TOWN OF ARLINGTON MASSACHUSETTS
INVITATION TO BID # 13-13

RECONSTRUCTION OF NATURAL TURF ATHLETIC FIELD
AND IRRIGATION SYSTEM AT ARLINGTON HIGH SCHOOL

ARLINGTON, MASSACHUSETTS

Sealed bids are invited and will be received by the Town Manager, Town of Arlington, Massachusetts, until **11:00 A.M., Thursday, June 6, 2013** at the Office of the Purchasing Agent, Town Hall, Arlington, Massachusetts 02476, at which time and place they will be publicly opened and read.

A BID DEPOSIT IN THE FORM OF CASH, CERTIFIED CHECK, OR TREASURER'S CHECK, shall accompany every bid. The amount of such bid deposit shall be FIVE PERCENT (5%) of the value of the bid.

Specifications and proposal forms will be available at the Office of the Purchasing Agent, Town Hall, Arlington, Massachusetts. All bids must be in sealed envelopes plainly marked: **BID ON: RECONSTRUCTION OF NATURAL TURF ATHLETIC FIELD AND IRRIGATION SYSTEM AT ARLINGTON HIGH SCHOOL, BID # 13-13, THURSDAY, June 6, 2013 AT 11:00 A.M.**

Attention is called to the fact that minimum wage rates and health and welfare and pension fund contributions are established for this contract and are a part of the specifications.

The conditions of employment as set forth in Federal Wage Determination MA080006 dated April 10, 2009, issued by the U.S. Department of Labor, shall prevail in the execution of the work under this contract. Attention is called to the fact that minimum wage rates and health and welfare and pension fund contributions are established for this contract and are part of the specifications.

Work under this contract shall be governed byM.G.L.Ch.30, Sec.39M.

Attestation Forms pursuant to M.G.L. Ch. 62C, Sec. 49A and M.G.L. Ch. 701 of the Acts of 1983 are enclosed and shall be submitted with bids.

Proposals are for Reconstruction of Natural Turf Athletic Field and Irrigation System at Arlington High School in the Town of Arlington, MA. The project Scope of work will include site excavation, earthwork, irrigation installation and landscaping. A Pre-Bid Meeting will be held at the site on Tuesday, May 28, 2013 at 1:00pm to allow for site observations. The field is located at 869 Massachusetts Avenue between the High School and DPW Yard.

It is the intention of the Owner to award the Contract to the lowest qualified responsive bidder. The bidder must submit a bid on all bid items in the Contract.

All proposals to include prices in both writing and in figures, and must be signed by the bidder with his business address.

An increase or decrease in the quantity of work shall not be regarded as a sufficient ground for and increase in the unit prices.

To receive consideration, bids must be in the hands of the Purchasing Agent or his authorized representative not later than the day and hour above mentioned. For further information relative to this bid, please confer with Domenic R. Lanzillotti, Director, Purchasing Department, Town Hall, Arlington, Massachusetts, 02476.

OSHA Construction Training Required: As of July 1, 2006, under M.G.L. – Chapter 30, Section 39s, any person, submitting a bid for, or signing a contract to work on, the construction, reconstruction, alteration, remodeling or repair of any public work by the Commonwealth of Massachusetts/Town of Arlington, and estimated by the awarding Authority to cost more than $10,000, shall certify on the Bid or Contract, under penalty of perjury, that all employees to be employed at the work will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration

The Town Manager reserves the right to cancel any invitation for bids, to reject in whole or in part any and all bids, when it is deemed in the best interest of the Town of Arlington to do so.

TOWN OF ARLINGTON

_____

Adam W. Chapdelaine
Town Manager Date: _____

I INSTRUCTION TO BIDDERS

1. Receipt of Bids

The Town may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informality in or reject any bids. Any bid may be withdrawn before the time for the opening of bids. Any bid received after the time and date specified shall not be considered. No bidder may withdraw his/her bid for a period of 30 days, excluding Saturdays, Sundays, and legal holidays after actual date of the opening thereof.

2. Preparation of Bid

Each bid shall be submitted on the forms attached to these documents. The bid forms may be removed and submitted separately from the other documents. All blank spaces for bid prices must be filled in with the unit price for the item or the lump sum for which the proposal is made. Bidders must bid on each item. All entries in the entire proposal must be made clearly, and prices written in both words and figures in the spaces provided.

Each bid must be in a sealed envelope addressed to the Office of the Purchasing Agent, 730 Massachusetts Avenue, Arlington, Massachusetts, 02476; and bearing on the outside the name of the bidder, his/her address, the name of the project for which the bid is submitted, and the notation ' **BID ON: BID # 13 - 13, RECONSTRUCTION OF NATURAL TURF ATHLETIC FIELD AND IRRIGATION SYSTEM AT ARLINGTON HIGH SCHOOL, ARLINGTON MASSACHUSETTS**

3. Bid Security

Every bid submitted by contractors shall be accompanied by a bid deposit in the form of cash, certified check, treasurer's or cashier's check, or a bid bond issued by a responsible bank or trust company and made payable to the Town of Arlington. The amount of the bid deposit shall be 5% of the amount of the bid. All security except those of the three lowest responsible and eligible bidders will be returned within ten days, Saturdays, Sundays, and legal holidays excluded, after opening of the bid. All bid securities will be returned on the execution of the contract or if no award is made within 30 days, excluding Saturdays, Sundays, and legal holidays, after the actual date of the opening thereof, unless forfeited under the conditions herein stipulated.

In case a party to whom a contract is awarded shall fail or neglect to execute the contract and furnish the satisfactory bond in the time specified, the Town may determine the bidder has abandoned the contract and thereupon the proposal and acceptance shall be null and void, and the bid security accompanying the proposal shall be forfeited to the Town as liquidation damages for such failure or neglect and indemnify the Town for any loss which may be sustained by failure of the bidder to execute the contract and furnish the bonds as aforesaid, provided that, in case of death, disability, or other unforeseen circumstances affecting the bidder, such bid security may be returned to him/her.

After execution of the contract and acceptance of the bonds by the Town, the bid security accompanying the proposal of the successful bidder will be returned.

4. Time of Completion

The bidder must agree to commence work within ten (10) business days from the date of signing the contract and to fully complete the project within the time specified within the Special Provisions section of this document.

5. Performance and Labor Material Bonds

A bond in the sum of 50% of the total amount of the Contract by the successful bidder and an additional bond in equal amount covering the payment for all labor and materials used in the work will be required. A surety company authorized to do business in Massachusetts and satisfactory to the Town of Arlington must provide these bonds. These bonds will be required at the execution of the contract. Attorneys-in-fact who sign contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

6. Laws and Regulations

The bidder's attention is directed to the fact that all applicable State laws, Town of Arlington Bylaws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they shall be deemed to be included in the contract the same as though herein written out in full.

7. Withdrawal of Bids

Upon proper written request and identification, Bids may be withdrawn only as follows:

a. At any time before the designated time for the opening of Bids.

b. Death or serious injury of a principal.

c. With the written approval of the Town of Arlington Office of the Purchasing Director.

d. At any time after the expiration of the period during which withdrawal is prohibited provided the bid has not been accepted by the Town.

8. Execution of Contract

The party to whom the contract is awarded shall be required to execute the contract and furnish the bonds duly executed with a satisfactory surety company within five to ten days, excluding Saturdays, Sundays, and legal holidays, of the date of the mailing of the notice to the bidder according to the address given by him/her, that the contract is ready for execution.

9. Obligation of Bidder

At the time of the opening of bids, each bidder shall be presumed to have read and to be thoroughly familiar with the contract documents. The failure or omission of any bidder to receive or examine any form, instrument, or documents shall in no way relieve any bidder from the obligation in respect to his bid.

10. Omissions, Discrepancies, Interpretations and Addenda

Should a bidder find discrepancies in, or omissions from, the drawings or contract documents, or should he/she have questions as to the interpretation of the plans or contract documents he/she shall submit such in writing to the Director of Purchasing at least five (5) days before the date herein set for the opening of bids. An interpretation will be mailed by certified mail to prospective bidders at the addresses given by them on or about two (2) days before the opening of bids. Signed copies of all addenda shall be included with the bid; omission of the signed addendum shall be cause for rejection of the bid.

11. Record of Address

Prospective bidders shall at the time plans and specifications are secured place on file with the Director of Purchasing their address, and are required to make any changes necessary to insure that the record is accurate, complete, and up to date.

12. Massachusetts Sales and Use Tax

Materials purchased for permanent installation in the work will be exempt from the Massachusetts Sales and Use tax. Each bidder shall consider this exemption in calculating his/her bid for the work.

13. State Tax Affidavit

Prospective bidders are required to certify that all state tax returns have been filed and all state taxes have been paid in order to be eligible to enter into a contract with the Town on this project. The included form is to be used for this purpose and is to be completed and returned as part of the bid and proposal.

14. Minimum Wage Rates

Prevailing rates for wages for work performed under this Contract will be as predetermined by the Commissioner of Labor and Industries of the Commonwealth of Massachusetts in accordance with the provisions of Sections 26 to 27D, inclusive, of c.149 of M.G.L. A schedule of the prevailing wages is included in the Minimum Wage Rates Section.

15. Sub-bids

No sub bids shall be sought in connection with this Contract.

16. All bidders shall submit the following supplemental information with a fee proposal:

a. Name, address and phone number of a minimum of three (3) references that can vouch for the performance of the bidder

b. Proof of Liability and Worker's Compensation Insurance Coverage

c. Completed tax attestation form

d. Bid deposit

II LOCATION OF WORK

1. Work under this contract includes all labor and materials to perform reconstruction of a natural turf athletic field and irrigation system at the Arlington High School in the Town of Arlington, Massachusetts.

III PROPOSAL

To the Town of Arlington, Massachusetts, herein called the TOWN, acting through its Town Manager; the undersigned, as bidder, declares as follows:

a. The only persons or parties interested in this proposal as Principals are named in this proposal;

b. This proposal is made without collusion with any other Person, firm or corporation;

c. He has carefully examined the requirements of the proposed work;

d. This proposal is based solely on his own investigation and research and not in reliance upon any survey, report or representations of any employee, officer or agent of the TOWN; and the undersigned proposes and agrees that if this proposal is accepted, he will contract with the TOWN, this Contract Bid Form being part of and included in said CONTRACT, to provide all necessary supervision, labor, equipment, machinery, tools, apparatus, and other means of service necessary to complete the requirements in the CONTRACT; and that he will take in full payment thereof the following sums to wit:

Bidders must bid on each item. All entries in the Contract Bid Form must be made clearly and in ink, and prices must be written in both words and figures in the space provided. Bidders should insert computed totals in the spaces provided therein:

DEFINITIONS OF ITEMS

ITEM#

1. **EROSION CONTROL: SILT FENCE** This work shall consist of the installation of all erosion control barriers necessary to prevent the potential migration of sediment from the work zone and shall include catch basin protection to prevent sediment from entering the drainage system caused by surface runoff from the site and shall be in accordance with Section 02050. Payment shall be made by the Lineal Foot.

2. **EXCAVATION FOR PLASTIC FENCE DEFINING LAYER REPLACEMENT:** This work shall consist of the excavation of up twelve inches of topsoil at select locations (See Sketch #1 – Athletic Field Reconstruction). Work shall adhere to requirements in Section 02100 and all other related Sectrions. Excavation shall extend to an elevation 12" beneath the existing as-built elevation indicated on Plan #2 As-Built Grading Plan. Excavation shall result in a suitably graded level bottom area with exposed edge of existing plastic fencing for connection of new plastic fencing defining layer. Payment shall be made by the Cubic Yard.

3. **TOPSOIL: FIELD EXCAVATION & STACKED:** This work shall consist of the excavation of the equivalent of four (4) inches of topsoil, across the entire area indicated as Area "A" on Sketch #2 Athletic Field Reconstruction. Excavated material shall be to an elevation no less than eight (8) inches above the Plastic Fence Defining Layer located 12" below the surface elevation indicated on Plan #2 As-Built Grading Plan. Work shall include the screening of all excavated material (to be handled no more than one time prior to screening). Work shall be in compliance with Section 02100. Payment shall be made by Cubic Yard.

4. **TOPSOIL: SCREENING:** This work shall consist of the screening of top soil excavated from the athletic field surface and removal and disposal of all tailings and debris from the screening process. See requirements in Section 02100 and Section 02920. Payment shall be made by Cubic Yard.

5. **TOPSOIL: REHANDLED AND SPREAD:** This work shall consist of earthwork needed to place and spread screened topsoil. Topsoil handling pay item shall include payment for handling one time only. If additional imported topsoil is necessary to achieve required grades and elevations topsoil shall adhere imported topsoil requirements and Section 02100. Payment shall be made by the Cubic Yard.

6. **TOPSOIL: IMPORTED:** If required, any topsoil necessary to be imported to achieve the necessary final sod bed elevation must meet the soil requirements indicated in Section 02920, Item 2.05. Payment shall be made by Cubic Yard.

7. **PLASTIC FENCE DEFINING LAYER INSTALLATION:** This work shall consist of the installation of a new Plastic Fence Defining Layer at select locations (See Sketch #1) at an elevation 12" below the elevation for this location indicated on Plan #2 As-built Grading Plan and as necessary over the 3" HDPE Irrigation main replacement line. New fencing

shall be connected to the exposed existing fencing as indicated in Section 02690. Payment shall be made by the Square Yard.

8. **TOPSOIL: FINE GRADING:** This work shall consist of fine grading of top soil to a prepared sod bed elevation 0.1ft below the surface elevation indicated on Plan #2 As-Built Grading Plan. Requirements shall be in accordance with Section 02210. Payment shall be made by the Cubic Yard.

9. **INSTALLATION & MAINTENANCE OF SOD:** This work shall consist of the installation of sod and maintenance as necessary until completion of contract in accordance with Section 02930 and Section 02390B. Payment shall be made by the Square Foot.

10. **REMOVAL OF DRAINAGE STRUCTURE SEDIMENT:** This work shall consist of the cleaning of catch basin and removal and disposal of sediment contained by silt fence as required by applicable regulations and as required in Section 02050. Payment shall be made by the Cubic Yard.

11. **IRRIGATION SYSTEM: 3" MAIN REPLACEMENT:** This work shall consist of the removal and replacement of 3" HDPE irrigation line as specified in Section 02810 and indicated as part of the system on Plan #8 Irrigation Replacement Plan. Work shall consist of excavation and installation to a maximum depth of 18" and include connection to all branch irrigation lines necessary. Work shall include removal and disposal of all existing 3" irrigation main replaced as part of this project. Payment shall be by the Lineal Foot.

12. **IRRIGATION SYSTEM: 1-1/2" MAIN REPLACEMENT:** This work shall consist of the removal and replacement of 1-1/2" HDPE irrigation line as specified in Section 02810 and indicated as part of the system on Plan #8 Irrigation Replacement Plan. Work shall consist of excavation and installation to a maximum depth of 8" and include connection to 3" Irrigation Main feeder line. Work shall include removal and disposal of all existing 1-1/2" irrigation line replaced as part of this project. Payment shall be by the Lineal Foot.

