



**INDUSTRIAL DRIVE ATHLETIC FIELDS AND
DAWSON RECREATION IMPROVEMENTS
HOLDEN, MA**

ADDENDUM NO. 3

to

CONSTRUCTION DOCUMENTS

March 1, 2024

Notice to Bidders

The attention of all bidders submitting proposals for “Industrial Drive Athletic Fields and Dawson Recreation Improvements” is called to the following Addenda to the specifications and plans. The items set forth herein, whether of omission, addition or substitution are to be included in, and form part of the specifications and plans of the above-named project for bids to be received as advertised.

**PLEASE BE SURE TO ACKNOWLEDGE RECEIPT
OF THIS ADDENDUM ON THE BID FORM**

The following clarifications, modifications, deletions, and additions are hereby incorporated into and become part of the Contract Documents. Contractors shall acknowledge receipt of this addendum with their bid submission.

WRITTEN CHANGES AND/OR CLARIFICATIONS TO SPECIFICATIONS

1. Specification Section 00 41 13 – FORM OF GENERAL BID:

DELETE: Specification Section 00 41 13 – FORM OF GENERAL BID

ADD: Specification Section 00 41 13 – FORM OF GENERAL BID, per attachment.

2. Specification Section 01 22 00 – MEASUREMENT AND PAYMENT

ADD: Specification Section 01 22 00 – MEASUREMENT AND PAYMENT, per attachment

3. Specification Section 01 56 26 – TEMPORARY CHAIN LINK FENCE:

FOR CLARIFICATION: DELETE All references to windscreens. Windscreens are not required to be included at the limit of work temporary construction fence.

4. Specification Section 11 68 33 – ATHLETIC FIELD EQUIPMENT:

ADD: 2.06 BLEACHERS:

A. Bleachers at **Industrial Drive** shall be three (3) row all aluminum bleachers that shall be 21'-0" in length with metal end caps for both the seat boards and footboards. Model LU-0321AD, as manufactured by GT Grandstands, 2810 Sydney Road, Plant City FL, 33566, 1-866-550-5511, or approved equal.

a. All structural frame-work, angles, substructure, understructure, cross bracing shall be of aluminum alloy 6061 T6, mill finish welded angle, 3/16". All seatboard and footboard extrusions and end caps shall be of aluminum alloy, 6063 T6, 1.92 lb./ft., with webbing and flanging, with silver 204 R1 clear anodized finish.

b. Furnish with the anchoring option for surface mount onto concrete pavement.

c. Contractor shall furnish four (4) total. All of them shall include the ADA option.

B. Bleachers at **Dawson Recreation, under Add Alternate #2** shall be four (4) row all aluminum bleachers that shall be 21'-0" in length with metal end caps for both the seat boards and footboards. Model LU-0421AS, as manufactured by GT Grandstands, 2810 Sydney Road, Plant City FL, 33566, 1-866-550-5511, or approved equal.

a. All structural frame-work, angles, substructure, understructure, cross bracing shall be of aluminum alloy 6061 T6, mill finish welded angle, 3/16". All seatboard and footboard extrusions and end caps shall be of aluminum alloy, 6063 T6, 1.92 lb./ft., with webbing and flanging, with silver 204 R1 clear anodized finish.

- b. Furnish with the anchoring option for surface mount onto concrete pavement.
- c. Contractor shall furnish one (1) total. Bleacher shall include the ADA option.

ADD: 2.07 PLAYER BENCHES:

- A. Model # 1119-15P– 15’ aluminum backless player’s bench, surface mounted, powder coated frame with aluminum plank as manufactured by Patterson- Williams Athletic MFG. Co., 2 Industrial Drive, PO Box 1290, Salem, IL 62881 (866) 710-3390, pwathletic.com or
 - a. Approved equal.

5. Specification Section 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS:

DELETE: Specification Section 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

ADD: Specification Section 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS, per attachment.

6. Specification Section 32 31 00 – FENCING:

DELETE: 2.05, B. The basis of design for the ornamental picket fence shall be:

- 1) Ameristar’s Echelon aluminum ornamental fencing, Style: Majestic, 3-rail style manufactured by Ameristar Perimeter Security USA Inc., in Tulsa, Oklahoma.
- 2) Or an approved equal.

C. Materials.

- 1) The fence shall be fabricated from Aluminum. The material for fence framework (i.e., tubular pickets, rails, and posts) shall conform to the requirements of ASTM B221. The aluminum extrusions for posts and rails shall be Alloy and Temper Designation 6005-T5. The aluminum extrusions for pickets shall be Alloy and Temper Designation 6063-T6.
- 2) Pickets shall be 5/8" square x .050" thick. Horizontal rails shall be 1" x 1-1/8" channel with .055" thick top & internal web wall, and .072" thick side walls and shall be punched to allow picket to pass through the top of the rail. The rail shall be constructed with an internal web insert providing a raceway for the pickets to be retained with a 1/8" retaining rod.

- 3) Fence posts and gate posts shall be 2"x2" square tube with 0.060" wall thickness. Maximum post spacing is 72" or as recommended by the manufacturer.
- 4) Swing gates shall be fabricated using tubular aluminum material, 1.25" sq. x .125" gate ends, and 5/8" sq. x .050 pickets. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding.
- 5) All ornamental picket fence gates shall have self-closing and latching hardware.
- 6) Accessories: Aluminum castings shall be used for all post caps, scrolls, finials, and other miscellaneous hardware. Hinges and latches shall be fabricated from aluminum, stainless steel, or composite materials.

D. Fabrication.

- 1) Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets. Grommets shall be inserted into the pre-punched holes in the rails and pickets shall be inserted through the grommets so that pre-drilled picket holes align with the internal upper raceway of the rails.
- 2) The manufactured framework shall be finished with a thermal stratification coating process (high-temperature, in-line, multi-stage, and multi-layer) including, a pretreatment/wash, and an electrostatic spray application of a polyester finish. The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be Black.

ADD: 2.05, B. The basis of design for the ornamental picket fence shall be:

- 1) Ameristar's Echelon Plus ornamental fencing, Style: Majestic, 3-rail pool style manufactured by Ameristar Perimeter Security USA Inc., in Tulsa, Oklahoma. Color shall be **black**.
- 2) Or an approved equal.

