

MINI-PILE SPECIFICATION

PART 1 GENERAL

- 1.1 SUMMARY - The work under this section of the specification includes requirements for the complete installation of a mini-pile foundation system with a design capacity of ___ tons. The mini-pile locations and details are presented on the plans by _____ dated _____.
- A. WORK INCLUDES - The Contractor shall furnish all labor, material, equipment and incidental items necessary to completely install the mini-piles shown on the drawings, and as specified herein.
 - B. General Contractors must use the following pre-approved specialty Contractor for micro-pile work under this section:
 - C. Specialty Contractors proposed to perform the micro-pile work must have at least 5 years documented experience installing micro-piles of similar capacity as required on this project. The name of the specialty contractor must be submitted with the bid.
- 1.2 SUBMITTALS - Submit the following in accordance with the general conditions of the contract specifications.
- A. Complete description of equipment, procedures and techniques for pile installation.
 - 1. Equipment required for installation including, but not limited to: drills, pumps, casing, etc.
 - 2. Pipe and rebar specifications
 - 3. Grout mix design
 - B. Pile design- Design drawings and calculations prepared by a registered professional engineer who has at least 5 years documented experience in the design of mini-piles. The design shall include pile design and pile-footing connection design at existing footings. The design shall conform with applicable provisions of the Building Code, FHWA Micro-pile Design and Construction Guidelines, and accepted industry practice.
 - B. Lad Test Equipment - Submit for approval information on the test jack and calibration results. The test jack and pressure gauge shall be calibrated in conformance with ASTM requirements.
- 1.3 QUALITY ASSURANCE - Work shall be performed in accordance with the project plans, specifications, and addenda. The Owner will provide and pay for the independent inspection of the pile installation and all testing required.
- 1.4 SUBSURFACE INFORMATION - Borings have been made available for design and estimating purposes. The Contractor, at his own expense, may make additional investigations prior to bid with permission of the owner.

PART 2 PRODUCTS

- 2.1 Pipe reinforcement shall conform to ASTM A252 Grade 2 or approved equal. Mill secondary pipe is acceptable provided coupons are submitted for each truckload. Splicing shall be by threaded and coupled connections or continuous butt welds, using procedures recommended by the pipe supplier.
- 2.2 Reinforcing bar shall conform to ASTM A615 Grade 60 or approved equal. Splicing details shall be either lap splices or approved couplers.

- 2.3 Grout shall consist of Type I or III Portland Cement and water mix with a minimum 28-day compressive strength shall be _____ psi. Potable water shall be used for mixing grout.
- 2.4 Regrout tubes, if required, shall be PVC pipe or approved equal. The pipe material shall be non-degradable and compatible with Portland cement. Regrout tubes shall be filled with grout at the completion of work.

PART 3 GENERAL NOTES

- 3.1 Piles shall be oriented as shown on the foundation plans. All piles shall be drilled within 4% of the angle indicated on the plans and within 3 inches of the location shown. Piles installed out of plumb or location shall be cause for rejection or reduced capacity as determined by the Designer.
- 3.2 All pile installation shall be performed under the supervision of a qualified geotechnical engineer retained by the Owner.
- 3.3 The Contractor shall protect all existing equipment and structures during pile installation.

PART 4 INSTALLATION

- 4.1 The minimum drilled hole diameter shall be within ½” of that shown on the plans. Holes shall be temporarily cased, as necessary, to the pile tip elevation or casing refusal materials. Casing may be terminated prior to the above requirements if the soils encountered can be drilled without caving.
- 4.2 If pile capacity dictates extending into refusal materials, continue drilling until an adequate rock socket is obtained as determined by the Designer.
- 4.3 Install mini-pile reinforcing in the center of the hole using centralizers as required. Measures shall be implemented to permit grout to flow from the pile to the annular spaces between the pile and the casing. Reinforcing bar and pile reinforcement shall be spliced as necessary.
- 4.4 Drill hole and casing shall be tremie grouted full length. At Contractor’s option, the pile reinforcing may be installed after grouting.
- 4.5 Temporary casing shall be slowly withdrawn and the grout level shall be checked periodically to ensure that the top of the grout does not fall below the bottom of the casing.
- 4.6 Care shall be exercised to prevent damage to previously installed piles. The center to center spacing of subsequently installed piles shall be adjusted based on soil conditions.
- 4.7 Piles may be regrouted to increase the bond with the surrounding soils. Piles which are to be regrouted shall be fitted with a regrout tube securely attached to the pile reinforcing. Regrouting shall be performed within 12 hours of pile installation.

PART 5 INSPECTION

- 5.1 All pile shall be continuously inspected by the Owner’s representative. A record shall be kept of each pile and shall include as a minimum:
1. Length of pile as installed
 2. Depth to rock
 3. Length of rock socket
 4. Theoretical grout volume

5. Actual grout volume for primary and regrouting
6. Grout pressure during casing withdrawal
7. Conditions encountered during drilling
8. Date and time of installation
9. Pile number or location description

5.2 Load tests, if required, shall be performed in accordance with ASTM 1143 “Quick Load Test Procedures”. The Contractor shall provide reaction system, calibrated jack, reference beams, dial gages, and personnel to operate the jacking system. Grout cubes shall be made from each mini-pile and tested at 3, 7, and 28 days. Grout shall have attained adequate strength for testing prior to performance of the load test.

PART 6 PAYMENT (pick one)

6.1 Pile installation shall be performed per the following rates:

Mobilization, load test, and demobilization		\$ _____
Install _____ ton capacity pile @ _____ ft. @ \$ _____ ea. =		\$ _____
Install _____ ton capacity pile @ _____ ft. @ \$ _____ ea. =		\$ _____
Total price		\$ _____

6.1A Pile installation and load tests shall be performed for the lump sum cost of \$ _____.

6.1B Pile installation shall be performed for the following rates:

Mobilization, demobilization		\$ _____
Install _____ ton capacity pile		\$ _____ /lf
Install _____ ton capacity pile		\$ _____ /lf
Perform load tests		\$ _____ ea