Village of Hastings-on-Hudson

7 Maple Avenue

Hastings-on-Hudson, New York 10706

BID MANUAL

Quarry Park

Issued for Bid: November 8, 2018

Village of Hastings-on-Hudson

Quarry Park

ISSUE TO BID

November 2018

TABLE OF CONTENTS

NOTICE TO BIDDERS

The Village of Hastings-on-Hudson hereby invites the submission of sealed bids for:

Quarry Park

Bids will be received until 3:00 P.M. on:

Date

December 7, 2018

By:

Francis A. Frobel

Village Manager

7 Maple Avenue

Hastings-on-Hudson, NY 10706

Clearly label your package: Quarry Park

There will be a pre-bid walk through scheduled for November 28 at 10:00 A.M. at Quarry Park.

Attendance is suggested

Awards will be made at a meeting to be held at a later date

The Village of Hastings-on-Hudson reserves the right to reject any or all bids

INSTRUCTIONS TO BIDDERS

1. Bids must be submitted on the attached set of forms. (Do not separate these sheets).

2. Each Bidder must state that no employee or member of the Village, and no spouse of such employee or member, is directly or indirectly interested in the proposal.

3. The proposal is to be enclosed and sealed in an envelope marked with the name of the bidder and **"Bid for: Quarry Park"**

   Proposals must be received by 3:00 P.M. on Friday, December 7, 2018 by:

   Francis A. Frobel
   Village Manager
   7 Maple Avenue
   Hastings-on-Hudson, NY 10706

   and will not be considered if submitted on other than the attached form bid. Bids will be opened at a time to be determined by the Owner.

4. The Village reserves the right to reject all bids or to award the bid in total or any part thereof which in their opinion will best serve its needs.

5. Where articles or items of equipment or supplies are designated as manufactured by a specific manufacturer, it is to be understood that the articles as specified represents and accepted standard. Where certain brands of materials, apparatus or equipment are specified, such goods have been selected in order to establish a standard for the particular service required; but it is not the intention to limit competition thereby.

6. All bids are to be on the basis of delivery prepaid to destination, and all freight and delivery costs are included in the bid price.

7. Bids submitted shall be binding for forty-five (45) days unless otherwise notified by the Village.

8. No work is to be subcontracted without prior written consent and approval of the owner. The Village reserves the right to make any alterations, additions, or omissions of work or materials herein specified, during the progress of the work that may be found necessary or desirable. The cost of any such changes shall be agreed upon in writing between the Village and the vendor before being executed. No extra work shall be allowed without such written agreement; and no extra work shall be performed before written notice is delivered to the Village that it is extra work.

9. During the performance of the contract, vendor agrees as follows:
   a) The contractor will not discriminate against any employee or applicant for employment because of race, creed, color or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion or transfer' recruitment or compensation; and selection for training including apprenticeship. The vendor agrees to post in conspicuous places

available to all employees and applicants for employment, notices setting forth the provisions of the nondiscrimination clause.

b) The contractor will, in all solicitations, or advertisements for employees placed by or on behalf of the vendor, state that all qualified applicants will receive consideration for employment without regard to race, color, creed or national origin.

10. Discrepancy

a) Should any bidder find any discrepancies in or omissions from the contract documents, or should the bidder be in doubt as to the meaning of any portion of said documents, they shall at once notify the Architect, Peter Gisolfi Associates and obtain an interpretation or clarification prior to submission of their bid. The Architect shall answer any and all questions in writing.
b) Any request for interpretation or clarification given in accordance with this provision shall be in writing.
c) The Architect's decision shall be final and binding on any and all interpretations.

11. Representation

Each bidder by making bid represents that:

a) They have read and understand the Bidding documents and their bid is made in accordance therewith.
b) They have visited the site and have familiarized themselves with the conditions under which the work is to be performed.
c) This proposal is made without any connection or collusion with any other person making any proposal for the work described herein. No official or employee or member of the Village, and no spouse of such employee or member, is directly or indirectly interested therein or in the supplies to which it relates or any portion of the profits thereof.

ARCHITECT	CIVIL ENGINEER
Mathew Neilsen	Arcadis, Inc.
120 Broadway Suite 1040	44 S. Broadway 15th Floor
New York, NY 10271	White Plains, NY 10602
(212) 431-3609	(914) 641-2546

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

SIGNATURE OF AUTHORIZED OFFICER: _____

TITLE: _____

DATE: _____

TELEPHONE: _____ FAX: _____

EMAIL: _____

NON-COLLUSIVE BID CERTIFICATION

VILLAGE OF HASTINGS ON HUDSON

NON-COLLUSIVE BID CERTIFICATION

Firm Name: _____

Business Address: _____

Telephone No. _____ ***Date of Bid:*** _____

1. *GENERAL BID CERTIFICATION*
   The Bidder certifies that he/she, or it, will furnish, at the prices herein quoted, the materials, equipment, and/or services as proposed in this Bid.
2. *NON-COLLUSIVE BID CERTIFICATION*
   By submission of this Bid, the Bidder certifies that he/she/it is complying with Section 103-d of the General Municipal Law as follows:

> ***"Statement of non-collusion in bids and proposals to political subdivisions of the state.*** *Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation, or local law for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury:"*

By submission of this Bid, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint Bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

- *The prices in this Bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor;*
- *Unless otherwise required by law, the prices which have been quoted in this Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other Bidder or to any competitor; and*
- *No attempt has been made or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.*

Bidder affirms under penalties of perjury that the foregoing statements are true.

Signature of Bidder or Authorized Officer:

_____

STATE OF NEW YORK

COUNTY OF _____

On the ____ day of _____, 20___ before me came _____,
Name

who by me being duly sworn, did state under oath that (s)he is the _____
Title

of _____ and that the foregoing statements are true.
Bidder

_____

Notary Public

Place Notary stamp below:

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we,

_____
(Here insert full name and address or legal title of Contractor)

As Principal, hereinafter called the Principal, and

_____
(*Here insert full name and address or legal title of Surety)*

a corporation duly organized under the laws of the State of New York as Sur**ety,** hereinafter called the Surety, ARE HELD AND FIRMLY BOUND UNTO the Village of Hastings on Hudson as Obligee, hereinafter referred to as the "Obligee" IN THE SUM OF (Equal to 5% of the base bid amount);

_____ DOLLARS ($ _____ _) _
(Dollar amount in written form) *(Dollar amount in numerical form)*

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for:_____

_____
(*Here insert full name and address and description of project)*

i) NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in due prosecution thereof, or in due event of the failure of the Principal to enter into such Contract and give such bonds, if the Principal shall pay to due Obligee the difference not to exceed due penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith Contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

ii) THE SURETY, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety and its Bond shall be in no way impaired or affected by any extensions of time, modifications, omission, addition or change in or to the said Contract or the Work to be performed thereunder or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by an assignment, subletting or other transfer thereof, or of any Work to be performed, or any moneys due or to become due thereunder; and said Surety does hereby waive notice of any and all such payments, extensions, modifications, omissions, additions, changes, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relations to assignees, subcontractors and other transferees shall have the same effect as to said Surety as thought done or mitted to be done by or in relation to said Principal.

iii) Signed and sealed this _____ day of _____, 20 ____.

_____
Principal Title

_____
Notary Public Seal

_____
Surety Title

_____
Notary Public Seal

BID FORM: Quarry Park

The undersigned hereby proposed and agrees to provide services and materials as specified for the Quarry Park.

Company: _____

Address: _____

_____

Phone: _____

Fax: _____

Contact Name: _____

Email Address: _____

Base Bid: _____

Schedule of Values Base Bid

Please fill-in pages 10 and 11

Alternate Bid Prices

Alternate One: _____$ _____

Alternate Two: _____ $ _____

Alternate Three: _____ $ _____

1. I have received and examined the Bidding Documents for the referenced purchase including the following Addenda:

   Addendum No. _____ Dated: _____

   Addendum No. _____ Dated: _____

   Addendum No. _____ Dated: _____

2. In submitting this proposal, I agree:

   a) To hold my bid open for forty-five (45) days from the Bid Date.
   b) To accomplish the work in accordance with the contract documents.
   c) To enter into a contract agreement for a lump sum construction contract within ten (10) calendar days of notice of acceptance of this proposal.
   d) To comply with all the provisions of the general terms and conditions of bids.
   e) To commence work immediately on the date of receipt of Notice of Award and to complete the project by _____. Bid security is to become the property of the Owner in the event the Agreement of Performance/Payment Bond are not executed within ten (10) days' Notice of Acceptance of the Proposal.

f) To guarantee all new construction for a period of two years from final acceptance and to furnish surety of guaranty acceptable to the owner in the amount of 100% of the final construction contract for a period of two years from the date of final acceptance.

g) I understand that it is an express term of the contract documents that, except as otherwise specifically provided therein, there shall be no damages payable by the Owner on account of any delay in the completion of the Work for any reason whatsoever, and that the sole remedy for any delay shall be an extension of the time for performance.

3. I, the undersigned, have familiarized myself with the existing conditions in the project area affecting the coast of the work and with the Contract Documents, Addenda (if any), Technical Specifications, Drawings and Bid Bond(s), hereby propose to furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services including utility and transportation services, and to perform and complete, within the time stipulated, all work required under the Base Bid contract in all accordance with the above listed documents.

4. I represent that I am authorized to submit this bid on behalf of the Bidder.

Signature: _____

Name of Firm: _____

Title: _____

(Seal, if by a Corporation)

Estimated Qty.	Unit	General Requirement	Unit Price	Total
614.00	LF	Construction Fence		
1,297.00	SF	Construction Entrance, 12" Stone Fill		
1.00	EA	Access Gates		
1.00	LS	Temporary Aqueduct Bridge Allowance		
1.00	EA	Signage Allowance		
1.00	LS	Mobilization Allowance		
		Removals		
614.00	LF	Chainlink Fence		
104.00	EA	Tree Removal		
104.00	EA	Stump Removal		
2.51	ACRE	Clearing and Grubbing Felled Trees, Stumps and Brush		
		Closure Fill & Grading		
5,700.00	CY	* Earthwork - Waste Cut and Fill		
285.00	BCY	Removal Allowance (5% of cut material)		
11,500.00	SY	* Landfill Cap System - 18" compacted soil cap fill and 6" planting soil layers		
15.00	LS	Cap Material Testing		
25.00	DAY	Field Density Testing		
1.00	LS	Site Surveying		
		Site Preparation		
3,460.00	CY	Planting Soil		
11,542.00	SY	Rototill Topsoil to 6" depth		
580.00	LF	Erosion Control (Silt Fence)		
		Planting		
22,106.00	SF	Mechanical Seading - Meadow Seed Mix I (Diverse Seed Mix)		
7,898.00	SF	Mechanical Seeding - Meadow Seed Mix II (Flowering Meadow Wet Soil Tolerant)		
73,952.00	SF	Mechanical Seeding - Meadow Seed Mix III (Low Mow Meadow Mix)		
		Pavement		
576.00	SY	Asphalt Path including 4" full depth asphalt, drainage layer and hauling		
		Drainage/Infiltration		
2.00	LCY	Rip Rap at drainage outlet		

67.00	LCY	Rip Rap Stone Dams and at Drainage Level Speader		
134.00	LF	HDPE Drainage Pipe (15" dia, bedding, excludes excavation and backfill)		

20.00	LF	Pipe Culvert		
1.00	LS	Cut and Fill for Pipes		
150.00	SY	Filter Fabric		
1.00	LS	Erosion Control Allowance		
175.00	SY	Base Course Drainage Layer		
4.00	EA	Drainage Structures - Inlets and outlets with grates		
1.00	EA	Modify Existing Fire Hydrant Allowance		
2.00	EA	Level Spreaders		
4.00	CLF	Utility Accessories including signs, markers, flags and tapes		

Total Bid: _____

Add Alternates

Planting

1,444.00	SY	Mulch, 3" depth		
1,180.00	EA	Shrubs, 3 gallon at 12"-24" height (3' O.C. spacing)		
17.00	EA	Canopy tree, 31/2" caliper		
38.00	EA	Small tree, 3" caliper		
51.00	EA	Guying and Deer Protection for New Trees		

Site Improvements

1.00	LS	Wood Deck Crossing with Kickrail including concrete, attachments, and drainage layer		

Deductions for Add Alternative

11.00	SY	Asphalt Path including drainage layer		
20.00	LF	Pipe Culvert and related work		
2.00	EA	Inlet Structures		
24,509.00	SF	Mechanical Seeding		

***See Measurement and Payment Detail** **Total Bid:_____**

References – Prime Contractor

List below all requested information for at three projects. Projects are to be similar in scope of work and contract amount to this project. This Reference List is to be completed with the bid proposal.

1. Project Name (or Description) _____

   Contract Amount _____ Completion Date _____

   Owner _____

   Contact Name _____ Telephone _____

   Architect/Engineer _____

   Contact Name _____ Telephone _____

2. Project Name (or Description) _____

   Contract Amount _____ Completion Date _____

   Owner _____

   Contact Name _____ Telephone _____

   Architect/Engineer _____

   Contact Name _____ Telephone _____

3. Project Name (or Description) _____

   Contract Amount _____ Completion Date _____

   Owner _____

   Contact Name _____ Telephone _____

   Architect/Engineer _____

   Contact Name _____ Telephone _____

FORM OF AGREEMENT

BETWEEN THE OWNER AND THE CONTRACTOR

AGREEMENT

Made as of _____, 20____

Between the Owner: Francis A. Frobel
Village Manager
7 Maple Avenue
Hastings-on-Hudson, NY 10706

And the Contractor:

For the Following Project: Quarry Park

The Owner and the Contractor agree as set forth below:

Article 1 - THE CONTRACT DOCUMENTS

1.1 The Contract Documents consist of the Instructions to Bidders, Supplementary Instructions to Bidders (if applicable), this Agreement, Conditions of the Contract (General and other Conditions, including, without limitations: Project Labor Agreement and Insurance Provisions), Drawings, Specifications, Addenda issued prior to execution of this Agreement. This forms the Contract and are fully a part of the Contract as if attached to this Agreement or repeated herein.

ARTICLE 2 - THE WORK OF THIS CONTRACT

2.1 The Contractor shall execute the entire Work as described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows: No Exceptions.

ARTICLE 3 - DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 the date of commencement shall be set forth in the Notice to Proceed.

3.2 The Contractor shall achieve Substantial Completion of the entire Work no later than _____ subject to adjustments to this Contract Time is provided in the Contract Documents. Liquidated damages related to failure to complete on time and defined in the Contract Documents shall be: Liquidated Damages are $500.00 per day.

ARTICLE 4 - CONTRACT SUM

4.1 The Owner shall pay the Contractor in the current funds for the Contractor's performance of the Contract Sum of _____ and 00/100 Dollars, subject to additions and deductions as provided in the Contract Documents.

4.2 The Contract Sum is based upon the following alternate(s) which is described in the Contract Documents and are hereby accepted by the Owner. Alternate _____.

4.3 Unite prices, if any, are as follows: None

ARTICLE 5 - PROGRESS PAYMENTS

5.1 Based upon Applications for Payment submitted by the Contractor to the Construction Manager, and upon Project Applications and Certificates for Payment issued by the Construction Manager and the Architect, the Owner shall make progress payments on the account of the Contracts Sum to the Contractor as provided below and elsewhere in the Contract Documents.

5.2 The period covered by each such Application for Payment shall be one calendar month ending on the last day of the month.

5.3 Provided an Application for Payment is submitted to the Engineer not later than the seventh day of the month, the Owner shall make payment due to the contractor not later than fourteen days thereafter. If the Engineer received an Application for Payment after the application date fixed above, the Owner shall make payment not later than twenty-four days after the Engineer received the Application of Payment.

5.4 Each Application for Payment shall be based upon the Schedule of Values submitted by the Contractor in accordance with the Contract Documents. The Schedule of Values shall allocate the entire Contract Sum among various portions of the Work and be prepared in such forma and supported by such data to substantiate its accuracy as the Construction Manager or Architect may require. The schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Application for Payment.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as the end of the period covered by the Application for Payment.

5.6 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

5.6.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the

Schedule of Values, less retainage of five percent (5%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in the General Conditions.

5.6.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5%).

5.6.3 Subtract the aggregate of previous payments made by the Owner; and

5.6.4 Subtract the amounts, if any, for which the Engineer as withheld or nullified.

5.7 The progress payment amount determined in accordance with Paragraph 5.6 shall be further modified under the following instances:

5.7.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to two-point-five percent (2.5%) of the Contract Sum, less such amounts as the Engineer recommends or determines for incomplete Work and unsettled claims; and

5.7.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with the Conditions of the Contract.

5.8 Reduction or limitation of retainage, if any, shall be as follows:

5.8.1 Retainage reduction will be made only if the Engineer judges that the Work is progressing satisfactorily.

ARTICLE 6 - FINAL PAYMENT

6.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when:

6.1.1 The Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct non-conforming Work as provided in the Conditions of the Contract, and to satisfy other requirements, if any, which necessarily survive final payment; and

6.1.2 A final Project Certificate for Payment has been issued by the Engineer.

6.2 Final payment shall be made by the Owner not more than 45 days after the issuance of the final Project Certificate for Payment, or as follows:

6.2.1 If the Owner disagrees with the final Project Certificate for Payment as certified by the Engineer then notification outlining all objections to payment shall be

delivered by the Owner to the Contractor within 10 days of issuance of the final Project Certificate for Payment.

ARTICLE 7 - MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision in the General Conditions of another Contract Document, the reference is to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, as the legal rate prevailing from time to time at the place where the Project is located.

7.3 Other Provisions: NO OTHER SPECIAL PROVISIONS.

ARTICLE 8 - TERMINATION OR SUSPENSION

8.1 The Owner may terminate the Contract of the Contractor as provided in the General Conditions.

8.2 The Work may be suspended by the Owner as provided in the General Conditions.

ARTICLE 9 - ENUMERATION OF THE CONTRACT DOCUMENTS

9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are as follows:

9.1.1 The General Conditions, and Specifications contained in the Project Manual.

9.1.2 The General Conditions are as follows, and are dated same as Project Manual in subparagraph 9.1.1 unless a different date is shown below:

Refer to Project Manual Table of Contents for a list of Drawings, bound separately, that are part of this Agreement.

9.1.3 The Addenda, if any, are as follows: (To be added if issued)

9.1.4 Other documents, if any, forming part of the Contract Documents are as follows: The Contractor will abide by NYS Labor Law § 220 & 230 et seq., in all respects.

ARTICLE 10 - EXECUTION

10.1 This agreement is entered into as of the day and year first written above and is executed in the least three original copies of which one is to be delivered to the Contractor, one to the Engineer for us in the administration of the Contract, and the remainder to the Owner.

Owner	**Contractor**
_____	_____
Signature	Signature
_____	_____
Printed name and title	Printed name and title

N.Y.S. PREVAILING WAGE RATES AND SUPPLEMENTS

Compliance with the New York State Constitution (Article 1, Section 17) and the New York State Law (Section 220)

Is your firm in full compliance with the New York State Labor Law?

(Please check one)

_____ Yes _____ No

Are the wage supplements paid into a Federally approved program?

_____ Yes _____ No

If Yes, please indicate which program:

If No, please indicate how the supplements are being paid:

Yes, I have read and understand the terms of the Contract and the laws of this Agreement.

Date: _____

Signature: _____

Date: _____

Notary: _____

Warranty

1.1 Definition: Warranties constitute a promise by the Contractor to correct, repair or replace as appropriate all non-conforming, defective or deficient Work upon reasonable notice during the warranty period.

1.2 The Contractor warrants to the Owner and the Engineer the materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modification not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear, and normal usage. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of material and equipment furnished and installed.

1. Nothing in this paragraph, "Warranty," shall be construed to bar the Owner from resorting to actions for breach of this Contract, or from invoking any other remedies under the Contract. The warranty does not limit the Owner's rights to seek any other remedy from the Contractor with respect to work not in compliance with the requirements of the Contract Documents.

2. Except as otherwise provided, the Contractor and/or its successor and assigns will be responsible for and shall make correct any defects due to faults in labor and materials which may occur within one (1) year after Substantial Completion payment has been made, except where sections of the specifications call for a longer period of time. The cost of correcting such defective work, including the cost of all damages of any kind sustained by the Owner, shall be borne by the Contractor as its sole cost and expense. All corrections to defective work shall be made at the convenience of the Owner.

1.3 The Contractor will be responsible for correction of defects in construction for a period of one (1) year after Substantial Completion, except where the specification warranty period calls for a longer period, in which case that warranty period shall control. The cost of correction of such defective work shall be the sole obligation of the Contractor. The Contractor shall indemnify and hold the Owner harmless for any damages resulting from defective work. All corrections of the work shall be at the convenience of the Owner.

1.4 The general warranties contained in paragraph 3.6 shall be in addition to warranties required by the Contract Documents or by law.

1.5 The warranties contained in the Contract Documents shall survive the expiration or termination of this Contract.

Insurance and Bonds

2.1 Contractor's Insurance

2.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in the State of New York, rated AA or better, such insurances as will protect the contractor from claims set forth below, which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor, or by a Subcontractor, or by anyone for whose acts may be liable.

1. Claims under worker's compensation, disability benefit, and other similar benefit acts which are applicable to the Work to be performed;

2. Claims for damages because of bodily injury, occupational sickness and disease, or death of the Contractor's employees;

3. Claims for damages because of bodily injury, sickness, or disease of any person other than the Contractor's employees;

4. claims for damages insured by usual personal injury liability coverage that sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting there from;

6. Claims for damages because of bodily injury, death of a person, or property damage arising out of ownership, maintenance, or use of a motor vehicle, and;

7. Claims involving contractual liability insurance applicable to the Contractor's operations arising out of obligations

2.1.2 The insurance required in Article 2.1.1 shall be written for not less than the limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any of the coverage required to be maintained after final payment.

2.1.3 Contractor shall be required to submit original policies of insurance for approval to the Owner and must provide certificates of insurance, policy number(s), dates of expiration, and any additional insured that may be required by endorsement. Each certificate furnished by the Contractor shall state that no policy may be cancelled or permitted to lapse and that no changes may be made of any kind, in any policy

of insurance, unless 30 days' notice of cancellation, non-renewal, or change is furnished to the Owner, and to be evidenced by return receipt or registered letter.

1. The Contractor shall not commence Work until all the insurance required by the Contract has been approved by the Owner.

2. The Contractor shall provide an endorsement from the Contractor's insurance carrier that specifically identifies the Owner, Engineer, Engineer's consultants, and the agents and employees of any of them, as additional insured on all policies other than Worker's Compensation Insurance. Such endorsements shall be submitted to the Owner for approval with the applicable Certificate of Insurance. Mere recitation of the additional insured interest on the Certificate is not acceptable.

3. If any of the insurance coverages herein are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment.

4. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

2.1.4 Nothing herein shall be deemed to limit the risks assumed by the Contractor to those for which insurance is required, or to limit impair risks assumed by the Contractor under this Agreement in any manner whatsoever.

2.1.5 Before an exposure to loss may occur, the Contractor shall file with the Owner two (2) certified copies of the policy or policies providing the required insurance coverage, each containing generally applicable conditions, definitions, exclusions, and endorsements specifically related to the Work.

Performance Bond and Payment Bond

3.3 Performance Bond and Payment Bond

3.3.1 The Contractor shall furnish Payment and Performance Bonds AIA A 311 form. The Bond premium shall be included in the Contract Sum. The Contractor is responsible for obtaining the Bonds. The Penal Sum of the Bond shall be equal to the Contract Price.

3.3.2 The Contractor shall deliver the Bonds to the Owner not later than three (3) days following the date of the Agreement. The Contractor may not commence Work at the project site until the Bonds have been received by the Owner.

3.3.3 The Contractor shall require the attorney-in-fact who executes the Bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

3.3.4 Upon request of any person or entity appearing to be a potential beneficiary of the bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

QUARRY PARK

100% CONSTRUCTION DOCUMENTS ISSUED FOR BID

TECHNICAL SPECIFICATIONS

November 6, 2018

Hastings-on-Hudson Board of Trustees

Village Manager:

Francis A. Frobel

Landscape Architect:

Mathews Nielsen Landscape Architects

120 Broadway, New York, NY 10271

Landfill Engineer:

Arcadis

44 S Broadway, White Plains, NY 10601

Civil Engineer:

Sherwood Design Engineers

483 10th Avenue, Suite 325, New York, NY 10018

SPECIFICATIONS
TABLE OF CONTENTS

END OF TABLE OF CONTENTS

NOVEMBER

SECTION 011000

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and Drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: Quarry Park

1. Project Location: Village of Hastings-on-Hudson, NY

B. Owner: Village of Hastings-on-Hudson, NY

C. Owner's Representative: Francis Frobel, Village Manager 7 Maple Avenue, Hastings-on-Hudson, NY 10706

D. Architect: Mathews Nielsen Landscape Architects, P.C., 120- Broadway, NY, NY 10271

E. Construction Manager: TBD

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

<u>General Construction</u>

1. Provide temporary facilities and control items to allow for construction operations and to restrict access to project site by non-authorized personnel.
2. Coordination with the Village of Hastings-on-Hudson and the Office of State Parks (OPHRP) related to the protection of and continued use of the Old Croton Aqueduct (OCA) which generally parallels the west boundary of the project site.

3. Coordination with the Village of Hastings-on-Hudson throughout the course of the project for all issues related to design, permitting, approvals and construction.
4. Provide and maintain temporary erosion, and sediment control measures.
5. General site demolition, salvage of materials if required, removals, and disposals.
6. Site excavation, removals, dewatering (if required), re-landfilling and compaction of previously placed solid waste in accordance with drawings and specifications to achieve **Subgrade**.
7. New soils work including grading and compaction of materials to establish **Final Cap.**
8. Installation of stormwater drainage system with risers that extend to final grade elevation.
9. New soils work including grading and compaction of materials to establish **Final Grade**.
10. Final grading of vegetated swales and installation of stormwater drainage structures including rims/grates to be set to match grades.
11. Provide an as-built topographic survey of the completed landfill final cap system and associated drainage elements. Need topo survey of subgrade, top of compacted soil cap fill layer, and final grade (3 total) for certification purposes. Also need surveying for location of field testing points.
12. Site paving installation including all subbase, reinforcement, jointing, and finishes.
13. Cast-in-place concrete including all formwork, reinforcing, placement of sleeves and conduit, and coordination with installation of site improvements to be cast into concrete.
14. Sourcing, acquisition and required maintenance of all planting including trees, shrubs, grasses, turf, and accessories including tree anchoring and temporary landscape protection fencing.
15. Maintenance of existing trees and plants to remain.
16. Installation and connections for all utilities including stormwater and water (fire hydrant).
17. QA Materials Testing
18. Field Quality control testing

B. Type of Contract:

1. Project will be contracted under one Prime Contract which may or may not include the three alternates as described within Specification Section 012300.

1.4 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to work areas as indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways, and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

NOVEMBER

1.5 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:30 a.m. to 8 p.m., Monday through Saturday. Sunday 10 am to 5pm. To extend beyond hours permitted requires permission from the owner.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than [two] 2 days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

1.6 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 20 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. The items listed below beginning with Article 1.4, refer to corresponding pay items listed in the Bid Form. They constitute all of the work for the completion of those items. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, plant, services, CONTRACTOR'S or ENGINEER'S field offices, layout surveys, job signs, sanitary requirements, testing, safety devices, approval and record drawings, water supplies, power, maintaining traffic, removal of waste, watchmen, bonds, insurance, and all other requirements. Compensation for all such services, things and materials shall be included in the prices stipulated for the lump sum, unit price and extra work unit price pay items listed herein.

B. Each lump sum, unit bid price and extra work unit bid price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR'S overhead and profit for each separately identified item.

1.2 ENGINEER'S ESTIMATE OF QUANTITIES

A. ENGINEER'S estimated quantities for unit price and extra work unit price pay items, as listed in the Bid Form, are approximate only and are included solely for the purpose of comparison of Bids. OWNER does not expressly or by implication agree that the nature of the materials encountered below the surface of the ground or the actual quantities of material encountered or required will correspond therewith and reserves the right to increase or decrease any quantity or to eliminate any quantity as OWNER may deem necessary. CONTRACTOR will not be entitled to any adjustment in a unit bid price as a result of any change in an estimated quantity and agrees to accept the aforesaid unit bid prices as complete and total compensation for any additions caused by changes or alterations in the Work ordered by OWNER.

B. The base bid items outlined will be performed by the OWNER and will be used as the primary assessment of the Bids. Additional alternate bid items will be added to the base bid up to the maximum amount of funds available for construction.

The final bid assessments will include the base bid items and additional alternate bid items totaling less than or equal to the maximum amount of funds.

1.3 CONTRACT - GENERAL

Item Earthwork - Waste Cut and Fill:

1. Measurement:

    a. Earthwork - Waste Cut and Fill, including dewatering, will be measured for payment on the basis of lines and grades necessary to meet the maximum and minimum grades specified, shown or ordered by ENGINEER.

2. Payment:

    a. The unit price payment (per cubic yard) for Earthwork - Waste Cut and Fill shall be full compensation for all labor, materials, tools, equipment, testing, and incidentals for excavating, relocating compacting and grading existing municipal solid waste to establish cap system subgrades as shown and specified and not specifically included under other items or contracts. Included in this bid item are all health and safety plans and practices; environmental monitoring plans and practices; dewatering; collection, testing and disposal of collected liquids; and odor suppressants.

Item Landfill Cap System:

1. Measurement:

    a. The quantity of Landfill Cap to be paid for will be the computed number of square yards within the limits shown, specified or ordered by the ENGINEER.
    b. The CONTRACTOR shall provide to ENGINEER certified surveys of areas with Landfill Cap System prior to and after Landfill Cap System installation operations. The determination of the actual quantities of materials will be made by ENGINEER. CONTRACTOR may, at his own expense, verify quantities.

2. Payment:

   a. The unit price payment (per square yard) for Landfill Cap System shall be full compensation for all labor, materials, tools, equipment, and incidentals for constructing the Landfill Cap System as shown and specified. Included in this bid item are installation of the 18-inch (min.) compacted soil cap fill layer and the 6-inch (min.) thick planting soil layer, including provision of all soil materials; earthwork required to unload, place, compact and grade soil materials; and all health and safety practices. Cap material testing, field density testing, and surveying shall be paid for under other items.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

The location of Alternate 1 is indicated for reference on Site Layout and Materials Plans L-101 and detailed on Site Details L-402. Complete work for these alternates is located on multiple sheets in the drawing set.

The locations of Alternates 2 and 3 are indicated for reference on Planting Plan L-103 and detailed on Planting Details L-403. Complete work for these alternates is located on multiple sheets in the drawing set.

A. Alternate No. 1: Install wood deck with kick rail on concrete footings.
   1. Alternate Description: As indicated on drawings and as specified in Section 033000 and 061533.

B. Alternate No. 2: Install shrub planting including mulch.
   1. Alternate Description: As indicated on drawings and as specified in Section 329300.

C. Alternate No. 3: Install tree planting.
   1. Alternate Description: As indicated on drawings and as specified in Section 329300.

END OF SECTION

SECTION 01 26 00

SPECIAL CONDITIONS

1. GENERAL

1.1. All work included in these specifications shall be governed by the Contract Documents.

1.2. The Division and Section format is based on the AIA-CSI Uniform System for Construction Specifications.

1.3. The Contractor shall be required to comply with applicable regulations, rules and requirements of the New York State Building Code and all other city and state and federal codes and regulations having jurisdiction under this project.

1.4. The Contractor shall be required to comply with the following sections of the Labor Law:

A. Section 220, subdivision 2, re: 8-hour day, 5-day week;
B. Section 220, subdivision 3 and 220-d, re: prevailing wage rates and supplements;
C. Section 220-e, re: anti-discrimination including all subparts; and
D. Section 222-e, re: elimination of dust hazards.

2. RESPONSIBILITY & INTENT

2.1. The Contractor shall provide all labor, materials, equipment, appliances and services necessary to execute and complete all work as required by the Contract Documents and the applicable Building Codes. Contractors to conduct pre-construction survey and provide photo/videos of any existing damages in areas where new construction is to take place prior to the start of work.

2.2. It is the intent that the work included under each Section of the Specifications shall cover the manufacture, fabrication, delivery, installation and/or erection, with all incidentals thereto, unless otherwise noted or specified. "Provide", means to "furnish and install".

2.3. The Contractor is cautioned that the "Work Included" is general and in no way limits or qualifies the Contract requirements.

2.4. It is the intent of the Contract Documents to provide for complete installation of all portions of the work. Except where work, or a portion thereof, is specifically noted as by Owner, it is understood that all items, materials and equipment are to be furnished and installed, complete, ready for operation or use. Where additional, or supplemental, details or instructions are required to complete an item or items of work, the Architect shall furnish the necessary information to the Contractor. No work shall be performed, installed or fabricated which depends upon the furnishing of such information, without the written approval of the Architect of the specific condition. The furnishing of such data shall not be the grounds for a claim for extra work by the Contractor. The Contractor will be deemed to have based his bid on a complete installation where additional details or instructions are required to complete the work, the Contractor is deemed to have made an allowance in his bid for the completing of such work, consistent with adjoining or similar details and/or the best accepted practices of the trade, whichever is more expensive.

2.5. Where the scope of the work of a Section in the Specifications or Drawings calls for service connections, supports, or installation, of any item or group of items being furnished by other sections the omission of any given item from the Drawings of his particular Contract shall not relieve the Contractor of the responsibility for installing, connecting or supporting such item at no increase in Contract cost. The Contractor is deemed to have examined the plans and specifications of all other Sections to ascertain the full scope of his work including but not limited to connections, supports and installation of equipment furnished by other trades or Sections.

2.6. Whenever any additional materials and/or workmanship not shown or specified are required to complete the work of the Contract Document in accordance with the obvious intent thereof, the Contractor shall provide these materials and workmanship at no additional cost to the Owner.

2.7. Salvageable Materials: All existing materials, equipment, misc. etc. scheduled for demolition are the property of the Owner. If requested, contractors will remove and store any such items to a location designated by the Owner.

2.8. Each contractor shall be responsible for dust protection in their respective areas of work. However, all contractors will be required to maintain the partition. Therefore, if one contractor(s) removes or damages the partition that contractor(s) will be responsible to replace the partition in kind."

3. PRODUCT ACCEPTANCE STANDARDS

3.1. Where the words "or acceptable equal" or other synonymous terms are used, it is expressly understood that they shall mean that the acceptance of any such submission is vested in the Architect, whose decision shall be final and binding upon all concerned. All submissions are subject to such review.

3.2. The intent of this article is to encourage and permit competition on qualified products by reputable and qualified suppliers and manufacturers, whose products, reputation and performance warrant approval for the conditions, intent of design and performance considerations.

3.3. Whenever a product is specified in accordance with Federal ASTM Designation, American National Standards Institute or other association standard, the Contractor shall present an affidavit from the manufacturer certifying that the product complies with the particular standard specification. Where necessary and requested substantiate compliance.

3.4. Whenever any product is specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturer, trade names or similar references, such reference is intended to establish the measure of quality which the Architect has determined as requisite and necessary for the project. The right is reserved to approve or disapprove proposed deviations of design, function, construction or similar differences which will affect the design intent.
The Architect shall have the right to reject any substitutions of submission of materials not manufactured in the U.S.A. or which have not been used successfully in the Architect's opinion for five years in this area. This also applies to acceptance of non-specified products.

3.5. Acceptance of Non-Specified Products:

A. For acceptance of products other than those specified, the Contractor shall submit a request, in writing, to the Architect and Owner. The request shall clearly define and describe the product for which approval is requested. Requests shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data, list of reference or other information necessary to completely describe the item.

B. The Contractor shall submit to the Owner for review two (2) copies of a complete list of suppliers, materials and equipment he proposes for use in connection with this project.

C. Substitution of products will be considered only under the following conditions:

1. The Contractor shall place orders for specified material and equipment promptly. No excuse or proposed substitution will be considered for materials and equipment due to unavailability unless proof is submitted that firm orders were placed ten (10) days after approval by the Architect of the item listed in the specifications.

2. The reason for the unavailability is beyond the control of the Contractor. Unavailability will be construed as being due to strikes, lockouts, bankruptcy, discontinuance of the manufacture of a product, or Acts of God.

3. Requests for such substitution shall be made in writing to the Architect within ten (10) days of date that the Contractor ascertains he cannot obtain the material or equipment specified.

4. Request shall be accompanied by a complete description of material or equipment which the Contractor wishes to use as a substitute as described above.

a) After any material or piece of equipment has been accepted, no change in brand or make will be permitted unless satisfactory written evidence is presented and approved by the Architect that the manufacturer cannot make scheduled delivery of approved material, or that material delivered has been rejected and the substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that the approval of such other material is in the best interest of the Owner.

b) For any item or items which the Owner may have pre-purchased before the start of the work because of excessive lead time required for such items, it will be the Contractor's responsibility to receive, store and install such items purchased by the Owner.

4. CONDITIONS AT THE SITE

4.1. The contractor has visited the site and agrees that he is cognizant and fully aware of the systems involved with his own work and the work of other trades and realizes what logistics are required to bring manpower and materials to the work areas and to remove from the work areas any demolition, debris, garbage and equipment that is

his responsibility.

4.2. The contractor must be aware that this work will be performed in a building occupied by the Owner and other trade contractors and must abide by all of the facilities rules and regulations. Noise and dust will be kept to a minimum level as defined by the Construction Manager. To that end, there will be some phasing and the contractor agrees to cooperate with the normal day-to-day requirements. A four (4) day notice of noise disturbance is to be submitted to the Construction Manager with the specific time of the noise. The Owner will inform the community.

4.3. The use of radios, tape players and the like will be prohibited within the job site.

4.4. The Contractor's facilities, offices, storage rooms, tool sheds, equipment, temporary construction, scaffolding, surplus materials, waste, other materials and other items stored on or at or located at the Site will be situated at such parts thereof as shall be designated by the Construction Manager and shall be relocated upon instruction of the Construction Manager. All such facilities, offices, storage rooms and tool sheds shall be adequate for the purpose intended and built and maintained in accordance with all Legal Requirements and insurance company recommendations. Each of the aforesaid items shall be removed from the Site when no longer required for the Work or as required by the Construction Manager.

4.5. During the execution of the Work and at all times while it is present on the Site working in any capacity whatsoever, the Contractor shall protect all unfinished Work and materials on the Site and all tools, plans, equipment and other apparatus used or to be used by the Contractor in connection with the Work, from rain, water, frost and other elements and from all other kinds of damage including, without limitation, vandalism, theft and waste. All materials stored on the Site shall be stored in a suitable manner. The Contractor shall be fully responsible for the materials so stored and neither the Owner nor the Construction Manager shall be under any responsibility therefore. The Contractor shall secure and protect the Work and all tools, equipment and material from and against damage, loss or injury resulting from the Contractor's activities. Until such time as the obligations of the Contractor under the Contract for the performance of the Work shall have been fully satisfied, the Contractor shall be fully responsible for any damage, loss or injury done to the Work, or any materials, tools, equipment or appliances incorporated into the Work or delivered to the premises for incorporation into the Work; and this shall be true irrespective of whether any particular portion of the Work to which such damage occurred has been completed so long as all of the Work shall not have been completed and accepted in accordance with the terms hereof and whether or not payment was made for such portion of the Work. Such risk of loss shall extend to damage or injury occasioned by Act of god, fire or other event or catastrophe whether natural or man-made. To the fullest extent permitted by law, except for the Construction Manager or Owner's intentional acts, neither the Construction Manager nor the Owner shall have any responsibility for any such injury, damage or loss.

4.6. The Contractor shall use only such workmen and other laborers on the Project as shall be compatible with all other laborers and workmen employed in connection with the Project; and no such laborer or workmen or retained by or on behalf of the Contractor shall be the cause of any labor disturbance, strike, picketing, jurisdictional union dispute or work slowdown. If any such dispute, strike, picketing, or slowdown shall occur due to the persons employed by or on behalf of the Contractor, then the Contractor shall immediately cease the continuation of such offending practice. The Contractor shall indemnify and hold harmless the Construction Manager and Owner

from any and all damages, injuries, expenses (including legal fees) and all other liabilities (including consequential damages resulting from any such labor problem). If any such dispute, strike, picketing or slowdown shall occur due to the persons employed by or on behalf of any Subcontractor, than the Contractor shall compel its Subcontractor to cease the continuation of such offending practice. Any such of the above do not constitute reason for a delay claim.

