

APPENDIX A
(Adopted December 21, 2011)

TOWN OF WEST NEWBURY PLANNING BOARD
APPLICATION FOR SPECIAL PERMIT and/or SITE PLAN REVIEW

Application for: Special Permit Site Plan Review Both

Please type or print clearly.

Pentucket Regional School District,

1. Applicant: Superintendent Justin Batholomew

Applicant's Address: 22 Main Street, West Newbury, MA 01985

Telephone Number: 978-363-2280

2. Owners of the Land: Pentucket Regional School District

Address: 24 Main Street, West Newbury, MA 01985

Telephone Number: 978-363-2280

Number of years of Ownership: _____

3. Year Lot was Created: _____

4. Description of Proposed Project, including applicable section(s) of the Zoning

Bylaw: Proposed athletic field lighting for new fields that have
been previously approved with the high school/ middle
school building project.

5. Description of Premises: Existing high school/middle school building are
make of brick with flat roofs. Site consists of
bituminous parking and driveways with grass and
turf athletic fields and vegetation

6. Address of Property Affected: 0, 22, 30 Main Street, West Newbury

Zoning District: Res B and RES C

Assessors: Map: 05720 Lot #: 0331

Registry of Deeds: Book: 4239 Page: 90

Plan Book and Plan Number _____

7. Existing Lot:

Lot Area (sq. ft.) 851,626

Street Frontage _____

Front Setback _____

Floor Area Ratio _____

Building Height 40'

Side Setbacks 77' (closest prop line)

Rear Setback _____

Lot Coverage _____

8. Proposed Lot (if applicable):

Lot Area (sq. ft.) no change
Street Frontage _____
Front Setback _____
Floor Area Ratio _____

Building Height: _____
Side Setbacks _____
Rear Setback _____
Lot Coverage _____

9. Required Lot (as required by Zoning Bylaw):

Lot Area (sq. ft.) 40,000sf/20,000sf
Street Frontage 200'/150'
Front Setback 40'/40'
Floor Area Ratio 25%/30%

Building Height 35', Dover Ammendment
Side Setbacks 20'/20'
Rear Setback 20'/20'
Lot Coverage 30%/35%

10. Existing Building (if applicable):

Ground Floor (sq.ft.) 104,839
Total sq. ft. 211,700
Use: Education

of Floors 3
Height 49'7"
Type of Construction IIA, IIB, IV

11. Proposed Building:

Ground Floor (sq.ft.) no change
Total sq. ft. _____
Use: _____

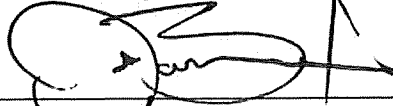
of Floors _____
Height _____
Type of Construction _____

12. Has there been a previous application for a Special Permit or Site Plan Review from the Planning Board on these premises? Yes If so, when, what type of construction, and the action made?

Construction of new middle school / high school building, parking and fields

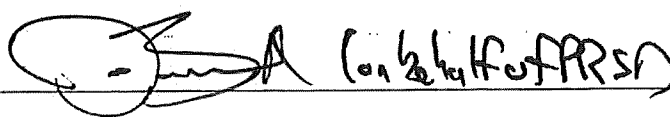
13. Applicant and Landowner signature(s):

Every Application for a Special Permit/Site Plan Review shall be made on this form which is the official form of the Planning Board. Every Application shall be filed with the Town Clerk's Office. It shall be the responsibility of the Applicant to furnish all supporting documentation with this application. The dated copy of this Application received by the Town Clerk or Planning Office does not absolve the Applicant from this responsibility. The Applicant shall be responsible for all expenses for filing and legal notification. Failure to comply with application requirements, as cited herein and in the Planning Board Regulations, may result in a dismissal by the Planning Board of this Application as incomplete.


Applicant's Signature:  _____

Print or type name here: Dr. Justin Bantylomen _____

Date: 11/28/22 _____

Owner's Signature:  _____

Print or type name here: Dr. Justin Bartholomew

Owner's Signature: 

Print or type name here: Dr. Justin Bartholomew

Date: 21 November 2022

(Please note that all Owners of Record must sign the Application.)

15. Please list title of plans and documents you will be attaching to this Application.

**Pentucket Regional School District Special Permit Modification
November 29, 2022**

Supplemental Information

- 1. Specific Field and Bleacher Photometric plans (see pgs. 13-17)**
- 2. Overall Site Photometric Plan (see pg. 18)**
- 3. Equipment Layout Plan (see pg. 19)**
- 4. Technical Information (balance of Musco report)**
- 5. Foot Candle Reference Guide (Wisconsin Lighting Lab)**

RECEIVED

09/20/2022

DORE + WHITTIER
NEWBURYPORT, MA



W.T. RICH COMPANY, INC.

SUBMITTAL COVER SHEET

PROJECT:

Pentucket Regional School District Building Project
24 Main Street
West Newbury, MA 01985
WTR Project No. 201805

ARCHITECT:

Dore & Whittier Architects, Inc.
260 Merrimac Street
Building 7, 2nd Floor
Newburyport, MA 01950

CONSTRUCTION MANAGER:

W.T. Rich Company, Inc.
1075 Worcester Street, Suite 310
Natick, MA 01760

DATE OF SUBMISSION:

9/19/2022

SUBMISSION BY:

W.T. Rich Company, Inc.

SUBMITTAL DESCRIPTION:

265600-5.0 - Musco Sports Lighting Complete Package (For Record)

SPECIFICATION SECTION:

265600 - Exterior Lighting

SPECIFICATION PARAGRAPH:

LEED DATA SHEET PROVIDED:

YES NO

REMARKS:

Refer to comments on electrical review cover sheet.

- Reviewed (No Comments)
- Reviewed (See Comments)
- Reviewed (Accepted for Record)
- Reviewed (Revise & Resubmit)
- Rejected

Checked only for conformance with the design concept of the project and with the information provided in the Contract Documents. Review of shop drawings or other submittals shall not release the Contractor from responsibility for deviations from Drawings and Specifications, errors in shop drawings or schedules, quantities, dimensions, fabrication, installation, and coordination requirements. The Contractor shall check and verify all field measurements.

 **FOR REVIEW AND APPROVAL**

Pentucket Regional School District Building Project
This submittal has been reviewed by W.T. Rich Co. for general conformance with the information provided in the Contract Documents. All field dimensions, verification and conditions have been or will be verified prior to fabrication.


W.T. RICH COMPANY, INC.

Digitally signed by Joshua P Hagan
DN: cn=US,
E=jphagan@doreandwhittier.com, o="Dore
& Whittier Architects, Inc.", CN=Joshua P
Hagan

Reason: I have reviewed this document
Date: 2022.09.22 15:11:36-0400'

Signature + Date

DORE + WHITTIER
Vermont | Massachusetts doreandwhittier.com



Submittal Transmittal

Vanderweil Engineers | Boston MA 02210 United States

PROJECT: 29129 - Pentucket Regional HS Study/SD 29129.00 DATE SENT: 9/22/2022

SUBJECT: Musco Sports Lighting Complete Package (For Record) SUBMITTAL ID: 265600-5.0

TYPE: Submittal TRANSMITTAL ID: 01429

PURPOSE: Approved as Noted - Reviewed and found generally acceptable. Minor deviations may be noted. No further submittal required if notations are complied with. VIA: Email

SPEC SECTION: 265600

FROM

NAME	COMPANY	EMAIL	PHONE
DL-Bos-ShopDrawings	Vanderweil Engineers	DL-Bos-ShopDrawings@Vanderweil.com	

TO

NAME	COMPANY	EMAIL	PHONE
Josh Hagan	Dore & Whittier Architects, Inc.	jhagan@doreandwhittier.com	(978) 499-2999

REMARKS:

**Response (Approved as Noted - Reviewed and found generally acceptable. Minor deviations may be noted. No further submittal required if notations are complied with.)
from: Joanna Gustafson (Vanderweil Engineers)**

Remarks:

1. No Comments - Submittal reviewed for record. Equipment is purchased by owner and specified by MUSCO, Installed by Division 26.

CONTENTS

QUANTITY: 1 DATED: 9/22/2022 NUMBER:

DESCRIPTION:

265600-5.0 - Musco Sports Lighting Complete Package (For Record)-RGV.pdf

ACTION:

REMARKS:

Submittal Transmittal

DATE: 9/22/2022
ID: 01429

COPIES:

DL-Bos-ShopDrawings (Vanderweil Engineers)



W.T. Rich Company
 1075 Worcester Street, Suite 310
 Natick, Massachusetts 01730
 P: (617) 467-6010

Project: 201805 Pentucket Regional Middle-High School
 24 Main Street
 West Newbury, Massachusetts 01985

Submittal #265600-5.0 - Musco Sports Lighting Complete Package (For Record) 265600 - Exterior Lighting

Revision	0	Submittal Manager	Ben Danforth (W.T. Rich Company, Inc.)
Status	Open	Date Created	Sep 19, 2022
Issue Date	Sep 19, 2022	Spec Section	265600 - Exterior Lighting
Responsible Contractor	Dore & Whittier Architects, Inc.	Received From	Josh Hagan (Dore & Whittier Architects, Inc.)
Received Date		Submit By	
Final Due Date	Oct 3, 2022	Lead Time	
		Cost Code	
Location		Type	Other
Approvers	Josh Hagan (Dore & Whittier Architects, Inc.), Vanderweil Team Inbox (R.G. Vanderweil Engineers, LLP)		
Ball in Court	Vanderweil Team Inbox (R.G. Vanderweil Engineers, LLP)		
Distribution	Matt Waltermire (W.T. Rich Company, Inc.), Steve Theran (The Vertex Companies, Inc.), Steve Taylor (W.T. Rich Company, Inc.), Laurie Soave (The Vertex Companies, Inc.), Suzanne Sarles (The Vertex Companies, Inc.), Eric Rubin (The Vertex Companies, Inc.), Ken Nobrega (W.T. Rich Company, Inc.), Kyle Manny (W.T. Rich Company, Inc.), Kyle Leone (W.T. Rich Company, Inc.), Jon Lemieux (The Vertex Companies, Inc.), Josh Hagan (Dore & Whittier Architects, Inc.), Brad Dore (Dore & Whittier Architects, Inc.), Ben Danforth (W.T. Rich Company, Inc.), Dan Blumberg (W.T. Rich Company, Inc.)		

Description

Submittal Workflow

Name	Sent Date	Due Date	Returned Date	Response	Attachments
General Information					265600-5.0 - Musco Sports Lighting Complete Package (For Record).pdf
Josh Hagan	Sep 19, 2022	Oct 3, 2022	Sep 20, 2022	Forwarded For Review	265600-5.0 - Musco Sports Lighting Complete Package (For Record).pdf (Current)
Comment	Please review as high priority				
Vanderweil Team Inbox	Sep 20, 2022	Sep 30, 2022		Pending	

<input checked="" type="checkbox"/> Approved as Noted <input type="checkbox"/> Reviewed for Informator <input type="checkbox"/> Rejected: Revise and Resubmit <input type="checkbox"/> Rejected	Project Number: 23129.00 Submittal ID: 265600-5.0
<p><small>This review is only for general coordination with the design concept, and the information given in the Construction Documents. Corrections or comments made on the shop drawings during this review as well as approval. They will do not relieve us of our responsibility for compliance with the requirements of the plans and specifications and applicable laws, codes and regulations. Review of a specific item shall not indicate review or an assembly of which the item is a component. The Contractor is responsible for determining to be confirmed and so raised at the jobsite; information that pertains to any in the fabrication processes or in the materials, methods, techniques, sequences or procedures of construction; coordination of the Work with that of all other trades; and performing all Work in a safe and satisfactory manner.</small></p>	
Date 9/22/2022 By: JG R.G. Vanderweil Engineers, LLP	

Project Submittal: Approval Letter

September 16, 2022

Josh Hagan
Dore and Whitter Architects Inc
260 Merrimac Street
Newburyport, MA 01950

RE: Pentucket Regional High School Football
Project #102066

Dear Josh Hagan

This serves as approval for submittals provided by Musco Sports Lighting, LLC. Please review the enclosed documents and note changes where appropriate. Upon your approval, we can begin fabrication of the materials for your project. Any changes may result in delay of production, delivery, and additional costs.

We shall deliver equipment to the job site 10 - 12 weeks, after submittal approval or release of order.

Please indicate your approval of these submittals in their entirety by signing below.

Authorized Signature

Date

Printed Name

Company Name

Please return one copy of this form to:

Musco Sports Lighting, LLC
2107 Stewart Road
Muscatine, Iowa 52761

Toll Free: 800-756-1205
Fax: 800-374-6402
Email: pete.robles@musco.com



MUSCO LIGHTING SUBMITTAL FOR PRODUCTION

PREPARED FOR:

Pentucket Regional High School Football

Lighting Project
West Newbury, MA
September 16, 2022

Project #102066

Submitted by:

Musco Sports Lighting, LLC

Attn: Pete Robles
2107 Stewart Road
Muscatine, Iowa 52761

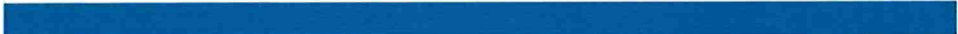
Toll Free: 800-756-1205
Fax: 800-374-6402



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- F. WARRANTY
- G. PRODUCT INFORMATION



A. BILL OF MATERIALS

Equipment Description	
80	Light-Structure System™ Total Light Control™ TLC-LED-1200 luminaires
16	Light-Structure System™ Total Light Control™ TLC-BT-575 luminaires
2	Light-Structure System™ Total Light Control™ TLC-RGBW luminaires
4	70 ft galvanized steel poles
4	80 ft galvanized steel poles
2	90 ft galvanized steel poles
10	Pre-cast concrete foundations (9,500 PSI) with integrated grounding
✓	Factory wired and assembled pole top luminaire assemblies
✓	Factory wired electrical component enclosures
✓	Factory built wire harnesses with plug-in connections
Control and monitoring cabinet Show-Light – Football & Soccer	
1	24 x 48 Control and monitoring cabinet Show-Light™ entertainment package
6	30-amp contactors
2	On-Off-Auto (OOA) switches
Control and monitoring – Baseball & Soccer 2	
1	24 x 48 Control and monitoring cabinet
✓	High/medium/low dimming
6	30-amp contactors
2	On-Off-Auto (OOA) switches
Warranty	
✓	Musco's Constant 25™ product assurance and warranty program that eliminates 100% maintenance costs for 25 years, including labor, materials, monitoring and guaranteed light levels.





B. LIGHTING DESIGN



Pentucket Regional HS FB
West Newbury, MA

Lighting System

Pole/Fixture Summary						
Pole ID	Pole Height	Min Height	Fixture Qty	Luminaire Type	Load	Circuit
A1-A2	80'	80'	3	TLC-LED-1200	5.95 kW	C
B1-B2	90'	16'	1	TLC-BT-575	0.59 kW	C
B1-B2	90'	90'	8	TLC-LED-1200	3.36 kW	B
C1-C2	80'	16'	2	TLC-BT-575	1.15 kW	B
C1-C2	80'	80'	7	TLC-LED-1200	8.19 kW	B
F1-F2	70'	16'	1	TLC-BT-575	0.59 kW	B
F1-F2	70'	70'	10	TLC-LED-1200	11.70 kW	A
F3-F4	70'	16'	2	TLC-BT-575	1.15 kW	A
F3-F4	70'	70'	10	TLC-LED-1200	11.70 kW	A
		16'	2	TLC-BT-575	1.15 kW	A
		60'	1	TLC-RGBW	0.64 kW	D
10			98		104.08 kW	

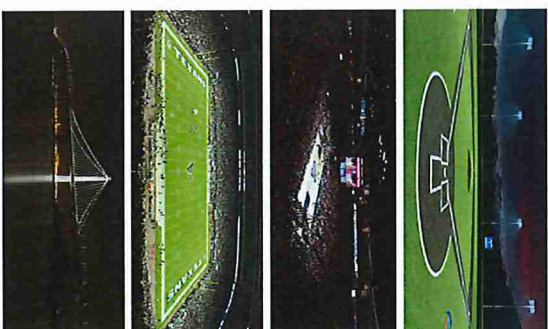
Circuit Summary			
Circuit	Description	Load	Fixture Qty
A	Football / Soccer 1	51.4 kW	48
B	Baseball / Soccer 2	38.55 kW	36
C	Baseball	12.85 kW	12
D	Blatenders	1.28 kW	2

Fixture Type Summary						
Type	Source	Wattage	Lumens	L20	L80	Quantity
TLC-LED-1200	LED 5700K -75 CRI	1170W	136,000	>120,000	>120,000	50
TLC-RGBW	LED 5700K -75 CRI	640W	28,500	>120,000	>120,000	2
TLC-BT-575	LED 5700K -75 CRI	575W	52,000	>120,000	>120,000	18

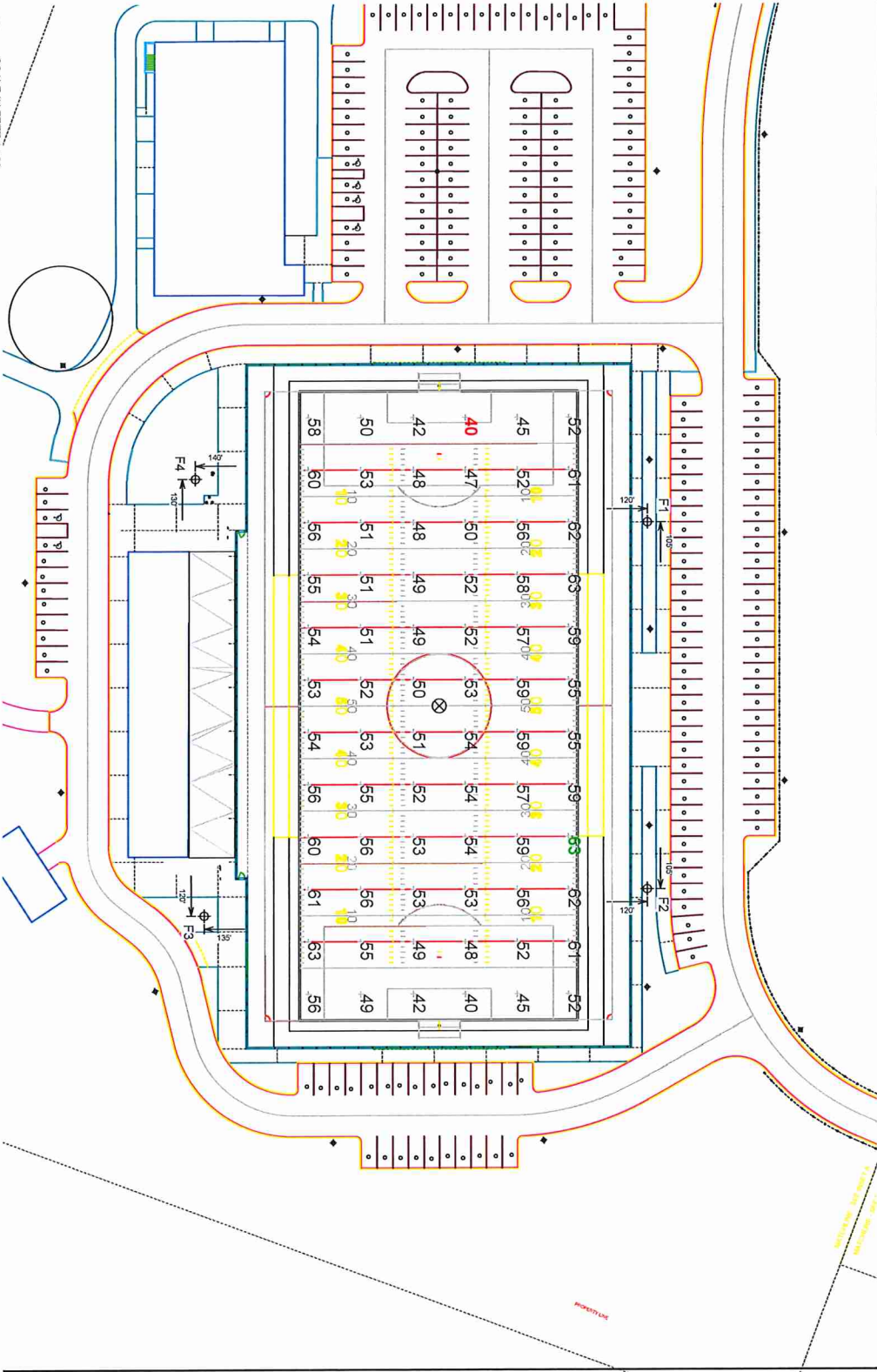
Light Level Summary

Calculation Grid Summary									
Grid Name	Calculation Method	Ave	Min	Max	Max/Min	Avg/Min	Circuits	Fixture Qty	
Baseball (Infield)	Horizontal Illuminance	51.7	39	62	1.57	1.33	B,C	48	
Baseball (Outfield)	Horizontal Illuminance	31	22	43	1.98	1.41	B,C	48	
Football	Horizontal Illuminance	53.6	40	63	1.58	1.34	A	48	
Home Blatenders	Horizontal	28.5	7	50	7.61	4.07	A,D	50	
Soccer 1	Horizontal Illuminance	53	41	62	1.52	1.29	A	48	
Soccer 2	Horizontal Illuminance	30.3	25	37	1.46	1.21	B	36	
Zero Grid	Horizontal Illuminance	5.81	0	64	0.00		A,B,C	96	

From Hometown to Professional



EQUIPMENT LIST FOR AREAS SHOWN								
QTY	LOCATION	SIZE	ELEVATION	MOUNTING HEIGHT	LUMINAIRE MAKE / MODEL	NO. OF LUMINAIRES	WATTAGE	OTHER
2	F1-F2	7'0"	15.5'	7'0"	TLC-RB-575	2	2	0
2	F3-F4	7'0"	15.5'	7'0"	TLC-RB-200	2	10	0
					TLC-RB-575	2	2	0
					TLC-RB-200	10	10	0
4	TOTALS					50	48	2



SCALE IN FEET 1 : 60
 0' 60' 120'

ENGINEERED DESIGN By: File #1020668 - 27-Jul-22

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

Pentucket Regional HS FB
 West Newbury, MA

GRID SUMMARY
 Name: Football
 Size: 360' x 160'
 Spacing: 30.0' x 30.0'
 Height: 3.0' above grade

LUMINATION SUMMARY
 MAINTAINED HORIZONTAL FOOTCANDLES

Guaranteed Average:	50
San Average:	53.60
Maximum:	63
Minimum:	40
Avg / Min:	1.34
Guaranteed Max / Min:	2
Max / Min:	1.58
UG (adjacent pts):	1.19
CU:	0.61
No. of Points:	72
LUMINAIRE INFORMATION	
Applied Circuits:	A
No. of Luminaires:	48
Total Load:	51.4 KW

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.5% dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-8-15.

