**State of Rhode Island**
**Department of Administration / Division of Purchases**
**One Capitol Hill, Providence, Rhode Island 02908-5855**
**Tel: (401) 574-8100 Fax: (401) 574-8387**

# ADDENDUM # 3

**3/14/19**

**Solicitation #7598601**

**Title: Building 8 ramp Improvements - Rhode Island College**

**Submission Deadline: March 20, 2019 @ 1:00 PM**

**Per the issuance of ADDENDUM #3 the following are noted:**

Please find attached Addendum #3 prepared by Crossman Engineering

*Interested Parties should monitor this website on a regular basis, for any additional information that may be posted.*

**Gary P. Mosca**
**Chief Buyer**

**REQUEST FOR BIDS**
**FOR**
**PROPOSED RAMP IMPROVEMENTS FOR BUILDING 8**
**RHODE ISLAND COLLEGE**
**STATE OF RHODE ISLAND, DEPARTMENT OF ADMINISTRATION**
**SOLICITATION NUMBER 7598601**

**ADDENDUM No. 3**
**March 12, 2019**

**TO ALL CONTRACTORS ESTIMATING:**

Bidders are hereby informed that plans and specifications for the above mentioned contract are modified, corrected, and/or supplemented as follows and Addendum No. 3 becomes part of the Contract Documents.

**00 54 22 BID FORM:**

1. Revision to Item 2 Alternates; Revise the description of the Alternate 1.

2. Add to Item 3 Unit Prices; Addition of line item number 20 for a temporary ADA ramp to be used during construction. The unit price will be a Lump Sum.

**QUESTIONS:**

1. The documents seem to be in disagreement on which scope is included in the base bid and which scope is included in the alternate:

- See Sheet C1 Note: "Alternate Bid Items 1 includes use of a wood ramp for the upper 25' in lieu of full-length concrete ramp.
  RESPONSE: The plan note is correct.
- See Bid Form – 2. Alternates – Furnish and install concrete ramp (full length) in lieu of the proposed wood ramp.
  RESPONSE: The Bid form has been revised. The Alternate Bid Item is the proposed ramp being half concrete and half wood.

2. The typical concrete ramp section detail on sheet C-4 references a DOT detail for a sloped retaining wall. Per the DOT detail referenced this would require a footing wall with a 3 ft- 8 inch base and a 1 ft -6 inch top. This seems to conflict with the design intent of a 6 ft wide ramp.
   RESPONSE: The top of the wall can be notched at 8" from the outside wall, to install a 4'-8" concrete walk between the walls and railing. The expansion joint will be just inside the railing. The total outside to outside width of the concrete ramp (wall & walk) will remain 6'.

3. Alternate No. 1 is confusing. The Bid Form states, "Furnish and install concrete ramp (full length) in lieu of the proposed wood ramp." Drawing C1 states, "Alternate Bid No. 1 includes use of a wood ramp for the upper 25' in lieu of full length concrete ramp." They contradict one another. Please clarify what is required under the Base Bid and what is required under Alternate No. 1.

RESPONSE: Please see the responses above.

4. The project manual that was issued on the State website has 127 pages that end with Section 017800 Closeout Submittals. Are there other specifications for this project such as Concrete, Carpentry, Painting, Earthwork, etc.?
   RESPONSE: Additional specifications are attached to this Addendum.

5. If there are no written specifications, what strength concrete is required? Is there a RIDOT standard mix to be used?
   RESPONSE: The concrete specification is attached to this Addendum

6. What is the grade and/or type of mahogany decking that is required (there are several versions of "mahogany")? Liberty Cedar sells a Red Meranti which is a South American lumber that is very dense. They do not recommend grooving the sides for blind fastening. Drawing S1 states using "hidden fasteners." Liberty Cedar sells a tongue and groove material that would be blind screwed through the tongue. Or you could select a pre-grooved decking that works with the hidden fastener system. They have several options on their website to look at or call them for assistance.
   RESPONSE: Red Meranti is acceptable, and a tongue and groove material or pre-grooved decking that works with the hidden fastener system are both acceptable.

7. Does the decking receive a finish such as a penetrating oil or sealer?
   RESPONSE: We recommend applying Messners Hardwood formula penetrating oil. This shall also be confirmed with supplier.

8. What paint is to be used on the railing?
   RESPONSE: The paint shall be a Rustoleum or equal, spray powder coating exterior paint for steel, black color, low gloss or as approved by Rhode Island College.

9. Is there any cover material required on the ground surface below the wood deck, such as a weed barrier or crushed stone?
   RESPONSE: no cover material is proposed.

10. Are there any requirements for the temporary ramp? Does it need to go to the bituminous walk near the concrete stairs?
    RESPONSE: There is a requirement for the Contractor to install a temporary ramp during construction. The temporary ramp shall be accessible from an existing sidewalk, and meet the ADA requirements. The revised bid form provides a unit price for this item.

11. Missing from the Project Manual are the following Specification Sections, as noted in the Table Of Contents; could you please provide?
    a. Division 03 00 00 – Concrete
       i. 033000 – Cast-In-Place Concrete
    b. Division 31 00 00 – Earthwork
       i. 310519.13 – Geotextiles
       ii. 311000 – Site Clearing
       iii. 312000 – Earth Moving

iv. 313211 – Erosion And Sedimentation Controls

c. Division 32 00 00 – Exterior Improvements
   i. 329113 – Soil Prep
   ii. 329219 – Seeding
   iii. 329343 – Trees, Shrubs

RESPONSE: These sections are included in the attached Addendum 3.

12. Could you please provide Specification Section 00 31 01 – Geotechnical Engineering Report?
    RESPONSE: Please disregard any notations that reference Specification Section 00 31 01- Geotechnical Engineering. There is no geotechnical report for this project.

13. Could you please provide Specification Section 00 31 02 – Hazardous Materials Inspection Report?
    RESPONSE: Please disregard any notations that reference Specification Section 003102 Hazardous Material Inspections Report. There is no hazardous material inspection report for this project.

14. Please clarify that per Specification Section 01 10 00 – Summary, 1.3 Schedule, C. Substantial Completion within 45 days after issuance of Purchase Order and Invitation to Bid, Completion Time, Final Completion, within 75 days of PO Issuance, which one is the correct duration of time?
    RESPONSE: Use the following schedule; Substantial Completion within 45 calendar days after issuance of Purchase Order and Final Completion, within 50 calendar days of PO Issuance.

15. Please clarify. Alternate #1 on Drawing C1 calls out for upper twenty five feet of ramp to be wood but Alternate #1 on the Bid Form calls out for full length concrete ramp. Which one is the correct base bid scope of work?
    RESPONSE: The plan notes are correct and the bid form has been revised to be consistent with the plans. The revised bid form is attached.

16. Since we are not able to view the existing landscaping due to the current weather condition, and there is no landscape drawing, can an allowance be set to carry for replacement of ground cover plants or a list be made available to us?
    RESPONSE: For this project, no transplanting will be required. The contractor shall provide shrub protection and fencing to protect the existing plantings adjacent to the construction area.

17. The design is based on RI DOT Standard 10.3.0 which is a sloped retaining wall. It is 18-inches wide at the top and, at minimum, 39-inches wide at the bottom. The ramp is only 72-inches wide. The concrete walls will be touching or overlapping.

RESPONSE: The top of the wall width is clarified in the response to question 2 above. When the wall/ramp height exceeds 2.5' above grade, the concrete bottom for the two sides should be formed as a monolithic pour.

**ADDENDUM 3 ATTACHMENTS**

1. 00 54 22 BID FORM
2. Pre-Bid Meeting Attendance Sheet
3. 011000 - Summary
4. 033000 – Cast-In-Place Concrete
5. 310519.13 – Geotextiles
6. 311000 – Site Clearing
7. 312000 – Earth Moving
8. 313211 – Erosion And Sedimentation Controls
9. 329113 – Soil Prep
10. 329219 – Seeding
11. 329343 – Trees, Shrubs
12. Soil Management Plan Template

Solicitation #:7598601
Solicitation Title: Rhode Island College – Proposed Ramp Improvements for Building 8

**00 54 22 BID FORM – ADDENDUM No. 3**

To: The State of Rhode Island Department of Administration
Division of Purchases, 2nd Floor
One Capitol Hill, Providence, RI 02908-5855

Bidder:

_____
Legal name of entity

_____
Address (street/city/state/zip)

_____
Contact name Contact email

_____
Contact telephone Contact fax

## 1. BASE BID PRICE

The Bidder submits this bid proposal to perform all of the work (including labor and materials) described in the solicitation for this Base Bid Price (*including the costs for all Allowances, Bonds, and Addenda)*:

$ _____
(base bid price *in figures* printed electronically, typed, or handwritten legibly in ink)

_____
(base bid price *in words* printed electronically, typed, or handwritten legibly in ink)

### Allowances

The Base Bid Price includes the costs for the following Allowance:

1. Allowance 1: = $2,500.00

   The Contractor is required to include the allowance amount of $2,500.00 within the projects base bid price. This allowance is for unforeseen items or for items as determined by the Rhode Island College. Use of this allowance amount by the Contractor must be authorized by Rhode Island College. Use of this allowance can be for items at the discretion of Rhode Island College. If any amount of the allowance amount is unused during construction, the remaining allowance amount shall be returned to the Rhode Island College as a credit to the project.

**Bonds**

The Base Bid Price ***includes*** the costs for all Bid and Payment and Performance Bonds required by the solicitation.

**Addenda**

The Bidder has examined the entire solicitation (including the following Addenda), and the Base Bid Price ***includes*** the costs of any modifications required by the Addenda.

*All Addenda must be acknowledged.*

Addendum No. 1 dated: _____

Addendum No. 2 dated: _____

Addendum No. 3 dated: _____

## 2. ALTERNATES (Additions/Subtractions to Base Bid Price)

The Bidder offers to: (i) perform the work described in these Alternates as selected by the Owner in the order of priority specified below, based on the availability of funds and the best interest of the Owner and (ii) increase or reduce the Base Bid Price by the amount set forth below for each Alternate selected.

1. **Alternate 1:** Furnish and Install both a concrete ramp and landing on the lower portion (25 linear feet) and a wooded ramp on the upper portion (25 linear feet) of the ramp. The wooded ramp area is in lieu of the full ramp being concrete.

   Add: _____ Subtract: _____

$ _____
(base bid price *in figures* printed electronically, typed, or handwritten legibly in ink)

_____
(base bid price *in words* printed electronically, typed, or handwritten legibly in ink)

## 3. UNIT PRICES

The Bidder submits these predetermined Unit Prices as the basis for any change orders approved in advance by the Owner. These Unit Prices include all costs, including labor, materials, services, regulatory compliance, overhead, and profit.

| NO. | ITEM | UNIT | UNIT PRICE |
|---|---|---|---|
| 1 | EXCAVATION-EARTH | CY | $ |
| | | | |
| 2 | TRIMMING AND FINE GRADING | SY | $ |

Solicitation #:7598601
Solicitation Title: Rhode Island College – Proposed Ramp Improvements for Building 8

| NO. | ITEM | UNIT | UNIT PRICE |
|---|---|---|---|
| | | | |
| 3 | REMOVE AND DISPOSE CONCRETE SIDEWALK | SY | $ |
| | | | |
| 4 | REMOVE AND DISPOSE BITUMINOUS SIDEWALK | SY | $ |
| | | | |
| 5 | REMOVE AND DISPOSE CONCRETE RAMP | SY | $ |
| | | | |
| 6 | REMOVE AND DISPOSE WOOD RAMP | SY | $ |
| | | | |
| 7 | REMOVE RAILING FOR RE-USE | LF | $ |
| | | | |
| 8 | STRIP EXISTING PAINT AND RE-PAINT RAILING | LF | $ |
| | | | |
| 9 | GRAVEL BORROW | CY | $ |
| | | | |
| 10 | CONCRETE SIDEWALK | CY | $ |
| | | | |
| 11 | FURNISH AND INSTALL CONCRETE RAMP | CY | $ |
| | | | |
| 12 | FURNISH AND INSTALL CONCRETE RAMP WALLS | CY | $ |
| | | | |
| 13 | FURNISH AND INSTALL WOOD RAMP | SF | $ |
| | | | |
| 14 | RE-INSTALL RAILING AND HARDWARE | LF | $ |
| | | | |
| 15 | INSTALL STRAW WATTLE | LF | $ |
| | | | |
| 16 | REMOVE STRAW WATTLE | LF | $ |
| | | | |
| 17 | LANDSCAPE PROTECTION | LF | $ |
| | | | |
| 18 | LOAM BORROW | SY | $ |
| | | | |
| 19 | SEED MIX | SY | $ |
| | | | |
| 20 | TEMPORARY ADA RAMP DURING CONSTRUCTION | LS | $ |
| | | | |

## 4. CONTRACT TIME

The Bidder offers to perform the work in accordance with the timeline specified below:

- Start of construction: within 7 days of issued PO or at a date as requested by the Rhode Island College (within 14 days after issuance of the PO).
- Substantial completion: Within 45 calendar days of issued PO
- Final completion: Within 50 calendar days of issued PO

## 5. LIQUIDATED DAMAGES

The successful bidder awarded a contract pursuant to this solicitation shall be liable for and pay the Owner, as liquidated damages and not as a penalty, the following amount for each calendar day of delay beyond the date for substantial completion, as determined in the sole discretion of the Owner: $250.00 Two Hundred and Fifty dollars per calendar day.