13. **IRRIGATION SYSTEM: SPRINKLER HEAD:** This work shall consist of the removal and replacement of irrigation sprinkler heads as specified in Section 02810 and indicated as part of the system on Plan #8 Irrigation Replacement Plan. Work shall consist of excavation and installation to a maximum depth of 8" and include connection to 1-1/2" Irrigation branch lines. Work shall include removal and disposal of all existing sprinkler heads and connection components replaced as part of this project. Payment shall be by EACH.

14 **IRRIGATION SYSTEM: VALVE BOX:** This work shall consist of the removal and replacement of irrigation valve boxes per zone replaced as part of the project and as specified in Section 02810 and indicated as part of the system on Plan #8 Irrigation Replacement Plan. Work shall consist of installation of necessary valve boxes, valves, wiring and components necessary for system to operate properly. Installation shall be to a maximum depth of 12". Work shall include removal and disposal of all existing boxes, valves, wiring etc replaced as part of this project. Payment shall be by EACH.

Proposals are for Reconstruction of Natural Turf Athletic Field and Irrigation System at Arlington High School in the Town of Arlington, MA. The project Scope of work will include site excavation, earthwork, irrigation installation and landscaping. A Pre-Bid Meeting will be held at the site on Tuesday, May 28, 2013 at 1:00pm to allow for site observations. The field is located at 869 Massachusetts Avenue between the High School and DPW Yard.

IV SCOPE OF WORK

1. Reconstruction of Natural Turf Athletic Field and Irrigation System.

The work under this section of the contract consists of furnishing all necessary labor, materials, equipment and services to reconstruct the Natural Turf Athletic Field and Irrigation System to pre-existing conditions indicated by the specifications and as-built construction drawings. The project Scope of work will include site excavation, installation of orange plastic barricade fencing, earthwork, removal and replacement of irrigation system components and landscaping including preparation for and installation of sod turf.

2. General

All work done under this contract shall be in conformance with the Commonwealth of Massachusetts Department of Public Works STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, THE SUPPLEMENTAL SPECIFICATIONS DATED JUNE 26, 1989, THE SUPPLEMENTAL SPECIFICATIONS DATED AUGUST 7, 1991, THE 1977 CONSTRUCTION STANDARDS, THE 1988 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, the 1981 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, and these SPECIAL PROVISIONS.

V SPECIAL PROVISIONS

1. Definition of Terms

All reference to Department herein and in the Commonwealth of Massachusetts, Standard Specifications for Highways and Bridges, 1988, shall refer to the Owner" as the Department of Public Works of the Town of Arlington."

2. Work Schedule

Work on this project is restricted to a standard 8-hour day, 5-day week, with the Prime Contractor and all Subcontractors working on the same shift. No work shall be performed on this Contract on Saturdays, Sundays, or Holidays without permission from the owner.

3. Time of Completion

The work specified under this contract shall be completed by July 12, 2013.

4. Performance, Labor and Material Bonds

A bond in the sum 50% of the total amount of the Contract by the successful bidder and an additional bond in equal amount covering the payment for all labor and materials used in the work shall be required. A surety company authorized to do business in Massachusetts and satisfactory to the Town of Arlington must provide these bonds. These bonds shall be required at the execution of the Contract. Attorneys-in-fact who sign contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

5. Bid Submission

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his/her address, and the name of the project for which the bid is submitted, and the name and number of the Contract for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as follows:

Bid Documents
Purchasing Director
BID # 13-13, RECONSTRUCTION OF NATURAL TURF ATHLETIC FIELD AND IRRIGATION SYSTEM

Town of Arlington
Town Hall, 730 Massachusetts Avenue
Arlington, Massachusetts 02476

The Owner will receive sealed bids until the time, and at the location designated in the Notice to Contractors. Bids received after this time will not be accepted. All interested parties are invited to attend; bids shall be opened publicly and read aloud.

6. Interpretation of Basic Estimate of Quantities

Attention is directed to the fact that the quantities of work to be done are based on observations and available data. The estimated quantities are approximate and should be used only as a guide. No quantities are guaranteed under this contract.

7. Prosecution of Work and Provisions for Travel

The Contractor shall give notice in writing to the Engineer at least seven days in advance of beginning any work affecting the maintenance of traffic where work affects the street in use by the public.

Before starting any work under this Contract, the Contractor shall submit his schedule of operations as provided herein.

The Contractor must prosecute the work efficiently and with the least possible delay.

The Contractor shall provide safe and convenient means of access to all buildings of property along the line of work at all times, coordinate the scheduling of safety and traffic details with the Arlington Police Department, and provide notification to the Arlington Department of Public Works and direct abutters at least one (1) business day prior to commencement of work adjacent to said abutter property.

8. Provisions for Access at All Locations

The Contractor shall cooperate with the various utility companies and provide access through a worksite if required for their work in connection with this project.

All permanent and temporary surfaces open for traffic during construction shall be maintained by the Contractor, as directed, in accordance with the provisions of herein.

THE TOWN WILL NOT ACCEPT ANY MATERIALS DELIVERED TO ANY PROJECT IN MOTOR VEHICLES OR SEMI-TRAILER UNITS THAT EXCEED THE LEGAL MAXIMUM GROSS WEIGHT ALLOWED FOR THE PARTICULAR CLASS, AS SPECIFIED IN SECTION 19 A OF CHAPTER 90 OF THE GENERAL LAWS OF MASSACHUSETTS.

9. Insurance Requirements

The limits of the several kinds of liability insurance required for this Contract, in addition to insurance for Workmen's Compensation are as listed as follows:

a. Bodily Injury Liability insurance, in an amount not less than Five Hundred Thousand Dollars ($500,000) for injuries, including wrongful death to any one person, and subject to the same limit for each person to an amount of not less than One Million Dollars ($1,000,000) as account of one accident.

b. Broad Form Property Damage Liability Insurance in an amount not less than Five Hundred Thousand Dollars ($500,000) for damages on account of any one accident, and in an amount not less than One Million Dollars ($1,000,000) for damages on account of all accidents.

c. Automobile Bodily Injury Liability Insurance, in an amount not less than Five Hundred Thousand Dollars ($500,000) for injuries, including wrongful death to any one person and subject to the same limit for each person in an amount not less than One Million Dollars ($1,000,000) on account of one accident.

d. Automobile Property Damage Insurance in an amount not less than Five Hundred Thousand Dollars ($500,000) for damages on account of any one accident and in an amount not less than One Million Dollars ($1,000,000) for damages on account of all accidents.

e. Contractors Public Liability Insurance in an amount not less than Five Hundred Thousand Dollars ($500,000) for each occurrence and in an amount not less than One Million Dollars ($1,000,000) annual aggregate.

10. Maintenance of Traffic

During construction, the Contractor shall maintain an unobstructed lane of travel along the asphalt driveway located to the north of the Athletic Field at all times. Driveway is utilized by student population before, during and after school. The Contractor shall make every effort to maintain access at all times. Reflective barrels, warning flagging, construction signage and other devices deemed necessary by the Engineer shall be utilized to direct pedestrian traffic safely past the construction zone. All work left unattended shall be barricaded/demarcated with suitable work safety devices.

All signs, barricades, and barrels shall be in accordance with materials Specification M9.30.2 of the Department's "Standard Specifications for Highways and Bridges, 1988 Edition.

11. Protection of Utilities and Property

The Contractor shall be responsible for maintenance and protection of all utilities and shall repair at his/her own expense any damage to such structures caused by his/her act or neglect, and shall leave them in as good condition as they were previous to the commencement of the work. In cases of damage to utilities caused by him resulting in an emergency, the Contractor shall promptly warn the Owner and shall, if requested, furnish laborers to work temporarily under the Owner's direction in getting access to the utility. Pipes or other structures damaged by the operation of the Contractor may be repaired by the Town, Department or Company, which suffers the loss. The cost of such repairs shall be at the expense of the Contractor.

12. Notice to Owners of Utilities

When necessary, written notice shall be given by the Contractor to all public service corporations or officials owning or having charge of publicly or privately owned utilities of his/her intention to commence operations affecting such utilities at least one week in advance of the commencement of such operations, and the Contractor shall at that time file a copy of such notice with the Engineer.

Before the Contractor begins any work or operations, which might damage any subsurface structures, he shall carefully locate all such structures and conduct his/her operations so as to avoid any damage to them. The following are the names and addresses of the utilities presumed to be affected, but the completeness of the list is not guaranteed:

Town of Arlington
Town Engineer, Wayne A. Chouinard P.E. (781- 316- 3320)
51 Grove Street
Arlington, MA. 02476

Town of Arlington
Water/Sewer/Highway, Operations, Jim Dodge (781- 316 -3373)
51 Grove Street
Arlington, Ma. 02476

National Grid (Gas) (781-466-5099)
John J. Warchol
52 Second Ave
Waltham, MA 02451

Verizon (781-939-3562)
Bob Parks
285 Locust St #1
Woburn, MA 01801

N-Star Corp. (617-541-7071)
One Nstar Way SW-340
Westwood, MA 02090

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

_____

(Signature of individual submitting bid or proposal)

_____

(Name of individual submitting bid or proposal)

_____

Name of Business

_____

Date

Pursuant to M.G.L. Chapter 62C, Section 49A, I certify under the penalties of perjury that I have complied with all laws of the commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____	_____
Social Security Number or Federal Identification Number	Signature of Individual or Responsible Corporate Officer and Title

NON-COLLUSION FORMS MUST BE SIGNED AND

SUBMITTED WITH BID

DEPARTMENT OF PUBLIC WORKS - ENGINEERING
TOWN OF ARLINGTON
51 Grove Street
Arlington, Massachusetts 02476
Telephone (781) 316-3320 Fax (781) 316-3281

PROJECT TITLE: BID #13-13 RECONSTRUCTION OF NATURAL TURF ATHLETIC FIELD & IRRIGATION SYS

ITEM #	QUANTITY	UNIT	DESCRIPTION	UNIT PRICE	AMOUNT
1	700	EA.	EROSION CONTROL: SILT FENCE		
2	175	C.Y.	EXCAVATION FOR PLASTIC FENCING DEFINING LAYER REPLACEMENT		
3	640	C.Y.	TOPSOIL: FIELD EXCAVATION AND STACKED		
4	640	C.Y.	TOPSOIL: SCREENING		
5	815	C.Y.	TOPSOIL: REHANDLED AND SPREAD		
6	200	C.Y.	TOPSOIL: IMPORTED		
7	5720	SF	PLASTIC FENCE DEFINING LAYER INSTALLATION		
8	5800	S.Y.	TOPSOIL: FINE GRADING		
9	52000	S.F.	INSTALLATION AND MAINTENANCE OF SOD		
10	3	C.Y.	REMOVAL OF DRAINAGE STRUCTURE SEDIMENT		
11	320	L.F.	IRRIGATION SYSTEM: 3" MAIN REPLACEMENT		
12	800	EA.	IRRIGATION SYSTEM: 1-1/2" LINE REPLACEMENT		
13	16	EA.	IRRIGATION SYSTEM: SPRINKLER HEAD		
14	4	EA.	IRRIGATION SYSTEM: VALVE BOX		
				TOTAL BID PRICE:	

*Prices must be in writing and in figures.

TOTAL BID PRICE IN WORDS: _____

FIRM NAME: _____

NAME PRINCIPAL: _____

ADDRESS:_____

AUTHORIZED SIGNATURE: _____

DATE:_____

CONTACT NAME:_____

TELEPHONE:_____

FAX:_____

Table of Contents

APPENDIX A

Technical Specifications: Engineering

APPENDIX A

DIVISION 2

TECHNICAL SPECIFICATIONS

RECONSTRUCTION OF NATURAL TURF ATHLETIC FIELD
AND
IRRIGATION SYSTEM
AT ARLINGTON HIGH SCHOOL

ARLINGTON, MASSACHUSETTS

The following technical specifications for the reconstruction of the Natural Turf Athletic Field and Irrigation System at Arlington High School are intended to describe the steps to be taken to ensure the quality of construction materials used and to ensure that the work is performed as required. Amendments and clarifications to these specifications may be made by the DEPARTMENT OF PUBLIC WORKS prior to or during construction to account for field conditions and other necessary construction adjustments.

Primary Specifications

Supplemental Specifications

APPENDIX A

Technical Specifications: Engineering

APPENDIX A

DIVISION 2

TECHNICAL SPECIFICATIONS

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Primary Specifications

Supplemental Specifications

SECTION 02930

RECONSTRUCTION OF FIELD

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide all work necessary to reconstruct athletic field to conditions and characteristics indicated on Construction Drawings as shown and specified. The work includes:

1. Prior to work commencing, field conditions shall be reviewed with Engineer or Owner's Representative and a minimum of eight hand dug test pits shall be prepared by CONTRACTOR and observed by Engineer and CONTRACTOR. As well as providing equipment load certification or calculations.
2. All monitor wells indicated on the Site Plan #3 As-Built Site Plan shall be demarcated and protected throughout the project and shall not be disturbed.
3. All Irrigation Sprinkler Heads shall be located, protected and replaced if broken.
4. Prior to excavation of the athletic field, the area shall be staked in a 50 foot grid pattern with marks indicating depth of cut to proposed subgrade elevations indicated on stakes and in conjunction with test pit observations . Stakes and marks shall be reviewed together by Contractor & Engineer. Approval for contractor to proceed with excavation shall be given by Engineer prior to excavation (See Section 02100).
5. For Area "A" indicated on Sketch #1 – Athletic Field Reconstruction, strip and excavate topsoil to the Plastic Barricade Fencing Defining Layer as indicated by Plan #1 As-Built Barrier and Subgrade Plan and Fig. 4-5. Replace irrigation lines and sprinkler heads determined to be broken in this area by a sprinkler test prior to commencing of excavation.
6. Identify limits of existing Plastic Barricade Fencing Defining and install new orange plastic barricade fence and attach to existing buried plastic fencing for Areas "A" and where required for irrigation system repairs per Section 02690 requirements.
7. Place on-site screened topsoil to finish grade.
8. Strip and excavate topsoil and turf for Area "1" indicated on Sketch #2 – Athletic Field Reconstruction to an elevation no less than eight (8) inches above the Plastic Fence Defining Layer on Plan #1 As-Built Barrier and Subgrade Plan.
9. Evaluate condition of drainage system if observed during excavation operations. Repair/replace if necessary.
10. Screen all excavated soil.
11. Replace soil and establish finish grade and prepare sod bed for sod installation.
12. Install required Irrigation System components and test system.
13. Identify and confirm required grass mix components of sod for suitable stability and viability with existing soil blend detailed in Section 02920.
14. Install sod and maintain.

15. Provide protection of sodded field until root system is established in soil mix and viable .

B. Some of this work may be specified in other sections. Contractor is responsible to coordinate the work of all sections.

1.02 QUALITY ASSURANCE

A. Comply with remaining Section 02000 requirements and Construction Drawings.

B. Contractor shall have a minimum of five years experience in the renovation and construction of turf playing fields and irrigation systems

C. Note the requirements under Part 2 Materials, Section 02350, for the use of specific machinery and equipment. Contractor must use the specified equipment or provide evidence that equipment to be used will perform to the same specifications.

