SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. The Conditions of the Contract and other Sections of Division I, General Requirements apply to this Section.

1.02 PROJECT MANAGEMENT

A. The Contractor must use sufficient personnel and adequate equipment to complete all the necessary work requirements within a minimum period of time.

B. Unless specifically authorized by the Owner, in writing, the work must be conducted between the hours of 7:00 a.m. and 5:00 p.m. on Monday through Saturday. No work is to be done on holidays or Sundays.

C. The Contractor is responsible for the security of partially completed work until the project is accepted by the Owner.

1.03 PROJECT MEETINGS

A. Pre-construction conference: Within 5 days following a Notice to Proceed, the Contractor shall schedule a pre-construction conference to be held at the project location. This conference will be attended by the project superintendent as a minimum. The contractor shall bring to this conference the following documents more fully described elsewhere in this specification:

1. Project Progress Schedule
2. Schedule of Values
3. Submittal Register
4. Notification of Product Substitution
5. Initial submittals covering first 30 days of construction
6. Site phone number and after hours point of contact and phone number.

B. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Landscape Architect of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. The Contract Documents.
b. Related requests for interpretations (RFIs).
c. Related Change Orders.
d. Deliveries.
e. Submittals.
f. Review of mockups.

g. Possible conflicts.
h. Compatibility problems.
i. Time schedules.
j. Weather limitations.
k. Manufacturer's written recommendations.
l. Warranty requirements.
m. Compatibility of materials.
n. Acceptability of substrates.
o. Temporary facilities and controls.
p. Space and access limitations.
q. Regulations of authorities having jurisdiction.
r. Testing and inspecting requirements.
s. Installation procedures.
t. Coordination with other work.
u. Required performance results.
v. Protection of adjacent work.
w. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

C. Progress Meetings: Conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner, and Landscape Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.

2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) Requests for interpretations (RFIs).
16) Status of proposal requests.
17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) Documentation of information for payment requests.

3. Minutes: Landscape Architect will record and distribute the meeting minutes.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

a. Schedule Updating: Contractor's Construction Schedule shall be updated at each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.04 COORDINATION

A. Project Schedule. The Contractor shall submit at the pre-construction conference for approval to the Owner a detailed operational schedule showing the sequence of operations prior to commencement of any work at the site. This project schedule will be in the form of a CPM, PERT or Gant chart which clearly reflects project tasks to be completed in a logical sequence. Any changes to this operational plan must be approved by the Owner. The Contractor shall keep this schedule updated to reflect actual progress, and will revise the schedule if required to do so based on substantial departures from the planned progress of the work.

B. Project Superintendent. The Contractor must retain a competent full time representative, satisfactory to the Owner. This representative shall not be changed, except with the consent of the Owner. The representative shall be in full charge of the work.

END OF SECTION

SECTION 01 55 00
ACCESS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide and maintain vehicular access to site and within site:

1. To temporary construction facilities, storage, and work areas.

2. For use by persons and equipment involved in construction of Project.

3. For use by emergency vehicles.

4. Access to the work area will be through the school site. Coordination with summer program schedules is required.

B. Remove temporary access facilities when no longer needed, and restore areas.

1.02 RELATED REQUIREMENTS

A. Section 01 31 00, PROJECT MANAGEMENT.

B. Section 01 57 00, TEMPORARY CONTROLS.

C. Section 01 74 00, CLEANING UP.

1.03 EXISTING PAVEMENTS

A. Designated existing on-site driveways may be used for construction traffic.

1. Provide temporary additional roads as needed for required construction access.

2. Maintain existing construction, and restore to original, or specified, condition at completion of Work.

B. Designated areas of existing parking facilities may be used for parking of construction personnel's private vehicles and of Contractor's lightweight vehicles.

1. Do not allow heavy vehicles or construction equipment in parking areas.

C. The Contractor must coordinate with The Town of Andover for any work which may affect the traffic on Town streets.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.01 CARE AND PROTECTION OF PROPERTY:

The Contractor shall be responsible for the preservation of all public and private property,

and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be promptly restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, to the satisfaction of the Owner.

3.02 REMOVAL

A. Completely remove temporary materials and construction when construction needs can be met by use of permanent installation.

1. Remove and dispose of compacted materials to depths required by conditions to be met in completed Work.

B. Restore areas to original or to specified conditions at completion of Work.

END OF SECTION

SECTION 01 57 00
TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. The requirements set forth in this section of the specifications apply to cross-country areas, river and stream crossings, and construction in and adjacent to wetlands, unless otherwise specifically stated.

C. Prior to commencement of work, the Contractor shall meet with the Owner, Landscape Architect and representative from the Andover Conservation Commission to develop mutual understandings relative to compliance of the environmental protection program.

1.01 REQUIREMENTS INCLUDED

A. Provide and maintain methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at the construction site and related areas under Contractor's control; remove physical evidence of temporary facilities at completion of work.

1.02 RELATED REQUIREMENTS

A. Section 01 57 00 - ACCESS
B. Section 01 74 00 - CLEANING UP

1.03 NOISE CONTROL

A. Noise levels shall not exceed those stipulated by Occupational Safety and Health Administration.

1.04 DUST CONTROL

A. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.05 SURFACE WATER AND GROUNDWATER CONTROL

A. Provide methods to control surface water to prevent damage to project, site, and adjoining properties.

B. Dispose of drainage water in a manner to prevent flooding, erosion, sedimentation, or other damage to any portion of the site or to adjoining areas and properties.

1.06 DEBRIS CONTROL

A. Maintain all areas under Contractor's control free of extraneous debris.

B. Initiate and maintain a specific program to prevent accumulation of debris at construction site.

1. Provide containers for deposit and removal of debris.

1.07 POLLUTION CONTROL

A. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations.

B. Take special measures to prevent harmful substances from entering public waters.

1. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

C. Provide systems for control of atmospheric pollutants.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Landscape Architect will notify the Contractor in writing of any observed non-compliance with the Contract Documents. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Landscape Architect until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

B. The notification process described under paragraph A above does not relieve the Contractor of the contractual obligation for continuous compliance with the Contract Documents.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine their construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

A. The Contractor shall not pollute water bodies with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all

applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.

B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 PROTECTING AND MINIMIZING EXPOSED AREAS:

A. The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, temporary vegetation, mulching or other protective measures shall be provided.

B. The Contractor shall take account of the conditions of the soil where temporary cover crop will be used to ensure that materials used for temporary vegetation are adaptive to the sediment control. Materials to be used for temporary vegetation shall be approved by the Landscape Architect.

3.05 LOCATION OF STORAGE AREAS:

A. The location of the Contractor's storage areas for equipment and/or materials shall be located on cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Landscape Architect. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Landscape Architect.

B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control shall be employed to protect any downstream areas from siltation.

C. There shall be no storage of equipment or materials within one hundred feet of delineated wetlands as indicated on the Drawings.

D. Storage areas in cross-country locations shall be restored to pre-construction conditions with the planting of native species of trees and shrubs.

3.06 PROTECTION OF LANDSCAPE:

A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Landscape Architect. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.

B. Branches, limbs, and roots shall not be cut except by permission of the Landscape Architect. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.

C. Where, in the opinion of the Landscape Architect, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting or other

operations, the Landscape Architect may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The Landscape Architect will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of.

3.07 CLEARING AND GRUBBING:

A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for construction operations, as approved by the Landscape Architect.

3.08 DISCHARGE OF DEWATERING OPERATIONS:

A. Any water that is pumped and discharged from the excavation as part of the Contractor's water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

B. Under no circumstances shall the Contractor discharge water to the areas designated as wetlands. When constructing in a wetlands area, the Contractor shall discharge water from dewatering operations directly to the nearest drainage system, stream, or waterway after filtering by an approved method.

C. The pumped water shall be filtered through filter fabric and baled straw, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.

3.10 DUST CONTROL:

A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust.

B. Calcium Chloride shall not be used for dust control within wetland resource areas, buffer zones, drainage basins, or in the vicinity of any source of potable water.

3.11 SEPARATION AND REPLACEMENT OF TOPSOIL:

A. Topsoil shall be carefully removed from areas where excavations are to be made, and separately stored to be used again as directed. The topsoil shall be stored in an area acceptable to the Landscape Architect and adequate measures shall be employed to prevent erosion and drying out of excavated topsoil material.

END OF SECTION

SECTION 01 62 00
SUBSTITUTIONS

PART 1 – GENERAL

1.01 GENERAL

A. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed after award of the Contract are considered requests for substitutions. The following are not requests for substitutions:

1. Substitutions requested during the bidding period and accepted by Addendum prior to award of the Contract.

2. Revisions to the Contract Documents requested by the Owner.

3. Specified options included in the Contract Documents.

4. Contractor's compliance with regulations issued by governing authorities.

B. Substitution Request Submittal: The Landscape Architect will consider request for substitution received within 10 days after execution of the Contract, provided that the proposed substitution does not compromise the Contractor's ability to achieve the Substantial and Final Completion dates required in the Contract Documents. The Contractor shall include a minimum of 30 days for the substitution approval process into the project schedule, as well as the potential for the substitution to be rejected with the requirement to provide specified products.

1. Submit three copies of each request for substitution. Submit requests according to procedures required for change-order proposals.

2. Identify the product or method to be replaced in each request. Include related Specification Section and Drawing numbers.

3. Provide documentation showing compliance with the requirements for substitutions and the following information.

a. Coordination information, including a list of changes needed to other Work that will be necessary to accommodate the substitution.

b. A comparison of the substitution with the Work specified, including performance, weight, size, durability, and visual effect.

c. Product data, including Drawings and descriptions of products and installation procedures.

d. Samples, where applicable or requested.

e. A statement indicating the effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the substitution on Contract Time.

f. Cost information, including a proposal of the net change, if any in the Contract Sum.

g. Certification that the substitution conforms to the Contract Documents and is appropriate for the applications indicated.

h. The Contractor's waiver of rights to additional payment or time that may become necessary because of the failure of the substitution to perform adequately.

4. Landscape Architect's Action: If necessary, the Landscape Architect will request additional information within one week of receipt of a request for substitution. The Landscape Architect will notify the Contractor of acceptance or rejection within two weeks of receipt of the request. Acceptance will be in the form of a change order.

a. Use the product specified if the Landscape Architect cannot make a decision within the time allocated.

PART 2 – PRODUCTS

2.01 GENERAL

A. Conditions: The Landscape Architect will receive and consider a request for substitution when one or more of the following conditions are satisfied. Otherwise, the Landscape Architect will return the requests without action except to record noncompliance with these requirements.

1. Extensive revisions to the Contract Documents are not required.

2. Changes are in keeping with the intent of the Contract Documents.

3. The specified product cannot be provided within the Contract Time. The Landscape Architect will not consider the request if the specified product cannot be provided as a result of failure to pursue the Work promptly.

4. The request is related to an "or-equal" clause.

5. The substitution offers the Owner a substantial advantage, in cost, time, or other considerations, after deduction compensation to the Landscape Architect for redesign and increased cost of other construction.

6. The specified product cannot receive approval by a governing authority, and the substitution can be approved.

B. The Contractor's submittal and the Landscape Architect's acceptance of Shop Drawings, Product Data, or Samples for construction not complying with the Contract Documents do not constitute an acceptable request for substitution, nor do they constitute approval.

PART 3 – EXECUTION

(Not Applicable)

END OF SECTION

SECTION 01 74 00
CLEANING UP

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Consult the individual Sections of the specifications for cleaning of Work installed under those Sections.

1.02 CLEANING DURING CONSTRUCTION

A. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on the site.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

3. Do not dispose of wastes into streams or waterways.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

C. Maintain the Site free from accumulations of waste, debris, and rubbish.

D. Provide on-site containers for collection of waste materials and rubbish.

E. At the end of each day, remove and legally dispose waste materials and rubbish from site.

F. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

G. Disposal of materials shall be in compliance with all applicable laws, ordinances, codes, and by-laws.

1.03 FINAL CLEANING

A. Prior to submitting a request to the Landscape Architect to certify Substantial Completion of the Work, the Contractor shall inspect all interior and exterior spaces and verify that all waste materials, rubbish, tools, equipment, machinery, and surplus materials have been removed, and that all sight-exposed surfaces are clean. Leave the Project clean and ready for occupancy.

B. Unless otherwise specified under other sections of the Specifications, the Contractor shall perform final cleaning operations as herein specified prior to final inspection.

C. Cleaning shall include all surfaces, interior and exterior, which the Contractor has had access to, whether new or existing.

D. Employ experienced workmen or professional cleaners for final cleaning.

E. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.

F. Use cleaning materials which will not create a hazard to health or property and which will not damage surfaces.

G. All broken or defective materials caused by the Contractor's Work shall be replaced at the expense of the Contractor.

H. Remove grease, mastic, adhesive, dust, dirt, stains, labels, fingerprints, and other foreign materials from finished surfaces. This includes cleaning of the Work of all finishing trades where needed, whether or not cleaning by such trades is included in their respective specifications.

I. Repair, patch, and touch up marred surfaces to the specified finish, to match adjacent surfaces.

J. Leave all architectural metals, hardware, and fixtures in undamaged, polished conditions.

K. Broom clean exposed concrete surfaces and paved surfaces. Rake clean other surfaces of grounds.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

SECTION 11 68 00

PLAYGROUND EQUIPMENT

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. This section is only a portion of the Contract Documents. All of the Contract Documents, including Conditions of the Contract and Division 1 General Requirements, apply to this section.

1.2 DESCRIPTION OF WORK

A. The work of this section includes, but is not limited, to the following:
   a. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all site improvements complete as shown on the Drawings and specified herein.

   b. Contractor is responsible for unloading equipment from the delivery vehicles and for furnishing equipment necessary to install the structures (recommended use of Telehandler and Man Lift, or as described by the manufacturer).

   c. To be included, but not limited to the following:

      i. Install the following play structure (Structures have been purchased by the Town) per the Manufacturers recommendation:

         1. Super Duper NetPlex Structure

         2. Lunar Burst Web Climber

         3. Rubber Half-Balls

      ii. Install the new chains and seats for the swing set (Parts directly purchased by Town). The post and framing of existing swing set to remain in it's current location and configuration.

B. The following items shown on the Drawings and/or noted herein shall be furnished and installed under their Sections of the specifications:

   1. Concrete for concrete footings under 32 13 13 Concrete

1.3 RELATED WORK

A. Carefully examine all the Contract Documents for requirements that affect the work of this Section. Other specification sections that directly relate to the work of this Section include, but are not limited to the following:

   1. Section 12 93 00 – Site Furnishings.
   2. Section 31 10 00 – Site Clearing and Preparation.
   3. Section 31 23 00 – Excavation Filling and Grading.
   4. Section 32 12 16 – Asphalt Paving.

5. Section 32 13 13 – Concrete.
6. Section 32 16 00 – Curbing.
7. Section 32 18 16.13 – Playground Protective Surfacing.
8. Section 32 18 17 – Engineered Wood Fiber Surfacing.
9. Section 32 31 00 – Fencing.
10. Section 32 90 00 – Planting.
11. Section 32 91 00 – Loam and Planting Preparation.
12. Section 32 92 00 – Turf and Grasses.
13. Section 33 40 00 – Storm Drainage Utilities

1.4 SUBMITTALS

A. Provide detailed shop drawings for all play equipment and individual components not purchased by the Owner for review and approval by the Landscape Architect. This submittal must include the following items to be considered complete:

1. Large-scale drawing showing all play components, their attachment to each other and the associated use zones.

2. Manufacturer's specifications for all play components.

3. Manufacturer's recommended installation including concrete footings if required. Mounting details for all equipment.

4. Evidence of compliance with IPEMA certification (ASTM F 1487-95) "Standard Consumer Safety Performance Specification for Playground Equipment for Public Use."

5. Supply documentation stating the system installer is a manufacturer's certified installer

B. Provide manufacturer's product material information and system performance data along with material and system samples for each item specified in this Section for the Architect's review and approval prior to ordering materials.

C. The Contractor shall verify by field inspection that all items within this section conform to the specified requirements and approved submittals prior to installation.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products and provide adequate protection against damage. Handle in strict compliance with manufacturer instructions and recommendations and store off the ground. Protect from all possible damage including, but not limited to chipping, staining, cracking and other damage.

B. Delivered materials shall be in manufacturer's original unopened and undamaged packages with labels legible and intact.

C. Store materials in unopened packages in a manner to prevent damage from the environment and construction operations.

D. Handle in accordance with manufacturer's instructions.

1.6 COORDINATION

A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work as necessary to assure the steady progress of the work of this Contract.

B. Substrates: Proceed with work only when substrate construction and penetrating work is complete.

1.7 GUARANTEE

A. In addition to the specific guarantee requirements of the GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS, the Contractor shall provide the manufacturers' standard written warranty for each product within this specification. All of these guarantees shall be in addition to, and not in lieu of, other liabilities that the Contractor may have by law or other provisions of the Contract Documents.

1.8 DEFINITIONS

A. The following items are included herein and shall mean:

1. S.S.H.B. - Standard Specifications for Highway and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.

2. A.S.T.M. - American Society for Testing and Materials. The following standard specifications are applicable to the associated items as listed.

a. F1487 …Playground Equipment for Public Use

b. A36...Steel

c. A153...Zinc Coating (hot-dip) on hardware

d. A307...Carbon Steel bolts 66000 psi tensile

3. CPSC - Consumer Product Safety Commission.

4. ADA - Americans with Disabilities Act and its current regulations.

5. MAAB: Massachusetts Architectural Access Board

6. AWS: American Welding Society

7. SSPS: Steel Structures Painting Council

1.9 QUALITY ASSURANCE

A. After installation of equipment, safety surfacing and immediate surrounding improvements, the playground installation contractor shall provide written certification by a Certified Playground Safety Inspector (CPSI) that the installed equipment conforms to all applicable safety and accessibility standards including, but not limited to ASTM, CPSC, ADA, and MAAB. The Owner reserves the right to retain an independent CPSI to inspect the playground equipment and surfacing after reinstallation. The Contractor will be responsible for correcting any deficiencies at their own expense to the satisfaction of the Landscape Architect.

B. Equipment Installer Qualifications: An experienced and certified installer who has completed work with similar equipment, materials, and design, and to the extent similar with this project and whose work has resulted in construction with a record of successful

performance in a minimum of 10 installations over 5 years. Contractor to provide their subcontractor's appropriate qualifications including references and experience. Installer shall follow manufacturer's instructions and installation documentation for all equipment.

PART 2 – PRODUCTS

2.1 Owner Purchased Playground Equipment

A. The Playground Equipment shown on the Drawings and described within the Specifications have been purchased by Town of Andover through a public community process and include specific components, materials, quality, design and appearance that form the Basis of Design required by this Contract.

B. The Basis of Design for all of the play equipment is Landscape Structures (www.playlsi.com). Rep. Contact John McConkey (johnmcconkey@obrienandsons.com), Phone 508-359-4200.

C. Refer to "Appendix A" for Playground Equipment Installation Instructions and details on the structures. The description of these products are defined as follows:
   a. Super Netplex 12' Towers
   b. Lunar Burst.
   c. ADA swing, chains and belts for replacement of existing swings (swing structure to remain).
   d. EuroFlex Half Ball as provided by Goric Marketing Group USA, Inc.

D. Representative image of the structures to install.

PART 3 – EXECUTION

3.1

A. Contractor is responsible for coordinating the delivery of Owner-purchased equipment with the City and Manufacturer, storage and securing all of the equipment on-site safely within temporary construction fencing prior to the installation.
B. Equipment shall be assembled to conform to the approved shop drawings. All fastenings shall be made as shown on the approved shop drawings and shall be securely tightened. All work shall be done so that no hazardous projections remain on the finished work.
C. Cleanup: Upon completion of the work under this Section, all excess materials and debris resulting from work under this Section shall be cleaned up, removed from the Site, and properly disposed.
D. Manufacturer's Guarantees and Insurance:
    a. Product Liability Insurance: The manufacturer of the playground equipment shall maintain, and have in effect at the time of the completed installation, an insurance policy covering completed operations (Product Liability) with a minimum limit of $1,000,000.00 (One Million Dollars). A certificate of insurance shall be available to the project owner on request.
    b. Guarantees: The manufacturer shall furnish a written guarantee, covering the replacement of any damaged Structures or components, at no extra charge for the

period of 15 (Fifteen) years. This guarantee does not cover Structures damaged by improper use or vandalism. Labor is not covered in this guarantee.

E. Warranties:
   a. Lifetime Limited Warranty for all stainless-steel fasteners, steel and aluminum posts, clamps, beams and caps, against structural failure due to corrosion/natural deterioration or manufacturing defects. This warranty does not include any cosmetic issues or wear and tear from normal use.
   b. 15-Year Limited Warranty on all perforated steel decks and stairs, steel rails, loops and rungs, sheet steel, rotationally-molded and sheet plastic components, recycled plastic lumber and Playweb tubular steel parts.
   c. The Contractor shall warrant that all structures and/or equipment installed will conform in kind and quality to the specifications set forth above, and will be free of defect in workmanship and material.
   d. The Contractor shall offer a 10-year limited warranty for all aluminum and all posts, clamps, beams, and caps against structural failure due to corrosion, deterioration, or workmanship (cosmetic issues excluded).
   e. The Contractor shall offer a 10-year limited warranty for all plastic and steel components against structural failure due to corrosion, deterioration, or workmanship (cosmetic issues excluded).
   f. The Contractor shall offer a 1-year limited warranty for all moving parts, swing seats and swing hangers bumpers and other equipment not included above against failure due to corrosion, deterioration, or workmanship.
   g. An authorized representative of the play equipment manufacturer must inspect and approve the completed installation. The play equipment will not be accepted by the play equipment manufacturer or the Owner until they are satisfied with the installation. No additional compensation will be given for any necessary corrective work. Contractor shall submit written certification from Manufacturer's Representative that all play equipment has been completely installed in accordance with manufacturer's requirements.

3.2 CLEANING, REPAIR AND PROTECTION

A. Repair minor damage to eliminate all evidence of repair. Remove and replace work that cannot be satisfactorily repaired.
B. Provide temporary protection to ensure that the work will be without dirt, stains, damage or deterioration at time of final acceptance. Clean up stains and spills as they occur. Remove protections and clean as necessary immediately before final acceptance.

C. Upon completion of the work and before acceptance, the Contractor shall remove and dispose of in an approved manner all surplus materials, rubbish, etc. which the Contractor may have accumulated during the course of the work and shall leave the site in a clean and orderly condition. The Contractor shall not abandon any material at or near the site regardless of whether or not it has any value.

END OF SECTION

SECTION 12 93 00

SITE FURNISHINGS AND IMPROVEMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. This section is only a portion of the Contract Documents. All of the Contract Documents, including Conditions of the Contract and Division 1 General Requirements, apply to this section.