**This bid proposal is irrevocable for 30 days from the bid proposal submission deadline.**

**If the Bidder is determined to be the successful bidder pursuant to this solicitation, the Bidder will promptly: (i) comply with each of the requirements of the Tentative Letter of Award; and (ii) commence and diligently pursue the work upon issuance and receipt of the purchase order from the Owner and authorization from the user agency.**

**The person signing below certifies that he or she has been duly authorized to execute and submit this bid proposal on behalf of the Bidder.**

**BIDDER**

**Date:** _____

_____
Name of Bidder

_____
Signature in ink

_____
Printed name and title of person signing on behalf of Bidder

# _____
Bidder's Contractor Registration Number

State of Rhode Island
Division of Purchases
One Capitol Hill
Providence, RI 02908

# "NON-MANDATORY" PRE-BID CONFERENCE SIGN IN SHEET

BID NUMBER: 7598601

BID TITLE: Building 8 Ramp Improvements - RIC

PRE-BID DATE AND TIME: March 5, 2019 @ 9:00AM

| Purchasing Representative: |
|---|
| Jessica Cimorelli |
| NON-Mandatory Pre-bid START TIME: |
| 9:01 am |
| NON-Mandatory Pre-bid END TIME: |
| 9:14 am |

| | COMPANY NAME | COMPANY REPRESENTATIVE | SIGNATURE | ADDRESS | CONTACT E-MAIL | CONTACT PHONE NUMBER |
|---|---|---|---|---|---|---|
| 16 | Rhode Island College | Jessica Cimorelli | Jessica Cimorelli | 600 Mt. Pleasant Ave Providence RI 02908 | jcimorelli@ric.edu | 401-456-8047 |
| 17 | TOWER CONSTRUCTION | MARC B. NOUMAN | MBNouman | 10 SOUTHERN INDUSTRIAL DR. CRANSTON, RI 02921 | ESTIMATING@ TOWERCONSTRUCTIONCORP.COM | 401-943-0110 |
| 18 | RIC | Andrew Mayes | | 600 Mt. Pleasant | amayes@ric.edu | 4014568535 |
| 19 | Grossman Engineering | Brian King | | 151 Centerville Rd Warwick RI | brian.king@grossmaneng.com | 401-738-5060 x26 |
| 20 | RIC | Karla Mello | K Mello | 600 Mt Pleasant | Kmello0@ric.edu | 456-8545 |
| 21 | chirica const. co. inc. | SCOTT SMITH | | 55 JEFFERSON BLVD. WARWICK R.I. 02888 | chirica construction@cox.net | 401 823-5334 |
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** VENDOR: PLEASE SUBMIT A BUSINESS CARD IF AVAILABLE**

## 01 10 00–SUMMARY

## PART 1 - GENERAL

1.1 PROJECT

A. The Project consists of the construction of the following types of work:

This project includes removal and disposal of bituminous and concrete sidewalk, removal and disposal of the existing concrete and wood ADA ramp and removing for re-use the existing ramp railing. New improvements include installation of cement concrete sidewalk, new concrete and wood ramps, stripping, repainting and reinstallation of existing rails, welding, installing new ramp hardware, loam seed and drainage pipe installation. During construction the Contractor shall install a temporary ramp for pedestrians to access the building. Ramp location shall be confirmed with Rhode Island College. After construction and after the new ramp is in use, the Contractor shall remove the temporary ramp from the site.

1.2 DESCRIPTION OF WORK

A. Scope of demolition and removal work is shown on drawings plus.

B. Scope of alterations work is shown on drawings and/or as specified herein.

1.3 SCHEDULE

A. Ordering of products, coordination and preparatory work is to commence within 7 days of receipt of Purchase Order.

B. Construction at the site can commence after issuance of Purchase Order. Final Completion shall be within 50 calendar days after issuance of Purchase Order. It is anticipated that a Purchase Order will be issued by April 19, 2019.

C. Substantial completion date is shall be within 45 calendar days after issuance of Purchase Order.

D. . This is the date to which liquidated damages may apply and may only be adjusted as provided for in the Contract Documents. Contractor shall be responsible for completing the submittals required for issue of a Purchase Order in a timely manner. No extension will be granted for purchasing delays.

E. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

1.4 ITEMS TO BE SALVAGED

A. Railing and Existing Landscaping.

1.5 SUBCONTRACTOR CERTIFICATION REQUIREMENTS

Subcontractors shall be licensed to work in the State of Rhode Island, and shall meet the insurance requirements of the Rhode Island College.

## PART 2 - PRODUCTS - NOT USED

## PART 3 - EXECUTION

3.1 CONTRACTOR USE OF SITE AND PREMISES

A. Owner intends to continuously occupy the facility. Work areas will be made available as mutually agreed to during project scheduling.

B. Construction Operations: Limited to areas noted on Drawings. Coordinate with Site Utilization Requirements. Include in the Base Bid all costs of this coordination, including all premium time wages that may be required to meet these requirements and project schedule. Cost of all work done during second or third shifts or on weekends and holidays shall be included in the bid price.

C. Arrange use of site and premises to allow:
   1. Adjacent projects to progress as planned for the Owner.
   2. Use of street and adjacent properties by the Public.
   3. Continued operation of the facility.

D. Provide access to and from site as required by law and by Owner:
   1. Maintain appropriate egress for workforce and users of the facility.
   2. Do not obstruct roadways, sidewalks, or other public ways without permit. Provide necessary signage and barriers to direct pedestrians around work areas.
   3. Barriers and signage must be provided by the contractor to the satisfaction of the Owner toseparate the work area from occupied areas. Efforts must be taken to limit dust, noise and odors from escaping the work area. Proper separation and protection of interior spaces shall be established and maintained during the project, to the satisfaction of the Owner.
   4. Contractor is responsible for cleaning construction dust and/or debris from public areas and daily or at the request of the Owner. Work areas within the building shall be kept tidy at all times.
   5. Contractor shall provide and maintain walk-off mats at work site entries.
   6. The Contractor shall coordinate with the Rhode Island College Engineer and provide access to the building at all times during construction, unless approved otherwise by the Rhode Island College Engineer.

E. Utility and Building Services Outages and Shutdown:
   1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days' written notice to Owner and authorities having jurisdiction.
   2. Prevent accidental disruption of utility services to other facilities.
   3. Contractor to provide written notification on Fire Sprinkler and Alarm System Impairment Notification Form found in Section 00 73 02.
   4. When construction activities impact ventilation, heating or air conditioning to occupied building spaces, the contractor shall provide the necessary equipment to maintain proper ventilation rates and a temperature of 68° heating and 72° cooling. Prior to the decommissioning of equipment, the contractor shall submit a plan for temporary HVAC services, including unit location, utility connection, ductwork tie in and other logistical considerations.
   5. Stormwater shall be maintained and/or controlled within the project limits during construction project.

F. Construction in Regularly Occupied Areas:
   1. Activities which require work in regularly occupied spaces shall be indicated on the Two-Week Look-Ahead and confirmed with the owner at least two (2) business days in advance.
   2. The safety of building occupants and construction workers is paramount. All construction activities within occupied spaces shall be marked with cones and caution tape. Computer generated signage shall be provided indicating the path of travel around construction zones, and shall also be posted at stairwell doors indicating where internal construction activities may take place.
   3. The Contractor shall coordinate with the Rhode Island College Engineer and provide access to the building at all times during construction, unless approved otherwise by the Rhode Island College Engineer.

3.2 TIME RESTRICTIONS AND WORKING HOURS

A. Disruptive Activities& Work Restrictions

1. Limit conduct of especially noisy work when events are in process. Working hours must conform to the City of Providence ordinance, unless approved otherwise by Rhode Island College.
2. Noise and vibration creating work restrictions are defined as follows:
   a. No restrictions: normal construction activities may take place. No restrictions on noise or vibrations. Utility shutdowns may occur following proper notifications.
   b. Quiet Work: vibration producing work may not occur. Work that generates noise that would escape the project site and cause disruption to occupants is prohibited. Disallowed activities include but are not limited to: demolition of block and concrete, use of jackhammers, saw cutting, hammer drilling, mechanical fastening and other work activities which provides loud noises or vibrations that are constant in nature.
   c. No Work: on site work is prohibited to take place during this time. Workers are prohibited from the site without prior notification to the Owner.
3. It is the sole discretion of the Owner to determine if activities are considered disallowed during quiet work periods. The designation of disallowed activities is contingent on location within the job site and the activities of the occupants.
4. The contractor my request a "disturbance test" which may allow for some disallowed activities to take place during quiet work times. Contractor may request with 24 hour notice to run a limited test to determine if a specific activity in a set location can be performed during quiet work periods. The owner will observe the impact on the occupied areas and determine if the activity take place. Waivers resulting from disturbance tests will be valid for a set period of time, based on construction activities and occupant usage.

B. Working Hours

1. Working hours must conform to the City of Providence ordinance, unless approved otherwise by Rhode Island College.
2. Sufficient time to clean up work zones shall be allocated at the end of the shift. All construction activities within the building shall be thoroughly vacuumed, wet mopped and cleaned to the satisfaction of the Owner at the end of each shift.
3. All construction materials, tools and debris must be removed from occupied building spaces once construction activities have ended for the day. If it is not feasible to do as such, notify the Owner immediately. With approval, the area shall be cordoned off with cones and caution tape and computer generated signage shall be posted to the satisfaction of the Owner.

3.3 SCHEDULE COORDINATION:

A. The contractor shall provide by noon on Thursdays the two week project look ahead which lists in detail the planned activities, locations of disturbance, scheduled subcontractors and working hours for the forthcoming Sunday-Saturday. The same shall be provided for the second week, but as a working draft. The document shall list out any utility shutdowns or other activities which require review and approval of the Owner.

3.4 SITE UTILIZATION PLAN

A. Refer to Drawings for approximate area for site staging.

1. Contractor is responsible for protection and restoration of existing conditions including, but not limited to hardscape, landscape and lawns.
2. Contractor shall provide six foot high construction fence that is properly secured and maintained around building in approximate locations shown on the site plan allowing access to all egress

doors designated by the Owner. Provide visual screening on fence using fabric approved by the Owner.

3. Contractor to provide overhead cover protection at all entrances and egresses from the building. Entrances and paths of egress must be clearly marked with signage with placement and language approved in advance by the Owner.
4. Staging of equipment, dumpsters and materials must be situated within the project fenced-in areas.

B. Large deliveries of materials or equipment that may block parking or access to the parking lot area shall occur prior to 7:30am. Use of areas outside of the project area will be permitted during off-hours is permissible provided such use is coordinated with the Owner at least 72 hours in advance.

C. For activities requiring closure of the parking lot, roadways and/or walkways, the Contractor is responsible for all temporary barriers and acquiring RIC Campus Police details to route pedestrians and vehicular traffic.

D. A Site Utilization Plan shall be submitted by the Contractor within ten (10) business days of issuance of the Purchase Order for approval by the Owner.

**END OF SECTION**

## SECTION 033000- CAST-IN PLACE CONCRETE

## PART 1 GENERAL

1.01 SCOPE

This section specifies cast-in-place concrete.

1.02 REFERENCES

A. ACI – Structural Concrete for Buildings.

B. ACE 304 – Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

C. ACI 308 – Standard Practice for Curing Concrete.

D. ACI 318 – Building Code Requirements for Reinforced Concrete.

E. ASTM C94 – Ready-Mixed Concrete.

F. ASTM C150 – Portland Cement.

G. ASTM C260 – Air Entraining Admixtures for Concrete.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Acquire cement and aggregate from same source for all Work.

C. Use only one (1) brand of cement and admixtures unless otherwise approved in writing by the Engineer or Owner.

D. Provide the Engineer or Owner with delivery ticket in accordance with ASTM C94 for each load of concrete.

## PART 2 PRODUCTS

2.01 MATERIALS

A. Cement:

1. Type I or Type II Portland Cement: ASTM C150. Use only one (1) brand of cement.

2. For areas with poor aggregate quality: Type II Portland Cement, ASTM C150. Use only one (1) brand of cement.

3. Type III Portland Cement: ASTM C150. For use at the Contractor's option under Cold Weather Concreting and Curing and Proportioning Concrete for Cold Weather.

B. Aggregate:

1. ASTM C33, "Specifications for Concrete Aggregate," Size Number 57.

2. For areas with poor quality aggregate, aggregate shall conform to ASTM C33 and meet the following minimum standards:

| TEST | ASTM | LIMIT |
|---|---|---|
| Fine Aggregate | | |
| Sieve Analysis | C 33 | (as specified below) |
| Clay lumps & Friables | C 142 | 2% Max |
| Light Weight Material | C 123 | 2% Max |
| Material finer than No. 200 | C 117 | 3% Max |
| Sand Equivalent | C 241 | 80% Min |
| Soundness (NaSO4) | C 88 | 10% Max |
| Coarse Aggregate | | |
| Sieve Analysis | C 33 | (as specified below) |
| Clay Lumps & Friables | C 142 | 0.5% Max |
| Light Weight Material | C 123 | 1.0% Max |

Gradation follows:

| Fine Aggregate | | Coarse Aggregate | |
|---|---|---|---|
| Sieve Passing Size(Weight) | % Passing Size | Sieve Passing | % Passing (Weight) |
| 3/8 | 100 | 1-1/2 | 100 |
| No. 4 | 90-100 | 1 | 90-100 |
| No. 16 | 45-75 | 3/4 | 50-80 |
| No. 30 | 25-55 | 3/8 | 15-40 |
| No. 100 | 0-8 | No. 4 | 0-10 |

C. Admixtures for Concrete:

1. Air-entraining admixtures - ASTM C260.

2. Water-reducing retarding admixtures - ASTM C494, Type D. Water-reducing, retarding admixtures may be used when approved by the Engineer or Owner. The time limit between batching and placing concrete may be extended up to an additional two (2) hours. Use a quantity of admixture within the range of the manufacturer's recommendation. The amount of water may be reduced; other proportions shall remain the same.

