



Submittal Review Response

Project Name:

Hilo WWTP Rehabilitation and Replacement Project Phase 1

Submittal No.:

02300-001.0

Date:

8/18/2025

Client: County of Hawai'i

Carollo Project No.: 203975

Contractor: Nan, Inc.

Submittal Name: Earthwork Lab Capabilities

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	<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 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	
Spec:	Paragraph:
Authored By:	Date Submitted:

Submittal Certification	
Check Either (A) or (B):	
<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> .
<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.
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:	
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 _____
 SPECIFICATION SECTION # _____
 SPECIFICATION _____
 PARAGRAPH _____
 DRAWING _____
 SUBCONTRACTOR _____
 SUPPLIER _____
 MANUFACTURER _____

CERTIFIED BY CQCM or Designee : _____



USACE CERTIFICATE
OF
LABORATORY VALIDATION



Construction Engineering Labs, Inc.

96-1173 Waihona Street, Suite B-7
Pearl City, HI, United States
Malia Guild
(808) 455-1522

has demonstrated, by abbreviated audit of its AASHTO accreditation, or by inspection of required records, equipment, procedures, facilities, and/or final reports, its proficiency to perform testing of construction materials, as established by the quality standards of AASHTO R 18 guidance and the requirements of the applicable ASTM standards.

THIS USACE CERTIFICATE OF LABORATORY VALIDATION IS ACCURATE AS OF ITS DATE AND TIME OF GENERATION:

08 JUL 2024 AT 12:39 HOURS

ALL METHODS LISTED ON THIS CERTIFICATE OF VALIDATION WILL EXPIRE ON 05/03/2026

PLEASE CONFIRM THE CURRENT VALIDATION STATUS OF THIS LABORATORY USING THE SEARCH FEATURE ON OUR PUBLIC WEBSITE: <https://mtc.erdcdren.mil>

Chad A. Gartrell, PE, Director
USACE Materials Testing Center
Vicksburg, Mississippi, USA

AGGREGATE

Aggregate - C 117 - Material Finer than 75 μ m (No. 200) Sieve
Aggregate - C 127 - Specific Gravity & Absorption in Coarse Aggregate
Aggregate - C 128 - Specific Gravity & Absorption in Fine Aggregate
Aggregate - C 131 - Los Angeles Abrasion Resistance on Small-Size Coarse Aggregate
Aggregate - C 136 - Sieve Analysis of Aggregates
Aggregate - C 566 - Total Moisture Content
Aggregate - C 702 - Reducing Samples to Testing Size
Aggregate - D 2419 - Sand Equivalent Value

BITUMINOUS

Bituminous - D 2041 - Theoretical Maximum Specific Gravity & Density (Rice)
Bituminous - D 2726 - Bulk Specific Gravity and Density
Bituminous - D 2950 - Density of Bituminous Concrete in Place by Nuclear Methods
Bituminous - D 3203 - Percent Air Voids
Bituminous - D 3549 - Thickness or Height of Compacted Asphalt Mixture Specimens
Bituminous - D 3666 - Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
Bituminous - D 6926 - Preparation of Bituminous Specimens using Marshall
Bituminous - D 6927 - Marshall Stability and Flow of Bituminous Mixtures

CONCRETE

Concrete - C 31 - Making and Curing Test Specimens in the Field
Concrete - C 39 - Compressive Strength of Cylindrical Specimens
Concrete - C 42 - Drilled Cores and Sawed Beams
Concrete - C 78 - Flexural Strength by Third Point Loading

Concrete - C 138 - Unit Weight and Air Content by Gravimetric
Concrete - C 143 - Slump
Concrete - C 172 - Sampling
Concrete - C 174 - Concrete Thickness by Drilled Cores
Concrete - C 231 - Air Content by Pressure ***required if C173 not performed***
Concrete - C 511 - Moist Cabinets, Moist Rooms, Water Storage Tanks
Concrete - C 617 - Capping Cylindrical Specimens
Concrete - C 1064 - Temperature of Concrete
Concrete - C 1077 - Concrete and Concrete Aggregate Testing Standards (Quality Standards)
Concrete - C 1231 - Unbonded Caps

SOILS

Soils - D 1140 - Material Finer than 75 μ m (No. 200) Sieve
Soils - D 1556 - Density & Unit Weight by Sand Cone
Soils - D 1557 - Compaction Characteristics by Modified Effort
Soils - D 1883 - CA Bearing Ratio (CBR)
Soils - D 2216 - Water Content
Soils - D 4318 - Liquid & Plastic Limits & Plasticity Index

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Loosening, excavating, filling, grading, borrow, hauling, preparing subgrade, compacting in final location, wetting and drying, and operations pertaining to site grading for buildings, basins, reservoirs, boxes, roads, and other facilities.
 - 2. Backfilling and compacting under and around structures.
 - 3. Backfilling and compacting above buried structures.
- B. For rock excavation and removal, see Section 02238 - Rock Removal.