7. Specification Section 32 32 53 -REINFORCED SOIL SLOPES:

DELETE: Specification Section 32 32 53 – REINFORCED SOIL SLOPES

ADD: Specification Section 32 32 53 – REINFORCED SOIL SLOPES

QUESTIONS AND CLARIFICATIONS

Question 1: *Please show limits of all alternates on demo/drainage and electrical plans.*

Response: Specific to demolition, drainage, and electrical work associated with Alternate #4, the scope of work shall include but not limited to all drainage and electrical materials, labor, tools, equipment, and appurtenances necessary to furnish and completely install all roadway storm drain pipe, structures, connections, outlets, stone materials, light fixtures, foundations, conduits, wiring, hand holes, panels, connections, etc. at the access road.

Specific to demolition, drainage, and electrical work associated with Alternate #5, the scope work shall include but not limited to all drainage and electrical materials, labor, tools, equipment, and appurtenances necessary to furnish and completely install all storm drain pipe, structures, connections, outlets, stone materials, pedestrian light fixtures, poles, conduits, hand holes, wires, panels, connections, etc. at ADA access path to the tennis courts at Dawson Recreation Area.

Question 2: *How will Low Bidder Be determined? Base bid Only? Base Bid with All Alternates? Base bid with which Specific Alternates or in what order?*

Response: Low bidder shall be determined by the base bid only. Alternates shall be awarded in the order they are listed in the contract documents.

Question 3: *Section 01 52 13 calls for a temp field office, is this required?*

Response: A temporary field office per the requirements of Specification Section 0152 13 – TEMPORARY FACILITIES is required.

Question 4: *Section 01 56 26 mentions mesh fabric (windscreen) for the 6' temp fence. Is this required?*

Response: The contractor shall refer to clarification item #3 listed above in the WRITTEN CHANGES AND/OR CLARIFICATIONS TO SPECIFICATIONS, windscreen for the 6-ft. temporary chain link fence is not required.

Question 5: *Sheet L301 calls out detail 4/L703 for the rip rap slope along the parking lot. It's unclear what the limits of this condition are and when it transitions to detail 8/L703 which is called out along the entrance drive on L300.*

Response: Refer to limits of condition of riprap slope at parking lot per SKL-1: RIPRAP SLOPE LOCATIONS APPROXIMATE LOCATIONS, per attachment.

Question 6: *For bidding purposes, we need a basis of design for the RSS w/ boulder walls and RSS w/ rip rap facing. As detailed it is currently not biddable as we don't know the embedment depth of the geosynthetic reinforcement. This impacts our earthwork calculations and associated pricing for potential imported aggregate materials.*

Response: For bidding purposes, contractor shall refer to Specification Section 00 41 13 – FORM FOR BID, Specification Section 01 22 00-MEASUREMENT AND PAYMENT, and 32 32 53 – REINFORCED SOIL SLOPES, per attachments.

Question 7: *Steel Boardwalk: Will the boardwalk be used by both pedestrians and vehicles, or just pedestrians? Specification section 1.04 B2 notes a pedestrian live load requirement of 90lbs per sf for main and secondary members, but B3 notes a requirement for the main supporting members, floor system and decking to be designed for an AASHTO H5 vehicular load, which is much different.*

Response: Contractor shall refer to Specification Section 32 32 14- PREFABRICATED STEEL BOARDWALK, Part 2 – PRODUCTS, Part 2.02 HELICAL PILE FOOTINGS FOR RAISED BOARDWALK, Item B piles shall yield of 65KSI and meeting the dimensional and workmanship requirements of ASTM A500 with an ultimate resistance capacity of 40,000psi; or as determined by the Structural Engineer.

For clarification, the final boardwalk condition is designed for pedestrian live loads, however the expectation is that the boardwalk will be construction from atop the deck.

Question 8: *Ornamental Metal Picket Fence: The spec on here calls for Residential Echelon with 5/8" pickets which our supplier said is not typical for a commercial installation. Ameristar confirmed that they are NO longer carrying an Aluminum in 5/8" pickets and they recommend Jerith which is their sister company. Should we quote the Jerith Aluminum 5/8" pickets, or quote the Ameristar Echelon Plus which is a commercial 3/4" picket?*

Response: Contractor shall refer to Item # 6 listed above in the WRITTEN CHANGES AND/OR CLARIFICATIONS TO SPECIFICATIONS above as it relates to Specification Section 32 31 00 – FENCING.

Question 9: *BVCL Fences: Chain Link Fabric: Specifications note 6ga core with 2" mesh, but the plans note 6ga core with 1.75" mesh. Tie Wire: Specifications note 9ga steel ties, but the plans note multi-lock bandit type ties. Post Spacing: Specifications note that posts are to be 8ft o/c, plans note posts are to be max. 10ft o/c*

Response: For clarification, the distance between posts shall be ten (10) feet maximum and equally spaced between end and gate posts. Contractor shall DELETE all references within the plans and specifications of "VINYL CLAD MULTI-LOCK BAND". Contractor shall use tie wires shall that shall be 9-gauge vinyl coated galvanized steel wire placed 15" on center along all horizontal rails, vertical posts and corner braces. The chain link fabric shall be #6 gauge, 2" diamond mesh per the specification.

Question 10: *We are working on our bid for the Holden Industrial Dr project, and could not find any information on the bleachers and team benches in the specifications other than a note on the last page of the athletic field spec. regarding placement. Would you please clarify the manufacturer and model # for these?*

Response: For clarification the Contractor shall refer to Item # 4 listed above in the WRITTEN CHANGES AND/OR CLARIFICATIONS TO SPECIFICATIONS above as it relates to Specification Section 11 68 33 – ATHLETIC FIELD EQUIPMENT.

Question 11: *Would you please clarify if the flat bar stock for the railings are to be ½” x 1-3/4” as noted on the plans, or ½” x 1-1/2” to match the posts?*

Response: For clarification, the flat bar stock for railings shall be 1/2” x 1-1/2”.

Question 12: *I am hoping you would be able to help me find out the load per pile for the helical pile portion of the project please.*

Response: Contractor shall refer to response to question no. 7 above.

Question 13: *Please provide specifications for weatherproof fusible utility disconnect switch.*

Response: Contractor shall provide 400amp switch disconnect switch with 400amp fuses as indicated on detail 2 on drawing E002 – ELECTRICAL SITE PLAN INDUSTRIAL DRIVE and on the One Line Diagram on drawing E601-ELECTRICAL SCHEDULE AND DIAGRAMS. Refer to Specifications Section 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS, per attachment.