1.2 DESCRIPTION OF WORK

A. The work of this section includes, but is not limited, furnishing and installing the following:

1. Picnic Table
2. Log sitting stump

B. The following items shown on the Drawings and/or noted herein shall be furnished and installed under their Sections of the specifications:

1. Concrete for concrete footings under 32 13 13 CONCRETE.

1.3 RELATED WORK

A. Carefully examine all the Contract Documents for requirements that affect the work of this Section. Other specification sections that directly relate to the work of this Section include, but are not limited to the following:

1. Section 11 68 00 – Playground Equipment
2. Section 31 10 00 – Site Clearing and Preparation
3. Section 31 23 00 – Excavation Filling and Grading
4. Section 32 16 00 – Asphalt Paving
5. Section 32 13 13 – Concrete
6. Section 32 16 00 - Curbing
7. Section 32 18 16.13 – Playground Protective Surfacing
8. Section 32 18 17 – Engineered Wood Fiber Surfacing
9. Section 32 31 00 - Fencing
10. Section 32 90 00 - Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities

1.4 SUBMITTALS

A. Shop Drawings: Refer to individual site furnishings for submittal requirements.

B. Provide manufacturer’s product material information and system performance data along with material and system samples for each item specified in this Section for the Architect’s review and approval prior to ordering materials.

C. The General Contractor shall verify by field inspection that all items within this section conform to the specified requirements and approved submittals prior to installation.

D. Provide color samples of the actual specified material for approval (no photo representations).

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products and provide adequate protection against damage. Handle in strict compliance with manufacturer instructions and recommendations and store off the ground. Protect from all possible damage including, but not limited to chipping, staining, cracking and other damage. Sequence deliveries to avoid delays, but minimize on-site storage.

1.6 COORDINATION

A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work as necessary to assure the steady progress of the work of this Contract.

B. Substrates: Proceed with work only when substrate construction and penetrating work is complete.

1.7 GUARANTEE

A. In addition to the specific guarantee requirements of the GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS, the Contractor shall provide the manufacturers' standard written warranty for each product within this specification. All of these guarantees shall be in addition to, and not in lieu of, other liabilities that the Contractor may have by law or other provisions of the Contract Documents.

PART 2 - PRODUCTS AND EXECUTION (Combined)

2.1 Basis of Design for all Site Furnishings and Amenities is Dumor Site Furnishings and (www.dumor.com) and Landscape Structures (www.playlsi.com) Contact: John McConkey (johnmcconkey@obrienandsons.com) Phone – 508-359-4200

A. PICNIC TABLE – Basis of Design shall be the following
   a. "Table Model 198" 6 Seats – Model 198-60PL (Qty 1)
   b. "Table Model 198" 8 Seats (ADA accessible) – Model 198-80PL (Qty 1)
   c. Table shall be a free standing table with attached bench seating, that does not need to be mounted for stability.
   d. Table shall have an option for an umbrella to be installed.
   e. Colors shall be the following:
      i. Recycled Table Top – Grey
      ii. Metal Leg Supports – Textured Grey
      iii. Metal Seats - Blue

2.2 LOG SITTING STUMPS (QTY 20)

A. Log sitting stumps shall be crafted from northern natural hardwood trees. Basis of Design are as offered by Natural Playgrounds Company, 85 Warren Street, Concord, NH, 0331. Tel:888-290-8405 ethan@naturalplaygrounds.com .
Alternate supplier: Nature's Instruments. Tel: 877-733-7456 sales@naturesinstruments.com
Or other supplier as approved by the Landscape Architect provided they meet the product description.
B. Log sizes shall vary from a minimum 12" diameter up to 18" diameter.
C. Log lengths shall be as noted on the drawings/details to allow for sufficient installation depth.
D. Log seat height after burial shall be a minimum 14" to max of 18"
E. Bark shall remain on the logs.
F. Install log sitting stumps as recommended by the manufacturer.

2.3 CLEANING, REPAIR AND PROTECTION

A. Repair minor damage to eliminate all evidence of repair. Remove and replace work that cannot be satisfactorily repaired.

B. Provide temporary protection to ensure that the work will be without dirt, stains, damage or deterioration at time of final acceptance. Clean up stains and spills as they occur. Remove protections and clean as necessary immediately before final acceptance.

C. Upon completion of the work and before acceptance, the Contractor shall remove and dispose of in an approved manner all surplus materials, rubbish, etc. which the Contractor may have accumulated during the course of the work and shall leave the site in a clean and orderly condition. The Contractor shall not abandon any material at or near the site regardless of whether or not it has any value.

END OF SECTION

SECTION 31 10 00
SITE CLEARING AND PREPARATION

PART 1 – GENERAL

1.0 RELATED DOCUMENTS

This section is only a portion of the Contract Documents. All of the Contract Documents, including Conditions of the Contract and Division 1 General Requirements, apply to this section.

1.1 DESCRIPTION OF WORK

A. Provide all labor, materials, equipment, and services necessary to complete the work of this Section as specified herein, as shown on the drawings, or both. The Contractor shall coordinate site preparation and demolition activities for each phase of construction. Refer to the Drawings for Phasing and items to be salvaged and relocated.

B. The work of this Section includes, but is not limited to, the following:

1. Staking layout, limits of work and extent of grading
2. Erosion and Sedimentation Control
3. Protection of existing improvements to remain
4. Tree protection
5. Clearing and grubbing
6. Stripping and stockpiling topsoil
7. Saw cutting existing pavement
8. Removing bituminous concrete pavement
9. Demolition, removal and legal off-site disposal of all existing above grade and subsurface improvements as indicated on the Drawings and as required by the work of this Contract
10. Salvaging materials

1.2 RELATED WORK

A. Carefully examine all of the Contract Documents for requirements that affect the work of this Section. Other specification sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 23 00 – Excavation Filling and Grading
4. Section 32 16 00 – Asphalt Paving
5. Section 32 13 13 – Concrete
6. Section 32 16 00 - Curbing
7. Section 32 18 16.13 – Playground Protective Surfacing
8. Section 32 18 17 – Engineered Wood Fiber Surfacing
9. Section 32 31 00 - Fencing
10. Section 32 90 00 – Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities

1.3 PROJECT CONDITIONS

A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional cost will be allowed because of lack of full knowledge of existing conditions.

B. Preparation and Workmanship: Except as otherwise specified, site preparation, demolition work and clean up shall be the work of the Contractor. Any item of work not specifically designed to be accomplished by a particular subcontractor shall be considered work of the Contractor.

C. Traffic: Conduct site clearing and demolition operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

D. Protection of Existing Improvements: Provide protection necessary to prevent damage to existing buildings, paving, services and all other improvements indicated to remain in place. Locate and identify existing underground utilities within project limit lines. Provide adequate means of protection of all utilities to remain. The Contractor shall contact “Dig-Safe” at 1-888-344-7233 prior to beginning any excavation work. The Contractor shall be solely responsible for locating all underground utilities prior to the commencement of work. Locations of existing utilities on the site plans are not warranted to show all existing utilities under or above ground. Existing utilities indicated on the site plans are shown only for the convenience of the Owner’s representatives.

   1. Protect improvements and surfacing on Owner’s property.

   2. Restore improvements damaged during construction to their original condition, as acceptable to the Owner and any agencies having jurisdiction.

E. Protection of existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, damaging heat from paving equipment, excess foot or vehicular traffic, or parking of vehicles within tree canopy drip lines. Provide temporary guards, fencing or any other necessary precautions to protect trees and vegetation to remain.

   1. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during the course of construction operations.

   2. Repair trees and vegetation indicated to remain that are damaged by construction operations, in a manner acceptable to the Landscape Architect. Employ a licensed arborist to repair damage to trees and shrubs.

   3. Replace trees and vegetation that cannot be repaired and restored to full-growth status, as determined by a licensed arborist. Trees determined to be removed due to damage caused by the work of this project shall be removed and replaced at the Contractor’s expense with a quantity of approved tree species that match the total tree caliper surface area of the removed trees as measured 12-inches above original grade. Damage requiring tree removal shall include damage to roots, trunk or branches where protection would have prevented such damage. The extent of damage requiring tree removal shall include any one or more of the following: permanent scaring of tree bark, loss of branches or portions of branches that disfigure the tree character, compaction or material contamination of the root zone, damage to roots beyond excavation payment lines, irreversible decline in tree health due to lack of watering.

F. Dust and Pollution Control: Provide dust control for dust generated by the work of this project. Dampen surface as required or use other approved method. Comply with pollution control requirements of the Town of Andover Board of Health.

G. Salvageable Improvements: Carefully remove items indicated to be salvaged or reused, and store at the site for future use. Protect such items from accidental damage, vandalism and theft.

H. Bench Marks: Locate, protect and maintain bench marks, monuments, control points and project engineering reference points.

I. Regulatory controls: All work within this Section must comply with the requirements of all authorities having jurisdiction.

PART 2 – PRODUCTS

2.1 TEMPORARY CONSTRUCTION FENCE.

A. Temporary Construction Fence shall be six-foot high galvanized steel fence panels on stable, movable footings and include hardware to secure panels together. Fencing shall be installed to secure site.

2.2 EROSION AND SEDIMENTATION CONTROL.

A. Materials for erosion and sedimentation control shall be as described herein:

1. Filter fabric: Refer to Section 31 23 00 – Excavation Filling and Grading

2. Straw wattles shall be composed of 100% agricultural straw and wrapped in natural fiber netting that is biodegradable, jute or similar material. Photo-degradable netting is not acceptable. Netting shall have 0.5 inch openings. Ends shall be secured with wire closures and installed in accordance to manufacturer's recommendations.

3. Matting: Refer to Section 32 91 00 – Loam and Planting Preparation for Erosion Control Matting

2.3 TREE PROTECTION.

B. Materials for tree protection shall be:

1. Pressure treated southern yellow pine wood posts

2. Spruce or fir wood rails

3. Orange plastic construction safety fence

4. Galvanized hardware

PART 3 - EXECUTION

3.1 SITE ENGINEERING /LAYOUT

A. Prior to the start of clearing and excavation operations, lay out and stake the new paved areas, limits of cut and fill and work limit lines for the Landscape Architect's review.

B. Promptly upon completion of layout work, and before any clearing or other construction work is begun, the Contractor shall arrange a conference on the site with the Landscape Architect to review the limits of work areas staked out. The limit of cut and fill shall be clearly marked to determine the extents of tree removal required.

3.2 TREE AND SHRUB PROTECTION

A. Prior to starting any construction work, erect tree protection in accordance with the Detail where shown and as directed by the Landscape Architect in the field.

B. Within the limit of work, protect all plant materials to remain. No such plant materials shall be used as guys or other fastenings. No material storage, vehicle parking or access routes shall occur under the dripline of trees to remain except where work is specifically shown on the Drawings.

C. The Contractor shall not cause any damage to trees to remain. If the limits of excavation defined by the Contract Documents require removal of roots of trees to remain, such roots shall be neatly cut after consulting with an Arborist and notifying the Architect.

3.3 CLEARING AND GRUBBING

A. After the Landscape Architect has reviewed the limit of clearing, remove trees and shrubs as indicated on the Drawings and as required to construct the work of this project.

B. Grubbing: Completely remove stumps and roots of vegetation indicated to be removed.

C. All materials from clearing operations shall be removed from the site prior to or by the end of the clearing operations. On-site disposal will not be allowed.

D. Fill holes, depressions caused by clearing and grubbing operations with fill material and placement conforming to Section 31 23 00 – Excavation Filling and Grading as specified for the proposed improvements. Place fill in horizontal layers, 6 inches in loose depth, and compact to the specified density.

F. Without exception, any area cleared for any reason by the Contractor, inside or outside the Limit of Work Line and not otherwise developed shall be loamed and seeded at no additional cost to the Owner.

G. Tree clearing shall include as many separate mobilizations as required by the Contractor's sequence of operations due to the phased nature of the project. A selective clearing operation shall be performed by the Contractor after rough grading has been completed, to remove trees, stumps and vegetation at the limits of cuts and fills as directed by the Landscape Architect in the field.

3.4 STRIPPING AND STOCKPILING TOPSOIL

A. Prior to the start of General Excavation, strip all topsoil and subsoil from within areas to be re-graded keeping the topsoil completely separate throughout the stripping and stockpiling operation. Do not commence the stripping operation without a clear understanding of the existing soil depths, planting and site conditions to be preserved and limits of topsoil stockpile and stripped areas.

B. All topsoil encountered during the stripping operations, regardless of depth, shall be removed and stockpiled on the site as shown on the Drawings or where directed by the Architect or removed from the site if the Contractor determines there is adequate topsoil to complete the work and after approval by the Architect. Areas having greater depths of topsoil than indicated on boring data

sheets or reasonably anticipated shall be stripped of all such material and fill shall be used to bring such areas to the rough grade level. Stones over six inches and tree roots over two inches in any dimension shall be removed from loam before stockpiling. Stripped soil that can be classified as fill as defined in Section 31 23 00 – Excavation Filling and Grading, shall be stockpiled for reuse in rough grading. This material shall be stripped separately from the topsoil. Topsoil and organic materials due to be stripped are as follows:

C. The Contractor shall control the stripping operation so that the topsoil does not become contaminated with subsoil or other earth materials. The Contractor shall use machinery suitable for achieving this result.

D. Subsoil: The material directly below the topsoil shall not be considered usable as Ordinary Fill as specified in Section 31 23 00 – Excavation Filling and Grading or for topsoil. The only area where subsoil may be used is under areas with new landscape planting. Subsoil shall be stripped separately from the topsoil and from the underlying earth materials. Subsoil shall be stripped as follows:

1. Building Structures, Roads, Parking Areas and other site improvements except lawn areas - remove completely.

2. Future Lawn Areas - not necessary to remove in fill condition. However, subsoil shall be removed from adjacent proposed buildings, structures, site improvements, roads and parking areas a distance equal to the depth of fill plus three feet in the particular location, i.e. for a five foot fill, subsoil shall be removed a minimum of eight feet away from the adjacent site improvements.

E. All excess subsoil encountered in earthwork operations shall be removed from the site and legally disposed of. Topsoil shall be stockpiled as described hereinabove.

3.5 BITUMINOUS CONCRETE

A. Remove and legally dispose of all bituminous concrete paving indicated on the Drawings to be removed and all other paving required to be removed in order to construct the Project.

B. Saw cut existing bituminous paving at all locations where pavement to be removed or pulverized meets existing pavement to remain and where new pavement meets existing pavement to remain. Sawcuts shall be made with sharp tools and blades to provide a clean, straight and vertical cut line. Use carbide or other type blade intended for that purpose.

3.6 ABOVE AND BELOW GRADE IMPROVEMENTS

A. Remove and legally dispose of all existing above and below grade improvements necessary to allow construction of all work of this Contract including but not limited to footings, playground equipment, pipes, tanks, concrete slabs, castings, curbing, walls, fencing, drainage, signage and any and all other improvements inside or outside the contract limits except items indicated on the Site Preparation Plan to be preserved and protected or removed and salvaged. Remove walls and other obstructions to a depth of at least 2 feet below finished grades and as required to construct the subsurface improvements of this project.

B. Abandonment, relocation, partial removal or complete removal of certain existing underground and above ground utilities including, but not limited to pipes, tanks, castings, conduits, electrical wiring and poles shall be performed as indicated on the Drawings.

3.7 SALVAGING MATERIALS

A. The Landscape Drawings depict specific memorial artifacts to be salvaged and relocated in the new design. The Contractor shall review these items in person with the Landscape Architect prior to any site demolition in these areas.

B. Salvaged items shall be carefully removed, cleaned and stored in a protected area until the new site conditions are prepared for their reinstallation.

3.8 DISPOSAL OF WASTE MATERIALS

A. Removal from Owner's property: Remove all waste materials from Owner's property in timely and responsible manner and legally dispose of off-site. Accumulation is not permitted. Maintain disposal routes clear, clean and free of debris. Dumping and / or burning of material on site will not be permitted.

3.9 CLEAN UP

A. Keep pavements and areas adjacent to and leading from the site, clean and free of mud, dirt and debris.

B. At completion of the work of this Section, remove materials generated by site clearing. Do not spill or disperse debris on the site. Leave the site in a safe and clean condition acceptable to the Architect.

END OF SECTION

SECTION 31 23 00
EXCAVATION, FILLING AND GRADING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 apply to the work of this Section.

B. The Contractor shall prior to any removal of surplus fill, excavated material, or debris from the site, furnish written evidence satisfactory to the owner or owner's representative that he has an approved dumping location for debris and/or spoil from his/her excavation activities.

1.02 DESCRIPTION OF WORK

A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform Earthwork as shown on the Drawings and as specified herein.

1. Excavating, filling, trenching and backfilling of all descriptions required for the construction of pavements, safety surfaces, equipment, site improvements, utilities, filling voids left by hardscape and plant removals, and all specialties. Provide all additional fill materials as required and specified herein.

2. Pumping and/or bailing necessary to maintain excavated spaces free from water from any source whatsoever.

3. Dust control.

4. Provide graded materials, as specified, for fills, base courses and backfills as required.

5. Rough grading.

6. Perform all compaction of fill materials as hereinafter specified.

7. Obtain all required permits, licenses and approvals of appropriate municipal and utility authorities prior to commencing work, pay all costs incurred therefrom.

8. If subgrade is deemed unsuitable for placement of subbase material, backfill w/ processed gravel. **Work under this Section shall include the excavation of 20 cubic yards of unsuitable material beyond the line and grades as shown on drawings, and as determined by the Landscape Architect**. Such removals shall be measured by a Civil Engineer or Land Surveyor employed by the Contractor and verified by the Landscape Architect. No

unsuitable material removals shall be credited to the Contractor without prior measurements and verifications.

B. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Andover and coordinate all work under this Section therewith.

C. The following related items are included under the Sections listed below.

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishing
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 32 12 16 – Asphalt Paving
5. Section 32 13 13 – Concrete
6. Section 32 16 00 - Curbing
7. Section 32 18 16.31 – Playground Protective Surfacing
8. Section 32 18 17 – Engineered Wood Fiber Surfacing
9. Section 32 31 00 - Fencing
10. Section 32 90 00 – Planting
11. Section 33 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage and Utilities

1.03 Submittals

A. Submit certified gradation test data for borrow materials a minimum of one week prior to delivery to the site.

B. Provide 50-pound samples of each material to a qualified laboratory for moisture density testing a minimum of one week prior to delivery to site.

C. Compaction test of subbase materials after installation and compaction and before surface material is installed.

1.04 Laws, Ordinances, Permits and

Fees The Contractor shall:

A. Give necessary notices, obtain all permits and pay all governmental taxes, fees and other costs in connection with this work, file all necessary plans, prepare documents and obtain all necessary approvals.

B. Obtain all required certificates of inspection for this work and deliver same to the Landscape Architect before request for acceptance and final payment for the work.

C. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawings and documents) in order to

comply with all applicable laws, ordinances, rules and regulations of the Town of Andover and the Commonwealth of Massachusetts, whether or not shown on the Drawings and/or specified.

D. The Contractor shall provide a temporary sidewalk whenever a sidewalk is closed because of the construction. This temporary sidewalk must be at the same level as the existing closed sidewalk and it must be visually partitioned off from the street and work area. The Contractor shall so conduct his operations as to interfere as little as possible with roads, driveways, alleys, sidewalks, or other nearby facility.

1.05 Definitions

A. The following related items are included herein and shall mean:

1. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of Massachusetts, Department of Transportation, latest edition

2. A.S.T.M. - American Society for Testing and Materials

3. A.A.S.H.T.O. - American Association of State Highway and Transportation Officials

B. “Excavation” consists of removal of material encountered to subgrade elevations indicated and disposal of materials removed.

C. “Finished grades” as used herein shall mean the required final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.

D. “Base Course” as used herein is the placed and compacted material immediately below the finish grade material to the thickness indicated on the Drawings.

E. “Subgrade” as used herein means the naturally occurring or placed and compacted material below the base course.

F. “Trench Excavation” is defined as an excavation of any length where the width is less than twice the depth and where the distance between the pay lines does not exceed ten feet.

G. “Open Excavation” is defined as all other excavation.

H. “Unauthorized excavation” is defined as excavation beyond approved measurement lines.

I. "Unsuitable materials" are soils containing organic matter, materials subject to attack from termites, materials subject to decomposition, soils too wet to be stabilized, frozen materials and existing materials that do not satisfy the product specification herein. Weak or soft material resulting from any of the Contractor's operations shall not be considered "unsuitable material".

J. "Excess material" is any excavated material that is not needed for the construction of project elements. The removal of excess material from the site shall be included in the Base Bid Contract.

K. Rock excavation shall be defined as solid, continuous rock or concrete mass, unable to be removed without mechanical measures and larger than 1 cubic yard in size. All other rock shall be unclassified excavation included in the contract bid price.

1.06 Bench Marks and Engineering

A. Lines and grade work in accordance with Drawings and Specifications shall be laid out by a registered Civil Engineer or registered Surveyor employed by the Contractor. The Contractor shall establish permanent bench marks, to which access can easily be had during the progress of the work. The Contractor shall maintain all established bounds and bench marks and replace, as directed, any which may be disturbed or destroyed. The selection of the registered Civil Engineer or Surveyor shall be approved by the Landscape Architect.

B. The Contractor shall submit written confirmation of dimensions and elevations on the ground and report any discrepancies immediately to the Landscape Architect. Such confirmation shall bear the Engineer's registration stamp. Any discrepancies not reported prior to construction shall not be the basis of claims for extra compensation.

C. The General Contractor shall not commence any excavation or construction work, until the Landscape Architect's verification has been received and approved by the Official.

1.07 Subsurface Information

A. Refer to the Existing Conditions Base Plan for surveyed information. The Owner, the Landscape Architect and the Surveyor shall not be responsible for the interpretations or conclusions made by the Contractor based on this information. This Existing Conditions Base Plan is provided so that the Contractor can familiarize himself with the expected conditions when preparing his bid. If the Contractor encounters subsurface conditions considered to be different than those presented in the Contract Documents, the Contractor shall notify the Architect in accordance with the General Conditions.

B. The Owner assumes no responsibility for the Contractor's failure to make his own site investigation and makes no warranty regarding the character of the soil or subsurface conditions which may be encountered during the performance of the work.

1.08 Finished Grades

A. The words "finished grades" as used herein mean the required final grade elevations indicated on the Drawings. Where not otherwise indicated, site areas shall be given uniform slopes between points, for which finished grades are shown, or between such points and existing grade except that vertical curves or roundings shall be provided at abrupt changes in slope.

1.09 Grades and Elevations

A. The Drawings indicate, in general, the alignment and finished grade elevations. The Landscape Architect, however, may make such adjustments in grades and alignment as are found necessary in order to avoid interference and to adapt the grading to other special conditions encountered.

1.10 Work in the Public Ways

A. Notify the appropriate municipal officials at least seven calendar days in advance of commencing any work in the public ways to obtain all required permission to perform this work. Perform all work in the public ways in a manner required by the municipal authorities.

B. Should there be any conflict between requirements specified in the Contract Documents and those of the Town of Andover, the municipal requirements shall govern.

C. Do not close or obstruct any streets or sidewalks unless and until they have been discontinued by the appropriate municipal authority or unless and until he shall have first secured all necessary or other permits therefor. No materials whatsoever shall be placed or stored in the streets. Conduct all operations to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks, or other facilities near enough to the work to be affected thereby.

1.11 Disposition of Existing Utilities

A. Active utilities existing on the site shall be carefully protected from damage and relocated or removed as required by the work. When an active utility line is exposed during construction, its location and elevation shall be plotted on the Record Drawings and both the Landscape Architect and the Utility Owner notified in writing.

