OFFICE OF THE PURCHASING AGENT

TOWN OF ARLINGTON
730 Massachusetts Avenue
Arlington, MA 02476

Telephone (781) 316-3003
Fax (781) 316-3019

DATE: June 24, 2022

TO ALL BIDDERS

BID NO. 22-32

SUBJECT: Hurd Field Renovations

ADDENDUM NO. 1

TO WHOM IT MAY CONCERN:

With reference to the bid request relative to the above subject, please note the following:

SEE ATTACHED QUESTIONS & RESPONSES

ADDENDUM MUST BE ACKNOWLEDGED WITH BID SUBMISSION.

All other terms, conditions and specifications remain unchanged.

Very truly yours,

Town of Arlington
Domenic Lanzillotti
Digitally signed by Domenic Lanzillotti
Date: 2022.06.24 16:09:31 -04'00'
Domenic R. Lanzillotti
Purchasing Officer

Stantec

ADDENDUM NO. 1

TOWN OF ARLINGTON
HURD FIELD RENOVATIONS
Bid Documents
June 24, 2022

ISSUED BY: Josh Atkinson
Stantec Planning & Landscape Architecture
Tel: (617) 654-6003
Email: josh.atkinson@stantec.com

Addendum issued to active bidders with documents on record.

The following addendum includes questions submitted in writing by Bidders, and changes based on the Owner and Owner's Consultants review of the documents.

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1. Questions, Clarifications and Interpretations (Questions (if applicable) in *italics*, answers in **bold**)

   1.01. *Maintenance for sod/seed puts us into 2023 for completion. Is owner planning on using field before then? If so they must accept the work and contractor shouldn't be held responsible for any damage do to use. Can this be clarified?*

   The field will be opened Summer 2023.

   1.02. *Can you supply a detail for the electrical concrete pads.*

   The electrical equipment will be in the shed and panelboards will be mounted on plywood backboards provided by contractor.

   1.03. *Can you define limit of new chain link fence fabric work detail 12/L5.2 Not clear on plans the extent of this work.*

   New chain link fence will be at the backstop, team areas, and batting cage. New mesh will only be on the replacing the existing at the southern fence line along the site. There will be no new fence along the eastern, western, or northern part of site.

   1.04. *Please clarify CLF at Bat Tunnel. I could not find a size on the plans or details.*

   Chain link fence at batting cage shall be 4' high.

   1.05. *Detail for infiltration trench does not specify pipe size. Please clarify.*

   4" perforated pipe.

   1.06. *I only saw specifications for one type of sod (Athletic Field Sod) is the sod outside the field the same spec?*

Yes, all sod will be the same. Please note that the sod should be from a farm that is using a native soil mix and not a sand based soil.

1.07. *Specifications call for 2" sand added to stripped topsoil blended and screened to make the rootzone mix. If this does not meet the end specification for rootzone mix and other ingredients need to be added will the contractor be compensated for this?*

If it is not listed in the specification, then the contactor will be compensated.

1.08. *Are we to install any fence guard? Looks like mostly all backstop and 8ft CLF.*

Fence guard shall only be at the batting cage chain link fence.

1.09. *Please provide a basis of bid foundation of the tensioned batting cage.*

Final foundation design shall be supplied by manufactures structural engineer. For bidding purposes, contractor shall assume a 24" x 48" deep concrete foundation with a #4 rebar cage.

1.10. *Please establish a basis of bid for what each contractor should carry for a topsoil strip thickness.*

Contractor shall assume 6" of topsoil average.

1.11. *Please confirm dimensions of the backstop. Plan and detail don't seem to match.*

Backstop shall have center section be approximately 20'-8 1/2" with 3 equally spaced section panels. The wings shall be approximately 29'-11" each and have 4 equally spaced section panels. From there, the fence will drop down to 8' chain link fence connecting from wing to the team areas.

Backstop posts shall be 6 5/8" post and 2" rail.