1.02 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. Standard Specifications for Highway Bridges.
- B. ASTM International (ASTM):
 - 1. D698-Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 - 2. D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method.
 - 3. D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
 - 4. D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.03 DEFINITIONS

- A. Backfill Above Concrete Structure: Backfill within volume bounded by the top surface of the structure.
- B. Backfill Adjacent to Structure: Backfill within volume bounded by the exterior surfaces of structure, the surface of undisturbed soil in the excavation around structure, and finish grade around structure.
- C. Embankments: Dikes, levees, berms, and similar facilities.
- D. Excavation: Consists of loosening, removing, loading, transporting, depositing, and compacting in final location, wet and dry materials, necessary to be removed for purposes of construction of structures, ditches, grading, roads, and such other purposes as are indicated on the Drawings.
- E. Unsuitable or unstable soils: Consists of soft or pumping soils that do not achieve required compaction.

1.04 SUBMITTALS

- A. Copy of Property Owner's Agreement allowing placement of surplus soil material on their property.
- ✓ B. Testing lab: Submit Contractor's proposed testing laboratory capabilities and equipment.
- C. Test reports:
 - 1. Submit certified test reports of tests specified to be performed by the Contractor.
 - 2. Sign and seal test reports by a registered Civil Engineer who practices geotechnical engineering and is registered in the state where the project is located.
- D. Qualifications of Offsite Borrow Source: If offsite borrow source is required, Contractor shall submit qualifications package of the borrow source for approval by the Engineer.

1.05 QUALITY ASSURANCE

- A. Initial compaction demonstration:
 - 1. Adequacy of compaction equipment and procedures: Demonstrate adequacy of compaction equipment and procedures before exceeding any of following amounts of earthwork quantities:
 - a. 50 cubic yards of backfill adjacent to structures.
 - b. 100 cubic yards of embankment work.
 - c. 100 cubic yards of fill.
 - d. 50 cubic yards of roadway base material.
 - e. 100 cubic yards of road fill.
 - 2. Compaction sequence requirements: Until specified degree of compaction on previously specified amounts of earthwork is achieved, do not perform additional earthwork of the same kind.
 - 3. After satisfactory conclusion of initial compaction demonstration and at any time during construction, provide confirmation tests as specified under "FIELD QUALITY CONTROL."
- B. Contractor shall perform work related to this Section in accordance with the approved Stormwater Pollution Prevention Plan (SWPPP).

1.06 SEQUENCING AND SCHEDULING

- A. Schedule earthwork operations to meet requirements specified in this Section for excavation and uses of excavated material.
- B. If necessary, stockpile excavated material in order to use it at specified locations.
- C. Excavation, backfilling, and filling: Perform excavation, backfilling, and filling during construction in manner and sequence that provides proper drainage at all times.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Performance requirements:
 - 1. Where mud or other soft or unstable or unsuitable material is encountered, remove such material up to 2 feet down and up to 2 feet beyond, or to the underlying basalt rock, whichever comes first. Refill space with compacted select material or stabilization material. Wrap stabilization material with stabilization fabric.
 - 2. Obtain acceptable import material from other sources if surplus or borrow materials obtained within Project site does not conform to specified requirements or are not sufficient in quantity.
 - 3. No extra compensation will be made for hauling of fill materials nor for water required for compaction.