Question 14: *Please provide specification for service rated main disconnect switch.*

Response: For clarification. service entrance rated main disconnect switch shall be 400amp fused disconnect switch or enclosed circuit breaker as indicated on the One Line Diagram on drawing E601-ELECTRICAL SCHEDULE AND DIAGRAMS. See Specifications Section 26 28 16-ENCLOSED SWITCHES AND CIRCUIT BREAKERS, per attachment.

Question 15: *Please allow the use of type XHHW copper conductors for underground feeders, branch circuits, and pedestrian lighting in place of type XLP.*

Response: Contractor is permitted to use Type XHHW copper conductors for underground feeders, branch circuits, and pedestrian lighting in place of type XLP.

Question 16: *Please provide specification for Blue Safety Lights, and a mounting detail with footing if required.*

Response: Contractor shall refer to Specification Section 32 33 00 – SITE FURNISHINGS AND ACCESSORIES, Part 2-PRODUCTS, Item 2.08: Blue Safety Light.

Question 17: *On sheet E002 in between the football, and soccer field is it possible that two pedestrian light poles are drawn but not labeled?*

Response: For clarification, there is one (1) pedestrian light fixture total shown between the football field and soccer field on E002 – ELECTRICAL SITE PLAN - INDUSTRIAL DRIVE.

Question 18: *Sheet E003 depicts conduits C25, C26, C27 coming out of the existing building. Are these conduit to be newly installed or are they stubbed out existing?*

Response: For clarification. Conduits C25, C26, C27 are to be completely new conduits newly installed into the existing building.

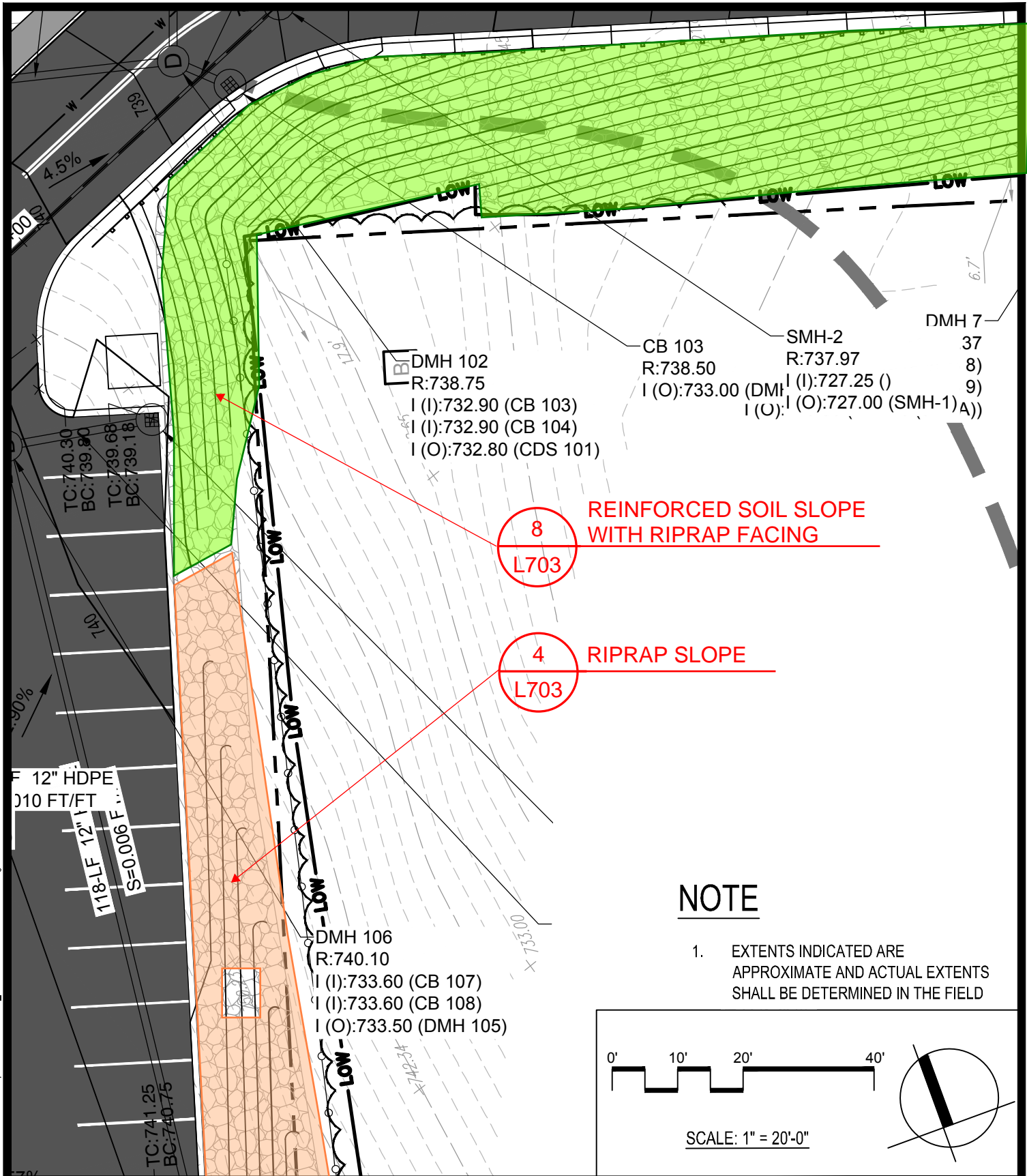
Question 19: *EV charging stations are called out on sheet E002. Are the EV charging units part of this bid, if so please provide specifications?*

Response: Refer to specification section 32 33 00 – SITE FURNISHINGS AND ACCESSORIES, Part 2-PRODUCTS, Item 2.06: ELECTRIC CHARGING STATION.

