

TOWN OF NORTH HAVEN

Project No. 16-27

**Lighting for Field Three
Gateway
88 Bassett Road
North Haven, CT**

May 2016

FINANCE

INVITATION TO BID
TOWN OF NORTH HAVEN

Sealed bids from qualified contractors to install lighting fixtures and poles for Youth Softball Field #3 at 88 Bassett Road will be received at the Finance Office, Memorial Town Hall, 18 Church Street, North Haven, Connecticut, until May 19, 2016 at 10:00 am, at which time and place they will be opened and publicly read. Specifications may be obtained from the Finance Office. After bids are received the Director of Finance and Administration may analyze whether vendors have submitted comparable bids and meet the requirements called for. In reviewing the bids, the Director of Finance and Administration may consider the past performance, financial responsibility, and sales and service experience of the vendors. The Director of Finance and Administration reserves the right to reject any or all bids, to waive any defects in same, or to choose to make purchases other than strictly in accordance with price considerations, and/or to choose other than the lowest bidder, if it be deemed in the best interest of the Town of North Haven. **Bidders are advised hereby of the existence of an Ordinance concerning Bid Preference for Town-Based Businesses.**

Edward J. Swinkoski, CPA
Director of Finance and Administration

BID Proposal

The undersigned _____, doing business in the City/Town of _____, submits herewith, in conformity with the general terms and conditions and specifications for the Town of North Haven Bid, Project 16- 27 for the following proposal to install lighting at Gateway Field #3, 88 Bassett Road in the Town of North Haven.

GENERAL DESCRIPTION

The Town of North Haven is soliciting bids from qualified Contractors to install lighting, 4 poles and appurtenances for the lighting for the youth softball field.

SCOPE OF WORK

The Scope of Work shall consist of providing total cost of labor, material, equipment and aerial truck to install four (4) poles, underground wiring, controls, panels and install lighting on the poles. It shall be performed in accordance with the attached specifications. The scope of work also includes coordinating with the utility company. The Town will consider equal or higher quality equipment than the equipment specified in the plans and specifications.

COMPLETION OF WORK

The above Scope of Work shall be completed no later than sixty (60) days after the award of the Contract. Extension of work related to changes in the bid shall be agreed upon by the Town of North Haven and the successful Bidder.

GENERAL INSTRUCTIONS TO BIDDERS

All Bid Proposals are to be:

- a. Submitted in duplicate unless otherwise indicated in the Bid Specification.
- b. Submitted using the proposal forms furnished with the Bid.
- c. Submitted in a sealed envelope with the Bidder's name and address in the upper left-hand corner of the envelope.
- d. Made out and signed in the corporate, or other, name of Bidder. In addition, an authorized person must fully and properly execute the bid.

Proposals received later than the time and date specified in the Invitation to Bid will not be considered.

Amendments to, or withdrawal of proposals received later than the time and date set for the bid opening will not be considered.

Bidders or their representatives may be present at the bid opening.

The Town of North Haven may require further information and references on any individual or company placing a bid prior to the awarding of a bid.

The Director of Finance and Administration reserves the right to correct an award erroneously made as a result of a clerical error on the part of the Town of North Haven.

A contract shall not be awarded to any corporation, firm or individual that has an unpaid and overdue debt to the Town of North Haven by nonpayment of taxes, by debt or contract, or who is in the default as surety or otherwise by any obligation to the Town of North Haven.

BIDS MUST BE SUBMITTED ON THIS FORM

BID PRICE

Labor \$ _____

Materials \$ _____

Total Bid Price \$ _____

Bids Submitted By:

Date:

Name of Firm

Telephone # Fax #

Address

Printed Name Title

City, State, Zip

Authorized Signature

NORTH HAVEN YOUTH SOFTBALL LIGHTING PROJECT

NORTH HAVEN, CONNECTICUT 06473

ELECTRICAL DRAWING LIST		
DWG. NO.	REV.	DRAWING TITLE
-	-	COVER PAGE
ES-1	-	ELECTRICAL SPECIFICATIONS
SE-1	-	SOFTBALL FIELD SITE ELECTRICAL PLANS AND NOTES
SE-2	-	SOFTBALL FIELD ELECTRICAL RISER DIAGRAMS AND DETAILS
SE-3	-	SOFTBALL FIELD SPECIFICATIONS
SE-4	-	SOFTBALL FIELD CONTROL SYSTEM SUMMARY
SE-5	-	LIGHTING POINT TO POINT PLANS AND FIXTURE DETAILS

ISSUE DATE: APRIL 27, 2016

CONSULTING ENGINEER:



MUSCO
ENGINEERING
ASSOCIATES

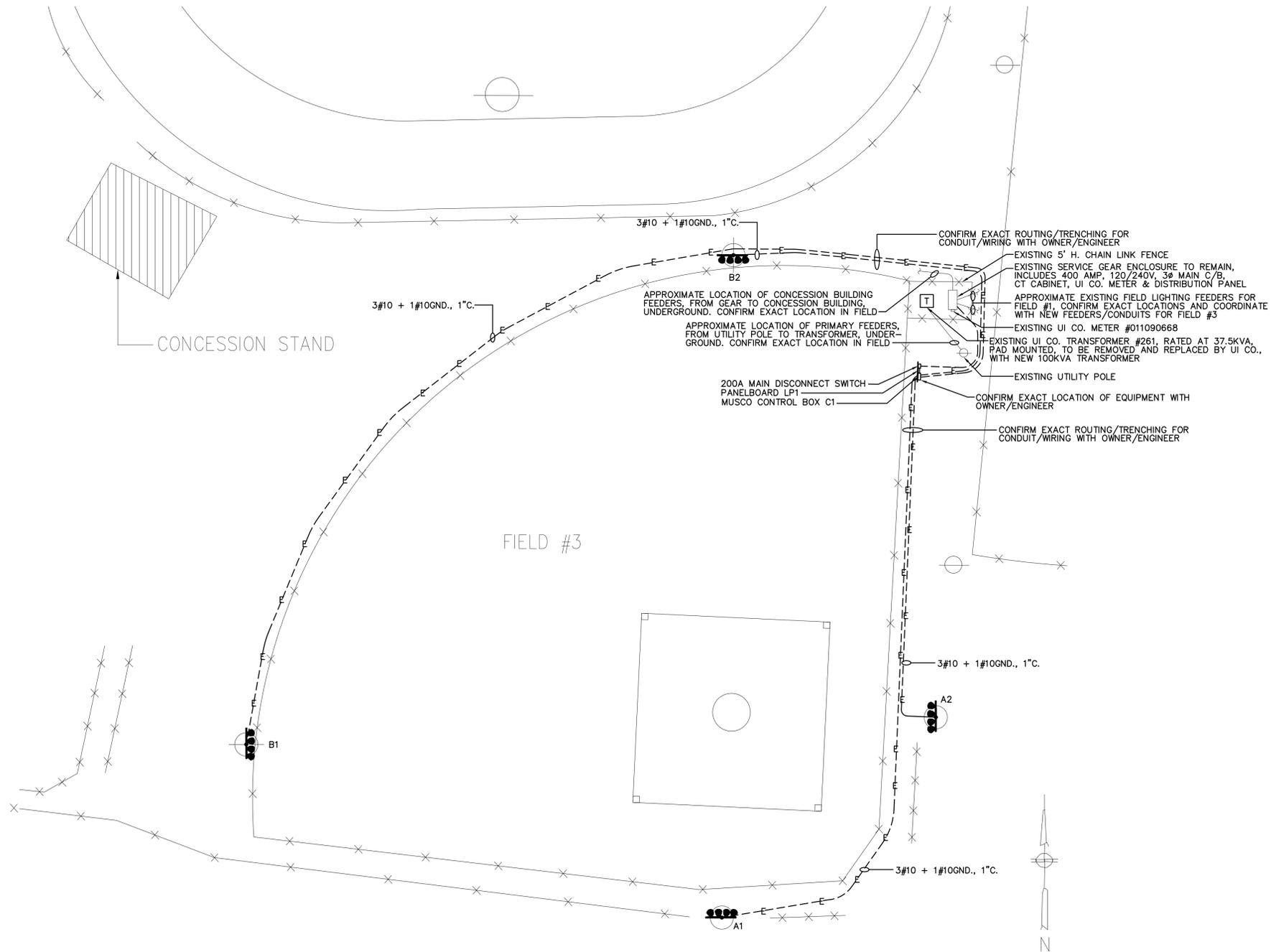
375 Morgan Lane, Unit 307
West Haven, CT 06516
(203) 932-1901 FAX (203) 931-1550
www.muscoengineering.com