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

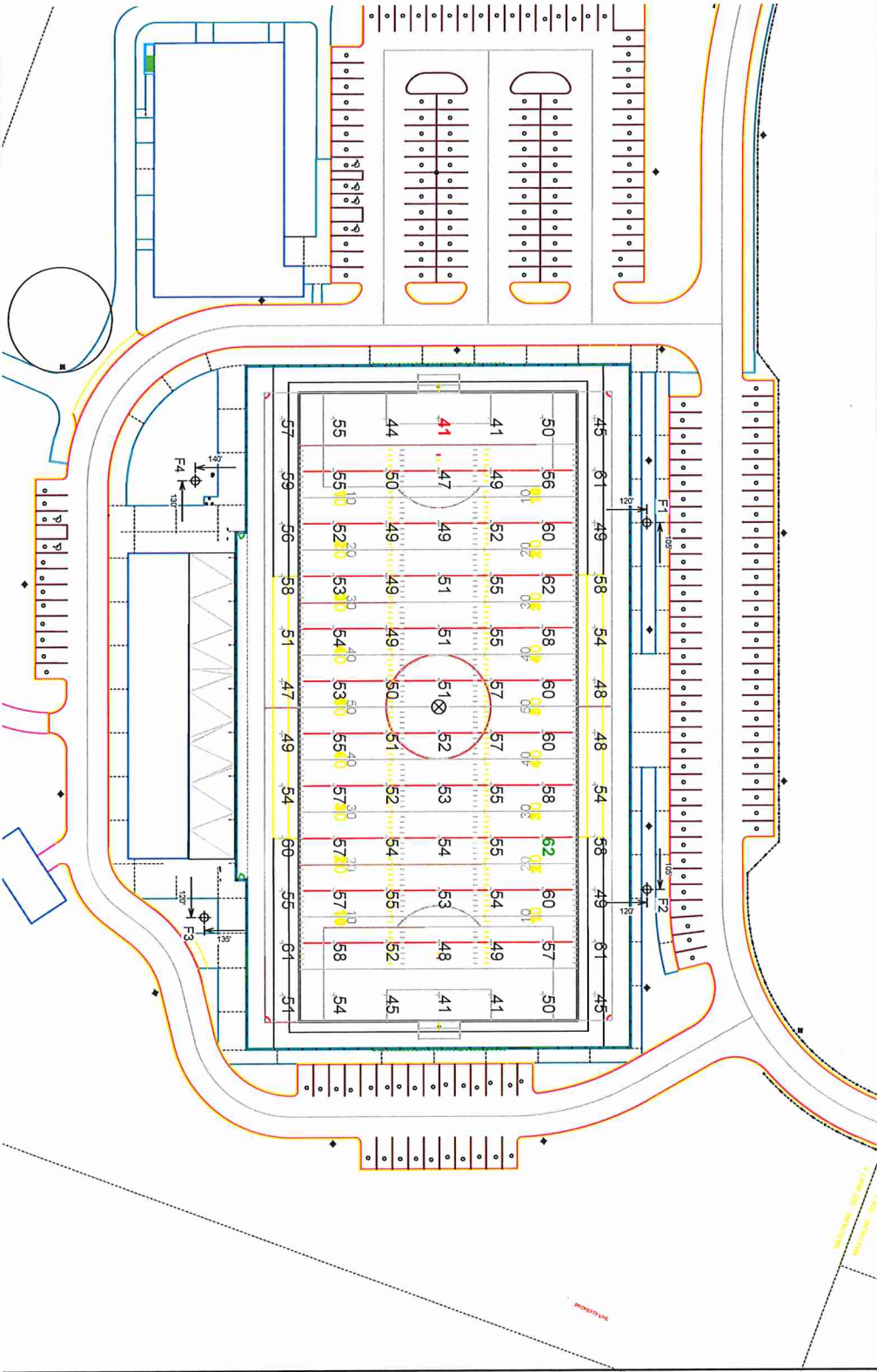
Installation Requirements: Results assume ± 3% nominal voltage at the side of the driver and structures located within 3 feet (1m) of design locations.

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ILLUMINATION SUMMARY

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EQUIPMENT LIST FOR AREAS SHOWN					
QTY	LOCATION	SIZE	FOOTING	HEIGHT	WARRANTY
2	F1-F2	7'0"	0"	15.52'	TLC-ED-575
2	F3-F4	7'0"	0"	15.52'	TLC-ED-1200
TOTALS					
50					
48					
2					



SCALE IN FEET 1 : 60
 0' 60' 120'

ENGINEERED DESIGN BY: File #1020668 - 27-JUL-22

Pentucket Regional HS FB
 West Newbury, MA

GRID SUMMARY
 Name: Section 1
 Size: 360' x 200'
 Spacing: 30.0' x 30.0'
 Height: 3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

Guaranteed Average:	50
San Average:	52.95
Maximum:	62
Minimum:	41
Avg / Min:	1.30
Guaranteed Max / Min:	2
Max / Min:	1.52
UG (adjacent pt):	1.34
CU:	0.70
No. of Points:	84

LUMINAIRE INFORMATION

Applied Circuit:	A
No. of Luminaires:	48
Total Load:	51.4 KW

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.3% 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.

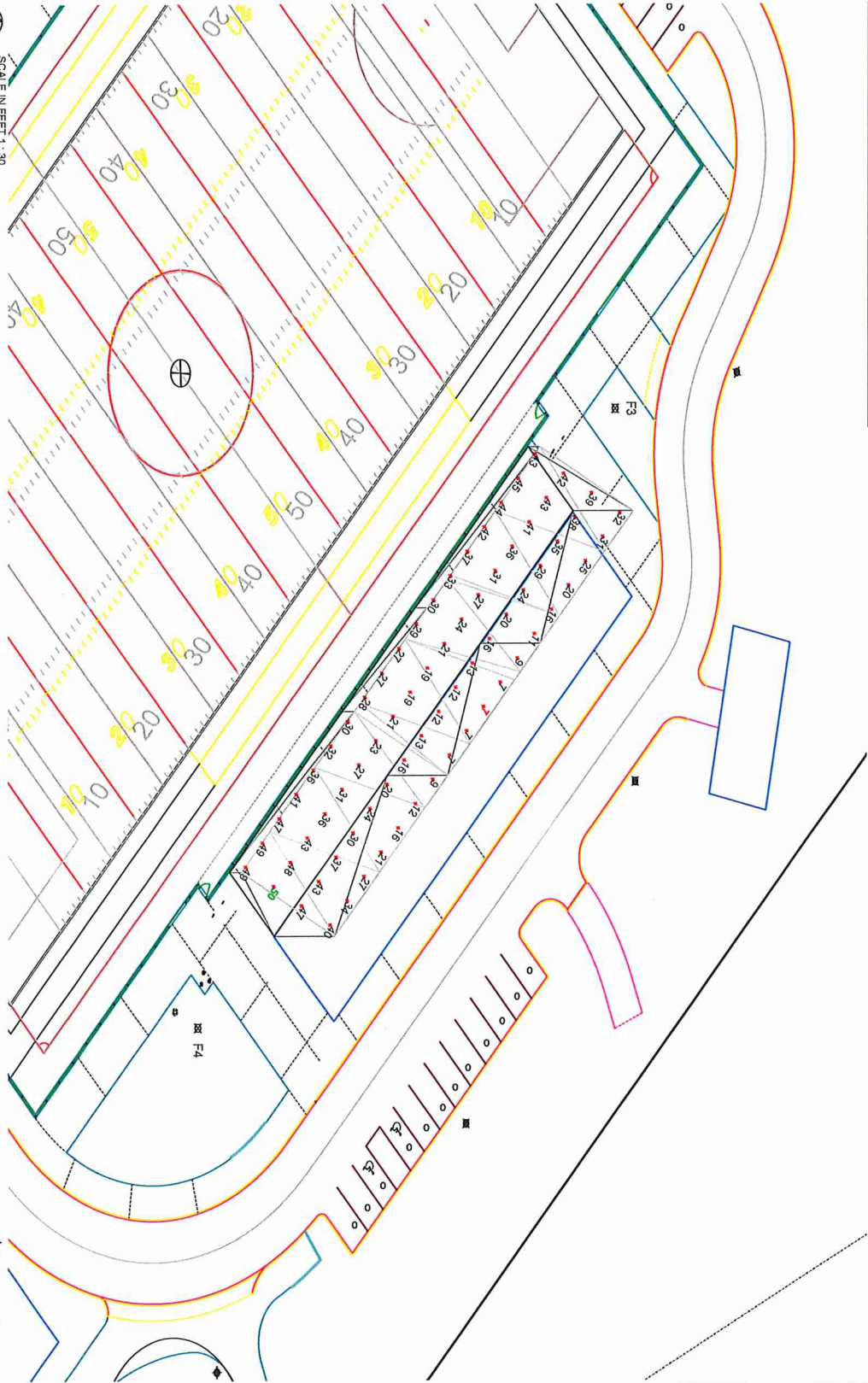
Installation Requirements: Results assume ± 3% nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

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ILLUMINATION SUMMARY

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EQUIPMENT LIST FOR AREAS SHOWN									
QTY	LOCATION	SIZE	SCALE	MOUNTING HEIGHT	ELEVATION	Luminaires			
						LMN	HT	HTS	OTHER
2	F1-F2	7'0"	-	15.5'	TLC-RF-975	2	10	2	0
2	F3-F4	7'0"	-	15.5'	TLC-LED-2000	2	10	2	0
				9'0"	TLC-RF-975	1	10	2	0
				9'0"	TLC-RF-975	1	10	2	0
				9'0"	TLC-LED-2000	1	10	2	0
				9'0"	TLC-LED-2000	1	10	2	0
TOTALS						50	50	0	0



Pole heights (⊕) dimensions are relative to 0.0 reference points (⊗)

ENGINEERED DESIGN BY: FILE #1020668 - 27-JUL-22

Pentucket Regional HS FB

West Newbury, MA

GRID SUMMARY	
Name:	Horns Bleachers
Spacing:	10'0" x 10'0"

ILLUMINATION SUMMARY	
MAINTAINED HORIZONTAL FOOT-CANDLES	
Spot Average:	28.67
Minimum:	50
Avg / Min:	4.32
Max / Min:	7.61
UG (adjacent psi):	1.84
CU:	0.03
No. of Points:	72

LUMINAIRE INFORMATION	
Applied Circuits:	A, D
No. of Luminaires:	50
Total Load:	52.68 kW

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.5% 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 Ampereage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

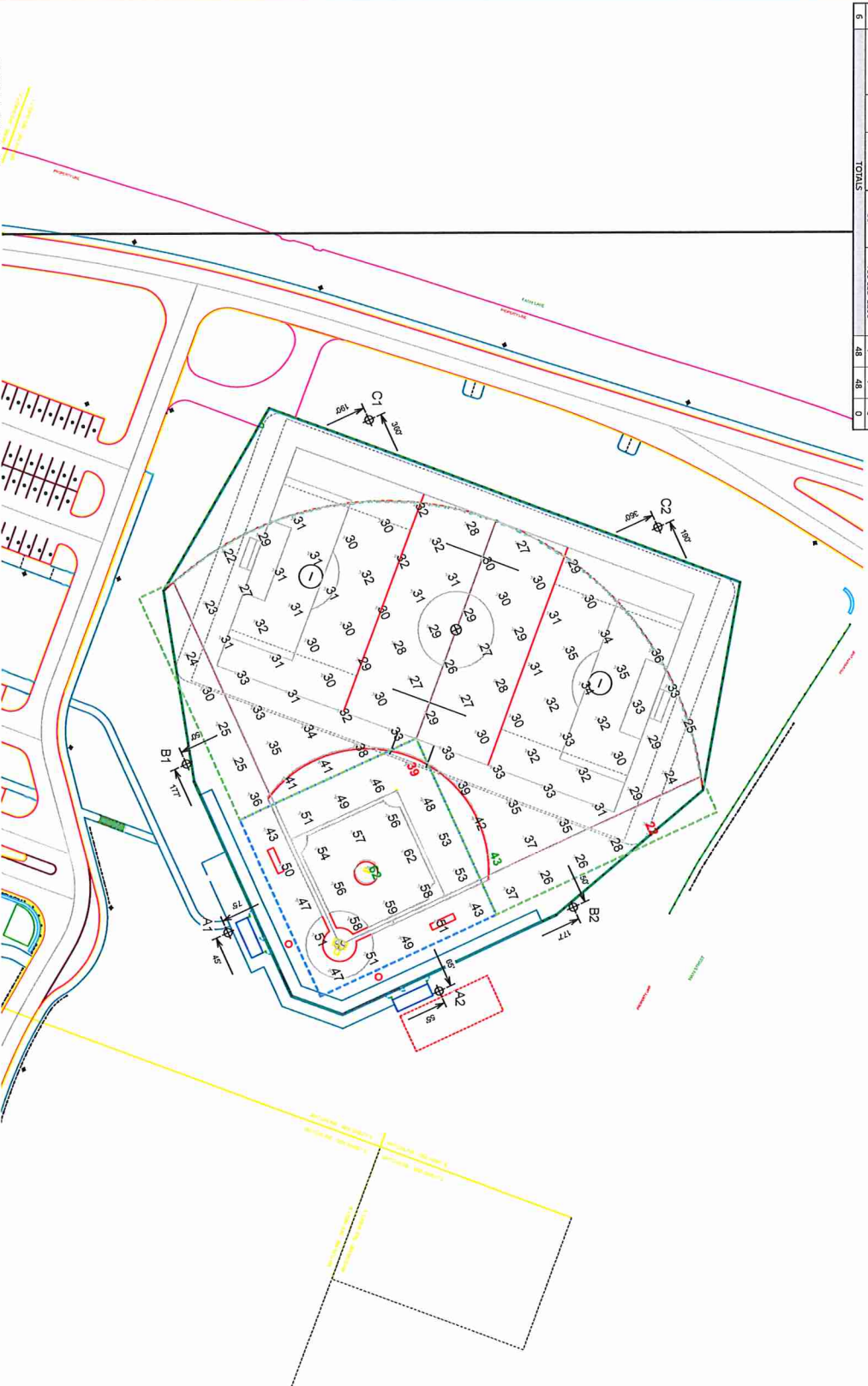
Installation Requirements: Results assume a 3% nominal voltage at the side of the driver and structures located within 3 feet (1m) of design locations.

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Lighting
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ILLUMINATION SUMMARY

EQUIPMENT LIST FOR AREAS SHOWN									
QTY	LOCATION	SIZE	SPACING	MOUNTING HEIGHT	LUMINAIRE	LUMINAIRE			
						QTY	HUB	OTHER	OTHER
2	A1-A2	80'	0'	15.5'	TLC-ER-975	1	1	0	0
2	B1-B2	90'	0'	15.5'	TLC-ER-975	2	2	0	0
2	C1-C2	80'	0'	15.5'	TLC-ER-975	2	2	0	0
TOTALS						48	48	0	0



ENGINEERED DESIGN By: File #10209688 - 27-JUL-22

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

ILLUMINATION SUMMARY	
MAINTAINED HORIZONTAL FOOTCANDLES	
Infield	30
Outfield	31.03
Guaranteed Average:	51.74
Spot Average:	62
Maximum:	39
Minimum:	22
Avg / Min:	1.31 / 1.44
Guaranteed Max / Min:	2 / 2.5
Max / Min:	1.57 / 1.98
UG (adjacent psi):	1.23 / 1.48
CU:	0.66
No. of Poles:	25
No. of Luminares:	48
Applied Circuits:	B, C
No. of Luminares:	48
Total Load:	51.4 kW

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.5% 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 Ampenage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

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

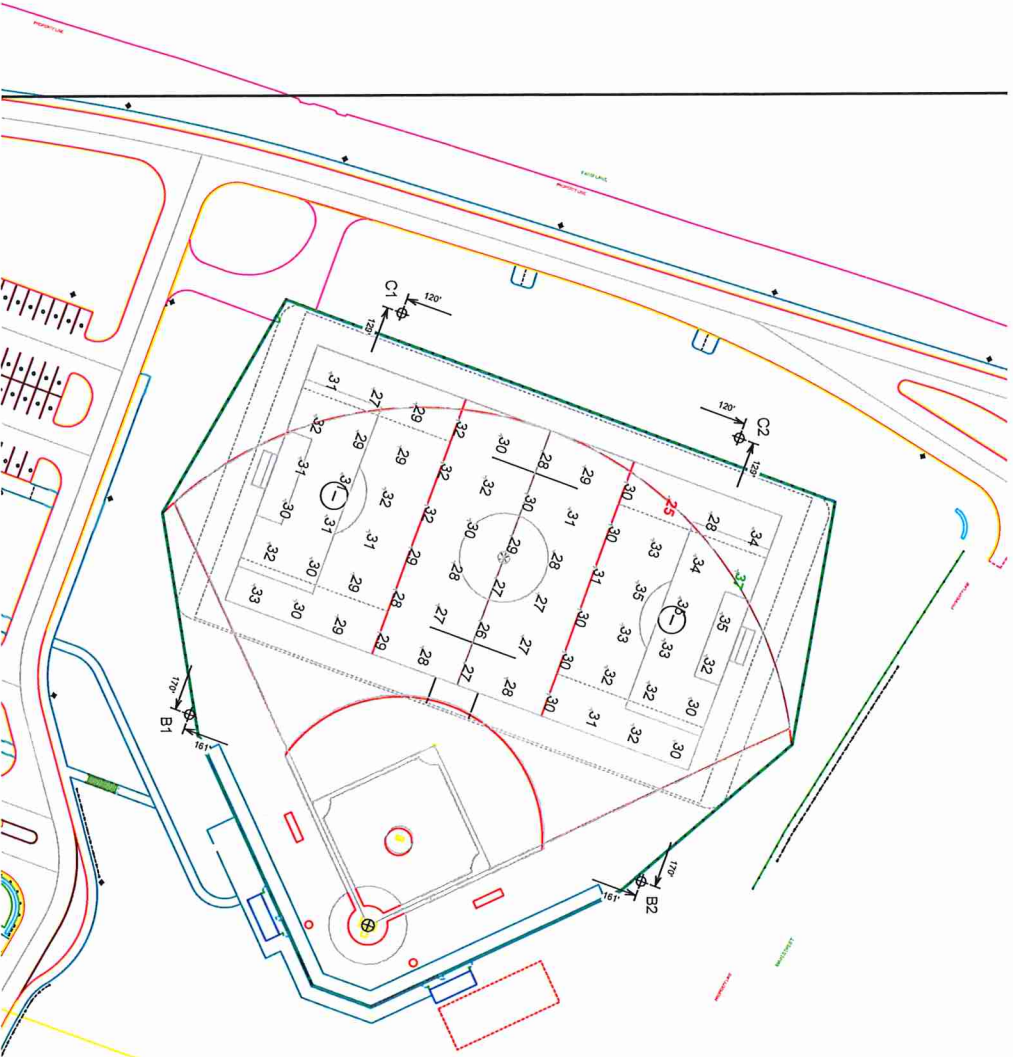
Pole locations (P) - dimensions are relative to 0:0 reference point(s)

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Lighting
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ILLUMINATION SUMMARY

EQUIPMENT LIST FOR AREAS SHOWN		Pole		Luminaires						
QTY	LOCATION	SIZE	HEIGHT	MANUFACTURER	MODEL	QTY	QTY	QTY	QTY	QTY
2	B1-B2	90"	15.48'	TLC-DR-975	TLC-LED-1200	2	2	2	0	0
2	C1-C2	80"	0'	15.48'	TLC-DR-975	1	1	1	0	0
4	TOTALS			80"	TLC-LED-1200	36	36	36	0	0



SCALE IN FEET 1 : 80
 0' 80' 160'

ENGINEERED DESIGN BY: FILE #1020668 - 27-JUL-22

Pentucket Regional HS FB
 West Newbury, MA
GRID SUMMARY
 Name: Soccer 2
 Site: 380' x 180'
 Spacing: 30.0' x 30.0'
 Height: 3.0' above grade

ILLUMINATION SUMMARY
 MAINTAINED HORIZONTAL FOOT-CANDLES
 Entire Grid
 Guaranteed Average: 30
 Scan Average: 30.33
 Maximum: 37
 Minimum: 25
 Avg / Min: 1.21
 Guaranteed Max / Min: 2.5
 Max / Min: 1.46
 UG (adjacent psi): 1.32
 CU: 0.42
 No. of Poles: 66
 LUMINAIRE INFORMATION
 Applied Circuits: B
 No. of Luminaires: 36
 Total Load: 38.53 KW

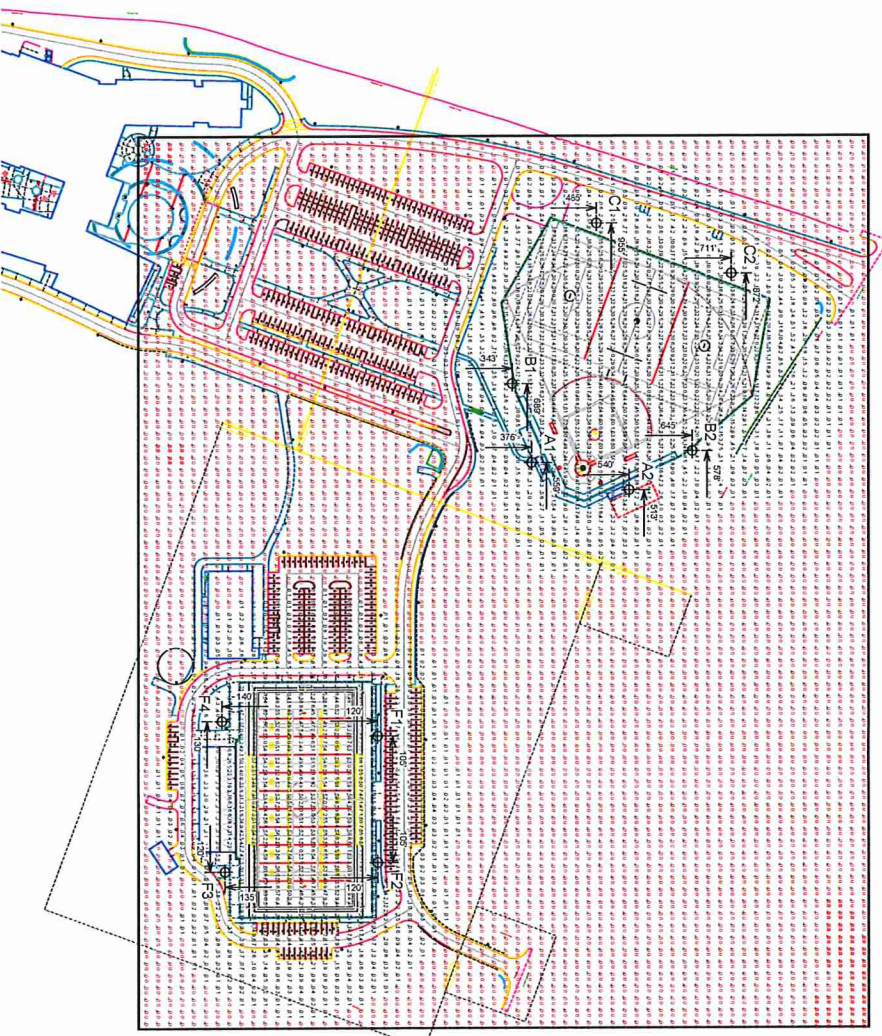
Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.5% dirt depreciation factor.
Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.
Electrical 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.

