

SECTION 03 37 13 DECORATIVE SHOTCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Furnish labor, materials, tools, and equipment necessary to place, texture and finish shotcrete walls, rock formations by pneumatically projected concrete.

1.02 RELATED DOCUMENTS

- A. The Contract Documents in their entirety, including the Drawings, Specifications/Project Manual, Photo Reference Manual, Construction Contract Clauses, and any other documents issued as part of the Contract, apply to this Section.

1.03 REFERENCE STANDARDS

- A. ACI (American Concrete Institute) 506R-90(95), Guide to Shotcrete.
- B. ACI 318 Building Code Requirements for Reinforced Concrete.
- C. ACI 305R Hot Weather Concreting.
- D. ACI 306R Cold Weather Concreting.
- E. ACI 350 .1-10 Code Requirements for Environmental Engineering Concrete Structures and Commentary; American Concrete Institute International

1.04 SYSTEM DESCRIPTION

- A. The fabrication of artificial rockwork and the placement, installation, and/or adjustment of finish details and exhibit accessories shall be in such a manner as to appear as realistic as possible.
- B. The work of this section replicates shotcrete placed on the west side of 63rd Street near the intersection of Valmont in Boulder, CO.

1.05 SUBMITTALS

- A. General:
 - 1. In accordance with the Submittal requirements defined in Division 1 of this specification, submit the following for the Architect's review:
 - a. Sources of all materials.
 - b. Proposed equipment for use on the project.
 - c. Qualifications of shotcrete firm, and all personnel as specified in this section.
- B. Test Reports and Certificates:

1. Proposed mix design and test results that document the capability of the mix design to meet the specified requirements of this section.
2. Mill certificates:
Furnish certified copies of cement, silica fume, and pozzolan mill test reports showing compliance with drawings and specifications.
3. Aggregate test reports:
Furnish tests documenting that aggregate used in the work meets requirements specified herein.
4. Admixture test report & certificate:
 - a. Submit copies of tests showing conformance with requirements of ASTM C 494.
 - b. Provide certificate from supplier of mix design that all admixtures and additives are compatible.

C. Colors

1. Indicate selected color(s) to be used in preparation of sample panels.
2. Acceptance of color selection is based on the Architect's review of finished sample panels.

D. Mockups:

1. Prior to beginning work the Shotcrete Contractor shall submit one sample panel measuring at least 5 feet X 4 feet for the specific shotcrete finish as specified in this section, to the Architect for review.
2. Sample panel shall represent the finished surfaces, texturing and coloring. Panel will be used as the basis for review and acceptance of the work.
3. Sample panel may not be fabricated in place and may not remain as part of the work.
4. Panels shall not be removed until the completion of all work.
5. Rejected sample panels shall be re-submitted for review at no additional cost to the Owner.

1.06 QUALITY ASSURANCE

A. Architect's Review:

1. It is intended that the finished products of work in this section simulate natural formations of rock and earth.
2. To achieve these simulations the Shotcrete Contractor will coordinate and cooperate fully with all other Contractors and with the Landscape Architect.

3. Landscape Architect explicitly reserves the right to continuously monitor the work for aesthetic quality and inform the contractor when the intended aesthetic results have or have not been achieved.

A. Follow recommendations of ACI 305R when placing shotcrete during hot or cold weather.

B. Qualifications of the Shotcrete Contractor and Personnel:

1. Established firm with a minimum of ten (10) years experience in successfully constructing artificial earth and rock formations for natural habitat exhibits of similar nature to this project.

2. Foreman:

Project Foreman with a minimum of 6000 hours experience in the management of similar project crews and experience in coordination with other trades in the completion of simulated artificial exhibitry fabrication projects.

3. Artists:

Provide artists skilled, to the Architect's satisfaction, in the simulation of natural formations of rock and earth to supervise and perform the application of all aesthetic work.

4. Project Personnel:

Provide full documentation of all construction crew members listing specific personnel to be used and detailing the experience of each person listed and their ability to perform all phases of the work to the Architect's satisfaction.

PART 2 PRODUCTS

2.01 STEEL REINFORCING MATERIALS

A. Steel Welded Wire Reinforcement:

1. Mesh Size and Wire Gage: As indicated on Drawings, min.

4x4X6guage

2. Wire shall be mounted 1.5" beyond outside of soil nail wall.

2.02 CONCRETE MATERIALS

A. Portland Cement:

1. Portland cement type I/II 698 lbs per yard

2. Use only one brand of cement throughout the project.

3. Regional Materials: Regionally extracted and fabricated aggregates.

4. Fly ash, Nebraska Ash, Class C, Gerald Gentleman Station, Unit#1
148lbs/yd

5. 3/8" coarse aggregate 530 lbs/yd

6. Fine Aggregate 1950 lbs/yd

7. AEA, Master Builders as need to obtain 5 – 8% Air Entrainment

8. Water 311 lbs

9. Compressive strength at 7 days 5480 psi

10. Compressive strength at 21 days 6530 psi
11. Density = 137.6 pcf
12. Water to Cement ratio = .38

2.03 SURFACE SEALANT TO PREVENT WINTER SALT DAMAGE

- A. Material: Porous Plus sealer
- B. Locations: On Shotcrete walls.

PART 3 EXECUTION

3.01 GENERAL

- A. The shotcrete application shall be a structural substrate, capable of maintaining the intended shape, and supporting live and dead loads as specified or as required by codes.
- B. Provide sufficient thickness in the texture coat to assure its structural integrity and bonding to the structural substrate and to create the specified finishes. 90% of the surface shall be between 3 and 8". 10% of the surface shall be between 8" and 24" and shall have additional reinforcement of #3 rebar and stretched wire lath.
- C. Latex Molds:
 1. Make latex molds of natural rocks as approved in submittals.
 2. Use latex molds or latex skins to create fine texture surfaces either for cast rock panels or to create finish for texture coat at required areas.

3.02 FINISHES

- A. Color as approved by the Architect.
- B. Highlight and contrasting colors will be applied after installation with a medium that is non toxic, durable and can withstand the daily service environment.
- C. Designed fissures and crevices between rock forms shall be shaded darker than the surrounding rock surface to accentuate depth and contrast.

3.03 APPROVED CONTRACTORS:

- A. Colorado Hardscapes is the approved contractor for this portion of work.

Colorado Hardscapes
8085 E. Harvard Ave
Denver, CO 80231
303-750-8200

- B. Any other contractors wishing to bid on this project must be pre-qualified with the Landscape Architect at least 3 days prior to bid opening. To be considered for approval to bid, a contractor must submit:

8085 E. Harvard Ave.

Denver, CO 80231

P: 303.750.8200

F: 303.750.8886

1. Photo references of 3 jobs of similar look. All three jobs must be at least 10,000 square feet.
2. Financial bonding ability of at least \$3 million with a current letter of good standing and capacity with the bonding company.
3. Employees resume and experience detailing the minimum hours of experience listed above.
4. An additional sample at least 2' by 2' showing texture and coloring capabilities.