3. Furnish the following information to the Engineer or Owner for approval:

   a. Brand name of the admixture.

   b. Amount of admixture, per cubic yard of concrete to be used.

   c. Reason for requesting the use of the admixture.

D. Water:

1. Clear, clean, and suitable for domestic consumption.

2.02 CONCRETE MIX

A. Schedule - Concrete Types and Finishes:

1. Proportion concrete in accordance with ACI 318. The strength of concrete (fc), air entrainment, slump, and finish meet the requirements below:

a. Structural Concrete /Foundation Walls.

| Unit | Requirement |
|---|---|
| Compressive Strength (f'c) (28 day) | 3,000 psi |
| Air Entrained | 4-6% |
| Slump (±1 inch) | 5" |
| Finish form | Finish with honeycomb filled surface |

b. Non-Structural Concrete, Walks and Slabs.

| Unit | Requirement |
|---|---|
| Compressive Strength (f'c) (28 day) | 2,500 psi |
| Air Entrained | 4-6% |
| Slump (±1 inch) | 5" |
| Finish | Broom finish or as specified on drawings |

B. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

C. Proportioning Concrete for Cold Weather:

1. For concrete placed under "Cold Weather Concreting and Curing" condition, the Contractor may elect to alter the required proportions in one of the following ways:

a. Type III Portland Cement.

1) Type III Portland Cement may be substituted in equal quantities for Type I or II Portland Cement.

b. Additional Cement.

1) An additional sack per cubic yard of Type I or Type II Portland Cement may be added.

D. Temperature Limits for Cold Weather Concrete:

1. Provide concrete having a minimum temperature of 50 degrees F and a maximum temperature of 90 degrees F at the time of placing. The temperature of the mixing water shall not exceed 140 degrees F. If aggregates are heated, heat uniformly with steam or water coil. Aggregate temperature shall not exceed 95 degrees F. Aggregate water mix temperature shall not exceed 80 degrees F. Do not use materials containing frost or icy lumps.

E. Proportioning Grout Fill:

1. Fine concrete aggregate with three (3) sacks of cement per cubic yard and a maximum slump of six (6) inches.

## PART 3 EXECUTION

3.01 MIXING

A. Plant Batched and Transit Mixed:

1. Batch at a central plant and mix enroute to the project in transit mix trucks in compliance with ASTM C94.

2. Place truck or transit mixed concrete within a maximum of 1-1/2 hours after introduction of cement into the batch. In hot weather or due to other contributing factors, a time less than 1-1/2 hours may be required by the Engineer or Owner.

3. Time interval between placement of batches not to exceed thirty (30) minutes.

B. Plant Batched and Project Mixed:

1. Batch aggregates at a central plant and add water, cement, and admixture at the project.

2. Meet all requirements specified for transit mix.

3. Add cement, water, and admixture by accurate measurement, using measuring devices approved by the Engineer or Owner.

C. Project Batched and Mixed:

1. Batch and mix at project site.

2. Methods and apparatus used to batch the design mix will be reviewed for approval by the Engineer or Owner.

3. Mixer rated capacity shall not to be less than one (1) bag per batch. Batch quantities requiring fractional bags will not be allowed.

4. Mix concrete a minimum period of 1-1/2 minutes after all materials are in the drum.

D. Hand Mixed:

1. Hand mixing may be allowed only upon written approval of the Engineer or Owner. Batches not to exceed 1/2 cubic yard in volume.

3.02 MIX ADJUSTMENTS

A. After the mix period but no later than fifteen (15) minutes from start of mixing, water may be added once for purposes of acquiring minimum slump, provided specified water-cement ratio is not exceeded. Adding water beyond these conditions constitutes retempering which will not be allowed. When water is added, an additional twenty (20) revolutions at mixing speed is required.

B. Air-entraining admixtures will not be allowed to be added after the start of mixing for purposes of acquiring minimum air content.

3.03 CONCRETE PLACEMENT

A. Notify Engineer or Owner a minimum of 24 hours prior to placement.

B. Convey concrete from a mixer to the forms as near final position as practical in a manner which will prevent segregation or loss of materials.

C. Place concrete in maximum eighteen (18) inch horizontal layers.

D. Immediately after placing, thoroughly compact concrete with mechanical vibrators. Provide minimum of two (2) vibrators. Provide minimum of two (2) power sources unless commercial power is available at site. Hand tamping or "spudding" when permitted, will be approved in writing by the Engineer or Owner.

E. Place each concrete section in a continuous operation, such as bottom slab, walls, and top slab.

F. Do not drop concrete freely from higher than four (4) feet above the surface of concrete being poured.

G. Do not place concrete in water or allow water to rise over freshly placed concrete until a set is sufficient to prevent damage.

3.04 SEAL CONCRETE PLACEMENT

A. Seal concrete may be deposited under water in a compact mass and in approximate horizontal layers without vibrating or tamping. Vibrate or tamp seal concrete when not placed under water.

C. Use tremie tube, closed bottom-dump bucket, or other means approved in writing by the Engineer or Owner.

C. Tremie tubes shall be not less than ten (10) inches in diameter and bottom-dump buckets shall not be less than 1/2 cubic yard capacity.

D. Place point of discharge upon the prepared foundation or upon concrete already placed, then discharge and raise slowly during the discharge travel.

E. Avoid agitating the mixture or allowing water to enter the tube or bucket.

3.05 PROTECTION FROM RAINFALL

A. Protect flat work during periods of precipitation with adequate waterproof covering. Support covering so that finishing may be performed and initial set obtained without damage. Dragging of tarpaulins or other covering across unset concrete will not be permitted.

3.06 CURING

A. Commence curing and protection of concrete immediately after placing. Cure Type I and Type II Portland Cement seven (7) days continuously and Type III Portland Cement three (3) days continuously by one (1) of the following methods:

1. Water Curing:

   Keep all surfaces of concrete and forms left on concrete wet. Shade concrete from sun with covering material or with sand or sawdust on slab, except during periods of required finishing. Use of sprinklers or flooding is permitted on slabs.

2. Membrane Curing:

   a. A liquid membrane-forming material may be used for curing at the Contractor's option. Complete required surface finish prior to application of curing compound; use water curing during finishing period. Spray material to surface at the rate of one (1) gallon per 300 square feet in two (2) applications, resulting in a coverage of 1 gallon per 150 square feet. Apply first coat immediately after acceptance of finish. Thoroughly wet concrete with water and apply material just as surface film of water disappears. Apply second coat after first application has set. Recoat any rupture to the membrane seal immediately or use water cure method.

3.07 COLD WEATHER CONCRETING AND CURING

A. When descending air temperature at the project falls below 40 degrees F the Contractor may at their option, continue concreting under conditions stated below. Normal concreting operations may resume when the temperature at the site exceeds 40 degrees F.

B. Provide cover and heating equipment sufficient to maintain the temperature of the concrete at not less than 50 degrees F for a period of three (3) days for Type I and Type II cement. Maintain the temperature at not less than 50 degrees F for a period of two (2) days for Type III cement or when one additional sack of Type I or Type II cement is added.

C. Provide additional protection to prevent the concrete temperature from dropping more then 40 degrees F in the 24 hour period following the required protection period.

D. Keep all surfaces of concrete and any forms remaining on concrete wet. Remove and replace any concrete injured by frost and freezing as directed by the Engineer or Owner.

3.08 FIELD QUALITY CONTROL

A. All tests will be performed by and at the expense of the Contractor. Concrete for the samples shall be provided by the Contractor at no additional cost to the Owner. Samples for testing will be selected on a random sample basis in accordance with ASTM C172. If the measured slump or air content falls outside the specified limits, a check test shall be made immediately on another portion of the same load. In the event of a second failure, the concrete shall be considered to have failed the requirements of the specification.

B. The following concrete tests will be taken:

1. Slump:

   Testing will be in accordance with ASTM C143. If the slump is greater than the specified range, the concrete will be rejected.

2. Air Content:

   Testing will be in accordance with ASTM C231. If the air content exceeds the specified range, the concrete will be rejected.

3. Compressive Tests:

   Compressive test cylinders will be molded, cured, prepared and tested in accordance with ASTM C31 and ASTM C39. Cylinders will be taken for testing at seven (7) and twenty-eight (28) days.

C. Test results of cylinders tested at twenty-eight (28) days will form the basis for acceptance or rejection of concrete strength. Each twenty-eight (28) day compressive test result shall be the average of the compressive test of two (2) cylinders from the same batch. No more than two (2) samples from each load will be taken. The concrete strength will be evaluated in accordance with ACI 318. The strength level of the concrete will be considered satisfactory if the averages of all sets of three (3) consecutive strength test results equal or exceed the required f'c and no individual strength test result falls below the required f'c by more than 500 psi.

**END OF SECTION 033000**

## SECTION 310519.13- GEOTEXTILES

## PART 1 GENERAL

1.01 SCOPE

A. Furnish of all labor, materials, and equipment necessary to install specified geotextile fabrics in locations as directed by the Engineer.

1.02 SUBMITTALS

A. Shop drawings and brochures shall be submitted for all items to be furnished in accordance with the provisions of the General Conditions as supplemented.

B. Submittals required under this section shall include, but not be limited to the following:

1. Materials Specifications
2. Materials Brochure
3. General Installation Practices and Installation Schedule

## PART 2 MATERIALS

2.01 FILTER/DRAINAGE FABRIC

A. Filter fabric for use in trench excavation operations shall be a nonwoven polypropylene fabric, DuPont Typar, Mirafi-140, or approved equal.

## PART 3 EXECUTION

3.01 GENERAL

Installation of geotextile fabrics shall be strictly in accordance with the manufacturer's instructions and specific layout plans and details reviewed by the Engineer.

A. Filter Fabric

The filter fabric shall be installed in the final graded trench bottom prior to placement of the crushed stone bedding and at other locations shown on the drawings or designated by the Engineer. The drainage fabric shall be overlapped to prevent intrusion of soil fines into the crushed stone bedding. The Contractor shall follow the manufacturer's installation recommendations.

3.02 FINAL INSPECTION AND ACCEPTANCE

A. The Contractor shall, at its expense, have a manufacturer's representative inspect the work at completion of the installation. Any work found to be unsatisfactory shall be corrected at the Contractor's expense.

B. The Engineer, at the Contractor's expense, reserves the right to have a manufacturer's representative inspect the installation process at any time during construction.

**END OF SECTION 310519.13**

**SECTION 311000- SITE CLEARING**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions apply to this section.

1.02 SECTION INCLUDES

A. Requirements for removal of vegetation, topsoil, fill and other items required to fully prepare the site for the proposed construction.

B. Work includes items not specifically covered by other sections of the specifications.

1.03 DEFINITIONS

A. Clearing: Removal of trash, vegetation, trees, or organic matter alive or dead.

B. Grubbing: Removal of vegetation including stumps, buried logs and roots.

C. Scalping: Removal of grass turf to a depth of 3 inches.

1.04 QUALITY ASSURANCE

A. Obtain Engineer's approval of staked work limits prior to starting the clearing, grubbing, and stripping.

1.05 PROJECT/SITE CONDITIONS

A. Environmental Requirements

1. Install erosion and sediment controls prior to starting the work. Erosion and sediment controls shall be maintained in accordance with all state and local requirements.

B. Existing Conditions

1. Temporarily remove property improvements, to the minimum extent necessary, to complete the work and restore improvements to condition which existed prior to construction.

1.06 REFERENCES

1. The *Rhode Island Department of Transportation Standard Specifications for Road and Bridge Construction, 2013 Edition,* with latest revisions.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 PROTECTION

A. Install temporary tree and plant protection at trees to be protected.

B. Do not cut or injure any trees or other vegetation outside the limits of disturbance and/or permanent easements, as indicated on the Drawings.

C. Trees, shrubbery, or plantings along the traveled highways or roads, shall not be removed except with the written approval of the Engineer.

D. Preserve certain vegetation such as trees, shrubs, hedges and plants within the construction area, as indicated on the Drawings to be protected or as directed by the Engineer.

E. Work In Improved Property

1. Protect trees, cultivated hedges, lawns, shrubs, and plants that might be damaged by the Contractor's operations.

2. Temporarily replant and care for trees under 4 inches in diameter which would be damaged by the construction operation. After the construction operations have been substantially completed, replant in their original positions and care for until growth is reestablished. If trees, cultivated hedges, lawns, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced at the Contractor's expense by items of kind and quality existing at the start of the work.

3. Do such handwork as may be required to prevent damage to buildings and improvements.

4. Protect fences and stone walls and if needed to be removed to facilitate construction or if damaged, upon completion of the work, properly restore or repair to at least as good a condition as existed prior to start of the work.

3.02 CLEARING

A. Cut or remove all trees, saplings, brush, and vines, windfalls, logs, and trees lying on the ground, dead trees and stubs more than 1 foot high above the ground surface.

B. Except where clearing is done by uprooting with machinery or where stumps are left longer to facilitate subsequent grubbing operations, trees, stumps, and the stubs to be cleared shall be cut as close to the ground surface as practicable, but no more than 6 inches above the ground surface in the case of small trees, and 12 inches in the case of larger trees. Saplings, brush, and vines shall be cut off close to the ground.

