new apartment building where the coral below had void zones that required filling.