ATTACHMENTS:

SKL-1: RIPRAP SLOPE CONDITIONS APPRXIMATE LOCATIONS
Specification Section 00 41 13 – FORM OF GENERAL BID
Specification Section 01 22 00 – MEASUREMENT AND PAYMENT
26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS
32 32 53 – REINFORCED SOIL SLOPES

END OF ADDENDUM NO. 3



RIPRAP SLOPE CONDITIONS
APPROXIMATE LOCATIONS

INDUSTRIAL DRIVE ATHLETIC
FIELDS & DAWSON RECREATION
IMPROVEMENTS

DMH 102
R:738.75
I (I):732.90 (CB 103)
I (I):732.90 (CB 104)
I (O):732.80 (CDS 101)

DMH 106
R:740.10
I (I):733.60 (CB 107)
I (I):733.60 (CB 108)
I (O):733.50 (DMH 105)

DMH 7
37
8)
9)
A))

CB 103
R:738.50
I (O):733.00 (DMH 102)

SMH-2
R:737.97
I (I):727.25 ()
I (O):727.00 (SMH-1)

Weston & Sampson
Weston & Sampson Engineers, Inc.
85 Devonshire Street, 3rd Floor
Boston, MA 02109
978.532.1900 800.SAMPSON

NOT RELEASED FOR
CONSTRUCTION

Drawn by: KH Proj. Mgr.: JM
Date: 02/27/2024
Ref. Sht No.: L500

SKL-01

SECTION 00 41 13
FORM OF GENERAL BID

Proposal of _____ (hereinafter called "Bidder")*

- a corporation, organized and existing under the laws of the State of _____
- a partnership
- a joint venture
- a limited liability company
- an individual doing business as _____

*Check corporation, partnership, joint venture, LLC or individual as applicable.

To the _____ (hereinafter called "Owner").

Everyone:

The undersigned Bidder, in compliance with your invitation for bids for construction of **Industrial Drive Athletic Fields and Dawson Recreation Area Improvements** having examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all superintendence, labor, services, materials, equipment, plant, machinery, apparatus, appliances, tools, supplies, bailing, shoring, removal, and all other things necessary to construct the project in accordance with the contract documents, within the time set forth below, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the contract documents, of which this bid is a part.

The Bidder hereby agrees that if selected as the Contractor it will commence work under this contract on or before a date to be fixed in the written "Notice to Proceed" given by the Owner to the Contractor and to fully complete the project within ____ Consecutive days of the start date fixed in the "Notice to Proceed". The Bidder further agrees to pay as liquidated damages the sum of \$ 500 for each consecutive calendar day thereafter during which the work has not been fully

completed, as provided in the "Liquidated Damages" provisions of Section 00 73 00, SUPPLEMENTARY CONDITIONS.

Bidder acknowledges receipt of the following addenda:

No. _____ Dated: _____

No. _____ Dated: _____

No. _____ Dated: _____

No. _____ Dated: _____

Item 1. BASE PROPOSAL: Bidder agrees to perform all of the work described in the specification and shown on the plans for the sum of: _____ Dollars and Cents (\$ _____)

Item 2. ADD ALTERNATE NO.1 – PLAYGROUND AT DAWSON RECREATION AREA: Bidder agrees to perform all of the work described in the specification and shown on the plans for the sum of: _____ Dollars and Cents (\$ _____)

Item 3. ADD ALTERNATE NO.2 – SYNTHETIC TURF BASEBALL FIELD AT DAWSON RECREATION AREA: Bidder agrees to perform all of the work described in the specification and shown on the plans for the sum of: _____ Dollars and Cents (\$ _____)

Item 4. ADD ALTERNATE NO.3 – BOARDWALK AND ASSOCIATED TRAILS AT DAWSON RECREATION AREA: Bidder agrees to perform all of the work described in the specification and shown on the plans for the sum of: _____ Dollars and Cents (\$ _____)

Item 5. ADD ALTERNATE NO.4 – ACCESS DRIVE AND HANDICAPPED PARKING SPACES AT DAWSON RECREATION AREA: Bidder agrees to perform all of the work described in the specification and shown on the plans for the sum of:

_____ Dollars and Cents (\$ _____)

Item 6. ADD ALTERNATE NO.5 – ACCESSIBLE PATH FROM PARKING LOT TO TENNIS COURTS AT DAWSON RECREATION AREA: Bidder agrees to perform all of the work described in the specification and shown on the plans for the sum of:

_____ Dollars and Cents (\$ _____)

Item 7. ADD ALTERNATE NO.6 – WORKOUT AREA AT INDUSTRIAL DRIVE: Bidder agrees to perform all of the work described in the specification and shown on the plans for the sum of:

_____ Dollars and Cents (\$ _____)

ALLOWANCE

Under the base bid, the Bidder shall include an allowance of **Thirty percent (30%)** of the total cubic yard volume of Stone Boulders (Item 1c of the Unit Pricing Schedule below) for all costs associated with onsite excavating, salvaging, relocating, placing of salvaged stone boulders associated with the Reinforced Soil Slope with Boulder Facing as indicated on the Contract Documents and meet Specification Section 32 32 53 – REINFORCED SOIL SLOPES, PART 2 – PRODUCTS, Item 2.06B.

UNIT PRICING SCHEDULE

Item No.	Description	Payment	Estimated Quantity	Unit Price	Total Amount (Words)	Total Amount (Numerals)
1.0 Reinforced Soil Slope with Boulder Facing						
1a	Dense Graded Crushed Stone	per Cubic Yard	3,906			\$
1b	¾" Crushed Drainage Stone	per Cubic Yard	2,122			\$
1c	Stone Boulders	per Cubic Yard	464			\$
1d	Geosynthetic Reinforcement	per Square Foot	43,350			\$
1e	4" Perforated Drain Pipe	per Linear Foot	180			\$
1f	Geotextile Fabric	Per Square Foot	13,500			
2.0 Reinforced Soil Slope with Riprap Facing						
2a	¾" Crushed Drainage Stone	per Cubic Yard	1,951			\$
2b	Placed Modified Rockfill	per Cubic Yard	612			\$
2c	Geosynthetic Reinforcement	per Square Foot	23,700			\$

(Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown

in words will govern.)

The BASE PROPOSAL and the above unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, bond premiums, engineering costs, etc., to cover the finished work of the several kinds called for.

The Bidder understands that all bids for this project are subject to the applicable bidding laws of the Commonwealth of Massachusetts, including General Laws Chapter 30, Section 39M, as amended.

The contract will be awarded to the lowest responsible and eligible bidder.

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 90 days, Saturdays, Sundays and legal holidays excluded, after the opening of bids.

Within 10 days of receipt of the written notice of acceptance of this bid, the Bidder will execute the formal agreement attached in Section 00 52 00 AGREEMENT and provide the requisite payment and performance bonds and certificates of insurance.