2.02 MATERIALS

- A. Water for compacting: Use water from source acceptable to Engineer.
- B. Soil and rock materials:
 - 1. General:
 - a. Provide aggregate base course, crushed rock, gravel, sand, select material, and stabilization material where specified or indicated on the Drawings.
 - b. If suitable surplus materials are available on site, obtain select material from cut sections, and excavations.
 - 2. Aggregate base course materials: As specified in Section 02050 - Soils and Aggregates for Earthwork.
 - 3. Crushed rock: As specified in Section 02050 - Soils and Aggregates for Earthwork.
 - 4. Select material: As specified in Section 02050 - Soils and Aggregates for Earthwork.
 - 5. Sand: As specified in Section 02050 - Soils and Aggregates for Earthwork.
 - 6. Drain Rock: As specified in Section 02050 - Soils and Aggregates for Earthwork.
 - 7. Stabilization material: As specified in Section 02050 - Soils and Aggregates for Earthwork.
- C. Controlled low-strength material: As specified in Section 02312 - Controlled Low Strength Materials (CLSM).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of conditions:
 - 1. Character and quantity of material:
 - a. Verify character and quantity of rock, gravel, sand, silt, water, and other inorganic or organic materials to be encountered in work to be performed.

- b. Determine gradation, shrinkage, and swelling of soil, and suitability of material for use intended in work to be performed.
- c. Determine quantity of material, and cost thereof, required for construction of backfills, cuts, embankments, excavations, fills, and roadway fills, whether from onsite excavations, borrow areas, or imported materials. Include in cost of work to be performed.
- d. Include wasting of excess material, if required, in cost of work to be performed.

3.02 PREPARATION

A. Backfills:

- 1. After clearing and excavation are completed, scarify entire areas that underlie backfills or structures to a depth of 6 inches and until surface is free of ruts, hummocks, and other features that would prevent uniform compaction by equipment to be used.
- 2. Recompact scarified areas to density specified before placing select material or concrete as specified on the Drawings.
- 3. If compaction of the foundation subgrade to required density cannot be achieved, the unsuitable soils shall be removed to a depth of up to 2 feet down and up to 2 feet beyond the edge of footing, or to the underlying basalt rock, whichever comes first.
- 4. If foundation areas are at basalt rock layer, clear and remove the loosened rock fragments, cobbles, and boulders. Refill with aggregate base course and compact the backfill as specified in this Section.
- 5. Do not place backfill against walls until:
 - a. Walls have been cast full height of structure and concrete has reached the specified strength.
 - b. Connecting slabs and beams have been cast, and concrete has reached the specified strength.
- 6. Do not place backfill on top of buried structures until:
 - a. Concrete has reached full strength.
- 7. Prior to backfilling:
 - a. Remove forms.
 - b. Clean trash and debris from the excavation site.
- 8. After inspection of foundation, walls, and pipes, place backfill symmetrically around structures to prevent eccentric loading of structures.
- 9. Place material on top of structure to prevent excessive point loading that exceeds the loading capacity of the structure.
 - a. Contractor is responsible for damage to structures due to improper backfilling and compaction.

B. Embankments:

- 1. After clearing is completed, scarify entire areas that underlie embankments to a depth of 6 inches and until surface is free of ruts, hummocks, and other features that would prevent uniform compaction by equipment to be used.
- 2. Recompact scarified areas to required densities before placing embankments, as specified on the Drawings.
- 3. If embankment areas are at a basalt rock layer, clear and remove the loosened rock fragments, cobbles, and boulders prior to fill compaction.

- C. Fills:
 - 1. After clearing is completed, scarify entire areas that underlie fill sections or structures to a depth of 6 inches and until surface is free of ruts, hummocks, and other features that would prevent uniform compaction by equipment to be used.
 - 2. Recompect scarified areas to required density before placing fills as specified on the Drawings.
 - 3. If fill areas are at a basalt rock layer, clear and remove the loosened rock fragments, cobbles, and boulders prior to fill compaction.
- D. Sloped surfaces for fill or foundations:
 - 1. Foundations for fill having slopes in excess of 1 vertical to 4 horizontal:
 - a. Bench or terrace to adequately key existing ground and fill built thereon.
 - 2. Slopes of original hillsides and old fills: Bench minimum of 10 feet horizontally as fill is placed.
 - 3. Provision of new benches:
 - a. Start new bench wherever vertical cut of next lower bench intersects existing grade.
 - b. Recompect material thus cut out along with new embankment material at no additional cost to the Owner.