1.12. *There are discrepancies in the electrical lighting spec, please clarify this will be an LED system.*

This will be an LED system. There have been revisions to specification and it is attached to this document to replace the previous version.

1.13. *Could the bid due date be extended a day or two?*

Yes, revised bid due date below:

Bid Due Date: Sealed bids for Hurd Field Renovations will be received at the Purchasing Department, 730 Massachusetts Avenue, Arlington, MA 02476 until 10:00 AM prevailing time, on <u>Wednesday July 6th, 2022</u> at which time and place said bids will be publicly opened and read aloud.

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2. Attachments:
   Specification section 26 56 68 Exterior Athletic Lighting

Distribution:
   Each Bidder
   Project File

SECTION 26 56 68

EXTERIOR ATHLETIC LIGHTING

265668.1 SPORTS LIGHTING SYSTEM LUMP SUM

PART 1: GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Work covered by this section of the specifications shall conform to the contract documents, engineering plans as well as state and local codes.

B. The purpose of these specifications is to define the lighting system performance and design standards for the Hurd lighting project using an LED Lighting source. The manufacturer / contractor shall supply lighting equipment to meet or exceed the standards set forth in these specifications.

C. The sports lighting will be for the following venues:

1. Softball

D. The primary goals of this sports lighting project are:

1. Guaranteed Light Levels: Selection of appropriate light levels impact the safety of the players and the enjoyment of spectators. Therefore light levels are guaranteed to not drop below specified target values for a period of 10 years.
2. Environmental Light Control: It is the primary goal of this project to minimize spill light to adjoining properties and glare to the players, spectators and neighbors.
3. Control and Monitoring: To allow for optimized use of labor resources and avoid unneeded operation of the facility, customer requires a remote on/off control system for the lighting system. Fields should be proactively monitored to detect luminaire outages over a 10-year life cycle. All communication and monitoring costs for 10-year period shall be included in the bid.

1.03 DEFINITIONS

A. CV: Coefficient of variation; a statistical measure of the weighted average of all relevant illumination values for the playing area, expressed as the ratio of the standard deviation for all illuminance values to the mean illuminance value.

B. Delegated-Design Submittals: Documents, including drawings, calculations, and material and product specifications prepared as a responsibility of Contractor to obtain acceptance by Owner and authorities having jurisdiction.

1. Horizontal Illuminance: Measurement in foot-candles (lux), on a horizontal surface 36 inches (915 mm) above ground, unless otherwise indicated.
2. LLD: Lamp lumen depreciation.
3. LLF: Light loss factor.
4. Luminaire: Complete lighting fixture, including ballast housing if provided.
5. Target Illuminance: Average maintained illuminance level, calculated by multiplying initial illuminance by LLF.
6. UG: Uniformity gradient; the rate of change of illuminance on the playing field, expressed as a ratio between the illuminances of adjacent measuring points on a uniform grid.
7. Vertical Illuminance: Measurement in foot-candles (lux), in two directions on a vertical surface, at an elevation coinciding with plane height of horizontal measurements.

1.04 PERFORMANCE REQUIREMENTS

A. Facility Type: Recreational or social facility.

B. Illumination Criteria: Comply with criteria in IESNA RP-6 for the following:

1. Minimum average maintained illuminance level for each lighted area for each sports venue and for the indicated class of play.
2. CV and maximum-to-minimum uniformity ratios for each lighted area equal to or less than those listed in IESNA RP-6 for the indicated class of play.
3. UG levels within each lighted area and between adjacent lighted areas equal to or less than those listed in IESNA RP-6 for the indicated speed of sport.

C. Illumination Calculations: Computer-analyzed point method complying with IESNA RP-6 to optimize selection, location, and aiming of luminaires.

