Clay County
Sports Lighting Bid Sheet

Manufacturer:	Musco Sports Lighting, LLC
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Terms: 25% of contract price required with order. Balance due Net 30 days upon delivery.

All prices include delivery within Clay County, FL to the job site and are for the lighting system materials only.

Section 1: Musco Sports Lighting Price List

A. Light-Structure System with Total Light Control – TLC for LED™ & SportsCluster System with Total Light Control – TLC for LED™

Light-Structure System with Total Light Control – TLC for LED™

The Light-Structure System with TLC for LED™ includes precast concrete bases, galvanized steel poles, electrical components enclosures, wire harnesses, luminaire assemblies and the Control-Link® control system. Installation is NOT included in pricing for the items listed in Section 1.

WARRANTY AND GUARANTEE: Musco will provide all materials and labor to maintain operation of the Light-Structure System™ to original design criteria for 25 years. Musco products and services are guaranteed to perform for the customer as detailed in the "Musco Constant 25™" document.

SportsCluster System with Total Light Control – TLC for LED™

SportsCluster System with TLC for LED™ includes electrical components enclosures, wire harnesses, luminaire assemblies and the Control-Link® control system (does not include poles or concrete bases). Utilizes existing sports lighting poles that are compatible with Musco's lighting system. Installation is NOT included in the pricing for the items listed in Section 1.

WARRANTY AND GUARANTEE: Musco will provide all materials and labor to maintain operation of the SportsCluster System® to original design criteria for 10 years. Musco products and services are guaranteed to perform for the customer as detailed in the "Musco Constant 10™" document. The Constant 10™ warranty is contingent upon a site inspection.

FOOTBALL							
Field Size	Pole Setback	Average Maintained Light Level	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials	Average Maintained Light Level	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials
360' x 160'	50'	30 FC	**$153,700**	**$106,100**	50 FC	**$234,100**	**$156,100**
360' x 160'	70'	30 FC	**$187,300**	**$118,400**	50 FC	**$266,700**	**$168,600**
360' x 160'	100'	30 FC	**$219,100**	**$118,700**	50 FC	**$319,500**	**$169,100**
360' x 160'	120'	30 FC	**$237,800**	**$130,700**	50 FC	**$331,800**	**$187,300**

SOCCER							
Field Size	Pole Setback	Average Maintained Light Level	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials	Average Maintained Light Level	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials
330x200	30’	30 FC	**$166,000**	**$90,600**	50 FC	**$211,800**	**$131,700**
330x200	50’	30 FC	**$166,000**	**$90,600**	50 FC	**$224,400**	**$143,800**
360x210	30’	30 FC	**$166,000**	**$90,600**	50 FC	**$224,400**	**$143,800**
360x210	50’	30 FC	**$177,700**	**$106,100**	50 FC	**$257,100**	**$164,500**
360x225	30’	30 FC	**$178,600**	**$105,800**	50 FC	**$237,000**	**$155,800**
360x225	50’	30 FC	**$179,500**	**$106,100**	50 FC	**$271,500**	**$170,200**

BASEBALL / SOFTBALL							
Field Type	Field Size	Average Maintained Light Level (Inf/Out)	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials	Average Maintained Light Level (Inf/Out)	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials
60’ Base Path	200’	30/20	**$107,400**	**$70,300**	50/30	**$119,200**	**$78,800**
60’ Base Path	225’	30/20	**$122,100**	**$80,500**	50/30	**$134,000**	**$92,100**
60’ Base Path	250'	30/20	**$127,200**	**$80,500**	50/30	**$149,900**	**$103,000**
60’ Base Path	300’	30/20	**$173,300**	**$119,800**	50/30	**$205,500**	**$134,300**
60’ Base Path	320'	30/20	**$177,800**	**$124,300**	50/30	**$226,800**	**$146,300**
90' Base Path	300'	50/30	**$235,900**	**$147,400**	70/50	**$325,300**	**$208,500**
90' Base Path	325'	50/30	**$259,600**	**$159,500**	70/50	**$352,300**	**$228,400**
90' Base Path	350'	50/30	**$273,100**	**$172,500**	70/50	**$403,800**	**$252,600**
90’ Base Path	320/360/320	50/30	**$261,200**	**$160,800**	70/50	**$413,600**	**$255,300**
90’ Base Path	330/400/330	50/30	**$366,200**	**$212,600**	70/50	**$464,600**	**$281,000**

