
A D D E N D U M N O . 1

**ATHLETIC FACILITIES RENOVATION
PROJECT**

DERBY HIGH SCHOOL

Derby, CT

KBA #17015.00 | CITY PROJECT NO. COD-02

Date: March 12, 2018

Page: 1 of 3

The following changes to the Project Manual shall become a part of the Drawings, Specifications, Bidding Requirements and Contract Documents; superseding previously issued Drawings, Specifications, Bidding Requirements, Contract Documents and Addenda, to the extent modified by this Addendum.

CLARIFICATIONS

BID DATE CHANGED TO: MONDAY, APRIL 2, 2018, time remains the same

CHANGES TO SPECIFICATIONS

TABLE OF CONTENTS

DIVISION 03 - CONCRETE

Add the following Section:

03 30 00 CAST-IN-PLACE CONCRETE

DIVISION 13 – SPECIAL CONSTRUCTION

Change 13 12 50 from “Grandstand Seating” to “Permanent Grandstand Seating and Press Box”

LIST OF DRAWINGS

Add the following drawings (previously unissued):

L4.09 Site Wall Details

L4.10 Site Wall Details

A1.01 Bleacher Demolition Plan, Layout & Sections

A1.02 Press Box Plans, Elevations, Sections & Details

BIDDING AND CONTRACT REQUIREMENTS

INVITATION TO BID

Paragraph 1

Bid Due Date **changed** from Friday, March 30, 2018 to: **MONDAY, APRIL 2, 2018**, time remains the same

DIVISION 03 – CONCRETE

Section 03 30 00 “Cast-In-Place Concrete” 15 pages

Add this Section in its entirety, attached at the end of this Addendum, dated March 12, 2018 – Addendum No. 1.

DIVISION 13 – SPECIAL CONSTRUCTION

Section 13 12 50 “Permanent Grandstand Seating and Press Box” 10 pages

Add the following Section in its entirety, attached at the end of this Addendum, dated March 12, 2018 – Addendum No. 1.

Section 13 12 51 “Prefabricated Structures” 4 pages

Add the following Section in its entirety, attached at the end of this Addendum, dated March 12, 2018 – Addendum No. 1.

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DIVISION 32 – EXTERIOR IMPROVEMENTS:

Section 32 32 00 “Segmental Retaining walls” 11 pages

Substitute the attached section in its entirety, dated March 12, 2018 – Addendum No. 1 in lieu of the section of the same name distributed with the bid drawings.

CLARIFICATION: Section 32 86 00 “Athletic Field Equipment” Section 2.15 “home bleacher companion benches” – Benches shall be Similar to Jaypro model PB-15PI (direct bury in lieu of surface mount).

CHANGES TO DRAWINGS

L2.01 SITE LAYOUT PLAN (re-issued with Bubbles) Revision date 3/12/2018

various call out clarifications

Wall design & Layout at south end

Clarifications to pressbox access stair and placement

L4.09 Site Wall Details (previously unissued) (Revision date 3/12/2018)

Alternate elevated metal walk detail.

L4.10 Site Details: ramp and rail details (previously unissued) (Revision date 3/12/2018)

C Drawings (11 sheets) Substitute included plans (11 sheets) in lieu of those included with the bid (Revision date 3/12/2018)

Various call outs

Revised Trench drains E and South

Revised Drainage Structures at home bleachers

Revised Grading Behind Visitors Bleachers,

Elevations at Home Press box.

Wall layout, grading and details

A1.01 Bleacher Demolition Plan, Layout and Sections (previously unissued) (Revision date 3/12/2018)

A1.02 Press Box Plans, Elevations, Sections & Details (previously unissued) (Revision date 3/12/2018)

BIDDER QUESTIONS:

Addenda #1 does not include any bidder questions:

ATTACHMENTS

L2.01 Site Layout and Materials Plan

L4.09 Site Wall Details

L4.09 Site Details

C1.01 UTILITY DEMOLITION PLAN

C1.02 DEMOLITION EROSION AND SEDIMENTATION CONTROL PLAN

C2.01 SITE LAYOUT (TRACK & FIELD)

C2.01 SITE LAYOUT (SOFTBALL FIELD)

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C3.01 SITE GRADING DRAINAGE & UTILITIES (TRACK & FIELD)
C3.02 SITE GRADING DRAINAGE & UTILITIES (SOFTBALL FIELD)
C3.03 ADD ALTERNATES
C5.01 CONSTRUCTION EROSION AND SEDIMENTATION CONTROL PLAN
C6.01 SITE DETAILS
C6.02 SITE DETAILS
C6.03 EROSION AND SEDIMENTATION CONTROL DETAILS
A1.01 Bleacher Demolition Plan, Layout & Sections (previously unissued)
A1.02 Press Box Plans, Elevations, Sections & Details (previously unissued)

Specifications:

Section 03 30 00 "Cast-In-Place Concrete" dated March 12, 2018 – Addendum No. 1. (previously unissued) 15 sheets
Section 13 12 50 "Grandstand Seating" dated March 12, 2018 – Addendum No. 1 (previously unissued) 10 sheets
Section 13 12 51 "Prefabricated Structures" dated March 12, 2018 – Addendum No. 1 (previously unissued) 4 sheets
Section 32 32 00 "Segmental Retaining Walls" Dated March 12, 2018 – Addendum No 1 (in lieu of bid section of same name) 11 sheets

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes in accordance with the Contract Documents and applicable Codes. The work shall include the following:
 - 1. Footings.
 - 2. Foundation walls.
- B. Related Sections include the following:
 - 1. Division 31, Section "Structural Fill"
 - 2. Division 31, Section "Earthwork"

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast furnace slag, and silica fume; subject to compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Concrete work shall conform to all requirements of A.C.I. 301-16 "Specifications for Structural Concrete ", published by the American Concrete Institute, Farmington Hills, Michigan, except as modified by the Supplemental Requirements below.
- B. Concrete supplier and Contractor shall certify that they are familiar with the above reference standard, and a copy shall be available on the job. A.C.I Standard 301-16 is available from American Concrete Institute, P.O. Box 9094, Farmington Hills, Michigan 48333-9094.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- E. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- F. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- G. Concrete Testing Service: Owner engages a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I.
- I. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- J. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Owner's independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures,

curing procedures, construction contraction and isolation joints, and joint-filler strips, semi rigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Submit reinforcing steel placing drawings for all reinforced concrete footings, buttresses, piers, walls and tie beams.
 - 1. Shop drawings for the reinforcement detailing, fabricating, bending and placing concrete reinforcement shall comply with ACI 315 “Manual of Standard Practice for Detailing Reinforced Concrete Structures”. All walls shall be drawn in elevation with all reinforcing included in the elevation including corner bars, dropped bars at column and door pockets and openings. The elevations shall be drawn to a minimum of $\frac{1}{4}'' = 1'-0''$.
 - 2. Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement. “SCHEDULING OF REINFORCING IS PROHIBITED”
 - 3. Subsequent submissions of shop drawings shall be dated and numbered and shall have all revision clearly noted with clouding of each revision.
 - 4. All reinforcing shall be properly labeled and indicated in elevations.
- D. Qualification Data: For Installer, manufacturers, and testing agency.
- E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- F. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.