SET NUMBER _____

UTILITIES
 ELECTRIC:
 UI COMPANY
 P.O. BOX 1564
 NEW HAVEN, CT 06506
 800-722-5584

PROJECT RESPONSIBILITY SCHEDULE				
TASK	RESPONSIBLE GROUP			
	UI COMPANY	ELECTRICAL CONTRACTOR	ARCHITECT/ENGINEER	
	PROVIDE	INSTALLS	PROVIDE	INSTALLS
PREPARE PRINTS & SCHEDULE				X
PRIMARY SYSTEM:				
PRIMARY CONDUIT		X	X	
TRENCH / BACKFILL		X	X	
1/8" NYLON PULL LINE PRIMARY & SECONDARY		X	X	
CABLE TO TRANSFORMER	X	X		
XFMR PRECAST JUNCTION BOX & PAD FOUNDATIONS		X	X	
TERMINATIONS AT INCOMING, OUTGOING & TRANSFORMER	X	X		
MARKING TAPE (RED) PRIMARY & SECONDARY		X	X	
TRANSFORMER:				
POLE MOUNT TRANSFORMER	X(A)	X(A)		
SECONDARY/SERVICES: XFMR TO MAIN EQUIP.			X	X
REVENUE METER, METERING XFMR & ASSOC. MATERIAL	X	X		
METER ENCLOSURE & ASSOCIATED MATERIAL			X	X
TRENCH / BACKFILL			X	X
CONDUIT			X	X
CONDUIT ELBOWS AT TRANSFORMER & JUNCTION BOX	X	X		
CONDUCTORS (SECONDARY) FROM XFMR TO BLDG.			X	X
CONNECTORS (AT TRANSFORMER)	X	X		
CONNECTORS (AT MAIN SWITCH)			X	X
GROUND SYSTEM PER U.I. STDS.			X	X
ABOVE GRADE JUNCTION BOX	X	X		
AS-BUILT DRAWINGS			X	
INSPECT WORK				X

(A) STANDARD TYPES AND VOLTAGES; LOADING CRITERIA PER UI COMPANY.
 (B) CONTRACTOR SHALL VERIFY RESPONSIBILITY CHART WITH UI CO. PRIOR TO BID AND CARRY ANY CHANGES AND OR CHARGES FROM UI CO. AS PART OF HIS BID.
 (C) ALL UTILITY COMPANY CHARGES ARE PART OF THE CONTRACTORS RESPONSIBILITY.
 (D) GENERAL CONTRACTOR IS RESPONSIBLE FOR ACTUAL COST OF TRENCHING AND BACKFILL, BUT ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SUPERVISION TO INSURE DEPTH, FILL, CONDUITS, WARNING TAPES, ETC.. ARE INSTALLED PER UTILITY CO. REQUIREMENTS.
 (E) COORDINATION, SERVICE LOCATION NEEDS TO BE APPROVED BY UI CO. PRIOR TO INSTALLATION.



ELECTRICAL LOAD CALCULATIONS	
NEW MUSCO LIGHTING FIXTURES/POLES	
LIGHTING POLES A1, A2, B1 & B2	28.8 KW
TOTAL CONNECTED LOAD	28.8 KW
ADDITIONAL 25%	7.2 KW
	36.0 KW
TOTAL ADJUSTED AMPS	86.7 AMPS
@240/120V, 1φ	

SITE ELECTRICAL LEGEND	
SYMBOL	DESCRIPTION
	LIGHT POLE/FIXTURE DESIGNATION
	UNDERGROUND ELECTRICAL CONDUIT/WIRING

SITE ELECTRICAL PLAN - SOFTBALL FIELD LIGHTING
 SCALE: 1" = 30'-0"

- NOTES:**
1. THE LOCATIONS OF THE PROPOSED NEW LIGHT POLES ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD AND WITH MUSCO LIGHTING LLC.
 2. COORDINATE THE FINAL LOCATION OF THE MUSCO LIGHTING CONTROL AND MONITORING CABINETS WITH THE TOWN OF NORTH HAVEN AND ENGINEER IN THE FIELD.
 3. COORDINATE THE ELECTRICAL WORK AND INSTALLATIONS WITH THE CIVIL ENGINEER.
 4. COORDINATE WITH THE TOWN OF NORTH HAVEN FOR ALL TREE AND SHRUB REMOVALS, IF NECESSARY, PATCHING AND REPAIRING OF EXISTING GROUND DUE TO CONSTRUCTION/TRENCHING WORK.
 5. THE CONTRACTOR SHALL REVIEW ALL AREAS OF CONSTRUCTION/INSTALLATIONS FOR LIGHTING POLES AND ELECTRICAL FEEDERS WITH UTILITY COMPANY, CALL BEFORE YOU DIG AS NOTED ON PLANS.
 6. IF ALUMINUM WIRING IS USED, SIZE PER THE 2011 NATIONAL ELECTRICAL CODE.
 7. CONTRACTOR TO PROVIDE SHOP DRAWING OF WIRING CALCULATIONS AND FEEDERS FOR REVIEW.
 8. WIRING FEEDERS FOR POLE LIGHTING SIZED PER VOLTAGE DROP CALCULATIONS BASED ON THE 2011 NEC.
 9. THE CONTRACTOR SHALL COORDINATE THE ROUTING/TRENCHING FOR NEW UNDERGROUND CONDUIT SYSTEMS WITH THE EXISTING UNDERGROUND FEEDERS, INCLUDING PRIMARY FEED TO TRANSFORMER, CONCESSION BUILDING SERVICE AND FIELD #1 LIGHTING POLES.

