

Musco Sports Lighting, LLC
Bob Crookham
3420 Coach Lane #8C
Cameron Park, CA 95682
(530)-672-9500



Peter McDonnell
9-4-2012

I have put together a short list of the values and features of our Light Structure Green System that make it the industry leader in product performance, energy efficiency, environmental spill control and warranty services.

Our LSG fixture technology is unique in that we are able to light fields for 40/50% less fixtures than standard 1500 watt MH technology. This means less fixtures to operate to achieve the desired performance. Less fixtures means fewer glare sources to impact the surrounding community.

Our unique patented reflector design provides over 2000 different reflector patterns to direct light to the target areas and keeps light off the surrounding properties.

Our visor system uses a variety of external visors to match the activity on the field and provide the most desirable cutoff for that sport. In the case of a Football Soccer field we would most likely use are 14" visors.

Our lighting designs in areas that require the best in spill and glare, follow the Dark Sky guidelines using our 14" visor and having a minimum of 25 degree aiming angle.

Musco will provide onsite field techs once the installation is complete to make any fine tune adjustments if needed.

Musco provides a 25 year warranty guarantee system performance. Our system also provides a wireless control system to make sure light come on and go at the desired times.

All fixtures are powered coated grey to blend into the surround area and not be shiny aluminum like is seen on some systems.

Regards,

Bob Crookham
Musco Lighting



Control System Summary

Project Specific Notes:

Project Information

Project #: 18524452
 Project Name: Marin Catholic High School Football
 Date: 02/29/12
 Project Engineer: Eric Svenby
 Sales Representative: Bob Crookham
 Control System Type: Control and Monitoring
 Communication Type: Digital Cellular
 Scan: 24452-50FC
 Distribution Panel Location or ID:
 Total # of Distribution Panel Locations for Project: 1
 Design Voltage/Hertz/Phase: 480/60/3
 Control Voltage: 120

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 lighting 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
 - Monitoring circuit from surge protection device to Control and Monitoring cabinet 1
 - 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

Equipment Listing

DESCRIPTION	APPROXIMATE SIZE	
1. Control and Monitoring Cabinet	24 X 48	
	QTY	SIZE
Total Contactors:	4	30 AMP
Total Off/On/Auto Switches:	1	

IMPORTANT NOTES

1. 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.
2. 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 luminaries come pre-wired to utilize all 3 phases across the entire facility.
3. 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.
4. If the lighting system will be fed from more than one distribution location, additional equipment may be required. Contact your Musco sales representative.
5. A single control circuit must be supplied per control system.
6. Size overcurrent devices using the full load amps column of the Circuit Summary By Zone chart- Minimum power factor of 0.9.

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



Control System Summary

Marin Catholic High School Football / 18524452 - 24452-50FC
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Form: T-5030-1

SWITCHING SCHEDULE

Field Type	Zones	Zone Description
Football	1	Football/Track

CONTROL POWER CONSUMPTION	
120V Single Phase	
VA loading of Musco Supplied Equipment	INRUSH: 1065.0 SEALED: 189.0

BALLAST SPECIFICATIONS .90 Minimum Power Factor	VOLTAGE: 480v THREE PHASE						
	208	220	240	277	347	380	480
BALLAST OPERATING VOLTAGE							
1500 Watt Metal Halide Lamp Operating line amperage per fixture, maximum	8.6	7.7	7.5	6.5	5.1	0.0	3.7
1000 Watt Metal Halide Lamp Operating line amperage per fixture, maximum	6.5	5.8	5.8	4.9	4.0	0.0	2.9

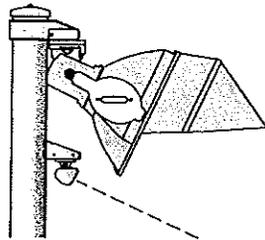
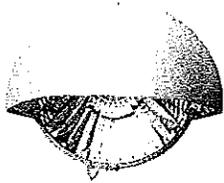
CIRCUIT SUMMARY BY ZONE

POLE	CIRCUIT DESCRIPTION	# OF FIXTURES	FULL LOAD AMPS	CONTACTOR SIZE (AMPS)	CONTACTOR ID	ZONE
F1	Football/Track	11	29.6	30	C1	1
F2	Football/Track	11	29.6	30	C2	1
F3	Football/Track	11	29.6	30	C3	1
F4	Football/Track	11	29.6	30	C4	1