B. Inactive or abandoned utilities encountered during construction operations shall be removed, plugged or capped in accordance with procedures of relative utility company or agency. The location of such utilities shall be noted on the Record Drawings and reported in writing to the Landscape Architect.

C. Active utility lines damaged in the course of construction operations shall be repaired or replaced as determined by the Landscape Architect without additional cost to the Owner.

D. Notify the Owner at least three (3) days in advance of the proposed time for shutting

down or interrupting utilities or services which may affect operation of adjoining properties. Unless otherwise authorized by the Owner, schedule such interruptions on weekends, holidays, or before or after Owner's normal working day. In no case shall any services or utilities be interrupted prior to notification and authorization by the Owner.

1.12 Protection

A. All rules and regulations governing the respective utilities shall be observed in executing all work under this Section. All work shall be executed in such a manner as to prevent any damage to existing streets, curbs, paving, service utility lines, structures and adjoining property. Monuments and bench marks shall be carefully maintained and, if disturbed or destroyed, replaced as directed.

B. The Contractor shall perform the installation, maintenance and removal of all sheet piling, shoring and bracing required for the protection of all items of this Contract affected by the work of this Section.

C. The Contractor shall furnish all facilities and materials necessary to prevent the earth at the bottom of excavation from becoming frozen or unsuitable to receive footing or other load bearing units.

D. The work of this Section shall be performed in such a manner as to cause no interference with access by the Subcontractors or other Contractors to all portions of the site as is necessary for the normal conduct of their work.

E. Protect all areas to remain undeveloped outside the Contract limit lines. Should these areas be damaged, the Contractor shall restore them to the satisfaction of the Landscape Architect and Owner at no additional cost to the owner. This includes the repairing and replacement of all damaged conditions such as plant materials and similar items.

1.13 Samples and Testing:

A. All fill material and its placement shall be subject to quality control testing. Contractor will submit the name of a qualified laboratory to perform test on materials, for Approval by Landscape Architect. The Contractor will pay for all costs of testing. Test results and laboratory recommendations shall be available to the Landscape Architect. Submit one test for each material source proposed for use.

B. Provide samples of each fill material from the proposed source of supply. Allow sufficient time for testing and evaluation of results before material is needed. Submit samples from alternate source if required. The Landscape Architect will be sole and final judge of suitability of all material.

C. The laboratory will determine maximum dry density and optimum water content in accordance with ASTM D1557, Method D and the in-place density in accordance with ASTM D1556.

D. Sampling and testing material delivered to the site shall be performed to ensure

material conforms to approved submittals. Materials in question may not be used, pending test results. Compaction tests shall be performed on placed fill materials. Materials that do not conform to the specified physical or performance requirements shall be removed and replaced with acceptable materials at the Contractor's expense.

F. Cooperate with laboratory in obtaining field samples of in-place materials after compaction. Furnish incidental field labor in connection with these tests.

G. Gravel Borrow shall be laboratory tested for permeability prior to approval in accordance with ASTM D 2434 Permeability of Granular Soils (Constant Head).

PART 2 – PRODUCTS

2.01 Fill Materials

A. Ordinary Fill

1. All material to be placed where the Specifications or Drawings call for Ordinary Fill shall be well-graded, natural, inorganic mineral soil approved by the Landscape Architect and shall have the physical characteristics of soils designated as group A-1, A-2-4, or A-3 under AASHTO-M145.

2. Ordinary Fill shall be free of organic or other weak or compressible materials, of highly plastic clays, of all materials subject to decay, decomposition or dissolution, of cinders or other materials which will corrode piping or other metal, of frozen materials, and of stones larger than 6 inches.

3. Ordinary Fill shall be of such nature and character that it can be spread and compacted to the specified density in a reasonable length of time.

4. Soil for use as Ordinary Fill shall contain no more than 35 percent by weight passing the No. 200 sieve.

5. It shall have a maximum dry density of one hundred pounds per cubic foot.

B. Gravel Borrow

1. All paving shall be installed over compacted graded gravel; all footings and all voids left from equipment removal shall be filled with compacted graded gravel.

2. All gravel fill shall meet the specifications of M1.03.1 "Processed Gravel for Subbase" in S.S.H.B. Submit sample and test results for approval.

Sieve Size	Percent Finer by Weight
2-inch	100
1/2-inch	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-8

C. Crushed Stone (Drainage Stone):

1. Drainage stone, or crushed stone, shall be 3/4" and (except where other size indicated on the Drawings) clean, angular stone of a hardness suitable for use in structural applications. 3/4" stone shall comply with M2.01.4 and 1/2" shall comply with M2.01.5 in S.S.H.B.

Percent Passing by Weight		
Sieve Size	**3/4-inch Stone**	**1/2-inch Stone**
1-inch	100	---
3/4-inch	90-100	---
5/8-inch	---	100
1/2-inch	10-50	85-100
3/8-inch	0-20	15-45
No. 4	0-5	0-15
No. 8	---	0-5

D. Filter Fabric

Filter Fabric used, as a drainage medium shall consist of a non-woven fabric made from polypropylene or polyethylene filaments or yarns. The fabric shall be inert to organic chemicals commonly encountered in the soil. The fabric shall conform to the following recommended property tests:

Property	Unit	Test Method	Minimum Value
Weight	oz/sy	ASTM D-3776-84	4.5
Grab Strength	lbs	ASTM D-4632-86	120
Grab Elongation	percent	ASTM D-4632-86	55
Trapezoid Tear Strength	lbs	ASTM D-4533-85	50
Mullen Burst Strength	psi	ASTM D-3786-80	210
Puncture Strength	lbs	ASTM D-4833-88	70
Apparent Opening Size (AOS)	U.S. std. Size Sieve	ASTM D-4751-87	70

PART 3 - EXECUTION

3.01 Grades and Elevations

A. Establish the lines and grades in conformity with the Drawings. Establish and maintain suitable stakes or batters at points where spot elevations are given on the Drawings and at any other points to be graded as directed by the Landscape Architect. Maintain sufficient reference points at all times during construction to properly perform the Contract installation.

3.02 Excavation

A. Prior to any excavation, contact DIG-SAFE at 1-888-344-7233 to identify subsurface utilities within the work area.

B. General

1. Excavate all material to the elevations, dimensions and form as shown on the Drawings and as specified for the construction of site improvements and other structures necessary for the completion of the utilities and site work. All unsuitable materials within the indicated and specified limits shall be excavated and removed at no additional cost to the contract as specified in 1.02 (B-8) of this section. Any quantities involving an extra or other adjustment of the Contract Price shall be subject to measurement verification and approval by the Landscape Architect prior to the excavation and removal of such materials. Unsuitable materials shall include the following:

a. Utility structures, building foundations and other man-made structures.

b. Peat, organic silt and other organic materials subject to decomposition, consolidation or decay.

c. Miscellaneous fill including cinders, ash, glass, wood, and metal.

2. In general, the Contractor shall be permitted to use machine excavation except for the final six (6) inches under footings, foundations, utility lines and structure, which shall be hand work.

3. If any part of the excavation is carried through error beyond the depth and dimensions indicated on the Drawings or specified herein, or if the foundation soils are disturbed by dewatering or other construction operation, the Contractor shall, at his own expense, refill with structural fill compacted to ninety-five (95) percent of the maximum dry density at optimum moisture content.

4. When excavation has reached the prescribed depth, the Landscape Architect shall be notified and will make an inspection of the condition and approve the placing of fill material.

5. The Contractor shall obtain from the proper authorities locations of all utilities within the scope of this work so that there will be no damage done to such utilities. Neither the Owner nor the Landscape Architect will be responsible for any such damage, and the Contractor shall restore any structure or utility so damaged without additional compensation. Attention is called to that fact that there are electric lines, and other utilities in certain locations within and adjacent to the sites. Written notifications to the appropriate utility agencies shall be made at least ten (10) days prior to the commencement of any work.

6. Wherever culverts, sewers, drains, manholes, catch basins, catch basin connections, water mains, valve chambers, utility tunnels, gas pipes, electric and telephone conduits, house service connections of any other underground constructions are encountered in excavating for utilities or any other site work, they shall be protected and firmly supported by the Contractor, at his own expense, until the trench is backfilled and the existing structures are made secure. Injury to any such structures caused by or resulting from the Contractor's operations shall be repaired at the Contractor's expense. The authority having charge of any particular underground structure shall be notified promptly of damage to its structure.

7. Excess material - Suitable excavation material which is allowable for fill and backfill shall be separately stockpiled as directed by the Landscape Architect. All surplus fill other than that required to complete the intent of the Contract shall become the property of the Contractor and shall be legally disposed of off the property. All excavated materials which, in the opinion of the Landscape Architect are not suitable for fill and backfill shall be removed and legally disposed of off the property.

8. Any unsanitary conditions encountered, such as broken sewer mains or uncovered garbage, shall be corrected or removed entirely as directed by the Landscape Architect.

C. Excavation for Site Improvements.

1. Excavate to the lines and grades shown on the Drawings and as specified to obtain the subgrades for the site improvements.

2. Trenching for all water and drain lines shall comply with the standards in S.S.H.B., specifically Section 150.64.

3. Existing service and utilities encountered shall be immediately repaired, protected and maintained in use until relocation of same has been completed or to be cut and capped where directed or be prepared for connection when so required.

3.03 Subgrade Preparation and Protection

A. General Requirements

1. All subgrade areas shall be made ready for fill by removal of all organic material, unsuitable soils and deleterious materials to firm natural ground as directed by the Landscape Architect.

2. Scarify, spot-fill, or otherwise treat the surface of areas to receive fill as necessary to remove holes, depressions, ruts, hummocks, or other uneven features.

B. Proof Rolling Subgrades

1. Prior to placement of fill, or bottom filter fabric where shown on drawings, proof roll natural ground by making a minimum of two passes with approved compaction equipment. Proof rolling may be waived by the Landscape Architect where excessively wet or saturated subgrade conditions are encountered.

3.04 Protection

A. Protect open excavations with fencing, warning lights and other suitable safeguards. No open excavation shall be left without proper barriers and other devices necessary for public safety.

B. Comply with local safety regulations or, in the absence thereof, with the provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc. and O.S.H.A.

C. Frost Protection - Make no excavation to the full depth indicated when freezing temperature may be expected unless the footing or slabs can be poured immediately after the excavation has been completed. Protect the bottoms as excavated from frost, if placing of concrete is delayed, with straw, tarpaulins or temporary heat until footings or slabs poured and backfill is placed.

D. Any ditching required to keep the site free from water during construction is the responsibility of the Contractor.

3.05 Fill and Compaction

A. Compaction Equipment and Density Requirements

1. Compaction equipment, unless otherwise specified, shall consist of heavy vibratory rollers, such as a Raygo 400 or other compaction equipment approved by the Landscape Architect. Equipment shall make a minimum of four (4) passes to achieve compaction as specified; to provide an evenly dense and compacted thickness throughout. All ruts shall be filled, the surface even and compacted to the density called for. The Landscape Architect retains the right to disapprove the use of any equipment that does not meet the above Specifications or perform the work as intended. Any modifications of equipment or method must be approved by the Landscape Architect.

2. Fill material under pavements and structures shall be compacted to ninety-five (95) percent of maximum density(s) determined by A.S.T.M. Test Designation D-1557, Method D or A.S.T.M. D-1556. For fill to 30” depth within seeded and planted areas compact portion of fill for planting to at least 80 percent but not more than 90 percent of the material’s maximum dry Proctor density

3. Refer to 1.13 in this Section for testing requirements.

B. Placing Fills and Compacting

1. Notify the Landscape Architect when excavation is ready for inspection. Filling and backfilling shall not be started until conditions have been approved by the Landscape Architect.

2. Fill material shall be placed in horizontal layers not exceeding six (6) inches. Each layer shall be compacted to the percentage of maximum dry density specified for the particular type of fill and at a water content equal to optimum dry density and optimum water content shall be as specified herein.

3. Where water content of the fill must be adjusted to meet this Specification, the fill shall be thoroughly disked to insure uniform distribution of any water added.

4. Areas to be filled or backfilled shall be free of construction debris, refuse, compressible or decayable materials and standing water. Do not place fill when materials or layers below it are frozen.

5. In confined areas adjacent to footings and foundation walls and in utility trenches, the fill shall be compacted with hand-operated vibration tampers. The maximum lift thickness shall be four (4) inches. The degree of compaction attained shall be equivalent to that attained in the adjacent open areas where heavy rolling equipment is used. Any areas which subsequently settle shall be refilled to true subgrade and properly compacted.

3.06 Grading

A. Do all grading required for the work including shaping, trimming, rolling and finishing of the surface of the subgrades for all surfaces. All ruts shall be eliminated. Grading for subgrades for paved areas shall be finished at the required depth below and parallel to the proposed surface within 1/4" in 10'-0" tolerance.

B. If, during the progress of rough grading work, any water pipe, sewer, conduit, drain, or other construction is damaged as a result of operations under this Contract, the Contractor shall repair all such damage at no additional cost to the Owner and restore work to its original condition.

C. Do all other cutting, filling and rough grading to the lines and grades indicated on the Drawings. Grade evenly to the finished grades shown on the Drawings. No stone larger than 2" in largest dimension shall be placed in upper 6" of fill.

D. Complete grading operations after site improvements are constructed, and all materials, rubbish and debris removed from the site. Leave subgrade for planting clean at required grades. Provide sufficient grade staking to witness correct lines and grades, as determined by the Landscape Architect.

F. Where streets or sidewalks within or outside the limit of Contract lines have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all material necessary to bring finish surfaces level with the existing adjacent surfaces. All work shall be installed to match the existing conditions in accordance with the governing authority. Notify the proper authorities prior to restoring surfaces outside the limit of Contract line.

G. Fine grading of the gravel borrow base shall be performed to achieve the tolerances specified herein.

H. Tolerances

Area	Max Grading Tolerance +/-
1. Subgrade in landscaped areas prior to placement of loam	3/4" in 10’
2. Gravel base under pavement	1/4” in 10’

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions, Division 0 and Division 1, General Requirements, apply to the work of this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to furnish and install ASPHALT PAVING, as indicated on the Contract Documents and as specified herein.

B. The work of this Section includes, but is not limited to the following:

1. Gravel base course construction
2. Hot mix asphalt paving
3. Patching and resurfacing disturbed paved areas

1.3 RELATED WORK

A. Carefully examine all the Contract Documents for requirements that affect the work of this Section. Other specification sections that directly relate to the work of this Section include, but are not limited to the following:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 13 13 – Concrete
6. Section 32 16 00 - Curbing
7. Section 32 18 16.13 – Playground Protective Surfacing
8. Section 32 18 17 – Engineered Wood Fiber Surfacing
9. Section 32 31 00 - Fencing
10. Section 32 90 00 - Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities

1.4 SUBMITTALS

A. At least 30 days prior to intended use, submit material certificates signed by material producer and Contractor indicating that products comply with requirements. Provide master mix formula for all bituminous concrete specified in this Section, listing quantities and pertinent ingredient properties for review and approval. Submit product data for traffic marking paint.

B. Submit aggregate samples for review and approval.

C. Do not order materials until Architect's approval of mix formula has been obtained. Delivered materials shall closely match the approved samples.

D. Submit product data for traffic marking paint.

1.5 PROJECT CONDITIONS

A. Weather: Perform work only when existing and forecasted weather conditions are within the limits established by referenced standards. Perform work only when ambient temperature is forecasted to be at least 50-degrees Fahrenheit and when temperatures have not been below 35-degrees Fahrenheit for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess amount of moisture or is in a frozen state.

B. Asphalt paving shall not be applied until the finished compacted gravel base has been tested and approved. A delay in paving after the gravel base is tested and approved may require recompaction and testing at no additional cost to the Owner.

C. Construction methods, transportation and delivery of mixtures, spreading, finishing, compaction joints, etc. shall conform to Section 460 of the Massachusetts Department of Transportation Standard Specifications for Highways and Bridges unless otherwise specified herein.

D. Substrates: Proceed with work only when substrate construction and penetrating work is complete and base is dry.

E. Traffic Control: Maintain access for vehicular and pedestrian traffic as required and for other construction activities.

F. Grade Control: Establish and maintain required lines and elevations.

1.6 REGULATORY REQUIREMENTS

A. Strictly comply with applicable codes, regulations and requirements of authorities having jurisdiction.

1.7 QUALITY ASSURANCE

A. Bituminous concrete shall be prepared, mixed, transported, placed, compacted and finished in accordance with the requirements set forth in the latest edition of the “Standard Specifications for Highways and Bridges” (hereinafter referred to as “SSHB”), as published by the Massachusetts Department of Transportation.

1.8 TESTING

A. During the placing and rolling operation, repeated checks shall be made to ascertain the correct rate of application to provide the required compacted thickness

B. If the average thickness is deficient from the specified thickness by one quarter (1/4) inch or more, the extent of the deficient area shall be corrected at the Contractor’s expense.

C. Upon completion of testing, the Contractor shall properly fill all test holes by compacting a fine aggregate bituminous concrete for the full depth of the core. The finished surface shall be smooth.

1.9 COORDINATION

A. This Contractor shall coordinate with all other trades especially grading, curb installation, electrical and plumbing contractors, through the General Contractor in order to prevent covering up unfinished or uninspected work and loss of time or labor by mis-scheduling and to

assure the steady progress of all work of the Contract. Any rework shall be done at no cost to the Owner.

1.10 LAYOUT AND GRADES

A. A Registered Land Surveyor or Registered Professional Engineer employed by the Contractor shall lay out all lines and grade work in accordance with the Contract Documents.

1.11 DISTURBING EXISTING PAVEMENT DURING CONSTRUCTION

A. Existing paved areas shall be protected from damage by construction activities to the extent possible. Where sections of the finished paved areas have to be removed, the edges shall be saw cut in all cases and patched.

B. Existing finished paved areas that require extensive cutting and patching or have become damaged and cannot be satisfactorily repaired by cutting and patching shall be resurfaced. These resurfaced areas shall be large enough to be applied by paving machines. Shape of these resurfaced areas shall be near and in rectangular patterns or shall conform to the shape or edges of other adjacent surface improvements. Edges of resurfaced areas shall be saw cut and existing pavements shall be removed from a distance of two feet into areas to be resurfaced, so that now pavement can neatly blend into existing pavement showing no joints or imperfections. If the gravel base course has been disturbed, the Contractor shall remove the disturbed material, repair the existing gravel base and apply a new binder course as specified herein.

C. All paving beyond the project's property line shall be in accordance with the requirements of the authority having jurisdiction. Provide traffic control for any work within the Town's Right-of-Way.

PART 2 - PRODUCTS

2.1 GRAVEL BASE COURSE

A. Subgrade preparation and gravel base course shall furnished and installed as specified under 31 23 00 EXCAVATION FILLING AND GRADING. Starting Asphalt Paving work specified herein shall constitute acceptance of the base course conditions. Any defects in work resulting from such conditions shall be corrected under this Section 31 12 16 Asphalt Paving, at no additional cost to the Owner.

2.2 ASPHALT PAVING MATERIALS AND PRODUCTS

A. Coarse Aggregates: Provide clean, sound, angular crushed stone, crushed gravel, complying with ASTM D 692-88.

1. Use of Recycled Asphalt Pavement (RAP) in the binder course and for asphalt driveways, parking lots and walkways shall be limited to a maximum of 20% in the binder course and 10% in the top course provided that the end product is in conformance with the designated job-mix formula. For any bituminous mixture containing RAP, the Contractor shall submit in addition to the Job-Mix formula, the amount and type of asphalt modifier to be added to the mixture to restore the asphalt properties of the RAP to a level that is consistent with the requirements for new asphalt.

B. Fine Aggregate: Provide sharp-edged natural sand or sand prepared from stone, gravel or combination thereof, complying with ASTM D 1073.

C. Bituminous material for tack coat shall be one of the following:

1. Cut-back asphalt (rapid curing type) conforming to AASHTO M81, Grade RC-70 or
2. Emulsified asphalt rapid-setting type conforming to AASHTO M140, Grade RS-1

D. Bitumen asphalt cement for the mixture shall conform to SSHB M3.01.0 and AASHTO M 226, Table 2 with the additional requirement of Ductlity at 60 degrees Fahrenheit.

E. Bituminous crack sealer shall be a hot-applied bituminous sealer conforming to Fed. Spec. SS-S-1401.

2.3 ASPHALT PAVING MIXES

A. Provide Class I Bituminous Concrete Pavement, Type I-1 in compliance with Section 460, Paragraph 460.40, SSHB and Article 2.2 ASPHALT PAVING MATERIALS AND PRODUCTS.

1. Binder Course and Top Course shall conform with the Job-Mix Formula given in Section M, paragraph M3.11.03, SSHB

2. The Binder Course shall consist of one lift of Binder Course asphalt paving to thickness as shown on the Contract Documents. RAP content shall not exceed 20%. The aggregate for the binder course shall conform to the following gradation requirements:

SIEVE SIZE	PERCENT PASSING
1”	100
3/4”	80 – 100
½”	55 - 75
#4	28 – 50
#8	20 - 38
#30	8 – 22
#50	5 - 15
#200	0 - 5
Bitumen % of mix	4.5 - 5.5

3. The Top Course for driveways, parking lots and walkways shall consist of one lift of Top Course asphalt paving to thickness as shown on the Contract Documents. RAP content shall not exceed 10%. The surface tolerance after completion shall be 3/16 inch when measured in any direction with a 10 ft. straightedge. The aggregate for the top course shall conform to the following gradation requirements:

SIEVE SIZE	PERCENT PASSING
5/8”	100
1/2”	95 – 100
3/8”	80 - 100
#4	50 - 76
#8	37 - 54
#30	17 - 29
#50	10 - 21
#200	2 - 7
Bitumen % of mix	5.5 – 7.0

PART 3 - EXECUTION

3.1 GRAVEL BASE COURSE

A. Subgrade preparation and gravel base course construction shall be performed in accordance with 31 23 00 EXCAVATION FILLING AND GRADING to meet the grades indicated on the Drawings and obtain a foundation of uniform bearing surface.

3.2 INSTALLATION OF ASPHALT PAVING

A. Preinstallation examination required: The Installer of asphalt paving shall examine the sub base and all related work, and the conditions under which this work is to be performed and notify the Contractor in writing of all deficiencies and conditions detrimental to the proper completion of their work. Beginning work means Installer accepts substrates, previous work, and conditions.

B. Reference Standards: Install asphalt concrete in strict compliance with Sections 460.60 through 460.68 of the State Standard Specifications, except where more restrictive requirements are specified.

C. Subbase Inspection: Do necessary grading in addition to that specified under Section 31 20 00 Earth Moving to bring sub-grade to required grades and sections for bituminous pavement base course construction. Tamp traces of trenches. Remove spongy and otherwise unsuitable material and replace with approved material. Loosen exceptionally hard spots and recompact. Take every precaution to obtain a foundation of uniform bearing strengths. Any defects in this work shall be corrected under this Section at no additional cost to the Owner.

D. Gravel Base Course Preparation: shall consist of approved gravel fill and placed on approved subgrade to the depth indicated and as specified under Section 31 23 00 EXCAVATION FILLING AND GRADING. The surface of the gravel base shall be shaped to the cross section of the pavement. The start of work under this Section shall constitute acceptance of the foundation conditions to which this work is to be applied.