3.03 INSTALLATION

- A. General:
 - 1. Dispose of excavated materials that are not required or are unsuitable for fill and backfill in lawful manner.
 - 2. Dispose of surplus material on private property only when written permission agreement is furnished by owner of property. Submit copies of such agreements.
 - 3. Obtain material required in excess of suitable material produced by cuts and excavation, from borrow areas subject to the material requirements specified.
 - 4. Rocks, broken concrete, or other solid materials larger than 3 inches in greatest dimension: Remove from project site at no additional cost to the Owner.
 - 5. Stabilization of subgrade: Provide materials used, or perform work required, to stabilize subgrade so it can withstand loads that may be placed upon it by Contractor's equipment.
- B. Borrow area: There is no borrow area on Project site.
 - 1. Where borrow material is required, import select material from source located off Project site selected by the Contractor and subject to acceptance by the Engineer.
 - 2. There will be no additional cost to the Owner for use of imported material.
- C. Compaction:
 - 1. Provide specified compaction for backfills, cuts, embankments, fills, roadway fills, and other earthwork.
 - 2. Perform confirmation tests to verify and confirm that work has complied, and is complying at all times, with compaction requirements specified in this Section for initial compaction demonstration and field quality control testing.

3. In-place density of compacted backfills, cuts, embankments, fills, and roadway fills determined in accordance with ASTM D1556, or with ASTM D6938.
 4. Maximum density, laboratory compaction: Soil maximum density and optimum water content when tested in accordance with ASTM D1557.
 5. To prevent damage to structures due to backfilling operations, place backfill with equipment that does not exceed AASHTO Standard Specifications for Highway Bridges, H-20 vehicle loading, within a distance from the face of the structure of not less than 1/2 the depth of backfill. The depth of backfill is the distance between the level being compacted and the bottom of the excavation. Outside this distance, heavier compaction equipment may be used.
 6. Compact to percentage of maximum density as follows:
 - a. Backfill adjacent to structures: 95 percent.
 - b. Backfilling voids: 95 percent.
 - c. Embankments: 95 percent.
 - d. Demolition areas: As indicated on the Drawings.
 - e. Other areas: 90 percent.
 - f. Under present and future structures: 95 percent.
 - g. Under roadways, parking and storage areas, curbs, and sidewalks: 95 percent.
 - h. Upper 6 inches of cuts: 95 percent.
 - i. Fills: 95 percent.
- D. Dewatering: As specified in Section 02240 - Dewatering.
- E. Excavation:
1. Blasting: Not permitted.
 2. Excavations for trenching: As specified in Section 02318 - Trenching.
 3. Excavations for structures:
 - a. Provide excavations conforming to dimensions and elevations indicated on the Drawings for each structure.
 - b. After clearing is complete, excavate for the structure, down to the elevation indicated on the Drawings. Unless directed by Engineer, do not carry excavations below elevation indicated on the Drawings.
 - c. Where soil is encountered having unsuitable bearing value, Engineer may direct in writing that excavation be carried to elevations below those indicated on the Drawings.
 - d. Where excavations are made below elevations indicated on the Drawings, adjust elevations of excavations in accordance with the following requirements:
 - 1) Under slabs: Restore to proper elevation in accordance with procedure specified for backfill in this Section.
 - 2) Under footings: Restore to the proper elevation using one of the following:
 - a) Aggregate base course.
 - b) Controlled low-strength material.
 - e. Excavation width:
 - 1) Extend excavations at least 2 feet clear from walls and foundations of structures to allow for placing and removal of forms, installation of services, and inspection.
 - 2) Do not undercut slopes.

- f. Difficulty of excavation: No extra compensation will be made for removal of rock or any other material due to difficulty of excavation.
 - 4. Excavation of lined channels:
 - a. Excavations in open cut for lined channels may be made so as to place concrete directly against excavated surfaces providing faces of excavations are:
 - 1) Firm and unyielding.
 - 2) Will stand or can be made to stand without sloughing.
 - b. Excavations to provide subgrade for lined channel or subdrainage material: Excavate to lines and grades indicated on the Drawings.
 - 5. Excavation of unlined channels and basins:
 - a. Excavate to lines and grades indicated on the Drawings.
 - b. Perform excavation and grading so that finish surfaces are in uniform planes with no abrupt breaks in surface.
 - 6. Excavation of ditches and gutters:
 - a. Cut ditches and gutters accurately to cross sections and grades indicated on the Drawings.
 - b. Take care not to excavate ditches and gutters below grades indicated on the Drawings.
 - c. Backfill excessive ditch and gutter excavations to grade with suitable material acceptable to the Engineer.
 - d. Do not deposit any material within 3 feet of edge of ditch unless otherwise indicated on the Drawings.
 - 7. Necessary over excavation:
 - a. Where it becomes necessary to excavate beyond normal lines of excavation in order to remove boulders or other interfering objects, backfill voids remaining after removal as specified in backfilling of voids below, or as acceptable to the Engineer.
 - b. Backfill voids with material acceptable to the Engineer:
 - 1) With acceptance of the Engineer, backfill with one of the following:
 - a) Aggregate base course.
 - b) Controlled low-strength material.
- F. Materials for backfills, embankments, and fills:
 - 1. General:
 - a. Obtain import select material from other sources if acceptable surplus materials from cuts and excavations obtained from within Project site are not sufficient in quantity for construction of Project.
 - 2. Backfills:
 - a. Backfill adjacent to structures, slabs, or walls: Select material meeting the requirements of select material, unless otherwise specified or indicated on the Drawings.
 - b. Backfill material under concrete structures: Aggregate base course material, except in areas where controlled low-strength material or concrete encasement are indicated on the Drawings.
 - c. Extend backfill in any area under concrete structures from undisturbed soil or rock to the bottom aggregate base course material layer.
 - 3. Embankments:
 - a. Select material, unless otherwise specified or indicated on the Drawings.
 - 4. Fills:
 - a. Select material, unless otherwise specified or indicated on the Drawings.

