

August 10, 2017

County of San Diego
Planning & Development Services
5510 Overland Avenue, 3rd Floor
San Diego, CA 92123

Re: Liberty High School - PDS2015-MUP-15-027
Dark Skies and Glare

1.0 Introduction

This photometric study will provide information to determine whether the proposed project meets the Guidelines listed in Section 4 of the Guidelines Determining Significance – Dark Skies and Glare. The photometric study follows the formats and guidance in the Report Format and Content Requirements.

The Light Pollution Code (LPC), also known as the Dark Sky Ordinance, was adopted "to minimize light pollution for the enjoyment and use of property and the night environment by the citizens of San Diego County and to protect the Palomar and Mount Laguna observatories from the effects of light pollution that have a detrimental effect on astronomical research by restricting the permitted use of outdoor light fixtures on private property" (Sec. 59.101).

The LPC was established to limit harmful effects of outdoor lighting on the Palomar and Mount Laguna Observatories. The LPC designates all areas within a fifteen (15) mile radius of each observatory as Zone A, with all other areas of the County designated as Zone B. Zone A has more stringent lighting restrictions, including limits on decorative lighting, so that night skies are dark enough for clear viewing through the telescopes at the observatories.

The LPC also defines classes of outdoor lighting. "Class I lighting" means outdoor lighting for an outdoor sales or eating area, vehicle fueling area, assembly or repair area, billboard or other sign, recreational facility or other similar application, where color rendition is important for commercial or safety purposes. "Class II lighting" means outdoor lighting for commercial, industrial and residential walkways, roadways and parking lots, equipment yards, outdoor security and residential entrance lighting.

2.0 Project Description

The proposed project is a 450 student, concrete tilt-up high school together with a high school recreational sports field designed for activities such as football, soccer and track. The project site is located within LPC Zone B. Proposed project lighting for the parking areas and school building is considered Class II lighting and proposed lighting for the sports field is considered Class I lighting.

3.0 Proposed Lighting

- **Parking Lot Lighting:** Parking lot light fixtures shall be 22' high aluminum light standards mounted on 3' tall concrete pedestals with 180 watt Low Pressure Sodium lamps (or if acceptable to the County, 16' high aluminum light standards mounted on 3' tall concrete pedestals with 3000 Kelvin LED lamps) manufactured by Visionaire Lighting, model number SUN-3-180-L-6-BOA6. The fixtures have full cutoff optics (i.e. they are fully shielded). The specifications for this fixture are included in Attachment A.
- **Building Lighting:** The building shall be lit with precision formed aluminum wall packs with 180 watt Low Pressure Sodium lamps (or if acceptable to the County, 3000 Kelvin LED lamps) manufactured by Visionaire Lighting, model number SUN-3-T4-180-L-6-PWM-BZ. The fixtures have full cutoff optics (i.e. they are fully shielded). The specifications for this fixture are included included in Attachment A.
- **Recreation Field Lighting:** The recreation field lighting will consist of (4) 60' tall poles with (7) Musco TLC-LED-1150 fixtures per pole. Six fixtures per pole will be mounted in the standard position at 60' and 1 fixture per pole will be mounted at 25' in the up light direction. The manufacturer is Musco Sports Lighting LLC. The fixtures are fully shielded, and have reflective inserts within the fixture housing to sharply direct and control light. The fixtures also have an extended and adjustable visor to precisely cut light spill and control glare. The fixture type is Light Emitting Diode (LED), with a Kelvin temperature of 5700K and CRI of 75. The wattage is 1150 watts per fixture. The specifications for the field lighting are included in Attachment B.

4.0 Photometric Analysis

Please see the attached photometric analysis (Attachment C):

- On the study you will find that the properties lines have been clearly identified, the engineering scale is called out near the bottom center of the page and a north arrow has been inserted to identify the orientation of the project.

- Offsite uses have been identified and structures delineated on the photometric plan, however, neighboring properties will not be significantly affected by the onsite lighting since we comply with the County Dark Sky Ordinance (see below).
- The fixtures have been identified by “type” which coincides with the fixture schedule on the photometric study and Paragraph 3.0 above.
- Please note that the encompassed area within the property lines reflects an adequate amount of lighting while maintaining light uniformity and exceeding the County’s requirement limiting light trespass at the property line to .2 foot candles or less.

5.0 CEQA Analysis

The County of San Diego establishes guidelines for determining the significance for Dark Skies and Glare. Normally, non-compliance with a particular standard in the guidelines will mean the project will result in a significant effect, whereas compliance will normally mean the effect will be determined to be “less than significant.”