4.7. The Contractor shall be responsible for instituting a safety program to be maintained and enforced through the period during which the Work is being prosecuted. A copy of safety program and weekly safety meeting minutes shall be provided to construction Manager.

4.8. The Contractor shall man the Project with at least one full-time on site supervisor responsible for loss and accident prevention and administering and supervising the safety. Each such supervisor shall have a working knowledge of OSHA requirements with respect to the operations for which he is responsible. Contractor to provide resume of site supervisor for construction approval.

4.9. The Construction Manager may direct the Contractor to leave out portions of the Work. If the Owner, Architect, Engineer or Construction Manager shall fail to respond to any inquiry or provide any information to the Contractor as required hereunder, and if as a result thereof the Contractor is delayed in the performance of any other work, the sole remedy of the contractor shall be to have a reasonable extension of the time in which to perform such Work after the date that such information is provided or obligation performed.

4.10. The consumption of alcoholic beverages or use of any controlled substances shall not be permitted on the property.

4.11. If required by the Owner, Contractor shall issue to all their field labor force, ID Badges which shall be worn while working on the property, for Owner's approval.

4.12. No smoking is permitted in the building.

4.13. Parking permitted only in areas designated by the Construction Manager."

4.14. All contractors are to refrain from using indecent language. Construction employees doing so, will be dismissed from the site.

5. RULES TO BE COMPLIED WITH

5.1. The Contractor and each Subcontractor hereby accepts and assumes full and exclusive liability for the payments of contributions, taxes, or premiums which may be payable or required under an Unemployment Insurance Act or Federal Social Security Act as to employees engaged in the performance of work included in this Contract. He further agrees to relieve the Owner from the liability for contributions measured by wages to the employees of the Contractor of his Subcontractors engaged in performance of the work included in this Contract.

5.2. The Contractor shall further comply with the rules and regulations which may be issued by the U.S. Commissioner of Internal Revenue with the approval of the Secretary of the Treasury for the enforcement of the Federal Social Security Act as to employees engaged in the performance of the work included in this Contract.

5.3. The Contractor shall procure and pay for all other permits, licenses, certificates and approvals necessary for the execution of this Contract.

5.4. The work shall be performed in accordance with the rules and regulations of OSHA, and all city, state and federal authorities, codes and restrictions having jurisdiction.

5.5. All mechanical and electrical equipment supplied shall have a U.L. label.

5.6. Use of existing building facilities during construction is prohibited including toilet rooms, telephones and water fountains. Contractor(s) will be backcharged $250.00 per occurrence if any individual related to the project is observed disregarding these rules.

5.7. Contractor shall provide a four day notice for utility disruption.

5.8. No lead or asbestos containing products to be used anywhere on this project.

5.9. Demolition to occur only per the schedule approved by the Owner/Owner'sRepresentative. Opening protection to be installed prior to commencing. Contractor must obtain approval from Construction Manager prior to commencement of demolition work. Failure to do so will result in a $500.00 back-charge per occurrence.

5.10. No storage of materials will be permitted in the existing buildings at any time. Contractors must provide exterior storage containers as needed. Location shall be approved by Construction Manager.

6. TEMPORARY PROVISIONS

6.1. Where required, the Contractor shall install and maintain the temporary fencing including gates, posts, mesh and chains. The Owner will provide the locks and keys. Personnel gates to have lockable welded handle with spring loaded closers.

6.2. The Contractor shall be responsible for installing and maintaining all site safety signage as needed. Additionally, if required, install signage on the entrance gate indicating the following: "Construction Entrance Only", "No Smoking Permitted - $1,000 Fine", "Hard Hat Area". Prepare additional temporary signs within the site to provide direction assistance and information to help construction personnel and visitors locate the following:

1. Access roads and parking and deliveries
2. Offices and first-aid stations.
3. Sanitary Facilities
4. Telephones
5. Emergency exits
6. Fire protection facilities
7. Barricades and obstructions
8. Hazardous elements of construction work.
9. Access to roofs.

6.3. Temporary partitions and doors shall be provided by the Contractor.

6.4. Temporary port-o-sans shall be provided and maintained by the Contractor to accommodate all of the project contractor's and subcontractor's employees. Follow OSHA standards.

6.5. All Contractors shall be responsible for minimizing dust and dirt.

6.6. All site elements must be restored to "As-Found" condition or better at the conclusion of the project.

7. TEMPORARY ELECTRIC LIGHT AND POWER

7.1. Temporary Electric Light and Power must be arranged by the Contractor, at no additional cost to the Owner. Power may be obtained from the building system.

8. TEMPORARY WATER

8.1. The Contractor must make all provisions for temporary water which can be accessed from the building. The Contractor shall avoid the waste of water, and shall be responsible for any damages caused by his uses of water during construction.

9. SIGNS

9.1. The Contractor shall maintain the premises free from advertising placards and inscriptions and other announcements, lettering or insignia of all kinds and shall remove forthwith, any signs or posters which may be placed, by others, on any structure or parts of the property, released by the Owner to the Contractor for construction purposes, or on any fence surrounding such property.

9.2. The installation of any item, element or assembly which bears on any exposed surface any name, trademark, or other insignia which is intended to identify the manufacturer, the vendor, or other sources from which such object has been obtained is prohibited. Also forbidden is the installation of any articles which bear visible evidence that an insignia, name or other device, has been removed. Name plates, giving performance requirements and capacity may be attached to operating equipment when located in mechanical and electrical spaces.

10. COLOR SELECTION

10.1. Color schedules will be issued by the Architect during the progress of the work and the Contractor, his Subcontractors and material suppliers shall cooperate in furnishing required color samples to aid on the final selection. Where special colors are selected, the Contractor shall furnish accurate reproductions of these colors, in duplicate, and on actual material to be furnished to the project, for final approval.

11. STORAGE AND ACCESS

11.1. The Contractor shall not use any space in the building for storage. Each Contractor shall make provisions to use storage trailers or other means for storing and securing materials to be incorporated in the Work. The Owner will assume no responsibility for the Contractor's tools, equipment or materials left in or out of

the building.

11.2. All existing materials, equipment, miscellaneous items, etc. scheduled to be saved or salvaged are the property of the Owner. The contractor will remove and store any such items to a location designated by the Owner. All items not requested to be salvaged by the Owner shall be discarded by the Contractor.

12. SALES TAX EXEMPTION

12.1. The Owner is exempt from payment of Federal, State, Local Taxes and sales and compensating use taxes of the State of New York and of cities and counties on all materials and supplies incorporated into the completed Project. These taxes are not to be included in any of the bids or charges. This exemption does not apply to tools, machinery, equipment or other property leased by or to the Contractor or a Subcontractor, or to supplies and materials which, even though they are consumed, are not incorporated into the completed Project, and the Contractor and Subcontractors shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on such leased tools, machinery, equipment or other property and upon all such unincorporated supplies and materials.

12.2. The Contractor and Subcontractors shall obtain any and all necessary certificates or other documentation from the appropriate governmental agency or agencies, and use such certificates or other documentation as required by law, rule or regulation.

13. MATERIAL AND EQUIPMENT LIST

13.1. Within ten (10) days after the date of award of each Sub-Contract, each Sub-Contractor shall submit for approval a complete list of suppliers, materials and equipment proposed for use in connection with the project to the Architect. Include information concerning anticipated lead times for materials and equipment, based upon suppliers' experience with specified or approved materials and equipment (See Article below).

13.2. After any material or piece of equipment has been approved, no change in brand or make will be permitted unless satisfactory written evidence is presented and approved by the Architect that the manufacturer cannot make a scheduled delivery of approved material, or that material delivered has been rejected and the substitution of a suitable material is an urgent necessity, or that other conditions have become apparent which indicate that the approval of such other material is in the best interest of the Owner.

14. SCHEDULING OF THE WORK

14.1. Execute the work in conjunction with the contract documents. In case of discrepancy between the plans and the actual conditions at the site report the conditions to the Architect.

14.2. Take every precaution to protect the existing work indicated to remain. If work that is to remain becomes damaged during the course of operations, it will be repaired and/or replaced to the Owner's satisfaction, at no additional cost.

14.3. If there are any deviations from the agreed-upon schedule, such a deviation shall be reported to all parties a minimum of 72 hours before a deviation takes effect, with mutual agreement.

14.4. Make necessary arrangements to have utilities and services temporarily disconnected while performing the work or as required, maintained for temporary use, and formulate a schedule of disruption with all parties, indicating when and how long such disruptions will continue, and the provisions to be provided for temporary utilities and/or services.

14.5. Schedule for completion shall be per the Bidding Guide. Time is of the essence.

14.6. Contractor shall provide a minimum of 48 hours advance written notice to the Construction Manager for deliveries of materials, site visits by inspectors, testing labs, manufacturers representatives or any other occasion that impacts the use of the site.

14.7. Contractors are required to place orders for long-lead-time items as soon after the written notice to proceed with the work as possible. No deviation in the time for substantial completion will be granted for reasons related to late delivery of material and equipment.

15. SHOP DRAWINGS, PRODUCT DATA, EQUIPMENT/DELIVERY SCHEDULES, SAMPLES AND COORDINATION DRAWINGS (collectively "Submissions")

15.1. Within 10 calendar days from the date of the Contract, the Contractor shall provide to the Architect and Construction Manager and Construction Manager a schedule of all Submissions. Submissions shall include (as relevant) all shop drawings, coordination drawings, fabrication drawings and erection drawings, schedules, reports, diagrams, layouts, setting plans, samples and other data required by Plans and Specifications and/or requested by the Architect and Construction Manager and Construction Manager pertaining to systems, methods of construction, equipment, materials, performance and test reports and data, wiring diagrams and controls, cuts, mock-ups, brochures, catalogs, and other data as may be necessary to describe the Work in sufficient detail, design and dimensions or as may otherwise be deemed necessary by the Architect and Construction Manager and Construction Manager. Each of the Submissions shall be delivered in such number as the Architect and Construction Manager and Construction Manager or Contract Documents may require for submission to the Architect for approval.

15.2. Architect's review of Submissions is for scope of Work. Acceptance review and approval of Submissions by Architect does not constitute approval and shall not relieve the Contractor from their:

A. obligation to perform the Work in accordance with the Contract Documents or
B. responsibility for the proper matching and fitting of its work with all contiguous or adjacent work and existing conditions, unless the Contractor has informed the Architect in writing of any deviations between Plans and Specifications and the Submissions to be submitted under this Article 3 and Contractor has been relieved of responsibility in writing by the Architect.

15.3. The Contractor shall make such corrections in Submissions as required by Architect or the Construction Manager and Contractor shall deliver corrected Submissions to the Architect as required until the Submissions are approved. If the Architect rejects any Submission due to non-conformance with the Contract Documents such rejection shall not form the basis for any claim by the Contractor for a delay or other damages.

15.4. All submissions shall be submitted and resubmitted as required in a timely fashion so as to cause no delay in the Work.

15.5. The Contractor shall verify at the Project site all conditions, dimensions and elevations indicated on the Plans and the Contractor shall advise Architect of any deviations that affect its Work. Approval of Submissions by Architect is not verification by Architect of field dimensions. The Contractor's obligations hereunder shall include taking field measurements for all Work, and approval of Submissions by the Architect or the Construction Manager shall not relieve the Contractor from correcting Work reflected in error on the Contractor's Submissions, not conforming to the field requirements or existing conditions or not complying with the terms of this Contract.

15.6. Submissions shall be identified with the name of the Project, dated and numbered sequentially with a consistent numbering system to be used for all revisions. Submissions shall be covered with a transmittal letter identifying the Project and the Specification number of each item, stating qualification, deviations or departures from the Contract Documents. All such Submissions shall be to proper scale and shall be prepared in accordance with industry standards. Electronic copies of all drawings shall be submitted to the Architect and Construction Manager for review and approval.

15.7. Within 10 calendar days of the signing of this Trade Contract, Contractor will submit to Architect an initial schedule, in a form satisfactory to the Construction Manager, showing equipment and material including quantities and delivery dates, aligning with project schedule requirements, for all manufactured and fabricated goods, materials, products, equipment, fixtures and other items required for the Work. Such schedule shall be updated as required by Architect.

15.8. If it is anticipated that finished products will have a range of color, graining, texture or other characteristics, the Contractor shall construct a mock-up and provide a sufficient number of samples of the specified products exhibiting the full range of all such characteristics. Products delivered or erected without such a submission and not approved by the Architect shall be subject to rejection. Except for range samples, or otherwise provided, all samples shall be submitted in such numbers as required by the Architect. All samples shall be marked, tagged, or otherwise properly identified with the name of the Contractor, the Project, the purpose for which they are being submitted and the date of submission.

15.9. No portion of the Work shall be commenced until the applicable Submission has been approved by the Architect.

15.10. During the progress of Work the Contractor shall update and revise shop drawings to reflect any revisions and changes to the Work. Upon final completion of the Work, the Contractor shall provide the Architect with such number of final as-built sets of documents as required by the Bidding Guide relating its Work to the

final as-built condition of the portion of the Project worked by the Contractor. Such as-builts shall be submitted in electronic format form or as required by Construction Manager.

16. WELDING AND CUTTING

16.1. Appropriate fire extinguishing equipment shall be provided where welding or cutting is to be performed. Sprinklers subject to fusing from heat due to welding or cutting shall be temporarily shielded, with valves to remain open. Contractors will be back charged for all fines imposed for false fire alarms.

16.2. Welding or cutting shall not be performed in or near rooms or locations where flammable gases, liquids or vapors, lint, dust or loose combustible stocks are present unless suitably protected when sparks or hot metal from the welding or cutting operations may cause ignition or explosion of such materials.

16.3. Combustible construction or material shall be wetted down or protected by noncombustible shields or covers from possible sparks, hot metal or oxide.

17. TEMPORARY USE OF EQUIPMENT

17.1. No equipment intended for permanent installation shall be operated for temporary purposes unless directed herein.

18. DEFECTIVE, DAMAGED AND UNSATISFACTORY WORK

18.1. Work which has become defective, damaged, unsatisfactorily installed, permanently stained, marred, cracked and materials which do not conform to grade of quality required, will be rejected, removed immediately, reset as required with material and methods of like kind and quality to produce satisfactory, complete work to full satisfaction of the Architect at no additional costs or extension of contract time.

19. CLEANING AND RESTORATION

19.1. Care shall be taken by all workmen not to mark, soil or otherwise deface finished surfaces. In the event that any finished surface becomes defaced in any way by mechanics or workmen, the Contractor responsible shall clean and restore such surfaces to their original condition or replace to the Owner's and Architect's satisfaction.

19.2. Areas of the building in which painting and finishing work is to be performed shall be cleaned throughout by the Contractor just prior to the start of this work, and these areas shall be maintained in satisfactory condition for painting and finishing as directed by the Architect. This cleaning shall include the removal of trash and rubbish from the area; broom cleaning of floors; the removal of plaster, mortar, dust and other extraneous materials from finish surfaces.

19.3. Upon completion of his work, and also when directed, the Contractor shall remove from the building and premises all temporary work.

19.4. Contractor and all Subcontractors shall cooperate in every possible way to expedite the use and occupancy of the building, and the completion of unfinished

items.

19.5. The Contractor shall clean each surface or unit associated with his/her trade to the condition expected in normal commercial building cleaning and shall comply with manufacturer cleaning instructions for all manufactured work. The following cleaning operations shall be completed by the associated trade performing the work before requesting an inspection for a Certificate of Substantial Completion:

A. Clean transparent materials including glass in doors and windows. Replace any damaged or broken glass resulting from the construction work.

B. Clean all exposed finishes to a dust free condition, free of stains, films and similar foreign substances.

C. Surfaces of mechanical and electrical equipment shall be cleaned to remove any dust and debris generated from the construction work.

D. Remove excess mortar, sealants, and adhesives from all new or existing surfaces.

E. Remove all excess, spilled, spattered, oversprayed, or dripped paint, or other finishes from new or existing surfaces which are not meant to be painted, stained or finished.

19.6. Contractor shall remove temporary protection and facilities installed for protection of work during construction unless otherwise directed by the Owner, Architect or Construction Manager.

19.7. All Contractors shall comply with authorities and/or agencies having jurisdiction and shall adhere to any and all safety standards for cleaning. Contractors shall not:

A. Burn or bury waste materials.

B. Discharge volatile, harmful or dangerous materials into drainage systems or water supplies.

C. Dispose of waste materials in an unlawful or improper manner.

19.8. Any Contractor who is cited or fined for improper or unlawful disposal of waste materials shall be solely responsible for all monetary penalties arising from such action.

20. COORDINATION

20.1. The Contractor shall coordinate the work of all Sub-Contractors, arrange space conditions to accommodate the work of all trades and prepare composite drawings as required to scale clearly the work of each trade Contractor in relation to each other.

20.2. The Contractor will be held responsible to correct unsatisfactory conditions resulting from improper coordination.

20.3. Contractors to communicate and supply shop drawings to each other to insure proper coordination.

20.4. Coordination drawings shall be submitted to the Architect for review and approval.

20.5. Daily field reports are to be provided by all Contractors to the Construction Manager.

20.6. Coordination Meetings:

A. General: Construction Manager to prepare a written memorandum on required coordination activities. Include such items as required notices, reports, minutes of meetings, and attendance at meetings. Distribute this memorandum to each entity performing work at the project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.

B. Weekly coordination meetings: Construction Manager shall schedule and hold weekly general project coordination meetings at regularly scheduled times that are convenient for the attendance of other prime contractors and other parties involved. These meetings are in addition to the specific meetings held for other purposes, such as regular project meetings and special pre-installation meetings. Required attendance includes the contractor and every other entity identified by the contractor as being currently involved in the coordination or planning for the work of the entire project. Conduct meetings in a manner that resolve coordination problems. The Construction Manager shall preside at each meeting, and shall record meeting results. The Construction Manager shall distribute copies of the meeting result to everyone in attendance, the Architect and to others affected by the decisions and actions resulting from each meeting.

20.7. Scaled and figured dimensions with respect to the items are approximate only; sizes of equipment have been taken from typical equipment items of the classes indicated. Before proceeding with the work, the contractor shall carefully check all dimensions and sizes and shall assume full responsibility for the fitting in of equipment and materials to the building and to meet architectural and structural conditions.

20.8. The Contractor shall use any signed completed coordination drawings as a working reference. Compare all shop drawings, prior to their submittal to the Architect, with the coordination drawings and revise the shop drawings to fit the coordination drawing condition. If revisions to the coordination drawings are required because of shop drawings, make revisions as directed by Construction Manager and notify all affected contractors with copy of notification to Construction Manager. Maintain up-to-date record of all revisions on own coordination drawing copies; keep one copy at project site.

20.9. No extra compensation will be paid to any contractor for relocating any duct, pipe, conduit, or other material installed without coordination among trades

involved or among other affected contractors.

21. MANUFACTURER'S DIRECTIONS

21.1. Where manufactured articles, materials and equipment are specified, but specific installation instructions are not included they shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the manufacturer's latest printed instructions.

21.2. The Contractor is required to maintain at the job site the current edition of such printed instructions. Where such directions are at variance with the specifications the Contractor shall require clarification from the Architect.

22. JOB PROGRESS MEETINGS

22.1. Job progress meetings shall be scheduled by the Owner during the course of construction. Each Contractor and such Sub-Contractors as required by the Contractor or the Owner or the Architect shall be present at job progress meetings. The trade Contractors shall answer questions on progress, workmanship, approvals required, delivery of materials and other subjects concerning the work. The purpose of such meeting is to coordinate the efforts of all concerned so that the work proceeds without delay to completion as required by the contract. Each contractor must send a qualified representative, knowledgeable in the project and authorized to make decisions behalf of the company, to every meeting. Failure to attend a project meeting or arriving late will result in a $500.00 back-charge, per occurrence.

22.2. The Owner, or the Construction Manager or the Architect may require any schedule to be modified so that changes in the work, delays or acceleration of any segment of the work shall be reflected in such schedule. The Contractor shall cooperate with the Owner in providing data for such changes in or modification of schedules.

23. MEASUREMENTS

23.1. Verify dimensions and measurements of the site and be responsible for the correctness of them. No extra charges or compensation will be allowed on account of difference between actual dimensions and measurements indicated on drawings; any difference found shall be submitted to the Architect in sufficient time for his consideration and direction before proceeding with the work involved.

23.2. It is the duty of each Contractor to take his own measurements of the work and be responsible for same.

23.3. Each Contractor shall thoroughly examine the drawings and specifications, carefully checking the figured dimensions, before commencing work, and report to the Architect if any discrepancy, error or defect appears, but shall not be held responsible for their existence.

24. LOCATION OF APPARATUS

24.1. The location of apparatus, equipment, fixtures, piping outlets, etc., shown or specified but not specifically dimensioned shall be considered as only approximate.

The actual location shall be as directed and as required to suit the conditions at the time of installation. Before installation, the Contractor shall consult the Architect, and ascertain the actual location required. He shall also consult with other trade Contractors and examine their drawings so as to avoid conflicts with other work and apparatus.

25. PUNCH LIST PROCEDURE

25.1. After submission of the list of items to be corrected by the Contractor as referred to in the General Conditions, the Architect reserves the right to issue a revised list of corrections to be made (Punch List). If such a revised list is necessary, the Architect will furnish to Contractor a "Punch List" of items requiring completion or correction.

25.2. It shall be the Contractor's responsibility to reproduce and distribute all necessary copies as needed to the various trades immediately and see that the items requiring correction or completion are given prompt attention. No certificates of Substantial Completion will be issued by the Architect until corrections are made, or the Architect is satisfied that they will be made.

26. OPERATING AND MAINTENANCE INSTRUCTIONS

26.1. Three bound (3) sets of operating and maintenance instructions shall be delivered to the Owner.

26.2. Upon completion of the work and at a time designated a representative shall be provided for a sufficient period to instruct the Owner in the operation and maintenance of each piece of equipment and of each system as a whole.

26.3. The Contractor shall certify by endorsement thereon, that each for the manuals is complete and accurate. The Contractor shall assemble these manuals for all Sections of the work, review them for completeness prior to submission. The Contractor shall provide suitable transfer cases and deliver the manuals suitably bound, indexed and marked.

27. NEW YORK STATE EDUCATION DEPARTMENT APPROVED DRAWINGS AND CERTIFICATES

27.1. All Plans and Contracts Documents must be approved by the New York State Education Department prior to signing the Contract by Owner and Contractors. Architect will notify all parties when such approval has taken place. Upon approval of Plans and Specifications, the Bureau of Facilities Planning will produce final approval papers. These papers will include a building permit, construction cannot commence until the building permit is prominently displayed at the work site.

28. STOCK MATERIAL AND MAINTENANCE KITS

28.1. All maintenance kits or stock, replacement parts of materials, spare construction materials, and equipment required under the Contract shall be supplied by the Contractor designated in the .

29. PROJECT CLOSE-OUT DOCUMENTATION

Prior to final payment, each Contractor shall submit to the Construction Manager and

Architect the following documents in an original and one hard copy, unless otherwise noted:

29.1. A complete listing of all trade sub-Contractors, business addresses and items supplied by each such trade Contractor.

29.2. A listing of manufacturers of major materials, equipment and systems installed in the work.

29.3. Payments of Debts and Claims and Consent of Surety: Adequate evidence that he has paid all obligations arising out of the Construction Contract. He shall submit AIA Document No. G-706, Contractor's Affidavit of Payment of Debts and Claims, together with AIA Document G-707, Consent of Surety, indicating written consent of the surety to final payment.

29.4. Release of Liens: The Contractor shall also submit AIA Document G-706-A, Contractor's Affidavit of Release of Liens, indicating that the releases for waivers submitted are complete to the best of his knowledge, information and belief and, if there are any exceptions that they be so stated specifically in this form.

29.5. Certificate of Substantial Completion AIA Document G-704.

29.6. Contractor's one year guarantee as outlined in the Specifications. Submit all other guarantees and warranties as outlined in the contract documents.

29.7. Submit individual Final Waiver's of Lien from subcontractors and suppliers as may be required by the Owner.

29.8. Final Approvals and Certificates: All final approvals and certificates as required by the specifications, drawings and all applicable codes and regulations.

29.9. Submit a current certificate of insurance.

29.10. Submit a Punch List Item Letter stating all items have been completed.

29.11. Turn in site documents (A201:3.11.1), Certificate of Current Insurance (A201:9.10.2), Contractors Guarantee of Insurability (A201:9.10.2), Certification of Wages and Final Application for Payment (AIA G702/703).

29.12. Turn over to Owner all Procedures manuals and spare parts.

29.13. As a predecessor to release of "retainage", contractor shall submit all close-out documentation including as-built drawings. No retainage reduction will be permitted until close-out requirements are approved.

30. DUST and VENTILATION PROTECTION and HAZARDS

30.1. If, in the construction of the Work covered by the Contract, a harmful dust hazard is created appliances or methods for the elimination of dust shall be installed and maintained and effectively operated by the Contractor at its expense.

30.2. The Contractor shall erect and maintain throughout the term of construction dust barriers between the construction areas and the existing building and grounds.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.3. DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's and Owner's Representative's responsive action.

B. Informational Submittals: Written information that does not require Architect's and Owner's Representative's approval. Submittals may be rejected for not com- plying with requirements.

1.4. SUBMITTAL PROCEDURES

A. General: Contractors and Sub-contractors shall not submit Architect's construction drawings with mark-ups as their submittals. Where possible, submittals shall be transmitted electronically to the Architect.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
3. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Architect's receipt of submittal.

D. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect

will advise Contractor when a submittal being processed must be delayed for coordination.

E. Direct Transmittal to Consultant: Where the Contract Documents indicate that submittals may be transmitted directly to Architect's consultants, pro- vide duplicate copy of transmittal to Architect and Owner's Representative. Submittal will be returned to the Architect, before being returned to Contractor.

F. If intermediate submittal is necessary, process it in same manner as initial submittal.

G. Allow 10 days for processing each resubmittal.

H. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

I. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space which is minimum 6" x 8" on label or beside title block to record Contractor's review and approval markings and action taken by Architect; Architect's stamp requires a space 3" x 8".
3. Include the following information on label for processing and recording action taken:

a) Project name.
b) Date.
c) Name and address of Architect.
d) Name and address of Contractor.
e) Name and address of subcontractor.
f) Name and address of supplier.
g) Name of manufacturer.
h) Submittal number or other unique identifier, including revision identifier.
i) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
j) Number and title of appropriate Specification Section.
k) Drawing number and detail references, as appropriate.
l) Location(s) where product is to be installed, as appropriate.
m) Other necessary identification.

J. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals. The Architect reserves the right to return submittals that deviate from the Contract Documents for correction and re-submission.

K. Additional Copies: Unless additional copies are required for final submittal, and unless Architect or Owner's Representative observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

1. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.

L. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form.
   1. Submittals received from sources other than the Contractors shall be re- turned to the sender "without action."
   2. Submittals received which are neither required nor requested by the Con- tract Documents shall be returned to sender "without action; submittal not required."
   3. Submittals received which are required for "Architect's Information" such as inspection and test reports, survey data, and fabricator's design calculations, will not be returned.

M. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

N. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

1.1. ACTION SUBMITTALS

A. Submittals: Within seven (7) days from receipt of a Notice to Proceed from the Owner, the Contractor shall provide to the Owner's Representative a schedule of all Submittals. Submittals shall include (as relevant) all shop drawings, coordination drawings, fabrication drawings and erection drawings, reports, diagrams, lay- outs, setting plans, samples and other data required by Plans and Specifications and/or requested by the Architect and Owner's Representative pertaining to systems, methods of construction, equipment, materials, performance and test reports and data, wiring diagrams and controls, cuts, mock-ups, brochures, catalogs, and other data as may be necessary to describe the Work in sufficient detail, design and dimensions or as may otherwise be deemed necessary by the Architect and Owner's Representative.

B. Material and Equipment List: Within seven (7) days of receipt of a Notice to Proceed, Contractor shall submit a preliminary list of Subcontractors. Upon approval of each Subcontractor, the Subcontractor shall submit for approval a complete list of suppliers, materials, and equipment proposed for use in connection with the project to the Architect. Include information concerning anticipated lead times for materials and equipment. This submitted list shall not be in lieu of submittals required by the Contract Documents.

C. Long Lead Items: All Shop Drawings that are considered long lead items by the Architect or Owner's Representative must be submitted a timely fashion. All other shop drawings must be submitted in sufficient time to allow at least ten (10) working days for the Architect's review.

D. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. Contractor shall:
   a) Clearly mark each copy to identify pertinent products or models.
   b) Show performance characteristics and capacities
   c) Show dimensions and clearances required.
   d) Show wiring or piping diagrams and controls.
   e) Modify drawings and diagrams to delete information which is not applicable to the work.
   f) Supplement standard information which is specifically applicable to the work.
2. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
3. Mark each copy of each submittal to show which products and options are applicable.
4. Include the following information, as applicable:

   a) Manufacturer's written recommendations.
   b) Manufacturer's product specifications.
   c) Manufacturer's installation instructions.
   d) Standard color charts.
   e) Manufacturer's catalog cuts.
   f) Wiring diagrams showing factory-installed wiring.
   g) Printed performance curves.
   h) Operational range diagrams.
   i) Mill reports.
   j) Standard product operating and maintenance manuals.
   k) Compliance with recognized trade association standards.
   l) Compliance with recognized testing agency standards.
   m) Application of testing agency labels and seals.
   n) Notation of coordination requirements.
   o) Material safety data sheets.

E. Samples

1. The Contractor shall submit for review to the Architect samples of materials listed under each section of the specifications. Samples shall be properly labeled for identification, consisting of the following information: job titles, sample number, submission number, label large enough to receive Architect's stamps.

2. The Contractor shall not commence work under sections of the specifications until the Architect's approval in writing is obtained for all listed samples.
3. The Contractor shall not construe approval of advance samples as total guarantee of acceptance of materials. Materials will be subjected to field inspections, from time to time, as work progresses.
4. Samples of specific manufactured products shall be accompanied with ap-

propriate manufacturer's literature at time of submission.

5. Samples shall be of sufficient size and quantity to clearly illustrate:
   a) Functional characteristics of the product, with integrally related parts and attachment devices.
   b) Full range of color, texture and pattern.
6. If it is anticipated that finished products shall have a range of color, graining, texture or other characteristics, the Contractor shall construct a mock-up and provide a sufficient number of samples of the specified products exhibiting the full range of all such characteristics. Products delivered or erected without such a submission and not approved by the Architect shall be subject to rejection. Except for range samples, or otherwise provided, all samples shall be submitted in such numbers as required by the Architect. All samples shall be marked, tagged, or otherwise properly identified with the name of the Contractor, the Project, the purpose for which they are being submitted and the date of submission.

F. Color Selection: The Contractor, Subcontractors and material suppliers shall co- operate in furnishing required color samples to aid on the final selection. Where special colors are selected, the Contractor shall furnish accurate reproductions of these colors, in duplicate, and on actual material to be furnished to the project, for final approval.

G. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Architect's Contract Documents or standard printed data. If Contractor submits the Architect's drawings with mark-ups as a shop drawing, the submittal shall be rejected.

1. Preparation: Include the following information, as applicable:
   a) Dimensions.
   b) Relationships with adjacent or critical features of work or materials
   c) Identification of products.
   d) Fabrication and installation drawings.
   e) Roughing-in and setting diagrams.
   f) Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
   g) Shopwork manufacturing instructions.
   h) Templates and patterns.
   i) Schedules.
   j) Design calculations.
   k) Compliance with specified standards.
   l) Notation of coordination requirements.
   m) Notation of dimensions established by field measurement.
   n) Identification or deviations from Contract Documents.
   o) Contractors' Submittal Stamp (see 1.4 above)

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches. Leave space for Architect's stamp (8" x 3").

3. Details shall be identified by reference to sheet and detail, schedule or room numbers shown on the Construction Drawings.

4. Shop Drawings shall have listed on them all Contract Reference drawing numbers plus Shop Drawing numbers on related work by other Subcon- tractors if available.

5. Each Shop Drawing shall have indicated on it the Submission Number (whether first, second, third, etc.) Shop drawings for the work of one trade shall be checked by Subcontractors of related trades, and shall have their stamp of approval before being submitted to the Architect.

6. Shop Drawings which involve a change from or variance with Contract Drawings shall be so noted by Contractor and Architect, duly advised in writing of recommended change and reasons thereof.
7. Number of Copies: See 2.1 A.1 above.

H. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product pro- posed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:

a) Generic description of Sample.
b) Product name or name of manufacturer.
c) Sample source.

4. Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, provide the following:

a) Size limitations.
b) Compliance with recognized standards.
c) Availability.
d) Delivery time.

5. Submit Samples for review of kind, color, pattern, and texture for a final check

of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as de- livered and installed.

a) If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.
b) Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, de- tails of assembly, connections, operation, and similar construction characteristics.

6. Number of Samples for Initial Selection: Submit six full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Owner's Representative, will return submittal with options selected.
7. Number of Samples for Verification: Submit six sets of Samples. Archi- tect shall keep two and Owner's Representative shall keep two sets at the job site; remainder will be returned.
8. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction ac- tivity. Sample sets may be used to determine final acceptance of construc- tion associated with each set.

a) Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b) Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

1.2. INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specifi- cation Sections.

PART 3 - EXECUTION

1.1. CONTRACTOR'S REVIEW AND RESPONSIBILITIES

A. Review each submittal and check for conformance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submit- ting to Architect.

B. Determine and verify:

1. Field measurements
2. Field construction criteria

3. Catalog numbers and similar data

C. Coordinate each submittal with requirements of the work and the Contract Documents.

D. Notify the Architect in writing, at time of submission, of any deviations in the submittals from the requirements of the Contract Documents.

E. Begin no fabrication or work which requires or references submittals until submittals are returned fully approved by Architect.

F. The Contractor shall make such corrections in Submissions as required by Architect or the Owner's Representative and Contractor shall deliver corrected Submissions to the Architect as required until the Submissions are approved. If the Architect rejects any Submission due to non-conformance with the Contract Documents such rejection shall not form the basis for any claim by the Contractor for a delay or other damages.

G. The Contractor shall verify at the Project site all conditions, dimensions and elevations indicated on the Plans and the Contractor shall advise Architect of any deviations that affect its Work. Approval of Submittals by Architect is not verification by Architect of field dimensions. The Contractor's obligations hereunder shall include taking field measurements for all Work, and approval of Submittals by the Architect or the Owner's Representative shall not relieve the Contractor from correcting Work reflected in error on the Contractor's Submissions, not con- forming to the field requirements or existing conditions or not complying with the terms of this Contract.

H. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the work or in the work of any other Contractor.'

I. The Contractor shall make any corrections or changes in the submittals required by the Architect and shall resubmit until approved.

J. Each shop drawing submittal after the first submission shall be clear of all previous stamps.

K. The same number of copies required for the original submission is required for each re-submission.

L. During the progress of Work, the Contractor shall update and revise shop drawings to reflect any revisions and changes to the Work. Upon final completion of the Work, the Contractor shall provide the Architect with such number of final As- built sets of documents as required by the Architect relating its Work to the final as-built condition of the portion of the Project worked by the Contractor. Such As- builts shall be submitted at the conclusion of the project.

1.2. ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's Submittal stamp and will return them without action.

B. Action Submittals: Architect or Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each sub- mittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming correlating all quantities and dimensions; selecting fabrication processors and techniques of construction; coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner.	No Exception Taken Make Corrections Noted Revise and Resubmit Rejected

by _____ _____ _____ _ date _____

Shop drawings that are returned: "Revise and Re-submit" or "Rejected" shall be corrected and resubmitted to the Architect promptly

C. Architect's review of Submittals is for scope of Work. Acceptance review and approval of Submittals by Architect does not constitute approval and shall not relieve the Contractor from its:

1. obligation to perform the Work in accordance with the Contract Documents, or
2. responsibility for the proper matching and fitting of its work with all contiguous or adjacent work and existing conditions, unless the Contractor has informed the Architect in writing of any deviations between Plans and Specifications and the Submissions to be submitted under Article 3 of the General Conditions and Contractor has been relieved of responsibility in writing by the Architect.

D. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

E. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

SECTION 015000

TEMPORARY FACILITES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Requirements for Construction Staging including but not limited to temporary utilities, support facilities, parking, security and protection facilities.

2. Requirements for Maintenance and Protection of Traffic (MPT).

B. Related Requirements:

1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. General: Installation and removal of, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Engineer, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.

E. Water and Sewer Service from Existing System: Water and Sewer from Owner's existing systems is available for use without metering and without payment of use charges. Provide connections and extension of services as required for construction operations.

F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extension of services as required for construction operations.

1.4 SUBMITTALS FOR APPROVAL

A. Construction Staging Plan: Contractor shall prepare a detailed Construction Staging Plan Submittal (reflecting the information shown on the drawings using a base map provided by Owner) depicting all temporary facilities, utility hookups, staging and parking areas, and temporary routes as they relate to vehicles, and pedestrians. No work shall begin on site until this plan is approved by the Owner's Representative. Contractor to update and maintain this plan throughout the course of construction.

B. Maintenance and Protection of Traffic Plan: Contractor shall prepare a detailed Maintenance and Protection of Traffic (MPT) Plan (reflecting the information shown on the drawings using a base map provided by Owner) depicting information required for safe and secure routes and access for vehicles, workers and pedestrians. The weight and access requirements associated with the Old Croton Aqueduct (OCA) shall be incorporated in this plan. No work shall begin on site until this plan is approved by the Owner's Representative and the NYS OPRHP. Contractor to update and maintain this plan throughout the course of construction.

1.5 INFORMATIONAL SUBMITTALS

A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.6 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Temporary Chain Link Construction Fence and Gates: Provide 6-foot or 8-foot high temporary chain link construction fence and gates consisting of the following:
   1. (1) 3/8-inch O.D. galvanized steel corner and end posts.
   2. 12-foot wide panels.
   3. (1) 3/8-inch O.D. galvanized steel top rail.
   4. 11.5-gauge chain link.
   5. Panel secured with (1) 3/8-inch panel clamps.
   6. 24-foot wide chain link access gate with locking mechanism.
   7. Line Posts, embed into 36-inch by 18-inch panel stand with 6-inch or 12-inch uprights, anchored to prevent unauthorized movement.
   8. Fences may not be moved without specific permission of the Director's Representative.

B. Traffic Signs, Cones, Barricades, and Striping: Traffic signs, cones, barricades, and striping shall be in accordance with the Manual of Uniform Traffic Control Devices (Most Current Edition) and the Contract Documents.
   1. Traffic signs shall consist of reflectorized aluminum galvanized steel. All wood supports and backs of plywood sign panels shall be painted with two (2) coats of white paint.
   2. Cones: Cones shall be predominantly orange, fluorescent red-orange, orange, not less than 18 inches in height, or fluorescent yellow and shall be made of a material that can be struck without damaging vehicles on impact.
   3. Barricades: Barricades used for traffic warning or channelization shall be constructed of lightweight, flexible, and deformable materials and be a minimum of 36 inches in height; and have at least an 18- inch minimum width, regardless of orientation. Steel drums shall not be used. The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4 to 6 inches wide. Each drum shall have a minimum of two orange and two white stripes. Any non-retroreflective spaces between the horizontal orange and white stripes, shall not exceed 2 inches wide. Drums shall have closed tops that will not allow collection of roadwork or other debris.
   4. Temporary Striping: Temporary striping shall consist of black tape to temporarily 'black out' and conceal the existing striping, temporary 'yellow and white' tape to provide temporary delineation of traffic during construction phases, and quick drying temporary markings to control traffic until the final course of asphalt pavement is in place. Temporary striping shall not cause damage to existing pavement to remain.