1. Grid Pattern Dimensions: For playing areas of each sport and areas of concern for spill-light control, correlate and reference calculated parameters to the grid areas and intersection points of the indicated grid pattern.
2. Spill-Light Control: Minimize spill light for each playing area on adjacent and nearby areas.
3. Prevent light trespass on properties near Project as defined by authorities having jurisdiction.
4. Glare Control: Design illumination for each playing area to minimize direct glare in adjacent and nearby areas.
5. Determine LLF according to IESNA RP-6.
6. Luminaire Mounting Height: Comply with recommendations in IESNA RP-6, with consideration for requirements to minimize spill light and glare.

# of Poles	Pole Designation	Pole Height	Existing
2	A1 and A2	60'	YES
2	B1 and B2	60'	Yes
2	C1 and C2	80'	NO

7. Ball Field:

   a. IESNA RP-6, Class of Play: IV.
   b. Illumination Levels and Design Factors: Playing surfaces shall be lit to an average target illumination level and uniformity as specified in the chart below. Lighting calculations shall be developed, and field measurements taken on the grid spacing with the minimum number of grid points specified below. Appropriate light loss factors shall be applied and submitted for the basis of design. Average illumination level shall be measured in accordance with the IESNA LM-5-04 (IESNA Guide for Photometric Measurements of Area and Sports Lighting Installations). Illumination levels shall not to drop below desired target values in accordance to IES RP-6-15, Page 2, Maintained Average Illuminance and shall be guaranteed for the full warranty period.

Area of Lighting	Average Target Illumination Levels	Maximum to Minimum Uniformity Ratio	Grid Points	Grid Spacing
Infield	30FC	2.5:1	25	20' x 20'
Outfield	20FC	3:1	94	20' x 20'
Overall Area	>20fc	8:1	271	20' x 20'

9. Electric Power Distribution Requirements:

   a. Electric Power: 240 V, 1 phase.

   b. Balance load between phases. Install wiring to balance three phases at each support structure.

   c. Include required overcurrent protective devices and individual lighting control for each sports field or venue.

1.05 ENVIRONMENTAL LIGHT CONTROL

A. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but not limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.

B. Spill Light and Glare Control: To minimize impact on adjacent properties, spill light and candela values must not exceed the following levels taken at 3 feet above grade.

150' From The Edge of Field	**Maximum**
Horizontal Footcandles	< .10FC
Vertical Footcandles	< .25 FC
Candela	< 17,000 CD

C. Spill Scans: Spill scans must be submitted indicating the amount of horizontal and vertical footcandles along the specified lines. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights. Illumination level shall be measured in accordance with the IESNA LM-5-04 after 1 hour warm up.

D. The first page of a photometric report for all luminaire types proposed showing horizontal and vertical axial candle power shall be provided to demonstrate the capability of achieving the specified performance. Reports shall be certified by a qualified testing laboratory with a minimum of five years experience or by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. A summary of the horizontal and vertical aiming angles for each luminaire shall be included with the photometric report.

1.06 SUBMITTALS

A. Product Data: For each type of lighting product; include the following:

1. Lamp life, output, and energy-efficiency data. Energy data shall comply with IESNA LM-47.

2. Photometric data based on laboratory tests of each luminaire type, complete with lamps, ballasts, and accessories.

3. Photometric data shall be certified by either a qualified independent testing agency or manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Submittals: The following documents:

1. Drawings and specifications for construction of lighting system.

2. Manufacturer's determination of LLF used in design calculations.

3. Structural analysis data and calculations used for pole selection.

a. Manufacturer Seismic Qualification Certification: Submit certification that sports lighting components and their mounting and anchorage provisions are designed to remain in place without separation of any parts when subjected to the seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems" Include the following:

i. Basis for Certification: Indicate whether withstand certifications are based on actual test of assembled components or on calculation.

b. Manufacturer Wind-Load Strength Certification: Submit certification that selected total support system, including poles, complies with AASHTO LTS-6 for location of Project.

