The City of
WORCESTER

DEPARTMENT OF PUBLIC WORKS & PARKS

Parks, Recreation & Cemetery Division - Capital Projects

REQUEST FOR BIDS

Hadwen Park
Boardwalk Renovations
July 07, 2023

PROJECT SPECIAL CONDITIONS & SPECIFICATIONS

Jay J. Fink, P.E., Commissioner

Robert C. Antonelli, Jr., Assistant Commissioner

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The City of WORCESTER

Department of Public Works & Parks
Parks, Recreation & Cemetery Division
50 Officer Manny Familia Way, Worcester, MA 01605

PROJECT SPECIAL CONDITIONS

ARTICLE 1 PROJECT SITE

a. All work of this contract is located within the confines and adjacent Right- of-Way of 19 Heard St., owned and maintained by the City of Worcester DPW and Parks.

ARTICLE 2 SUMMARY OF WORK

a. The work to be completed under this contract involves the furnishing of all labor, materials and equipment for the following items of work and all incidentals thereto. All work shall be performed in full accordance with the specifications, other contract documents, obviously implied and necessary or under the direction of the Owner.

b. The plans and specifications are intended to be cooperative, and any item called for in one and not the other shall be as binding as if called for in both. During the bidding period discrepancies should be immediately brought to the attention of the Owner for clarification. If a discrepancy is discovered within the plans and the specifications after the Bid period, **the Owner will determine which shall apply.**

c. When Applicable, The City of Worcester DPW and Parks, will specify Project Standard appurtenances/amenities such as, but not limited to, park benches, trash receptacles, irrigation controllers, pedestrian, parking and sports field lighting, etc. in the facilities within their jurisdiction that are currently installed at this or other facilities. By standardizing, it provides the Division with a consistent product which through familiarity reduces operator training and maintenance time. Standardization also provides opportunities for maintenance cost saving through interchangeable parts such as but not inclusive to luminaries, ballast, poles, compatibility with current Division maintenance equipment etc.

d. Quality Control: In order to ensure the highest level of quality with respect to the playing surface of this greatly utilized public athletic facility, the General Contractor / Awardee shall have a minimum of five (5) years of successful experience.

1. as the Prime Contractor constructing (provide verifiable references upon request)
2. ability to demonstrate constructing (provide verifiable references upon request)
3. coordinating and supervising (provide verifiable references upon request)

Park and Playground Improvements of similar size and quality of this Project as per the standards of the Project specifications and construction drawings.

ARTICLE 3 WORK WITHIN A PUBLIC PROPERTY

a. As a point of information, all the work to be undertaken is located within the confines of an unsecured public property, and as such is subject to acts of vandalism. The City of Worcester is not liable for any damage to the Contractor's equipment or materials. The Contractor shall take all means and measures necessary to protect the public, work in progress, work completed, and all furnishings, materials and equipment stored at the site through the completion of the Project. The repair or replacement of work in place or in progress shall be the sole responsibility of the Contractor and shall be accomplished at no cost to the Owner.

ARTICLE 4 SITE INSPECTION

a. It shall be contingent upon the Contractor to inspect the site as an aid to determining the extent of the work under the various contract items before submission of the Bid.

ARTICLE 5 PRE-CONSTRUCTION MEETINGS

a. A mandatory pre-construction meeting will be arranged by the Owner's representative after the award of the Contract. Sub-consultants may be asked to attend the pre-construction meeting if determined by the Owner's Representative to be warranted.

ARTICLE 6 SITE ACCESS

a. Prospective bidders are advised that access to the Project sites shall be in accordance with the governing traffic patterns with specific locations into the site, to be verified in the field after award of the contract.

b. Regardless of the eventual location of the construction access and limits of work, the Contractor shall make every provision to ensure the access and safety of the public using the balance of any of the existing amenities on the property.

ARTICLE 7 OWNER'S TAX EXEMPTION

a. The Awarding Authority, as a department of a corporate municipality in the Commonwealth is exempt from the taxes listed below. Contractor shall notify all suppliers of the following current certificates.

1. Federal Excise Taxes as applied to articles taxable under Chapter 32 of the Internal Revenue Code of 1954, as amended, City Excise Tax Exemption Certificate is not required.

2. From Sales and Use Tax imposed by the Commonwealth of Massachusetts under Chapter 14, Acts of 1966, the City has been assigned and exemption certificate with respect to leases, rentals, or purchases of "Tangible Personal Property". The Owner at the Contractor's request will furnish the tax-exempt certification number.

ARTICLE 8 TIME FOR COMPLETION & SEQUENCE OF WORK

a. Except as the work may be interrupted by weather conditions as hereinafter specified, the Contractor shall prosecute the Work with the diligence necessary to ensure its completion within the required time. The Contractor shall provide sufficient labor, materials, and equipment, and shall promptly take such appropriate action to keep the Work on schedule or as directed by the Owner. No additional time shall be provided for Change Orders.

b. The Parks, Recreation and Cemetery Division shall be solely responsible for determining when the work shall be interrupted due to unsatisfactory weather conditions. Determination of the period to be included in the Time for Completion shall cease when the City directs that the work stops due to weather and shall commence again on the first working day thereafter that the City may designate for the work to be resumed.

c. The Contractor must completely understand that once the Contractor mobilizes and begins work, the Contractor shall be on-site, every day during the normal work week, and must work continuously until substantial completion of the Project. The Parks, Recreation, and Cemetery Division will not allow any time gaps of any length of time during the construction due to the Contractor's scheduling of other work not related to this specific Contract.

d. It should be further understood that this Project will not be a "fill-in" for the Contractor and that the Contractor does not have the ability to start and stop construction at the Contractor's option. Any unauthorized time gaps will be subject to a flat fee of $500.00 per day. The Owner reserves the right to deduct said fee from the Contractor's periodic application for payment and the Contract Sum.

e. The Contractor shall carry on the Work and adhere to the schedule during all disputes and disagreements with the Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements. The Contractor shall exercise reasonable precautions, efforts and measures to avoid or mitigate situations that would cause delays.

f. Punch list shall be completed within 28 days from date of issue.

g. Project Completion/Occupation Date by November 30, 2023.

h. The Contractor is advised that the **required calendar days** regarding Time for Completion and Punchlist, shall be consecutive.

ARTICLE 9 LIQUIDATED DAMAGES

a. Prospective Bidders are advised that liquidated damages shall be in effect for this Project. The Contractor shall be liable for and compensate the Owner.

1. the sum of Five Hundred and Dollars ($500.00) as fixed and agreed, as liquidated damages for each calendar day of delay from the date stipulated for completion, or as modified in accordance with the provisions of the Contract
2. If Applicable, State and Federal Grant Funding losses.
3. and/or actual costs incurred by the Owner for additional Construction Administration/Management (City Staff, Consultants, etc.) salaries/compensation from the date stipulated for completion, or as modified in accordance with the provisions of the Contract and notification to The Sureties.

ARTICLE 10 CONSTRUCTION SCHEDULES & PAYMENT ESTIMATES

a. The Contractor must submit a construction schedule to the Owner indicating the general sequence of all work under this Contract. This schedule must be submitted within 7 calendar days of the date of the Notice-to-Proceed and shall be revised if required to the satisfaction of the Owner.

b. The Contractor shall submit a breakdown and monthly cost estimate (schedule of values) for all items of work, including separate categories, phases, grant funded or reasonable requests by the Owner.

c. The established breakdown of items, categories and values shall be utilized to prepare the monthly pay requisition forms. It is recommended that the Contractor submit a draft Payment Applications to the Owner for approval, no later than the second week of every month. The Owner shall review and edit this copy to indicate the amount of payment to be approved and return this to the Contractor after field review.

d. Revised/updated; monthly payment estimates, construction schedule, As Builts and proof of up to date daily construction reports shall be submitted with monthly Payment Applications. The Contractor shall then formally submit three (3) originals of the Payment Applications, conforming to the Owner's approval, for payment.

ARTICLE 11 CONSTRUCTION REPORTS & WEEKLY PROGRESS MEETINGS

a. The Contractor and Sub-Contractors shall attend a regular weekly meeting with the Owner at the Parks, Recreation and Cemetery Division Headquarters, 50 Officer Manny Familia Way, Worcester, MA, at a pre-determined time set by the Owner. The Contractor must be present for these meetings during the Contract and reserves no right to cancel the meeting.

b. The Contractor will be required to take minutes for the weekly scheduled meetings. The Contractor will have three (3) business days from the date of the meeting to submit to the Owner the minutes of the meeting on the Parks, Recreation and Cemetery Division form. The form will be supplied to the respective Contractor when the Notice to Proceed has been issued.

c. The Contactor will be required to maintain daily construction reports (DCRs) (format and information required to be provided and/or approved by Owner). PDF of the DCRs shall be submitted weekly for Owner review and files.

d. The Owner may desire other meetings from time to time, and the Contractor shall attend these, and such Sub-Contractors as are directed to attend. All the above-mentioned conditions should apply.

ARTICLE 12 HOURS OF OPERATION

a. Unless otherwise approved by the Owner, hours of operation shall be 7:00 a.m. to 3:30 p.m., Monday through Friday, excluding City observed holiday(s).

ARTICLE 13 CONTRACT DOCUMENTS

a. The Owner will furnish the Contractor, without charge, four (4) complete copies of the Contract Documents. Additional copies requested by the Contractor will be furnished at cost.

ARTICLE 14 STORAGE, USE OF MATERIALS & EQUIPMENT/MACHINERY

a. Bidders are advised that the storage of equipment within the confines of the Project limit shall be at the Contractors own risk. No material or equipment shall be stored outside the limits of work as defined in the contract documents, designated and agreed to by the Owner.

b. The Contractor shall not use as any part of his operation any skid steered, track driven, or heavy machinery/equipment on adjacent roadways.

ARTICLE 15 DELIVERY, INSPECTION & ACCEPTANCE OF NEW AMENITIES

a. General Contractor shall provide product manufacturer and Owner, 72 hours advance notice of any onsite scheduled deliveries of Amenities for Inspection and Acceptance.

b. Any damages noted by any of the parties present at time of inspection shall be corrected in one of the three options below, as determined by the Owner, with no delays or extensions to the Project Schedule.
   1. Repair to the **FIT & FINISH** of the manufacturer's/factory Specification prior to installation.
   2. Replace with new product from manufacturer/factory.
   3. Install damaged product and field repair to the Owner's satisfaction and provide new identical replacement part as spare.
   4. This Article shall also apply to amenities stored offsite and damages discovered while under the Responsibilities of the General Contractor, until the Acceptance of Work.

ARTICLE 16 CARE AND RESPONSIBILITIES OF CONTRACTOR

a. Except as otherwise specifically stated in the Contract Documents and Technical Specifications, the Contractor shall provide and pay for all materials, tools, labor, equipment, water, light, heat, power, transportation, superintendence, protection, temporary construction of every nature, charges, levies, fees or other expenses, permits and back charges and all other services and facilities of every nature whatsoever necessary for the performance of the Contract and to deliver all improvements embraced in this Contract completed in every respect within the specified time.

b. Unless otherwise specified herein all materials, workmanship, methods, and practices shall conform to the current Standards and Ordinances of the appropriate Departments and/or Commissions of the City. The following documents are available online at http://www.ci.worcester.ma.us/dpw/ , a hard copy or CD will be furnished to the Contractor upon request.

i. The City of Worcester DPW and Parks, Engineering Division, Construction Management Section, Standard Specifications and Details - March 2007 or current edition.

ii. Permit Manual – Revised 2004 or current edition.

c. The Contractor shall be responsible for detailed layout. All stakeout and grade control shall be performed by a third-party MA registered Land Surveyor, approved by the Owner, for this purpose. The Owner has the option to verify and approve the layout and locations of improvements prior to excavation or installation.

d. Grade control shall be verified by the Contractor for compliance with federal, state and or local accessibility requirements. During the construction sequence (such as: installation of subbase, bituminous binder and/or top, concrete flatwork etc.), the Contractor shall be required to verify grades, by approved methods, with the Owner present and prior to placement of finished grade for sidewalks, pathways, plazas, ramps, parking spaces, associated appurtenances, etc., that are required to meet accessibility and the Project Documents.

e. The Contractor shall verify dimensions and utility locations shown on the plans and if any inconsistencies or discrepancies should be noted on the Drawings, or between the Drawings and actual field conditions, or between the Drawings and the specifications he/she shall immediately notify the Owner. The Contractor will be held responsible for any errors resulting from his/her failure to exercise the precaution. Such information shall be marked on copies of the "As Built" drawings and the original "As Built" drawings are to be reviewed at weekly job meetings.

f. The Contractor shall provide final As Built Survey Drawings to the Owner. See "Record Drawings – As Built" of this Section. Punch list items shall be completed within twenty-eight (28) consecutive calendar days from date of issue, unless agreed upon otherwise by both parties. Owner has the right to complete punch list items not completed in within this timeline and deduct cost from the Contract.

g. The Contractor shall maintain a full-time onsite superintendent, whether the construction forces are employed by his construction company or employed by a Sub-Contractor.

h. As soon as the Contract is executed, the Contractor shall order materials, submit construction schedules as herein after specified and otherwise anticipate the Notice to Proceed. When the Owner gives the Notice to Proceed, the work of construction shall begin at the time stipulated therein and shall be completed within the Time for Completion specified.

i. It is the Contractor's responsibility to make his own investigation and related assumptions, to satisfy her/him as to subsurface conditions and to ensure that these are reflected in the bid.

j. In order to verify locations of utilities and varying field conditions, exploratory excavations may be necessary, the cost of which is to be included in the contract bid price.

k. The Contractor's attention is called to the necessity of obtaining permits and coordination with, especially those required by various departments of the City and all external utility companies. These permit fees will **not be waived** by the City and must be paid in full by the Contractor.

l. The Contractor shall furnish and maintain all temporary fences, barriers, enclosures, lights and warning devices necessary to protect his/her work area and to protect the public and his work forces throughout the life of this Contract.

ARTICLE 17 EMERGENCY CONTACT INFORMATION

a. The Contractor will be required to submit within seven (7) business days after the Notice to Proceed a list of all people that will be involved with the completion of this Project including all principal(s), president(s), superintendent, and Project manager of the company. The list shall contain the following information, including

but not limited to name, title, address, voice mail number, cell/contact phone number, fax number and email address.

ARTICLE 18 ON SITE SUPERINTENDENT & PROJECT MANAGER

a. The Contractor must, always, maintain an on-site Superintendent during the construction and administration of this Contract. The superintendent must be completely familiar with all aspects of the Project and capable of following the construction through from start to finish. The Contractor does not have the right to switch, replace, change or otherwise remove the superintendent assigned to this Project unless specifically authorized in writing by the Owner. The on-site superintendent must be present a minimum of seven (7) hours per day during construction. If the on-site superintendent fails to meet the above-mentioned requirements, the Contractor will be subject to a flat fee of $500.00 per day. The Owner reserves the right to deduct said fee from the Contractor's periodic application for payment and the Contract Sum.

The Contractor must assign a Project Manager to this Contract that is completely familiar with all aspects of the work, available and capable of completing the Project. The Contractor does not have the right to switch, replace, change or otherwise remove the on-site Superintendent and/or Project Manager assigned to this Project unless specifically authorized in writing by the Owner. It should be further understood that the Owner would discuss all matters regarding the administration of this Contract with only one (1) Project Manager, regardless of how many the Contractor assigns to the Project.

All correspondence, emails, voice mail, faxes, etc. will be handled through the designated Project Manager only. The Parks, Recreation and Cemetery Division reserves the right, in conjunction with the Contractor, to remove the Contractor's assigned on-site Superintendent and/or Project Manager if the City feels it is the best interest to do. Upon written notification, the Contractor must assign a new Project Manager within three (3) business days.