1. The gradation shall conform to Gravel Borrow as specified in Section 31 23 00 EXCAVATION FILLING AND GRADING. Gradation shall be determined by a mechanical wet sieve analysis and in accordance with ASTM D-422.

2. The gravel shall be spread in layers from self-spreading vehicles or with power graders of approved types, or by hand methods upon the prepared subgrade. The gravel shall be compacted to not less than 95-percent of the maximum dry density of the material as determined by the Method of Test for ASTM Designation D - 1557, Method D. Grading and compaction shall continue until the surface is even and true to the proposed lines and grades within a tolerance of 3/8-inch above or below the required cross sectional elevations and to a maximum irregularity not exceeding 3/8-inch under a ten foot line longitudinally. Any specific area which after being rolled, does not form a satisfactory, solid foundation shall be removed, replaced and recompacted. The gravel shall be spread and compacted in layers not exceeding 6-inches in compacted thickness. The Contractor shall furnish, set and maintain all line and grade stakes necessary to guide the automated grade control equipment.

3. Contractor shall maintain the gravel base course in an acceptable condition, protected from traffic, erosion and other elements until the asphalt paving is placed.

4. After the subgrade and /or existing pavement surfaces have been prepared as specified herein, the Contractor shall check all frames, covers, grates, water valve boxes and all miscellaneous castings that are located in the proposed pavement area to insure that all such items have been accurately positioned and set to the proper slope and elevation. All covers and grates shall be set flush with the required finished pavement surface. No depressions or mounds will be permitted in the pavement to accommodate inaccuracies in the setting of these appurtenances.

5. For reclaimed base course requirements refer to Section 31 10 00 – Site Clearing and Preparation.

E. Tack Coat: Tack coat shall be applied to previously paved, hardened surfaces. Apply uniformly by mechanical means at a rate of 0.05 gal/s.y. after thoroughly cleaning such surfaces of all foreign matter and loose material. Surfaces shall be dry before the tack coat is placed. The tack coat shall be applied immediately prior to laying the new pavement.

F. Placing Mix: Paving shall be laid in two courses except as noted on the Drawings. The thickness of each course shall be as shown on the Drawings and measured in place after compaction. The first course shall be the Binder Course and the second course shall be Top Course as defined in “Table A” of Section M3.11.03 “Job-Mix Formula” of the SSHB.

1. Any unsatisfactory irregularities or defects remaining after the final compaction shall be corrected by removing and replacing with new material as specified, to form a true and even surface. All minor surface projections, joints and minor honeycombed surfaces shall be ironed out smoothly to grade, as directed.

2. No vehicular traffic or loads shall be permitted on the newly completed pavement until stability has been attained and the material has cooled sufficiently to prevent distortion of loss of fines.

G. Rolling: Begin rolling mixture when asphalt concrete can bear weight of roller without excessive displacement. Roll at least three times and provide a smooth, compact, uniform surface free of roller marks. After first rolling repair displaced area as needed with additional hot material. Roll at least two additional times to thoroughly compact concrete to maximum density and to remove roller marks.

H. Tolerances: The finished surface of each hot-mixed asphalt course shall be tested for smoothness using a 10-foot straight edge applied parallel with and at right angles to the center line of the paved area. Surfaces exceeding the following tolerances within the 10-feet will not be accepted.

Binder Course: 1/4-inch Top Course: 3/16-inch

3.3 PATCHING EXISTING ASPHALT PAVEMENT

A. In areas on site where new pavement abuts existing pavement and/or where existing pavement requires patching due to removal of existing pavement for installation of work under this Contract, patching of existing pavement shall be as follows:

1. Sawcut the existing edge of pavement in a straight line at a 90-degree angle to the vertical in such a manner that all existing loose or cracked areas of pavement are removed.

2. Edges of existing pavement shall be painted with a thin coat of bitumen (RS-1) immediately before placing new pavement.

3. Asphalt shall be installed as specified herein. Smooth transition surfaces shall be provided where new pavement abuts existing paved surfaces.

4. Joints shall be sealed and sanded immediately after new pavement installation.

B. All asphalt patching work within public right-of-ways shall be completed in accordance with the requirements of the authority having jurisdiction.

1. Provide traffic control for work within the public right-of-way.

2. All road surfaces shall be cut by an approved mechanical means before any excavation is started to insure against unnecessary damage to pavement.

3. Excavation shall be completed in a safe and workmanlike manner and is to create a minimum amount of obstruction to pedestrian and or vehicular traffic.

4. Gravel Borrow shall be used and placed on six inch layers and compacted to 95% of the maximum dry density by mechanical means.

5. Resurfacing:

a. The work to be completed hereunder shall include the replacement of all existing bituminous pavements disturbed by the work. This shall include roadways, sidewalks, berms, driveways, parking lots and other paved areas encountered in the work.

Resurfacing will not be strictly limited to those areas disturbed, when in the judgment of the Architect an expansion of the work is necessary for proper restoration and to those areas specifically shown on the Drawings.

b. All work shall conform the requirements of the Massachusetts Highway Department SSHB, latest edition. Specific gradations of mix will be as directed by the Town Engineer or Architect to suit the use intended.

c. All cut joints at existing and new top pavement surfaces shall be sealed with bitumen and sand. This includes roadways, sidewalks, driveways, and all other pavements.

3.4 CLEANING, REPAIR AND PROTECTION

A. Three days after rolling, the finished pavement shall be tested. Any section that shows ponding, indentation, rutting or picking up shall be resurfaced at the Contractor’s expense.

B. Provide temporary protection to ensure work is completed without dirt, stains, damage or deterioration at time of final acceptance. Clean up stains and spills as they occur. Remove protection and clean as necessary immediately before final acceptance review.

3.5 GUARANTEE

A. The Contractor shall guarantee all pavement installations, including materials and workmanship, for a period of one year from the date of acceptance. The Contractor shall make interim repairs as necessary to maintain all paved areas in good, usable conditions.

END OF SECTION

SECTION 32 13 13
CONCRETE

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The conditions of the Contract, including Division 00 and Division 01, apply to the work under this Section.

B. The Contractor shall prior to any removal of surplus fill, excavated material, or debris from the site, furnish written evidence satisfactory to the owner or owner's representative that he has an approved dumping location for debris and/or spoil from his/her excavation activities.

1.2 WORK INCLUDED

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to furnish and install reinforced concrete pavement and stairs as indicated on the Drawings and as specified herein.

B. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments within jurisdiction and coordinate all work under this Section, including but not limited to:

1. Footings for site improvements, playground equipment footings
2. Concrete setting bed for curbing

C. The following related items are included under the Sections listed below.

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 16 00 – Asphalt Paving
6. Section 32 13 13 - Concrete
7. Section 32 18 16.13 – Playground Protective Surfacing
8. Section 32 18 17 – Engineered Wood Fiber Surfacing
9. Section 32 31 00 - Fencing
10. Section 32 90 00 – Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities

1.3 SUBMITTALS

A. Submit manufacturer's product data for the following:

1. Concrete mix designs for footings

1.4 LAWS, ORDINANCES, PERMITS AND FEES

The Contractor shall:

A. Give necessary notices, obtain all permits and pay all governmental taxes, fees and other costs in connection with this work, file all necessary plans, prepare documents and obtain all necessary approvals.

B. Obtain all required certificates of inspection for this work and deliver same to the Architect before request for acceptance and final payment for the work.

C. Include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawings and documents) in order to comply with all applicable laws, ordinances, rules and regulations in the Town of Andover and the Commonwealth of Massachusetts, whether or not shown on the Drawings and/or specified.

1.5 DEFINITIONS

A. The following related items are included herein and shall mean:

1. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of Massachusetts, Department of Transportation, latest edition

2. A.S.T.M. - American Society for Testing and Materials

3. A.A.S.H.T.O. - American Association of State Highway and Transportation Officials

4. ACI – American Concrete Institute

1.6 SUBSURFACE INFORMATION

A. The Owner assumes no responsibility for the Contractor's failure to make his own site investigation and makes no representation regarding the character of the soil or subsurface conditions which may be encountered during the performance of the work.

1.7 FINISHED GRADES

A. The words "finished grades" as used herein mean the required final grade elevations indicated on the Drawings. Where not otherwise indicated, site areas shall be given uniform slopes between points, for which finished grades are shown, or between such points and existing grade except that vertical curves or roundings shall be provided at abrupt changes in slope.

1.8 GRADES AND ELEVATIONS

A. The Drawings indicate, in general, the alignment and finished grade elevations. The Landscape Architect, however, may make adjustments in grades and alignment as are found necessary to avoid interference and to adapt the grading to special conditions encountered.

1.9 WORK IN THE PUBLIC WAYS

A. Notify the appropriate municipal officials at least seven calendar days in advance of commencing any work in the public ways to obtain all required permission to perform this work. Perform all work in the public ways in a manner required by the municipal authorities.

B. Should there be any conflict between requirements specified in the Contract Documents and those of the municipality, the municipal requirements shall govern.

C. Do not close or obstruct any streets or sidewalks unless and until they have been discontinued by the appropriate municipal authority or unless and until he shall have first secured all necessary or other permits therefor. No materials whatsoever shall be placed or stored in the streets. Conduct all operations to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks, or other facilities near enough to the work to be affected thereby.

1.10 QUALITY ASSURANCES

A. Unless otherwise specified, work and materials for construction of the reinforced Portland cement concrete paving shall conform to referenced ACI specifications including, but not limited to 301, 309R, 310, 316R, and applicable portions MassDOT Specifications Section 476 Cement Concrete Pavement. In the event of a discrepancy between these specifications and referenced standards, the most restrictive shall apply.

B. Paving work and base course installation shall be done only after excavation and construction work which might damage them have been completed. Damage caused during construction shall be repaired before acceptance.

D. Existing paving areas shall, if damaged or removed during course of this project, be repaired or replaced under this Section. Workmanship and materials for such repair and replacement, except as otherwise noted, shall match as closely as possible those employed in existing work installed under this Contract.

E. Pavement, base, or subbase shall not be placed on a muddy or frozen subgrade.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE COURSE

A. Base course shall be specified, provided, installed and paid for under 31 23 00 Excavation Filling and Grading Specification Section.

2.2 FORM MATERIALS

A. Unless otherwise indicated, construct form work for concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practical sizes to minimize number of joints and to conform to the joint system shown on Drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.

C. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

2.3 PORTLAND CEMENT CONCRETE

A. Cast-in-place concrete shall be air-entrained concrete with a minimum 28-day compressive strength of 4,000 pounds per square inch. For below grade elements, minimum 28-day compressive strength of 4,000 pounds per square inch. Concrete shall be air-entrained 7% minimum, +/- 1% by volume. Concrete slump shall have a slump of 3 inches to 5 inches. Maximum aggregate size shall be ¾ inch. Thickness of concrete shall be as noted on the Contract Documents.

B. Cement shall be stored in a weather-tight structure and in such a manner as to prevent deterioration or intrusion of foreign matter. It shall be easily accessible for proper inspection and identification of each shipment. Cement that has hardened or partially set shall not be used.

2.4 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Landscape Architect.

C. Adjustments to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

2.5 CONCRETE MIX

A. Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd. or fraction thereof.

B. Provide batch ticket for each batch discharged and use in work indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

C. Ready-Mix Concrete: Comply with requirements of ASTM C94, and as herein specified.

D. Delete reference for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.

E. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required.

F. When air temperature is between 85 Deg. F (30 deg. C) and 90 Deg. F (32 deg. C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 Deg. F. (32 deg. C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBGRADE

A. Areas to be paved shall be compacted and brought to subgrade elevation and all work specified, performed and paid under Earth Moving Specification Section. Prepared subgrade will be inspected by the Owner’s Representative. Contractor shall arrange to have the Owner’s Representative visit the site to inspect and approve subgrade.

3.2 AGGREGATE BASE COURSE

A. Base course shall be specified, provided, installed and paid for under 31 23 00 Excavation Filling and Grading Specification Section.

3.3 FORMWORK

A. Forms shall conform to the lines, dimensions and shapes of concrete shown providing for openings, recesses, keys, slots, beam pockets and projections as required.

B. Make forms clean and free of foreign material before placing concrete.

C. Do not use earth cuts as forms for vertical surfaces, unless approved by the Architect.

E. Design of Formwork

1. Comply with ACI 301, Chapter 4, Paragraph 4.2. Formwork drawings shall bear the seal of licensed professional engineer.

2. Provide forms so that no discernible imperfection is in evidence in finished concrete surfaces due to deformation, bulging, jointing, or leakage of forms.

3.4 PORTLAND CEMENT CONCRETE

A. Ready Mix Concrete

1. Comply with ASTM C94.

2. Add mixing water only at the site.

3. Discharge the concrete completely at the site within 1-1/2 hours after the introduction of the cement to the aggregates. In hot weather reduce this time limit so that no stiffening of the concrete shall occur until after it has been placed.

3. Begin the mixing operation within thirty minutes after the cement has been intermingled with the aggregates.

B. Placing Concrete

1. Preparation before placing: Conform to ACI 310, Chapter 8, Paragraph 8.1.

2. Conveying

a. Comply with ACI 301, Chapter 8, Paragraph 8.2.
b. Provide a spout or downpipe and elephant trunk or other appropriate method to prevent concrete from falling freely through a height greater than 3 feet.

1. Depositing: Comply with ACI 301, Chapter 8, Paragraph 8.3.

2. Consolidating: Comply with ACI 309R, "Recommended Practice for Consolidation of Concrete". All concrete shall be vibrated. Maintain at least one vibrator as a stand-by.

C. Curing

1. It is essential that concrete be kept continuously damp from time of placement until end of specified curing period. It is equally essential that water not be added to surface during floating

and troweling operations, and not earlier than 24 hours after concrete placement. Between finishing operations surface shall be protected from rapid drying by a covering of waterproofing paper. Surface shall be damp when the covering is placed over it, and shall be kept damp by means of a fog spray of water, applied as often as necessary to prevent drying, but not sooner than 24 hours after placing concrete. None of the water so applied shall be troweled or floated into surface.

2. Concrete surfaces shall be cured by completely covering with curing paper or application of a curing compound.

   a. Concrete cured using waterproof paper shall be completely covered with paper with seams lapped and sealed with tape. Concrete surface shall not be allowed to become moistened between 24 and 36 hours after placing concrete. During curing period surface shall be checked frequently, and sprayed with water as often as necessary to prevent drying, but not earlier than 24 hours after placing concrete.

   b. If concrete is cured with a curing compound, compound shall be applied at a rate of 200 square feet per gallon, in two applications perpendicular to each other.

   c. Curing period shall be seven days minimum.

D. Form Removal

1. Do not remove forms until the concrete has thoroughly hardened and has attained sufficient strength to support its own weight and construction live loads to be placed thereon, without damage to the structure. In general, do not disturb forms for framing until the concrete has attained at least 40% of design strength for side forms and 80% of design strength for bottom forms. Remove no forms for 24 hours after placing concrete. Protect concrete walks from pedestrian traffic for a period of 3 days after placing. Damp cure as per standards above. Be responsible for proper form removal and replace any work damage due to inadequate maintenance or improper or premature form removal.

3.5 FIELD QUALITY CONTROL

A. Sampling and testing for quality control during placement of concrete may include the following, as directed by the Landscape Architect.

1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.

2. Slump: ASTM C143, one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.

3. Air Content: ASTM C173, volumetric method for lightweight or normal weight concrete; one for each set of compressive strength test specimens.

4. Concrete Temperature: Test hourly when air temperature is 40 deg. F (4 deg. C) and below, and when 80 deg. F (27 deg. C) and above; and each time a set of compression test specimens made.

5. Compression Test Specimen: ASTM C31; one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

6. Compressive Strength Tests: ASTM C39; one set for each 100 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

7. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

8. Strength level of concrete will be considered satisfactory if average of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.

9. Test results will be reported in writing to Architect and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day test.

10. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

3.6 FINISHING

A. General Requirements Concrete surfaces for footing shall be woodfloated with a slightly rough surface and finished with a domed or sloped surface to shed water to the edges of the form.

3.7 PROTECTION OF CONCRETE SURFACES

A. Protection of Concrete: Under no circumstances shall the Contractor pour and leave the fresh concrete open to vandalism, while it is setting up. Damaged concrete shall be subject to rejection by the Landscape Architect.

3.8 ACCEPTANCE STANDARDS

A. The following acceptance standards shall be applied to this Contract. Any portion of the concrete paving that does not meet required acceptance standards shall be removed at the direction of the Owner's Representative. Saw cut and remove concrete and discard off site in a legal manner and replace with new concrete meeting the requirements of this Section.

1. Shall not pond water.
2. Concrete shall not display cracking.
3. Pours not conforming to the Contract Documents.
4. All forms shall be removed from the site.
5. Surfaces shall be free of surface voids and projections.

END OF SECTION

SECTION 32 16 00
CURBING

PART 1-GENERAL

1.01 RELATED DOCUMENTS

A. This section is only a portion of the Contract Documents. All of the Contract Documents, including Conditions of the Contract and Division 1 General Requirements, apply to this section.

1.02 DESCRIPTION OF WORK

A. The work of this Section includes, but is not limited to the following:

1. Vertical Granite Curb

2. Precast Concrete Curb

1.03 RELATED WORK

A. Carefully examine all of the Contract Documents for requirements that affect the work of this Section. Other specification sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 12 16 – Asphalt Paving
6. Section 32 13 13 – Concrete
7. Section 32 18 23.13 – Playground Protective Surfacing
8. Section 32 18 17 – Engineered Wood Fiber Surfacing.
9. Section 32 31 00 – Fencing
10. Section 32 90 00 – Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage

1.04 INTENT

A. The intent of the work of this Section is to provide curbing which at a minimum complies with Commonwealth of Massachusetts, Department of Transportation, “Standard Specifications for Highways and Bridges,” (hereinafter referred to as SSHB) Section 500, “Curb and Edging” and to more stringent requirements specified herein.

B. Department of Public Works: All work within any public way and all work affecting any public way, including without limitation, roadways, sidewalks, curbs, and other work shall be done in strict compliance with the requirements of the authority having jurisdiction including local and State Standard Specifications, except when Standard Specifications are in conflict with these specifications, the most restrictive and inclusive requirements shall govern.

1.05 SUBMITTALS

A. Shop Drawings: The name of the Contractor shall be shown on the shop drawings. Finished work shall conform to approved samples and shop drawings.

1. Provide large scale, detailed and complete shop drawings/placement drawings showing all curbing work including all dimensions, radii, straight and radial transition curbs for accessible curb cuts with lengths clearly indicated.

2. Provide an itemized schedule of all curb pieces. Curbing shall be individually listed by type with radius and straight pieces noted with their lengths. Tapered, transition and corner curbs shall be individually listed.

B. Product Data: Submit manufacturers' certifications stating that materials comply with requirements.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products adequately protected against damage. Handle in strict compliance with manufacturer's instructions and recommendations and store off the ground. Protect from all possible damage including, but not limited to, chipping, staining, cracking and other damage. Cracked, chipped, or stained units will be rejected and shall not be utilized in this work. Sequence deliveries to avoid delays, but minimize on-site storage.

1.07 COORDINATION

A. The work of this Section shall be coordinated with that of other trades affecting or affected by the work of this Section, including paving work to be done by others, as necessary to assure the steady progress of the Work.

PART 2 - PRODUCTS

2.01 MORTAR

A. Cement mortar shall conform to Section M4.02.15 of the Massachusetts Department of Transportation SSHB.

B. Concrete for curb setting shall be 4,500 lb. concrete as specified in Section 32 13 13 – CONCRETE PAVEMENTS.

2.02 GRANITE CURB

A. Granite shall be "New England" structural granite conforming to ASTM C 615, Class I Engineering Grade, suitable for curbstone use.

1. Curb shall be light gray, free from seams which impair structural integrity, and with percentage of wear less than 32 percent, as determined by ASTM C 131.

B. Vertical Granite Curb: Furnish vertical granite curbing, type VA-4 as described in Section M9.04.0 and M9.04.1 of the Massachusetts Department of Transportation SSHB. All curb shall be basically light gray in color, free from seams and other structural imperfections or flaws which would impair its structural integrity, and of a smooth splitting appearance. The top surface shall be sawed to an approximate true plane, and shall have no projections or

depressions greater than 1/8 inch. The front and back arris lines shall be pitched straight and true and there shall be no projections on the back surface for 3 inches down from the top that would exceed a batter of 4" per foot. The front surface shall be at right angles to the planes of the top and ends and shall be smooth quarry split, free from drill holes. Minimum length shall be 6 feet unless otherwise shown on the Drawings.

2.03 PRECAST CONCRETE CURB

A. Furnish precast concrete curb to sizes, shapes and dimensions shown on the Drawings. These materials shall conform to the following requirements:

1. Precast concrete curb shall be Portland cement Type I. Cement concrete shall be air-entrained 5,000 psi, ¾-inch, 705 pounds. Curbstones shall be 6" x 18 x 6'-0" typically. For curbing mounted flush with adjacent surfaces, curb stone shall be finished to match the exposed surfaces of the other six-inch-wide raised curb stones.

B. Precast concrete curb construction methods shall comply with the requirements of Section 500 of the Mass. SSHB, as last amended:

1. Precast concrete curb shall be set on a six inch select gravel base, unless otherwise indicated on the Drawings, and to the required line and grade.

2. Unless otherwise indicated on the Drawings, curbing shall be set in a trench, which shall have been excavated to a width of 18 inches. The subgrade of the trench shall be at a depth of six inches plus the depth of the curbstone. Subgrade shall then be filled to proper level to support curb at final grade. Fill for this purpose shall consist of fine gravel or very coarse sand and a dry mortar pack concrete thoroughly tamped.

3. Set all curb with continuous concrete setting bed. Concrete shall be as specified herein for footings.

4. Curb units shall be placed in accurate line, each piece butting the next with maximum joint spacing no larger than ¼-inch. Final points shall be joined by closure pieces made to order. No curb stone shall be cut in the field. After alignment, curb shall be carefully backfilled with suitable material. Extreme care shall be taken not to destroy alignment.

5. Curb shall be set at line and grade required and shall project 6" above pavement grade, unless otherwise noted on Drawings. All curbing shall be installed prior to installation of the adjacent finished surfaces.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Curb shall be set to the line and grade required and shall project above finished grade elevations in accordance with the Details.

B. Preinstallation Examination Required: The installer shall examine previous related work, and conditions under which this work is to be performed and notify Contractor in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means installer accepts substrates, previous work, and conditions.

C. Manufacturer's Instructions: Strictly comply with Mass. S.S.H.B. including Section 500 of the

latest edition for the installation of specified curb, unless these specifications are more restrictive. In such cases these specifications will prevail.

D. Trench Preparation: Curb shall be set in a trench excavated to a width of 20 inches. The bottom of the trench shall be 6 inches deeper than the depth of the curbstone. The subgrade shall then be filled to proper levels with a minimum of 6 inches of compacted gravel borrow at the lines and grade shown on the plan to provide continuous support to the bottom of curb. Gravel borrow shall be thoroughly rammed or tamped until firm and unyielding.

E. Precast Concrete Curb Installation: Set curbs true to line and grade with vertical exposed curb faces plumb and with curb top surface parallel to adjacent surfaces. The maximum space between joints shall not be more than 1/4 inch. Place concrete continuously along the front and back of the curb as indicated on the Detail. The curbing contractor shall confirm true vertical and horizontal alignment immediately after setting concrete and adjust curb sections as necessary to provide a true line. Joints as described under pointing below.