The stated guidelines for determining significance are:

1. *The project will install outdoor light fixtures that do not conform to the lamp type and shielding requirements described in Section 59.105 (Requirements for Lamp Source and Shielding) and are not otherwise exempted pursuant Section 59.108 or Section 59.109 of the San Diego County Light Pollution Code.*
2. *The project will operate Class I or Class III outdoor lighting between 11:00 p.m. and sunrise that is not otherwise exempted pursuant Section 59.108 or Section 59.109 of the San Diego County Light Pollution Code.*
3. *The project will generate light trespass that exceeds 0.2 foot-candles measured five feet onto the adjacent property.*
4. *The project will install highly reflective building materials, including but not limited to reflective glass and high-gloss surface color, that will create daytime glare and be visible from roadways, pedestrian walkways or areas frequently used for outdoor activities on adjacent properties.*
5. *The project does not conform to applicable Federal, State or local statute or regulation related to dark skies or glare, including but not limited to the San Diego County Light Pollution Code.*

With respect to the proposed project:

1. All outdoor light fixtures conform to the lamp type and shielding requirements described in Section 59.105.
2. The proposed Class I lighting for the sports field will only be utilized for scheduled events will not operate between 11:00 PM and sunrise in accordance with Section 59.107 of the San Diego County Code.
3. As evidenced by the photometric plans, the project will not generate light trespass that exceeds 0.2 foot-candles when measured five feet onto the adjacent properties.
4. The project will be concrete tilt-up construction and will not install highly reflective building materials that will create daytime glare that is visible from surrounding roadways or adjacent properties.
5. The proposed lighting for the project conforms to all applicable Federal, State, and local statutes and regulations relating to dark skies or glare including the San Diego Light Pollution Code.

Based on the project's compliance with the established guidelines for determining significance, the project is not considered to have a significant effect related to dark skies or glare.

6.0 Report Preparer

Richard Alexander Anderson
Electrical Contractor License #998621
Hamann Construction

Dated: _____

Sports Field Photometric Plan:

Clayton Temaat
Project Engineer
Musco Sports Lighting

Attachment A

Site Lighting Specifications

Sunset LPS

Project Name:

Catalog Number:

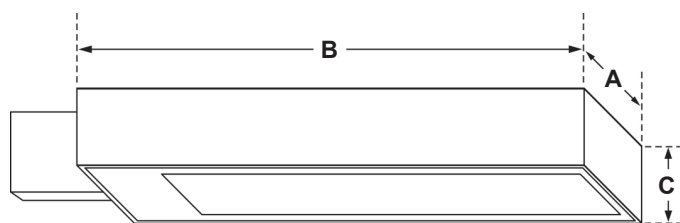
Type



Sun-3 shown



Dimensional Drawings



Fixture	A	B	C	Max. Watts	Lbs
SUN-1	15"	24"	9"	55 W	45
SUN-2	15"	29"	9"	90 W	50
SUN-3	20"	29"	9"	2 × 90 W	60
SUN-4	15"	52"	9"	180 W	70

The **LPS Sunset** family of Low Pressure Sodium luminaires is designed to maximize the benefits of Low Pressure Sodium light sources with unmatched lumens per watt while eliminating glare with IES **full cutoff optics**. The instant on off control and the high CRI rating make fluorescent lamps a popular choice for many applications.

The **LPS Sunset** family is available in five sizes of housings with arm or yoke mount options. Two reflector options are available with a Type III providing an asymmetrical distribution, and a Type IV providing a forward throw distribution pattern. A durable polyester powder coat finish is available in a variety of architectural colors.

Lamp wattages range from 55 watts to 180 watts of Low Pressure Sodium lighting; or 64–216 watts of Fluorescent lighting. A popular version of the **LPS Sunset** fixture is the twin-90 watt luminaire which utilizes two-90 watt lamps mounted side-by-side, enabling the use of a standard shoebox design which coordinates well with most architectural applications.

Low Pressure Sodium lighting is the community standard for a number of areas where observatories are located. The International Dark-Sky community favors the use of this light source for all types of outdoor lighting. Street lighting, roadways, bridges and general area lighting are ideal applications for the **LPS Sunset** family of fixtures.

Model	Optics	Wattage	Source	Voltage	Mounting	Finish	Options
SUN-1	Type III *For BOA only (T3) 	55 (55)	LPS (L)	120 (1) 208 (2) 240 (3) 277 (4) 480 (5)	Bolt-On Arm 6" (BOA6) Bolt-On Arm 10" (BOA10) Parallel Pole Mount (PPM) Parallel Wall Mount (PWM) Yoke Mount (YM) Wall Mount (WM) Knuckle Mount (KM)	Bronze (BZ) Black (BK) White (WH) Forest Green (FG) Grey (GY) Silver Metallic (SL) Custom Color (CC)	<u>Photocell & Receptacle</u> *Specify voltage (PCR120) (PCR208) (PCR240) (PCR277) (PCR480)** Photo Receptacle *With shorting cap (PER) <u>Fusing</u> *Specify voltage Single in-line fuse (SF120) (SF277) Double in-line fuse (DF208) (DF240) (DF480)** Terminal Block (TB) Cast Wall Plate (BAWP) Internal Light Shield (ILS) Dual Circuit *Fluorescent only. Requires two ballasts. (DS) Emergency Battery Pack *Fluorescent only. Provides a minimum of 90 minutes of illumination during power outages (EBP) **not available for fluorescent sources.
SUN-2	Type IV *With parallel pole or wall mount only (T4) 	90 (90)					
SUN-3		2 × 90 (2×90)					
SUN-4		135 (135) 180 (180)		M-Tap *Multi-Tap ballast wired at 277 V unless specified (6) 347 (8)			

For more detailed information on mounting, wiring or installation instructions, please consult factory. If poles are not ordered with fixtures, please specify mounting requirements. This document contains proprietary information of Visionaire Lighting, LLC. Any use of this information requires the written approval of Visionaire Lighting, LLC. In keeping with our TQM policy of continuous improvement, Visionaire reserves the right to change any specifications contained herein without prior notice.