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

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 ILLUMINATION SUMMARY

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QTY	LOCATION	Pole	SIZE	GRADE	ELEVATION	Luminaires				
						MOONING	DRY	TRIP	OTHER	TOTAL
2	A1-A2	80'	0"	15.48'	TLC-RF-575	1	5	0	0	6
2	B1-B2	90'	0"	15.48'	TLC-LED-1200	5	1	0	0	6
2	C1-C2	80'	0"	15.48'	TLC-RF-575	2	2	0	0	4
2	F1-F2	70'	-	15.5'	TLC-LED-1200	7	7	0	0	14
2	F3-F4	70'	-	15.5'	TLC-LED-1200	10	10	0	0	20
TOTALS						98	96	0	0	194



SCALE IN FEET 1 : 200
 0' 200' 400'

ENGINEERED DESIGN BY: File #12020688 - 27-JUL-22

Pentucket Regional HS FB

West Newbury, MA

GRID SUMMARY
 Name: Zone Grid
 Size: 1480' x 1230'
 Spacing: 200' x 200'
 Height: 3.0' above grade

ILLUMINATION SUMMARY
 MAINTAINED HORIZONTAL FOOTCANDLES
 Entire Grid

Scan Average:	5.81
Maximum:	64
Minimum:	0
Avg / Min:	-
UG (adjacent pole):	23.59
CU:	0.92
No. of Poles:	4514
LUMINAIRE INFORMATION	
Applied Circuits:	A, B, C
No. of Luminaires:	96
Total Load:	102.8 kW

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.

Pole locations (P) - dimensions are relative to 0.0' reference point(s) (X)



ILLUMINATION SUMMARY

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Pentucket Regional HS FB

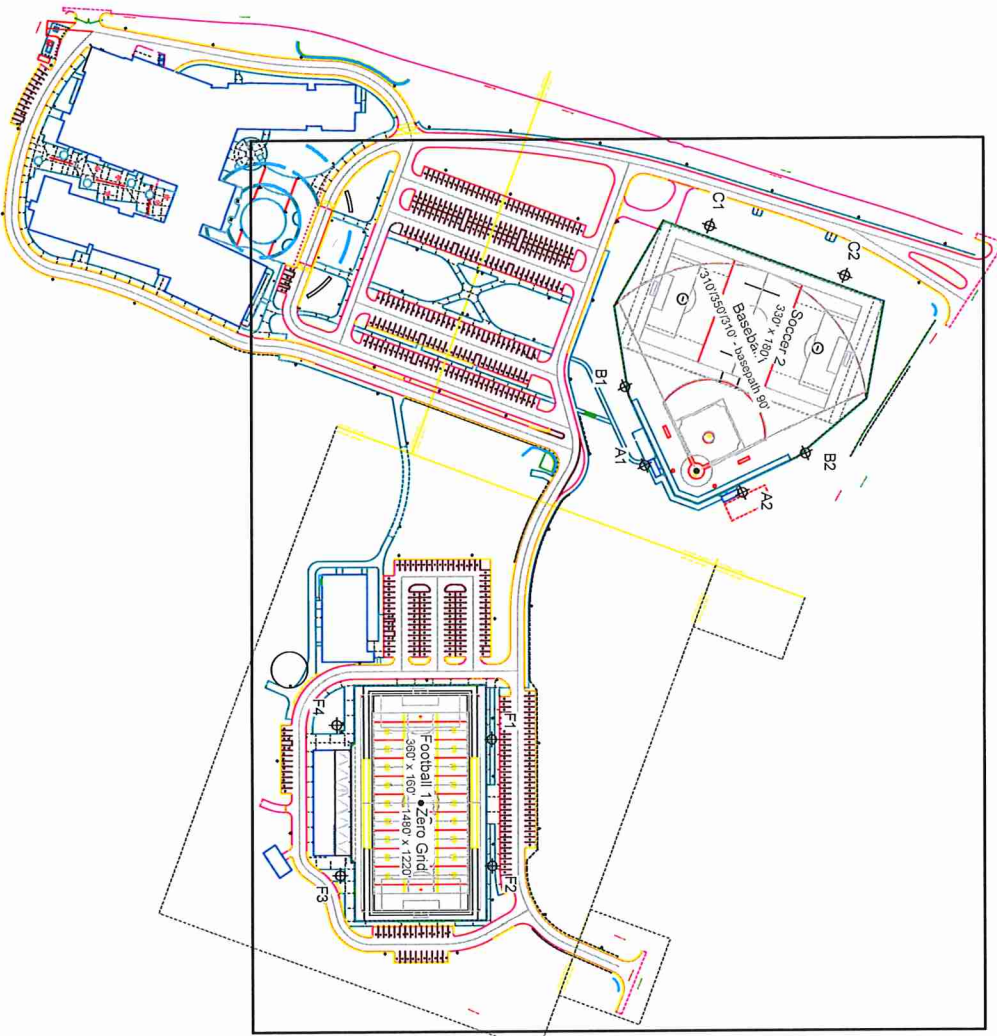
West Newbury, MA

EQUIPMENT LAYOUT

- INCLUDES:**
- Football 1
 - Soccer 1
 - Soccer 2
 - Zero grid

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

Installation Requirements: Results assume a 3% nominal voltage at the end of the electrical structures located within a feet (ft) of design locations.



EQUIPMENT LIST FOR AREAS SHOWN

QTY	LOCATION	POLE SIZE	STATUS	HEIGHT	TYPE	LUMINAIRE	QTY
2	A1-A2	80"	0'	15.5'	TTC-BR-575	1	480
2	B1-B2	90"	0'	15.5'	TTC-CE-1200	5	480
2	C1-C2	80"	0'	15.5'	TTC-CE-1200	8	480
2	F1-F2	70"	-	15.5'	TTC-CE-1200	2	480
2	F3-F4	70"	-	15.5'	TTC-CE-1200	2	480
2	F5-F4	70"	-	15.5'	TTC-CE-1200	1	480
10	TOTALS						98

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (per luminaire)	Line Amperage Per Luminaire (Total Amps)
Single Phase Voltage	208 220 240 277 347 380 480
TTC-CE-1200	180 180 180 180 180 180 180
TTC-CE-1200	7.0 6.6 6.3 5.2 4.2 4.0 3.0
TTC-CE-1200	4.5 4.3 3.8 3.3 2.7 - - 1.9
TTC-CE-1200	3.4 3.2 2.9 2.3 2.0 1.8 1.3



SCALE IN FEET 1:200
ENGINEERED DESIGN BY: File #1020658 - 27-Jul-22

Pole location(s) - Dimensions are relative to Q1 reference point(s)

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EQUIPMENT LAYOUT



C. CONTROLS AND MONITORING





Control System Summary

Project Specific Notes:

Project Information

Project #: 102066
 Project Name: Pentucket Regional High School Football
 Date: 07/27/22
 Project Engineer: Tanner Lanphier
 Sales Representative: Mike Berry
 Control System Type: Control-Link™ Control and Monitoring System
 Communication Type: PowerLine-ST
 Scan: 102066B
 Document ID: 102066P1V6-0727094436
 Distribution Panel Location or ID: Baseball
 Total # of Distribution Panel Locations for Project: 2
 Design Voltage/Hertz/Phase: 480/60/3
 Control Voltage: 120

Equipment Listing

DESCRIPTION	APPROXIMATE SIZE	QTY	SIZE (AMPS)
1.Control and Monitoring Cabinet	24 X 48		
Total Contactors		6	30 AMP
Total Off/On/Auto Switches:		2	

Materials Checklist

Contractor/Customer Supplied:

- A dedicated 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
 - HID rated or D-curve circuit breaker sized per full load amps on Circuit Summary by Zone Chart
- Wiring
 - See chart on page 2 for wiring requirements
 - Equipment grounding conductor and splices must be insulated (per circuit)
 - Lightning ground protection (per pole), if not Musco supplied
- 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
- Breaker lock-on device to prevent unauthorized power interruption to control power and powerline connection (if present)
- 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.

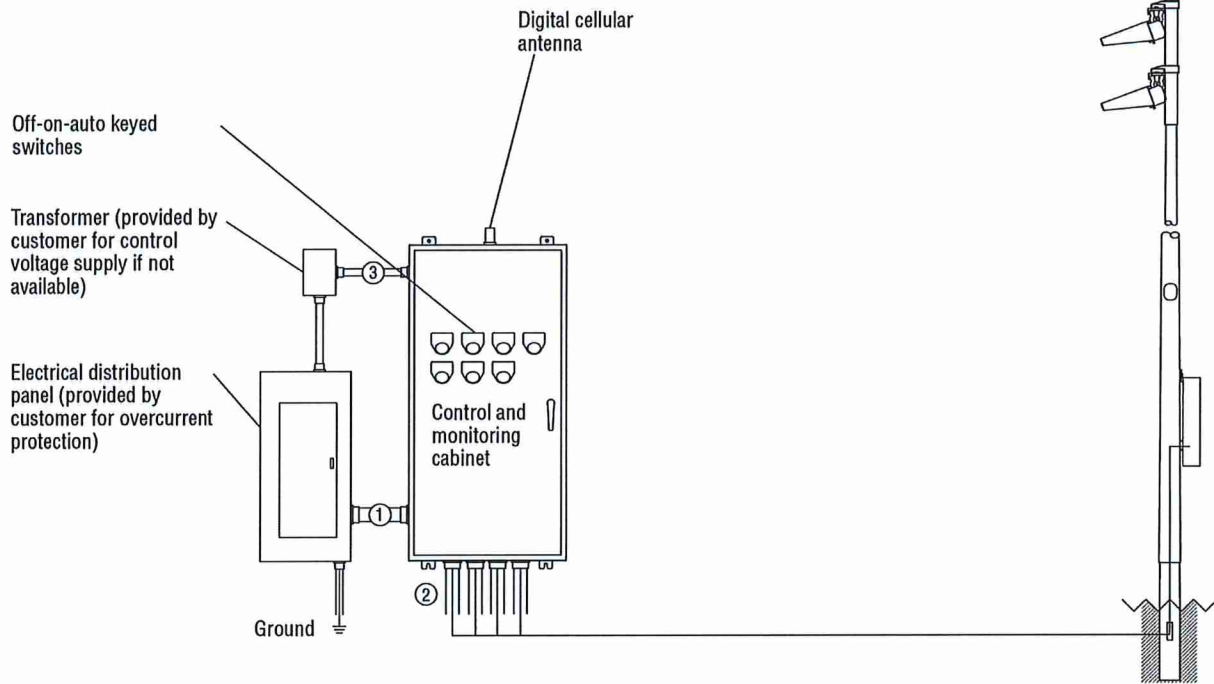
Note: Activation may take up to 1 1/2 hours.

IMPORTANT NOTES

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 electrical components 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 luminaires 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 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 is 0.9.

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

Control-Link. Control and Monitoring System



Conduit ID	Description	# of Wires	Wire (AWG)	Conduit (in)	Max. Wire Length (ft)	MUSCO Supplied	Notes
1	Line power to contactors, and equipment grounding conductor	*A	*B	*C	N/A	No	A-E
2	Load power to lighting circuits, and equipment grounding conductor	*A	*B	*C	N/A	No	A-E
3	Control power (dedicated, 20A)	3	12	*C	N/A	No	C,E

*** Notes:**

- A. See voltage and phasing per the notes on cover page.
- B. Calculate per load and voltage drop.
- C. All conduit diameters should be per code unless otherwise specified to allow for connector size.
- D. Equipment grounding conductor and any splices must be insulated.
- E. Refer to control and monitoring system installation instructions for more details on equipment information and the installation requirements.

R60-100-00_B

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



Control System Summary

Pentucket Regional High School Football / 102066 - 102066B
Baseball - Page 3 of 8

SWITCHING SCHEDULE

<u>Field/Zone Description</u>	<u>Zones</u>
Baseball	1,2
-Baseball / Soccer 2	1
-Baseball	2
Soccer 2	1

CONTROL POWER CONSUMPTION	
120V Single Phase	
VA loading of Musco Supplied Equipment	INRUSH: 1470.0
	SEALED: 156.0

CIRCUIT SUMMARY BY ZONE

POLE	CIRCUIT DESCRIPTION	# OF FIXTURES	# OF DRIVERS	*FULL LOAD AMPS	CONTACTOR SIZE (AMPS)	CONTACTOR ID	ZONE
B1	Baseball / Soccer 2	10	10	17.0	30	C1	1
B2	Baseball / Soccer 2	10	10	17.0	30	C2	1
C1	Baseball / Soccer 2	8	8	14.4	30	C3	1
C2	Baseball / Soccer 2	8	8	14.4	30	C4	1
A1	Baseball	6	6	10.5	30	C5	2
A2	Baseball	6	6	10.5	30	C6	2

*Full Load Amps based on amps per driver.

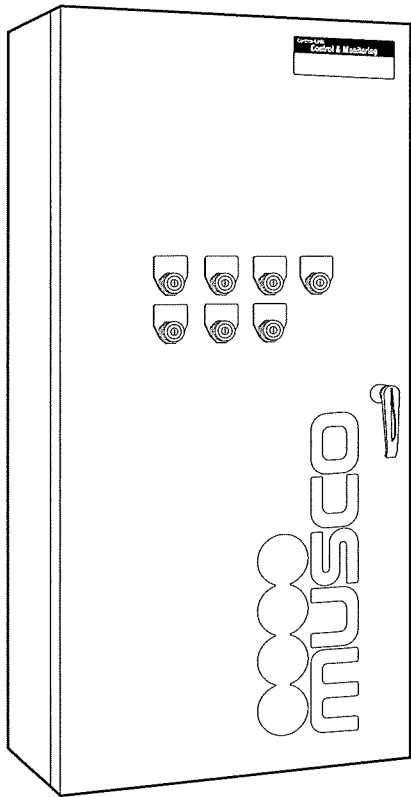


Control System Summary

Pentucket Regional High School Football / 102066 - 102066B
Baseball - Page 4 of 8

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 B1	17.00		
1	1	C2	Pole B2	17.00		
1	1	C3	Pole C1	14.38		
1	1	C4	Pole C2	14.38		
1	1	C5	Pole A1	10.50		
1	1	C6	Pole A2	10.50		

ZONE SCHEDULE				
ZONE	SELECTOR SWITCH	ZONE DESCRIPTION	CIRCUIT DESCRIPTION	
			POLE ID	CONTACTOR ID
Zone 1	1	Baseball / Soccer 2	B1	C1
			B2	C2
			C1	C3
			C2	C4
Zone 2	2	Baseball	A1	C5
			A2	C6



Overview

Control-Link® Control and Monitoring System provides remote on/off control, dimming, system monitoring, and management of your lighting system.

Features

Control

- Lighting system and auxiliary equipment
- Control with: Control-Link website, smartphone app, phone call, email, or fax up to 10 years in advance
- Seven controllable lighting zones
- Three customizable dimming levels (factory set at 100%, 50%, 20%)
- Multi-level user security settings
- Door-mounted or remote-mounted on/off/auto switches allow for manual override of automated control

Monitoring

- Detects luminaire outages and other issues that affect light quality

Management and Support

- Control-Link Central™ service center provides support 24 hours a day, 7 days a week for scheduling, monitoring, and reporting
- Luminaire outage notification within the next business day
- Customized usage reports through website

Technical Specifications

Control and Monitoring Cabinet Ratings

UL 508A Listed E204954
 CE declaration LVD, EMC, RoHS
 IEC 60439-1 compliant UL test report 05NK26317
 IEC Emissions/Immunity Class A compliant
 Operating temperature -4°F to 140°F (-20°C to 60°C)
 FCC Part 15 Class A compliant
 Weight for 72 inch (1829 mm) cabinet 180 lb (82 kg)
 Weight for 48 inch (1219 mm) cabinet 140 lb (64 kg)

Short Circuit Current Rating (SCCR)

with 30 A contactors* 18 kA
 with 60 or 100 A contactors* 25 kA

*Minimum circuit breaker interrupt rating must be greater than or equal to SCCR rating listed above.

Construction

Control and Monitoring Cabinet

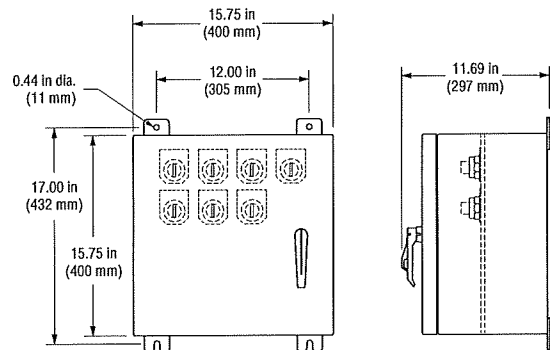
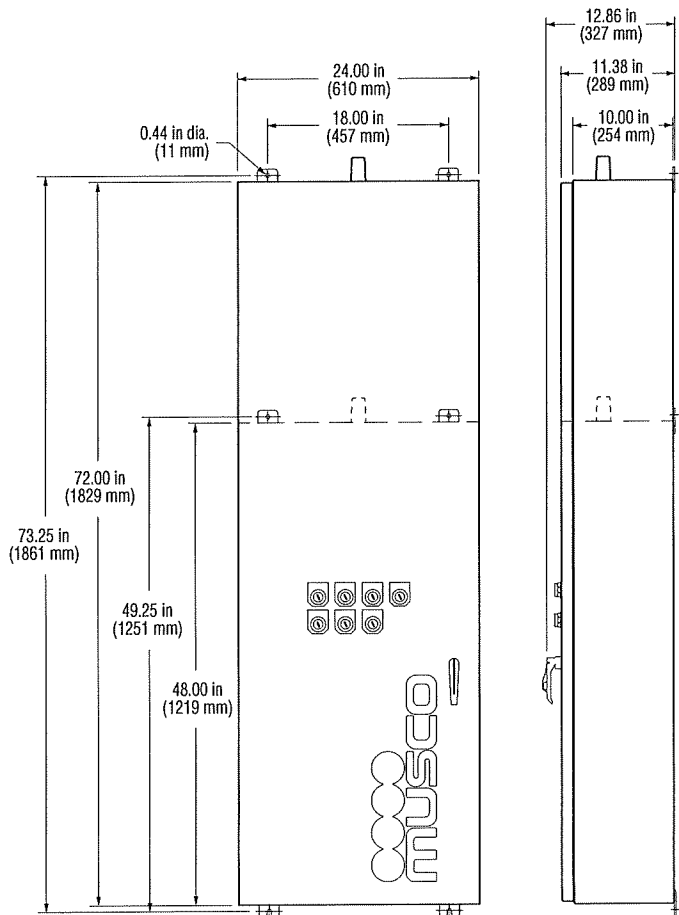
- NEMA type 4 (IP65) cabinet
- Powder-coated aluminum 5052 H32 cabinet and panel
- Lockable, 3-point latch
- Supports lighting system voltage up to 480 V
- Requires 120 V or 230 V phase-to-neutral control voltage
- Protective cover isolates high voltage

On/Off/Auto Manual Switches Cabinet (optional)

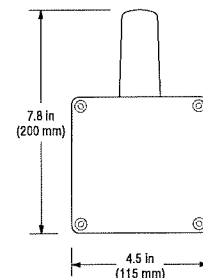
- NEMA type 4 (IP65) cabinet
- Powder-coated aluminum 5052 H32 cabinet and panel
- Lockable door
- Hinged interior panel for switch mounting

Remote Wireless Antenna Cabinet (for wireless communication)

- Cast aluminum with texture gray paint finish
- Omnidirectional antenna
- Operating temperature: -40°C (-40°F) to 85°C to (185°F)
- Frequency: 900 MHz or 2.4 GHz



Manual switches cabinet



Remote wireless antenna cabinet

Datasheet: **Control-Link® Control and Monitoring System**

Internal Details

- Factory wired, programmed, and tested
- Internally fused
- Control power terminal blocks provided
- One control circuit operates entire cabinet
- Plug-in wire harnesses provided to connect multiple cabinets

Control Module

Receives and stores schedules from Control-Link Central™ service center, operates your equipment, and verifies schedules were carried out.

- Executes scheduled on/off or dimming events.
- Stores schedules for up to 7 days
- Reboots automatically and executes current schedule when power is restored, in case of power interruption
- Monitors Musco lighting system and reports issues to keep facilities operating and to help plan routine maintenance. Alerts Control-Link Central service center to schedule appropriate action or maintenance.

Communication Modules

Communication with Control-Link Central is done via an integrated, high speed, cellular connection with no additional monthly charges during the warranty period.

Communication with light poles is done via powerline communication or wireless communication.

- Powerline communication requires a dedicated 20A circuit (lighting circuit distribution panel)
- Wireless communication requires a dedicated antenna to be mounted at least 3 ft above the cellular antenna, and 7 ft total distance away, and line of sight to lighting poles.

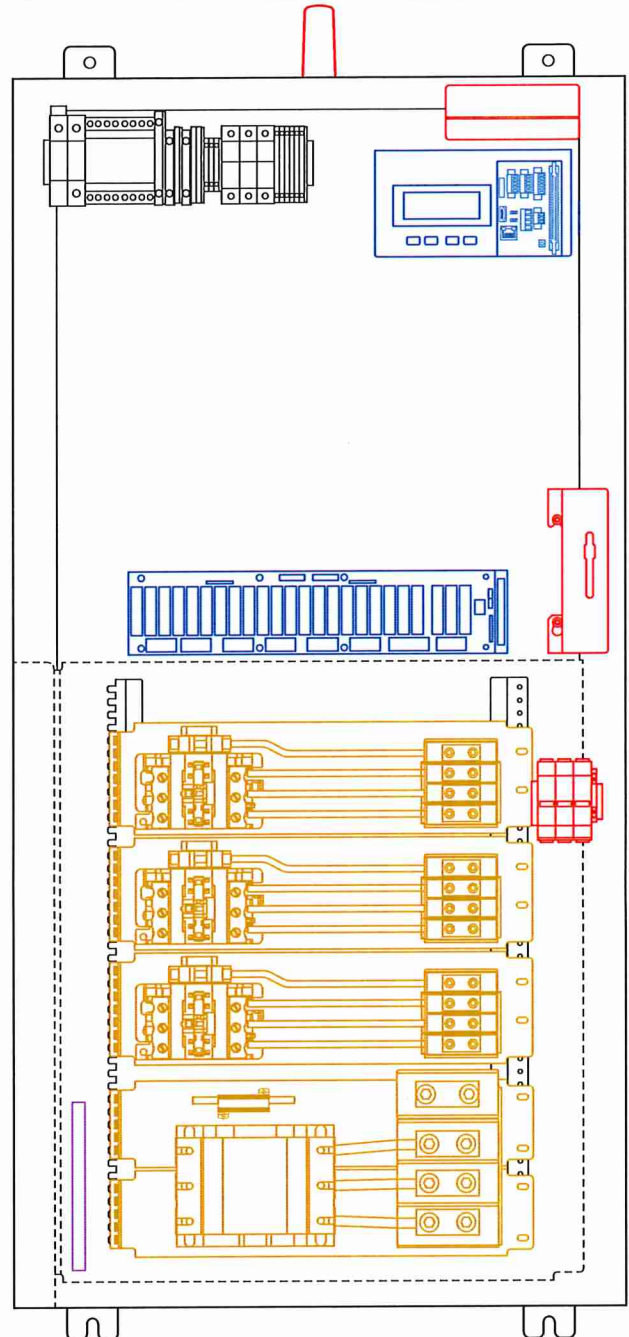
Contactor Modules

Operates equipment based on control module schedules.