ARTICLE 19 PROVISIONS FOR TRAFFIC/POLICE DETAIL (As Applicable)

a. The Contractor shall not close or obstruct any portion of the **RIGHT-OF-WAY** without obtaining the necessary permission from the proper municipal authorities. If any street or private way shall be rendered unsafe by the Contractor's work, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the Owner including the provision of police details required to complete the work.

b. The Contractor at his/her expense shall maintain public roads and sidewalks passable and accessible, and the Contractor shall assume full responsibility for the adequacy and safety of provisions made. He shall conduct his construction operations such that interference with the activities of park users will be held to a minimum.

c. The Contractor shall cooperate in every way possible with the municipal authorities in accommodating park activities and events.

ARTICLE 20 COMMUNICATIONS

a. All notices, demands, requests, instructions, approvals, proposals and claims must be in writing and must be presented in person or by mail to the Owner, or alternate methods (s) agreed upon by both parties.

b. Any notice to or demand upon the Contractor shall be considered sufficiently given if delivered at the office or field office of the Contractor stated on the signature page of the Agreement (or at such other office as the Contractor may from time to time designate in writing to the Owner), or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.

c. All papers required to be delivered to the **Owner** shall, unless otherwise specified in writing to the Contractor, be delivered to:

Robert C. Antonelli, Jr., Assistant Commissioner
Department of Public Works and Parks
50 Officer Manny Familia Way, Worcester, MA 01605

and any notice to or demand upon the Owner shall be sufficiently given is so delivered, or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission to said Owner at such address, or to such other representatives of the Owner or to such other address as the Owner may subsequently specify in writing to the Contractor for such purpose.

d. Any such notice shall be deemed to have been given as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post, or in the case of telegrams, at the time of actual receipt.

ARTICLE 21 PARTIAL USE OF SITE IMPROVEMENTS

a. The Owner, at its election, may give notice to the Contractor and place in use those sections of the improvements which have been completed, inspected and can be accepted as complying with the Technical Specifications and if, in its opinion, each such section is reasonably safe, fit and convenient for the use and accommodation for which it was intended, provided:

1. The use of such sections of the improvements shall in no way impede the completion of the remainder of the work by the Contractor.
2. The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.
3. The use of such sections shall in no way relieve the Contractor of his liability due to having used defective materials or due to poor workmanship.
4. The period of guarantee stipulated in the specifications shall not begin to run until the date of the final acceptance of all work which the Contractor is required to construct under this Contract.

ARTICLE 22 SAMPLING, TESTING, INSPECTION OF WORK & MATERIALS

a. Sampling, testing and inspections ordered or required by the Owner to ensure that work and materials are as specified, and that compaction of all materials conforms to the necessary requirements shall be taken and completed by the Owner or representatives of a Massachusetts certified testing laboratory satisfactory to the Owner and shall be paid for by the Owner unless described/required in the Technical Specifications. Contractor shall provide the Owner at least 72 hours advance notice of work to coordinate the intent of this Article and shall apply automatically with all work below finished grade unless directed otherwise by the Owner.

ARTICLE 23 TEMPORARY FACILITIES

a. Furnish all labor, materials, and services to fulfill the requirements for temporary facilities, at no additional cost to the Owner, and comply with all requirements set forth herein, except where noted requirements conflict with Federal, State, or Local laws, rules, and regulations, in which case(s) the applicable Federal, State, or Local requirements shall govern.

ARTICLE 24 SANITARY FACILITIES

a. Provide, place, and maintain in good order from the commencement to final completion of the work, suitable temporary toilet facilities for use by all persons employed under this contract. Toilets shall be rented from and serviced by an approved company and shall be kept sanitary and always secured. The type of toilets proposed for use shall have the approval of the appropriate City Agency, and the number of units shall be as recommended by the Department of Labor. Toilets shall be locked during nonworking hours and placed in a secured (fenced) location, where possible.

ARTICLE 25 TEMPORARY LIGHT AND POWER

a. Make all necessary arrangements with the local utility company and pay all costs including labor, in operating and maintaining all temporary services for electricity used during the construction, unless specifically noted otherwise.

b. Ensure that temporary wiring, outlets, and lighting are provided in accordance with the current requirements of Bulletin No. 12, Division of Industrial Safety, Department of Public Safety, Commonwealth of Massachusetts.

ARTICLE 26 TEMPORARY WATER

a. Contractor shall be responsible to furnish, install and coordinate temporary water needs and temporary connections.

ARTICLE 27 UTILITIES

a. The Contractor shall obtain and pay for all licenses and/or permits, which are required by the City or any other agencies that may be involved; he/she shall comply with all codes, regulations and standards of the City.

b. Contractor shall be responsible for all on-site coordination with utility companies and public agencies and for obtaining all required permits and paying all required fees. In accordance with M.G.L., Chapter 82, Section 40, including amendments; Contractor shall notify all utility companies and government agencies in writing prior to such excavation, Contractor shall also call "Dig Safe" at 1-(888) 344-7233 no less than 72 hours (exclusive of Saturdays, Sundays and Holidays.) prior to such excavation. Documentation of requests and numbers provided to Contractor shall be provided to Owner prior to excavation work.

ARTICLE 28 PHOTOGRAPHS & TIME-LAPSE CAMERAS - Not in Contract (NIC)

ARTICLE 29 CONTRACTOR'S SHOP & WORKING DRAWINGS

a. Contractor to coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

b. All Contractors are directed to the timeliness and critical importance of expediting the submittal process. Any lead times that may impact sequencing should be prioritized to meet the Project schedule. The Owner must be notified if any delays arise that impact lead times.

c. The Contractor shall coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that requires sequential activity.

d. The Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

e. To avoid the need to delay installation as a result of the time required to process submittals and to allow sufficient time for submittal review, all initial product submittals, shop drawings shall be submitted for processing and within **twenty-eight calendar days** (28) days from the date of Notice to Proceed.

f. The Contractor must allow the Owner **10 calendar days** (10) per initial and subsequent shop drawing review to achieve efficient construction sequencing. Allow additional time if the Owner must delay processing to permit coordination with subsequent submittals. If an intermediate submittal is necessary, process the same as the initial submittal. Allow ample time for reprocessing each submittal to achieve efficient construction sequencing.

g. No extension of Contract Time will be authorized because of the Contractor's failure to transmit submittals to the Owner for processing sufficiently in advance of the scheduled Work.

h. Shop drawings, product data and samples submitted for each item will be reviewed no more than two (2) times at the Owner's expense. Submittals failing to comply with the Contract requirements will be reviewed at times convenient to the Owner and the Owner's consultants and at the Contractor's expense, based upon the hourly rate of the Engineer/Consultant for each subsequent re-submittal. The Owner reserves the right to deduct said reimbursement from the Contractor's periodic application for payment and the Contract Sum.

i. The Owner's review and approval of submittals shall be held to limitations stated in the conditions of the Contract. In no case shall approval or acceptance by the Owner be interpreted as release of Contractor of responsibility to fulfill requirements of Contract Documents. No acceptance or approval of submittals, nor any indication or note marked by the Owner on submittals, shall constitute authorization for increase in Contract Sum. The Owner will stamp each submittal with an action stamp.

j. As the timely submittal of samples, shop drawings, catalogue cuts and other related submittals is of paramount importance to the completion of the Project within the stipulated time period, a contract value of 1% will be assigned to this effort. Upon receipt of the complete submittal package the General Contractor will be permitted to submit payment of this item with a value equal to 1% of the base bid contract amount.

k. Show in large-scale any unique fabrication and setting requirements or any other specified areas seen as necessary or as directed by the Owner's Representative.

l. Prior to review by Owner's representative, shop drawings shall indicate specification section or drawing reference and proof of review and approval by Contractor for Project compliance, otherwise the submittal will be rejected immediately and count as one (1) official review as per item "h" above.

m. The Contractor shall provide two sets of bindered hard copies of all final approved shop documents and or drawings and warranties as part of the closeout of the Project.

n. Contractor shall submit to the Owner's Representative a notarized certificate of compliance from the galvanizer with all galvanizing requirements including ASTM number and weight of coatings in ounces per square foot. Certificate of compliance shall also contain the following:

1. Sole Source Responsibility: include statement that galvanizer accepts sole responsibility for coatings under this Article. Galvanizer who does not accept this responsibility is not acceptable and will be rejected.

2. Quality Assurance: include evidence that Galvanizer meets requirements of ANSI Q90.

3. Certificate of Compliance with Current Environmental Regulations: Galvanizer shall certify that coatings proposed for use comply with applicable environmental regulations. Contractor and Galvanizer shall be responsible for penalties assessed by governmental or environmental authorities for coatings that do not comply with current environmental regulations. All coatings shall be Lead-free.

ARTICLE 30 HISTORICAL, ARCHAEOLOGICAL OR ANTIQUE ITEMS

a. The Contractor during his excavation, site clearance and other operations may come upon, uncover or otherwise discover items of historical, archaeological or antique nature. The Contractor shall immediately stop operations at the site of the discovery and notify the Owner so that a proper evaluation may be made of its importance. The Owner shall arrange for the evaluation in a manner that shall not unduly interfere with the Contractor's operation.

b. All such items, if designated by competent authority to be of historical, archaeological or antique nature shall not become the property of the Contractor but shall be placed in the custody of the Owner for disposition.

c. The Contractor shall be required to remove with care or to assist in the removal of any such item or items and to transport the same to a place of safe keeping within the City. The costs for so assisting shall be reimbursed to the Contractor if approved by the Owner.

ARTICLE 31 PROVISIONS FOR PUBLIC SAFETY & CONVENIENCE

a. Care shall be taken to establish and maintain such methods and procedures as will not create hazards. Access to all park facilities and shall be maintained in a reasonable and safe manner for the duration of the construction period.

b. Every reasonable effort shall be made to reduce to a minimum any interference with or inconveniences to park operations and park patrons due to the construction work. Excavated material shall be trucked away and returned if the Owner deems it necessary and practical as a means for avoiding serious interference with and inconvenience to business concerns and abutters.

c. The Contractor's attention is directed to the fact that the work on this Project is to be performed within a recreation area and adjacent to park drives and walkways which are utilized by pedestrians, bikers, joggers and vehicles. The Contractor shall be responsible for the installation of adequate precautions and other safety measures and controls deemed necessary by the Owner in order to protect all park users.

d. Any automotive equipment not protected by traffic cones that is operating on a public way under this Project shall have one amber flashing warning light mounted on the cab roof or on the highest practical point of the machinery. This light shall be in operation while the equipment is so working.

e. Trenches shall not be opened in park areas until all material and equipment required for the work are on the site and available for immediate use. The work at each trench shall be practically continuous, with the placing of utilities, backfill and patching (where applicable) of the surface closely following each preceding operation. When work is not in progress, trenches in areas subject to use by park patrons shall be covered with steel plates capable of safely sustaining all anticipated loads.

f. The Contractor shall provide traffic signs, warning markers and other construction safety measures as necessary to maintain public safety and optimum traffic flow. Parking of personal vehicles will be prohibited in construction areas as directed.

g. With suspension of construction activities during holidays, weekends and nights, the Contractor shall remove temporary traffic and/or safety control devices, as requested, and return them to their positions when work begins again. Payment for the installation and maintenance of appropriate safety provisions shall be included under the base bid price and no separate payment shall be considered.

h. The Contractor shall without additional compensation be required to always maintain access to the Project area and property for fire apparatus and other emergency vehicles.

ARTICLE 32 PROTECTION OF EXISTING FACILITIES

a. All existing walks, pipes, conduits, poles, fences, stairways, curbing, walls, buildings, trees and other structures which are to remain in place shall be carefully supported and protected from injury by the Contractor without additional compensation and in case of injury they shall be restored by him without compensation therefore to as good condition as that in which they were found. The value of any trees damaged shall be determined in accordance with established practices of the American Association of Nurserymen or a Registered or Certified Arborist selected by the Project Manager. Limits of liability shall not be limited to the replacement with new and immature trees.

b. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings, where required, for accommodation of travel and to provide access to the building/property during construction, and shall remove said structures thereafter.

c. The location of all/ prior existing utility systems is not known and therefore may not be shown on the drawings prepared for this Project. The existence of utilities shall not be considered as an unusual obstacle, and the Contractor

shall not be entitled to extra compensation for maintaining, protecting, or repairing these utilities. The Contractor shall use the exploratory excavation included in his contract price, whenever he/she or the Owner's representatives deem it necessary to verify, or prevent interruption of, existing services.

ARTICLE 33 AS BUILT SURVEY / PROJECT CLOSEOUT DELIVERABLES

a. The Contractor shall cooperate with the Project Manager and shall prepare and maintain a live set of as built drawings on which shall be recorded accurately, as the work progresses, the actual "as built" quantities and locations and dimensions of all his work, indicating thereon all variations from the Contract Drawings. This record of "as built" conditions shall include the **ALL** the work of the Contractor and Sub-Contractors and proof of compliance prior to final acceptance of all work. **As built shall be submitted for review with monthly payment applications.**

b. Prior to final acceptance of the work, all "as built" data shall be transferred as a separate overlay or external reference with the digital Auto CAD format files provided to the Contractor by the Owner. This work shall be performed by the Contractor's Registered Land Surveyor with the cooperation of the Contractor as required. After review and approval by the Owner the record drawings will be completed and delivered to the Owner.

1. All geographic data must be submitted in a standard real-world coordinate system. The following coordinate system is required:

Projection:	Massachusetts State-plane Mainland
Datum:	NAD83
Fipszone:	2001
Units:	Feet
Spheroid:	GRS1980

2. All digital data must be delivered in the following format:

Autodesk AutoCAD dwg. format, and one of the following file formats:

ESRI Geodatabase
ESRI Shapefile format
ESRI Arc/Info Interchange File format (e00)
Autodesk AutoCAD dxf format

3. All data must be clean of undershooting and overshooting arcs (dangles). Polygons must be snapped closed at nodes and lines must snap to one another at nodes.

4. All data must be thematically organized. There must be separate layers for road edges, road centerlines, buildings, streams, water and sewer mains, hydrants, easements, parcels, water bodies, etc. For example, if a stream is coincident with a parcel boundary that coincident line must appear in both the parcel layer and the stream layer. All data shown on the plan shall be submitted digitally.

5. Features, which contain a third, dimension or elevation data (z value) must have the elevation value within the attribute data. If elevation data is submitted in a CAD format, then the value must be part of the feature (polyline).

6. Documentation:

   A. A list of all files being submitted is required.

   B. CAD data shall include metadata for each layer included within the file. This documentation will provide information on the source of the data, feature type (point, line, polygon, etc.), source date, and a general description of what is shown on the layer(s).

C. GIS data submissions (e.g., mdb, shp file, e00 export) must include all items from B above as well as metadata for each of the feature's geographic data attributes. This will include a complete description of each attribute's definition as well as a description of what each of the attribute values mean for each field.

7. Documentation on the method/s used for data collection shall be submitted for all data deliverables.
8. Documentation on the horizontal and vertical accuracy shall be submitted for all data deliverables.
9. Text & Annotation:
   A. For CAD submissions, text must be placed in separate layers. Features must not be erased in order to accommodate the placement of text. Text layers must be thematically separate, meaning that text associated with hydrography should be placed on a single layer, while text pertaining to a parcel's ID number should be placed on yet another separate layer. For example, should there be text on a map defining a parcel's ID number and another piece of text defining a stream name, the deliverable to the town must include two (2) separate text layers, one for the parcel ID numbers and one for the stream names.
   B. Text associated with a GIS formatted data deliverable must be in one of four forms.
      1. A label attribute. This would be related to the feature's attribute fields as previously described above in Section 6.
      2. Annotation subclass. This would be separate annotation included within a feature data set as a series of text attribute tables (TAT).
      3. Annotation coverage (e00 export). This would be an entirely separate feature class containing text or annotation only.
      4. Feature linked annotation as prescribed in ArcGIS.
10. The Owner shall supply the Contractor with electronic files (AutoCAD) for the sole purpose of creating As Built Drawings.
11. **As built tasks shall be assigned a monetary value equal to 2 percent (2%) of Initial Contract value or $20,000 (whichever is greater) and be included as an item in the approved Schedule of values.**
12. **Contractor shall submit the final approved as built within twenty-eight (28) consecutive calendar days of Issue of Punch list and:**
    a. Prior to Notice of substantial completion.
    b. Prior to Approval of final payment application.