F. Pointing Joints in Precast Concrete Curb: The joints between curbstones and edging (both front and back) shall be carefully filled with cement mortar and neatly pointed on the top and front exposed portions. After pointing, the curbstones or edging shall be satisfactorily cleaned of all excess mortar that may have been forced out of the joints and that may be on the exposed surfaces of the curb.

G. Tolerances: The following installed tolerances are allowable variations from locations and dimensions indicated by the Contract Documents and shall not be added to allowable tolerances indicated for other work.

1. Allowable Variation from True Plumb: 1/8-inch over exposed face

2. Allowable Variation from True Line: 1/4-inch in 20-feet

3.02 REPAIR, CLEANING AND PROTECTION

A. Repair minor damage to eliminate all evidence of repair. Clean exposed surfaces using non-abrasive materials and recommended methods. Remove and replace damaged or unsuitable work that cannot be successfully cleaned or repaired.

B. Provide temporary protection to ensure work is without damage or deterioration at time of final acceptance. Remove protections and re-clean as necessary immediately before final acceptance.

C. After completion of the work in this Section, the Contractor shall remove all debris, materials, rubbish, etc. from the site and legally dispose of them. New or existing improvements that have been damaged in the work under this Contract shall be repaired to the satisfaction of the Architect.

END OF SECTION

SECTION 32 18 16.13
PLAYGROUND PROTECTIVE SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 apply to the work of this Section.

1.2 DESCRIPTION OF WORK

A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all paving operations complete as shown on drawings and specified herein.

B. Work includes, but is not limited to the following:

1. Grading and Compacting of Subbase
2. Poured-in-Place Rubber Safety Surfacing
3. Curbing
4. Cleaning, Repair and Protection

1.3 RELATED WORK

A. Carefully examine the site and all of the Contract Documents for requirements that affect the work of this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions. Other specifications sections that directly relate to the work of this Section include, but are not limited to, the following:

B. The following related items are included under the Sections list below:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 12 16 – Asphalt Paving
6. Section 32 13 13 – Concrete
7. Section 32 16 00 – Curbing
8. Section 32 18 17 – Engineered Wood Fiber Surfacing
9. Section 32 31 00 - Fencing
10. Section 32 90 00 – Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities.

C. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.

1.4 REFERENCES

A. The following related items are included herein and shall mean:

1. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.

2. A.S.T.M. - American Society for Testing and Materials.

B. American Society of Testing and Materials (ASTM)

1. 355 Shock Absorbing Properties of Playing Surface Systems and Materials (GMAX)

2. F1292 Impact Attenuation of Surface Systems Under and Around Playground Equipment

3. F1951 Determination of Accessibility of Surface Systems Under and Around Playground Equipment

1.5 SUBMITTALS

A. Submit Poured-in-Place Rubber manufacturer's Product Literature including IPEMA certification, Specification Data and installation instructions.

1. Provide 2 color samples for each specified color combination identified on the drawings, 12" x 12" square, up to 10 samples to Owner/Landscape Architect. The final color samples and ratios for each zone to be specified by Landscape Architect during selection process

2. Submit test results for impact attenuation in accordance with ASTM F 1292 Standard Specification and accessibility in accordance with ASTM F1951.

3. Provide Manufacturer's Warranty for Owner's acceptance.

4. Submit test results for impact attenuation in accordance with ASTM F 1292 Standard Specification and accessibility in accordance with ASTM F1951. Submit evidence of IPEMA (International Playground Equipment Manufacturer's Association) certification.

B. Submit installer qualifications (Manufacturer-certified installer of system).

1. Installers of the rubber safety surface system shall have five (5) years experience, minimum, and shall provide three (3) local references where installation can be inspected.

C. The General Contractor shall verify by field inspection that all items within this section conform to the specified requirements and approved submittals prior to installation

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products and provide adequate protection against damage. Handle in strict compliance with manufacturer instructions and recommendations and store off the ground. Protect from all possible damage including, but not limited to chipping, staining, cracking and other damage. Sequence deliveries to avoid delays, but minimize on-site storage.

1.7 COORDINATION

A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work as necessary to assure the steady progress of the work of this Contract.

B. Start of work under this Section shall constitute acceptance of the foundation conditions to which this work is to be applied. Any defects in work resulting from such conditions shall be corrected under this Section, at no extra cost to the Owner.

C. Substrates: Proceed with work only when substrate construction and penetrating work is complete. Maintain the sub-base in satisfactory condition and properly drained until surface improvement is placed.

1.8 GUARANTEE

A. The Contractor shall deliver standard written manufacturer's guarantee in the Owner's name covering all materials and workmanship. In addition to the specific guarantee requirements of the GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS, the Contractor shall provide the manufacturers' standard written warranty for each product within this specification. All of these guarantees shall be in addition to, and not in lieu of, other liabilities that the Contractor may have by law or other provisions of the Contract Documents.

1.9 QUALITY ASSURANCE:

A. Surface Installer Qualifications: Company specializing in outdoor resilient surfaces in the USA and certified members of NPCAI. The applicator shall be approved and trained, with a minimum of five years' documented experience and have completed 5 public playgrounds in the past 5 years. Conditions of all surface substrates with respect to structural performance shall be evaluated and approved by the surface installer prior to application of surface system.

B. Performance requirements

1. All safety surfacing within playground equipment use zones shall meet or exceed the performance requirements of the CPSC, ADA and Fall Height Test ASTM F 1292 and IPEMA certified for the highest playing point of each piece of play equipment.

2. Surfaces intended to serve as accessible routes of travel shall be firm, stable and slip resistant and shall be meet the requirements of ASTM F 1951 and ASTM F 1292

C. Post-installation testing

1. Impact attenuation testing shall be performed by a National Recreation and Parks Association/National Playground Safety Institute (NRPA/NPSI) Certified Playground Safety Inspector (CPSI) and trained in the proper operation of the Triax test equipment.

2. Impact attenuation testing shall be performed according to ASTM 1292 in presence of the owner within 30 days of installation. As a precondition of surfacing acceptance, the Contractor shall provide the testing results in writing. Up to 10 drop test locations will be required at each separate play area.

3. If the surfacing does not meet the safety standards or impact attenuation performance requirements, at the contractor's expense, the contractor will be required to bring the surfacing up to compliance within 30 days or less. The extent of failure and determination of replacement will be at the discretion of the Owner. Should they be found during or after installation, any violations of the C.P.S.C. Guidelines, ASTM, ADA or impact attenuation performance requirements shall be corrected to the satisfaction of the owner.

Any proposed corrective work shall be reviewed and approved by the Landscape Architect before corrective work begins. At no cost to the Owner, re-testing of the corrective work to confirm performance requirements have been met will be covered by the Contractor.

4. Impact attenuation requirements: Gmax test scores shall be **less than 150 and HIC scores shall be less than 850** or current ASTM 1292 standard, whichever is more strict.

   a. Please refer to the Fall Height Table for general reference on safety surfacing minimum depth. Actual depths shall be adjusted (thickened) as required to accommodate the final Gmax and HIC requirements as described within this document and incoordination with the fall heights of the equipment to be installed.

FALL HEIGHT	
PIP DEPTH*	FALL HEIGHT
2.5”	4’
3”	5’
3.5”	6’
3.5”	7’
4”	8’
4.5”	9’
5”	10’
6”	12’

PART 2 - PRODUCTS

2.1 GRADING AND COMPACTION OF SUB-BASE

A. Do all necessary grading in addition to that specified under Section 31 23 00 – EXCAVATION FILLING AND GRADING to bring subgrade or foundation after final compaction to required grades and sections to obtain a foundation of uniform bearing surface. In absence of specific requirements, compact foundation by such means as will provide firm base and insurance against settlement of superimposed work.

B. Sub-base preparation, including material, shall be of properly approved quality as specified under Section 31 23 00 – EXCAVATION FILLING AND GRADING. Start of work under this Section shall constitute acceptance of the foundation conditions to which this work is to be applied. Any defects in work resulting from such conditions shall be corrected under this Section, at no additional cost to the Owner.

2.2 POURED-IN-PLACE RUBBER SAFETY SURFACING

A. Furnish and install Poured-in-Place Rubber Safety Surface complete with gravel base, asphalt binder, sub drainage and concrete edging per the Contract Documents.

B. To establish a standard of quality, design, and functionality desired, Drawings and Specifications have been based on the material "Playbound" 2-layer poured-in-place by Surface America, www.surfaceamerica.com , PO Box 157, Williamsville, NY 14231; Telephone: (800) 999-0555, Fax: (716) 632-8324 or Architect approved equal.

1. Primer shall be as per manufacturer's system, and recommended by manufacturer.

2. Cushion Course: blend of 100% recycled SBR (Styrene Butadiene Rubber) and aromatic polyurethane binder. Cushion Course thickness per the Contract Documents, and final poured-in-place surfacing depth shall be in accordance with fall height CPSC safety requirements. Required mix proportions by weight: as ratio 14% urethane divided by 86% rubber

3. Top Surface; thickness shall be per the Contract Documents. Required mix proportions by weight: as ratio 18% urethane divided by 82% rubber. There will be four different colors used throughout the rubber play surfacing.

4. All colors listed below in the ratio shall be EPDM (Ethylene Propylene Diene Monomer) with aliphatic polyurethane and mix proportions by weight.

a. Color Surface A (Dark Blue):
   1. 40% Black
   2. 30% Royal Blue
   3. 20% Purple
   4. 10% Sky Blue

b. Color Surface B (Purple Grey):
   1. 30% Black
   2. 30% Sky Blue
   3. 20% Purple
   4. 20% Pearl

c. Color Surface C (Grey):

   1. 40% Black
   2. 40% Pearl
   3. 20% Sly Blue

d. Color Surface D (Gold):

   1. 60% Gold
   2. 40% Pearl

e. Color Surface E (Yellow-Red):

   1. 30% Gold
   2. 30% Primary Red
   3. 30% Yellow
   4. 10% Beige

f. Color Surface F (Beige):

1. 50% Light Grey
2. 30% Beige
3. 20% Pearl

g. Color Surface E (Blue and Green for Planet Earth):

Blue Ratio: 100% Sky Blue

Green Ratio: 100% Bright Green

5. Other approved manufacturers include

a. Playsites and Surfaces, 908 Long Island Ave, Deer Park, NY 11729 tel 631-392-0960

b. Duraturf by Sports surface specialties, East Aurora, NY 14052 locally represented by Premier Park and Play, contact Doug Knotts 617-244-3317

C. Loose color samples shall be submitted by the contractor, and approved by Architect. Upon approval, bound color mockups in specified ratios shall be provided for Landscape Architect for final selection. Solar Reflectance values shall be provided for each sample

D. Materials shall not contain hazardous substances, such as toluene, lead, or mercury compounds or cadmium coloring pigments.

E. The finished surface shall be slip-resistant; supply ASTM-E-303 slip characteristic test results.

F. Material shall be ignition-resistant; supply passing ASTM-D 2859 test results.

G. Material shall be water-permeable, and wear and weather-resistant. Sealants shall be low odor and non-yellowing.

PART 3 - EXECUTION

3.1 SUBBASE, EDGER AND DRAINAGE

A. Install edger system in accordance with the drawings and per the manufacturer's recommendations. Install the underdrainage as indicated on the Drawings. Install gravel base where indicated on the drawings and in accordance with Section 31 23 00 – EXCAVATION FILLING AND GRADING. Install asphalt binder base where indicated on the drawings and in accordance with Section 32 12 16 – ASPHALT PAVING.

3.2 POURED-IN-PLACE RUBBER SAFETY SURFACE

A. Installation shall be as recommended by the manufacturer and shall be to the depths and widths indicated on the drawings.

B. Do not proceed with playground surfacing installation until all applicable site work, including substrate preparation, fencing, concrete edge restraints, playground equipment installation and other relevant work has been completed.

C. Poured in place surfacing must be installed on a dry subsurface with no prospect of rain within the initial drying period and within recommended temperature range (40 degree Fahrenheit and rising) of the manufacturer.

D. The contractor shall provide copies of testing procedures and results, performed by an independent testing source, which demonstrate compliance with the CPSC and ASTM guidelines. Per CPSC and ASTM F-1292 Critical Height testing procedures at 30, 72, and 120 degrees F, the installed surface shall pass the 150 G-max and 850 HIC test for a height at least equal to the highest fall height of equipment as installed within its zone.

B. When installed, the system shall be handicapped-accessible and comply with the Civil Rights Restoration Act of 1987 and the Americans with Disabilities Act of 1990 (ADA). Surface must comply with Massachusetts Architectural Access Board accessibility requirements and ASTM F1951.

C. Contractor shall provide a written five (5) year performance guarantee from date of substantial completion. The manufacturer shall provide a written guarantee for three (3) years from date of installation against decay and biochemical degradation calling for replacement of defective materials during the guarantee period. Contractor shall install system so as to comply with manufacturers' warranty requirements.

D. Install material per manufacturer's specifications.

3.3 CLEANING, REPAIR AND PROTECTION

A. Repair minor damage to eliminate all evidence of repair. Remove and replace work that cannot be satisfactorily repaired.

B. Provide temporary protection to ensure that the work will be without dirt, stains, damage or deterioration at time of final acceptance. Clean up stains and spills as they occur. Remove protections and clean as necessary immediately before final acceptance.

C. Upon completion of the work and before acceptance, the Contractor shall remove and dispose of in an approved manner all surplus materials, rubbish, etc. which the Contractor may have accumulated during the course of the work and shall leave the site in a clean and orderly condition. The Contractor shall not abandon any material at or near the site regardless of whether or not it has any value.

END OF SECTION

SECTION 32 18 17
ENGINEERED WOOD FIBER SURFACING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 apply to the work of this Section.

1.02 DESCRIPTION OF WORK

A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all paving operations complete as shown on drawings and specified herein.

B. Work includes, but is not limited to the following:

1. Grading and Compacting of Subbase
2. Engineered Wood Fiber Surfacing
3. Rubber Kick Mat
4. Cleaning, Repair and Protection

1.03 RELATED WORK

A. Carefully examine the site and all of the Contract Documents for requirements that affect the work of this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions. Other specifications sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 10 00 – Asphalt Paving
6. Section 32 13 13 – Concrete
7. Section 32 16 00 – Curbing
8. Section 32 18 16.13 – Playground Protective Surfacing
9. Section 32 31 00 – Fencing
10. Section 32 90 00 - Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 41 00 – Storm Drainage Utilities

B. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.

1.04 REFERENCES

A. The following related items are included herein and shall mean:

1. S.S.H.B. - Standard Specifications for Highways and Bridges, the Commonwealth of Massachusetts, Department of Public Works, latest edition.

2. A.S.T.M. - American Society for Testing and Materials.

B. American Society of Testing and Materials (ASTM)

1. 355 Shock Absorbing Properties of Playing Surface Systems and Materials (GMAX)

2. F1292 Impact Attenuation of Surface Systems Under and Around Playground Equipment

3. F1951 Determination of Accessibility of Surface Systems Under and Around Playground Equipment

1.05 SUBMITTALS

A. Submit Engineered Wood Fiber Surfacing and Rubber Kick Mat manufacturer's Product Literature including IPEMA certification, Specification Data and installation instructions.

1. Provide one (1) sample for each product to Owner/Landscape Architect for approval.

2. Submit test results for impact attenuation in accordance with ASTM F 1292 Standard Specification and accessibility in accordance with ASTM F1951.

3. Provide Manufacturer's Warranty for Owner's acceptance.

4. Submit test results for impact attenuation in accordance with ASTM F 1292 Standard Specification and accessibility in accordance with ASTM F1951. Submit evidence of IPEMA (International Playground Equipment Manufacturer's Association) certification.

B. Submit installer qualifications (Manufacturer-certified installer of system).

1. Installers of the wood fiber and rubber mat system shall have five (5) years minimum experience and shall provide three (3) local references where installation can be inspected.

C. The General Contractor shall verify by field inspection that all items within this section conform to the specified requirements and approved submittals prior to installation

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products and provide adequate protection against damage. Handle in strict compliance with manufacturer instructions and recommendations and store off the ground. Protect from all possible damage including, but not limited to chipping, staining, cracking and other damage. Sequence deliveries to avoid delays, but minimize on-site storage.

1.07 COORDINATION

A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work as necessary to assure the steady progress of the work of this Contract.

B. Start of work under this Section shall constitute acceptance of the foundation conditions to which this work is to be applied. Any defects in work resulting from such conditions shall be corrected under this Section, at no extra cost to the Owner.

C. Substrates: Proceed with work only when substrate construction and penetrating work is complete. Maintain the sub-base in satisfactory condition and properly drained until surface improvement is placed.

1.08 GUARANTEE

A. The Contractor shall deliver standard written manufacturer's guarantee in the Owner's name covering all materials and workmanship. In addition to the specific guarantee requirements of the GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS, the Contractor shall provide the manufacturers' standard written warranty for each product within this specification. All of these guarantees shall be in addition to, and not in lieu of, other liabilities that the Contractor may have by law or other provisions of the Contract Documents.

1.09 QUALITY ASSURANCE:

A. Surface Installer Qualifications: Company specializing in outdoor resilient surfaces in the USA and certified members of NPCAI. The applicator shall be approved and trained, with a minimum of five years' documented experience and have completed 5 public playgrounds in the past 5 years. Conditions of all surface substrates with respect to structural performance shall be evaluated and approved by the surface installer prior to application of surface system.

B. Performance requirements

1. All safety surfacing within playground equipment use zones shall meet or exceed the performance requirements of the CPSC, ADA and Fall Height Test ASTM F 1292 and IPEMA certified for the highest playing point of each piece of play equipment.

2. Surfaces intended to serve as accessible routes of travel shall be firm, stable and slip resistant and shall be meet the requirements of ASTM F 1951 and ASTM F 1292

C. Post-installation testing

1. Impact attenuation testing shall be performed by a National Recreation and Parks Association/National Playground Safety Institute (NRPA/NPSI) Certified Playground Safety Inspector (CPSI) and trained in the proper operation of the Triax test equipment.

2. Impact attenuation testing shall be performed according to ASTM 1292 in presence of the owner within 30 days of installation. As a precondition of surfacing acceptance, the Contractor shall provide the testing results in writing. Up to 10 drop test locations will be required at each separate play area.

3. If the surfacing does not meet the safety standards or impact attenuation performance requirements, the contractor will be required to bring the surfacing up to

compliance within 30 days or less. The extent of failure and determination of replacement will be at the discretion of the Owner. Should they be found during or after installation, any violations of the C.P.S.C. Guidelines, ASTM, ADA or impact attenuation performance requirements shall be corrected to the satisfaction of the owner, any proposed corrective work shall be reviewed and approved by the Landscape Architect before corrective work begins.

4. Impact attenuation requirements: **Gmax test results shall be less than 150 and HIC test results shall be less than 850.**

   a. Please refer to the fall height zones of the playground equipment and the safety surfacing minimum depth required for said playground equipment. Actual depths shall be adjusted (thickened) as needed by contractor to accommodate the final Gmax and HIC requirements.

PART 2 - PRODUCTS

2.01 GRADING AND COMPACTION OF SUB-BASE

A. Do all necessary grading in addition to that specified under Section 31 23 00 – Excavation Filling and Grading to bring subgrade or foundation after final compaction to required grades and sections to obtain a foundation of uniform bearing surface. In absence of specific requirements, compact foundation by such means as will provide firm base and insurance against settlement of superimposed work.

B. Sub-grade infiltration rates shall be confirmed with in-place testing. A minimum of one test at each playground surfacing type shall be conducted. Tested infiltration rates shall meet or exceed a minimum of two inches per hour (2”/hr). If infiltration rates fail to meet the minimum, remediation of the sub-grade material shall be required to bring the sub-grade infiltration rates into compliance.

C. Sub-base preparation, including material, shall be of properly approved quality as specified under Section 31 23 00 – Excavation Filling and Grading. Start of work under this Section shall constitute acceptance of the foundation conditions to which this work is to be applied. Any defects in work resulting from such conditions shall be corrected under this Section, at no additional cost to the Owner.

2.02 ENGINEERED WOOD FIBER SURFACING

A. Furnish and install Engineered Wood Fiber Surfacing as indicated in the drawings and specified herein.

B. Material shall be IPEMA certified and consist only of recently harvested North American hardwoods including Oak, Maple, Ash, Poplar, Hickory, Beech, Birch and Locust. All woods shall have been debarked and shall be free of soil, leaves, twig material and other contaminates which hasten decomposition. The moisture content shall be between 25% and 55% by weight. No chemical treatment or additives are allowed. Positively no recycled wood from pallets or waste wood is permitted due to the possibility of contamination and the risk of poor surface stability.

C. The density of the material shall be from 18 lbs. per cubic foot to 23 lbs. per cubic foot. Wood

fiber surfacing shall be randomly sized, approximately ten times longer than wide. The material shall meet the gradation requirements of ASTM C136.

D. Hardwood fiber must meet or exceed C.P.S.C., A.D.A., C.S.A., ASTM F-1292-99, and ASTM F-1951 guidelines.

E. Wood fiber must be wheelchair accessible as required by the Americans With Disabilities Act and have been tested to the guidelines of ASTM PS-83 or ASTM F-1951 for accessibility

F. Provide sufficient amount of material to allow for compaction to depths indicated on the plans/details and as per manufacturer's recommendations.

G. Filter fabric shall be provided that is 100% polyester, nonwoven, engineering geotextile fabric, Mirafi 140N or equal. Provide 12" overlap on all seams

H. Filter fabric shall be provided that is 100% polyester, nonwoven, engineering geotextile fabric, Mirafi 140N or equal. Provide 12" overlap on all seams

2.03 RUBBER KICK MAT

A. Furnish and install Rubber Kick Mats as indicated in the drawings and specified herein.

B. Material used will be manufactured from recycled rubber. Dimensions of each mat are 72"' x 88" x 1.5" thick. Mat edges shall be beveled, 90* or squared edges will not be acceptable. Mats shall meet the IPEMA impact rating for the associated playground equipment. Mat shall have an anchoring system to prevent displacement of the kick mat. Mat must meet the Americans with Disabilities Act (ADA) regulations. Rubber Mat color shall be Black.

C. The Basis-of-Design on the rubber mats are TuffMat Resilient Wear Mat as provided by Zeager Bros, Inc. 4000 East Harrisburg Pike, Middletown, PA. 800-346-8524. www.zeager.com; or an approved equal.

PART 3 - EXECUTION

3.01 SUBBASE

A. Prepare the subgrade in accordance with the drawings and per the manufacturer's recommendations.

3.02 ENGINEERED WOOD FIBER SURFACING

A. Installation shall be as recommended by the manufacturer and shall be to the widths indicated on the drawings. Fiber depths shall be inaccordance with the impact attenuation requirements noted by the associated playground structures.

B. Do not proceed with playground surfacing installation until all applicable site work, including substrate preparation, fencing, concrete edge restraints, playground equipment installation and other relevant work has been completed.

C. The contractor shall provide copies of testing procedures and results, performed by an independent testing source, which demonstrate compliance with the CPSC and ASTM

guidelines. Per CPSC and ASTM F-1292 Critical Height testing procedures at 30, 72, and 120 degrees F, the installed surface shall pass the 150 G-max and 850 HIC test for a height at least equal to the highest fall height of equipment as installed within its zone.