4. Design calculations for the following:

a. Target illuminance.

b. Point calculations of horizontal and vertical illuminance, CV, and UG at minimum grid size and area.

c. Point calculations of horizontal and vertical illuminance in indicated areas of concern for spill light.

d. Calculations of source intensity of luminaires observed at eye level from indicated properties nearby the playing fields.

e. Short-circuit current calculations for rating of panelboards.

f. Total connected and estimated peak-demand electrical load, in kilowatts, of lighting system.

g. Capacity of feeder required to supply the lighting system.

5. Wiring requirements, including required conductors and cables and wiring methods.

C. Manufacturer Certificates: Signed by manufacturers certifying that support structures, including brackets, arms, appurtenances, bases, anchorages, and foundations, comply with requirements.

1. Field quality-control test reports.

2. Operation and Maintenance Data: For sports lighting system components to include in operation, and maintenance manuals.

3. Warranty: Special warranty specified in this Section.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. With a service center capable of providing training, parts, and emergency maintenance repairs.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of luminaires, lamps, and luminaire alignment products and to correct misalignment that occurs subsequent to successful acceptance tests. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, and unauthorized repairs and alterations from special warranty coverage.

1. Luminaire Warranty: Luminaire and luminaire assembly shall be free from defects in materials and workmanship for a period of five years from date of Substantial Completion.

2. Alignment Warranty: Accuracy of alignment of luminaires shall remain within specified illuminance uniformity ratios for a period of five years from date of successful completion of acceptance tests.

a. Realign luminaires that become misaligned during the warranty period.

b. Replace alignment products that fail within the warranty period.

c. Verify successful realignment of luminaires by retesting as specified in Part 3 "Field Quality Control" Article.

PART 2: PRODUCTS

2.01 LUMINAIRES, LAMPS, AND DRIVERS

A. Luminaires: Listed and labeled, by an NRTL acceptable to authorities having jurisdiction, for compliance with UL 1598 for installation in wet locations.

1. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without using tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent their accidental falling during relamping and when secured in operating position. Door shall be removable for cleaning or replacing lens.

2. Exposed Hardware: Stainless-steel latches, fasteners, and hinges.

3. Spill-Light Control Devices: Internal louvers and external baffles furnished by manufacturer and designed for secure attachment to specific luminaire.

B. Ballast/Drivers Mounting: Remote drivers and supporting electrical equipment shall be mounted approximately 10 feet above grade in aluminum enclosures. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure.

C. Manufacturer shall provide surge protection at the pole equal to or greater than 40 kA for each line to ground (Common Mode) as recommended by IEEE C62.41.2_2002

D. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, drivers and other enclosures shall be factory assembled, aimed, wired and tested.

E. Durability: All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed carbon steel shall be hot dip galvanized per ASTM A123. All exposed aluminum shall be powder coated with high performance polyester or anodized. All exterior reflective inserts shall be anodized, coated, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All exposed hardware and fasteners shall be stainless steel of 18-8 grade or better, passivated and coated with aluminum-based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Structural fasteners may be carbon steel and galvanized meeting ASTM A153 and ISO/EN 1461 (for hot dipped galvanizing), or ASTM B695 (for mechanical galvanizing). All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.

F. System Description: New Lighting system (poles C1 and C2 only) shall consist of the following:

1. Galvanized steel poles and cross-arm assembly.
2. Non-approved pole technology:
    a. Square static cast concrete poles will not be accepted.
    b. Direct bury steel poles which utilize the extended portion of the steel shaft for their foundation will not be accepted due to potential for internal and external corrosive reaction to the soils and long term performance concerns.
3. Lighting systems shall use concrete foundations. See Section 2.04 for details.
    a. For a foundation using a pre-stressed concrete base embedded in concrete backfill the concrete shall be air-entrained and have a minimum compressive design strength at 28 days of 3,000 PSI. 3,000 PSI concrete specified for early pole erection, actual required minimum allowable concrete strength is 1,000 PSI. All piers and concrete backfill must bear on and against firm undisturbed soil.
    b. For anchor bolt foundations or foundations using a pre-stressed concrete base in a suspended pier or re-inforced pier design pole erection may occur after 7 days. Or after a concrete sample from the same batch achieves a certain strength.
4. Manufacturer will supply all drivers and supporting electrical equipment for new and existing poles.
    a. Remote drivers and supporting electrical equipment shall be mounted approximately 10 feet above grade in aluminum enclosures. The enclosures shall be touch-safe and include drivers and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Disconnect per circuit for each pole structure will be located in the enclosure. Integral drivers are not allowed.

