INVITATION FOR BID
CITY OF NEW BEDFORD
Department of Parks, Recreation and Beaches
Hazelwood Park
Bowling Greens Project
New Bedford, Massachusetts

Bid # 20650016

July 17, 2019

Jonathan F. Mitchell
Mayor

Parks, Recreation and Beaches
181 Hillman Street, Bldg. 3
New Bedford, MA 02740
Documents to be submitted with Bids

5 % Bid Bond
Form for General Bid
Non-Collusion Tax Compliance Statement
References (Under Contract Time and Liquidated Damages)

EEO Documentation- Recommended

Certificate of Understanding: Certification of Compliance with Executive Order 11246

Schedule of Participation for Minority, Woman & Disadvantaged Business Enterprises

Letter of Intent - for each MBE/WBE/DBE Participation

MBE/WBE Contractor Identification Statement - for each MBE/WBE/DBE

Bidder's Certification - must be completed and signed by the General Contractor and all Subcontractors who will work on the project (to include MBE/WBE/DBE and non-MBE/WBE/DBEs)

If applicable, a completed and signed MBE/WBE/DBE Unavailability Certification in the event that the work listed on the Schedule is not sufficient to fulfill the Requirement for MBE/WBE/DBE Participation. This certification must include a statement by the bidder of the reasons why it believes it is in compliance with this Provision, and a list of the names, addresses, telephone numbers and reason given for unavailability of the Minority/Woman/Disadvantaged Contractor who was contacted by the Bidder with respect to the performance of work under the contract.
## SPECIFICATIONS FOR
Hazelwood Park - Lawn Bowling Project
City of New Bedford, Massachusetts

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Sealed Bids for construction of the Hazelwood Park – Lawn Bowling Project will be received by the City of New Bedford, Massachusetts, acting through its Department of Parks, Recreation and Beaches. The project consists of the installation of two lawn bowling greens, drainage, walkways, irrigation system and controller, conduit, wood ditch and bank, seeding, planting and all miscellaneous work and clean up as specified or required to complete the work.

Contract documents are only available electronically by emailing purchasing@newbedford-ma.gov during normal business hours (8:00 AM to 4:00 PM) on or after July 17, 2019 at 9:00 am.

The estimated cost of this project is $200,000 dollars.

Each Bid shall be submitted in accordance with the Instructions to Bidders.

Minimum Wage Rates as determined by the Commissioner of the Department of Workforce Development under the provision of the Massachusetts General Laws, Chapter 149, Section 26 to 27H, as amended, apply to this project. Federal Minimum Wage Rates as determined by the United States Department of Labor under the Davis-Bacon Act also apply to this project.

The bidding and award of this Contract will be under the provisions of M.G.L. Chapter 30, Section 39M.

All bids will be received and opened by the Purchasing Department, in the office of the Purchasing Agent, Room 208, City Hall, 133 William Street, New Bedford, Massachusetts, 02740. Bids will be received no later than:

August 9, 2019 at 11:00 am

The City of New Bedford is the Awarding Authority and reserves the right to waive any minor informality. The Awarding Authority also reserves the right to reject any or all proposals, or to accept any other than the lowest priced proposal should it be deemed to be in the best interest of the City of New Bedford, Massachusetts, to do so.

<table>
<thead>
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<tr>
<td>Advertise Solicitation</td>
<td>Wednesday, July 17, 2019</td>
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<td>FB Available</td>
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<td>General Bids Due</td>
<td>Friday, August 9, 2019 at 11:00 am</td>
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AWARDING AUTHORITY:
CITY OF NEW BEDFORD
SUSAN BRUCE, DIRECTOR OF PURCHASING
133 WILLIAM STREET
INSTRUCTIONS TO BIDDERS

A. FOREWORD: The attention of all bidders is called to all applicable provisions of Massachusetts General Laws, Chapter 149 - Sections 44A to 44J, inclusive, Section 26 to 29 inclusive, and Chapter 30, Section 39F to 39M inclusive, and 39R of the General Laws of the Commonwealth of Massachusetts, as amended to date.

B. GENERAL: The Awarding Authority invites proposals for the Work described in the Contract Documents attached hereto. Before submitting his/her proposal each bidder shall visit the site, examine its conditions, thoroughly acquaint himself/herself with its obstacles and advantages for performing the Work, and compare the Contract Documents with the conditions found. All proposals submitted shall be subject to all applicable provisions of law, including, without limiting the generality of the foregoing, Chapter 30, Section 39F to 39M inclusive, and 39R, and Chapter 193 of the Acts of 2004, as amended to date.

C. QUESTIONS: All questions as to the interpretation of the Contract Documents shall be submitted in writing and emailed to: Susan Bruce at susan.bruce@newbedford.ma.gov and answers to such questions will be sent in the form of an Addendum, to every individual or firm on record as having taken a set of Contract Documents. No questions will be answered unless received at least seven days, Saturdays, Sundays and legal holidays excluded prior to the expiration of the time set for filing sub-bids.

D. BID FORMS: The Awarding Authority will furnish to every person applying therefore a Form for General Bid and a Form for Sub-Bid.

E. CONTRACT DOCUMENTS: The Awarding Authority will, upon deposit of the amount per set as designated in the Invitation to Bid for the return of same in good condition, furnish one (1) complete set of Contract Documents to each Bidder requesting same. No partial sets of Contract Documents will be issued.

F. REJECTION OF CERTAIN GENERAL BIDS REQUIRED BY LAW: The law requires that every general bid, and every sub-bid, which is not accompanied by the prescribed bid deposit or which is not on a form furnished by the Architect or Awarding Authority or otherwise does not conform with Chapter 30, Section 39F to 39M inclusive, and 39R, and Chapter 193 of the Acts of 2004, as amended to date, or which is on a form not completely filled in or which is incomplete, conditional, or obscure, or which contains any addition not called for, shall be rejected by the Awarding Authority.

G. FURTHER RIGHT TO REJECT GENERAL BIDS: The Awarding Authority further reserves the right to reject any or all general bids if it be in the public interest so to do and to reject any sub-bid on any sub-trade if it determines that such sub-bid does not represent the sub-bid of a person competent to perform the Work as specified or that less than three such sub-bids were received and that the prices are not reasonable for acceptance without further competition.

H. GENERAL BIDS: General Bids must be submitted on the FORM FOR GENERAL BID, a sample of which is bound into the Contract Documents and may be removed and used for additional copies. The General Bid shall be completely filled in, signed, enclosed in an envelope, sealed and plainly marked with the Project Name. The bid accompanied by a bid deposit in the amount of five percent (5%) of the bid price shall be filed with the Awarding Authority at the place designated in the Invitation to Bid. The bid shall be filed before the time designated in the Invitation to Bid for the opening of General Bids.

1. General Bids shall be for the complete Work as specified, with no Work to be performed by sub-bidders; and the General Contractor shall be selected on the basis of such General Bids.

2. If the bid is mailed, the General Bidders shall enclose their sealed bid in an outer envelope and address as follows:
   FROM: General Bidder's Name and Business Address
   TO: City of New Bedford
3. No telegraphic or facsimile transmission of bid or telegraphic or facsimile transmission modification of a bid will be considered. No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.

I. REQUIREMENTS FOR FOREIGN CORPORATIONS: The attention of all bidders is called to the provisions of General Laws Chapter 30, Section 39L, which provides that the Awarding Authority may not enter into a contract for construction Work and may not approve as a sub-contractor furnishing labor and materials for a part of any such Work a foreign corporation which has not complied with the requirements of Chapter 156d Section 151 of the General Laws. The term "foreign corporation" means a corporation not incorporated under the laws of the Commonwealth of Massachusetts.

J. SALES TAX: Purchases of building materials and supplies to be used on this project are entitled to exemption from the Sales and Use Tax if the conditions imposed by Paragraph 6 (f) of Section I of Chapter 14 of the Acts of 1966 are otherwise satisfied. Bidders are instructed to submit proposals on the basis that no Massachusetts Sales and Use Tax will be imposed on purchases of building materials and supplies used in connection with this Project.

K. CONSTRUCTION TIME: The Agreement will include a stipulation that the Work be substantially completed no later than May 1, 2020 following receipt of the Owner’s Notice to Proceed. If the Contractor fails to meet the construction deadline, the Contractor is responsible for all Owner and Architect costs associated with the deadline not being met. The Architect is to perform two on-site punch lists. If additional punch lists are needed, the Contractor shall be responsible for all Owner and Architect costs associated with the additional punch list visits.

L. WITHDRAWAL OF BIDS: A bidder may withdraw his bid, either personally or by written request, at any time prior to the scheduled time for opening bids. No bidder may withdraw his bid for a period of thirty calendar days after the date set for the opening thereof, and bids shall be subject to acceptance by the Owner during this period. Failure to submit a completed copy of the required Statement of Bidder Qualifications shall be cause for rejection of a General Bid by the Owner.

M. EXECUTION OF AGREEMENT:

The form of Agreement which the successful bidder will be required to execute is included in the Project Manual.

The bidder to whom the Contract is awarded shall, within fifteen calendar days after notice of award and receipt of Agreement forms from the Owner, sign and deliver required copies to the Owner.

At or prior to delivery of the signed Agreement, the bidder to whom the Contract is awarded shall deliver to the Owner those Certificates of Insurance required by the Contract Documents and such Labor and Materials Payment Bonds and Performance Bond as are required by the Owner.

Bonds and Certificates of Insurance shall be approved by the Owner before the successful bidder may proceed with the Work. Failure or refusal to provide Bonds or Certificates of Insurance in a form satisfactory to the Owner shall subject the successful bidder to loss of time from the allowable construction period equal to the time of delay in furnishing the required material.

N. METHOD OF AWARD: The contract will be awarded to the lowest responsible and eligible general bidder on the basis of the proposed contract price if such exists, and if the Awarding Authority, in its sole discretion, decides to award on the basis of such alternate. Special attention is called to the provisions of the General Laws, Chapter 149, Sections 44A to 44H defining the term "lowest responsible and eligible bidder" and giving the Awarding Authority the right to require essential information in regard to qualifications.
O. **TAX CERTIFICATION**: The successful Bidder will be required to submit a tax certificate as required by chapter 62C, Section 49A of the Massachusetts General Laws, as follows:

**CERTIFICATE UNDER M.G.L. c.62C, S49A**

I certify under the pains and penalties of perjury that ___________________________ has/have complied with all laws of the Commonwealth of Massachusetts relating to taxes.

______________________________
Employer Identification Number

______________________________
Name

______________________________
Date

______________________________
Title of Business Officer (if Applicable)

**END OF INSTRUCTIONS TO BIDDERS**
FORM FOR GENERAL BID

FROM:

TO: City of New Bedford
    Purchasing Department
    133 William Street
    Room 208
    New Bedford, MA 02740-5194

A. The undersigned proposes to furnish all labor and materials required for implementation of Hazelwood Park Bowling Greens Project in accordance with the accompanying Plans and Specifications prepared by Gardner + Gerrish, LLC. for the Contract Price specified below, subject to additions and deductions in accordance with terms of the Specifications.

B. This bid includes addenda numbered ____________________________

C. The Proposed Contract Price is SEE SHEET ATTACHED plus Alternate Sheet

D. The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

E. The undersigned agrees that, if he is selected as general contractor, he will within five days, Saturdays, Sundays, and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price; provided, however, that if there is more than one surety company, the surety companies shall be jointly and severally liable.

F. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards made subject to section 44A

Date:__________________________________________

Name of General Bidder:__________________________
By _____________________________
(Name of Person Signing Bid and Title)

_______________________________
(Business Address)
NOTE: THE UNIT PRICE FOR EACH ITEM MUST BE WRITTEN IN WORDS AND FIGURES. IN CASE OF DISCREPANCY, THE AMOUNT SHOWN IN WORDS WILL GOVERN. All prices are installed price.

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<th>QUANTITY</th>
<th>UNIT BID PRICE</th>
<th>TOTAL COST</th>
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<td>Loam &amp; Hydroseed Tall Turf Fescue Clover Mix</td>
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<td>As-built Plan</td>
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<td>One Year Maintenance</td>
<td>LS</td>
<td>________</td>
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**LEGEND**

LF = Linear Feet  
CY = Cubic Yard  
SY = Square Yard  
SF = Square Feet  
EA = Each  
TN = Ton  
PH = Per Head  
AC = Acres  
PO = Per Hour  
FSF = Face Square Feet  

LS = Lump Sum
Contractor:______________________________________________

ALTERNATE ITEMS

ALTERNATE BID 1 – Concrete Ditch and Bank

Alternate #1 shall be the REPLACEMENT of proposed wood bank and ditch with concrete system as detail on sheet L-6. Rubber pad and gluing included. Layout, alignment and dimensioning stay the same. Sand and 2” drainage pipe are still included as overlay. Base bid is wood bank and ditch detail.

ADD $_____________________________________________________

ADD AMOUNT (words)________________________________________

ALTERNATE BID 2 – Custom Wood Fence and Gates

Alternate #2 shall be the ADDITION of custom wood fence, pedestrian gate, and service gate as shown on sheets L-2, L-3, L-4 and detailed on sheet L-6. Work includes provision of cedar wood, prime and painting, assembly, brackets, and bolts as shown on sheets L-2, L-3, L-4 and detailed on sheet L-6. Base bid is to leave 6’ high temporary chain link fence in place.

ADD $_____________________________________________________

ADD AMOUNT (words)________________________________________

ALTERNATE BID 3 – Water Drinking Fountain

Alternate #3 shall be the ADDITION of a water drinking fountain as shown on sheet L-2, detail #xx on sheet L-7. Work includes, excavation, provision of gravel base and concrete, piping connection from outside of valve box to fountain and installation of fountain. Base bid is bituminous concrete. Base bid includes piping to water box as detail on Irrigation plan and details.

ADD $_____________________________________________________

ADD AMOUNT (words)________________________________________
ALTERNATE BID 4 – Lighting Conduit

Alternate #4 shall be the ADDITION of trenching, backfill, conduit, warning tape, hand holds, and connection to existing basement conduit as shown and detailed on sheet L-3 Grading and Utility Plan. No wire, footings or lighting is included. Base bid is loam and seed.

ADD $ ________________________________

ADD AMOUNT (words) ____________________________

ALTERNATE BID 5 – Concrete Path - Sidewalk

Alternate #5 shall be the REPLACEMENT of proposed bituminous asphalt paths as shown on sheets L-2, L-3, L-4 and detailed on sheet L-5. Work includes provision and installation of concrete surfacing, troll joints, broom surfacing, sealing, construction joints, and expansion joints. A joint plan will be produced if this alternate is accepted. Score joints 5’ O.C. and construction joints 30’ O.C. Base bid is bituminous asphalt.

ADD $ ________________________________

ADD AMOUNT (words) ____________________________

ALTERNATE BID 6 – Maintenance

Alternate #6 shall be the ADDITION of a three (3) year maintenance package as included in Appendix A.

ADD $ ________________________________

ADD AMOUNT (words) ____________________________

ALTERNATE BID 7 – Park Benches

Alternate #7 shall be the ADDITION of a eight (8) Model P6 steel benches as manufactured by Belson Outdoors, LLC. 627 Amersale Drive | Naperville, IL 60563; Toll Free: (800) 323-5664; F: (630) 897-0573 or equal. Color Mossy Green. Surface mounted.