ARTICLE 34 RUBBISH REMOVAL

a. The Contractor shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of the work; but this shall in no way be construed to relieve the Contractor of his primary responsibility for maintaining the site clean and free of debris, leaving all work in a clean condition. The Contractor shall always keep the site free of rubbish and construction debris.

b. The Contractor shall provide sufficient metal barrels or dumpsters into which all refuse and garbage shall be deposited. All containers shall have tight fitting covers. These shall be secured overnight or removed daily.

c. At the end of each work week, the Contractor shall thoroughly clean premises of rubbish and debris of any nature and remove such from the premises.

ARTICLE 35 PROJECT CONSTRUCTION SIGN

a. Contractor will provide and temporarily install one monolithic 48" high X 96" wide X ¾" thick Project sign and 2- 4"x 4" posts to identify the Project at a location to be determined in the field by the Owner.

b. The Project sign shall conform exactly to the City of Worcester's DPW and Parks, Parks, Recreation and Cemetery Division's prototype Projects sign including but not limited to size, backer material, font style, size and relief, capitalization, color, weather proofing, fasteners and fastener locations.

c. **Final Graphic and language will be provided by the Owner** (Background color is forest green, text is white). **Sample below is for reference only.**

d. The Contractor shall be responsible installation and removal of sign and posts.

End of DPW & Parks Special Conditions

PROJECT SPECIAL SPECIFICATIONS

General

1. The following special standard specifications are to be used on contract work awarded by the City of Worcester DPW and Parks, Parks Recreation and Cemetery Division. They are intended to supplement, support and suit this specific Project.

ARTICLE 36 DEMOLITION, SITE EXCAVATION & PREPARATION

a. Existing damaged boardwalk designated for renovations and appurtenances shall be disposed offsite at the end of the Project and are not eligible for reuse except for helical pile as identified in the field by Engineer after award of bid.

b. Contractor shall remove, disassemble, stockpile, palletize and deliver to 50 Officer Manny Familia Way, Owner identified salvageable IPE lumber and SS cable pickets complete from existing damaged boardwalk designated for renovation. Existing galvanized steel railings for disposal shall be stockpiled on site until the end of the Project or as directed by Owner.

c. The work shall consist of excavating, removing and legal disposal of surplus if any, vegetation, earth, boulders, masonry, existing pavements, building materials, footings, appurtenances, and other materials encountered of whatever nature that is unsuitable for the construction and improvements of finished conditions. Excavated to the depth necessary to install according to the specifications, plans and details plans provided in the construction bidding documents.

d. Location of existing utilities shall be verified before excavation commences. The Drawings are based on available utility record drawings and site observation.

e. The excavation shall be carried out to such depths that sufficient materials will be left above the designated grade to allow for compaction to this grade. Should the Contractor, through negligence or other fault, excavate below the designated lines, he shall replace such excavation at his own expense. The Owner shall have complete control over excavation, moving, placing, and disposition of all material. Existing materials/objects determined to be unsuitable or not required or used, as determined by the Owner, for finished conditions shall be disposed offsite at no additional cost.

f. The Contractor shall inform and satisfy himself as to the character, quantity, and distribution of all material to be excavated. No payment shall be made for any excavated material, which is used for purposes other than those designated or implied.

g. If it is necessary in the process of the work to interrupt existing surface drainage, sewers, or to pass under drainage, conduits, utilities, or similar underground structures, or parts thereof, the Contractor shall protect it or provide temporary services. The Contractor shall, at his own expense, satisfactorily repair all damage to such facilities or structures that may result from any of his operations or from negligence during the period of the Contract.

h. No excavation shall be started until the Owner has approved the proposed area of construction.

i. Excavation shall be performed at such places as are indicated on the Drawings, to the lines, grades and elevations shown or as directed by the Project Manager and shall be made in such manner that requirements for the formation of the sub-grade can be followed. Unless directed otherwise any disturbed existing rimmed structures shall be adjusted flush to final adjacent grade.

j. Existing pavements and base courses shall be carefully saw cut or core drilled and removed to the lines indicated and, in a manner, to obtain sound edges or connections, and so as not to disturb or damage existing buildings, utilities, pavements, and base coats which are to remain.

k. Unit pavers, such as granite brick and concrete, shall be carefully removed and stockpiled for reuse, if required.

l. All excavations shall be opened using minimum, straight, parallel cuts through pavement and base materials, and other excavations opened using square or rectangular cuts or as directed to minimize removal while permitting regular, straight-line repair and patching.

m. No excavation shall commence in any until the pavement covering the proposed excavation has been marked for cutting.

n. Excavated areas shall be made safe for the residents at the end of each workday.

o. Transport excavated materials, waste materials, trash, and debris and legally dispose of it off City property.

p. Prevent, minimize and control groundwater and/or surface water to accumulate in excavations. Remove water to prevent the undercutting of footings and soil changes detrimental to the stability of sub-grades, foundations and granite, brick or concrete paving.

q. Payment for site excavation and preparation work shall be considered incidental to the individual items installed. No separate payment shall be made for site excavation and preparation work. No separate payment shall be made for all labor, equipment, tools and incidentals necessary to complete the work to the satisfaction of the City, including transportation and disposal of excavated materials.

r. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

s. Soil testing, if required, for all materials to be reused on-site or removed and disposed of offsite, shall be the responsibility of the Contractor. The City reserves the right to obtain its own test results from the same sample as the Contractor without penalties to the Owner. The Contractor is required to obtain a large enough sample to divide with the Owner for this proposes.

t. Transport excavated materials, waste materials, trash, and debris and legally dispose of it off City property.

u. Surplus excavated material not needed as specified above shall be hauled away and disposed of by the Contractor at no additional cost to the Owner, at appropriate locations, and in accordance with arrangements made by him. Disposal of all rubble shall be in accordance with all applicable local, state and federal regulations.

v. The Contractor shall comply with Massachusetts regulations (310 CMR 40.0032) that govern the removal and disposal of surplus excavated materials. Materials, including contaminated soils, having concentrations of oil or hazardous materials less than an otherwise Reportable Concentration and that are not a hazardous waste, may not be disposed of at locations where concentrations of oil and/or hazardous material at the receiving site are significantly lower than the levels of those oil and /or hazardous materials present in the soil being disposed or reused.

w. If required: In response to the State/ Federal imposed quarantine regarding the Asian long-horned beetle infestation, the protocol for handling and disposal of wood-based materials within the Project area by the Contractor shall be to:

   i. at a minimum, process all onsite vegetative, wood and cellulose based materials (trees, shrubs, root, stumps, branches, leaves, etc. **twelve inches and under in diameter** and designated for disposal) to a size of less than one inch as measured in two directions by approved mechanical means (woodchipper) prior to disposal/removal offsite. All other existing vegetative, wood and cellulose based products; tree trunks, stumps, branches etc., **greater than twelve inches, in diameter** and designated for removal/disposal shall be delivered to the current transfer station.

   ii. Contractor shall be responsible to comply with changes or current quarantine protocols for the duration of the Project.

ARTICLE 37 CAST IN PLACE CEMENT CONCRETE

a. The scope of work under this article shall consist of furnishing all labor, materials, equipment, transportation, reinforcing, forming, finishing and curing of cast in place concrete for the construction of concrete pads, footings and walls for the structures and site improvements as specified herein and according to the plans and details shown in the construction drawings and the balance of any concrete construction necessary to completion of the Project.

b. Unless otherwise specified, all materials shall conform to the relevant provisions of Section 901, **Cement Concrete Masonry,** and Section M4, **Cement and Concrete Materials** of latest edition of The Massachusetts Department of Public Works Standard Specifications for Highways, Bridges and Waterways.

c. At a minimum, concrete to be used shall be Class 4,000 PSI - minimum 28-day compressive strength, and cement content of 610 lbs. per cubic yard for ¾" coarse aggregate. Concrete shall be discharged at site within 90-minutes after batching.

d. All horizontal (pad) concrete construction shall be air entrained which shall be 4.5% to 7%, as determined by ASTM C231.

e. Formwork shall be sufficient to resist pressure of the concrete without springing and tight enough to prevent leakage of mortar. Forms shall be staked, braced, or tied together to maintain their position and shape when concrete is compacted in place. Forms shall be clean and shall produce an even finish for exposed surfaces.

Forms shall not be removed for at least twenty-four (24) hours after concrete has been placed, or longer if directed by Owner.

f. Preformed expansion joint filler shall be non-extruding and resilient non-bituminous type conforming to AASHTO-M135.

g. Reinforcing as required or pads shall be welded wire fabric, 6" X 6", W1.4 X W1.4 gauge cold-drawn steel wires formed into a mesh and welded together at points of intersection in conformance with ASTM A-185-70. Welded wire fabric shall be furnished in mats and not in rolls.

h. All references to 'processed gravel', 'gravel borrow', or 'gravel' shall conform to Article 38 Gravel Borrow.

i. Curing and protection shall be accomplished by applicable optimum method specified in Section 901, **Cement Concrete Masonry,** and Section M4, **Cement and Concrete Materials** of latest edition of The Massachusetts Department of Public Works Standard Specifications for Highways, Bridges and Waterways.

j. The Contractor is responsible for the quality and strength of the concrete. Inferior concrete, including that damaged by frost action shall be removed and replaced at no additional cost to the Owner.

k. The Contractor shall be responsible to repair or replace any concrete exhibiting deficient materials or workmanship with in one (1) year of final acceptance.

l. Payment for concrete and concrete work shall be considered incidental to the individual item in which the concrete is used. No separate payment shall be made for concrete work.

ARTICLE 38 GRAVEL BORROW

a. The scope of work under this article shall consist of furnishing all labor, materials, equipment and transportation required for placement and compaction of approved processed gravel according to the plans and details plans and details shown in the construction drawings and the balance of any subbase construction necessary to the completion of the Project.

b. All references to 'processed gravel', 'gravel borrow', or 'gravel base' shall conform to this Article.

c. Gravel borrow shall consist of inert material that is hard durable stone and coarse sand, free from loam and clay, surface coatings and deleterious material. Gravel borrow containing recycled bituminous and concrete material shall not be used in areas of pervious finish grade (i.e., ball fields, skinned, and lawns areas, etc.).

d. Gradation requirements for gravel borrow shall be determined by AASHO-T11 and T27 and shall conform to the following:

Sieve	Percent Passing
2"	100
½"	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-10

e. Maximum size of stone in gravel shall be two (2) inches, largest dimension.

f. Gravel shall be spread and compacted in layers not exceeding six (6) inches in depth compacted measurement and all layers shall be compacted to not less than ninety-five percent (95%) of the maximum dry density of the material as determined by the Standard AASHO Test Designation T99 compaction test Method C at optimum moisture content.

ARTICLE 39 BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall furnish all labor, materials and equipment and shall place the pavements as indicated on the drawings and as herein specified.

1.02 RELATED WORK:

A. N/A

1.03 SYSTEM DESCRIPTION:

A. GENERAL

The types of pavement systems to be utilized on this Project are as follows:

1.04 REFERENCES

The following standards form a part of these specifications and indicate the minimum standards required:

American Society for Testing and Materials (ASTM)

ASTM D1557 Test for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 Pound Rammer and 18-Inch Drop

Commonwealth of Massachusetts Highway Department Standard Specification for Highway and Bridges (MHD)

MHD 405	Gravel Base Course
MHD 420	Class I Bituminous Concrete Base Course, Type I-1
MHD 460	Class I Bituminous Concrete Pavement
MHD 476	Cement Concrete Pavements
MHD 860	Reflectorized Pavement Markings

Federal Specifications

SS-S-164	Sealing Compound, Hot Poured Type, for Joints in Concrete
SS-S-1401C	Sealants, Joint, Non-Jet-Fuel-Resistant, Hot Applied, for Portland Cement and Asphalt Concrete Pavement

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SPECIAL CONDITIONS, SUBMIT THE FOLLOWING:

Six sets of complete job mix formula shall be submitted to the Engineer at least two weeks before any of the work of this section is to begin.

PART 2 - PRODUCTS

2.01 GRAVEL SUBBASE:

A. Gravel subbase shall consist of inert material that is hard durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials.

B. Gradation requirements for gravel subbase shall be as specified in the Gravel Borrow Article.

2.02 BITUMINOUS CONCRETE PAVEMENT:

A. Bituminous concrete pavements shall consist of Class I Bituminous Concrete, Type I-1.

B. Bituminous concrete mixtures shall be within the composition limits of base courses, binder courses, top courses and surface treatment, in accordance with MHD M3.11.03, with constituents that conform to Table A, below.

TABLE A

PERCENT BY WEIGHT PASSING SIEVE DESIGNATION

Standard Sieves (in.)	Base Course	Binder Course	Top Course	Surface Treat.
2 in	100			
1 in	55-80	100		
¾ in		80-100		
5/8 in			100	
½ in	40-65	55-75	95-100	
3/8 in			80-100	100
No.4	20-45	28-50	50-76	80-100
No.8	15-33	20-38	37-54	64-85
No.16			26-40	46-68
No.30	8-17	8-22	17-29	26-50
No.50	4-12	5-15	10-21	13-31
No.100*			5-16	7-17
No.200	0-4	0-5	2-7	3-8
Bitumen	4-5	4.5-5.5	5.5-7.0	7-8

* Percentages shown for aggregate sizes are stated as proportional percentages of total aggregate for the mix.

Unless authorized by the Engineer, no Job-Mix Formula will be approved which specifies:

Less than 4% passing No. 200 for Top Course.
Less than 6% bitumen for Top Course.

C. The joint sealant shall be a hot poured rubberized emulsified asphalt sealant meeting the requirements of Federal Specifications SS-S-1401 or SS-S-164.

D. The tack coat shall be an asphalt emulsion, RS-1 if required, conforming to MHD Section M3.03.0.

2.03 SEAL COAT:

A. Seal coats shall be within the composition limits for protective seal coat emulsion in accordance with MHD M3.03.3.

B. Silica sand when blended with seal coat emulsion shall be No. 30 silica sand.

PART 3 - EXECUTION

3.01 GENERAL:

Paving courses required for the Project shall be as shown on the drawings and as specified herein. Pavement thicknesses specified are measured in compacted inches. If a pavement course thickness exceeds 2-1/2 compacted inches, the course shall be installed in multiple lifts with each lift not exceeding 2-1/2 compacted inches in thickness.

3.02 GRAVEL SUBBASE:

A. The gravel subbase to be placed under pavement shall consist of 12-inches of gravel evenly spread and thoroughly compacted.

B. The gravel shall be spread in layers not more than 4-inches thick, compacted measure. All layers shall be compacted to not less than 95 percent of the maximum dry density of the material as determined by ASTM D1557 Method C at optimum moisture content.

3.03 TEMPORARY BITUMINOUS PAVEMENT:

A. Where specified and directed by the Engineer and after placement of the gravel subbase, the Contractor shall place temporary bituminous pavement above the trench, between the edges of the existing pavement. It shall consist of Class I Bituminous Concrete Pavement, Type I-1, 2-inches thick, in accordance with MHD 460.

B. The temporary pavement shall be repaired as necessary to maintain the surface of the pavement until replaced by permanent pavement. When so directed by the Engineer, the Contractor shall remove the temporary pavement and install or regrade the subbase for installation of permanent pavement.

3.04 PERMANENT BITUMINOUS PAVEMENT:

A. The bituminous paving mixture, equipment, methods of mixing and placing, and the precautions to be observed as to weather, condition of base, etc., shall be in accordance with MHD 460.