Light-Structure GREEN™

**For your budget,
for the environment.**



New Technology

- Cuts operating costs in half
- Reduces spill light by 50%
- Includes system monitoring and remote on/off control services
- Provides constant light levels

Same 5 Easy Pieces™

- Complete system from foundation-to-poletop
- Factory wired, aimed, and tested
- Fast, trouble-free installation
- Comprehensive corrosion protection package

Includes

Musco Constant 25™

25-Year Product Assurance and Warranty

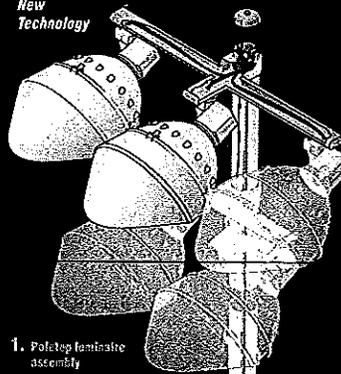
Provides 25 years of trouble-free lighting equipment operation, including parts, labor, and group lamp replacement.



We Make It Happen

www.musco.com

New Technology

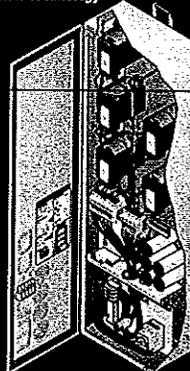


1. Poletop luminaire assembly

2. Wire harness

3. Galvanized steel pole

New Technology



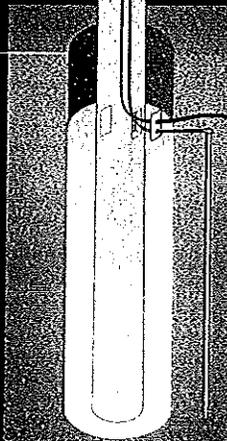
4. Electrical components enclosure

5. Precast concrete base

Ground line

All you add is:

- Grounding rod and connection to system grounding lug
- Concrete backfill
- Underground wiring
- Service entrance





MUSCO
GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE

ILLUMINATION SUMMARY

Track

Marin Catholic High School Football
Kentfield, CA

Track

- Size: Irregular
- Grid Spacing = 30.0' x 30.0'
- Values given at 3.0' above grade

- Luminaire Type: Green Generation
- Rated Lamp Life: 5,000 hours
- Avg Lumens/Lamp: 134,000

**CONSTANT ILLUMINATION
HORIZONTAL FOOTCANDLES**

Entire Grid
No. of Target Points: 47
Average: 13.9
Maximum: 29
Minimum: 3
Avg/Min: 4.27
Max/Min: 8.80
UG (Adjacent Pts): 0.00
CV: 0.69
Average Lamp Tilt Factor: 1.000
Number of Luminaires: 44
Avg KW over 5,000: 68.82
Max KW: 74.8

Guaranteed Performance: The CONSTANT ILLUMINATION described above is guaranteed for the rated life of the lamp.

Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

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.