Bid security is attached in the sum of five percent (5%) of the total bid in accordance with the conditions of Section 00 21 13 INSTRUCTIONS TO BIDDERS. The bid security may become the property of the Owner in the event the contract and bond are not executed within the time set forth above.

The selected Contractor shall furnish a performance bond and a payment bond in an amount at least equal to one hundred percent (100%) of the contract prices in accordance with Section 00 61 13.13 PERFORMANCE BOND, Section 00 61 13.16 PAYMENT BOND, and as stipulated in Section 00 72 00, GENERAL CONDITIONS of these specifications.

The undersigned offers the following information as evidence of its qualifications to perform the work as bid upon according to all the requirements of the plans and specifications.

1. Have been in business under present name for _____ years.

2. The names and addresses of all persons interested in the bid (if made by a partnership or corporation) as Principals, are as follows:

(Attach supplementary list if necessary)

04/29/2022

3. The Bidder shall state below what work of a similar character to that included in the proposed contract it has done, and give references that will enable the Owner to judge its experience, skill and business standing (add supplementary page if necessary).

Completion Date	Project Name	Contract Amount	Design Engineer	Reference Name	Telephone No.
-----------------	--------------	-----------------	-----------------	----------------	---------------

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

00 41 13-5

Pursuant to M.G.L. CH. 62C, Sec 49A, the undersigned Bidder certifies under the penalties of perjury that it is in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

The undersigned Bidder hereby certifies that (1) it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and 3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration.

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this paragraph the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity which sells materials, equipment or supplies used in or for, or engages in the performance of, the same or similar construction, reconstruction, installation, demolition, maintenance or repair work or any part thereof.

The undersigned Bidder hereby certifies, under pains and penalties of perjury, that the foregoing bid is based upon the payment to laborers to be employed on the project of wages in an amount no less than the applicable prevailing wage rates established for the project by the Massachusetts Department of Labor and Workforce Development. The undersigned bidder agrees to indemnify the awarding authority for, from and against any loss, expense, damages, actions or claims, including any expense incurred in connection with any delay or stoppage of the project work arising out of or as a result of (1) the failure of the said bid to be based upon the payment of the said applicable prevailing wage rates or (2) the failure of the bidder, if selected as the Contractor, to pay laborers employed on the project the said applicable prevailing wage rates.

The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth of Massachusetts under the provisions of Section Twenty-Nine F of Chapter Twenty-Nine, Section 25C (10) of

Chapter 152 (workers' compensation) or any other applicable debarment provisions of any other Chapter of the General Laws or any rule or regulations promulgated thereunder

Respectfully submitted:

Date _____

By _____
(Signature)

(Name - Typed or Printed)

(Title)

(SEAL - if bid is by a corporation)

(Business Name)

(Federal ID Number)

(Business Address)

(City and State)

(Telephone Number)

SECTION 01 22 00

MEASUREMENT AND PAYMENT

GENERAL

- A. The following subsections describe the measurement of and payment for the work to be done under the items listed in the FORM FOR GENERAL BID.
- B. All work performed as described in these Contract Documents will be paid for under one or more of the items listed in the FORM FOR GENERAL BID. All other activities required in connection with performance of the work, whether described in the Contract Documents or mandated by applicable codes, permits and laws, will not be separately paid for unless specifically provided for in the form of general bid, but will be considered incidental to performance of the overall project.
- C. Each Unit or Lump-Sum price stated in the FORM FOR GENERAL BID shall constitute full compensation as herein specified for each item of work completed in accordance with the Contract Drawings and Specifications.
- D. The payment items listed herein and in the FORM FOR GENERAL BID are intended to provide full payment for the work shown on the Contract Drawings and specified herein. Any work called for or implied in the Contract Documents but not listed as a payment item shall be considered incidental to the overall project.
- E. Unless otherwise noted, each item shall be furnished, installed, and/or performed in accordance with the technical specification section whether a specific applicable payment item exists or not.
- F. Price adjustments for certain payment items shall be as described in Specification Section 01 22 00.13 PRICE ADJUSTMENTS. Payment shall be made at the unit prices included in Section 00 41 43 or, if no such items are contained in Section 00 41 43, by change order.
- G. All warranty inspections and related work shall not be separately measured for payment but shall be considered incidental to the project.
- H. All unit price items requiring payment by installation area or volume (per square foot, per cubic yard, etc.) shall be verified in the field by the contractor using surveying techniques daily to verify areas/volumes prior to payment.

BID ITEMS

1.0 REINFORCED BOULDER SLOPE WITH BOULDER FACING

Item 1a – Dense Graded Crushed Stone

- A. The work of this item shall be measured per cubic yard to furnish, transport, and place dense graded crushed stone on site per the Contract Drawings and as required by the Engineer.
- B. The contract unit price to be paid per cubic yard shall constitute full compensation for supplying all material, labor, tools, and equipment necessary to install the dense graded crushed stone as described in and required by the Contract Documents including, but not limited to placing, and compacting dense graded crushed stone per the Contract Documents.
- C. The work of this item shall be paid for at the Contract unit price under Item 1b– “Dense Graded Crushed Stone”.

Item 1b– ¾” Crushed Drainage Stone

- A. The work of this item shall be measured per cubic yard to furnish, transport, and place ¾” crushed drainage stone on site per the Contract Drawings and as required by the Engineer.
- B. The contract unit price to be paid per cubic yard shall constitute full compensation for supplying all material, labor, tools, and equipment necessary to install the ¾” crushed stone as described in and required by the Contract Documents including, but not limited to placing crushed stone per the Contract Documents.
- C. The work of this item shall be paid for at the Contract unit price under Item 1b– “¾” Crushed Drainage Stone”.

Item 1c– Stone Boulders

- A. The work of this item shall be measured per cubic yard to furnish, transport, and install stone boulders per the Contract Drawings and as required by the Engineer.
- B. The contract unit price to be paid per cubic yard of stone boulder shall constitute full compensation for supplying all material, labor, tools, and equipment necessary to install the stone boulder as described in and required by the Contract Documents including, but not limited to: moving, handling, and placing stone boulder stone per the Contract Documents.
- C. The work of this item shall be paid for at the Contract unit price under Item 1c– “Stone Boulders”.