TENNIS			
# Courts	Average Maintained Light Level	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials
2	50 FC	**$69,500**	**$49,400**
3	50 FC	**$81,500**	**$52,600**
4	50 FC	**$81,500**	**$52,600**
6	50 FC	**$162,400**	**$102,300**

BASKETBALL - OUTDOOR			
# Courts	Average Maintained Light Level	Price for Light-Structure TLC-LED Materials	Price for SportsCluster TLC-LED Materials
2	50 FC	**$61,100**	**$44,300**

BASKETBALL - INDOOR - 10 year parts and labor warranty		
# Courts	Light Level	Price for LED Material
1 – 94 x 50	80 FC	**$25,500**

PARKING LOT - 10 year parts and labor warranty			
Parking Lot Area	Light Level	Price for LED Material	Price per Square foot (to be used for alternate size areas)
320’ x 200’	1 FC	**$28,600**	**$0.45/sq ft**

1. **This pricing is based on using Musco’s typical 5700 Kelvin/75 CRI LED fixtures. Other Kelvin & CRI LED fixtures combinations are available and may add additional cost.**

2. **Sales tax, labor and unloading of the equipment is not included as part of the materials only pricing.**

3. **Pricing is based on shipment of entire project together to one location. Delivery time of order, submittal approval, and confirmation of order details include voltage and phase and pole location is approximately 4-6 weeks standard shipping.**

4. **This pricing list should not be considered complete and exhaustive due to the nature of each project being unique, design-build situation.**

B. Light-Structure System with Green Generation Lighting® metal halide technology or SportsCluster System with Green Generation Lighting® metal halide technology will be reduced by 15% on all field pricing packages on the bid form. This pricing list should not be considered complete and exhaustive due to the nature of each project being unique, design-build situation.

Example: 360’ x 160’ Football @ 30FC (50’ SETBACK)

$153,700 X 15% = $23,055

$153,700 - $23,055

Metal Halide Technology Pricing = $130,645

Includes precast concrete bases, galvanized steel poles, electrical components enclosures, wire harnesses, luminaire assemblies and the Control-Link® control system (does not include poles with SportsCluster®). Installation is NOT included in pricing for the items listed in Section 1.

WARRANTY AND GUARANTEE: Musco will provide all materials and labor to maintain operation of its lighting system to original design criteria for 10 years. Musco products and services are guaranteed to perform for the customer as detailed in the “Musco Constant 10™” document.

C. Other Applications

	Cost	
Additional lighting for security, special areas, replacing fixtures on existing poles or non-standard field sizes & pole locations	**$3,500**	per fixture
Control-Link Retrofit Unit (material only)	**$8,500**	per unit
Control-Link Unit - Multiple Services (material only)	**$6,700**	per unit
Osprey Nest Platforms	**$3,000**	each
LED Security Fixture (mount on Musco pole)	**$1,850**	per fixture
LED Pathway Lighting (8' pole with LED fixture)	**$2,300**	per pole
LED Area Lighting (15' pole with LED fixture)	**$2,250**	per pole
LED Roadway Lighting (30' pole with LED fixture)	**$2,550**	per pole
LED Bollard Lighting (42" pole with LED fixture)	**$800**	per pole
LED Controls - Multi-Watt™ Dimming	**$100**	per fixture

Section II: Adders/Deducts

A. The above pricing is based upon 2017 FBC 130 mph. For each 10 mph increase in wind zone, the equipment price will increase by 10%.

B. Florida Building Code, 2017 edition with supplement for public schools will add up to 20% to the price of the job plus any applicable wind zone increase adder.

C. Broward County and Miami-Dade County for HVHZ wind zone will add up to 30% to the price of the job plus any applicable wind zone increase adder.

Section III: Labor Costs

A. Pole Installation **(price per pole)**

Pole Height	LS 2017 FBC 130 mph Price
40’	**$4,150**
50’	**$4,300**
60’	**$4,600**
70’	**$5,300**
80’	**$6,450**
90’	**$9,500**
100’	**$11,550**
110’	**$17,550**

B. Sub-Standard Soil Conditions – The above installation price is based upon 130 mph wind zone installed in standard class 5 soils. If sub-standard soil conditions exist, it is understood that there may be additional costs associated with a sub-standard soil installation and owner agrees to accept the additional costs. In addition, because wind zones sometimes impact pole size, there maybe a 10% increase in the cost of installation for each 10 mph increase in wind zone.