1.03 SUBMITTALS

A. Submit sod vendor's certification for required grass seed mixture, indicating percentage by weight, and percentages of purity, germination, and weed seed for each grass species.

B. Submit the following materials certification:

1. Fertilizer (s) analysis.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver seed and fertilizer materials in original unopened containers, showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.

1.05 PROJECT CONDITIONS

A. Work notification: Notify Engineer at least 7 working days prior to start of field renovation operations.

B. Protect existing utilities, paving, and other facilities from damage caused by field renovation operations. (See As-Built Plans provided in Appendix B)

C. Restrict traffic from sodded areas until established. Erect signs and barriers as required.

D. Provide hose and needed watering equipment as required.

E. The irrigation system will be installed prior to installation of sod. Locate, protect, and maintain the irrigation system during sodding operations. Repair irrigation system components damaged during sod operations at this Contractor's expense.

F. Vehicular movement over the Athletic Field shall not be permitted until the full depth of the covering soils has been determined and approval of acceptable low ground pressure excavation equipment by the Engineer. The tracked equipment shall operate only over previously placed covering soil, not directly on the geo-composite or any other geosynthetic. No equipment shall be operated directly on the geo-composite or other geosynthetic surface.

1. Prior to equipment being utilized on the athletic field there shall be eight separate test pits hand excavated to identify the depth and elevation of the following three layers beneath the athletic field.
   i. Plastic Fence Defining Layer
   ii. Bottom of Vegetative Subgrade Layer (gray-sandy material) (or 12 inches in depth) whichever is lesser.
   iii. Top of drainage layer (or 12 inches in depth) whichever is lesser.

2. The equipment used to spread the covering soils shall not exert ground pressures exceeding the following:

Allowable Equipment Ground Pressure (psi)	Thickness of Covering Soils Above Geosynthetics (in.)
< 5	12
< 10	18
< 20	24
> 20	36

3. Equipment loading certifications or calculations shall be provided to Engineer or Owner's Representative prior to site work commencing .

1.06 WARRANTY

A. Provide a uniform stand of grass by watering, mowing, and maintaining sodded areas until final acceptance. Re-sod areas which fail to provide a uniform stand of grass until all affected areas are accepted by the Engineer or Owner's Representative.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Equipment:

1. Power rake: Harley Model TR12 Rake or approved equal.

2. Other equipment: as proposed by the contractor and acceptable to the Engineer.

B. Sod: An "approved" nursery grown blend of improved Kentucky Bluegrass (50%), perennial rye (20%) and fescue (30%) varieties such as 'Versaturf', as available from Tuckahoe Turf Farms, Wood River Jct., RI, 800-556-6985. Selected sod shall be deemed viable for Athletic Field use and existing on-site soil mixture/blend indicated in Section 02920, Item 2.05.

1. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free of weeds, undesirable grasses, stones, roots, thatch, and extraneous material; viable and capable of growth and development when planted.

C. Topsoil: obtained from on-site.

1. Topsoil to be stripped and stockpiled on site shall be the soil to be utilized on this project. If additional soil is required, soil mixture shall meet necessary Soil Specifications provided from Section 02920, Item 2.05.

2. Provide topsoil free of substances harmful to the plants which will be grown in the soil.

D. Fertilizer:

1. Granular, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.

a. Type A: Starter fertilizer containing 19% nitrogen, 19% phosphoric acid, and 19% potash by weight.

F. Ground limestone: Dolomitic Limestone containing not less than 85% of total carbonates and ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve.

G. Sand: Clean, washed, graded sand, 90% passing a .5-2 mm screen.

H. Water: Free of substance harmful to grass growth. Contractor is responsible for setting up a water supply from the proposed irrigation connection. Coordinate water supply hook-up with town of Arlington DPW.

PART 3 - EXECUTION

3.01 GENERAL

A. Anticipated Sequence of Work: the following is a proposed sequence for reconstruction of Natural Turf Athletic Field at Arlington High School. If contractor wishes an alternate sequence, it must be proposed in writing to the Engineer at least 10 working days prior to the start of construction. See appropriate specification sections for work to be performed under those sections.

B. Sequence:

1. Strip existing top soil and turf in Area "A" to the elevation of the Plastic Fence Defining Layer and install/repair plastic barricade fence in (see Sketch #1 Athletic Field Reconstruction).

2. Strip existing top soil and remove four (4) inches of topsoil, debris, grass/lawn and any other material present in Area "1" (See Sketch #2 Athletic Field Reconstruction) to an elevation no less than eight (8) inches above the Plastic Fence Defining Layer indicated by Plan #1 As-Built Barrier and Subgrade Plan.

3. Screen all excavated soil.

4. Re-place and grade soil, establish required grade, elevations and slopes.

5. Power rake to establish finish grade and prepare sod bed. (See As-Built Grading Plan for required elevations and slopes).

6. Install/replace required Irrigation System components and test system.

7. Apply starter fertilizer (19-19-19) @ 1.0 lb. Nitrogen/1,000 sf.

8. Install sod.

9. Protection of sodded field until turf is established.

3.02 PREPARATION FOR SODDING.

A. Limit preparation to areas which will be immediately sodded.

B. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture. Roll and rake, remove ridges, and fill depressions as required to drain. Elevations and grades shall match Plan #2 As-Built Grading Plan included in Appendix B.

C. Apply starter fertilizer to indicated turf areas at a rate equal to 1.0 lb. of actual nitrogen per 1,000 sq. ft. (220 lb./acre).

D. Apply fertilizers to renovated areas by mechanical rotary distributor. Fertilize areas inaccessible to power equipment with hand tools.

E. Restore prepared areas to specified condition if eroded, settled, or otherwise disturbed after fine grading and prior to seeding.

3.03 INSTALLATION

A. Sodding:

1. Lay sod to form a solid mass with tightly-fitted joints. Butt ends and sides of sod strips. Do not overlay edges. Stagger strips to offset joints in adjacent courses. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with adjacent existing curbs, sidewalks, drains, and lawn areas.

2. Do not lay dormant sod or install sod on saturated or frozen soil.

3. Install initial row of sod in a straight line, beginning at bottom of slopes, perpendicular to direction of the sloped area. Place subsequent rows parallel to and lightly against previously installed row.

4. Water sod thoroughly with a fine spray immediately after laying.

5. Roll with light roller to ensure contact with sub-grade.

3.04 PROTECTION

A. Restrict traffic and use of newly seeded (sodded) areas throughout first growing season. Maintain fencing throughout growing season and establishment period.

B. Remove fencing in August of 2013 or at the direction of the Owner or Engineer.

3.05 MAINTENANCE

A. Maintain seeded or sodded fields until completion and acceptance of the entire project.

B. Maintain seeded areas, including watering, spot weeding, mowing, applications of herbicides, fungicides, insecticides, and re-seeding until a full, uniform stand of grass free of weeds, undesirable grass species, disease, and insects is achieved and accepted by the Engineer.

1. Water daily to maintain adequate surface soil moisture for proper seed germination. Continue daily watering for not less than 30 days. Thereafter apply 1/2" of water twice weekly until acceptance.

2. Repair, rework, and re-seed (or re-sod) all areas that have washed out, are eroded, or do not catch.

3. Mow fields as soon as top growth reaches a 3" height. Cut back to 2" in height. Repeat mowing as required to maintain specified height.

3.07 ACCEPTANCE

A. Inspection to determine acceptance of fields will be made by the Town of Arlington Recreation Department or Parks and Fields Department, upon Contractor's request. Provide notification at least 10 working days before requested inspection date.

1. Sodded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, even colored viable lawn is established, free of weeds, undesirable grass species, disease, and insects.

B. Upon acceptance, the Owner will assume field maintenance.

3.08 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work, including work area, perimeter, adjacent asphalt driveway and catch basins. Remove from site all excess materials, litter, debris, and equipment. Repair damage resulting from field renovation operations.

END OF SECTION

SECTION 02050

EROSION CONTROL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 - General Specification sections, and Sketch #3 –Athletic Field Reconstruction Erosion Control Plan apply to the work of this Section.

1.02 DESCRIPTION OF WORK

A. The work in this Section includes the furnishing of all materials, tools, supervision, equipment, and labor consisting of but not limited to: hauling, grading, drying, removal of storm water, removal of unsuitable materials, protection of installed materials and all work incidental to installation and maintenance of erosion control measures, as specified herein and on the Construction Drawings.

1.03 LINE AND GRADE CONTROL

A. CONTRACTOR is responsible for line and grade control for all aspects of the work in this Section in accordance with the Construction Drawings and these Specifications.

1.04 INTENT

A. The intent of the work under this Section is to provide erosion control measures to prevent siltation from entering adjoining properties, wetlands, water bodies, drainage system or other land subject to M.G.L. Chapter 131, Section 40, the Wetlands Protection Act.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Hay bales.
B. Synthetic Silt Fence, which shall be 36-inches in height and fabricated of polypropylene.

PART 3 - EXECUTION

3.01 SEDIMENT CONTAINMENT

A. Place silt fence as close as feasible to the down gradient limit of work so as to prevent siltation from entering adjacent properties, drainage system and areas outside the limits of work (see Sketch #3 – Athletic Field Reconstruction Erosion Control Plan.
B. Hay bales and silt fence shall be constructed or installed at the locations indicated on the Construction Drawings and adjacent to other work areas as directed by the Engineer.

C. Silt fence shall be maintained in such a manner so as to prevent migration of silt or other water-borne material, prevent siltation of wetlands, and to prevent channelling of and erosion by storm water runoff or other water for the duration of the project.

D. Silt fences shall be inspected weekly or after any storm event exceeding precipitation of 0.5 inch in 24 hours. Hay bales and silt fence shall be replaced or repaired as required by the OWNER and/or Engineer. Sediment contained by Silt Fence and cleaned from catchbasins shall be removed and disposed of properly as part of this Section.

E. Silt fence shall be removed upon completion of work and acceptance of field conditions by the OWNER and/or Engineer.

3.02 EROSION CONTROL

A. All areas disturbed by the CONTRACTOR which exhibit erosion potential prior to the completion of work shall, at the direction of the OWNER and/or Engineer, be provided with an acceptable temporary vegetative cover or mulch if deemed necessary.

B. Protect work areas against erosion. Repair and re-grade as needed to restore work areas. Place and compact soils in areas disturbed by the CONTRACTOR.

3.03 PROTECTION OF INSTALLED MATERIALS

A. The CONTRACTOR shall be responsible for maintaining installed materials and preventing their damage.

B. In the event of damage to prior work or work· completed as specified in this Section, the CONTRACTOR shall immediately make all repairs and replacements necessary, to the approval of the OWNER, and at no additional cost to the OWNER.

END OF SECTION

SECTION 02100

SITE GRADING AND EXCAVATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

A. The work in this Section includes the furnishing of all materials, tools, supervision, equipment, and labor consisting of but not limited to: hauling, grading, screening, drying, removal of storm water, removal of unsuitable materials, protection of installed materials, and protection of installed materials as specified herein and as indicated on the included Construction Drawings.

B. Locate all existing utilities in work areas prior to commencing any excavation activities. The CONTRACTOR shall be responsible for preserving and protecting all utilities.

C. Excavation shall mean the removal from place all materials and shall include soil, structures above and below ground, rock, pavements, topsoil, demolition waste material, rubbish, tree stumps, boulders, logs, ashes, cinders or organic material such as peat, humus or organic silt.

1.03 LINE AND GRADE CONTROL

A. CONTRACTOR is responsible for line and grade control for all aspects of the work in this Section in accordance with the Construction Drawings and these Specifications.

B. CONTRACTOR is responsible for preparing and providing a final as-built plan including topography detailed with 1 foot contour lines and spot elevations along the top of slopes, bottom of slopes and along the perimeter of the limits of work. As-built plan shall also include all physical surficial features located within the project work area including, monitor wells, sprinkler heads, edge of pavement, valve boxes and limits of plastic fence defining layer repairs. Plan shall be performed and certified by a Massachusetts Professional Land Surveyor.

1.04 CLASSIFICATION OF EARTHWORK AND EXCAVATION

A. Earthwork and excavation involving existing soils on the site shall be classified as follows:

1. Soils located in the athletic field area of reconstruction above the Vegetative Subgrade Soil Layer are non-contaminated, clean borrow soils (See Fig. 4-5).

2. Soils with background or zero concentrations of contaminants, or non-contaminated soils, are located in areas not designated to be furnished with any form of Barrier.

1.05 SUBMITTALS

A. The CONTRACTOR shall submit to the ENGINEER testing results of soil mixture if additional soil is required to be imported for project, tests shall be conducted on representative samples of imported soils. Such test results must document compliance with individual specifications for the intended use.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Irrespective of requirements excavated soils utilized on the site shall be free of gross debris of any kind, trash, organic matter, vegetation, gypsum, ferrous, limestone based materials or any other unsuitable objects. Excavated soils utilized on the site shall have no particles larger than 2-inches in diameter.

PART 3- EXECUTION

3.01 GENERAL EXCAVATION

A. Excavation shall be carried out to the dimensions indicated on the Construction Drawings, specifications or as discussed on-site with the Engineer, and shall not exceed the minimum excavation necessary to efficiently complete the required work.

B. Excavations shall not be allowed without prior discussion with and approval from Engineer.

C. Excavated materials will be segregated and stockpiled in separate areas on the Site and shall not create or pose an erosion or sediment runoff potential.

D. Topsoil excavated from the site shall be screened by the CONTRACTOR to a natural and friable texture, without undesirable refuse, or foreign materials. It shall be free from roots, turf, stones larger than one inch in any dimension, noxious weeds, tall grass, brush, sticks, stubble or other material which would be detrimental to fine grading or the proper development of vegetative growth.

E. Vehicular movement over the Athletic Field shall not be permitted until the full depth of the covering soils has been determined and approval of acceptable low ground pressure excavation equipment by the Engineer. The tracked equipment shall operate only over previously placed covering soil, not directly on the geo-composite or any other geosynthetic. No equipment shall be operated directly on the geo-composite or other geosynthetic surface.

I. Prior to equipment being utilized on the athletic field there shall be eight separate test pits hand excavated to identify the depth and elevation of the following three layers beneath the athletic field.

i. Plastic Fence Defining Layer

ii. Bottom of Vegetative Subgrade Layer (gray-sandy material) (or 12 inches in depth) whichever is lesser.
iii. Top of drainage layer (or 12 inches in depth) whichever is lesser.

II. The equipment used to spread the covering soils shall not exert ground pressures exceeding the following:

Allowable Equipment Ground Pressure (psi)	Thickness of Covering Soils Above Geosynthetics (in.)
< 5	12
< 10	18
< 20	24
> 20	36

III. Equipment loading certifications or calculations shall be provided to Engineer or Owner's Representative prior to site work commencing .