Housing

- The **LPS-Sunset** is precision CNC sheared and formed aluminum. Available in five sizes.
- All hardware is rust-resistant stainless steel.

Lens and Door Assembly

- Hinged door frame is fully gasketed. A one-piece extruded silicone gasket seals the door frame against the housing.
- The lens is clear, impact resistant Lexan, secured with galvanized lens retainers, and sealed with form-fitting silicone gasketing. Size III lens is glass.

Optical System

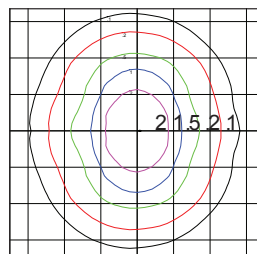
- Reflector is precision CNC cut and bent, multifaceted, segmented, 95% reflective aluminum reflector for IES Type III and IV light distribution patterns.

Quali-Guard® Finish

- The finish is a Quali-Guard® textured, chemically pretreated through a multiple-stage washer, electrostatically applied, thermoset polyester powder coat finish, with a minimum of 3-5 millimeter thickness. Finish is oven-baked at 400 °F to promote maximum adherence and finish hardness. All finishes are available in standard and custom colors.
- Finish is guaranteed for two (2) years.

Mounting

- A rounded extruded aluminum, Bolt-On Arm (BOA), with an in-pole nut plate, securing two half-inch zinc running bolts, with stainless steel hardware is standard. A Round Pole Plate Adaptor



**LPS-SUNSET-3
ISOLUX CURVE
TYPE III
LPS OPTICS
TWO 90-WATT LAMPS**

Scale: 1 Square = 28 ft
Initial Light Loss Factor = 1.00
Mounting Height = 28 ft
Arm Length: 1 ft
Arrangement: Single

(RPP) is required for mounting to 3" - 5" round poles.

- Knuckle mount designed to slip over a 2 5/8" tenon.
- Available in yoke mount or parallel pole mount as well.

Electrical Assembly

- All ballasts are premium-grade HPF high-reactance autotransformer, factory wired and tapped to voltage requirement.
- LPS lamps from 55 through 180 watts, providing high lumens per watt, superior energy efficiency and quick restrike.

Options

- Photocell & receptacle
- Photo receptacle
- Fusing
- Terminal block
- Cast wall plate
- Internal light shield
- Dual circuit
- Emergency battery pack

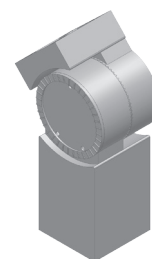
Please consult factory for custom options.

Listings

- **Sunset** is UL listed, suitable for wet locations.
- Powder Coated Tough™

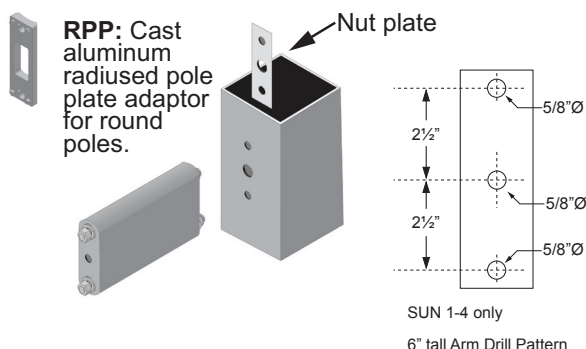


Adjustable Knuckle Mount

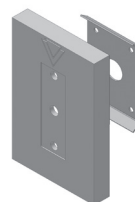


(SUN-1 KM Shown)