- SITE NOTES:**
1. ELECTRICAL CONTRACTOR TO BALANCE ALL NEW LUMINAIRE LOADS AS REQUIRED.
 2. ELECTRICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO ENGINEER INDICATING SITE LIGHTING DISTRIBUTION WIRING AND BALANCING.
 3. SITE LIGHTING POLES SHALL BE PROVIDED WITH FUSES FOR 240V FIXTURES.
 4. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORATION OF FINISHED GRADE, (GRASS, CONCRETE, PAVEMENT, ETC.) AND ANY ASSOCIATED AREAS AFFECTED BY HIS WORK, BACK TO ITS ORIGINAL CONDITION.
 5. CONTRACTOR TO COORDINATE ADDITIONAL PULL BOX LOCATIONS WITH LOCAL AUTHORITIES.
 6. ALL EQUIPMENT USED ON THE JOB SHALL BE NEW AND HAVE U.L. LABEL.
 7. EXACT LOCATION OF EQUIPMENT TO BE DETERMINED BY THE ENGINEER.

- GENERAL NOTES:**
1. REFER TO DRAWING EG-1 FOR GENERAL NOTES, ABBREVIATIONS AND DRAWING LIST.
 2. REFER TO DRAWING ES-1 FOR ELECTRICAL SPECIFICATIONS.

GENERAL SCOPE OF WORK NOTES:

1. LIGHTING FIXTURES FOR POLES A1, A2, B1 & B2 SHALL BE NEW.
2. LIGHTING POLES AND CONCRETE BASES FOR A1, A2, B1 & B2 SHALL BE NEW.
3. THE CIRCUIT BREAKERS INSIDE OF ELECTRICAL PANELS SHALL BE NEW AS INDICATED AND WILL BE USED TO FEED THE MUSCO LIGHTING EQUIPMENT.
4. PROVIDE LIGHTING & CONTROLS AS REQUIRED TO MEET MUSCO LIGHTING STANDARDS. MOUNT LIGHTS ON THE NEW LIGHTING POLES AS INDICATED.
5. PROVIDE SHOP DRAWING OF LOCATIONS AND DISTRIBUTION OF LIGHTING FOR REVIEW BY THE ENGINEER & MUSCO LIGHTING REPRESENTATIVE.
6. INSTALLATION OF MUSCO LIGHTING EQUIPMENT AND LIGHTING CONTROLLER EQUIPMENT AS INDICATED ON THE PLANS AND SPECIFICATIONS.
7. PROVIDE COORDINATION WITH MUSCO LIGHTING TO ENSURE A COMPLETE WORKING SYSTEM FOR THE TOWN OF NORTH HAVEN, SHOWN ON THE DRAWINGS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THE PROPOSED NEW LIGHTING POLES ARE SEALED AND WEATHER TIGHT AS REQUIRED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE DELIVERY, LOADING, AND HANDLING OF ALL PROJECT MATERIALS ON SITE.

IMPORTANT! READ!
WARNING AND DISCLAIMER OF LIABILITY
UNDERGROUND UTILITIES

The user of this document is WARNED NOT TO RELY on the purported accuracy, scale, dimension, measurement, descriptions, or elevations of any underground structure.

The underground structures depicted hereon are for informational purposes only. The Preparer of this document DISCLAIMS ANY LIABILITY whatsoever to the user. There are no warranties or representations, expressed or implied and any use other than for informational purposes is excessive, unintended and an impermissible misuse of this document.

Before Excavating Call Toll Free 1-800-922-4455 for Underground Utility Information. Please call 48 hours before service is required on jobsite.

NOTES			
REV.	DATE	BY	REVISION

Lighting Consultant:

Consulting Engineers:

MUSCO ENGINEERING ASSOCIATES
 375 Morgan Lane, Unit 307
 West Haven, CT 06516
 (203) 932-1901 FAX (203) 931-1550
 www.muscoengineering.com

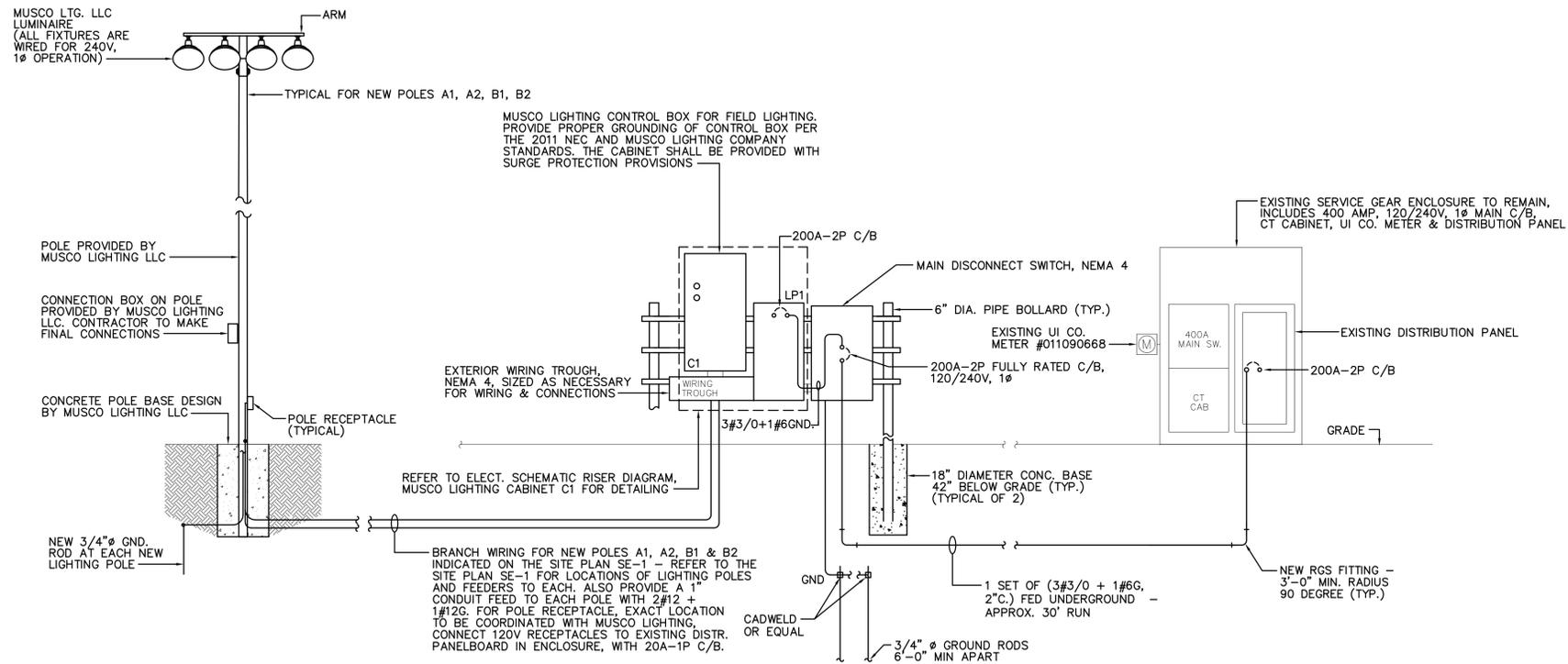
Project:
NORTH HAVEN SOFTBALL FIELD LIGHTING PROJECT
 North Haven, Connecticut 06473