ADD $ ________________________________

ADD AMOUNT (words) ____________________________
CITY OF NEW BEDFORD
 MASSACHUSETTS

NON-COLLUSION AND TAX COMPLIANCE FORM

CERTIFICATE OF NON-COLLUSION

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

________________________________________
Signature of individual submitting bid

________________________________________
Name of business/organization

TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. c. 62C, §49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

________________________________________
Signature of person submitting bid

________________________________________
Name of business
CITY OF NEW BEDFORD
MASSACHUSETTS

VOTE OF CORPORATION AUTHORIZING
EXECUTION OF CORPORATE AGREEMENTS

At a meeting of the Board of Directors of ________________________ duly called
and held on ______________, 20___ at which a quorum was present and acting
throughout, the following vote was duly adopted.

VOTED: That ______________, a __________________ of the corporation, be and hereby is
authorized to affix the Corporate Seal, sign and deliver in the name and behalf of the
corporation contract documents with the City of New Bedford, the above mentioned
documents to include but not be limited to Bids, Proposals, Deeds, Purchase and Sales
Agreements, Agreements, Contracts, Leases, Licenses, Releases and Indemnifications;
and also to seal and execute, as above, surety company bonds to secure bids and
proposals and the performance of said contract and payment for labor and materials, all in
such form and on such terms and conditions as he/she, by the execution thereof, shall
deem proper. A true copy

ATTEST:

__________________________________________

__________________________________________ (Affix Corporate Seal)

Signature

__________________________________________

Title: Clerk

__________________________________________

Date

Revised 05/10
OSHA CERTIFICATION REQUIREMENT

Effective July 1, 2006, all employees of a contractor to be employed on public building and public works worksites must have successfully completed at least a 10 hour course in construction safety and health approved by OSHA at the time the employee begins work.

I, ____________________________, as ____________________________, of the
(Print Name) (Position with the entity submitting bid)

joint venture/corporation/partnership or other legal entity submitting this bid for a public works project falling under §39M of Chapter 30 of the Massachusetts General Laws and Chapter 149 of the same, do hereby certify that any and all employees found on my worksite for this project have, or will have by the start of their work on the project, successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that was at least 10 hours in duration.

A copy of the OSHA completion cards for each employee must be submitted to the City of New Bedford before work on this project is to begin and must be supplemented as new employees are hired or contracted to work on this project.

______________________________, as
Signature

______________________________, of
Position

______________________________, on
Company/Corporation/Joint Venture/Partnership/Etc.

__________________________
Date
CONTRACT TIME AND LIQUIDATED DAMAGES

LIQUIDATED DAMAGES (not a penalty) shall be assessed at the rate of $500.00 per day for each and every calendar day that completion of the work overruns the CONTRACT TIME.

BIDDERS QUALIFICATIONS

CONTRACTOR QUALIFICATIONS
A. Installer: A firm with at least ten (10) years’ experience in installation of Fine Turf (lawn bowling greens, croquet greens, and/or golf course greens) with at least three (3) projects of similar size in the last five years, which meets the criteria required by this specification and which is acceptable to the City of New Bedford.

B. References: The Contractor must supply a minimum of three (3) references for work of this type with their Bid Form using the outline below, including names and phone numbers of the Park Manager and/or Superintendent, the scope of work, the year which it was installed, and cost.

C. Foreman: Except where the Contractor is an individual and gives his/her personal superintendence to the work he/she will employ and maintain on the work a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor’s representative at the site. The supervisor shall have full authority to act on behalf of the Contractor and all communications given to the supervisor shall be as binding as if given to the Contractor. The supervisor shall be present on the site at all times to provide adequate supervision and coordination of the work. The foreman/supervisor shall have demonstrated experience with spray parks/splash pads. Contractor shall submit a Resume of such experience with their Bid Form. The Contractor shall maintain the same foreman for the duration of the installation of the work.
This statement shall be filled out and returned with the Proposal.

Bidders Complete Name: ____________________________________________

Permanent Mailing Address: _______________________________________

State of Incorporation: ____________________________________________

Telephone Number: ___________________ Fax Number: ________________

Email (if available): _____________________________________________

Names of Officers/Principals: ______________________________________

________________________________________________________________

________________________________________________________________

________________________________________________________________

________________________________________________________________

Years in Business Under Above Name: ________________________________

Type(s) of Work by Your Firm: ______________________________________

Names of Construction Foreman: ___________________ Years in Business:

Project Experience (three references):

________________________________________________________________

________________________________________________________________

________________________________________________________________
Experience in Fine Turf of similar scope and cost (three minimum): References must be within the last five years.

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<td>Project Scope and Contract Amount</td>
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</table>
List subcontractors to be used on this project.

Contractor: ________________  Item: ________________

Contractor: ________________  Item: ________________

Contractor: ________________  Item: ________________
Insurance and Indemnification

This agreement becomes part of the contract for which the contractor is performing services to City of New Bedford.

A. Contractor shall maintain workers compensation, general liability, automobile, professional liability and umbrella insurance for the minimum amount required by the contract that this contractor applies to or as outlined below, whichever limits and coverages are higher. Insurance coverages and certificates shall be provided and include the City of New Bedford as an additional insured, on a primary and non-contributory basis, on all liability policies.

B. Minimum required insurance limits (coverage on an occurrence basis):
   Commercial General Liability
   - $2,000,000 Products/Completed Operations Aggregate
   - $2,000,000 General Aggregate
   - $1,000,000 Any One Occurrence (coverage A)
   - $1,000,000 Any One Person or Organization (Coverage B)

   Automobile Liability (Comprehensive Coverage)
   - $1,000,000 Each Accident

   Commercial Excess Liability ("Umbrella")
   - $1,000,000 Products/Completed Operations Aggregate
   - $1,000,000 General Aggregate
   - $1,000,000 Any One Occurrence (coverage A)
   - $1,000,000 Any One Person or Organization (Coverage B)

   Employers Liability (Coverage "B" on the Workers Compensation Policy)
   - $ 500,000 Each Accident
   - $ 500,000 Each Employee for Injury by Disease
   - $ 500,000 Aggregate for Injury by Disease

   Professional Liability
   - $2,000,000 General Aggregate
   - $1,000,000 Any One Occurrence

C. Any contractor who does not carry worker’s compensation insurance coverage to protect himself personally from work-related injuries hereby fully releases, holds harmless, and indemnifies the City of New Bedford from any injuries that may occur to the contractor himself during the course of this contract. In no way does this provision affect the absolute duty of every contractor to provide workers’ compensation insurance coverage.
to each and every one of his employees and himself according to the provisions of this Agreement and all applicable state and federal laws.

D. To the fullest extent permitted by law, the contractor hereby acknowledges and agrees that it shall indemnify, hold harmless and defend the City of New Bedford, the Owner, and any of the officers, directors, employees, agents, affiliates, subsidiaries and partners from and against all claims, damages, losses and expenses, including but not limited to, attorney’s fees, arising out of or resulting from the performance of the Contractor’s Work under this contract, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease, or death or injury to or destruction of tangible property (other than to the Work itself) including loss of use resulting there from, and (2) is caused in whole or in part by any acts or omissions of the contractor, its employees, agents or anyone directly or indirectly employed by any of them or anyone whose acts any of them may be liable.

E. All Insurance Certificates must contain a clause indicating that certificate holders be given a minimum of 30 days written notice prior to the cancellation of contractors insurance. Contractor must furnish the certificate referred to above as an express condition precedent to the Contractor’s duty to make any progress payments to contractor pursuant to this Agreement.

F. The contractor hereby acknowledges its obligation under the forgoing paragraph to indemnify the City of New Bedford against judgments suffered because of the contractor’s work and to assume the cost of defending the City of New Bedford against claims as described in the forgoing paragraph.

Company: __________________________________________

Printed Name: ______________________________________

Authorized Signature: ________________________________
PAYMENT BOND

CITY OF NEW BEDFORD
MASSACHUSETTS

KNOW ALL MEN BY THESE PRESENTS:

That we, ________________ ____________________________, as Principal, and
____________________________ ____________________________, as Surety,
are held and firmly bound unto the City of New Bedford, Massachusetts, as Obligee,
in the sum of ________________________________ dollars ($__________) to
be paid to the Obligee, for which payments, well and truly to be made, we bind ourselves, our respective
heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has made a contract with the Obligee, bearing the date of _____ __, 20__
for the ____________________________________________ in ___________, Massachusetts.

NOW the conditions of this obligation are such that if the Principal and all subcontractors under said
contract shall pay for all labor performed or furnished and for all materials used or employed in said
contract and in any and all duly authorized modifications, alterations, extensions of time, changes or
additions to said contract that may hereafter be made, notice to the Surety of such modifications,
alterations, extensions of time, changes or additions being hereby waived, the foregoing to include any
other purposes or items set out in, and to be subject to, provisions of M.G.L. c.30 §39A, and M.G.L. c.149
§29, as amended, then this obligation shall become null and void; otherwise it shall remain in full force and
virtue.

IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals this:
_______ Day of ___________ 20__

PRINCIPAL
____________________________
By: ____________________________
SEAL
Attest: ____________________________

SURETY
____________________________
By: ____________________________
ATTORNEY-IN-FACT
Attest: ____________________________

The rate for this bond is _____% for the first $___________ and _____% for the next $___________
The total premium for this bond is $_____________
BOND NO. __________

PERFORMANCE BOND

CITY OF NEW BEDFORD
MASSACHUSETTS

KNOW ALL MEN BY THESE PRESENTS:

That we, ____________________________________________, as Principal, and
___________________________________________, as Surety,
are held and firmly bound unto the City of New Bedford, Massachusetts, as Obligee,
in the sum of ___________________________________ dollars ($.___________)
to be paid to the Obligee, for which payments, well and truly to be made, we bind ourselves, our respective
heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the said Principal has made a contract with the Obligee, bearing the date of _____ 20___
for the ____________________________________________ in __________, Massachusetts.

PROJECT TITLE

NOW, the condition of this obligation is such that if the Principal and all Subcontractors under said contract
shall well and truly keep and perform all the undertakings, covenants, agreement, terms and conditions of said
contract on its part to be kept and performed during the original term of said contract and any
extensions thereof that may be granted by the Obligee, with or without notice to the Surety, and during
the life and any guarantee required under the contract, and shall also well and truly keep and perform all
the undertakings, covenants, agreements, terms and conditions of any and all duly authorized
modifications, alterations changes or additions to said contract that may hereafter be made, notice to the
Surety of such modifications, alterations, changes or additions being hereby waived, then this obligation
shall become null and void; otherwise, it shall remain in full force and virtue.

IN THE EVENT, that the contract is abandoned by the Principal, or in the event that the Obligee, under the
provisions of Article 19 of the General Conditions of said contract terminates the employment of the
Principal or the authority of the Principal to continue the work, said Surety hereby further agrees that said
Surety shall, if requested in writing by the Obligee, take such action as is necessary to complete said
contract.

IN WITNESS WHEREOF, the Principal and Surety have hereunto set their hands and seals this:
_____ Day of _________ 20___

PRINCIPAL ________________________________  SURETY ________________________________

By: ______________________________________  By: __________________________________

SEAL  ATTORNEY-IN FACT

Attest: __________________________________  Attest: ________________________________

The rate for this bond is ____% for the first $___________ and ____% for the next $___________
The total premium for this bond is $______________
SECTION 01100
GENERAL REQUIREMENTS

All work done under this Contract shall be in conformance with the latest version of Massachusetts Department of Transportation (MADOT) Standard Specifications for Road and Bridge Construction 2004 Edition, the Massachusetts Standard Details 2009 Edition, the 2003 Manual on Uniform Traffic Control Devices with 2004 Revision, and the 2004 American Standards for Nursery Stock. All work done under this Contract shall also be in conformance with the Drawings and these Supplemental Technical Specifications.

SCOPE OF WORK

The general summary of work to be done under this contract consists of, but shall not be limited, to the following as shown in the Contract Documents:

- Mobilization and provide controls as necessary to ensure public safety and facilitate construction;
- Maintenance and further installation of erosion and sediment control devices;
- Removal and proper disposal of existing unclassified material including sawcutting, pavement;
- Earthwork and site preparation including rough grading of stormwater management facilities;
- Installation of Directional, Regulatory, Warning and Guide signage;
- Installation of temporary fencing for site control and rain garden soil protection;
- Installation of electrical connections;
- Connection to existing water service;
- Lawn bowling greens;
- Subsurface drainage
- Irrigation system and controller
- Wood fence and gates
- Installation of benches;
- Drain pipe connections to existing stormwater system;
- Bituminous concrete pavement cut and repair;
- Pavement patching and replacement;
- Loam installation for disturbed areas within the site;
- Installation of plantings and hydoseeding; and
- Demobilize and final cleanup of the site including removal of remaining erosion and sediment control devices and any remaining sediment, pavement sweeping;

CHANGE ORDER PROCEDURE

DESCRIPTION

The Contractor shall comply with this procedure in the process of giving notification of change and preparing and submitting a proposal for adjustment due to a desired, perceived, or actual change in

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the work. Changes in the work, or period of performance of the work, may be directed in writing by
the Owner or Landscape Architect or may be requested by the Contractor. In either case, payment
for work accomplished under a modification may not be made until a formal contract modification,
incorporating the change into the contract, has been issued and executed. Therefore, it is incumbent
upon the Contractor to comply fully with this procedure and to expedite the resolution of changes.

CHANGE SUBMITTALS

When requested, the Contractor shall submit the following to the Owner or Landscape Architect in
accordance with the Submittals procedures described in these specifications:

1. Proposal cover letter on Contractor's letterhead;
2. Detailed price proposal;
3. Drawings or other explanatory data; and
4. Time extension statement with justification if any time extension is requested.

COMPLIANCE

The Contractor shall take such measures as needed to assure familiarity and compliance by its staff
with these procedures. If change proposals are incomplete, unclear, or ambiguous or are not
supported by adequate documentation, the data will be returned and the Contractor shall resubmit or
supplement the proposal as requested by the Owner or Landscape Architect. Delay resulting from
the Contractor's noncompliance with this procedure shall not in itself constitute the basis for an
extension in the time of performance under the contract.

PROCESSING CHANGES INITIATED BY THE LANDSCAPE ARCHITECT

The Landscape Architect will initiate changes only in writing. The Owner will sign any Request for
Proposal (RFP). This will establish a Proposed Change (PC) number, by which the change will be
identified until such time as it may be incorporated into the contract by formal modification.

The Contractor may or may not be authorized to proceed with the changed work pending resolution
of changes in the contract price or time of performance. If the work described in the RFP becomes
critical to the timely performance of the Contractor's work, a written request for a Notice to Proceed
must be forwarded to the Owner immediately. The Owner will issue any Notice to Proceed. This
unilateral modification to the contract may be subject to further negotiation regarding price and time
for completion.

Payment for changed work, covered by a unilateral modification, will not be made until a
bilateral modification covering the changed work has been executed.