b. Manufacturer shall provide surge protection at the pole equal to or greater than 40 kA for each line to ground (Common Mode) as recommended by IEEE C62.41.2_2002.

5. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free installation.

6. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment.

7. Control cabinet to provide remote on-off control, monitoring of the lighting system. See Section 2.3 for further details.

8. Contactor cabinet to provide on-off control.

9. Manufacturer shall provide lightning grounding as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.

   a. Integrated grounding via concrete encased electrode grounding system.

   b. If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780.The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.

10. Enhanced corrosion protection package: Due to the potentially corrosive environment for this project, manufacturers must provide documentation that their products meet the following enhanced requirements in addition to the standard durability protection specified above:

    a) Exposed carbon steel horizontal surfaces on the crossarm assembly shall be galvanized to no less than a five (5) mil average thickness.

    b) Exposed die cast aluminum components shall be Type II anodized per MIL-STD-8625 and coated with high performance polyester.

    c) Exposed extruded aluminum components shall be Type II anodized per MIL-STD-8625 and coated with high performance polyester.

G. Safety: All system components shall be UL listed for the appropriate application.

2.02 ELECTRICAL

A. Electric Power Requirements for the Sports Lighting Equipment:
   1. Electric power: 240 Volt, 1 Phase
   2. Maximum total voltage drop: Voltage drop to the disconnect switch located on the poles shall not exceed three (3) percent of the rated voltage.

B. Energy Consumption: The kW consumption for the field lighting system shall be 28kW, or less.

2.03 CONTROL

A. Instant On/Off Capabilities: System shall provide for instant on/off of luminaires.

B. Lighting contactor cabinet(s) constructed of NEMA Type 4 aluminum, designed for easy installation with contactors, labeled to match field diagrams and electrical design. Manual off-on-auto selector switches shall be provided.

C. Dimming: System shall provide for 3-stage dimming (high-medium-low). Dimming with be set via scheduling options (Website, app, phone, fax, email).

D. Remote Lighting Control System: System shall allow owner and users with a security code to schedule on/off system operation via a web site, phone, fax or email up to ten years in advance. Manufacturer shall provide and maintain a two-way TCP/IP communication link. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

The owner may assign various security levels to schedulers by function and/or fields. This function must be flexible to allow a range of privileges such as full scheduling capabilities for all fields to only having permission to execute "early off" commands by phone. Scheduling tool shall be capable of setting curfew limits.

Controller shall accept and store 7-day schedules, be protected against memory loss during power outages, and shall reboot once power is regained and execute any commands that would have occurred during outage.

E. Remote Monitoring System: System shall monitor lighting performance and notify manufacturer if individual luminaire outage is detected so that appropriate maintenance can be scheduled. The controller shall determine switch position (manual or auto) and contactor status (open or closed).

F. Management Tools: Manufacturer shall provide a web-based database and dashboard tool of actual field usage and provide reports by facility and user group. Dashboard shall also show current status of luminaire outages, control operation and service. Mobile application will be provided suitable for IOS, Android and Blackberry devices.

Hours of Usage: Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.

1. Cumulative hours: shall be tracked to show the total hours used by the facility
2. Report hours saved by using early off and push buttons by users.

G. Communication Costs: Manufacturer shall include communication costs for operating the control and monitoring system for a period of 10 years.

H. Communication with luminaire drivers: Control system shall interface with drivers in electrical components enclosures by means of powerline communication.