Item 1d – Geosynthetic Reinforcement

- A. The work of this item shall be measured per square foot to furnish and place geosynthetic reinforcement fabric across the Site per the Contract Drawings and as required by the Engineer.
- B. Contract unit price to be paid per square foot for full compensation to furnish all labor, materials, tools, and equipment necessary to furnish, transport, and place approved geosynthetic reinforcement at reinforced soil slopes per the Contract Drawings.
- C. The work of this item shall be paid for at the Contract unit price under Item 1d – “Geosynthetic Reinforcement”.

Item 1e – 4” Perforated Drain Pipe

- A. The work of this item shall be measured per linear foot furnished and installed on site per the Contract Drawings and as required by the Engineer.
- B. The contract unit price to be paid per linear foot shall constitute full compensation for supplying all material, labor, tools, and equipment necessary to install the 4” Perforated Drain Pipe as described in and required by the Contract Documents including, but not limited to: installation of 4” Perforated pipe and geotextile fabric per the Contract Documents.
- C. The work of this item shall be paid for at the Contract unit price under Item 1e – “4” Perforated Pipe.”

2.0 REINFORCED SOIL SLOPE WITH RIPRAP FACING

Item 2a– ¾” Crushed Drainage Stone

- A. The work of this item shall be measured per cubic yard to furnish, transport, and place ¾” crushed drainage stone on site per the Contract Drawings and as required by the Engineer.
- B. The contract unit price to be paid per cubic yard shall constitute full compensation for supplying all material, labor, tools, and equipment necessary to install the ¾” crushed stone as described in and required by the Contract Documents including, but not limited to placing crushed stone per the Contract Documents.
- C. The work of this item shall be paid for at the Contract unit price under Item 1b– “¾” Crushed Drainage Stone”.

Item 2b– Placed Modified Rockfill

- A. The work of this item shall be measured per cubic yard to furnish, transport, and install stone boulders per the Contract Drawings and as required by the Engineer.
- B. The contract unit price to be paid per cubic yard of stone boulder shall constitute full compensation for supplying all material, labor, tools, and equipment necessary to install the stone boulder as described in and required by the Contract Documents including, but not limited to: importing, handling, and placing modified rock fill per the Contract Documents.
- C. The work of this item shall be paid for at the Contract unit price under Item 2b– “Placed Modified Rockfill”.

Item 2c – Geo-Grid Reinforcing

- D. The work of this item shall be measured per square foot to furnish and place geo-grid reinforcing at the reinforced soil slopes with riprap facing per the Contract Drawings and as required by the Engineer.
- E. Contract unit price to be paid per square foot for full compensation to furnish all labor, materials, tools, and equipment necessary to furnish, transport, and place approved geo-grid reinforcement at reinforced soil slopes with riprap facing per the Contract Drawings.
- F. The work of this item shall be paid for at the Contract unit price under Item 1d – “Geo-Grid Reinforcing”.

END OF SECTION

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Non-fusible switches.
 - 3. Enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include wiring diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.
- C. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.2 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.3 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Eaton.
 - 2. General Electric Company.
 - 3. SIEMENS Industry, Inc.; Energy Management Division.
 - 4. Square D; by Schneider Electric.

- B. Type HD, Heavy Duty:
 - 1. Single throw.
 - 2. Three pole.
 - 3. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.
 - 4. Lockable handle with capability to accept three padlocks and interlocked with cover in closed position.

- C. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 - 3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

2.4 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Eaton.
 - 2. General Electric Company.
 - 3. SIEMENS Industry, Inc.; Energy Management Division.
 - 4. Square D; by Schneider Electric.

- B. Type HD, Heavy Duty, Three Pole, Single Throw: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

- C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

2.5 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1).
- C. Operating Mechanism: The circuit-breaker operating handle shall be externally operable directly operable through the front cover of the enclosure (NEMA 250 Type 1)

PART 3 - EXECUTION

3.1 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 2. Outdoor Locations: NEMA 250, Type 3R.
 3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.

3.2 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

- D. Install fuses in fusible devices.
- E. Comply with NFPA 70 and NECA 1.
- F. Set field-adjustable circuit-breaker trip ranges to values indicated on the Drawings.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 26 05 53 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections: All testing is to be done by the contractor with the assistance of the manufacturer as required.
- B. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.
 - f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.

- 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
 - h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - i. Verify correct phase barrier installation.
 - j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Measure contact resistance across each switchblade fuse holder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
- e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

C. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:

- a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
- b. Inspect physical and mechanical condition.

- c. Inspect anchorage, alignment, grounding, and clearances.
 - d. Verify that the unit is clean.
 - e. Operate the circuit breaker to ensure smooth operation.
 - f. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
 - g. Inspect operating mechanism, contacts, and chutes in unsealed units.
 - h. Perform adjustments for final protective device settings in accordance with the coordination study.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.
- 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

SECTION 32 32 53

REINFORCED SOIL SLOPES

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Work shall consist of subsurface explorations, designing, furnishing all materials, labor, equipment, and installation of the reinforced soil slopes (RSS) with boulder and riprap facing in accordance with these specifications and to the lines, grades, and dimensions shown on the plans.
- B. The contractor shall perform or subcontract a subsurface exploration program for the design of the two RSS's consisting of soil borings and rock cores per Section 02 32 13.13, SOIL BORINGS. The subsurface investigation shall be performed prior and for the design of the RSS's.

1.02 RELATED WORK:

- A. Section 00 31 32, SUBSURFACE DATA
- B. Section 01 33 23, SUBMITTALS
- C. Section 02 32 13.13, SOIL BORINGS
- D. Section 31 00 00, EARTHWORK
- D. Section 31 23 19, DEWATERING
- E. Section 31 50 00, SUPPORT OF EXCAVATION

1.03 REFERENCE STANDARDS:

- A. Geosynthetic Reinforcement
 - 1. ASTM D 4595 - 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:GG1 - Single Rib Geogrid Tensile Strength
 - 4. GRI:GG5 - Geogrid Pullout
- B. Drainage Pipe

1. ASTM D 3034 - Specification for Polyvinyl Chloride (PVC) Plastic Pipe
 2. ASTM D 1248 - Specification for Corrugated Plastic Pipe
- C. Engineering Design
1. Publication No. FHWA-CFL/TD-06-006 "Rockery Design and Construction Guidelines", November 2006
 2. Publication No. FHWA-NHI-10-024 "Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes - Volume I", November 2009
 3. Publication No. FHWA-NHI-10-025 "Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes - Volume II", November 2009
- D. Where specifications and reference documents conflict, the Engineer shall make the final determination of applicable document.