3.02 SUBGRADE PREPARATION

A. Prior to excavation of the athletic field, the area shall be staked in a 50 foot grid pattern with marks indicating depth of cut to proposed subgrade elevations indicated on stakes and in conjunction with test pit observations .
1. For Area "A" stakes and marks shall be reviewed together by Contractor & Engineer. Approval for contractor to proceed with excavation shall be given by Engineer prior to excavation.
2. For Area "1" stakes and marks shall be reviewed together by Contractor & Engineer. Approval for contractor to proceed with excavation and stripping of topsoil excavation shall be given by Engineer prior to excavation.

B. Stripping shall be completed as specified elsewhere in these specifications and/or as discussed with Engineer.

C. Within Engineered Barrier and Direct Contact Barrier areas, the CONTRACTOR shall excavate the existing soils in all areas to the minimum elevations required and necessary to complete the field reconstruction. Where necessary exposed surface shall be prepared to receive Plastic Fence Defining Layer detailed in specified in Section 02690, Part 3.02, Preparation.

3.03 MAINTENANCE OF GRADING

A. Repair any settlement or washouts that occur prior to acceptance of work. Reestablish all grades to required elevations and slopes.
B. Shore and brace, in compliance with all applicable codes, where space restrictions limit sloping or stability of excavation slides is questionable.
C. Scarify, reshape and compact, to required density, all areas disturbed by subsequent operations or adverse weather.

D. Excavation operations shall be conducted in such a manner so as to prevent the damage or disturbance of adjacent structures.

3.04 PROTECTION OF INSTALLED MATERIALS

A. Excavations shall be performed so as to prevent damage to existing structures, safeguard people and property, minimize traffic inconvenience, protect the structures to be installed, and provide safe working conditions.

B. Excavations, where needed, shall be adequately sheeted and braced. Where the installation of sheeting is impractical or might cause damage as a result of, but not limited to, vibration, settlement or lateral movement, other methods shall be utilized.

C. The CONTRACTOR shall be responsible for maintaining installed materials, stakes and survey control points, erosion control barriers etc. and prevent their damage.

D. In the event of damage to prior work or work completed as specified in this Section, the CONTRACTOR shall immediately make all repairs and replacements necessary, to the approval of the OWNER, and at no additional cost to the OWNER.

END OF SECTION

SECTION 02210

FINISH GRADING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1 Site Grading and Excavation - Section 02100
2 Vegetative Subgrade Soil- Section 02350
3 Soil Preparation - Section 02920
4 Reconstruction of Field – Section 02930
5 Lawns and Grasses - Section 02930B

1.02 DESCRIPTION OF WORK

A Provide all labor, materials, equipment, services, and transportation required to complete finish grades complete, as shown on the Drawings, and as specified herein.

1.03 PROJECT/SITE CONDITIONS

A Dust Nuisance: Assume full responsibility for alleviation or prevention of dust as a result of grading work.

1.04 SEQUENCING AND SCHEDULING

A Regrade as required to finish grades and slope and to the satisfaction of the Engineer.

1.05 DEFINITIONS

A References to Engineer shall mean Town of Arlington Engineering staff or the Owner's designated representative.

PART 2 - PRODUCTS

2.01 EQUIPMENT:

At Contractor's option, but in accordance with requirements Section 02100 Site Grading & Excavation.

PART 3 - EXECUTION

3.01 EXAMINATION

A Verification of Conditions: Verify that the following items have been completed prior to commencement of finish grading:

1 Installation of the topsoil and all soil preparation including debris removal.
2 Incorporation of soil amendments (as required by the Soil Testing Laboratory Report) and as otherwise specified.

3.02 INSTALLATION

A Finish Landscape Grading

1 Provide all grading as shown on the Drawings and as specified.
2 Provide all grades for natural runoff of water without low spots or pockets. Accurately set flow line grades at 2 percent minimum gradient unless otherwise noted in Drawings.
3 Finish grade all mulch areas, plant beds, and lawn areas by hand raking. Finish grades shall be smooth, even and on a uniform plane with no abrupt changes of surface. Slope uniformly between given spot elevations, unless otherwise shown on drawings.
4 Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given, or between points established by walks, paving, curbs or catch basins.
5 Tops and toes of all slopes shall be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.
6 The final finish grading will be done on site by the Contractor and, if required, as directed by the Engineer and to his satisfaction until approved.
7 The Contractor shall have on site at the time of the grading review, sufficient manpower, earth and equipment available to do the work resulting from the review.

B Tolerances:
1 All planting areas, including lawn areas, shall be true to grade, within 1 in. when tested with a 10 ft. straightedge.
2 Hold finished grades of topsoi1(s) and plant backfill mixes below top of adjacent pavement, headers, curbs, or walls as follows:
a Sodded Lawn: 1 inch

END OF SECTION

SECTION 02810

IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Replace all damaged pipe, parts and components of the disturbed underground irrigation system indicated in Plan #8 Irrigation Replacement Plan. The reconstructed irrigation system shall be re-established to the conditions indicated on Plan #7 As-built Irrigation Plan, by Kelcole Irrigation Inc., dated November 10, 2005. This work may require or involve any of the following items and conditions including:

1. Automatic irrigation system parts including piping, fittings, sprinkler heads, and accessories.

2. Valves, backflow preventer, and fittings.

3. Rain Sensor and Irrometer.

4. Controller, control wire, in lockable, vandal-resistant pedestal control enclosure. Location and type of power source for controller to be determined.

5. Testing.

6. Excavation and backfilling irrigation system work.

7. Associated exterior plumbing, backflow preventer, and accessories to complete the system.

8. Tap, valve, piping and water meter to supply irrigation system from existing water main.

9. Pipe sleeves.

1.02 QUALITY ASSURANCE

A. Comply with Section 02000 requirements.

B. Designers and installer's qualifications: Minimum of 5 years experience installing irrigation systems of comparable size.

C. Materials, equipment, and methods of installation shall comply with the following codes and standards:

1. National Fire Protection Association, (NFPA): National Electrical Code.

2. American Society for Testing and Materials, (ASTM).

3. National Sanitation Foundation, (NSF).

4. The Irrigation Association, (IA).

5. Commonwealth of Massachusetts Health Code.

6. Town of Arlington Department of Public Works, and Board of Health.

D. In the presence of the Engineer and a representative of the Town of Arlington Department of Public Works and Parks Department, demonstrate the complete operation of the irrigation system through a full cycle.

1.03 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each of the system components to be replaced.

B. Submit shop drawings for the parts of the system to be installed. Include piping layout and details illustrating location and types of sprinkler heads, valves, control systems and wiring, and list of fittings. Show sprinkler head coverage.

C. Upon irrigation system acceptance, submit written operating and maintenance instructions. Provide format and contents as directed by the Engineer.

D. Provide irrigation system record drawings:

1. Legibly mark drawings to record actual construction.

2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.

3. Identify field changes of dimension and detail and changes made by Change Order.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.

B. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends, both threaded or plain.

C. Store and handle materials to prevent damage and deterioration.

D. Provide secure, locked storage for valves, sprinkler heads, and similar components that can not be immediately replaced, to prevent installation delays.

1.05 PROJECT CONDITIONS

A. Protect existing trees, plants, lawns, and other features designated to remain as part of the final landscape work.

B. Promptly repair damage to adjacent facilities caused by irrigation system work operations. Cost of repairs at Contractor's expense.

C. Promptly notify the Engineer of unexpected sub-surface conditions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers:

RAIN BIRD SPRINKLER MFG. CO., GLENDORA, CA
THE TORO CO., IRRIGATION DIV., RIVERSIDE, CA
WEATHER-MATIC DIV./TELSCO INDUSTRIES, DALLAS, TX
HUNTER
JAMES HARDIE IRRIGATION

2.02 MATERIALS

A. General:

1. Provide only new materials, without flaws or defects and of the highest quality of their specified class and kind.

2. Provide pipe continuously and permanently marked with manufacturer's name or trademark, size schedule and type of pipe, working pressure at 73 degrees F. and

National Sanitation Foundation (NSF) approval.

B. Plastic pipe, fittings, and connections:

1. Polyvinyl chloride pipe: ASTM D2241, rigid, unplasticized PVC, extruded from virgin parent material. Provide pipe homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, wrinkles, and dents.

a. 1" diameter and under: SDR 21, Class 200.

b. Over 1" diameter: SDR 26, Class 160.

2. Polyethylene pipe: ASTM D2239 flexible polyethylene pipe rated at 100 PSI minimum working pressure.

3. PVC pipe fittings: ASTM D2241 schedule 40 PVC molded fittings suitable for solvent weld, slip joint ring tight seal, or screwed connections. Fittings made of other materials are not permitted.

a. Size slip fitting socket taper to permit a dry unsoftened pipe end to be inserted no more than halfway into the socket. Saddle and cross fittings are not permitted.

b. Schedule 80 PVC pipe may be threaded.

c. Use male adaptors for plastic to metal connections. Hand tighten male adaptors plus one turn with a strap wrench.

4. Insert fittings: ASTM D2466 insert type fittings.

a. Saddle and cross fittings not permitted.

2.03 ACCESSORIES

A. Drainage fill: 1/2" to 3/4" washed pea gravel.

B. Fill: Clean soil free of stones larger than 2" diameter foreign matter, organic material, and debris.

1. Provide imported fill material as required to complete the work. Obtain rights and pay all costs for imported materials.

2. Suitable excavated materials removed to accommodate the irrigation system work

may be used as fill material subject to the Engineer's review and acceptance.

C. Clamps: Stainless steel, worm gear hose clamps with stainless steel screws or ear type clamps.

D. Low voltage wire connectors: Socket seal type wire connectors and waterproof sealer.

E. Valve access boxes: Tapered enclosure of rigid plastic material comprised of fibrous components chemically inert and unaffected by moisture corrosion and temperature changes. Provide lid of same material, green in color.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine final grades and installation conditions. Do not start irrigation system work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Layout and stake the location of each pipe run and all sprinkler heads and sprinkler valves. Obtain Engineer's acceptance of layout prior to excavating. Layout shall be consistent with Plan #7 As-Built Irrigation Plan.

B. Strip sod for pipe trenches with a mechanical sod stripper uniformly 1" to 1-1/2" thick with clean cut edges.

C. Place sleeves as indicated for installation of piping and control wire. Coordinate installation of sleeves with paving installers.

3.03 INSTALLATION

A. Excavating and backfilling:

1. Excavation shall include all materials encountered, except materials that cannot be excavated by normal mechanical means.

2. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings.

3. If the pulling method is used, the pipe "plow" shall be a vibratory type. Starting and finishing holes for pipe pulling shall not exceed a 1'-0" by 3'-0" opening.

4. Excavate to depths required to provide 2" depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.

5. Fill to match adjacent grade elevations with approved earth fill material. Place and compact fill in layers not greater than 8" depth.

   a. Provide approved earth fill or sand to a point 4" above the top of pipe.

   b. Fill to within 6" of final grade with approved excavated or borrow fill materials free of lumps or rocks larger than 3" in any dimension.

   c. Provide clean topsoil fill free of rocks and debris for top 6" of fill.

6. Provide 1 cu. ft. of drainage fill aggregate around each pop-up impact type sprinkler head to permit drainage of water from the sprinkler case.

7. If necessary, install 3” irrigation line to a maximum depth of 18” in the same location as previous 3” main. Plastic Fence Defining Layer shall be replaced accordingly if disturbed.

8. Install 1-1/2” irrigation lines with a maximum depth of 12" based on finished grades. Installation of the 1-1/2” lines and sprinkler heads shall not cause damage to the Plastic Fence Defining Layer and shall not exceed a maximum depth of 12”. Any damage to Plastic Fence Defining Layer caused during installation of the irrigation system shall be repaired at the cost of the CONTRACTOR.

9. Excavate trenches and install piping and fill during the same working day. Do not leave open trenches or partially filled trenches open overnight.

10. Replace stripped sod in sufficient time to allow for satisfactory sod recovery and growth. Water stripped and reinstalled sod until irrigation system is placed in operation.

11. Replace paving of same materials, using joints and patterns to match existing adjoining paving surfaces.

B. Plastic pipe:

1. Install plastic pipe in accordance with manufacturer's installation instructions. Provide for thermal expansion and contraction.

2. Saw cut plastic pipe. Use a square-in-sawing vice, to ensure a square cut. Remove

burrs and shavings at cut ends prior to installation.

3. Make plastic to plastic joints with solvent weld joints or slip seal joints. Use only solvent recommended by the pipe manufacturer. Install plastic pipe fittings in accordance with pipe manufacturer's instructions. Contractor shall make arrangements with pipe manufacturer for all necessary field assistance.

4. Make plastic to metal joints with plastic male adaptors.

5. Make solvent weld joints in accordance with manufacturer's recommendations.

6. Allow joints to set at least 24 hours before pressure is applied to the system.

7. Uncoil poly-pipe and insert fitting full depth. Secure poly-pipe to insert fittings with stainless steel clamps. Double clamp pipe over 1-1/4" diameter.

8. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress.

C. Sprinklers, fittings, valves, and accessories:

1. Install fittings, valves, sprinkler heads, risers, and accessories in accordance with manufacturer's instructions, except as otherwise indicated.

   a. Provide concrete thrust blocks where required at fittings and valves.

2. Set sprinkler heads perpendicular to finished grades, except as otherwise indicated.

3. Provide pop-up spray heads with an adjustable double swing joint riser assembled by the use of at least 3 standard 90 degree ells. Fabricate double swing joint risers of schedule 80 PVC nipples and schedule 40 PVC elbows.

4. Obtain Engineer’s review and acceptance of height for proposed sprinkler heads and valves prior to installation.

5. Locate sprinkler heads to assure proper coverage of indicated areas. Do not exceed sprinkler head spacing distances indicated.

6. Install pop-up impact or gear driven sprinklers with an adjustable double swing joint riser of at least 3 standard 90 degree elbows. Fabricate double swing joint risers of schedule 80 PVC nipples and schedule 40 PVC elbows. The horizontal nipple connected directly into the side of the lateral line shall be a minimum of 3" long. All other nipples of the swing joint riser shall be of length as required for proper

installation of the sprinkler head.

a. If the sprinkler heads have a side inlet, 2 street ells and a nipple may be used instead of a double swing joint assembly.

7. Install quick-coupling valves with an adjustable double swing joint riser assembled by the used of at least 3 standard 90 degree elbows. Fabricate double swing joint risers of schedule 80 PVC nipples and schedule 40 PVC elbows.

8. Install controller as required.

9. Install in-ground control valves in a valve access box as indicated.

10. Install valve access boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box.

11. Seal threaded connections on pressure side of control valves with teflon tape or approved plastic joint type compound.

12. Install irrometer in valve access box in accordance with manufacturer's recommendations. Interrupt low voltage ground wire to controller/valve as indicated.

13. Install rain sensor on indicated vertical surface, in accordance with manufacturer's recommendations. Interrupt low voltage ground wire prior to first valve as indicated.

D. Control wiring:

1. Install electric control cable in the piping trenches wherever possible. Place wire in trench adjacent to pipe. Install wire with slack to allow for thermal expansion and contraction. Expansion joints in wire may be provided at 200-foot intervals by making 5-6 turns of the wire around a piece of 1/2" pipe instead of slack. Where necessary to run wire in a separate trench, the depth of trench shall not exceed 12” and all project specification shall apply.