2.04 SUPPORT STRUCTURES

A. Wind Loads: Wind loads shall be based on the 2015 International Building Code. Wind loads to be calculated using ASCE 7-10, an ultimate design wind speed of 130mph and exposure category C.

B. Support-Structure Wind-Load Strength: Poles and other support structures, brackets, arms, appurtenances, bases, anchorages, and foundations shall comply with AASHTO LTS-6 and shall be certified by manufacturers to withstand steady winds up to 150 mph with a gust factor of 1.3 without permanent deflection or whipping.

C. Support-Structure Seismic Strength: Poles or other support structures, brackets, arms, appurtenances, base, anchorage, and foundation shall be designed to prevent separation of components or fracture of poles, luminaire supports, or pole foundations during a seismic event.

D. Mountings, Fasteners, and Appurtenances:

1. Corrosion resistant, compatible with support components, and shall not cause galvanic action at contact points.

a. Steel Components: Hot-dip galvanized after fabrication, complying with ASTM A 123/A 123M.

b. Mounting Hardware Fasteners: Hot-dip galvanized, complying with ASTM A 153/A 153M.

E. Concrete for Pole Foundations: 3000-psi, 28-day minimum compressive strength. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete." Concrete specified for early pole erection.

1. Manufacturer shall provide lightning grounding as defined by NFPA 780 and be UL Listed per UL 96 and UL 96A.

a. Integrated grounding via concrete encased electrode grounding system.

F. Foundation Design: The foundation design shall be based on soil parameters as outlined in the geotechnical report. Report is conducted by Geotechnical Services Inc. dated November 19, 2021. If no geotechnical report is available, the foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by 2015 IBC Table 1806.2.

G. Foundation Drawings: Project specific foundation drawings stamped by a registered engineer in the state where the project is located are required. The foundation drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole. These drawings must be submitted at time of bid to allow for accurate pricing.

H. If grounding is not integrated into the structure, the manufacturer shall supply grounding electrodes, copper down conductors, and exothermic weld kits. Electrodes and conductors shall be sized as required by NFPA 780.The grounding electrode shall be minimum size of 5/8 inch diameter and 8 feet long, with a minimum of 10 feet embedment. Grounding electrode shall be connected to the structure by a grounding electrode conductor with a minimum size of 2 AWG for poles with 75 feet mounting height or less, and 2/0 AWG for poles with more than 75 feet mounting height.

PART 3: EXECUTION

3.01 SOIL QUALITY CONTROL

A. It shall be the Contractor's responsibility to notify the Owner if soil conditions exist other than those on which the foundation design is based, or if the soil cannot be readily excavated. Contractor may issue a change order request / estimate for the Owner's approval / payment for additional costs associated with:

1. Providing engineered foundation embedment design by a registered engineer in the State of Massachusetts for soils other than specified soil conditions;
2. Additional materials required to achieve alternate foundation;
3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.

3.02 DELIVERY TIMING

A. Delivery Timing Equipment On-Site: The equipment must be on-site 10-12 weeks from receipt of approved submittals and receipt of complete order information.

3.03 INSTALLATION

A. Use web fabric slings (not chain or cable) to raise and set structural members.

B. Install poles and other structural units level, plumb, and square.

C. Except for embedded structural members, grout void between pole base and foundation. Use nonshrinking or expanding concrete grout firmly packed in entire void space. Use a short piece of 1/2-inch- diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.

D. Baffles and Louvers for Spill-Light Correction: Install on luminaires with fasteners provided by manufacturer.

E. Install controls and ballast/driver housings in cabinets mounted on support structure at least 10 feet above finished grade.

3.02 FIELD QUALITY CONTROL

A. Perform the following field quality-control tests, inspections, and analysis according to IESNA RP-6 and IESNA LM-5, where applicable, and prepare test reports:

1. After installing sports lighting system and after electrical circuits have been energized, upon substantial completion of the project and in the presence of the Contractor, Project Engineer, Owner's Representative, and Manufacturer's Representative, illumination measurements shall be taken and verified for compliance with requirements.
2. Playing and Other Designated Areas: Make field measurements at intersections of grids, dimensioned and located as specified in Part 1 "Performance Requirements" Article and as described below.
    a. Ball Field. Measure at least 25 points in field and 70 point outfield.