1.04 DESIGN CRITERIA:

- A. Refer to Section 00 31 32 SUBSURFACE DATA for information on site and subsurface conditions.
- B. Refer to plans for details and location of proposed stormwater infiltration system in relationship to the RSS's and hydrostatic conditions for design.
- C. RSS's shall be designed to support earth pressures, unrelieved hydrostatic pressures, HS20-44 traffic loads (as applicable) and any adjacent structure surcharge loads, utility loads, stockpile, equipment and construction loads. Design and construction of each section shall meet the requirements of ACI 318 and the AASHTO Load Factor.
- D. Soil and bedrock conditions utilized in the design shall be based upon subsurface explorations by the Contractor performed in accordance with Section 02 32 13.13, SOIL BORINGS.
- E. Should the actual soil and/or bedrock conditions observed during construction differ from those assumed for the design, design shall be reviewed by the contractor's RSS Design Engineer at the Engineer's direction.
- F. The design for the RSS's plans shall be prepared and sealed by the Contractor's RSS Design Engineer. The design analysis shall consider the external stability against sliding, deep-seated overall instability, local bearing capacity failure, and settlement, internal stability, facial stability of the reinforced soil mass, and external

global stability and shall be in accordance with acceptable engineering practice and these specifications. The analysis shall be performed in accordance with the publications in Section 1.03.D of these specifications.

- G. The design of the geosynthetic reinforcement shall take into consideration the effects from obstructions.
- H. Minimum embedment: the minimum RSS embedment shall be 2 feet.
- I. While vertical spacing between geosynthetic reinforcement layers may vary, it shall not exceed 2.0 feet .
- J. The geosynthetic reinforcement placement in the RSS system design shall have 100 percent continuous coverage parallel to the slope and wall face. Gapping between horizontally adjacent layers of geosynthetic (partial coverage) will not be allowed.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01 33 23 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Contractor's RSS Design Engineer: At the time of the bid, the Contractor shall submit a list containing at least five (5) comparable project which the RSS Design Engineer has installed RSS. A brief description of key project features; time period (dates) when design work and construction was performed; ultimate client's name, address, telephone number, and email address for each project. The RSS Design Engineer may not use consultants or manufacturer's representatives to meet the requirements of this section.
- B. Contractor's Qualifications: At the time of the bid, the Contractor shall submit:
 - 1. A list containing at least five (5) comparable installations on which the Contractor and the Superintendent have installed RSS. A brief description of key project features; time period (dates) when work was performed and ultimate client's name; direct client contact name, address, telephone number and email address shall be included for each project. The Contractor may not use consultants or manufacturer's representatives to meet the requirements of this section.
 - 2. Resume of Project Superintendent including pertinent project experience.
- C. Material Submittals: Manufacturers' literature and certifications two weeks prior to start of work stating that the facing and geosynthetic reinforcement meet the requirements of Section 2 of this specification.
- D. Shop Drawings:
 - 1. The Contractor's RSS Design Engineer shall submit for approval separate geotechnical design calculations and drawings for the proposed RSS with boulder

facing and RSS with rip rap, sealed by a Registered Professional Engineer currently licensed in the Commonwealth of Massachusetts. As a minimum the RSS design calculations shall include:

- a. Detailed summary of design assumptions
- b. Applicable code and design references
- c. Geotechnical engineering parameters for existing site soil and bedrock, and proposed fill.
- d. Analysis results, including but not limited to, external stability against sliding, external global stability, local bearing capacity and settlement, internal stability, and facial stability of the reinforced soil mass.
- e. Plan and profile views indicating the type, spacing, and length of geosynthetic reinforcement.

1.06 DELIVERY AND STORAGE:

- A. Contractor shall check materials upon delivery to assure that specified type and grade of materials have been received.
- B. Contractor shall store and handle materials in accordance with manufacturer's recommendations and in a manner to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping or other causes.
- C. Contractor shall protect materials from damage. Damaged materials shall not be incorporated into the RSS and reinforced rockery wall system.

1.07 QUALITY CONTROL:

- A. The Contractor shall engage an RSS Design Engineer who is a Registered Professional Engineer in the Commonwealth of Massachusetts. The Contractor's RSS Design Engineer shall have at least five (5) years of experience in design of RSS or slope stabilization using geosynthetics and rockery walls similar to those required for this project and have completed a minimum of three projects with similar specialty work.
- B. The Contractor shall engage a contractor with at least five (5) years of experience in construction of RSS or slope stabilization using geosynthetics and rockery walls similar to those required for this project and have completed a minimum of three projects with similar specialty work.

PART 2 - PRODUCTS

2.01 GEOSYNTHETIC REINFORCEMENT:

- A. Geosynthetic reinforcement shall consist of geogrids or geotextiles manufactured as a soil reinforcement element. The type, strength, and placement location of the reinforcing geosynthetic shall be determined by the Contractor's RSS Design Engineer.
- B. Detailed test data shall be submitted to the Engineer for approval and shall include the following:
 - 1. Tensile strength in accordance with ASTM D 4595 or GRI GG-1.
 - 2. Creep in accordance with ASTM D 5262.
 - 3. Site damage and durability in accordance with GRI GG-4.
 - 4. Pullout in accordance with GRI GG-5 or GRI GT-6
 - 5. Connection test data in accordance with NCMA SRWU-1

2.02 DRAINAGE AGGREGATE:

- A. Drainage aggregate shall be determined by the RSS Design Engineer.

2.03 DRAINAGE PIPE:

- A. The drainage collection pipe shall be a perforated or slotted PVC, or corrugated HDPE pipe. The drainage pipe may be wrapped with a geotextile to function as a filter.
- B. Drainage pipe shall be manufactured in accordance with ASTM D 3034 and/or ASTM D 1248.

2.04 REINFORCED BACKFILL:

- A. The reinforced backfill shall be free of debris and shall meet the gradation and compaction requirements provided by the Contractor's RSS Design Engineer.

2.05 GEOTEXTILE FABRIC:

- A. Geotextile fabric shall meet the requirements provided by the Contractor's RSS Design Engineer.

2.06 FACING:

- A. Slope facing for the RSS with Riprap facing shall consist of rip rap meeting the requirements in MassDOT Specification Section M2.2.0, Riprap. Riprap shall be laid and not dumped.