The Contractor shall prepare and submit its proposal for change to include at a minimum:

1. A cover letter referencing the PC number and citing the attachments, if any, which constitute
   the Contractor's total proposal.
2. A detailed price proposal showing labor, construction equipment, and material quantities and
   prices at the lowest practical level of each element of the work.
3. Any drawings, sketches, catalog cuts, samples, certifications, or other data required to be
   submitted by the Owner or Landscape Architect or that is required to fully document

GENERAL
01100-2
Contractor's work under the proposed change.
4. A statement of the proposed change in the time of completion of the contract, together with all required justification for such a change.
5. A statement to the effect that there is "no change in price and/or time of completion of the work under this contract as a result of this proposed change", if that is the case.

The Owner may accept the Contractor's proposal without negotiation. Alternatively, upon receipt of a proposal which is satisfactory in form, the Owner or Landscape Architect may require negotiation with the Contractor to arrive at a fair and equitable change in the contract price and time of completion. Upon agreement, a contract modification will be issued by the Owner for Contractor's execution.

PROCESSING CHANGES INITIATED BY THE CONTRACTOR

Should the Contractor feel that a change to the work under the contract, or to the contract itself, is necessary or desirable, it shall propose such a change to the Owner or Landscape Architect. This proposed change shall include a clear and concise description of the proposed change, along with that information cited in above.

Within a reasonable time, the Owner or Landscape Architect will review the Contractor's proposal and determine if the proposed change is in the Owner's best interest. If so, Contractor will be advised of this and a PC number will be assigned to Contractor's proposal.

EXECUTING CHANGED WORK

The Contractor is cautioned not to proceed with the work described in a proposed change until it is authorized to do so in writing by the Owner or Landscape Architect.

INSPECTION OF WORK

DESCRIPTION

Work included in this Section consists of periodic observation of construction of the project. The Contractor's work shall be monitored periodically by the Owner or Landscape Architect.

The Owner or Landscape Architect does not anticipate that a full-time construction observation will be assigned to this work. The Owner or Landscape Architect will provide periodic field visits as identified in the Drawings.

The Owner or Landscape Architect's construction observation work is inspectional in nature and will not include supervision or direction of the actual work of the contractor.

In no event will the Owner or Landscape Architect be responsible or liable for the contractor's use or administration of personnel, machinery, staging, or other temporary or precautionary construction, safety precautions or procedures, or for compliance by the contractor with the provisions, terms, or specifications of the contract. Observation services provided by the Owner or Landscape Architect are solely for the benefit of the Owner.
The Contractor shall keep the Owner or Landscape Architect informed concerning the work status and projected work schedule through regular communications.

The Contractor shall not cover any work related to the required field visits until one of the following occurs:

1. The Contractor is authorized by the Owner or Landscape Architect to proceed after the field visit.
2. The field visit is rescheduled by the Owner or Landscape Architect to a later construction event.
3. The field visit is waived in writing by the Owner or Landscape Architect.

The Contractor shall submit a written request for a Final Inspection seven calendar days in advance of the planned completion date. After review of the Notice of Completion, the Owner or Landscape Architect may reject the Notice for cause or schedule the Final Inspection. The Owner or Landscape Architect will perform its Final Inspection on all phases of the work and develop a comprehensive punch list, which will be provided to the Contractor.

The Completion Verification Inspection will be scheduled when the punch list items discovered during the Final Inspection have been corrected. The Owner or Landscape Architect may add new items to the punch list at this inspection.

The Contractor is advised that the Owner or Landscape Architect will not accept the work until the Owner or Landscape Architect determines substantial completion has been achieved. Therefore, to minimize its risk, the Contractor should schedule its work to be substantially complete in time to allow the Final Inspection, punch list work, and Completion Verification Inspection to occur in advance of the Contract Completion Date. Due to the construction time period and the anticipated weather conditions, substantially complete will be defined as the completion of construction for all item and the temporary stabilization of all disturbed areas, excluding planting and final seeding. Planting and final seeding is to occur during the time periods specified in the Drawings.

Nothing in this Section shall be construed to limit the Owner’s or Landscape Architect’s or right to inspect the work at any time.

CONSTRUCTION SCHEDULES

DESCRIPTION

Work included in this Section consists of preparation, submittal, and updating of the project.

CONSTRUCTION SCHEDULE

Submit the following to the Owner or Landscape Architect in accordance with the Submittals Section. Submittals are for the record or approval as indicated.

1. The proposed construction schedule shall be submitted for approval within five (5) calendar days after receipt of Notice to Proceed.
2. Submit contract Weekly Summary Reports to the Owner or Landscape Architect for the
record on a weekly basis.

3. Submit construction progress schedule as backup to progress invoices.

The construction schedule shall show all work activities for completion of the work to be performed under this contract and will reflect Contractor's general sequential approach to the work. The construction schedule will be in an arrow diagram, precedence diagram, or bar chart format. The minimum level of detail (number of activities) shall include the activities described in the Schedule of Values and the Scope of the Work. The construction schedule shall demonstrate completion of all work within the period of performance of the contract in a reasonable and achievable manner.

PERIODIC SCHEDULE UPDATES

The Contractor shall support periodic payment requests with an approved construction schedule marked to indicate progress. Submit updated schedule as necessary.

When in the opinion of the Owner or Landscape Architect, changes in the work occur that significantly affect the schedule, the Contractor shall submit a revised construction schedule for approval. The revised construction schedule shall be submitted within 10 calendar days after it is requested by the Owner or Landscape Architect. The current approved construction schedule shall be used as a baseline for progress reporting.

CONTRACT WEEKLY SUMMARY REPORT

The Contractor shall maintain a weekly record of actions, events and manpower utilized. This report shall be completed and submitted to the Owner or Landscape Architect at the end of each week. Reports are to be complete and accurately describe actions and events.

SUBMITTAL PROCEDURES

DESCRIPTION

This Specification Section covers the preparation and submission of all work plans, drawings, samples, manufacturer's literature and brochures, installation instructions, and operation and maintenance manuals as specified herein and in the various sections of these Specifications.

A Submittal Schedule shall be submitted for approval within five (5) calendar days after receipt of Notice to Proceed.

DRAWINGS

The term "drawings" as used herein includes fabrication, erection and installation, layout, and setting drawings; lists or schedules of materials and catalogues and brochures; performance and test data; and all other drawings and descriptive data pertaining to materials and methods of construction as may be required to show that the materials, equipment, or systems and the positions thereof conform to the requirements of the Contract Documents.

When requested by the Owner or Landscape Architect, drawings shall be accompanied by design
computations.

Sheet sizes of drawings shall not exceed 24 in. by 36 in. The title block on all drawings shall bear the name of the Owner and the name of the project and shall include a space for the Owner's index number.

The Contractor's drawings shall be submitted electronically in PDF format to the Owner or Landscape Architect for review and approval.

The Contractor shall maintain a complete set of construction drawings at the jobsite, clearly marked to reflect as-built conditions. Upon completion of the work, the Contractor shall submit these Record Drawings to the Owner or Landscape Architect.

The Owner or Landscape Architect will review drawings and schedules only for conformance with the design of the Project and for compliance with the Contract Documents and Contract Drawings. The Contractor shall make any and all corrections required by the Owner or Landscape Architect.

Drawings shall be reviewed and returned within ten (10) working days of receipt of drawings at jobsite. Drawings and all supporting data, catalogs, or similar information shall be prepared by the Contractor or his suppliers and subcontractors but shall be submitted as instruments of the Contractor.

The Owner or Landscape Architect's review of drawings will be of a general nature and shall not relieve the Contractor from responsibility for errors and omissions of any sort, for deviations from Drawings or Specifications, or for conflict with the work of others that may result from such deviations. The Owner or Landscape Architect's review of drawings will not relieve the Contractor of responsibility to complete the work in accordance with the requirements of the Contract Documents.

After Notice of Award, the Contractor shall submit a Drawing Submittal Schedule to the Owner or Landscape Architect. The Contractor's drawing schedule shall be brought up to date from time to time to show the latest changes, omissions, and additions. The Schedule will be based on the Contractor's Construction Schedule and will show when the Contractor will submit the drawings and when he/she expects them to be returned so that construction activities shown on the Construction Schedule are not interrupted. There will be a minimum of three weeks between these two activities. Specific methods and routines for handling drawing reviews shall be established in advance within the general framework of the Contract Documents.

Work for which the Contractor's submittals are required shall not be started until the submittals have been reviewed and accepted in writing by the Owner or Landscape Architect. Any revision by the Contractor of a previously accepted submittal must be accepted in writing by the Owner or Landscape Architect before implementation.

SAMPLES

The Contractor shall, at his expense, furnish the Owner or Landscape Architect with samples of the various materials thereon specified in the Specification and Drawings. Samples shall be sent to the office of the Owner or Landscape Architect at the Contractor's expense.

GENERAL

01100-6
PRODUCT DATA

The Contractor shall submit to the Owner or Landscape Architect product data for all items required by the Specification and Drawings to be furnished by the Contractor in accordance with the approved schedule.

SUBMITTAL SUMMARY TABLE

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NOTES 1. This table is intended to summarize all submittals required by the Contract. Where a submittal is called for in the Specification or Contract but is not itemized herein, the number of copies and distribution will be same as similar documents listed unless directed otherwise by the Landscape Architect. 2. Legend A – Approval Required R – Project Record 3. The number and type of documents submitted for all submittals that include drawings will be as specified in the Submittals and Substitutions section or related sections.

QUALITY CONTROL

DESCRIPTION

This Section provides the requirements for Contract quality control (QC) pertaining to the Work, including:

1. QC of products and workmanship;
2. Manufacturer's instructions; and
3. Manufacturer's certificates and field services.

WORKMANSHIP

The Contractor shall comply with industry standards of the region, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

The Contractor shall provide suitably-qualified personnel to produce work of specified quality.

The Contractor shall secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

The Contractor shall provide materials to match approved samples.

MANUFACTURER'S INSTRUCTIONS

The Contractor shall require compliance with instructions in full detail, including each step in sequence. Should instructions conflict with the Contract Documents, the Contractor shall request clarification from the Landscape Architect before proceeding.

MANUFACTURER'S CERTIFICATES

When required in individual Specifications sections, the Contractor shall submit manufacturer's certificates, in duplicate, certifying that products meet or exceed specified requirements.

TESTING LABORATORY SERVICES (NIC)

The Contractor shall employ and pay for services of an independent testing laboratory to perform the material tests and other services required by the Specification and Drawings.

The services will be performed in accordance with the requirements of governing authorities and with specified standards.

The reports will be submitted to the Landscape Architect in duplicate giving observations and results of the tests, indicating the compliance or non-compliance with specified standards and with the Contract Documents.

The Contractor shall cooperate with testing laboratory personnel and furnish tools, samples of materials, design mix, equipment, storage, and assistance as requested.

The Contractor shall notify the Landscape Architect and the testing laboratory 24 hours prior to expected time for operations requiring testing services.

The Contractor shall make arrangements with the testing laboratory and pay for additional samples and tests for the Contractor's convenience.
MANUFACTURER'S FIELD SERVICES

When required by the manufacturer or Landscape Architect, the Contractor shall have the manufacturer provide a qualified representative to observe field conditions, conditions of surfaces and installation, and quality of workmanship as applicable and to make written report of observations and recommendations to the Owner or Landscape Architect.

AUTHORITY OF LANDSCAPE ARCHITECT

The Landscape Architect or Owner will decide all questions that may arise as to the quality and acceptability of materials furnished. All questions that may arise as to the interpretation of the Contract Drawing and Specifications shall be determined by the Landscape Architect.

The Landscape Architect will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, and the Landscape Architect will not be responsible for the Contractor's failure to perform the work in accordance with the Contract Documents.

The Landscape Architect will not be responsible for the acts or omissions of the Contractor or any subcontractors, of the agents or employees of any Contractor or subcontractor, or of any other persons at the site or otherwise performing any of the work.

COORDINATION OF DRAWINGS AND SPECIFICATIONS

The Contractor shall take no advantage of any apparent error or omission in the Contract Drawings or Specifications. In the event the Contractor discovers such an error or omission, he shall immediately notify the Landscape Architect. After consultation with the Landscape Architect, the Landscape Architect will make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the Contract Drawings and Specifications.

When general reference is made on the Contract Drawings or within the Specifications to any cited Standard Specifications, it shall refer to the current edition of such Specifications or the latest revision thereof or interim Specifications adopted and in effect on the date of Effective Date of Agreement. In the event of a conflict between the Contract Drawings and the specifications, the Landscape Architect shall be notified to provide a clarification to the Contractor.

COOPERATION WITH UTILITIES

The Contractor will notify all utility companies, all pipeline owners, or other parties affected and endeavor to have all necessary adjustments of the public or private utility fixtures, pipelines, and other appurtenances within or adjacent to the limits of construction made as soon as practical.

Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be crossed, relocated or adjusted are to be moved by the Contractor or its designated agents, except as otherwise noted on the Contract Drawings. In the case of utility lines, the Contractor shall coordinate with the respective utilities for their removal and relocation.

GENERAL
01100-9
Attention is directed to the possible existence of underground facilities not known to the Owner or Landscape Architect or in a location different from that which is shown on the Contract Drawings. The Contractor shall take steps to ascertain the exact location of all underground facilities prior to doing work that may damage such facilities or interfere with their service.

INDEPENDENT TESTING AND INSPECTION (NIC)

The testing and/or inspection firm shall meet requirements specified herein.

1. Independent testing and inspection, when required by the contract, will be performed by an independent testing and/or inspection firm, hereinafter called "the firm", under the authority of a professional Landscape Architect, licensed by the state in which the project is located and within the discipline for which the test and/or inspection is being made. The firm shall be the Contractor's subcontractor. Unless otherwise specified herein, tests shall be performed in accordance with industry standards.

2. When material is proposed for use which is specified to be either certified or tested but cannot be identified with specific certification or test reports, the Landscape Architect may, at its discretion, select random samples from the lot for testing.

These samples shall be prepared in accordance with the referenced test specification and furnished by the Contractor to the firm at the Contractor's expense. The number of samples and tests will be as specified. The cost of testing the samples shall be solely the responsibility of the Contractor.

REQUIREMENTS

The requirements for sampling and testing or inspection are specified in the Specifications and Drawings. The Contractor shall maintain a complete and up-to-date file of all quality control documentation at the jobsite.

MATERIAL AND EQUIPMENT

DESCRIPTION

This Specification Section includes the requirements for the transportation, handling, storage, and protection of materials and equipment as specified herein and in the various Sections of these Specifications. This Section also addresses the procedure for Contractor-proposed product substitutions.

MANUFACTURER REQUIREMENTS

In general, the Contractor shall receive, handle, and store materials and equipment in accordance with manufacturer's recommendations and in a manner which will protect such items from damage or deterioration.
GENERAL

Products include the material, equipment, and systems used on this Project. Comply with the Specifications, Drawings and referenced standards as minimum requirements.

TRANSPORTATION AND HANDLING

The Contractor shall receive, handle, and store materials and equipment supplied by him/her in a manner that will protect such items from damage or deterioration in accordance with procedures provided by manufacturers and the Owner.