Bolt-On Arm Detail Cast Wall Plate

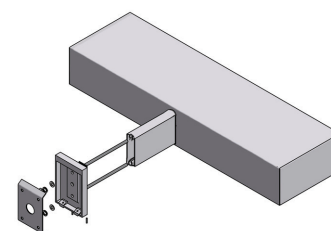


Cast Wall Plate



*For use with standard Bolt-On Arm

Parallel Mounting Detail



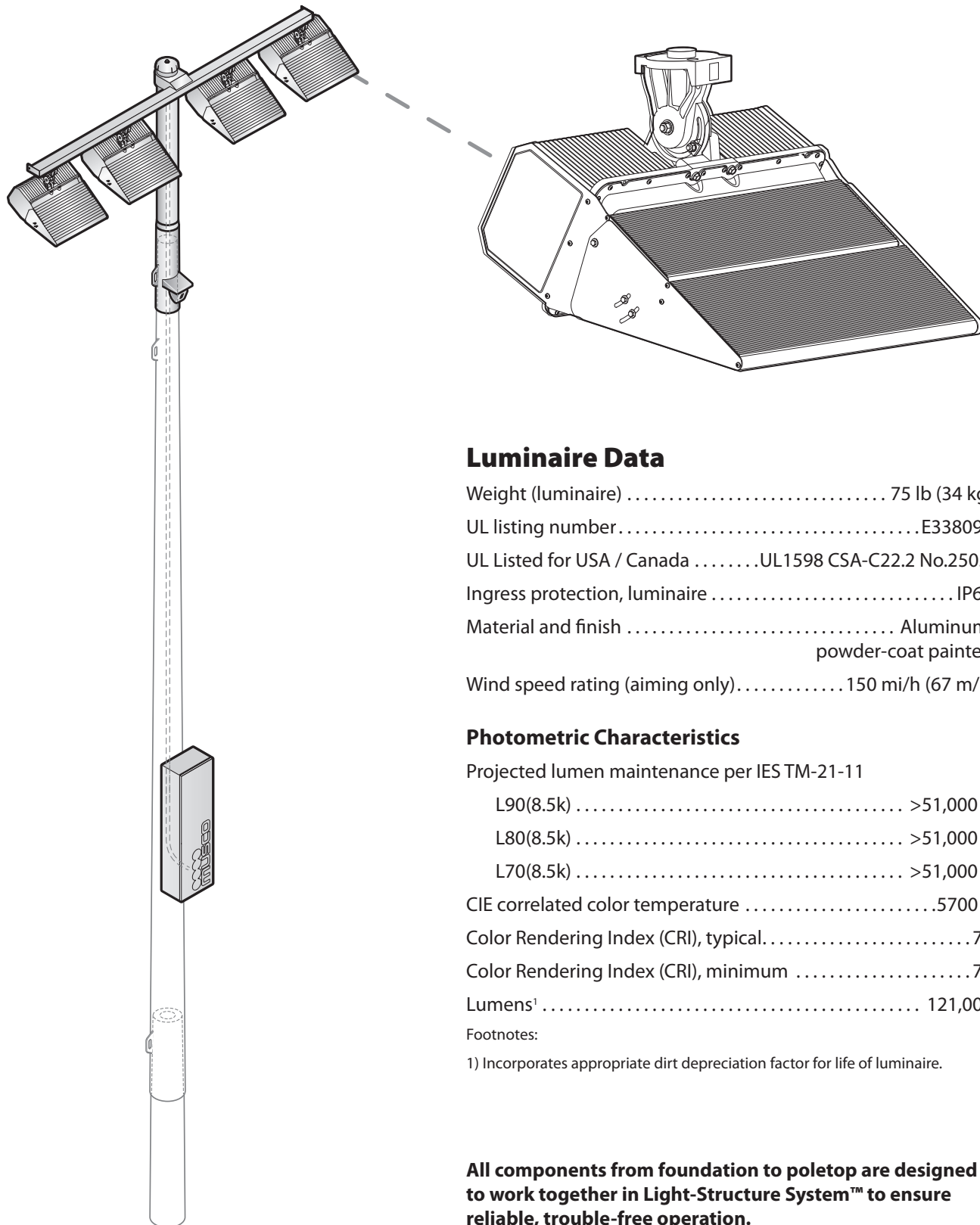
EPA Data

Fixture with Arm						
SUN-1	2.0	3.4	4.0	4.9	4.7	4.9
SUN-2	2.3	3.9	4.6	5.5	5.3	5.5
SUN-3	3.1	5.3	6.2	7.5	7.2	7.5
SUN-4	3.7	5.4	7.6	10.2	9.9	10.2

Attachment B

Field Lighting Specifications

Luminaire and Driver Components – TLC-LED-1150



Luminaire Data

Weight (luminaire)	75 lb (34 kg)
UL listing number	E338094
UL Listed for USA / Canada	UL1598 CSA-C22.2 No.250.0
Ingress protection, luminaire	IP65
Material and finish	Aluminum, powder-coat painted
Wind speed rating (aiming only)	150 mi/h (67 m/s)

Photometric Characteristics

Projected lumen maintenance per IES TM-21-11

L90(8.5k)	>51,000 h
L80(8.5k)	>51,000 h
L70(8.5k)	>51,000 h
CIE correlated color temperature	5700 K
Color Rendering Index (CRI), typical	75
Color Rendering Index (CRI), minimum	70
Lumens ¹	121,000

Footnotes:

1) Incorporates appropriate dirt depreciation factor for life of luminaire.

All components from foundation to poletop are designed to work together in Light-Structure System™ to ensure reliable, trouble-free operation.

Luminaire and Driver Components – TLC-LED-1150

Driver Data

Electrical Data

Rated wattage¹

Per driver..... 1,150 W

Per luminaire..... 1,150 W

Number of luminaires per driver..... 1

Starting (inrush) current..... <40 A, 256 μ

Fuse rating..... 15 A

UL ambient temperature rating,
electrical components enclosure 50°C (122°F)

Ingress protection,
electrical components enclosure IP54

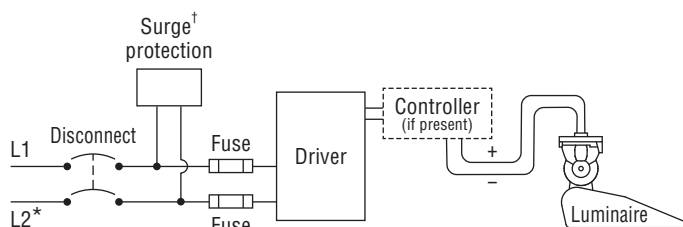
Efficiency 95%

Dimming mode..... optional

Range, energy consumption15 – 100%

Range, light output.....20 – 100%

Typical Wiring



* If L2 (com) is neutral then not switched or fused.