C. Selective Trimming

1. Cut back limbs and branches of trees to be preserved only to the extent necessary for construction.

2. Trim neatly, and cleanly so that the remaining tree will not be damaged and healing will be facilitated. Where limbs and branches over 1 inch in diameter have been cut, the newly cut area of the tree shall be given a thorough application of approved tree-healing paint.

3.03 GRUBBING

A. Remove completely all stumps.

B. Remove to a depth of 12 inches all roots 3 inches and larger in diameter.

C. Remove to a depth of 6 inches all roots less then 3 inches in diameter.

D. Measure depths from the existing ground surface, or the proposed finished grade, or the proposed grade of the gravel borrow subbase, whichever is the lower.

3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

A. Dispose of cleared and grubbed materials off site at authorized disposal location.

B. Such disposal shall be carried on as promptly as possible after removal of material in the clearing and grubbing operations and shall not be left until the final period of cleaning up.

C. Elm bark whether stripped from the wood or intact with the wood shall be either buried at least 1 foot below grade in approved dumping areas or burned in a suitable incinerator off-site with satisfactory anti-pollution and fire prevention controls to prevent the spread of Dutch Elm Disease.

3.05 REMOVAL AND DISPOSAL MISCELLANEOUS OBJECTS

A. Removal and disposal of miscellaneous items such as fences, posts and railings, guardrail, private signs, highway bounds, walls and any other object not specifically covered by another section of the Specifications, specifically indicated on the plans to be removed or required to be removed for the construction of the new work.

**END OF SECTION 311000**

**SECTION 312000- EARTH MOVING**

PART 1 - GENERAL

1.01 SCOPE

A. The work of this section includes the furnishing of all labor, materials, tools, equipment, accessories and appurtenances necessary to satisfactorily complete all stripping of topsoil, excavation of earth and rock, stockpiling, removal of unsatisfactory materials, saw cutting and pavement and sidewalk removal, backfilling, filling, compaction, and grading not specified elsewhere, and all incidental work pertaining thereto within the limits of the work indicated or required as specified herein.

1.02 RELATED DOCUMENTS –Not Used

1.03 PROTECTION OF WORK

A. The Contractor shall execute the work so that no damage occurs to adjacent utilities, structures, property, or any other installation located in or adjacent to work areas. Damaged utilities shall be repaired with similar or better materials of the same size and to requirements of the utility owner. The Contractor shall have on site the necessary manpower, materials and equipment such as pumps, piping, and the like as required protecting and maintaining uninterrupted flows in existing utilities during construction.

B. Excavations shall be kept free from water, snow and ice during construction. Bedding and backfill material shall not be placed in water. Water shall not be allowed to rise upon or flow over bedding and backfill material.

C. The Contractor shall maintain all benchmarks, monuments and other reference points and, if disturbed, shall replace them at no additional cost to the Owner.

D. Excavating equipment shall be of such size and type, and used in a manner, that will not damage existing items such as but not limited to paved surfaces, utilities, structures, trees.

E. The finished subgrade shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the finished surfaces are placed. Until the subgrade has been observed by the Engineer, no pavement materials shall be installed thereon.

F. The Contractor shall take whatever steps necessary to prevent catch basins and drain lines from receiving silt and sediment washed from project work areas. The Contractor shall clean out catch basins and drain lines that have not been successfully protected.

1.04 SUBMITTALS

A. Shop drawings and brochures shall be submitted for all items to be furnished in accordance with the provisions of the General Conditions as supplemented.

B. Submittals required under this section shall include, but not be limited to the following:

1. Materials Testing Results;
2. Materials Brochures;
3. Temporary Earth Support Certification Letter Including Design Calculations

4. Concrete testing
5. Control of Water Certification Letter; and
6. Soil Testing and Compaction Testing Reports

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fill materials, meeting the following requirements, shall be used in the areas shown on the drawings or where specified herein. Fill materials may be obtained from either on-site excavations or from off-site sources as appropriate.

2.02 SUITABLE EXCAVATED MATERIAL

A. Suitable excavated material shall be material excavated for the installation of proposed utilities that meets the below specifications for gravel borrow, select fill or crushed stone. The re-use of this material must be approved by the Owner. The contractor shall provide the Owner with documentation showing that the excavated material meets the below specifications.

2.03 GRAVEL BORROW

A. Gravel borrow shall consist of hard, durable gravel and sand, free from trash organic matter and clay, surface coatings, and other deleterious material.

B. Gravel Borrow shall be placed in maximum twelve (12) inch lifts compacted to a minimum density of 95 percent of the maximum density determined by ASTM D1557, (Modified Proctor).

C. Gravel borrow shall have a maximum stone size of three (3) inches and shall meet the following gradation requirements:

| U.S. Sieve Size | Percent Passing | |
|---|---|---|
| | Bank Run Processed Sand/Gravel | Reclaimed Processed Material |
| 3 inch | 60-100 | 100 |
| 1 1/2 inch | | 70-100 |
| 3/4 inch | | 50-85 |
| 1/2 inch | 50-85 | |
| 3/8 inch | 45-80 | |
| No. 4 | 40-75 | 30-55 |
| No. 40 | 0-45 | |
| No. 50 | | 8-25 |
| No. 200 | 0-10 | 2-10 |

2.04 GRAVEL BORROW BEDDING/GRANULAR MATERIAL

A. Gravel borrow bedding/Granular material shall consist of hard, durable gravel and sand, free from trash organic matter and clay, surface coatings, and other deleterious material.

B. Gravel borrow bedding/Granular material shall be placed in maximum twelve (12) inch lifts compacted to a minimum density of 95 percent of the maximum density determined by ASTM D1557, (Modified Proctor).

C. Gravel borrow bedding/Granular material shall have a maximum stone size of one and one half (1-½") inches and shall meet the following gradation requirements:

| U.S. Sieve Size | Percent Passing |
|---|---|
| 1 1/2 inch | 100 |
| 1/2 inch | 50-85 |
| 3/8 inch | 45-80 |
| No. 4 | 40-75 |
| No. 40 | 0-45 |
| No. 200 | 0-10 |

2.05 SELECT FILL

A. Select fill shall consist of hard durable sand or sand and gravel, free from trash, organic matter, clay, surface coatings and other deleterious materials.

B. Select shall be placed in twelve (12) inch lifts compacted to a minimum density of 95 percent of the maximum density determined by ASTM D1557, (Modified Proctor).

C. Select fill placed between the mid-height of a pipe and twelve (12) inches above a pipe shall have a maximum stone size of three (3) inches. Select fill used for other purposes shall have a maximum stone size of two thirds of the loose lift thickness and that portion passing the three (3) inch sieve shall meet the following gradation requirements, as determined by ASTM C136 and ASTM C117:

| U.S. Sieve Size | Percent Passing |
|---|---|
| 4 inch | 100 |
| No. 10 | 30-100 |
| No. 40 | 0-70 |
| No. 200 | 0-15 |

2.06 CRUSHED STONE

A. Crushed stone shall consist of clean, crushed, non porous rock, or crushed gravel, uniformly blended.

B. Crushed stone shall meet the following gradation requirements:

| U.S. Sieve Size | Percent Passing |
|---|---|
| 2 1/4 inch | 100 |
| 2 inch | 90-100 |
| 1 1/2 inch | 30-55 |
| 1 1/4 inch | 0-25 |
| 1 inch | 0-5 |

2.07 CRUSHED STONE AND CRUSHED OR SCREENED GRAVEL BEDDING

A. Crushed stone and crushed or screened gravel bedding shall consist of clean, crushed, non porous rock, or crushed gravel, uniformly blended.

B. Crushed stone and crushed or screened gravel bedding shall meet the following gradation requirements:

| U.S. Sieve Size | Percent Passing |
|---|---|
| 1 1/2 inch | 100 |
| No. 4 | 0-5 |

PART 3 - EXECUTION

3.01 PREPARATION

A. Stripping

1. Prior to any excavation, filling, or grading operations, all topsoil, subsoil, fill or similar organic soils found within the Limit of Work line shall be stripped to their full depth in the area of all structures and in all areas required to be filled, excavated or graded. Stripped materials suitable for re-use as loam shall be stockpiled. Stockpiles shall be kept separate and not mixed with any other materials. Excess stripped materials and unacceptable materials shall be legally disposed of off-site by the Contractor unless otherwise specified.

B. Pavement Cutting

1. Where excavations are to be made in paved or surface treated areas, the pavement shall be cut with a pavement saw or wheel cutter prior to excavation unless otherwise noted.

2. In areas where the trench width is greater than the original cut, the pavement shall be re-cut prior to paving.

C. Clearing and Grubbing

1. Excavation shall consist of the removal of soil, rock, and other materials to the limits shown on the drawings, specified herein, and as required to provide firm bearing. No structures, pavements, utilities or fill materials of any kind shall be placed in, or upon excavated areas such as have been observed by the Engineer.

2. Rippable rock shall be considered earth excavation. Rippable rock is defined as rock which can be excavated using a single tooth hydraulic ripper pulled by a D8 Dozer or equivalent equipment.

3. Excavated materials meeting the requirements for the various fill materials specified herein shall be stockpiled for reuse. Unsuitable or excess suitable materials shall be legally disposed of off-site by the Contractor unless otherwise specified.

4. Excavation shall be to the limits as necessary to install utilities, pavement or other facilities unless otherwise specified. Excavation of unsuitable material beyond the limits necessary shall only be performed as authorized by the Engineer.

5. The proposed contour lines and spot grades shown on the drawings are finish elevations. Excavation to subgrade shall be the distance below these elevations as may be required by the size and thickness of the pavements, structures, utilities and surface treatments as shown on the drawings, details and sections, or as specified herein.

6. Over-excavation beyond the specified or detailed limits shall be backfilled and properly compacted by the Contractor and at no additional cost to the Owner.

7. Excavating equipment shall be of such size and type, and operated in such a manner, that will not damage items such as, but not limited to, existing paved surfaces, utilities, structures and trees.

8. The Contractor shall, at his own expense, be responsible to make excavations under guy wires, along side of poles, buildings, and other objects as necessary to complete the work. This may require the Contractor to perform hand excavation. The Contractor has the full responsibility for this work for which there shall be no special compensation unless otherwise noted herein. The relocation of utility poles, and the like, shall be done at the Contractor's expense.

D. Trench Excavation

1. Trench excavation shall consist of the removal of all materials encountered. Excavations shall be made to accommodate the elevation depth of cover, or detail shown on the drawings or specified. Trench widths shall be kept to the minimum practicable but shall be at least three (3) feet wide or two (2) feet plus the diameter of the pipe, whichever is greater. The bottom of the trenches shall be firm and free of water and shall be accurately graded and shaped to allow placement of required bedding beneath the bottom of all barrels, bells or couplings of all pipes installed.

2. Design criteria require that pipe be laid in trench conditions, therefore trenches for utilities in fill areas shall be excavated after all fill materials have been placed, spread and compacted to an elevation at least one (1) foot above the top of the proposed utility. This requirement is necessary to fulfill design criteria and should not be construed as a dictation of the Contractor's means and methods of construction.

3. If, through the Contractor's error, the excavations are carried beyond the specified limits, or if inadequate dewatering causes softening of the subgrade which necessitates removal, backfill shall be with gravel fill, placed and compacted as specified hereinafter under Trench Backfilling. Backfill shall be performed at no additional cost to the Owner.

4. When trenching occurs around trees to remain, the tree roots shall not be cut but rather, the trench shall be tunneled under or around the roots by careful hand digging and without injury to the roots.

5. The Contractor shall excavate to provide a minimum cover over the top of the pipe and fittings of five (5) feet below finished grade unless otherwise shown.

E. Foundation Excavation

Not Applicable

F. Excavation in Graded Areas

1. Excavation in graded areas shall be performed as necessary to bring such areas to proper subgrade or finish grade. Subgrade for grass areas shall be a minimum of six (6) inches below finish grade unless otherwise specified.

G. Rock and Boulder Excavation

1. Rock excavation shall include the excavation, removal and disposal of solid rock and all boulders one (1) cubic yard or more in volume which require blasting or drilling and splitting. Boulders of less than one (1) cubic yard or more in volume or other materials found in the excavations, however stiff, heavy and compact, including rippable rock, which, in the opinion of the Engineer, can be removed without blasting or drilling and wedging, shall not be considered as rock excavation.

2. Blast shall be covered to prevent scattering of material and all adjacent property shall be suitably protected. Explosives shall be transported, handled and stored in a safe manner and in compliance with all state and local regulations. Charges shall not be so large as to shake, loosen or endanger adjacent structures or their contents or to do harm to their occupants. Responsibility for damage to persons or property shall rest solely with the Contractor. Only personnel qualified in the use of explosives shall be employed for blasting. The Contractor is responsible for obtaining all necessary permits at no additional cost to the Owner, as well as completing a pre-blast survey of adjoining properties and improvements to document the existing condition of items that may be damaged by the residual effects of blasting. A video or photographic recording may be utilized in the survey.

3. The Contractor shall design his blast pattern and use blast control methods to prevent detrimental effects to the rock outside of the excavation limits. All loose, unsound or semi-detached rock fragments, as determined by the Engineer, which may be detrimental to the proposed structure or installation shall be removed from the excavation. Excavation beyond necessary limits, made to remove damaged rock shall be backfilled by the Contractor with compacted gravel fill at no additional cost to the Owner.