B. Make field measurements at established test points in areas of concern for spill light and glare.

C. Perform analysis to demonstrate correlation of field measurements with specified illumination quality and quantity values and corresponding computer-generated

values that were submitted with manufacturers documents and submit a report of the analysis.

D. Correction of Illumination Deficiencies for Playing Areas: Make corrections to illumination quality or quantity measured in field quality-control tests that vary from specified illumination criteria by plus or minus 10 percent or more; add or replace luminaires, or change mounting height, revise aiming, or install louvers, shields, or baffles. If luminaires are added or mounting height is changed, revise aiming and recalculate and modify or replace support structures, if indicated. Retest as specified above after repairs, adjustments, or replacements are made. Report results in writing.

E. Field Light Level Accountability

1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period of 10 years. These levels will be specifically stated as "guaranteed" on the illumination summary provided by the manufacturer.

2. The contractor/manufacturer shall be responsible for conducting initial light level testing and an additional inspection of the system, in the presence of the owner, one year from the date of commissioning of the lighting.

3. The contractor/manufacturer will be held responsible for any and all changes needed to bring these fields back to compliance for light levels and uniformities. Contractor/Manufacturer will be held responsible for any damage to the fields during these repairs.

F. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including footcandles and uniformity ratios are not in conformance with the requirements of the performance specifications and submitted information, the Manufacturer shall be required to make adjustments to meet specifications and satisfy Owner.

3.03 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sports lighting. Refer to Division 01 Section "Demonstration and Training."

3.04 WARRANTY AND GUARANTEE

A. 10-Year Warranty: Each manufacturer shall supply a signed warranty covering the entire system for 10 years from the date of shipment. Warranty shall guarantee specified light levels. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term. Warranty does not cover weather conditions events such as lightning or hail damage, improper installation, vandalism or abuse, unauthorized repairs or alterations, or product made by other manufacturers.

B. Maintenance: Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and luminaire outage for 10 years from the date of equipment shipment. Parts and labor shall be covered such that individual luminaire outages will be repaired when the usage of any field is materially impacted. Manufacturer is responsible for removal and replacement of failed

luminaires, including all parts, labor, shipping, and equipment rental associated with maintenance. Owner agrees to check fuses in the event of a luminaire outage.

PART 4: DESIGN APPROVAL

4.01 PRE-BID SUBMITTAL REQUIREMENTS (Non-Musco)

A. Design Approval: The owner / engineer will review pre-bid submittals per section 4.1.B from all the manufacturers to ensure compliance to the specification 10 days prior to bid. If the design meets the design requirements of the specifications, a letter and/or addendum will be issued to the manufacturer indicating approval for the specific design submitted.

B. Approved Product: Musco's Light-Structure System with TLC for LED™ is the approved product. All substitutions must provide a complete submittal package for approval as outlined in Submittal Information at the end of this section at least 10 days prior to bid. Special manufacturing to meet the standards of this specification may be required. An addendum will be issued prior to bid listing any other approved lighting manufacturers and designs.

C. All listed manufacturers not pre-approved shall submit the information at the end of this section at least 10 days prior to bid. An addendum will be issued prior to bid; listing approved lighting manufacturers and the design method to be used.

D. Bidders are required to bid only products that have been approved by this specification or addendum by the owner or owner's representative. Bids received that do not utilize an approved system/design, will be rejected.