† Not present if indoor installation.

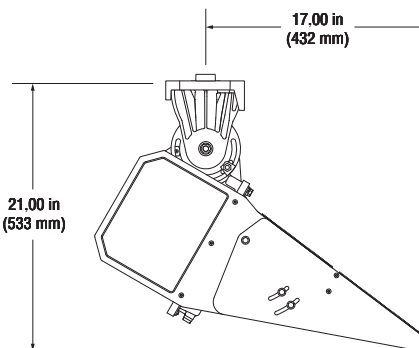
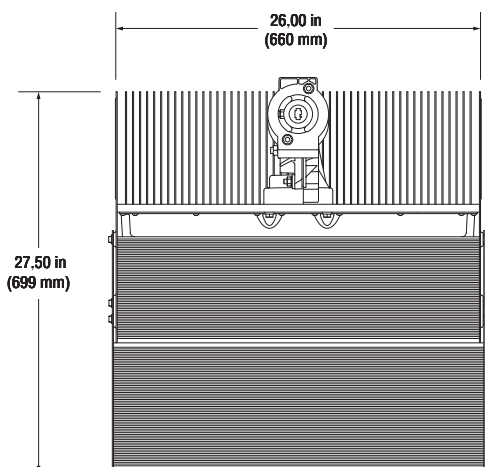
	200 Vac 50/60 Hz	208 Vac 60 Hz	220 Vac 50/60 Hz	230 Vac 50 Hz	240 Vac 50/60 Hz	277 Vac 60 Hz	347 Vac 60 Hz	380 Vac 50/60 Hz	400 Vac 50 Hz	415 Vac 50 Hz	480 Vac 60 Hz
Max operating current²	7.26 A	6.98 A	6.60 A	6.31 A	6.05 A	5.24 A	4.18 A	3.82 A	3.63 A	3.50 A	3.03 A

Footnotes:

- 1) Rated wattage is the power consumption, including driver efficiency losses, at stabilized operation in 25°C ambient temperature environment.
- 2) Operating current includes allowance for 0.90 minimum power factor, operating temperature, and LED light source manufacturing tolerances.

Notes

1. Use thermal magnetic HID-rated or D-curve circuit breakers.
2. See *Musco Control System Summary* for circuit information.



Superior light control and long term reliability

Alignment

Thermal Management

LED Optic

Housing Internal Environment

Lens

- Permanently sealed to keep optics away from harmful environmental elements
- Vented and filtered to adapt to environment
- Impact-resistant, tempered glass for strength

Heat Sink

- Unique convective air cooling design
- High thermal conductivity, corrosion resistant construction
- Machined mounting surface for maximum heat transfer of the Diode Assembly
- Maintains low LED junction temperature during high wattage operation

Knuckle Assembly and Connection Plate

- Factory aimed to within 0.2 degree accuracy
- Maintains alignment in up to 150 mph winds
- Internal wiring protected from elements
- Completes integration of lighting to structural and electrical components...complete system

Diode Assembly

- Custom high-power diode package
- Metal core printed circuit board

Optics

- High-temperature rated materials for long life
- Multiple beam spreads to meet custom project requirements and provide maximum light control

Light Control Visor

- Factory aimed
- Controls and directs more light onto the field
- Dramatically reduces glare and spill
- Enhances on-field playability

Attachment C

Photometric Plans

Literacy First Charter High School Multipurpose

El Cajon, CA

Lighting System

Pole / Fixture Summary						
Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Group
F1-F4	60'	60'	6	TLC-LED-1150	6.90 kW	A
		25'	1	TLC-LED-1150	1.15 kW	A
4			28		32.20 kW	

Group Summary				
Group	Description	Avg Load	Max Load	Fixture Qty
A	Football/Soccer	32.2 kW	32.2 kW	28

Fixture Type Summary							
Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1150	LED 5700K - 75 CRI	1150W	121,000	>51,000	>51,000	>51,000	28

Light Level Summary

Calculation Grid Summary							
Grid Name	Calculation Metric	Illumination				Groups	Fixture Qty
		Ave	Min	Max	Max/Min		
Blanket Grid	Horizontal	0.80	0	57	0.00	A	28
Blanket Grid	Max Vert Illuminance (by Light Bank)	1	0	79	0.00	A	28
Football	Horizontal Illuminance	34.6	16	57	3.49	A	28
Property Spill	Horizontal	0.03	0	0.16	66542.62	A	28
Property Spill	Max Candela (by Fixture)	1100	5.47	6590	1205.29	A	28
Property Spill	Max Vertical Illuminance Metric	0.05	0	0.20	7027.31	A	28
Road Spill	Horizontal	0	0	0	396.52	A	28
Road Spill	Max Candela (by Fixture)	7.56	0.26	31.5	121.85	A	28
Road Spill	Max Vertical Illuminance Metric	0	0	0	188.91	A	28
Soccer	Horizontal Illuminance	32.7	15	53	3.63	A	28
Track	Horizontal	7.02	0.15	16.6	112.43	A	28

NOTES: Due to setbacks of Musco Poles they will need to have pole pads.

