**Revise Section 504 of the Standard Specifications as follows:**

Revise Section 504.30, Paragraph (b), as shown:

1. * 1. Submittals. The following documents shall be submitted . . .
2. *Personnel*. At least 14 calendar days before starting soil nail work, the soil nailing Contractor shall identify on-site supervisors and drill operators assigned to the project and submit a summary of each individual’s experience. Only those individuals designated as meeting the qualifications requirements shall be used for the project. The soil nailing Contractor shall not substitute for any of these individuals without written approval by the Engineer. The Engineer will review the soil nailing Contractor qualifications and staff within 15 working days after receipt of the submission. The Engineer may suspend the work if the soil nailing Contractor substitutes unqualified personnel for qualified personnel during construction. If work is suspended due to the substitution of unqualified personnel per subsection 504.29, the Contractor shall be fully liable for additional costs resulting from the suspension of work and no adjustment in contract time resulting from the suspension of the work will be allowed.

**Revise Section 504.33, Paragraph 4, as shown:**

* + 1. Excavation. The Contractor shall be responsible for providing the necessary survey and alignment control during the excavation for each lift, . . .

Excavation of the next-lower lift shall not proceed until soil nail installation, initial shotcrete face placement, attachment of bearing plates and nuts, and soil nail testing have been completed and accepted per subsection 504.40 in the current lift. Soil nail grout and shotcrete shall have achieved a compressive strength of at least 1000 psi before excavation of the next underlying lift.

**Revise Section 504.34, second paragraph as shown:**

* + 1. Soil Nail Installation. Soil nail length and drill hole diameter used shall be those necessary to develop the specified load capacity to satisfy the acceptance criteria, . . .

Holes shall be drilled for the soil nails at the locations, elevations, orientations, and minimum lengths shown on the plans. Drilling equipment and methods shall be suitable for the ground conditions and conform to the installation methods submitted by the soil nailing Contractor. Drilling muds or other fluids shall not be used to remove cuttings. If caving ground is encountered, cased drilling methods shall be used to support the sides of the drill holes. Self-drilling soil nail bars (also known as hollow, self-grouting or pressure grouted soil nail bars) shall not be used unless indicated on the plans. Soil nail bars shall be as shown on the plans. Provide centralizers per Section 504.26 (e).

**Revise Section 504.38, third paragraph as shown:**

* + 1. Verification Testing of Sacrificial Soil Nails. The total number and location of tests shall be determined and spaced to evaluate soil nail performance in each soil strata encountered along the total length of the wall. A minimum of two verification tests shall be performed on sacrificial test soil nails at . . .

Verification test soil nails shall have both bonded and unbonded lengths. Along the unbonded length, the soil nail bar shall not be grouted. The unbonded length of the test soil nails shall be at least 3 feet as measured from the back of the bearing plate to the top of the grout.

Verification tests shall be conducted according to the loading schedule of Table 504-4. Each load increment shall be held for at least 10 minutes. The Contractor shall record soil nail movements at each load increment and the time intervals shown in the table for each load step. Creep tests shall be performed at 0.75 VTL. The alignment load (AL) should be the minimum load required to align the testing apparatus and shall not exceed 5 percent of the VTL. The dial gauges shall be set to “zero” after applying the alignment load. Following application of the maximum load, the load shall be reduced to the alignment load and the dial gauge readings recorded as the permanent set.

Revise Section 504.39, second paragraph as shown:

* + 1. Proof Testing of Production Soil Nails. Successful proof testing shall be performed on 5 percent of the production soil nails in each soil nail row or a minimum of one per row. Verification tests shall not be included in the 5 percent; except that the Engineer may allow the verification tests to be included based on the plans and site conditions. The Engineer will determine the locations and number of proof tests before soil nail installation in each row unless otherwise shown on the plans. Production proof test soil nails shall have both bonded and temporary unbonded lengths. Fully grouted test soil nails shall not be proof tested. The Contractor shall maintain the stability of the hole for the temporary unbonded test length for subsequent grouting. If the unbonded test length of production proof test soil nails cannot be satisfactorily grouted subsequent to testing, the proof test soil nail shall become sacrificial and shall be replaced with an additional production soil nail installed at the Contractor's expense. The temporary unbonded length of the test soil nail shall be at least 3 feet as measured from the back of the bearing plate to the top of the grout.

Proof tests shall be conducted according to the loading schedule of Table 504-5. Unless the soil is susceptible to creep per subsection 504.38, each load increment shall be held until readings are stable as defined by three readings within 0.005 inches taken one per minute over three minutes. The Contractor shall record soil nail movements at each load increment and the time intervals shown in the table for each load step. Creep tests shall be performed at 1.00 PTL. The alignment load (AL) shall be the minimum load required to align the testing apparatus and shall not exceed 5 percent of the PTL. Set dial gauges to “zero” after applying the alignment load. Following application of the maximum load, reduce the load to the alignment load and record the permanent set.

Revise Section 504.43 (c) as shown:

 **Initial Shotcrete Facing.** The initial shotcrete facing shall be installed per Section 641. Membrane curing compound shall not be used. Maturity meters shall be used to monitor all shotcrete per subsection 641.05.

1. *Initial Face Finish.* Shotcrete finish shall be either an undisturbed gun finish as applied from the nozzle or a rod, broom, wood float, rubber float, steel trowel or rough screeded finish as shown on the Plans.
2. *Attachment of Soil Nail Head Bearing Plate and Nut.* Bearing plate, washers, and nut shall be attached to each soil nail head as shown on the plans. While the initial shotcrete facing is still plastic and before its initial set, the plate shall be uniformly seated on the shotcrete by hand-wrench tightening the nut. Where uniform contact between the plate and the shotcrete cannot be provided, the plate shall be set in a bed of grout. After grout has set for 24 hours, the nut shall be hand-wrench tightened. Bearing plates and headed studs shall be located within the tolerances shown on the Plans.
3. *Shotcrete Facing Tolerances.* Construction tolerances for the shotcrete facing from plan location and plan dimensions shall be as shown in Table 504-6.