C.	Removal of Existing Concrete Poles	**$4,600 per pole**
D.	Removal of Existing Wooden Poles	**$1,750 per pole**
E.	Straighten Concrete Pole	**$5,000 per pole**
F.	Patching Concrete Poles	**$4,000 per pole**
G.	Installation of Fixtures on Existing Poles	**$6,000 per pole**
H.	Installation of Control Link Retrofit	**$2,100 per unit**
I.	Retrofit existing Gymnasium with LED	**$750 per fixture**
J.	Site Inspection – Evaluation of existing lighting system	**$2,500 per project**

Section IV: Electrical Costs

A. Service Options

Option A – 200 Amp Service (Section IV, A, 1)	**$12,650 each**
Option B – 400 Amp Service (Section IV, A, 1)	**$21,300 each**
Option C – 600 Amp Service (Section IV, A, 1)	**$25,900 each**
Option D – 800 Amp Service (Section IV, A, 1)	**$28,750 each**

B. Conduit, Pull Boxes and Conductors

1. Wiring from Panel to Contactors

a. Connect wiring from one 3 pole, 30 amp breaker to one 3 pole, 30 amp contactor using 3-#6 conductors, max distance of 10 feet	**$100 each**
b. Connect wiring from one 3 pole, 60 amp breaker to one 3 pole, 60 amp contactor using 3-#4 conductors, max distance of 10 feet	**$110 each**

2. Wiring from Contactors to Poles

a. 2” PVC with (4) #1 THWN conductors	**$30 per foot**
b. 2 ½” PVC with (4) 3/0	**$40 per foot**
c. 4” PVC with (4) 500mcm	**$75 per foot**
d. (2) 4” PVC with (4) 300mcm	**$98 per foot**

3. Copper Conductors in PVC Conduit pricing is based on a 500' maximum distance. After 500’ the per foot pricing will apply.

a	10	$5,400	**$5.75 per foot**
b	8	$5,980	**$8.65 per foot**
c	6	$6,210	**$11.50 per foot**

4. Pull Boxes

a. Brooks 38T pull box with 8” x 8” x 6” PVC box Inside	**$600 each**
b. Connect 4-#1 conductors from pull box to sports lighting pole, maximum distance of 10 feet	**$150 each**

C. Installation of Contactor Cabinets

a. 48” Cabinet	**$5,750 each**
b. 72” Cabinet	**$8,650 each**

D. Lightning Protection

1. Surge Arrestor – protection at remote electrical enclosure	**$1,200 each**
2. Surge Arrestor – protection on line side of panel	**$9,900 each**

E. Pole Grounding

1. Provide and install ground rods for poles 70’ and below	**$900 per pole**
2. Provide and install ground rods for poles 80’ and above	**$1,450 per pole**

Section V: Engineered Plans

A.	Electrical Engineering Drawings, sealed by P.E.	
	1. Adder for 200 amp service	**$6,600 each**
	2. Adder for 400 amp service	**$9,950 each**
	3. Adder for 600 amp service	**$15,900 each**
	4. Adder for 800 amp service	**$26,450 each**
B.	Structural Engineering Drawings, sealed by P.E.	
	1. Foundation and pole plans based on assumed soils	**$1,350 per project**
	2. Foundation and pole plans based on geotech report	**$3,300 per project**
C.	Geotech report	**$9,950 per project**
D.	Bonding (over $200,000)	**$2,000 per $100,000**
E.	Site survey	**$3,300 per project**
F.	Project management	**$6,000 per project**

Section VI: Yearly Adjustments

A. During the term of this contract, technical upgrades to these products may periodically become available and will be offered to the owner. Musco reserves the right to supply upgraded technology provided it maintains the on-field lighting performance, enhances benefits and does not exceed the prices bid when applied to a project application under the current contract provisions.

B. During the term of this contract, new products with improved technology may become available. Musco reserves the right whether or not to offer new products to the owner based upon the application, and it is at the owner's discretion whether or not to accept the associated, increased costs of the new, improved technology.

C. During the term of this contract if the State of Florida Building Code and/or wind speeds change, Musco reserves the right to adjust pricing accordingly.

Sports Lighting - Base Bid Lighting Equipment

Part 1 - General

A. The project goals are as follows:
   i. Guaranteed Light Levels: Selection of the appropriate light levels impact the safety of the players and the enjoyment of the spectators. Therefore, the lighting system shall be designed such that the light levels are guaranteed for a period of 25 years.
   ii. Environmental Light Control: Provide precise control of light with engineered optic systems using proven spill and glare reduction methods. The lighting system manufacturer needs to certify that they can meet or exceed all local lighting ordinances, offsite spill and glare. If required, lighting manufacturer will meet Dark Skies requirements.
   iii. Life Cycle Costs: 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, and the field(s) should be proactively monitored to detect luminaire outages over a 25 year life cycle.
   iv. Control and Monitoring: To allow for optimized use of labor resources and to avoid unneeded operation of the facility, a remote on/off control system for the lighting system must be included. Fields should be proactively monitored to detect luminaire outages over the 25 years life cycle. All communication and monitoring costs for the 25 year period shall be included in the pricing.