Also to meet spill requirement the Field Max/Min does not meet standards.

From Hometown to Professional



We Make It Happen®

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2017 Musco Sports Lighting, LLC.

EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	F1-F4	60'	-	25'	TLC-LED-1150	1	1	0
				60'	TLC-LED-1150	6	6	0
4	TOTALS					28	28	0

Literacy First Charter High School Multipurpose
El Cajon,CA

GRID SUMMARY	
Name:	Blanket Grid
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED HORIZONTAL FOOTCANDLES			
	Entire Grid		
Scan Average:	0.8		
Maximum:	57		
Minimum:	0		
Avg / Min:	-		
Max / Min:	-		
UG (adjacent pts):	869.74		
CU:	0.85		
No. of Points:	3835		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	28		
Total Load:	32.2 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
Reported per TM-21-11. See luminaire datasheet for details.			

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

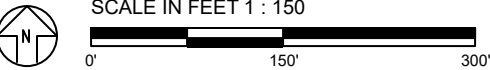
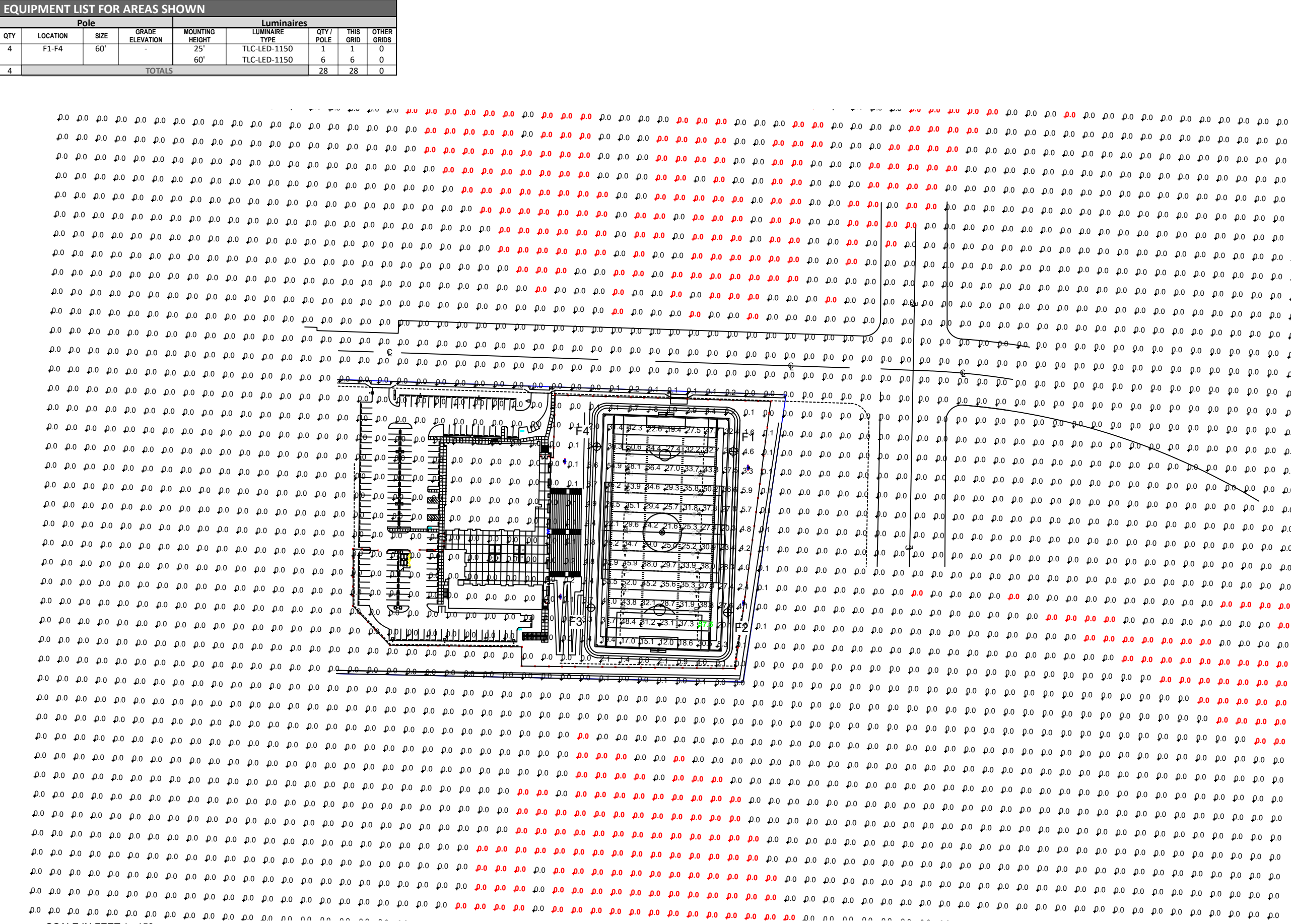
Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



We Make It Happen.®

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2017 Musco Sports Lighting, LLC.