4. Steel reinforcement and accessories.
5. Repair materials.

G. Field quality-control test and inspection reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Store materials protected from exposure to harmful weather conditions and at a temperature above 40° Fahrenheit.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

ACI 301-16
ACI 117

2.2 CONCRETE

- A. Concrete compressive strength for foundation walls and footings shall have:
 1. Compressive strength = 4000 psi minimum at 28 days.
 2. Slump = 4" +/- 1"
 3. Air Content = 6 to 8% for all walls, footings and slabs exposed to freezing temperatures.
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- C. Cementitious Materials:
 1. Portland Cement: ASTM C 150, Type I/II gray
 2. Flyash ASTM C618 Class C and ACI318-05
 3. Sand ASTM C33 SSD
- D. Normal-Weight Aggregates: ASTM C 33. Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 1. Maximum Coarse Aggregate Size: 3/4" nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- E. Water: ASTM C94 and potable.

- F. Air-Entraining Admixture: ASTM C 260
 - 1. For Footings, foundation walls, column piers and buttresses and all other concrete exposed to freeze/thaw action. - Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

- G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494
 - 2. Retarding Admixture: ASTM C 494
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017

- H. Do not use admixtures containing calcium chloride. All concrete shall contain a water-reducing and densifying admixture such as MASTER BUILDERS POZZOLITH or an approved equal as follows:
 - 1. All admixtures shall be incorporated as an integral part of the mix design.
 - 2. Admixture shall be manufactured by a firm having not less than 10 years experience in manufacturing and field testing of the product

- I. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
 - 1. When air temperature is between 85° and 90° F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes.
 - 2. When air temperature is above 90° F, reduce mixing and delivery time to 60 minutes.

2.3 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.4 STEEL REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."
- B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.5 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.8 CURING MATERIALS

- A. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- B. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.9 MISCELANEOUS RELATED MATERIALS

- A. Grout for leveling plates shall be "Five Star" non-shrink, nonmetallic grout as manufactured by Five Star Products, or approved equal.
- B. Bonding Agent: ASTM C 1059, Type II, non-re-dispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Give the RDP at least 2 working days' notice before placing concrete. Execution shall be in accordance with A.C.I. STANDARD 301-16, except as noted below.
- B. Employ a licensed land surveyor to check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before structural steel erection work proceeds. Contractor shall submit to the RDP the anchor bolt survey with all discrepancies between elevations, locations, conditions, etc., shown on the drawings and those actually encountered in the field noted on the survey. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with RDP.

3.2 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.3 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install dovetail anchor slots in concrete structures as indicated.

3.4 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.7 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by RDP.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Discharge concrete from mixer within 1 1/2 hours of batching.

3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Formed Surfaces: Cure formed concrete surfaces, including foundation walls and footings and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- C. Cure concrete according to ACI 308.R-16, by one of the following methods contractor shall be responsible for utilizing an appropriate curing method to achieve the required strength, moisture levels and other parameters.
 1. After placing and finishing, use one or more of the following methods to preserve moisture in the concrete:

- a. Ponding, continuous fogging, or continuous sprinkling;
- b. Application of mats or fabric kept continuously wet;
- c. Continuous application of steam (under 150°F);
- d. Application of sheet materials conforming to ASTM C171;
- e. Curing and Sealing Compound

3.9 COLD AND HOT WEATHER CONCRETE:

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When average high and low temperature is expected to fall below 40°F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot Weather Placement: Comply with ACI 301 and as follows:
 1. Maintain concrete temperature below 90°F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
 3. Loss of slump, flash set, or cold joints due to temperature of concrete as placed will not be acceptable. When temperature of concrete exceeds 90°F, obtain acceptance by the RDP of proposed precautionary measures to be undertaken. When temperature of steel reinforcement, embedments, or forms is greater than 120°F, fog steel reinforcement, embedments, and forms with water immediately before placing concrete. Remove standing water before placing concrete.

3.10 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.11 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Grout beam bearing plates and column leveling plates after they are set to true levels.
- B. Install Sika Latex acrylic bonding agent in strict accordance with manufacturer's recommendations, including but not limited to the removal of all foreign materials by mechanical means such as chipping or sandblasting, and dampening the surface with clean water before installation.
- C. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brushcoat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing agency to perform tests and to submit reports and the Owner will engage a qualified firm to perform Special Inspections per the Statement of Special Inspections. The Statement of Special Inspections document will be implemented by the RDP.
- B. Inspections:

1. Steel reinforcement placement.
 2. Headed bolts and studs.
 3. Verification of use of required design mixture.
 4. Concrete placement, including conveying and depositing.
 5. Curing procedures and maintenance of curing temperature.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 60 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064 one test hourly when air temperature is 40°F and below and when 80°F and above, and one test for each composite sample.
 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 6. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 8. Test results shall be reported in writing to RDP, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
11. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

END OF SECTION 03 30 00

SECTION 13 12 50 – PERMANENT GRANDSTAND SEATING AND PRESS BOX

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section includes modifications to existing exterior, permanent home team grandstand seating and a new press box.
- B. Providing all Engineering Design, materials, fabrication, freight, installation, supervision, and other miscellaneous items required for grandstand seating and press box in accordance with these Specifications and Contract Drawings.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 02 Section “Earthwork”.
 - 2. Division 03 Section “Cast-In-Place Concrete”.
 - 3. Division 26 Section “Electrical”.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for all press box components, including paint products, railings, and chainlink fence products.
- C. Shop Drawings detailing fabrication and erection of replacement seating system and press box. Include seating plan indicating aisles, walkways, seating sections, and relationship to existing construction. Show anchorage and accessory items for seating and press box. Show front, rear and end elevations and sections through press box. Provide details and schedules for the fabrication and of all structural components. Include details of all cuts, connections, chamber, welds and other pertinent data. Provide templates for anchors and bolts specified for installation under other Sections. All drawings must be prepared by and bear the stamp of a professional engineer licensed in the State of Connecticut.
 - 1. All structural detailing shall follow the standard practice as set forth in AISC “Detailing for Steel Construction.”
 - 2. Seating plan indicating aisles, walkways, seating sections, and relationship to existing construction.
 - 3. End elevations/sections indicating deck configuration, method of attachment, railing, and size of framing members.
 - 4. Seatboard/footboard configuration and method of attachment.

5. Calculations by a Registered Professional Engineer with State Licensure.
6. Schedule of work experience, including names and telephone numbers of contacts; 10 projects minimum of equal value.
7. Schedule of work experience, including names and phone numbers of contacts, 10 projects minimum of equal value.
8. Project schedule, including phasing with other trades and designation for all tasks, milestone dates for drawing submittal, fabrication time, key material delivery dates and designated dates of installation.