Promptly inspect the shipments to assure that the products comply with requirements, the quantities are correct, and the products are undamaged.

STORAGE AND PROTECTION

Materials and equipment shall be stored off the ground on blocking or pallets and shall be covered for protection from vandalism and weather damage.

Materials and equipment shall be stored, tested, and cleaned prior to use, in accordance with the Specification and all specific manufacturers’ requirements. Damaged or nonconforming items shall be removed immediately to a separated storage area for expeditious removal from site.

The Contractor shall provide a secure outside storage area in the vicinity of the site.

SUBSTITUTIONS

Substitutions will be considered only when a product becomes unavailable due to no fault of the Contractor or when deemed appropriate by the Owner or Landscape Architect.

Document each request with complete data substantiating the compliance of the proposed substitution with the Contract Documents.

The request constitutes a representation that the Contractor:

1. Has investigated the proposed product and determined that it meets or exceeds, in all respects, the specified product.
2. Will provide the same warranty for substitution as for the specified product.
3. Will coordinate installation and make other changes which may be required for the Work to be complete in all respects.
4. Waives claims for additional costs which may subsequently become apparent.

Substitutions will be considered when they are indicated or implied on shop drawings or product data submittals without separate written request, or when acceptance will require substantial revision of the Contract Documents.

The Landscape Architect will determine acceptability of the proposed substitution, and will notify the Contractor of acceptance or rejection in writing within a reasonable time.

GENERAL
01100-11
Only one request for the substitution will be considered for each product. When substitution is not accepted, the Contractor shall provide the specified product.

REJECTED MATERIALS AND DEFECTIVE WORK

Materials furnished by the Contractor and condemned by the Landscape Architect as unsuitable or not in conformity with the specifications shall forthwith be removed from the work by the Contractor, and shall not be made use of elsewhere in the work.

Any errors, defects, or omissions in the execution of work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good by and at the expense of the Contractor and in a manner satisfactory to the Owner or Landscape Architect.

The Contractor shall reimburse the Owner for any expense, losses or damages incurred in consequence of any defect error, omission or act of the Contractor or his employees, as determined by the Landscape Architect, occurring previous to the final payment.

PROJECT CLOSEOUT

DESCRIPTION

This Section specifies administrative and procedural requirements for the project closeout including, but not limited to:

1. Project record document (as-built drawings) submittal.

Record Drawings (As-Built)

Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Upon completion of work, submit record drawings to the Landscape Architect.

Record Specifications

Maintain one complete copy of the Project Manual, including addenda. Mark these documents to show substantial variations in actual Work performed in comparison with the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data. Upon completion of the Work, submit record Specifications to the Landscape Architect.

GENERAL
01100-12
Test Results

A copy of all test reports signed by authorized official of testing laboratory that a material, product, or system identical to the material, product, or system to be provided has been tested in accord with specified requirements.

REMOVAL OF PROTECTION

Remove temporary protection and facilities installed for protection of the Work during construction. Erosion and sediment control measures and best management practices can be removed after permanent measures have been established.

WARRANTIES

DESCRIPTION

This Section specifies general administration and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers’ standard warranties on products and special warranties.

1. Refer to the General Conditions for terms of the Contractor’s special warranty of workmanship and materials;
2. General closeout requirements are included in Section “Project Closeout”; and
3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the specifications and Drawings.

Disclaimers and Limitations

Manufacturer’s disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

DEFINITIONS

Standard Warranties

Standard product warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Landscape Architect.

Special Warranties

Special warranties are written required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Landscape Architect.
WARRANTY REQUIREMENTS

Related Damages and Losses

When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for corrections of warranted Work.

Reinstatement of Warranty

When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

Replacement Cost

Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Landscape Architect has benefited from use of the Work through a portion of its anticipated useful service life.

Owner's Recourse

Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights and remedies.

Rejection of Warranties

The Landscape Architect reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents. The Landscape Architect reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to counter sign such commitments are willing to do so.

All warranties shall be submitted to the Owner in accordance with conditions of the Contract and the Submittals.

WARRANTY PERIOD

All warranties required by the Contract documents shall commence on the date of Final Acceptance.

END OF SECTION

GENERAL
01100-14
SECTION 02001
MOBILIZATION/DEMOBILIZATION

PART 1 - GENERAL

1.01 Work Included

A. Provide all facilities, labor, materials, tools, equipment, appliances, transportation, supervision, and supplies necessary to complete the Work under this project. The Work includes, but is not necessarily limited to:

1. Protection of adjacent properties in the vicinity of all work areas, as directed by Landscape Architect.
2. All required bonds and insurance.
3. Site cleanup and restoration.
4. All notifications required by law and/or regulations.
5. All required submittals.

1.02 Related Work Specified Elsewhere

A. Site Preparation and Demolition - Section 02100

1.03 Applicable Laws and Regulations

A. The Contractor shall comply with all applicable rules and regulations relative to Work on this project promulgated by the Owner and enforced by its departments, including but not limited to the Building Department and Board of Health.

B. The Contractor shall obtain required permits and make all required notifications, including payment of any associated fees.

C. The Contractor shall notify affected utility companies, including Dig Safe, before starting work and comply with their requirements.

1.04 Project Site Conditions

A. Site conditions existing at time of the Pre-Construction conference shall be maintained insofar as practical.

B. Variations of conditions or discrepancies in actual conditions as they apply to site operations shall be brought to the attention of the Landscape Architect prior to the commencement of any site work.
C. The use of explosives shall not be permitted.

1.05 Submittals

A. The Contractor shall submit to the Landscape Architect all required permits, and all other information related to the Work to be performed under this project in accordance with the General Conditions.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Protection

A. The Contractor shall protect existing trees, monuments, existing improvements, adjacent property, and facilities from damage.

B. The Contractor shall conduct operations with a minimum of interference to public or private accesses and facilities. Maintain site access and egress at all times and clean and keep clear all roadways daily, or as required by the governing authority. At such times deemed necessary by the Landscape Architect, dust control shall be provided with equipment provided by the Contractor.

C. The Contractor shall protect benchmarks, property corners, groundwater monitoring wells, and all other survey monuments from damage or displacement. If a marker needs to be removed, it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same.

3.02 Site Maintenance & Cleanup

A. The project site shall be maintained in a neat and orderly fashion throughout the duration of the project. All wastes generated during construction activities shall be containerized.

B. Upon completion of work, the Contractor shall remove all equipment, supplies, excess and waste materials, etc., and restore the Site to its pre-construction condition, to the satisfaction of the Landscape Architect.
3.03 Site Security

A. Contractor shall be responsible for maintaining the security of the Site to protect his own equipment, supplies and all work areas which may pose a health or safety risk to the Public.

END OF SECTION
SECTION 02100
SITE PREPARATION AND DEMOLITION

PART 1—GENERAL

1.01 Description

A. The Contractor shall provide all facilities, labor, materials, tools, equipment, appliances, transportation, supervision, and related work necessary to complete the Work specified in this section, and as shown on the Drawings.

B. The Contractor shall perform all work under this section of the specifications subject to the General Conditions and Supplementary Conditions of the Contract.

C. The Work of this section includes, but is not necessarily limited to:

1. Protection of existing vegetation, trees and stumps indicated on the Drawings.

2. Removal and disposal of concrete walks.

3. Removal and disposal of bituminous concrete.


5. Removal and disposal on utility pole bases

6. Removal and disposal of buried water line.

7. Removal and disposal of below ground foundations that impede improvements.

8. Removal and disposal of benches and footings

9. Disconnecting, capping or sealing, and abandoning site utilities in place.

10. Disconnecting, capping or sealing, and removing site utilities.

11. Removal of abandoned piping, wire fencing, fence posts and any other debris not previously disposed of.

1.02 Related Sections

A. The Contractor shall carefully examine all of the Contract Documents for requirements which affect the work in this section. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

SITE PREPARATION AND DEMOLITION
02100-1
1. Earthwork – See Section 02200
2. Bituminous Concrete Paving – See Section 02510
3. Cast in Place Concrete – See Section 03300

1.03 Materials Ownership

A. Except for materials indicated to be stockpiled or to remain Owner’s property, cleared materials shall become Contractor’s property and shall be removed from the site.

1.04 Submittals

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings according to Division I Section "Contract Closeout." Identify and accurately locate existing utilities to remain and capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.05 Laws and Regulations

A. The Contractor shall conform to applicable codes for dust and runoff control.

B. The Contractor shall obtain required permits and licenses from authorities. Pay associated fees including disposal charges, if applicable.

C. The Contractor shall notify affected utility companies before starting work and comply with their requirements.

D. The Contractor shall not close or obstruct roadways, sidewalks or hydrants without permits.

E. The Contractor shall conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

F. The Contractor shall conform to the Commonwealth of Massachusetts Department of Transportation, Division of Public Works, Standard Specifications for Road and Bridge Construction, and current Addenda.

1.06 Environmental Requirements

The Contractor shall construct temporary erosion control systems as shown on the plans or as directed by the Landscape Architect to protect adjacent properties and water resources from erosion and sedimentation.

SITE PREPARATION AND DEMOLITION
02100-2
1.07 Project Conditions

A. Conditions existing at time of inspection for bidding purposes shall be maintained by Owner in so far as practical.

B. Variations to conditions or discrepancies in actual conditions as they apply to site preparation operations shall be brought to the attention of the Owner prior to the commencement of any site work.

C. The Contractor shall be responsible for all cutting and patching required by the Work. All surfaces and finishes shall be restored using materials and methods necessary to equal original conditions.

D. The use of explosives shall not be permitted without the Owner’s written permission.

E. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

F. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner’s premises where indicated. Materials not specifically identified for salvage shall become the property of the contractor and shall be legally disposed of off-site.

G. Notify utility locator service for area where Project is located before site demolition.

H. Comply with all regulations including "Dig Safe" requirements.

PART 2—PRODUCTS

2.01 Soil Materials

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Section "Earthwork."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.
2.02 **Concrete Materials**

A. Requirements for portland cement concrete materials are specified in Section "Cast in Place Concrete."

2.03 **Barrier Devices**

A. Install barriers and security devices, including temporary fence, as needed for protection and control of vehicular and pedestrian traffic.

**PART 3—EXECUTION**

3.01 **Protection**

A. Before demolition begins, the Contractor shall protect indicated trees and areas to remain as shown on the Demolition Plans. Tree protection will consist of orange construction fence. The location of tree protection is determined from the diameter of the tree in inches converted to a radius in feet unless noted differently on the plans. This method shall prevent damage to the trunk, foliage and root system by construction equipment and procedures. Fencing shall be maintained by the Contractor.

B. The Contractor shall protect other plants, monuments, existing improvements, adjacent property, and facilities from damage.

C. The Contractor shall be responsible, at his cost, to repair or replace immediately any damage to existing trees or root systems that are to remain. The Contractor shall hire a licensed arborist to determine the repair and replacement needs and methods.

D. The Contractor shall replace damaged trees and shrubs designated to remain with the same size and species.

E. The Contractor shall conduct operations with a minimum of interference to public or private accesses and facilities. Maintain access and egress at all times and clean or sweep any roadways daily or as required by the governing authority. At such times as deemed necessary by the Owner, dust control shall be provided with equipment provided by the Contractor.

F. The Contractor shall protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed, it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same.

G. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
3.02 Utilities

A. The Contractor shall locate and identify existing utilities that are to remain and protect them from damage.

B. The Contractor shall notify all corporations, companies, individuals or local authorities owning, or having jurisdiction over, utilities running to, through or across areas disturbed by demolition operations.

C. The Contractor shall have all utility services disconnected at service mains in accordance with requirements governing the utility involved.

D. The Contractor shall locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

E. Remove all abandoned utilities from beneath buildings, structures, slabs, footings and utilities. Refill excavations with compacted granular fill. Abandoned utilities outside of the Work areas may be left in place. Abandoned utilities shall be plugged at the limit of excavation with cast-in-place concrete that completely fills the pipe or conduit for a distance of two pipe diameters or more.

F. Abandoned catch basins, manholes, vaults or similar below grade structures shall be removed in their entirety and the resulting depressions refilled with compacted granular fill.

3.03 Grubbing (NIC)

A. The Contractor shall completely grub the area within the clearing limits to completely remove stumps and root systems to a depth of 18" below exposed subgrade.

B. Depressions from the removal of stumps or roots shall be filled and compacted with approved on site material.

1. Place fill material in horizontal layers not exceeding eight inch loose depth, and compact each layer to a density equal to adjacent original ground.

3.04 Topsoil Stripping (NIC)

A. Strip topsoil in its entirety in a manner to prevent intermingling with underlying subsoil or other waste materials. Stockpile off site for re-use.

1. Strip surface soil of unsuitable topsoil, including trash, pavement, debris, building materials, weeds, roots, and other waste materials. Dispose of off-site.

SITE PREPARATION AND DEMOLITION
02100-5
B. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile topsoil for re-spreading on-site. There is no excess topsoil on site. **Additional offsite topsoil will be necessary.**

3.05 Site Improvements

A. Remove existing above and below grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement at nearest control or construction joint to remain before removing existing pavement. Saw-cut faces vertically.

C. Except where fence posts are installed in wall or curb, remove posts completely, including the entire footings. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces. Where posts are installed in curb or wall, cut posts 1/2” below adjoining concrete surface.

3.06 Disposal

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, pavement, slabs on grade, building materials, and waste materials, including trash and debris, and legally dispose of them off Owner’s property.

3.07 Potential Contamination—Soils

A. The Contractor’s attention is directed to his obligations related to potentially contaminated soils.

**END OF SECTION**
SECTION 02200
EARTHWORK

PART 1—GENERAL

1.01 Related Documents

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

B. Referenced ASTM requirements.

C. The Commonwealth of Massachusetts Department of Transportation, Division of Public Works, Standard Specifications for Road and Bridge Construction, and current Addenda.

1.02 Summary

A. This Section includes the following:
1. Excavation, fill, grading and preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Base course for asphalt paving.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling trenches within building lines.
8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
10. All excavation is "unclassified." Separate or additional payment will not be made for the excavation, removal and replacement with granular fill of bedrock or boulders if encountered.

B. Related Sections include the following:
1. Section "General Conditions."
2. Section "Site Clearing" for site stripping, grubbing, removing topsoil, and protecting trees to remain.
3. Section "Dewatering" for lowering and disposing of ground water during construction.
4. Section "Excavation Support and Protection."
5. Section "Landscaping" for finish grading, including placing and preparing topsoil for lawns and plantings.
6. Section "Cast-in-Place Concrete" for granular course over vapor retarder.
1.03 **Rock Removal Limits**

A. **Rock Removal:** Minimum rock removal limits are as specified below:
   1. 24 inches outside of concrete forms other than at footings.
   2. 12 inches outside of concrete forms at footings.
   3. 6 inches outside of minimum required dimensions of concrete cast against grade.
   4. 6 inches beneath bottom of concrete slabs on grade.
   5. 6 inches beneath pipe in trenches for pipes 18 inches nominal diameter and 12 inches beneath pipes in trenches for pipes greater than 18 inches in nominal diameter.
   6. The greater of 24 inches wider than pipe or 42 inches wide.