E. REQUIRED SUBMITTAL INFORMATION FOR ALL MANUFACTURERS (NOT PRE-APPROVED) 10 DAYS PRIOR TO BID. All items listed below are mandatory, shall comply with the specification and be submitted according to pre-bid submittal requirements. Complete the Yes/No column to indicate compliance (Y) or noncompliance (N) for each item. Submit checklist below with submittal:

Yes/ No	Tab	Item	Description
	A	Letter/ Checklist	Listing of all information being submitted must be included on the table of contents. List the name of the manufacturer's local representative and his/her phone number. Signed submittal checklist to be included.
	B	Equipment Layout	Drawing(s) showing field layouts with pole locations
	C	On Field Lighting Design	Lighting design drawing(s) showing: a. Field Name, date, file number, prepared by b. Outline of field(s) being lighted, as well as pole locations referenced to the center of the field (x & y), Illuminance levels at grid spacing specified c. Pole height, number of fixtures per pole, horizontal and vertical aiming angles, as well as luminaire information including wattage, lumens and optics d. Height of light test meter above field surface. e. Summary table showing the number and spacing of grid points; average, minimum and maximum illuminance levels in foot candles (fc); uniformity including maximum to minimum ratio, coefficient of variance (CV), coefficient of utilization (CU) uniformity gradient; number of luminaries, total kilowatts, average tilt factor; light loss factor.

	D	Off Field Lighting Design	Lighting design drawing showing initial spill light levels along the boundary line (defined on bid drawings) in footcandles. Lighting design showing glare along the boundary line in candela. Light levels shall be taken at 30-foot intervals along the boundary line. Readings shall be taken with the meter orientation at both horizontal and aimed towards the most intense bank of lights.
	E	Photometric Report	Provide first page of photometric report for all luminaire types being proposed showing candela tabulations as defined by IESNA Publication LM-35-02. Photometric data shall be certified by laboratory with current National Voluntary Laboratory Accreditation Program or an independent testing facility with over 5 years experience.
	F	Performance Guarantee	Provide performance guarantee including a written commitment to undertake all corrections required to meet the performance requirements noted in these specifications at no expense to the owner. Light levels must be guaranteed to not fall below target levels for warranty period.
	G	Structural Calculations	Pole structural calculations and foundation design showing foundation shape, depth backfill requirements, rebar and anchor bolts (if required). Pole base reaction forces shall be shown on the foundation drawing along with soil bearing pressures. Design must be stamped by a structural engineer in the state of Massachusetts, if required by owner. (May be supplied upon award).
	H	Control & Monitoring System	Manufacturer of the control and monitoring system shall provide written definition and schematics for automated control system.They will also provide ten (10) references of customers currently using proposed system in the state of Massachusetts.
	J	Warranty	Provide written warranty information including all terms and conditions. Provide ten (10) references of customers currently under specified warranty in the state of Massachusetts.
	K	Project References	Manufacturer to provide a list of ten (10) projects where the technology and specific fixture proposed for this project has been installed in the state of Massachusetts. Reference list will include project name, project city, installation date, and if requested, contact name and contact phone number.
	L	Product Information	Complete bill of material and current brochures/cut sheets for all product being provided.
	M	Delivery	Manufacturer shall supply an expected delivery timeframe from receipt of approved submittals and complete order information.
	N	Non-Compliance	Manufacturer shall list all items that do not comply with the specifications. If in full compliance, tab may be omitted.

PART 5 - COMPENSATION

Item 265668.1 – SPORTS LIGHTING SYSTEM

METHOD OF MEASUREMENT:

The Exterior Athletic Lighting, including Poles, Fixtures, and controls panels, to be paid for under this item shall be a lump sum for and include all required equipment and accessories, installed,

connected, tested, and accepted as a complete ready for operation and accepted as satisfactory by the Engineer.

METHOD OF PAYMENT:

Payment shall be based on the unit price bid for this item. The unit price shall constitute full compensation for complete compliance with requirements of this item, including all labor, equipment, materials, tools, incidental work and construction methods for the completion of Electrical. This work includes, but is not limited to, the scope of work described in Division 26, or as otherwise required by the Owner's Representative.

END OF SECTION