- Compliant with IEC 60947-4-1 for continuous operation at 100% of rated current
- Contactors rated for 30, 60, or 100 amps

Ground Bar

Provides integral ground bar for lighting equipment grounding.





D. CONTROLS AND MONITORING - SHOW LIGHT



Control System Summary

Project Specific Notes:

Project Information

Project #: 102066
 Project Name: Pentucket Regional High School Football
 Date: 07/27/22
 Project Engineer: Tanner Lanphier
 Sales Representative: Mike Berry
 Control System Type: Control-Link™ Control and Monitoring System with Show-Light™ Entertainment Package
 Communication Type: PowerLine-ST
 Scan: 102066B
 Document ID: 102066P1V6-0727094436
 Distribution Panel Location or ID: Football Stadium
 Total # of Distribution Panel Locations for Project: 2
 Design Voltage/Hertz/Phase: 480/60/3
 Control Voltage: 120

Equipment Listing

DESCRIPTION	APPROXIMATE SIZE	QTY	SIZE (AMPS)
1.Control and Monitoring Cabinet	24 X 48		
Total Contactors		6	30 AMP
Total Off/On/Auto Switches:		2	

Materials Checklist

Contractor/Customer Supplied:

- A dedicated 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
 - HID rated or D-curve circuit breaker sized per full load amps on Circuit Summary by Zone Chart
- Wiring
 - See chart on page 2 for wiring requirements
 - Equipment grounding conductor and splices must be insulated (per circuit)
 - Lightning ground protection (per pole), if not Musco supplied
- 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
- Breaker lock-on device to prevent unauthorized power interruption to control power and powerline connection (if present)
- 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

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 electrical components 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 luminaires 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 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 is 0.9.

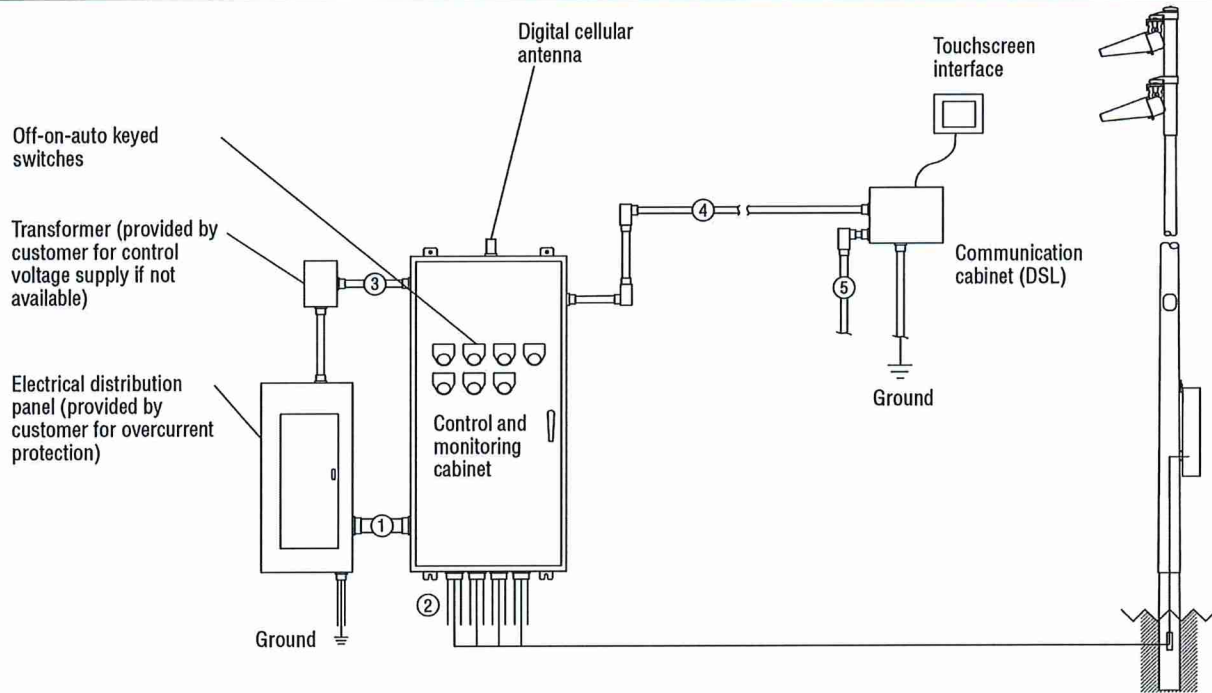
NOTE: Refer to Installation Instructions for more details on equipment information and the installation requirements.



Control System Summary

Pentucket Regional High School Football / 102066 -
Football Stadium - Page 6 of 8

Control-Link® Control and Monitoring System



Conduit ID	Description	# of Wires	Wire (AWG)	Conduit (in)	Max. Wire Length (ft)	MUSCO Supplied	Notes
1	Line power to contactors, and equipment grounding conductor	*A	*B	*C	N/A	No	A-E
2	Load power to lighting circuits, and equipment grounding conductor	*A	*B	*C	N/A	No	A-E
3	Control power (dedicated, 20A)	3	12	*C	N/A	No	C,E
4	Communication cable to touchscreen	*F	*F	*C	1500	No	C,E,F
5	Control power	3	*B	*C	N/A	No	A-E

R60-104-00_F

*** Notes:**

- A. See voltage and phasing per the notes on cover page.
- B. Calculate per load and voltage drop.
- C. All conduit diameters should be per code unless otherwise specified to allow for connector size.
- D. Equipment grounding conductor and any splices must be insulated.
- E. Refer to control and monitoring system installation instructions for more details on equipment information and the installation requirements.
- F. Cat5e cable (Belden 7937A or equal) is required. Communication cabinet requires control power circuit and connection to earth ground. Standard wall outlet is required to power touchscreen. Touchscreen connects to communication cabinet with Ethernet cable (<300 ft.).

IMPORTANT: Control wires (3,5) and communication wire (4) must be in separate conduit from line and load power wires (1, 2).



Control System Summary

Pentucket Regional High School Football / 102066 -
Football Stadium - Page 7 of 8

SWITCHING SCHEDULE

<u>Field/Zone Description</u>	<u>Zones</u>
Football	1
Bleachers	2

CONTROL POWER CONSUMPTION	
120V Single Phase	
VA loading of Musco Supplied Equipment	INRUSH: 1470.0 SEALED: 156.0

CIRCUIT SUMMARY BY ZONE

POLE	CIRCUIT DESCRIPTION	# OF FIXTURES	# OF DRIVERS	*FULL LOAD AMPS	CONTACTOR SIZE (AMPS)	CONTACTOR ID	ZONE
F1	Football	12	12	19.6	30	C1	1
F2	Football	12	12	19.6	30	C2	1
F3	Football	12	12	19.6	30	C3	1
F4	Football	12	12	19.6	30	C4	1
F3	Bleachers	1	4	1.7	30	C5	2
F4	Bleachers	1	4	1.7	30	C6	2

*Full Load Amps based on amps per driver.



Control System Summary

Pentucket Regional High School Football / 102066 -
Football Stadium - Page 8 of 8

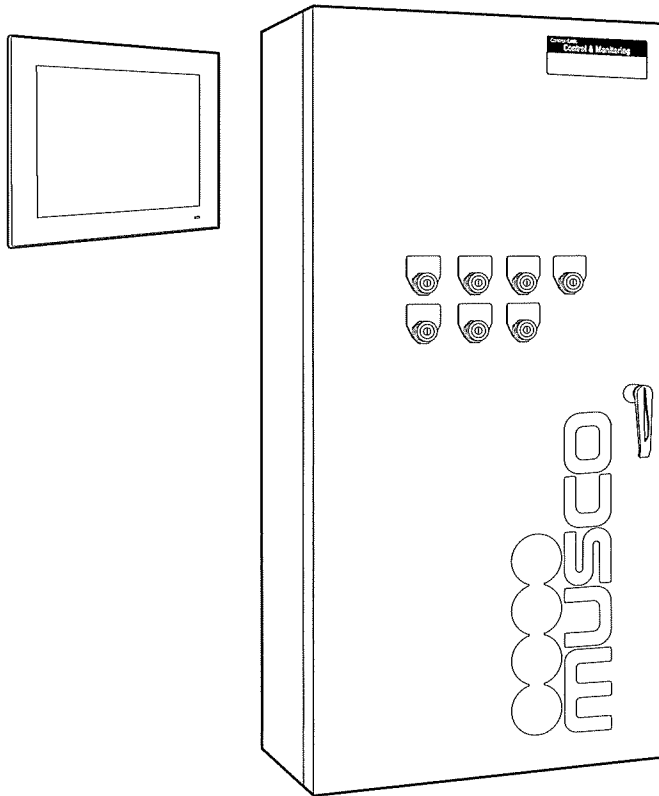
PANEL SUMMARY						
CABINET #	CONTROL MODULE LOCATION	CONTACTOR ID	CIRCUIT DESCRIPTION	FULL LOAD AMPS	DISTRIBUTION PANEL ID (BY OTHERS)	CIRCUIT BREAKER POSITION (BY OTHERS)
2	2	C1	Pole F1	19.62		
2	2	C2	Pole F2	19.62		
2	2	C3	Pole F3	19.62		
2	2	C4	Pole F4	19.62		
2	2	C5	Pole F3	1.66		
2	2	C6	Pole F4	1.66		

ZONE SCHEDULE				
ZONE	SELECTOR SWITCH	ZONE DESCRIPTION	CIRCUIT DESCRIPTION	
			POLE ID	CONTACTOR ID
Zone 1	1	Football	F1	C1
			F2	C2
			F3	C3
			F4	C4
Zone 2	2	Bleachers	F3	C5
			F4	C6

Show-Light® Entertainment Package

Overview

Control-Link® Control and Monitoring System with Show-Light® entertainment package provides remote on/off control, dimming, color changing, pre-programmed and custom light shows, system monitoring, and management of your lighting system.



Features

Control Features

- Controls: Lighting system and auxiliary equipment
- Control options: Control-Link website, smartphone app, onsite touchscreen, phone call, email, or fax up to 10 years in advance
- Multi-level user security settings
- Door-mounted or remote-mounted on/off/auto switches allow manual override of automated control
- Seven controllable lighting zones
- Four customizable dimming levels (factory defaults: 100%, 50%, 20% and blackout)

Show-Light Entertainment Package Features

- Six preprogrammed light shows included, up to three of them can be custom
- Preprogrammed light shows include: pole chase, luminaire chase, score, wave, pulse, marquee, and random
- Customize the color of Musco TLC-RGBW luminaires if present

Monitoring

- Detects luminaire outages and other issues that affect light quality

Management and Support

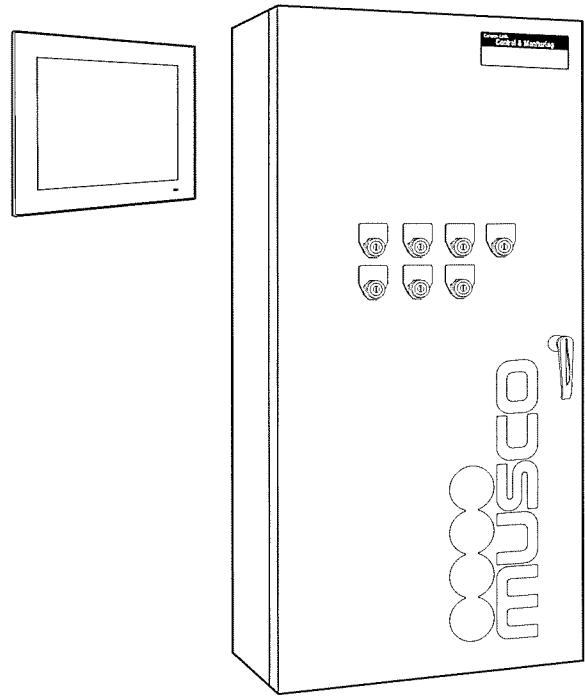
- Control-Link Central™ service center provides support 24 hours a day, 7 days a week for scheduling, monitoring, and reporting
- Luminaire outage notification within the next business day
- Customized usage reports through website

Technical Specifications - Ratings

Control and Monitoring Cabinet

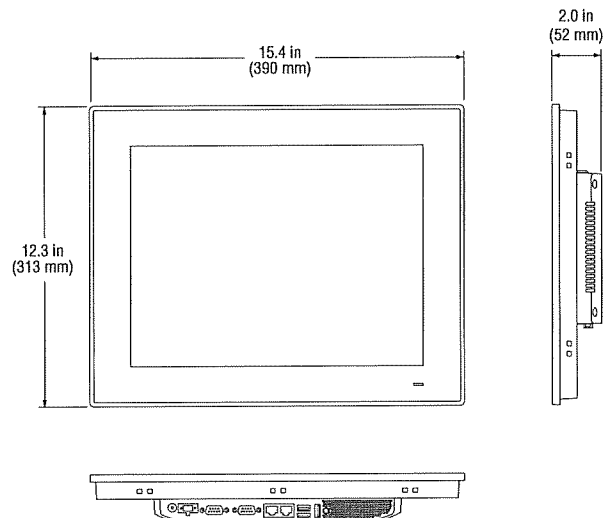
UL 508A Listed.....	E204954
CE declaration	LVD, EMC, RoHS
IEC 60439-1 compliant	UL test report 05NK26317
IEC Emissions/Immunity.....	Class A compliant
Operating temperature	-4°F to 140°F (-20°C to 60°C)
FCC Part 15	Class A compliant
Weight for 72 inch (1829 mm) cabinet	180 lb (82 kg)
Weight for 48 inch (1219 mm) cabinet	140 lb (64 kg)
Short Circuit Current Rating (SCCR)	
with 30 A contactors*	18 kA
with 60 or 100 A contactors*	25 kA

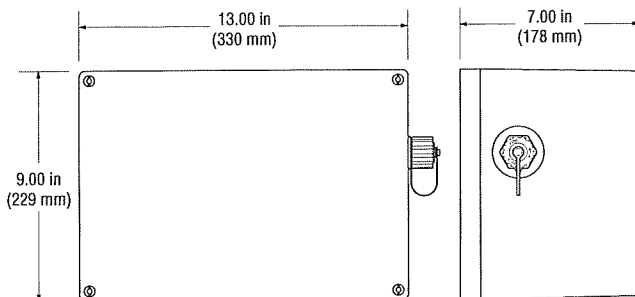
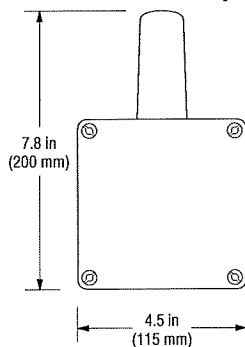
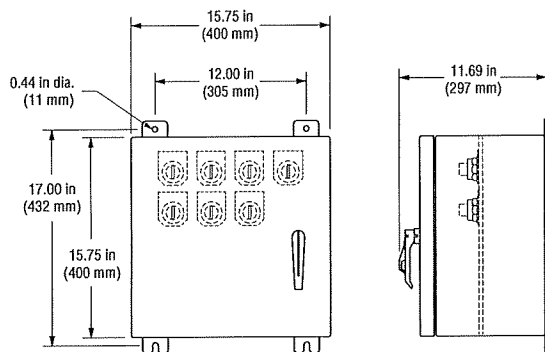
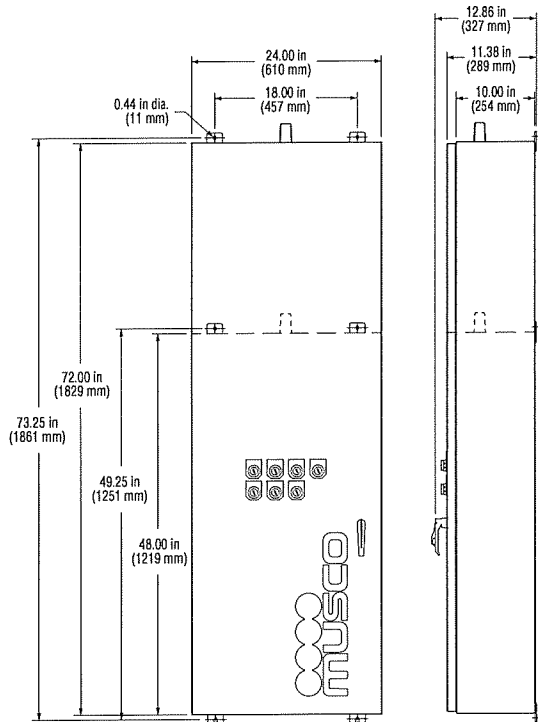
*Minimum circuit breaker interrupt rating must be greater than or equal to SCCR rating listed above.



Touchscreen System Interface

Approvals.....	UL, CB, CCC, BSMI
CE declaration	LVD, EMC, RoHS
FCC Part 15	Class B Compliant
Operating temperature	32°F to 122°F (0°C to 50°C)
Storage temperature.....	-40°F to 140°F (-40°C to 60°C)
Backlight life.....	50,000 h
Input voltage	120 Vac 60 Hz, 240 Vac 50 Hz (Vdc power supply provided)
Mounting options.....	Wall or desk mounts
Environment.....	Indoor use only





Technical Specifications - Construction

Control and Monitoring Cabinets

- NEMA Type 4 (IP65) cabinet
- Powder-coated aluminum 5052 H32 cabinet and panel
- Lockable, 3-point latch
- Supports lighting system voltage up to 480 V
- Requires 120 V or 230 V phase-to-neutral control voltage
- Protective cover isolates high voltage

On/Off/Auto Manual Switches Cabinet (optional equipment)

- NEMA type 4 (IP65) cabinet
- Powder-coated aluminum 5052 H32 cabinet and panel
- Lockable door
- Hinged interior panel for switch mounting

Remote Wireless Antenna Cabinet (if wireless communication)

- Cast aluminum with texture gray paint finish
- Omnidirectional antenna
- Operating temperature: -40°F (-40°C) to 185°F to (85°C)
- Frequency: 900 MHz or 2.4 GHz

Touchscreen Communication Cabinet

- NEMA type 4 (IP65) cabinet
- Powder-coated aluminum 5052 H32 cabinet
- VDSL communication
- Requires 120 V or 230 V phase-to-neutral control voltage

Datasheet: Control-Link® Control and Monitoring System

Internal Details

- Factory wired, programmed, and tested
- Internally fused
- Control power terminal blocks provided
- Plug-in wire harnesses provided to connect multiple cabinets

Control Module

Receives and stores schedules from Control-Link Central™ service center, operates your equipment, and verifies schedules are carried out.

- Executes light show commands and scheduled on/off or dimming events.
- Stores schedules for up to 7 days
- Automatic recovery mode to current lighting schedule in the event of power interruption or loss.
- Monitors Musco lighting system and reports issues to keep facilities operating and to help plan routine maintenance. Alerts Control-Link Central service center to schedule appropriate action or maintenance.

Communication Modules

Communication with Control-Link Central is done via an integrated, high speed, cellular connection with no additional monthly charges during the warranty period.

Communication with luminaire controllers is done via powerline or wireless communication.

- Powerline communication requires a dedicated 20A circuit (distribution panel)
- Wireless communication requires a dedicated antenna to be mounted 3 ft above the cellular antenna, and 7 ft total distance away, and line of sight to remote antennas at light pole locations.
- VDSL communication with touchscreen user interface requires Cat5e cable (Belden 7937A)

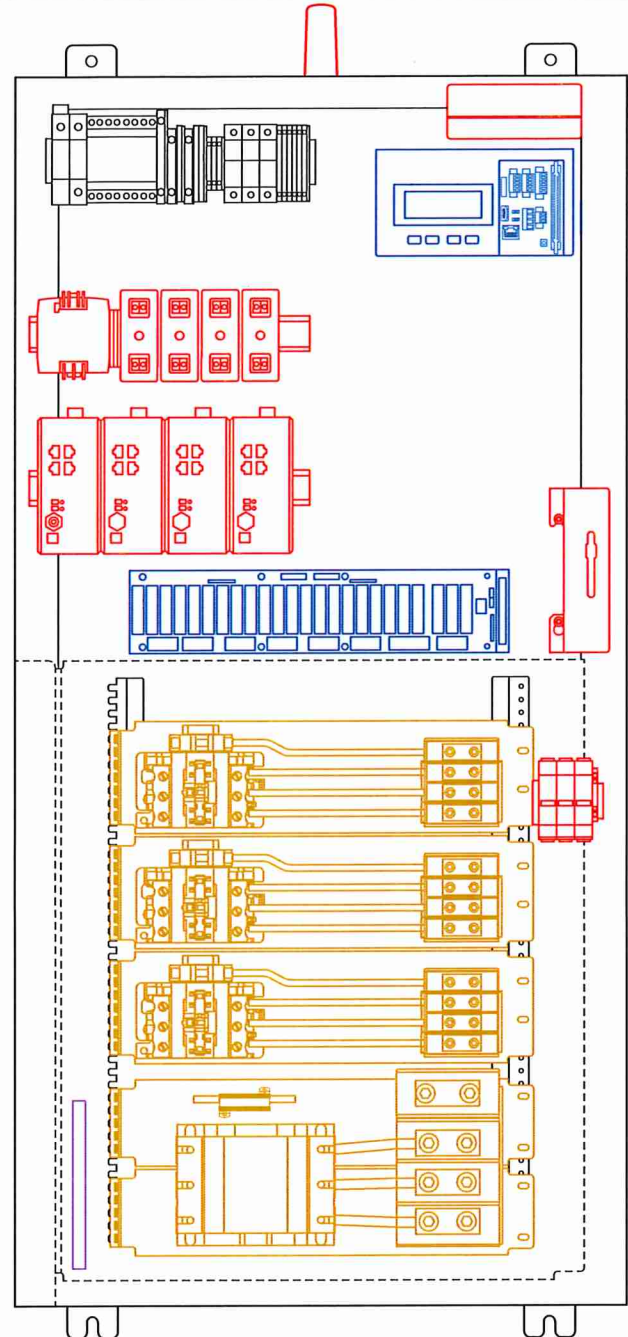
Contactors Modules

Switches equipment based on control module schedules.

- Compliant with IEC 60947-4-1 for continuous operation at 100% of rated current
- Contactors rated for 30, 60, or 100 A

Ground Bar

Provides integral ground bar for lighting equipment grounding.