B. BASE COURSE AND BINDER COURSE PAVEMENT:

1. Immediately prior to installing the base binder course, the trimmed edges shall be made stable and unyielding, free of loose or broken pieces and all edges shall be thoroughly broomed clean. Contact surfaces of trench sides, curbings, manholes, catch basins, or other appurtenant structures in the pavement shall be painted thoroughly with a uniform coating of asphalt emulsion (tack coat), just before any mixture is placed against them.

2. The binder course shall be repaired as necessary to maintain the surface of the pavement until placement of the permanent overlay. If required, the Contractor shall place a leveling course before placing the permanent overlay.

3.05 PAVEMENT PLACEMENT:

A. Unless otherwise permitted by the Engineer for particular conditions, only machine methods of placing the pavement shall be used. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of

spreading and finishing the mixture true to line, grade, width and crown. The mixtures shall be placed and compacted only at such times as to permit proper inspection and checking by the Engineer.

B. After the paving mixtures have been properly spread, initial and intermediate compaction shall be obtained using steel wheel rollers having a weight of not less than 240 pounds per inch width of tread.

C. Final rolling of the top course or surface treatment pavement shall be performed by a steel wheel roller weighing not less than 285 pounds per inch width of tread at a mix temperature and time sufficient to allow for final smoothing of the surface and thorough compaction.

D. Immediately after placement of top course or surface treatment pavement, all joints between the existing and new top course or surface treatment pavements shall be sealed with hot poured rubberized asphalt sealant meeting the requirements of Federal Specification SS-S-1401 or SS-S-164.

E. Where there is no backing for the edges of the curb-to-curb pavement, the Contractor shall provide a gravel transition. The gravel transition shall be installed immediately after the pavement is placed, shall be feathered and extend a minimum of 18 inches, and shall be compacted using the same equipment as for pavement compaction. The gravel shall be uniformly graded material with a maximum size of 3/8 to 1/2 inch.

F. When directed by the Engineer, the Contractor shall furnish and install additional paving to provide satisfactory transition for driveways and walkways impacted by a new curb-to-curb pavement installation. The transition installation will be considered incidental to the curb-to-curb pavement installation.

3.06 ADDITIONAL PAVING:

A. If the Engineer determines that the existing bituminous concrete pavement on local streets is thicker than the permanent pavement specified herein, the Contractor may be required to install additional Type I-1 bituminous concrete to obtain the depth of the existing pavement.

B. If for the installation of full width paving, the Engineer determines that the existing road surface requires additional leveling pavement, then the Contractor shall install additional Type I-1 bituminous concrete to bring the section to proper line and cross section. Additional paving required to restore the proper line and cross section of binder course installed by the Contractor which has become rough and uneven shall be furnished and installed at the expense of the Contractor.

3.07 PARKING LOTS, DRIVEWAYS and SIDEWALKS:

A. Pavement shall consist of a 2-1/2-inch binder course and a 1-1/2-inch top course on a minimum 8-inch gravel sub-base. All thicknesses are compacted thicknesses.

B. Adjacent concrete work, slate work, sidewalks, structures, etc., shall be protected from stain and damage during the entire operation. Damaged or stained areas shall be replaced or repaired to equal their original condition.

C. All joints between binder and top course shall be staggered a minimum of 6-inches.

D. After final rolling, no vehicular traffic of any kind shall be permitted on the pavement until it has cooled and hardened sufficiently to prevent distortion and loss of fines, and in no case in less than 6 hours.

E. Smoothness of all areas of the finished surface shall not vary more than 1/4-inch when tested with a 16 foot straight-edge, applied both parallel to and at right angles to the centerline of the paved area. At building entrances, curbs, and other locations where an essentially flush transition is required, pavement elevation tolerance shall not exceed plus or minus 1/8-inch. Irregularities exceeding these amounts, or which retain water on the surface, shall be corrected by removing the defective work and replacing or repairing it to the satisfaction of the Engineer.

F. The surface area to be seal coated, as shown on the drawings, shall be swept and air cleaned. The first coat shall be applied with eight (8) pounds of #30 silica sand blended with each gallon of emulsion applied at a rate of 0.15 gallons per square yard. The second coat shall be a straight sealer applied at the rate of 0.1 gallons per square yard.

3.08 PAVEMENT MARKINGS:

A. The Contractor shall replace all pavement markings removed or covered-over in carrying out the work, and as directed by the Engineer, no sooner than 48 hours after completion of permanent pavement. The markings shall be 4-inches wide, white or yellow, single or double lines as required.

B. When directed by the Engineer, the Contractor shall provide temporary markings at no additional cost to the Owner.

3.09 PAVEMENT REPAIR:

A. If required in the contract or if permanent pavement becomes rough or uneven, permanent pavement patches and trenches shall be repaired and brought to grade utilizing "infrared" paving methods following completion of the construction.

B. The Contractor performing the work shall use care to avoid overheating the pavement being repaired.

C. Pavement repair shall extend a minimum of 6-inches beyond all edges of the pavement patch to assure adequate bonding at the pavement joints.

ARTICLE 40 GENERAL LAWN AREAS, LOAM & SEEDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The work under this section shall require the Contractor to provide all labor, materials, equipment and transportation involved in the installation and establishment of playfield turf or lawn. The work shall include, but not limited to the re-use, screening, re-spreading of existing topsoil and the furnishing of additional loam borrow-if required, incorporating soil additives, fine grading, seeding and the protection and maintenance of the established lawn until final acceptance of the Project, or a minimum of sixty (60) days, whichever is longer.

1.02 Not Used.

1.03 QUALITY ASSURANCE

A. Qualifications of Work

Provide at least one person who shall be always present during execution of this portion of the Work, be thoroughly familiar with the type of materials being installed and the best methods for their installation, and direct all work performed under this Section.

B. Standards

1. All planting material shall meet or exceed the specifications of Federal and State laws requiring inspection for plant disease and insect control.

1. Quality shall conform to the current edition of "Horticultural Standards" for number one grade nursery stock, as adopted by the American Association of Nurserymen. ANSI 2260.1 - Nursery Stock.

C. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

1.04 SUBMITTALS

A. Materials List

Within 30 days after award of Contract and before any seeding materials are delivered to the job site, submit to the Owner a complete list of all seeding and other items proposed to be installed. At least 10 days prior to shipment/delivery of materials, the Contractor shall submit to the Owner a one (1) cubic foot representative sample, certifications, certified test results for materials as specified below. The Contractor shall provide a listing of the addresses (locations) identifying the origin of the soil to be delivered. If the origin is from multiple locations, all locations shall be provided at the time of submission o required information specified above. No material shall be ordered or delivered until the required submittals have been submitted and approved by the Owner. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Owner reserves the right to reject, on or after delivery, any material that does not meet these specifications.

1. Include complete data on source, size, and quality.

2. Demonstrate complete conformance with the requirements of this Section.

3. This shall in no way be construed as permitting substitution for specific items described in the Drawings or these Specifications unless the substitution has been approved in advance by the Owner.

B. Certificates

1. All certificates required by law shall accompany shipments.

2. Prior to installation, deliver all certificates to the Owner.

1.05 PRODUCT HANDLING

A. Delivery and Storage

1. Deliver all items to the site in their original containers with all labels intact and legible at time of Owner's inspection.

2. Immediately remove from the site all seeding materials, which are not true to name, and all materials, which do not comply with the provisions of this Section of these Specifications.

3. Use all means necessary to protect seeding materials before, during, and after installation and to protect the installed work and materials of all other trades.

B. Replacements

In the event of damage or rejection, immediately make all repairs and replacements necessary to the approval of the Owner, at no additional cost to the Owner.

1.06 PLANTING SEASON

A. Seeding

Seeding shall be done between August 15th to September 30 and/or April 1st to June 15th.

B. Variance

If special conditions exist which may warrant a variance in the above planting dates, a written request shall be submitted to the Owner stating the special conditions for the proposed variance. Permission for the variance will be given if warranted in the opinion of the Owner. Regardless of the time of seeding, the Contractor shall be responsible for a full growth of grass.

PART 2.00 - PRODUCTS

2.01 TOPSOIL

A. General

Screened loam shall be "fine sandy loam" or "sandy loam" determined by mechanical analysis (ASTM d-422) and based on the USDA Classification System. Screened loam shall have the following mechanical analysis:

Textural Class	Percentage of Total Weight	Average Percentage
Sand (0.05-2.0mm dia.)	45-75	60
Silt (0.002-0.05mm dia.)	15-35	25
Clay (<0.002mm dia.)	5-20	15

Screened loam shall not contain less than 5 percent nor more than 10 percent organic matter as determined by the loss on ignition of oven-dried samples, at 100 degrees C, +/- 5 degrees C.

Screened loam shall consist of fertile, friable natural loam capable of sustaining vigorous plant growth. Loam shall be without admixture of subsoil and refuse, resulting in a homogenous material free of stones greater than ½" in the greatest dimension, be free of lumps, plants, glass, roots, sticks, excessive stone content, debris and extraneous matter as determined by the Owner. Screened loam shall fall within the pH range of 6.0-6.5 except as noted on plans and details. It shall be uncontaminated by salt water, foreign matter and substances harmful to plant growth. The maximum soluble salt index shall be 100. Screened loam shall not have levels of aluminum greater than 200 parts per million.

If limestone is required to amend the screened loam to bring it within the pH range of 6.0-6.5, no more than 200 pounds of limestone per 1000 square feet of loam, incorporated into the soil, or 50 pounds of limestone per 1000 square feet of loam, surface application, per season.

The Owner will reject any material delivered to the site which, after post-delivery testing does not meet these specifications. If the delivered screened loam does not meet the specifications in this document, the delivered screened loam will be removed by the Contractor at the Contractor's expense and at the time of rejection.

B. Testing

The Contractor shall take representative samples of topsoil from the site and from topsoil to be hauled in and shall submit samples to a Soil Testing Laboratory for chemical analysis, and physical analysis. The Contractor shall indicate to the testing agencies that turf is to be planted and who the Owner is. The Contractor shall forward to the Owner two copies of analysis and recommendations of the testing agencies.

2.02 FERTILIZER

A. General

All fertilizer shall be a commercial balanced, 10-6-4 fertilizer delivered to the site in bags labeled with the manufacturer's guaranteed analysis.

B. Commercial Fertilizer

Commercial fertilizer shall be a complete fertilizer in which 50-70 percent of the nitrogenous elements shall be derived from organic sources; phosphate shall be derived from superphosphate containing 16-20 percent phosphoric acid or bonemeal containing 25-30 percent phosphoric acid and 2-3 percent nitrogen; and potash shall be derived from muriate of potash containing 55-60 percent potash. It shall contain the following percentages by weight.

18% Nitrogen - 26% Phosphoric Acid - 12% Potash

Fertilizer shall be mixed, as specified, and delivered to the site in standard, unopened containers showing weight, guaranteed analysis, and name of manufacturer.

C. Special Protection

If stored at the site, always protect fertilizer from the elements.

2.03 SOIL AMENDMENTS

A. Peat

Peat shall be moist. It shall be finely shredded, consist of 90 percent organic moss peat, be brown in color, and suitable for horticultural purposes. Shredded particles shall not exceed one (1) inch in diameter. Peat shall be measured in air-dry condition, containing not more than 35 percent moisture by weight. Ash content shall not exceed 10 percent.

B. Limestone

Ground dolomitic limestone shall be an approved agricultural limestone and shall contain not less than 85 percent of total carbonates. Limestone shall be ground to such fineness that 50 percent will pass a 100-mesh sieve, and 90 percent will pass a 20-mesh sieve.

2.04 GRASS SEED

A. General

All grass seed shall be:

1. Free from noxious weed seeds and cleaned.

2. Grade A current crop seed.

3. Treated with appropriate fungicide at time of mixing.

2. Delivered to the site in sealed containers with dealer's guaranteed analysis.

B. Seed Mix Proportions by Weight

Percent by Weight	Seed	Min. % of Purity	Min. % of Germination
10%	Shamrock Kentucky Bluegrass	98%	90%
10%	Perennial Creeping Red Fescue	98%	90%
20%	Annual Ryegrass	98%	90%
30%	Intermediate Ryegrass	98%	90%
30%	Perennial Ryegrass	98%	90%

SECTION 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection

1. Prior to all work of this Section, carefully inspect the installed work of all other trades, and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that seeding may be completed in accordance with the original design and the referenced standards.

B. Discrepancies

1. In the event of discrepancy, immediately notify the Owner.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 SUBGRADE PREPARATION

A. The Contractor shall do whatever grading is necessary to bring the subgrade to a true, smooth slope, parallel and 6" below finished grade, for all seed bed areas. Remove all existing lawns and grasses, including roots.

B. There must be sufficient grade staked, as determined by the Owner, to insure correct line and grade of subgrade and of finished grade.

C. Immediately prior to being covered with topsoil, the top 3" of the subgrades shall be raked or otherwise loosened and shall be free of stones, rock, and other foreign material 3" or greater in dimensions.

3.03 FINISH GRADE PREPARATION

A. Topsoil shall not be delivered or worked in a wet, frozen or muddy condition.

B. Topsoil shall be placed and spread over approved areas to a depth sufficiently no less that than 4" in "loam and seed" lawn areas and 15" in plant bed areas so that after natural settlement and light rolling, the completed

work will conform to the lines, grades, and elevations indicated. If excess topsoil exists, topsoil shall be spread a maximum of 8" deep on lawn areas.

C. After topsoil has been spread in approved areas, it shall be carefully prepared by scarifying or harrowing, and stones over one inch in diameter shall be removed from the topsoil. It shall be free of smaller stones in excessive quantities, as determined by the Owner.

D. The whole surface shall then be rolled with a roller, which weighs not more than 100 pounds per foot of width. During the rolling, all depressions caused by settlement of rolling shall be filled with additional topsoil, and the surface shall be regraded and rolled until presenting a smooth and even finish to the required grade.

3.04 SEED BED PREPARATION

A. After the areas to be seeded have been brought to the grades specified, spread limestone at a rate of 100 pounds per 1,000 square feet.

B. Apply the 18-26-12 fertilizers at a rate of 5 pounds per 1,000 square feet within 10 days prior to seeding. Thoroughly and evenly incorporate fertilizer and lime with the soil to a depth of 3" by discing or other approved method. In areas inaccessible to power equipment, use hand tools. Adjacent to trees and shrubs, use hand tools to avoid disturbances of the roots.

C. The Seeding Contractor shall reconstitute the soil, as may be recommended by a soil testing agency, prior to use as planting soil. Any deficiencies in the topsoil shall be corrected by the Contractor, as recommended, at no expense to the Owner.

D. After incorporation of fertilizer and lime into the soil, the seedbed shall be fine graded to remove all ridges and depressions and the surface cleared of all debris and of all stones one inch or more in diameter.

3.05 SEEDING

A. Immediately before seeding, the ground shall be restored, as necessary, to a loose friable condition by dicing or other approved method to a depth of not less than 2". The surface shall be cleared of all debris and of all stones 1" or more in diameter.

B. Seed all areas to be seeded with specified grass seed, sowing evenly with an approved mechanical seeder at the rate of 6 pounds per 1,000 square feet. Sow 3 pounds per 1,000 square feet in one direction and 3 pounds per 1,000 square feet at right angles to the first seeding. Spread seed when soil is moist. Cultipacker, or approved similar equipment, may be used to cover the seed and to firm the seedbed in one operation. In areas inaccessible to cultipacker, the seeded ground shall be lightly raked and rolled in two directions with a water ballast roller. Extreme care shall be taken during seeding and raking to ensure that no change shall occur in the finished grades and that the seed is not raked from one spot to another. Hydro-seeding is an acceptable manner of seeding, providing the Contractor certifies in writing that the hydro-seed fertilizer mix is as herein specified and applied at the equivalent rate of 6 pounds per 1,000 square feet.