C. Temporary Orange Construction Fencing: Provide 4-foot high, orange polyethylene warning fence with metal posts, to serve as tree protection fence as specified in Section 015639 – Temporary Tree and Plant Protection. Fences may not be moved without the specific permission of the Owner's Representative.

D. Temporary pavement shall be provided and installed in accordance with the Contract Drawings and Section 32 12 16 Asphalt Pavement. Typical temporary pavement shall consist of Type 3 Asphaltic Concrete, "Binder Course".

E. Temporary water filled barricades shall be provided and installed per the approved MPT plan: Yodock Barricade Longitudinal Channelizing Device with chain link fence (10'-0" overall ht.) as manufactured by Yodock, tel. 888-496-3625, or approved equal.

F. Gravel for Temporary Pedestrian Walkway: Temporary walkway shall consist of 5" deep crusher fines over a heavy grade filter fabric.

1. Particle size shall be 3/8" minus with no clay lumps, organic or other deleterious material. Fines from granite or other hard stones shall be irregular and angular particles to allow interlocking into a tight matrix.

Particle Size	% of Passing
3/8"	100%
No. 4	90-100%
No. 8	55-80%
No. 16	40-70%
No.30	25-50%
No. 200	6-15%

2. Filter Fabric shall be: woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
   a) Survivability: Class 2; AASHTO M 288.
   b) Grab Tensile Strength: 247 lbf (1100 N); ASTM D 4632.
   c) Tear Strength: 90 lbf (400 N); ASTM D 4533.
   d) Puncture Strength: 90 lbf (400 N); ASTM D 4533.
   e) Apparent Opening Size: No. 60 (0.250-mm) sieve, maximum; ASTM D 4751.
   f) Permittivity: 0.02 per second, minimum; ASTM D 4491.
   g) UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355

2.2 TEMPORARY FACILITIES

A. Construction Trailer / Field Office: If the Contractor requires the use of a construction trailer during the project – it shall be a prefabricated or mobile unit with serviceable finishes, temperature controls, and foundations adequate for normal loading. Unit shall be located within the limits of construction staging area as outlined on the drawings. Contractor shall make a submission to Owner that outlines placement, size and required utility infrastructure to support any proposed temporary field offices **(Contractor shall pay Use Charges for all utilities (including establishment of sub-metering and service extension(s) as required to service any proposed temporary field offices)**.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Drainage: Provide temporary utilities to safely collect and convey stormwater during construction. Refer to Erosion and Sediment control plans and the approved SWPPP for more information.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
   1. Maintain support facilities until Owner's Representative schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Maintain temporary roads and paved areas adequate for construction operations.

   1. Provide temporary roads as specified on the approved drawings. Contractor shall maintain surface until project/phase is complete.
   2. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.

C. Temporary Pedestrian Walkways:

   1. Provide temporary pedestrian walkways as required to maintain pedestrian access. Contractor shall maintain surface until project/phase is complete.

D. Traffic Controls: Comply with requirements of the MPT and Construction Staging Plan(s):

   1. Protect existing site improvements to remain including curbs, pavement, and utilities.
   2. Maintain access for fire-fighting equipment and access to fire hydrants (where they exist).
   3. Provide traffic cones, temporary barricades and all other required traffic protection measures as shown on the drawings to ensure vehicles and pedestrian are precluded from entering work areas.

E. Parking: Contractor may park "private vehicles" within the bounds of the contractor parking area (and construction staging area to the extent that space allows and without hindering construction operations, cost, or schedule). Parking area for private vehicles will not be provided by Owner in any other areas of the Park. Parking and access for Vehicles "owned" by the Contractor shall be permitted within the bounds of the construction site as required and in accordance with the Maintenance and Protection of Traffic Plans.

F. Project Informational Signs: Provide signs as indicated below. Unauthorized signs are not permitted.
   1. Project Identification Signs: Provide 2 Project identification signs (Owner will provide text and graphics in a compatible digital file as directed by the Contractors sign fabricator – sign size will be 4'-0" x 8'-0"- signs shall be printed on vinyl with weather resistant ink – vinyl sign shall be mounted on ¾" x 4'-0" x 8'-0" sign board as supported by two pressure treated 4"x 4"x10'-0" posts - placed 3'-0" into the ground with concrete footing/encasement).

2. Temporary Traffic Signs: Contractor to provide all traffic and pedestrian traffic control signs as specified on the drawings.

    a. Provide temporary, directional signs for construction personnel and visitors in accordance with Construction Access drawings.
    b. Maintain and touchup all signs so they remain legible at all times.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. This does not include waste exposed or removed as part of the solid waste relocation activities. Refer to 312000.01 Solid Waste Relocation specification for information related to the handling of solid waste materials on site. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Division 01 Section "Execution". If construction waste is stored in areas visible to the public – containers and waste shall be removed on a daily basis. Project contractors will be responsible for management of waste related to their activities.

H. Site Maintenance:
1. Contractor is responsible for clearing snow and ice from roadways, staging and storage areas, parking areas, walkways and entrances, in order to provide safe access to all areas of work (for the duration of the Project).

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Division 01 Section "Summary of Work."

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of NYS DEC and applicable SWPPP permit.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
1. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction and terms of applicable SWPPP. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Site Enclosure Fence: Contractor shall provide and maintain the construction fencing and gates, with locks, throughout the entire project. Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As per Construction drawings (or as additionally determined by Owner's Representative)

2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Wherever locks are installed – two shall be installed – one provided by the contractor and one to be provided by OPRHP – so that OPRHP can gain access to any locked area at any time. If contractor has to install any locks that OPRHP does not have keys to – Contractor shall provide one set of keys to Owner's Representative within 1 hour of lock being installed.

3. Site Contractor shall provide gate keys to the Construction Manager and the Owner. Provide access privileges to the site.

4. Perimeter fence shall remain in place until final acceptance the work as indicated in the project milestones in Section 011000.

F. Security Enclosure and Lockup: Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.

G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION

SECTION 015639

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general landscape protection at and proximate to the project site [including the property of the Old Croton Aqueduct (OCA)] and professional pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Pre-installation conference to review required limits of Protection Zone fencing, phasing and protocol for protection of site features.

C. Related Sections:

1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
2. Section 024000 "Site Preparation, Demolition and Clearing".

1.3 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.

B. Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and identified at Pre-installation site walk.

C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of the following:

1. Organic Mulch: 1-gallon volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.

2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.

C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified arborist and tree service firm.

B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or videotape.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.6 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by ISA and Licensed in jurisdiction where Project is located.

B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

C. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
b. Enforcing requirements for protection zones.
c. Arborist's responsibilities.

d. Field quality control.

1.7 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Planting Soil: Provide in accordance with specification Section 329113 – Planting Soil.

B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, conforming to Specification Section 329300 – Plants.

C. Protection-Zone Fencing: Fencing fixed in position and meeting one the following requirements.

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart.

a. Height: 4 feet
b. Color: High-visibility orange, nonfading.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify protection zones. Tie a 1-inch green-vinyl tape around each tree to remain on trunk at 54 inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Protection Zones: Mulch where tree protection is needed within work zone, within drip line of tree at Landscape Architect's direction.

1. Apply 4-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.3 TREE AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Landscape Architect.

B. Maintain protection zones free of weeds and trash.

C. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

D. Maintain protection-zone fencing in good condition as acceptable to Landscape Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not move protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to Owner/Landscape Architect preapproval.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 310000 "Earthwork".

B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as directed by arborist.

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut Ends: Do not paint cut root ends.
3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in Section 310000 "Earthwork".

B. Root Pruning at Edge of Protection Zone: Prune roots as directed by arborist by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.6 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as directed by the arborist and as follows:

1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
2. Pruning Standards: Prune trees according to ANSI A300 (Part 1)
3. Cut branches with sharp pruning instruments; do not break or chop.
4. Do not apply pruning paint to wounds.

B. Chip removed branches and spread over areas identified by Landscape Architect.

3.7 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with planting soil. Place planting soil in a single uncompacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.

4. Perform repairs within 24 hours.
5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree that measures 4 inches or smaller in caliper size. Only native trees shall be planted; Landscape Architect to determine species.
2. Provide one new tree of 3-inch caliper size for each 4” caliper size of tree being replaced that measures more than 6 inches , for example, removal of a 12” caliper tree requires three (3) 3-inch replacement trees (12/4=3).

    a. Species: Species selected by Landscape Architect.

3. Plant and maintain new trees as specified in Section 329300 "Plants."

C. Soil Aeration: Where directed by Landscape Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 01 77 00

PROJECT CLOSE-OUT

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:

To facilitate the orderly transfer of project information of the site to the Owner and his maintenance staff the following project close-out information must be completed in accordance with the Contract Documents.

B. Scope of Items includes but is not limited to:

1. Close-out documentation
2. Warranties.
3. Project record documents.
4. Operating and maintenance instructions.
5. Coordination of clean-up.

C. Related Items specified in other Sections:

1. Payments and completion - As per the Agreement.
2. Submittals: Division 1

1.2 QUALITY ASSURANCE

A. Codes:

All work shall comply with all state, county and local Building Code and Standards.

B. Personnel:

Delegate the responsibility for maintenance of the record documents to one person on the Contractor's staff.

C. Accuracy of Records:

Coordinate all changes in the record documents within 24 hours after having received the reviewed information. Make proper entries on each page of drawings and specifications to accurately record the change.

1.3 SUBMITTALS

See Division 1 and each item.

1.4 PRODUCT HANDLING

Protect the job set of record documents from deterioration, loss or damage until transfer of the recorded data to the Owner.

PART 2 - PRODUCTS

1.1. PROJECT CLOSE-OUT DOCUMENTATION

A. Punch List:

After the Construction Manager and Architect declares the project ready for close-out, submit a list of outstanding "punch list" items to identify work to be corrected or completed.

1. Revised Punch List: The Construction Manager and Architect reserves the right to issue a revised punch list. If such a revised punch list is necessary, the Architect will provide a copy to the Owner.

2. Punch List Distribution: It shall be the contractor's responsibility to reproduce and distribute all necessary copies of any punch list to the various Subcontractors immediately and see that the items requiring correction or completion are given prompt attention.

3. Completion of Punch List Items: No Certificate of Substantial Completion will be issued until corrections required by said punch list are made or the Architect is satisfied that they will be made.

B. Documentation:

Prior to final payment, the Contractor shall obtain from each Sub-Contractor the following documents in an original and one copy unless otherwise noted and submit same to the Architect.

1. Subcontractor List: A complete listing of all Subcontractors with business addresses.

2. Manufacturer List: A listing of manufacturers of major materials, equipment and systems installed in the work.

3. Payment of Debts and Claims and Consent of Surety: Adequate evidence that the Contractor has paid all obligations to date arising out of the contract. Contractor shall submit AIA Document No. G-706 (or other approved form), Contractor's Affidavit of Payment of Debts and claims, together with AIA Document G-707 (or other approved form) and Consent of Surety, indicating written consent of the surety of final payment.

4. Release of Liens: Contractor and Subcontractors shall also submit AIA Document G- 706A (or other approved form) Subcontractor's Affidavit of Release of Liens, indicating that the releases for waivers submitted are complete to the best of his knowledge.

C. Shop Drawings, Manufacturers' Literature and Test Data:

Submit to the Construction Manager, before final acceptance, a electronic copies of all reviewed shop drawings (with all corrections noted), plus sets of all reviewed catalog cuts, equipment manuals, etc. Material shall be indexed to specification section.

D. Attic Stock and Maintenance Kits:

Keys, maintenance kits or stock, replacement parts or materials, spare construction material, and equipment required under the Contract shall be delivered or made available to the Owner.

E. Final Payment Requirements:

Before final payment may be authorized, the following submittals must be complete, updated and on file:

1. Progress Payment Certificate
2. Change Orders
3. As-Built (Record) Drawings in AutoCAD digital format on disk and two hard copies.
4. Substantial Completion Items List
5. Statement of Satisfactory Completion
6. Warranties

1.2. WARRANTIES

A. Definition:

Unless additional maintenance or performance warranties are required, all the work shall be warranted by the Contractor for one year after the date of Substantial Completion of all the work. Where the Owner requests and obtains use of a portion of the work prior to the date of Substantial Completion, the Contractor's warranty for the portion so use shall commence as of the date such use commences. The warranty shall not include replaceable items such as light bulbs or cleaning materials, or damage by war, vandalism or unusual climatic phenomenon.

B. Scope:

Deliver to the Architect upon completion of all the work under this Contract his written warranty made out to the Owner and in form satisfactory to the Architect and the Owner, warranting all of the work under the Contract to be free from faulty materials, and free form improper workmanship. Under the warranty, the Contractor shall replace work in accordance with the General Conditions such work as may be found by the Owner to be improper or imperfect and to make good all damage caused to other work or materials by the imperfection or removal and replacement of the imperfect work.

C. Time Limit/Individual Warranties:

The warranty may cover a longer period than that stated in above where so stipulated in the Contract Documents. Warranties under service policies and warranties for individual pieces of equipment shall be assigned and delivered to Owner on the date of final acceptance, but individual warranties shall in no way modify or shorten the one year overall warranty to be provided.

D. Extended Warranties and Special Warranties

Certain extended warranties by Contractors or maintenance contracts longer than one year's duration

are required under various sections of the specifications. At the completion of the work all such warranties or maintenance contracts covering material, workmanship, maintenance , or other items as specified, shall be forwarded in duplicate to the Architect, together with a letter addressed to the Owner giving a summary of each said warranty as follows:

- Character of work covered by warranty
- Name of Contractor furnishing warranty
- Period of warranty
- Condition of warranty

Contractor shall issue four (4) copies of a special written agreement of warranty if called for under each specification section. Examples of items requiring a special agreement of warranty include certain equipment.

E. Format:

1. The warranties shall cover all the work done under this Contract. All subcontractor warranties shall bear the endorsement of the Contractor in writing, as per the following format:

   To:

   Attention of: Construction Manager

   Re: (Work Covered in Warranty) _____

   Name of Contractor _____

   Address of Contractor _____

   Re:_____(name of project)

   Dear

   The undersigned warranties to the Owner that he will be responsible for all faulty or defective materials, equipment and workmanship, in the _____ work* and that he will remedy any defects and pay for all damage to other work resulting from his work which shall appear within a period of_____year(s) from the date of Substantial Completion as defined in the Contract Documents.

   (Add additional conditions of warranty as noted in various technical sections of the Specifications.)

   During the warranty period, upon written notice from Owner, the undersigned shall proceed with due diligence at the undersigned's sole expense to remove and replace properly any defective materials and equipment or perform any labor necessary to correct any such defect in the above. In case that the undersigned fails to remedy such defects, than the Owner may furnish such materials and equipment or labor as are necessary to correct the work, and the undersigned agrees to reimburse the Owner for any expense therefore promptly and fully.

   Witness: Signed:** _____

Date: Signed:** _____

* (the contractor shall insert "all of the work as that term is defined in the Contract Documents")

** Signatures must be notarized.

Contractor - endorsement of above warranty.

Date: Signed:** _____

2. See the Roofing Technical Specification for a detailed description of the required warranties.

F. Cost:

Contractor warranties shall provide for the correction of work performed without additional charge. Any additional expense or damage resulting from imperfect work or the removal or replacement of imperfect work shall also be covered by the Contractor warranty.

1.3. PROJECT RECORD DOCUMENTS

A. Project Record Drawings:

The purpose of the project drawings (as-built drawings), is to record the actual locations of the work in place including but not limited to underground lines, concealed piping, and ductwork within buildings, concealed valves and control equipment, and to record changes in the work.

B. Contract Drawings and Specifications:

In addition to the sets of contract drawings that are required to perform the work, the Contractor shall maintain, at the site, one (1) copy of all drawings, specifications and addenda that are part of the contract as awarded. Each of these documents should be clearly marked " Project Record", maintained in a clean and neat condition available at all times for inspection by the Owner or the Architect, and shall not be used for any other purpose during the progress of the work.

C. Project Record Requirements:

The Contractor shall mark up an electronic copy of the "Project Record" in red and indicate changes with a "cloud" around the areas affected to show:

1. General:
   a) Accepted changes in the work.
   b) Details not shown in the original contract documents.
   c) Accepted change orders.
   d) Relocation of work.
   e) Changes in dimensions.
   f) Changes in floor elevations.
   g) Substitutions: include the updating of all equipment schedule sheets.

D. Submittal Procedure:

The project record drawings are to be submitted when all the work is completed, and forwarded to the Architect and his consultants for review.

1. All project record drawings must be submitted in AutoCAD digital format on disk with two hard copies.

2. Shop Drawings: Project record drawings submitted in the form of Shop Drawings to the Architect shall be keyed into reproducible copies of the Construction Drawings with indications of the applicable shop drawings and other data for complete cross numbers or other data on both shop drawings and construction drawings by indicating the specific areas each shop drawing covers with a key plan and indicating shop drawing number, etc. Size, dimensions, and information indicated on shop drawings need to be duplicated on construction drawings.

3. Material Data: Reviewed catalog cuts, certified performance data for all materials and equipment, etc. shall be indexed by Project Manual Section and submitted to the Architect for review along with the above drawings before final payment.

1.4. OPERATING AND MAINTENANCE INSTRUCTIONS

Arrange to familiarize the Owner's maintenance forces with the routine care and repair of products or assemblies at the time of final acceptance.

A. Written Instruction:

Provide four (4) sets of operating and maintenance instructions covering completely the operating and maintenance of all equipment furnished under the Contract and deliver to the Owner. Certify by endorsement that each of the manuals is complete and accurate.
Assemble these manuals for all sections of work, review them for completeness prior to submission.

B. Personnel Instructions:

Upon completion of the work and at a time designated by the Owner's Director of Engineering Services, a factory representative shall be provided for a sufficient period to instruct representatives of the Owner in the maintenance of each major component and of each system as a whole. Such period shall not exceed five (5) man days for the work of each section of the specifications.

1.5. COORDINATION OF CLEANUP

A. Intent:

At completion of the work, the site and premises shall be left in a neat, unobstructed condition, and all work in perfect repair and order. All tools, appliances, trailers, materials and equipment belonging to the Contractor and his Subcontractors shall be removed from the premises upon completion of the work.

B. Re-cleaning:

Re-cleaning will not be required after the work has been inspected and accepted unless later operations of the Contractors, in the opinion of the Owner, make re-cleaning of certain portions necessary.

PART 3 - EXECUTION

1.1. COORDINATION

A. Record the changes of all trades within the Record Documents to accurately show installed work. At the time of Project Record transfer to the Owner, provide a general review of the information and the filing method for the Owner's staff.

1.2. PROJECT CLOSE-OUT SUBMITTAL PROCEDURE

A. No partial submittals of the above items are to be made to the Architect. All items of each category to be collected and delivered at one time to the Architect together with a letter of transmittal listing all items. Where items are to be delivered to the Owner's representative the Contractor shall furnish the Architect a copy of the transmittal acknowledging receipt.

END OF SECTION

SECTION 02 40 00

SITE PREPARATION, DEMOLITION AND CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work:

1. Work under this section shall include all supervision, labor, materials, equipment, plant and incidentals required to complete all demolition, site preparation and site clearing needed to construct the site improvements as shown on the contract drawings.

B. Work of this Section consists of selective site demolition, removals, and other related work in preparation for earthwork and construction of this Project.

1. Remove existing site elements, foundations and appurtenances, pavement, and structures to extent indicated, including demolition and excavation if required for removal. Primarily the site will be surface cleared and grubbed only (i.e. first 6 inches of soil max.). The only items to be removed are those that are non-compactable. If demolition / removal is required, the Contractor shall consult with the Environmental Engineer for direction regarding excavation of waste material. Contractor shall also refer to Specification Section 312000.01 Solid Waste Relocation for more information.
2. Removing or, as indicated, abandoning in place site utilities by qualified person(s) including disconnecting, capping, and sealing at points of connection to existing remaining utility services.
3. Remove or break up existing pavement as indicated on the Drawings, or as directed by the Site and Environmental Engineer.
4. Obtaining services of a utility locator service to perform a full mark-out prior to any demolition or site work..
5. Protect existing improvements and utilities to remain.
6. Provide vehicular and pedestrian access and safety protection along the site roadway frontage and surrounding the construction areas.
7. Coordinate different phasing and staging of various sections of the development.

1.2 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

C. Stormwater Pollution Prevention Plan (SWPPP).

1.3 RELATED SECTIONS INCLUDE THE FOLLOWING:

1. Section 015000 - Temporary Facilities and Controls
2. Section 310000 - Earthwork
3. Section 312319 - Dewatering
4. Section 312500 - Soil Erosion and Sediment Control
5. Section 312000.01 Solid Waste Relocation
6. Section 312000.02 Landfill Final Cap Backfill

1.4 RELATED STANDARDS

A. Code of the Village of Hastings-on-Hudson

1.5 DEFINITIONS

A. Debris and/or Obstructions: Existing materials including but not limited to concrete slabs and foundations, paving materials, abandoned utilities pipes, duct banks, and structures, rubble material including bricks, ashes, wood, cinders, debris, aggregate, and masonry, catch basins and manholes, miscellaneous metal items, boulders; and any other below grade debris and obstructions of any size encountered within the required excavations regardless of the nature of the materials encountered, their geological definitions, the water contents thereof, and the means of excavation required.

B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

C. Remove, removal, and like terms: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.

D. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse. Store items indicated for removal and salvage to a location as approved by Owner.

E. Structures: Footings, foundations, retaining walls, slabs, curbs, utility and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

F. Excavation and other related terms: See Section 310000 Earthwork.

1.6 SUBMITTALS

A. General: Refer to and comply with Division 1, Section 013300 Submittal Procedures, for procedures and other submittal criteria.

B. Work Plans and Schedules:

1. Schedule of Procedures and Operations: Submit prior to start of any site clearing, removal, or excavation work to show coordination and verifications for shut-off, capping, and discontinuation or continuation of utility services. Comply with additional related provisions specified in Division 1 Section 017300 Execution Requirements.

a. Show the protection of existing structures and utilities that are to remain including piping and conduits. This plan shall include a written description supported by sketches, drawings, and specific materials and equipment to be used for protection.
b. Refer to the Stormwater Pollution Prevention Plan (SWPPP) for more information.
c. Submit planned methods and sequences for controlled demolition, including the locations of proposed saw cutting and schedules indicating proposed sequence of operations for selective demolition.

2. Schedule of Salvaged Material: Submit inventory list of items and material salvaged. Record the material type, size, condition and other characteristics. Also record salvage and storage dates and storage location.
3. Proposed Environmental-Protection, Dust-Control and Noise-Control Measures: Comply with all requirements of the approved Environmental Mitigation Plan as detailed in Division 1 of these Specifications. Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation.

C. Data submitted for Information and Reference:

1. Permits and/or Permissions by Utility Authority: Submit for respective work on site utility structures and distribution systems in accordance with Utility Authority requirements.

2. For Transport and Disposal Off-site:

a. Copies of permits necessary to transport materials for disposal off site and haul routes.
b. Location of legal disposal sites for waste and removed materials of this Project. Refer to Specification 31 20 00.01 Solid Waste Relocation Section 1.3.C.

D. Record Drawings: Submit according to Division 1.

1. Identify and accurately locate capped utilities and other subsurface structural and other utility services and conditions to be abandoned in place.

1.7 QUALITY ASSURANCE

A. Qualifications: Use person(s) with knowledge of and experience with the various utility services and materials and their application, preferably a qualified installer with respect to item, to perform cutting and removal of utilities and to supervise removal of items indicated for salvage and/or relocation.

B. Regulatory Requirements: Comply with safety, protection, and pollution controls of regulatory agencies or authorities having jurisdiction at Project location including federal, state, and local hauling and disposal regulations. In addition to the requirements of the Contract, safety requirements shall conform to ANSI A10.6 "Demolition Operations - Safety Requirements" and ANSI A10.11 “Safety Nets Used During Construction, Repair, and Demolition Operations”.

C. Construction Monitoring of Site Clearing Operations: During construction operations, the Landscape Architect, Site and/or Environmental Engineer may be present at the site to observe site clearing and demolition operations and shall be permitted free and unrestricted access to the site and work.

D. Damage or loss, whether by reasons of fire, theft, or other casualty, or any other occurrence to the various items required to be demolished or salvaged, shall be at the risk of the Contractor from and

after the date of the Contract, and no such damage or loss shall relieve the Contractor from any obligation under the contract to complete all demolition and removal work as specified.

E. Damage to Existing Work Not to be Removed: Existing items that are not to be removed shall not be disturbed or damaged in any way except where specifically required by the Contract in order to accomplish the removals. If any such disturbance or damage occurs to the existing work, which is to remain, or which is to be salvaged and/or relocated, the Contractor shall promptly repair the damage and restore or replace the damaged items at no additional cost to the Village.

1.8 PROJECT / SITE CONDITIONS

A. Surface and Subsurface Conditions:

1. Comply with additional provisions as specified in Division 1 Section 017300 Execution Requirements.
2. The Contractor, by careful examination, shall become informed as to the nature and location of the Work, the nature of the surface and/or subsurface conditions; the location of existing utilities and other structures; the character of the equipment and facilities needed primarily to and during the execution of the Work; and facilities needed preliminary to and during the execution of the Work.
3. Review available information and make an independent interpretation of the surface and subsurface conditions that may affect the work of the Contract.

B. Existing Utilities and Services:

1. Maintain existing utilities indicated to remain in service and protect them against damage during on-site operations.
2. Verify that utilities have been disconnected and capped as approved before proceeding with work.
3. Comply with additional provisions as specified in Division 1 Section 017300 Execution Requirements.

C. Traffic: Minimize interference with adjoining park areas including the Old Croton Aqueduct (OCA), roads, streets, walks, bikeways, and other adjacent occupied or used facilities during site-clearing operations and construction.

1. Obtain and pay for all necessary permits required for the maintenance and protection of traffic as required by the Village of Hastings on Hudson or applicable regulatory agency.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
3. Maintain access during construction to and along the Old Croton Aqueduct Trail abutting the property.

D. Hazardous or Contaminated Materials:

1. If materials that are suspected of containing hazardous materials are encountered, do not disturb. Immediately notify the Environmental Engineer. Comply with Environmental Health and Safety Plan (HASP) and related requirements in Division 1.

2. Contractor shall review design of landfill cap components and associated grading design with Environmental Engineer and Site Engineer prior to construction to ensure design intent is fully understood and to understand protocols if hazardous materials are encountered during construction.

E. Materials Ownership:

1. General: Except for materials indicated to be salvaged, indicated for reuse on Project, or subsequently designated to remain Village's property, all excavated, demolished, and cleared materials shall become property of the Contractor and shall be immediately removed from the site in a legal manner unless otherwise directed by the Environmental Engineer.
2. Historic: Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Village that may be encountered during site clearing, demolition, or earthwork remain Owner's property.
   a. Coordinate with the Owner's Representative who will advise or arrange establishment of any special procedures for removal and salvage.
   b. As directed, the Contractor shall carefully remove and salvage each item or object in a manner to prevent damage and deliver such item(s) promptly to the Owner.

F. Sale or storage of removed items or materials on-site is not permitted.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide all materials, equipment and supplies as required to completely perform the demolition and site preparation work specified herein and as shown on the Drawings.

2.2 LAYOUT EQUIPMENT

A. Stakes and batter-boards shall be of size and quality necessary to execute the work. The Contractor shall use wire, non-stretching cord, or laser equipment to establish reference lines.

2.3 PROTECTION OF DRAINAGE / SEDIMENTATION CONTROL

A. Contractor shall confirm that materials conform to all applicable regulations of all Agencies having jurisdiction over the drainage systems and stormwater discharge.

B. Implementation and maintenance of the erosion and sedimentation control devices shall be the responsibility of the Contractor. Contractor shall refer to plans and SWPPP for more information on erosion control measures.

2.4 CONSTRUCTION FENCES AND GATES

A. Refer to Section 015000 Temporary Facilities and Controls.

2.5 MATERIALS

A. Fill/Backfill: Comply with requirements of Section 310000 Earthwork.

B. Utility Closures:

1. Plugs, Caps, and Flanges: As approved to suit, galvanized or cast iron thread plugs, welded caps, and/or flanges.
2. Concrete and/or Grout: Minimum 3000 psi type to suit.
3. Thrust Blocks: Minimum 2500 psi concrete type.

C. Storage Materials for Salvaged Items:

1. Provide wood cribbing for heavy and bulky items.
2. Furnish wood pallets of standard type and size for handling salvaged items such as cleats and other loose items of like kind collected together.
3. Furnish heavy-duty wire mesh to form pallet baskets and/or flat cable strapping for holding, in storage and during handling, loosely stacked items on pallet as conditions require and as approved by the Village.
4. Tagging Materials: Inventory identification tagging shall be material including ink writing resistant to long-term weather exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing conditions and correlate with requirements indicated to determine the extent of site preparation, demolition, removals and other related work required.

B. Use a utility locator service and perform related utility “mark-out” before site clearing operations begin.

C. Verify items to be salvaged by Contractor for placement in Owner’s storage, inventory and record the condition of items to be removed and salvaged, and verify location of Owner’s storage location before relocation.

D. When unanticipated structural conditions or electrical or other utility elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report of conditions as found to the Site and Environmental Engineer.

3.2 PREPARATION

A. Contractor shall furnish all services, labor, equipment, and materials required to perform clearing, selective demolition, and removal of this Section and to prepare site for subsequent work of this Contract. Accept actual conditions existing and as found at site.

1. The surface of required site prepared areas or subsequent excavations, removals, stripping, or grading work may expose soft grades during the course of the Work. Contractor shall take actions necessary, subject to concurrence and approval by the Landscape Architect, to allow the progress of the Work to continue and to make the site accessible to construction equipment. The Work required under this Section will result in a site surface suitable to conduct subsequent work, including provision of site access for any required construction equipment. Should soil conditions be encountered that, in the opinion of the Environmental Engineer are unsuitable for the Work to proceed, the Contractor shall follow the direction of the Environmental Engineer to provide suitable site conditions. Payment of additional work shall be on a Time and Materials basis with no mark up.
2. Use water, mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding and pollution. Refer to SWPPP for more information.

B. Protection: Protective measures shall include temporary construction in addition to protection provisions specified in Division 1 Section 015000, Temporary Facilities and Controls and Section 310000 Earthwork.

1. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during work operations that may cause damage.
   a. Protect sidewalk paving and street curbs in addition to crossing traffic locations.
   b. Protect existing drainage systems from intrusion of debris and clogging.
   c. Protect adjacent surfaces and finishes including the Old Croton Aqueduct pathway and associated appurtenances

2. Take precautions to guard against movement, settlement, or collapse of any adjacent conditions, sidewalks or street passages, adjoining property, and adjacent structures. Be liable for any such movement, settlement, or collapse. If such damage does accidentally occur, safeguard the public and repair promptly. Contractor is responsible for documenting existing conditions of all adjacent structures and surfaces prior to construction. Photos shall be submitted to the Owner prior to the start of work.

3. Protection of Persons:
   a. Provide temporary facilities including barricades and fencing to prevent entry to demolition areas by unauthorized persons. Access to demolition areas shall be prevented by temporary facilities such that the facilities cannot be circumvented or thwarted without exceptional means or force.

   b. The necessary temporary closures, guardrails, barricades, and other devices shall be provided so as to adequately protect workmen and employees, visitors, and inhabitants from possible injury.

4. Temporary Erosion Control Measures: Protect against soil erosion to adjacent properties, park areas, roads and walkways as specified. Refer to SWPPP for more information.
5. Dewatering: As specified under Section 312319 Dewatering.

C. Layout and Field Survey Work:

1. See Division 1 Section 017300 Execution Requirements and Section 310000 Earthwork for additional provisions.

2. Establish benchmarks and survey control points and protect from disturbance during construction.

3.3 REMOVALS FOR SALVAGE

A. Perform removals for salvage and salvage work in a systematic manner.

B. Salvage Materials and Items: Remove materials or items that are indicated by Contract Documents to be removed for salvage and that are to remain on the property of Owner.

C. Procedures used are to be developed and optimized during removal and are dependent upon conditions encountered and results achieved. General procedures are indicated below for materials to be salvaged.

1. Clean salvaged items of dirt and demolition debris.
2. Tag or label each item.
3. Evaluate materials for quality characteristics and inventory each unit and material or item type as they are prepared for storage.
4. Group like materials and material sizes together.
5. Store items in a secure area until delivery to Owner.
6. As applicable, transport items to Owner's storage area off-site as designated by the owner's Representative.

3.4 CLEARING, STRIPPING, AND GRUBBING

A. Remove existing grasses and other vegetation, paving and related base materials, debris, and/or obstructions before removing existing soil materials.

B. Completely remove stumps, roots, and related organic matter above and below surface.

C. Strip and remove existing plantings and topsoil to the top level of existing inorganic soil material. Maintain segregation of surface topsoil material for disposal.

1. Depth of anticipated topsoil layer existing on-site shall be "as found", estimated at 6 inches below surface grade. Surface material may be used below the cap as filler or leveling material.
2. Dispose of plantings and topsoil and other removed materials off-site.

3.5 DEMOLITION AND REMOVAL OPERATIONS

A. Demolish and remove from the site all existing on and above grade elements and surface improvements not otherwise indicated to be reused. Conform to conditions shown for preparing site areas to accommodate new work.
1. Demolition of existing site elements and surface finishes shall be to level and extent indicated or, if not indicated, to invert elevations and lateral dimension required to complete removal of system or item.
2. Demolition includes the cutting out, destruction, and complete removal of the item or portion of item so designated.

3. Equipment, fixtures, and miscellaneous articles not designated for re-use, as well as debris which is found on the premises and which has been abandoned by the Owner, shall be removed from the work site by the Contractor.
4. Use of explosives is not permitted.

B. Removal of existing underground or buried elements shall be related to and adjusted together with Earthwork operations as specified in Section 310000 Earthwork.
   1. Open excavations shall be secured and made safe daily.

C. On-Site Utilities and Services:
   1. Verify location and status. Arrange disconnect as applicable.
   2. Utility and Service Line Terminations, unless otherwise shown or approved by the Site Engineer shall be as follows:
      a. Close open ends of abandoned underground utilities with sufficiently strong closures to withstand pressures, which may result after closing, and to suit type of utility or service line and in accordance with the standards and procedures of the owner of the service line.

         1) Sewer: Cut and plug at nearest manhole.
         2) Water: Cut and plug at nearest main. Install thrust blocks at caps and plugs.
         3) Steam: Cut and plug at nearest main.
         4) Gas: Comply with utility regulations.
         5) Telephone: Comply with utility regulations.
         6) Electric: Comply with utility regulations.

      b. Piping: Disconnect piping at unions, flanges, valves, or fittings.
      c. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.
      d. Close open ends of metallic conduit and pipe with threaded galvanized metal caps, 24" long concrete or plastic plugs, or other suitable method for the type of material and size of pipe. Do not use wood plugs.
      e. Close open ends of concrete and masonry utilities with masonry bulkheads, constructed of unit masonry and mortar to completely and solidly fill the opening for a depth/length of 16" minimum.

   3. Items abandoned and not removed shall be identified, located, and marked on Project survey documents for inclusion with as-built survey record documents.
      a. Record locations shall include invert elevation and location of capping or disconnect related to point of termination.
   4. Protect utilities to remain. Include visibly marked location for identification by others subsequently performing work on-site and maintain at least until completion of earthwork.

D. Remove existing debris and obstruction materials that may occur at all areas of the site as indicated and as approved by the Environmental Engineer. Fill depressions caused by clearing and removal operations with specified fill material to suit design conditions, unless further excavation or earthwork is indicated. Excavation, grading, backfilling, and filling with placement of fill material in compacted horizontal layers shall be as specified in Section 310000 - Earthwork. Any excavation work/backfill work within the landfill area shall be coordinated with Environmental Engineer prior to commencing and refer to Specification Section 312000.02 Landfill Cap Backfill for more information.

E. Stockpiling of existing soil, gravel, debris, and/or construction materials shall adhere to the following:
   1. Stockpile soil materials away from edge of excavation areas.

2. Cover temporary storage piles to prevent windblown dust and protect against erosion.

3.6 REPAIRS / RESTORATIONS

A. General: Promptly repair damage to adjacent construction caused by work operations.

B. Repair or replace existing off-site and to remain on-site improvements damaged during the conduct of this work with material of same or better kind, quality, and size as approved by the Owner's Representative.
   1. Where repairs to existing surfaces are required, patch surfaces to produce surface suitable for new materials.
   2. Provide repairs or, if required, replacement of construction in a manner that eliminates evidence of patching and refinishing.

C. Re-install items removed for salvage and reuse and items removed at Contractor's convenience or by error after or, as applicable to item, concurrent with completion of Project work. Include pick-up and delivery from storage back to site. Replace fasteners and other components that may have been damaged during removal. Secure connections and comply with applicable specification for item.

3.7 CLEAN UP AND DISPOSAL

A. Remove and dispose of materials resulting from operations as work progresses.

B. Burning or burying of removed materials will not be permitted on the site.

C. Except for items or materials indicated to be salvaged, remove materials from demolition and removals, excess soils, debris and/or obstructions, waste/trash, off the Project site and legally disposed of.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Before completion of Contract Work, remove temporary items and materials installed for use during site clearing, removals, and construction operations of subsequent Project work. See Division 1 Section 015000 Temporary Facilities and Controls for additional provisions.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition and removal operations. At completion of the Work of this Section, site shall be cleared and leveled. All voids caused by removal of stumps, structures or other elements shall be filled and leveled to grades indicated on the Drawings. Stockpiles shall be tidy, covered and contained as required under Section 312500–Soil Erosion and Sediment Control. All erosion control measures shall be left in place.

B. Refer to Division 1 for maintenance cleaning and final cleaning.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture.

1.3 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. Comply with ACI 301.

B. Comply with ACI 117.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I/II.
2. Fly Ash: ASTM C 618, Class C or F.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C 595/C 595M.

B. Normal-Weight Aggregate: ASTM C 33/C 33M, 1-1/2-inch nominal maximum aggregate size.

C. Air-Entraining Admixture: ASTM C 260/C 260M.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

E. Water: ASTM C 94/C 94M.

2.4 RELATED MATERIALS

A. Vapor Retarder: Plastic sheet, ASTM E 1745, Class A or B.

B. Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick; or plastic sheet, ASTM E 1745, Class C.

C. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

2.5 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.6 CONCRETE MIXTURES

A. Normal-Weight Concrete:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.45
3. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
4. Slump Limit: 4 inches plus or minus 1 inch.
5. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.

1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR-RETARDER INSTALLATION

A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.

1. Lap joints 6 inches and seal with manufacturers' recommended adhesive or joint tape.

3.4 STEEL REINFORCEMENT INSTALLATION

A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness

C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

3.6 CONCRETE PLACEMENT

A. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

B. Do not add water to concrete during delivery, at Project site, or during placement.

C. Consolidate concrete with mechanical vibrating equipment according to ACI 301.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.

C. Revise locations in subparagraph below to suit Project. Retain second option if additional finishing is required.

1. Apply to concrete surfaces exposed to public view.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING UNFORMED SURFACES

A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.

1. Do not further disturb surfaces before starting finishing operations.

C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes unless otherwise indicated.

D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.

E. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 305.1 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Tests: Perform according to ACI 301.

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. but less than 25 cu. yd. plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

END OF SECTION

SECTION 061533

RECYCLED PLASTIC LUMBER DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Recycled HDPE resin (RPL) decking.
2. Recycled HDPE resin (RPL) kickrail
3. Recycled HDPE structural beams with fiberglass filament and fiberglass rebar reinforcement
4. Attachment hardware for decking and kick rails
5. Accessories: Connections, fittings and fasteners.