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Date:	04/27/16
Scale:	NONE
Drawn By:	SMK
Checked By:	MVM
Project No.	160309-1
Sheet Title:	SEAL

SOFTBALL FIELD SITE ELECTRICAL PLANS AND NOTES

Dwg. No. **SE-1**

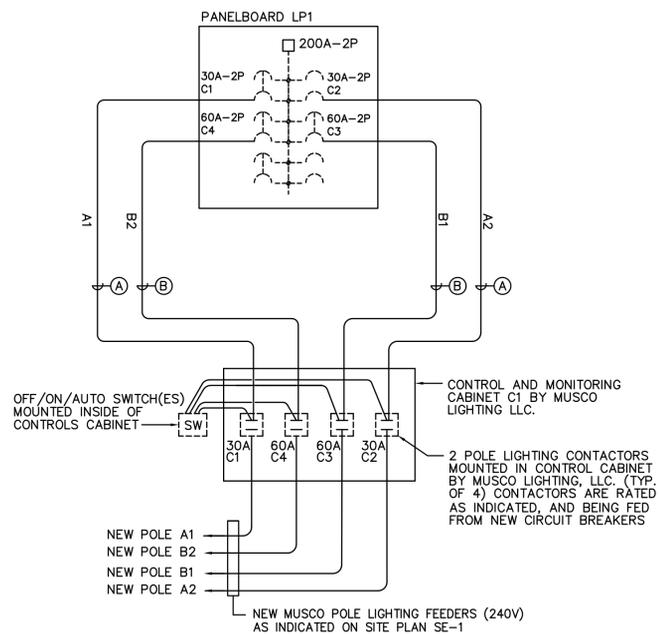


NOTES:

1. ALL EXTERIOR ELECTRICAL EQUIPMENT TO BE WEATHERPROOF, STAINLESS STEEL, NON-RUSTING, NEMA 4.
2. ALL CONDUIT ABOVE GROUND TO BE RIGID GALVANIZED STEEL.
3. PROVIDE STAINLESS STEEL, NON-RUSTING, SUPPORT BRACKETS, ALL HARDWARE TO BE STAINLESS STEEL.
4. CONTRACTOR SHALL USE EXPANSION JOINTS AS NEEDED.
5. COORDINATE WITH UTILITY COMPANY, UI COMPANY FOR ADDITIONAL REQUIREMENTS TO BE PROVIDED.
6. PROVIDE OVERCURRENT PROTECTION FOR EACH POLE LOCATION.
7. COORDINATE THE SHORT CIRCUIT RATING OF NEW EQUIPMENT BEING SUPPLIED WITH EXISTING RATINGS AVAILABLE.
8. COORDINATE WITH RICARDO TRAJANO OF UI COMPANY FOR ANY ADDITIONAL ELECTRICAL REQUIREMENTS, AT 203-926-5227.

PROPOSED ELECTRICAL RISER DIAGRAM

SCALE: NONE



**ELECTRICAL SCHEMATIC RISER DIAGRAM
MUSCO LIGHTING CABINET C1**

SCALE: NONE

WIRING LEGEND:

- (A) 3#10 + 1#10 GND.
- (B) 3#6 + 1#8 GND.

NOTES

REV.	DATE	BY	REVISION

Lighting Consultant:



Consulting Engineers:



375 Morgan Lane, Unit 307
West Haven, CT 06516
(203) 932-1901 FAX (203) 931-1550
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Project:

**NORTH HAVEN
SOFTBALL FIELD
LIGHTING PROJECT**

North Haven, Connecticut 06473

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Date: 04/27/16

Scale: NONE

Drawn By: SMK

Checked By: MVM

Project No. 160309-1

SEAL

Sheet Title: SOFTBALL FIELD ELECTRICAL RISER DIAGRAMS AND DETAILS

Dwg. No.

SE-2

SECTION 26 56 86 – EXTERIOR ATHLETIC LIGHTING

PART 1 – GENERAL

1.1 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 performance and design standards for Seymour High School Softball. 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 Field
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 25 years. Life-cycle Cost. In order to reduce the operating budget, the preferred lighting system shall be energy efficient and cost effective to operate. All maintenance costs shall be eliminated.
2. 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 including all costs to monitor for 25 years. Fields should be proactively monitored to detect fixture outages over a 25-year life cycle. All communication costs shall be included in the bid.

1.2 LIGHTING PERFORMANCE

- A. Performance Requirements: Playing surfaces shall be lit to an average target light level and uniformly 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. Average illumination level shall be measured in accordance with the IESNA LM-5-04. Light levels shall be guaranteed not to drop below desired target values from the first 100 hours of operation for the maximum warranty period of 25 years or 10,000 hours.
B. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, minimum mounting heights shall be 60'. Higher mounting heights may be required based on photometric report and ability to ensure the top of the beam angle is a minimum of 10 degrees below horizontal.
C. Lighting Methodology: There are two methods that will be considered for calculation of the lighting design for this project. The approved Lighting Method #1, automated timed power adjustments, as described in C.1 utilizes methodology that adjusts light levels through a series of programmed adjustments. The alternate Lighting Method #2, straight depreciation, as described in C.2 uses continuous lamp lumen depreciation which is recovered by relamping and cleaning lenses of the luminaires. Both methods must be at or above target light values throughout the 25 years of the contract/warranty provided by the manufacturer. Scans shall reflect initial design lumens, end of life design lumens, recoverable light loss factor (RLLF), and the Coefficient Utilization (CU) for the design. A +/- 10% design/testing allowance is not acceptable.
1. Lighting Method #1: Automated Timed Power Adjustments:
a. The lighting system shall use automated timed power adjustments to achieve a lumen maintenance control strategy as described in the IESNA Lighting Handbook 10th Edition, Lighting Controls Section page 16-8: "Lumen maintenance involves adjusting lamp output over time to maintain constant light output as lamps age and dirt accumulation reduces luminaire output. With lumen maintenance control, either lamps are dimmed when new, or the lamp's current is increased as the system ages".
b. Independent Test Report: If lamp replacement interval is greater than 3,000 hours, manufacturer shall supply an independent test report with applicable recoverable light loss factors. Manufacturers bidding an automated timed power adjustment system must provide

an independent test report certifying the system meets the lumen maintenance control strategy above and verifying the field performance of the system for the duration of the useful life of the lamp based on lamp replacement hours. Report shall be signed by a licensed professional engineer with outdoor lighting experience. If report is not provided at least 10 days prior to bid opening, the manufacturer shall provide the initial and maintained designs called for in this specification under Lighting Method #2: Alternate Manufacturers, section 1.2.C.2.
c. Project References: Manufacturers bidding any form of Automated Timed Power Adjustment light system must provide a minimum of 10 project references within the state of Connecticut that have been completed within the last 12 months utilizing this exact technology. Manufacturer will include project name, project city, and if requested, contact name and contact phone number for each reference.