D. Samples

1. Color samples for siding and roofing
2. 12" x 12" chain link
3. Seat mounting brackets if new are required

E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.

1.4 DESIGN CRITERIA

A. All material and workmanship shall comply with the following requirements:

1. The 2016 Connecticut State Building Code (CSBC) and 2016 Connecticut Fire Safety Code (CSFSC) including:
 - a. 2012 International Building Code (IBC)
 - b. 2012 International Mechanical Code (IMC)
 - c. 2012 International Energy Conservation Code (IECC_
 - d. 2014 NFPA 70 National Electrical Code (NEC)
 - e. 2009 ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
 - f. 2012 International Fire Code (IFC), including all referenced standards.
 - g. Current OSHA
 - h. Connecticut General Statutes
 - i. Title II of the Americans with Disabilities Act (ADA) including the 2010 ADA Standards for Accessible Design
 - j. 2012 ICC 300 Standards For Bleachers, Folding and Telescoping Seating and Grandstands
2. AISC Manual of Steel Construction, Load & Resistance factor Design, 13th Edition
3. Aluminum Association of America

B. Structural Performance: Engineer, fabricate, and install modifications to grandstand seating systems to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each of the respective components of each metal fabrication.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:

- a. Concentrated load of 200 lbf applied at any point and in any direction.
- b. Uniform load of 50 lbf per linear foot applied horizontally and concurrently with uniform load of 100 lbf per linear foot applied non-concurrently or vertically downward.
- c. Concentrated and uniform loads above need not be assumed to act concurrently.

C. Federal Specification LP-390C, Type 1, Class M, Grade 2, Category

D. Design Loads:

| | | |
|------------|------------------|---|
| Dead Load: | 10 psf | seat and footboards, risers, etc. |
| Live Load: | 100 psf | To structural members. All stringers and girders shall be limited to L/200 for maximum vertical live load deflection. |
| Live Load: | 120 plf | Seatboards/Footboards |
| Wind Load: | Local Wind Speed | On projected vertical surface. Uplift per current State Building Code |

- E. General: The structure shall be properly braced for wind and construction loads until all structural elements are secured. Lateral and longitudinal bays shall be cross-braced as required. Guardrails shall be of adequate size, location, and height to meet specified codes and designed to carry required loads.
- F. Code Compliance: Submittals shall be based upon specifications contained in the bid documents. Interpretation of code compliance for life safety issues is provided in design documents. Any change to design must have approval prior to bid. Design changes to reduce aisles or exits is not allowed. Bidder is responsible to meet the code interpretation provided in bid drawings and specifications.
- G. Deflection: Structural elements shall be sized to limit the live load deflections to 1/360 of the span.
- H. Foundations: Foundations have been sized by an engineer and are based on soil bearing capacity per the provided geotechnical report. Soil bearing capacity to be verified by the Owner prior to placement of footings. Foundation sizes on drawings will not be reduced under any circumstance. Downsizing or redesigned foundations are not allowed.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing permanent grandstand seating systems and press boxes similar to those indicated for this project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work. Review of the manufacturer’s qualifications shall be based upon the following criteria:
 - 1. 10 Years minimum experience in the design, fabrication and erection of permanent grandstand seating systems and press boxes.

2. A list of similar projects completed within the last three (3) years. Provide references and telephone numbers for each. The Owner shall have the right to visit any one of the listed projects. Out of state travel costs shall be borne by the bidder.
 3. Compatibility and equality of any proposed alternate manufacturer's system with the Construction Drawings and this Specification.
- B. Evaluation of compatibility and equivalence shall be at the sole discretion of the Owner.
- C. Engineer Qualifications: Professional engineer legally authorized to practice in the State of Connecticut and experienced in providing engineering services of the kind indicated for permanent grandstand seating systems and new press box similar to this Project in material, design, and extent, and that have a record of successful in-service performance.
- D. Coating System Applicator Qualifications: Company specializing in coating system application with a minimum of 10-years' experience.
- E. Installer Qualifications: Arrange for modifications to existing grandstand seating systems and new press box by a firm that can demonstrate successful experience in installing permanent grandstand seating items similar in type and quality to those required for this Project.
- F. Installer Certification: Obtain written certification from manufacturer of permanent grandstand seating systems and press box certifying that Installer is approved by manufacturer to install specified grandstand system and new press box and supervised by personnel trained by the Manufacturer in proper application of the product. Provide copy of certification for Architect prior to awarding this work. Such certification shall have been issued by the manufacturer no less than 5 years prior to the date of the Contractor's Bid Proposal.
- G. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code—Steel", AWS D1.2 "Structural Welding Code—Aluminum", and AWS D1.3 "Structural Welding Code—Sheet Steel".
1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- H. Submit evidence of product liability Certificate of Insurance for life of the product.
- I. Warranty: The Press Box shall be under warranty for a period of one year beginning at date of Substantial Completion. The Press Box is warranted to be free from defect in materials and workmanship in the course of manufacture. This warranty excludes any other defects resulting from abnormal use in service, accidental or intentional damage or any occurrences beyond manufacturer's control.
- J. Product shall be guaranteed for five (5) years on the structure and three (3) years on the finish together with labor. Damage resulting from abnormal use, vandalism, or incorrect installation (if done by other than authorized installer of the manufacturer) is not applicable. The coating system shall be guaranteed for a ten (10) year period against defective materials and workmanship.

- K. Project schedule, including phasing with other trades and designation for all tasks, milestone dates for drawing submittal, fabrication time, key material delivery dates and designated dates of installation.
- L. Detailed Certificate of Insurance, including products/completed operations liability insurance, shall be provided.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack materials, provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1.7 PROJECT CONDITIONS

- A. A visitation to the site prior to bid by a qualified representative of the grandstand and press box manufacturer is recommended. No allowance will be made after the award of contract for any problems encountered which would have been discovered during the pre-bid visitation. In addition, the representative of the manufacturer will revisit the site within six (6) months after completion of the project for reinspection with the Owner.
- B. Field Measurements: Check actual locations of other construction to which grandstand seating system and press box must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings to avoid delaying the Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurement. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting at no additional cost to the Owner.
- C. Code compliance: Approval Drawings shall be based upon the criteria indicated herein. Achieving compliance to the Codes indicated is mandatory and is the manufacturer's responsibility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with the Plans and Specifications herein provide grandstand seating components by GT Grandstands or comparable product.

2.2 STRUCTURAL STEEL

- A. All detailing, fabrication, and erection shall be in accordance with AISC Specifications, Load & Resistance Factor Design. All fabrication shall be completed in an AISC certified facility.
- B. Structural steel shall be ASTM A572 multi-certified grad 50, Miscellaneous steel shall be ASTM A36.

- C. All bolts 5/8" diameter and larger shall be ASTM A325. All bolts 1/2" and smaller shall be ASTM A307. Threaded rod shall be ASTM A36.
- D. All welds shall conform to ANSI/AWS D.1, latest edition. Electrodes shall be E70XX.