4. After blasting, the rock surface at subgrade shall thoroughly cleaned of all vegetation, soil, excessively broken rock, excessively weathered or decomposed rock, loose fragments, ice, snow and other objectionable substances. Picking, barring, wedging, streams of water, hammers and other effective means shall be used as required to accomplish this cleaning. All free water left on the surface of the rock shall be removed. The Engineer shall be notified and provided the opportunity to observe the cleaned rock surface before any masonry, concrete, bedding, or fill is placed on or against the rock.

5. Where boulders are on the sides of or in the bottom of the excavations, they shall be wholly or partially removed at a minimum to the limits as specified and/or as determined by the Engineer. In removing boulders lodged in the sides of the excavations, the Contractor shall not disturb or undermine adjacent pavement or structures. Pavement surfaces damaged beyond reasonable limits as determined by the Engineer, shall be repaired by the Contractor at no additional cost to the Owner. In general, boulders or rock fragments which extend under paved surfaces shall be removed by blasting or mechanical splitting.

6. Unauthorized excavations in rock, or excavations made beyond or below the indicated limits shall be refilled and compacted with approved gravel fill at no additional cost to the Owner.

7. Depressions below the required grade resulting from the removal of boulders and rock fragments shall be refilled with compacted gravel fill at no additional cost to the Owner.

8. Pre-drilling through overburden is an acceptable method, however, blasting rock through overburden will not be allowed unless otherwise authorized by the Engineer. The Contractor shall remove the overburden from the rock surface to determine the true configuration of the formation. The Contractor will not be allowed to commence blasting operations until the Engineer has verified the Contractor's measurement of the rock surface.

9. Whenever provisions for a future connection are placed in pipelines in rock areas, the rock shall be removed for a distance of at least three (3) feet, horizontally from the end or face of the pipe and in the direction of the future connection and full vertical height.

H. Excavation of Unsuitable Foundation Materials Below Trench Grade and/or Subgrade

1. Existing soils, which are considered unsuitable foundation materials by the Engineer, shall be removed to the limits directed by the Engineer. The lateral limit for the excavation of unsuitable material beneath structures shall be defined as the intersection point, with suitable subgrade material, of an imaginary line drawn downward at a forty-five (45) degree angle from the outside of the foundation. For pipelines, the horizontal limits are defined as two (2) feet plus the diameter of the pipe or a minimum total width of three (3) feet whichever is larger unless otherwise directed or shown. The horizontal limits are defined as two (2) feet outside the outside face of the manhole or catch basin base.

2. The exposed subgrade shall be compacted and the area backfilled with gravel fill. The Engineer shall be present during the excavation of all unsuitable soils in order to permit verification of the limits of and volume of material removed.

I. Experimental Excavation

1. The Contractor shall make excavations at locations authorized by the Engineer, for the purpose of confirming the location and depth of existing utilities or structures.

2. Additional experimental excavations shall be requested by the Contractor to precisely locate utilities and underground structures which may be affected by his work. The Contractor shall backfill the experimental excavations with materials meeting the specification for common fill, unless directed otherwise by the Engineer. Backfill of experimental excavation shall be compacted in accordance with the requirements for Trench Backfilling.

3.02 TEMPORARY EARTH SUPPORT

A. The Contractor shall design, furnish, install and maintain temporary earth support systems, as required, to prevent injury to persons, collapse of the sides of excavation, and damage, disturbance and settlement of adjacent property. Sheeting and bracing shall be of the adequate type, size and strength for the conditions encountered and shall be driven to true alignment in a workmanlike

manner. Temporary earth system, prior to excavating shall also include the means of dewatering. The Contractor shall engage a registered Professional Engineer to Certify and Stamp the design.

B. Timber sheeting shall be straight and sound and shall be tongue and grooved where groundwater is encountered. Minimum thickness of timber sheeting shall be a nominal three (3) inches.

C. Steel sheeting shall have a minimum thickness of 3/8 inch. Steel sheeting shall be designed for the conditions encountered and shall be driven tight with interlocking corners to serve as a ground water cutoff.

D. The Contractor has the option of leaving sheeting in place or removing the sheeting. Sheeting left in place shall be cut off at least one (1) foot above the crown of the pipe. In no case, shall the top of the sheeting be left in place within five (5) feet of the finished grade.

E. Excavated slopes in rock shall be approximately laid back or be stabilized by rock bolts or other means deemed appropriate by the Contractor. Loose or semi-detached rock shall be scaled from the rock surface. When necessary, wire mesh or other suitable means deemed appropriate by the Contractor shall be installed to prevent injury to workers from falling rock.

F. The Contractor shall engage an independent Registered Professional Engineer (in the state where the project is located) with the experience in the design of temporary earth support to evaluate his methods of excavation and provide guidance regarding proper slopes and to design or provide guidance of temporary earth support during construction. The Contractor shall submit a stamped letter of an Independent Registered Engineer to the Engineer certifying conformance to the above requirements, before the start of any construction.

3.03 CONTROL OF WATER

A. The Contractor shall evaluate the impact of the anticipated subsurface soil and groundwater conditions on his proposed method of excavation and dewatering and other operations in accordance with these specifications.

3.04 STRUCTURAL AND EMBANKMENT FILLS (NOT USED)

3.05 PIPE BEDDING AND TRENCH BACKFILLING

A. General

1. The requirements for the pipe bedding and trench backfilling are described herein and are shown on the drawings. Drainage pipes shall be installed at the depths shown on the drawings.

2. Pipe and/or structures shall be placed on specified bedding materials, to provide uniform support and a stable foundation for the pipeline or structure and backfill material. No bedding shall be placed on unstable subgrade soils. An unstable subgrade is defined as a condition of running sand, running silt, quick bottom, or otherwise soft, soupy or spongy bottom. If an unstable condition exists, or develops during the excavation, the Contractor shall excavate, dewater and stabilize the subgrade to the extent necessary to provide a firm stable foundation prior to placing bedding, pipe and/or structures.

3. The height of fill adjacent to structures and pipelines shall be increased at approximately the same rate on all sides to prevent displacement.

B. Trench Bedding

1. Pipelines and appurtenant items of work shall be laid in the bedding material, from the bottom of the excavation to the mid-diameter of the pipe, for the full width of the trench. Bedding material shall be compacted to a minimum density of 95 percent of the maximum density as determined by ASTM D1557 (modified Proctor) and shall meet the requirements for gravel fill or crushed stone.

2. The type and thickness of bedding material shall be adjusted based on field conditions, as follows:

   a. Where the bottom of the trench is stable and the existing material at trench grade meets the requirements for Gravel Borrow, as determined by the Engineer, the Contractor will not be required to excavate six (6) inches below the pipeline for placement of bedding material. Gravel Borrow or crushed stone bedding material shall be placed and compacted to the mid-diameter of the pipe as specified hereinbefore.

   b. When the subgrade material does not meet the specification for Gravel Borrow, the excavation shall be made to a depth of six (6) inches below the bottom of the pipe for placement of bedding material.

   c. Where the bottom of the trench excavation is below the groundwater level and pumping of water is done from within the excavation, the Contractor shall use a bedding system which provides a stable working surface which limits the disturbance of the subgrade and prevents migration or washing of fine soils from the subgrade due to the flow of water into the trench. If the subgrade is stable and meets the requirements of gravel fill, excavation for six (6) inches of bedding material is not required.

   d. Where the subgrade soil type is a low or non-plastic silt (ML), silty or clayey sand (SM, SC), fine to medium sand (SP), or clayey gravel (GM, GC), as defined by the soil classification system described in ASTM Standard Method D2487 (Unified System), a two (2) layer bedding system shall be utilized, with an approved filter cloth to prevent migration of silt into the bedding material. The upper layer of this two (2) layer system, from the mid-diameter of the pipe to six (6) inches below the bottom of pipe, shall consist of crushed stone. The lower layer shall consist of at least six (6) inches of gravel borrow placed on top of the filter cloth. The filter cloth shall be continuous along the trench bottom, and shall wrap up the sides of the trench, to above the mid-diameter of the pipe and laid on top of the crushed stone from the trench wall to the pipe to prevent downward migration of fines. All joints and ends in the filter cloth shall lap at least twelve (12) inches to form a closure.

3. If the Contractor excavates beyond the required limits, the Contractor shall backfill this unauthorized excavation with compacted gravel borrow at no additional cost to the Owner. Gravel Borrow used to replace unsuitable material or unauthorized excavation shall be compacted to a minimum density of 95 percent of the maximum density determined by ASTM D1557, (Modified Proctor).

4. The type and size of compaction equipment used shall not cause excessive surcharge loads on any walls or other structures.

3.06 SOIL TESTING

A. General

1. Three (3) types of soil tests shall be performed by an approved soil testing laboratory furnished by the Contractor. The Soil Testing Laboratory shall be approved by Owner. The type of tests, timing and frequency are described below.

2. The performance of these tests does not relieve the Contractor of his responsibility to control his operations and perform tests as necessary to assure that the work performed meets the requirements of the specifications.

B. Sieve Analysis Tests

1. Sieve analysis tests shall be performed on soil samples obtained by the Contractor for acceptance of material from off site borrows sources or from on-site excavations. As a minimum, a test shall be performed on at least one (1) random sample obtained from each type of fill being placed on site. Additional tests shall be performed on samples obtained from the fill when it is suspected by the Engineer that the material does not meet specifications. Tests shall also be performed when it is noted that the gradation of material actually being placed differs significantly from the documented gradation from a particular source.

2. Sieve analysis shall be performed in accordance with ASTM C136 and ASTM C117.

C. In-Place Density Tests

1. In general, at least one (1) test shall be performed for each fifty (50) feet of pipeline installed, and conducted at a minimum of every two lifts. Structural and embankment fills shall be tested at least once for each one hundred (100) cubic yards of fill placed. For structures and embankments, a minimum of four (4) tests shall be performed during each of two (2) separate visits by the testing laboratory.

2. Tests shall be performed in accordance with ASTM D1556, ASTM D2167, or ASTM D2922.

3. The Test locations shall be determined by the Engineer or Architect.

4. Testing subcontractors shall be retained by the Contractor to perform testing to meet the requirements. Test results shall be submitted to the Owner.

5. Testing subcontractors shall be approved by the Rhode Island College prior to construction.

D. Moisture Density Relationship Test

1. Moisture Density Relationship Tests (Proctor Tests) shall be performed in conjunction with In-Place Density Tests for each different fill material tested.

2. Tests shall be performed in accordance with ASTM D1557.

3.07 GRADING

A. The areas to be graded shall be raked or machine-graded to remove stones and other unsatisfactory material and then shall be compacted as specified. Any depressions which occur during the compaction operation shall be filled with additional suitable material and then the surface regraded and compacted until true to line and grade as required.

B. Foundations and basement areas removed/excavated during the demolition work shall be backfilled, compacted and graded to match surrounding conditions.

**END OF SECTION 312000**

## SECTION 313211- EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.01 SCOPE

A. The Work under this section consists of furnishing all necessary labor, equipment, materials, and performing all operations in connection with construction sediment and control measures.

B. General

1. All erosion and sediment control measures are to be placed prior to any disturbance caused by grading and or excavation and shall conform to the Department of Environmental Management requirements and appropriate regulatory agency for the State.

2. The Contractor shall be solely responsible for ensuring that erosion and sediment control measures are implemented and maintained at the site.

3. Soil disturbing activities include but are not limited to: clearing and grubbing, excavation for utilities, roadway repair, grading and preparation for final seeding.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Section 010000 General Requirements, apply to this section.

1.03 SUBMITTALS

A. Submittals will be required if filter sock is utilized. Submittals required shall include, but not be limited to the following:

1. Materials Specifications
2. Materials Brochure
3. General Installation Practices and Installation Schedule

PART 2 - PRODUCTS

2.01 MATERIALS

A. Synthetic Filter Fabric for silt fences:

1. Erosion control fabric shall conform to the plans.

B. Support Posts: 4 foot - 2 x 2 wood.

C. Straw Bales:

1. Oat or wheat straw, free from weeds, viable weed seeds, foreign matter detrimental to plant life, and dry.

    a. Grass hay bales are not acceptable.

    b. In order to prevent deterioration of the bindings, all bales shall be either wire-bound or string-tied so that bindings are oriented around the sides rather than along the tops and bottoms of the bales.

D. Natural Mulch Wattle

1. Natural Mulch Wattle shall be submitted to the Engineer for approval.
2. Wattle shall be 12" in diameter and Stakes shall be 1" x 1" x 2' hard wood stakes spaced 4' O.C.

E. Silt Sack

1. Silt Sack shall be submitted to the Engineer for approval.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Install silt fence and staked hay bales upgradient from existing drainage basins to prevent silt intrusion. Remove controls following establishment of vegetation cover and utilize as mulch at swales or on steep slopes.

B. Prior to construction, install natural mulch wattle along the downhill construction limits in accordance with the erosion control standard detail to prevent silt intrusion upon adjacent land. Remove controls following establishment of vegetation cover and utilize as mulch at swales or on steep slopes.

C. Install sediment and erosion control measures on the down slope toe of all top soil stock piles.

D. Maintain and remove all erosion controls as specified.

E. Temporary seeding shall be placed on exposed surfaces that will not be brought to final grading or permanent cover treatment within thirty (30) days of the exposure to reduce erosion and sedimentation by stabilizing exposed soils. Seeded areas shall be checked regularly for bare spots, washouts, and healthy growth to assure that a good stand of grass is being maintained. Re-seed areas that fail to establish vegetation cover as soon as such areas are identified.