ILLUMINATION SUMMARY



Pole location(s) ⚡ dimensions are relative to 0,0 reference point(s) ⊗

EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	F1-F4	60'	-	25'	TLC-LED-1150	1	1	0
				60'	TLC-LED-1150	6	6	0
4	TOTALS					28	28	0

Literacy First Charter High School Multipurpose
El Cajon,CA

GRID SUMMARY	
Name:	Blanket Grid
Spacing:	30.0' x 30.0'
Height:	3.0' above grade

ILLUMINATION SUMMARY			
MAINTAINED MAX VERTICAL FOOTCANDLES			
	Entire Grid		
Scan Average:	1.0		
Maximum:	79		
Minimum:	0		
Avg / Min:	-		
Max / Min:	-		
UG (adjacent pts):	491.50		
CU:	0.85		
No. of Points:	3835		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	121,000 lumens		
No. of Luminaires:	28		
Total Load:	32.2 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1150	>51,000	>51,000	>51,000
Reported per TM-21-11. See luminaire datasheet for details.			

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

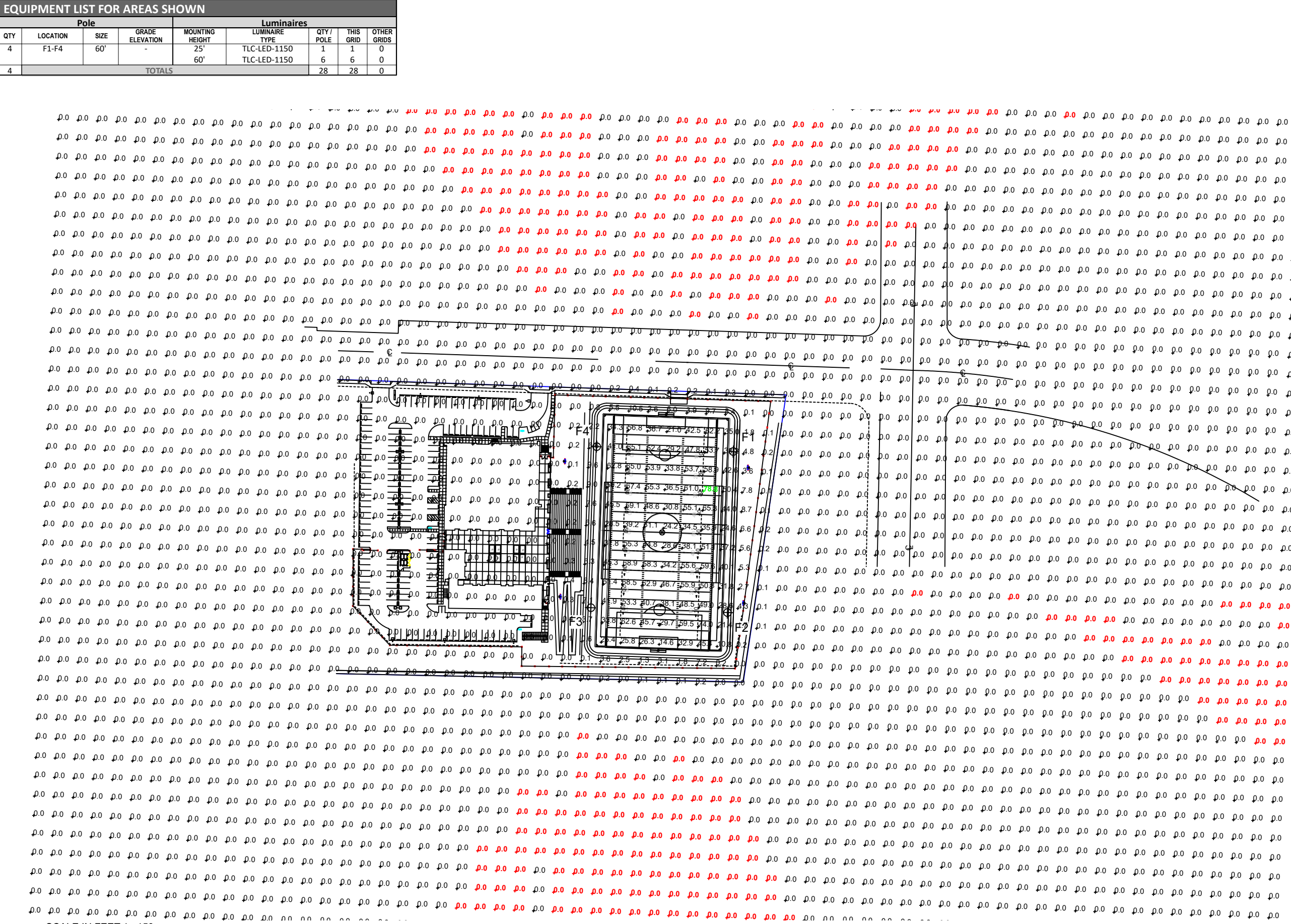
Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



We Make It Happen.®

Not to be reproduced in whole or part without the written consent of Musco Sports Lighting, LLC. ©1981, 2017 Musco Sports Lighting, LLC.