B. **Rock excavation and removal includes replacement with granular fill.**

C. **All excavation is "unclassified."** Separate or additional payment will not be made for the excavation of bedrock or boulders if encountered. **Rock and boulders shall remain on site unless approved for removal by the Landscape Architect.**

1.04 **Definitions**

A. **Backfill:** Soil materials used to fill an excavation.
   1. **Initial Backfill:** Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. **Final Backfill:** Backfill placed over initial backfill to fill a trench.

B. **Base Course:** Layer placed between the subbase course and asphalt paving.

C. **Bedding Course:** Layer placed over the excavated subgrade in a trench before laying pipe.

D. **Borrow:** Satisfactory soil imported from off-site for use as fill or backfill.

E. **Drainage Course:** Layer supporting slab-on-grade used to minimize capillary flow of pore water.

F. **Excavation:** Removal of material encountered above subgrade elevations.
   1. **Additional Excavation:** Excavation below subgrade elevations as directed by Landscape Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
   2. **Bulk Excavation:** Excavations more than 10 feet in width and pits more than 30 feet in either length or width.
   3. **Unauthorized Excavation:** Excavation below subgrade elevations or beyond indicated dimensions without direction by Landscape Architect. Unauthorized excavation, as well as remedial work directed by Landscape Architect, shall be without additional compensation.
G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering or ripping.

I. Peat: Any soil classified as Pt or OH by the Unified Soil Classification System or any other soft or compressible soil or soil with more than 5% organic (by weight) content.

J. Unsuitable Materials: Unsatisfactory soils - any soil too soft, too wet or too compressible to support the various building, utility or site loads which will likely be applied; or any fill material containing refuse, debris, ashes, cinders, building rubble, construction materials, wood, trash, organic material or other material in sufficient quantities which, in the opinion of the Landscape Architect, would render the soil unacceptable to support the various building utility or site loads which are likely to be applied.

K. Granular Fill: Borrow or on-site material conforming to the specified gradation requirements for use as fill to bring the site to subgrade or for refill of excavations made to remove peat or other unsuitable materials.

L. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

M. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

N. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

O. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.05 Submittals

A. Product Data: For the following:
   1. Plastic warning tape.

B. Samples: For the following:
   1. 10-lb samples, sealed in airtight containers, of each proposed soil material from on-site or borrow sources, delivered to testing agency.
   2. 12-by-12-inch sample of drainage fabric.

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3. 12-by-12-inch sample of separation fabric.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
   1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
   2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.

1.06 Quality Assurance

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to AS1'M D 3740 and ASTM E 548.

B. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.07 Project Conditions

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Landscape Architect and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Landscape Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Landscape Architect’s written permission.
   3. Contact utility-locator service for area where Project is located before excavating.
   4. Comply with all regulations including "Dig Safe" requirements.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

C. All excavations are "unclassified."

D. Blasting is not permitted.

E. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
   1. Grab Tensile Strength: 200 lbf; ASTM D 4632.
   2. Tear Strength: 75 lbf ASTM D 4533.
5. Apparent Opening Size: No. 30; ASTM D 4751.

F. The Contractor is responsible to field verify and become familiar with all field conditions which may affect the performance of the specified work.

G. The Contractor is responsible to document existing trees and site improvements adjacent to and in the construction area to establish pre-construction conditions which might be misconstrued as damaged during subsequent construction activities.
   1. Documentation shall be sufficiently detailed photographs or videotapes provided to the owner prior to starting construction activities.

H. Work includes all excavation necessary to provide a fully complete and functional facility in accordance with the plans and specifications.

I. It is the Contractor's responsibility to contact DIG SAFE.

J. Contractor shall not start construction activities until temporary erosion and sedimentation control and tree protection measures are in place.

1.08 Protection

A. Provide temporary barricades and other forms of protection as required to provide free and safe passage of owner's personnel and visitors to and from the site.

B. Remove protection upon completion of required work.

C. No utility trench shall be left open overnight.

D. Any damage to existing utilities, drainage components or other site improvements caused by neglect or carelessness on the part of the Contractor, is to be repaired immediately in a manner satisfactorily to the Owner and at no additional cost to the Owner.

1.09 Material Ownership

A. Stripped topsoil and other materials indicated to be stockpiled remain the Owner's property and will be moved and stored at a location as directed by the Owner.

B. All material which is not the Owner's and is not required for the completion of the project, will be removed from the site and properly disposed of.
PART 2- PRODUCTS

2.01 Soil Materials

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW and SP, or a combination of these group symbols; free of rock or gravel larger than three inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SM, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols. Unsatisfactory soils also include satisfactory soils not maintained within two percent of optimum moisture content at time of compaction.

D. Backfill Outside of Structure Limits: Satisfactory soil materials conforming to the State Standards for "Common Borrow."

E. Subbase: Naturally or artificially graded mixture of natural or processed and washed crushed gravel, crushed stone, and natural or crushed sand; conforming to the State Standards for "gravel borrow."

F. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; conforming to the State Standards for "Crushed Stone" or "Crushed Gravel," M.0 1.09. Gradation II.

G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed and washed gravel, crushed stone, and natural or crushed sand; conforming to the State Standards for "Gravel Borrow."

H. Bedding: Artificially graded mixture of crushed and washed gravel, crushed and washed stone, conforming to the State Standards for "Bedding Material," M.0 1.04.

I. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

J. Filter Material: Processed and washed, narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
K. Impervious Fill: Bentonite and sand mixture consisting of 5% processed commercial bentonite and 95% sand capable of compacting to a dense state.

L. Granular Fill: Granular fill placed beneath structures and footings, within the foundation zone as shown on the drawings; within the top 48 inches below utilities, and slabs on grade; and within the top 24 inches beneath walks and pavement shall be considered "Engineered Fill" and shall conform to the State Standards for "Gravel Borrow." Granular fill placed outside of the above specified limits shall conform to the State Standards for "Common Borrow." Granular fill may be suitable material from on-site excavations specifically approved by the Landscape Architect for re-use and such additional quantities from off-site sources as required to complete the fill placement to subgrade or the indicated site grades, whichever is higher in elevation.

M. Sand: Natural or processed material conforming to the requirements of ASTM C-33 fine aggregate.

2.02 Accessories

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum six inches wide and four mils thick, continuously inscribed With a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
   2. Yellow: Gas, oil, steam, and dangerous materials.
   3. Orange: Telephone and other communications.
   4. Blue: Water systems.
   5. Green: Sewer systems and storm drains.

B. Drainage Fabric: Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
   1. Grab Tensile Strength: 110 lbf; ASTM D 4632.
   2. Tear Strength: 40 lbf; ASTM D 4533.
   5. Apparent Opening Size: No. 50; ASTM D 4751.
PART 3- EXECUTION

3.01 Preparation

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Construct and maintain erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Refer to Section "Erosion Control" for detailed specifications and requirements.

D. Construct and maintain stormwater control measures.

3.02 Dewatering

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
   2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

C. Refer to Section "Dewatering" for detailed specifications and requirements.

3.03 Explosives

A. Explosives: Do not use explosives.

3.04 Excavation, General

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
   2. Segregate and stockpile separately satisfactory materials for re-use.
3.05 **Excavation for Removal of Peat and Unsuitable Materials**

A. Peat and unsuitable materials shall be removed completely from beneath structures and utilities and within the park.

B. The Contractor shall perform such excavations as necessary to completely remove the peat and all other unsuitable material to such limits as directed by the Landscape Architect. The Contractor shall provide all sheeting, shoring and excavation support; perform all dewatering and control and diversion of water; provide all shoring and support necessary to protect roads, walks, public and private property, utilities and any structures and facilities to remain; dispose of all peat and unsuitable material off-site; refill excavations with compacted granular fill; and provide sufficient quantities of common borrow and gravel borrow as necessary to bring the site to subgrade or the indicated site grade, whichever is higher in elevation.

3.06 **Excavation for Structures**

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus one inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
   1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
   2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus one inch. Do not disturb bottom of excavations intended for bearing surface. In areas of fill or refill, the site shall be brought to a minimum of 24 inches above the required bottom of footing, then excavations made to the required depths.

3.07 **Excavation for Walks and Pavements**

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.08 **Excavation for Utility Trenches**

A. In areas of fill or refill, the site shall be brought to a minimum of 24 inches above invert, and then excavations made to the required depths.

B. Excavate trenches to indicated gradients, lines, depths, and elevations.
   1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

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C. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
   1. Clearance: 12 inches on each side of pipe or conduit or such additional width to install sheeting, shoring or trench boxes.

D. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
   1. For pipes and conduit less than six inches in nominal diameter and flat-bottomed, multipleduct concuit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
   2. For pipes and conduit six inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
   3. Excavate trenches six inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

E. Trench Bottoms: Excavate trenches 12 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate bedding for bell of pipe.
   1. Excavate trenches 12 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.09 Approval of Subgrade

A. Notify Landscape Architect when excavations have reached required subgrade.

B. If Landscape Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted granular fill material as directed.

C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Landscape Architect.

3.10 Unauthorized Excavations

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill shall be used when directed by Landscape Architect.
   1. Fill unauthorized excavations under other construction or utility pipe with compacted gravel or as otherwise directed by Landscape Architect.

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3.11 Storage of Soil Materials

A. Stockpile borrow materials and satisfactory excavated soil materials on site for re-use. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
   2. Unsuitable materials shall not be stockpiled on-site. Remove unsuitable materials within 72 hours of excavation.

3.12 Backfill

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
   2. Surveying locations of underground utilities for record documents.
   3. Inspecting and testing underground utilities.
   4. Removing concrete formwork.
   5. Removing trash and debris.
   6. Removing temporary shoring and bracing, and sheeting.
   7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.13 Utility Trench Backfill

A. Place and compact bedding course on trench bottoms and around the lower half of pipe (or lower quadrant of pipe for pipes 36 inches or greater in diameter) as indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Provide four inch-thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of four inches of concrete before backfilling or placing roadway subbase.

C. Place and compact initial backfill of subbase material, free of particles larger than one inch, to a height of twelve inches over the utility pipe or conduit.
   1. Place and compact material carefully under pipe haunches in 6-inch lifts and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

D. Coordinate backfilling with utilities testing.

E. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

F. Place and compact final backfill of satisfactory soil material to final subgrade.
G. Install warning tape directly above utilities, thirty inches below finished grade, except six inches below subgrade under pavements and slabs.

3.14 Fill

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Scarify, bench, or break up sloped surfaces steeper than one vertical to four horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use satisfactory soil material.
   2. Under walks and pavements, use satisfactory soil material.
   3. Under steps and ramps, use satisfactory soil material.
   4. Under building slabs, use engineered fill.
   5. Under footings and foundations, use engineered fill.

3.15 Moisture Control

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within two percent of optimum moisture content.
   1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by two percent and is too wet to compact to specified dry unit weight.

3.16 Compaction of Backfills and Fills

A. Place backfill and fill materials in layers not more than eight inches in loose depth for material compacted by heavy compaction equipment, and not more than four inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTMD 1557:
   1. Under structures, building slabs, steps, and pavements, scarify and re-compact top twelve inches of existing subgrade and each layer of backfill or fill material at 95 percent.
   2. Under walkways, scarify and re-compact top six inches below subgrade and compact each layer of backfill or fill material at 92 percent.
   3. Under lawn or unpaved areas, scarify and re-compact top six inches below subgrade and compact each layer of backfill or fill material at 85 percent.

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3.17 Grading

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus one inch with a tolerance of ½ inch when tested with a ten foot straigtedge.
   2. Walks: Plus or minus one inch.
   3. Pavements: Plus or minus ½ inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of ½ inch when tested with a ten foot straightedge.

3.18 Subsurface Drainage

A. Drainage Piping: Drainage pipe is specified in Section "Storm Water Drainage Systems."

B. Subsurface Drain: Place a layer of drainage fabric around perimeter of drainage trench as indicated. Place a six inch course of filter material on drainage fabric to support drainage pipe. Encase drainage pipe (top, bottom and sides) in a minimum of six inches of filter material and wrap in drainage fabric, overlapping sides and ends at least six inches.
   1. Compact each course of filter material to 95 percent of maximum dry unit weight according to ASTM D 698.

C. Drainage Backfill: Place and compact filter material over subsurface drain, to limits indicated, to within twelve inches of final subgrade. Overlay drainage backfill with one layer of drainage fabric, overlapping sides and ends at least six inches.
   1. Compact each course of filter material to 95 percent of maximum dry density according to ASTM D 698.

3.19 Subbase and Base Courses

A. Under pavements and walks, place subbase course on prepared subgrade and as follows:
   1. Place base course material over subbase.
2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
3. Shape subbase and base to required crown elevations and cross-slope grades.
4. When thickness of compacted subbase or base course is eight inches or less, place materials in a single layer.
5. When thickness of compacted subbase or base course exceeds eight inches, place materials in equal layers, with no layer more than eight inches thick or less than four inches thick when compacted.

B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least twelve inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.20 Drainage Course

A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
   1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
   2. When compacted thickness of drainage course is six inches or less, place materials in a single layer.
   3. When compacted thickness of drainage course exceeds six inches, place materials in equal layers, with no layer more than six inches thick or less than three inches thick when compacted.

3.21 Protection

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

END OF SECTION
SECTION 02301
BOWLING GREEN, FILL BACKBOARD
AND PLYNTH

PART 1 - GENERAL

1.1 Scope

A. This Section applies to the furnishing of all supplies, material, equipment and labour necessary to complete the bowling green fill materials and grading work, including but not limited to:

1 Grading and compaction of the existing sub-base; (NIC)

2 Supply, installation, compaction and levelling of the gravel sub-base material; (NIC)

3 Installation, compaction and levelling of the root zone fill material;

4 Supply installation of plynth, backboard, and ditch material;

5 Irrigation system shall be fully operational prior to placing any of the sub-base or root zone fill in greens. Irrigation system to be used to help with consolidation of the sub-base and root zone layers.

1.2 Testing

A. All root zone fill and gravel sub-base material supplied by Contractor shall be tested by an approved soil testing laboratory at the Contractor’s expense.

B. All material must meet the products as specified herein and soil reports indicating compliance must be submitted to the Consultant prior to installation.