2. Provide sufficient slack at site connections at remote control valves in control boxes, and at all wire splices to allow raising the valve bonnet or splice to the surface without disconnecting the wires when repair is required.

3. Connect each remote control valve to one station of a controller except as otherwise indicated.

4. Connect remote control valves to common ground wire system.

5. Make wire connections to remote control electric valves and splices of wire in the field, using wire connectors and sealing cement in accordance with manufacturer's recommendations.

6. Provide tight joints to prevent leakage of water and corrosion build-up on the joint.

F. Sleeves:

1. Provide new sleeves for all locations where piping crosses under pavement. Install sleeves prior to paving installation.

2. Install pipe sleeves under existing concrete or asphalt surface by jacking, boring, or hydraulic driving of the sleeve. Remove and replace existing concrete and asphalt surfaces where cutting is necessary. Obtain Owner's permission before cutting existing concrete and asphalt surfaces. Where piping is shown under paved areas which are adjacent to turf areas, install the piping in the turf areas.

G. Flushing, testing, and adjustment:

1. After sprinkler piping and risers are installed and before sprinkler heads are installed, open control valves and flush out the system with full head of water.

2. Perform system testing upon completion of each section. Make necessary repairs and retest repaired sections as required.

3. Adjust sprinklers after installation for proper and adequate distribution of the water over the coverage pattern. Adjust for the proper arc of coverage.

4. Tighten nozzles on spray type sprinklers after installation. Adjust sprinkler adjusting screw on lateral line or circuit as required for proper radius. Interchange nozzles patterns as directed by the Engineer, to give best arc of coverage.

5. Adjust all electric remote control valve pressure regulators and flow control stems for system balance and optimum performance.

6. Adjust all irrometer moisture level selector switches as directed by the Engineer. Test as required to obtain satisfactory soil moisture operating conditions.

7. Test and demonstrate the controller by operating appropriate day, hour, and station selection features as required to automatically start and shut down irrigation cycles to accommodate plant requirements and weather conditions.

H. Service - Provide the following services:

1. When requested, return to the site during the subsequent fall season and winterize the system. Drain all water from the system or blow out the system with compressed air.

2. When requested, return to the site during the subsequent spring season and demonstrate to the Owner the proper procedures for the system start-up, operation, and maintenance.

I. Patch any and all disturbance to existing pavements, sidewalks, curbs, grass areas, utilities or other material disturbed by installation of irrigation or connection of irrigation to existing water or electric supply. Repairs to be in accordance with these specifications and the Arlington Department of Public Works requirements.

3.04 DISPOSAL OF WASTE MATERIAL

A. Stockpile, haul from site, and legally dispose of waste materials, including unsuitable excavated materials, rock, trash, and debris.

B. Maintain disposal route clear, clean, and free of debris.

3.06 ACCEPTANCE

A. Test and demonstrate to the Engineer and Owner the satisfactory operation of the system free of leaks.

B. Instruct the Owner's designated personnel in the operation of the system, including adjustment of sprinklers, controller (s), valves, pump controls, and moisture sensing controls.

C. Upon acceptance the Owner will assume operation of the system.

3.07 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from irrigation system installation.

END OF SECTION

SECTION 02920

SOIL PREPARATION

PART 1- GENERAL

1.01 RELATED DOCUMENTS

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

1. Reconstruction of Field – Section 02930
2. Erosion Control – Section 02050
3. Site Grading and Excavation - Section 02100
4. Plastic Fencing Defining Layer – Section 02690
5. Finish Grading - Section 02210

1.02 DESCRIPTION OF WORK

A. Provide all base loam, course sand, soil amendments and products, soils testing, sampling, lawn and meadow grass topsoil, labor, materials, equipment, services, and transportation and all other items that are required to complete the specified Soil Preparation as shown on the Drawings and as specified herein.

1.03 DEFINITIONS

A. Subgrade: Soil material and levels resulting from the approved rough grading work.

1. Subgrade soil(s): Subgrade soil shall be existing soil or other materials which are either undisturbed or have been placed resulting from the approved rough grading work.

B. Vegetative Subgrade Soil: This shall be the soils below the proposed topsoil.

C. Topsoil for Lawns and Meadow Grass: Base loam, course sand, compost and other amendments for use as Topsoil.

D. Landscape Soils: A collective term for all topsoil and subsoils in landscaped areas.

E. References to Engineer shall mean Town of Arlington Engineering Staff or the Owner's designated representative.

1.04 SOILS TESTING LABORATORY IMPORTED TOPSOILS (IF NECESSARY)

A The Contractor shall retain a Soils Testing Laboratory that is acceptable to the ENGINEER and which is capable of providing all the soil testing and amending work specified in this Section.

B The Contractor shall submit representative samples of loam which he intends to import onto the site to the University of Massachusetts Field Station or to a Soil and Plant Testing Laboratory acceptable to the Engineer. All reports shall be sent to the Engineer for approval. Samples of loam to be brought to the site must be approved prior to delivery of soil. Deficiencies in the loam shall be corrected by the Contractor, as directed by the Engineer after review of the testing agency report.

1. All costs for confirmatory testing shall be paid by the Contractor .

2. Sampling shall be provided by the Contractor. The Owner's representative may carry out additional or confirmatory sampling.

C The Contractor shall send a copy of this Section 02920- Soil Preparation and a copy of the plant list (from the Planting Plans) to the Soils Testing Laboratory for their use when making recommendations.

D Testing Reports shall contain at a minimum the following tests and the laboratory's recommendations for amending the soils for the imported topsoil(s).

1. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System.
2. The silt and clay content shall be determined by a Hydrometer Test of soil passing the # 200 sieve.
3. Percent of organics shall be determined by the West Experiment Station, University of Massachusetts, and Amherst or a Soil and Plant Testing Laboratory acceptable to the Engineer. .
4. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Soluble Salts, and Acidity (pH).
5. Soil analysis tests shall include recommendations for each of the tested soils for soil additives to correct soils deficiencies as necessary, to perform for their respective relationship to plant types including lawns.
    a Provide rates of application for all additives per both 1000 sq. ft and per cubic yard.
6. All tests shall be performed in accordance with the current standards of the Association of Official Agricultural Chemists.

1.05 SUBMIITALS

A Product Data: Manufacturer's current catalog cuts and/or specifications and granular analysis demonstrating compatibility with the specifications of the following:
1. Fertilizer(s)
2. Soil Amendment(s)
3. Peat moss and or other organic matter amendment(s)
4. Agricultural chemical(s)
5. Coarse Sand

B Materials Samples
1. Base Loam: (2) 2 pound samples.
2. Coarse Sand: (2) 2 pound samples.
3. Compost: (1) 1 pound sample.

C Soil Testing and Soils Testing Report Submittal:
1. All testing of the soil mix components shall be carried out by the Soils Testing Laboratory. Recommendations for amending and/or correcting the soil mix will be provided to the Contractor by the Soils Testing Lab after approval by the Engineer or Owner’s Representative.
2. Failure of any material by testing and/or amendment procedure to meet Specification requirements shall require the Contractor to seek another source for the failed material and the initiation of all testing procedures for the new replacement material shall immediately take place.
3. The Contractor shall be responsible for recognizing that these critical project materials warrant timely and serious attention, that the testing process to achieve Approved materials should be considered a lead time item, and that under no circumstance shall failure to comply with all specification requirements be an excuse for "staying on project construction schedule."

D Soil Samples Submittals: Sampling shall be done by the Contractor. The size of the samples and method of sampling shall be as follows: Samples shall be representative of the material to be brought to the site. Each sample shall be a Composite Sample, which consists of 5 separate sub samples taken from a minimum of (5) different locations at each source and mixed together to make the test sample. Samples shall be submitted for the following items:
1. Base Loam: (2) samples minimum.
2. Course Sand: (2) samples minimum.
3. Compost: (2) samples minimum.
4. Mixed and Amended Lawn and Meadow Grass Topsoil: (2) samples minimum
5. The Contractor shall schedule this testing in order to permit reasonable time for testing, evaluation, and approvals prior to scheduled installation.

E Certification of Conformance for the Contractor's Amending and Installing Topsoil(s): The Contractor shall submit a written certification of his installation of landscape soils, soil mix, and backfill mixes for conformance and compliance with the Approved Soils Testing Report(s).

1.06 PROJECT/SITE CONDITIONS AND DOCUMENTS

A Existing Conditions

The Contractor shall become familiar with and review all project documents.

1.07 SEQUENCING AND SCHEDULING

A Install the Topsoil only after the following has been completed and approved:

1. Install the Topsoil only after vegetative support layer cultivation and has been completed and approved.
2. Landscape sub-drainage is installed and accepted.

1.08 FIELD QUALITY CONTROL

A Tests: The right, at any time is reserved by the Engineer to take samples of the topsoil mix for testing for conformity to the approved Soils Testing Report.

PART 2 - MATERIALS

2.01 VEGETATIVE SUBGRADE SOIL:

Refer to Section 02350 specifications.

2.02 BASE LOAM

A Base Loam as required for the work shall be free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Base Loam shall also be free of quack-grass rhizomes, Agropyron Repens, and the nutlike tubers of nutgrass, *Cyperus Esculentus*, and all other primary noxious weeds. Base Loam shall not be delivered or used for planting while in a frozen or muddy condition. Base Loam for mixing shall conform to the following grain size distribution for material passing the #10 sieve:

	Percent Passing	
U.S. Sieve Size Number	Minimum	Maximum
10	---	100
18	85	100
35	70	95
60	50	85
140	36	55
270	28	42
0.002mm	3	6

1. The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 6 or less. (D80/D30 < 6)
2. Maximum size shall be one inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.
3. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.
4. The organic content shall be between 3.5 and 7.0 percent.

2.03 COURSE UNIFORM SAND

A Coarse Uniform Sand for creating soil mixes and for subsurface drainage shall be uniformly graded medium to coarse sand consisting of clean, inert, rounded grains of quartz or other durable rock free from loam or clay, surface coatings and deleterious materials with the following gradation for material passing the #10 sieve:

	Percent Passing	
U.S. Sieve Size Number	Minimum	Maximum
10	100	--
18	60	85
35	25	50
60	10	22
140	0	10
270	0	3
0.002mm	0	0.5

B Maximum size shall be one inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.

C The ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D30) shall be 3.5 or less. (D70/D20 <3.5)

D Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

2.04 ORGANIC AMENDMENTS (COMPOST):

The following additives shall be used as applicable depending on the recommendations of the Soils Testing Report(s). .

A Compost for amending planting media shall be a stable, humus-like material produced from the aerobic decomposition of organic residues. The residues, if biosolids, shall consist of compost meeting MA DEP Type 1 requirements or approved equal. The compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria as reported by the producer.

1. The ratio of carbon to nitrogen shall be in the range of 10: 1 to 25: 1.
2. Stability shall be assessed by either a C02 evolution test, a re-heating test, or the Solvita procedure. Protocols for each are specified by the coalition of Northeastern Governors Source Reduction Task Force (CONEG) in their 1966 report, "Model Procurement Specifications for Source Separated Compost." and the Solvita manual (version 3.5). For the C02 test, the compost respiration shall be no more than 6 mg C02-C/gBVS day. For re-heating using the Dewar self-heating test, the maximum heat rise shall be no greater than 9 degree C above room temperature (20 to 25 degrees C). For the Solvita test, the compost must achieve a maturity index of 6 or more. Stability tests shall be conducted by Woods End Research Laboratory,Mt. Vernon, Maine.

3. Pathogens/MetalsNector Attraction reduction shall meet 4) CFR Part 503 rule, Table 3, page 9392, Vol. 58 No. 32, and Commonwealth of Massachusetts 310 CMR 32.00 (for applications to soils with human activity).
4. Organic Content shall be at least 40 percent (dry weight). One hundred percent of the material shall pass a 3/8-inch (or smaller) screen. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall not exceed one percent dry weight. Organic content shall be determined by weight loss on ignition for particles passing a number 10 sieve according to procedures performed by the West Experiment Station at the University of Massachusetts, Amherst or equal as follows. A 50-cc sub-sample of the screened and mixed compost is ground to pass the number 60 sieve. Two to three grams (±. O.OOlg) of ground sample, dried to a constant weight at 105 degrees C is placed into am uffle furnace. The temperature is slowly raised (5C/minute) to 450C and maintained for three hours. T he sample i s removed to an oven to equilibrate at 105C and the weight is taken. Organic matter is calculated as loss on ignition.
5. PH: The pH shall be between 5.5 to 8.0 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter American Society of Agronomy *Methods of Soil Analysis,* Part 2,1986.
6. Salinity: Electrical conductivity of a one to two soil to water ratio extract shall not exceed 2.0 mmhos/cm (dS/m).
7. The compost shall be screened to 3/8 inch maximum particle size and shall contain not more that 3 percent material finer that 0.002mm as determined by hydrometer test on ashed material. The compost shall have a texture suitable for incorporation without causing loss of hydraulic conductivity of the soil mix.
8. Nutrient content shall be determined by the University of Massachusetts Soil Testing Laboratory or equivalent laboratory and utilized to evaluate soil required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), and buffer pH.

2.05 MIX DESIGN FOR LAWN AND MEADOW GRASS AREAS

A The Lawn Area Planting Medium shall consist of a blend of approximately three parts by volume of Sand, two parts by volume Base-Loam, and two parts by volume Organic Amendment. Blending of the components shall be carried out with earth moving equipment prior to placement. The components shall be blended to create a uniform mixture as determined by the Engineer.

B The final mix shall have an organic content between 4 and 6 percent and conform to the following gradation requirements for material passing a Number 10 sieve.

	Percent Passing	
U.S. Sieve Size Number	Minimum	Maximum
10	100	--
18	73	90

35	51	73
60	27	48
140	15	28
270	12	18
0.002mm	2	4

C Maximum size shall be one inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.

D The ratio of the particle size for 80% passing (D80) to the particle size for 30% passing (D30) shall be 4.5 or less. (D80/D30 <4.5)

E Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.

F Planting Medium for Lawn Areas shall have a minimum infiltration rate of four inches per hour when compacted to a minimum of 90 percent Standard Proctor.

2.06 CHEMICAL COMPONENTS: The following additives shall be used as applicable depending on the recommendations of the soils testing report(s).

A Standard commercial pre-mixed and balanced pre-plant or lawn fertilizers which meet the recommendations of the Soils Testing Report(s).

B Ground Limestone: Agricultural limestone containing not less than 85% of total carbonates, ground to such fineness that 50% will pass #100 sieve and 90% will pass #20 sieve.

C Dolomite Lime: Agricultural grade mineral soil conditioner containing 35% minimum magnesium carbonate and 49% minimum calcium carbonate, 100% passing #65 sieve. "Kaiser Dolomite 65 AG" by Kaiser, Inc. or accepted equal.

D Gypsum: Agricultural grade product containing 80% minimum calcium sulfate.

E Iron Sulfate (Ferric or Ferrous): Supplied by a commercial fertilizer supplier, containing 20% to 30% iron and 35% to 40% sulfur.

F Sulfate of Potash: Agricultural grade containing 50% to 53% of water-soluble potash.