B. Sports Lighting Performance
   i. The performance shall be in accordance with IES RP-6-15, which states maintained average illuminance levels are values which the lighting system should always meet or exceed.
   ii. Uniformity Ratio: The foot-candle level shall have a uniformity ratio of maximum ratio of not greater than the following:
      1. The manufacturer guarantees field light intensity levels and uniformity ratios at initial start-up and throughout rated life of the lamp and shall be maintained for the warranty life.

Football – Standard 4-pole layout, with poles located at the 15-yard line, with setbacks from the field as given below with two options for lighting levels to be submitted and quoted.

Field Size	Pole Setback	Target Light Level	Target Light Level	Uniformity	Grid Spacing	Grid Points
360’ x 160’	50’	30 fc	50 fc	2.0:1	30’ x 30’	72
360’ x 160’	70’	30 fc	50 fc	2.0:1	30’ x 30’	72
360’ x 160’	100’	30 fc	50 fc	2.0:1	30’ x 30’	72
360’ x 160’	120’	30 fc	50 fc	2.0:1	30’ x 30’	72

Soccer – Standard 4-pole layout, with poles located at a distance of (Field Length/2 – ((Field Width/2 + Setback) x 0.40)) from the centerline, with setbacks from the field as given above. Standard outside pole locations for a 6-pole design would be located at a distance of (Field Length/2 – ((Field Width/2 + Setback) x 0.28) from the center line, with setbacks from the field as given below with two options for lighting levels to be submitted and quoted.

Field Size	Pole Setback	Target Light Level	Target Light Level	Uniformity	Grid Spacing	Grid Points
330x200	30’	30 fc	50 fc	2.0:1	30’ x 30’	77
330x200	50’	30 fc	50 fc	2.0:1	30’ x 30’	77
360x210	30’	30 fc	50 fc	2.0:1	30’ x 30’	84
360x210	50’	30 fc	50 fc	2.0:1	30’ x 30’	84
360x225	30’	30 fc	50 fc	2.0:1	30’ x 30’	96
360x225	50’	30 fc	50 fc	2.0:1	30’ x 30’	96

Baseball (90’ Base path) – Standard A-pole locations are 50’ down line and 55’ off for a 90’ base path. Standard B-pole locations are 5’ beyond the outfield radius and 10’ off the foul line for a 4-pole design and are at a distance down the line of ((Foul Line + (Base path* 0.5))/2) and 40’ off the foul line for a 6-pole and 8-pole design. Standard C-pole locations are 5’ beyond the outfield radius at an angle of 20 degrees from the foul line for a 6-pole design and 10 degrees from the foul line for an 8–pole design. Standard D-pole locations are 5’ beyond the outfield radius at an angle of 30 degrees from the foul line for an 8-pole design.

Softball (60’ Base path) – Standard A-pole locations are 35’ down line and 40’ off for a 60’ base path. Standard B-pole locations are 5’ beyond the outfield radius and 10’ off the foul line for a 4-pole design and are at a distance down the line of ((Foul Line + (Base path*0.5)/2) and 40’ off the foul line for a 6-pole and 8-pole design. Standard C-pole locations are 5’ beyond the outfield radius at an angle of 20 degrees from the foul line for a 6-pole design and 10 degrees from the foul line for an 8–pole design.

Field Type	Field Size	Target Light Level (Inf/Out)	Target Light Level (Inf/Out)	Uniformity Infield	Uniformity Outfield	Grid Spacing	Grid Points (Infield / Outfield)
60’ Base Path	200’	30/20 fc	50/30 fc	2.0:1	2.5:1	20’ x 20’	25/73
60’ Base Path	225’	30/20 fc	50/30 fc	2.0:1	2.5:1	20’ x 20’	25/96
60’ Base Path	250'	30/20 fc	50/30 fc	2.0:1	2.5:1	20’ x 20’	25/119
60’ Base Path	300’	30/20 fc	50/30 fc	2.0:1	2.5:1	20’ x 20’	25/181
60’ Base Path	320'	30/20 fc	50/30 fc	2.0:1	2.5:1	20’ x 20’	25/209
90' Base Path	300'	50/30 fc	70/50 fc	2.0:1	2.5:1	30’ x 30’	25/73
90' Base Path	325'	50/30 fc	70/50 fc	2.0:1	2.5:1	30’ x 30’	25/90
90' Base Path	350'	50/30 fc	70/50 fc	2.0:1	2.5:1	30’ x 30’	25/106
90' Base Path	320/360/320	50/30 fc	70/50 fc	2.0:1	2.5:1	30’ x 30’	25/100
90' Base Path	330/400/330	50/30 fc	70/50 fc	2.0:1	2.5:1	30’ x 30’	25/121

Tennis – Standard pole locations are 6’ beyond the serving line and 3’ outside the fence.