2.3 Materials

A. Extrusions

- 1. Footboards and toeboards shall be 6063-T6 extruded aluminum with a fluted surface and a wall thickness of .078". The minimum acceptable vertical height is 1.750". Footboards and toeboards shall be slip and stain resistant finish. Finish shall be produced in addition to the mill finish and shall prevent oxidation staining. Slip resistance shall improve co-efficient of friction in all directions. This is not an untreated mill finish.
- 2. Seats shall be 6063-T6 extruded aluminum with a fluted surface and a minimum of 4 vertical legs. The exact size of seatboard is 2" x 10" x .080" wall thickened at the joints and weighing 1.9 lbs. per foot with 1" radius comfort curve front edge. Seat Brackets shall bolt directly to the steel understructure. Supporting seat brackets in the aluminum channels of the deck will not be permitted. Mounting brackets: 3/16" thick A36 steel plate, plasma cut, bent and galvanized. Seat board ends shall be closed with cast aluminum, friction fit end caps and secured with rivets.
- 3. Footboards shall be 6063-T6 extruded aluminum with a fluted surface and a wall thickness of .078". The minimum acceptable vertical height is 1.750". Footboards shall be slip and stain resistant finish. Finish shall be produced in addition to the mill finish and shall prevent oxidation staining. Slip resistance shall improve co-efficient of friction in all directions. This is not an untreated mill finish.
- 4. Adapter plates shall be 6061-T6 extruded aluminum and shall be mill finish.

B. Hardware:

- 1. Bolts used for field installation shall be hot dipped galvanized after fabrication.
- 2. End Caps.
 - a. Seatboard, walkway, footboard and aisle board end caps shall be cast aluminum, friction fit.

C. Closure

- 1. Vertical closure shall be provided at the locations shown on the drawings and shall enclose the area from 1.5" below walking surface to 4" above grade:
 - a. Vertical closure material shall be a minimum 1/2" thick
 - b. Vertical closure material shall be 100% recycled post-consumer products
 - c. Vertical closure material shall be non-metallic, non-corrosive, wear and abrasion resistant, stress-crack resistant, waterproof, impervious to most chemicals, and impact resistant
 - d. Panels shall be provided in color selected by the architect
 - e. Panel color must be impregnated through the material, and no panels shall be painted
 - f. Panels shall have no water absorption

- g. Vertical closure material shall be provided in panels and framed on all sides with heavy duty aluminum shapes integrated with the grandstand steel and /or aluminum framing

2.4 PRESS BOX

A. DESIGN CRITERIA

1. Press box shall be independently supported 8 feet wide x 30 feet 6 inches long.
2. Press box dimensions: 8 feet wide x 30 feet 6 inches long with 3 interior compartments.
3. Press box to be of open construction, allowing inspection of electrical wiring, switches and other components without destructive disassembly.
4. All material and workmanship shall be in accordance with the applicable state building codes indicated.
5. All electric components shall be UL listed.
6. Design Loads:
 - a. Live Load 100 psf floor
 - b. 50 psf roof (w/ filming platform)
 - c. Wind Per Local Regulations on vertical surfaces
7. Design Classification
 - a. Use Group: A-5, Construction Type: IIB

B. Support Structure

1. Galvanized
2. Structural shapes meet one of the following ASTM specifications: A36, A36/A572 grade 50, A572 grade 50, A529-50, or A500 grade B.
3. Shop connections are seal welds or bolted.
4. After fabrication, all steel is hot-dipped galvanized to ASTM-A-123 specifications.
5. All materials shall be new and shall comply with ASTM specifications.

C. Floor Construction

1. Main support to be galvanized steel floor frame sized to support structure and 26 gauge "U" panel underbelly with galvalume finish for support of insulation.
2. Floor to be mill finished interlocking Aluminum Decking System, extruded aluminum alloy 6063 T6, mill finish. Attach Decking System to steel floor frame with mechanical fasteners at end of plank and at intermediate supports.
3. Insulation: R-13 Fiberglass, BATT insulation with vapor barrier.

D. Wall Structure

1. 4 inch x 4 inch x 11 gauge square tubing with maximum span of 14 feet on front wall and maximum span of 6 feet on back wall and 4 inch x 18 gauge steel studs with maximum spacing of 5 feet for all walls with siding. Spans greater than these require engineered calculations for design. All steel studs treated with metal primer after welding.
2. Insulation: R-13 Fiberglass BATT insulation with vapor barrier

E. Interior Finish

1. 5/8" vinyl coated gypsum panels, Class A rated.
2. Cove Base: Vinyl 4 inches.

F. Exterior Finish

1. 26ga "U" panel pre-finished ribbed steel exterior siding with Kynar 500 finish (color as selected from standard color list)

G. Roof Structure

1. 4 inch x 4 inch x 3/16" square tubing with maximum spacing of 6 feet on center and 4" x 18ga gauge steel studs with maximum spacing of 2 feet on center. All treated with metal primer after welding.
2. Roof: 1/8 inch steel plate roof, continuous welded seams coated with metal primer and 36 mils of white elastomeric roof coating.
3. Insulation: R 19 Batt insulation with vapor barrier.
4. Fascia: 26 gauge steel prefinished trim with Kynar 500 finish (color as selected) to match metal siding.
5. Ceiling: 24 inch x 24 inch gypsum suspended ceiling system, class A rated.

H. Exterior Doors

1. 18 gauge insulated galvanized hollow metal door with 16 gauge steel wrap around frames (paint to match siding), hydraulic closer, weatherstrip, aluminum threshold and exterior commercial lever handled lockset, interior panic bar exit device.

I. Interior Door

1. Interior Birch Unit. Dimensions: 3 feet 0 inches x 6 feet 8 inches.
2. Hardware: Handles shall be lever type that allow operation without tight grasping or twisting of the wrist.

J. Interior Walls

1. Framing to be steel galvanized studs (25 gauge) 1 1/4 inch x 3 5/8 inch at maximum 2 feet on center.
2. Finishes to be consistent with all other interior finishes.

K. Windows

1. Frame: Extruded aluminum single hung, vertical sliding unit, thermal break.
2. Sash: Tilt toward inside for easy cleaning.
3. 7/8" insulated tempered safety glass.
4. Dimensions of each unit: Dependent on compartment size. At interior wall locations or structural support locations the dimension between windows shall be no greater than 6 inches.
5. Frame color white.

L. Work Bench

1. 18 inch wide work bench of plastic laminate.