D. When installed, the system shall be handicapped-accessible and comply with the Civil Rights Restoration Act of 1987 and the Americans with Disabilities Act of 1990 (ADA). Surface must comply with Massachusetts Architectural Access Board accessibility requirements and ASTM F1951.

E. Contractor shall provide a written five (5) year performance guarantee from date of substantial completion. The manufacturer shall provide a fifteen year (15-yr) limited warranty from date of installation against decay and biochemical degradation calling for replacement of defective materials during the guarantee period. Contractor shall install system so as to comply with manufacturers' warranty requirements.

3.03 RUBBER KICK MAT

A. Installation shall be as recommended by the manufacturer and shall be to the locations as indicated on the drawings.

3.04 CLEANING, REPAIR AND PROTECTION

A. Repair minor damage to eliminate all evidence of repair. Remove and replace work that cannot be satisfactorily repaired.

B. Provide temporary protection to ensure that the work will be without dirt, stains, damage or deterioration at time of final acceptance. Clean up stains and spills as they occur. Remove protections and clean as necessary immediately before final acceptance.

C. Upon completion of the work and before acceptance, the Contractor shall remove and dispose of in an approved manner all surplus materials, rubbish, etc. which the Contractor may have accumulated during the course of the work and shall leave the site in a clean and orderly condition. The Contractor shall not abandon any material at or near the site regardless of whether or not it has any value.

END OF SECTION

SECTION 32 31 00

FENCING

PART 1 - GENERAL

1.01 General Requirements

A. The conditions of the Contract, including Division 00 and Division 01, apply to the work under this Section.

B. All references to products by manufacturer, trade name or performance Specifications bearing the connotation "or approved equal" shall be as determined by the Landscape Architect and the City.

1.02 Work Included

A. Provide all labor, equipment, implements and materials required to furnish, install, construct and perform all site improvements complete as shown on the Drawings and specified herein.

B. To be included, but not limited to the following:

1. Black Vinyl Coated Chain Link Fence

2. Construction fence

1.03 References

A. Examine all other Sections of the Specifications and all Drawings for the relationship of the work under this Section and the work of other trades. Cooperate with all trades and all departments of the Town of Andover and coordinate all work under this Section therewith.

B. The following related items are included under the Sections listed below:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 16 00 – Asphalt Paving
6. Section 32 13 13 – Concrete
7. Section 32 16 00 – Curbing
8. Section 32 18 16.13 – Playground Protective Surfacing
9. Section 32 18 17 – Engineered Wood Fiber Surfacing
10. Section 32 90 00 – Planting
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities

Submittals

A. Shop Drawings and Samples

1. Provide complete Shop Drawings and/or samples and catalog cuts for all items called for on the Drawings and as specified and in accordance with applicable requirements under Division 1. Refer to individual items specified herein for additional submittal requirements.

1.04 Product Delivery, Storage and Handling

A. Deliver materials in manufacturer's original unopened and undamaged packages with labels legible and intact.

B. Store materials in unopened packages in a manner to prevent damage from the environment and construction operations.

C. Handle in accordance with manufacturer's instructions.

1.05 Definitions

A. The following items are included herein and shall mean:

1. S.S.H.B. - Standard Specifications for Highway and Bridges, the Commonwealth of Massachusetts, Department of Transportation, latest edition.

2. A.S.T.M. - American Society for Testing and Materials. The following standard specifications are applicable to the associated items as listed.

a. A36...Steel
b. A153...Zinc Coating (hot-dip) on hardware
c. A307...Carbon Steel bolts 66000 psi tensile
d. F2049...Fences/Barriers for Public Use Outdoor Play Areas

1. AAB: Architectural Access Board.

2. ADA: Americans with Disabilities Act and its current regulations.

3. AWS: American Welding Society.

4. CPSC: Consumer Product Safety Commission.

5. SSPS: Steel Structures Painting Council.

PART 2 - PRODUCTS

2.01 Black Vinyl Coated Chain Link Fence

A. Submittals:

1. Shop Drawings: Supply shop drawings at an approved scale for location, installation and erection of all components of the chain link fence.

2. Product information: Provide manufacturer's product data showing installation and limitations in use. Supply Certificates of Compliance for all materials required for fabrication and installation.

3. Material Selection and Samples: Submit samples showing the material size, gauge and finish for all components required for construction, including but not limited to:

    a. A 12"x12" sample of fence fabric.
    b. A 12" section of each type of fence pipe required.
    c. Provide 1 of each type of fitting required.
    d. Provide a 6" sample of fabric tie material.

B. Scope: This specification covers colored chain link fence, including chain link fabric, framework, and fittings. Fence heights; heights and widths shall be shown on the drawings.

C. PVC Coating: Fence fabric and framework shall be thermally-fused vinyl coating over galvanized steel. "A Bonded or extruded and glued" fabric will not be accepted.

D. Color: All fence material including fabric, framework, fittings and hardware shall be black.

E. Fabric: Fabric for all fences shall be a 2" diamond mesh. Fabric shall be #9 gauge (0.148" nominal core wire diameter) with a minimum breaking strength of 1,290 pounds, thermally fused in accordance with ASTM F668-2b. The weight of the zinc coating on the steel wire shall be 0.3 oz. per square foot minimum. Chain link fabric shall be color matched with framework materials. Fabric shall be knuckled at both selvages.

F. Framework: Shall consist of terminal posts, line posts, top rail, bottom rail, mid rail, truss rods at end and corner post frames.

G. Posts and rails shall be steel pipe, Type 1: ASTM F 1083, standard weight, schedule 40, minimum yield strength of 25,000 psi, sizes as indicated below. Before color is applied, all materials shall be given a minimum 1.8 ounce per s.f. coating of zinc. PVC-coated finish shall be applied in accordance with ASTM F 1234, apply supplemental color coating of 12 mils (0.254-0.356 mm) of thermally fused PVC.

1. Sizes of Framework:

    a. Fences 5' Height to 8' Height:
    Provide mid rail braces between all end/corner posts and adjacent line posts at all fences 5'-8' in height.

Post or Rail	Outside Diameter	Pounds/Foot
End Corner & Pull Post	2.875"	5.79
Line Post	2.375"	3.65
Top and Bottom Rail	1.660"	2.27
Mid Rail Braces	1.660"	2.27

H. Top rail couplings 6-inch minimum in length shall be spaced at maximum 20-foot centers and 9 gauge minimum fabric tie wires shall be spaced at 18-inch maximum centers.

1. Clip bands (by Page or equal) shall be spaced at 12-inch maximum centers.

I. Accessories:

1. Chain link fence accessories: ASTM F 626, Provide items required to complete fence system. Galvanize each ferrous metal item in accordance with ASTM A 153 and finish to match framing (Black Vinyl Coating).

2. 2. Post Caps: Formed steel, weather tight dome-shape closure cap. Provide one cap for each post. Caps shall be affixed to the post securely so as to prevent removal.

3. Stretcher Bars: One piece lengths equal to 2-inches less than full height of fabric with a minimum cross section of 3/16 inch x 3/4-inch. Provide stretcher bars where chain link fabric meets terminal posts.

4. Tie Wire: 9 gauge vinyl coated galvanized steel wire for attachment of fabric to line posts.

K. General: Certain components not adaptable to the here in specified coating process may be color coated by other means. All fittings shall be pressed steel or malleable iron. Tie wires shall be minimum 9 gauge PVC coated steel or 6 gauge aluminum. Line and terminal posts to be of sufficient length to be set to the full depth of concrete footing indicated on the Drawings. Maximum spacing of line posts shall be 10-feet.

L. Testing of Fence Fabric:

1. Each fence panel shall be constructed such that it will pass the following test. Deflection of the fence fabric shall be no greater than 2 inches when a force of 30 pounds is applied in the center of a framed panel, perpendicular to the plane of the fence fabric. Fabric shall return to original position true to the plane of the fence when force is released.

2.02 Construction Fence

A. Construction Fence shall be six-foot high galvanized steel fence panels on stable, movable footings and include hardware to secure panels together.

PART 3 - EXECUTION

3.01 Black Vinyl Coated Chain Link Fence

A. Fence Erection

1. Install fences as indicated on the Plan and in accordance with the Details. Fence installation includes four general categories of fence construction as indicated on the Drawings.

2. Fabric: Leave approximately 1" between finish grade and bottom selvage. Pull fabric taut and tie to posts and rails. Install fabric on field side of fence and anchor to framework so that fabric remains in tension after pulling force is released.

3. Stretcher Bars: Thread through fabric and secure to posts with approved fasteners spaced not over 12" O.C.

4. Wire Ties: Wire ties shall be installed 12" O.C. and securely fastened.

5. Fasteners: Install bolts for tension bands with nuts on side of fence opposite fabric and trim bolts if they extend more than 1/4” beyond the nut after tightening. Trimmed bolts shall be touched up with rust-inhibiting gloss black spray paint.

3.02 Construction Fence

A. Furnish and install construction fencing as needed to secure the site

3.03 Clean Up and Protection

A. Remove all excess materials from the site and clean up any spills as they occur. Blow or sweep all metal saw dust and metal shavings from finished surfaces to prevent rust staining.

B. Protect Work of this Section to ensure that the finished work will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 32 90 00
PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 apply to the work of this Section.

1.02 DESCRIPTION OF WORK

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Contract Documents and as specified in this Section and includes, but is not limited to, the following:

1. Planting trees, shrubs
2. Planting maintenance
3. One-year plant guarantee period for all plants
4. Inspection and acceptance
5. Pruning and maintenance of existing trees to remain
6. Cleaning and protection

1.03 RELATED WORK

A. Carefully examine the site and all of the Contract Documents for requirements that affect the work of this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions. Other specifications sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 16 00 – Asphalt Paving
6. Section 32 13 13 – Concrete
7. Section 32 16 00 - Curbing
8. Section 32 18 16.13 – Playground Protective Surfacing
9. Section 32 18 17 – Engineered Wood Fiber Surfacing
10. Section 32 31 00 - Fencing
11. Section 32 91 00 – Loam and Planting Preparation
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities

B. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.

1. The planting subcontractor shall become fully acquainted with the nature and requirements of the project including the location of all underground utilities prior to starting the work of this Section.

1.04 REFERENCES

A. The following standards shall apply to the work on this Section.

1. American National Standards Institute (ANSI):
Z60.1 American Standard for Nursery Stock, latest edition, published by American Association of Nurserymen, (AAN).

1.05 SUBMITTALS

A. Material Samples and testing:

1. Provide full analysis of existing on-site loam, and off-site loam source from a laboratory that has been approved in writing by the Architect. Sampling and testing shall be as specified, and performed under the work of Section 32 91 00 Loam and Planting Preparation.

2. Planting mulch: submit one gallon-sized Ziploc bag.

3. Provide manufacturers' certified analysis for soil amendments and fertilizers.

1.06 REGULATORY REQUIREMENTS

A. Strictly comply with all applicable codes, regulations and requirements having jurisdiction.

B. All fertilizer and pesticide applications shall be performed by a licensed applicator in strict conformance with all local, state and federal regulations. Notify the Owner's Project Representative at least two (2) weeks prior to scheduled date of application.

1.07 QUALITY ASSURANCE

A. Subcontract planting work to a single landscape construction company specializing in this work. All work shall be performed by experienced landscape professionals familiar with planting procedures and under the full-time supervision of a qualified foreman. The General Contractor shall notify the Architect in writing upon the selection of a landscape subcontractor and arrange for a pre-construction meeting between the Architect, General Contractor, and Subcontractor. Such meeting shall seek to establish the proposed schedule, source of plants, consideration of substitutions and general review of procedures.

B. Inspection of Plant Materials: Plant materials are subject to inspection and approval upon delivery to the project site. Certificates of inspection of plant material shall be furnished as may be required by Federal, State and other authorities. No plants shall be planted until required inspections have been made and the plants approved.

C. Label at least one tree and one shrub of each species within each plant grouping with a securely attached waterproof tag bearing legible designation of botanical and common name.

1.08 PLANTING SEASONS

A. Complete landscaping work as quickly as possible as portions of the site become available for this work. Work only within seasonal limitations for proper planting as follows:

Type of Plant Material	Spring Season	Fall Season
Evergreen Trees & Shrubs	April 15 to June 1	Aug. 15 to Oct. 1

Deciduous Trees & Shrubs Shall be planted in a dormant condition.

B. Planting performed outside of these seasonal limitations will not be accepted unless approval is obtained in writing from the Architect. Any approved work outside of these seasonal limitations pertains only to the work to be performed in the season of the year requested.

1.09 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Deliver packaged materials in manufacturer's original unopened containers showing weight, analysis and name of manufacturer. Comply with manufacturer's instructions and recommendations for storage and handling. Protect all materials from damage, deterioration, injury and theft while stored at the site.

1.10 EXAMINATION OF CONDITIONS

A. All areas to be planted shall be inspected by the Contractor prior to starting work and any incorrect grading or inadequate drainage shall be reported to the Architect prior to beginning work.

PART 2 - PRODUCTS

2.01 LOAM

A. Loam for planting shall be approved, specified, provided, and installed under the work of Section 32 91 00 Loam and Planting Preparation, and that has been pH adjusted according to particular planting applications and improved through the addition of organic material as directed under this Section.

B. Planting loam mix for groundcover, perennial and bulb planting shall have a pH value of 5.5 to 6.5, which has been thoroughly premixed with organic material in the proportions of one part organic matter (humus or compost), with 5 parts of approved loam. Organic material shall be specified, provided, and installed under Section 32 91 00, Loam and Planting Preparation.

2.02 SOIL ADDITIVES

A. Soil additives shall be specified, provided, and installed under the work of Section 32 91 00 Loam and Planting Preparation.

2.03 STANDARD OF PLANTS

A. The Contractor shall furnish all plants shown on the Contract Documents. No substitutions will be permitted, without written approval by the Landscape Architect. Furnish plants which have been nursery grown in accordance with the American Standard for Nursery Stock of the American Nursery and Landscape Association (ANLA) and ANSI Z60.1 - latest edition, and which have been grown under climate conditions similar to those in the locality of the project. All plants shall conform to the varieties, sizes and quantities specified on the plans and typical of their species. They shall be free from insects, insect eggs, scale and/or disease. The root system of each shall be well provided with fibrous roots. Plants shall have a sound, healthy, well-formed upper growth with straight trunks, well-branched and densely foliated when in leaf. Plants shall be legibly tagged with its proper name for purposes of identification of plant material during planting.

1. Measurements: Height and spread dimensions specified refer to the main body of the plant and not from branch or root tip to tip. Measure the caliper of trees up to 4 inches at 6 inches above the ground level. Measure trees larger than 4 inches 1 foot above ground level.

2. Plants larger than specified in the plant list may be used if approved by the Architect, but use of such plants shall not increase the contract price. If the use of larger plants is approved, the spread of roots or ball of earth shall be increased in proportion to the size of the plant.

2.04 BARK MULCH

A. Bark Mulch: for planting beds shall be a 100% pine bark product free from lumps, dirt, or deleterious materials. Bark shall be substantially free from wood fibers. No pieces of bark shall exceed three (3) inches in any dimension, or be thicker than 1/4 inch. Mulch shall have been aged for a minimum of six months, and not longer than two years. Bark shall be no more than two years old. All plant beds shall receive a two to four inch layer of mulch, not to exceed four inches.

2.05 WATER

A. Water: shall be furnished by the Contractor from a legal off-site source via water truck and be suitable for irrigation, free of toxic ingredients. Sources of water at or near the site that are made available to the Contractor are a convenience to the Contractor. Limitations of site water sources shall be supplemented by off-site sources at the Contractor's expense to meet the maintenance requirements of this Section. Any municipal fees associated with providing water for this work shall be borne by the Contractor.

1. Watering Equipment: The Contractor shall furnish sufficient watering equipment to distribute water evenly with complete coverage daily to all seeded areas.

2. All new and transplanted trees shall be furnished and installed with 20 gallon, slow release watering Treegator bags or approved equal. Manufactured by Spectrum Products, Inc., Youngsville, NC, phone 1-800-treegator.

2.06 ANTIDESICCANTS

A. Antidesiccants shall be emulsions or other materials which will provide a protective film over plant surfaces permeable enough to permit transpiration and specifically manufactured for that purpose. Antidesiccant shall be "Wilt-Pruf" available from Nursery Specialty Products, Inc., New York, N.Y. or approved equal, and mixed and applied according to the manufacturer's instructions.

2.07 TREE ANCHORING MATERIALS

A. Stakes: For supporting small trees under 3" caliper shall be of sound wood uniform in size, reasonably free of knots, and capable of standing in the ground at least two years. Stakes shall be 2"x 4," not less than eight and one half feet in length and stained dark brown.. All trees 3" caliper or over shall be supported by guying cable as per planting detail.

B. Arbor Ties: Utilize Arbortie by Deeproot, or approved equal, when staking and guying plant material.

2.08 TREE WRAPPING MATERIALS

A. Wrapping Material: shall only be as directed by the Landscape Architect. First quality, heavy waterproof crepe paper manufactured for this purpose. It shall consist of two layers of 30 pound or heavier craft paper with an asphalt coating between, similar to and equal to the

"Grizzly Bear" tree wrapping paper, as manufactured by the Ludlow Corporation, Needham, MA or approved equal.

PART 3 - EXECUTION

3.01 PLANTING

A. All plant roots and earth balls must be kept damp and thoroughly protected from sun and drying winds at all times from the beginning of the digging operation, during transportation, and on the ground until the final operation of planting.

B. Prior to spreading loam, subgrades shall have been tested to determine if they are too compact to drain water as specified.

C. Plant material Selection: at least one month prior to the expected planting date, the Contractor shall request that the Landscape Architect select and tag plants to be planted as specified. The Contractor shall pay for the transportation, subsistence and overnight accommodations, if necessary, for the Landscape Architect's representative during the period of time required to select and tag the plant material.

1. The Contractor shall be responsible to certify the availability of quality plants in specified sizes from his/her sources of supply prior to requesting that the Landscape Architect make plant source inspections. In the event that plants at the inspection location are found to be unavailable or of insufficient size, the Contractor shall be liable to reimburse the Owner for all costs of the Landscape Architect's hourly services which are incurred during unproductive inspection trips.

2. Unless specifically designated otherwise, a representative of the Contractor shall accompany the Landscape Architect on all plant material selection field trips.

3. Representative samples only of shrubs, perennials and groundcover plants may be tagged or marked for approval as an "Approved Typical Sample" and shipped to the site. Any shrub or groundcover plant that arrives at the construction site that does not meet the Approved Typical Sample will be rejected by the Landscape Architect.

4. Inspection and approval of plants at the source shall not impair the right of subsequent inspection and rejection upon delivery to the site, or during the progress of the work if the Landscape Architect finds that plants do not meet the requirements of the PLANT LIST or this Contract, have declined noticeably due to handling abuse, lack of maintenance, or other causes. Cost of replacements, as required, shall be borne by the Contractor.

D. Contractor shall located all existing underground utilities of the proposed planting and notify the Architect of any conflicts prior to digging.

E. Locations for all plants shall be staked-out on the ground and approved by the Architect before any excavation is made. Adjustments in locations shall be made as directed by the Architect. Planting shall be in accordance with the planting details on the Drawings.

F. The Contractor shall take special care to insure that the plant material is not planted too deeply by removing burlap and soil mounded around the base of the plant, at the top of the rootball, to expose the trunk flare. A measurement shall be taken from the trunk flare to the bottom of the root ball. This measurement shall be the depth of the planting hole.

G. The plants shall be set at the center of the holes with trunk flare level to, or 1" – 2" above, finish grade. Once plant is set in planting pit, the Contractor shall remove the top 12" minimum, of wire basket and all visible rope and burlap.

H. Hole shall be backfilled in layers of loam not more than nine inches and each layer watered sufficiently to settle before the next layer is put into place. Do not place any subsoil, sod or waste materials in planting hole.

I. Each tree and shrub shall be pruned in accordance with National Arborist Association Standards to preserve the natural character of the plant. Remove all tags, labels and dead or broken branches.

J. Staking of newly planted trees shall be performed directly after they are planted. Trees of 3-inch caliper or under, require staking only as needed to hold the tree plumb. All trees of 3-inch caliper and over shall be staked. Support ties shall allow tree to move and sway, but be able to return the trunk to a plumb and true position. Contractor shall adjust staking as frequently as needed during the maintenance period.

K. A 2 – 4 inch settled layer of bark mulch shall be applied over the entire area of the plant beds. Plantings installed over three months prior to the date of substantial completion shall be weeded and replenished with fresh mulch to specified thickness prior to acceptance.

L. Provide a soil saucer equal to the diameter of the hole around each tree. Particular attention shall be made to create saucers at sloped areas that contain water around the base of the plant. Soil saucers shall be repaired and maintained as needed to perform effectively during the maintenance period.

M. Plants shall be watered at a rate of 3–5 gallons per inch of caliper twice within the first twenty-four (24) hours of the time of planting.

3.02 MAINTENANCE

A. Tree and Shrub Plantings:

1. The Contractor shall maintain plantings until the date of substantial completion or until the date of acceptance, whichever is later.

2. Maintenance shall begin immediately after each plant is planted and shall include watering, weeding, pruning, pest control, removal of dead materials and otherwise maintaining plants. Correct defective work as soon as possible after it becomes apparent and weather and season permit. Reset settled plants to proper grade and position, restore planting saucer, and remove dead material. Repair soil saucers around trees and replenish bark mulch to meet the specified thickness as needed throughout the maintenance period.

3. Watering: The Contractor shall include in his base bid costs for weekly watering of all plant areas for the entire first growing season. The required watering frequency will vary depending on temperature and natural rainfall. The Contractor shall respond to adverse weather conditions in a timely manner to maintain the moisture level in the soil necessary for proper plant establishment. Plants shall be watered at a rate of 3-5 gallons per inch of caliper. Slow release watering bags shall be filled weekly during this period. Plants subjected to drought stress during the required maintenance period may become unacceptable as determined by the Architect and require replacement at no additional cost to the Owner.

4. Anti-desiccant: Treat plants subject to desiccation at the time of planting and again prior to winter according to the manufacturer's recommendations.

5. During the maintenance period, any decline in the condition of plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturalists to inspect plant materials and to identify problems and recommend corrective procedures. The Landscape Architect shall be immediately advised of such actions. Inspection and recommendation reports shall be submitted to the Architect.

3.03 ACCEPTANCE

A. Upon completion of planting work per Construction Phase, the Contractor shall request in writing that the Landscape Architect formally inspect the planting work. The General Contractor, Owner, and landscape Architect shall walk all areas of completion to determine date of turnover to the Owner.

B. Following the correction of all Punch List deficiencies, the Contractor shall request in writing that the Landscape Architect formally inspect the planting work. If plant materials and workmanship are acceptable, the Landscape Architect will issue a written Certificate of Final Acceptance to the Contractor.

3.04 PLANT GUARANTEE

A. The date of the Certificate of Final Acceptance shall establish the commencement of the required one-year guarantee and establishment period for planting work.

B. At the end of the guarantee and establishment period, a final inspection will be held to determine whether any plant material replacements are required. Plants found to be unacceptable shall be removed promptly from the site and replaced.