B. Related Sections:

1. Section 033000 “Cast-In-Place Concrete”
2. Section 310000 “Earthwork”
3. Section 321216 “Asphalt Paving”

1.3 REFERENCES AND STANDARDS

A. ASTM Standards:
1. D883 Terminology Relating to Plastics
2. D883 Terminology Relating to Plastics
3. D2565 Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications
4. D2915 Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products
5. D4329 Practice for Fluorescent UV Exposure of Plastics
6. D6109 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products
7. D6112 Test Methods for Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes
8. D6341 Test Method for Determination of the Linear Coefficient of Thermal Expansion of Plastic Lumber and Plastic Lumber Shapes Between –30 and 140°F (–34.4 and 60°C)
9. D6662 Standard Specification for Polyolefin-Based Plastic Lumber Decking Boards
10. E84 Test Method for Surface Burning Characteristics of Building Materials
11. U.S. Americans with Disabilities Act Accessibility Guidelines (ADAAG)

12. ANSI A117.1 Accessible and Usable Buildings and Facilities
13. ACI 301 – Formwork and Form Accessories

B. The Contractor shall conform to the requirements of the above standards, unless otherwise specified herein. In the event of a conflict between these specifications and the referenced standards and/or specifications, the more stringent requirement shall control.

1.4 STRUCTURAL MATERIAL PERFORMANCE REQUIREMENTS

1. Flexural Strength: 2,114 psi - D6109
2. Flexural Modulus Secant @ 1% strain: 137,836 psi - D6109
3. Compression Strength Parallel to grain: 3,402 psi - D6108
4. Compression Strength Perpendicular to grain: 3,169 psi - D6108
5. Compression Modulus Strength Parallel to grain Secant @ 1% strain: 84,672 psi - D6108
6. Moisture Absorption: <0.1% in 24 hrs
7. Thermal Expansion: 0.0000281 inch/inch/deg. F - D6341-98
8. Average Screw Pull Out: 703 pounds - D6117
9. Shear Strength: 1,340 psi - D2344

1.5 DIMENSIONAL PROPERTIES

A. Cup/Bulging Tolerances: Deviation in the face from a straight line from edge to edge of piece.
1. Face width 4": 3/32"
2. Face width 6": 1/8"
3. Face width 8": 3/16"
4. Face width 10": 1/4"
5. Face width 12": 1/4"

B. Length Tolerances = 3" / -0" - Measured at 70 deg F.

1.6 STRUCTURAL PERFORMANCE CRITERIA

A. Maximum Live Load Deflection: L/360.

B. Live Load: Pedestrian Loading = 100 psf.

1.7 ACTION SUBMITTALS

A. Product Data:
1. For plastic decking and metal framing anchors.
2. For structural members and metal anchors.
3. Include installation instructions.

B. Product Data: Submit manufacturer’s specifications, technical data, certifications, and installation instructions for all materials, components, accessories, and finishes/sealers

C. A certificate, issued by an accredited laboratory, attesting to minimum design stresses, as obtained from testing of samples taken from the materials to be supplied for this work, shall accompany this statement.

D. Samples: For plastic decking, not less than 12 inches long, showing the range of variation to be expected in appearance of decking, including surface texture.

E. Submit installation details for each component and for each area of decking and related support framing. Include plans, elevations, and sections to show the following at a minimum:

1. Steel supports, fastenings, and attachments to other work maintaining the structural integrity of support framing.

2. Location of all joints of rails and planks

3. Arrangement of visible hardware (screw pattern layout) on decking

F. Preinstallation Conference: Conduct conference at Project Site with qualified installer, Owner's Representatives, and Landscape Architect. At least 7 days notice will be given prior to the conference.

1.8 INFORMATIONAL SUBMITTALS

A. Material Certificates:
1. Composition and Testing: Certified copies of required tests for materials supplied as specified in this item and as required by the Engineer shall be submitted and approved prior to ordering any material. Contractor shall also submit verification that RPL meets minimum composition requirements.

1.9 QUALITY ASSURANCE

A. Qualification Data: Submit for firms and persons specified in Article "Quality Assurance" herein and as specified in Division 1 Section 014000 "Quality Requirements" to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.

B. Source all RPL from single manufacturing lot to assure color and texture consistency.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Handle and store plastic lumber to comply with manufacturer's written instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Recycled Plastic Lumber (RPL):
   1. Material: TanDeck recycled HDPE resin Ultimate Marine Dock Board as manufactured by Tangent Technologies, 1001 Sullivan Road, Aurora, IL 60506, (630) 264-1110; or approved equal.
   2. Color: Light Gray or approved equal.
   3. Size: 2”x6” board for decking and 2”x2” board for kickrail.

B. Structural RPL
   1. Material: Tangent Technologies PolyForce Plus HDPE with fiberglass filament and fiberglass bar reinforcement as manufactured by Tangent Technologies, 1001 Sullivan Road, Aurora, IL 60506, (630) 264-1110; or approved equal.
   2. Color: Light Gray or approved equal.
   3. Size: 3”x12” Beam

C. Accessories:
   1. Fasteners for RPL to RPL: Provide Stainless steel fasteners (Type 304) - Strong Drive Heavy Duty Wood Screws 0.188 diameter with 5/16"hex drive, integral washer and a minimum thread length of 2.4" - or approved equal. - All holes to be pre-drilled and countersunk.
   2. Miscellaneous concealed fasteners, shims, brackets, bolts, nuts, etc. To be hot dipped galvanized steel in accordance with ASTM A153.
   3. Epoxy anchoring system: as indicated, minimum embedment 3".

2.4 FASTENERS, SUPPORTS AND CONNECTORS

A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide bolts, nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into substrate.

B. Power-Driven Fasteners: ICC-ES AC70.

C. Wood Screws and Lag Screws: ASME B18.2.1, ASME B18.6.1, or ICC-ES AC233.

D. Stainless-Steel Bolts: ASTM F 593, Alloy Group 2 ASTM F 594, Alloy Group 2 hex nuts and, where indicated, flat washers.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION, GENERAL

A. Do not use units or material with defects which impair the quality of the Work and units which are too small to fabricate the Work with minimum joints or with optimum joint arrangement.

B. Install Work accurately to required lines and levels with members plumb and true, accurately cut and fitted and securely fastened. Closely fit rough carpentry to other associated construction.

C. Securely attach RPL Work to substrates by anchoring and fastening as indicated, or, if not indicated, as required by the referenced standards. Select fasteners of size that will not penetrate through members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members.

D. Butt Joints of decking planks, if required and approved on the shop drawings, shall be installed with consideration for expansion and contraction. Gap to be installed is dependent on temperature at the time of installation. Size of joint shall be calculated using the temperature at the time of installation and the linear coefficient of thermal expansion, and shall comply with referenced Accessibility Standards. Consult manufacturer for the Linear Coefficient of Thermal Expansion as determined using ASTM D6341. Buckling of planks will not be accepted.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

3.4 INSTALLATION – FRAMING

A. Install required items where indicated and where required for support, attachment or screening of other Work. Form to shapes indicated or required. Coordinate locations and cut and shim as required to provide items at true and level planes to receive Work to be attached. Install closure strips to nailers at all edges.

B. Attach to substrates as indicated; if not indicated, size and space fasteners as required to support applied loading. Maximum spacing of fasteners shall not exceed 16". Unless otherwise shown on the Contract Drawings, install and secure material to non-wood construction as follows:
   1. To Concrete: Attach material with approved epoxy anchors.

C. Counter-sink bolts and nuts flush with surfaces, unless otherwise shown.

3.5 ADJUSTING

A. Repair damaged surfaces after completing erection. Replace damaged boarding if repairs are not approved by the Construction Manager.

END OF SECTION

SECTION 31 00 00

EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work:

1. Work under this section shall include all supervision, labor, materials, equipment, plant and incidentals required to complete all excavation, backfilling, filling and grading for the placement of clean fill to form the landscape features and site improvements as indicated on the Drawings and as specified herein. For excavation and backfilling of any potentially hazardous areas, consult the Environmental Engineer.
2. The work shall include but not necessarily be limited to:
   a. Saw cut and remove existing pavement.
   b. Excavate and remove unsuitable fill.
   c. Provide, install and remove temporary excavation supports.
   d. Place and compact structural fill.
   e. Rough and fine grading
   f. Construct and stabilize slopes and swales

1.2 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

C. Stormwater Pollution Prevention Plan (SWPPP).

DEFINITIONS:

A. Satisfactory soil materials which can be used for unclassified backfill are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M145, soil classification Groups A-1, A-24, A-2-5, and A-3.

B. Unsatisfactory soil materials are those defined in AASHTO M145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, A-7; also peat and other highly organic soils, or soils containing large cobbles, roots, trash or debris of any kind.

C. Select Granular Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag, natural or crushed sand.

D. Crushed Stone Base: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2” sieve and not more that 5% passing a No. 4 sieve.

E. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

RELATED SECTIONS:

A. Section 312000.01 – Solid Waste Relocation

B. Section 312000.02 – Landfill Final Cap Backfill

C. Section 312319 - Dewatering

D. Section 312500 - Soil Erosion and Sediment Control

E. Section 313210 – Filter Fabric

F. Section 315010 - Excavation, Backfilling and Filling for Utilities

G. Section 324020 - Aggregate Base Course

H. Section 321216 – Asphalt Paving

1.3 REFERENCES

A. State of New York Department of Transportation Standard Specifications, dated 1/8/2015 or the latest edition.

B. New York State Department of Environmental Protection Standards and Specifications for Erosion and Sediment Control, dated November 2016 or the latest edition.

C. Code of the Village of Hastings-on-Hudson.

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

E. D 422 -Test Method for Particle -Size Analysis of Soils

F. D1556 -Test Method for Density of Soil in Place by the Sand-Cone Method.

G. D1557 -Test Methods for Moisture-Density Relations of Soils and Soils – Aggregate Mixture Using 10-lb (4.54-kg) Rammer and 18-in. (475-mm) Drop.

H. D 2167 -Test Method for Density of Soil in Place by the Rubber Balloon Method

I. D 2922 -Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

J. D 3017 -Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

K. D4253 -Test Methods for Maximum Index Density of Soils Using A Vibratory Table.

L. D4254 -Test Methods for Minimum Index Density of Soils and Calculation of Relative Density.

M. D 4318 -Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils

1.4 JOB CONDITIONS

A. Existing Utilities: It is the Contractor's responsibility to verify existence and location of existing utility piping and appurtenances, whether or not shown explicitly on the Drawings. Locate and mark out existing underground utilities in areas of work. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Site Engineer immediately for direction.

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

C. Use of Explosives: The use of explosives is not permitted.

D. Protection of Persons and Property: Barricade open excavations occurring as part of this work. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

E. Excavation must comply with the Village of Hastings-on-Hudson requirements for trench or hole restoration, and for maintenance of street traffic as described in the Contract Documents.

F. Prevent soil and surface water from entering onto the streets or Old Croton Aqueduct (OCA) from the work area in accordance with the SWPPP.

G. Where required for protection of adjacent utilities or structures or where required for performance of the Work, secure the sides of excavations against movement as follows:

1. Install sheet piling or sheeting held in place by waling and bracing members. Top of sheeting shall extend at least six inches above ground.
2. Do not excavate below the bottom of sheet piling or sheeting except as necessary to install sheeting.
3. Fill voids behind sheeting immediately with material conforming to paragraph 1.3 of this section.
4. For excavations extending to a depth of 5 feet or more, and where sheeting is not required excavate slopes to a safe angle of repose, or protect trench excavations by use of a portable trench shield.
5. Restore all areas impacted by excavation to their original condition, matching pavement types and sections to meet original pavement grades.

H. Excavated Materials:

1. If any contaminated or hazardous materials are encountered at the site the Contractor shall consult with the Environmental Engineer as to how to proceed. All such soils or other materials must be excavated and disposed of in a legal manner at an approved site, as directed by the Environmental Engineer.

I. Soil Backfill:

1. Excavated soils may be used for backfill provided they comply with the Environmental Engineer's specifications.

2. Contractor shall coordinate with Environmental Engineer for appropriate backfill for landfill cap. Refer to drawings and specifications from Environmental Engineer for more information.

1.5 SUBMITTALS

A. Test Reports – Compaction Testing for pavement base material to be provided to Site Engineer for approval.

1.6 QUALITY ASSURANCE

A. Quality Control Testing during Construction: Allow testing service to inspect and approve or reject sub-grades and fill layers before further construction work is performed.
B. Perform field density tests in accordance with ASTM D 1556 (Sand Cone Method or ASTM D2167 (Rubber Balloon method), as applicable.

C. Compaction testing to be provided to Site Engineer for approval.

PART 2 - PRODUCTS

2.1 GENERAL

A. The project site subsurface conditions may consist partially of variable thickness layers of Unsuitable Material. This material may not be considered as acceptable backfill material as described herein, or as determined by the Environmental Engineer.

B. All material for embankment, backfilling for utility trenches, and structural fill should be free of bricks, blocks, debris, excavated pavement, stumps, roots and other organic matter, as well as ashes, oil and other perishable or foreign matter.

2.2 MATERIALS

A. Crushed Stone:

1. Crushed stone shall be broken stone, sound, hard and roughly cubical in shape and shall comply with ASTM C33, Size No. 67. Crushed stone shall have a maximum size of three quarter (3/4) inch and a minimum size of one-quarter (1/4) inch with the following gradation:

   100% passing the 1-inch sieve
   90-100% passing the 3/4-inch sieve
   20-50% passing the 3/8-inch sieve
   0-10% passing the No. 4 sieve
   0-5% passing the No. 8 sieve

B. Riprap

1. Riprap shall consist of stones of acceptable size and quality, placed in embankments or for outfall protection. All riprap shall be granite, dolomite, gneiss, trap rock or other approved hard and durable stone. No riprap stone shall be smaller than the commercial two and one-half (2-1/2) inch stone.
2. In general, riprap stone shall be graded from two and one-half (2-1/2) inches to eighteen (18) inches so that the smaller stones shall fill voids between the larger stones.

3. When available and suitable for the purpose, larger stones will be permitted. Larger stones will be required for slope facing.

2.3 SOURCES

A. The location of the fill stockpile is shown on the Contract Drawings. The source of fill shall be reviewed by the Environmental Engineer, Site Engineer and Landscape Architect prior to start of fill placement. The soil horticultural soil material above the landfill cap shall be subject to special inspection and soil testing in conformance with the landscape specifications.

B. If sufficient quantities of materials are unavailable, furnish material from sources off site. Provide certification of analysis of all proposed imported materials for approval prior to procurement.

C. All materials brought onto the site shall be stockpiled in well delineated and separate stockpiles such that no mixing of materials occurs.

PART 3 - EXECUTION

3.0 PREPARATION

A. Contact Dig. Safely. New York at least 2 working days before the start of the project. Contractor shall call 811.

B. Confirm locations of buried structures and utilities with all agencies and/or utility companies. Field confirmation of buried structures and utilities shall be made before beginning work at the site. Contractor shall notify Site Engineer of any discrepancies prior to commencing construction. Obtain all applicable utility clearances and be responsible for performing the work shown using means and methods satisfactory to all government agencies and/or utilities companies. Should the contractor's operations cause damage to utilities or structures, the contractor shall notify the appropriate agency and shall arrange for immediate repairs.

3.1 PLACEMENT

A. Rip rap to be hand placed in conformance with plans and details

B. Crushed stone to be mechanically placed, manually spread and leveled to conform with plans and details.

3.2 FIELD TESTS

A. Inspection and Testing
   1. Refer to Specification Section 315010 Excavation, Backfilling and filling for Utilities

B. Testing Requirements for Fill and Backfill
   1. Control Tests: Fill and backfill refer to Specification Section 315010 Excavation, Backfilling and filling for Utilities

3.3 MAINTENANCE

A. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

3.4 DISPOSAL OF EXCESS MATERIALS

A. Transport acceptable excess excavated material to designated locations, as directed by the Environmental Engineer. Stockpile soil or spread as directed by the Environmental Engineer.

END OF SECTION

SECTION 31 20 00.01

SOLID WASTE RELOCATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. CONTRACTOR shall provide all labor, materials, equipment and incidentals required to perform all excavating, temporary storage, and re-landfilling of previously placed solid waste required to complete the Work.
   2. Contractor shall excavate, relocate, grade, and compact landfilled solid waste materials within the existing landfill footprint to achieve landfill cap subgrades as shown and specified. No importation of fill material to achieve subgrades is permitted.
   3. All dewatering for leachate and non-impacted water, including collection, storage, testing, treatment, and off-site disposal, in accordance with Section 31 23 19 is included.
   4. All transportation and disposal of excess excavated solid waste at an approved off-site disposal facility is included. Included are all plans, manifests, recordkeeping, and any other supporting documentation necessary for shipment and off-site disposal.

B. Related Sections:
   1. Section 31 20 00.02, LANDFILL FINAL CAP BACKFILL.
   2. Section 31 23 19, DEWATERING.

C. General:
   1. CONTRACTOR is required to use appropriate methods to excavate, haul, re-landfill, and compact existing landfilled solid waste materials achieving the supporting subgrade required to obtain the final landfill configuration as shown and specified.

1.2 QUALITY ASSURANCE

A. Tests:
   1. Required Tests:
      a. Soil testing for final cap shall be in accordance with Section 31 20 00.02, LANDFILL FINAL CAP BACKFILL.

B. Permits and Regulations:
   1. CONTRACTOR shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.3 SUBMITTALS

A. Shop drawings on application of required odor suppressant.

B. Dewatering Work Plan in accordance with the requirements of Section 31 23 19 DEWATERING.

C. Off-site waste disposal records, including the name and identification number of the facility, address, name of responsible contact for the facility, telephone and fax number for the contact, signed letter of agreement to accept waste, bills of lading and waste manifests.

1.4 JOB CONDITIONS

A. Subsurface Information: No subsurface borings are available.

B. Potential Environmental Conditions: CONTRACTOR shall be aware of the possibility of encountering potential hazardous environmental conditions associated with the existing landfill waste, landfill gas, or leachate.

C. Leachate: All surface and subsurface water that comes into contact with solid waste is considered leachate and shall be collected, tested, and treated, as necessary, prior to disposal.

PART 2 - PRODUCTS

2.1 ODOR SUPPRESSANT

A. Odor Suppressant:
   1. Biodegradable, non-hazardous, non-combustible, non-reactive aqueous foam applied using a pneumatic sprayer.
   2. Manufacturer:
      a. RusFoam® OC (AC645)
      b. Or equal.

PART 3 - EXECUTION

3.1 INSPECTION

A. ENVIRONMENTAL ENGINEER will examine areas and conditions of waste to be re-landfilled. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

A. CONTRACTOR shall perform all excavation required to complete the Work as shown and specified. Excavation shall include earth, solid waste, demolition debris and all other materials within the excavation limits.

3.3 DRAINAGE AND DEWATERING

A. Dewatering Work Plan: Prior to the start of waste relocation activities, submit a Dewatering Work Plan in accordance with the requirements of Section 31 23 19 DEWATERING, that includes methods for handling, storage, treatment, and disposal of excavation-derived water that has come into contact with exposed solid waste.

B. Provide drainage and dewatering in accordance with the requirements of Section 31 23 19 DEWATERING and the approved Dewatering Work Plan.

3.5 SOLID WASTE

A. Solid waste shall be relocated to the top of the landfill as shown and specified at an approximate minimum grade of 2 percent and maximum grade of 3 horizontal to 1 vertical slope.

B. Excavated solid waste shall be re-located within the existing landfill footprint to the greatest extent practical to achieve the cap subgrades as shown and specified.

C. Solid waste shall not be placed if any water is on the surface of area to receive solid waste.

D. Solid waste shall be placed in horizontal loose lifts of up to 18 inches each.

E. Compact each lift before placing the next lift.

F. Compact using suitable equipment to the satisfaction of ENVIRONMENTAL ENGINEER. Compacted subgrade shall be firm, dense, and thoroughly compacted and consolidated; shall be free, from mud, muck, and other unsuitable materials; and shall remain firm and intact under construction operations. Subgrades which are otherwise solid but which become soft or mucky due to construction operations shall be reinforced with crushed stone or gravel. The finished elevation of the subgrade after waste relocation and compaction shall not be above the subgrade elevations shown.

G. CONTRACTOR shall provide all survey grade staking and any other horizontal or vertical control needed to accomplish the work.

H. At the direction of the OWNER or ENVIRONMENTAL ENGINEER, apply odor suppressant per manufacturer's recommendations at end of each shift of excavation or of re-landfilling.

I. For all areas where excavation or filling operations are complete or will be suspended for seven days or longer the CONTRACTOR shall place 18 inches of soil cap fill to establish landfill final cover system.

J. Apply additional odor suppressants as conditions warrant to mitigate complaints from the surrounding community.

3.6 DISPOSAL OF EXCESS EXCAVATED SOLID WASTE

A. CONTRACTOR shall haul away material removed from excavations that cannot be re-landfilled within the existing landfill footprint. This may include large or bulky waste materials that cannot be compacted or that could potential result in settlement of or voids within the subgrade.

B. Any excess solid waste which is generated during the project as a result of excavation activities within the landfill footprint that is not relocated within the landfill footprint and below the final cap shall be disposed at an authorized solid waste management facility. Provide documentation of proper disposal, including the name of the facility, quantity disposed, and dates of disposal to

the ENVIRONMENTAL ENGINEER. Contractor shall comply with all requirements of the disposal facility.

C. Transportation and disposal of excess solid waste materials shall be in compliance with all federal, state, and local Laws and Regulations..

D. No excavated solid waste material shall be disposed off-site without prior approval of the ENVIRONMENTAL ENGINEER.

3.7 UNAUTHORIZED EXCAVATION

A. All excavations outside lines and grades shown or indicated and that are not approved by ENVIRONMENTAL ENGINEER, together with removing and disposing of the associated material, shall be at CONTRACTOR's expense. Fill unauthorized excavations with properly-compacted select fill material at CONTRACTOR's expense.

+ + END OF SECTION + +

SECTION 31 20 00.02

LANDFILL FINAL CAP BACKFILL

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:
1. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to perform all excavating, backfilling and compacting, and testing of materials for constructing the landfill final cap system comprised of an 18-inch (in-place minimum) thick compacted soil cap fill layer having a maximum permeability of 10^{-5} cm/sec, overlain by a 6-inch (min.) thick planting soil layer capable of supporting vegetative growth. Included are all grading, field and laboratory testing, surveying, and other facilities required to complete the Work.
2. All temporary means needed to prevent discharge of sediment to water courses from dewatering systems, rainfall run-off or erosion, in accordance with approved plans, are included.
3. All necessary earthwork required to unload, place, compact and grade the soil cap fill and planting soil layer is included.
4. All necessary earthwork required to cut, fill and grade existing grade to within 0.1 inch of specified grade.
5. Testing Services: Testing of materials, moisture content during placement and compaction of fill materials, in-place permeability, and degree of compaction for compliance with technical requirements of these Specifications.
6. All necessary work required to design, furnish, install, and construct temporary bridging system to cross the Old Croton Aqueduct, including all permits and approvals, is included.
7. All survey control to establish the thickness of the landfill cap, including topographic surveys of the subgrade surface, the top of the 18-inch compacted soil cap layer, and the completed landfill final grades, is included.

B. Related Sections:
1. Section 01 50 00, TEMPORARY FACILITIES AND CONTROLS
2. Section 31 20 00.01, SOLID WASTE RELOCATION
3. Section 31 23 19, DEWATERING

C. General:
1. CONTRACTOR is required to use approved clean material from off-site sources as shown on the Drawings in the Plan, to achieve landfill final cap system grades.

2. CONTRACTOR shall be responsible for field measurement and layout work as required to control lines, grades and lift thickness during completion of the work, and for employing personnel to perform said work per acceptance of the Environmental Engineer. Copies of all field notes shall accompany survey work performed by the CONTRACTOR and shall be submitted prior to the request for payment upon completion and certification of the work by the CONTRACTOR.
3. Prior to the start of cap construction, CONTRACTOR shall complete a topographic survey of the landfill subgrade surface.
4. Prior to placement of the planting soil layer, CONTRACTOR shall complete a topographic survey of the top of the 18-inch (min.) compacted soil cap fill layer surface.
5. CONTRACTOR shall complete an as-built topographic survey of the completed landfill final cap system final grades. In the event that the as-built survey indicates that the lines, grades or thickness, as specified, have not been achieved, the CONTRACTOR shall promptly repair and/or replace the work in conformance with the Specifications and to the satisfaction of the Environmental Engineer at no additional cost. Any repeat as-built survey work necessitated due to the CONTRACTOR's improper performance of the work will be paid for by the CONTRACTOR. Surveys shall be prepared by a New York State licensed surveyor.
6. CONTRACTOR's test data for proposed borrow sources shall indicate compliance with the Specifications in order to be accepted. The data shall be presented to and accepted by the Environmental Engineer prior to bringing materials on-site. CONTRACTOR shall assist the Environmental Engineer in doing periodic conformance testing while the work is in progress. The field data shall be certified and sealed by a New York Licensed Professional Environmental Engineer.

D. Erosion and Sediment Control:
   1. Construct erosion and sediment control measures in accordance with the standards and specifications of the most recent version of the "New York State Standards and Specifications for Soil Erosion and Sediment Control".
   2. Erosion and sediment control measures shall be installed prior to construction.
   3. Sediment and erosion control measures shall be installed as required and as approved by the Environmental Engineer and in accordance with the approved Storm Water Pollution Prevention Plan (SWPPP).
   4. All control measures shall be maintained or replaced during the construction period, as necessary or required. Additional erosion and sedimentation control measures will be installed during the construction period if required, or ordered by the Environmental Engineer.
   5. The CONTRACTOR shall control dust and wind erosion throughout the construction. CONTRACTOR shall control dust to prevent nuisance conditions and to prevent a hazard to on-site personnel.

E. CONTRACTOR shall provide Environmental Engineer with access to the borrow pit or cover material source upon request for the purposes of observing material source operations and obtaining samples.

1.2 REFERENCES

A. Standards referenced in this Section are:
   1. ASTM D 422, Test Method for Particle-Size Analysis of Soils.
   2. ASTM D 1556, Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   3. ASTM D 1557, Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).
   4. ASTM D 2216, Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
   5. ASTM D 2487, Soils for Environmental Engineering Purposes.
   6. ASTM D 2922, Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   7. ASTM D 4253, Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
   8. ASTM D 4254, Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
   9. ASTM D 4318, Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
   10. ASTM D 4972, pH of Soils.
   11. ASTM D 5084, Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
   12. ASTM D 5268, Standard Specification for Topsoil Used for Landscaping Purposes.
   13. ASTM D 6938, Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
   14. ASTM E329, Specification for Agencies Engaged in Construction Inspection and/or Testing.
   15. Occupational Safety and Health Administration, (OSHA):
       a. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations)

1.3 TERMINOLOGY

A. The following words or terms are not defined but, when used in this Section, have the following meaning:
   1. “Subgrade” is the uppermost surface of landfilled waste material after relocation, grading, and compaction; the surface upon which the landfill final cap system is constructed.

1.4 QUALITY ASSURANCE

A. CONTRACTOR’s Testing Laboratory:
   1. Retain the services of independent testing laboratory to perform testing and determine compliance with the Contract Documents of the materials specified in this Section.

2. Testing laboratory shall comply with ASTM E329 and requirements of Section 1.4 B, Quality Assurance Testing.
3. Testing laboratory shall be experienced in the types of testing required.
4. Selection of testing laboratory is subject to OWNER's and ENVIRONMENTAL ENGINEER's acceptance.

B. CONTRACTOR's Testing Laboratory Scope:
1. Collect samples and perform testing of proposed fill materials in the laboratory and in the field to demonstrate compliance of the Work with the Contract Documents.
2. Testing laboratory shall perform testing required to obtain data for selecting moisture content for placing and compacting fill materials.
3. Submit to ENVIRONMENTAL ENGINEER and CONTRACTOR written report results of each test.

C. Quality Assurance Testing:
1. Quality assurance testing is in addition to field quality control testing required under Part 3 of this Section.
2. Materials used in the Work may require testing and retesting, as directed by ENVIRONMENTAL ENGINEER, during the Project. Allow free access to material stockpiles and facilities at all times. Tests not specifically indicated to be performed at OWNER's expense, including retesting of rejected materials and installed Work, shall be performed at CONTRACTOR's expense.

D. Required Quality Assurance Material Testing by CONTRACTOR's Testing Laboratory:
1. Borrow source testing requirements for the soil cap fill - Testing shall conform, as a minimum, to the following parameters at the following frequencies:

Type of Test	**Testing Frequency***	**Testing Method**
Grain size	1,000 yd^3	ASTM D 422
Moisture content	1,000 yd^3	ASTM D 2216
Moisture-density curve	1,000 yd^3	ASTM D 1557
Atterberg limits	1,000 yd^3	ASTM D 4318
Recompacted permeability**	5,000 yd^3	ASTM D 5084

***** Tests shall be conducted at these minimum frequencies. Testing shall be conducted with any visible change in material and any change in the source of material.

****** Soil will be recompacted to 90% of the Modified Proctor maximum dry density.

2. Chemical Testing - Furnish analytical results of representative samples of soil cap fill and top soil for VOCs, PCBs, PAHs, ETPH, and RCRA 8 metals prior to bringing material on site. The results must not contain metals at concentrations above residential standards or detectable amounts of PCBs, PAHs, VOCs, or ETPH.

E. Regulatory Requirements:
1. Perform excavation work in compliance with requirements of authorities having jurisdiction and Laws and Regulations, including:

a. OSHA, 29 CFR Part 1926, Section .650 (Subpart P – Excavations).

2. Obtain required permits and approvals for excavation and fill Work, including work permits from right-of-way owners and permits from environmental authorities having jurisdiction over discharge of water from excavations.

3. Obtain required permits, approvals, and authorizations for bridging and crossing the Old Croton Aqueduct, including permits from the New York State Office of Parks, Recreation & Historic Preservation, and permits from any authorities having jurisdiction.

1.5 TOPOGRAPHIC SURVEYS

A. Plot required survey information on a reproducible map at a scale of 1-inch = 40 feet with 1-foot elevation contours. Mapping shall conform to the National Map Accuracy Specifications and shall bear the seal of a licensed land surveyor registered in New York. The map shall contain a title block with the name and address of the CONTRACTOR and the signature of the registered surveyor. Record Drawings shall include labeled contour lines, property line locations including bearings and distances, horizontal grid systems, cross-sections and details, and any field changes of elevations, dimensions, and details. Indicate locations of physical features on site including: structures, utilities, roadways, driveways, garages, and fences. Indicate on a separate drawing excavation limits and verification of sampling points. Utilize AutoCAD Release 2014 compatible electronic files for all maps. Provide data on compact discs or DVD. In addition to AutoCAD drawings, compact discs shall contain for each drawing all surveyed points with their northing, easting, elevation, description; and all drawing support files (i.e. shapes, fonts, etc.).

1.6 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Samples:
      a. Submit samples of all soil cap fill and top soil materials required.

B. Informational Submittals: Submit the following:
   1. Site Quality Control Submittals:
      a. Borrow, Backfill and Grading: Testing laboratory shall submit copies of the following reports directly to Environmental Engineer, with copy to the CONTRACTOR:
         1) Tests on borrow material.
         2) Chemical testing analytical results.
         3) Field density tests.
         4) Modified Proctor optimum moisture - maximum density curve for each soil used for backfill.
         5) Undisturbed or recompacted permeability tests.
      b. Submit the proposed compaction procedure and equipment to be used.
      c. Submit any additional reports from required field testing as specified in Part 3 of this specification.

2. Topographic Surveys:
   a. Landfill subgrade surface.
   b. Top of 18-inch (min.) compacted soil cap fill layer surface.
   c. Completed landfill final grades.

3. Qualifications Statements:
   a. Submit qualifications for independent testing laboratory.
   b. Submit qualifications for earthwork testing agency.

4. Disposal Records:
   a. Submit proof of acceptance at permitted facility of all materials removed from the site for off-site disposal or recycling.

1.7 SITE CONDITIONS

A. Subsurface Information: Information available relative to subsurface conditions at the Site is not intended as a representation or warranty of continuity of conditions between soil borings or test pits, nor of groundwater levels at dates and times other than date and time when measured, nor that purpose of obtaining the information and data were appropriate for use by CONTRACTOR. OWNER will not be responsible for interpretations or conclusions drawn therefrom by CONTRACTOR.

B. Soil borings and other exploratory operations may be made by CONTRACTOR, at no additional cost to OWNER. Coordinate CONTRACTOR-performed test borings and other exploratory operations with OWNER and utility owners as appropriate. Perform such explorations without disrupting or otherwise adversely affecting operations of OWNER or utility owners. Comply with Laws and Regulations relative to required notifications.

C. Existing Structures:
   1. The Contract Documents show or indicate structures and Underground Facilities adjacent to the Work. Such information was obtained from existing records and is not guaranteed to be correct or complete. CONTRACTOR shall explore ahead of the excavation to determine the exact location of all existing structures and Underground Facilities. Existing structures and Underground Facilities shall be supported and protected from damage by CONTRACTOR. Immediately repair and restore existing structures and Underground Facilities damaged by CONTRACTOR without additional cost to OWNER.
   2. Movement or operation of construction equipment over Underground Facilities shall be at CONTRACTOR's sole risk and only after CONTRACTOR has prepared and submitted to ENVIRONMENTAL ENGINEER and utility owners (as applicable), and received acceptance therefrom, a plan describing CONTRACTOR's analysis of the loads to be imparted and CONTRACTOR's proposed measures to protect structures and Underground Facilities during the Project.

3. Coordinate with utility owners for shut-off of services in active piping and conduits. When required by utility owner, OWNER will assist CONTRACTOR with utility owner notifications. Completely remove buried piping and conduits indicated for removal and not otherwise indicated as being abandoned or to remain in place.

D. Old Croton Aqueduct (OCA):
   1. The OCA is adjacent to the west side of the Site. The most direct access to the site is across the OCA from Aqueduct Lane, which generally parallels the aqueduct routing on the west. There is no direct access to the Site from public streets. The CONTRACTOR is advised that there are Environmental Engineering requirements and restrictions for crossing the OCA with heavy equipment and loaded triaxle trucks. The maximum allowable load above the OCA is 10,000 lbs. The CONTRACTOR shall design, furnish, install, and construct temporary bridging system, as required, to cross the OCA safely and to protect the subsurface structure. The CONTRACTOR shall coordinate with, and meet all requirements of, the New York State Office of Parks, Recreation & Historic Preservation, and shall provide all documentation necessary for the Village to obtain all permits and approvals for the OCA crossing.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Soil Cap Fill:
   1. Provide soil materials with a maximum particle size of 1 inch and a maximum in-place permeability of 1.0×10^{-5} cm/sec. The range of acceptable gradation for the final cover soils is as follows:

Sieve Size	Suggested Grain Size Range (% pass)*
6.3 mm	89-100%
4.75 mm (#4)	83-100%
2.0 mm (#10)	50 100%
425 mm (#40)	23-85%
150 mm (#100)	12-65%
75 mm (#200)	12-48%

B. General Fill:
   1. Material shall be free of: rock and gravel larger than three inches in any dimension, debris, waste, frozen materials, organic material, and other deleterious matter.
   2. Fill shall have a liquid limit not greater than 45, and plasticity index not greater than 25.

3. Previously-excavated materials complying with the Contract Documents requirements for general fill may be used for general fill.
4. When on-site materials are found unsuitable for use as general fill, provide select fill or approved off-site general fill materials. Prior to using off-site material as general fill, furnish submittal for and obtain ENVIRONMENTAL ENGINEER's approval of the material proposed for use.

C. Planting soil: Provide planting soil in accordance with the requirements of Section 32 91 13 Soil Preparation.

2.2 SOURCE QUALITY CONTROL

A. Perform quality assurance testing, and submit results to ENVIRONMENTAL ENGINEER, in accordance with the 'Quality Assurance" Article in Part 1 of this Section.

PART 3 – EXECUTION

3.1 INSPECTION

A. Provide ENVIRONMENTAL ENGINEER with sufficient notice and with means to examine areas and conditions under which excavating, filling, and grading will be performed. ENVIRONMENTAL ENGINEER will advise CONTRACTOR in writing when ENVIRONMENTAL ENGINEER is aware of conditions that may be detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Site Preparation:
1. Clear areas to be occupied by permanent construction of all trees, brush, roots, stumps, logs, wood and other materials and debris. Remove from the Site and properly dispose of all waste materials not associated with landfill waste relocation as shown on the drawings and specified in Specification Section 31 20 00.01.
2. Burning is not allowed at the Site.
3. CONTRACTOR shall comply with all terms of permits for the Work.

B. Use of Explosives:
1. Use of explosives is not allowed.

C. Dust Control:
1. Control objectionable dust caused by CONTRACTOR's operation of vehicles and equipment, clearing, and other actions. To minimize airborne dust, apply water or use other methods subject to ENVIRONMENTAL ENGINEER's acceptance and approval of authorities having jurisdiction.

D. Maintenance and Protection of Traffic:
   1. Keep all streets and traffic ways open for passage of traffic and pedestrians during the Project, unless otherwise approved by owner of the street, traffic way, or right-of-way, as applicable. Construction traffic shall access the Site only via entrance(s) indicated on approved MPT plan.
   2. When required to cross, obstruct, or temporarily close a street or traffic way, provide and maintain suitable bridges, detours, and other acceptable temporary expedients to accommodate traffic. Closings of street or traffic way shall be for shortest time practical, and passage shall be restored immediately after completion of fill and temporary paving or bridging.
   3. Give required advance notice to fire department, police department, and other emergency services as applicable of proposed construction operations.
   4. Give reasonable notice to owners or tenants of private property who may be affected by construction operations. Give such notice not less than 10 days prior to construction that will affect the property.
   5. Hydrants, valves, fire alarm boxes, and other facilities that may require access during construction shall be kept accessible for use.
   6. Provide temporary signage, signals, barricades, flares, lights and other equipment, service, and personnel required to regulate and protect traffic and warn of hazards. Such Work shall comply with requirements of owner of right-of-way and authorities having jurisdiction at the Site. Remove temporary equipment and facilities when no longer required, and restore grounds to original or to specified conditions, as applicable.

E. Site Access and Old Croton Aqueduct Protection:
   1. CONTRACTOR shall design, furnish, install, and construct all temporary bridging systems as required to protect the Old Croton Aqueduct. CONTRACTOR shall coordinate with the New York State Office of Parks, Recreation & Historic Preservation, and with any other authorities having jurisdiction, for approval of all aqueduct crossings.
   2. Maximum allowable load above the Old Croton Aqueduct is 10,000 lbs.
   3. Remove temporary bridging and facilities when no longer required, and restore grounds to original conditions, as applicable.

F. Subgrade:
   1. Subgrade shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud, muck, and other soft or unsuitable materials; and shall remain firm and intact under all construction operations. Finished elevation of stabilized subgrades shall not be above subgrade elevations shown.

3.3 DEWATERING

A. Provide dewatering as specified in Section 31 23 19 DEWATERING.

3.4 BACKFILL

A. After completion of the subgrade, furnish, place and compact all backfill required to provide 2-foot thick (in-place minimum) landfill final cap consisting of 18 inches (in-place minimum) compacted soil cap fill layer having a maximum permeability of 10^{-5} cm/sec and 6 inches (in-place minimum) planting soil as shown and specified. Provide and compact all fill required for the finished grades as shown and as specified in this Section.

B. Place fill in excavations as promptly as progress of the Work allows, but not until completing the following:
   1. ENVIRONMENTAL ENGINEER's authorization after observation of construction below subgrade.

C. Fill that includes organic materials or other unacceptable material shall be removed and replaced with approved fill material in accordance with the Contract Documents.

D. Place fill to the grades shown or indicated. Unless otherwise specified or directed by Environmental Engineer, fill shall be placed in horizontal loose lifts not exceeding 8 inches in thickness and shall be mixed and spread in a manner assuring uniform lift thickness after placing.

E. Place fill materials at moisture content and density as specified in this Article's requirements on compaction density. Furnish and use equipment capable of adding measured amounts of water to the fill materials to bring fill materials to a condition within required moisture content range. Furnish and use equipment capable of discing, aerating, and mixing the fill materials to ensure reasonable uniformity of moisture content throughout the fill materials, and to reduce moisture content of borrow materials by air drying, when necessary. When subgrade or lift of fill materials requires moisture-conditioning before compaction, fill material shall be sufficiently mixed or worked on the subgrade to ensure uniform moisture content throughout the lift of material to be compacted. Materials at moisture content in excess of specified limit shall be dried by aeration or stockpiled for drying.