C. Promptly after seeding, wet the seedbed thoroughly, keeping all areas moist throughout the germination period.

D. Mulch shall be placed immediately after seeding. Straw or salt marsh hay that has been thoroughly fluffed shall be spread evenly and uniformly at the rate of two to three tons per acre. Lumps and thick mulch materials shall be thinned. All mulch anchor stakes, strings and matting shall be removed before final acceptance of lawns. In addition, following mulching, all slopes of 5:1 or greater shall be covered with jute, biodegradable tobacco netting or approved equal for additional stabilization. Securely stapled in place. Overlap all joints in netting a minimum of 6”.

E. Take whatever measures are necessary to protect the seeded area while it is germinating. These measures shall include furnishing warnings signs, barriers, and other needed measures of protection.

3.06 MAINTENANCE

A. Maintenance shall begin immediately after seeding operations and shall continue until Acceptance or for a minimum of 60 days or after two pre-approved cuttings, whichever is longer.

B. Maintenance of seed areas shall consist of watering, weeding, curing, repair of all erosion, and reseeding as necessary to establish a uniform stand of grass. Lawns shall be watered in a satisfactory manner during and immediately after planting, and not less than twice per week until final acceptance. All areas, which fail to show a uniform stand of grass for any reason, shall be reseeded repeatedly until a uniform stand is attained. Scattered bare spots and not exceeding 6" square of any lawn area, will be allowed at the discretion of the Owner.

C. At the time of the first cutting, there shall be a uniform stand between 3 and 3-1/2" high, and mechanical mower blades shall be set between 2-1/2" and 3" high.

D. Catch shall be representative of seed specified.

3.07 SPRING RE-SEEDING

If the original seeding of the areas affected by work takes place in the fall, the Contractor shall be responsible for additional spring maintenance, including reseeding by slice seeding, application of fertilizer and removal of weeds.

3.08 ACCEPTANCE

The Owner shall inspect all work for Acceptance upon written request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date of inspection. ***Upon completion and re-inspection of all repairs or renewals necessary in the judgment of the Owner***, he shall certify in writing to the Contractor as to the Acceptance of the work.

3.09 ACCEPTANCE IN PART

The work may be accepted in parts when it is deemed to be in the Owner's best interest to do so and when approval is given to the Contractor in writing to complete the work in parts. Acceptance and use of such areas by the Owner shall not waive any other provisions of this Contract.

3.10 CLEANUP

A. When any of this work is done while buildings are occupied, pavements shall be always kept clear, broom cleaned to prevent tracking dirt into buildings.

B. After completion of all planting operations, dispose of all debris and excess material to the satisfaction of the Owner. All pavements shall be swept and hosed clean.

3.11 FINAL INSPECTION AND ACCEPTANCE

At the end of the guarantee period, the Owner will inspect all guaranteed work for the Final Acceptance upon written request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date for final inspection.

Upon completion and re-inspection of all repairs or renewals necessary in the judgment of the Owner at that time, he shall certify in writing to the Contractor as to the Final Acceptance of the Project.

ARTICLE 41 SECURITY CAMERA APPURTENANCES (NIC)

ARTICLE 42 PLAYGROUND EQUIPMENT NIC)

ARTICLE 43 POURDED-IN-PLACE PLAYGROUND SAFETY SURFACING (NIC)

ARTICLE 44 SPORTS COURTS BIT. CONCRETE PAVING & PAINTING (NIC)

ARTICLE 45 WPRC DIVISION CHAIN LINK FENCE FRAMEWORK & FABRIC

General

1. This work includes the installation of Polymer color coated fence framework and fabric of various heights in accordance with these specifications and in conformity with the details, lines and grades shown on the plans or established.

    a. **Repair/replace existing 4' high chain link fence framework and fabric.**
        i. **Replace approximately 20 linear feet of fabric (fence line and gate) and associated appurtenances as needed, replace with 6-gauge core fence fabric.**
        ii. **Replace one existing end/gate post and cap.**
        iii. **Reuse/reset existing framework and gate, hardware and associated appurtenances.**
        iv. **Match existing construction and specifications.**

Construction Requirements

1. Locate and install all posts in concrete (4000 psi at 28 days), with minimum depth of 48 inches below finish grade and minimum diameter of twelve inches or four times the diameter of post, whichever is greater. Typical spacing of post shall be 120 inches max on center. Typical spacing of post on the precast concrete wall shall be the middle of top "anchor" block (Designed spacing of 92 inches O.C.). Refer to plans for post concrete footing depth and size for batting cage, bullpen, backstop and netting framework. Install plumb and true to line and grade and to the height as indicated within the drawings. All posts shall have continuous horizontal rails at the top, middle (for fence height greater than 72 inches), and bottom. In addition, all end and corner posts shall be braced to the nearest line post with center brace rails. Outside sleeve type top rail couplings shall be placed a maximum of twelve (12) inches from posts.

2. **Owner shall be contacted 48 hours prior to install of all fence and gate post/footings for inspection and approval of excavation/footing size.** Failure to notify entitles the Owner to pick at random 20 percent of installed post and concrete footing(s) for removal and inspection to verify they meet Specifications. Replacement and/or reinstall of new materials shall be at no additional cost to the Owner.

3. Chain link fence shall have continuous top and bottom rails. Refer to plans for rail layout for batting cage, bullpen and backstop and netting framework. Top and bottom edge of fence fabric shall have knuckled edges. Fabric shall be stretched uniformly taut and as tight as possible, true to line and grade and complete in all details. Install tension bars at corners.

4. All chain link fence fabric shall be fastened on the outside of the posts unless directed otherwise by the Owner. The fabric shall be properly stretched and securely fastened to the posts and between posts the top and bottom of the fabric shall be fastened to the horizontal braces as specified, herein. The fabric shall be fastened to end and corner posts with tension bars and stretcher bar bands spaced at one (1) foot intervals.

5. Fabric shall be aligned so that top and bottom shall extend one half the height of the "diamond" beyond outer edge of top and bottom of the horizontal rail. The fabric shall also be one (1) inch maximum above finish grade. The fabric shall be tied (as per item 5 below) to all line posts, top, middle and bottom rails every six (6) "diamonds" as measured horizontally or vertically. Overlapping fence fabric sections shall overlap one full height of the "diamond" and be centered on the horizontal rail.

6. All fabric shall be fastened to all line posts and horizontal rails with 0.020" thickness, 200/300 series stainless steel ½" wide bands, with a minimum breaking strength of 850 lbs., 1/2" band capacity ear-lokt design buckles to be manufactured with 0.050" thick material, 201/301 series stainless steel. Fabric for bleachers shall be attached at each vertical post only, three bands per post. All bands shall be pulled tight and raw ends of steel bands shall be secured in buckle by folding ear tabs around steel bands as per manufacturer's recommended installation procedure. No sharp edges shall protrude from band-it buckles.

Materials

Fabric, posts, gate frames, gate hinges, gate stops, braces, rails, stretcher bars, truss rods, post caps, stretcher bar bands, tension wire shall, and other parts shall be of steel, pressed steel or approved equal except that post tops and rail ends may be of aluminum. **No malleable iron, ductile iron materials will be accepted**. The Contractor shall supply a notarized mill certification from manufacturer that all materials used have been tested and fully comply with the specifications specified herein.

1. Fabric: The fabric shall consist of color coated, class 2b thermally fused and bonded, -gauge core wire, 2-inch diamond mesh typical and 1.75-inch diamond mesh for fabric adjacent to tennis courts. All fabric shall be knuckled at both selvages. Public side of fabric shall be installed in accordance with the Owner's direction. The height of the fabric as shown on details shall be typically one piece unless directed otherwise by Owner. Fabric for bleachers will be as per manufacturer's standard.

(a) *Galvanized Coated Fabric:* All materials used shall conform to the requirements of ASTM A392 Class-2, or ASTM A491. Except aluminum alloy items, shall conform to ASTM-B211, B221 and B429.

2. Framework: Type II, Group IC round steel pipe (electric resistance welded), cold-formed as per ASTM F1043-00 Standard, with minimum yield strength of 50,000 psi. The external zinc coating shall be Type B, zinc with polymer film, 0.90 oz / sq. ft, minimum zinc coating with a chromate conversion and a verifiable polymer film. The internal coating shall be Type B, zinc 0.90 oz./sq.ft. Minimum or type D, zinc pigmented, 81% nominal coating with 0.30 mils minimum thickness. Gate framework joints shall be welded and coated in accordance with Practice A780, employing zinc-rich paint. Refer to plans for framework sizes for batting cage, bullpen, backstop and netting framework.

(a) End, Corner and Pull Post. Galvanized steel, physical pipe dimension and weights as follows:

(1) Up to 12-foot fabric height: 2.875-inch OD pipe, 4.64-lbs. /lin. ft.
(2) **For basketball and tennis courts: 4.000-inch OD pipe, 6.56-lbs. /lin. ft.**
(3) For combo batting cage/bullpen and backstop: 4.000-inch OD pipe, 6.56-lbs. /lin. ft.
(4) Maximum Spacing between all posts is 10'- 0" On Center.

(b) Line Posts. Galvanized steel, physical pipe dimension and weights as follows:

(1) Up to 12-foot fabric height: 2.375-inch OD steel pipe, 3.12-lbs. /lin. ft.
(2**) For basketball and tennis courts: 2.875-inch OD pipe, 4.64-lbs. /lin. ft.**
(3) For combo batting cage/bullpen and backstop: 4.000-inch OD pipe, 6.56-lbs. /lin. ft.
(4) Maximum Spacing between all posts is 10'- 0" On Center.

(c) Gate Posts. Galvanized steel, single gate widths, physical pipe dimension and weights as follows:

(1) Up to 6-feet: 2.875-inch OD pipe, 4.64-lbs./linear ft.
(2) Over 6-feet to 13 feet: 4.0-inch OD pipe, 6.56-lbs./ linear ft.
(3) Gate frames as per ASTM F 900-94.

(d) Rails (Top, middle and bottom rails): Galvanized steel, manufacturer's longest lengths joined by six-inch (6") long sleeves, rail shall run continuously along top of fence. Bottom rail shall be joined at line posts with boulevard clamps. Minimum pipe sizes and weights as follows:

(1) 1.660-inch OD pipe, 1.82-lbs. /lin. ft. minimum.
(2) Top, Bottom, Middle and Intermediate rails are required for fencing adjacent to the sports court footprint.

(e) Couplings: Expansion types, approximately 6-inch long, install one sleeve for each 500-foot run. Standard couplings are installed at each rail end to form one continuous top rail.

(f) Attaching Devices: Provide fittings for attaching top rail securely to each gate corner pull and end post.

(g) Sleeves: Galvanized steel pipe not less than 6 inches long and with inside diameter not less than 1/2-inch greater than outside diameter of the post pipe. Provide steel plate closure welded to bottom of sleeve of width and length not less than 1-inch greater than outside diameter of sleeve.

(h) Post Brace Assembly: Manufacturer's standard adjustable braces at end of gateposts and at both sides of corner and pull posts. Provide horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 3/8-inch diameter galvanized steel truss rods and adjustable tightener.

(i) Post Tops: Galvanized steel, screwed and weather-tight closure cap for each tubular post. Furnish caps with openings to permit passage of top rail.

(j) Tension Bars: Galvanized steel, one-piece lengths equal to full height of fabric, with minimum cross-section of 3/16 inch x 3/4 inch. Provide tension bar for each gate and end post, and two for each corner and pull post. Stretcher Bar Bands will be manufacturer's standard.

(k) Gate Cross-Bracing: 3/8-inch diameter galvanized steel truss rods and adjustable tightener.

(l) Non-Shrink, Non-Metallic Grout: Premixed, factory-packaged, non-corrosive, non-staining, non-gaseous, exterior grout approved by the Engineer.

(m) Single and Double Swinging Gate and Hardware: Swing gates and hardware shall be manufactured to meet the requirements of ASTM F900. Unless indicate otherwise, and to meet ADA requirements, the minimum clear opening for all single gates (as measure with gate perpendicular to framework) shall be 36 inches.

(1) Hinges. Industrial butt hinges, size and material as required for the gate size. Non-lift-off type, offset to permit 180-degree gate opening. Provide one pair of hinges for each leaf, gates eight feet and taller in nominal height shall have three hinges per leaf. Spot-weld to post and paint (non polymer coated), to prevent rotational movement.

(2) Latch (for both single and double gates). Pressed steel, industrial series fulcrum gate latch, straight fork type, provide latch catch for double gates, designed to permit operation from either side of gate, with padlock eye as integral part of latch catch. Clamped and bolted through or welded to frame to prevent rotational movement. Provide two latch and catch for double gates. All gates shall be equipped with one gate stop.

(n) Sleeves if required for fence shall be galvanized steel pipe conforming to ASTM F1043 sizing as required to accommodate posts.

Polymer Coated Framework

Shall meet the above-mentioned specification for materials. The framework shall be subjected to a complete thermal stratification coating process (multi-stage, high-temperature, multi-layer) including, as a minimum, a six-stage pretreatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The material used for the base coat shall be a zinc-rich (gray color) thermosetting epoxy; the minimum thickness of the base coat shall be two (2) mils. The material used for the finish coat shall be a thermosetting "no-mar" TGIC polyester powder; the minimum thickness of the finish coat shall be two (2) mils. The stratification-coated pipe shall demonstrate the ability

to endure a salt-spray resistance test in accordance with ASTM B117 without loss of adhesion for a minimum exposure time of 3,500 hours. Additionally, the coated pipe shall demonstrate the ability to withstand exposure in a weather-ometer apparatus for 1,000 hours without failure in accordance with ASTM D1499 and to show satisfactory adhesion when subjected to the crosshatch test, Method B, in ASTM D3359. The polyester finish coat shall not crack, blister or split under normal use. Painted framework and accessories are not acceptable, welded joints shall be top coated to match frame color. Color of the polymer coated framework and accessories shall be black and in accordance with ASTM F934.

ARTICLE 46 ATTACHMENTS

CON COM Order of Conditions (20 pages)

End of DPW & Parks Special Conditions and Specifications.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
349-1236
MassDEP File #

eDEP Transaction #

Worcester
City/Town

A. General Information

Please note: this form has been modified with added space to accommodate the Registry of Deeds Requirements

1. From: City of Worcester
Conservation Commission

2. This issuance is for (check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

a. First Name | b. Last Name

City of Worcester Department of Public Works & Parks
c. Organization

50 Skyline Drive
d. Mailing Address

Worcester | MA | 01605
e. City/Town | f. State | g. Zip Code

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

4. Property Owner (if different from applicant):

a. First Name | b. Last Name

c. Organization

d. Mailing Address

e. City/Town | f. State | g. Zip Code

5. Project Location:

19 Heard Street
a. Street Address

Worcester
b. City/Town

15-029
c. Assessors Map/Plat Number

-00004
d. Parcel/Lot Number

Latitude and Longitude, if known: d m s
d. Latitude

d m s
e. Longitude

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP: 349-1236
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Worcester
City/Town

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):

Worcester	
a. County	b. Certificate Number (if registered land)
1727, 1889, 2164	262, 275, 374
c. Book	d. Page

7. Dates:

2/1/19	2/21/19	2/22/19
a. Date Notice of Intent Filed	b. Date Public Hearing Closed	c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

Hadwen Park Phase 2	
a. Plan Title	
Beals & Thomas	David LaPointe, RLA
b. Prepared By	c. Signed and Stamped by
2/5/19	1:10
d. Final Revision Date	e. Scale
NOI Application Materials and Plan	2/1/19
f. Additional Plan or Document Title	g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☒ Public Water Supply	b. ☐ Land Containing Shellfish	c. ☒ Prevention of Pollution
d. ☒ Private Water Supply	e. ☒ Fisheries	f. ☒ Protection of Wildlife Habitat
g. ☒ Groundwater Supply	h. ☒ Storm Damage Prevention	i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP: 349-1236
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Worcester
City/Town

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) — a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☐ Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☒ Bordering Vegetated Wetland	250 a. square feet	250 b. square feet	c. square feet	d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. ☒ Bordering Land Subject to Flooding	1000 a. square feet	1000 b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

Massachusetts Department of Environmental Protection
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B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☐ Coastal Beaches	a. square feet	b. square feet	c. nourishment (cu yd)	d. nourishment (cu yd)
14. ☐ Coastal Dunes	a. square feet	b. square feet	c. nourishment (cu yd)	d. nourishment (cu yd)
15. ☐ Coastal Banks	a. linear feet	b. linear feet		
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17. ☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. ☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		
22. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

Massachusetts Department of Environmental Protection
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City/Town

B. Findings (cont.)

* **#23.** If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. ☐ Restoration/Enhancement *:

a. square feet of BVW | b. square feet of salt marsh

24. ☐ Stream Crossing(s):

a. number of new stream crossings | b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. The work is a maintenance dredging project as provided for in the Act; or
   b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
   c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on _____ unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
349-1236
MassDEP File #

eDEP Transaction #
Worcester
City/Town

C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

"Massachusetts Department of Environmental Protection" [or, "MassDEP"]

"File Number 349-1236 "

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

19. The work associated with this Order (the "Project")
    (1) ☐ is subject to the Massachusetts Stormwater Standards
    (2) ☒ is NOT subject to the Massachusetts Stormwater Standards

    If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

    a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

    b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:

    i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;

    ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;

    iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

See Attachment A.