# Courts	Target Light Level	Uniformity
2	50 fc	2.0:1
3	50 fc	2.0:1
4	50 fc	2.0:1
6	50 fc	2.0:1

Basketball - Outdoor - Standard pole locations are 6’ beyond the end line and 6’ beyond the sideline of the outer court.

# Courts	Target Light Level	Uniformity
2	50 fc	2.0:1

Basketball - Indoor - Lighting shall be provided utilizing LED luminaires

# Courts	Target Light Level	Uniformity
94’ x 50’	80 fc	2.0:1

Parking Lots - Lighting shall be provided utilizing LED luminaires*

Parking lot	Total Square Feet	Target Average Light Level	Uniformity
320’ x 200’	64,000	1 fc	N/A

*Pricing for alternate size parking lots may be determined by calculating a cost per square foot of the base size parking area and utilizing this cost to a different size area.

C. Point by Point Analysis

i. Measurements of light shall be demonstrated on computer generated model that consists of a grid of specified number of points covering a stated area on an equally spaced grid. See the below chart for the exact specifications of points, areas, and grid spacing each field.

ii. Light Level and Uniformity Ratio shall be calculated and shown on the computer generated model. The Light Levels and Uniformities must meet or exceed the defined criteria.

Computer Models - Test Stations

Area of Lighting	Size of Area to be Covered	Grid Spacing
Football	Entire Field	30’ x 30’
Soccer	Entire Field	30’ x 30’
Baseball	Entire Field	30’ x 30’
Softball	Entire Field	20’ x 20’
Tennis Courts 1 – 6	Entire Court	20’ x 20’
Basketball Courts 2	Entire Court	20’ x 20’
Basketball – indoor	Entire Court	10’ x 10’
Parking Lot	Entire area (320’x200’)	4’ x 4’

D. Spill/Glare Equipment

i. Light Control Luminaires: All luminaires shall utilize spill light and glare control devices including, but no limited to, internal shields, louvers and external shields. No symmetrical beam patterns are accepted.

ii. Glare Control: Maximum candela measured at 5’ above grade at a distance of 100’ should be better than that of a comparable HID design. These values are defined for typical sports fields listed below.*

Typical Field Type	Maximum Candela at 100’
Baseball	<7,000 candela
Softball	<7,000 candela
Football	<7,000 candela
Soccer	<7,000 candela
Tennis	<7,000 candela

*If the design of the project requires the pole setback to be greater than 70’ from the edge of the field, the candela value at 100’ may exceed the value stated in the above chart.

Part 2 – Product

A. Sports Lighting System Construction

i. System Description – Light-Structure System™ shall consist of the following:
   a. Galvanized steel poles and cross-arm assembly. No direct burial steel or inverted base steel poles allowed.
      1. The cross-arm mounting plate shall be attached to the cross-arm assembly at the factory.
   b. Pre-engineered concrete base embedded in concrete backfill. 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 the anchor bolt foundations shall be allowed to cure for a minimum of 28 days before the pole stress is applied.
   c. All luminaires shall be constructed with a die cast aluminum housing to protect the luminaire reflector system. If manufacturer cannot provide die cast aluminum housing, external hail shrouds shall be required. Luminaires shall be complete with an external visor. The luminaire and visor should be powder coat painted to match the Electrical Component Enclosure.
   d. Manufacturer must mount all drivers and supporting electrical equipment in aluminum enclosures mounted approximately 10’ above grade. 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. Safety disconnect per circuit for each pole structure will be located in the enclosure.
   e. 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.
   f. Wire harness complete with an abrasion protection sleeve, strain relief and plug in connections for fast, trouble free installation.
   g. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment.
   h. Control cabinet to provide remote on-off control and monitoring of the lighting system.
   i. Manufacturer must supply a signed warranty covering the entire system (Light-Structure System™) for 25 years from the date of shipment.