C. Soil density after compaction on the root zone fill should be between 92 and 94 Lbs per SF.

PART 2 - PRODUCTS

2.1 Green Fill Materials

A. Low-calcareous sub-angular sand mix for the lawn bowling green root zone mix; containing 0.9% to 1.2% organic content by weight percent through loss on ignition and include a germinating fertilizer mix. (NIC)

B. The organic amendment (peat) shall be mixed at the required percent with the root zone material. The mixture shall be thoroughly mixed so that the fibres are mixed and not balls of lumps of organic matter. Any stock piled material contaminated by other sands or soil to be discarded. (NIC)

C. Root zone fill to have a minimum depth of at a minimum fifteen inches (15.0”) as shown in contract drawings.
2.2 Properties of Root Zone Fill

Table # 1

<table>
<thead>
<tr>
<th>SOIL CLASSIFICATION</th>
<th>PARTICLE SIZE</th>
<th>PERCENTAGE RETAINED ON SIEVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel</td>
<td>&gt;2.0mm</td>
<td>0%</td>
</tr>
<tr>
<td>Very Coarse Sand</td>
<td>1.0-2.0mm</td>
<td>7-12%</td>
</tr>
<tr>
<td>Coarse Sand</td>
<td>0.5-1.00mm</td>
<td>&gt;25%</td>
</tr>
<tr>
<td>Medium Sand</td>
<td>0.25-0.5mm</td>
<td>&gt;30%</td>
</tr>
<tr>
<td>Fine Sand</td>
<td>0.1-0.25mm</td>
<td>&gt;10% - &lt;20%</td>
</tr>
<tr>
<td>Very Fine Sand</td>
<td>0.05-.1mm</td>
<td>&lt;6%</td>
</tr>
<tr>
<td>Silt</td>
<td>&lt;0.05mm</td>
<td>&lt;2%</td>
</tr>
</tbody>
</table>

Uniformity Coefficient must be between 2.25 to 3.0 (D60/D10)

Bulk Density: <1.65 grams per cubic cm

Porosity Values:
- Total – 35 - 55%
- Capillary 18 - 25%
- Air 18 - 30%

Infiltration Rate: > 250 mm/hr.

Minimum C.E.C.: 5 meq/100 grams Under Compaction

2.3 Gravel Sub-Base Material

A. ¼”-3/8” clean, washed, angular, crushed natural stone, free from shale, clay, roots and vegetative material.

B. Minimum four inch (4”) depth of gravel sub-base material at centre of greens.

C. Properties of gravel sub-base material shall be as shown in Table 2.

Table # 2

<table>
<thead>
<tr>
<th>PARTICLE SIZE</th>
<th>SIEVE SIZE</th>
<th>PERCENTAGE PASSING BY WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 - 5.0mm</td>
<td>No. 4</td>
<td>98%</td>
</tr>
<tr>
<td>2.36mm</td>
<td>No. 10</td>
<td>2%</td>
</tr>
</tbody>
</table>
D. All ditches shall confirm to current World Bowls Board dimensions.

2.4 Bowling Green Plynth Trough Board

A. Plynth boards and posts to be installed as shown on contract drawings and details using materials as detailed on sheets L-2, L-3, L-4 and details on L-6.

B. Plynth board elevation to be consistent at +/- 1/16” throughout the green.

C. The top of the plynth to be nine inches (9 inches) from the inside top of the backboard elevation.

D. Taper inward slope of plynth board toward the green (45% as shown in contract drawings). (NIC)

2.5 Bowling Green Backboard

A. Backboards shall confirm to current World Bowls Board Dimensions.

B. Backboard installation to be undertaken as shown on contract drawings and details using materials as detailed on sheets L-2, L-3, L-4 and details on L-6.

C. 7 - 10 degree inside angle of backboards toward green.

D. Maintain approximately eight inches (8 inches) from inside edge of plynth to backboards.

E. Two ply natural insertion rubber, 6.0mm in thickness or equivalent fitted to backboard (green color).

PART 3 - EXECUTION

3.1 Existing Sub-Base Compaction (NIC)

A. Grade existing sub-base with 1% (1:100) fall from center of greens to lateral drainage pipes as per drawings.

B. Compact existing sub-base to 100% corrected maximum dry density.

C. Fine grade to ensure uniform drainage. Care needs to be taken that slopes from center of greens to drains are smooth and to line and level, without pockets of sub-grade depressions.

D. Top of grade at center of greens to be a minimum of 4” below finished surface of gravel sub-base surface.

3.2 Gravel Sub-Base Material

A. Install gravel sub-base material at 4.0”. Ensure that trucks to do not disturb the compacted sub-base and drainage system. (NIC)
B. All the equipment spreading the gravel shall be track equipment. Sharp turning that displaces the gravel shall be avoided. All vehicles shall only work off a gravel raft rather than off the sub-base.

C. Consolidate or compact to 95% corrected dry density with a small track excavator or roller. To ensure no contamination of the site, all equipment must be completely cleaned of soils, sands, and gravels before entering any of the green sites.

D. When gravel material has been roughly levelled, pneumatic vibrate and use a small tractor/bobcat with low pressure turf tires to achieve a level firm gravel surface. Laser level gravel sub-base material to +/- 1/4".

3.3 Root Zone Fill Material

A. Install root zone fill material in four inch (4") lifts. The gravel sub-base drainage layer shall be watered prior to laying the root zone fill material. The root zone material shall be moist at the time of installation and not be placed on the gravel sub-base in a total dry state.

B. A distinct interface between the gravel sub-base drainage layer material and the root zone material shall be maintained at all times with no mixing of materials permitted.

C. Water continuously during installation of root zone fill to ensure proper compaction and removal of trapped air.

D. Compact each lift to maximum dry density by utilizing vibrator/hand tampers or a small roller. Ensure that equipment does not disturb the compacted sub-base material while placing or compacting root zone material. Care must be taken not to disturb plynth boards during installation of root zone fill.

E. When all rootzone mix is in, heavily water mix and allow 24 hours prior to final laser levelling. Further consolidation can be achieved with a tracked vehicle. No wheel equipment shall be permitted to work on the root zone fill layer, only track equipment.

F. Check plynth board levels with laser level to ensure accuracy to +/- 1/16". Adequate moisture shall be maintained at all times to assist with consolidation so that the root zone material is not displaced by wind.

G. Using laser level, screed green to ensure very hard uniform green to +/- 1/16" accuracy. Water continuously during screeding process to ensure firmness. Final levels need to match plynth levels and within the required tolerances.

H. Contamination from surrounding soils must be avoided at all times. Any root zone fill material contaminated by spills or leaking such fuels from equipment shall be removed and discarded.

3.5 Bowling Green Plynth Board

A. Install plynth boards and 4” x 4” posts on all four (4) sides of greens as shown in details.
B. Plynth boards to be laser levelled to within +/- 1/16" green on all four (4) sides of greens.

C. Composite wood posts to be located 3.0' o.c.

D. Composition plynth board to be cut as shown on details to 2" x 12", attach to posts with two galvanized or SS carriage bolts, washers and nuts, slot 1.0" horizontal for movement.

3.6 Bowling Green Backboard Installation

A. Construct footing and backboard wall with materials as per contract drawings and details.

B. Angle backboard 7-10 degrees toward green (all four sides of green).

C. Install carriage bolts and washers (prior painted) as shown in details.

D. Hardware used must be stainless steel.

E. Backboards to be laser levelled to within +/- 1/16" green on all four (4) sides of greens.

F. Rubber to be adhered to backboard by adhesive or equivalent so not to damage bowls.

END OF SECTION
SECTION 02400
STORM DRAINAGE SYSTEM

PART 1—GENERAL

1.01 Description

A. Provide all facilities, labor, materials, tools, equipment, appliances, transportation, supervision, and related work necessary to complete the Work specified in this section, and as shown on the Drawings.

B. All work performed under this section of the specifications shall be subject to the General Conditions and Supplementary Conditions of the Contract.

C. The Work of this section shall include, but is not necessarily limited to the construction of a site storm drainage system, trench crossings, "rip rap" outlet sections, inlet and outlet structures, all as shown on the Drawings, as directed by the Landscape Architect and as specified herein.

1.02 Related Sections

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

1. Dewatering and Drainage Control—See Section 02140

2. Riprap—See Section 02420 (NIC)

1.03 Reference Standards

A. References herein to any technical society, organization, group or body are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable:

AASHTO M252: Specification for Corrugated Polyethylene Drainage Tubing, 3 to 10 Inch Diameter
AASHTO M294: Specification for Corrugated Polyethylene Pipe, 12 to 36 Inch Diameter
ASTM D1056: Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D3350: Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM D2321: Standard Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
PART 2—PRODUCTS

2.01 General

A. All materials for storm drainage system shall be new and unused.

2.02 Corrugated High Density Poly Ethylene Pipe (HDPE)

A. Acceptable Manufacturers:

The storm drainage pipe shall be Nyloplast pipe as manufactured by Advanced Drainage Systems, Inc. or Landscape Architect approved equivalent.

B. Materials:

1. HDPE pipe shall be N-12 black, corrugated on the exterior with smooth walled interior. Pipe diameters and lengths shall be as specified on the Construction Drawings.

2. Corrugated Polyethylene Pipe, The product supplied under this specification shall be high density polyethylene corrugated exterior /smooth interior pipe. Twelve-to-36-inch diameters shall conform to AASHTO M294 Type S; 8-and 10-inch diameters shall meet the strength requirements of AASHTO M252 with the addition that the pipe have a smooth interior liner. Material shall conform to ASTM D3350. Minimum conveyance factors shall be as shown in Table 1.

Table 1
Conveyance Factors

<table>
<thead>
<tr>
<th>Nominal Pipe Diameter (in.)</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>24</th>
<th>30</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15.7</td>
<td>28.5</td>
<td>46.3</td>
<td>83.9</td>
<td>136.4</td>
<td>293.9</td>
<td>532.9</td>
<td>866.6</td>
</tr>
</tbody>
</table>

3. Joints and Fittings

a. Pipe joints and fitting shall conform to AASHTO M252 or AASHTO M294, or be approved by the Landscape Architect. Coupling bands should cover at least one full corrugation on each section of pipe. When gasketed coupling bands are required, the gasket shall be made of closed-cell synthetic expanded rubber meeting the requirements of ASTM D1056, Grade RE42. All gaskets shall be installed on the coupler by the pipe manufacturer prior to delivery to the Project site. All coupling bands shall meet or exceed the soil-tightness requirements of the AASHTO Standard Specifications for Highway Bridges, Section 23, paragraph 23.3.1.5.4(e).

b. Fitting shall conform to the requirements of AASHTO M294.
2.03 **Drain Basins**

A. Precast inline drains shall be Nyloplast as manufactured by Advanced Drainage Systems, Inc. or Landscape Architect approved equivalent, the diameter and depth as detailed on the Drawings and shall conform to ASTM A48, latest issue. See Drainage Details on Sheet L7 and L8.

2.04 **Backfill and Bedding**

A. Backfill material shall be CA-6, grade 8 or 9, in conformance with M.A.D.O.T. Standard Details and the Massachusetts Standard Specification for Road and Bridge Construction, current and addenda.

B. The source of the material shall be approved by the Landscape Architect prior to delivery. Samples of the proposed material shall be submitted to the Landscape Architect for approval prior to delivery and installation.

**PART 3—EXECUTION**

3.01 **General**

A. Contractor shall install and maintain erosion control measures as necessary.

3.02 **Subgrade Preparation**

A. Existing topsoil shall be striped and stockpiled, subgrade shall be excavated to the required lines and grades as shown on the Construction Drawings and to match the existing ditch bottom slope. The subgrade shall be compacted to a minimum of 95% density based on a Standard Proctor (ASTM D-698). If the required compaction density cannot be achieved due to the presence of unsuitable material, the material shall be excavated and replaced as directed by the Landscape Architect. Topsoil shall be re-spread to a minimum depth of four inches over entire disturbed area.

3.03 **Pipe Installation**

A. All delivered pipe shall be inspected. Damaged pipes may not be accepted. Pipe shall be delivered to the Project site and handled by means that provide adequate support to the pipe and do not subject it to undue stresses or damage. When handling the placing corrugated polyethylene pipe care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by metal edges or rocks). The manufacturer's special handling requirements shall be strictly observed. Pipe shall be stored on a relatively flat surface so the full length of the pipe is evenly supported. Unless the pipe is specifically manufactured to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when stored outdoors for 15 days or longer.
B. As soon as the excavation is completed to the normal grade of the bottom of the trench, the Contractor shall immediately place the bedding material in the trench. Then the pipe shall be firmly bedded in the compacted bedding material to conform accurately to the lines and grades indicated on the Drawings.

C. Install pipe, fittings, and accessories in accordance with manufacturer’s instructions.

D. Notch under pipe bells and joints, where applicable to provide for uniform bearing under entire length of pipe.

E. Excavation, backfilling and compaction shall be a specified in Section 02200 of the “Earthwork” Specifications.

F. Maintain optimum moisture content of bedding material to attain required compaction density.

3.04 Backfill

A. Backfill material shall be CA-6, grade 8 or 9, in conformance with R.I.D.O.T. Standard Details and the Massachusetts Standard Specification for Road and Bridge Construction, current and addenda. Backfill material shall be placed and compacted in uniform lifts of a maximum loose thickness of six inches. The source of the material shall be approved by the Landscape Architect prior to delivery. Samples of the proposed material shall be submitted to the Landscape Architect for approval prior to delivery and installation.

3.05 Drain Basin

A. Drain Basins and Inline Drains shall be constructed at the location and to the lines, grades, dimensions and design noted on Drawings.

B. Invert shall conform accurately to the size of the adjoining pipes.

1. Smooth plastic pipe, the dimension of the outlet pipe, shall be used to form the invert.

2. Side inverts and main inverts where the direction changes, shall be laid out in smooth curves of the longest possible radius which is tangent, within the manhole, to the centerline of adjoining pipelines.

3. Invert shelves shall be graded to provide a one inch per one foot wash from the manhole walls.

C. Openings which are cut in the risers in the field shall be carefully made so as not to damage the riser. Damaged risers will be rejected and shall be replaced at no additional expense to the Owner.

STORM DRAINAGE SYSTEM

02400-4
3.06 Cleaning

A. At the completion of the Work, clean all piping, structures, as well as open drainage courses through and to which water from this construction is directed to the satisfaction of the Landscape Architect.

END OF SECTION
SECTION 02510
BITUMINOUS CONCRETE PAVEMENT

PART 1 GENERAL

1.01 Related Documents

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

1.02 Description of Work

A. Work consists of a processed aggregate base, bituminous concrete surface course, conforming to the lines, grade, compacted thickness and typical cross section as shown on the plans and details.

1.03 Related Work

A. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:

1. Section 02300 - Earthwork.

1.04 Submittals

A. The Contractor shall submit the following samples, certifications or test results prior to use on the project.

1. Sieve analysis and product certification for processed aggregate.
2. Sieve analysis for bank-run gravel.
3. Product certification for bituminous concrete surface course.

PART 2 PRODUCTS

2.01 Materials

A. Processed aggregate for processed base course shall conform to Article M.05.01 of the MADOT State Standard Specifications in all applicable respects, including reclaimed aggregate is an acceptable material for this item. Gravel shall conform to the following gradation requirements:

<table>
<thead>
<tr>
<th>Sieve size</th>
<th>% passing by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 inch</td>
<td>55-100</td>
</tr>
<tr>
<td>No.4</td>
<td>20-95</td>
</tr>
<tr>
<td>No.40</td>
<td>0-50</td>
</tr>
<tr>
<td>No.200</td>
<td>0-5</td>
</tr>
</tbody>
</table>

BITUMINOUS PAVING
02510-1
B. The material for the bituminous concrete mixture shall be Type I-1 and shall conform to the requirements of Part 400 of the MADOT State Standard Specifications.

PART 3 EXECUTION

3.01 Subgrade

A. Prepare the subgrade for pavement, as detailed on the plans, below and parallel to the finished grade after compaction.