G Single Superphosfate: Commercial product containing 20% to 25% available phosphoric acid.

H Ammonium Sulfate: Commercial product containing approximately 21 % ammonia.

I Ammonium Nitrate: Commercial product containing approximately 34% ammonia.

J Calcium Nitrate: Agricultural grade containing 15-112% nitrogen.

K Ureaform: Granular commercial product containing 38% nitrogen, and minimum 27% water insoluble nitrogen (WIN).

L I.B.D.U. (Iso Butyldiene Diurea): Commercial product containing 31 % nitrogen.

M Soil Sulfur: Agricultural grade sulfur containing a minimum of 96% sulfur;

N Iron Sequestrene: Geigy Iron Sequestrene 330 Fe, by Ciba-Geigy Corporation, (919) 292-7100, containing approximately 10% iron.

0 Potassium Nitrate: Agricultural grade containing approximately 13% nitrogen (N) and 44% potash (K20).

P Trace Elements: FRIT Industries product 503 Micromax manufactured by Grace/Sierra or equal.

Q Bone Meal: A fine ground, steam-cooked, packing house bone with a minimum analysis of (23) percent phosphoric acid and (1) percent nitrogen.

1. Bone meal shall be used for all bulbs in amounts as required by the Soils Lab.

2.07 COMMERCIAL FERTILIZER SUPPLIERS AND MIX BLENDERS:

A Sierra Chemical Co. (408-263-8080).
B W. R. Grace and Co. (800-527-1893).
C Or Equal.

2.08 ACCESSORIES

A Water: Clean, fresh and potable. Transport as required.

PART 3 - EXECUTION

3.01 SOIL MOISTURE CONTENT

A General: Do not work soil when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in air or that clods will not break readily, nor when it is frozen. Apply water, if necessary, to bring soil to an optimum moisture content for tilling and planting.

3.02 TOPSOIL SPREADING, DEPTH

A Sequence: Soil subgrade cultivation shall be approved prior to spreading of topsoil.
1. Installation of topsoil:
   A Install in all planting areas of the project.
   B Fine Grading: See Section 02210 Finish Grading.
2. Spread topsoil as required by excavation to establish required finish grade and slope.
3. Grass Areas. Amendments incorporation for Topsoil:
   A After the topsoil has been spread and graded, apply soil amendments at the rate recommended in the topsoil analysis. Apply limestone at least 5 days prior to application of fertilizer. Apply commercial fertilizer within 10 days of seeding.
   B Thoroughly and evenly incorporate soil amendments into the soil to a depth of 6 inches by discing or other approved method. In areas inaccessible to power equipment, use hand tools. Off site mixing of

soil amendments with topsoil is not acceptable unless approved in advance by Engineer. After the incorporation of soil amendments into the soil, fine grade the bed to remove all ridges and depressions, and clear the surface of all stones one inch or more in diameter and other debris.

3.03 FIELD QUALITY CONTROL

A Tests: Right is reserved to· take samples at any time of amended landscape soils and backfill mixes for testing for conformity to Specifications.

B Rejected Materials: Remove and legal dispose off site at Contractor's cost. Pay cost of testing of materials, not meeting Specifications.

END OF SECTION

SECTION 02690

PLASTIC FENCING DEFINING LAYER

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

A. The work in this Section includes the furnishing of all tools, supervision, equipment, and labor consisting of but not limiting to: hauling, grading, drying, removal of storm water, removal of unsuitable materials, protection of installed materials and all work incidental to the proper installation of the vegetative sub grade soil, as specified herein and as indicated on the Drawings.

1.03 LINE AND GRADE CONTROL

A. CONTRACTOR is responsible for line and grade control for all aspects of the work in this Section in accordance- with the Construction Drawings and these Specifications.

1.04 DEFINING LAYER

A. Both the Direct Contact Barrier and the Engineered Barrier with soil separation layer shall be provided with a defining layer placed beneath the vegetative support soil at a depth of 12 inches below the ground surface, as shown on the Design Drawings.

1.05 SUBMITTALS

A. The CONTRACTOR shall submit to the DESIGN ENGINEER for his inspection and approval samples of the plastic fencing material to be utilized as the defining layer.

PART 2 – PRODUCTS

2.01 PLASTIC FENCING DEFINING LAYER

A. The Defining Layer material shall be a high visibility plastic warning barrier fencing in neon orange, neon lime yellow, or similar color.

B. The Defining Layer material shall be constructed of long lasting synthetic material that is both flexible and durable.

C. The Defining Layer material shall not interfere with the vertical movement of water within the soil horizons in the Direct Contact Barrier and the Engineered Barrier.

D. The Defining Layer material shall be High Visibility Economy Warning Barrier manufactured by Roadtech Manufacturing Co., Viking Industrial and Safety Supplies, or an approved equivalent.

PART 3 – EXECUTION

3.01 GENERAL

A. All work shall be performed in accordance with the Construction Drawings, these Specifications and any pertaining local requirements.

3.02 PREPARATION

A. The CONTRACTOR shall ensure that the surfaces where the Defining Layer is to be placed shall be graded to a uniform slope.

3.03 INSTALLATION

A. The Plastic Fencing Defining Layer shall be secured on the vegetative sub grade surface sufficiently so that placement of the vegetative support soil does not dislodge or move the defining layer material. The new orange high visibility fencing shall over lap the exposed existing fence layer at least 12 inches in all directions and attached to the existing fencing every 3 feet with rigid, durable, non-degrading plastic ties.

3.04 PROTECTION OF INSTALLED MATERIALS

A. The CONTRACTOR shall be responsible for maintaining installed materials in conformance with the requirements of this Section.

B. In the event of damage to prior work or work completed as specified in this Section, the CONTRACTOR shall immediately make all repairs and replacements necessary, to the approval of the OWNER and the Engineer and at no additional cost to the OWNER.

END OF SECTION

SECTION 02350

VEGETATIVE SUBGRADE SOIL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION OF WORK

A. The work in this Section includes the furnishing of all tools, supervision, equipment, and labor consisting of but not limiting to: hauling, grading, screening, drying, removal of storm water, removal of unsuitable materials, protection of installed materials and all work incidental to the proper installation of the vegetative sub grade soil, as specified herein and as indicated on the Drawings.

1.03 LINE AND GRADE CONTROL

A. CONTRACTOR is responsible for line and grade control for all aspects of the work in this Section in accordance with the Construction Drawings and these Specifications.

PART 2 - PRODUCTS

2.01 VEGETATIVE SUBGRADE

A. Vegetative Subgrade Soil shall be a non-plastic sand or gravel soil material, free of contamination, sharp rocks, debris of any kind, organic matter, vegetation or any unsuitable objects. The subgrade soil shall be classified GW, GP, SW, or SP by the Unified Soil Classification System and the USDA system.
B. Vegetative Subgrade Soil shall be free of particles over 2-inches in diameter.
C. Vegetative Subgrade Soil shall have an in-place Saturated Hydraulic Conductivity no less than 5.0×10^{-4} cm/sec. when compacted to a minimum of 90% of its maximum dry density.
D. Vegetative Sub grade Soil shall have the following minimum internal shear strengths in

accordance with ASTM D3080 at 90 percent of the maximum dry density at optimum moisture content: $\geq 14°$ (peak)
$\geq 11°$ (post-peak)

PART 3 - EXECUTION

3.01 GENERAL

A. All work shall be performed in accordance with the Construction Drawings, these Specifications and any pertaining local requirements.

3.02 PREPARATION

A. The CONTRACTOR shall ensure that the surfaces where vegetative subgrade soil is to be placed shall be graded to a uniform slope.

3.03 INSTALLATION

A. Vegetative Sub grade Soils shall be spread and compacted in loose lifts, not exceeding 12-inches in thickness.
B. The density of the installed Vegetative Sub grade Soils shall not be less than 90 percent of the maximum dry density, as determined by the modified proctor test ASTMDI557.
C. All Sub grade Soil shall be compacted to a constant density at a moisture content between optimum moisture minus 2% and optimum moisture plus 3% as established by ASTM D698.
D. The bonding surface between adjoining lifts shall be moistened and scarified or tracked prior to installing overlying lifts.
E. The CONTRACTOR shall install the Vegetative Subgrade Soils to the line and grade as required by the Construction Drawings. The Vegetative Sub grade Soils installed as part of the Engineered Barrier and Direct Contact Barrier system shall have a minimum thickness, after compaction, of 12 inches as shown on the Drawings.
F. Grading of the Vegetative Sub grade Soils may be accomplished via depth markers, or other approved method, to establish the thickness of the vegetative sub grade layer. Depth markers shall be removed once the vegetative sub grade soils have been installed.
G. The CONTRACTOR shall ensure that the Engineered Barrier Defining Layer and the Direct Contact Barrier Defining Layer are placed as required during or after installing Vegetative Sub grade Soil.

H. Vehicular movement over the geo-composite drainage layer shall not be permitted until the full depth of the covering soils has been placed. Placement of the covering soils material should be performed using a low ground pressure bulldozer. The tracked equipment shall operate only over previously placed covering soil, not directly on the

geo-composite or any other geosynthetic. No equipment shall be operated directly on the geo-composite or other geosynthetic surface.

I. The equipment used to spread the covering soils shall not exert ground pressures exceeding the following:

Allowable Equipment Ground Pressure (psi)	Thickness of Covering Soils Above Geosynthetics (in.)
< 5	12
< 10	18
< 20	24
> 20	36

3.04 QUALITY CONTROL

A. Contractor shall conduct quality control testing on the installed vegetative sub grade soil as follows:

1. Field density/Moisture content test (ASTM D29221D3017) shall be performed on all installed vegetative subgrade soils at a minimum frequency of five test every acre every 12-inch lift.

3.05 PROTECTION OF INSTALLED MATERIALS

A. The CONTRACTOR shall be responsible for maintaining installed materials in conformance with the requirements of this Section.

B. In the event of damage to prior work or work completed as specified in this Section, the CONTRACTOR shall immediately make all repairs and replacements necessary, to the approval of the OWNER and the CQA CONSULTANT and at no additional cost to the OWNER.

END OF SECTION

SECTION 02930B

LAWNS AND GRASSES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1. Reconstruction of Field – Section 02930
2. Erosion Control – Section 02050
3. Site Grading and Excavation - Section 02100
4. Plastic Fencing Defining Layer – Section 02690
5. Finish Grading - Section 02210
6. Lawns and Grasses- Section 02930B

1.02 DESCRIPTION OF WORK

A Provide all labor, materials, equipment, services and transportation required to complete lawns and grasses as shown on the Drawings and as specified.

1.03 REFERENCES

A Hortus III - 1976 Edition, Bailey Hortorium, Cornell University.

1.04 SUBMITTALS

A Product Data:

1 Manufacturer's current catalog cuts and specifications for incorporating mulch and soil stabilizer for hydroseed mix.
2 Athletic Field Seed Mix
3 Meadow Grass Mix.
4 Jute Mesh.
5 Seeding device for Cultipactor Seeding

B Certificates:

1 Certificates of inspection as required by law for transportation of each shipment of sod along with invoice.
2 Seed mix certificate confirming the grasses and their minimum percent grass seed purity and germination (including incorporated top dress fertilizer and rate of application for hydroseeding and meadow mix).

1.05 DELIVERY, STORAGE, AND HANDLING

A Seed:

1 Delivery: Furnish standard seed in unopened manufacturer's standard

containers bearing original certification labels showing quantity, analysis and name of manufacturer.

2 Storage: Protect seed from weather or other conditions that would damage or impair the effectiveness of the product.

B Hydroseeding Mulch:

1 Labeling: Each package of cellulose fiber shall be marked by the manufacturer to show the air-dry weight content.

2 Storage: Protect from weather or other conditions, which would damage or impair the effectiveness of the product.

1.06 CLIMATE RESTRICTIONS

A Do not install lawns during rainy or freezing weather, or when soil is frozen.

1.07 TIMING OF INSTALLATION

A Hydroseeded Lawns and Cultipactor Seeding:

1 Hydroseeding shall be done within one (1) calendar days after the completion and acceptance of finish grading in any area.

2 Hydroseeding of Meadow Mix:
Between April 1 - May 31 and Between August 15 - October 1.

3 Athletic Fields (Cultipactor Seeded only):
Between July 1 and October 15.

4 If special conditions exist which may warrant a variance in the above dates, a written request shall be submitted to the Engineer stating the conditions and proposed variance. Permission for the variance shall be given if in the opinion of the Engineer the variance is warranted.

1.08 WARRANTY

A Time Period: Warrant that lawns and grasses shall be in a healthy and flourishing condition of active growth until acceptance by the Engineer of the 90 Day Maintenance Period. Refer to Section 02970 Landscape Maintenance Part 3 Execution for lawn maintenance requirements until and during the 90 Day Maintenance Period.

B Appearance During Warranty: Lawns shall be free of dead or dying patches, disease, and all areas shall show foliage of a normal density, size and color. The flourishing grass coverage for the lawns and grasses shall mean that a minimum of 95% of the area planted shall be covered with the specified grasses by the end of the 90 day maintenance period in order to qualify for the acceptance of the 90 day maintenance period.

C Delays:
Delays caused by the Contractor in completing planting operations which extend the planting into more than one planting season shall extend the Warranty Period correspondingly.

D Coverage: Warrant growth and coverage of hydro seeded areas to the effect that the area planted shall be covered with vigorous well established lawn weed free with no bare spots.

E Exceptions: Contractor shall not be held responsible for failures due to damage by Owner, vandalism, or Acts of God during Warranty Period. Report such conditions in writing.

1.09 INSPECTIONS:

A Engineer reserves the right to inspect seed mixes and the hydroseed accessories upon delivery to the site and to reject any or all of the shipment if it does not meet his satisfaction.

1.10 MAINTENANCE AND PROJECTION OF NEW LAWNS UNTIL THEIR ACCEPTANCE AT THE PRELIMINARY REVIEW.

A The Contractor's Maintenance of Lawns shall begin as soon as each lawn area is seeded and shall continue until acceptance by the Engineer at the Acceptance of the 90 Day Maintenance Period.

B Maintenance shall begin immediately after the installation of each lawn area.

1 Refer to Section 02970 Landscape Maintenance PART 3 -EXECUTION for requirements.

PART 2 - PRODUCTS

2.01 SEED MIXES:

A Seed Mix Uses: Use where shown on the Drawings.
Seed Composition: Use only fresh, clean, certified, new crop seed of the following varieties mixed in the following proportions:

B LAWN SEED MIX TABLE:
ATHLETIC FIELDS SEED MIX (Cultipactor Seeded): by Lofts.

Seeding Rate: 260 lbs/acre or *6lbs/1* ,000 square feet.

SEEDS	SEED MIX PROPORTION (by weight)	PURITY MIN. (by weight)	GERMIN. MIN.
Turf-Type Tall Fescue Grass	80%	Latest Crop	Current Standard

Perennial Rye Grass	10%	Latest Crop	Current Standard
Kentucky Blue Grass	10%	Latest Crop	Current Standard
Total Mix:	100%		

a Turf - Type Tall Fescue Grasses shall consist of a minimum of 2 cultivars, such as Rebel 3D, Rebel JR. or Tribute.

b Perennial Rye Grasses shall consist of a minimum of 2 cultivars such as Palmer II, Prelude II, or Repell II.

c Kentucky Bluegrass shall consist of a minimum of 1 cultivar such as Sydspot.