ii. System Description – SportsCluster® System (existing structures) shall consist for the following:
   a. Galvanized cross-arm assembly for attachment to existing structures
      1. The cross-arm mounting plate shall be attached to the cross-arm assembly at the factory
   b. All luminaires shall be constructed with a die cast aluminum housing to protect the luminaire reflector system. If manufacturer cannot provide die cast aluminum housing, external hail shrouds shall be required. Luminaires shall be complete with an external visor. The luminaire and visor should be powder coat painted to match the Electrical Component Enclosure.

c. Manufacturer must mount all drivers and supporting electrical equipment in aluminum enclosures mounted approximately 10’ above grade. 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. Safety disconnect per circuit for each pole structure will be located in the enclosure.
d. Wire harness complete with an abrasion protection sleeve, strain relief and plug in connections for fast, trouble free installation.
e. All luminaires, visors, and cross-arm assemblies shall withstand 150 mph winds and maintain luminaire aiming alignment.
f. Control cabinet to provide remote on-off control and monitoring of the lighting system.
g. Product assurance and warranty program is contingent upon site inspection and compatibility with existing structures.
h. Manufacturer must supply a signed warranty covering the entire system (SportsCluster® System) for 10 years from the date of shipment.

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

iv. Durability
a. All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed steel shall be hot dip galvanized per ASTM A123. All exposed hardware and fasteners shall be stainless steel of at least 18-8 grade, passivated and polymer coated to prevent possible galvanic corrosion to adjoining metals. All exposed aluminum shall be powder coated with high performance polyester. All exterior reflective inserts shall be anodized, coated with a clear, high gloss, durable fluorocarbon, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All wiring shall be enclosed within the cross-arms, pole, or electrical components enclosure.

v. Lightning Protection
a. Manufacturer shall supply and equip all structures with lightning protection meeting NFPA 780 standards. Manufacture shall integrate the required grounding electrode into the structure. System shall be UL listed.
b. If grounding is NOT integrated into the structure the Manufacturer shall supply an electrode of not less than 5/8” in diameter and 8’ in length, with a minimum of 10’ 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 a 75 feet mounting height.

vi. Safety
a. All safety components shall be UL listed for the appropriate application.

vii. Electric Power Requirements for sports lighting equipment
a. Maximum total voltage drop to the disconnect switch located on the poles shall not exceed 3% of rated voltage. Voltage/Phase to be determined for each specific site.

viii. Building Code
   a. The base bid of the lighting system must comply with Florida Building Code Edition 2017, Exposure C, Standard Variation with a wind speed of 130 mph.

ix. Structural Design
   a. The stress analysis and safety factor of the poles shall conform to AASHTO 2013 (LTS-6) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

x. Soil Conditions
   a. The design criteria for these specifications are based on soil design parameters that shall meet or exceed those of a Class 5 material as defined by 2017 FBC, Table 1806.2. It shall be the installing contractor's (or manufacturer's) responsibility to notify the owner of soil conditions other than the design criteria. The owner shall then be responsible and absorb the additional costs associated with:
      1. Engineered foundation embedment design by a registered engineer in the State of Florida
      2. Additional materials and/or services required to achieve alternate foundation
      3. Geotechnical report

xi. Foundation Drawings
   a. Project specific foundation drawings stamped by a registered engineer in the State of Florida. The drawings shall be available to the owner at the time of permit. The foundation drawings must list the moment, shear (horizontal) force, and axial (vertical) force at ground level for each pole.

B. Control and Monitoring

i. Instant On/Off Capabilities
   a. System shall provide for instant on/off of luminaires.

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

iii. Optional Dimming
   a. System shall provide for "High, Medium, Low" or "High/Low" dimming.
   b. System shall include key activated switches to allow for automated dimming control or manual override.

iv. Remote Lighting Control System
   a. System shall allow owner and users with a security code to schedule on/off system operation via web site, phone, fax or email up to 10 years in advance.
   b. Manufacturer shall provide and maintain two-way TCP/IP communication link.
   c. Trained staff shall be available 24/7 to provide scheduling support and assist with reporting needs.

d. 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 a 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.
e. 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 power outage.