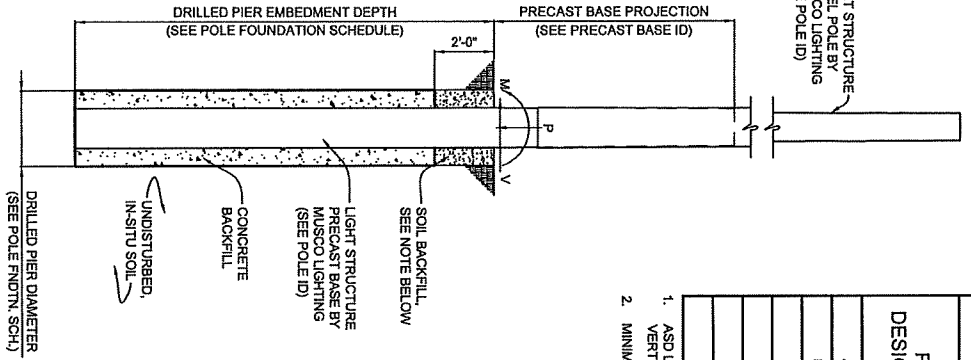
E. STRUCTURAL INFORMATION



POLE FOUNDATION SCHEDULE

POLE DESIGNATION	FORCES (k)			DRILLED PIER		
	MOMENT (M) FT-LBS	SHEAR (V) LBS	VERTICAL (P) LBS	DIAMETER INCHES	EMBEDMENT DEPTH	CONCRETE BACKFILL YD ³ (2)
A3, A4	93,824	2,005	2,916	30	16'-0"	1.7
B3, B4	130,640	2,393	3,405	30	16'-0"	1.7
C3	104,790	2,151	3,143	30	16'-0"	1.7
C4	107,908	2,196	3,149	30	16'-0"	1.7
F1, F2	89,774	2,058	3,191	30	16'-0"	1.7
F3, F4	91,532	2,085	3,241	30	16'-0"	1.7

- ASD LOAD COMBINATION D + 0.9W.
- VERTICAL FORCE IS WEIGHT OF PRESSED POLE (DOES NOT INCLUDE PRECAST BASE WEIGHT).
- MINIMUM CONCRETE BACKFILL VOLUME, SITE CONDITIONS MAY REQUIRE ADDITIONAL BACKFILL.



POLE FOUNDATION ELEV.

SOIL BACKFILL NOTE:
THE TOP TWO FEET OF ANNULUS SHALL BE BACKFILLED WITH SOIL, WITH A CLASSIFICATION OF CLASS 5 (TABLE 1802) OR BETTER. COMPACTION 95% FOR COHESIVE SOIL AND 98% FOR A COHESIONLESS SOIL BASED UPON STANDARD PROCTOR TESTING (ASTM D998).

PRECAST BASE IDENTIFICATION

PRECAST BASE TYPE	PRECAST BASE WEIGHT	PRECAST BASE LENGTH ABOVE GRADE	PROJECTION ABOVE GRADE	STANDARD EMBEDMENT	OUTSIDE DIAMETER
5B	4,580 LBS	23'-11"	7'-11"	16'-0"	18.25"

POLE IDENTIFICATION

POLE DESIGNATION	POLE TYPE	PRECAST BASE TYPE	FIXTURE CONFIGURATION (FIX. PER XARM)	FIXTURE AND ACCESSORIES EPA (F ³)
A3, A4	LSS90B	5B	6 (5)	14.0
B3, B4	LSS90A	5B	10 (4+4)	20.2
C3	LSS90B	5B	8 (7)	17.2
C4	LSS90B	5B	9 (4+4)	18.8
F1, F2	LSS70D	5B	12 (6+6)	23.3
F3, F4	LSS70D	5B	13 (6+6)	24.3

- POLES F3 & F4 HAVE (1) MUSCO LED FIXTURE AT 60'-4" AGL INCLUDED ABOVE.
- POLES A3, A4, C3, & C4 HAVE (1) MUSCO LED FIXTURE AT 15'-6" AGL INCLUDED ABOVE.
- POLES B3, B4, & F1 - F4 HAVE (2) MUSCO LED FIXTURES AT 15'-6" AGL INCLUDED ABOVE.

DESIGN NOTES

DESIGN PARAMETERS:
WIND: V₁₀ = 123 MPH, V₃₀ = 95 MPH (EXPOSURE C, RISK CATEGORY II) PER MASSACHUSETTS STATE BUILDING CODE - 780 CMR, 9TH EDITION (IBC 2015 / ASCE 7-10).

GEOTECHNICAL PARAMETERS:
ALLOWABLE END BEARING SOIL PRESSURE: 4,000 PSF
ALLOWABLE LATERAL SOIL BEARING PRESSURE: 0 PSF/FT (GRADE TO -2'-0"), 150 PSF/FT (-2'-0" TO -6'-0"), 200 PSF/FT (BELOW -6'-0") IN ACCORDANCE WITH MASSACHUSETTS STATE BUILDING CODE - 780 CMR, 9TH EDITION, CHAPTER 18.

DESIGN SOIL PARAMETERS ARE AS NOTED. ACTUAL ALLOWABLE SOIL PARAMETERS MUST BE VERIFIED ON SITE. REFERENCE SOILS AND FOUNDATION REPORT (9/10/2019) BY PEE ASSOCIATES AND BORINGS B-1 - B-4 BY GREEN ENVIRONMENTAL (#43519).

A REGISTERED ENGINEER OR REPRESENTATIVE OF IS RECOMMENDED (NOT REQUIRED) TO BE AVAILABLE AT THE TIME OF THE FOUNDATION INSTALLATION TO VERIFY THE SOIL DESIGN PARAMETERS AND TO PROVIDE ASSISTANCE IF ANY PROBLEMS ARISE IN FOUNDATION INSTALLATION.

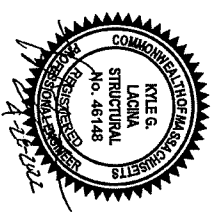
ENCOUNTERING SOIL FORMATIONS THAT WILL REQUIRE SPECIAL DESIGN CONSIDERATIONS OR EXCAVATION PROCEDURES MAY OCCUR. POLE FOUNDATIONS WILL NEED TO BE ANALYZED ACCORDING TO THE SOIL CONDITIONS THAT EXIST. IF ANY DISCREPANCIES OR INCONSISTENCIES ARISE, NOTIFY THE ENGINEER OF SUCH DISCREPANCIES. FOUNDATIONS WILL THEN BE REVISED ACCORDINGLY. REVISIONS WILL BE ANALYZED PER RECOMMENDATIONS DIRECTED BY A REGISTERED ENGINEER.

ALL EXCAVATIONS MUST BE FREE OF LOOSE SOIL AND DEBRIS PRIOR TO FOUNDATION INSTALLATION AND CONCRETE BACKFILL PLACEMENT. TEMPORARY CASINGS OR DRILLERS SLURRY MAY BE USED TO STABILIZE THE EXCAVATION DURING INSTALLATION. CASINGS MUST BE REMOVED DURING CONCRETE BACKFILL PLACEMENT. CONCRETE BACKFILL MUST BE PLACED WITH A TRIMME WHEN SLURRY OR WATER IS PRESENT WITHIN THE EXCAVATION OR WHEN THE FREE DROP EXCEEDS 5'-0".

CONTRACTOR MUST BE FAMILIAR WITH THE COMPLETE SOIL INVESTIGATION REPORT AND BORINGS AND CONTACT THE GEOTECHNICAL FIRM (IF NECESSARY) TO UNDERSTAND THE SOIL CONDITIONS AND THE POSSIBILITY OF GROUND WATER PUMPING AND EXCAVATION STABILIZATION OR BACKFILL DURING PRECAST BASE INSTALLATION AND PLACEMENT OF CONCRETE BACKFILL.

CONCRETE:
CONCRETE SHALL BE AIR-ENTRAINED AND HAVE A MINIMUM COMPRESSIVE DESIGN STRENGTH AT 28 DAYS OF 3,000 PSI. 3,000 PSI CONCRETE SPECIFIER'S EARLY POLE ERECTION, ACTUAL REQUIRED MINIMUM ALLOWABLE CONCRETE STRENGTH IS 1,000 PSI. ALL FIRMS AND CONCRETE BACKFILL MUST BEAR ON AND AGAINST FIRM UNDISTURBED SOIL.

GENERAL NOTES:
FIXTURES MUST BE LOCATED TO MAINTAIN 10'-0" MINIMUM HORIZONTAL CLEARANCE FROM ANY OBSTRUCTION. ENGINEER MUST BE NOTIFIED IF FOUNDATIONS ARE NEAR ANY REMAINING WALLS OR WITHIN/NEAR ANY SLOPPED STEEPERS THAN 3H : 1V. POLES, FIXTURES, PRECAST BASES, ELECTRICAL ITEMS AND INSTALLATION PER MUSCO LIGHTING.



PENTUCKET REGIONAL HS FOOTBALL FIELD LIGHTING WEST NEWBURY, MA

MUSCO Lighting
CORPORATE: 100 1st AVE WEST
OSKAHOOLA, IA 52577
(800) 825-6020

STRUCTURAL ENGINEERS, P.C.
114 NICHOLAS DRIVE
MARSHALLTOWN, IOWA 50158
PHONE NUMBER: 641-752-6334
EMAIL: MSL.INFO@SEPC.BIZ

DRIVING TITLE:
POLE AND FOUNDATION
SCALE: SEE PLAN
NOTES:
SCAN #102066A-AR

DATE: 28 APRIL 2022
PROJECT NUMBER: 102066
DRAWING NUMBER: C1



F. WARRANTY





Musco Constant 25™

25-Year Product Assurance & Warranty Program

Project name: Pentucket Regional High School Project number: 102066

Owner: Pentucket Regional School District City: West Newbury State: MA

Covered product(s): Light-Structure System™ with TLC for LED™ technology

Date issued: Date of Shipment Expiration: Date of Shipment + 25 years

Musco Sports Lighting, LLC will provide all materials and labor to maintain operation of your lighting system to original design criteria for 25 years. Musco products and services are guaranteed to perform on your project as detailed in this document.

Light Performance

Specified illumination levels will be maintained and are marked as guaranteed in the Musco Illumination Summary.

Individual luminaire outages that occur during the warranty and maintenance period are repaired when the usage of any field is materially impacted.

Spill Light Control

If specified, spill light levels at identified locations are guaranteed to be controlled to the maximum values provided in the Musco Illumination Summary.

Energy Consumption

Total average kW consumption for your lighting system is guaranteed to be not more than the total load shown in the Musco Illumination Summary.

Monitoring, Maintenance, and Control Services

Musco shall monitor the performance of your lighting system, including on/off status, hours of usage, and luminaire outages. If outages that affect playability are detected, Musco will contact you and proactively dispatch technicians.

On-off control of your lighting system is provided via an easy-to-use web site scheduling system, smartphone app, phone, email, or fax. Our trained Control-Link Central™ service center staff is available toll-free 24/7. Regular usage reports are always available on Control-Link Central's web site.

Structural Integrity

Your project has been designed to IBC, 2015, 130mph, Exposure C.
Structural integrity of equipment manufactured by Musco is guaranteed.

Musco has a team of people to ensure fulfillment of our product and services warranty and maintains financial reserves dedicated to support our fulfillment of this warranty. Please keep this document as your signed contract guaranteeing comprehensive service for the 25 year period.



Musco Constant 25™

25-Year Product Assurance & Warranty Program

Terms and Conditions

Service under this Contract is provided by Musco Sports Lighting, LLC ("Musco") or an authorized servicer approved by Musco. Services performed under this Contract shall consist of furnishing labor and parts necessary to restore the operation of the Covered Product(s) to original design criteria provided such service is necessitated by failure of the Covered Product(s) during normal usage. This Contract covers Product(s) consisting of Musco's Total Light Control – TLC for LED® with Control-Link® and any additional Musco manufactured product as listed on page 1.

"We", "us," and "our" mean Musco. "You" and "your" mean the purchaser of the Covered Product(s). No one has the authority to change this Contract without the prior written approval of Musco. Musco shall not assume responsibility for their agents or assignees other than as described below. If there is a conflict between the terms of this Contract and information communicated either orally or in writing by one or more of our employees or agents, this Contract shall control.

Additional Provisions

- 1. Availability of Service:** Control-Link Central™ operators shall be available 24/7 via web site, phone, fax, or email. Maintenance service specialists shall be available 8AM to 5PM Central Time, and services shall be rendered during these same hours in your local time zone, Monday through Friday (with the exception of national holidays). Hours of operation are subject to change without notice to you. Musco will exercise all reasonable efforts to perform service under this Contract, but will not be responsible for delays or failure in performing such services caused by adverse weather conditions, acts of any government, failure of transportation, accidents, riots, war, labor actions or strikes or other causes beyond its control.
- 2. Determination of Repairs:** Musco will utilize the field monitoring system and any information provided by the customer to determine when the usage of the field is materially impacted. From this information, Musco will determine needed repair and/or replacement of Covered Product(s) and parts. Repair will be with Product(s) of like kind and quality.
- 3. Your Requirements Under this Contract:** You must meet all electrical and installation requirements as specified by the manufacturer. In addition, you promise and assure: full cooperation with Musco, Musco's technicians and authorized servicers during telephone diagnosis and repair of the Covered Product(s); reasonable accessibility of the Covered Product(s); a nonthreatening and safe environment for service.

You agree to check fuses and to replace fuses as needed. Musco provides spare fuses in the lowest alpha-numeric numbered enclosure. Musco will replenish spare fuses used.

You agree to keep your control system online. This means keeping the required control voltage to the control system at all times. Any deviation from this practice must be discussed with Musco's Warranty Department.

- 4. Service Limitations — This Contract does not cover:** 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 Product(s) parts or components, failure of existing structures, supporting electrical systems or any non-Musco equipment, or acts of God/nature (including, but not limited to: earthquake, flood, tornadoes, typhoons, hurricanes, or lightning).

5. Contract Limitations:

- a. EXCLUSIONS FROM COVERAGE:** IN NO EVENT WILL MUSCO BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH INCLUDE, BUT ARE NOT LIMITED TO, ANY DELAY IN RENDERING SERVICE OR LOSS OF USE DURING THE REPAIR PERIOD OF THE COVERED PRODUCT(S) OR WHILE OTHERWISE AWAITING PARTS.
 - b. Limitation of Liability:** To the extent permitted by applicable law, the liability of Musco, if any, for any allegedly defective Covered Product(s) or components shall be limited to repair or replacement of the Covered Product(s) or components at Musco's option. THIS CONTRACT IS YOUR SOLE EXPRESS WARRANTY WITH RESPECT TO THE COVERED PRODUCT(S). ALL IMPLIED WARRANTIES WITH RESPECT TO THE COVERED PRODUCT(S) INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXPRESSLY EXCLUDED.
 - c. For the purposes of and by your acceptance of this Contract you acknowledge and agree that if a surety bond ("Bond") is provided the warranty and/or maintenance guarantee provided for in this Contract and any corresponding liability on behalf of the issuing surety under the Bond is limited to the first twelve (12) months of said warranty and/or maintenance guarantee coverage period. Any warranty and/or guarantee coverage period in excess of said initial 12 month period does not fall within the scope of the Bond and shall be the sole responsibility of Musco.**
 - d. Musco requires reasonable access for a crane or man lift equipment to service the lighting system. Musco will not be responsible for damage from operating the vehicle on the property when the equipment is operated in the prescribed manner over the designated access route.**
 - e. Obsolescence or Environmental Restrictions:** If during any maintenance or other work performed under this Warranty, any of the parts of the Covered Product(s) are found to be either obsolete, no longer available, or prohibited by any state of federal agency, Musco shall replace said parts with comparable parts and materials with equal operating characteristics solely at Musco's discretion. The cost of replacement of any obsolete cellular related technology shall be borne by you. Prior to completing any such work, Musco shall notify you of the cost (if any) you will incur in the replacement of such parts under this section.
- 6. Transfer and Assignment:** Except to owners, you shall not have the right to assign or otherwise transfer your rights and obligations under this Contract except with the prior written consent of Musco; however, a successor in interest by merger, operation of law, assignment or purchase or otherwise of your entire business shall acquire all of your interests under this Contract.
 - 7. Governing Law:** Unless otherwise governed by applicable state law, the Contract shall be interpreted and enforced according to the laws of the State of Iowa.
 - 8. Subrogation:** In the event Musco repairs or replaces any Covered Product(s), parts or components due to any defect for which the manufacturer or its agents or suppliers may be legally responsible, you agree to assign your rights of recovery to Musco. You will be reimbursed for any reasonable costs and expenses you may incur in connection with the assignment of your rights. You will be made whole before Musco retains any amounts it may recover.

Signature: _____

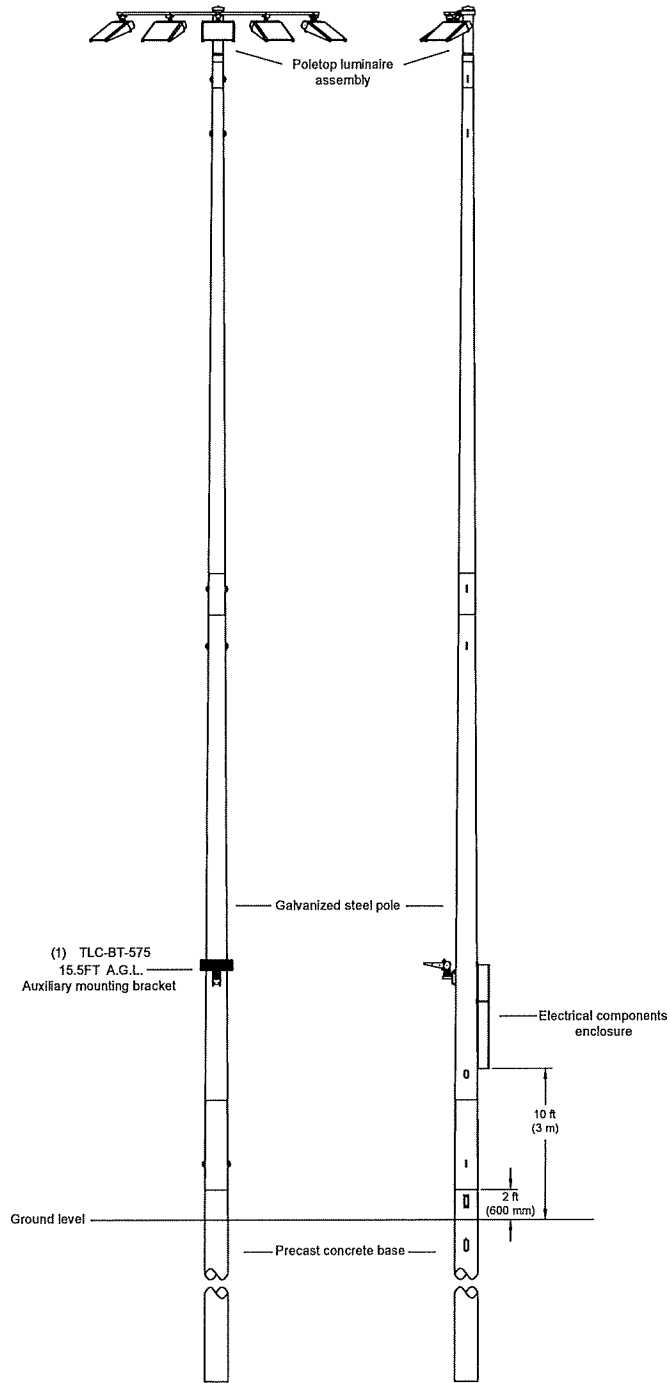
Vice President of Sales



G. PRODUCT INFORMATION



Musco Lighting, Inc. is an Equal Opportunity Employer. Minorities and women are encouraged to apply. Musco Lighting, Inc. is an Equal Opportunity Employer. Minorities and women are encouraged to apply.



POLE(S): A1-A2
 Musco 80FT Light-Structure System™ pole
 TLC for LED™ luminaires
 (5)TLC-LED-1200

DATE:	BY:	R.L.	REVISIONS:

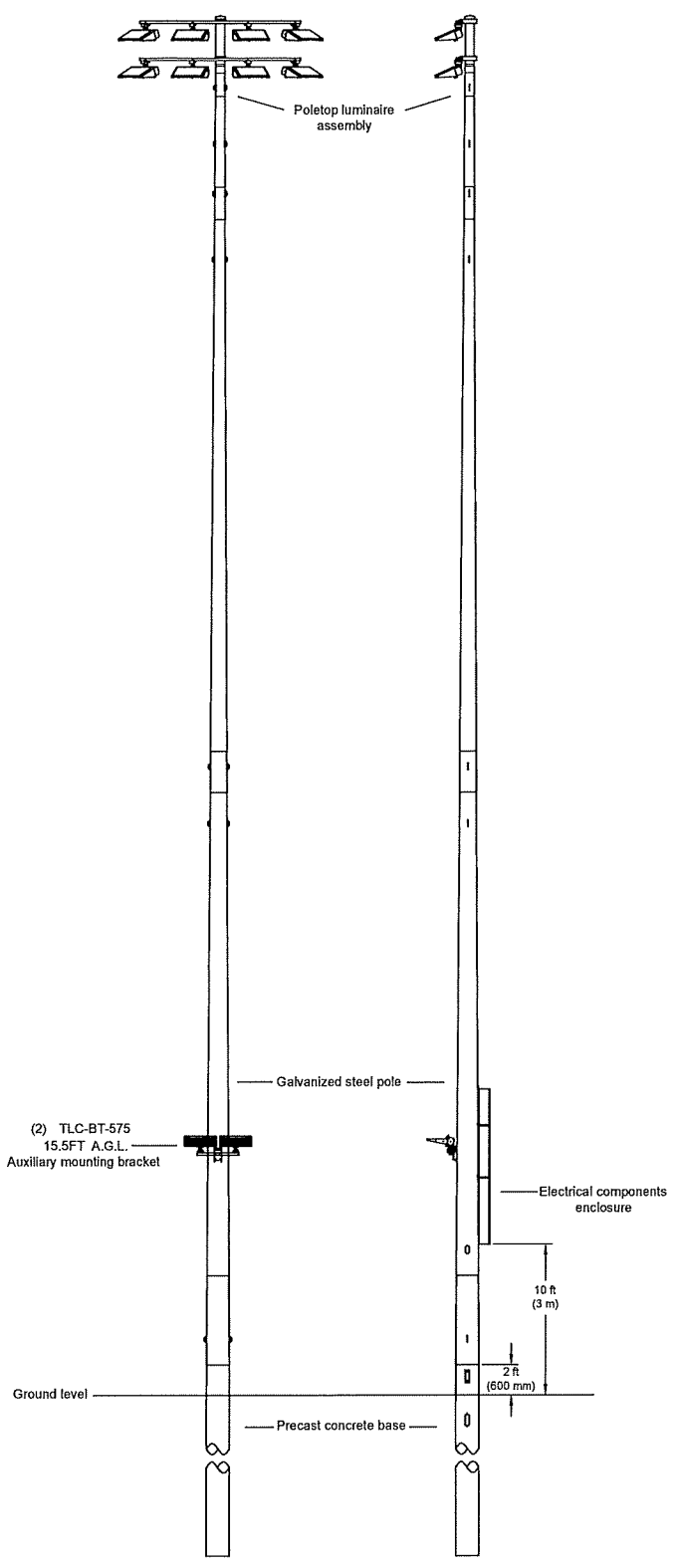
DATE:	BY:	R.L.	REVISIONS:


MUSCO
 Lighting

CORPORATE OFFICE:
 P.O. Box 608
 100 1st Avenue West
 Okaloosa, Iowa 52577
 +1-800-825-6020
 +1-841-673-0411

Pentucket Regional HS FB
 West Newbury, MA
 Pole Configuration Drawing **B**

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POLE(S): B1-B2
 Musco 90FT Light-Structure System™ pole
 TLC for LED™ luminaires
 (8)TLC-LED-1200