M. Electrical

1. Submittal drawing shall indicate devices and circuitry.
2. Fixtures: 2 lamp, 40 watt fluorescent, white strip design as manufactured by Lithonia Lighting, or equal. Fixtures shall be located above countertop and be maximized to full length of compartment space.
3. All wiring to be encased in thin all EMT conduit min. 12thhn copper wire. N.E.C. breaker box to be 100 amp surface mounted on wall with 1.5 inch rigid conduit to be stubbed out at back wall of press box ready for service line to be connected. (Service line to Press Box is responsibility of Owner).
4. Electrical outlet(s) installed per NEC shall be standard duty. All outlets shall be surface mounted and grounding type on wall
5. Sound, Telephone, Clock, Field Communication: Empty double outlet boxes per N.E.C. with 3/4 inch conduit stubbed out bottom of Press Box for use of Owner. Outlet boxes to be flush mounted into wall. Any wiring completed on site will be responsibility of such contractor for inspections. Quantity. Two will be provided. Owner shall indicate additional boxes needed.

N. Filming Area/Observation Deck

1. Bilco #S-50 roof hatch with Alaco #460 aluminum ladder. Include guardrail on sides with gate to provide fall protection at open sides of roof hatch.
2. Weathertight outlet box for cameras. Quantity: as indicated on plans.
 - a. Access: Roof hatch with OSHA-rated aluminum ladder mounted to an interior back wall.
 - b. Roof guardrailing to be 48" above walking surface around perimeter of deck attached to 5/8 inch galvanized studs to be welded to roof support structure. The guardrailing to include anodized aluminum with 9 gauge galvanized chain link fencing fastened in place with galvanized fasteners and aluminum ties.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, drawings, diagrams, templates, instruction, and directions for assembling and installing seating systems. Coordinate delivery of such items to Project site.

3.2 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for modifications to existing grandstand seating and new press box system. Set grandstand seating components and press box accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- B. Fit exposed connections accurately together to form hairline joints. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

3.3 INSTALLATION

- A. General: Comply with plans, approved shop drawings; manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Erect grandstand seating components and press box securely, with provisions for thermal and structural movement.
- B. Installation shall be performed directly by the Manufacturer or by a factory certified Installer.

3.4 ADJUSTING AND CLEANING

- A. Touch-up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal.
- B. For galvanized surfaces, clean bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.
- C. Clean all surfaces after erection in accordance with manufacturer's recommendations.
- D. Remove and properly dispose of all packaging and construction debris.

END OF SECTION 13 12 50

SECTION 13 12 51 – PREFABRICATED STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section includes prefabricated wood storage sheds.
- B. Providing all Engineering Design, materials, fabrication, freight, installation, supervision, and other miscellaneous items required for storage shed structures in accordance with these Specifications and Contract Drawings.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 03 Section “Cast in Place Concrete”.

1.3 SUBMITTALS

- A. Shop Drawings: Contractor shall provide fully dimensioned shop drawings and manufacturer’s technical literature for all improvements and confirm colors, fabrication, reinforcing, and anchoring systems for approval.
- B. Samples
 - 1. Color samples for siding and roofing for selection by Owner
- C. Design Loads:
- D. General: The structure shall be properly braced for wind and construction loads until all structural elements are secured. Lateral and longitudinal bays shall be cross-braced as required.
- E. Deflection: Structural elements shall be sized to limit the live load deflections to 1/200 of the span.

1.4 QUALITY ASSURANCE

- A. Engineer Qualifications: Professional engineer legally authorized to practice in the State of Connecticut and experienced in providing engineering services of the kind indicated for prefabricated wood structures similar to this Project in material, design, and extent, and that have a record of successful in-service performance.
- B. Submit evidence of product liability Certificate of Insurance for life of the product.

- C. Warranty:
- D. Product shall be guaranteed for five (5) years on the structure and three (3) years on the finish together with labor. Damage resulting from abnormal use, vandalism, or incorrect installation (if done by other than authorized installer of the manufacturer) is not applicable. The coating system shall be guaranteed for a ten (10) year period against defective materials and workmanship.
- E. Project schedule, including phasing with other trades and designation for all tasks, milestone dates for drawing submittal, fabrication time, key material delivery dates and designated dates of installation.
- F. Detailed Certificate of Insurance, including products/completed operations liability insurance, shall be provided.

1.5 PROJECT CONDITIONS

- A. A visitation to the site prior to bid by a qualified representative of the prefabricated wood-framed structure manufacturer is recommended. No allowance will be made after the award of contract for any problems encountered which would have been discovered during the pre-bid visitation. In addition, the representative of the manufacturer will revisit the site within six (6) months after completion of the project for reinspection with the Owner.
- B. Field Measurements: Check actual locations of other construction to which prefabricated wood-framed structure must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings to avoid delaying the Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurement. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting at no additional cost to the Owner.
- C. Code compliance: Approval Drawings shall be based upon the criteria indicated herein. Achieving compliance to the Codes indicated is mandatory and is the manufacturer's responsibility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Product: Subject to compliance with the Plans and Specifications herein provide Carefree Building Storage Master Cottage or comparable product.

2.2 STORAGE SHED

- A. Wood storage sheds shall be size indicated on drawings. Three sheds are required.
- B. Sheds shall be weatherproof.

- C. Foundation lumber shall be pressure treated 4 x 4 timbers.
- D. Framing lumber shall be manufactured to conform to PS 20, "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review. Species shall be one of the following: Southern Yellow Pine; Douglas Fir; Hem-Fir.
- E. Exterior: Vinyl clapboard siding shall be applied over 1/2-inch plywood sheathing. Provide solid vinyl trim.
- F. Roof sheathing shall be 1/2" CDX plywood.
- G. Flooring shall be pressure treated 2 x 6 floor joists at 12 inches on center, covered with 3/4-inch UL exterior grade plywood.
- H. Roofing shall include aluminum drip edges and 30-year architectural roof shingles.
- I. Roof structure shall be engineered roof trusses 16 inches on center utilizing metal barbed structural connectors pressed into the wood with up to 20 tons of force.
- J. Shed shall have reinforced double leaf door, with adjoining pressure treated ramp from floor to grade.
- K. Entire structure shall be painted in latex/acrylic exterior paint. Color to be selected by Architect.
- L. Shed shall not have windows.
- M. Access ramp shall be provided at all doors.
- N. Screened wall louvers shall be provided on both gable ends.
- O. Exterior door shall be 18 gauge galvanized hollow metal with 16-gauge steel wrap around frames (paint to match siding), hydraulic closer, weatherstrip, aluminum threshold and exterior commercial lever handled, keyed lockset.
- P. Provide galvanized steel floor guards.
- Q. Provide overhead storage loft.
- R. Provide large trim and overhangs.
- S. Stud walls shall be 16 inches on center approximately 8 feet high. Headers shall be provided over doors and studs provided in corners.
- T. Provide garage package including passage door, garage door with ramp and heavy-duty pressure treated floor.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Confirm completion of pavements and other improvements are properly sequenced prior to installation of storage sheds.
- B. Coordinate and furnish anchorages, drawings, instructions, and directions for installing wood sheds.
- C. Coordinate delivery to Project site.

3.2 INSTALLATION

- A. Sheds shall be fabricated on site.
- B. Fabricate wood storage sheds on site on concrete slab where indicated on Drawings. Anchor shed to slab in conformance with manufacturer's recommendations and in accordance with Connecticut State Building Codes.