3.02 Construction

A. The methods employed in performing the work and all equipment, tools, machinery and other plant used in handling materials and executing any part of the work shall conform to all the requirements of Article 3.02.04 for construction of the sub-base, Article 3.04.03 for construction of the base and Article 4.06.03 for construction of pavement; RIDOT State Specifications except as noted below:

1. Daily samples of completed work will not normally be required; such samples shall be furnished by the Contractor only upon specific request of the Architect, in which case the Contractor shall remove the samples as directed and replace with the new material equal to that in adjacent areas.

2. The surface of the finished base shall not vary by more than 1/4 inch from a 10 foot straight edge applied parallel to the center line of the base.

3.03 Patching

A. Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular patches extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Re-compact existing unbound aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, bituminous asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances and surroundings. Remove spillages and clean affected surfaces.

C. Patching: Fill excavated pavements with asphalt base mix and while still hot, compact. Cover asphalt base course with compacted surface layer finished flush with adjacent surfaces.

D. Portions of pavement courses which become mixed with foreign material or are in any way defective shall be removed, replaced with fresh mixture, and compacted to density of surrounding areas. Bituminous material spilled outside"
lines of finished pavement shall be immediately and completely removed. Such material shall not be employed in the work.

A. Joints shall present same texture, density, and smoothness as other sections of the course. Continuous bond shall be obtained between portions of existing and new pavements and between successive placements of new pavement. New material at joints shall be thick enough to allow for compaction when rolling. Compaction of pavement, base, and subgrade at joints shall be such that there is no yielding of new pavement relative to existing pavement when subjected to traffic.

B. Contact surfaces of previously constructed pavement (if greater than or equal to two days since binder placed), manholes, and similar structures shall be thoroughly cleaned and painted with a thin uniform coating of bitumen immediately before fresh mixture is placed. Tack coat shall be applied at rate which will leave bituminous residue of 5 to 7 gallons/100 yd.2 after evaporation of vehicle. Base surface shall be dry and clean when tack coat is applied. Bituminous paving material shall not be placed until vehicle has completely evaporated from tack coat. Adjoining new paving shall be placed before tack coat has dried or dusted over.

C. Earth or other approved material shall be placed along pavement edges in such quantity as will compact to thickness of course being constructed, allowing at least 12 inches of shoulder width to be rolled and compacted simultaneously with rolling and compacting surface. Pavement edge shall be trimmed neatly to line before placing earth or other approved material along edge.

D. No vehicular traffic of any kind shall be allowed to pass over the newly finished surface until it has had time to set. Seventy-two hours will be considered sufficient time for the pavement to set in most cases, but this period may be extended by the Owner’s Representative as required by weather or other reasons. Under all circumstances, damage to the pavement caused by the Contractor’s or public vehicles driving over the pavement before the pavement has fully cured shall be repaired as specified, at no additional cost to the Owner.

3.04 Pavement Marking

A. Do not apply pavement marking paint until layout, colors and placement have been verified with Landscape Architect.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material, graffiti plaint, dirt, trash, dust, etc.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, edges. Apply at manufacturer’s recommended rates to provide a minimum wet film thickness.

BITUMINOUS PAVING
02510-3
3.05 **Field Quality Control**

A. The Owner shall select and retain an independent testing laboratory to provide compaction tests. Compaction tests will be provided for all areas to be paved prior to completing work over the compacted area. Minimum number of tests required, unless directed otherwise by the Architect, is one per each 5,000 square feet of area of pavement.

B. Additional tests at the Contractor's expense will be required if, in the opinion of the Architect, the failure rate justifies it.

C. Work which is shown not to be in conformance with specification requirements will be replaced at the Contractor's expense. Contractor shall pay for retesting of areas which fail.

D. The Contractor shall coordinate and schedule all testing as work progresses. Any scheduled tests which are canceled but billed for shall be paid by the Contractor.

**END OF SECTION**
SECTION 02800
SITE FURNISHINGS

PART 1 GENERAL

1.01 Related Documents

A. The General Documents, as listed on the Table of Contents shall be included in and made a part of this Section.

B. Examine all Contract Documents and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 Summary

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

1. Benches;
2. Drinking water Fountain

1.03 Related Work Under Other Sections

A. The following items of related work are specified and included in other Sections of the Specifications:

1. Section 02100 - SITE PREPARATION AND DEMOLITION
2. Section 02200 - EARTHWORK
3. Section 03300 – SITE CAST-IN-PLACE CONCRETE

1.04 References

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

2. ASTM: American Society for Testing and Materials

B. National Concrete Masonry Association Standard "Specifications for the Design and Construction of Load Bearing Concrete Masonry." (NCMA)

D. ACI: American Concrete Institute 530-99/530.1-99 Building Code
   Regulations for Masonry Structures and Specifications for Masonry Structures
   and Commentaries

E. ASTM: American Society for Testing and Materials
   A82-97a Standard Specification for Steel Wire, Plain, for Concrete
   Reinforcement
   A153/ Standard Specification for Zinc Coating (Hot-dip) on Iron and
   A153M Steel Hardware
   A276 Standard Specification for Stainless Steel Bars and Shapes
   B5 Standard Specification for High Conductivity Tough-Pitch Copper
   Refinery Shapes
   B101 Standard Specification for Lead-Coated Copper Sheet and Strip for
   Building Construction
   B370 Standard Specification for Copper Sheet and Strip for Building
   Construction.
   C31/C31M Standard Specification for Making and Curing Concrete Test
   Specimens in the Field
   C62 Standard Specification for Building Brick (Solid Masonry Units Made
   from Clay or Shale)
   C67 Standard Test method for Sampling and Testing Brick and Structural
   Clay Tile
   C90 Standard Specification for Loadbearing Concrete Masonry Units
   C144 Standard Specification for Aggregate for Mortar Masonry
   C150 Standard Specification for Portland Cement
   C207 Standard Specification for Hydrated lime for Masonry Purposes
   C216 Standard Specification for Facing Brick
   C260 Standard Specification for Air-entraining Admixtures for Concrete
   C270 Standard Specification for Mortar for Unit Masonry
   C426 Standard Test Method for Linear Drying Shrinkage for Concrete
   Masonry Units
   C827 Standard Test Method for change in Height at Early Ages of Cylindrical
   specimens from Cementious Mixtures

1.05 Submittals

A. Manufacturer's Literature: Submit copies of each of manufacturer's material
   descriptions, dimensions, details, and installation instructions for the
   following. Submit manufacturer's material descriptions for primer coat and
   finish coat.

   1. Benches;
   2. Drinking Water Fountain

B. Complete Shop Drawings for the following:

   1. Shop Drawings for installation of the drinking water fountain.
1.06 Quality Standards

A. Workmanship and finish shall be equal to the best practice of modern shops for each item of work. Metal fabrication shall be accomplished using the highest standards of workmanship. All work shall be executed by experienced mechanics, shall conform to the requirements of the Contract Documents, and meet the following requirements.

1. Individual metal pieces shall be saw cut and carefully fitted together.
2. Sections shall be well formed to shape and size with sharp lines and angles; curved work shall be sprung evenly to curves.
3. Exposed surfaces shall have a smooth finish and sharp, well defined lines and arises.
4. Grind all edges of bars and plates completely free from nicks and machine marks, prior to galvanizing, shop priming, or finishing.
5. All surfaces and connections of metal items shall be without visible grinding marks, surface differentiation or variation.
6. All fabricated metal items shall be fine sanded throughout to produce a high standard of surface smoothness.
7. Castings shall have sharp corners and edges and shall be clean, smooth and true to pattern.
8. Welding shall be continuous and shall extend for the entire length of the joints except where specifically indicated on the Contract Documents. All exposed welds shall be ground smooth.
9. The use of gas cutting torch in the field for correcting fabrication errors will be permitted only when the prior written approval of the Owner’s Representative has been obtained for each specific condition.
10. Weld with uncoated wire to prevent flux deposits. If coated wire is used, all flux residue shall be thoroughly removed and bare white metal exposed, prior to galvanization, if applicable. Where overlapping surfaces are welded, seal off contact area by welding all edges around contact area.
11. All welds shall be water tight.
12. All shop connections shall be full seam welded and ground flush and smooth. Field connections bolted unless otherwise permitted as indicated in this Section 02800, Site Furnishings. Draw up all threaded connections tightly, after buttering same with pipe joint compound, to exclude water. Deform threads to prevent loosening for all exposed connections subject to vandalism.

1.07 General Installation

A. Where anchors, bolts or fasteners are exposed, they shall be configured or secured in such a way as to prevent their casual removal by use of vandal-proof heads or fastenings unless otherwise specified on Drawings.

B. All metal inserts, anchor slots, anchors, anchor bolts, fastenings, and other fastening devices, for attachment of site improvement items to pavements, except as otherwise specified under other Sections of this Specification, shall
be in specified, provided, delivered installed and paid for under the work of this Section 02800, Site Furnishings.

C. Unless specifically called out in the Contract Documents, galvanized steel or cast iron sections to be joined shall not be welded after galvanizing but shall be mechanically attached by means of unexposed sleeves and fasteners sufficient to provide secure attachment under normal usage.

D. Free-standing site improvement items shall be set plumb and horizontal regardless of the pitch of the finished surrounding grade unless otherwise shown on the Contract Documents.

E. The Contractor shall be responsible for timing the delivery of site improvement items so as to minimize the on-site storage time prior to installation. All stored materials are the responsibility of the Contractor and shall be protected from weather, careless handling and vandalism.

F. Contractor shall be responsible for the correct location of site improvement items. Take particular care to maintain shapes, plumb and level during the pouring of concrete.

G. All Work shall be accurately set to established lines and elevations and rigidly set in place to supporting construction.

1.08 Coordination

A. The work of this Section 02800, Site Furnishings shall be completely coordinated with the work of other Sections. Verify dimensions and work of other trades that adjoin materials of this Section 02800, Site Furnishings, before installing items specified.

B. Obtain all necessary templates and patterns required from other trades for proper execution of work of this Section 02800, Site Furnishings. Coordinate the delivery of items, templates, and patterns manufactured by other trades to maintain construction schedule. Receive from other trades items to be installed under this Section 02800, Site Furnishings.

1.09 Guarantee

A. The Contractor shall furnish and deliver standard written manufacturer’s guarantee in Owner’s name covering all materials and workmanship under this Section 02800, Site Furnishings, in addition to, and not in lieu of, guarantee requirements set forth under Section 02000, GENERAL REQUIREMENTS, and other liabilities which the Contractor may have by law or other provisions of the Contract Documents.

B. Supplier shall pay for repairs of any damage to any part of the project caused by defects in his work and for any repair to the materials or equipment caused by replacement. All repairs are to be done to the satisfaction of the Owner’s Representative.
C. Any part of the work installed under this contract requiring excessive maintenance shall be considered as being defective, and shall be replaced by the Supplier during the one year guarantee period at no cost to the Owner.

PART 2 PRODUCTS

2.01 Furnishings

A. All furnishings will be as specified in the plans and details or approved equal.

2.02 Other Furnishings

A. See Materials Sheet L5 for product and contact information.

2.03 Concrete

A. Concrete footings shall be 4,000 pounds per square inch cast-in-place concrete as specified under the work of the Section 03300, SITE CAST-IN-PLACE CONCRETE of this Specification.

2.04 Grout

A. Grout as required for anchoring shall be a pourable, quick setting, non-metallic and nonshrinking hydraulic cement grout equal to the following:

1. Five Star Grout
   U.S. Grout Corporation
   425 Stillson Road
   Fairfield, CT 06430
   (800) 243-2206

2. Sika Grout 212
   Sika Corporation
   Lyndhurst, NJ 07071
   (201) 933-8800

3. Harris Construction Grout
   AH Harris & Sons
   10 West Mill St.
   Medfield, MA 02052
   (508) 359-7321

2.05 Earthwork Materials

A. All backfill materials, including base and subbase materials, ordinary borrow, drainage fill and sand shall be as specified under the Section 02200, Earthwork of this Specification.
PART 3 EXECUTION

3.01 Earthwork

A. All excavation, filling, compacting and grading of backfill materials, including base and subbase materials, ordinary borrow, drainage fill and structural associated with and used in the installation of the items of this Section 02800, Site Furnishings, shall be as specified under the Section 02200, Earthwork.

3.02 Concrete

A. Concrete footing placement, protection and formwork shall be as specified under the Section 03300, SITE CAST-IN-PLACE CONCRETE. Concrete footings shall be to the sizes noted on the Contract Documents. No calcium chloride will be permitted.

3.03 Furnishings

A. Install all items in accordance with manufacturer’s instructions and in locations shown on the Contract Documents and installed and paid for under this Section 02800, Site Furnishings.

B. The Contractor shall be responsible for timing the delivery of the existing park bench, so as to minimize on-site storage time prior to installation. All stored materials and items must be protected from weather, careless handling and vandalism.

C. Please see plans and details for product information and installation instructions at the end of this section.

3.05 Other Furnishings

A. Install all items in accordance with manufacturer’s instructions and in locations shown on the Contract Documents and installed and paid for under this Section 02800, Site Furnishings.

B. The Contractor shall be responsible for timing the delivery so as to minimize on-site storage time prior to installation. All stored materials and items must be protected from weather, careless handling and vandalism.

3.07 Acceptance Standards

A. Site Improvement items fabricated, provided and delivered and installed under this Section 02800, Site Furnishings including bench, picnic table and wall bench will be rejected by the Owner’s Representative for the following reasons and as determined by the Owner’s Representative:
1. Upon installation horizontal or vertical curves do not meet the shapes and profiles shown on the Contract Documents. Curves that have broken backs, sags, saddles, tangents or kinks will be rejected.

2. Indications of field welding or cutting.

3. Damage such as scrapes, nicks and dents to the finish.

4. Threaded connections are not drawn up tightly. Threads have not been deformed to prevent loosening.

5. Anchorage into concrete or masonry is not solid but is perceptibly loose. Anchorage does not meet the requirements of the Contract Drawings.

END OF SECTION
WOOD FENCES AND GATES

PART 1 - GENERAL

1.01 SUMMARY
A. Section Includes:
   1. Wood Fences and Gates
B. Related Sections:
   1. Earth Moving

1.02 REFERENCES
A. American Society of Testing Materials (ASTM):
   1. ASTM A36 “Standard Specification for Carbon Structural Steel”
   3. ASTM A153 "Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware"
   4. ASTM A500 "Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes"
B. American Welding Society (AWS)
   1. AWS D1.1 "Structural Welding Code - Steel"

1.03 SUBMITTALS
A. Submit Product Data and manufacturer's written instructions for care, installation and maintenance.
B. Shop Drawings:
   1. Show Dimensions, fencing layout, finish, weight and size of members, methods of fastening, and installation details of fence and gates. Provide coordination drawings where inserts or sleeves are required.

PART 2 - PRODUCTS

2.01 WOOD FENCES AND GATES
A. Wood Materials: Western Red Cedar; WRCLA.
   1. Fence (Slats) Boards and Trim: Surfaced One Side, Two Edges (S1S2E); Standard Grade and Better; size and location as indicated on Drawings.
2. Horizontal Supports: Rough Sawn; Custom Knotty Grade; size and location as indicated on Drawings.