- B. Slope facing for the RSS with Boulder facing shall meet the requirements provided by the Contractor's RSS Design Engineer. The rockery wall facing shall be designed in accordance with Publication No. FHWA-CFL/TD-06-006 "Rockery Design and Construction Guidelines", November 2006.

C. Rock Size Schedule:

Wall Height	Boulder Course					
	A	B	C	D	E	F
< 3.28 ft	2.3 to 3 ft. dia. min. 661 to 2,000 lbs	1.5 to 2.3 ft. dia. min. 300 to 661 lbs	-	-	-	-
< 6.56 ft	3 to 4 ft. dia. min. 2,000 to 4,000 lbs	2.3 to 3 ft. dia. min. 661 to 2,000 lbs	1.5 to 2.3 ft. dia. min. 300 to 661 lbs	-	-	-
< 9.84 ft	3 to 4 ft. dia. min. 2,000 to 4,000 lbs	3 to 4 ft. dia. min. 2,000 to 4,000 lbs	2.3 to 3 ft. dia. min. 661 to 2,000 lbs	1.5 to 2.3 ft. dia. min. 300 to 661 lbs	-	-
< 11.50 ft	4 to 4.5 ft. dia. min. 4,000 to 6,000 lbs	3 to 4 ft. dia. min. 2,000 to 4,000 lbs	2.3 to 3 ft. dia. min. 661 to 2,000 lbs	2.3 to 3 ft. dia. min. 661 to 2,000 lbs	1.5 to 2.3 ft. dia. min. 300 to 661 lbs	1.5 to 2.3 ft. dia. min. 300 to 661 lbs

The designated height (H) and base width of (H2) and a minimum dimension of the top course of 1.5-2.3 ft. diameter.

PART 3 -EXECUTION

3.01 INSPECTION

- A. Contractor's field construction supervisor shall have demonstrated experience and be qualified to direct all work at the site.

3.02 EXCAVATION:

- A. Contractor shall excavate to the lines and grades shown on the approved Drawings. The Contractor shall excavate unsuitable materials to stable natural ground where encountered at proposed excavation subgrade, as required by the Engineer, unless otherwise indicated on the drawings. Unsuitable material includes undocumented fill, topsoil, loam, peat, other organic materials, pre-construction fill, snow, ice, and trash.

- B. Contractor shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted backfill material as required by the Engineer, at the Contractor's expense.
- C. Contractor shall verify location of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of excavation. Excavation support, if required, is the responsibility of the Contractor.

3.03 FOUNDATION PREPARATION:

- A. Following the excavation, the foundation soil shall be examined by the Engineer to assure actual foundation soil strength meets or exceeds the assumed design bearing strength. Soils not meeting the required strength shall be removed and replaced with material, as required by the Engineer.
- B. Prior to fill placement, the Contractor shall compact the exposed subgrade to a firm and unyielding condition with at least 5 passes by a 12-ton smooth drum vibratory roller over the subgrade or other acceptable compaction equipment subject to the approval of the Engineer.
- C. Fill placed outside the RSS shall consist of compacted material per the Drawings and Section 31 00 00.

3.04 GEOSYNTHETIC REINFORCEMENT PLACEMENT:

- A. All geosynthetic reinforcement shall be installed at the proper elevation and orientation as shown on the approved shop drawings, or as required by the Contractor's RSS Design Engineer.
- B. At the elevations shown on the approved shop drawings, (after the units, drainage material, and backfill have been placed to this elevation) the geosynthetic reinforcement shall be laid horizontally on compacted infill.
- C. Geosynthetic reinforcement layers shall be one continuous piece for their entire embedment length. Overlapping of the geosynthetic in the design strength direction (perpendicular to the RSS face) shall not be permitted. Along the length of the RSS, horizontally adjacent sections of geosynthetic reinforcement shall be butted in a manner to assure 100 percent coverage parallel to the RSS face.
- D. Tracked construction equipment shall not be operated directly on the geosynthetic reinforcement. A minimum of 6-inches of backfill is required prior to operation of tracked vehicles over the geosynthetic. Turning should be kept to a minimum.

Rubber-tired equipment may pass over the geosynthetic reinforcement at slow speeds (less than 5 mph).

- E. The geosynthetic reinforcement should be installed under tension. The nominal tension shall be applied to the reinforcement and secured in place with staples, stakes or by hand tensioning until reinforcement is covered by six inches of fill.

3.05 DRAINAGE MATERIALS:

- A. Drainage aggregate shall be installed to the line, grades, and sections as shown on the approved shop drawings. Drainage aggregate shall be placed to the minimum thickness shown on the approved shop drawings.
- B. Drainage collection pipes shall be installed to maintain gravity flow of water outside the reinforced soil zone. The drainage collection pipe shall daylight at an elevation lower than the lowest point of the pipe within the aggregate drain.
- C. The main collection drain pipe shall be a minimum of 3-inches in diameter.

3.06 BACKFILL PLACEMENT:

- A. The reinforced backfill shall be placed as shown on the approved shop drawings in the maximum compacted lift thickness of 10-inches and shall be compacted to a minimum of 95% of Modified Proctor density (ASTM D 1557) at a moisture content within 2% of optimum. The backfill shall be placed and spread in such a manner as to eliminate wrinkles or movement of the geosynthetic reinforcement.
- B. At the end of each day's operation, the Contractor shall slope the last level of backfill away from the facing and reinforced backfill to direct water runoff away from the slope face.
- C. At completion of RSS construction, backfill shall be placed level with final top of RSS elevation. If final grading, paving, landscaping, and/or storm drainage installation adjacent to the RSS's is not placed immediately after completion, temporary grading and drainage shall be provided to ensure water runoff is not directed at the slope face nor allowed to collect or pond behind the slope face until final construction adjacent to the RSS and reinforced rockery wall system is completed.

3.07 CONSTRUCTION ADJACENT TO COMPLETED RSS AND REINFORCED ROCKERY WALL SYSTEM:

- A. The Contractor is responsible for ensuring that construction adjacent to the RSS's does not disturb the RSS systems or place temporary construction loads on the RSS system that exceed design loads, including loads such as water pressure, temporary

grades, or equipment loading. Care should be taken by the Contractor to ensure water runoff is directed away from the RSS and reinforced rockery wall system until final grading and surface drainage collection systems are completed.

END OF SECTION