C. All replacements shall be plants of the same kind and size originally specified. The cost shall be borne by the Contractor, except for possible replacements due to vandalism or neglect on the part of others.

3.05 PRUNING AND MAINTENANCE OF EXISTING TREES TO REMAIN

A. Prune existing trees to remain as noted by the Landscape Architect.

3.06 CLEANING AND PROTECTION

A. During operations, keep pavements clean and work area in an orderly condition. Protect all plantings from damage by other contractors and trades and trespassers. After completion of the work, the Contractor shall remove all debris, materials, rubbish, excess dirt, etc. from the site and dispose of them in a legal manner. The premises shall be left clean and presentable to the satisfaction of the Architect.

END OF SECTION

SECTION 32 91 00
LOAM AND PLANTING PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 apply to the work of this Section.

1.2 DESCRIPTION OF WORK

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Contract Documents and as specified in this Section and includes, but is not limited to, the following:

1. Loam from off-site, if on-site loam is insufficient.
2. Sampling and testing of on-site and off-site loam
3. Sand
4. Modifying, screening, placing, spreading and grading of loam
5. Fine grading
6. Erosion control matting
7. Inspection and acceptance
8. Cleaning and protection

1.3 RELATED WORK

A. Carefully examine the site and all of the Contract Documents for requirements that affect the work of this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions. Other specifications sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 16 00 – Asphalt Paving
6. Section 32 13 13 – Concrete
7. Section 32 16 00 - Curbing
8. Section 32 18 16.13 – Playground Protective Surfacing
9. Section 32 18 17 – Engineered Wood Fiber Surfacing
10. Section 32 31 0 - Fencing
11. Section 32 90 00 – Planting
12. Section 32 92 00 – Turf and Grasses
13. Section 33 40 00 – Storm Drainage Utilities

B. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM):

D 75	Practice for Sampling Aggregates
D 422	Test Method for Particle-Size Analysis of Soils
D698-00a	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3)
D1557	Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10-lb rammer and 18-in. drop

B. A.O.A.C.: Association of Official Agricultural Chemists.

1.5 SUBMITTALS

A. At least 30 days prior to ordering materials, the Contractor shall submit to the Architect representative samples, certifications, manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Architect. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Architect reserves the right to reject, on or after delivery, any material that does not meet these Specifications.

B. Existing On-Site loam: Sample and test existing on-site loam. The Contractor shall sample the existing loam soils of the construction site in the following manner:

1. The Contractor shall provide a one cubic foot representative sample per each 1,000 cubic yard on-site stockpile of existing loam for testing. All stockpile sampling shall be per ASTM D 75 and Appendixes for securing samples from stockpiles.

2. Preparation of Samples: Contractor shall place these soil slices into a large, clean plastic container and mix thoroughly. Contractor shall take one cup of soil mixture and dry it at room temperature (do not dry samples in an oven or on a stove or radiator). Once soil is dry, place soil in sandwich size zip-type plastic bag and close it tightly. Label each sample on outside of bag, identifying sample by soil type and acre. Provide an approved site plan showing locations of stockpiles cross referenced to soil samples and test results.

C. Loam from off-site, if on-site loam is insufficient: The Contractor shall provide a one cubic foot representative sample per each 1,000 cubic yard proposed stockpile of loam borrow for testing. All stockpile sampling shall be per ASTM D 75 and Appendixes for securing samples from stockpiles.

D. Testing will be at the Contractor's expense. Contractor shall deliver all samples to testing laboratories via overnight courier and shall have the testing report sent directly to the Architect. Perform all tests for gradation, organic content, soil chemistry and pH by UMASS Soil and Plant Tissue Laboratory, West Experiment Station, North Pleasant Street, University of Massachusetts, Amherst, MA 01003, (413) 545-2311. Testing reports shall include the following tests and recommendations.

1. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System.
2. Percent of organics shall be determined by the loss on ignition of oven-dried samples. Test samples minus #10 material shall be oven-dried to a constant weight at a temperature of 450 degrees Fahrenheit (752 degrees Centigrade).
3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, extractable Aluminum, Lead, Zinc, Cadmium, Copper, Soluble Salts, and pH and buffer pH. A Conductivity

Meter shall be used to measure Soluble Salts in 1:2 soil/water (v/v). Except where otherwise noted, nutrient tests shall be for available nutrients.

4. Soil analysis tests shall show recommendations for soil additives to correct soils deficiencies as necessary, and for additives necessary to accomplish lawn and planting work as specified.

E. Compost: Submit supplier's certification of contents.

F. Limestone: Submit supplier's certification that the limestone being supplied conforms to these Specifications.

G. Acidulant: Submit supplier's certification that the acidulant being supplied conforms to these Specifications.

H. Fertilizer:

1. Submit product data of seeding/sodding and planting fertilizer and certificates showing composition and analysis. Submit fertilization rates for fertilizer product based upon soil testing, analysis, and recommendations as specified, performed and paid for under in this Section.

1.6 REGULATORY REQUIREMENTS

A. Strictly comply with all applicable codes, regulations and requirements having jurisdiction.

B. All fertilizer applications shall be performed by a licensed applicator in strict conformance with all local, state and federal regulations. Notify the Owner's Project Representative at least two (2) weeks prior to scheduled date of application.

1.7 EXAMINATION OF CONDITIONS

A. The Contractor and any sub-Contractor responsible for the execution of the Work of this Section, shall review the subgrades and elevations to verify that the subgrades have been prepared as required by the Contract Documents, prior to proceeding with the spreading of the planting loam. Carefully review the requirements of this Section, to understand the requirements of percolation testing, compaction, slope and absence of debris of the subgrade prior to spreading of the loam borrow.

B. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to sampling and testing of all materials prior to final planting installation.

1.8 DEFINITIONS

A. The following definitions shall apply to the work of this Section.
The following size distributions of mineral particles by diameter and sieve size shall apply to the following conventional names of soil types:

Conventional Name	Retained on U.S. Sieve No.	Diameter (mm)
Very coarse sand	#18	1 - 2
Coarse sand	#35	0.5 - 1
Medium sand	#60	0.25 - 0.5
Fine sand	#140	0.10 - 0.25
Very fine sand	#270	0.05 - 0.10

Silt	by hydrometer	0.002 - 0.05
Clay	by hydrometer	Less than 0.002

PART 2 - PRODUCTS

2.1 LOAM

A. Loam: The Contractor shall provide additional loam as necessary to complete the work of this Section from off-site sources if there is not sufficient material on site suitable to complete the Work. The Contractor shall submit samples and an analysis from each proposed source of material. Provide loam that is fertile, friable, natural loam reasonably free from subsoil, clay lumps, brush, litter, roots, stones and other foreign materials.

B. Loam shall be one of the following sandy loams; “coarse sandy loam”, “sandy loam”, “fine sandy loam”, determined by mechanical analysis ASTM D-422 and based on the USDA Classification System, and as defined in this Section. It shall be uniform in composition, without admixture of subsoil. It shall be free of stones greater than one and one-quarter inches, lumps, plants and their roots, debris and other extraneous matter.

C. Textural Classification:

US Sieve No.	Percent Passing by Weight	
	Maximum	Minimum
10	-------	100
18	93	75
35	80	50
60	56	29
140	32	19
270	23	18

a. Percent Gravel in the loam mix shall be <15%.
b. Organic Matter = 3.5 – 7.0%
c. pH shall be between 6.3 and 6.8

Saturated hydraulic conductivity of the mix shall not be less than 4.0 inches per hour according to ASTM D5856-95 (2000) when compacted to a minimum of 88% Standard Proctor, ASTM 698

Soil test shall include breakdown of sand and subfractions from very course to very fine.

1. One hundred percent by weight shall pass a one-inch (1”) sieve opening, and the maximum retained on the 1/4” sieve shall be 20 percent by weight of the total sample.
2. On-site and off-site loam shall be screened to achieve above specified sieve analysis.
3. The contractor should anticipate amending the onsite loam for conformance to the requirements as stated herein.

D. Organic content and pH: loam shall contain not less than 6% or more than 10% organic matter of the sample that passes a 1/4” sieve when determined by the wet combustion method on a sample dried at 105 degrees C. The pH value shall be within a range of 5.5 to 6.5 for loam to be used in planting areas and within a range of 6 to 7 for loam to be used in seeding areas.

1. Loam borrow shall be pH adjusted for particular planting applications and shall be adjusted prior to delivery to the Project sites as recommended by UMASS Soil & Plant Tissue Laboratory test results.

    a. When pH of loam borrow is equal to or greater than 7 use aluminum sulfate to adjust pH downward to required levels.
    b. When pH of loam borrow is less than 7 use either sulfur or ferrous sulfate to adjust pH downward to required levels.
    c. When pH of loam borrow must be raised to the required levels use limestone.
    d. Regardless of amendment the Contractor chooses to use, the Contractor, not the Owner, shall be responsible for obtaining specified pH by seeding and/or planting time.

E. Loam shall be uncontaminated by salt water, foreign matter and substances harmful to plant growth. Topsoil shall not have levels of extractable aluminum greater than 200 parts per million except for acid-loving plants. Cation Exchange Capacity (CEC) shall be between 10 and 15.

F. All planting loam provided from off-site sources shall be brought to the site meeting all specification requirements. There must be no mixing or amending of soil on site. The loam borrow must not be handled or moved when in a wet or frozen condition. Loam shall also be free of quack-grass rhizomes, Agropyron Repens, and the nut-like tubers of nutgrass, Cyperus Esculentus, and all other primary noxious weeds

G. Screened loam which has been stockpiled on the site may be used provided it can be made to comply with this Specification and that it has been screened to meet the above requirements.

H. To assure planting loam purchased and screened loam stockpiled fulfills specified requirements regarding textural analysis, organic matter content, and pH, soil testing results will be obtained and paid for by the Contractor and submitted to the Architect for approval before any soil is placed or delivered to the site.

2.2 SOIL ADDITIVES

A. Soil additives shall be used to counteract soil deficiencies as recommended by the soils analysis.

B. Lime: Provide approved agricultural limestone containing not less than 85% of total carbonates with a minimum of 30% magnesium carbonates. Lime shall meet Massachusetts Department of Food and Agriculture standards for Fine-Sized Classification so that 50% passes a 100 mesh, 60% passes through a 60-mesh sieve, and 95% will pass a 20 mesh sieve.

C. Aluminum Sulfate shall be unadulterated, 57% (Ortho Division, Chevron Chemical Company), or approved equal.

D. Sand additive shall be comprised of clean, coarse, granular sand, subangular to sub-round, free from organic matter and deleterious substances. Sand shall be washed sand in accordance with the table below.

SIEVE SIZE % passing

No. 4	100
No.8	90-100
No. 16	80-100
No. 30	25-60
No. 50	0-25
No. 100	0-5
No 200	0-3

1. The sand should have a coefficient of uniformity (D60/D10) of less than 4.0

2. Amend existing loam to achieve requirements as described in 2.1.

E. Compost: Provide compost as needed to raise the Organic Content of the topsoil to within specified range. Compost shall be:

1. Compost shall be derived from organic leaf and yard residues that meet all State Environmental Protection Agency requirements. The product shall be well composted, free of viable weed seeds and contain material of a generally humus nature capable of sustaining growth of vegetation, with no materials toxic to plant growth. The material shall be fully composted. The composted material shall have a moisture content such that no visible free water or dust is produced when handling the material. Submit complete product analysis including: Organic Nitrogen, Carbon/Nitrogen Ratio, Total Phosphorous, Total Potassium, Organic Matter, pH, particle size and product density.

2. Compost products shall meet the following physical criteria:

Parameters	Range
pH	5.5 – 8.0
Moisture Content	35% - 55%
C:N ratio	15 – 30:1
Organic Matter	> 40%
Particle Size	< 3/4”
Soluble Salts	< 4.0 mmhos (ds)
Bulk Density	< 1200 lbs/cuyd
Foreign Matter	< 1% by weight
Solvita Maturity Rating	5 - 7

b. Acceptance of composted products shall be based on the following submittals by the Contractor:

i. A request for Approval of a Material Source.

ii. A copy of the Composting Permit for the Material Source selected.

iii. Certification by the supplier that the compost product meets state EPA guidelines and that it originates from 100 percent recycled vegetation material that has been aerobically composted.

G. Bone meal shall be fine ground, steam cooked, packing house bone with a minimum analysis of 23% phosphoric acid and 4% nitrogen.

H. Fertilizers: Commercial fertilizer shall be a complete fertilizer complying with all State and Federal Fertilizer laws. Fifty-percent of available nitrogen shall be in a slow-release form as is found in certain urea-form products, or natural organic forms, or a combination of both. The

salt index of the fertilizer shall not exceed 35. It shall contain the following percentages by weight.

		Lawns
Nitrogen	(N)	10%
Phosphorus	(P)	10%
Potash	(K)	10%

Fertilizer shall be delivered and mixed as specified, in standard size unopened containers, showing weight, analysis in compliance with Massachusetts Department of Food and Agriculture regulations, and name of manufacturer. It shall be stored in a weatherproof storage place, in such a manner that it will be kept dry, and its effectiveness not impaired.

1. Fertilizer for planting shall be formulated for top-dressing, soil surface application to plants. Fertilizer shall be designed and certified by the manufacturer to provide controlled release of fertilizer continuously for not less than 9 months. One hundred percent of the nitrogen content shall be derived from organic materials. Nitrogen source shall be coated to ensure slow release. Fertilizer percentages of weight of ingredients shall be as recommended by the soil testing and analysis specified, performed, and paid for under this Section, Loam and Planting Preparation.

PART 3 - EXECUTION

3.0 KICKOFF MEETING:

A. At least 10 working days prior to the start of work, the Contractor shall request a landscape construction kickoff meeting with the owners representative, landscape architect and any other parties involved with landscape construction. Contractor shall articulate the means and methods of subgrade preparation, soil placement and other steps outlined in the Specification.

3.1 FILLING AND COMPACTION

A. Verify that the subgrade preparations have been reviewed and accepted, including removal of all existing vegetation prior to placement of planting soils.

1. Notify the Landscape Architect of soil placement operations at least seven calendar days prior to the beginning of work.

B. Perform percolation tests on existing subsoils or placed fill prior to placing and spreading loam for seeding, sodding, and planting. Placed Loam shall be confirmed to infiltrate as noted:

1. Perform percolation testing of subsoil or placed fills to determine whether or not the subgrade will drain properly. Perform percolation tests as a rate of one (1) per 5,000sf or as directed by the Landscape Architect. A minimum of three (3) infiltration tests shall be conducted on the site.
   a. Dig a hole in the installed subgrade soil that is a minimum of 4 inches in diameter and 4 inches deep.
   b. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
   c. In the event that the water drains at a rate less than one and one-half

inch per hour (1.5" / 60 minutes), till the soil to a depth required to break the over compaction (min of 6").

2. Perform percolation testing of installed Loam to determine whether or not it will drain properly. Perform percolation tests as a rate of one (1) per 5,000sf or as directed by the Landscape Architect. A minimum of three (3) infiltration tests shall be conducted on the site. Locations of Loam infiltration tests shall not be within 5' from any previous infiltration test conducted on the subgrade.
   a. Dig a hole in the installed loam planting soil that is a minimum of 4 inches in diameter and 4 inches deep.
   b. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
   c. In the event that the water drains at a rate less than three and one-half inch per hour (3.5" / 60 minutes), till the soil to a depth required to break the over compaction.

3. In the event that percolation testing indicates that the subsoil, placed fills or ordinary borrow has been over compacted and will not drain, the contractor shall loosen up the top 6" min of the subgrade (up to 24" depending on compaction level of subgrade) to be planted, seeded, or sodded by ripping or other mechanical means. Recompact the borrow by driving a small, tracked bulldozer over the area at low speeds so that the tracks of the bulldozer pass over the affected area and the soil is compacted to a density that will percolate as specified under the work of this Section. Under no circumstances shall wheeled vehicles be driven over subsoil, placed fills or ordinary borrow that have been shown to percolate or subsoil, placed fills or ordinary borrow that has been loosened and shown to percolate.

4. Perform sufficient percolation tests in areas of poorly draining or compacted subsoil or compacted placed fills as directed by the Architect to ensure that these underlying soils drain. Likewise, perform sufficient percolation tests after ripping and loosening to ensure that the soils are no longer too compact to drain.

B. Subsoil or ordinary borrow shall have been excavated and filled as required by the Contract Documents. Do not damage the work previously installed. Maintain all required angles of repose of materials adjacent to the loam as shown on the Contract Documents. Do not over excavate compacted subgrades of adjacent pavement or structures during loaming operations.

C. Confirm that the subgrade is at the proper elevation and that no further earthwork is required to bring the subgrade to proper elevations. Subgrade elevations shall slope parallel to the finished grade and or toward any subsurface drain lines as shown on the Contract Documents. Provide a written report to the Architect that the subgrade has been placed to the required elevations and that the subgrade drains water at the rates specified under the required percolation tests specified, performed and paid for under this Section, Loam and Planting Preparation. Perform no work of placing and spreading loam until elevations have been confirmed and written report has been accepted by the Architect.

D. Clear the subgrade of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout or other material harmful to plants have been spilled into the subgrade material, excavate the soil sufficiently to remove the harmful material. Such construction debris, trash, rubble and foreign material shall be removed

from the site and disposed of in a legal manner. Fill any over excavation with approved fill and compact to the required subgrade compaction levels.

E. Do not proceed with the installation of loam until all utility work in the area has been installed.

F. Protect adjacent walls, walks and utilities from damage or staining by the loam. Use 0.5-inch plywood and or plastic sheeting to cover existing concrete, metal and masonry work and other items as directed during the progress of the work. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.

3.2 FINE GRADING

A. Immediately prior to dumping and spreading loam, the subgrade shall be in a friable condition, cleaned of all stones greater than 2 inches and all debris or rubbish. Such material shall be removed from the site, not raked to the edges and buried. Notify the Architect that the subsoil has been cleaned and request his/her attendance on site to review and approve subgrade conditions prior to spreading loam borrow.

B. Loam borrow delivered to the site shall be protected from erosion at all times. Materials shall be spread immediately. Otherwise, materials that set on site for more than 24 hours shall be covered with tarpaulin or other soil erosion system acceptable to the Architect and surrounded by silt fence.

C. No loam borrow shall be handled, planted, or seeded in any way if it is in a wet or frozen condition. A moist loam borrow is desirable.

D. Soil additives shall be spread and thoroughly incorporated into the layer of loam by harrowing or other methods reviewed by the Architect. The following soil additives shall be incorporated:

1. Ground limestone or acidulant as required by soil analysis to achieve the required pH as described in this Section. Spread limestone at the rate required by soil analysis up to a maximum limit of 200 pounds per 1,000 square feet. Should recommendations of soil analysis require greater rates of application than 200 pounds per 1,000 square feet, a surface application of limestone not in excess of 50 pounds per 1,000 square feet shall be made to the established lawn during the season after Final Acceptance. This second application of limestone shall be performed and paid for under the work of Section 32 92 00, Turf and Grasses, at rates determined under the testing requirements of this Section, Loam and Planting Preparation.

2. Fertilizer at the rate and of analysis recommended by the soil analysis. For lawn areas this fertilizer application shall be the first in a series of fertilizer applications made under this Contract and shall be applied and incorporated under this Section, Loam and Planting Preparation. A second and third application of fertilizer for turf areas shall be specified, spread and paid for under Section 32 92 00 Turf and Grasses, of this Specification. For planting areas this fertilizer application shall be primary application and the process of application described under Section 32 90 00, Planting of this Specification and specified, provided, performed and paid for under this Section, Loam and Planting Preparation.

3. Compost, sand or other soil amendments as required by soil analysis.

E. Loam shall be sampled and tested as specified, performed and paid for under the work of this Section, to verify application and incorporation of limestone, fertilizer and other soil amendments.

F. After loam and required additives have been spread, carefully prepare the loam by scarifying, harrowing, or tilling the loam to integrate soil additives into the top 8 inches of the loam. Remove all large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove from unscreened soils all stones over 3/4 inch in diameter from the top 6 inches of the loam bed. Loam shall also be free of smaller stones in excessive quantities as determined by the Architect and as specified herein.

G. Sufficient grade stakes shall be set for checking the finished grades. Stakes must be set in the bottom of swales and at the top of slopes. Deviation from indicated elevations that are greater than one-tenth of a foot shall not be permitted. Connect contours and spot elevations with an even slope. Finish grades shall be smooth and continuous with no abrupt changes at the top or bottom of slopes.

H. During the compaction process, all depressions caused by settlement or rolling shall be filled with additional loam and the surface shall be regraded and rolled until presenting a smooth and even finish corresponding to the required grades.

I. The Contractor shall install loam in successive horizontal lifts no thicker than 6 inches in turf areas and 12 inches in plant bed areas to the desired compaction as described herein. The Contractor shall install the soil at a higher level to anticipate any reduction of loam borrow volume due to compaction, settling, erosion, decomposition, and other similar processes during the warranty period. The Architect will ensure that the full depths of loam for lawn and plant beds are obtained by digging holes in the loam at the same frequency as for compaction testing.

1. Compact loam to the required density as specified.
2. Maximum dry density for loam shall be determined in accordance with ASTM D698. The following percentages of minimum to maximum dry densities shall be achieved for fill materials or prepared subgrades.

In lawn, plant beds and tree pits:

	Minimum	Maximum
Soils within planting areas in top eighteen inches of finished grade	80%	85%
Soils within Lawn Areas in top eighteen inches of finished grade	84%	86%

3. The surface area of each lift shall be scarified by raking prior to placing the next lift.

J. In addition to the range cited above, compact each lift sufficiently to reduce settling but not enough to prevent the movement of water and feeder roots through the soil. The loam borrow in each lift should feel firm to the foot in all areas and make only slight heel prints. At completion of the loam borrow installation, the soil should offer a firm, even resistance when a soil sampling tube is inserted from lift to lift. After the placement of each lift, perform percolation tests to determine if the soil has been over compacted. Perform the following percolation test procedure:

1. Dig a hole in the installed soil that is a minimum of 4 inches in diameter. Holes in 6-inch lift in turf areas shall be 4 inches deep. Holes in 12-inch lifts in plant beds shall be 8 inches deep. Do not penetrate through the lift being tested.
2. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
3. In the event that the water drains at a rate less than one inch per hour, till the soil to a depth required to break the over compaction.
4. Perform a minimum of one soil percolation test per 10,000 square feet area of turf area and 2,500 square feet of tree and shrub planting area as directed by the Architect.

K. Select equipment and otherwise phase the installation of the loam to ensure that wheeled equipment does not travel over subsoil, placed fills or ordinary borrow or already installed soil. Movement of tracked equipment over said soils will be reviewed and considered for approval by the Architect. If it is determined by the Architect that wheeled equipment must travel over already installed soil, provide a written description of sequencing of work that ensures that compacted soil is loosened and uncompacted as the work progresses or place one-inch thick steel plate ballast (or equivalent ballast approved by the Architect) over the length and width of any travel way to cover loam borrow to protect it from compaction.

L. Disturbed areas outside the limit of lawn work shall be graded smooth and spread with a minimum of 6 inches of loam to the finished grade.