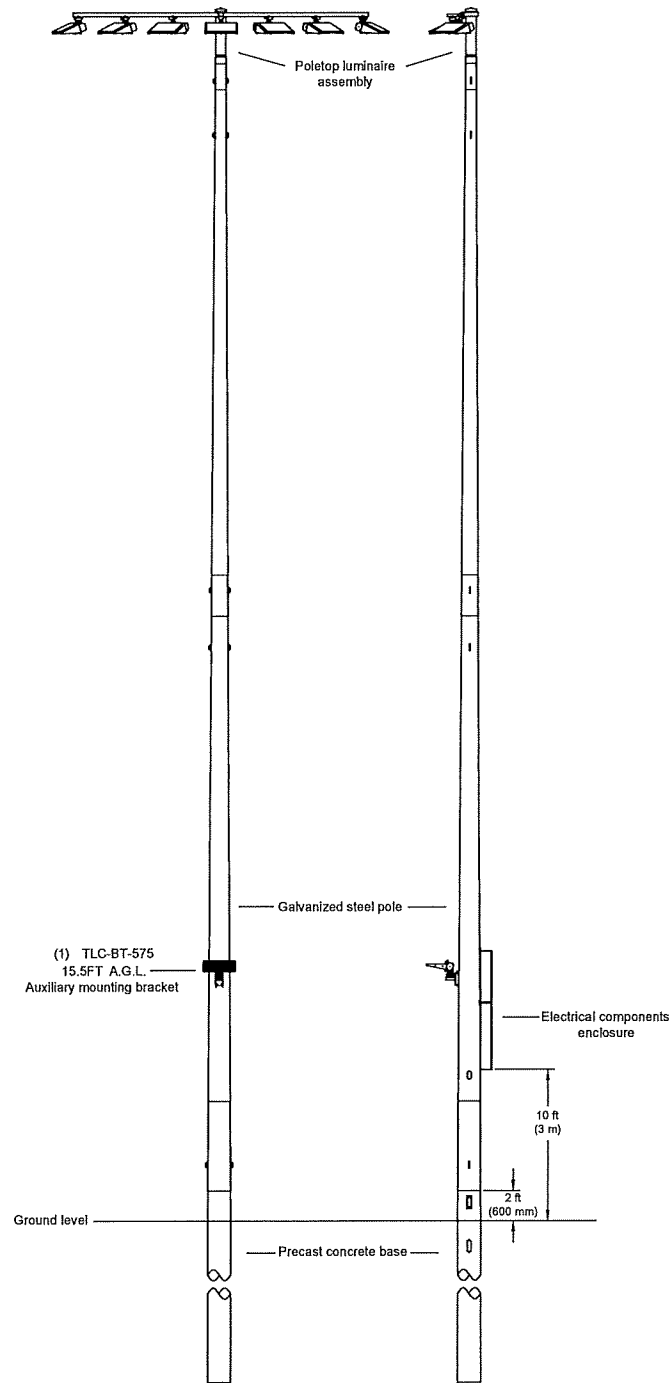
PROJECT NUMBER 102066	DATE 07/26/2022
DESIGNED BY V. Maer	CHECKED BY NTS
DRAWING NUMBER 102066P1	
SHEET NUMBER 2 OF 5 SHEETS	

DATE:	BY:	R.L.	REVISIONS:

CORPORATE OFFICE:
 P.O. Box 808
 100 1st Avenue West
 Okaloosa, Iowa 52577
 +1-800-823-6020
 +1-641-673-0411

Pentucket Regional HS FB
 West Newbury, MA
 Pole Configuration Drawing **B**

Musco Lighting, Inc. is a registered provider of continuing education for the International Illumination Society (IIS).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illuminating Engineering Society (IES).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of America (ISA).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Australia (ISA).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Canada (ISC).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Europe (ISE).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of India (ISI).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Japan (ISJ).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Korea (ISK).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Mexico (ISM).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of South Africa (ISSA).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Taiwan (IST).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of Thailand (IST).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of the United Kingdom (ISUK).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of the United States (ISUS).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of the United Kingdom (ISUK).
 Musco Lighting, Inc. is a registered provider of continuing education for the Illumination Society of the United States (ISUS).



POLE(S): C1-C2
 Musco 80FT Light-Structure System™ pole
 TLC for LED™ luminaires
 (7)TLC-LED-1200

DATE	07/26/2022
PROJECT NUMBER	102066P1
DESIGNED BY	D. Van Maer
CHECKED BY	NTS
SCALE	1/8" = 1'-0"
SHEETS	3 OF 5

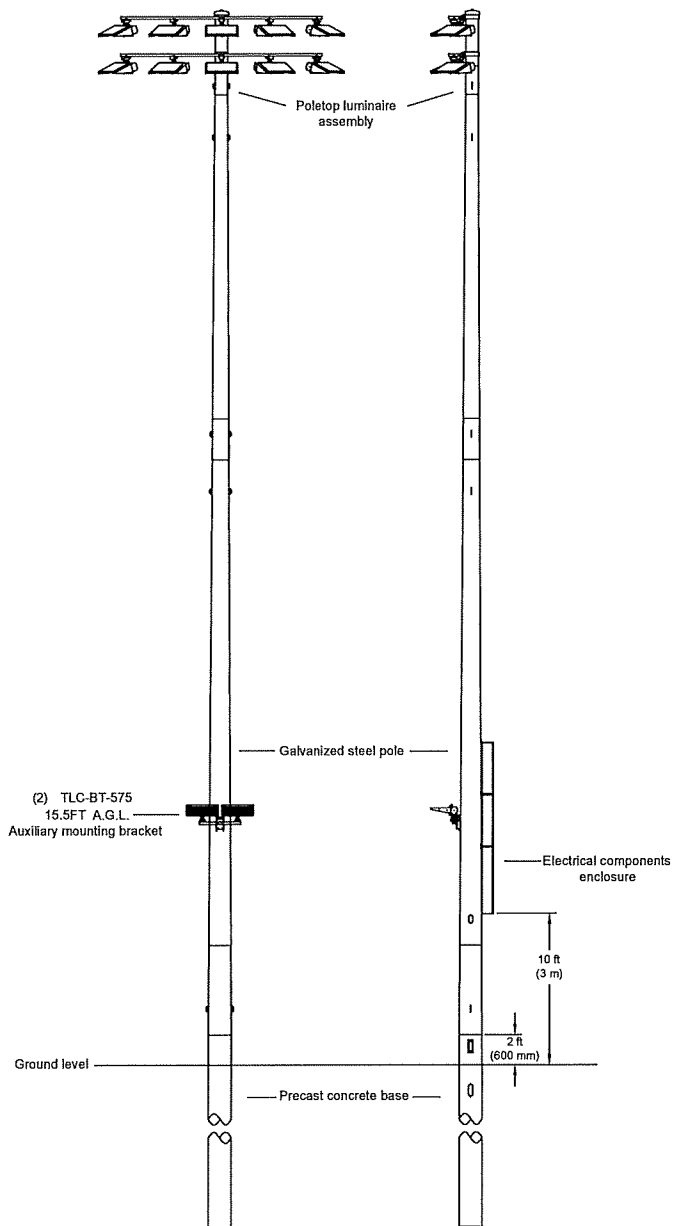
DATE:	BY:	R.L.	REVISIONS:


MUSCO
 Lighting

CORPORATE OFFICE:
 P.O. Box 808
 100 1st Avenue West
 Oshtemo, Iowa 52577
 +1-800-825-6020
 +1-641-673-0411

Pentucket Regional HS FB
 West Newbury, MA
 Pole Configuration Drawing **B**

Musco Lighting, Inc. is the manufacturer of the products shown on this drawing. The products shown on this drawing are subject to change without notice. The user of this drawing is advised to consult the Musco Lighting, Inc. product literature for the most current information.



POLE(S): F1-F2
 Musco 70FT Light-Structure System™ pole
 TLC for LED™ luminaires
 (10)TLC-LED-1200

DATE	07/26/2022
BY	NTS
CHK'D BY	Meer
DESIGNED BY	Meer
PROJECT NUMBER	102066
DRAWING NUMBER	102066P1
SHEET	4 OF 5

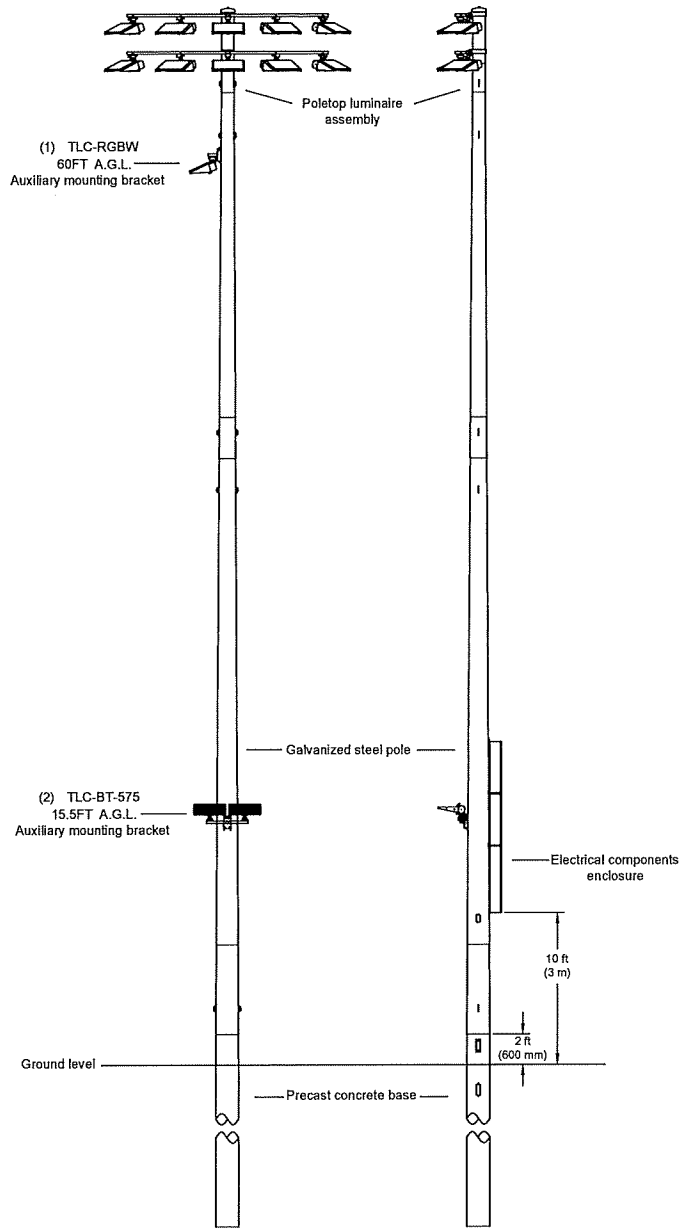
DATE:	BY:	R.L.	REVISIONS:


MUSCO
 Lighting

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 P.O. Box 808
 100 1st Avenue West
 Oskaloosa, Iowa 52577
 +1-800-825-6020
 +1-641-673-0411

Pentucket Regional HS FB
 West Newbury, MA
 Pole Configuration Drawing **B**

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POLE(S): F3-F4
 Musco 70FT Light-Structure System™ pole
 TLC for LED™ luminaires
 (10)TLC-LED-1200

DATE:	01/28/2022
BY:	NTS
SCALE:	102066P1
PROJECT NUMBER:	102066
DRAWN BY:	D.Ver Meer
CHECKED BY:	
DATE:	01/28/2022
BY:	NTS
SCALE:	102066P1
PROJECT NUMBER:	102066
DRAWN BY:	D.Ver Meer
CHECKED BY:	

DATE:	BY:	REVISIONS:


MUSCO
 Lighting

CORPORATE OFFICE:
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 Oskaloosa, Iowa 52577
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 +1-841-873-0411

Pentucket Regional HS FB
 West Newbury, MA
 Pole Configuration Drawing **B**

5 Easy Pieces™

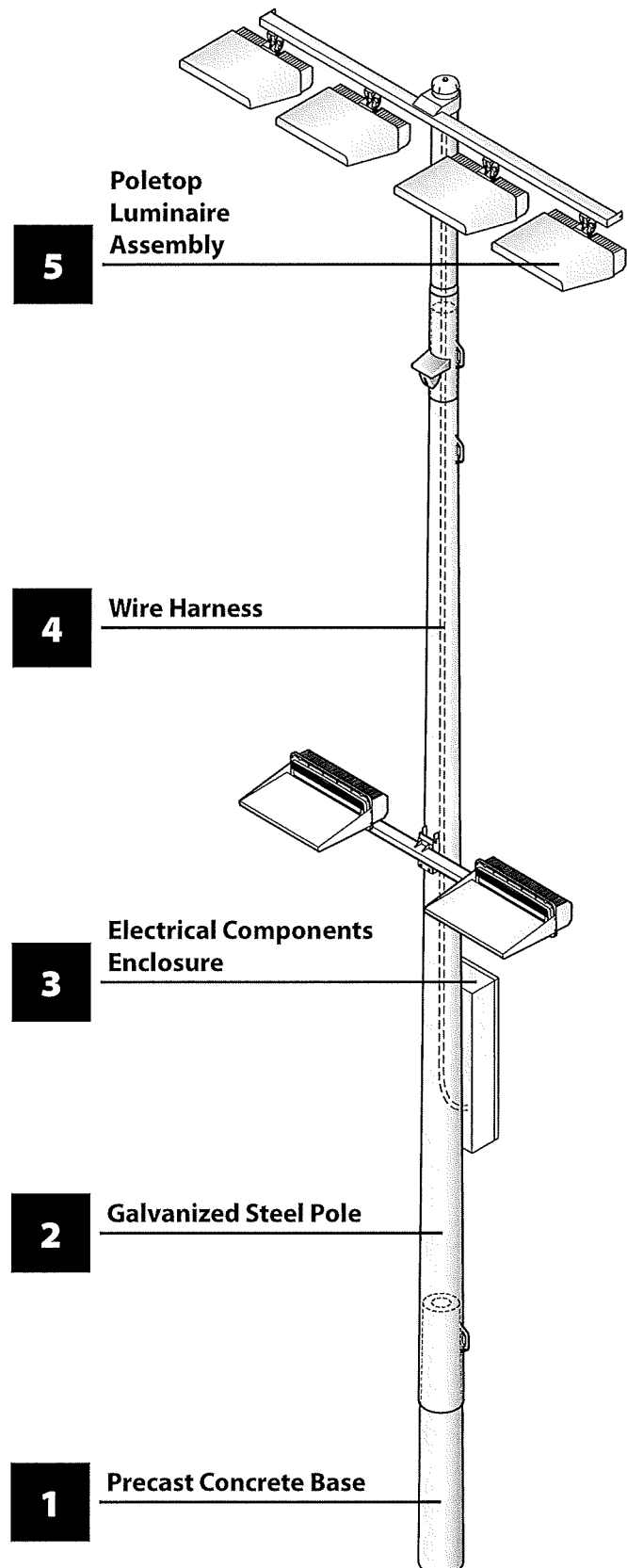
Complete System from Foundation to Poletop

Factory wired, aimed, and tested

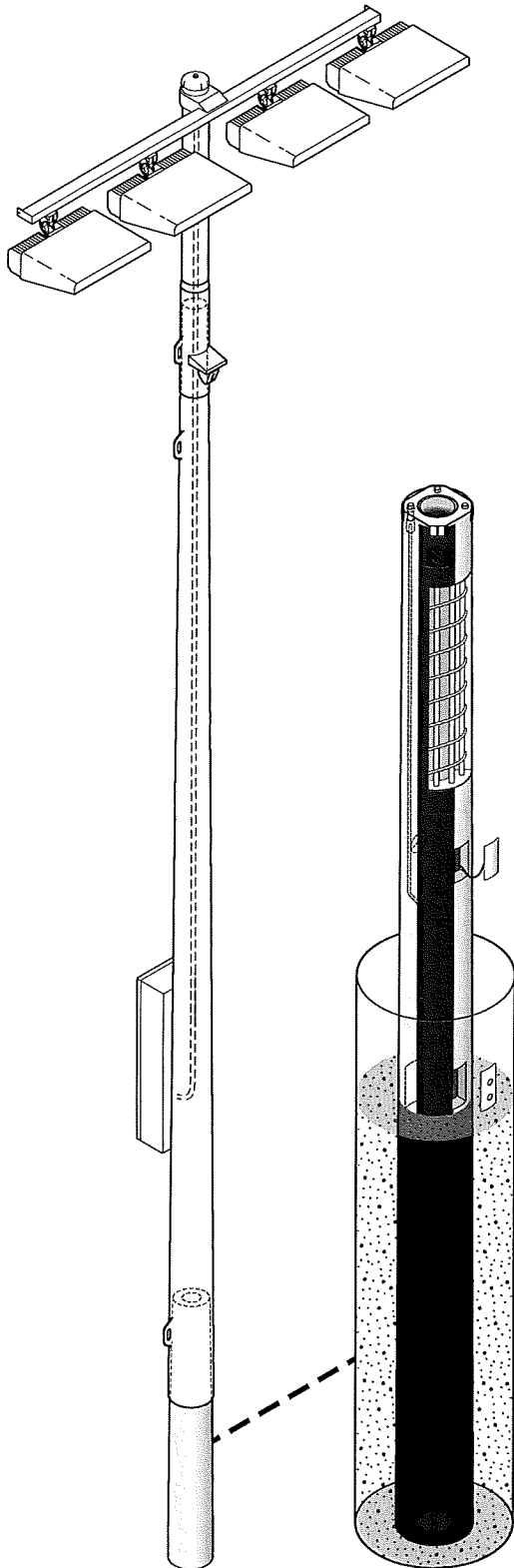
Fast, trouble-free installation

Comprehensive corrosion package

Integrated lightning ground



TLC for LED® – Precast Concrete Base



Overview

The precast concrete base is set directly into the ground and backfilled with concrete. The base includes an integrated lightning ground system.

Features

Base

- Set pole on base in 24 hours
- Tapered upper section for slip-fit steel pole
- Access holes for wire entry
- Epoxy-coated ends prevent water intrusion
- Lifting hole accepts load-rated steel rod provided by Musco

Integrated Lightning Ground System

- Complies with NFPA 780, UL 96A, and EN 62305 standards when installed per Musco installation instructions
- UL Listed, Class II Lightning Protection, file number E337467
- Tested up to 100 kA by independent laboratory
- Steel pole interfaces with integrated grounding system by means of the pole grounding connector
- 2/0 AWG (crosssectional area of 67.4 mm²) grounding electrode conductor
- Concrete-encased grounding electrode, 20 feet (6.1 m) total length, ½ inch (12.7 mm) diameter

Technical Specifications

Base dimensions vary. For measurements refer to project-specific *Foundation and Pole Assembly* drawing.

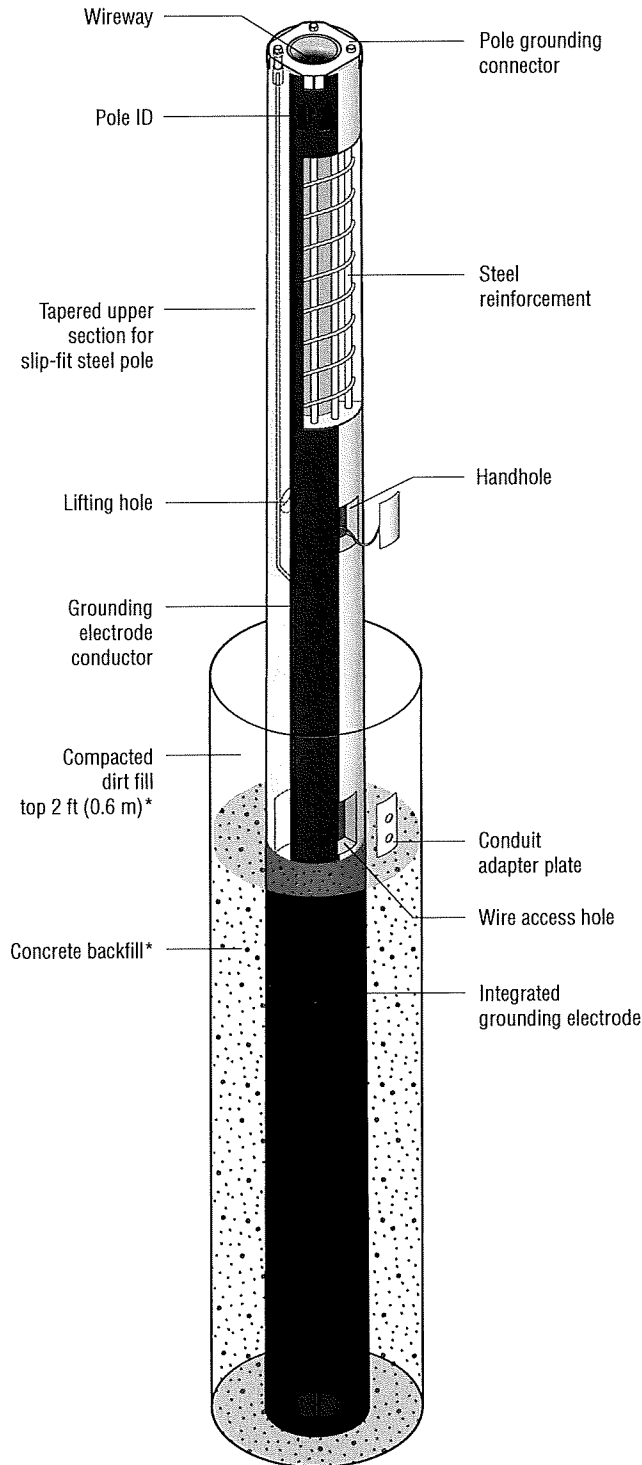
Construction

- Spun concrete construction
- Prestressed steel vertical strands and coil spiral for strength throughout base
- Minimum design strength is 9500 lb/in² (65.5 MPa) at 28 days
- Meets ASTM C1804 design requirements

Quality Assurance Tests

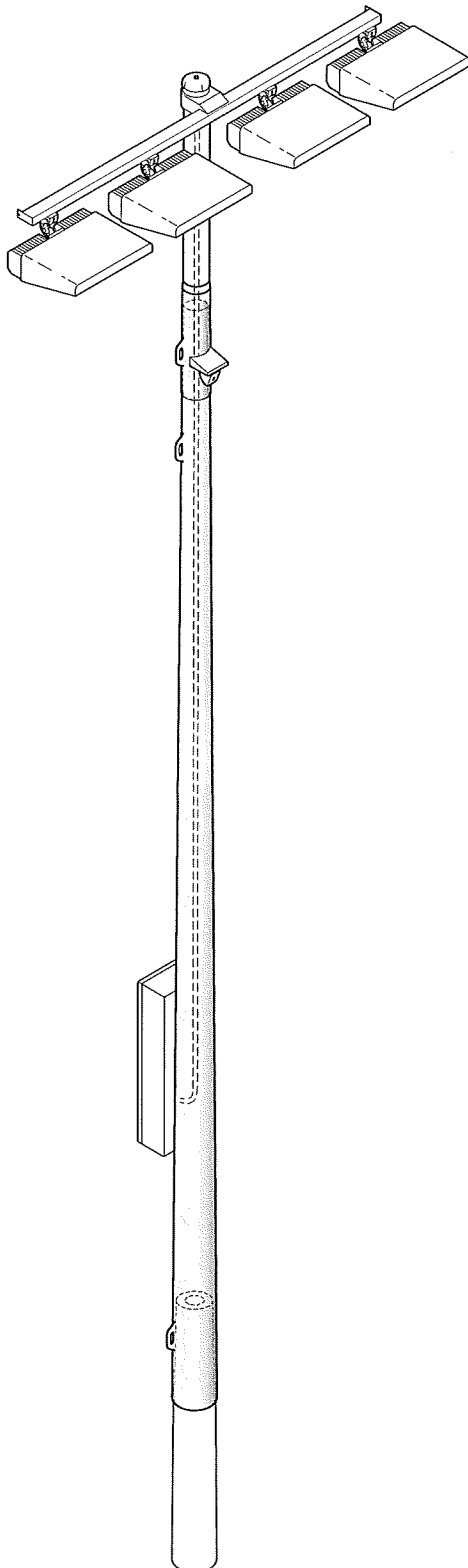
- 28-day compressive strength
- Bending moment capacity
- Grounding system continuity

TLC for LED® – Precast Concrete Base



*Standard pier foundation shown. Foundation and/or backfill may vary per alternate foundation design.