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

vi. Management Tools
   a. Manufacturer shall provide a web based database and dashboard tool of actual field usage and provide reports by facility and user group.
      1. Dashboard shall also show current status of luminaire outages, control operation an service
      2. Mobile application will be provided suitable for IOS, Android and Blackberry devices.
   b. Hours of Usage
      1. Manufacturer shall provide a means of tracking actual hours of usage for the field lighting system that is readily accessible to the owner.
         a. Cumulative hours shall be tracked to show the total hours used by the facility.
         b. Report hours saved by using early off and push buttons by users.
   c. Communication Cost
      1. Manufacturer shall include communication cost for the operating of the control and monitoring system for a period of 25 years.

vii. Warranty
   a. 25 Year Warranty (Light-Structure System™)
      1. Manufacturer shall supply a signed warranty covering the entire system for 25 years from the date of shipment.
      2. Warranty shall guarantee specified target light levels.
      3. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term.
      4. 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. 10 Year Warranty (SportsCluster® System)
      1. Manufacturer shall supply a signed warranty covering the entire system of 10 years from the date of shipment.
      2. Warranty shall guarantee specified target light levels.
      3. Manufacturer shall maintain specifically-funded financial reserves to assure fulfillment of the warranty for the full term
      4. 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
      5. Constant 10™ warranty is contingent upon a site inspection

c. Maintenance
    1. Manufacturer shall monitor the performance of the lighting system, including on/off status, hours of usage and luminaire outage for the life of the warranty (date of equipment shipment).
    2. Parts and labor shall be covered such that individual luminaire outages will be repaired when the usage of any field is materially impacted.
    3. Owner agrees to check fuses in the event of a luminaire outage.

d. Exclusions
    1. Maintenance, repair or replacement necessitated by loss or damage resulting from any external causes such as, but not limited to, theft, environmental conditions, negligence, misuse, abuse, improper electrical/power supply, unauthorized repairs by third parties, attachments, damage to cabinetry, equipment modifications, vandalism, animal or insect infestation, physical damage to covered products parts or components, or acts of God/nature (including, but not limited to: earthquake, flood, tornadoes, typhoons, hurricanes and lightning).
    2. It is the customer's responsibility to check and change fusing.

e. Manufacturer shall have in place, the personnel, procedures and processes to implement and execute the warranty as detailed in this section of the specification

viii. Inspection and Verification

a. The lighting manufacturer shall guarantee illumination light levels for the life of the warranty.
    1. Field measurements shall be done per IESNA RP-6-15 recommendations.
    2. Failure to achieve the required results will require individual luminaire re-aiming and re-measurements at the expense of the manufacturer.

Part 3 – Installation (pole construction, pole removal and relight)

A. Pole Installation
   i. Provide pricing for labor to install owner furnished poles & fixtures. Price will include unloading of the equipment upon arrival to job site, excavation of holes, assembly of the poles and luminaires, all wiring from the remote electric enclosures to the luminaires, proper grounding, installation of the pre-stressed foundations with concrete backfill, pole erection and aiming. Installation assumes standard soils of 2000 psf with no rock or abnormal collapsing holes.

B. Removal of existing poles or structures
   i. Provide pricing for labor to take down existing poles, structures and fixtures and remove them to a staging area on the job site designated by the owner. Concrete and steel poles will be completely removed. Any pre-engineered concrete base will be cut – foundations will not be removed but cut and jack hammered to a foot below grade. Wood poles may be cut off 2 feet below grade, as long as the stumps are covered back with soil.

C. Installation of fixtures on existing poles
   i. Provide pricing for labor to take down existing fixtures and remove them to a staging area on the job site designated by the owner. The cost will also include labor to install the new fixtures on the existing structure. Installation assumes that the pole structure and wiring will be sufficient to handle the new fixtures. Owner assumes all responsibility of structural integrity of existing poles.

D. Owner and Bidder responsibilities
   i. Owner's responsibilities
      a. Provide total access to the site and poles location for construction. Equipment must be able to move from location to location on standard rubber tires – no towing required.
      b. Remove any trees, limbs, shrubs, etc. for total access to poles locations.
      c. Survey in pole locations and aiming points (one per field) for sighting in lighting cross arms. Mark home plate, foul lines, and field boundary lines. Final grade elevations will also need to be marked if necessary.
      d. Removal, replacement, and repair of all fencing necessary for construction.
      e. Repair and replacement of any field turf, asphalt, curbs, and concrete inadvertently damaged during installation.
      f. Provide area on site for disposal of spoils from foundation excavation.
      g. Locate and mark existing underground utilities not covered by "One Call" and irrigation systems including sprinkler heads prior to excavation. Bidder will not responsible for repairs to unmarked utilities.
      h. Pay for any power company fees and requirements, if necessary.
      i. Additional charges will apply for foundation excavation and construction in non-standard soils (rock, caliche, high water table, collapsing holes, alluvial soils, etc.) Standard soils are defined as Class 5 soils in the 2017 Edition of the Florida Building Code and can be excavated using standard earth auguring equipment.
      j. Provide a source of water such as a fire hydrant or 2" water line for foundation excavation. Pay for any all fees associated with the water access and usage.
      k. Pay for any and all permitting fees.