Table with 5 columns: Area of Lighting, Average Target Light Levels, Maximum to Minimum Uniformity Ratio, Grid Points, Grid Spacing. Rows for Infield and Outfield.

2. Lighting Method #2 – Straight Depreciation

- a. Light Level Requirements: Manufacturer shall provide computer models and guarantee target light levels on the field over 25 years. The specified maximum Recoverable Light Loss Factor of 0.65 and maintenance/group relamping schedule shall be provided in accordance with recommendations in the Leukos Abstract Volume 6, Number 3, January 2010, page 163-201: "Light Loss Factors for Sports Lighting", and presented at the 2009 IESNA Annual Conference.
For Lighting Method #2, scans for both initial and target light levels are required. 1500w Fixture RLLF Requirements
Table with 2 columns: Lamp Replacement Interval (hours), Recoverable Light Loss Factor (RLLF). Row for 3000 hours, 65.
b. Based on anticipated hours of usage (300 hours per year), Option #2 systems would require a minimum of 2 group lamp replacement over the 25 years. Data would reflect the actual RLLF adopted by the designer.

Table with 5 columns: Area of Lighting, Initial Light Levels, Maximum to Minimum Uniformity Ratio, Grid Points, Grid Spacing. Rows for Infield and Outfield.

1.3 ENVIRONMENTAL LIGHT CONTROL

- A. Spill Light Control: All fixtures shall utilize maximum spill light and glare control devices including, but not limited to: internal shields, louvers and external shields.
B. Spill Light Control: In accordance with Seymour, CT lighting ordinance, maximum initial horizontal footcandles at the property line shall not exceed 0.1 footcandles. Footcandle readings shall be taken at 30-foot intervals along the specified line. Illumination level shall be measured in accordance with the IESNA LM-5-04 at the first 100 hours of operation.

PART 2 – PRODUCT

2.1 SPORTS LIGHTING SYSTEM CONSTRUCTION

- A. Manufacturing Requirements: All components shall be designed and manufactured as a system. All luminaires, wire harnesses, ballast and other enclosures shall be factory assembled, aimed, wired and tested.
B. 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/CEN 1461 (for hot dipped galvanizing), or ASTM B305 (for mechanical galvanizing). All wiring shall be enclosed within the crossarms, pole, or electrical components enclosure.
C. System Description: Lighting system shall consist of the following:
1. Galvanized steel poles and crossarm assembly.
2. Non-approved pole technology: Square static cast poles will not be accepted. 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. Pre-stressed concrete base embedded in concrete backfill allowed to cure for 12-24 hours before pole stress is applied. Alternate may be an anchor bolt foundation designed such that the steel pole and any exposed steel portion of the foundation is located a minimum of 18 inches above final grade. The concrete for anchor bolt foundations shall be allowed to cure for a minimum of 28 days before the pole stress is applied.
4. All luminaires shall be constructed with a die-cast aluminum housing or external hail shroud to protect the luminaire reflector system.
5. Manufacturer will remote all ballasts and supporting electrical equipment in aluminum enclosures mounted approximately 10' above grade. The enclosures shall be touch-safe and include ballast, capacitor and fusing with indicator lights on fuses to notify when a fuse is to be replaced for each luminaire. Safety disconnect per circuit for each pole structure will be located in the enclosure. Integral ballast fixtures will not be accepted.
6. Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections for fast, trouble-free maintenance.
7. Controls and Monitoring Cabinet to provide on-off control and monitoring of the lighting system constructed of NEMA Type 4 aluminum. Communication method shall be provided by manufacturer. Cabinet shall contain custom configured controller modules for 30, 60, and 100 amps, labeled to match field diagrams and electrical design. Manual Off-On-Auto selector switches shall be provided.
8. Lighting Protection: Manufacturer shall provide integrated lightning grounding via concrete encased electrode grounding system as defined by NFPA 780 and be UL Listed per UL 96 and UL 95A. 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 not less than 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.
D. Safety: All system components shall be UL listed for the appropriate application.

2.2 ELECTRICAL

- A. Electric Power Requirements for the Sports Lighting Equipment:
1. Electric power: 480 Volt, 3 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 average kW consumption for the field lighting system shall be 25 kW for metal halide fixtures in Lighting Method 1. Lighting Method 2 kW will be defined in Life Cycle calculation chart (1.4) using a RLLF of .65.

- C. Revised Electrical Distribution: Manufacturer shall provide, at their cost, revised electrical distribution plans to include changes to service entrance, panel, and wire sizing if using Lighting Method 2.

2.3 STRUCTURAL PARAMETERS

- A. Mounting Heights: To ensure proper aiming angles for reduced glare and to provide better playability, the minimum pole mounting heights from the playing field surface shall be as noted in Section 1.2.B. Higher mounting heights may be required based on photometric performance of manufacturer's luminaires to meet spill and glare requirements.
B. Support Structure Wind Load Strength: Poles and other support structures, brackets, arms, bases, anchorages and foundations shall be determined based on the IBC Building Code, wind speed of 100 MPH, exposure category C. Luminaire, vior, and crossarm shall withstand 150mph winds and maintain luminaire aiming alignment.
C. Structural Design: The stress analysis and safety factor of the poles shall conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
D. Soil Conditions: The design criteria for these specifications are based on soil design parameters as outlined in the geotechnical report. If a geotechnical report is not provided by the owner, the foundation design shall be based on soils that meet or exceed those of a Class 5 material as defined by IBC.
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 Connecticut.
2. Additional materials required to achieve alternate foundation.
3. Excavation and removal of materials other than normal soils, such as rock, caliche, etc.
E. 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.

2.4 CONTROLS AND MONITORING

- A. 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 manufacturer shall notify the owner of outages within 24 hours, or the next business day. The controller shall determine switch position (Manual or Auto) and contactor status (open or closed).
B. 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.
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.
C. 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 lamp outages, control operation and service scheduling including relamping operations completed and scheduled.
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. Current lamp hours: shall be tracked separately to reflect the amount of hours on the current set of lamps being used, so relamping can be scheduled accurately.
D. Communication Costs: Manufacturer shall include communication costs for operating the controls and monitoring system for a period of 25 years.