3.3 PROTECTIONS/CLEAN UP

- A. Clean all surfaces after erection in accordance with manufacturer's recommendations.
- B. Remove and properly dispose of all packaging and construction debris.

END OF SECTION 13 12 50

SECTION 32 32 23 — REINFORCED SEGMENTAL RETAINING WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section “Summary.”

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Segmental retaining walls with soil reinforcement.
 - 2. Capstone
 - 3. Fence footing brackets
 - 4. Backfill requirements
- B. Related Sections include the following:
 - 1. Division 3 Section “Concrete Site Walls”
 - 2. Division 31 Section “Site Clearing”.
 - 3. Division 31 Section “Earth Moving”.
 - 4. Division 32 Section “Chain Link Fence”
 - 5. Division 33 Section “Storm Drainage”.

1.3 DEFINITIONS

- A. Form 817: “Standard Specifications for Roads, Bridges and Incidental Construction”, State of Connecticut, Department of Transportation, Form 817, 2016 edition, as amended.

1.4 REFERENCE STANDARDS

- A. Engineering Design
 - 1. NCMA Design Manual for Segmental Retaining Walls, Second Edition.
 - 2. NCMA TEK 2-4 - Specifications for Segmental Retaining Wall Units.
 - 3. NCMA SRWU-1 - Determination of Connection Strength between Geosynthetics and Segmental Concrete Units.
 - 4. NCMA SRWU-2 - Determination of Shear Strength between Segmental Concrete Units.
- B. Segmental Retaining Wall Units
 - 1. ASTM C 140 - Sampling and Testing Concrete Masonry Units
 - 2. ASTM C 1262 - Evaluating the Freeze - Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units.
 - 3. ASTM C 33 - Specification for Concrete Aggregates

4. ASTM C 90 - Standard Specification for Load-Bearing Concrete Masonry Units
5. ASTM C 150- Specification for Portland Cement
6. ASTM C 595 - Specification for Blended Hydraulic Cements

C. Geotextile Filter

1. ASTM D 4751 - Standard Test Method for Apparent Opening Size

D. Geosynthetic Reinforcement

1. ASTM D 4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
2. ASTM D 5262 - Test Method for Evaluating the Unconfined Creep Behavior of Geosynthetics.
3. GRI GG-1: Single Rib Geogrid Tensile Strength
4. GRI GG-5: Geogrid Pullout
5. GRI GT-6: Geotextile Pullout

E. Soils

1. ASTM D 698 - Moisture Density Relationship for Soils, Standard Method
2. ASTM D 422 - Gradation of Soils
3. ASTM D 424 - Atterberg Limits of Soils
4. ASTM D G51 - Soil pH

F. Drainage Pipe

1. ASTM D 3034 - Specification for Polyvinyl Chloride (PVC) Plastic Pipe
2. ASTM D 1248 - Specification for Corrugated Plastic Pipe

G. Where specifications and reference documents conflict, the Owner or Owner's Representative shall make the final determination of applicable document.

1.5 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide segmental retaining walls capable of withstanding the effects of loads due to soil pressures resulting from grades indicated.

1. Design retaining walls according to NCMA's "Design Manual for Segmental Retaining Walls". Note location of adjacent chain link fence – modify design of wall and geogrids as required to permit full depth concrete fence foundations.

1.6 SUBMITTALS

A. Product Data: For each type of segmental retaining wall and other manufactured products specified.

B. Provide engineered shop drawings of all walls, with appropriate loads and surcharges, prepared and sealed by a Structural Engineer responsible for their preparation. The information provided shall include design loadings and structural analysis. For walls over four feet in height, the Structural Engineer of record shall perform a global stability analysis utilizing the site soil

properties provided in the Geotechnical Report included in the Project Manual. The Engineer shall

1. Review the site soil and geometric conditions to ensure the designed wall is compatible with the site prior to construction and during construction to review actual conditions.
 2. Shall Inspect the site conditions, materials incorporated into the retaining wall, and the construction practices used during the construction.
 3. Shall provide the Architect with a letter after completion, certifying the design meets the requirements of this specification, the design was compatible with the site and the wall was constructed according to design. Include test data required by “Source Quality Control” in Section 2 for each roll of soil reinforcement.
- C. Provide detailed drawings indicating layout and elevations of wall, specifying “steps” in wall elevations consistent with per project grading requirements. Steps shall be designed with a consistent spacing and shall be limited to the design and minimized in amount unless otherwise approved.
- D. Samples for Verification: Sets for each color, finish, and pattern of unit required. Include 5 or more samples; in each set showing the full range of variations expected.
- E. Qualification Data: Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Preconstruction Test Reports: Indicate and interpret test results for compliance with performance requirements.
- G. Materials Submittals
1. Product Test Reports: Indicate compliance of retaining wall units, soil reinforcement and wall accessories with requirements of the design based on comprehensive testing of current products.
 2. Include test data verifying properties used as basis of structural design.
 3. Include test data required by “Source Quality Control” Paragraph 2.4 for each roll of soil reinforcement.
- H. Research/Evaluation Reports: Evidence of system’s compliance with building code in effect for Project from a model code organization acceptable to authorities having jurisdiction.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed segmental retaining walls similar in material, design and extent to that indicated for Project that has resulted in construction with a record of successful in service performance.
- B. Professional Engineer Qualifications: The professional engineer for wall designs shall be legally qualified to practice in the **State of Connecticut** and be experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of systems that are similar to those indicated for this Project in material, design and extent.

- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated without delaying the Work, as documented according to ASTM E 548.

- D. Mockups: Before installing segmental retaining walls, construct sample wall panels to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for completed Work.
 - 1. Locate mockups as directed by Architect and Project Manager.
 - 2. Build mockups for each type of segmental retaining wall in sizes approximately 96 inches long by 36 inches high above finished grade at front of wall.
 - a. Include typical base and cap or finished top construction.
 - b. Include backfill to typical finished grades at both sides of wall.
 - c. Include 36 inch return at 1 end of mockup with typical corner construction.
 - 3. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. Approval of mockups does not constitute approval of deviations from Construct Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
 - b. When directed, demolish and remove mockups from Project site.
 - c. Approved mock-ups may be incorporated into the finished work.

- E. Construction Tolerances: The following tolerances are the maximum allowable deviation from the planned wall construction:
 - 1. Vertical Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
 - 2. Horizontal Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
 - 3. Rotation: +/- 2 degrees from planned wall batter
 - 4. Bulging: 1.0 inch over a 10 ft distance

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project Site in an undamaged condition.

- B. Store and handle retaining wall units and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping or other causes.

- C. Store accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

- D. The installing contractor shall check all materials delivered to the site to ensure that the correct materials have been received and are in good condition.

- E. The Contractor shall store and handle all materials in accordance with the Manufacturer's recommendations and in a manner to prevent deterioration or damage due to moisture, temperature changes, contaminants, breaking, chipping or other causes.