TLC for LED® – Galvanized Steel Pole



Overview

The galvanized steel pole is designed to slip-fit together with the precast concrete base and the poletop luminaire assembly.

Features

- Slip-fit connection allows pole assembly with come-alongs
- Built-in hardware for attaching electrical components enclosure
- Wire access from inside the pole (no exposed wiring or conduit)
- Shipped in sections for easier handling
- Labeled with pole identification for location on field

Technical Specifications

Pole dimensions vary. For measurements refer to project specific pole configuration drawing.

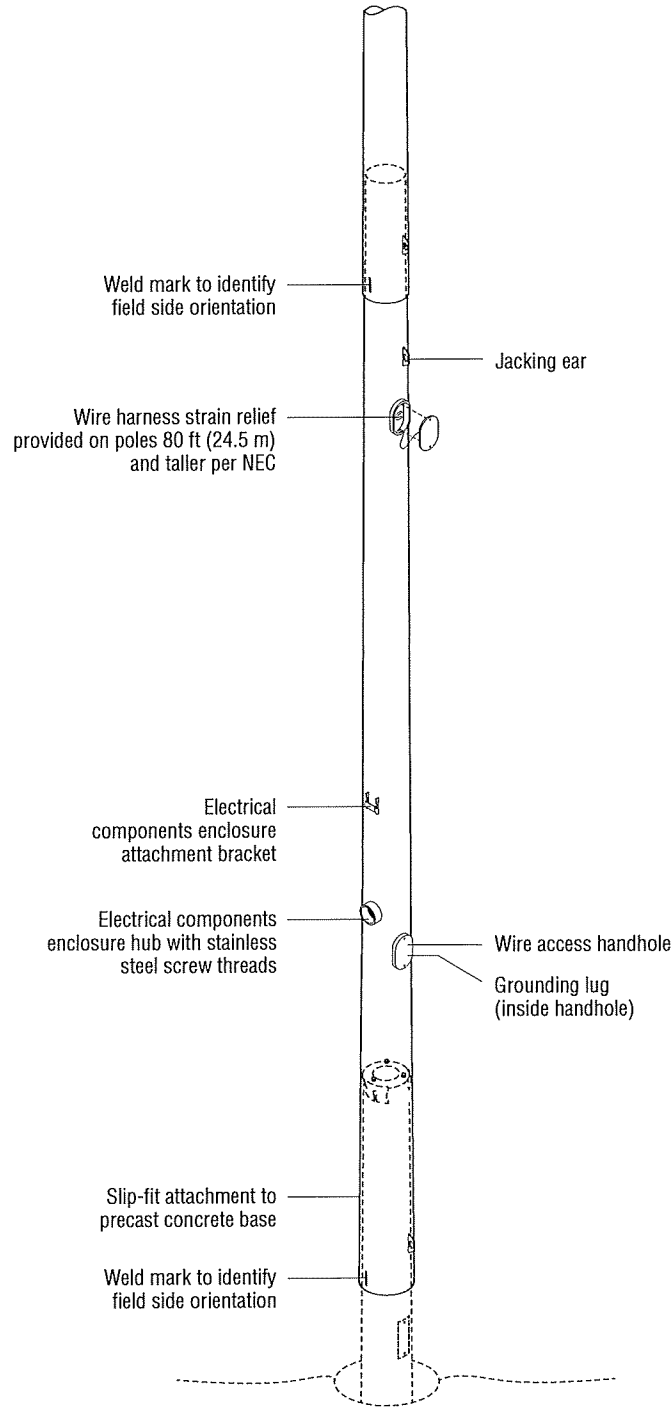
Construction

- Pole designs comply with all major building codes
- High strength, low alloy, tapered, round steel pole
- Hot-dip galvanizing inside and outside after fabrication meets ASTM-A123 and EN 1461 standards
- Conforms to AASHTO stress standards and BS EN 40-3-1
- Grounding lug—rated for aluminum (AL) or copper (CU) wiring
- Pole shipped in sections
- Stainless steel fasteners passivated and coated
- Material certifications are available

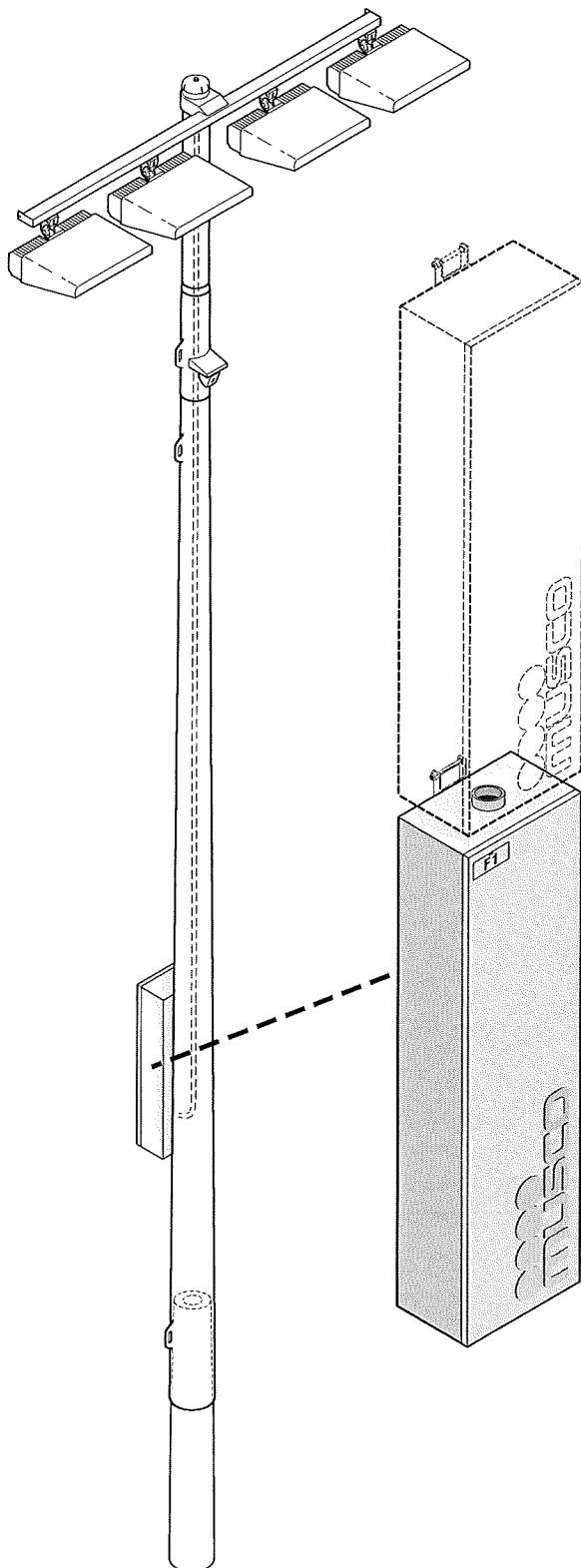
Quality Assurance Tests

- Bending stress
- Minimum galvanizing thickness
- Straightness measurement

TLC for LED® – Galvanized Steel Pole



TLC for LED® – Electrical Components Enclosure



Overview

The electrical components enclosure contains all necessary equipment to operate luminaires. Built-in mounting hardware allows for easy attachment to the galvanized steel pole. Quick connect plugs fasten to the wire harness.

Features

- Factory-built and tested as a unit
- Quick connect plug for easy field wiring
- Mounted 10 ft (3 m) above grade for servicing with ladder
- Labeled with pole identification and electrical information
- Drivers individually fused and spare fuses supplied
- Wire access from inside the pole (no exposed wiring or conduit)
- Disconnect per circuit

Technical Specifications

For amperage draws and circuitry refer to project specific document.

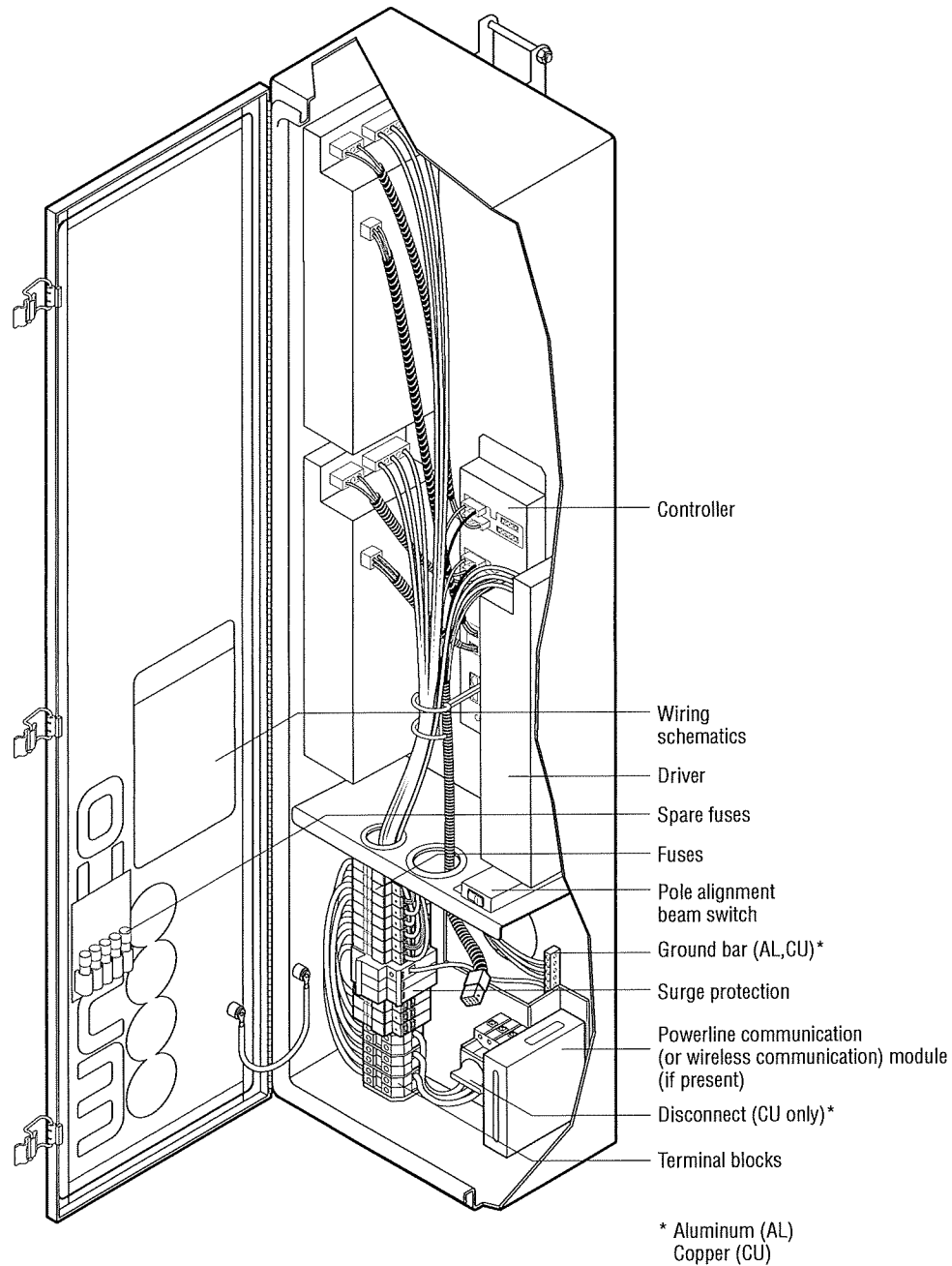
Construction

- 0.08 inch (2 mm) thick, powder-coated aluminum
- Enclosure ratings: NEMA 3R, IP54
- Designed to operate in up to 50° C (122° F) ambient temperature
- Full length stainless steel hinge
- All stainless steel fasteners passivated and coated
- Meets touchsafe standards
- Up to four drivers per enclosure
- Approximate weight 65 lb (29 kg)
- Lower enclosure size 14.25 in (362 mm) wide x 8 in (203 mm) deep x 52.5 in (1334 mm) high
- Upper enclosure size 14.25 in (362 mm) wide x 8 in (203 mm) deep x 40.5 in (1029 mm) high

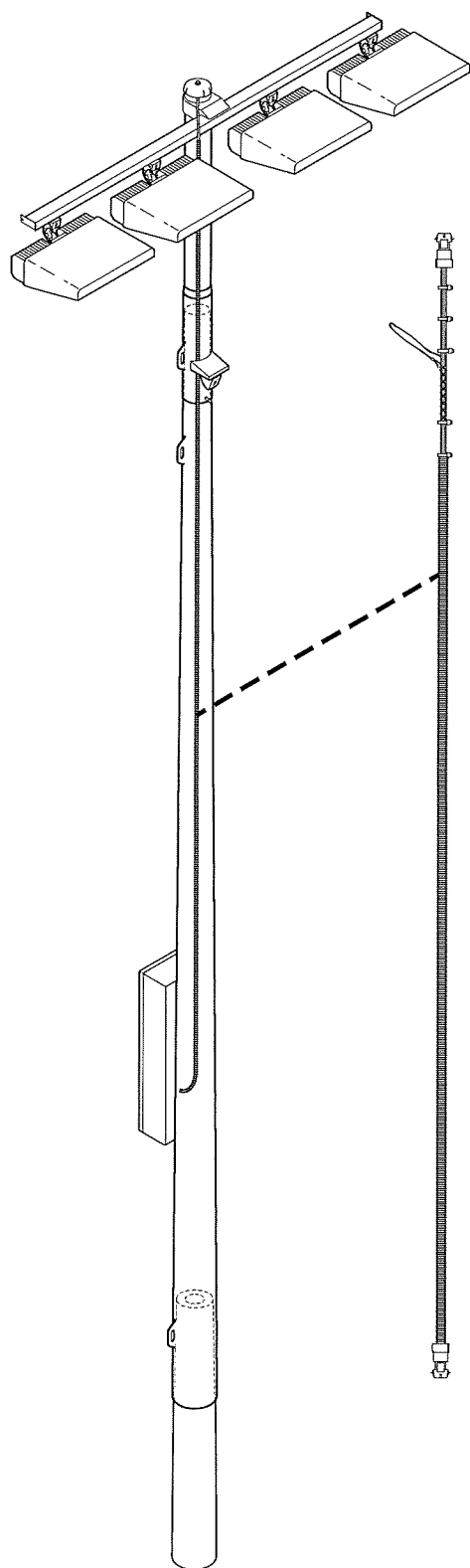
Quality Assurance Tests

- Grounding continuity
- High potential dielectric withstand
- Full functionality test

TLC for LED® – Electrical Components Enclosure



TLC for LED® – Wire Harness



Overview

The factory-built wire harness connects the electrical components enclosure to the poletop luminaire assembly.

Features

- Quick connect plugs for easy field wiring
- Factory-assembled support grip alleviates strain on connections
- Spiral wound cable eliminates slippage
- Protective sleeve prevents wire damage
- All internal wiring, no exposed wires
- Labels identify pole and luminaires

Technical Specifications

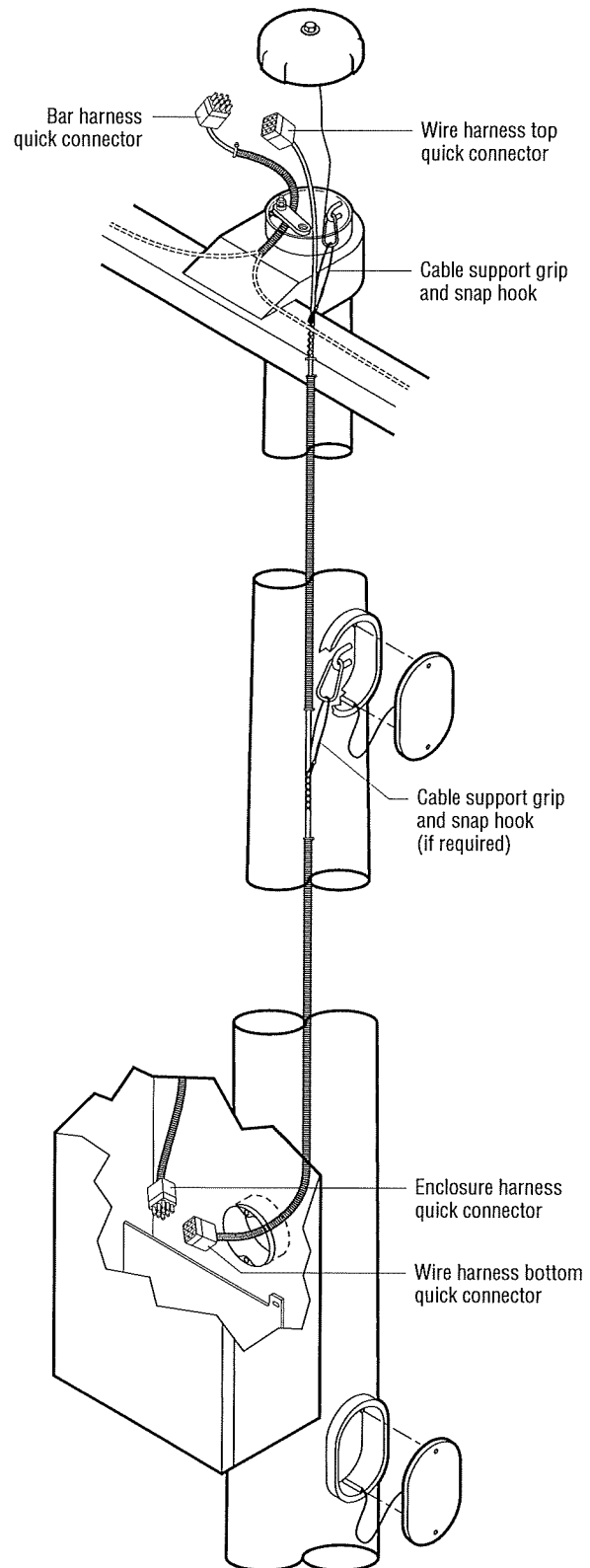
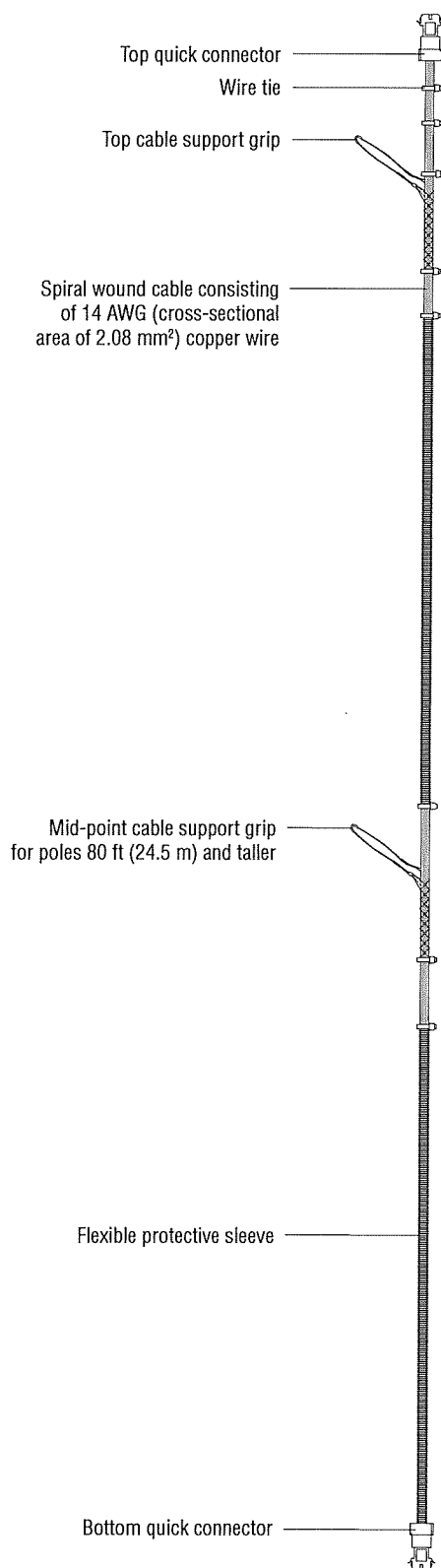
Construction

- Spiral wound, wrapped cable, 14 AWG (cross-sectional area of 2.08 mm²) copper wire
- Integral cable support grip
- Two wires per driver
- Each harness supports up to four drivers
- Multiple top connectors may be present if required for number of luminaires

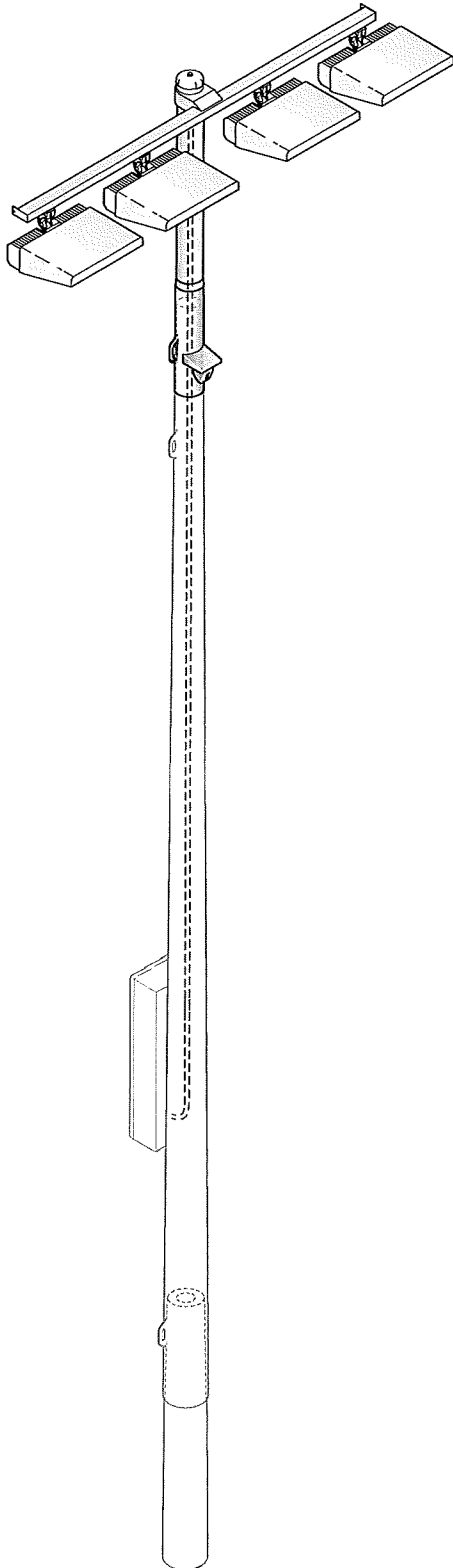
Quality Assurance Tests

- Connector/load resistance
- High potential dielectric withstand
- Grounding continuity
- Termination crimp

TLC for LED® – Wire Harness



TLC for LED® – Poletop Luminaire Assembly, Weld On



Overview

The factory-aimed poletop luminaire assembly is the upper section of the pole and slip-fits together with the galvanized steel pole.