PART 3 – EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Delivery Timing Equipment On-Site: The equipment must be on-site 4-6 weeks from receipt of approved submittals and receipt of complete order information.
B. Illumination Measurements: 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. The illumination measurements shall be conducted in accordance with IESNA LM-5-04. For Lighting Method 1, Timed Power Adjustment systems, light levels must be measured and exceed the specified target levels. For Lighting Method 2, light levels must be measured and meet the specified initial light levels.
C. Field Light Level Accountability
1. Light levels are guaranteed not to fall below the target maintained light levels for the entire warranty period of 25 years.
2. The contractor/manufacturer shall be responsible for an additional inspection one year from the date of commissioning of the lighting system and will utilize the owner's light meter in the presence of the owner.
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.
D. Correcting Non-Conformance: If, in the opinion of the Owner or his appointed Representative, the actual performance levels including foot-candles, uniformity ratios, and maximum kilowatt consumptions are not in conformance with the requirements of the performance specifications and submitted information, the manufacturer shall be liable to any or all of the following:
1. Manufacturer shall at his expense provide and install any necessary additional fixtures to meet the minimum lighting standards. The Manufacturer shall also either replace the existing poles to meet the new wind load (EPA) requirements or verify by certification by a licensed structural engineer that the existing poles will withstand the additional wind load.
2. Manufacturer shall minimize the Owner's additional long term fixture maintenance and energy consumption costs created by the additional fixtures by reimbursing the Owner the amount of \$1,000.00 (one thousand dollars) for each additional fixture required.
3. Manufacturer shall remove the entire unacceptable lighting system and install a new lighting system to meet the specifications.

3.2 25 YEAR WARRANTY

- A. Each manufacturer shall supply a signed warranty covering the entire system for 25 years or for the maximum hours of coverage based on the estimated annual usage, whichever occurs first. Warranty shall guarantee that the average light levels will not fall below target levels; lamp replacements; system energy consumption; monitoring, maintenance and control services; spill light control, and structural integrity. Manufacturer shall maintain specifically funded financial reserves to assure fulfillment of the warranty for the full term. Warranty may exclude fuses, storm damage, vandalism, abuse and unauthorized repairs or alterations.
B. Preventative and Spot Maintenance: Manufacturer shall provide all preventative and spot maintenance, including parts and labor for 25 years from the date of equipment shipment. Individual lamp outages shall be repaired when the usage of any field is materially impacted. Owner agrees to check fuses in the event of a luminaire outage.

3.3 PRE-BID SUBMITTAL REQUIREMENTS

- A. Approved Product: Musco's Green Generation Lighting® sports lighting system is the approved "Lighting Method 1" product. All submittal information at the end of this section must be submitted at least 10 days prior to bid for any alternates using Method #1 or any manufacture using Method #2.

- An addendum will be issued prior to bid, listing any approved alternate lighting manufacturers and the design method to be used.
B. Design Approval: The owner / engineer will review pre-bid submittals per section 3.3 A from all the manufacturers to ensure compliance to the specification. 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.
C. 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.

REQUIRED SUBMITTAL INFORMATION ANY ALTERNATE MANUFACTURERS 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

Table with 3 columns: Tab, Item, Description. Rows A through K detailing submittal requirements such as Letter/Checklist, Equipment Layout, On Field Lighting Design, Off Field Lighting Design, Structural Calculations, Control & Monitoring System, Electrical Distribution Plans, Warranty, Independent Testing Report, Project References, and Product Information.

Table with 3 columns: L, M, Description. L: Non-Compliance. M: Life-cycle Cost Calculation. Descriptions of manufacturer responsibilities for non-compliance and life-cycle cost calculations.

The information supplied herein shall be used for the purpose of complying with the specifications for Seymour High School Softball. By signing below I agree that all requirements of the specifications have been met and that the manufacturer will be responsible for any future costs incurred to bring their equipment into compliance for all items not meeting specifications and not listed in the Non-Compliance section.

Manufacturer: _____ Signature: _____

Contact Name: _____ Date: ____/____/____

Lighting Consultant:



Consulting Engineers:



375 Morgan Lane, Unit 307 West Haven, CT 06516 (203) 932-1901 FAX (203) 931-1550 www.muscoengineering.com

Project:

NORTH HAVEN SOFTBALL FIELD LIGHTING PROJECT

North Haven, Connecticut 06473

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Date: 04/27/16

Scale: NONE

Drawn By: SMK

Checked By: MVM

Project No. 160309-1

SEAL

Sheet Title:

SOFTBALL FIELD LIGHTING SPECIFICATIONS

Dwg. No.



Control System Summary

Project Specific Notes:

Project Information

Project #: 133082
 Project Name: North Haven Youth Softball
 Date: 04/12/16
 Project Engineer: J.Brown
 Sales Representative: Mike Mahoney
 Control System Type: Control and Monitoring
 Communication Type: Digital Cellular
 Scan: 133082A
 Document ID: 133082P1V1-0412134119
 Distribution Panel Location or ID:
 Total # of Distribution Panel Locations for Project: 1
 Design Voltage/Hertz/Phase: 240/60/1
 Control Voltage: 120

Equipment Listing

DESCRIPTION	APPROXIMATE SIZE	QTY	SIZE
1. Control and Monitoring Cabinet	24 X 48	2	30 AMP
Total Contactors		2	60 AMP
Total Off/On/Auto Switches		2	

Materials Checklist

Contractor/Customer Supplied:

- A single control circuit must be supplied per distribution panel location. If the control voltage is NOT available, a control transformer is required.
- Electrical distribution panel to provide overcurrent protection for circuits. Thermal/Magnetic circuit breaker sized per full load amps on Circuit Summary by Zone Chart
- Wiring:
 - Dedicated control power circuit
 - Power circuit to and from lighting contactors
 - Harnesses for cabinets at remote locations
 - Means of grounding, including lightning ground protection
- Electrical conduit wireway system
 - Entrance hubs rated NEMA 4: must be die-cast zinc, PVC, or copper-free die-cast aluminum
 - Mounting hardware for cabinets
 - Control circuit lock-on device to prevent unauthorized power interruption to control power
 - Anti-corrosion compound to apply to ends of wire, if necessary

Call Control-Link Central™ operations center at 877/347-3319 to schedule activation of the control system upon completion of the installation. Note: Activation may take up to 1 1/2 hours

IMPORTANT NOTES

- Please confirm that the design voltage listed above is accurate for this facility. Design voltage/phase is defined as the voltage/phase being connected and utilized at each lighting pole's ballast enclosure disconnect. Inaccurate design voltage/phase can result in additional costs and delays. Contact your Musco sales representative to confirm this item.
- In a 3 phase design, all 3 phases are to be run to each pole. When a 3 phase design is used Musco's single phase luminaires come pre-wired to utilize all 3 phases across the entire facility.
- One contactor is required for each pole. When a pole has multiple circuits, one contactor is required for each circuit. All contactors are UL 100% rated for the published continuous load. All contactors are 3 pole.
- If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
- A single control circuit must be supplied per control system.
- Size overcurrent devices using the full load amps column of the Circuit Summary by Zone chart. Minimum power factor is 0.9.