- F. Store and handle geotextiles according to ASTM D 4873.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Basis of Design wall units are Siena Stone and Concord Wall units as manufactured by Unilock, or approved equal. As distributed by Unilock New England, Uxbridge, MA.
- B. Subject to compliance with requirements, or equal wall unit products may be manufactured by one of the following:
 - 1. Retaining Wall Units:
 - a. Licensees of Allan Block Corp.
 - b. Licensees of Amastone Co.
 - c. Licensees of Anchor Wall Systems, Inc.
 - d. Licensees of ICD Corp.
 - e. Licensees of Keystone Retaining Wall Systems, Inc.
 - f. Licensees of Kiltie Corp.; Versa-Loek Retaining Wall Systems Division.
 - g. Licensees of Mesa Retaining Wall Systems.
 - h. Licensees of Reinforced Earth Co., (The).
 - i. Licensees of Rockwood Retaining Wall Systems.
 - 2. Soil Reinforcement:
 - a. Amoco Fabrics and Fibers Co.
 - b. Huesker, Inc.
 - c. Nicolon Corp.; Nicolon/Mirafi Group.
 - d. Strata Systems, Inc.
 - e. Tensar Earth Technologies, Inc.

2.2 RETAINING WALL UNITS

- A. Siena Stone Concrete Segmental Retaining Wall Units:

1. The concrete wall modules shall be solid units 39" x 7.25" x 13.5" inches (318# ea), 39"x7.25"x20"(477# ea.) or 39"x7.25"x36.5" (954# ea) with a maximum tolerance of plus or minus 1/8 in. for each dimension.
2. The concrete wall modules shall have a integral shear key connection that shall be offset to permit a minimum wall batter of 1H : 8V.
3. The concrete wall modules shall have a minimum 28-day compressive strength of 35 MPa (5000 psi) as tested in accordance with ASTM C 140. The concrete shall have a maximum moisture absorption rate of 5 percent to ensure adequate freeze-thaw protection.
4. Provide corner, closed end and coping units as shown on the drawings compatible with the structure design system of the pavers and matching in color and appearance.
5. Color: Split face texture, Color to be Granite.

B. Concord Wall Concrete Segmental Retaining Wall Units:

1. The concrete wall modules shall be 15.75" x 5.87" x 11.75" inches (75.6# ea), 11.75 x 7.875" x 5.875" (43# ea.) or 9.875" x 11.75" x 5.875" (67.5# ea) or other standard system units with a maximum tolerance of plus or minus 1/8 in. for each dimension.
2. The wall modules shall have a integral shear key connection that shall be offset to permit a minimum wall batter of 1H : 8V.
3. The concrete wall modules shall have a minimum 28-day compressive strength of 35 MPa (5000 psi) as tested in accordance with ASTM C 140. The concrete shall have a maximum moisture absorption rate of 5 percent to ensure adequate freeze-thaw protection.
4. Color: Split face texture Color to be Granite to match Sienna units.

C. Surface Texture: Provide units with machine split faces and smooth walls and cast beds.

D. Special Units: Provide corner units, end units, cap units and other special shapes as necessary to produce retaining walls of dimensions and profiles indicated and to provide indicated textures on exposed surfaces.

2.3 INSTALLATION MATERIALS

A. Wall Backfill: shall consist of free draining sands or gravels with less than 5% passing the #200 sieve size or as specified in the Construction Drawings.

1. The Engineer shall review and determine the suitability of the wall infill soil at the time of construction.

B. Retained Soil: shall be on site soils unless specified otherwise in the Construction Specifications or as directed by the Owner or Owner's Representative. If imported fill is required, it shall be examined and approved by the Engineer.

- C. Granular Backfill/Leveling Base Material: shall be non-frost susceptible, well graded compacted crushed stone similar to CT DOT 3/4" processed aggregate, or a concrete leveling base, or as shown on the Construction Drawings.
- D. Drainage aggregate: shall be ornamental, free draining 3/4" washed crushed stone similar to CT DOT gradation #6 or approved equal.
 - 1. Drainage aggregate shall be a free draining angular granular material of uniform particle size which in all instances is separated from the native soils, sands or processed aggregates by a geotextile filter fabric.
- E. Peastone: shall be ornamental, 3/8" washed crushed stone similar in gradation to CT DOT No. 8 stone.
- F. Drainage Pipe: Refer to Specifications Division 33.
 - 1. Drainage pipe shall be perforated corrugated HDPE or PVC pipe, with a minimum diameter of 100 mm (2 inches), protected by a geotextile filter to prevent the migration of soil particles into the pipe, or as specified on the construction drawings.
- G. Geotextile Filter Fabric: shall be nonwoven #140N as manufactured by Mirafi or approved equal.
 - 1. Apparent Opening Size: No. 1000 per ASTM D 4751.
 - 2. Permeability: 150 gpm/sq. ft. per ASTM D 4491.
 - 3. Grab Strength: 100 lbf per ASTM D 4632.
- H. Geogrid Reinforcement:
 - 1. The Design Engineer shall determine the type, strength and placement location of the reinforcing geosynthetic based on the approved wall system. The design properties of the reinforcement shall be determined according to the procedures outlined in this specification.
 - 2. Detailed test data shall be submitted with the design calculations and shall include tensile strength (ASTM D 4595 or GGI GG-1), creep potential (ASTM D 5262), site damage and durability (GRI GG-4) and pullout resistance (GRI GG-5 or GRI-GT-6) and connection strength (NCMA SRWU-1).
- I. Cap adhesive: Product supplied or recommended by retaining wall unit manufacturer for adhering cap units to units below.
- J. Fence Post Footing Brackets: For fence posts set within 18" behind wall unit face provide 'Sleeve-it' model 1224R 12" diameter x 24" depth steel reinforced fence post footing brackets for soil reinforced walls as manufactured by Strata Systems, Inc. or approved equal. Strata@geogrid.com
- K. Other aggregate materials: Comply with requirements of Division 31, Section "Earth Moving".
- L. Concrete: Division 32, Section "Concrete Pavement and Curbs".

1. "Porous" or "No-Fines" concrete refer to the same product and shall be a commonly available pervious or porous concrete mix acceptable to the engineer for the application used.
- M. Drain Vents/ Rodent Screens. Provide metal drain wall screens at drainage weeps and rodent screens where drain lines daylight at ends of walls. Color to match segmental retaining wall block

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive segmental retaining walls and conditions under which walls will be installed, with Installer present, for compliance with requirements for excavation tolerances, condition of subgrades, and other conditions affecting performance of retaining walls.
1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 RETAINING WALL INSTALLATION

- A. General: Place units according to manufacturer's written instructions. Lay units in running bond, overlapping half units of course below.
1. Form corners and ends by using special units.
 2. Do not use units with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
 3. Mix units from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
 4. Cut unit with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.
- B. Site Preparation
1. The foundation soil shall be excavated or filled as required to the grades and dimensions shown on the Construction Drawings or as directed by the Owner or Owner's Representative.
 2. The foundation soil shall be proof rolled and examined by the Engineer to ensure that it meets the minimum strength requirements according to the design assumptions. If unacceptable foundation soil is encountered, the contractor shall excavate the affected areas and replace with suitable quality material under the direction of the Engineer.
 3. In cut situations, the native soil shall be excavated to the lines and grades shown on the Construction Drawings and removed from the site or stockpiled for reuse as retained soil.