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.

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D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No

2. The City of Worcester Conservation Commission hereby finds (check one that applies):

   a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

   1. Municipal Ordinance or Bylaw — 2. Citation

   Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

   b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

   City of Worcester Wetlands Protection Ordinance & Regulations — 1. Municipal Ordinance or Bylaw

   COW GRO Part 1. Ch. 6. — 2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.

   The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):

   See Attachment A.

ATTACHMENT A

Worcester Conservation Commission

Special Order of Conditions

City of Worcester Wetlands Protection Ordinance & City of Worcester Wetlands Protection Regulations

(City of Worcester Revised Ordinance Part I, Chapter 6)

And

Massachusetts General Laws, Chapter 131, §40 - Massachusetts Wetlands Protection Act

19 Heard Street (AKA Hadwen Park) (CC-2019-008; DEP# 349-1236)

Project Description: Conduct soil borings and associated site work

Waivers Granted: Worcester Wetlands Protection Regulations performance standard 4.2.4 15' buffer

Table of Contents:

Notes:

- **Office of the Commission** is located at the Division of Planning and Regulatory Services (455 Main Street 4th floor, Worcester, MA), which can be contacted by e-mailing planning@worcesterma.gov or calling 508-799-1400 ext. 31440.
- **Asterisked (*) conditions** are standard conditions of approval for all projects.

I. Conditions to Meet Prior to and During Construction

21. Person Responsible for Compliance with the Order of Conditions* – A person shall be designated to be responsible to monitor compliance with the Order of Conditions. Their name and contact information (24/7) shall be provided to the Office of the Commission prior to start of any activity. This person shall conduct:

    a) periodic inspections to assure the adequacy and continued effectiveness of erosion and sediment controls;

    b) inspections of said controls following 0.5-inch or greater rain events, or after a heavy snow melt.

22. Contract* - This Order of Conditions and all approved plans shall be included as part of any contract and subcontract and shall be posted in a prominently displayed location in the supervisory office on site during all phases of construction.

23. Notification* - The applicant shall notify the Office of the Commission a minimum of 48 hours prior to the start of any activity.

24. Wetland Flagging – Prior to construction, wetland flags shall be installed along the wetland boundary, and shall remain in place during and after construction until approved for removal through the issuance of Certificate of Compliance for the entire project, except as required to conduct the soil boring that is within the resource area itself.

II. Conditions to Meet Before the Start of Any Activity

25. Stormwater Pollution Prevention Plan (SWPPP)* – That one (1) copy of the SWPPP submitted to the EPA in compliance with the NPDES permit requirements, if applicable, shall be provided to the Office of the Commission prior to commencement of work.

26. Tree Cutting* – Tree cutting is allowed following installation of erosion and sediment controls; otherwise, it may be allowed, prior to such installation, with the explicit permission of the Commission or its Agents.

27. Trees To Remain* – All trees to remain post construction shall be marked on site as shown on the approved plan so that the Commission or its representative can verify them before any clearing takes place.

28. Pre-Construction Conference* -

    a) The Conservation Commission or its Agents shall conduct a pre-construction conference prior to commencement of activities in each phase of the project. Phasing, if any, shall conform to the approved plans.

    b) The property owner / applicant and any person performing work that is subject to this Order are responsible for understanding and complying with the requirements of this Order, the Wetlands Protection Act, 310 CMR 10.00 and City of Worcester Wetlands Protection Ordinance and Regulations. Said persons shall acknowledge such in writing prior to commencement of activities.

29. Inspections Prior to Site Preparation and Site Work* - Erosion and sediment controls shall be installed and verified, in compliance with final approved plans, by the Commission or its Agents prior to the commencement of any excavation, grubbing and/or stumping of vegetation, grading, construction, or other site preparation.

30. Construction Schedule - Submit a Construction Schedule consistent with Work Sequencing plans provided to the Office of the Commission prior to the start of any activities.

31. Demarcation of Limit of Work – For areas of work within the 100 foot buffer to a bordering vegetated wetland/bank, prior to construction, the contractor shall stake out the 15 foot Worcester Wetlands Protection Ordinance no-disturb buffer or limit of work, whichever is further from the bordering

vegetated wetlands, using an orange snow/construction fence to demarcate the no-disturbance zone during construction in order to prevent encroachments beyond the approved limit of work and prevent resource area impacts. All efforts shall be made to keep work out of the resource area except as required by one soil boring.

III. Stormwater Management System

32. Catch Basins* –

    a) The paved roadways and parking lots shall be bermed and shall be installed with standard City of Worcester catch basins.

    b) Prior to start of activity on site that causes soil erosion and sedimentation, catch basin filter traps shall be installed in the existing and new catch basins.

    c) Catch basins shall be cleaned as warranted during construction to keep them clear of sediment, and minimum twice a year thereafter.

33. Stormwater Management System Maintenance* – The stormwater management system shall be maintained in accordance with the approved design plans and Operation and Maintenance Plan on file with the Office of the Commission. The system shall be maintained in good hydraulic condition (e.g. any accumulated silt/sediment shall be removed; the system shall be kept free of any litter, refuse, or other extraneous matter, etc.). This condition shall extend in perpetuity beyond the issuance of the Certificate of Compliance.

IV. Conditions to Meet During Construction

34. Limit of Work* – No removal, filling, dredging or altering of jurisdictional areas shall take place outside the approved work under this Order of Condition.

35. Work Sequencing* – Activities shall take place in accordance with all phasing and sequencing shown on the plan and/or provided in the application materials on file with the Office of the Commission and shall follow any lot opening restrictions otherwise provided herein.

36. Erosion Stabilization -

    a) *Erosion and Sediment Controls** - All erosion and sediment controls shall be monitored, maintained, and adjusted for the duration of the project to prevent adverse impacts to jurisdictional areas. Additional erosion and sediment controls may be utilized on site as needed.

    b) *Off Site Impacts** - There shall be no off-site erosion, flooding, ponding, or flood-related damage from runoff caused by the project activities.

    c) *Unanticipated Drainage or Erosion** - The applicant shall control any unanticipated drainage and/or erosion conditions that may cause damage to jurisdictional areas and/or abutting or downstream properties. Said control measures shall be implemented immediately upon need. The Office of the Conservation Commission shall be notified if such conditions arise and of the measures utilized.

    d) *Soil Stabilization due to Delay in Work** - If there is an interruption of more than 10, but less than 60 days between completion of grading and revegetation, the applicant shall sow all disturbed areas with annual rye grass to prevent erosion. If soils are to be exposed for longer than 60 days, a temporary cover of rye or other grass should be established following US Soil Conservation Services procedures, as recently amended, to prevent erosion and sedimentation. Once final grading is complete, loaming and seeding of final cover should be completed promptly.

    e) *Grading of Slopes**-

i. >40% Slope – Slopes shall not exceed those specified in the plans approved by the Conservation Commission. Any slope equal to or greater than 40% (1 vertical to 2 1/2 horizontal) shall be stabilized with erosion control matting.

ii. <40% Slope – Final grades of vegetated areas shall not exceed a slope of 1 vertical to 2 1/2 horizontal (40%) and shall be stabilized to prevent erosion, particularly during the construction period.

f) *Stockpile Maintenance** - Any stockpiling of loose materials shall be properly stabilized to prevent erosion into and sedimentation of jurisdictional areas. Preventative controls such as haybales or erosion control matting shall be implemented to prevent such an occurrence.

g) *Stockpile Location* – In no case shall any soil or excavated material be stockpiled within 50 feet of any wetland, floodplain, or storm drain inlet.

h) *Site Stabilization Prior to Winter** - Prior to winter, exposed soils shall be stabilized (e.g. with demonstrated vegetative growth, impermeable barriers, erosion control blankets, etc.).

37. Invasive Insects* -

a) *Plantings* – No trees to be planted shall be species susceptible to the Asian Longhorned Beetle or Emerald Ash Borer.

b) *Wood Removal* – All tree, brush & wood removal shall adhere to the most recently amended requirements set forth by the Massachusetts Department of Conservation & Recreation for any project located in the Asian Longhorned Beetle Quarantine Zone.

38. Invasive Vegetation – The goal of this condition is to keep jurisdictional areas (bufferzone and resource areas) free of all invasive, likely invasive, and potentially invasive species as identified in *The Evaluation of Non-native Plant Species for Invasiveness in Massachusetts*, published by the MA Invasive Plant Advisory Group in April 1, 2005. This condition is intended to prevent the introduction and spread of non-native and invasive species which are known to result in resource area alterations and have impacts on wildlife habitat, etc.

a) *Vegetation removal and introduction* – Any vegetation removal shall be done by hand and no new vegetation shall be introduced to this site.

b) *On-going Management* – Disturbed area shall be allowed to revegetate naturally and inspected at least twice per growing season to ensure no invasive vegetation is present, or until Certificate of Compliance is issued. If invasives are found to be present, applicant shall contact the Commission and remove the plants.

39. Dust Control* - Provisions for dust control shall be provided during all construction and demolition activities. Such provisions shall be conducted in compliance with all City of Worcester Water Use Restrictions, if in effect, during such activities.

40. Dewatering* – If dewatering is required,

a) Notice of such activities shall be given to the Office of the Commission within 24 hours of commencement;

b) There shall be no discharge of untreated dewatered stormwater or groundwater to jurisdictional areas either by direct or indirect discharge to existing drainage systems;

c) Any discharge to surface waters or drainage structures must be visibly free of sediment;

d) To the maximum extent practicable, proposed dewatering activities should be located outside of the 100' buffer. If such activities must be located within the 100' buffer, they shall be monitored at all times when the pumps are running;

e) Dewatering activities shall be confined within an area of secondary containment at all times.

41. Equipment/Material Placement - No equipment or materials are to enter or be placed within the 30' buffer to the wetland at any time.

42. Spill Prevention* -

    a) No fuel, oil, or other pollutants shall be stored in any resource area or the buffer zone thereto, unless specified in this Order;

    b) No refueling shall take place within resource areas or 100-ft to a resource area;

    c) The applicant shall take all necessary precautions to prevent discharge or spillage of fuel, oil or other pollutants onto any part of the site;

    d) A spill kit shall be present on site at all times.

V. Conditions to Meet at Completion of Project

43. Site Stabilization* - All disturbed areas shall be properly stabilized with well-established perennial vegetation or other approved methods before the project is considered complete.

44. Erosion and Sediment Controls* - Erosion and sediment controls shall not be removed from the site until all disturbed areas have been stabilized with final vegetative cover and approval has been received from the Commission or its Agents to do so. The controls must then be removed within two weeks of receipt of that certification.

45. Certificate of Compliance* - Upon completion of the project, the applicant shall request in writing a Certificate of Compliance from the Commission. If the project has been completed in accordance with plans stamped by a registered professional engineer, architect, landscape architect, or land surveyor, certification must include a written statement by such professional certifying the same.

    a) If the project required compliance with the Massachusetts Stormwater Standards and/or work was conducted within Riverfront Area or Bordering Land Subject to Flooding, a certified as-built plan-of-land shall be provided showing final grades, resource areas, and all constructed improvements;

    b) If permanent markers were required, the certified as-built plan-of-land shall depict their location.

VI. General Conditions

46. Change in Ownership* - If a change in ownership takes place while this Order is still in effect, it is the responsibility of the new owner to notify the Commission of the change and to provide the name of the person responsible for compliance with the Order.

47. Conservation Agent's Power to Act* - With respect to all conditions, except _____, the Conservation Commission designates the Conservation Agent, as its Agent with full powers to act on its behalf in administering and enforcing this Order, unless the Agent determines approval from the Commission is appropriate.

48. Right to Inspect* - A member of the Conservation Commission or its Agent may enter and inspect the property and the activity that are the subjects of this Order at all reasonable times, with or without probable cause or prior notice, and until a Certificate of Compliance is issued, for the purpose of evaluating compliance with this Order (and other applicable laws and regulations).

49. Changes to the Plan or Errors & Omissions* -

    (a) If any plan, calculation, or other data presented to the Office of the Commission is in error or have omissions, and are deemed significant by the Commissioners or their Agents, all work will stop at the discretion of the Commission, until the discrepancies have been rectified to the Commission's satisfaction.

(b) The applicant must notify the Commission in writing of any changes in the plans or implementation of the proposed activity where mandated by any local, state, or federal agencies having jurisdiction over the proposed activity. If, in the opinion of the Commission, any changes in the plans or implementation of the proposed activity so require, then the Commission may modify, amend or rescind this Order in a way consistent with:

- M.G.L. Chapter 131, Section 40,
- 310 CMR 10.00, *Wetlands Protection*,
- the City of Worcester's *Wetlands Protection Ordinance*, and
- the Commission's *Wetlands Protection Regulations*

If any provisions of any conditions, or application thereof is held to be invalid, such invalidity shall not affect any other provisions of this Order. If the Commission deems that a proposed change is major or substantial, a new hearing may be required.

50. Liability* - The applicant shall indemnify and save harmless the Commonwealth, the City of Worcester, the Conservation Commission, and its Agents against all sites, claims or liabilities of every name and nature arising at any time out of or in consequence of the acts of the Commission or its Agents in the performance of the work covered by this Order and/or failure to comply with the terms and conditions or this Order whether by itself or its employees or subcontractors.

CC-2019-008
19 Heard St
(Hadmen Park)

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
349-1236
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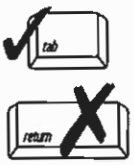
eDEP Transaction #

Worcester
City/Town

E. Signatures

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

2/22/19
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

3
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy must be mailed, hand delivered or filed electronically at the same time with the appropriate MassDEP Regional Office.

Signatures:

☒ by hand delivery on
2/22/19
Date

☐ by certified mail, return receipt requested, on
Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

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G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

Project Location | MassDEP File Number

Has been recorded at the Registry of Deeds of:

County | Book | Page

for: Property Owner

and has been noted in the chain of title of the affected property in:

Book | Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

CC-2019-008

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

Provided by DEP

A. Request Information

1. Location of Project

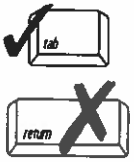
a. Street Address

b. City/Town, Zip

c. Check number

d. Fee amount

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

4. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

☐ Superseding Order of Conditions – Fee: $120.00 (single family house projects) or $245 (all other projects)

☐ Superseding Determination of Applicability – Fee: $120

☐ Superseding Order of Resource Area Delineation – Fee: $120

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

DEP File Number:

Provided by DEP

B. Instructions (cont.)

Send this form and check or money order, payable to the *Commonwealth of Massachusetts,* to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/).