NOTE: Refer to Installation Instructions for more details on equipment information and the installation requirements

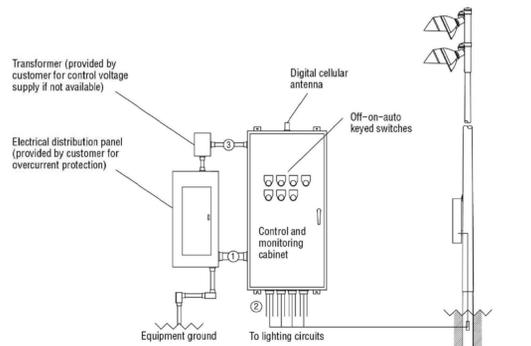
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Form: T-3030-1



Control System Summary

North Haven Youth Softball / 133082 - 133082A
- Page 2 of 4

Control-Link Control and Monitoring System

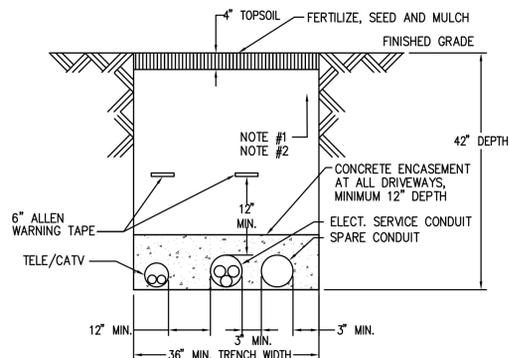


Wire	Description	# of Wires	Typ. Wire Size (AWG)	Max. Wire Length (FT)	Wire from Musco	Notes
1	Line power to contactors, and equipment grounding conductor	Note A	Note B	27	No	A - E
2	Load power to lighting circuits	Note A	Note B	N/A	No	A - D
3	Control power (dedicated, 20A)	3	12	N/A	No	C, D

Notes: A. Voltage and phasing per the notes on cover page.
 B. Calculate per load and voltage drop.
 C. All conduit diameters should be per code.
 D. Refer to control and monitoring system installation instructions for more details on equipment information and the installation requirements.
 E. Contact Musco if maximum wire length from circuit breaker to contactor exceeds value in chart.

IMPORTANT: Control (3) wires must be in separate conduit from line and load power wiring (1, 2).

R60-02-00_C



- NOTES:**
- COMMON FILL/BACKFILL: MINERAL SOIL SUBSTANTIALLY FREE FROM ORGANIC AND UNSUITABLE MATERIALS, AND FREE FROM ROCK OR GRAVEL LARGER THAN 2" IN DIAMETER. PLACE AND COMPACT IN MAX. 8" LAYERS.
 - COMPACTION: AT PAVEMENTS; 95 PERCENT MAXIMUM DENSITY-ASTM D1557, AT LAWN AREAS; 90 PERCENT MAXIMUM DENSITY-ASTM D1557.
 - THE TRENCH DETAIL SHOWS A TYPICAL INSTALLATION FOR CONDUITS IN THE GROUND AND MAY NOT REPRESENT THE ACTUAL NUMBER OF CONDUITS BEING INSTALLED. REFER TO THE SITE ELECTRICAL PLAN FOR COUNTS.

TRENCH DETAIL AT PAVEMENT/GRASS AREAS

SCALE: NONE



Control System Summary

North Haven Youth Softball / 133082 - 133082A
- Page 3 of 4

SWITCHING SCHEDULE

Field/Zone Description	Zones
Softball	1

CONTROL POWER CONSUMPTION	
120V Single Phase	
VA loading of Musco Supplied Equipment	INRUSH: 1568.0 SEALED: 194.8

BALLAST SPECIFICATIONS	VOLTAGE: 240v SINGLE PHASE					
90 Minimum Power Factor						
BALLAST OPERATING VOLTAGE	208	220	240	277	347	380 480
1500 Watt Metal Halide Lamp	8.6	8.3	7.5	6.5	5.1	4.7 3.7
Operating line amperage per fixture - maximum						
1000 Watt Metal Halide Lamp	6.5	6.4	5.8	4.9	4.0	3.6 2.9
Operating line amperage per fixture - maximum						

CIRCUIT SUMMARY BY ZONE						
POLE	CIRCUIT DESCRIPTION	# OF FIXTURES	FULL LOAD AMPS	CONTACTOR SIZE (AMPS)	CONTACTOR ID	ZONE
A1	Softball	3	22.5	30	C1	1
A2	Softball	3	22.5	30	C2	1
B1	Softball	5	37.5	60	C3	1
B2	Softball	5	37.5	60	C4	1



Control System Summary

North Haven Youth Softball / 133082 - 133082A
- Page 4 of 4

PANEL SUMMARY

CABINET #	CONTROL MODULE LOCATION	CONTACTOR ID	CIRCUIT DESCRIPTION	FULL LOAD AMPS	DISTRIBUTION PANEL ID (BY OTHERS)	CIRCUIT BREAKER POSITION (BY OTHERS)
1	1	C1	Pole A1	22.50		
1	1	C2	Pole A2	22.50		
1	1	C3	Pole B1	37.50		
1	1	C4	Pole B2	37.50		

ZONE SCHEDULE

ZONE	SELECTOR SWITCH	ZONE DESCRIPTION	CIRCUIT DESCRIPTION	
			POLE ID	CONTACTOR ID
Zone 1	1	Softball	A1 A2 B1 B2	C1 C2 C3 C4

NOTES

REV.	DATE	BY	REVISION

Lighting Consultant:



Consulting Engineers:



375 Morgan Lane, Unit 307
West Haven, CT 06516
(203) 932-1901 FAX (203) 931-1550
www.muscoengineering.com

Project:

NORTH HAVEN SOFTBALL FIELD LIGHTING PROJECT

North Haven, Connecticut 06473

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Date: 04/27/16

Scale: NONE

Drawn By: SMK

Checked By: MVM

Project No. 160309-1

SEAL

Sheet Title:
SOFTBALL FIELD CONTROL SYSTEM SUMMARY

Dwg. No.

SE-4

Pole / Fixture Summary

Pole ID	Pole Height	Fixture Qty	Lamp Type	Group
A1	60'	3	1500W MZ	A
A2	60'	3	1500W MZ	A
B1	60'	5	1500W MZ	A
B2	60'	5	1500W MZ	A
4		16		

Calculation Grid Summary

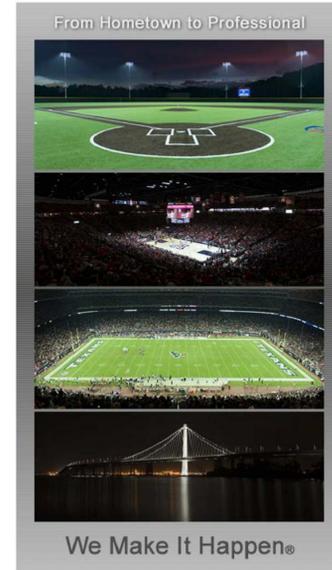
Grid Name	Calculation Metric	Type	Light Level			Uniformity		Groups	Fixture Qty
			Ave	Min	Max	Max/Min	Ave/Min		
Softball (Infield)	Horizontal Illuminance	Constant	50.7	38	62	1.63	1.33	A	16
Softball (Outfield)	Horizontal Illuminance	Constant	39.1	26	47	1.84	1.52	A	16