- b. Extend fill in any area under concrete structures from undisturbed soil or rock to the bottom of aggregate base course material layer.
 - 5. Roadway fills: One of the following, unless otherwise specified or indicated on the Drawings:
 - a. Aggregate base course material.
 - b. Select material.
- G. Placement:
 - 1. General:
 - a. Lines and grades:
 - 1) Construct backfills, embankments, fills, and road fills, at locations and to lines and grades indicated on the Drawings.
 - 2) Overbuild permanent fill slopes by at least 1 foot and then cut to final grade to provide adequate compaction of the remaining fill.
 - 2. Backfills:
 - a. Place loose material in successive layers that do not exceed 6 inches in thickness after compaction.
 - b. Bring each layer to a moisture content within 2 percent of optimum moisture content before compacting.
 - c. Defective compacted backfills: Remove and recompact.
 - 3. Fills:
 - a. Place loose material in successive layers that do not exceed 6 inches in thickness after compaction.
 - b. Bring each layer to a moisture content within 2 percent of optimum moisture content before compacting.
 - c. Defective compacted fills: Remove and recompact.
 - 4. Embankments:
 - a. Place loose material in successive layers that do not exceed 6 inches in thickness after compaction.
 - b. Bring each layer to a moisture content within 2 percent of optimum moisture content before compacting.
 - c. Defective compacted embankments: Remove and recompact.
 - 5. Roadway fills:
 - a. Place loose material in successive layers that do not exceed 6 inches in thickness after compaction.
 - b. Bring each layer to a moisture content within 2 percent of optimum moisture content before compacting.
 - c. Defective compacted roadway fills: Remove and recompact.
 - 6. Disposal areas:
 - a. In disposal areas: In disposal areas as indicated on the Drawings, bring fill up in an essentially level layer over entire spoil area indicated:
 - 1) Continue filling spoil area until disposal of surplus excavated material is completed.
 - 2) Slope edges of fill area at between 1 and 2 horizontal to 1 vertical to the intersection with existing grade.
 - 3) Provide slopes that are smooth and uniform.
 - 4) Level finished surface of disposal area to within 4 inches of elevation indicated on the Drawings.

- b. Clods or hard lumps of earth of 6 inches in greatest dimension: Break up before compacting material in embankments, except as provided as follows:
 - 1) When fill material includes large rocky material or hard lumps, such as hardpan or cemented gravel which cannot be broken readily, remove such material from the fill.
 - 2) Place sufficient earth or other fine material around larger material as it is deposited so as to fill interstices and produce dense, compact fill. Do not place such material within 2 feet of finish grade of fill.