3. Posts: Rough Sawn; No. 2 Grade and Better; size and location as indicated on Drawings.

4. Finish: As indicated on Drawings.

B. Steel Framed Gate Materials:

1. Steel tubes: ASTM A500

2. Angles: ASTM A36

3. Plates: ASTM A36

4. Bolts, Nuts, Screws, Clips and Washers: AISI 300 series stainless steel. Exposed screws shall be Phillip's flat head, countersunk unless noted otherwise.

5. Bolts for Field Connections Only: Provide washers under heads and nuts bearing on wood. Draw nuts tight and nick threads of permanent connections. Use beveled washers where bearing is on sloped surfaces.


7. Steel Finish: Paint as specified in Section 09 90 00 (09900). Color to match adjacent enclosure.

C. Fasteners:

1. Nails:
   a. Flat head aluminum with ring or spiral-threaded shank and blunt point.
   b. Length sufficient to penetrate into support framing a minimum of 1-1/2 inch.

2. Bolts and Washers: Hot-dip galvanized in accordance with ASTM A153, unless noted otherwise.

3. Concrete Anchors:
   a. Avendra, LLC Preferred Manufacturers:
      None
   b. Approved Manufacturers:
      "Red-Head"; ITW Ramset/Redhead (800-899-7390)
      "Wej-H"; United Inds. Metals Group (800-952-5063)
      Approved substitution
      Galvanized machine screws or bolts with standard expansion shield.

4. Adjustable (Wood) Post Base:
   a. Avendra, LLC Preferred Manufacturers:
      None
   b. Approved Manufacturers:
      "AB Series"; Simpson Strong-Tie Company, Inc. (800-999-5099)
      Approved substitution

WOOD FENCE AND GATE
02821-2
c. Galvanized steel slotted plate and spacer

D. Gate Hardware:

1. Avendra, LLC Preferred Manufacturers:
   a. None

2. Approved Manufacturers:
   a. Stanley Hardware (800-337-4393)

3. Wood Gates:
   a. Hinges: #SC908BP, 1-1/2 pair per leaf.
   b. Slide Bolt: #SP1271, Slide Bolt, 1 each.
   c. Cane Bolt: #CD1009, 1 per leaf.

4. Steel Framed Gates:
   a. Hinges: Ball bearing, galvanized, 1-1/2 pair per leaf.
   b. Latch: Industrial double drive latch assembly with locking device.
   c. Cane Bolt: #CD1009, 1 per leaf.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Construct plumb, square, level and anchored securely with smooth miters and field cuts after joining. Provide adequate support for anchoring.

B. Install gates plumb, level, and secure for full opening without interference. Adjust hardware for smooth operation.

C. Set posts in concrete footings as shown on Drawings.

D. Expansion Bolts:
   1. Install in snug fittings, smoothly drilled holes in accordance with the manufacturer's written instructions.
   2. Place bolts so load acts in shear.

END OF SECTION
SECTION 02920
TURF

PART 1 – GENERAL

1.01 Summary

A. Section Includes:
   1. Seeding.
   2. Hydroseeding.
   3. Erosion-control material(s).

1.02 Submittals

A. Product Data: For each type of product indicated.
   1. Pesticides and Herbicides: Include product label and manufacturer's application
      instructions specific to this Project.
   2. Certification of Grass Seed: From seed vendor for each grass-seed monostand or
      mixture stating the botanical and common name, percentage by weight of each
      species and variety, and percentage of purity, germination, and weed seed. Include
      the year of production and date of packaging.
   3. Certification of each seed mixture for turfgrass includes identification of source
      and name and telephone number of supplier.
   4. Product Certificates: For soil amendments and fertilizers, from manufacturer.
   5. Maintenance Instructions: Recommended procedures to be established by Owner
      for maintenance of turf during a calendar year. Submit for approval by Landscape
      Architect before expiration of required initial maintenance periods.

1.03 Quality Assurance

A. Installer Qualifications: A qualified Landscape Installer whose work has resulted in
   successful turf block, turf and meadow establishment.

1.04 Delivery, Storage and Handling

A. Seed and Other Packaged Materials: Deliver packaged materials in original,
   unopened containers showing weight, certified analysis, name and address of
   manufacturer, and indication of conformance with state and federal laws, as
   applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in
   "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod
   Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass
   Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod
   from breakage and drying.

1.05 Project Conditions
A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion
1. Planting: April 1st - June 15th
2. Planting: August 1st - October 15th

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.06 Maintenance Services

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of Landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:
1. Seeded Turf: 45 days from date of planting completion.
   a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
2. Sodded Turf: 21 days from date of planting completion.

PART 2 - PRODUCTS

2.01 Seed

A. Seed Species: State-certified seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed.

B. Turfgrass Sod: Certified, Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

C. Turfgrass Species: Sod of Certified, Number 1 Quality/Premium grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed. Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

2.02 Inorganic Soil and Amendments
A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
   1. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
   2. Provide lime in form of ground dolomitic limestone.

2.03 Organic Soil and Amendments

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
   1. Organic Matter Content: 50 to 60 percent of dry weight.
   2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

2.04 Fertilizers

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
   1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
   2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
   1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
   2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.05 Planting Soils

A. Planting Soil (topsoil) is provided topsoil free of stones one half inch or larger in any dimension and other extraneous materials harmful to plant growth. Topsoil shall meet an approved “loam sand” soil classification (60% sand, 30% silt, 10% clay).

2.06 Mulches

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
2.07 Pesticides

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.08 Erosion Control Materials

A. Erosion-Control Blankets: Shall be North American Green SC150 biodegradable straw-coconut mat enclosed in a photodegradable plastic mesh or approved equal. Include manufacturer’s recommended steel wire staples, six inches long. Staple pattern “A” that uses 0.7 staples per SY shall be used.

PART 2 - EXECUTION

3.01 Examination

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
   a. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
   b. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
   c. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
   d. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.02 Preparation

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.03 Turf Area Preparation

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of four inches. Remove stones larger than one half inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
   1. Apply superphosphate fertilizer directly to subgrade before loosening.
   2. Spread planting soil to a depth of four inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
      a. Reduce depth of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
   1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
   2. Loosen surface soil to a depth of at least six inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top four inches of soil. Till soil to a homogeneous mixture of fine texture.
      a. Apply superphosphate fertilizer directly to surface soil before loosening.
   3. Remove stones larger than one half inch in any dimension and sticks, roots, trash, and other extraneous matter.
   4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus one half inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.04 Preparation for Erosion Control

A. For erosion-control blanket, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
B. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.05 Seeding

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds five mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
   1. Do not use wet seed or seed that is moldy or otherwise damaged.
   2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
   3. Broadcast spread seed.

B. Sow seed at a total rate of 5-3/4 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions. (NIC).

E. Protect seeded areas with slopes not exceeding 1:5 by applying hydromulch.

3.06 Turf Maintenance

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
   1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
   2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
   3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of four inches.
   1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
   2. Water turf with fine spray at a minimum rate of one inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is no more than two inches. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is
wet. Schedule initial and subsequent mowings to maintain the following grass height: 2-1/2 inches.

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
   1. Use fertilizer that will provide actual nitrogen of at least two lb/1000 sq. ft. to turf area.

3.07 Satisfactory Turf

A. Turf installations shall meet the following criteria as determined by Landscape Architect:
   1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding ninety percent over any ten sq. ft and bare spots not exceeding five by five inches.
   2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.08 Turf Maintenance

A. Maintain and establish meadow by watering, weeding, mowing, trimming, replanting, and performing other operations as required to establish a healthy, viable meadow. Roll, re-grade, and re-plant bare or eroded areas. Provide materials and installation the same as those used in the original installation.
   1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and meadow damaged or lost in areas of subsidence.
   2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
   3. Apply treatments as required to keep meadow and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
   4. Use "glove herbicide" or rubber glove with cotton ball of non selective herbicide and apply to individual plant tissue.

B. Watering: Install and maintain temporary piping, hoses, and meadow-watering equipment to convey water from sources and to keep meadow uniformly moist.
   1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
   2. Water meadow with fine spray at a minimum rate of one half inch per week for four weeks after planting unless rainfall precipitation is adequate.

C. Weed Control: Maintain meadow at six inch height of cut for first two years. Conduct fall mowing to a height of four to six inches.
3.09 Pesticide Application

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.10 Cleanup and Protection

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION
SECTION 02930
PLANTS

PART 1 - GENERAL

1.01 Summary

A. Section Includes:
   1. Plants (trees, shrubs, perennials, ground cover)
   2. Planting soils.

1.02 Submittals

A. Product Data: For each type of product indicated, including soils for approval.
   1. Manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials.

B. Samples for Verification: For each of the following:
   1. Bark Mulch: 1-quart volume of organic mulch in sealed plastic bag labeled with composition of materials and source of mulch. Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.

C. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit for approval by Landscape Architect before start of required maintenance periods.

D. Warranty: Sample of special warranty.

1.03 Quality Assurance

A. Installer Qualifications: A Qualified Landscape Installer whose work over the last five years has resulted in successful establishment of plants.

B. Provide quality, size, genus, species, and variety of plants indicated.

C. Measurements: Do not prune to obtain required sizes.

D. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements six inches above the root flare for trees up to four-inch caliper size, and twelve inches above the root flare for larger sizes.

E. Other Plants: Measure with stems, petioles, and foliage in their normal position.

F. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms.
injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected plant material immediately from Project site.

G. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

H. Pre-installation Conference: Conduct conference at Project site.

1.04 Delivery, Storage and Handling

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

D. Handle planting stock by root ball.

E. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.05 Project Conditions

A. Field Measurements: Verify actual grade elevations, service and utility locations, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
1. Planting: April 1 – June 15
    September 1 - November 1

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C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

D. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.06 Warranty

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
1. Failures include, but are not limited to, the following:
   a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
   b. Structural failures including plantings falling or blowing over.

2. Warranty Periods from Date of Substantial Completion.
   a. Trees, Shrubs, Vines, and Ornamental Grasses: **12 months.**
   b. Ground Covers, Biennials, Perennials, and Other Plants: **12 months.**

3. Include the following remedial actions as a minimum:
   a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
   b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
   c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
   d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.07 Maintenance Service

A. Initial Maintenance Service for Trees, Shrubs, Ground Cover and Other Plants: Provide maintenance by skilled employees of Landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: **12 months from date of Substantial Completion.**

**PART 2 - PRODUCTS**

2.01 Plant Material
A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
   1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
   2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Landscape Architect, with a proportionate increase in size of roots or balls.

C. Transplant existing plants per Planting Plan and Plant Schedule. NOT APPLICABLE.

D. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

E. Plant selection at the source does not affect the Landscape Architect’s right of re-inspection and rejection during the progress of the work.

2.02 Organic Soil Amendments

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
   1. Organic Matter Content: 50 to 60 percent of dry weight.
   2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.03 Fertilizers

A. Preplant incorporation of phosphorous and potassium into soils should be based on soil test results.
2.05 Planting Soils

A. Planting Soil: Existing, native surface topsoil as stockpiled on site. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth. Mix existing, native surface topsoil with the following soil amendments in the following quantities to produce planting soil:

1. Ratio of Topsoil by Volume: 1:2
2. Ratio of loose Compost by volume: 1:8
3. Ratio of existing subgrade soil free of rocks greater than one inch: 3:8
4. Ten pounds of bone meal per CY of planting soil.
5. Supplement with additional planting soil when quantities are insufficient.

2.06 Mulches

A. Organic Shredded Bark Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of the following:

1. Type: Shredded Aged Pine.
2. Size Range: three inches maximum, one half inch minimum

PART 3 - EXECUTION

1.01 Examination

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
   1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
   2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
   3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
   4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

1.02 Preparation

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
A. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

B. Lay out plants at locations following Landscape Architect's on site directions. Adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

C. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

1.03 Planting Area Establishment

A. Loosen subgrade of planting areas to a minimum depth of six inches to permit bonding of planting mix with subgrade. Remove stones larger than two inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

B. Spread planting soil to a depth of six inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

D. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

1.04 Excavation for Trees and Shrubs

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately two times as wide as ball diameter for balled and burlapped, balled and potted, container-grown and fabric bag-grown stock.

2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

4. Maintain required angles of repose of adjacent materials as shown on the Details. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.

5. Maintain supervision of excavations during working hours.

6. Keep excavations covered or otherwise protected overnight.

B. Subsoil and topsoil removed from excavations may be used as a portion of planting soil.
C. Obstructions: Notify Landscape Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

1.05 Tree, Shrub and Vine Planting

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the topmost root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

A. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

B. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare two inches above adjacent finish grades.
   1. Use planting soil for backfill.
   2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops, sides and bottoms of root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
   3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

C. Set balled and potted and container-grown stock plumb and in center of planting pit or trench with root flare two inches above adjacent finish grades.
   1. Use planting soil for backfill.
   2. Carefully remove root ball from container without damaging plant.
   4. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
   5. Continue backfilling process. Water again after placing and tamping final layer of soil.

1.06 Tree, Shrub and Vine Pruning

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Landscape Architect.
C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

1.07 Planting Area Mulching

A. Mulch backfilled surfaces of planting areas and other areas indicated.

B. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of **three inch average thickness**, with thirty six inch radius around trunks or stems. Do not place mulch within three inches of trunks or stems.

C. Organic Mulch in Planting Areas: Apply **three inch average thickness** of organic mulch extending twelve inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within three inches of trunks or stems.

3.08 Plant Maintenance

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.09 Pesticide Applications

A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

PLANTS
02930-8
3.10 Cleanup and Protection

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Final Completion remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.11 Disposal

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION
SECTION 03100
CONCRETE FORMWORK

PART 1 - GENERAL

1.01 Related Work
A. Section 03200 - Concrete Reinforcement.
B. Section 03250 - Concrete Accessories.
C. Section 03300 - Cast-In-Place Concrete.

1.02 Quality Assurance
A. Construct and erect concrete formwork in accordance with ACI 347.

1.03 Reference Standards
A. ACI 318 - Building Code Requirements for Reinforced Concrete.
B. ACI 347 - Recommended Practice for Concrete Formwork.
C. PS 1 - Construction and Industrial Plywood.

1.04 Delivery, Storage and Handling
A. Deliver, handle and store formwork material to prevent warping or damage detrimental to strength of materials or to surfaces to be formed.
B. Ensure formwork surfaces in contact with concrete are not contaminated by foreign matter.

PART 2 - PRODUCTS

2.01 Wood Form Materials
A. Exposed Concrete Surfaces: Plywood conforming to PI 1, minimum veneer Grade B-B, tight fitting, and adequately stiffened to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surfaces.
B. Unexposed Concrete Surfaces: Plywood, lumber, tight fitting, adequately stiffened to support weight of concrete without deflection detrimental to structural tolerances.
C. Nails, Spikes, Lag Bolts, through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while pouring concrete.

2.02 Prefabricated Forms
A. Steel Type: Matched, tight fitting and adequately stiffened to support weight of concrete without deflection detrimental to structural tolerances and appearance of finished concrete surfaces.