F. Install inlet protection, Silt Sack or approved equal, at existing catch basins within the vicinity of construction where feasible.

3.02 DUST CONTROL

A. In areas subject to surface and air movement of dust, where on-site or off-site damage is likely to occur, one or more of the following preventive measures shall be taken for dust control:

1. Minimize the period of soil exposure through the use of temporary ground cover and other temporary stabilization practices.

2. Sprinkle the site with water until surface is wet. Repeat as needed.

3.03 SILT FENCE

A. Silt fences are appropriate for the following general locations:

1. Immediately upstream of the point(s) of runoff discharge from a site before flow becomes concentrated.

2. Below disturbed areas where runoff may occur in the form of overland flow.

3. Along the down slope toe of all top soil stock piles.

B. Materials

1. Utilize filter fabric in accordance with the Soil Erosion and Sediment Control Plans. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum six (6) inch overlap, and securely sealed.

2. Filter fabric shall be stapled or wired to the fence and six (6) inches of the fabric shall be extended into the ground. Filter fabric shall not be stapled to existing trees.

3. Support posts shall be spaced at a maximum six (6) feet and driven securely into the ground a minimum of twenty-four (24) inches.

4. The height of a silt fence shall not exceed thirty-six (36) inches. Higher fences may impound volumes of water sufficient to cause failure of the structure.

C. Maintenance

1. Silt fences shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.

2. Silt fences shall be inspected for depth of sediment, tears, and to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground. Any deficiencies shall be repaired immediately.

3. Should the fabric on a silt fence decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

4. Sediment deposits should be removed after each storm event and/or when deposits reach approximately 1/3 the height of the silt fence or when the sediments limit or prevent the flow of water through the fabric hydraulic.

5. Any sediment deposits remaining in place after the silt fence is no longer required shall be dressed to conform with the existing grade, prepared, and seeded.

2.04 STRAW BALE EROSION CONTROL FENCE

A. Straw bale erosion control fences are appropriate for the following general locations:

1. Sheet flow applications: Straw bales shall be placed in a single row, lengthwise on the contour with ends of adjacent bales tightly abutting one another.

2. Channel flow applications: Straw bales shall be placed in a single row, lengthwise and oriented perpendicular to the direction of flow with ends of adjacent bales tightly abutting one another. The barrier shall be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment laden runoff will flow either through or over the barrier but not around it.

B. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of four (4) inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the barrier. Backfill shall conform to the ground level of the downhill side and shall be built up to four (4) inches against the uphill side of the barrier.

C. Each bale shall be securely anchored by at two (2) stakes or rebar driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or rebar shall be driven a minimum of twelve (12) inches into the ground or deep enough into the ground to securely anchor the bales, whichever is greater.

D. The gaps between bales shall be chinked (filled by wedging with straw to prevent water from escaping between the bales). Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency.

E. Maintenance

1. Inspection shall be frequent and repair or replacement shall be made promptly as needed.

2. Straw bale carriers shall be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

2.05 NATURAL MULCH WATTLE

A. Natural Mulch Wattle is appropriate for the following general locations:

1. Sheet flow and low concentrated flow applications.

2. Above and below disturbed areas and erodible slopes.

3. Along the down slope toe of all top soil stock piles.

4. On frozen ground or paved surfaces.

B. Materials

1. Materials shall be submitted to the Engineer for approval.

C. Installation

1. Installation of wattle shall be strictly in accordance with the manufacturer's instructions and specific layout plans and details reviewed by the Engineer.

D. Maintenance

1. Wattle shall be inspected immediately after each rainfall and at least daily during prolonged rainfall.

2. Should the sediment control become damaged or ineffective prior to the end of the expected usable life and the barrier still be necessary, the control shall be repaired or replaced promptly.

3. Sediment deposits should be removed after each storm event and/or when deposits reach approximately 1/2 the height of the barrier or when the sediments limit or prevent the flow of water through the barrier.

4. Any sediment deposits remaining in place after the wattle is no longer required shall be dressed to conform with the existing grade, prepared, and seeded.

**END OF SECTION 313211**

## PART 1 – GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work of this section.

### 1.02 DESCRIPTION OF WORK

A. Provide all materials, equipment and labor necessary to complete the work as indicated on the drawings or as specified herein.

B. The principal work of this section includes, but may not be limited to, the following:

1. Preparation of Subgrade
2. Grading and Spreading Topsoil
3. Grading and Spreading of Top Dressing
4. Preparation of Areas for Seeding
5. Soil Testing
6. Application of Limestone
7. Application of Lawn Starter Fertilizer
8. Application of Turf Maintenance Fertilizer

### 1.03 QUALITY ASSURANCE

A. Subcontract work to a firm specializing in such work unless contractor is fully experienced and qualified.

B. Do not make substitutions without written approval. If specified materials are not available, obtain approval for substitution from the Landscape Architect.

### 1.04 SUBMITTALS

A. Certified analysis and source of off-site and on-site topsoil to be provided. Certification shall list soil additives to topsoil including rates and type of lime, humus, peat, fertilizer, etc.

B. Certifications and/or labels of proposed soil additives and proposed seed, stating names of each.

### 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect all products from weather or other damaging or deteriorating conditions.

## PART 2 – PRODUCTS

### 2.01 TOPSOIL

A. Fertile, friable, medium-textured sandy loam with no admixture of refuse or any natural or introduced materials toxic to plant growth and free from subsoil and stumps, roots, brush, stones, clay lumps or other extraneous matter over ¾" in diameter. (Screen to ¾".)

B. Sandy loam shall possess good filtration and permeability rates, and shall possess a mechanical analysis where: N 85% of sand size is 0.5 to 1.0 mm and N 95% of sand mix is between 0.5 and 2.0 mm and no more than 5% of mix is less than 0.5 mm.

C. Acidity range of approximately pH 5.5 to 7.5 when tested according to methods of testing of A.O.A.C. and organic content not less than 3% nor more than 20% as determined by wet combustion method (Chromic acid reduction). Topsoil may be amended to meet such requirements. Provide analysis prior to delivering topsoil to site, including recommended rates and types of soil additives to achieve desired mix.

D. On site topsoil (stockpiled), if available, shall be free of debris, roots and branches. It shall be made to conform to the requirements for sandy loam furnished from the site as specified herein.

**2.02 TOP DRESSING**

A. Same as topsoil, except it shall be screened to 3/8"

**2.03 LIMESTONE**

A. Dolomitic limestone containing up to 50% magnesium carbonate in a dry, granular form.

**2.04 LAWN STARTER FERTILIZER**

A. Complete fertilizer in granular form, from commercial sources, bearing manufacturer's analysis 10-20-10 ratio of N-P-K, 40% organic Nitrogen.

## 2.05 TURF MAINTENANCE FERTILIZERS

A. Complete fertilizer in granular form, bearing a manufacturer's analysis of 20-5-10 ratio of N-P-K, 40% organic Nitrogen.

## 2.06 WATER

A. Clean, fresh potable water, from on-site public water system (hydrant).

# PART 3 – EXECUTION

## 3.01 SOIL TESTING

A. The tested material shall equal loose, friable, sandy loam or loam topsoil free of a mixture of subsoil, refuse, stumps, roots, rocks, brush, weeds and other materials that will prevent the formation of a suitable seed bed. Organic matter shall constitute not less than five (5) percent nor more than twenty (20) percent of the loam as determined by loss-on-ignition of oven- dried samples that have been drawn by the Landscape Architect unless otherwise specified or directed. The loam shall have an acidity range of approximately 5.5 pH to 7.6pH. The Contractor shall notify the Owner of the intended source of loam to be employed, at least three weeks prior to the intended time of use to allow time for sampling.

If after the testing of the samples, the loam is found unsatisfactory for intended use, the Engineer may require as a requisite for acceptance that the Contractor, without additional compensation, add to the loam proposed by him for use such lime, particulate fertilizer, or particulate humus as is necessary to render the loam suitable.

B. Both existing soil in existing turf areas, as well as new soils shall be tested for nutrient content and pH to determine correct quantities of soil additions.

## 3.02 PREPARATION OF SUBGRADE

A. Prepare subgrade in accordance with the requirements of Section 02200. Grade to final uniform subgrade. Scarify and loosen subgrade to a friable condition in any areas where compaction exists before placing new topsoil.

## 3.03 GRADING AND SPREADING 4" OF TOPSOIL

A. Remove all debris and other inorganic materials on any prepared subgrades, and reshape and dress any damaged or eroded slopes, swales, and other areas. Rototill to a depth of 4" and loosen subgrade to a friable condition in any areas where compaction may have occurred. Topsoil shall not be placed until subgrade is in suitable condition and free of excessive moisture or frozen materials. Topsoil shall be spread as required on all disturbed and bare areas to produce a total depth of 4" as shown. Fill all depressions in existing grades with suitable fill material as specified in Section 02200, prior to spreading of topsoil, then shape and finish grade to depth of topsoil required.

B. Area shall be progressively fine graded to laser optical tolerances and machine and hand raked. Off-site topsoil added as required to correct depressions and

other irregularities, to produce smooth and unbroken finish grades and the depth of topsoil required.

C. Drawings show grading design intent. Finish grades shall conform to lines, grades, sections, and shapes of lawn areas as required. Provide positive drainage. Provide smooth, uniform, rounded transitions at all changes and breaks in grade.

D. Starter fertilizers: all required materials shall be spread and distributed into the soil at rates and amounts specified herein.

E. After establishment of finish grade entire area shall be hand raked and rolled using a light roller. Remove any resultant depressions.

**3.04 PREPARATION OF AREAS FOR SEEDING**

A. GENERAL DESCRIPTION: This work shall consist of the preparation of the seed bed. Work shall be done as described herein:

1. Areas shall be finely raked to a finished grade. Substantially, all sticks, litter, wire, weeds, cable or stones larger than one (1) inch in greatest dimension shall be removed and disposed of as directed.

2. Where the soil has become compacted, prior to fine raking, areas to be seeded shall be rototilled to a minimum depth of four (4) inches.

3. No seeding will be permitted on areas where the seed bed has not been properly prepared or where the soil is compacted.

4. Request inspection of the work for approval before proceeding with seeding.

**3.05 PREPARATION OF AREAS FOR TOP DRESSING**

A. All sports fields and other identified areas not otherwise disturbed shall receive this renovation work.

B. Mow existing turf to 1" or less. Re-edge in field to conform to standard dimensions for that field type.

C. Make two passes in different directions with a power de-thatcher to remove thatch. Remove from surface.

D. Make two passes with a deep-tined core aerator, in different directions. Leave cores on surface.

E. Remove by scarifying all high areas around in field edges, bike paths, mounds, etc. Apply top dressing material up to a depth of 2" (where necessary to smooth potholes) by means of mechanical spreader, throughout the entire area to be rehabilitated.

**3.06 APPLICATION OF LIMESTONE**

A. When applied dry, limestone shall be spread evenly and incorporated thoroughly into the soil by discing or other approved means, except in top dressing areas.

B. When applied hydraulically, no discing will be necessary.

C. Granular treatment to be applied at the rate of 25 to 50 lbs. per 1,000 square feet, or as required by soil pH test to produce a pH of 6.0 to 6.5.

**3.07 APPLICATION OF LAWN STARTER FERTILIZER**

A. After the incorporation of ground limestone into the seed bed, then apply the fertilizer.

B. Fertilizer shall be applied at the rate of 20 lbs. per 1,000 square feet, or in accordance with soil test reports.

C. Apply fertilizer according to manufacturer's recommendations.

**3.08 APPLICATION OF SEED**

A. See section 02820

**3.09 APPLYING JUTE MESH**

A. Apply jute mesh loosely (on all slopes 3:1 or steeper) but smoothly to fit the contour of the finished grade, parallel to and in same direction as the flow of water. The up-slope end of each separate strip or piece of jute mesh shall be buried in a six (6) inch minimum vertical anchor slot or junction slot with the soil tamped firmly against the mesh. Where more than one width of material is required, edges shall overlap a minimum of twelve (12) inches, and the up-slope section of mesh will be on top. Down-hill ends of the jute mesh shall be folded under approximately four (4) inches and stapled in place. Staples will be inserted through the mesh along edges, overlaps, and in the center of all jute mesh strips at intervals not greater than three (3) feet. All anchor slots, junction slots, check slots and terminal folds shall have five (5) staples spaced not more than nine (9) inches on center across widths.

B. On seeded banks, jute shall be applied immediately after seeding.

**3.10 APPLICATION OF TURF MAINTENANCE FERTILIZER**

A. One application of turf maintenance fertilizer will be required before final acceptance of seeded areas.

END OF SECTION

## PART 1 – GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

### 1.02 DESCRIPTION OF WORK

A. Provide all materials, equipment and labor necessary to complete the work as indicated on the drawings or as specified herein.

B. The principal work of this section includes, but may not be limited to, the following:

1. Preparation of seed bed
2. Application of seed
3. Application of weed control
4. Acceptance of seeding

### 1.03 QUALITY ASSURANCE

A. Subcontract seeding work to a firm specializing in such work unless contractor is fully experienced and qualified.

B. Each seed bag or container shall display a label that identifies the contents as a true representation of the seed mix and percentages required by specification. No seed shall be applied to a site until the Owner's representative has determined the mixture meets all requirements.

C. Do not make substitutions without written approval. If specified seed mixes are not available, obtain approval for substitution from the Owner's Representative.