M. Contractor shall be responsible for maintaining all stockpiles of existing, on-site loam on the site until final placement of all loam has been approved by the Architect in writing. No loam shall be removed from the site unless approved by the Architect in writing. Upon written approval by the Architect, Contractor shall remove all excess, unused existing on-site loam from the site and dispose of it in a legal manner.

N. The contractor shall install erosion control matting where required on the drawings and specified under Section 32 92 00 – Turf and Grasses.

3.3 ACCEPTANCE

A. Confirm that the final grade of the loam borrow is at the proper finish grade elevations. Adjust grade as required to meet the contours and spot elevations noted on the Plans. Request the presence of the Architect to inspect final grade. Do not proceed with the remaining work of this Contract until the Architect has given his/her written approval of the final grade.

B. Placed Lawn and Planting Soils must be capable of infiltrating water at the minimum rate provided in this Specification for each type of planting soil.

END OF SECTION

SECTION 32 92 00
TURF AND GRASSES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 apply to the work of this Section.

1.02 DESCRIPTION OF WORK

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Contract Documents and as specified in this Section and includes, but is not limited to, the following:

1. Seeding
2. Installation of erosion control blanket
3. Maintenance
4. Inspection and acceptance
5. Cleaning and protection

1.03 RELATED WORK

A. Carefully examine the site and all of the Contract Documents for requirements that affect the work of this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions. Other specifications sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 11 68 00 – Playground Equipment
2. Section 12 93 00 – Site Furnishings
3. Section 31 10 00 – Site Clearing and Preparation
4. Section 31 23 00 – Excavation Filling and Grading
5. Section 32 16 00 – Asphalt Paving
6. Section 32 13 13 – Concrete
7. Section 32 16 00 - Curbing
8. Section 32 18 16.13 – Playground Protective Surfacing
9. Section 32 18 17 – Engineered Wood Fiber Surfacing
10. Section 32 31 00 - Fencing
11. Section 32 90 00 - Planting
12. Section 32 91 00 – Loam and Planting Preparation
13. Section 33 40 00 – Storm Drainage Utilities

B. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.

1. The planting subcontractor shall become fully acquainted with the nature and requirements of the project including the location of all underground utilities prior to starting the work of this Section.

1.04 SUBMITTALS

A. Material Samples and testing:

1. Provide full analysis of existing on-site loam, and off-site loam source from a laboratory that has been approved in writing by the Architect. Sampling and testing shall be as specified, and performed under the work of Section 32 91 00 Loam and Planting Preparation.
2. Provide manufacturers' certified analysis for soil amendments and fertilizers to meet the requirements of this Section, Turf and Grasses.
3. Provide certified analysis for seed mixtures required including percentages of purity, germination and weed seed.
4. Provide organic pre-emergent weed treatment product and safety data, application rates.

1.05 REGULATORY REQUIREMENTS

A. Strictly comply with all applicable codes, regulations and requirements having jurisdiction.

B. All fertilizer and pesticide applications shall be performed by a licensed applicator in strict conformance with all local, state and federal regulations. Notify the Architect at least two (2) weeks prior to scheduled date of application.

1.06 QUALITY ASSURANCE

A. All work shall be performed by experienced landscape professionals familiar with planting procedures and under the full-time supervision of a qualified foreman.

B. Analysis of Materials: For each type of packaged material required for the work of this Section, provide manufacturers' certified analysis.

1.07 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Deliver packaged materials in manufacturer's original unopened containers showing weight, analysis and name of manufacturer. Comply with manufacturer's instructions and recommendations for storage and handling. Protect all materials from damage, deterioration, injury and theft while stored at the site.

1.08 EXAMINATION OF CONDITIONS

A. All areas to be seeded shall be inspected by the Contractor prior to starting work and any incorrect grading or inadequate drainage shall be reported to the Architect prior to beginning work.

PART 2 - PRODUCTS

2.01 LOAM

A. Loam for lawns shall be approved, specified, provided, and installed under the work of Section 32 91 00, Loam and Planting Preparation, and loam amendments required by the test results and the work of this Section including but not limited to humus, fertilizers and limestone shall be applied separately at the required rates to the rough graded loam and shall be thoroughly and evenly incorporated to the full depth of the in-place loam. Apply approved limestone in sufficient quantity to bring the acidity of the loam to pH 6.5.

2.02 SOIL ADDITIVES

A. Soil additives shall be specified, provided, and installed under the work of Section 32 91 00 Loam and Planting Preparation.

2.03 SEED

A. Seed Material: Provide fresh, clean, new-crop seed complying with tolerance for purity and germination establish by Official Seed Analysis of North America. Seed shall be composed of the following varieties that shall be mixed in the proportions stated and shall test to minimum percentages of purity and germination. Deliver seed in fully labeled, standard, sealed containers. Seed that has become wet, moldy, or otherwise damaged, will not be accepted.

B. Seed, General Lawn, shall have the following seed mixture composition:

Common Name	Proportion By Weight	Percent Purity	Percent Germination
Pennlawn Fescue	50%	95%	90%
Penn Fine Ryegrass 'Penn Fine'	25%	95%	90%
Baron Kentucky Bluegrass	25%	95%	90%

1. All varieties shall be within the top 50 percent and 25 percent respectively, of varieties tested in National Turfgrass Evaluation Program, or currently recommended as low maintenance varieties by University of Massachusetts or the University of Rhode Island.

2. Seeding rate for the seed mix shall be 6 pounds per 1,000 square feet.

3. Seed used for overseeding as specified herein shall be Perennial Ryegrass having 95% purity and 90% germination.

2.04 FERTILIZERS

A. Fertilizer shall be a commercial product complying with the State and United States fertilizer laws. Deliver to the site in the original unopened containers that shall bear the manufacturer's certificate of compliance covering analysis. Fertilizer shall contain not less than the percentages of weight of ingredients as recommended by the soil analysis.

B. Nitrogen fertilizer shall be slowly soluble ureaformaldehyde, methylene urea, or isobutylidene diurea; or slow release sulfur-coated urea.

C. Phosphorus shall be superphosphate or triple superphosphate.

D. Potassium shall be sulfate of potash, K2SO4.

E. Salt indexes per unit of nutrient for nitrogen, phosphorous, and potassium shall be less than 1.0 when compared to sodium nitrate (6.3).

2.05 LIMESTONE

A. Ground limestone for adjustment of loam borrow pH shall contain not less than 85 percent of total carbonates and shall be ground to such fineness that 40 percent will pass through 100 mesh sieve and 95 percent will pass through a 20 mesh sieve. Contractor shall be aware of loam borrow pH and the amount of lime needed to adjust pH to specification in accordance with testing lab recommendations.

2.06 WATER

A. Water: shall be furnished by the Contractor from a legal off-site source via water truck and be suitable for irrigation, free of toxic ingredients. Sources of water at or near the site that are made available to the Contractor are a convenience to the Contractor. Limitations of site water sources shall be supplemented by off-site sources at the Contractor's expense to meet the maintenance requirements of this Section. Any municipal fees associated with providing water for this work shall be borne by the Contractor.

1. Watering Equipment: The Contractor shall furnish sufficient watering equipment to distribute water evenly with complete coverage daily to all seeded areas.

2.07 STRAW

A. Straw for mulch at seeded areas shall be mowings of acceptable herbaceous growth reasonably free from noxious weeds or woody stems and shall be reasonably dry. No salt hay shall be used.

2.08 WOOD FIBER MULCH

A. Wood Fiber Mulch: shall be derived from natural, clean, whole woodchips. Fiber shall not be produced from recycled material such as sawdust, paper, or cardboard fiber. It shall be dyed green to contrast with the soil on which it is to be applied. Fiber shall have a water holding capacity of not less than 31.5 ounces of water per 3.5 ounces of fiber. The rate of application for wood fiber mulch shall be in accordance with manufacturer's guidelines.

2.09 EROSION CONTROL MAT

A. The erosion control blanket shall be a machine-produced mat of 100% agricultural straw matrix. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with lightweight photodegradable polypropylene netting having an approximate 0.50 x 0.50 inch (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers (50 stitches per roll width) with degradable thread. The blanket shall be manufactured with a colored line or thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) to ensure proper material overlapping. The straw erosion control blanket shall be S150 as manufactured by North American Green, or Architect approved equal. The erosion control blanket shall have the following properties:

1. Material Content:

Matrix	100% Straw Fiber (0.50 lb/yd^2) (0.27 kg/m^2)

Netting	Both sides lightweight photodegradable (1.64 lbs/1,000 ft^2 [0.80 kg/100m^2] approximate weight)
Thread	Degradable

2. Physical Specifications (per roll):

	English	Metric
Width	6.67 ft	2.03 m
Length	108.00 ft	32.92 m
Weight	40.00 lbs ± 10%	18.14 kg
Area	80.00 yds^2	66.89 m^2
Stitch Spacing	1.50 inches	3.81 cm

3. Furnish and install erosion control mat on all seeded areas of 3:1 or greater in slope and in all vegetated swales.

2.10 HERBICIDES, CHEMICALS AND INSECTICIDES

A. Provide chemicals and insecticides as needed for fungus or pest control. All chemicals and insecticides shall be approved by the Massachusetts Department of Food and Agriculture for the intended uses and application rates.

B. Provide post emergent crab grass control throughout the maintenance period to ensure a germinated and mown lawn free of crab grass.

PART 3 - EXECUTION

3.00 GENERAL

A. All areas within the Limit of Work lines not required to be otherwise developed shall be seeded as shown in the Contract Documents. The Contractor shall restore all lawn areas disturbed because of this Contract with specified loam and seed, as directed by Owner, whether within or outside the Limit of Work line.

3.01 PREPARATION OF SUBGRADE AND SPREADING OF LOAM

A. Preparation of subgrade and spreading of loam shall be specified, and performed under the work of Section 32 91 00 Loam and Planting Preparation.

3.02 FINE GRADING

A. Fine grading shall be specified, and performed under the work of Section 32 91 00 Loam and Planting Preparation.

3.03 SEEDING

A. Contractor shall obtain Landscape Architect's written approval of fine grading and be preparation before doing any seeding work.

B. Seeding shall be done immediately after fine grading provided the seedbed has remained in a friable condition and has not become muddy or hard. If it has become hard, it shall be tilled to a friable condition and fine graded again.

C. The season for seeding shall be from April 1 to June 15 and from August 15 to October 15. The actual planting of seed shall be done, however, only during periods within this season which are normal for such work as determined by weather conditions and by accepted practice in this locality. To prevent loss of soil via water and wind erosion and to prevent the flow of sediment, fertilizer, and pesticides onto roadways, sidewalks, and into catch basins, seed loam areas within 5 Days of spreading the loam.

D. Sow seed using a spreader or hydroseeder. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity of seed specified or scheduled. Apply seed at one half the rate in two directions at right angles to each other. Roll the seeded areas lightly and water with a fine spray.

1. After the grass has germinated, all areas and parts of areas that fail to show a uniform stand of grass, for any reason whatsoever, shall be reseeded and such areas and parts of areas shall be reseeded repeatedly until all areas are covered with a uniform germination.

2. Install straw mulch at areas seeded by spreader and cellulose fiber mulch at areas seeded by hydroseeder. Install mulch immediately after fine grading topsoil and seeding.

3. Sow seed using a spreader in lawn areas directly adjacent to building structures as an alternative to Hydroseeding in these areas.

E. Seeding of lawn shall be by Hydroseeding Method specified as follows:

1. Prior to the start of work, furnish a certified statement as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of hydroseeding that can be covered with the quantity of solution in the hydroseeder.

2. Hydroseed with wood cellulose fiber mulch at a rate of 46 pounds per 1,000 square feet or 2000 pounds per acre.

3. For the hydroseeding process, a mobile tank with a capacity of at least 500 gallons shall be filled with water and the mixture noted above in the specified proportions. The resulting slurry shall be thoroughly mixed by means of positive agitation in the tank. Apply the slurry by a centrifugal pump using the hose application techniques from the mobile tank. Only hose application shall be permitted. At no time shall the mobile tank or tank truck be allowed onto the prepared hydroseed beds. The hose shall be equipped with a nozzle of a proper design to ensure even distribution of the hydroseeding slurry over the area to be hydroseeded and shall be operated by a person thoroughly familiar with this type of seeding operation.

3.04 LAWN MAINTENANCE

A. Maintenance shall begin immediately after any area is seeded and shall continue for a minimum of 60 days during the active growing period for seeded areas or until Final Acceptance, whichever is longer.

B. Following the completion of all lawn construction work, and until final acceptance of the project. In the event that seeding operations are completed too late in the Fall for

adequate germination and growth of grass, then maintenance shall continue into the following Spring for the minimum 60 Day period.

C. Maintenance shall consist of watering, weeding, mowing, repair of ruts and erosion, repair of protective devices and reseeding.

1. Weed treatment: At fescue lawns that were seeded the previous fall, a pre-emergent herbicide application is required in early spring. A post-emergent shall also be applied in late spring.

D. Watering: The Contractor shall include in his base bid costs for daily and, if necessary, continuous watering of all grass areas during a normal eight hour working day to maintain the seed bed in a continuous moist condition satisfactory for good germination and turfgrass development. Control weeds as necessary to maintain grass at 98% weed free.

E. Maintenance shall include all temporary protection fences, barriers and signs and all other work, tools and equipment incidental to proper maintenance.

F. The Contractor shall be responsible for all maintenance of lawns necessary to establish a uniform germination of the specified grasses.

G. Mowing and Edging:

1. The Contractor shall keep all lawns mowed until Acceptance of the contract by cutting to a height of 2 inches when growth reaches 3 inches or as directed by the Landscape Architect.
2. At each mowing, all edges of walks, drives, plant beds and other border conditions shall be edge trimmed by hand or machine to produce straight and uniform edge conditions.
3. Remove and discard from paved areas only clippings and debris generated by each mowing and edging operation legally off-site. Landscape Architect, if practical and aesthetic, may allow sweeping (not blowing) clippings back into grass. Mowers shall be equipped with mulching blades. Do not remove from grass areas any clippings that have been generated by mowing operations. Do not mow grass when wet.

H. Fertilizing at General Lawn seeded areas: The first application of fertilizer is specified, provided, performed and paid for under the Section 32 91 00, LOAM AND PLANTING PREPARATION. A second application of fertilizer shall be applied to seeded areas at the time of the first mowing and shall be performed and paid for under this section, TURF AND GRASSES. This second application shall be applied at a rate that ensures that one-half pound of nitrogen is applied per 1,000 square feet. Phosphorus and potassium shall be applied proportionally in accordance with the recommendations of the soil tests and the quantities previously integrated into the soil during the first application. A third application of nitrogen fertilizer shall be applied to seeded areas approximately two months after the second application and shall be paid for under this section, TURFS AND GRASSES. This third application shall correspond to the following application rates dependent upon the month of application.

1. May 1-15: Apply 1.0 pound of nitrogen per 1,000 square feet.
2. June 15-30: Apply 1.0 pound of nitrogen per 1,000 square feet.
3. August 15 through September 15: Apply 1.0 pound of nitrogen per 1,000 square feet.
4. November 1-15: Apply 1.5 pounds of nitrogen per 1,000 square feet.

Nitrogen fertilizer shall be composed of 50 percent slowly soluble or slow release nitrogen fertilizer.

3.05 LAWN REVIEW AND ACCEPTANCE

A. At the end of the maintenance period, seeded areas shall have a close stand of grass as defined above with no weeds present and no bare spots greater than 3 inches in diameter over greater than 5 percent of the overall seeded area. At least 90 percent of the grass established shall be permanent grass species. If seeded areas are deficient, the Contractor's responsibility for maintenance of all seeded areas shall be extended until deficiencies are corrected. Seeded areas to be corrected shall be prepared and reseeded in accordance with the requirements of this Section, TURF AND GRASSES.

B. At the time of acceptance, the Contractor shall remove temporary barriers used to protect lawn areas.

C. The Architect shall review the lawns upon written request by the Contractor. The request shall be received at least ten days before the anticipated date of review.

D. The conditions of lawns will be noted and determination made by the Architect whether maintenance shall continue in any part. When acceptance is made in writing to the Contractor, the Contractor’s responsibility for maintenance of lawns or parts of lawns shall cease.

E. Areas of lawn not meeting the criteria for establishment specified herein will be noted. Remedial work and maintenance shall continue until the lawn is accepted by the Owner.

3.06 CLEANING AND PROTECTION

A. During operations, keep pavements clean and work area in an orderly condition. Protect lawns from damage by other contractors and trades and trespassers. After completion of the work, the Contractor shall remove all debris, materials, rubbish, excess dirt, etc. from the site and dispose of them in a legal manner. The premises shall be left clean and presentable to the satisfaction of the Architect.

END OF SECTION

SECTION 33 40 00
STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 apply to the work of this Section.

1.02 DESCRIPTION OF WORK

A. The work of this Section consists of providing all labor, equipment, materials, incidental work, and construction methods necessary to perform all planting work and related items as indicated on the Contract Documents and as specified in this Section and includes, but is not limited to, the following:

1. High Density Polyethylene pipe and fittings (HDPE)

1.03 RELATED WORK

A. Carefully examine the site and all of the Contract Documents for requirements that affect the work of this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions. Other specifications sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 11 68 00 – Playground Equipment.
2. Section 12 93 00 – Site Furnishings.
3. Section 31 10 00 – Site Clearing and Preparation.
4. Section 31 23 00 – Excavation Filling and Grading.
5. Section 32 12 16 – Asphalt Paving.
6. Section 32 13 13 – Concrete.
7. Section 32 16 00 – Curbing.
8. Section 32 18 16.13 – Playground Protective Surfacing.
9. Section 32 18 17 – Engineered Wood Fiber Surfacing.
10. Section 32 31 00 – Fencing.
11. Section 32 90 00 – Planting.
12. Section 32 91 00 – Loam and Planting Preparation.
13. Section 32 92 00 – Turf and Grasses.

B. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work of the Contract.

1. The Contractor shall become fully acquainted with the nature and requirements of the project including the location of all underground utilities prior to starting the work of this Section.

1.04 Submittals

A. Refer to Division 1, for submitted provisions and procedures.

1. Product Data: Submit manufacturer's technical product data and installation instructions for storm drain system materials and products. Descriptive literature showing pipe dimensions, pipe and joint materials and dimensions, and other details for each class or type of pipe or product to be furnished for this contract. All pipe furnished under the contract shall be manufactured in accordance with these Specifications.

1.05 Interpretation of Drawings

A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of a lack of knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation of the site.

B. Plans, surveys, measurements and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period and formed his own conclusions as to the full requirements of the work involved.

C. All work shall be performed to the true intent and purpose of the drawings and all necessary parts to make complete, approved working systems ready for use, shall be furnished without extra charge.

1.05 Obtaining Information

A. Obtain from the manufacturer the proper method of installation and connection of the equipment that is to be furnished and installed. Obtain all information that is necessary to facilitate the work and complete the project.

PART 2 - PRODUCTS

2.01 Corrugated Perforated Polyethylene Pipe

A. General: Provide pipes of the following materials of class indicated. Provide pipe fittings and accessories of same materials and class as pipes with joining method, as indicated. The piping shall be manufactured by an established manufacturer of good reputation in the industry and in a permanent plant adapted to meet all the design requirements of the pipe.

1. Corrugated perforated polyethylene pipe shall have an interior surface that is smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. Pipe shall conform to AASHTO M-294, AASHTO M252, or AASHTO MP6, Type S depending on the diameter of the pipe required.

2. Pipe and fittings shall be high-density polyethylene meeting the requirements of ASTM D3350.

3. Pipe shall be installed with a minimum 12-inch cover for AASHTO H-10 loading.

B. Joints on Corrugated Polyethylene Pipe.

1. Corrugated polyethylene pipe and fittings shall be jointed with coupling devices made by

the same manufacturer as the piping and of the same material specified for the piping.

2. Coupling bands or external snap couplings shall cover a minimum of one full corrugation in each section of pipe to be joined. Couplings shall have neoprene gaskets to minimize soil infiltration.

3. Pipe entrances at structures shall be made with a mortar made with Type II cement. Mortar mixture shall follow instructions provided by cement manufacturer.

4. Watertight joints shall be provided when indicated on the Contract Drawings.

2.02 Filter Fabric

A. Filter Fabric used shall conform to Section 31 90 00-Excavation, Filling and Grading.

2.03 Crushed Stone

A. Crushed Stone used shall conform to Section 31 90 00-Excavation, Filling and Grading.

PART 3 - EXECUTION

3.01 General Requirements

A. Obtain detailed information from the manufacturers of apparatus as to the proper method of installing and connecting same.

B. Carefully store materials and equipment that are not immediately installed after delivery. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material.

C. Any defective pipe, fitting or drain apparatus that is discovered after it has been installed or has been installed improperly, shall be removed and replaced with non-defective parts to the satisfaction of the Landscape Architect at the Contractor's expense.

D. Trenches shall be kept free of water and as dry as possible during the installation of the bedding material, pipe and jointing for as long a period as required. Pipe shall not be laid in water or when trench conditions are unsuitable for the work.

E. No backfilling shall take place, unless otherwise ordered by the Landscape Architect, until the inspection has been completed.

F. Excavation, backfill and pipe bedding material shall be in accordance with Section 31 00 00 Excavation, Filling and Backfill.

3.02 Installation of Corrugated Polyethylene Pipe and Pipe Fittings

A. General: Install piping in accordance with governing authorities having jurisdiction, except where more stringent requirements are indicated.

B. Pipe Storage: Pipe sections shall not be stored on areas over the newly placed pipe or other pipelines which might be damaged by the superimposed load, and storage sections shall be restricted to approved areas.

C. Handling Pipe: The Contractor will be required to furnish suitable devices to permit satisfactory support of all parts of the pipe unit when it is lifted.

D. Placing Pipe: Except where a concrete cradle or envelope is required, the pipe shall be placed in a crushed stone cradle. In trenches, no blocking or supporting of the piping by concrete, stones, bricks, wooden wedges, or method other than bedding the pipe on crushed stone will be permitted. Each length of pipe shall be shoved home against the pipe previously laid and held securely in position. Joints shall not be "pulled" or "cramped".

E. Jointing Pipe: After the pipe are aligned in the trench and are ready to be jointed, all joint surfaces shall be cleaned.

F. Alignment and Placement: All pipe shall be placed with extreme care as to grade and alignment. Each pipe shall be so placed as to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.

1. Stakeout of drain work and setting of line and grade is the responsibility of the Contractor.

G. Cleaning: Care shall be taken to prevent earth, water, and other materials from entering the pipeline. As soon as possible after the pipe and manholes are completed, the Contractor shall clean out the pipeline and manholes being careful to prevent soil, water, and debris from entering any existing Drain.

1. Place plugs in end of uncompleted conduit at end of day or whenever work stops.

2. Flush lines between manholes to remove collected debris.

H. Review of Completed Corrugated Polyethylene Pipe System: If the visual observation of the completed drain or any part thereof shows any pipe, manhole, or joint to be of defective work or material the defect shall be replaced or repaired as directed. The visual observation shall be conducted by the Owner’s representative and any defects shall be as identified by such. The Contractor shall coordinate and provide site access for the Owner.

3.03 Drainage System Cleaning and Acceptance

A. The new drainage system shall be cleaned by flushing all pipes with clean water and removal of debris from catch basins and drywells, prior to final review and acceptance by the Owner.

END OF SECTION