F. The water content of fill material shall be controlled during placement within the range necessary to obtain the compaction specified. In general, the moisture content of the fill shall be within three percent of the optimum moisture content for compaction as determined by laboratory tests (Modified Proctor). CONTRACTOR shall perform all necessary work to adjust the water content of the material to within the range necessary to permit the compaction specified. No fill material shall be placed when free water is standing on the surface of the area where the fill is to be placed. No compaction of fill will be permitted with free water on any portion of the fill to be compacted.

G. Place fill materials in horizontal, loose lifts, not exceeding specified uncompacted thickness. Place fill in a manner ensuring uniform lift thickness after placing.

H. Do not place fill materials when standing water is present on surface of the area where fill will be placed. Do not place fill in a frozen condition or on top of frozen material. Fill containing organic materials or other unacceptable material previously described shall be removed and replaced prior to compaction.

I. Repair, at CONTRACTOR's expense, observed or measured settlement. Make repairs and replacements as required within 30 days after being so advised by ENVIRONMENTAL ENGINEER.

J. Replacement of Unacceptable Excavated Materials: In cases where over-excavation to replace unacceptable soil materials is required, backfill the excavation to required subgrade with select fill material and thoroughly compact in accordance with the "Compaction Density Requirements" in this Article. Select fill necessary to replace subgrade materials disturbed and softened as a result of CONTRACTOR's operations or to backfill unauthorized excavation shall be provided, placed and compacted at CONTRACTOR's expense.

3.5 GRADING

A. General:
   1. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas.
   2. Smooth subgrade surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
   3. Capped Areas: Minimum slope shall be 2 percent and maximum slope shall be 33.3 percent (3:1 horizontal:vertical) within capped areas.

   4. Grassed Areas or Areas Covered with Gravel, Stone, Wood Chips, or Other Special Cover: Finish areas to receive planting soil or special cover to within not more than one inch above the required subgrade elevations.

3.6 COMPACTION AND PERMEABILITY

A. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

B. Perform compaction with equipment suitable for the type of fill material placed. Select and use equipment capable of providing the minimum density and maximum permeability required in the Contract Documents.

C. The effectiveness of the equipment selected by CONTRACTOR shall be tested at the commencement of compaction work by construction of a small section of c within the area where the final cap backfill is to be placed. If tests on this section of fill show that the specified compaction and permeability are not obtained, CONTRACTOR shall increase

the amount of coverages, decrease the lift thickness or obtain a different type of compactor, all at no additional cost to Owner.

D. Mechanically compact each lift, by not less than two complete coverages of the compactor. One coverage is defined as the conditions reached when all portions of the fill lift have been subjected to the direct contact of compactor's compacting surface. Compaction of fill materials by inundation with water is unacceptable.

E. Do not compact fill when standing water is present on the fill to be compacted. Do not compact fill in a frozen condition or on top of frozen material. Fill containing organic materials or other unacceptable material previously described shall be removed and replaced prior to compaction.

F. If required density and permeability are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly-functioning compaction equipment, CONTRACTOR shall perform all work required to provide the required density and permeability. Such work shall include, at no additional cost to OWNER, complete removal of unacceptable fill areas and replacement and re-compaction until acceptable fill is provided.

G. Compaction Density Requirements:
   1. Minimum density for fill materials other than planting soil shall be 90 percent of maximum density obtained in the laboratory in accordance with ASTM D1557.
   2. Fill shall be wetted and thoroughly mixed to achieve optimum moisture content plus-or-minus three percent.
   3. Replace natural, undisturbed soils or compacted soil subsequently disturbed or removed by construction operations with materials compacted as indicated.
   4. Field quality control testing for density, to verify that specified density was obtained, will be performed during each day of compaction Work. Responsibility for field quality control testing is specified in the "Field Quality Control" Article in Part 3 of this Section.
   5. When field quality control testing indicates unsatisfactory compaction or permeability, provide additional compaction necessary to obtain the specified compaction and permeability. Perform additional compaction Work at no additional cost to OWNER until specified compaction and permeability are obtained. Such work includes complete removal of unacceptable (as determined by ENVIRONMENTAL ENGINEER) fill areas and replacement and re-compaction until acceptable fill is provided in accordance with the Contract Documents.

H. Seal all test holes due to Shelby tubes, nuclear density gauges, and compaction testing with low permeability soil cap material.

I. Repair, at CONTRACTOR's expense, observed or measured settlement. Make repairs and replacements as required within 30 days after being so advised by ENVIRONMENTAL ENGINEER.

3.7 FIELD QUALITY CONTROL

A. CONTRACTOR will employ an earthwork testing agency to perform field quality control testing.

B. Field Quality Control Testing Laboratory Scope:
   1. Perform field moisture content and density tests to ensure that the specified compaction of fill materials has been obtained.
   2. Report results of each test to ENVIRONMENTAL ENGINEER and CONTRACTOR.

C. In-place Testing Requirements: CONTRACTOR shall test the in-place soil cap fill material for the following parameters at the following frequencies:

Type of Test	**Testing Frequency***	**Testing Method**
In-place density and moisture content	9 tests/acre/lift	ASTM D 6938
Lift thickness	1 test/2,500SF/lift	Field
Shelby Tube/Permeability	2/acre/lift	Field & Laboratory Measurements

***** Tests shall be conducted at these frequencies for each 6-inch compacted lift. In-place testing locations (except lift thickness measurements) shall be surveyed by CONTRACTOR.
   a. Field density tests - A Moisture-Density gauge shall be used for all field density tests. Test locations and identification shall be as directed by the Environmental Engineer. Test reports shall note the identification provided by the Environmental Engineer and the lift for each test. CONTRACTOR shall coordinate surveying of the test locations.
   b. CONTRACTOR shall provide a plan view survey of the site after placement of each lift of the soil cap fill and planting soil showing the field testing locations.
   c. CONTRACTOR shall sequence the work to provide adequate time to test and obtain the results of testing prior to placement of the next lift of material. The CONTRACTOR shall not place the subsequent lift of material until the previous lift is verified by the ENVIRONMENTAL ENGINEER as meeting the specifications.
   d. Compaction: Comply with ASTM D1556 and ASTM D6938, as applicable.
   e. All Shelby tube sample locations shall be backfilled with soil cap fill material and compacted in place with a tamping rod, Modified Proctor Hammer, or hand tamper.

D. Authority and Duties of Testing Agency:
   1. Technicians representing the testing laboratory shall inspect the materials in the field, perform testing, and report findings to ENVIRONMENTAL ENGINEER and CONTRACTOR. When materials furnished or the Work performed does not comply with the Contract Documents, technician will direct attention of ENVIRONMENTAL ENGINEER and CONTRACTOR to such failure.
   2. Technician will not act as foreman or perform other duties for CONTRACTOR. Work will be checked as it progresses, but failure to detect defective Work or noncomplying materials shall not in any way prevent later rejection when defect is dis-

covered, nor shall it obligate ENVIRONMENTAL ENGINEER for Substantial Completion or final acceptance. Technicians are not authorized to revoke, alter, relax, enlarge, or release requirements of the Contract Documents, or to approve or accept any portion of the Work.

E. Authority and Duties of Testing Agency:
   1. Use of testing agency shall in no way relieve CONTRACTOR of the responsibility to provide materials and Work in full compliance with the Contract Documents.
   2. To facilitate testing agency, CONTRACTOR shall advise testing agency at least two days in advance of filling operations to allow for completion of field quality control testing and for assignment of personnel.
   3. It shall be CONTRACTOR's responsibility to accomplish the specified compaction for fill and other earthwork. CONTRACTOR shall control construction operations by confirmation tests to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the Contract Documents relative to compaction, permeability, and control.
   4. CONTRACTOR shall demonstrate adequacy of compaction equipment and procedures before exceeding one or more of the following quantities of earthwork. Each test location shall include tests for each layer, type, or class of fill to finish grade.
   5. Testing agency will inspect and indicate acceptable subgrades and fill layers before construction work is performed thereon. Testing of subgrades and fill layers shall be taken as specified in Paragraph 3.6C above.

F. Periodic compliance tests will be made by ENVIRONMENTAL ENGINEER to verify that compaction and permeability are complying with the requirements specified, at no cost to CONTRACTOR. CONTRACTOR shall remove the overburden above the level at which ENVIRONMENTAL ENGINEER wishes to test and shall fill and re-compact the excavation after testing is complete.

G. If testing laboratory reports or inspections indicate subgrade or fill compaction below specified density, or permeability above the specified maximum, CONTRACTOR shall remove unacceptable materials as necessary and replace with specified materials and provide additional compaction at CONTRACTOR's expense until acceptable. Costs for retesting of subgrade or fill materials that did not originally comply with specified density and permeability shall be paid by CONTRACTOR.

+ + END OF SECTION + +

SECTION 31 23 19

DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for dewatering construction excavations and for field monitoring of the effects thereof.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 024000 – Site Preparation, Demotion and Clearing
2. Section 315010 – Excavation, Backfilling and Filling for Utilities
3. Section 310000 – Earthwork
4. Section 312000.01 – Solid Waste Relocation
5. Section 312000.02 – Landfill Final Cap Backfill
6. Section 312500 – Soil Erosion and Sediment Control

1.2 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

C. Stormwater Pollution Prevention Plan (SWPPP).

1.3 DESIGN AND PERFORMANCE REQUIREMENTS

A. Job Conditions:

1. The Contractor shall take all steps necessary to familiarize himself with and obtain a thorough knowledge of the characteristics of the existing soils, groundwater, and site conditions adjacent to and beneath the work area prior to designing and selecting a dewatering system and the discharge point.
2. The Contractor shall be responsible for verification of location of existing underground structures and utilities.
3. Dewatering activities shall accord due consideration of existing conditions and adjacent structures, pavements and soil conditions. The Contractor shall be responsible for any failure of slopes, excavations or disturbance of structures or amenities due to dewatering activities.
4. Dewatering system shall not disturb or interfere with the function of stability of existing structures, utilities, or with the construction.

5. All surface and subsurface water that comes into contact with solid waste during waste relocation activities is considered leachate and shall be collected, tested, and treated, as necessary, prior to disposal. All dewatering of leachate, including collection, storage, testing, treatment, and off-site disposal, is included.

B. Dewatering System:
   1. To monitor effectiveness of dewatering system design and install instrumentation that shall suffice in monitoring the effects of dewatering activities.

1.4 QUALITY ASSURANCE

A. Entities performing the work of this section shall have been engaged in such work for at least the last five years, shall have satisfactorily completed dewatering projects involving complexities similar to those required under this Contract, and shall have available adequate equipment, facilities, and qualified personnel to design, install, and maintain the dewatering system required under this Section. Entities shall have no pending litigation against them resulting from dewatering activities performed whether due to their own fault or that of others, nor shall they have had a legal judgement against them in the past 5 years resulting from failure caused by dewatering activities for which they were responsible.

1.5 SUBMITTALS

A. Submit summary of qualifications and experience on projects of similar complexity to demonstrate conformance to the requirements of 1.4 of this Section.

B. Submit details of method proposed for installing the permanent construction in areas where dewatering is required.

C. Submit design calculations for the extent of groundwater lowering, pumping discharge, and monitoring instrumentation. Methods of calculation shall be subject to review by the Site and Environmental Engineer.

D. Submit shop drawings of the Dewatering Work Plan showing the layout of all appurtenances for the dewatering system including pump size(s), sumps, filters, well point size and spacing, header pipe size, discharge pipe size, silt box size and construction, discharge locations, and any other equipment required by the Work. Dewatering Work Plan shall address procedures for accomplishing dewatering work, including methods for minimizing the generation of leachate as well as leachate collection, handling, storage, treatment, and disposal. The drawings shall be drawn to a scale of 1 inch equals 30 feet. Include calculations of water inflow and discharge and sizing of all elements. The Dewatering Work Plan shall be signed and stamped by a Professional Engineer licensed in the State of New York.

E. Submit daily reports recording discharge flow rate from the dewatering system.

F. All changes to the Contractor's approved dewatering systems shall be subject to the review of the Site and Environmental Engineer.

PART 2 - PRODUCTS

A. Proposed products shall be subject to the review by the Site and Environmental Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of dewatering system and monitoring instrumentation shall not commence until review of the design and equipment has been accepted in writing from the Environmental Engineer. Acceptance by the Site and Environmental Engineer shall not relieve the Contractor from responsibility for the adequacy of the design to achieve the performance requirements, as specified in 1.3.B of this Section.

B. The Contractor is responsible for establishing average piezometric levels from the measurements of groundwater levels supplied by instrumentation designed and installed by the Contractor prior to the dewatering operations. The groundwater level readings observed during construction by monitoring instrumentation shall be referenced to the pertinent preconstruction groundwater level to determine the extent of groundwater lowering.

C. Intercept and divert storm water runoff, surface water, and groundwater away from excavation and piezometer installations through the use of dikes, curb walls, ditches, pipes, sumps, or other means. Also refer to the latest version of the Stormwater Pollution Prevention Plan (SWPPP).

D. Remove water from excavation as fast as it collects to prevent damage to the subgrade.

E. Dewatering operations shall be designed to prevent loss of fines through the well points and pumping system.

F. Elements of the system shall be located to allow for a continuous dewatering operation without interfering with the permanent construction. Where portions of the dewatering system are located in the areas of permanent construction, the Contractor shall submit details of the method he proposes for installing the permanent construction in these locations for review and acceptance by the Environmental Engineer.

G. Obtain the Site and Environmental Engineer’s concurrence before shutting down dewatering system for any reason

3.2 OPERATIONS

A. Prior to commencing dewatering operations, install and obtain initial readings on all instrumentation specified in the Dewatering Work Plan. Do not commence pumping until installation records and initial readings have been received and accepted by the Environmental Engineer.

B. The dewatering system shall be activated sufficiently in advance of excavation, so that the water level is maintained below the surface of the excavation during all stages of construction.

C. Unless otherwise approved by the Environmental Engineer, the dewatering system shall be operated on a 24-hour-per-day basis, 7 days per week, and standby pumping facilities shall be provided to maintain the continued effectiveness of the system.

D. Dewatering operations shall not be discontinued without the prior written concurrence of the Environmental Engineer. Contractor shall provide stand-by equipment to insure continuity of dewatering operations.

E. Maintain the water level below the required subgrade to provide dry soil conditions in the excavation, unless otherwise permitted by the Environmental Engineer. Maintain the water level at said elevation until no danger to any structure under construction can occur because of buildup of excessive hydrostatic pressure.

F. If the Site and Environmental Engineer agree, the extent of dewatering may be reduced for structures designed to withstand uplift pressure, provided the water level at any stage of the construction does not result in uplift pressures in excess of 80 percent of the downward pressure produced by the weight of the structure and backfill (if any) in place.

G. Maintain standby equipment in immediate operation in the event that any part of the system becomes inadequate or fails.

3.3 LEACHATE COLLECTION AND DISPOSAL

A. All surface and subsurface water that comes into contact with solid waste is considered leachate and shall be collected, tested, and treated, as necessary, prior to disposal.

B. Surface water shall be diverted to prevent entry into the excavation. Dewatering shall be limited to that necessary to assure adequate access and a safe excavation, and to ensure that compaction requirements can be met.

C. Contractor shall make every effort and shall employ the necessary means and methods to prevent surface and subsurface water from coming into contact with solid waste and surfaces so as to minimize the generation of leachate which shall be treated prior to disposal.

D. The Contractor shall minimize area of open excavation so as to limit the volume of dewatering required for the project.

E. Dispose of all water that has contacted exposed solid waste by separately collecting, temporarily storing, and shipping off-site for treatment as leachate, or treating on site and discharging in accordance with all applicable permits. Disposal into municipal sewer system may be permitted only with approval of the local sewerage authority.

F. Contractor shall obtain all necessary permits and pay all fees associated with disposal methods utilized.

G. All water removed shall be handled, treated, and disposed in a manner that meets all federal state, and local requirements.

3.4 REPAIR AND CLEANUP

A. After dewatering is completed, after completion of the permanent construction, or as approved by the Environmental Engineer, dismantle and remove all equipment.

B. Monitoring instrumentation shall be deactivated, as instructed by the Environmental Engineer, upon completion of required monitoring.

C. Promptly repair and/or replace all damaged or destroyed facilities, as required to maintain functionality during construction.

3.5 PROTECTION OF MONITORING INSTRUMENTATION

A. The Contractor shall exercise precaution to protect instrumentation from damage. Should any instruments or instrument installation be damaged for any reason, whether or not due to the Contractor's negligence, the Contractor shall halt filling or other operations in the vicinity of said instrument and shall immediately make the necessary repairs or replacement. Should the Contractor fail to repair or replace any instrument within seven calendar days after its damage, damages to the Owner for such failure shall be liquidated in the sum of $200.00 for each subsequent calendar day the Contractor fails to repair or replace each nonfunctioning instrument. If in the sole determination of the Owner, the damage is due to Contractor's negligence or inadequate protection of the instruments, the repairs or replacement shall be at no additional cost to the Owner.

END OF SECTION

SECTION 31 25 00

SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. The Work specified in this Section consists of the labor, equipment, tools, materials and services needed to manage stormwater and provide and maintain temporary and permanent erosion control measures prior to and throughout construction as described herein, shown on the Contract Drawings or as directed by the Site Engineer. Work in this Section includes, but is not limited to:

1. A trained Contractor to execute, maintain and update the Stormwater Pollution Prevention Plan (SWPPP) for this project.
2. Filing of the General Permit for Stormwater Discharges from Construction Activity Permit GP-0-15-002.
3. Filing of the Notice of Intent (NOI).
4. Coordination with the Site Engineer regarding Code of the Village of Hastings-on-Hudson and NYSDEC requests pertaining to erosion and sedimentation control.
5. Installation and maintenance of temporary and permanent sedimentation and erosion control measures in accordance with NYS DEC standards.
6. Construct and maintain sediment basins and/or sediment traps during construction.
7. Construct temporary drainage swale to convey stormwater to sediment basins or sediment traps.
8. Control of erosion from stockpiles.
9. Perform weekly Inspections by a Qualified Inspector of erosion control measures during and after rainfall and prepare reports.
10. Repair of failed sedimentation and erosion control measures.
11. Removal and disposal of sediment deposits in a manner that does not result in additional erosion or pollution.
12. Removal of temporary erosion control measures once construction and permanent stabilization is complete.
13. Update the SWPPP when necessary.
14. Maintain and make available for public viewing the SWPPP report, site inspection report, NOI certificates and the GP-0-15-002 permit.

B. Permitting

1. The Contractor shall renew the SPDES General Permit for Stormwater Discharges During Construction Activity as in accordance with the requirements for GP-0-15-002 permit if necessary.

C. Stormwater Pollution Prevention Plan (SWPPP)

1. The Contractor shall refer to the Storm Water Pollution Prevention Plan (SWPPP) for detailed erosion control measures design.
2. The Prime Contractor and the Subcontractor implementing any measures of the SWPPP will be required to sign a certification statement in the SWPPP and the Erosion and Sediment Control

Plan (ESC) must sign the "Contractor/Subcontractor SPDES Certification" before commencing any construction activity at the site.

1.2 RELATED DOCUMENTS

A. Drawing and general provision of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

B. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

C. New York State Department of Environmental Conservation (NYS DEC) Standards and Specifications for Erosion and Sediment Control, November 2016, or latest edition.

D. Stormwater Pollution Prevention Plan (SWPPP).

1.3 RELATED SECTIONS

1. Section 024000 - Site Preparation, Demolition and Clearing
2. Section 310000 - Earthwork
3. Section 312319 - Dewatering
4. Section 315010 - Excavation, Backfill, Filling for Utilities

1.4 PERFORMANCE REQUIREMENTS

A. Contractor shall comply with all applicable Federal, State, and Local codes, ordinances, regulations, statutes and standards.

B. Conform to all erosion and sedimentation control requirements per New York Standards and Specifications for Erosion and Sediment Controls by NYS Department of Environmental Conservation (NYS DEC).

C. Install temporary erosion and sediment control measures as one of the first steps of site preparation, before any clearing and grubbing or earthwork occurs. Temporary erosion and sediment control measures shall be maintained throughout the construction, and shall not be removed until permanent cover is completely established and stabilized, with no visible unstable rills or erosion, subject to the approval of the Site Engineer.

D. The Contractor shall install, inspect, maintain, and modify control measures as required by changing remedial construction needs over time.

E. The Contractor shall plan and execute the Work to minimize routing of storm or flood water over disturbed areas in order to minimize erosion and sedimentation to the extent practicable. Similarly, the control measures shall minimize, to the extent practicable, the flow of stormwater over ground such that rills or unplanned ditches are not formed.

1.5 RELATED REQUIREMENTS

A. New York State Standards and Specifications for Erosion and Sediment Control, November 2016 or the latest version.

B. New York State Stormwater Management Design Manual, 2015 or the latest version.

C. Notice of Intent

1.6 EROSION CONTROL MEASURES

A. Silt Fence

B. Storm Drain Inlet Protection - Silt Sack

C. Grassed Waterway

D. Lined Waterway

E. Temporary Seeding and Mulching

F. Land Grading

G. Stabilized Construction Entrance

H. Runoff Diversion

I. Slope Stabilization

J. Dewatering

K. Stone Outlet Sediment Trap

L. Dust Control

1.7 SUBMITTALS

A. Storm Water Pollution Prevention Plan (SWPPP)

1. Contractor shall review the Storm Water Pollution Prevention Plan (SWPPP) prepared pursuant to New York State Department of Environmental Conservation (NYSDEC) requirements, and in compliance with the SPDES General Permit.
2. A SWPPP shall be developed and submitted for approval prior to the initiation of construction activities. The SWPPP shall include the following at a minimum:

    a. Provide background information about the scope of the project, including the location, type and size of project.
    b. Provide a site map for the project, including a general location map. The site map should show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; adjacent off-site surface water(s), wetlands and drainage

patterns that could be affected by the construction activity; existing and final slopes; locations of off-site material, waste, borrow or equipment storage areas; and location (s) of the stormwater discharge(s).

c. Provide a description of the soil(s) present at the site.
d. Provide a construction phasing plan describing the intended sequence of construction activities, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance. Consistent with the New York Guidelines for Urban Erosion and Sediment Control, there shall not be more than five (5) acres of disturbed soil at any one time without prior written approval from NYSDEC.
e. Provide a description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a pollutant source in the storm water discharges.
f. Provide a description of construction and waste materials expected to be stored on-site with updates as appropriate, and a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention response.
g. Describe the temporary and permanent structural and vegetative measures to be used for soil stabilization, runoff control and sediment control for each stage of the project from initial land clearing and grubbing to project close-out.
h. Identify and show on a site map the specific location(s), size(s), and length(s) of each erosion and sediment control practice.
i. Provide the dimensions, material specifications, and installation details for all erosion and sediment control practices, including the siting and sizing of any temporary sediment basins.
j. Identify temporary practices that will be converted to permanent control measures;
k. Provide an implementation schedule for staging temporary erosion and sediment control practices, including the timing of initial placement and the duration that each practice should remain in place.
l. Provide a maintenance schedule to ensure continuous and effective operation of the erosion and sediment control practices.
m. Provide the name(s) of the receiving water(s).
n. Provide a delineation of SWPPP implementation responsibilities for each part of the site.
o. Provide a description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable.
p. Provide any existing data that describes the stormwater runoff characteristics at the site.

B. Enforcement of documentation and repair activities as noted in the SWPPP shall be by the Signatory of the SWPPP, who shall be a designated representative of the Contractor.

C. The SWPPP shall be updated monthly to reflect changed site conditions or when directed by the Site Engineer. The SWPPP and all inspection reports shall be maintained in a log book at the site. A monthly summary of the site inspection activities shall be provided to the Site Engineer and added to the SWPPP.

D. Weekly SPDES Stormwater Inspection Reports

1. Following commencement of construction, site inspections shall be conducted by a Qualified Inspector the at least every seven (7) calendar days. During each inspection the qualified professional shall record the following information:

a. Date and time of inspection
b. Name and title of person(s) performing the inspection.
c. Weather description, soil conditions at time of the inspection.
d. On a site map, indicate the extent of all disturbed site areas and drainage pathways during the inspection. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
e. A description of natural surface water bodies located within or immediately adjacent to the property boundaries of the construction site which receive runoff from disturbed areas.
f. Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
g. A description of the condition of the runoff at all points of discharge from the construction site.
h. Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;
i. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume (for example, 10 percent, 20 percent, or 50 percent). All sediment removed from control practices shall be disposed of in accordance with all applicable regulations and in such a manner as transport of sediments does not re-occur.
j. Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and
k. Identify all erosion and sediment control practice that need repair, maintenance, or not install property, or are not functioning as designed, or in need to be reinstalled, replaced or redesigned.
l. Include digital color photographs (with date stamp) in each weekly report of all practices that are in need of corrective actions, and showing the practices after corrective actions have been completed.
m. All inspection reports must be signed by the Qualified Inspector.

1.8 INSEPCTION NOTIFICATION

A. Within one (1) business day of the inspection, the Qualified Inspector shall notify the Site Engineer and Contractor of any corrective action that need to be taken. The Contractor shall begin implementing the corrective actions writing one (1) business day of the notification and complete them in a reasonable time frame.

1.9 ON-SITE RECORDS

A. The NOI, SWPPP and the inspection reports required for this Project site are public documents that the Contractor or operator must make available on-site for review and copying by any person within five (5) business days of the Contractor or operator receiving a written request by any such person to

review the NOI, SWPPP or inspection reports. Copying of documents will be done at the requester's expense.

1.10 PROJECT AND SITE CONDITIONS

A. The Contractor shall carefully examine the site to determine the full extent, nature, and location of work required to conform to the Contract Drawings and Specifications. The Contractor shall bring any inaccuracies or discrepancies between the Contract Drawings and Specifications to the Site Engineer's attention in order to clarify the exact nature of the Work to be performed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Silt Fence

1. Meet the requirements of NYSDOT 209-2.08 Silt Fence and Table 737-01G.
2. Fence posts shall be 3 ft minimum length and be of wood or steel. Hardwood posts shall be at least 3 square inch in cross sectional area; steel posts shall be of T or U cross-section, with a minimum weight of 1.0 lb/ft.
3. Fasteners shall be heavy duty staples, hog rings, tie wires or other fasteners compatible with the fence post material.
4. Silt Fence geotextile shall have a minimum permittivity of 0.05 sec-1 and a maximum Apparent Opening Size of 0.0236 inch or sieve designation of #30.

    a. Reinforced support shall be minimum 16 gauge welded wire mesh with 6 inch openings or polymeric mesh.
    b. Silt Fence geotextile shall have a minimum Grab Strength of 90 lbf in both the Machine and Cross-Machine directions.

B. Inlet Protection Filter:

1. Inlet filter shall be manufactured from a specially designed woven polypropylene geotextile and sewn by a double needle machine, using a high strength nylon thread.
2. Inlet filter shall be selected to fit the opening of the catch basin or drop inlet frame and grate.
3. Inlet filter shall two dump straps attached at the bottom to facilitate the emptying; shall have lifting loops as an integral part of the system to be used to lift the filter sack from the basin; shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin
4. Inlet filter seams shall have a certified average wide width strength per ASTM D-4884 standards.
5. Inlet filter material shall meet ASTM D-4632
6. Manufacturers:
    a. Siltsack by BMP Store. www.bmpstore.com
    b. Dandy Sack by Dandy Products Inc.,Westerville, Ohio. www.dandyproducts.com
    c. Products or approved equal.

C. Temporary Check Dams:

1. The primary purpose of a check dam is to reduce flow velocity in a channel, thereby reducing erosion in the channel. A check dam will capture sediment that falls out of suspension behind it due to decreased velocity. A check dam is not intended to and generally does not filter sediment from turbid water.
2. The maximum drainage area for any temporary check dam shall be 2 acres.

D. Stabilized Construction Entrance

1. The purpose of a Stabilized Construction Entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets. Contractor shall install a stabilized pad of aggregate underlain with geotextile at all points where trucks and construction equipment enter and/or leave the site as shown on the plans and as directed by the Site Engineer.
2. Broken Stone: Stone shall consist of straight one (1") inch or two (2") inch coarse aggregate in accordance with ASTM C33, free from organic or other deleterious material. Recycled Concrete Aggregate (R.C.A.) of the specified sizes is acceptable.
3. Geotextile - Separation: Separation application is defined as the placement of a flexible porous geotextile between dissimilar materials so that the integrity and functioning of both materials can be maintained or improved, but where water seepage through the geotextile is not a critical function.
4. Fibers used in the manufacture of geotextiles, and the threads used in joining geotextiles by sewing, shall consist of long-chain, synthetic polymers, composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The geotextile and the threads used in sewing geotextiles, shall be resistant to chemical attack, rot, and mildew. The geotextile shall have no tears or defects which adversely alter its physical properties. They shall be formed into a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.
5. Geotextiles shall conform to the following AASHTO M-288 properties for separation geotextiles:

	ASTM TEST		
Structure	N/A	Woven	Non Woven
Elongation	D4595	< 50%	≥ 50%
Grab Strength (minimum)	D4632	1100 N (247 LBF)	700 N (157 LBF)
Trapezoid Tear Strength (minimum)	D4533	400 N (90 LBF)	250 N (56 LBF)
Puncture Resistance (minimum)	D4833	400 N (90 LBF)	250 N (56 LBF)
Permitivity (minimum)	D4491	.02 /sec. Minimum	.02 /sec. Minimum
Apparent Opening Size (maximum)	D4751	0.6 mm Maximum Std. No. 230 sieve	0.6 mm Maximum Std. No. 230 sieve

6. Geotextile shall be ADS 315, as manufactured by Advanced Drainage Systems, Inc., Hillard, OH, FX66 manufactured by Carthage Mills, Cincinnati, OH, or 600X (woven) or 160N (nonwoven) as manufactured by Mirafi, Inc., Charlotte, NC, or approved equal.
7. Unless otherwise shown on the plans, for sites with only one (1) construction entrance, the Stabilized Construction Entrance shall be twenty-four (24') feet wide. Where there are two (2) or more construction entrances to the site the Stabilized Construction Entrance shall be twelve (12') feet wide each. Length of the entrance shall be a minimum of fifty (50') feet.
8. The ground shall be prepared by removing stumps and other organic material, along with any large boulders and sharp objects which may tear or damage the fabric. After the ground has been prepared, the fabric shall be rolled directly on the ground. The fabric shall be placed over the entire area that is to be covered by the aggregate, unless otherwise directed by the Site Engineer. All seams shall be overlapped approximately six (6") inches. No equipment, materials or machinery shall be placed on or be transported over exposed fabric. Broken stone shall then be carefully placed to prevent dislocation of the fabric.
9. If the fabric is damaged during installation, the rupture shall be removed and the damaged area shall be covered with a patch of new fabric that will overlap the undamaged fabric approximately six (6") inches in all directions. All repaired fabric surface costs will be deemed part of the price bid.
10. Broken stone shall be spread utilizing suitable equipment or from piles dumped along the proposed site. Stone shall be evenly spread so that the course will have, after rolling, a minimum of six (6") inches in thickness. No segregation of large or fine materials will be allowed, but the stone as spread shall be well graded with no pockets of fine material.
11. The entrance shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic inspection and top dressing with additional aggregate as directed by the Site Engineer. All sediment spilled, dropped, or washed onto the public streets must be removed immediately.
12. When necessary, wheels of all vehicles leaving the construction site must be cleaned to remove sediment prior exiting the site. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses at all times. The cleaning of wheels, if necessary, shall be deemed part of the bid price of this item.
13. All materials installed for the Stabilized Construction Entrance shall be removed from the site and disposed of by the Contractor at the end of all construction activity as directed by the Site Engineer, at no additional cost to the City.

E. Slope Stabilization / Erosion Control Blanket

1. Erosion control blanket shall provide a temporary, biodegradable cover material to reduce slope and/or channel erosion and enhance revegetation. Erosion control blanket performance capabilities shall be determined by ASTM D 6459, "Determination of Erosion Control Blanket (ECB) Performance in Protecting Hillslopes from Rainfall-Induced Erosion", and ASTM D 6460, "Determination of Erosion Control Blanket (ECB) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion."

2. Blanket performance requirements:

Slopes:	< or = 3H: 1V
a. C factor:	.039
b. Shear Stress:	1.60 lb/ft^2 (77 Pa)
c. Velocity:	0.50 ft/sec (1.5 m/sec)

d. Functional Longevity: < or = 15 months

3. Submittals:
   a. Submittals shall include complete design data, Product Data Sheets, Product Netting Information, SDS, Staple Pattern Guide, Installation Guidelines, Manufacturing Material Specifications, Manufacturing Certifications, CAD Details, and a Manufacturing Quality Control Program.
4. Products:
   a. Erosion control blanket shall be Curlex I CL as manufactured by American Excelsior Company, Arlington, TX (1-866-9Fibers)
   b. Erosion control blanket shall be Landlok as manufactured by Contech Engineered Solutions, (1-800-338-1122)
   c. Erosion control blanket shall be Filtrexx Compost Erosion Control Blanket as manufactured by Filtrexx Sustainable Technologies, Akron, Ohio (1-877-542-7699)
   d. Or approved equal

PART 3 - EXECUTION

3.1 General REQUIREMENTS

A. The Contractor shall provide all means, methods, services, facilities, power, equipment, tools, material, consumables, incidentals, labor and supervision necessary to manage stormwater and implement and maintain erosion and sedimentation control measures to effectively minimize erosion and sedimentation.

B. Construction, including but not limited to clearing, grubbing, earthwork and excavations shall be conducted in such a manner as to minimize erosion and sedimentation.

C. Install erosion and sedimentation control products in accordance with manufacturers' recommendations prior to any major soil disturbances, or in their proper sequence and maintained until permanent protection is established.

D. Erosion and sedimentation control measures shall be inspected by the Contractor daily. Repairs shall be made as soon as practical.

E. Cover staged soil piles with temporary liners when precipitation is expected in order to minimize soil erosion.

F. Employ, construct, inspect, maintain and document all temporary erosion and sediment control measures in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, (Latest version).

G. If the planned measures do not result in effective control of erosion and sediment runoff, the Contractor shall immediately adjust the program and/or institute additional measures in order to eliminate excessive erosion and sediment runoff.

H. Conduit Outlet Protection must be installed at all required outfalls prior to the drainage system becoming operational.

I. Contractor is responsible for keeping all adjacent roads clean during life of construction project.

3.2 TEMPORARY AND PERMANENT SEEDING AND STABILIZATION

A. Any disturbed areas that will be left exposed more than 30 days and not subject to construction traffic, shall immediately receive a temporary seeding. If the season prevents the establishment of a temporary cover, the disturbed areas shall be mulched with straw or equivalent material, at a rate of two (2) tons per acre, according to NYS DEC standards.

B. Permanent Vegetation shall be seeded or sodded on all exposed areas within ten (10) days after final grading. Mulch will be used for protection until seeding is established

C. A sub-base course will be applied immediately following rough grading and installation of improvements in order to stabilize streets, roads, driveways and parking areas. In areas where no utilities are present, the sub-base shall be installed within 15 days or preliminary grading.

D. Immediately following initial disturbance or rough grading all critical areas subject to erosion (i.e.: steep slopes, roadway embankments) will receive a temporary seeding in combination with straw mulch or a suitable equivalent, at a rate of two (2) tons per acre, or as in accordance with the NYS DEC requirements.

E. Any slopes greater than 3:1which receive pipeline installation will be backfilled and stabilized daily.

F. Install stabilized construction entrance with a minimum 50 feet long x 24 feet wide x 6” thick pad of 1” to 4” stones, immediately after initial site disturbance.

G. At the time when the site preparation for permanent vegetative stabilization is going to be accomplished, any soil that will not provide a suitable environment to support adequate vegetative ground cover, shall be removed or treated in such a way that will permanently adjust the soil conditions and render it suitable for vegetative ground cover. If the removal or treatment of the soil will not provide suitable conditions, non-vegetative means of permanent ground stabilization will have to be employed.

3.3 DUST CONTROL

A. Dust control measures shall be implemented as needed, including, but not limited to, those items when visible dust is generated during the clearing, demolition and earthwork.

B. Air monitoring during earthwork operations (mass excavation, backfilling, and grading operations, as per local regulatory requirements.

3.4 INLET PROTECTION

A. To install the inlet filter in the catch basin, remove the grate and place the filter in the opening. Hold approximately six inches of the filter sack outside the frame. This is the area of the lifting straps. Replace the grate to hold the sack in place.

B. Remove all accumulated sediment and debris in the vicinity of the inlet after each storm event.

C. Empty the inlet filter sack when it is 1/3 full of sediment.

D. To remove the inlet filter, take two pieces of 1" diameter rebar and place through the lifting loops on each side of the sack to facilitate the lifting of filter.

E. To empty the inlet filter, place unit where the contents will be collected. Place the rebar through the lift straps and lift. This will lift filter from the bottom and empty the contents. Clean out and rinse. Return the inlet filter to its original shape and place back in the basin.

F. Inlet filter is reusable. Once the construction cycle is complete, remove filter from the basin and clean. Filters should be stored out of sunlight until next use.

3.5 SILT FENCE

A. Silt fences shall be placed within 2 ft of the area under consideration, but at least 10 ft from the toe of a slope to allow for maintenance and roll down of larger materials from the slope.

B. The geotextile shall be embedded to a minimum of 6 inches with native material tamped in place so that no flow can pass under the fence.

C. The geotextile shall be placed on the upslope side of the fence posts.

D. Where ends of the geotextile join each other, they shall be overlapped by a minimum of 6 inches, folded and stapled or sewn.

1. Silt Fence:

    a. Fence posts shall be driven a minimum of 16 inches into the ground.
    b. Maximum center to center fence post spacing shall be 10 ft.
    c. Reinforced support shall be a minimum 30 inches high and tied to fence posts.
    d. Geotextile shall be securely fastened to reinforced support with ties spaced every 24 inches at the top and mid-section.

3.6 STABILIZED CONSTRUCTION ENTRANCE:

A. The length of the stabilized construction entrance shall be a minimum of 50 feet.

B. The width shall be 12 foot minimum, but not less than the full width where ingress or egress occurs. For a single site entrance, this shall be a minimum of 24 feet.

C. A stabilization geotextile, as per Section 313210 – Filter Fabric, shall be placed over the entire area before gravel placement. This will also serve as a suitable separation fabric.

D. A minimum of 6 inches of ¼ inch washed gravel shall be placed over the geotextile.

E. The entrance shall be maintained in a condition which will prevent tracking of sediment onto public streets, including top-dressing as required.

F. Construction Roads shall be top-dressed with new gravel as required.

3.7 STABILIZED CONSTRUCTION ENTRANCE:

A. Erosion control blanket shall be installed as directed by the Site Engineer in accordance with manufacturer's Installation Guidelines, Staple Pattern Guides, and Cad details. The extent of erosion control blanket is indicated on the project drawings.

B. Erosion control blanket shall be oriented in vertical strips and anchored with staples, as identified in the Staple Pattern Guide. Adjacent strips shall be abutted or overlapped to allow for installation of a common row of staples that anchor through the nettings of both blankets. Horizontal joints between erosion control blankets shall be sufficiently overlapped with the uphill end on top for a common row of staples so that the staples anchor through the nettings of both blankets.

C. Where exposed to overland sheet flow, a trench shall be located at the uphill termination. Erosion control blanket shall be stapled to the bottom of the trench. The trench shall be backfilled and compacted. Where feasible, the uphill end of the blanket shall be extended three feet over the crest of the slope.

D. Slop erosion control blanket shall be overlapped by the channel erosion control blanket sufficiently for a common row of staples to anchor through the nettings of both blankets when terminating into a channel.

END OF SECTION

SECTION 31 32 10

FILTER FABRIC

PART 1 - GENERAL

1.1 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

1.2 SUMMARY

A. The work of this section includes all labor, materials, equipment and services necessary to furnish and install a pervious sheet of polyester, nylon, glass or polypropylene filter fabric as indicated on the Contract Drawings.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 315010 – Excavation, Backfilling and Filling for Utilities
2. Section 312500 – Soil Erosion and Sediment Control

1.3 SUBMITTALS

A. General: Refer to and comply with Division 1 Section 01330, "Submittals Procedures" for procedures and additional submittal criteria.