C. Wall Drainage System

1. The approved non-woven geotextile shall be set against the back of the first retaining wall unit, over the prepared foundation, and extend towards the back of the excavation, up the excavation face and back over the top of the infill soil to the retaining wall, or as shown in the Construction Drawings.
2. The drainage pipe shall be placed behind the leveling base, or lower course of facing units as shown in the Construction Drawings or as directed by the Engineer. The pipe shall be laid at a minimum gradient of 1% to ensure adequate drainage to free outlets.
3. T - Sections and outlet pipes shall be installed on the drainage pipe at 15 m (50 ft.) centers or as shown on the Construction Drawings.
4. The remaining length of geotextile shall be pulled taut and pinned over the face of the retained soil. Geotextile overlaps shall be a minimum of 1 ft. and shall be shingled down the face of the excavation in order to prevent the infiltration of retained soil into the wall infill.

D. Leveling Base or Spread Footing Placement

1. The leveling base material shall be crushed stone compacted to 98% Standard Proctor Density, or vibrated concrete along the grades and dimensions shown on the Construction Drawings or as directed by the Engineer. The minimum thickness of the leveling base shall be as shown on the drawings, or 7.25 inches.

E. Installation of Modular Concrete Retaining Wall Units

1. The bottom row of retaining wall modules shall be placed on the prepared leveling base as shown on the Construction Drawings. Care shall be taken to ensure that the wall modules are aligned properly, leveled from side to side and front to back and are in complete contact with the base material.
2. The wall modules above the bottom course shall be placed such that the tongue and groove arrangement provides the design batter (i.e. setback) of the wall face. Successive courses shall be placed to create a running bond pattern with the edge of all units being approximately aligned with the middle of the unit in the course below it.
3. The wall modules shall be swept clean before placing additional levels to ensure that no dirt, concrete or other foreign materials become lodged between successive lifts of the wall modules.
4. A maximum of 3 courses of wall units can be placed above the level of the infill soil at any time.
5. The contractor shall check the level of wall modules with each lift to ensure that no gaps are formed between successive lifts that may affect the pullout resistance of geogrid reinforcement, if applicable.
6. Care shall be taken to ensure that the wall modules and geosynthetic reinforcement are not broken or damaged during handling and placement.

F. Drainage Soil

1. The drainage soil will be placed behind the retaining wall modules with a minimum width of 1 ft. and separated from other soils using the approved nonwoven geotextile.
2. Drainage soil shall be placed behind the wall facing in maximum lifts of 6 inches and compacted to a minimum density of 95% Standard Proctor.
3. No heavy compaction equipment shall be allowed within 3 ft. of the back of the wall fascia.

G. Infill Soil

1. Wall infill soil shall be placed behind the first course of the wall facing units in maximum lifts of 6 inches and compacted to a minimum density of 95% Standard Proctor. At the specified elevations, geogrid reinforcement shall be placed, as described in this specification. The fill shall be placed and compacted level with the top of the wall modules at the specified geogrid elevations prior to placing the geogrid reinforcement.
2. Wall infill soil shall be placed on top of the geogrid reinforcement layers in maximum lifts of 6 inches and compacted to a minimum of 95% Standard Proctor Density. Care shall be taken to ensure that the geogrid lays flat and taut during placement of the infill soil. This is best achieved by placing fill on top of the geogrid near the wall fascia and spreading toward the back of the infill soil zone.
3. No tracked construction equipment shall be allowed to operate directly on top of the geogrid until a minimum thickness of 6 inches of fill has been placed. Rubber tired equipment may drive on top of the geogrid at slow speeds but should exercise care not to stop suddenly or make sharp turns. No heavy equipment shall be allowed within 3 ft. of the back of the wall.

H. Geogrid Soil Reinforcement

1. Pre-cut sections of geogrid reinforcement shall be placed horizontally at the specified elevations and with longitudinal axis perpendicular to the wall face (i.e. machine direction), at the elevations shown on the Construction Drawings, or as directed by the Engineer.
2. The geogrid shall be placed over the compacted infill soil and the wall facing units with the outside edge extending over the tongue of the bottom unit and to within 1 in. of the front facing unit. Care shall be taken to ensure that the wall modules are swept clean and that the geogrid is in complete contact with the top and bottom faces of the adjacent wall modules. The next course of wall modules shall be carefully placed on top of the lower modules to ensure that no pieces of concrete are chipped off and become lodged between unit layers.
3. The geogrid shall be pulled taut away from the back the wall modules during placement of infill soil. Alternatively, suitable anchoring pins or staples can be used to ensure that there are no wrinkles or slackness prior to placement of the infill soil. The geogrid shall lay perfectly flat when pulled back perpendicular to the back of the wall fascia.

I. Retained Soil

1. Retained soils shall be placed and compacted behind the infill soil or drainage soil if applicable, in maximum lift thickness of 6 inches. The retained soils shall be undisturbed native material or engineered fill compacted to a minimum density of 95% Standard Proctor.
2. No heavy compaction equipment shall be allowed within 3 ft. of the back of the wall modules.

J. Finishing Wall

1. Items continue fill, geogrid and compaction for each lift until the grades indicated on the Construction Drawings are achieved.
2. Coping units shall be secured to the top of the wall with two 3/8 inch beads of the approved flexible concrete adhesive positioned 2 inches in front and behind the tongue of the last course of retaining wall units.
3. Finish grading above the wall to direct surface run off water away from the segmental retaining wall. Use a soil with a low permeability to restrict the rate of water infiltration into the retaining wall structure.

3.3 FIELD QUALITY CONTROL

- A. Comply with requirements of Division 31, Section "Earth Moving" for in place soil density testing.
1. In each compacted backfill layer, perform at least 1 field in place density test for each 100 feet or less of retaining wall length, but no fewer than 2 tests along a wall face.
 2. Perform additional testing if required by Project Manager or Architect.

3.4 ADJUSTING AND CLEANING

- A. Remove and replace segmental retaining walls of the following description:
1. Broken, chipped, stained, or otherwise damaged units. Units may be repaired if methods and results are approved by Architect.
 2. Segmental retaining walls not matching approved samples and mockups.
 3. Segmental retaining walls not complying with other requirements indicated.
 4. Cracks in units longer than 1/2".
 5. Walls out of tolerance of specification as listed herein.
- B. Replace in a manner which results in segmental retaining wall's matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement, at no additional cost to the Owner.

END OF SECTION 32 32 23