3.04 FIELD QUALITY CONTROL BY CONTRACTOR

- A. Provide quality control over the Work of this Section as required by Section 01450 - Quality Control and Section 01460 - Contractor Quality Control Plan.
- B. Field tests:
 - 1. Sampling and testing shall be performed by Contractor's testing laboratory. See Section 01455 - Regulatory Quality Assurance - Special Tests and Inspections for requirements.
- C. Confirmation tests:
 - 1. Contractor's responsibilities:
 - a. Adequacy of compaction equipment and procedures:
 - 1) Demonstrate adequacy of compaction equipment and procedures.
 - 2) At each test location include tests for each type or class of backfill from bedding to finish grade.
 - b. Compaction sequence requirements:
 - 1) Do not perform additional earthwork of the same kind until specified degree of compaction has been demonstrated.
 - c. Cost of confirmation tests: Paid for by the Contractor.
 - d. Qualifications of Contractor's testing laboratory: Acceptable to Engineer.
 - e. Copies of confirmation test reports: Submit promptly to the Engineer.
 - 2. Minimum frequency of confirmation testing:
 - a. Maximum dry density versus moisture:
 - 1) Shallow Spread Footing Foundations: One (1) test per 100 square feet, or a fraction thereof, of spread footing excavation of the subgrade and each lift of fill or backfill.
 - 2) Continuous Wall and Thickened Edge Footing Foundations: One (1) test per 50 linear feet length, or a fraction thereof, per wall footing excavation along the same column/wall line, of the subgrade and each lift of fill or backfill.
 - 3) Below Grade Foundations: One (1) test per 500 square feet, or a fraction thereof, of the subgrade and each lift of fill or backfill.
 - 4) Slabs-On-Grade: One (1) test per 1,000 square feet, or a fraction thereof, of the subgrade and each lift of fill or backfill.
 - 5) Paved Areas: One (1) test per 50 linear feet of each lane of roadway, or 750 square feet of parking pavement areas, or a fraction thereof, of the subgrade and each lift of backfill.

- 6) Sidewalks (with no vehicular traffic): One (1) test per 100 linear feet length, or a fraction thereof, of the subgrade and each lift of backfill.
- 7) Pipe Trench: One (1) test per 100 linear feet of trench, or a fraction thereof, of the subgrade and each lift of backfill and as specified in Section 02318 - Trenching.

D. Tolerances:

1. Finish grading of backfills, cuts, embankments, fills, and roadway fills:
 - a. Perform fine grading under concrete structures such that finish surfaces are never above the grade or cross section indicated on the Drawings and are never more than 0.10 feet below.
 - b. Provide finish surface for areas outside of structures that are within 0.10 feet of grade or cross section indicated on the Drawings.
2. Unlined channels and basins:
 - a. In both cut and fill, and levee and access road side slopes in cut: Vertical tolerance of none above and 3 inches below grade indicated on the Drawings on bottom and side slopes.
 - b. On top surface of levee and access road in both cut and fill, and levee and access road side slopes in fill: Vertical tolerance of none below and 3 inches above grade indicated on the Drawings.
3. Areas which are not under structures, concrete, asphalt, roads, pavements, sidewalks, dikes, and similar facilities:
 - a. Provide finish graded surfaces of either undisturbed soil, or cohesive material not less than 6 inches deep.
 - b. Intent of proceeding is to avoid sandy or gravelly areas.
4. Finish grading of surfaces:
 - a. Reasonably smooth, compacted, and free from irregular surface changes.
 - b. Provide degree of finish that is ordinarily obtainable from blade grader operations, except as otherwise specified.
 - c. Uniformly grade areas that are not under concrete.
 - d. Finish ditches and gutters so that they drain readily.

3.05 FIELD QUALITY CONTROL BY OWNER

A. Compliance tests:

1. As specified in Section 01455 - Regulatory Quality Assurance except where specified as provided by Contractor.
2. Frequency of testing: Periodic compliance tests may be made by the Engineer to verify that compaction is meeting requirements previously specified.

3.06 ADJUSTING

A. Finish grades of excavations, backfills, and fills:

1. Repair and reestablish grades to required elevations and slopes due to any settlement or erosion that may occur from action of the elements or any other cause prior to final acceptance.

- B. Compaction:
 - 1. Perform remedial work if confirmation or compliance test fails to meet specified requirements using one of the following methods:
 - a. Remove and replace backfill at the proper density.
 - b. Other means acceptable to the Engineer.
 - 2. Retesting:
 - a. Costs of retesting: Contractor is responsible for the costs of retesting required to confirm and verify that remedial work has brought compaction within specified requirements.
 - b. Contractor's confirmation tests during performance of remedial work:
 - 1) Performance: Perform tests in manner acceptable to the Engineer.
 - 2) Frequency: Double amount specified for initial confirmation tests.

3.07 PROTECTION

- A. Finish grades of backfills, cuts, excavations, and fills:
 - 1. Protect newly graded areas from erosion and deterioration by action of the elements.
- B. Ditches and gutters:
 - 1. Maintain ditches and gutters free from detrimental quantities of debris that might inhibit drainage until final acceptance.

END OF SECTION