By: Eric Svenby

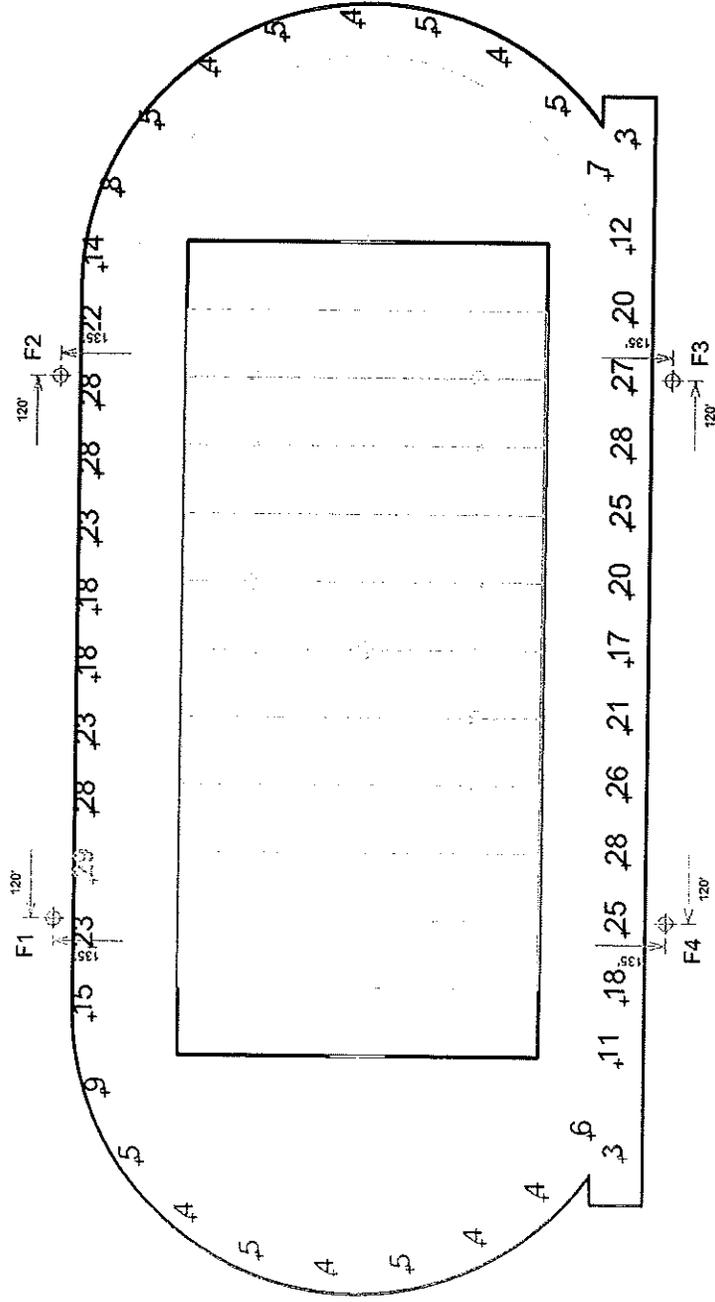
File #: 24452-50FC

Date: 29-Feb-12

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EQUIPMENT LIST FOR AREAS SHOWN

QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	Luminaires		
					LAMP TYPE	QTY/POLE	THIS GRID OTHER GRIDS
4	F1-F4	80'		80'	11	11	0
4	TOTALS				44	44	0



SCALE IN FEET 1 : 80



Pole location(s) Ⓢ dimensions are relative to 0.0 reference point(s) ⊗



GUARANTEED PERFORMANCE

EQUIPMENT LAYOUT

Marin Catholic High School Football
Kentfield, CA

- INCLUDES:**
- Football
 - Track

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.