B. General: Submit manufacturer’s catalog cut and sample of proposed filter fabric for approval.

1.4 REFERENCES AND STANDARDS

A. The work covered by this specification shall conform to the latest edition and the latest addenda thereto of the following standards to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM)

1. ASTM D 3786 Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics Diaphragm Bursting Strength Tester Method
2. ASTM D 3787 Bursting Strength of Knitted Goods: Constant-Rate-of Traverse (CRT), Ball Burst Test
3. ASTM D 4355 Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
4. ASTM D 4491 Water Permeability of Geotextiles by Permittivity

5. ASTM D 4533 Trapezoid Tearing Strength of Geotextiles
6. ASTM D 4632 Grab Breaking Load and Elongation of Geotextiles
7. ASTM D 4751 Determining the Apparent Opening Size of a Geotextile
8. ASTM D 4759 Determining the Specification Conformance of Geosynthetics
9. ASTM D 4833 Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

1.5 DELIVERY AND STORAGE

A. Store synthetic fiber filter cloth to prevent exposure to moisture and extended ultraviolet ray exposure due to direct sunlight in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 FILTER FABRIC

A. Provide a pervious sheet of polyester, nylon, glass or polypropylene filaments woven, spun bonded, fused, or otherwise manufactured into a non-raveling fabric with uniform thickness and strength. Class of fabric shall be as indicated on the Drawings. The fabric shall have the following manufacturer certified minimum average roll properties as determined by ASTM D 4759:

Physical Property	Class A (Use for rip rap and retaining wall structure filter)	Class B (Use for underdrains)	Test Method
Grab tensile strength machine and transverse direction	200 lbs. min.	80 lbs. min.	ASTM D 4632
Grab elongation machine and transverse direction	15 % min.	15 % min.	ASTM D 4632
Puncture resistance	80 lbs. min.	25 lbs. min.	ASTM D 3787 or ASTM D 4833
Mullen burst strength	320 psi min.	130 psi min.	ASTM D 3786
Trapezoidal tear strength	50 lbs min.	25 lbs. min.	ASTM D 4533
Seam Strength	180 lbs. min.	70 lbs. min.	ASTM D 4632
Apparent opening size	0.6 mm max. (U.S. Standard Sieve No. 30)	0.297 mm (U.S. Standard Sieve No. 50)	ASTM D 4751
Permeability	0.001 cm/sec.min.	0.01 cm/sec. min.	ASTM D 4491
Ultraviolet Degradation	70% Strength Retained at 150 hours	70% Strength Retained at 150 hours	ASTM D 4355

PART 3 - EXECUTION

3.1 INSTALLATION OF FILTER FABRIC

A. Place and anchor synthetic fiber filter fabric on prepared surface where indicated. Loosely lay material so that placement of overlying materials do not stretch or tear the material. Do not place over stumps, rocks larger than 2 inches diameter and other debris which may puncture or otherwise damage the fabric.

B. Join joints by overlapping or sewing. Sewn joints shall be lapped a minimum of 4 inches and double sewn using nylon or polypropylene thread. Overlapped joints shall be lapped a minimum of 18 inches where fabric is placed above water and a minimum of 36 inches where fabric is placed below water.

C. Repair damaged fabric by placing an additional layer of fabric to cover the damaged area a minimum of 3 feet overlap in all directions.

D. Where filter fabric is placed behind gabions and beneath rip-rap, the long dimension shall be placed parallel to the direction of the flow.

E. Overlap successive sheets so the upstream sheet is placed over the downstream sheet.

F. As fabric is placed under water, place specified backfill material on it to the required thickness.

G. Do not allow fabric placement to advance more than 50 feet ahead of the backfill placement.

H. Obtain approval of filter fabric installation before placing fill or backfill. Place fill or backfill on fabric in the direction of overlaps. Do not drop rip-rap or large or medium stone atop filter fabric from a height greater than 1 foot. Do not drop smaller sizes of stone atop filter fabric from a height greater than 3 feet.

I. After placement, do not leave filter fabric uncovered for more than 2 weeks. Follow manufacturer's recommended installation procedures.

END OF SECTION

SECTION 31 50 10

EXCAVATION, BACKFILLING AND FILLING FOR UTILITIES

PART 1 - GENERAL

1.1 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

C. Storm Water Pollution Prevention Plan (SWPPP).

1.2 SUMMARY

A. Scope of Work:

1. Work under this section shall include all supervision, labor, materials, equipment and incidentals required to complete all excavation, trenching, and backfilling for utilities as indicated on the drawings and as specified herein.

2. The work shall include but not necessarily be limited to:
   a. Provide, install and remove temporary excavation supports.
   b. Excavate utility trenches
   c. Construction underground utilities
   d. Construct above and underground drainage system
   e. Install utility bedding and filter fabric
   f. Backfill trenches
   g. Dewatering as needed

1.3 DEFINITIONS

A. As used herein, excavation shall mean the removal of all materials, of any description, encountered in the work as part of the Contract.

B. Backfilling shall mean the filling of excavations made for construction purposes and shall extend to existing grades or design grades, whichever are lower.

C. Filling shall mean the placement of fill material in conformance with requirements of this Section at or above existing grades.

1.4 RELATED SECTIONS:

A. The following Sections contain requirements that relate to this Section:

1. Section 310000 – Earthwork
2. Section 312319 – Dewatering
3. Section 313210 – Filter Fabric
4. Section 334110 – Manhole and Drainage Structures
5. Section 334130 – High Density Polyethylene Pipe

1.5 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. ASTM D 422 Test Method for Particle -Size Analysis of Soils

C. ASTM D 1556 Test Method for Density of Soil in Place by the Sand-Cone Method

D. ASTM D 1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop

E. ASTM D 2167 Test Method for Density of Soil in Place by the Rubber Balloon Method

F. ASTM D 2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

G. ASTM D 3017 Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

H. ASTM D 4318 Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils

1.6 JOB CONDITIONS

A. Existing Utilities: Locate and mark out existing underground utilities in areas of work. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Environmental and Site Engineer immediately for directions.

B. Beware and protect the existing Croton Aqueduct tunnel and associated drainage components.

C. Protect excavations as follows:

1. Prevent water from entering excavated areas and, if it does, remove it immediately to maintain a dry condition at all times in accordance with Section 312319 – "Dewatering."
2. Dispose of water in a legal manner not to cause injury to the public health or damage to public or private property, and to a source approved by the Site and Environmental Engineer and in accordance with Section 312319 – "Dewatering."
3. If water enters excavated areas and weakens or disturbs underlying soil, remove the weakened or disturbed soil and replace it as specified in Section 312319 – "Dewatering."
4. Where required for protection of adjacent utilities or structures or where required for performance of the work, secure the sides of excavations against movement.

5. For excavations extending to a depth of 5 feet or more, and where sheeting is not required, excavate slopes to a safe angle of repose, or protect trench excavations by use of a portable trench shield.
6. Restore all areas impacted by excavation to their original condition, matching pavement types and sections to meet original or the proposed pavement grades.
7. Provide all pumping materials and equipment as necessary to keep all excavations free of water from any source whatsoever.

D. Any contaminated or hazardous materials excavated at the site shall be reviewed with the Environmental Engineer for direction.

E. Do not traverse-paved areas with tracked vehicles or equipment such as carry-all scrapers, which may damage such pavement unless protected to the satisfaction of the Site Engineer.

F. Do not place fill or backfill on frozen subgrade.

G. Do not perform rolling or other compaction at any time when the ground water level is above a plane two feet below the surface to be compacted. When the ground water level is above such plane, lower it by approved methods and maintain it below such level prior to and during the compaction operations.

1.7 SUBMITTALS

A. Submit to the Environmental Engineer samples of each designation of fill or backfill material proposed for use under this Contract subject to the following:

1. Submit sample in clean, sturdy container or bag which shall not permit loss of any of the material.
2. Clearly label sample with: Contract location; project title and number; designation of fill; and source of the material being supplied.
3. Submit sample at least three weeks prior to delivery of material to the site.
4. Do not deliver any material until the Environmental Engineer has checked and approved material from that source.

1.8 QUALITY ASSURANCE

A. Quality Control Testing Construction: Allow testing service to inspect and approve sub-grades and fill layers before further construction work is performed.

B. Perform field density tests in accordance with ASTM D 1556 (Sand Cone Method) or ASTM D2167 (Rubber Balloon method), as applicable.

C. If in the opinion of Environmental Engineer or Site Engineer based on testing service reports and inspection, subgrade or fills, which have been placed, are below specified density, provide additional compaction and testing.

PART 2 - PRODUCTS

2.1 MATERIALS
Refer to Section 310000 Earthwork, PART 2 - Materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Contact Dig. Safely. New York at least 2 working days before the start of the project. Contractor shall call 811.
B. Confirm locations of buried structures and utilities with all agencies and/or utility companies. Field confirmation of buried structures and utilities shall be made before beginning work at the site. Obtain all applicable utility clearances and be responsible for performing the work shown using means and methods satisfactory to all government agencies and/or utilities companies. Should the contractor's operations cause damage to utilities or structures, the contractor shall notify the appropriate agency and shall arrange for immediate repairs.

3.2 EXCAVATION

A. General

1. Excavation shall consist of the removal of all materials found in the work.
2. Excavate to elevations required for installation of permanent construction in such manner as not to disturb the subgrade below such elevations.
3. Perform excavation around and adjacent to existing structures, pipes and conduits which are to remain in place, without damage to or movement of existing construction. Use hand excavation to locate and expose near surface structures, pipes and conduits. When excavation is to be performed under such structures, pipes and conduits, support them in a manner as approved by the Site Engineer or utility provider to ensure uninterrupted operation of the supported items.

B. Dewatering

1. Where excavations are to extend below the water table, prior to placement of any permanent construction or filling or backfilling any excavated area, lower the water table in such an area to two feet below the elevation of the required subgrade and maintain this condition until the fill or pavement is placed thereon.
2. Dewater in a manner to prevent the loss of ground due to the migration of soil fines into the dewatering system.
3. Refer to Section 312319 – Dewatering.
4. Also refer to the latest version of the Storm Water Pollution Prevention Plan.

C. Trenching for Utilities

1. Shape bottom of trench to uniform invert section.
2. Stability of Excavations: Trench sides of excavations to comply with codes and ordinances having jurisdiction. Shore and brace where soil stability of material excavated is questionable. Maintain sides of excavations in safe condition until completion of backfilling.
3. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
4. Material Storage: Stockpile satisfactory excavated materials where directed by the Environmental Engineer or Site Engineer, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations.
5. Excavation for Pavements: Cut surface under pavements to comply with cross-section, elevations and grades as shown on the drawings.
6. Excavating for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room.

    a. Excavate trenches to the depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Keep bottoms of trenches sufficiently below finish grade to avoid freeze-up.
    b. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
    c. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Environmental Engineer and Site Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

D. Disposal of Excavated Material

1. All debris and all material unsuitable for or in excess of that required for backfill or fill, shall be disposed of as directed by the Environmental Engineer.

E. Restrictions

1. Do not place backfill until the Environmental Engineer and Site Engineer has completed a coordinated field inspection with the Landscape Architect and has inspected and approved the Work and indicated where backfill may be placed. Backfill at new concrete shall not be placed for a minimum of 72 hours and the concrete has attained minimum design strength as verified by laboratory testing.
2. Leave all pipe joints exposed until all tests on such pipe, required by other Sections of the Specifications, have been performed.
3. Remove all temporary structures, sheet piles, sheeting, bracing and forms and all organic materials and debris of every nature, taking care, upon the removal of sheet piling, sheeting and temporary supports, not to cause movement of adjacent ground or structures or create the danger of a slide.

3.3 PLACEMENT AND COMPACTION

A. Equipment

1. Steel vibratory rollers shall have provision for regulation of vibration frequency. The Environmental Engineer and Site Engineer shall be informed of the type and size of equipment to be used before the start of any compaction efforts.
2. Placement and spreading equipment shall be reviewed and approved by the Environmental Engineer and Site Engineer.
3. Unless otherwise shown on the Contract Drawings, pneumatic-tired rollers shall have minimum weight of 20 tons and a tire pressure of between 60 and 150 psi as directed by the Environmental Engineer and Site Engineer. When mechanical tampers are to be used, the Environmental Engineer shall be informed of the type and size for approval before compaction efforts with this equipment can begin.

B. Compaction Requirements

1. All compaction requirements and tests for same shall be performed in accordance with the notes shown on the drawings, specified herein and/or as required to comply with Code Requirements.
2. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture-density relationship determined in accordance with ASTM D 1557; and not less than the following percentages of relative density, determined in accordance with ASTM D 4253 & 4254 for soils which will not exhibit a well-defined moisture-density relationship.
   a. Trenches: Place fill in loose lifts not exceeding 12” in thickness. Compact fill to a minimum of 95% maximum modified Proctor dry density.
3. Provide compaction tests as follows:

   a. At trenches one per every 100 linear feet.
   b. All other locations, not less than one compaction test per 2500 s.f. for each lift.

C. Subgrade, Excavated and Existing Surfaces

1. Compact surface with a minimum of six passes of an approved vibratory steel roller operated at a speed not to exceed three miles per hour and at the optimum operating frequency recommended by the manufacturer.
2. In areas where surface consists of a fine grained soil, compact with a minimum of six passes of an approved pneumatic-tired roller.
3. Overlap passes of roller a minimum of six inches.
4. In areas where use of a roller is impractical, compact surface while at or near optimum moisture content with mechanical tampers.

D. Backfill and Fill

1. Moisture content of backfill and fill material shall be within a range of plus or minus two percent of optimum, as determined by Method C of ASTM D1557.
2. Backfill, conforming to I-12 gradation, shall be placed in 12-inch, loose layers and compacted with a minimum of six passes of an approved vibratory roller operated at a speed not to exceed three miles per hour.
3. Overlap passes a minimum of six inches.

4. Backfill and fill, conforming to I-10 gradation, shall be placed in 12-inch, loose layers and compacted with a minimum of six passes of an approved pneumatic-tired roller.
5. In areas where a 12-inch layer over existing material is not adequate to support the construction equipment, increase thickness of first lift as approved by the Site Engineer.
6. In areas where use of a roller is impractical, place fill in maximum 8-inch, loose layers and compact with approved mechanical tampers to specified density.
7. Compact backfill as specified for fill. In pipe trenches, each layer of backfill shall be not more than eight inches (8") in thickness before compaction. Backfill shall be placed on both sides of the pipe, simultaneously.
8. The surface of filled or backfilled areas, which are to receive pavement or on which a structure is to be placed, shall be within plus or minus 1/2 inch of the elevations shown on the Drawings and shall be free of depressions or projections greater than 1/2 inch when tested with a 16-foot straight edge.
9. The surface of filled areas at other locations shall be within plus or minus one inch of elevations shown on the drawings unless a closer tolerance is necessary to meet requirements of other sections of the specifications or the drawings.

3.4 FIELD TESTS

A. Inspection and Testing

1. All inspection and testing shall be performed by the Contractor. Gradation and maximum density will be determined in accordance with ASTM D 422 and Method C of ASTM D 1557. Where appropriate, Atterberg Limits will be determined on fine grained soils in accordance with ASTM D 4318.
2. The Environmental Engineer and Site Engineer will notify the Contractor of approval of material source within seven days after receiving samples. Approval of a source of backfill or fill material shall be subject to material continuing to meet the requirements of 2.1.
3. The laboratory will determine the density of compacted fill or backfill by in-place density tests or from undisturbed samples cut from the compacted fill or backfill as required. Notify the Environmental Engineer and Site Engineer 72 hours prior to start of filling or backfilling to allow time to make provisions for such testing.
4. To evaluate whether material has been compacted to specified density the Environmental and Site Engineer will compare results of in-place density tests with results of control tests on material of the same designation using Method C of ASTM D 1557.
5. If fill or backfill have not been sufficiently compacted as determined by in-place density tests, the compaction effort shall be continued and moisture content shall be adjusted as necessary until the specified compaction is obtained at no additional cost to the Contract.
6. The Contractor is responsible to check conformance to elevations shown on the Drawings and required tolerance for surface straightness.
7. Provide labor and equipment to take samples as directed and to assist the Environmental and Site Engineer in other tests.

B. Testing Requirements for Fill and Backfill

1. Control Tests: Fill and backfill material will be tested by the Contractor to determine maximum density (Method C of ASTM D 1557) and gradation (ASTM D 422) at a frequency of one test per 2500 cubic yards of material.

2. In-Place Density Tests: Tests will be performed by the Contractor to determine the in-place density after compaction at the frequency of one test per lift per 2,500 square feet unless otherwise directed by the Environmental Engineer or Site Engineer. Test methods may be either sand-cone (ASTM D 1556), rubber balloon (ASTM D 2167) or nuclear device (ASTM D 2922) with moisture content for nuclear method determined by ASTM D 3017. For trenches, structures or any area where manually operated compactors are used, one density test will be performed for each 8-inch thickness of compacted backfill for the length of trench shown on the Drawings but no more than 150 L.F. each in length. Tests will measure the density of the layer immediately below each compacted layer and the density of the uppermost or final layer.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. NYSDOT Specifications (2008 edition) shall be used as basis of design where noted.

1.2 SUMMARY

A. Work of this Section consists of:

1. Furnishing and installing hot mix asphalt paving.

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. A list of those Documents and Sections include, but is not limited to the following:

1. Section 312000: “Earthwork”
2. Section 329113: “Planting Soil”

1.3 DEFINITIONS & ABBREVIATIONS

A. Hot Mix Asphalt Paving Terminology - Refer to ASTM D8 for definitions of terms.

B. NYSDOT – New York State Department of Transportation.

1.4 SYSTEM DESCRIPTION

A. Provide hot mix asphalt paving according to materials, workmanship, and other applicable requirements of standard specifications of state DOT.

1. Standard Specification - NYSDOT.
2. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this section.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

B. Job Mix Designs: Certification by NYSDOT of each job mix proposed for the work.

C. Material Certificates: For each paving material, signed by manufacturers.

D. Quality Control Submittals:

1. Other Aggregates: Name and location of source and laboratory test results.
2. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Owner's Representative's information. This submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

1. Manufacturer shall be a paving mix manufacturer registered with and approved by the NYSDOT.

B. Testing Agency Qualifications: Qualified according to ASTM D3666.

C. Regulatory Requirements: Comply with NYSDOT Specifications for asphalt paving work.

D. Preinstallation Conference: Conduct conference at project site to review methods and procedures related to hot mix asphalt paving including, but not limited to:

1. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot mix asphalt.
2. Review condition of subgrade and preparatory work.
3. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
4. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
5. Review excavation/limit of work requirements as described in 310000 "Earthwork."

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 degrees F.
2. Slurry Coat: Comply with weather limitations of ASTM D3910.
3. Base Course: Minimum surface temperature of 40 degrees F and rising at time of placement.
4. Top Course: Minimum surface temperature of 60 degrees F at time of placement.

PART 2 - PRODUCTS

2.1 ASPHALT CONCRETE

A. Compacted Broken Stone Base Course - Refer to specification section 324020 "Aggregate Base Course" for information on Compacted Stone Base Course.

B. Base Course - The pavement binder course shall be constructed of the type described below and as shown on the Contract Drawings. Binder course material shall be laid to a width and depth shown on

the Contract Drawings. Temperature range 250 degrees F to 325 degrees F.

1. Type 3, Asphalt Concrete - This binder course shall be NYSDOT Type 3, per NYSDOT Table 403-1. Final compacted thickness shall be as shown on the Drawings, but not less than 3 inches.

C. Tack Coat

1. NYSDOT - Tack coats of asphalt emulsions, Type 702-6, Table 702-9, shall be furnished and applied in accordance with NYSDOT Specification Section "407 - Tack Coat." Prior to placing the next course, the asphalt shall be allowed to cure per manufacturer's recommendations.

D. Top Course - Pavement wearing course construction shall be the type described below and as shown on the Drawings. The wearing course shall be constructed to a width and depth as shown on the Drawings.

1. Type 6F, Asphalt Concrete - This wearing course shall be NYSDOT Type 6F2 per NYSDOT Table 403-1. Final compacted thickness shall be as shown on the Drawings, but not less than 1" inches. (The "F" designation indicates that high friction coarse aggregates are required.) Temperature range from 250 degrees F to 325 degrees F.

2.2 AUXILIARY MATERIALS

A. Herbicide: Not permitted.

B. Sand: ASTM D1073 or AASHTO M29, Grade Nos. 2 or 3.

C. Joint Sealant: ASTM D3405 or AASHTO M301, hot applied, single-component, polymer-modified bituminous sealant.

2.3 MIXES

A. Hot Mix Asphalt: Dense, hot laid, hot mix asphalt plant mixes meeting requirements of NYSDOT Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Permanent restoration of pavements shall not begin until 30 days after trench or structure backfill has been completed in accordance with the applicable specifications or until testing of any installed utility has been complete in accordance with the specifications (whichever is the longest period of time after completion of trench or structural backfill.

1. Completion of backfill shall include compaction tests to ascertain compliance with degree of compaction required as described in Section 310000.

(a.) Verify base conditions under provisions of Section 310000 "Earthwork".
(b.) Verify that compacted subgrade is dry and ready to support paving.
(c.) Verify gradients and elevations of base are correct.

B. Patching: Clean area to be patched in accordance with article 3.2.E. Fill excavated pavements with hot mix asphalt base mix and, while still hot, compact flush with adjacent surface.

3.2 PREPARATION

A. All existing and new manholes, frames and covers, valve boxes, curb boxes, etc. shall be raised or lowered to be 1/2 inch below the new pavement grade.

1. No manhole covers or valve box covers shall be covered with paving material, or be exposed in a depression in the pavement greater than 1/2 inch.

B. Catch basin frames and grates shall be raised or lowered to be 1 inch below the new pavement finished grade.

C. All new pavements, where meeting existing pavement, shall be butted up against a vertical face in the existing pavement.

1. This vertical face to be cut to the depth of the new pavement.
2. Where the new pavement is an overlay, the beginning and end of the top course shall be similarly butted against a vertical face.
3. The existing asphalt pavement shall be removed for a minimum length of 2 feet, as measured parallel to the direction of paving, or greater if required to eliminate any noticeable bump or to provide adequate drainage away from structures, and to the width of new pavement.
4. Protect existing concrete pavement not identified to be removed.

3.3 PREPARATION - PRIMER

A. Apply primer in accordance with manufacturer’s instructions and State of New York standards.

B. Apply primer to contact surfaces of curbs and gutters.

C. Fill cracks greater than ¼”

3.4 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions and State of New York standards.

3.5 INSTALLATION

A. Install Work in accordance with New York State Department of Transportation standards.

B. Place asphalt within four hours of applying primer or tack coat.

C. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact with vibratory pans and hand tamps in area inaccessible to rolling equipment.

D. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.6 PLACING AND COMPACTING

A. Placing mix in an appropriate ambient temperature and on a surface sufficiently warm to minimize the risk of excessive cooling before completion of rolling is of paramount importance. Holding the aggregate particles in place is solely the function of the film of asphalt. The asphalt cannot perform this function properly if the mix is too cool when rolled.

1. A thin course compresses very little under the roller and, as it cools quickly, it must be rolled as soon as possible.

2. The Contractor shall supply sufficient number of rollers to perform the required compaction while asphalt concrete is still hot and in a workable condition and coordinate speed of paver with rollers such that the degree of compaction required is obtained.
3. A high degree of densification is not the goal with this type of mix -- the aim is firm seating and contact of the aggregate particles.
4. One or two coverages (see Table 1) with a steel-wheeled roller weighing 8 to 10 tons is sufficient. Additional rolling may be excessive, causing a break in the bond of asphalt between aggregate particles, particularly after the mix has cooled.
5. When overtaken by sudden storms, the Owner's Representative may permit work to continue up to the amount which may be in transit from the plant at the time, provided the mixture is within temperature limits specified.

B. Paving - All asphalt concrete shall be installed using self-powered units in accordance with the NYSDOT Specification "401-3.05 Bituminous Pavers and 401-3.11 Spreading and Finishing", except that the sixth paragraph of 401-3.11 beginning with the words "If there are less than 1,500 square yards. . ." is deleted and the following substituted:

1. A self-powered paving unit shall be provided except where hand methods are permitted by the Owner's Representative in small areas or areas inaccessible to a paving unit. For such areas, the mixture shall be dumped, spread, screened and compacted to give the required section and compaction thickness.
2. Surface Treatment (NYSDOT) - Bituminous surface treatment to be constructed in accordance with NYSDOT "Section 410 Bituminous Surface Treatment - Single Course", Paragraphs 410-1 through 410-3.01 G.

C. Compaction - Asphalt concrete shall be compacted in accordance with NYSDOT Specification "402-3.07 Compaction and 402-3.09 Joints" using either option as follows:

1. Option A - Vibratory compaction.
2. Option B – For small projects, trench repair, parking areas, etc., a tandem roller (static or vibratory) 8- to 10-ton size may be used.

D. The required number of passes for either vibratory or static rollers, listed in Table 1, are minimums and may be increased by the Owner's Representative. One pass shall be defined as one movement of the roller over any point of the pavement in either direction. Static roller passes shall continue until all ruts, ridges, roller marks or other irregularities are removed from the surface. The Owner's Representative may alter the compaction procedures for small areas where the specified procedures are not practical.

E. TABLE 1

REQUIRED NUMBER OF PASSES (MINIMUM)

PAVEMENT COURSES	VIBRATORY ROLLER		STEEL-WHEEL TANDEM FINISH ROLLER
	VIBRATING PASSES (1)	STATIC PASSES (2)	STATIC PASSES
Base (open graded each lift)	4	2	5
Base (dense graded)	4	2	5
Binder (dense graded)	4	Not required	5
Top (dense graded all types)	2	Not required	2

(1) The required number of vibrating passes shall be reduced by one-half (1/2) for dual vibrating drum rollers when the drums are tandem and are both in the vibrating mode.
(2) The required number of static passes may be completed by the vibratory roller operating in the static mode.

F. Unless otherwise directed by the Owner's Representative, vibratory rollers having pneumatic drive wheels shall compact the longitudinal joint by using one of the pneumatic drive wheels to overlap the joint in two passes with the drum operating static. Unless otherwise directed by the Owner's Representative, dual vibrating drum rollers shall compact the joint by overlapping the joints in two passes with both drums operating static.

G. To prevent adhesion of the mixture to the drum(s), the drum(s) shall be kept properly moistened with water, or water mixed with small quantities of detergent or other Department approved materials. If required to prevent pneumatic tire pickup, the pneumatic drive wheels may be coated with a fine mist spray of fuel oil or other similar material. In all instances, the surface of the pavement shall be protected from drippings of fuel oil or any other solvents used in paving, compaction or cleaning operations.

H. If the Owner's Representative determines that unsatisfactory compaction is being obtained or damage to highway components and/or adjacent property is occurring using vibratory compaction equipment, the Contractor shall immediately cease using this equipment and proceed with the work in accordance with the conventional static compaction procedures at no additional cost.

The Contractor should note that if he elects to use vibratory compaction equipment, he assumes full responsibility for the cost of repairing all damage that may occur to components and adjacent property or underground utilities.

I. Areas inaccessible to rollers shall be compacted using vibratory pans, making a minimum of two passes on each course. Hand tamps shall be used for small areas not otherwise compacted.

J. At the end of each work day, when placing top course material, the face of each paving lane shall be ended by the placing of a 2-inch x 4-inch or suitable sized board perpendicular to the pavement and shimmed with asphalt concrete to provide a driving surface such that the board and shim material can be easily removed and a vertical face retained for butting the start of the new pavement on the following work day.

K. In no cases shall a vibratory roller be used over the Old Croton Aqueduct (OCA).

3.7 SEAL COAT

A. Apply seal coat to surface course in accordance with New York State Department of Transportation standards.

3.8 TOLERANCES

A. Surface Tolerance - The pavement surface shall be constructed to a 1/4-inch tolerance. If, in the opinion of the Owner's Representative, the pavement surface is not being constructed or has not been constructed to this tolerance based upon visual observation or upon riding quality, they may test the surface with a 16-foot straight edge (furnished by the Contractor) or string line placed parallel to the centerline of the pavement and with a 10-foot straight edge or string line placed transversely to the centerline of the pavement on any portion of the pavement.

   1. Variations exceeding 1/4-inch shall be satisfactorily corrected or the pavement relayed at no additional cost as ordered by the Owner's Representative.

B. Thickness Tolerance - The thickness indicated for each of the various courses of bituminous pavement is the nominal thickness. The pavement shall be so constructed that the final compacted thickness is as near to the nominal thickness as is practical, and within the tolerances specified below.

   1. Material which is part of a trueing or leveling course or shim course will not be considered in pavement thickness determinations.
   2. A tolerance not to exceed 1/4-inch from the nominal thickness required for the course specified under one pay item will be acceptable where the required nominal thickness is 4 inches or less. A tolerance not to exceed 1/2-inch from the nominal thickness required for the course or courses specified under one pay item will be acceptable where the required nominal thickness is over 4 inches. In addition, the sum total thickness of all bituminous mixture courses shall not vary from the total of the nominal thickness indicated on the plans by more than 1/4 inch where the total nominal thickness is 4 inches or less; or more than 1/2 inch where the total nominal thickness is over 4 inches but not more than 8 inches; and by not more than 5/8-inch where the total nominal thickness is more than 8 inches.

3.9 FIELD QUALITY CONTROL

A. The required degree of compaction for wearing or top courses and shim course is a finished product having not more than 7 percent air voids.

3.10 PROTECTION

A. Any pavement, constructed or reconstructed, which is subsequently damaged due to activity of work under this contract, shall be removed and replaced by the Contractor at no additional cost to the Owner.

B. Protect pavement from vehicular traffic until compaction is completed.

3.11 TESTING OF ASPHALT CONCRETE

A. The Contractor shall engage a testing laboratory acceptable to the Owner's Representative to perform "Marshall Tests" on the asphalt concrete supplies. The tests to determine percent air voids, asphalt content, mix gradation and thickness of courses in the pavement after placing and compaction.

3.12 WASTE MANAGEMENT

A. Separate and dispose of waste in accordance with the Project's Waste Management Plan (Section 017419).

END OF SECTION

SECTION 32 40 20

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

A. Scope of Work:

1. Work under this section shall include all supervision, labor, materials, equipment, plant and incidentals required to provide, install and compact dense graded aggregate base course (DGABC) for all pavement as indicated on the Drawings and as specified herein.

1.2 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

C. NYS DOT Standard Highway Specifications, dated 01/01/2016 or latest edition

D. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 321216 – Asphalt Paving

1.3 REFERENCES

A. The following is a listing of the publications referenced in this Section:

1. American Society for Testing and Materials (ASTM)
2. ASTM C 88 Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
3. ASTM C 117 Test Method for Material Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregate by Washing
4. ASTM C 131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
5. ASTM C 136 Method for Sieve Analysis of Fine and Coarse Aggregates
6. ASTM D 1556 Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
7. ASTM D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3(2,700 kN m/m3))
8. ASTM D 1883 Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils

9. ASTM D 2167 Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
10. ASTM D 2434 Test Method for Permeability of Granular Soils (Constant Head)
11. ASTM D 2922 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
12. ASTM D 3017 Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
13. ASTM D 3665 Practice for Random Sampling of Construction Materials
14. ASTM D 4318 Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.4 SUBMITTALS

A. Submit to the Site Engineer:
   1. The proposed source of material. Material shall come from a source approved by the NYSDOT and/or the Site Engineer. Do not deliver material until the Site Engineer has approved of the source.

B. If the source and/or the supplier of the aggregate base course material changes, resubmittals for approval must be made.

1.5 QUALITY CONTROL AND ASSURANCE

A. Provide and maintain quality control plans and procedures that shall ensure all base course materials and completed construction conform to this section. The Owner shall be afforded access to the Contractor's plant, equipment and field operations at all times for checking compliance with the approved quality control procedures. Provide labor and equipment to take samples as directed and assist the in other tests. Repair all areas from which samples are taken to meet all requirements of this section.

B. The quality control plan shall include as a minimum:

   1. Assignment of quality control responsibility to specifically named individuals.
   2. Outline of sampling location procedures and in-place density testing methodologies.
   3. Provisions for the prompt implementation of control and corrective measures.
   4. Provisions for liaison with the Owner at all times.
   5. Performance of necessary quality control tests, including use of a nuclear gage.

C. Sampling and Testing

   1. The Owner may elect to inspect, test, and approve aggregate base course at the source. At least five days prior to delivery of material to site, the Site Engineer and Owner shall be notified.
   2. Base course material delivered to the construction site will be sampled and tested by the Owner for conformance to the requirements specified in Subsection 2.1. A copy of the test analyses will be on file with the Owner. The samples will be taken from stockpiles on site, prior to material placement operations. Minimum testing frequencies will be as follows:

Aggregate Base Course Using Virgin Aggregate	
Gradation	1 test per Lot
Moisture-Density	
Proctor Test	1 test per Lot

a. A lot shall be defined as one day's production but no more than 400 cubic yards.
b. The Contractor will check base course thickness at least once every 2,500 square feet.
c. The Contractor will determine field density of compacted base course from in-place density tests. Frequency of testing will be at least one test every 2,500 square feet per lift. Locations of random sampling shall be determined in accordance with ASTM D 3665. The in-place field density shall be determined in accordance with ASTM D 2922 and ASTM D 3017, or ASTM D 2167, or ASTM D 1556.
d. The Contractor will check conformance to elevations required by the Contract Drawings and required tolerance for surface straightness.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Virgin aggregate:

1. For base course shall be quarry processed, crushed dolomite, limestone, gneiss, or trap rock free from coatings of clay, silt, vegetable matter, and other objectionable materials, and shall contain no clay balls.
2. Gradation for dense graded gravel base course shall be as follows per NYS DOT Highway Specifications Section 302-2.03:

SIEVE SIZE	% PASSING BY WEIGHT
2"	100
1/4"	30-65
No. 40	5-40
No. 200	0-10

*The plasticity index shall not exceed 5.0 for the granular material.

**The aggregate base course shall have not less than 90% by weight with at least two fractured faces and 100% with at least one fractured face, and with a maximum of 7% of flat or elongated pieces. A flat piece is one having a ratio of length to width greater than five.

B. Soundness of Aggregates: Loss limitation shall not be more than 10% loss by weight, using sodium sulfate for 5-cycle test period, or not more than 15% loss by weight, using magnesium sulfate for a 5-cycle test period as determined by ASTM C 88 or as approved by NYSDOT or the Village.

C. Resistance to Degradation: Percentage loss between the original weight and the final weight of the test sample shall not exceed 45% as determined by ASTM C 131.

PART 3 - EXECUTION

3.1 EQUIPMENTS

A. Placing and spreading equipment shall be approved by the Owner and be capable of spreading material without segregation of aggregate sizes.

B. Steel vibratory rollers to be used for compaction, shall have provision for regulation of vibration frequency. Pneumatic rubber-tired rollers shall have a minimum weight of 20 tons and tire pressure of between 60 and 150 psi, as directed by the Owner. All compaction equipments, including mechanical tampers when proposed, are subject to review and approval by Owner.

3.2 DESIGN AND PERFORMANCE REQUIREMENTS

A. Job Conditions

1. Aggregate base course shall not be placed or spread unless subgrade is free of frost and standing water.
2. Do not place aggregate base course, or perform any compaction operations when ground water level is above a plane two feet below the bottom of the base course. This condition would be indicated by existing water level readings, known site conditions or by the results of probes performed by the Contractor before material placement.
3. When necessary, lower and maintain ground water below the required plane by methods approved by the Owner.

B. Design and Tolerance

1. Surface of the base course shall be within plus or minus 1/4 inch of elevations shown on the Contract Drawings and free of depressions or projections greater than 3/8 inch when tested with a 16-foot straight edge applied parallel with or at right angles to the centerline.
2. Thickness of base course at any point shall not be deficient by more than 1/4 inch from the required thickness shown on the Contract Drawings.
3. The field density of the base course after compaction shall be at least 95 percent of the maximum density as determined by Procedure "C" of ASTM D 1557, with the exception that base course material passing the 1 1/2-inch sieve shall be used instead of the material passing the 3/4 inch sieve specified.

3.3 PREPARATION OF SUBGRADE

A. Verify that job conditions specified in Subsection 3.2 A have been met and there are no high points in the subgrade which would interfere with meeting the tolerance requirements specified in Subsection 3.2.B.

B. For granular subgrades, compact subgrade with a minimum of 6 passes of an approved vibratory steel roller, operating at the optimum operating frequency as recommended by the manufacturer. In areas where access by specified vibratory equipment is limited or not practical, the Contractor shall provide alternate means for achieving specified compaction, to be approved by the Site Engineer.

C. For fine-grained soil subgrades, compact subgrade with a minimum of 6 passes of an approved pneumatic rubber-tired roller.

D. Rollers shall be operated at a speed not to exceed 3 miles per hour. Roller passes shall be overlapped a minimum of 6 inches.

E. All subgrade compaction operations shall be performed at or near optimum moisture content. In areas where use of a roller is impractical, compact subgrade with approved mechanical tampers. Provide grade control as follows:

1. Set grade stakes on a rectangular grid not more than 25 feet on centers.
2. After firmly driving stakes, offset mark each 6 inches above the top of base course.
3. Maintain stakes during placement and compaction of base course.

3.4 PLACEMENT AND COMPACTION

A. Place base course materials evenly over the prepared subgrade with approved spreading equipment. In multi-layer construction, the previously constructed layer should be cleaned of loose foreign material prior to placing the next layer. The surface of the compacted material shall be kept moist until covered by the next layer.

B. When spread, base course materials shall be at or near optimum moisture content and of a thickness such that the maximum depth of a compacted layer shall be 6 inches. In multi-layer construction, the base course shall be placed in approximately equal-depth layers.

C. Compact immediately after spreading, while at or near optimum moisture content, by rolling. The number, type and weight of rollers shall be sufficient to compact the material to the required density.

D. In areas where use of rollers is impractical, compact with manually operated equipment while at or near optimum moisture content.

E. The base course shall be maintained in a condition that will meet all specification requirements until the work is accepted. Equipment used in the construction of an adjoining section may be routed over completed portions of the base course, provided no damage results and provided that the equipment is routed over the full width of the base course to avoid rutting or uneven compaction.

F. If, in the opinion of the Owner, Environmental Engineer or Site Engineer, the compacted base course softened due to exposure to the elements, drain off all free-standing water and re-compact the base course until density requirements are met.

G. Refer to NYSDOT Specification Section 302-3.05 Transporting, Spreading, Compacting and Finishing of Option A for more information.

3.5 ADJUSTMENT OF DEFICIENCIES

A. Scrape, add or remove material or replace deficient material, and re-compact to meet specified density, grade or smoothness criteria.

B. In no case will the addition of thin layers of material be added to the top layer of base course to meet grade. If the elevation of the top layer is 1/2 inch or more below grade, the top layer of base shall be scarified to a depth of at least 3 inches, new material added, and the layer shall be cut back to grade and rerolled.

END OF SECTION

SECTION 32 91 13

PLANTING SOIL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Planting Soil Materials and Installation
2. Inorganic Soil Amendments
3. Organic Soil Amendments
4. Planting Soil Protection
5. Testing and analysis for specification conformance

B. Related Requirements:

1. Section 015639: “Temporary Tree and Plant Protection”
2. Section 310000: “Earthwork”
3. Section 312000.02 “Landfill Final Cap Backfill”
4. Section 329200: “Turf and Grasses”
5. Section 329300: "Plants"

1.3 REFERENCES

A. “Official Methods of Analysis of AOAC International”, latest edition, published by AOAC (formerly Association of Official Agricultural Chemists), 481 Frederick Avenue, suite 500, Gaithersburg, MD 20877.