4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

TECHNICAL SPECIFICATIONS SITEWORK CONSTRUCTION

Hadwen Park Boardwalk Renovations
19 Heard Street
Worcester, Massachusetts 01605

Prepared for:

The City of Worcester
Department of Public Works and Parks
50 Officer Manny Familia Way
Worcester, Massachusetts 01605

Prepared by:

Beals and Thomas, Inc.
144 Turnpike Road
Southborough, MA 01772-2104

Issue Date: 04-2023

SITEWORK CONSTRUCTION

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 Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The Work of this Section Includes: General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary controls, utilities, support facilities, temporary site fencing, and, if applicable, temporary erosion and sedimentation controls if not specified in Section 311000 "Site Clearing".

1.3 DEFINITIONS

A. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line.

B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.

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

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data:

1. General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction

1.6 INFORMATIONAL SUBMITTALS

A. 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 video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.7 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Erection of sheds or structures.
4. Impoundment of water.
5. Excavation or other digging unless otherwise indicated.
6. 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.

D. Take precautions to protect plants from airborne contaminants, such as paint or fireproofing overspray.

PART 2 - PRODUCTS

2.1 MATERIALS

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

1. Type: Ground or shredded bark.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural.

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

1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch-diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch-OD line posts, and 2-7/8-inch-OD corner and pull posts**;** with 1-5/8-inch-OD top

and bottom rails; with tie wires, hog ring ties, and other accessories for a complete fence system.

a. Height: 72 inches.

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.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree 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.

3.3 TREE PROTECTION

A. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 4-inch uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within 6 inches of tree trunks.
2. Install temporary root-protection matting over mulch to the extent indicated.

B. Trunk Protection: Protect the trunk of each tree to remain as follows:

1. Install 2-by-4-inch wood planks around trunk at maximum 3 inches apart. Minimum three planks per tree. Band together with no less than three steel bands stapled to the planks to hold them securely in place.

a. Height: 48 inches

3.4 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 areas 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. Chain-Link Fencing: Install to comply with ASTM F567 and with manufacturer's written instructions.

B. Maintain protection zones free of weeds and trash.

C. Maintain hydration of plants to assure plant survival.

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

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.

3.5 EXCAVATION

A. Trenching within Protection Zones: Where trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, 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. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

3.6 ROOT PRUNING

A. Prune tree roots that are affected by temporary and permanent construction. Prune roots as follows:

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 covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible.

B. Root Pruning at Edge of Protection Zone: Prune tree roots 12 inches inside of the protection zone by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.7 REPAIR AND REPLACEMENT

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

3.8 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. Due to Asian long-horned beetle restrictions, all businesses must be certified to perform work that would result in the movement or transport of wood materials in the regulated area.

END OF SECTION 015639

SECTION 024120 - SELECTIVE SITE DEMOLITION

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. Demolition and removal of selected site elements.
   2. Salvage of existing items to be reused or recycled.

B. Related Requirements:

   1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
   2. Section 015639 "Temporary Tree and Plant Protection" for temporary protection of existing trees and plants that are affected by selective site demolition.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective site demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective site demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Site Demolition Activities: Indicate the following:

1. Detailed sequence of selective site demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Coordination of Owner's continuing occupancy of portions of site and of Owner's partial occupancy of completed Work.

C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

D. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.

E. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective site demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of site immediately adjacent to selective site demolition area. Conduct selective site demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Landscape Architect of discrepancies between existing conditions and Drawings before proceeding with selective site demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective site demolition operations.

1. Maintain fire-protection facilities in service during selective site demolition operations.

1.9 COORDINATION

A. Arrange selective site demolition schedule so as not to interfere with Owner's operations.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective site demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective site demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Verify that hazardous materials have been remediated before proceeding with selective site demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.

1. Comply with requirements specified in Section 013233 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged.
3. Before selective site demolition or removal of existing elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

2.2 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective site demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective site demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect work that is to remain or that is exposed during selective site demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective site demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

2.3 SELECTIVE SITE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective site demolition systematically, from higher to lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least <**Insert number**> hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective site demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
10. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."

B. Site Access and Temporary Controls: Conduct selective site demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective site demolition. When permitted by Architect, items may be removed to a

suitable, protected storage location during selective site demolition[**and cleaned**] and reinstalled in their original locations after selective site demolition operations are complete.

2.4 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."

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. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

2.5 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective site demolition operations began.

2.6 SELECTIVE SITE DEMOLITION SCHEDULE

A. Remove: Damaged lumber of boardwalk indicated to be replaced.

B. Remove and Salvage: Wood decking of portions of boardwalk being replaced.

C. Existing to Remain: Undamaged portions of boardwalk indicated on Drawings.

END OF SECTION 024120

SECTION 311000 - SITE CLEARING

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. Order of Conditions issued by the Worcester Conservation Commission for the Project.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Removing above- and below-grade site improvements.
4. Temporary erosion and sedimentation control.

B. Construction runoff or dewatering effluent shall not be discharged directly or tributary to stormwater management infiltration systems without the specific approval of the Owner or Engineer. Approval will require effluent water quality testing.

C. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary erosion- and sedimentation-control measures.

1.3 DEFINITIONS

A. 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.

B. 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.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.

D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches in diameter; and free of weeds, roots, toxic materials, or other non-soil materials.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings and according to requirements in Section 015639 "Temporary Tree and Plant Protection.".

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

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

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

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

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

B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.7 FIELD CONDITIONS

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

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where directed.

C. Utility Locator Service: Notify Dig Safe System for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Do not direct vehicle or equipment exhaust towards protection zones.

F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

G. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

PART 2 - PRODUCTS

2.1 STRAW WATTLE / FILTER SOCK

A. Sediment Wattle / Filter Sock filled with compost or straw as shown on the plans shall be manufactured by Earth Saver Erosion Control Products, Filtrex International, LLC, Agresource or approved equal.

B. Hardwood Stakes: 1-inch by 1-inch by 3 feet kiln dried hardwood stakes.

2.2 FILTER BAGS FOR CATCH BASINS

A. Non-woven polypropylene filter bag manufactured specifically for controlling sediment flow into catch basins.

1. Ultra-DrainGuard® Catch Basin Insert.
2. Siltsack® Hi-Flow or equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

C. Protect existing site improvements to remain from damage during construction.

1. Do not cut, remove, destroy or trim trees or other vegetation outside the designated areas without approval of the Owner.

2. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. As construction progresses and seasonal conditions dictate, more erosion control facilities may be required. Address new conditions that may be created and provide additional facilities over the above minimum requirements as may be required.

C. As a minimum, the following shall apply:

1. Trees may be cut whenever desired, but brush and stumps shall not be removed until 1 week prior the start of construction in that area. The existing ground surface shall be disturbed as little as possible prior to the start of construction.
2. Provide erosion control barriers as shown on the Drawings or as otherwise required to reduce the sediment content of the water. Other methods which reduce the sediment content to an equal or greater degree may be used as approved by the Architect.
3. Ensure that all runoff leaving the site flows to water courses in such a manner to prevent erosion.
4. Loam and seed or mulch disturbed areas as soon as practicable but not contrary to the requirements of other Sections.

D. Catch Basin Protection

1. Filter Bags

a. Install in accordance with manufacturer’s recommendations.
b. Remove accumulated silt periodically as necessary to maintain effectiveness.
c. Dispose of accumulated silt off-site, or on-site as approved by the Architect.

E. Straw Wattle/Filter Sock

1. Install as shown on Drawings to catch silt.
2. Place straw wattle on ground surface and stake in place as shown on Drawings.
3. Remove accumulated silt and replace filter sock periodically as necessary to maintain effectiveness.
4. Dispose of accumulated silt off-site, or on-site as approved by the City.

F. Existing Drainage Facilities

1. Clean existing storm sewers, culverts, or other drainage facilities which become partially or totally blocked due to siltation from Contractor's operations. Make any necessary arrangements with the jurisdictional agency for the cleaning of the facility.

G. Temporary Drainage Diversion

1. Divert the surface runoff water around the site as may be required.
2. Restore drainage conditions to those existing prior to construction unless otherwise shown on the Drawings.

H. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

I. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

J. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 SITE IMPROVEMENTS

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

3.5 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Burning tree, shrub, and other vegetation waste or other waste and debris is prohibited.

C. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

HELICAL PILE FOUNDATIONS

1. Description

The Contractor shall be responsible for designing and furnishing all work and materials for installation of helical piles (i.e. helical piles). Helical pile work includes but is not limited to the following:

- Furnish all labor, equipment, materials and incidentals required to design, deliver to the site, and install helical piles as shown on the Drawings and as specified herein. The helical piles shall be designed to provide the allowable capacities specified herein.

- Provide all equipment necessary for the installation of the helical piles at the locations indicated on the Drawings. Each helical pile shall be installed to the minimum length determined by the Contractor using installation torque indicative of the design allowable capacities.

- Provide equipment and materials for the protection of existing utilities, vehicles, pedestrians, and other facilities located within the work area.

- Install helical piles through whatever material is encountered to the required depth to achieve design capacity.

- Helical piles shall be cut-off, as needed, at the elevations required to enable connection of bracket assemblies to the boardwalk decking as shown on the Drawings.

- Provide qualified personnel for design and onsite installation, inspection and record keeping as specified herein.

~~1.1. Related Work~~

~~Additional related items specified elsewhere include:~~

~~BOARDWALK WITH RAILS~~

1.2. Referenced Codes and Standards

Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title, or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation. In case of conflict, the particular requirements of this specification shall prevail. The latest publication as of the issue of this specification shall govern, unless indicated otherwise.

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

ASTM A29/A29M Steel Bars, Carbon and Alloy, Hot-Wrought and Cold Finished.

ASTM A36/A36M Structural Steel.

ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

ASTM A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware.

ASTM A252 Welded and Seamless Steel Pipe Piles.

ASTM A775 Electrostatic Epoxy Coating

ASTM A193/A193M Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service.

ASTM A320/A320M Alloy-Steel Bolting Materials for Low Temperature Service.

ASTM A325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

ASTM A500 Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A513 Standard Specification for Electric Resistance Welded Carbon and Alloy Steel Mechanical Tubing.

ASTM A536 Standard Specifications for Ductile Iron Castings

ASTM A572 HSLA Columbium-Vanadium Steels of Structural Quality.

ASTM A618 Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.

ASTM A656 Hot-Rolled Structural Steel, High-Strength Low-Alloy Plate with Improved Formability.

ASTM A958 Standard Specification for Steel Castings, Carbon, and Alloy, with Tensile Requirements, Chemical Requirements Similar to Wrought Grades.

ASTM A1018 Steel, Sheet and Strip, Heavy Thickness Coils, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, Columbium or Vanadium, and High-Strength Low-Alloy with Improved Formability.

ASTM D1143 Method of Testing Piles Under Static Axial Compressive Load.

ASTM D3689 Method of Testing Individual Piles Under Static Axial Tensile Load.

1.2.2. American Welding Society (AWS):

AWS D1.1 Structural Welding Code – Steel.

AWS D1.2 Structural Welding Code – Reinforcing Steel.

1.2.3. American Society of Civil Engineers (ASCE):

ASCE 20-96 Standard Guidelines for the Design and Installation of Pile Foundations.

1.2.4. Deep Foundations Institute (DFI):

Guide to Drafting a Specification for High Capacity Drilled and Grouted Micropiles for Structural Support, 1st Edition, Copyright 2001 by the Deep Foundation Institute (DFI).

1.2.5. Society of Automotive Engineers (SAE):

SAE J429 Mechanical and Material Requirements for Externally Threaded Fasteners.

1.3. Quality Assurance

The Helical Pile Contractor shall not sublet the whole or any part of the contract without the express written permission of the Owner.

- Helical piles and bracket assemblies shall be installed by a specialized helical pile contractor. The Helical Pile Contractor shall have a minimum of 7 years of experience in designing and installing Helical piles of the type specified herein, including experience with similar subsurface materials, groundwater conditions, helical pile sizes and techniques required.

- The Helical Pile Contractor shall be trained and certified by the helical pile manufacturer in the proper methods of design and installation of helical piles. The Contractor shall provide names of on-site personnel materially involved with the work, including those who carry documented certification from the manufacturer. At a minimum, these personnel shall include foreman, machine operator, and project engineer/manager.

- The Contractor shall employ an adequate number of skilled workers who are experienced in the necessary crafts and who are familiar with the specified requirements and methods needed for proper performance of the work of this specification.

- All Helical Piles shall be installed in the presence of a designated representative of the Owner unless said representative informs the Contractor otherwise. The designated representative shall have the right of access to any and all field installation records and test reports.

- Helical Pile components as specified therein shall be manufactured by a facility whose quality systems comply with ISO (International Organization of Standards) 9001 requirements. Certificates of Registration denoting ISO Standards Number shall be presented upon request to the Owner or their representative.

- The Helical Pile Contractor shall employ a professional engineer registered in the Commonwealth of Massachusetts to design the helical piles; monitor, record, and evaluate the torque test results; and certify that each helical pile has achieved the required capacity. The engineer shall have at least five (5) years of experience in helical pile design, installation and pile load test setup, monitoring, and analysis.

1.4. Submittals

Required submittals include Pre-construction Submittals, Post-construction Submittals, and Close-out Submittals.

1.4.1. Pre-Construction Submittals

The Contractor shall prepare and submit to the Engineer, for review and acceptance, working drawings and design calculations for the Helical Piles intended for use at least 14 calendar days prior to planned start of construction. All submittals shall be signed and sealed by a Registered Professional Engineer currently licensed in the Commonwealth of Massachusetts.

Pre-construction Submittals shall include:

- A detailed description of the construction procedures and equipment proposed for installation of the helical piles. Include description of methods to maintain alignment of the piles during installation and the required angle for inclined piles. Procedures shall include a description of mitigating measures to be taken if the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to achieving the minimum overall length required and if the helical pile is refused or deflected by a subsurface obstruction.

- Working drawings indicating:

    - Helical pile number, location and pattern by assigned identification number

    - Helical pile design load

    - Type and size of central steel shaft for helix segments and riser segments, including transition bars

    - Helix configuration (number and diameter of helix plates) on lead segment and extension segment(s), if required

    - Minimum effective installation torque

    - Minimum overall length

    - Inclination of helical pile

    - Cut-off elevation

    - Helical pile bracket assembly to boardwalk deck beam, including thread bars (if used)

- Shop drawings for all helical pile components, including transition adapters, helical segments, riser segments, thread bar adapters, brackets, and bolt connections. Include identification of manufacturer’s catalog numbers.

- Example field log to be used for recording installation details for each helical pile installation.

- Mill test reports for the central steel shaft for the materials delivered to the site. The ultimate strength, yield strength, % elongation, and chemistry composition shall be provided.

- Copies of calibration reports for each torque indicator or torque motor, and all load test equipment to be used on the project. The calibration tests shall have been performed within forty five (45) working days of the date submitted. Helical pile installation and testing shall not proceed until the Engineer has received the calibration reports. These calibration reports shall include, but are not limited to, the following information:

    - Name of project and Contractor

    - Name of testing agency

    - Identification (serial number) of device calibrated

    - Description of calibrated testing equipment

    - Date of calibration

    - Calibration data

- Qualifications of the helical pile contractor and qualifications of the Contractor's Engineer who will design the helical piles and design, monitor, evaluate and prepare report for pile load tests. Qualifications shall satisfy the requirements of Section 1.3 of these specifications.

- ISO9001 certificate for helical pile manufacturer or complete description of product testing and manufacturing quality assurance programs used to assess and maintain product quality.

- Work shall not begin until all the submittals have been received and accepted by the Engineer. The Contractor shall allow the Engineer a reasonable time to review, comment, and return the submittal package after a complete set has been received. All costs associated with incomplete or unacceptable submittals shall be the responsibility of the Contractor.