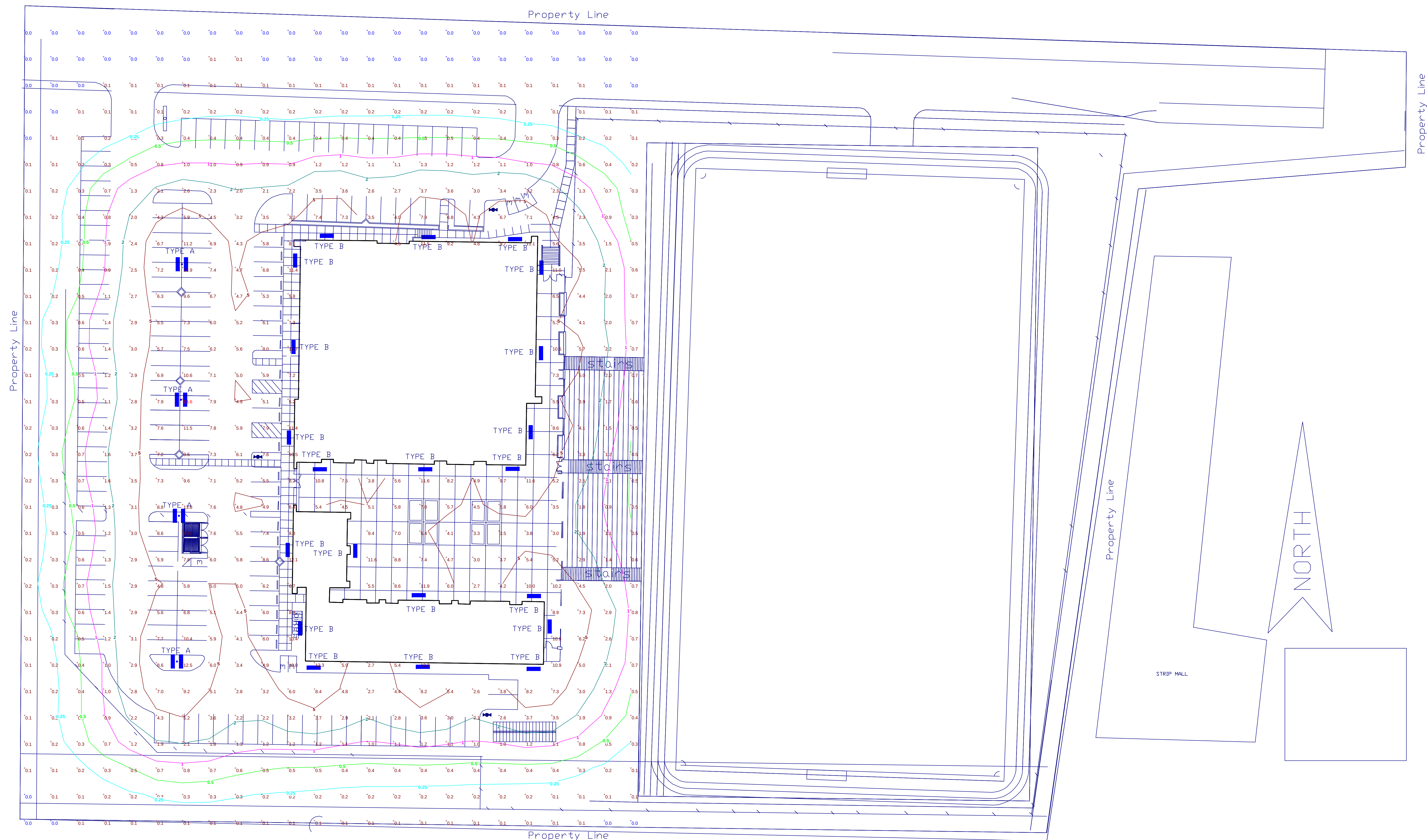
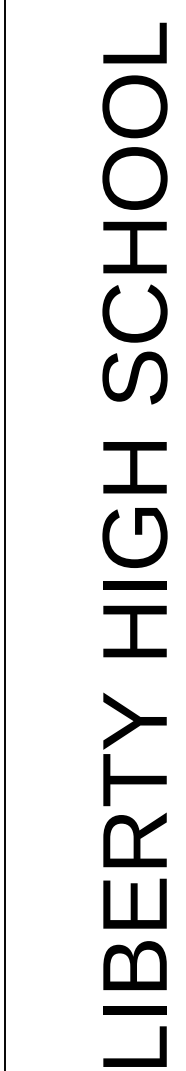
ILLUMINATION SUMMARY



SCALE IN FEET 1 : 150

0' 150' 300'

Pole location(s) ⚡ dimensions are relative to 0,0 reference point(s) ⊗



LUMINAIRE SCHEDULE									
Symbol	Label	Qty	Catalog Number	Description	Lamp	File	Lumens	LLF	Watts
	A	4	SUN-3-T-180-L-G BOA-BZ	VISIONAIRE LIGHTING SUNSET LOW PRESSURE SODIUM POLE LIGHT FIXTURE	180W LPS MOUNTED AT 25 A.F.F.	SUN-III ies	33000	1.00	440
	B	21	SUN-3-T-180-L-G PWM-BZ	VISIONAIRE LIGHTING SUNSET LOW PRESSURE SODIUM WALL MOUNTED FIXTURE	180W LPS MOUNTED AT 25 A.F.F.	SUN-FT ies	33000	1.00	220