D. Loam to be screened to ¾", with 3% min. organic matter, applied to a depth of 4" min. See Section 02810 for additional information.

### 1.04 SUBMITTALS

A. Certifications and/or labels of proposed seed mixtures stating common and scientific names of grasses, percentages by weight, and percentages of purity and germination.

B. Product information of all proposed weed control chemicals.

## 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect all products from weather or other damaging or deteriorating conditions.

B. Seed mixes that have been damaged or have deteriorated in transit or storage are not acceptable.

C. Seeding Schedule: Prepare a proposed seeding schedule. Schedule dates for each type of landscape work during normal seasons for such work.

Seeding: April 1 – June 1 August 15 – October 15

D. Correlate with specified maintenance periods to provide maintenance to date of acceptance. Once the schedule is accepted, revise dates only as approved in writing, after documentation of reasons for delays.

## 1.06 WARRANTY

A. Warranty seeding until final acceptance of grass stand.

## 1.07 MAINTENANCE

A. Maintenance of seeding to be performed by the installer includes:

1. Watering
2. Regrading and replanting eroded areas
3. Seeding or patching sparse or bare areas

B. Maintain seeded areas immediately after placement until grass is accepted.

C. Mow lawn area twice before final acceptance.

## PART 2 – PRODUCTS

## 2.01 SEED

A. General: Pure, live, fresh seed from commercial sources meeting and labeled in accordance with State and Federal laws, rules and regulations. All seed to have minimum germination rate of 85%, unless noted otherwise. Seed all areas indicated including all disturbed areas and top dressed areas with the following mixes, corresponding to area delineated on the plans:

**SEED TYPE # 1 Endophyte Enhanced Seed Mix (GENERAL LAWN AREAS)**

| *Grass Type by Weight* | *Purity* | *Proportioned Germination* | |
|---|---|---|---|
| Improved Perennial Ryegrass | 30% | 99% | 90% |
| Turf Type Tall Fescue | 30% | 99% | 90% |
| Chewings Fescue | 30% | 95% | 85% |
| Kentucky Bluegrass Fescue | 10% | 98 | 85% |

Weed seed content shall be 0%, and inert materials shall be 1% maximum. **Apply at the rate of 6# per 1000 s.f.**

## 2.03 WATER

A. Clean, fresh potable water.

## 2.04 JUTE MESH

A. Apply to all slopes 3:1 or greater. See section 02810

## PART 3 – EXECUTION

### 3.01 APPLICATION OF SEED

A. The approved seed mixture for type I seed areas shall be applied at the specified rate by means of slice seeder method. Type II seed shall be applied by hydroseed method.

B. Distribute seed over area in two separate passes, each one perpendicular to the other (north-south, east-west orientation).

C. Broadcast seeding will be permitted only with written permission of Owner. All requests shall be in writing with detailed and itemized procedure to be followed.

### 3.02 JUTE MESH

A. Apply jute mesh over all slopes 3:1 or greater immediately after seeding. See Section 02810.

### 3.03 ACCEPTANCE OF SEEDING

A. PROVISIONAL ACCEPTANCE:
Provisional acceptance period shall be defined as the elapsed time between application of seed and the establishment of a good, healthy uniform growth of grass.

1. Provisional acceptance for purposes of payment will not occur until the seeded areas are well established, exhibiting a vigorous growing condition, devoid of bare spots greater than 1 square foot.

B. FINAL ACCEPTANCE:

1. It will be the contractor's responsibility to maintain seeding areas in an approved condition until provisional acceptance.

2. The Contractor shall keep all seeded areas watered and in good condition reseeding if and when necessary during the provisional acceptance period.

3. All seeded areas shall be guaranteed by the Contractor for not less than one growing season from the time of provisional acceptance. Growing season shall be defined as follows:

a.) If provisional acceptance is received during April, May, June or July, next growing season shall end on October 15.

b.) If provisional acceptance is received during September, October, November or December, next growing season shall end on June 1.

4. At the end of the guarantee period, inspection will be made by the L.A. upon written request submitted by the Contractor at least ten (10) days before the anticipated date. Lawn areas not demonstrating satisfactory stands as outlined above, (except if damaged by vandalism) as determined by the L.A., shall be renovated, reseeded and maintained meeting all requirements as specified herein.

5. After all necessary corrective work has been completed, the L.A. shall certify in writing the final acceptance of the lawn area.

6. Decision of Owner as to necessity to replace lawns or repair any defects in workmanship, or cause of any destruction or loss, impairment or failure to flourish, shall be conclusive and binding upon Contractor. Replacements shall be the same as specified. All replacements shall be planted as specified herein at Contractor's expense.

7. "Vandalism" as noted above, is intended to mean any acts, whether intentional or accidental, by other persons, which clearly result in damage, and which may reasonably be considered to be beyond the Contractor's reasonable control, as determined by the Owner's representative.

END OF SECTION

# PART 1 – GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

## 1.02 DESCRIPTION OF WORK

A. Provide all materials, equipment and labor necessary to complete the work as indicated on the drawings or as specified herein.

B. The principal work of this section includes, but may not be limited to, the following:

1. Planting.
2. Setting Plants.
3. Pruning of New Plant Material.
5. Fertilizing.
6. Mulching Plants.
7. Watering.
8. Maintenance.
9. Plant Replacement Guarantee.
10. Transplanting.

## 1.03 REFERENCES

A. ANSI Z260.1 – Nursery Stock, latest edition (American Association of Nurserymen, Inc.).

## 1.04 QUALITY ASSURANCE

A. Subcontract planting work to a firm specializing in such work unless contractor is fully experienced and qualified.

B. An arborist, licensed by the state in which the work is to be performed, is required for all pruning work.

C. At least one tree and one shrub of each variety is to be tagged with a waterproof tag bearing legible designation of botanical and common name, and all other standard products shall be delivered sealed and unbroken.

D. Do not make substitutions without written approval. If specified landscape material is not available, obtain approval for substitution from the landscape architect.

E. Where formal planting arrangements are shown, select stock with uniform height and spread, and label with numbers to assure symmetry in planting.

F. The Landscape Architect reserves the right to inspect all plant materials for compliance with specifications, and to reject unsatisfactory or defective work at any time during progress of work.

## 1.05 SUBMITTALS

A. Certified analysis and source of off-site topsoil, to be provided. Certification shall list soil additives to topsoil, rates and type.

B. Certifications and/or labels of proposed plant materials or substitutions, listing common and scientific names of each.

## 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect all products from weather or other damaging or deteriorating conditions.

B. Plants that have been damaged or have deteriorated in transit or storage are not acceptable.

C. Keep plants moist, fresh and protected against exposure to sun, wind and freezing temperatures whether in the receiving yard, in transit, while being handled or at the job site awaiting planting.

D. Deliver trees and shrubs after preparations for planting have been completed and plant immediately.

E. Planting Schedule: Prepare a proposed planting schedule. Schedule dates for each type of landscape work during normal seasons for such work. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

Deciduous material: March 1 - June 15
October 15 - December 1

Evergreen material: March 1 - June 30
August 15 -November 30

F. Correlate planting schedule with specified maintenance periods to provide maintenance to date of acceptance.

G. Coordination with Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to Landscape Architect. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting

operations.

## 1.07 WARRANTY

A. Provide a warranty for tree, shrub and ground cover plantings for a minimum of one year including one continuous growing season. Commence warranty on date identified in the Certificate of Final Completion.

B. Warranty: Include coverage of plants from death or unhealthy conditions.

C. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty and an extended maintenance service commencing on date of replacement.

## 1.08 MAINTENANCE

A. Maintenance of shrub and groundcover planting to be performed by Installer include:

1. Watering, cultivating and mulching.
2. Replacing of dead material.
3. Resetting plants to proper grades, or to upright position.

# PART 2 – PRODUCTS

## 2.01 PEAT HUMUS

A. Natural peat humus, fee from excessive amounts of zinc, low in wood content, free from hard lumps and in a shredded or granular form; acidity range approximately 5.5 pH to 7.6 pH and organic matter not less than 85%, minimum water absorbing ability shall be 200% by weight on an oven-dry basis.

## 2.02 SHRUB FERTILIZER

A. Complete water-soluble controlled-release fertilizer, Agriform planting tablets or approved equal bearing manufacturer's analysis: 20-10-5 ratio of N-P-K applied according to manufacturer's recommendation.

## 2.03 MULCH

A. Clean, well aged dark brown (no dye) shredded Pine or Hemlock bark free from weeds or other extraneous material.

B. Mulch shall be a dark brown shredded pine or hemlock mulch and submitted for approval prior to application.

## 2.06 WATER

A. Clean, fresh, potable water.

## 2.07 PLANT MATERIALS

A. Plant materials shall be of size and caliper required and comply with the Horticultural Standards of the American Association of Nurserymen (ANSI 2260-1) in all respects.

B. Plants of other kinds than those named in the Plant Schedule on the Drawings shall not be accepted without written approval of Landscape Architect.

C. Unless otherwise approved by Landscape Architect, all plants shall be nursery-grown in accordance with good horticultural practices, and shall have been grown under climatic conditions similar to those in the locality of the project for at least two (2) years. They shall have been transplanted or root pruned at least nine (9) months previous to moving to the site.

D. Replacement plants larger in size than existing may be used if approved by Landscape Architect, provided use of larger plants does not increase Contract price.

E. If use of larger plants is approved, increase ball of earth of spread of roots in proportion to size of plant.

F. Pruning: All plants and all tree trunks shall be measured when branches are in their normal position. Dimensions for height and requirements for spread, where specified, refer to main body of plant and not from branch-tip to branch-tip. Desired clear unbranched height of tree trunks may be created provided necessary pruning of lower branches does not leave unsightly scars or other wise damaging trunk.

# PART 3 – EXECUTION

## 3.01 PLANTING

A. Layout: Determine location of underground utilities, and lay out plants so as to avoid possible damage to such structures. Plant pit and bed locations shall be staked on ground by contractor and approved prior to excavation. Adjustments in locations and outline shall be made as directed in field. Labor, equipment and new smooth stakes are to be furnished by the Contractor for this purpose.

B. Excavation: Planting beds and pits shall conform to the approved staked locations and outlines. Latter shall be neatly formed by means of spades and/or other approved tools. When conditions detrimental to plant growth are encountered,

such as rubble fill, adverse growing conditions, of obstructions, notify Landscape Architect before planting. Remove from the site immediately all sod, weeds, roots and other objectionable excavated material unsuitable for backfill.

C. Pits and Beds: Size of pits shall be as indicated on detail drawings. Any excavation in excess of that required shall be replaced with planting soil.

D. Loam mix: Add peat humus to loam to create loam mix for planting pits. Loam mix shall be at least 25% peat humus. Loam mix is the referred to backfill material under 3.02 SETTING PLANTS.

## 3.02 SETTING PLANTS

A. Set plants plumb and at such a level that after settlement they bear the same relation to the surrounding ground as they bore to the ground from which they were dug. Settle backfill material for plants, thoroughly and properly, by firming or tamping. Accompany backfilling with thorough watering unless otherwise approved. Form saucer capable of holding water around individual plants, exclusive of plant beds, by placing ridges of planting soil around each or as directed by the Owner's representative.

B. Place balled or burlapped plants carefully in the prepared pits so that the ball rests on undisturbed earth. Then partially fill backfill around the plant and thoroughly tamp. Loosen the burlap around the top 1/3 of root ball and spread it out away from the plants or cut it away and remove. The remainder of backfill shall then be placed in the hole and firmed.

C. Spread out root of the bare root plants in a natural position over mound in pit. Cut off broken or frayed roots cleanly. Backfill shall be sifted through them and solidly firmed.

D. Container Grown Materials: Remove plant from container and "butterfly" root ball or otherwise spread out roots on setting mound. Backfill shall be sifted through them and solidly firmed.

E. Planters: Place not less than a 4" layer of gravel in bottom of all planters, install filtration fabric and fill with a planting mixture of 1 part topsoil, 1 part coarse sand, 1 part peat humus and 3 lbs. dolomitic limestone per cubic yard of mix. Place soil mix, compacting lightly, to elevation 2" below top of planter.

## 3.03 PRUNING OF NEW PLANT MATERIAL

A. After planting, prune only broken or deformed branches and in such manner as to preserve natural character of plant.

B. Perform all pruning with sharp tools, with cuts flush and clean. Paint exposed living tissue on pruning cuts over 2" in diameter with tree wound compound.

C. Trees that have had their leaders cut, or so damaged that cutting is necessary, will not be accepted. There shall be no abrasion of bark, nor fresh cuts of limbs over ½".

## 3.02 FERTILIZING

A. During backfill operations, place plant tablets in upper foot of backfill around perimeters at a rate of 1 tablet per ½" of caliper, or as recommended by manufacturer.

## 3.09 MULCHING PLANTS

A. Application of mulch should occur only after planting operations have been completed and initial watering has taken place.

B. Mulch shall be applied a depth of three (3) inches in all planting beds, as indicated on the drawings.

C. Mulch shall be a dark brown shredded pine or hemlock mulch and submitted for approval prior to application.

## 3.10 WATERING

A. The plants shall be watered immediately following planting, preferably when two-thirds of the backfill has been placed so all air pockets are removed and the plant properly set.

B. Soak the plants thoroughly again within a twenty-four (24) hour period after the initial planting.

C. Additional waterings shall be made at least once every three weeks unless otherwise directed until final acceptance of the plant material.

## 3.11 MAINTENANCE

A. Contractor is responsible for protection and maintenance of all work prior to final acceptance. No plants will be accepted unless they show a healthy growth and satisfactory condition.