1.4.2. Post-Installation Submittals

- The Contractor shall provide the Engineer copies of helical pile installation records within 24 hours after each installation is completed. Formal copies shall be submitted on a weekly basis. As a minimum, data shall include:

    - Name of project and Contractor

    - Name of Contractor's supervisor during installation

- Date and time of installation
- Name and model of installation equipment
- Type of torque indicator used
- Location of Helical Pile by assigned identification number
- Actual Helical pile type and configuration – including manufacturer's catalogue numbers for lead section (number and size of helix plates), number and type of extension sections, and associated hardware used to make shaft connections and bracket connections to deck
- Helical pile installation duration and observations
- Total length of installed helical pile
- Cut-off elevation
- Inclination of helical pile
- Installation torque at one-foot intervals for the final 10 feet
- Comments pertaining to interruptions, obstructions, or other relevant information
- Certified load capacities

1.4.3. Closeout Submittals

- Submit Warranty documents as specified herein
- Submit, for Engineer's Acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Engineer may have under Contract Document.

1.5. Design Requirements

Design of the helical piles shall be based on Allowable Stress Design (ASD) and conform to the following minimum design criteria:

- Helical pile manufacturer shall furnish a guarantee for a period of ten (10) years from date of delivery against defects due to manufacturing of helical piles and bracket assemblies. Helical pile manufacturer must carry product liability insurance.
- Helical piles shall be designed to provide minimum allowable design capacities as shown in plans.
- Vertical and inclined helical piles will be located as indicated on the Contract Drawings.

- Piles shall be designed so that the helices derive support entirely in the inorganic soils underlying fill and organic soil strata.

- Minimum factor of safety shall be 2.0. The design loads shall be confirmed with pile load tests as specified herein.

- Design and installation of helical piles shall conform to the manufacturer's recommendations. In the event of a conflict between these specifications and manufacturer's recommendations, the more stringent shall govern.

1.6. Allowable Tolerances

- Centerline of Helical Piles shall not be more than 3 inches from indicated plan location.

- Vertical piles shall be within 2° of plumb.

- Inclined piles shall be within 5° of design alignment.

- Top elevation of Helical Pile shall be within +1 inch to –2 inches of the design vertical elevation.

1.7. Project Conditions

The Contractor shall visit the site to review all details of the work and working conditions, to verify dimensions in the field and to advise the Engineer of any discrepancy before performing any work.

The Contractor shall verify that all helical piles may be installed in accordance with all pertinent codes and regulations regarding such items as underground obstructions, right-of-way limitations, utilities, etc. The Contractor shall consult the Contract Drawings and official records of existing utilities, both surface and subsurface, and their connections to be fully informed on all existing conditions and limitations as they apply to this work. Contractor shall repair or replace any construction induced damage to existing active utilities to the satisfaction of the governing utility owner at the Contractor's expense.

Subsurface explorations (drive sample borings and probe borings) were performed on a wide spacing along the elevated boardwalk alignment. Locations of the borings are shown on the Contract Drawings, and Boring Logs are included in Appendix of the Geotechnical Report. Contractor shall review logs of these explorations and other pertinent data for the site as described in the Geotechnical Report. After obtaining Engineer's permission, take whatever additional explorations deemed necessary at no additional cost to the Owner or Engineer. It should be expected that conditions will vary between the explorations.

The aforementioned data is for general information and is accurate only at the particular locations and time the subsurface explorations were made. It is the Contractor's responsibility to make interpretations and draw conclusions on the character of the materials encountered and the impact on this work based on Contractor's expert knowledge of the area and helical pile installation techniques.

2. Materials

It is the helical pile installation contractor's responsibility to select the appropriate size and type of helical piles and bracket assemblies to support the loads stated in these specifications. These specifications provide minimum requirements to aid the contractor in making appropriate materials selections. The size and number of helical blades must be such that the helical piles achieve the appropriate torque and capacity in the soils at this site. Failure to achieve proper torque and capacity shall result in contractor replacing helical piles as appropriate to support the required loads. All installation procedures, materials, and replacements shall be acceptable to the Engineer.

2.1. Helical Piles

Contractor's design of the helical piles shall conform to the minimum material requirements stated below:

- Central steel shaft consisting of lead helical segments, helical extensions and welded adapter bars used to transition to 3-1/2 inch OD riser pipe: use hot rolled solid steel bars meeting dimensional and workmanship requirements of ASTM A29. The bar shall be at least 1.75 inches square and consist of high strength low alloy, low to medium carbon steel grade with improved strength due to fine grain size and shall have a minimum yield strength of 90 ksi and a torque strength rating of at least 11,000 ft-lb.

- Central steel shaft riser above lead helical segment or helical extension: use 3-1/2 inch OD structural steel pipe, seamless or straight-seam welded, per ASTM A500 or A513. Wall thickness is 0.300 inch (Schedule 80). Pipe shall have minimum yield strength of 50 ksi and a torque strength rating of 13,000 ft-lb.

- Helix bearing plate shall be hot rolled carbon steel sheet, strip or plate formed on matching metal dies to true helical shape and uniform pitch. Bearing plate material shall conform to ASTM A572, A1019, or A656 with minimum yield strength of 50 ksi. Plate thickness is 3/8 inch.

- Bolts used to connect the central steel shaft sections together shall be ¾ inch diameter per ASTM A320 Grade L7 or ASTM A325.

- Coupling shall be formed as an integral part of the helical extension segment and riser segment as hot upset forged sockets.

- Walkway vertical and angled bracket assembly plates shall be rated for the design loads specified herein and the strength of the structure they support. The bracket assembly for vertical helical piles shall be bolted to the riser section to resist tension loading.

- Thread bars shall be used to form the connection between the riser section and angled brackets for inclined helical piles. Bolts for the bracket assembly are specified on the Contract Drawings.

2.2. General

Helical pile shaft connections shall be in-line, straight and rigid and shall have a maximum tolerable slack of 1/16 inch or as otherwise accepted by the Engineer. All helical pile bolts shall be securely snug tightened.

All components of helical piles shall be hot-dipped galvanized in accordance with ASTM A123 and/or A153, as applicable, after fabrication.

The Contractor may be allowed to use materials that with structural capacities greater than or equal to those specified, based solely on the opinion of the Engineer.

Helical piles shall be designed for a Service Life of 50 years.

3. Construction Requirements

Contractor shall be responsible for selecting installation equipment, tooling and procedures for installing helical piles. These specifications provide minimum requirements to aid the contractor in making appropriate selections.

3.1. Installation Equipment and Material Acceptance

Loads specified in Article 1.5 are allowable design loads. A minimum factor of safety of 2.0 shall be used to determine the required ultimate tensile and compressive capacity of the helical piles with regard to their interaction with soil. Helical pile capacity in soil depends on the geometric configuration of the helical blades about the lead section and the subsurface conditions. The torque applied during installation provides an indirect verification of axial capacity. Manufacturer's recommendations should be followed regarding the torque and the tensile/bearing capacity relationship for the particular helical pile selected. The number and size of blades shall be determined by the Contractor so as to achieve the required torque and tensile/bearing capacity for the soil conditions at the site. However, the ratio of design allowable capacity to the total area of the helical blades shall not exceed the allowable subsurface material bearing capacity.

Helical piles shall be advanced into the ground until the required torque is achieved to accommodate the ultimate tensile and bearing capacity plus an additional distance to ensure proper embedment. For the helical piles, the embedment length shall be achieved by continuing advancement while maintaining or exceeding the required torque for the last three (3) feet of penetration.

3.2. Installation Equipment and Material Acceptance

All drive tools and equipment shall comply with the manufacturer's written installation instructions.

All helical pile installation equipment and materials shall be acceptable to the Engineer prior to delivery to the site. Acceptance will be based upon submission of records and data, as discussed in the Specifications. Once accepted, changes in installation equipment and materials will not be permitted without additional review and acceptance, and will be considered only after Contractor has submitted any and all information requested by Engineer.

3.3. Installing Helical Piles

Loads specified in Article 1.5 are allowable design loads. A minimum factor of safety of 2.0 shall be used to determine the required ultimate tensile and compressive capacity of the helical piles with regard to their interaction with soil. Helical pile capacity in soil depends on the geometric configuration of the helical blades about the lead section and the subsurface conditions. The torque applied during installation provides an indirect verification of axial capacity. Manufacturer's recommendations should be followed regarding the torque and the tensile/bearing capacity relationship for the particular helical pile selected. The number and size of blades shall be determined by the Contractor so as to achieve the required torque and tensile/bearing capacity for the soil conditions at the site. However, the ratio of design allowable capacity to the total area of the helical blades shall not exceed the allowable subsurface material bearing capacity.

Helical piles shall be advanced into the ground until the required torque is achieved to accommodate the ultimate tensile and bearing capacity plus an additional distance to ensure proper embedment. For the helical piles, the embedment length shall be achieved by continuing advancement while maintaining or exceeding the required torque for the last three (3) feet of penetration.

3.4. Installation Procedures

- The Helical Pile installation technique shall be such that it is consistent with the geotechnical, logistical, environmental, and load carrying conditions of the project.

- The lead section shall be positioned at the locations shown on the working drawings. Battered Helical Piles can be positioned perpendicular to the ground to assist in initial advancement into the soil before the required batter angle is established. The Helical Pile sections shall be engaged and advanced into the soil in a smooth, continuous manner at a rate of rotation of 5 to 20 RPM's. Extension sections shall be provided to obtain the required minimum overall length and installation torque as shown on the working drawings. Connect sections together using coupling bolt(s) and nut torqued to 40 ft-lb.

- Sufficient down pressure shall be applied to uniformly advance the Helical Pile sections approximately 3 inches per revolution. The rate of rotation and magnitude of down pressure shall be adjusted for different soil conditions and depths.

3.5. Termination Criteria

- The torque as measured during the installation shall not exceed the torsional strength rating of the central steel shaft.

- The minimum installation torque and minimum overall length criteria as shown on the working drawings shall be satisfied prior to terminating the Helical Pile installation.

- If the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to achieving the minimum overall length required, the Contractor shall have the following options:

    - Terminate the installation at the depth obtained subject to the review and acceptance of the Owner, or:

    - Remove the existing Helical Pile and install a new one with fewer and/or smaller diameter helix plates. The new helix configuration shall be subject to review and acceptance of the Owner. If re-installing in the same location, the top-most helix of the new Helical Pile shall be terminated at least (3) three feet beyond the terminating depth of the original Helical Pile.

- If the minimum installation torque as shown on the working drawings is not achieved at the minimum overall length, and there is no maximum length constraint, the Contractor shall have the following options:

    - Install the Helical Pile deeper using additional extension sections, or:

    - Remove the existing Helical Pile and install a new one with additional and/or larger diameter helix plates. The new helix configuration shall be subject to review and acceptance of the Owner. If re-installing in the same location, the top-most helix of the new Helical Pile shall be terminated at least (3) three feet beyond the terminating depth of the original Helical Pile.

    - De-rate the load capacity of the Helical Pile and install additional Helical Pile(s). The de-rated capacity and additional Helical Pile location shall be subject to the review and acceptance of the Owner.

- If the Helical Pile is refused or deflected by a subsurface obstruction, the installation shall be terminated and the pile removed. The obstruction shall be removed, if feasible, and the Helical Pile re-installed. If the obstruction can't be removed, the Helical Pile shall be installed at an adjacent location, subject to review and acceptance of the Owner.

- If the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to proper positioning of the last plain extension section relative to the final elevation, the Contractor may remove the last plain extension and replace it with a shorter length extension. If it is not feasible to remove the last plain extension, the Contractor may cut said extension shaft to the correct elevation. The Contractor shall not reverse (back-out) the Helical Pile to facilitate extension removal.

- The average torque for the last three feet of penetration shall be used as the basis of comparison with the minimum installation torque as shown on the working drawings.

The average torque shall be defined as the average of the last three readings recorded at one-foot intervals.

~~3.6. Static Load Capacity Testing~~

~~Static compression and tension load capacity tests shall be performed on three (3) sacrificial or production test helical piles (at Contractor's option) constructed immediately prior to the start of work on the balance of production piles. Locations of the test helical piles shall be selected by the Engineer. Installation methods, procedures, equipment and overall lengths shall be identical to those proposed for use in installing production helical piles to the extent practical, unless otherwise accepted by the Engineer.~~

~~Each of the test helical piles shall be tested in general conformance with ASTM D1143 for compression load testing and ASTM D3689 for tension testing. The minimum test load shall be two (2) times the design load. Apply test loads and record load-deformation data in accordance with the applicable ASTM standard loading procedures.~~

~~If the load test fails to meet the design requirements, Contractor shall modify the helical pile design and/or installation methods and retest the modified pile at no additional cost to the Owner.~~

~~3.6.1. Load Test Equipment~~

~~The load test equipment shall be capable of increasing or decreasing the applied load incrementally. The incremental control shall allow for small adjustments, which may be necessary to maintain the applied load for a sustained, hold period.~~

~~The reaction system shall be designed so as to have sufficient strength and capacity to distribute the test loads to the ground. It should also be designed to minimize its movement under load and to prevent applying an eccentric load to the helical pile head. The direction of the applied load shall be collinear with the helical pile at all times.~~

~~Dial gauge(s) shall be used to measure helical pile movement. The dial gauge shall have an accuracy of at least +/-0.001-in. and a minimum travel sufficient to measure all helical pile movements without requiring resetting the gauge. The dial gauge shall be positioned so its stem is parallel with the axis of the helical pile. The stem may rest on a smooth plate located at the helical pile head and positioned perpendicular to the axis of the helical pile. The dial gauge shall be supported by a reference apparatus to provide an independent fixed reference point. The reference apparatus shall be independent of the reaction system and shall not be affected by any movement of the reaction system.~~

~~The hydraulic jack shall be positioned at the beginning of the test such that the unloading and repositioning of the jack during the test shall not be required. The jack shall also be positioned co-axial with respect to the helical pile head so as to minimize eccentric loading. The hydraulic jack shall be capable of applying a load not less than two times the proposed design load (DL). The pressure gauge shall be graduated in 100 psi increments or less. The stroke of the jack shall~~

~~not be less than the theoretical elastic shortening of the total helical pile length at the maximum test load.~~

3.7. Non-Conforming Helical piles

Non-conforming helical piles include anchors that are not installed within tolerances as specified in these specifications, are damaged, are not installed to the required torque, or the helical pile is not installed in the specified bearing stratum. To mitigate and/or remedy nonconforming helical piles, the Contractor may be required to provide additional helical piles or supplement helical piles to meet specified requirements at no additional cost to the Owner. Mitigating measures shall be submitted for review and acceptance by the Engineer. Re-use of components of helical piles that had been previously installed and removed shall be at the acceptance by the Engineer.

3.8. Field Modifications

Field welding, if required, shall be in accordance with the "Code for Welding in Building Construction" of the American Welding Society. Welding of galvanized steel can produce toxic gases and should be done in adequate ventilation and with appropriate gas detection, breathing gear, and other safety equipment per OSHA regulations. Modification of manufactured helical pile shaft, helical blades, bracket assemblies, and shaft connections is prohibited and shall not be performed without approval of product manufacturing company and acceptance by the Engineer.

3.9. Quality Assurance Observation

Installation of helical piles shall be observed by the Engineer to verify the length, final installation torque, and load capacity tests. Contractor shall notify Engineer at least 24 hours prior to installation work.

4. Method of Measurement and Basis of Payment

HELICAL PILE FOUNDATIONS shall be measured by the lineal feet of helical piles placed, measured from the bottom of the timber deck beam to the bottom of the pile, complete in place. Payment for materials shown on the plans or specified herein as being part of the HELICAL PILE FOUNDATIONS which may be incidental to their construction shall be included as part of the contract unit bid price. HELICAL PILE FOUNDATIONS will be paid for at the contract unit bid price per lineal foot, which price shall include all labor, materials and incidental costs to complete the work.