C MEADOW GRASS MIX (Hydroseeded):

1 Seeding Rate:

a Annual Rye Grass (Lolium multiforum) shall be seeded at the rate of 20 pounds per acre.

b The following mixture shall be seeded at the rate of 15 pounds per acre:

Virginia Wild Rye (Elymus virginicus): 6 pounds.
Little Bluestem (Schizachyrium scoparium): 4.5 pounds.
Indian Grass (Sorghastrum nutans): 3 pounds.
Big Bluestem (Andropogon geradi): 1.5 pounds.

2.02 SEEDING ACCESSORIES

A Water: Potable water. Transport as required.

B Hydroseeding Mulch:

1 Composition: Green-colored, fibrous, 100% virgin wood fiber mulch containing no growth or germination-inhibiting factors.

2 Weight: Weight specification refers only to air dry weight of the fiber material. Absolute air dry weight is considered equivalent to 10% moisture.

3 Dispersion in Slurry: Mulch shall be manufactured in such manner that after addition to and agitation in slurry tanks with fertilizer, seed, water and other approved additives, fibers in the material will become uniformly suspended to form a homogeneous slurry.

4 Absorption Capacity: When hydraulically sprayed on the ground, the material will form a blotter-like groundcover impregnated uniformly with seed, which will allow the absorption of moisture and allow rainfall to percolate to the underlying soil.

5 Product: "X-I00 Spra-mulch" by Pacific Wood Fibers (253) 885-1341, or "Conwed Fiber" by Conwed Corporation (704) 871-8500 or equal.

C Hydroseeding Soil Stabilizer:

1 Composition: Totally organic substance, supplied in powder form and at least 90% of which is 92% pure muciloid derived from ground Plantago ovatainsularis husks. Stabilizer shall be water-soluble, non-toxic hydrophilic and shall not inhibit germination.

2 Product: "Ecology Controls M-binder" by Ecology Controls, (213) 877-8600, "R-Binder" by Clyde Robin Seed Co., (415) 785-0425, or equal.

2.04 HYDROSEEDING EQUIPMENT

A Type: Commercial hydro-seeder with built-in agitation system and an operating capacity sufficient to agitate, suspend and homogeneously mix slurry.

B Distribution Lines: Sufficient to prevent stoppage and provide even distribution of the slurry over the ground.

C Pump Capacity: 150 minimum psi at the nozzle.

D Slurry Tank: 1,000 gallons minimum capacity.

2.05 PROTECTIVE COVERINGS

A Product: Refer to Section 02270 - Erosion Control for jute mesh.

2.06 CULTIPACTOR SEEDING DEVICE

A Machine Pulled Equipment: Cultipactor Seeding equipment or other approved seeding equipment which will successfully seed the seed mixes specified for the Seeding Device.

B Brillion Seeding Device or other approved seeding equipment for areas not accessible to the machine pulled equipment for the seeding mixes.

PART 3 - EXECUTION

3.01 EXAMINATION FOR LAWN INSTALLATION

A Verification of Conditions:

1 Grades: Verify that grades are within (1) inch plus or minus of the required finished grades. Verify that all soil preparation has been completed and approved. Report all variations in writing.

2 Soil Preparation Work: Verify that all fertilization amending and scarification specified in Section 02920 has been completed before any seeding work in Lawn Areas or Meadow Mix Seed Areas shall be done.

3.02 PREPARATION

A The seed bed shall be raked either by power rake or by hand to produce a loose friable seed bed.

B Stones, Weeds, Debris: Verify that all areas to receive lawns grasses are clear of stones larger than *(1/2)* inch in any dimension, weeds, debris and other extraneous materials shall be removed.

1 Remove and legally dispose any of these materials at no additional cost to the Owner.

C Excessive Soil Moisture: Do not commence work of this Section when soil moisture content is so great that excessive compaction will occur.

D Inadequate Soil Moisture: Apply water, as necessary, to bring soil to an optimum moisture content for planting. Do not work soil when it is so dry that dust will form in air or that clods will not break readily.

E Care shall be taken that no lime, fertilizer, hydroseed mulch or seed mix comes in contact with the adjacent planting areas.

3.03 LAWN INSTALLATION

A Areas for Lawn Seed are designated and shall be where located on the Drawings and are listed below:

1 Meadow Grass Mix: This mix shall be for hydroseeded only.

2 Athletic Field Lawn Seed Mix: This mix shall be cultipactor seeded only.

B Hydroseeding Preparation: Do all slurry preparation at the job site.

1 Do not dry mix seed or agitation will damage the seed.

2 Blend the water, seed, hydro seeding soil stabilizer and hydroseed mulch into the hydro seeding machine according to the machine's mix schedule and component manufacturer's directions.

3 Commence spraying immediately when the tank is full.

C Hydroseeding Spraying Application:

1 General: Apply specified slurry mix in a sweeping motion to form a uniform mat at the specified rate. Keep hydro seeding within designated areas and keep from contact with other plant materials.

2 Unused Mix: Do not use any slurry mixture that has not been applied within four (4) hours of mixing. Promptly remove from the site.

3 Protection: After application, do not operate any equipment over the hydroseeded areas.

4 Reseeding: Reseed all areas and parts of areas that fail to show a

uniform stand until all areas comply with the specified Warranty.

D Watering For Hydroseeded Lawns and Cultipactor seeded Grass Mixes
1 Watering shall be done again within 72 hours of installations or earlier if conditions require.
a Watering shall be done with a fine spray until the seed bed is moistened to a depth of (112) inches. Do not use ajet nozzle or permit disturbance of the seed bed or flood adjacent areas.
2 Rejected Materials: Remove rejected materials immediately from the site at Contractor's expense. Pay cost of testing of materials not meeting Specifications.

3 .04 ATHLETIC FIELD LAWN INSTALLATION (Cultipactor Seeding Only)
A Fine grade areas to be seeded as shown on the Drawings.
B Immediately before any seed is sown, the ground shall be scarified, or raked lightly until the surface is smooth, friable and of uniform fine texture.
C Sow the seed evenly by use of a cultipactor or approved seeding device. If a cultipacker is not used, cover seed with a layer of topsoil by dragging, light raking or other approved method. No seeding shall be done when the ground is frozen, excessively wet or otherwise nontillable. Do not broadcast seed when wind velocity exceeds 15 mph.
D Distribute seeds uniformly over designated areas at the specified rate. Sow half the seed with the sower moving in one direction and the remainder with the sower moving at right angles to the first sowing.
E Roll in two directions with a water ballast hand roller and water with a fine spray. Take extreme care during seeding and raking to ·ensure that no change occurs in the finished grades and that seed is not raked from one spot to another.

3.05 PROTECTIVE COVERINGS
A Install jute mesh as specified in Section 02270- Erosion Control on slopes 3: 1 or greater.

3.06 MAINTENANCE AND PROTECTION OF LAWNS AND ALL GRASS SEED MIXES UNTIL ACCEPTANCE OF THE PRELIMINARY REVIEW
A See Section 02970 - Landscape Maintenance.
1 The Maintenance shall be as specified in PART-3 EXECUTION of Section for Lawns.
a This Maintenance shall begin immediately after the material is installed.

3.07 FIELD QUALITY CONTROL
A Tests: Samples of materials may be taken and tested for conformity to Specifications at anytime.

3.08 CLEANING

A Erosion: Immediately restore eroded areas. Keep all adjacent paved surfaces cleaned of dirt, mud or stains and organic debris.

B Over - Sprayed Hydroseed Mix: Immediately clean over - sprayed hydroseed mix from any surface other than lawn .

END OF SECTION

APPENDIX B

Construction Document List

ID	Plans/Sketches/Figures	Date
Locus	Arlington High School Locus Map	NA
Fig 4-5	Typical Section Engineered Barrier with Soil Separation Layer	9/08/03
Plan #1	As-Built Barrier & Subgrade Plan, rev.1 – Sheet 1	3/25/2006
Plan #2	As-Built Grading Plan, rev.1 - Sheet 2	3/25/2006
Plan #3	As-Built Site Plan, rev.1 - Sheet 3	3/25/2006
Plan #4	As-Built Utility Plan Water Sewer Gas, rev.1 – Sheet 4	3/25/2006
Plan #4A	As-Built Utility Plan Electric & Telecom, rev.1 – Sheet4A	3/25/2006
Plan #5	As-Built Drainage Plan, rev.1 – Sheet 5	3/25/2006
Plan #6	Barrier Detail Sheet #1, Fig 6-3 (See Detail B-18)	3/17/2006
Plan #7	Irrigation As-Built Drawing, sheet 2 of 3	Nov. 10, 2005
Plan #8	Irrigation System Replacement Plan	May 2013
Sketch #1	Sketch #1 – Athletic Field Reconstruction	May 2013
Sketch #2	Sketch #2 – Athletic Field Reconstruction	May 2013
Sketch #3	Sketch #3 – Athletic Field Reconstruction Erosion Control Plan	May 2013

APPENDIX C

GENERAL INFORMATION – Provided by Town of Arlington Department of Public Works

Introduction
The Town of Arlington Department of Public Works is seeking qualified contractors to perform repairs to the Natural Turf Athletic Field and Irrigation System at the Arlington High School located at 869 Massachusetts Avenue, Arlington MA.

Background Information
The natural turf athletic field is located at a Massachusetts Contingency Hazardous Waste Site. Located beneath the athletic field are two barriers associated with the remediation design: an Engineered Barrier (EB) and a Direct Contact Barrier (DCB). The EB is a synthetic geotextile product and the location is indicated on the as-built plans included in Appendix B. The DCB consists of the In-Situ soils currently in place above the EB. During construction an orange plastic barricade fence was installed twelve (12) inches below the field surface. This layer is called the plastic fence defining layer and serves as a visual warning and identifier to any future excavation work that may occur within the field.

Existing Conditions
The current surface of the natural turf athletic field has become disturbed resulting in an uneven surface with ruts, deposition of debris, improper grades and sporadic disturbances to portions of the Plastic Fencing Defining Layer.

Based on visual observations the 3" HDPE Irrigation Main is intact. It is anticipated that all branch lines and sprinkler heads will require replacement.

Project Goals
The project goal is to reconstruct the athletic field surface to the conditions indicated in the as-built plans included in Appendix B. The required conditions upon completion of this project will be to match conditions including field grades, elevations, slopes and specifications in place at the completion of the original field construction in 2005. To expedite the timeline for use of the field, sod will be specified as the specified lawn cover. These conditions and requirements are indicated on the as-built plans included in Appendix B and in the included specifications.

Special Conditions
1) The over-riding Specification for this project will be Section 02930. This specification details the anticipated requirements necessary for the reconstruction of the field. Due to the possibility of encountering unforeseen conditions, the original specifications for the field construction in 2005 are included. These specifications will be included and require adherence and will supersede Section 02930 only if the necessary scope of work items are encountered that are not detailed in Section 02930

2) There will be an on-site Pre-bid meeting scheduled for May 28, 2013 at 1:00pm to allow contractors to observe the site and ask questions.

The winning proposal shall include all labor and material necessary to complete the project and include all work necessary to reestablish field conditions indicated in the provided Construction Drawings.

APPENDIX D

Executive Summary provided by Brown and Caldwell: Licensed Site Professionals

Executive Summary

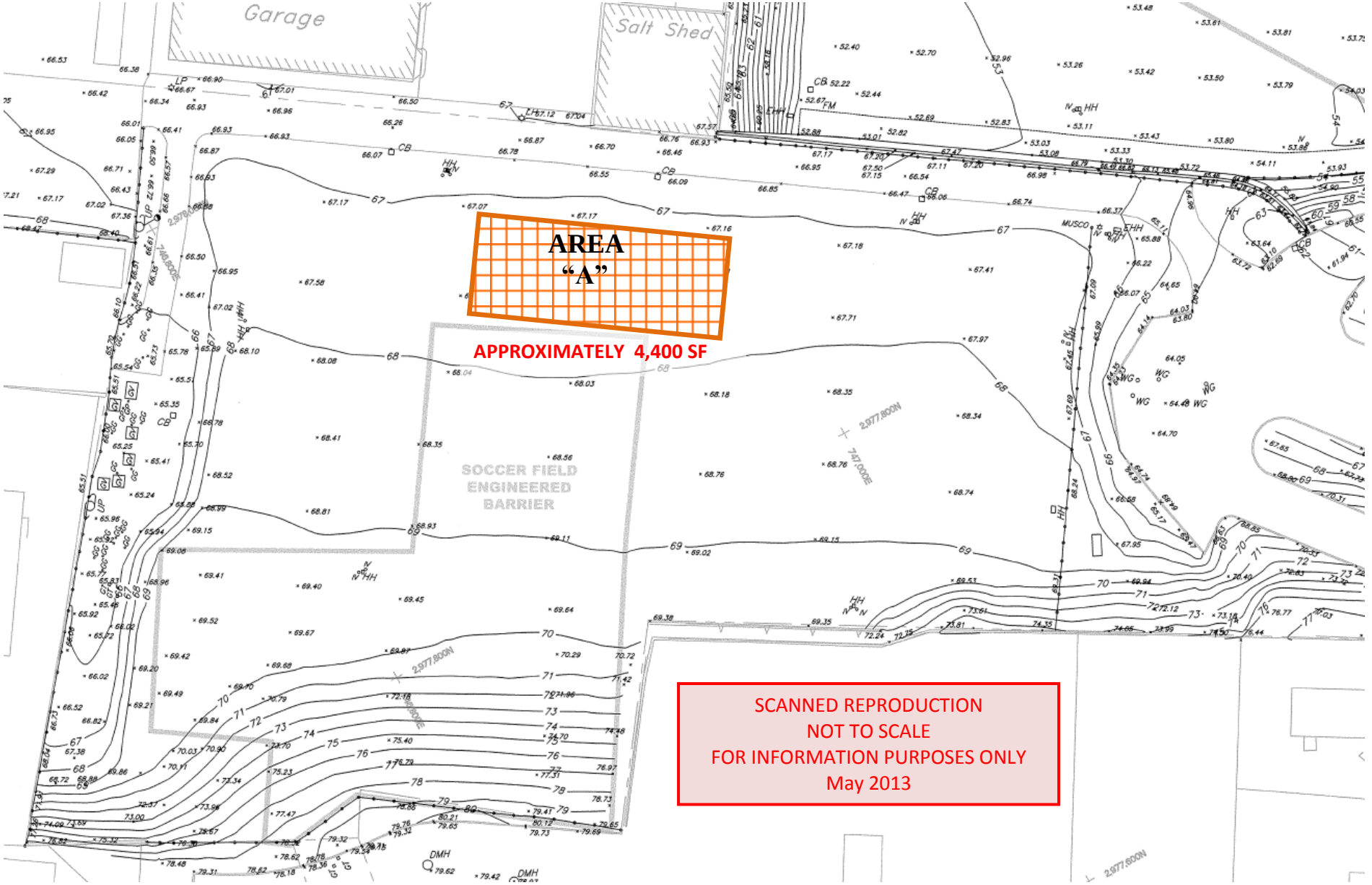
This past winter the Arlington Department of Public Works (ADPW) used the Soccer Field (the practice field in the south west corner of the school ground adjacent to the ADPW salt sheds and parking lot) for placement of excess snow from storm events. In February, after a recent snow storm and warming trend, ADPW workers were pushing snow across the field with a front end loader when they noticed sod, topsoil and orange high visibility plastic fencing in the snow piles. Prior to February 20, 2013 the Soccer Field had been frozen and was able to support the weight of dump trucks and the front end loader used to push the snow into piles. The sudden onset of warm weather apparently thawed the ground enough to allow the loader to also scoop up soil and sod.