## 3.12 PLANTING ON BANKS: (when shown on plans)

A. Apply jute mesh loosely but smoothly to fit the contour of the finished grade, parallel to and in same direction as the flow of water. The up-slope end of each separate strip or piece of jute mesh shall be buried in a six (6) inch minimum

vertical anchor slot or junction slot with the soil tamped firmly against the mesh. Where more than one width of material is required, edges shall overlap a minimum of twelve (12) inches, and the up-slope section of mesh will be on top. Down-hill ends of the jute mesh shall be folded under approximately four (4) inches and stapled in place. Staples will be inserted through the mesh along edges, overlaps and in the center of all jute mesh strips at intervals not greater than three (3) feet. All anchor slots, junction slots, check slots and terminal folds shall have five (5) staples spaced not more than nine (9) inches on center across widths.

B. On seeded banks over 3:1 slopes, jute shall be applied immediately after seeding. On shrub banks, apply jute after finish grading. Cut openings in mesh for each plant and plant and mulch as specified.

## 3.14 PLANT REPLACEMENT GUARANTEE

A. Guarantee that, upon completion and final acceptance tree, shrub and groundcover planting conforms to requirements of contract documents, and that all plants except transplant materials are healthy and will remain so for a period of one (1) year. Such period shall commence with date of final acceptance.

B. At any times within period of guarantee, Contractor shall replace any planting that for any reason, other than vandalism, has died or is in a dying condition, or which has failed to flourish in such a manner or to such a degree that its usefulness or appearance has been impaired.

C. The Owner will not maintain plantings until after guarantee period. Contractor shall not have any claim that materials have failed to flourish as a result of Owner's maintenance operations, or lack of maintenance, and shall abide by terms stated herein for guarantee and replacement of plant materials.

D. Decision of Owner as to necessity to replace any plant materials or repair any defects on workmanship, or cause of any destruction or loss, impairment or failure to flourish, shall be conclusive and binding upon Contractor. Replacements shall be of same species and size as specified on Plant List.

E. "Vandalism" is intended to mean any acts, whether intentional or accidental, by other persons occurring following final acceptance, which clearly result in breakage or other damage to individual plants or plant beds, and which may reasonably be considered to be beyond Contractor's reasonable control, as determined by the Owner's representative.

## 3.15 TRANSPLANTING (when shown on plans)

A. Perform transplanting incorporating standard AAN practice. Plant in accordance with these specifications.

B. Transplanting shall be performed with the same care given to all other plantings.

C. Transplanted material does not require a one year guarantee.

END OF SECTION

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# Section 1
# Introduction

Tighe & Bond has prepared this *Soil Management Plan* (SMP) for Rhode Island College for the management activities specific to the improvements of the existing drainage and sewer infrastructure on the east campus of Rhode Island College. This document is supplemental to the East Campus Sewer Improvement Project Construction Documents. Tighe & Bond has prepared the following SMP for the excavation, stockpiling, management and off-Site disposal and/or re-use of soils at the Site.

During previous soil investigations completed at the college, but not in proximity to or associated with this investigation, elevated arsenic concentrations have been identified in soil at concentrations above the Rhode Island Department of Environmental Management (RIDEM) Residential Direct Exposure Criterion of 7 milligrams-per-kilogram (mg/kg). According to previous documentation, no other contaminants were detected at levels above the applicable regulatory criteria, and the elevated arsenic was attributed to natural background conditions. RIDEM was notified of the previous arsenic concentrations identified at the college. No analytical data from the proposed areas of excavation associated with this project have been collected to date.

As described in this SMP, the contractor shall assume that all soils managed during this project may contain elevated arsenic concentrations unless analytical testing has been completed in accordance with this SMP. In addition, excess soil shall not be transported off- site unless in accordance with the SMP.

# Section 2
# Soil Management

## 2.1 Soil Management Procedures

The following procedures should be followed during the excavation, stockpiling, management and re-use of soils at the Site. Site activities should also conform to the bid documents associated with the East Campus Sewer Improvement project.

**Pre-Excavation Activities**

1. A minimum of 72 hours prior to conducting any site grading or excavation, DIGSAFE should be contacted to obtain a valid DIGSAFE permit to inform public utility owners to locate and mark all underground utilities in the proposed work zone. Additionally, there are some campus owned utilities that will need to be located utilizing an independent utility location company. The contractor is responsible for coordinating and hiring a sub-contractor to perform the services as Rhode Island College will not perform any utility location. The Site contractor shall coordinate with local authorities to obtain the location of utilities unmarked by DIGSAFE (typically municipal water and sewer lines) at least 72 hours prior to excavation. When Site activities approach the location of any underground utility, the exact location shall be determined by safe and acceptable means. Any underground utility lines exposed in the excavation will be protected, supported, or removed. If an

unmarked underground utility is encountered, the contractor shall cease work immediately and notify the owner of the utility for further instruction.

2. Prior to excavation, all staff working at the Site, including the contractor must prepare and familiarize themselves with their Site specific Health and Safety Plan (HASP). Each contractor performing tasks at the Site should have their own HASP applicable to their personnel. Tighe & Bond has not prepared a HASP for Site contractors and assumes no responsibility for the health and safety of Site contractors or their personnel.

**Excavation Activities**

1. Site activities should be planned to be completed within a secured area of the Site and access to the Site should be restricted during the project. Additionally, off-hour access to the Site will be controlled with a locking temporary construction fence.

2. Soil excavation and grading shall be conducted in accordance with applicable Site permits.

3. During excavation activities, dust suppression methods must be utilized when visible windblown dusts are generated. The excessive generation of dust must be managed during soil excavation, stockpiling and loading. If excessive dust generation cannot be controlled or mitigated, the activity should be discontinued until conditions improve. (See Section 2.2 for additional information.)

4. If the presence of oil or hazardous materials (OHM) or any other unforeseen condition is identified during excavation activities, Site activities will immediately stop. Contractors should contact the appropriate Environmental Professional and the Rhode Island College Project Manager prior to continuing Site activities. The appropriate Site contacts are provided in Section 4.

5. Excess excavated soils will be staged and temporarily stored in a designated area of the property for no more than 90 days. The storage location shall be selected to prevent unauthorized access to the materials.

6. Excess excavated soils will be stockpiled on polyethylene sheeting and/or stored in roll-off containers. Stockpiled or stored soils will be covered with polyethylene sheeting (6 mil minimum) prior to leaving the Site and at the end of each workday. Soil shall be securely stockpiled in order to prevent migration and erosion from the stockpile locations.

7. Soil stockpiles shall be inspected daily; and damage to the covers shall be repaired immediately.

8. The contractor shall take measures to control stormwater run-off of impacted/stockpiled soils, which may include, siltation fences and staked hay bales in the areas of the Site used for stockpiling.

**On-Site Reuse Procedures:**

Soil generated from Site excavations may be placed back into its original excavation for use as backfill during the Site activities. The contractor shall make all reasonable efforts to backfill soils the corresponding depth and location from which the soils were originally removed.

**Decontamination Procedures**

Non-disposable equipment used during the soil excavation activities, including excavators, loaders and soil transport vehicles) must be properly decontaminated in accordance with the Contractors decontamination procedures as appropriate prior to removal from the Site.

## 2.2 Dust Prevention

TheContractorwillprepareaDustPrevention Planpriortobeginning work. During excavation activities, dust suppression methods must be utilized when visible windblown dusts are generated. The excessive generation of dust must be managed during soil excavation, stockpiling and loading. If excessive dust generation cannot be controlled or mitigated, the activity should be discontinued until conditions improve.

TheContractorshallmaintainawatertruck(s)attheSitetocontrolairbornedust during soil excavation,gradingandothersitedevelopmentactivities. Initiationofdust controlmeasureswillbeatthedirectionofRhode Island College,theEnvironmentalProfessional, and/ortheContractor.TheContractorshallusethewatertruck whentheSitesoilsbecomedryandthereispotentialforairbornedust. TheContractor shallhaveasufficientnumberofoperablewatertruckstomaintainamoistsoilsurfaceat allareasoftheSitewereexposedsoilsexist. Additionally,theContractorshallinstalland maintain the facilities to filland maintain the water truck(s).

## 2.3 Confirmatory Soil Sampling

The stockpile locations shall be accessible to the Environmental Professional upon completion of the stockpiling activities to allow for soil sample collection. Soil analytical testing must be performed by a Rhode Island Department of Health approved laboratory. The testing program for off-site soil reuse/disposal must be completed in compliance with the permit requirements of the planned receiving facility. Approval from the Environmental Professional, Rhode Island College Project Manager and the proposed receiving facility representative must be acquired prior to soils leaving the Site.

At a minimum analytical testing should include the following:

| | |
|---|---|
| PetroleumHydrocarbons | EPAMethod8100M |
| VolatileOrganicCompounds | EPAMethod8260 |
| Semi-volatileOrganicCompounds | EPAMethod8270 |
| PolychlorinatedBiphenyls | EPAMethod8081 |
| TotalRCRA8 Metals | EPAMethod6010&7471A |
| Flashpoint | EPAMethod1010M |
| Corrosivity(pH) | EPAMethod9045C |
| Reactivity (SulfideandCyanide) | EPAMethodsSW-8467.3.3.2/9014and SW-8467.3.4.2/376.2 |

**Soils Classifications**

Based on the analytical results, soils may be categorized as the following:

Non-regulated - results are below the RIDEM Method 1 Residential Direct Exposure Criteria (RDEC). Soils in this category do not require special handling.

Regulated – results exceed the RDEC. These soils must be managed properly and taken to a permitted receiving facility.

Hazardous Waste – results exceed United States Environmental Protection Agency (US EPA) Resource Conservation and Recovery Act (RCRA) hazardous waste criteria. These soils are subject to US EPA RCRA regulations and must be transported and disposed of at a RCRA-permitted treatment, storage, disposal (TSD) facility in accordance with applicableregulations.

## 2.4 Groundwater Assessment and Dewatering

At this time the excavation activities are planned for a maximum of 15 feet below grade and it is anticipated that groundwater will be encountered in some locations during Site activities. Groundwater dewatering activities should be planned for the Site.

## 2.5 Off-Site Soil Disposal

This SMP proposes the reuse of the stockpiled soils on Site. Soils that cannot be reused on Site are subject to the following procedures;

1. Soil excavated from the Site may not be transported off-Site for re-use or disposal without prior approval from the Environmental Professional, Rhode Island College Project Manager and the proposed receiving facility representative.

2. Prior to off-site shipment, a pre-classification soil sample(s) will need to be analyzed in accordance with the selected disposal facilities requirements. Laboratory testing must completed by the Environmental Professional.

3. Soil analytical testing must be performed by a Rhode Island Department of Health approved laboratory.

4. Soil data may indicate that soil subject to removal from the Site meets the Residential Direct Exposure Criteria (RDEC) for all constituents and may have multiple options for re-use. Soil data will likely contain elevated arsenic concentrations that exceed the RDEC and will be subject to off-Site disposal.

5. No soil shall leave the Site for re-use or disposal without the approval of the Environmental Professional, the Rhode Island College Project Manager and the proposed receiving facility.

6. If soil does not meet the RDEC and cannot be reused on-Site, the soil subject to off-Site disposal must be properly managed and disposed of off-Site at an appropriately licensed facility.

7. If the soils are to be removed from the site, the soil will need to be transported under proper shipping documentation to an assigned disposal facility.

8. The Environmental Professional and Rhode Island College Project Manager should oversee the preparation of the necessary shipping documents and disposal procedures.

9. Copies of the material shipping records for any soils shipped from the Site must be provided to the Environmental Professional and the Rhode Island College Project Manager. This information will be included in closure reporting and likely submitted to the RIDEM.

## 2.6 Implementation Schedule

Limited investigative work is scheduled to begin during the winter of 2013/2104 with full scale excavation and stockpiling activities occurring in the spring of 2014. The project is scheduled to be substantially complete by June 30, 2014 and ready for the application of final pavement by October 24, 2014.

# Section 3
# Notification Requirements

During previous soil investigations completed at the college elevated arsenic concentrations have been identified in soil at concentrations above the RIDEM Residential Direct Exposure Criterion of 7 milligrams-per-kilogram (mg/kg). Although elevated arsenic has beenattributed to natural background conditions, RIDEM was notified of the previous arsenic concentrations identified at the college. No analytical data from the proposed areas of excavation associated with this project have been collected to date. If elevated arsenic concentrations are identified in soils at the Site, the concentrations shall be reported to RIDEM and managed in accordance with all RIDEM regulations.

If extenuating Site or soil conditions are discovered beyond that which is outlinedin the SMP, the Environmental Professional and Rhode Island College Project Manager should be notified immediately.

# Section 4
# Site Contacts

The following table provides the contact information for the various individuals that the contractor may need to contact during the completion of this project.

| Company / Affiliation | Name | Address | Phone Number |
|---|---|---|---|
| Tighe & Bond | Rebecca Sherer | 53 Southampton Road Westfield, MA 01085 | (413) 562-1600 |
| Rhode Island College | Kevin Fitta | 600 Mount Pleasant Ave., Providence, RI 02908 | (401)456-9885 |
| RIDEM, Office of Waste Management | Jeffrey Crawford | 235 Promenade Street Providence, RI 02903 | (401)222-2797 |
| RIDEM Emergency Response | Jim Ball | 235 Promenade Street Providence, RI 02903 | (401)222-2797x7129 or (401)222-3070 |

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