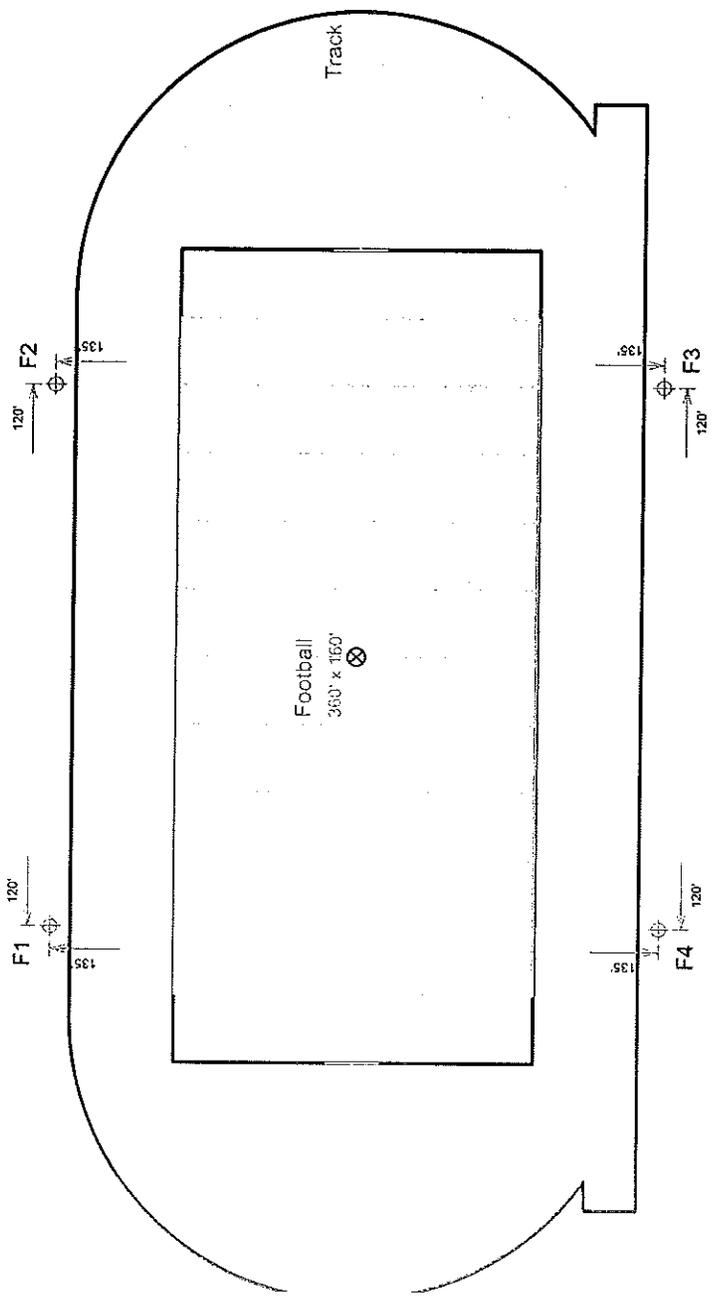
EQUIPMENT LIST FOR AREAS SHOWN

Pole		MOUNTING		LAMP		QTY/ POLE
QTY	LOCATION	SIZE	GRADE ELEVATION	HEIGHT	TYPE	
4	F1-F4	80'	-	80'	1500W MZ	11
4	← TOTALS →					44

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (90 min. power factor)

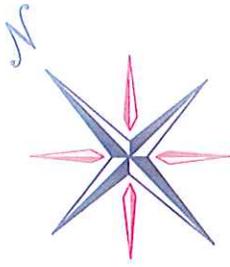
Line Amperage Per Luminaire (max. draw)	
Single Phase Voltage	208 220 240 277 347 380 480
1500 watt MZ	8.6 (60) 7.7 (60) 7.5 (60) 6.5 (60) 5.1 (60) 3.7 (60)



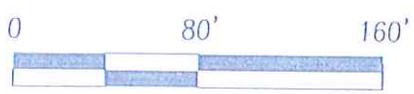
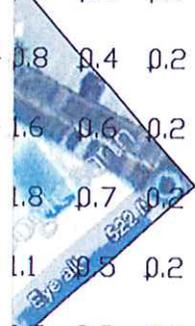
SCALE IN FEET 1 : 80



By: Eric Svenby
 File #: 24452-50FC
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 Pole location(s) ⌀ dimensions are relative to 0,0 reference point(s) ⊗
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0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.0	0.0
0.0	0.0	0.3	0.2	0.1	0.1	0.0	0.0	0.0
0.0	0.1	0.5	0.3	0.1	0.1	0.0	0.0	0.0
0.0	0.1	0.8	0.4	0.2	0.1	0.0	0.0	0.0
0.0	0.1	1.6	0.6	0.2	0.1	0.0	0.0	0.0
0.0	0.1	1.8	0.7	0.2	0.1	0.0	0.0	0.0
0.0	0.1	1.1	0.5	0.2	0.1	0.0	0.0	0.0
0.0	0.1	1.5	0.3	0.2	0.1	0.0	0.0	0.0
0.0	0.1	1.4	0.2	0.1	0.1	0.0	0.0	0.0
0.0	0.0	1.3	0.1	0.1	0.0	0.0	0.0	0.0
0.0	0.0	1.2	0.1	0.1	0.0	0.0	0.0	0.0
0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.0	0.0
0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0



SCALE: 1 inch = 80'

Marin Catholic H.S.
Kentfield, CA
Google w/Blanket Grid

CORPORATE OFFICE:
P.O. Box 808
100 1st Avenue West
Oskaloosa, Iowa 52577
800/825-6020

DATE:	BY: R.L.	REVISIONS:

JOB NUMBER:
18524452

DRAWN BY:
ES

CHECK BY:

REPRESENTATIVE:
B Crookham

SCALE:
1" = 80'

DATE:
2/29/12

DRAWING NUMBER:
24452G1

1 OF 1 SHEETS

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