ii. Bidder's responsibilities

a. Provide required poles, fixtures, foundations and associated designs.
b. Provide structural design for poles and foundations, certified by a professional engineer licensed in the State of Florida
c. Provide layout of poles locations and aiming diagram
d. Provide light test upon completion of works, once owner supplied electrical system is energized.
e. Provide review of electrical design as provided by Electrical Contractor or Electrical Engineer.
f. Provide bonding per the State of Florida requirements.
g. Provide equipment and materials to off load equipment at job site per scheduled delivery.
h. Provide storage containers for material, including electrical enclosures
i. Provide adequate trash containers for cardboard waste and packing debris.
j. Provide adequate security to protect delivered products from theft, vandalism and damage during installation.
k. Obtain any and all required permits. Costs to be paid by Owner.
l. Make appropriate contact to ensure utility locations have been marked prior to excavation and trenching. Repair any damage to existing utilities made during construction.
m. Provide materials and equipment to install Musco's Light-Structure System™ foundations as specified on layout.
n. Remove augured spoils to owner designated location at job site.
o. Provide materials and equipment to assemble and install Musco's TLC for LED™ fixtures and terminate all necessary wiring.
p. Provide equipment and materials to assemble and erect Musco's Light-Structure System™ poles.

Part 4 – Electrical Supply labor/equipment

A. Electrical Services

i. All services are to be quoted at 277/480 volt three phase. Base all service feeders on a length of 150 feet at burial depth of 36” with no obstructions in the path. Provide lump sum costs for equipment and labor to install each of the following four options.

a. Option A

1. 200 amp three phase meter can
2. 200 amp main circuit breaker N3R 42 circuit panel with 8 three pole 30 amp breakers
3. Service feeders. (4) 3/0 conductors in a 2 1/2” raceway. 150’
4. Build service rack out of 2” galvanized pipe with galvanized uni-strut to accommodate meter can, electrical panel and one lighting contractor cabinet sized at 72” high, 36” wide and 12” deep. The lighting contactor cabinet will be provided by the sports lighting manufacturer and installed.
5. Pull necessary permits

b. Option B

1. 400 amp three phase meter can
2. 400 amp main circuit breaker N3R 42 circuit panel with 8 three pole 60 amp breakers
3. Service feeders. (4) 500 mcm conductors in a 4” raceway. 150’
4. Build service rack out of 2” galvanized pipe with galvanized uni-strut to accommodate meter can, electrical panel and one lighting contractor cabinet sized at 72” high, 36” wide and 12” deep. The lighting contactor cabinet will be provided by the sports lighting manufacturer and installed.
5. Pull necessary permits

c. Option C

1. 600 amp three phase meter can
2. 600 amp main circuit breaker N3R 42 circuit panel with 12 three pole 60 amp breakers
3. Service feeders. (2) 4” raceways with (4) 300 MCM conductors in a 4” raceway. 150’
4. Build service rack out of 3” galvanized pipe with galvanized uni-strut to accommodate meter can, electrical panel and one lighting contractor cabinet sized at 72” high, 36” wide and 12” deep. The lighting contactor cabinet will be provided by the sports lighting manufacturer and installed.
5. Pull necessary permits

d. Option C
    1. 800 amp three phase CT enclosure
    2. 800 amp three phase CT meter can
    3. 800 amp main circuit breaker N3R 42 circuit panel with 12 three pole 80 amp breakers
    4. Service feeders (2) 4” raceways with (4) 500 mcm conductors in each raceway. 150’
    5. Build service rack out of 3” galvanized pipe with galvanized uni-strut to accommodate meter can, CT enclosure, electrical panel and one lighting contractor cabinet sized at 72” high, 36” wide and 12” deep. The lighting contactor cabinet will be provided by the sports lighting manufacturer and installed.
    6. Grounding per NEC and local building codes
    7. Pull necessary permits

ii. Conduit, pull boxes and conductors
    a. Provide equipment and labor to install conduit, pull boxes and conductors. All installations are to be in PVC schedule 40 pipe at a burial depth of 36” with twin conductors.

iii. Lightning protection
    a. Surge Arrestors: UL labeled and rated for 277/480 V, 3 phase, 4 wire, as manufactured by Erico (TDX-50) or equal and shall be attached to the bottom of the remote electrical enclosure and/or on line side of main electrical panel.