B. American Society of Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshonocken, PA 19428 (610) 832-9585:

1. ASTM C-136 Dry Sieving
2. ASTM D-422-63 Hydrometer
3. ASTM D1556 In situ Density by Sand Cone
4. ASTM D1603 Carbon Black Content
5. ASTM D2256 Tensile Strength and Elongation
6. ASTM D4101 Polypropylene
7. ASTM D2101 Young’s Modulus
8. ASTM D2922-01 Nuclear Density

9. ASTM D698 Standard Proctor
10. ASTM F1647-99 Organic Matter Content
11. ASTM D4972 pH
12. USDA Soil Survey Lab Methods Manual (Number 42, November 2004)

C. "Recommended Soil Testing Procedures for the Northeastern United States", Latest Edition, Northeastern Regional Publication No. 493, (NRP-493), Agricultural Experiment Stations of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and West Virginia, latest edition..

1. Document may be obtained on the web at:
   http://ag.udel.edu/extension/Information/Soil_Testing/title-95.htm
   a. Test for soil Organic Matter by loss of weight on ignition, as described in NRP-493, p. 59.
   b. Test for soil Soluble Salts shall be by the 1:2 (v:v) soil:water Extract Method as described in NRP-493, p. 74.

D. Code of Federal Regulations Title 40, Chapter I-Environmental Protection Agency 40 CFR Part 503 rule, Table 3, page 9392, Vol. 58 No. 32.

1.4 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. CEC: Cation exchange capacity.

C. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

D. Finished Grade: Elevation of finished surface of planting soil

E. Imported Soil/Imported Fill: Clean, non-planting soil that is transported to Project site for use.

F. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

G. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

H. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

I. Planting Soil: imported horticultural soil; or manufactured soil that has been modified as specified with soil amendments to produce a soil mixture best for plant growth.

J. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.

K. SSSA: Soil Science Society of America.

L. Subgrade: Within the waste footprint, the uppermost surface or elevation of landfilled waste material after relocation, grading and compaction; the surface upon which the landfill final cap system is construction. In the limited areas outside of the waste footprint, subsoil is the surface or elevation remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

M. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

N. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

O. USCC: U.S. Composting Council.

P. Waste Material: Existing landfilled solid waste materials.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1. Prior to commencement of any landscape planting work of this Section, arrange a conference at the site of this Project with the Owner's Representative. At least seven (7) days' notice shall be given prior to the conference.

1. Conference attendance will include the Contractor, the supervisor/foreman appointed to oversee the work of this Section; the supervisor/foreman responsible for soil preparation, mixes, and placement; supervisor/foreman for plant installation work and other persons as deemed appropriate for coordination of work and quality control.

1.6 ACTION SUBMITTALS

A. Comply with pertinent provisions of section 013300 "Submittal Procedures"

B. Product Data: For each type of product indicated.

1. The manufacturer shall provide certifications on the key physical properties describing the materials used and installation instructions and general recommendations.
2. For organic soil amendments, signed by product manufacturer:

    a. Compliance with EPA 40 CFR Park 503 rule.

3. Include recommendations for application and use

C. Product Certificates:

1. For inorganic soil amendments, signed by product manufacturer.

a. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

2. For organic soil amendments, signed by product manufacturer

a. Compliance with EPA 40 CFR Part 503 Rule

D. Material Test Reports:

1. General: Submit written reports of each sample tested. Samples shall have been tested within the prior four (4) months. Each report include the following as a minimum and such other information required specific to material tested:

a. Date issued.
b. Project Title names of Contractor and supplier.
c. Testing laboratory name, address and telephone number, and name(s), as applicable, of each field and laboratory inspector.
d. Date, place, and time of sampling or test, with record of temperature and weather conditions.
e. Location of material source.
f. Type of test.

2. Imported Topsoil Test Reports for Planting Soil and Soil for Imported Fill.

a. Planting Soil for Testing Prior to Delivery: Submit to the Owner's Representative the laboratory test results for the organic matter, pH value, soluble salts, deleterious material, nutrients and gradation (see 1.8.E below). These tests will be performed and signed by a certified soils laboratory.
b. Results of tests including identification of deviations from specified ranges. Identify any toxic substance(s) harmful to plant growth or life. Recommendations for soil amendments, mix proportions, and methods of preparation, as applicable to specifications herein.

3. Organic Amendment Test Reports

a. Provide results of tests including identification of deviations from specified ranges. Identify any toxic substance(s) harmful to plant growth or life.

E. Samples for verification:

1. Planting Soil Mix: 1 lb. sample in labeled bag.
2. Sand: 1 lb. sample in labeled bag.
3. Compost: 1 lb. sample of each type in labeled bag.

F. The contractor shall submit quantity records on a weekly basis to the Director or Owner's Representative.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. For each testing agency.
2. For landscape installer.

B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article. All planting soil used on this project shall be tested and approved before placement.

C. Field quality-control reports.

1.8 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: Engage an experienced installer who has completed landscaping and soil supply work similar in material, design, and extent to that indicated for this project with a record of successful landscape establishment.

    a. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
    b. Experience: Three years' experience in installation of planting soil in addition to requirements in Division 01 Section "Quality Requirements."
    c. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

2. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in the types of tests to be performed. Rutgers Soil Laboratory is an example of an acceptable lab.

B. All Planting Soil used on this project shall be tested and approved before placement.

C. Secure approval before stripping planting soil from a borrow area or delivering planting soil to the project site.

D. Soils Observation: Owner’s Representative retains right to reject unsatisfactory material at any time during progress of work. Notify Owner’s Representative of sources of soil materials seven days in advance of delivery to site.

E. Planting Soil and Soil for Imported Fill Testing and Analysis:

1. All planting soil shall be analyzed by a qualified soil-testing laboratory stating pH, organic content, particle size, textural class, percentages of organic matter; gradation of sand, silt, and clay content; infiltration rate, deleterious material; and salinity.

2. Provide one (1) test for every 200 cubic yards of planting soil delivered to the site. Test(s) shall have been performed within four (4) months of delivery date unless otherwise approved by Owner’s Representative.

F. Compost Testing and Analysis: Furnish compost analysis by a qualified soil testing laboratory stating pH, organic content, moisture content, salinity, carbon to nitrogen ratio, and compost texture analysis.

1. Provide one (1) test for every 100 CY delivered to the site. Test(s) shall have been performed within two (2) months of delivery date unless otherwise approved by Owner's Representative.

2. Material failing the frequency testing shall not be incorporated into the work and shall be removed from the site at the Contractor's expense.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Accessory and Packaged Materials:

1. Deliver packaged materials in unopened standard size bags or containers, each clearly bearing the name, guarantee, and trademark of the producer, material composition, manufacturers' certified analysis, and the weight of the material.

2. Packaged material shall be stored off the ground and covered in a manner to prevent materials from getting wet or damp and in such manner that material effectiveness will not be impaired.

B. Bulk Materials Deliveries

1. Deliver bulk materials with each individual shipment accompanied by an affidavit and/or certification from the vendor (supplier), countersigned by the Contractor upon receipt, identifying the material type, composition, analysis, and weight and certifying that the material furnished complies with specification requirements of this Project.

2. Affidavits and/or certifications for bulk materials shall be furnished in duplicate with one copy submitted to Owner's Representative at the end of day of shipment receipt at the Project site and the second copy retained with material or on file with Contractor.
3. Planting soil mixes may be delivered to the site and stockpiled only in areas specifically designated by the Director or Owner's Representative. Materials shall be protected from contaminants and erosion as well as other dissimilar soil mixes. Temporary storage means and methods shall be submitted and approved by the Director or Owner's Representative.

4. Planting Soil mix storage areas shall be kept neat, clean, and necessary precautions shall be taken to avoid damage to existing plants, meadow areas, and existing site structures.

5. Planting Soil Mix Deliveries: Contractor shall provide delivery ticket(s) with name and address of vendor, date, and estimated volume of each delivery.

6. Planting Soil mixes and compost materials stored on site shall be covered with a tarpaulin until time of actual use.

7. Stockpiles of onsite or offsite Planting Soil shall not exceed 100 cubic yards, and shall be no more than four (4) feet in height to prevent anaerobic conditions within the piles. Soil shall be stockpiled for no more than thirty (30) consecutive calendar days. After thirty (30) conservative days the soil must be legally disposed of off-site at the Contractor's expense. If the material is to be submitted for re-use on site, it must first be re-tested and approved.

1.10 PROJECT/SITE CONDITIONS

A. Existing Conditions:

1. Existing Trees to Remain: Determine locations of existing trees to remain and critical root zone areas in accordance with specification Section 015639 “Temporary Tree and Plant Protection.” Exercise care when installing planting soil around existing trees and tree protection area so as to not damage existing roots.
2. Structures and Utilities: Determine location of existing and proposed above grade and underground structures and utilities and perform work in a manner that will avoid damage. Hand excavate, as required at no additional cost to the Owner.
3. Should the Contractor, in the course of Work, find any discrepancies between the Contract Drawings and physical conditions, it will be Contractor's duty to inform the Owner’s Representative immediately in writing for clarification. Work done after such discovery, unless authorized by the Owner’s Representative, shall be done at the Contractor's risk.
4. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Owner’s Representative before installation of Planting Soil.

B. Perform both off site mixing and on-site soil work only during suitable weather conditions. Do not disc, rototill, or work soil when frozen, excessively wet, or in otherwise unsatisfactory condition.

C. Planting Soil Mixes shall not be handled, hauled, or placed during rain or wet weather or when wet near or above field capacity.

1.11 SEQUENCING AND SCHEDULING

A. Adjust, relate together, and otherwise coordinate work of this Section with work of the Project and all other Sections of the Specifications.

B. No placement of Planting Soil mixes shall occur until subgrade conditions, including earthwork, landfill capping and subsurface utilities are completed.

C. Allow in schedule of operations for the Owner’s Representative to observe subgrades and transition layers before further construction work or operations are performed. Placement of all Planting Soil will be monitored and observed by the Owner’s Representative.

D. Sequence Planting Soil installation so as to not drive or operate any mechanical equipment over any installed Planting Soil material during storage, transport, placement, or after installation of Planting Soil material. Planting Soil material that has been driven over shall be removed from the site and legally disposed of at the Contractor’s expense.

E. Planting Soil Mixes should be stored and handled to be kept free of seed and rhizomes of invasive or weed species. Any material that has been contaminated should be disposed of and replaced at no additional cost to the Owner.

1.12 REGULATORY REQUIREMENTS

A. Comply with all rules, regulations, laws and ordinances of local, state and federal authorities having jurisdiction. Provide labor, materials, equipment, and services necessary to make Work comply with such requirements without additional cost to Director.

B. Procure and pay for permits and licenses required for work of this section.

PART 2 - PRODUCTS

2.1 PLANTING SOIL MIX

A. General: Imported topsoil (sandy loam) or manufactured sandy loam soil from off-site sources. Planting soil is used in the upper layer of the cap and in planting operations. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land**,** bogs or marshes. Material shall be free of stones 1 1/2 inch or larger in any dimension and other extraneous materials harmful to plant growth. Comply with the following additional requirements:

1. pH: Between 6.0 and 7.0 as determined by ASTM D-4972.
2. Organic content: Between 3% and 6% as determined by ASTM F1647-99.

3. Particle Size as determined by ASTM C-136:

Sieve Size	Min. % Passing
37.5 mm (1 1/2”)	100
19 mm (3/4”)	95
4.75 mm (No. 4)	75
2 mm (No. 10)	60

4. Textural Class as determined by combined hydrometer and wet sieving in compliance with:

Textural Class	% Total Weight
Sand (0.05—2.0 mm dia. range)	45-75
Silt (0.002—0.05 mm dia. range)	0-50
Clay (Less than 0.002 mm dia. range)	0-20

5. Internal Rate of Percolation: Between 1” and 3” per hour as determined by ASTM D-5126

6. Salinity: less than .80 mmhos/cm (dS/m) as determined by NRP-493 Soluble Salts by the 1:2 (V:V) Soil:Water Extract Method

2.2 SAND

A. Medium Sand for mixing to create sandy loam mix to meet specification requirements shall be naturally occurring, manufactured, uniformly graded coarse sand consisting of clean, inert, rounded grains of quartz or other durable rock free from loam or clay, surface coatings, mica, and other deleterious materials. Medium Sand material shall meet the following gradation for material passing a Number 10 Sieve for washed sieving.

U.S. Sieve Size No.	% Passing Minimum	% Passing Maximum
10	100	-
18	70	90
35	35	60
60	12	25
140	2	20
270	0	5
0.002 mm	0	0.5

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

F. Sand: See Article 2.2.A of this Section.

2.4 ORGANIC SOIL AMENDMENTS

A. Type 1 Compost is for Seeded Meadow Mix 1 areas and shall be spent mushroom substrate (SMS), weed free with no unpleasant odor and follows the below guidelines:
   1. Brown to black color
   2. Particle Size: 3/8” – 1/2" in size for surface applications and 1/2" or slightly larger for incorporated applications.

3. Earthy odor
4. Moisture Content: 30 to 50 percent by weight, as determined by ASTM F-1647-99.
5. Organic Matter: greater than 40 percent of dry weight, as determined by ASTM F1647-99.
6. Ash Content: less than 60 percent
7. Carbon to Nitrogen Ratio: below or equal to 30:1
8. Nitrogen: 1.5 to 3 percent
9. Phosphorus: 0.5 to 2 percent
10. Potassium: 1 to 3 percent
11. pH: 6 to 8 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter as per ASTM D4972
12. Salinity: Electrical conductivity of a one to two soil to water ratio extract shall not exceed .80 mmhos/cm (dS/m) as determined by NRP-493 method.

B. Type 2 Compost is for non-meadow planting beds and shall be well-composted, stable, humus like, and weed free organic matter with no unpleasant odor, produced by aerobic decomposition of organic leaf or yard waste compost (composted for a minimum of one year) or by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

1. pH: 6.5 to 7.2 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter as per ASTM D4972
2. Salinity: Electrical conductivity of a one to two soil to water ratio extract shall not exceed 2.0 mmhos/cm (dS/m) as determined by NRP-493 method.
3. Moisture Content: 35 to 55 percent by weight, as determined by ASTM F-1647-99.
4. Organic-Matter Content: 40 percent of dry weight, as determined by ASTM F1647-99.
5. Carbon to Nitrogen Ratio: Between 12:1 to 25:1.
6. Particle Size: Minimum of 98 percent passing through a 1-inch sieve.
7. Ammonium levels below 100 ppm

C. Compost pathogens/metals/vector attraction reduction shall meet EPA 40 CFR Part 503 rule, Table 3, Page 9392, and Vol. 58 No. 32.

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to the procurement of planting soil and starting delivery of soil, all approved for those items required in Section titled “Submittals” shall be given in writing and accepted by the Owner’s Representative.

B. Prior to the placement of planting soil, the subgrade must be accepted for “Landscape Areas” by the Owner’s Representative. Refer to section 310000 “Earthwork” and Section 312000.02 “Landfill Final Cap Backfill” for subgrade approval requirements.

3.2 EXAMINATION

A. Examine areas to receive planting soils for compliance with requirements and other conditions affecting performance. The Contractor shall not place any planting soil on subgrade prior to inspection and approval of Owner’s Representative for compliance of subgrade with specifications -

including, but not limited to "Section 312000.02 "Landfill Final Cap Backfill". Proceed with installation only after unsatisfactory conditions have been corrected.

1. Deficiencies include, but shall not be limited to the following:
   a. Construction debris present within the planting areas.
   b. The subgrade is at incorrect depths for installing the designed cap and soil profile.
   c. Incomplete subsurface drainage installation.
   d. Conflict with underground utilities.
   e. Subgrade contaminated with oils, compressible material, silt or clay.

B. Prior to excavation for planting soil, ascertain the location of surface and subsurface utilities.

1. Take proper precautions so as not to disturb or damage subgrade or sub-surface elements. Contractor failing to take these precautions shall be responsible for making requisite repairs to damaged utilities or subsurface element at Contractor's own expense and no modification to schedule.

2. If subsurface elements are uncovered at a specific location for plant items, notify the Owner's Representative immediately for direction on the removal or relocation of item(s).

3.3 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, existing trees, shrubs, and plantings from damage caused by soil placement operations.

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

C. Place excavated soil to subgrade depths as indicated in drawings and in accordance with specification Section 310000 "Earthwork" and Section 312000.02 "Landfill Final Cap Backfill".

3.4 PLACING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply planting soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet. Do not mix historic fill with imported soils.

B. Application: Spread planting soil to total depth indicated on Drawings but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

1. Lifts: Apply planting soil in lifts not exceeding 12 inches in loose depth for material compacted by mechanical compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

C. Compaction: Compact each lift of planting soil to 85 percent of maximum Modified Proctor density according to ASTM D 698. Care should be taken to not over compact the soils. Refer to article 3.5 of this specification.

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

3.5 PLANTING SOIL COMPACTION

A. General:

1. Compaction levels with material dry density shall be determined by ASTM D-2922 and Modified Proctor Density in accordance to ASTM D 1557, Method D.

2. Control soil compaction during construction for compliance with the percentage of density specified. Utilize appropriate equipment in sufficient quantity and sizes to perform compaction work.

3. Keep rollers and other heavy equipment at least 8 feet from footings, shoreline stabilization, foundations, piers, and walls of buildings and 3 feet from appurtenances and other structures on site.

B. Compaction shall be continuous over the entire area as indicated for each density value and in uniform layers no more than thickness specified (after compaction). Equipment shall make sufficient passes to obtain uniformly the desired density. Each layer shall be compacted before the overlaying lift is placed. Compaction layer thickness shall be as follows:

1. At conditions compacted by hand-operated equipment: 6” thickness.

2. At conditions compacted by mechanical equipment: 12” thickness.

C. Fill material shall be treated so that the moisture content at the time of compaction is at or no more than 3% above the optimum moisture content for the compacted soil.

D. If the fill material becomes too dry for the required compaction, fill shall be moistened by a method approved by the Owner’s Representative prior to or continuing compaction operations.

3.6 AMENDMENT OF PLANTING SOIL WITH COMPOST

A. Uniformly apply compost to planting soil surface and blend into planting soil with a roto-tiller at the following rates:

Apply 1 inch depth Type 1 Compost over proposed Seeded Meadow Mix 1 (Low Mow Mix) areas blend into top 4 to 6 inches.

Apply 3 inch depth Type 2 Compost over proposed plant bed areas (non-meadow planting areas) blend into top 12 inches.

B. Make minimum of three passes over compost and planting soil with roto-tiller to ensure a uniform blending of materials.

3.7 PLANTING SOIL FINISH GRADING

A. The locations and elevations of constructions are indicated on the drawings and, unless inconsistencies are brought to the written attention of the Owner's Representative prior to the commencement of work, the Contractor shall be held responsible for the proper location and elevations of the completed work.

B. Uniformly smooth grades of all areas including excavated and fill sections and adjacent areas for subsequent work. The subgrade shall be reasonably smooth, compacted, and free from irregular surfaces changes.

C. Finish grading in planting areas shall be within one tenth of a foot (0.1') of the elevations shown on the drawings.

D. Grades not otherwise indicated shall be uniform levels or slopes between such points and existing grades, except that the surface shall be rounded at abrupt changes or slopes. Care shall be exercised in grading all flat areas so as to prevent low spots and water pockets.

E. Before any placement of planting soil mixes on the existing or prepared subgrade, verify preparation to design line and grade.

3.8 FIELD QUALITY CONTROL

A. In-situ density tests shall be carried out by the Contractor at a frequency of one test per layer per 5,000 square feet for all Planting Soil areas. In-situ tests shall be carried out utilizing either Sand Cone or Nuclear Density methodologies at the Contractors discretion. Test results shall be compared with Standard Proctor Maximum Dry Densities, as determined in advance for each material.

3.9 PROTECTION

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

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.

   1. Remove and replace soil materials to depth as directed by the Owner's Representative and Division 310000 "Earthwork"; reshape and re-compact as per approved settlement methodology.

C. Maintenance of Planting Soil Grading:

   1. Protection of Newly Graded Areas:

      a. Protect newly graded areas from vehicular traffic and erosion. No mechanical equipment shall be operated over any Planting Soil mixes either during or after placement.
      b. Keep all graded planting soil areas free of trash and debris
      c. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

D. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking or moving vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

E. Reconditioning Compacted Graded Areas:

1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather or are over compacted, scarify the surface, reshape and compact to the required density prior to further construction.
2. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Owner's Representative and replace contaminated planting soil with new planting soil.
3. Remove and properly dispose of all protection measures upon completion of planting installation.

3.10 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

3.11 DISPOSAL

A. Disposal: Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property in accordance with Section 017419 Construction Waste Management and Disposal.

3.12 ACCEPTANCE

A. Confirm that the final grades of the Soils are at the proper finish grade elevations. Adjust grade as required to meet the contours and spot elevations noted on the Plans. Request the presence of the Owner's Representative to inspect final grade. Do not proceed with the remaining work of the Contract until the Owner's Representative has given his/her written approval of the final grade.

END OF SECTION

SECTION 32 92 00

TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Seeding
   2. Hydroseeding
   3. Maintenance of seeded areas
   4. Aerating and Reseeding

B. Related Requirements:
   1. Section 310000 "Earthwork"
   2. Section 312500 “Soil Erosion and Sediment Control”
   3. Section 329113 "Planting Soil"
   4. Section 329300 "Plants"

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.
B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
D. Planting Soil: Imported soil or manufactured soil that has been modified with soil amendments to produce a soil mixture best for plant growth. See section 329113 "Planting Soil" and drawing designations for planting soils.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Prior to commencement of any landscape planting work of this Section, arrange a conference at the site of this Project with the Owner’s Representative At least seven (7) days’ notice shall be given prior to the conference.

1. Conference attendance will include the Contractor, the supervisor/foreman appointed to oversee the work of this Section; the supervisor/foreman responsible for soil preparation, mixes, and placement (As specified in Section 329113 – Planting Soil) the supervisor/foreman for plant installation work (As specified in Section 329300 – Plants) and other persons as deemed appropriate for coordination of work and quality control.
2. At the conference, review planting installation and sequence schedules of both Project and plant installations, specification criteria and installation, material sources procedures, outstanding submittals and approvals, and such other subjects necessary for coordination of Work.
3. Establish follow up meeting(s) as necessary.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Landscape Installer.
B. 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.

   1. Certification of each seed mixture specified. Include identification of source and name and telephone number of supplier.

C. Product Certificates: For compost, from manufacturer.
D. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of meadow areas during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

A. Qualifications:

   1. Landscaping Installer Qualifications: Engage an experienced installer who has completed landscaping and soil supply and seeding installation work similar in material, design, and extent to that indicated for this project with a record of successful landscape establishment.

      (a.) Installer's Field Supervisor(s) for Installation and Maintenance shall be an English-speaking supervisor(s) experienced in seeded, sodded, and hydroseeded meadow installation and maintenance.
      (b.) Provide names of projects, project locations, client contact names and phone numbers for a minimum of five (5) projects of similar size and scope, for review by Owner’s Representative.
      (c.) Supervisor(s) shall be maintained full-time on Project site when meadow installation or maintenance is in progress.
      (d.) Perform all meadow installation work with personnel totally familiar with preparations and meadow installation under supervision of an experienced landscape Foreman.
      (e.) Provide adequate numbers and types of accessible personnel to meet the scheduling requirements of the meadow installation.

2. Soil-Testing Laboratory Qualifications: As indicated in Specification Section 329113 “Planting Soil”

   (a.) The contractor shall pay for all testing required in this Section.

B. Pesticide applicator: State licensed, commercial. Contractor shall conform to all New York State Department of Environmental Conservation (NYSDEC) regulations for application of pesticides.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original, unopened, and undamaged containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing grass 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.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Accessory and Packaged Materials:

1. Deliver packaged materials in unopened standard size bags or containers, each clearly bearing the name, guarantee, and trademark of the producer, material composition, manufacturers' certified analysis, and the weight of the material.
2. Accessory and packaged material shall be stored off the ground and covered in a manner to prevent materials from getting wet or damp and in such manner that material effectiveness will not be impaired.

1.9 PROJECT/SITE CONDITIONS

A. Existing Conditions:

1. Existing Trees to Remain: Determine locations of existing trees to remain and protection areas extending to their existing drip lines. Exercise care when planting around existing trees and tree protection areas so as to not damage existing roots. Utilities: Determine location of existing and proposed above grade and underground utilities and perform work in a manner that will avoid damage. Hand excavate, as required at no additional cost to the Owner.
2. Should the Contractor, in the course of Work, find any discrepancies between Contract Drawings and physical conditions, it will be Contractor's duty to inform the Construction Manager immediately in writing for clarification. Work done after such discovery, unless authorized by the Owner’s Representative, shall be done at the Contractor's risk.
3. When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Owner’s Representative and Owner’s Representative before planting.

B. Environmental Requirements and Planting Schedule:
   1. Planting Restrictions: Plant during one of the following periods, weather permitting. Coordinate planting periods with maintenance periods to provide required maintenance.

      (a.) Seeded and Hydroseed Meadow:

         1) Spring Planting: April 1- May 31.
         2) Fall Planting: August 15- October 31

   2. 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.

      (a.) Do not install seed when ambient temperatures may drop below 40 deg. F or rising above 80 deg. F. Do not install seed when wind velocity exceeds 30 mph (48 k/hr). Do not seed when the ground is frozen, excessively wet, or the soil is otherwise in an unsatisfactory condition for seeding.

1.10 COORDINATION, SEQUENCING AND SCHEDULING

A. General: Adjust, relate together, and otherwise coordinate work of this Section with Work of Project and all other Sections of Specifications. Coordination of work to include, but is not limited to:

   1. Subsurface Utilities.
   2. Concealed Conditions.
   3. Sequence of planting soil placement and plant installation.
   4. All other construction activities requiring access to meadow areas.

B. Coordination with Plants: Install meadows and seeded areas after the completion of (Alternate) tree or shrub plantings in adjacent areas and planting beds.

C. Watering: The Contractor shall be responsible for the coordination of the planting and site water availability. Water, if not available at the time of planting, shall be furnished by the Contractor. All water, water tank trucks, spray heads, hoses and other equipment required for watering shall be furnished by the Contractor as needed at no additional cost to Owner.

D. Sequence lawn planting and planting soil installation so as to not drive or operate any mechanical equipment over any installed planting soil material. Planting soil material that has been driven over shall be removed from the site and legally disposed of at the Contractor’s expense.

1.11 REGULATORY REQUIREMENTS

A. Comply with all rules, regulations, laws and ordinances of local, state and federal authorities having jurisdiction. Provide labor, materials, equipment and services necessary to make Work comply with such requirements without additional cost to Owner.

B. Procure and pay for permits and licenses required for work of this section. Process to start work immediately.

1.12 MEADOW MAINTENANCE

A. Begin maintenance immediately after each area is planted and continue until acceptable meadow areas are established, but for not less than the following periods:

1. Seeded Meadow Areas: 90 days from date of Final Acceptance.

(a.) When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.

B. Maintain and establish seeded areas by watering, fertilizing, weeding, applications of pre-emergent and post-emergent herbicides, pesticides, and fungicides, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniform meadow.

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.

C. Watering: Provide and maintain temporary piping, hoses, and meadow-watering equipment to convey water from sources and to keep meadow uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed and mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water meadow at a minimum rate of 1 inch per week.

D. Mow meadow in accordance with section 3.9 of this specification.

PART 2 - PRODUCTS

2.1 MEADOW SEED MIX 1 (LOW MOW MEADOW MIX)

A. Seed: Seed mix shall be fresh, recleaned seed from the latest crop. All seed shall be free of noxious weeds and undesirable species. Seed shall contain no less than 75% PLS (pure live seed). Low Mow Meadow Mix shall be comprised of the following plant species and meet the specified content percentages:

% of Mix	Botanical Name	Common Name
34%	Festuca rubra	Creeping Red Fescue
33%	Festuca ovina	Sheep Fescue
10%	Festuca brevipila ‘Beacon’	Hard Fescue ‘Beacon’
5%	Festuca ovina var duriuscula (F. longifolia) ‘Rhino’	Hard Fescue ‘Rhino’
5%	Festuca ovina var. glauca (F. arvernensis) (F. glauca)	Blue Fescue ‘Blue Ray’
5%	Poa pratensis ‘Argyle’	Kentucky Bluegrass ‘Argyle’
5%	Poa pratensis ‘Shamrock’	Kentucky Bluegrass ‘Shamrock’
3%	Agrostis perennans, Albany Pine Bush-NY Ecotype	Autumn Bentgrass, Albany Pine Bush-NY Ecotype
100	Total	

B. Mix Application Density: Mix to be applied at 6lbs per 1000SF.

2.2 MEADOW SEED MIX 2 (FLOWERING MEADOW WET SOIL TOLERANT)

A. Seed: Seed mix shall be fresh, recleaned seed from the latest crop. All seed shall be free of noxious weeds and undesirable species. Seed shall contain no less than 75% PLS (pure live seed). Flowering Meadow Wet Soil Tolerant Mix shall be comprised of the following plant species and meet the specified content percentages:

% of Mix	Botanical Name	Common Name
1%	Achillea millefolium	Common Yarrow
1%	Agrostis gigantea	Redtop
1%	Agrostis perennans, Albany Pine Bush-NY Ecotype	Autumn Bentgrass, Albany Pine Bush-NY Ecotype
1%	Asclepias tuberosa PA Ecotype	Butterfly Milkweed PA Ecotype
1%	Chamaecrista fasciculata PA Ecotype	Partridge Pea PA Ecotype
1%	Chrysanthemum maximum	Shasta Daisy
2%	Coreopsis lanceolata	Lancelleaf Coreopsis
0.5%	Eupatorium coelestinum VA ecotype	Mistflower VA Ecotype
8%	Linum perenne ssp. lewisii	Perennial Blue Flax
17%	Lolium multiflorum	Annual Ryegrass
0.5%	Papaver rhoeas Shirley Mix	Corn Poppy Shirley Mix
2%	Rudbeckia hirta Coastal Plain NC Ecotype	Blackeyed Susan, Coastal Plain NC Ecotype
64%	Schizachyrium scoparium Fort Indiantown Gap-PA Ecotype	Little Bluestem Fort Indian-town Gap-PA Ecotype
100	Total	

B. Mix Application Density: Mix to be applied at 20lbs per acre.

2.3 MEADOW SEED MIX 3 (DIVERSE SEED MIX)

A. Seed: Seed mix shall be fresh, recleaned seed from the latest crop. All seed shall be free of noxious weeds and undesirable species. Seed shall contain no less than 75% PLS (pure live seed). Low Mow Meadow Mix shall be comprised of the following plant species and meet the specified content percentages:

% of Mix	Botanical Name	Common Name
39%	Avena sativa	Oats
4%	Lolium multiflorum	Annual Ryegrass
14%	Schizachyrium scoparium Fort Indiantown Gap-PA Ecotype	Little Bluestem Fort Indian-town Gap-PA Ecotype
15%	Festuca rubra	Creeping Red Fescue
15%	Festuca ovina	Sheep Fescue
4%	Festuca brevipila ‘Beacon’	Hard Fescue ‘Beacon’
2%	Festuca ovina var duriuscula (F. longifolia) ‘Rhino’	Hard Fescue ‘Rhino’
2%	Festuca ovina var. glauca (F. arvernensis) (F. glauca)	Blue Fescue ‘Blue Ray’

2%	Poa pratensis 'Argyle'	Kentucky Bluegrass 'Argyle'
2%	Poa pratensis 'Shamrock'	Kentucky Bluegrass 'Shamrock'
1%	Agrostis perennans, Albany Pine Bush-NY Ecotype	Autumn Bentgrass, Albany Pine Bush-NY Ecotype
100	Total	

B. Mix Application Density: Mix to be applied at 58lbs per acre.

2.4 BIOSTUMULANT

A. Biostimulant: Liquid concentrate of manure extract and biostimulants that include cold water kelp extract, humic acid and fulvic acid, combined with chelated iron and surfactant.
B. Acceptable Product: Launch 0-0-1 Biostimulant as manufactured by PBI/Gordon Corporation, 1217 West 12th Street, Kansas City, MO 64101-0090, or approved equal. Comply with the following analysis:
   1. Guaranteed Analysis:
      (a.) Soluble Potash (K_2O) 1.00%
      (b.) Iron (Fe).....0.36%
      0.36% chelated Iron (Fe) derived from Potassium Hydroxide, Ferrous EDTA (ethylene diamine tetra acetic acid)
   2. Non-plant Food Ingredients:
      (a.) Manure Extract.....74.30%
      (b.) Humic and fulvic acids.....9.00%
      (c.) Kelp Extract.....1.20%
      (d.) Siloxan Surfactant 0.36%

2.5 PESTICIDES & HERBICIDES

A. General: Pesticide, registered and approved by the 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 Nonselective): 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 Nonselective): Effective for controlling weed growth that has already germinated.
D. Conform to all NYSDEC regulations for use of pesticides and herbicides.

2.6 PLANTING ACCESSORIES

A. Water: Potable, clean, fresh, and free from harmful materials deleterious to plant growth, water shall be furnished and applied by Contractor as necessary for lawn installation and maintenance.
B. Fungicides and Pesticides: EPA registered and approved before use for type and rate of application by Owner's Representative and agencies with jurisdiction of type recommended by manufacturer for application.

C. Pre-emergent and Post-Emergent Herbicides: EPA registered and approved before use for type and rate of application by Owner's Representative, and agencies with jurisdiction, of type recommended by manufacturer for application.
D. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.7 PLANTING SOIL

A. Refer to specification Section 329113 "Planting Soil"

2.8 INORGANIC SOIL AMENDMENTS

A. As specified in Section 329113 "Planting Soil."

2.9 ORGANIC SOIL AMENDMENTS

A. As specified in Section 329113 "Planting Soil."

2.10 MULCHES

A. Refer to Section 329300 "Plants"

2.11 EROSION-CONTROL MATERIALS

A. Refer to Section 312500 "Soil Erosion and Sediment Control"

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
    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. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
    3. Uniformly moisten excessively dry soil that is not workable or which is 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 Owner's Representative and replace with new planting soil.

3.2 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 overspray.

B. Provide 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.
C. Planting soil preparation at seeded areas

1. Limit preparation to areas to be planted.
2. Prepare the site in accordance with specification section 329113 “Planting Soil”.
3. Fine Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus .1” inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.
4. Moisten prepared meadow areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
5. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

D. Meadow area preparation

1. All sticks, stones, roots, vegetation, or other objectionable material which might interfere with the formation of a finely pulverized seed bed shall be removed from the soil and a smooth uniform surface grade shall be established. Hollows, depressions, and gullies shall be filled with planting soil.
2. Remove all pre-existing weedy vegetation at the seeding site – 99% of all existing vegetation must be removed. Manually remove weeds including roots, or apply for two applications at full label rates of a non-selective herbicide which does not leave an active soil residual, such as glyphosate (e.g. Round-up TM) or glufosinate-ammonium (e.g. Final^{TM}).

   (a.) One or two weeks shall be allowed to elapse between spraying operations, so that weed seeds and perennial plant parts may have time to germinate or regrow and so be destroyed by the second spraying. Delay seed after second spraying as recommended by herbicide manufacturer.
   (b.) Comply with all local, state, and federal laws regarding the application and use of herbicides. Manually remove all existing vegetation if herbicide is not permitted. Coordinate weed removal so as not to damage or destroy adjacent lawns, trees, seedlings, or bare root trees.

3.3 SEEDING

A. Uniformly sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
4. Do not broadcast seed by hand.

B. Sow seed at a total rate of 5 lbs/1,000 SF
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 and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.
E. Protect seeded areas with slopes not exceeding 1:4 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft. Take precautions to prevent damage or staining of structures, paving or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

F. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.4 HYDROSEEDING

A. Hydroseeding: Mix specified seedand fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Spray-apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre **(**dry weight, and seed component is deposited at not less than the specified seed-sowing rate.

3.5 MEADOW AREA MAINTENANCE

A. Meadow Area Maintenance

1. Maintenance: Begin maintenance immediately after seed placement. Maintain meadow areas by fertilizing, weeding, mowing, trimming and other operations such as rolling, regarding and replanting as required to establish a smooth, acceptable meadow, free of eroded or bare areas.

2. Seeded Meadow Establishment and Watering: Keep soil moist during seed germination period until initial acceptance. Supplement rainfall with temporary irrigation to produce a total penetration of 2” per day after germination.

(a.) Mowing: Contractor is responsible for all maintenance for not less than 90 days. Refer Section 1.12 Meadow Maintenance. Review and coordinate mowing schedule with Owner’s maintenance staff. Contractor shall anticipate this minimum maintenance regime which shall include removal of all clippings:

i. MIX 1: *During first growing season* meadow shall be mown to a height of 3”-4” after it is established and growing well. Contractor shall assume mowing twice during intital maintenance period. It can be sprayed with a broadleaf herbicide to knock out any weed infestation, but only after it has been established for at least 6 months.

ii. MIX 2: *During first growing season*: when overall vegetation reaches a height of 18”-24” it shall be mowed (with a brush hog mower or string trimmer not a lawn mower) to 8”. Contractor shall assume mowing once during intital maintenance period. Mowing should cease by mid-September. *During second/subsequent growing seasons*: prior to new spring growth reaching a height of 2” trim any material standing from the previous year. If there is a heavy infestation of invasive plants in the second growing season, trim the meadow to 8”.

iii. MIX 3: *During first growing season*: when overall vegetation reaches a height of 18”-24” it shall be mowed (with a brush hog mower or string trimmer not a lawn mower) to 8”. Contractor shall assume mowing once during intital maintenance period. Mowing should cease by mid-September. *During second/subsequent growing seasons*: prior to new spring growth reaching a height of 2”, trim any material standing from the previous year. If there is a heavy infestation of invasives in the second growing season, trim the meadow to 8”. After its established and growing well, can be mowed to a height of 3”-4” any time.

(b.) Reseed: Reseed and/or hydroseed areas larger than 1 square foot not having uniform coverage

B. Replacement And Restoration

1. Seeded Meadow Replacement Requirements: For the maintenance period until Owner’s final acceptance of all planting, and at no additional cost to Owner, the Contractor is to replace any seeding that is dead or that are, in the opinion of the Owner’s Representative, in an unhealthy or unsightly condition, or inadequate due to improper maintenance. All replacement planting is to be done no later than the next succeeding planting season after receipt of the Owner’s Representative’s instructions.
2. Replacement of planting is to be in accordance with the original specifications and its costs considered to be included in the bid price.
3. At the completion of the maintenance period and/or the meadow establishment period, all non-degradable erosion-control measures, protection measures, etc., shall be removed by the Contractor unless otherwise directed in writing by the Owner’s Representative.

3.6 SATISFACTORY MEADOW SEED AREAS

A. Meadow installations shall meet the following criteria as determined by Owner’s Representative:

1. Satisfactory Seeded Meadow: At end of maintenance period, a healthy, uniform, close stand of grasses has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Use specified materials to reestablish meadow that does not comply with requirements, and continue maintenance until meadow is satisfactory and approved by Owner’s Representative.

3.7 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to 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’s Representative before each application is performed.
B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.8 CLEAN UP AND PROTECTION

A. Promptly remove soil and debris created by seeding work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them in accordance with 017419.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from foot and vehicular traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
D. Remove non-degradable erosion-control measures after grass establishment period.

END OF SECTION

SECTION 32 93 00

PLANTS

PART - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Trees
2. Shrubs
3. Tree Stabilization
4. Deer Fencing

B. Related Sections:

1. Section 015639: “Temporary Tree and Plant Protection” for protection of existing vegetation
2. Section 310000: “Earthwork”
3. Section 329113: “Planting Soil”

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

D. Finish Grade: Elevation of finished surface of planting soil.

E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

F. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

G. Planting Area: Areas to be planted.

H. Planting Soil Mix/Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments to produce a soil mixture best for plant growth. See Section 329113 "Planting Soil" for drawing designations for planting soils.

I. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

J. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

K. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

L. Subgrade: Within the waste footprint, the uppermost surface or elevation of landfilled waste material after relocation, grading and compaction; the surface upon which the landfill final cap system is construction. In the limited areas outside of the waste footprint, subsoil is the surface or elevation remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 COORDINATION

A. Coordination with Seeded Areas (Meadow): Plant trees, shrubs, and other plants after finish grades are established and before planting meadow areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting meadow areas, protect meadow areas, and promptly repair damage caused by planting operations. Refer to Specification Section 329200 “Turf and Grasses”.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Prior to commencement of any landscape planting work of this Section, arrange a conference at the site of this Project with the Construction Manager and Owner. At least seven (7) days’ notice shall be given prior to the conference.

1. Conference attendance will include the Contractor, the supervisor/foreman appointed to oversee the work of this Section; the supervisor/foreman responsible for soil preparation, mixes, and placement (As specified in Section 329113 Planting Soil), the supervisor/foreman for seed and meadow installation work (As specified in Section 329200 Turf and Grasses), the supervisor/foreman for plant installation work, and other persons as deemed appropriate for coordination of work and quality control.
2. At the conference, review planting installation and sequence schedules of both Project and plant installations, specification criteria and installation, material sources procedures, outstanding submittals and approvals, and such other subjects necessary for coordination of Work.
3. Establish follow up meeting(s) as necessary.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.

    a. Include in plant list the botanical and common names, size, quantity, form, root ball, limb height (if applicable), other requested data, and source locations for all plant materials.
    b. Include names, addresses and phone numbers of each nursery source associated with each plant item.
    c. Plant lists shall clearly identify deviations from specified plants and any approved substitutions. Where deviations or other changes occur in plant list, identify both the original specified plant item and the new plant item.
    d. Plants listed with submittal shall be available at the nursery for inspection and selection as specified in Part 1 "Plant Sourcing, Selection, and Inspections" herein. Contractor shall evaluate and verify at proposed nursery source that plant material conforms to the requirements of the Contract Documents prior to scheduling Owner's Representative inspection and selection / tagging trip.

2. Maintain and re-submit updated Plant List and Source Identification as deviations or other changes occur until Substantial Completion. Submit as a Record Document at completion of Contract work.
3. Submit technical descriptive data for each manufactured or packaged product of this Section including mulch, soil amendments, tree staking materials, deer fencing, and plant treatment material as applicable. Include manufacturer's product testing and certified analysis and installation instructions for manufactured or processed items and materials. Include guaranteed analysis and weight of pre-packaged material as specified for certification of material not pre-packaged.

B. Samples for Verification: For each of the following:

1. 1 lb. of mulch in labeled plastic bag.
2. One package Mycorrhizal Innoculant
3. Deer Fencing Material:
    a. 7.5' ht. polypropylene mesh
    b. 5/8" Heavy-Duty Steel post with Ground Sleeve & Cap
    c. ground stakes
    d. 8" heavy ties (zip ties)
4. Tree Anchoring Material:
    a. Arbortie: 12" Length

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer: include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Installer shall have experience working in areas with tight conformance to grade conditions. Include, for a minimum of three (3) projects, project names, addresses, year completed, and include names and addresses of Owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

C. Schedule: Upon being awarded the Contract the Contractor shall submit a detailed schedule of landscape activities including but not limited to the following:

1. Date for Landscape Kickoff Meeting – this shall happen at the earliest possible time
2. Dates for Landscaping Submittals
3. Dates for Plant Tagging and Procurement trips
4. Dates for detailed landscape operations including soil deliveries, soil placement and plant installations itemized by each exterior plant type.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

A. Qualifications:

1. Nursery/Plant Supplier Qualification: Plant Nursery(ies) shall have a nursery facility as an integral part of operation where majority of plants can be grown and reviewed, shall be reputable, and shall have been in continual operation with a minimum of 7 years' experience as a plant grower. Nursery shall be capable of the following as a minimum:

   a. Supplying plant material conforming to the quality standards, visual characteristics, sizes, species cultivars, and quantities indicated by the Contract Documents.
   b. Conformance to cultural practices and maintenance procedures suitable for healthy plant material.

2. Plant Installer Qualifications: Engage an experienced installer who has completed plant installation work similar in material, design, and extent to that indicated for this project with a record of successful landscape establishment.

   a. Installer's Field Supervisor(s) for Installation and Maintenance shall be an English-speaking supervisor(s) experienced in tree, shrub, groundcover and plant installation and maintenance.
   b. Provide names of projects, project locations, name of supervisor for installer, client contact names and phone numbers for a minimum of five (5) projects of similar size and scope, for review by Owner's Representative.
   c. Supervisor(s) shall be maintained full-time on Project site when installation or maintenance is in progress.
   d. Perform installation work with personnel totally familiar with preparations and exterior plant installation under supervision of an experienced landscape Foreman.

e. Provide adequate numbers and types of accessible personnel to meet the scheduling requirements of the exterior plant installation.

3. Soil-Testing Laboratory Qualifications: As indicated in Specification section 329113 "Planting Soil"

   a. The contractor shall pay for all testing under this Section.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. 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 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

1.10 PLANT SOURCING, SELECTION, AND INSPECTIONS

A. General:

1. Contractor shall locate plant material source(s), confirm the availability of each plant type in compliance with Contract Documents, and shall submit, as specified, a complete list of all plant material for Project with nursery source identification for each plant.

2. All proposals for substitutions of plant material must be approved by the Owner's Representative in writing.

3. Owner's Representative, after review of submitted Plant List and Source Identification, will inspect plant materials at place of growth from identified nursery stock and at site before planting for compliance with requirements of genus, species, variety, size, quality, and other characteristics and for the purpose of plant selection.
   a. For the purpose of plant material selection by Owner's Representative and Owner, the terms "inspect" and "inspection" are to be construed as an evaluation, consideration, judgment, and review for acceptability at time of observation.
   b. Trees are to be inspected and tagged prior to being dug. Container grown trees will not be considered.

4. In addition to inspection at place of growth, Owner's Representative and Owner retain the right to inspect plant materials for size, condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory of defective material at any time during progress of the work even if previously inspected and approved.

5. Plant material not selected and tagged or otherwise reviewed as unacceptable shall not be delivered to Project and plant material subsequently rejected after delivery shall be removed immediately from Project site and replaced at no additional cost to the Owner.

B. Sourcing:

1. Source all plant material from nurseries that grow material within 400 miles of Project site. Contractor shall make effort to source planting material from the same USDA Plant Hardiness Zone: USDA Zone 7A.
2. All trees and shrubs shall be nursery grown for inspection and tagging in their growing locations.
   a. A representative sample of each shrub species will be tagged. The remainder of shrubs shall meet the quality of the representative sample.
3. Pre-dug plants shall not be acceptable unless they are indicated and accepted as container grown plants in the plant list.
4. A nursery source may be rejected by Owner's Representative if it is determined before, during, or after inspection and/or receipt of the plants that nursery source does not meet any of the following:

   a. The quality standards set forth by Contract Documents are not met by the nursery or nursery plant stock.
   b. Nursery or nursery plant stock exhibits an infestation with pest or disease.
   c. The intended visual characteristics of the plants are not met by the nursery stock.
   d. Nursery cannot supply the specified plants in sizes, species cultivar and/or quantities indicated by Contract Documents.
   e. The nursery does not follow cultural practices or maintenance procedures suitable for healthy plant material.

C. Contractor's Preparation for Plant Selection

1. Make all pre-selection arrangements with and at nursery supply source(s) to insure a ready supply of materials, equipment, and manpower required for an efficient selection and tagging procedure.
2. Request visit of Owner's Representative and Owner as applicable, at least fourteen (14) days in advance of the Contractor's desired inspection date for each type of plant material.
3. Arrange for Owner's Representative's travel for each inspection/tagging trip and confirm that quantities of material for inspection meet or exceed the following requirements:
   a. 1-4 Specified: Three (3) times the amount of material available for inspection
   b. 5-9 Specified: Two (2) times the amount of material available for inspection
   c. 10 or greater specified: One and one-half (1.5) times the amount of material available for inspection
4. As directed by Owner, plant Installer's Supervisor and nursery representative shall be present for plant inspection and tagging at the nursery source and at applicable times on-site.

D. Plant Material Inspection and Selection at Nursery

1. Owner's Representative will inspect plant material and make selection prior to digging at place of growth for compliance with genus, species, variety, size, quality, and desired design intent.

   a. All trees will be inspected and selected at the nursery sources by Owner's Representative for conformity to the specification requirements.
   b. The Owner's Representative may only require inspection of representative samples of each species of shrub, groundcover, vine, perennial, and annual.
   c. Nursery shall certify in writing that all trees tagged are disease and pest free.

2. Selected plants shall be tagged in the nursery as directed by Owner's Representative. Seals shall be placed by Owner's Representative on selected plants and not removed until the end of the Guarantee / Warranty period.

3. Inspection and selection by Owner's Representative shall not affect the right of inspection and rejection during delivery or during and after installation.

4. Photographs: Furnish photographs of the plant material at the Owner's Representative's option or request.

    a. Photographs (using digital camera) shall be taken at the nursery source. A scale figure or measuring device to indicate size shall be in each photograph.

        1) Tree photographs shall include images of the entire plant, and detail photographs showing the following: base of the tree, leaves, branching structure, form and habit.
        2) Shrub photographs shall include images of the entire plant, and detail photographs showing the following: base of the plant, leaves, branching structure, form and habit, rootball (for balled and burlap material), and/or roots (for potted material).

    b. Each photograph taken shall be labeled with the botanical and common names, nursery name, location and date.
    c. Furnish Owner's Representative digital disk and 2 print copies, minimum 4"x 6" size, of all photographs within 5 days of Owner's Representative's request.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Notify Owner's Representative of sources of planting materials seven days in advance of delivery to site.

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

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing or proposed 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.
3. Accompany each delivery of bulk materials with appropriate certificates.

D. 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.

E. Handle planting stock by root ball.

F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

G. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

H. 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.

I. 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, but not overly wet condition.

1.12 FIELD 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. Spring Planting:

a. Deciduous trees and shrubs: March 15 to May 1
b. Evergreen trees and shrubs: March 30 to May 15

2. Fall Planting:

a. Deciduous trees and shrubs: October 15 to November 30
b. Evergreen trees and shrubs: September 1 to October 15

3. The following species are fall planting hazards and shall be dug and planted in the Spring only. Digging or planting at times other than spring season shall be done at Contractor's risk, and shall not relieve Contractor of the obligation of Warranty/Guarantee obligations. If the Contractor elects to plant trees on this list in the fall without having arranged for a spring-dug tree, the Warranty Period shall be extended from one (1) year to two (2) years with the same replacement warranty as spring planted trees (see Article 1.13. A.).

a. Trees:

1) Betula
2) Carpinus

3) Celtis
4) Cercis
5) Cercidiphyllum
6) Crataegus
7) Fagus
8) Halesia
9) Koelreuteria
10) Liquidamber
11) Liriodendron
12) Malus
13) Nyssa
14) Ostrya
15) Prunus
16) Pyrus
17) Quercus –except Q. palustris
18) Salix
19) Sorbus
20) Styrax
21) Tilia tomentosa
22) Ulmus parviflora
23) Zelkova

4. 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.

1.13 WARRANTY & MAINTENANCE

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period. The Contractor shall provide

1. Failures include, but are not limited to, the following:

   a. Death and unsatisfactory growth, except for defects resulting from Owner abuse, lack of adequate maintenance by Owner or neglect by Owner.
   b. Structural failures including plantings falling or blowing over.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty and Maintenance Periods: Warranty and Maintenance from date of Substantial Completion as noted below:

   a. Trees, Shrubs: one (1) year from date of Substantial completion including watering at no additional cost to Owner. Refer Section 3.9 of this specification.

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 is required except for losses or replacements due to failure to comply with requirements.
d. For replaced plant material, provide extended warranty for period equal to original warranty period.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated 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 are unacceptable.
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 Owner's Representative and approved by Owner, with a proportionate increase in size of roots or balls.

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

D. Labeling: Label each tree and shrub with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 MULCHES

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

1. Type: Shredded hardwood.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Black or Dark Brown

2.3 TREE-STABILIZATION MATERIALS

A. Tree Anchoring:

1. General: Stakes and guy shall only be required if directed by Architect to prevent wind overturn of proposed trees.
2. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2 by 2 inches by length indicated, pointed at one end.
3. Guying Material: Flat woven polypropylene material 3 /4 " wide, 900 lb. break strength, white in color as provided by Deep Root Partners, L.P., 345 Lorton Avenue #103, Burlingame, CA (800-458-7668) or approved equivalent.
4. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

2.4 MISCELLANEOUS PRODUCTS

A. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

B. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

C. Deer Fencing: Provide complete Garden Keeper Kit system as manufactured by Benner's Gardens (1-800-244-3337), or approved equal.
   1. 7.5' high polypropylene mesh (heavy-weight)
   2. 5/8" Heavy-Duty Steel posts with Ground Sleeve and Cap
   3. Ground Stakes
   4. 8" Heavy-Duty Ties (zip ties)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

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. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
3. Suspend planting 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 or which is dusty.

B. 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 Owner's Representative and replace with new planting soil.

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

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, grass areas and existing plants from damage caused by planting operations.

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.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Owner's Representative's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Owner's Representative. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Planting Soil."

B. Placing Planting Soil: Place manufactured planting soil mix over exposed subgrade in accordance with Section 329113 "Planting Soil."

C. Before planting, obtain Owner's Representative's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

D. Application of Mycorrhizal Fungi: At time directed by Owner's Representative, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavation and planting activities shall not penetrate compacted soil cap fill layer (18" minimum depth) of the two feet depth cap.

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. 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.
2. Excavate to the depth and width as shown on the drawings.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

4. 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.
5. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

B. Backfill Soil: Use planting soil, as specified in Section 329113 for backfill. Subsoil and soil removed from excavations may not be used as backfill soil unless otherwise indicated. Refer to specification section 310000 "Earthwork."

C. Obstructions: Notify Owner's Representative if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

D. Drainage: Notify Owner's Representative if subsoil conditions show evidence of unexpected water seepage or retention in tree or shrub planting pits.

1. Upon completion of planting pit or trench excavation and prior to planting, fill excavations with 12" minimum depth water and allow water to naturally drain out. When water has drained out, fill excavation again with 12" minimum depth water and measure rate of drainage. Drainage rate should be a minimum of 1" per hour (1 inch drop in water elevation per hour within pit or excavation).

    a. Frequency of Drainage Testing**:**

        1) Tree Pits: test each tree pit
        2) Planting Bed Areas: one drainage test for every 1,000 sq. ft. of planting bed, or one drainage test per planting bed less than 1,000 sq. ft.

2. If pits or planting beds do not drain freely, notify Owner's Representative for direction prior to installation of trees.

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

3.5 TREE AND SHRUB PLANTING

A. Inspection: At time of 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 top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Backfill: Planting soil mix as specified in Section 329113.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under 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.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Backfill: Planting soil mix as specified in Section329113.
2. Carefully remove root ball from container without damaging root ball or plant.
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.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

3.6 TREE AND SHRUB PRUNING

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

B. Prune, thin, and shape trees and shrubs as directed by Owner's Representative.

C. Prune, thin, and shape trees and shrubs according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Owner's Representative, 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.

3.7 TREE STABILIZATION

A. Trunk Stabilization by Rootball Anchoring: Install rootball anchors as directed by manufacturer's recommendations.

3.8 PLANTING AREA MULCHING

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

1. Organic Mulch in Planting Areas: Apply 2-inch average thickness of organic mulch over entire surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 6 inches of trunks or stems.

3.9 DEER FENCING

A. General: Install deer fencing per manufacturer's instructions around all newly planted trees (4-foot minimum offset from tree trunk) and along all perimeters of shrub planting bed. Fencing around trees shall be in groupings that allow continued use of pedestrian pathways.

1. Fence post and ground sleeves shall not penetrate soil cap layer.
2. Fencing layout shall be approved by Landscape Architect prior to installation.

3.10 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 when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.11 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Owner's Representative.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved, under the supervision of an Arborist.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Owner's Representative.

B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Owner's Representative determines are incapable of restoring to normal growth pattern.

C. Repair and replace, in kind, any existing vegetation disturbed by construction practices that is shown to remain.

1. All existing trees are to be replaced in accordance with specification section 015639 "Temporary Tree and Plant Protection"

3.12 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

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

C. Protect plants from damage due to landscape operations and operations of other contractors and trades.

D. Treat, repair, or replace damaged plantings.

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

END OF SECTION

SECTION 33 41 10

MANHOLES AND DRAINAGE STRUCTURES

PART 1- GENERAL

1.1 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

C. Code of the Village of Hastings-on-Hudson

1.2 SUMMARY

A. The work specified in this Section consists of the labor, equipment, tool, materials, needed to install storm drain pipes and drainage structures, as necessary to construct the drainage improvements on the Contract Drawings or as directed by the Engineer, which include but not limited to:

1. Pipe and fittings
2. Cleanouts
3. Encasement for piping
4. Manholes
5. Catch basins
6. Trench drain
7. Area Drains and Manholes (HDPE)

B. The work specified in this Section also include furnishing labor, equipment, tool, materials, shop drawings, permitting and services needed to perform clean, inspect, excavation, backfill, trenching, compaction, installing the storm drain pipes and structures.

C. Related sections: The following Sections contain requirements that relate to this Section:

1. Section 312319 – Dewatering
2. Section 315010 – Excavation, Backfilling and Filling for Utilities
3. Section 324020 – Aggregate Base Course
4. Section 334130 – High Density Polyethylene Pipe

1.3 REFERENCES

A. The following is a listing of the publications referenced in this Section:

1. American Association of State Highway and Transportation Officials (AASHTO)

    a. AASHTO M 198 Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

2. American Concrete Institute (ACI)

    a. ACI 318 Building Code Requirements for Reinforced Concrete

3. American Society for Testing and Materials (ASTM)

    a. ASTM A 48 Gray Iron Castings
    b. ASTM A 536 Ductile Iron Castings
    c. ASTM C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens.
    d. ASTM C 55 Concrete Building Brick
    e. ASTM C 117 Test Method for Material Finer Than 0.075mm (No. 200) Sieve in Mineral Aggregates by Washing
    f. ASTM C 136 Method for Sieve Analysis of Fine and Coarse Aggregates
    g. ASTM C 150 Portland Cement
    h. ASTM C 443 Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
    i. ASTM C 497 Method of Testing Concrete Pipe, Manhole Sections, or Tile.
    j. ASTM C 822 Definition of Terms Relating to Reinforced Concrete Pipe and Related Products
    k. ASTM C 891 Installation of Underground Precast Concrete Utility Structures
    l. ASTM C 913 Precast Concrete Water and Wastewater Structures

1.4 ENVIRONMENTAL REQUIREMENTS

A. Cold weather requirements shall conform to the applicable requirements of the section entitled “Concrete” except that in a precast plant the ambient temperature may be below 40 degrees F providing that forms and product are preheated and heat cured and protected. Temperature recording devices shall be used.

1.5 DESIGN AND PERFORMANCE REQUIREMENTS

A. When approved by the Site Engineer, the Contractor may substitute cast-in place manholes and drainage structures which conform in size and strength to the precast structures shown on the Contract Drawings and as specified in this Section. When approved by the Site Engineer, the Contractor may also substitute precast drainage structures which conform in size and strength to the cast-in-place structures shown on the Contract Drawings and as specified in this section. Equivalent strength of substituted structures shall be based on structural design of reinforced concrete as outlined in ACI-318.

B. The Contractor may substitute castings of the same material and strength to those shown on the Contract Drawings and designed to support the applicable live load with a factor of safety of 4.0 for castings subject to aircraft loads and 3.0 for other castings, if approved by the Site Engineer.

C. Design of lifting devices for precast structures shall conform to ASTM C 913.Design of joints for precast structures shall conform to ASTM C 913. Unless otherwise shown on the Contract Drawings, joints shall be designed for leakage not to exceed .025 gallons per hour per foot of joint at 3 feet of head.

D. Manholes and drainage structures shall be constructed in accordance with the Rules and Regulations, Standard Details and Standard Specifications of Code of the Village of Hastings-on-Hudson.

1.6 QUALITY ASSURANCE

A. Workers shall be experienced and skilled in the fabrication and installation of precast and cast-in-place concrete manholes and drainage structures.

B. Precast concrete manholes and drainage structures will be visually inspected by the Contractor when delivered to the construction site. Damaged material or material not meeting the requirements of this section shall be removed from the construction site and replaced, at no additional cost to the Owner.

C. Where manholes and drainage structures are cast-in-place, do not place concrete until the Owner has inspected the formwork and verified that the dimensions and concrete reinforcing are in accordance with details shown on the Contract Drawings or per code requirements and as specified in this section.

D. Conform to the applicable requirements for quality assurance of the section entitled “Concrete” except that, if the concrete is precast, the producer shall maintain a fully equipped testing lab and employ a Quality Control Technician to perform Quality Control Tests. Unless otherwise shown on the Contract Drawings, Quality Control Tests for precast concrete shall consist of compression tests on a minimum of two cylinders for each day’s production tested in accordance with ASTM C 39 for cylinders or ASTM C 497 for drilled cores. Acceptance shall be based on the requirements of ACI 318.

E. Tolerances of dimensions, squareness, joint surfaces, reinforcement location, and thickness of slabs and walls for precast structures shall conform to ASTM C 913.

F. Single Source Responsibility: Provide pre-sloped channel drain system from single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with precast concrete manufacturer’s instructions for unloading, storing and moving precast manholes and drainage structures.

B. Care shall be taken when storing precast concrete manholes and drainage structures to prevent damage to the Owner’s property or other public or private property, and any property so damaged shall be repaired at the Contractor’s expense. Each precast structure shall be clearly marked by

indentation or waterproof paint to indicate the date of manufacture, manufacturer and identifying symbols and/or numbers shown on the Contract Drawings to indicate its intended use.

C. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

D. Storage: Store materials in clean, cool, dry area in accordance with manufacturer's instructions. Do not store materials in direct sunlight.

E. Handling: Protect materials during handling and installation to prevent damage.

1.8 SUBMITTALS

A. Submit the following in accordance with the requirements of Division 1:

1. Shop drawings of precast concrete manholes and drainage structures and of concrete reinforcement for cast-in-place concrete manholes and drainage structures, if used;
2. Catalog cuts of frames, grates and covers;
3. Catalog cuts of gaskets for joints in precast concrete manholes and drainage structures, including manufacturer’s installation instructions.

B. Submit design calculations prepared by a Professional Engineer, licensed in the State of New York:

1. For substitute designs of manholes and drainage structures, submit calculations which verify that the substituted design is equivalent to the design shown on the Contract Drawings.
2. For substitute castings, submit calculations, which verify that the substituted design will support the live loading including factor of safety or submit certified proof-of-design test results.

C. Submit certificate from gasket manufacturer certifying that the proposed gaskets comply with the requirements specified in this Section and that the gaskets are compatible with the type of joint used.

D. Submit certified test results for precast concrete compressive strength testing.

E. Submit plans, methods, equipment and procedures as applicable for:

1. Prevention of accumulation of groundwater as specified in 3.2.
2. Methods other than guide devices to avoid misalignment of joints during installation of precast structures as specified in 3.2.
3. Methods to prevent floatation of watertight structures as specified in 3.1.

F. Submit to the Site Engineer, certified test data covering gradation and composition of the crushed stone for bedding proposed for use, together with one 75 pound representative sample of the material.

1. Submit the sample in a clean, sturdy container or bag which shall not permit loss of any of the material.

2. Clearly label the container or bag of the sample with: Contract location, title and number; the name of the material supplied; and location of the source.
3. The Site Engineer will approve or disapprove the proposed material within 21 days after receipt of the sample.
4. Do not deliver material to the construction site from any source until the Site Engineer has approved the material from that source.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. For each of the specified materials, manufacturer shall be one of the following, or approved equal.

1. Drainage Structures

    a. Size and type as specified on the drawings.

2. Manhole and Drainage Structure Frames, Covers and Grates

    a. Campbell Foundry Co.
    b. Neenah Foundry
    c. NDS

2.2 MATERIALS

A. Concrete

1. Manufacture of precast concrete structures shall conform to ASTM C 913.

B. Precast Concrete Drainage Structures

1. Precast manholes and drainage structures shall be fabricated of air entrained concrete as shown on the Contract Drawings using ASTM C 150, Type II or Type III, Portland cement, having a minimum 28-day compressive strength of 4000 psi and a maximum water cement ratio of 0.45. Substitution of slag of fly ash for a portion of the cement shall not be required.
2. There shall be a continuity of reinforcement at all corners of the structure.
3. In uncontaminated soil, joints between precast sections, which occur four feet or more below finished grade, shall be sealed with rubber gaskets conforming to ASTM C 443 or a preformed flexible plastic gasket as specified in 2.02 B.4 below. Where manhole and drainage structure installation in contaminated soil is shown on the Contract Drawings, joints between precast sections shall be sealed with a preformed flexible plastic gasket conforming to AASHTO M198, Type B, except that gasket size, lengths, quantity of primer and packing material shall be in accordance with the manufacturer's recommendation. Preformed flexible plastic gaskets shall be the following, or approved equal:

    a. "Ram-Nek", as manufactured by Diplomatic Marine, Inc.
    b. "GS-79", as manufactured by the General Sealants Corp.

C. HDPE Areas Drains

1. The drain basins required for this contract shall be manufactured from polyethylene pipe stock, utilizing a thermo-molding process to reform the pipe stock to the specified configuration.
2. The drainage pipe connection stubs shall be manufactured from polyethylene pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The pipe bell spigot shall be joined to the main body of the drain basin.
3. The pipe stock used to manufacture the main body and pipe stubs of the surface drainage basin shall meet the mechanical property requirements for fabricated fittings as described by ASTM D3034, Standard for Sewer PVC Pipe and Fittings; ASTM F1336, Standard for PVC Gasketed Sewer Fittings. Frames, grates and covers shall conform to Village of Hastings-on-Hudson standards for all vehicular spaces and for covers located in pedestrian spaces.
4. Grates located in non-vehicular spaces shall conform to Village of Hastings-on-Hudson standards. Grates and covers shall be locking type. All frames; grates and; covers for drain basins shall be capable of supporting H-25 wheel loading for heavy-duty traffic.
5. All grates will be hinged to the frame using pins. Metal used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05 for ductile iron and ASTM A-48-83 class 30B for cast iron frames.

D. Frames, Grates and Covers

1. Castings, frames, and covers for manholes and drainage structures which are outside the site property line and under the jurisdiction of other Village agencies, even though constructed as part of this Contract, shall be constructed in accordance with the Code of the Village of Hastings-on-Hudson.
2. Castings for manhole and drainage structure frames shall be as specified by the Code of the Village of Hastings-on-Hudson.
3. Manhole and drainage structure frames for structures which are inside the site property line and not under the jurisdiction of other Village agencies shall be as specified by the Code of the Village of Hastings-on-Hudson.
4. Manhole covers for structures which are inside the site property line and not under the jurisdiction of other Village agencies shall be as specified by the Client and the Contract drawings. The design loading is H-20 loading.
5. Drainage structure grates for structures which are inside the site property line and not under the jurisdiction of other Village agencies shall be as specified by the Client and the Contract. The design loading is H-20 loading for hardscape and non H-20 loading for softscape.
6. Softscape grates shall be NDS 15” dia. round grates, UV protected High Density Polyethylene (HDPE), 1-1/4” grate openings or approved equal.

E. Masonry for Manhole and Drainage Frame Collars

1. Concrete Brick -ASTM C 55, Grade N-i.
2. Mortar — one part ASTM C 150, Type II Portland cement, three parts sand and sufficient potable water to produce a plastic homogeneous mortar.

F. Crushed Stone for Pipe Bedding and Drainage Structures

1. See Section 315010 Excavation, Backfill and Filling for Utilities

PART 3 - EXECUTION

3.1 PREPARATION

A. Consult Contract Drawings for the proper orientation of the structure to ensure proper alignment with entering pipes, conduits or cables.

B. Do not install structures under site conditions known to result in loads heavier than that for which the structure was designed.

C. Immediately prior to placement in the excavation, precast concrete structures shall be inspected in the presence of the Owner and/or Site Engineer to verify that they are internally clean and free of damage. Damaged units shall be removed from the construction site and replaced, at no additional cost to the Owner. Subject to the approval of the Owner and/or Site Engineer, damaged precast concrete structures may be repaired in a manner that ensures that the structure will conform to the requirements of this Section and its intended use. Acceptance of repaired units is at the sole discretion of the Owner and/or Site Engineer.

3.2 INSTALLATION

A. Excavation and Backfill

1. Excavate for manholes and drainage structures in accordance with Section 315010 – "Excavation, Backfilling and Filling for Utilities" in the location and to depth shown on the Contract Drawings. Provide clearance around the sidewalls of the structure as required for construction.
2. If ground water is encountered, prevent accumulation of water in excavations using methods in accordance with Section 312319 – "Dewatering". Manholes or drainage structures shall be placed in a dry trench.
3. Where the possibility exists of a watertight structure becoming buoyant in a flooded excavation, take necessary steps to avoid floatation of the structure. Refer to Section 312319 – "Dewatering"

B. Manhole and Drainage Structure Support and Backfilling

1. Manholes and drainage structures shall be supported at proper grade and alignment on crushed stone bedding or other support system, as shown on the Contract Drawings.
2. Backfill excavations for manholes and drainage structures in accordance with Section 315010 – "Excavation, Backfilling and Filling for Utilities."

C. Precast Concrete Manhole and Drainage Structure Installation

1. To ensure safety, precast structures shall only be lifted at the lifting points so designated by the manufacturer.
2. When lowering manholes and drainage structures into the excavations and joining pipe to the units, take precautions to ensure that the interior of the pipeline and structure remains clean.
3. Set precast structures so that they firmly and fully bear on crushed stone bedding, compacted in accordance with the provisions of Section 315010 – "Excavation, Backfilling and Filling for Utilities" or on other support system shown on the Contract Drawings.

4. Assemble multi-section structures by lowering each section into the excavation. Lower, set level and firmly position the base section before placing additional sections.
5. Ensure joint integrity by removing all foreign materials from joint surfaces and verifying that sealing materials are placed properly. Avoid misalignment by using guide devices affixed to the lower section.
6. Joint sealing materials may be installed at the site or at the manufacturer's plant.
7. Verify that manholes and drainage structures installed satisfy required alignment and grade.
8. Remove knockouts or cut structure to receive piping so as not to create openings in excess of that required to receive pipe. Fill annular space with mortar.
9. Cut pipe to finish flush with interior of structure.

D. HDPE Areas Drains

1. The specified High Density Polyethylene drainage basin shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material shall be crushed stone or other granular material meeting the requirements of class 1 or 2 material as defined in ASTM D2321.
2. The surface drainage basins shall be bedded and back-filled uniformly in accordance with ASTM D2321. The drain basin body will be cut at the time of the final grade so as to maintain a one piece, leak proof structure. No brick, stone or concrete block will be used to set the grate to the final grade height. For H-20 or above load rated installations, an 8" to 10" thick concrete ring will be poured under the grate and frame.

E. Installation of Castings

1. Set frames using mortar and masonry as required. Radially laid concrete brick shall have 1/4-inch thick vertical joints at inside perimeter. Lay all concrete brick in a full bed of mortar and completely fill all joints. Where more than one course of concrete brick is required, stagger vertical joints.
2. For manholes and other structures with covers located within unpaved areas, set frame and cover 2 inches above finished grade to allow the area to be graded away from the cover beginning 1 inch below the top surface of the frame.

3.3 ADJUSTMENTS

A. Vertical Adjustment of Existing Manhole and Drainage Structures

1. Where required, adjust the top elevation of existing manholes and drainage structures to suit finished grades shown on the Contract Drawings.
2. Existing frames, grates and covers shall be carefully removed, cleaned of all mortar fragments and reset to the required elevation in accordance with the requirements specified in 3.2 E for installation of castings.
3. When removal of an existing concrete wall is required, the concrete shall be removed so as not to damage the existing vertical reinforcing bars. The vertical bars shall be cleaned of all concrete and bent into the new concrete top slab or spliced to required vertical reinforcement, as shown on the Contract Drawings.

END OF SECTION

SECTION 33 41 30

HIGH DENSITY POLYETHYLENE PIPE

PART 1 - GENERAL

1.1 SUMMARY

A. This item shall consist of the furnishing, placing and construction of high density polyethylene stormwater drainage pipes (HDPE) as described and specified herein and elsewhere in other sections of the contract specifications and as shown on the Contract Drawings. The work under this item includes the furnishing of all materials, equipment, supplies and tools, the performance of all labor and services, and all incidentals necessary to complete the new installation or modification of existing installations in a neat, substantial and workmanlike manner.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 315010 – Excavation, Backfilling and Filling for Utilities
2. Section 334110 – Manholes and Drainage Structures

1.2 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. Examine all drawings and other sections of the specifications for requirements therein affecting the work of this trade.

1.3 SUBMITTALS

A. The Contractor shall submit to the Site Engineer for approval the following:

1. Gradation data for pipe bedding materials.
2. Product data for perforated and solid pipe.

1.4 QUALITY ASSURANCE

A. Code Regulations: All work shall be done in accordance with the applicable ordinances, codes and regulations adopted by the city/village in which the work is performed and which are in effect at the time of signing the contract. The Contractor shall notify the Owner and Site Engineer of any conflicts therewith as specified and such conflict will be revised to comply with Code of the Village of Hastings-on-Hudson requirements. Such conflicts, if any, shall be settled before signing of the contract.

B. Protection: All work, equipment and materials shall be protected at all times. The Contractor shall make good all damage caused either directly or indirectly by his workmen. Work shall be properly protected to prevent obstruction or damage. All pipe opening shall be closed with caps or plugs during installation. All equipment shall be tightly covered and protected against dirt, water, chemical and mechanical injury. At the final completion, all work shall be thoroughly cleaned and delivered in perfect condition.

C. Damaged material or material not meeting the requirements of this section shall be removed from the construction site and replaced at no additional cost.

1.5 WARRANTY

A. The Contractor shall guarantee all work performed by him/her against all defects in materials and workmanship for a period of one year from the date of final acceptance of the work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide pipes of the following materials of class indicated. Provide pipe fittings and accessories of same materials and class as pipes with joining method, as indicated. The piping shall be manufactured by an established manufacturer of good reputation in the industry and in a permanent plant adapted to meet all the design requirements of the pipe.

1. Corrugated polyethylene pipe shall have an interior surface that is smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. Pipe shall be suitable for use in low head/low pressure applications. Pipe shall conform to AASHTO M-294, Type S or ASTM F2306 as applicable to the specified pipe.
2. Pipe and fittings shall have the following material properties:

    a. Virgin material for pipe and fitting production shall be high-density polyethylene conforming with the minimum requirements of cell classification 435400C for the corrugated exterior profile, and 445464A, for the interior liner as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%.
    b. The virgin pipe material shall comply with the notched constant ligament-street (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306 respectively.
    c. The interior liner resin shall have a material designation code of PE3408/PE3608 by the Plastic Pipe Institute and a Hydrostatic Design Basis of 1600 psi.

3. Fittings shall conform to AASHTO M294 or ASTM F2306. Bell and spigot connections shall utilize a spun-on, welded or integral bell and spigot with gaskets meeting ASTM F477.
4. Pipe units shall have a minimum laying length of 20-feet except as otherwise indicated or allowed by the Engineer. Shorter pipe sections shall be fabricated by the manufacturer. No field cuts will be allowed to create shorter pipe units.
5. Pipe shall be installed with a minimum 12-inch cover (to bottom of bituminous asphalt paving or to top of concrete paving) for AASHTO H-25 loading and follow the requirements of ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic pipe for Sewers and Other Gravity-Flow Applications.

B. Joints on Corrugated Polyethylene Pipe:

1. Corrugated polyethylene pipe and fittings shall be joined with watertight joints meeting the requirements of AASHTO M294 or ASTM F2306.
2. The watertight joints shall be of a bell and spigot design.
3. The pipe and fitting joints shall be watertight according to the requirements of ASTM D3212. Spigot shall have two gaskets meeting the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly.
4. The integral bell shall be reinforced with a polymer composite band. The bell tolerance device shall be installed by the manufacturer.
5. Exposed vent tubes or pin holes at the pipe joints or any other opening that may result in a leak path shall be sealed by the manufacturer with a HDPE weld.
6. Pipe entrances at structures shall be made with an NPC Corrugated Pipe Adapter and a Kor-N-Seal II Pipe to Manhole Connector Series 306 as manufactured by Trelleborg Engineering Systems, or approved equal, unless otherwise specified on the drawings.

C. Level Spreader - This section describes 4- through 36-inch ADS DURASLOT pipe for use in surface drain applications.

1. DURASLOT pipe, as manufactured by Hall Construction Products and Services (HCPS) and distributed by ADS, Inc., shall have a smooth interior and annular exterior corrugations with an aluminum slot mounted longitudinally along the length of the pipe to accept the grate frame while maintaining the original pipe diameter.
    a. 4- through 10-inch pipe shall meet AASHTO M252, Type S.
    b. 12- through 36-inch pipe shall meet AASHTO M294, Type S or ASTM F2306.
    c. Manning's "n" value for use in design shall be 0.012.
    d. The pipe length section is 10 feet.
2. The aluminum grate frame shall be manufactured from 0.063" tempered commercial aluminum meeting the requirements of ASTM B209, consisting of two parallel plates separated by spacers spanning the slot on 6" centers. The grate shall be ½ - #13 galvanized steel meeting the requirements of ASTM F1267, Type 2, Class 2.
3. The slot height shall be 2.5" high. The slot width shall be 1.75" wide open top slot.
4. The flange at the bottom of the aluminum grate shall be riveted to the pipe with a minimum of two rivets per linear foot.

D. Fittings

1. Fittings shall conform to AASHTO M252, AASHTO M294, or ASTM F2306.
2. DURASLOT fittings shall be modified from fittings which conform to AASHTO M252, AASHTO M294, or ASTM F2306.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Unless otherwise directed by the Site Engineer, all new or re-laid pipe shall be installed in pipe bedding in accordance with the plans and in conformance with these specifications.
2. Pipe installation shall consist of installing the pipe in bedding material per Section 315010 Excavation, Backfill, and Filling for Utilities, with a thickness directly under the pipe of 4 inches (100 millimeters) and pre-shaped to a height of 10% of the total height of the pipe. After the pipe has been installed, the trench shall be backfilled with bedding material to a height of 50% of the total height of the pipe.

B. Trenching:

1. Excavation and Backfilling: Methods of backfilling shall be in conformance with 315010 – Excavation, Backfilling, and Filling for Utilities.
2. Where pipe is to be laid below the ground line, a trench shall be excavated to the required depth, the bottom of which shall be graded to the elevation of the bottom of the bedding material or to afford a uniform firm bearing for the pipe throughout its entire length, whichever the case may be. When rock is encountered, it shall be excavated to not less than 12 inches below the bottom of the pipe; and this depth shall be refilled with bedding material which shall be thoroughly tamped.
3. Where pipe is to be laid in a fill area, the embankment shall be placed and compacted to an elevation 12 inches above the top of the proposed pipe, whereupon the trench excavation shall be made and the pipe installed.
4. Where the nature of the foundation is poor, the poor material shall be removed and replaced with a layer of gravel fill of such depth as approved by the Environmental and Site Engineer; or special construction of the character shown on the plans, special provisions or as ordered by the Environmental Engineer and Site Engineer, may be employed.

C. Pipe Laying:

1. The placement of pipe shall start at the downstream end and progress upstream. All pipes shall be carefully laid, true to the lines and grades given, hub ends upgrade and with the spigot ends fully entered into the adjacent hubs.
2. Pipes shall be joint in accordance with the pipe manufacturer’s standard installation instructions.
3. If so ordered by the Site Engineer, any pipe which is not in true alignment, or which shows any settlement or distortion after laying, shall be taken up and re-laid or corrected, to the satisfaction of the Site Engineer without additional compensation.

D. Plug Pipes:

1. Where shown on the plans or directed by the Site Engineer, the Contractor shall plug existing pipes with cement masonry, and plug the HDPE pipes with the proper end caps.

E. Slotted Drain Pipe:

1. All slotted or perforated drain pipe and related fittings shall be handled and assembled in accordance with the manufacturer's instructions.

END OF SECTION