Group Summary

Group	Description	Load	Fixture Qty
A	Field 3	25.02 kW	16



MY PROJECT
 Name: North Haven Youth Softball
 Location: North Haven, CT



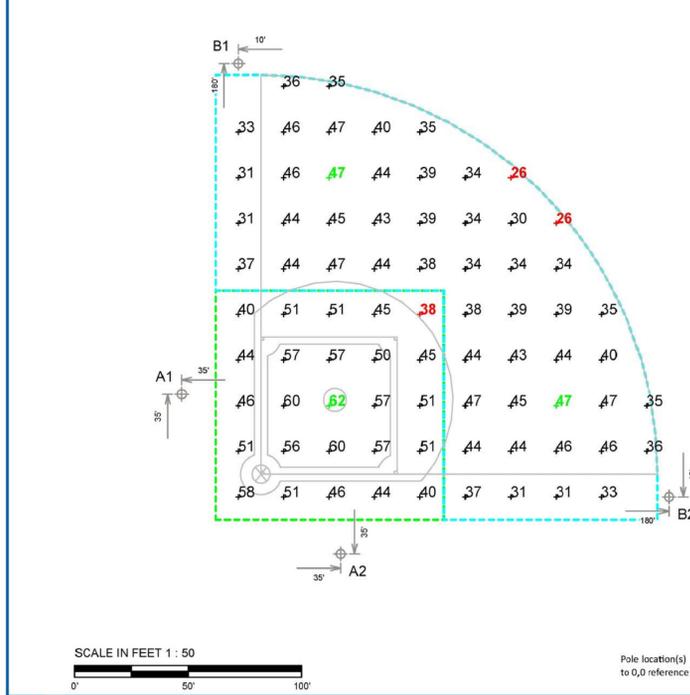
ENGINEERED DESIGN
 By: Jared Brown
 File # / Date: 133082B 25-Apr-16

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PROJECT SUMMARY

EQUIPMENT LIST FOR AREAS SHOWN

QTY	LOCATION	Pole		Luminaires			QTY / POLE	THIS GRID	OTHER GRIDS
		SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY			
2	A1-A2	60'	-	60'	1500W MZ	3	3	0	
2	B1-B2	60'	-	60'	1500W MZ	5	5	0	
4				TOTALS		16	16	0	




MY PROJECT
 Name: North Haven Youth Softball
 Location: North Haven, CT

GRID SUMMARY

Name: Softball
 Size: 175'/175'/175' - basepath 60'
 Spacing: 20.0' x 20.0'
 Height: 3.0' above grade

CONSTANT ILLUMINATION

SUMMARY	HORIZONTAL FOOTCANDLES	
	Infield	Outfield
Guaranteed Average:	50	30
Scan Average:	50.73	39.10
Maximum:	62	47
Minimum:	38	26
Avg / Min:	1.33	1.52
Guaranteed Max / Min:	2	2.5
Max / Min:	1.63	1.84
UG (adjacent pts):	1.30	1.49
CU:	0.62	
No. of Points:	25	52

LUMINAIRE INFORMATION
 Luminaire Type: Green Generation
 Design Usage Hours: 5,000 hours
 Design Lumens: 134,000
 Avg Lamp Tilt Factor: 1.000
 No. of Luminaires: 16
 Avg KW: 25.02 (27.2 max)

Guaranteed Performance: The Guaranteed Average CONSTANT ILLUMINATION described above is guaranteed for the design usage hours of the system.
Field Measurements: Illumination measured in accordance with IESNA RP-6-15 and CIBSE LG4. Individual values may vary. See the Warranty document for details.
Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.
Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

ENGINEERED DESIGN
 By: Jared Brown
 File # / Date: 133082B 25-Apr-16

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ILLUMINATION SUMMARY

NOTES

REV.	DATE	BY	REVISION

Lighting Consultant:



Consulting Engineers:



MUSCO ENGINEERING ASSOCIATES
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 www.muscoengineering.com

Project:

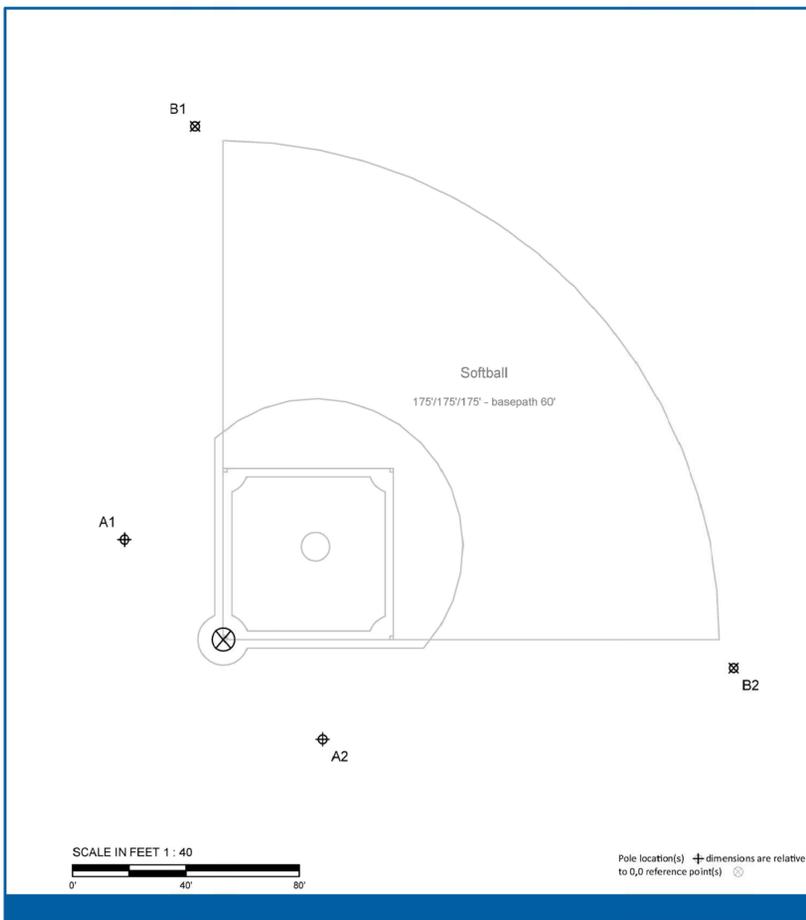
**NORTH HAVEN
 SOFTBALL FIELD
 LIGHTING PROJECT**
 North Haven, Connecticut 06473

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Sheet Title:	SEAL

LIGHTING POINT TO POINT
 PLANS AND FIXTURE DETAILS

Dwg. No.
SE-5




MY PROJECT
 Name: North Haven Youth Softball
 Location: North Haven, CT

EQUIPMENT LAYOUT
 Includes:
 - Softball
Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.
Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN

QTY	LOCATION	Pole		Luminaires			QTY / POLE
		SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY	
2	A1-A2	60'	-	60'	1500W MZ	3	
2	B1-B2	60'	-	60'	1500W MZ	5	
4				TOTALS		16	

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (90 min power factor)	Line Amperage Per Luminaire (max draw)					
	208 (60)	220 (60)	240 (60)	277 (60)	347 (60)	480 (60)
1500 watt MZ	8.6	8.3	7.5	6.5	5.1	4.7

ENGINEERED DESIGN
 By: Jared Brown
 File # / Date: 133082B 25-Apr-16

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EQUIPMENT LAYOUT