The Soccer Field had historically been underlaid with chromite ore processing residues (COPR) from chroming operations disposed of in the subsurface. Over the past several years this area has been the subject of a Massachusetts Contingency Plan, Chapter 21 E investigation and remediation. In 2004, sections of the Soccer Field were covered by either "Direct Contact Barrier" or "Engineered Barrier" to isolate the COPR from surface contact. The Direct Contact Barrier area of the field is a two foot thick separation layer consisting of 12 inches of a sandy vegetative subgrade material, a high visibility plastic orange fencing material, and 12 inches of vegetative support soil (top soil) and seeding for the grass surface. Due to the higher concentrations of COPR left in some areas of the Soccer Field, those areas were covered with a two foot thick "Engineered Barrier" consisting of a bottom "containment layer" (a geocomposite clay liner overlain with a 60 mil HDPE geomembrane, overlain by a geocomposite drainage layer), orange plastic fencing, and two feet of soils and seeding similar to those of the Direct Contact Barrier.

On February, 20, 2013, the Licensed Site Professional (LSP) for the 51 Grove Street Site, was notified by the ADPW Director that some of the snow handling activity had damaged portions of the field resulting in the removal of the top soil and exposure of some of the orange plastic defining layer. ADPW personnel also noticed damaged irrigation piping. Upon inspection and identification of where the damage had occurred, the LSP was able to determine that the damage was limited to a portion of the field that was overlain by a direct contact barrier and that no sections of the engineered barrier had been damaged. The LSP was also able to assess that approximately 15,000 square feet of the soil direct contact barrier has been damaged and would require repair. The damage was also determined to be limited in depth over most of the area and not exposing the orange defining layer separating the topsoil from the underlying sandy subgrade material. However, in a smaller area (approximately 500 to 1000 square feet) the excavation has also encountered the orange defining layer and the top of the sandy subgrade material. Note that there is no risk to the health of contractors as long as the material below the sandy vegetative subgrade material is not excavated. The damaged irrigation piping network is also within the two foot direct contact barrier and above the underlying COPR impacted soils.

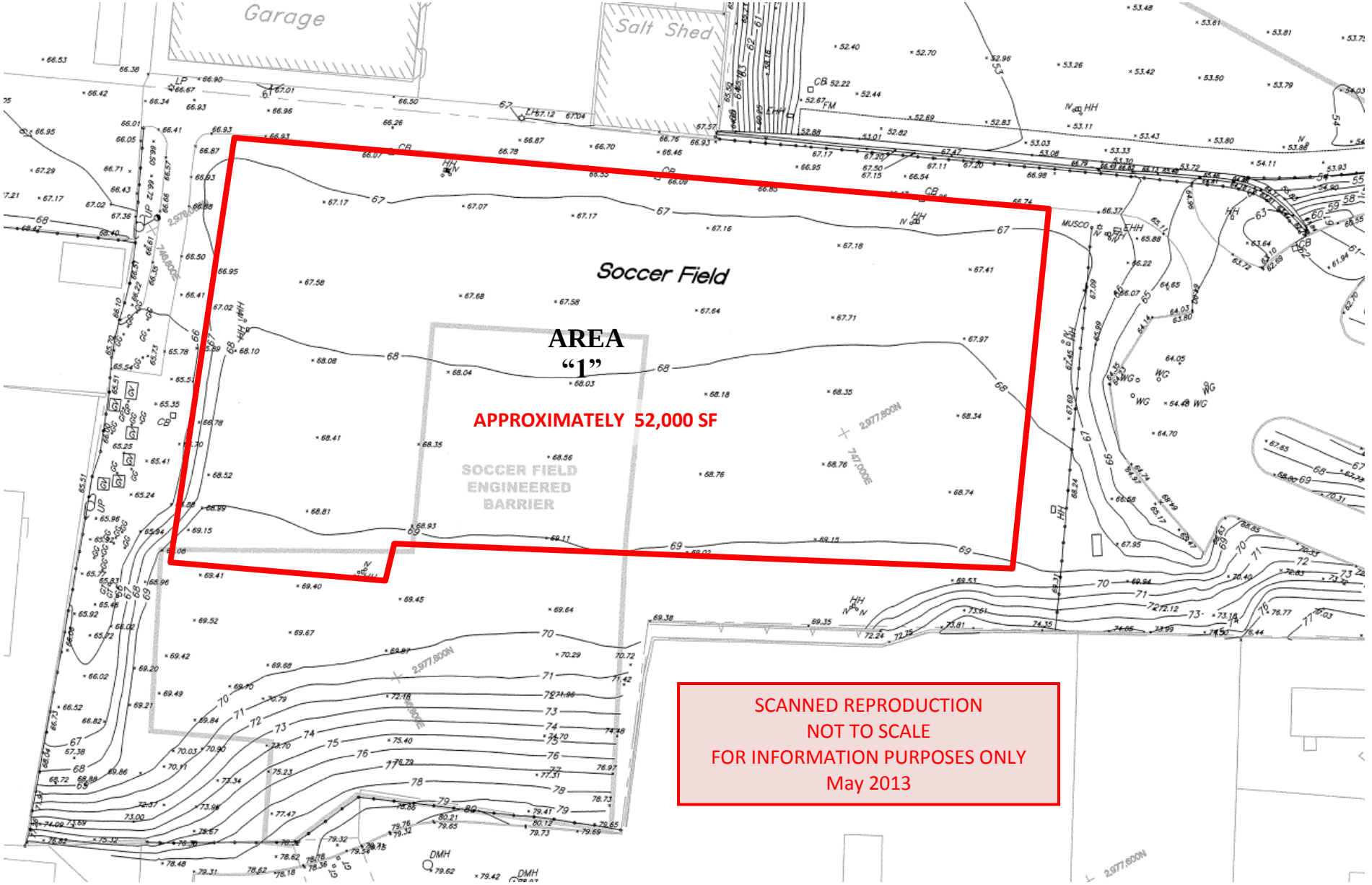
To assure that the playing surface is reconstructed consistent with the original design, it is recommended that the surface be restored in accordance with the "As-built" construction plans and specifications developed by Brown and Caldwell (Phase IV Remedy Implementation Plan dated September 2003 and As-built Report dated March 2006). In general, the damaged area that has exposed the orange fencing should be stripped down to the top of the sandy vegetative subgrade material (visibly different from vegetative support soil) and the orange high visibility fencing should be replaced with new material attached every 3 feet with plastic ties to the existing fencing. The area should then be covered with approximately 12 inches of vegetative support soil and sod to the grades documented in the As-built report. The grass seed from the original specifications will be replaced with an appropriate athletic field sod. To match the playing surface, the remainder of the Soccer Field surface will be stripped of 2 inches of grass and soil which will be replaced by sod. In areas overlying the "Engineered Barrier" where sod will be replaced all earth moving equipment must be low ground pressure equipment (45 psi maximum contact pressure for tires and crane/backhoe out-riggers, and 4-inch maximum rut depth).

ARLINGTON HIGH SCHOOL
LOCUS MAP
Not to Scale



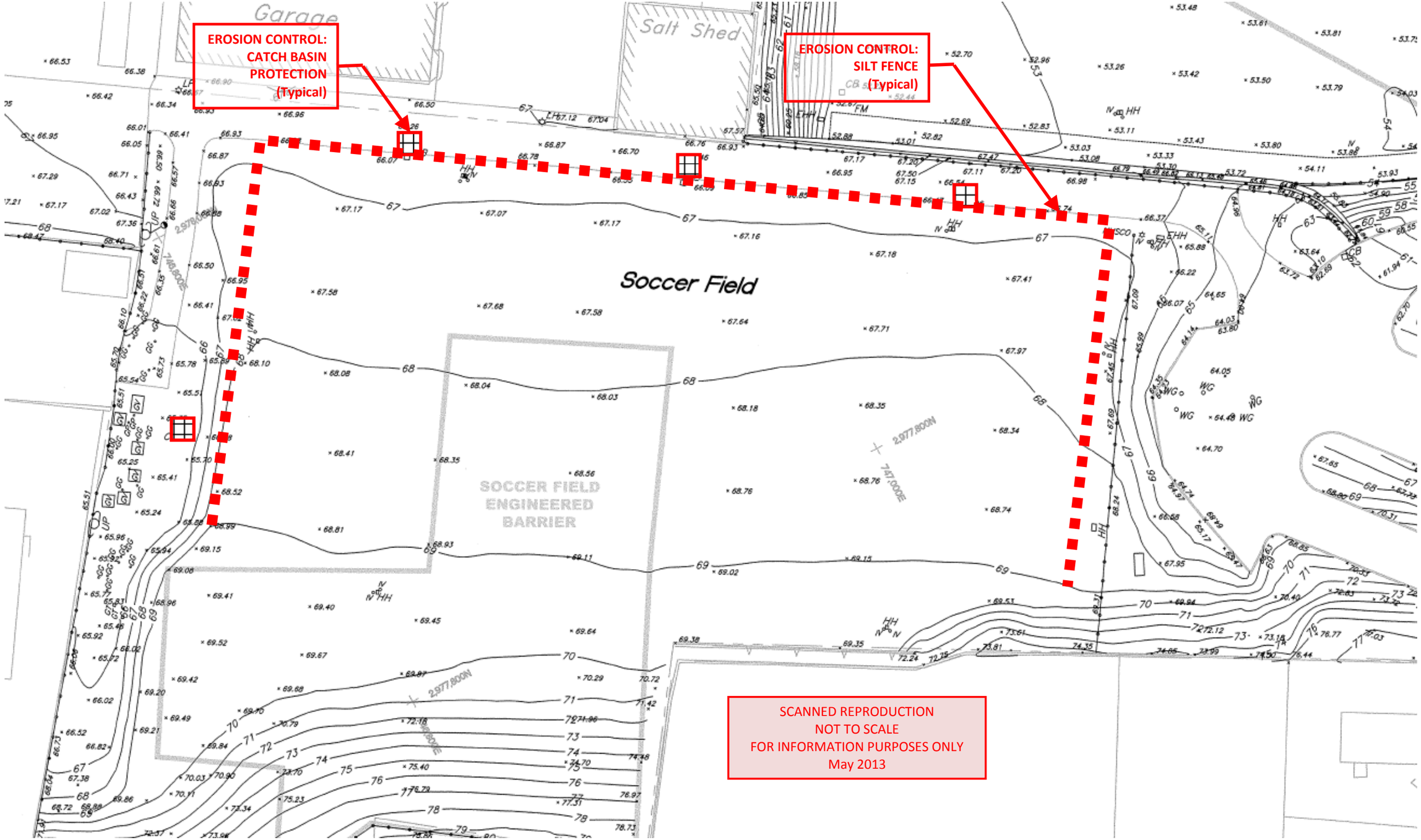
Sketch #1 – Athletic Field Reconstruction

Arlington High School
Arlington, Massachusetts 02476



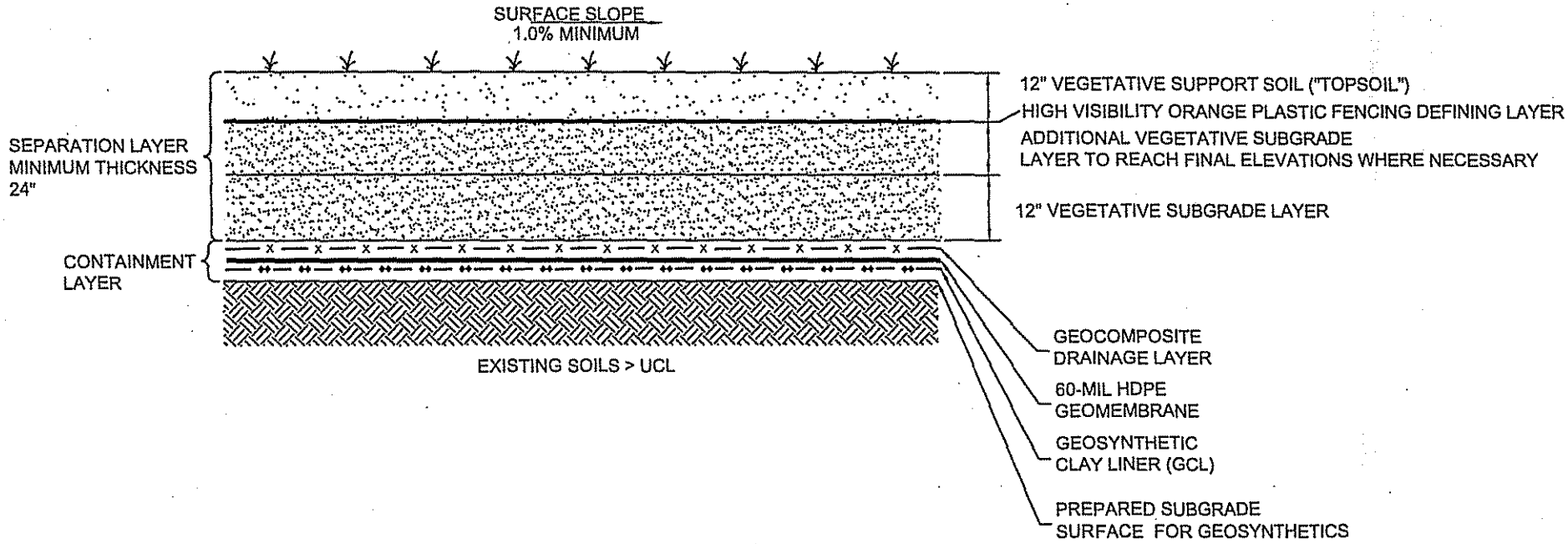
Sketch #2 – Athletic Field Reconstruction

Arlington High School
Arlington, Massachusetts 02476



Sketch #3 – Athletic Field Erosion Control Plan

Arlington High School
Arlington, Massachusetts 02476



BROWN AND CALDWELL
48 Leona Drive, Suite C
Middleborough, Massachusetts 02346
Tel. (508) 923-0879 • Fax. (508) 923-0894

DATE:	09/08/03
SCALE:	NOT TO SCALE
PROJECT:	22491
FILE:	Design Details

FIGURE 4-5

TYPICAL SECTION ENGINEERED BARRIER WITH SOIL SEPARATION LAYER

PREPARED FOR:
demaximis inc./ARLINGTON REMEDIAL ACTION SETTLEMENT TRUST