Features

- Each luminaire is factory-built, tested, and ships as a unit
- Luminaires are factory-aimed to two-tenths degree of accuracy
- Luminaire mounts and connects in a single step
- Slip-fit connection allows assembly with come-alongs
- All luminaires are factory-wired to a quick connect harness for easy installation
- Labels identify pole and luminaire location
- No exposed wiring or conduit
- Factory-set pole alignment beam allows easy field alignment

Technical Specifications

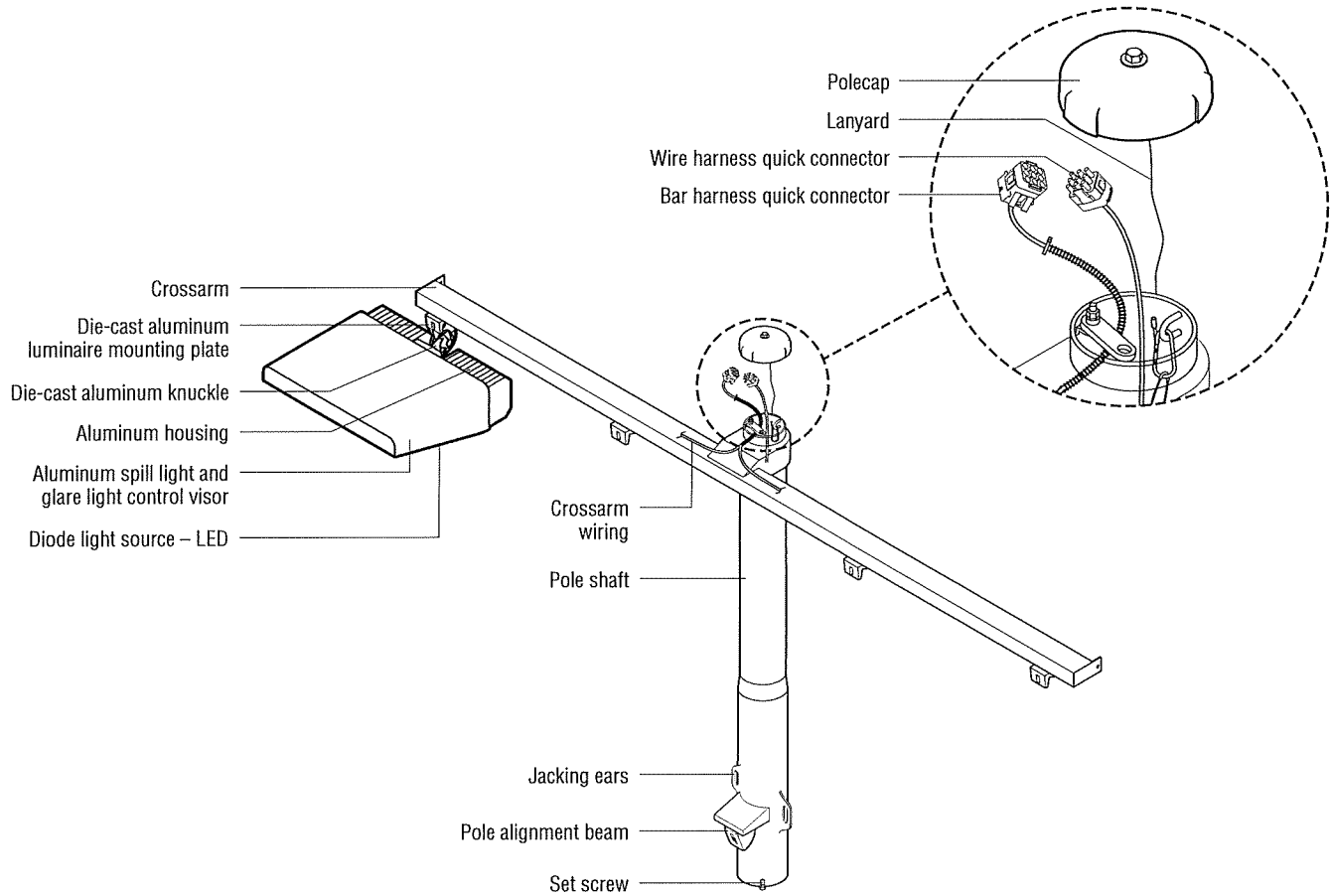
Construction

- Crossarms and pole shaft hot-dip galvanizing inside and outside after fabrication meets ASTM-A123 and EN 1461 standards
- All aluminum components are powder-coated or anodized to mil-A-8625F and BS 5599
- Luminaire and knuckle are powder-coated die-cast aluminum
- All stainless steel fasteners are passivated and coated
- Crossarms are constructed of rectangular steel tubing
- Polecap is attached with stainless steel lanyard and securing bolt

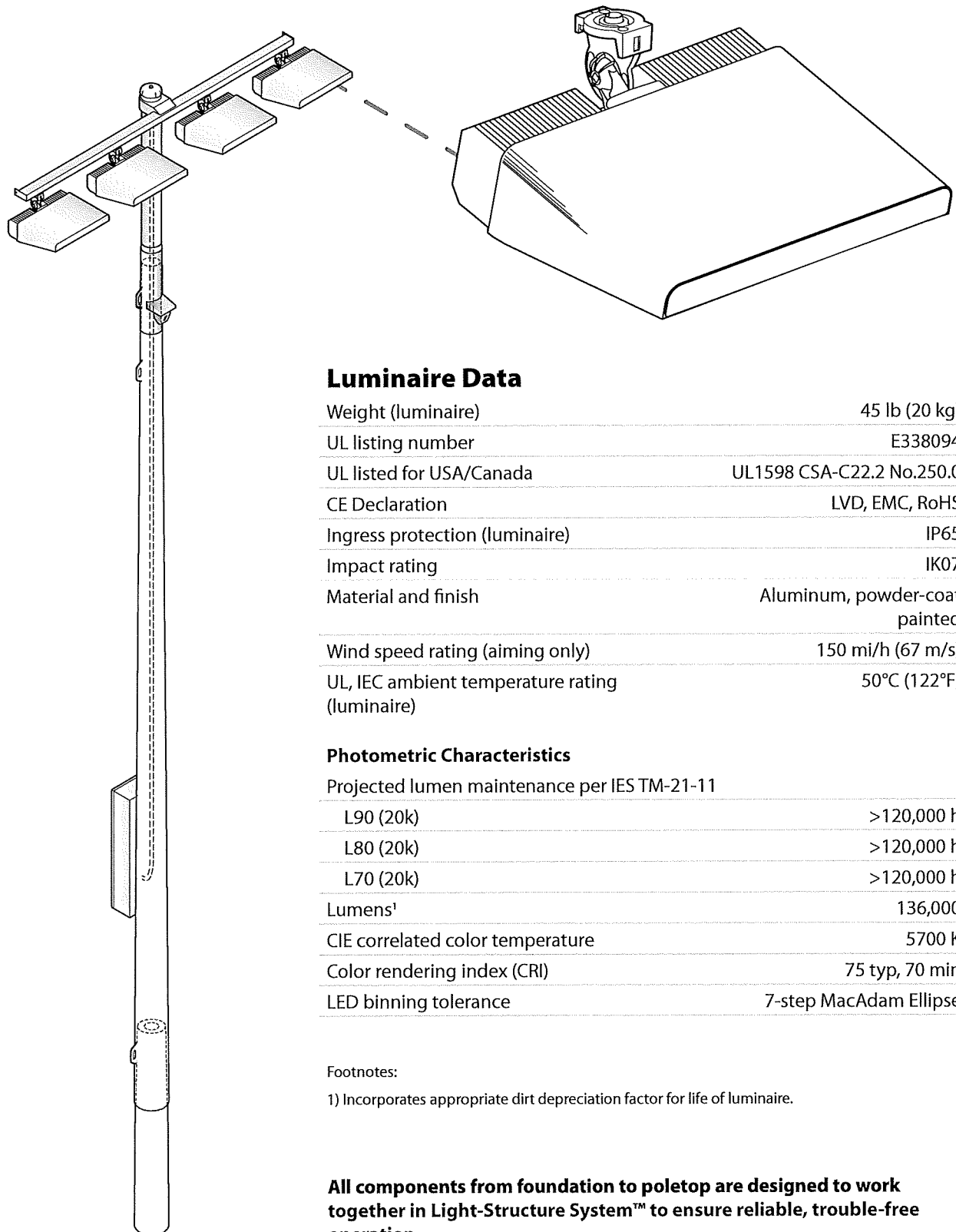
Quality Assurance Tests

- Galvanizing thickness
- High potential dielectric withstand
- Electrical continuity

TLC for LED® – Poletop Luminaire Assembly, Weld On



Luminaire and Driver – TLC-LED-1200



Luminaire Data

Weight (luminaire)	45 lb (20 kg)
UL listing number	E338094
UL listed for USA/Canada	UL1598 CSA-C22.2 No.250.0
CE Declaration	LVD, EMC, RoHS
Ingress protection (luminaire)	IP65
Impact rating	IK07
Material and finish	Aluminum, powder-coat painted
Wind speed rating (aiming only)	150 mi/h (67 m/s)
UL, IEC ambient temperature rating (luminaire)	50°C (122°F)

Photometric Characteristics

Projected lumen maintenance per IES TM-21-11	
L90 (20k)	>120,000 h
L80 (20k)	>120,000 h
L70 (20k)	>120,000 h
Lumens ¹	136,000
CIE correlated color temperature	5700 K
Color rendering index (CRI)	75 typ, 70 min
LED binning tolerance	7-step MacAdam Ellipse

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 – TLC-LED-1200

Driver Data

Electrical Data

Rated wattage¹

Per driver 1170 W

Per luminaire 1170 W

Number of luminaires per driver 1

Starting (inrush) current <40 A, 256 μs

Fuse rating 15 A

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

Ingress protection, electrical components enclosure IP54

Efficiency 95%

Dimming mode optional

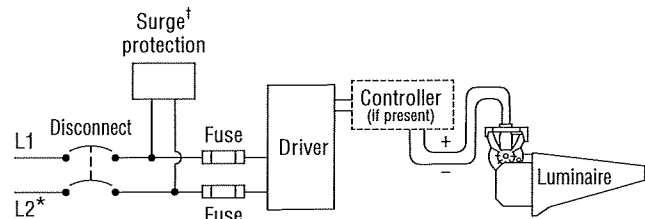
Range, energy consumption 14 – 100%

Range, light output 19 – 100%

Flicker <2%

Total harmonic distortion (THD) at full output <20%

Typical Wiring



* If L2 is neutral then not switched or fused.

† Not present if indoor installation.

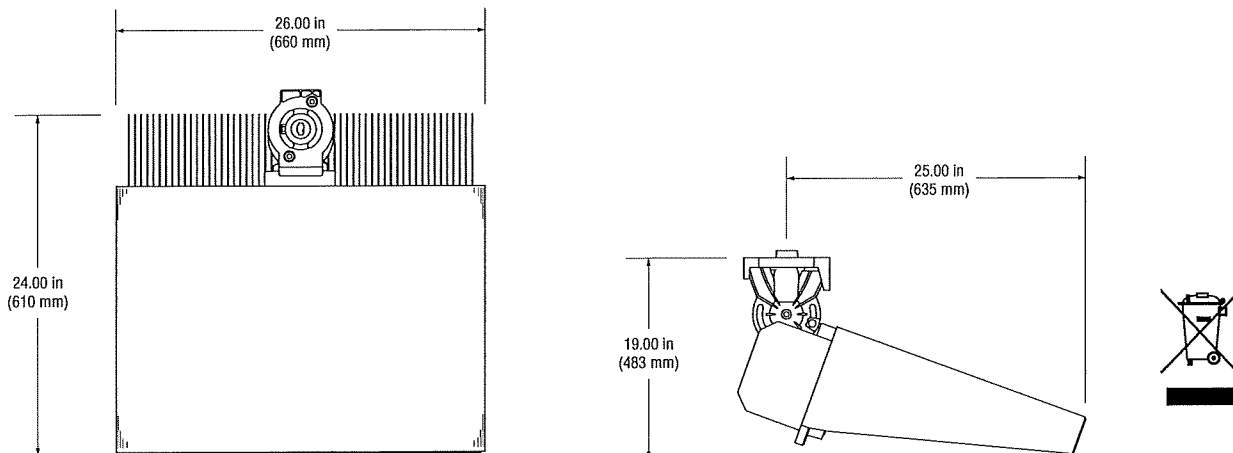
	200 Vac 50/60 Hz	208 Vac 60 Hz	220 Vac 50/60 Hz	230 Vac 50 Hz	240 Vac 50/60 Hz	277 Vac 60 Hz	347 Vac 60 Hz	380 Vac 50/60 Hz	400 Vac 50 Hz	415 Vac 50 Hz	480 Vac 60 Hz
Max operating current per luminaire ²	7.26 A	6.98 A	6.60 A	6.31 A	6.05 A	5.24 A	4.18 A	3.82 A	3.63 A	3.50 A	3.03 A

Footnotes:

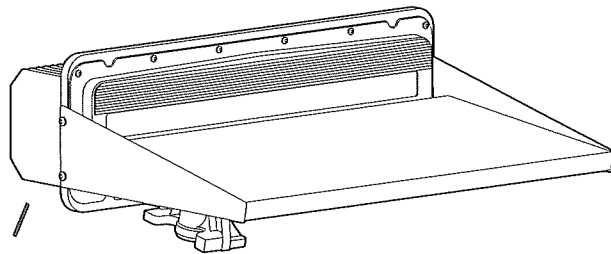
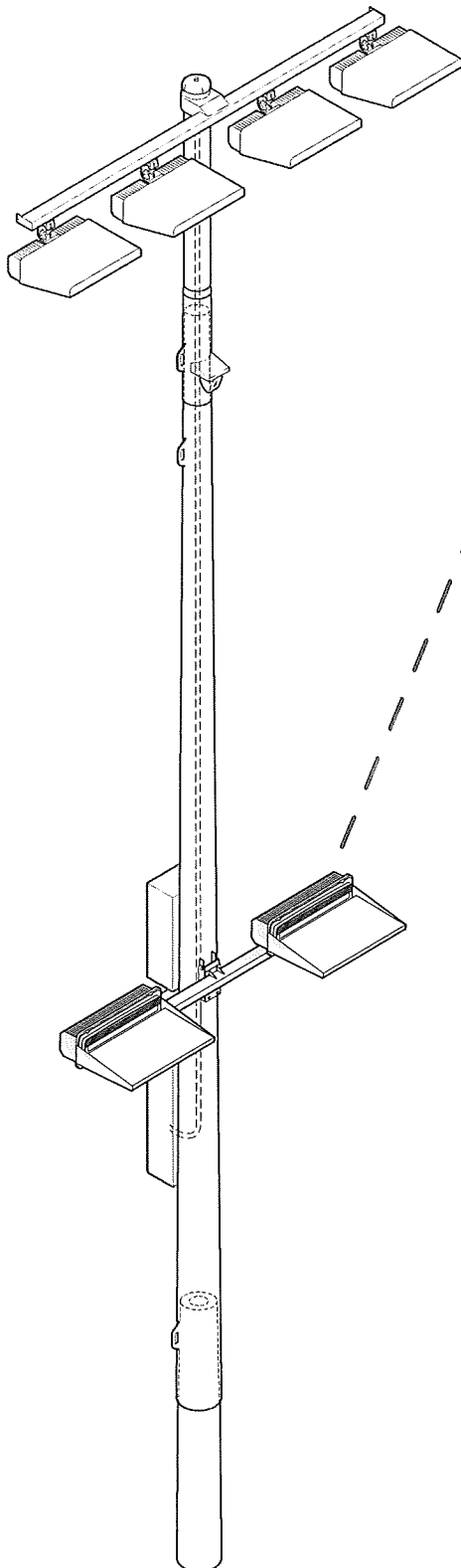
- 1) Rated wattage is the power consumption, including driver efficiency losses, at stabilized operation in 25°C ambient temperature environment.
- 2) Operating current includes allowance for 0.90 minimum power factor, operating temperature, and LED light source manufacturing tolerances.

Notes

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



Luminaire and Driver – TLC-BT-575



Luminaire Data

Weight (luminaire)	34 lb (15 kg)
UL listing number	E338094
UL listed for USA/Canada	UL1598 CSA-C22.2 No.250.0
CE Declaration	LVD, EMC, RoHS
Ingress protection (luminaire)	IP65
Impact rating	IK07
Material and finish	Aluminum, powder-coat painted
Wind speed rating (aiming only)	150 mi/h (67 m/s)
UL, IEC ambient temperature rating (luminaire)	50°C (122°F)

Photometric Characteristics

Projected lumen maintenance per IES TM-21-11	
L90 (20k)	>120,000 h
L80 (20k)	>120,000 h
L70 (20k)	>120,000 h
Lumens ¹	52,000
CIE correlated color temperature	5700 K
Color rendering index (CRI)	75 typ, 70 min
LED binning tolerance	7-step MacAdam Ellipse

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.

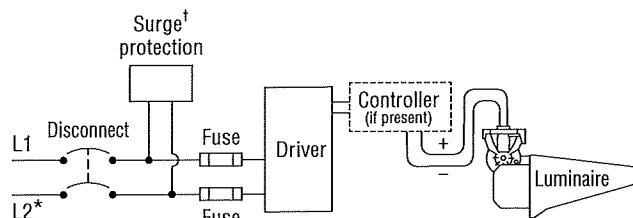
Luminaire and Driver – TLC-BT-575

Driver Data

Electrical Data

Rated wattage ¹	
Per driver	575 W
Per luminaire	575 W
Number of luminaires per driver	1
Starting (inrush) current	<40 A, 256 μs
Fuse rating	15 A
UL, IEC ambient temperature rating, electrical components enclosure	50°C (122°F)
Ingress protection, electrical components enclosure	IP54
Efficiency	95%
Total harmonic distortion (THD) at full output	<20%

Typical Wiring



* If L2 is neutral then not switched or fused.

† Not present if indoor installation.

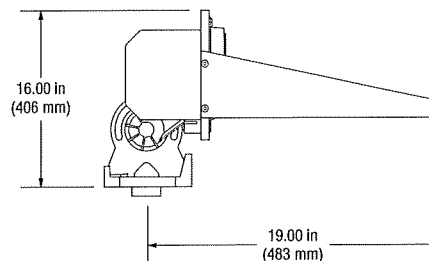
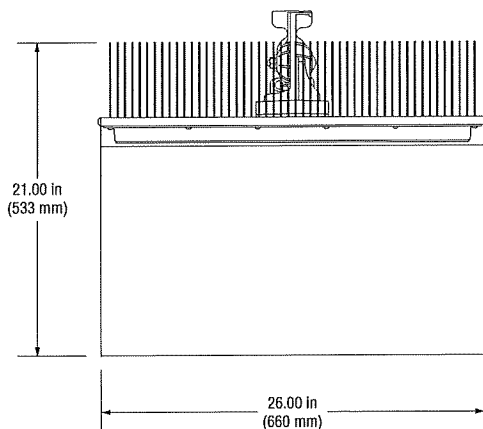
	200 Vac 50/60 Hz	208 Vac 60 Hz	220 Vac 50/60 Hz	230 Vac 50 Hz	240 Vac 50/60 Hz	277 Vac 60 Hz	347 Vac 60 Hz	380 Vac 50/60 Hz	400 Vac 50 Hz	415 Vac 50 Hz	480 Vac 60 Hz
Max operating current per luminaire ²	3.48 A	3.35 A	3.16 A	3.03 A	2.90 A	2.51 A	2.01 A	1.83 A	1.74 A	1.68 A	1.45 A

Footnotes:

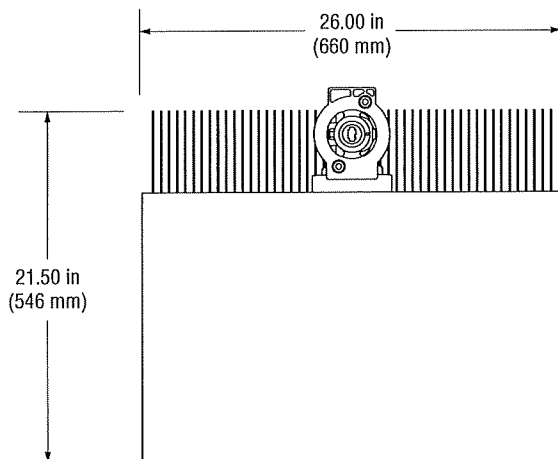
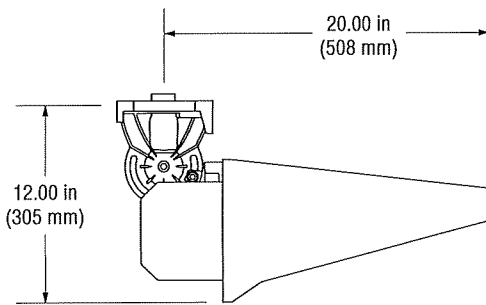
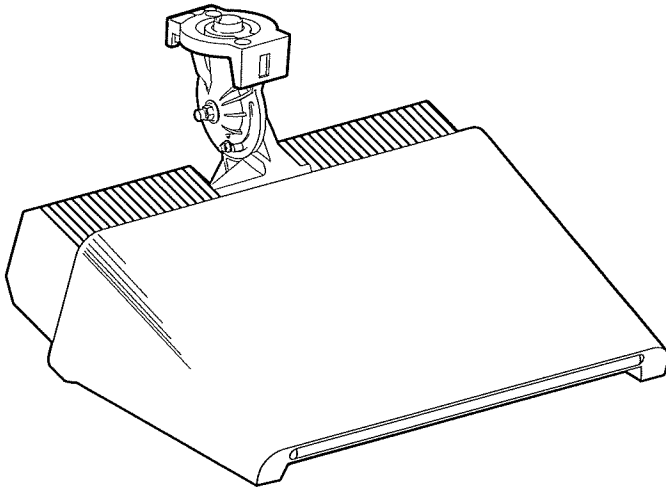
- 1) Rated wattage is the power consumption, including driver efficiency losses, at stabilized operation in 25°C ambient temperature environment.
- 2) Operating current includes allowance for 0.90 minimum power factor, operating temperature, and LED light source manufacturing tolerances.

Notes

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



Datasheet: TLC for LED® RGBW Luminaire and Driver



Luminaire Data

Weight (luminaire)	40 lb (18 kg)
UL listing number	E338094
UL listed for USA / Canada	UL 1598 CSA-C22-2 No.250.0
Ingress protection, luminaire	IP65
Impact rating	IK07
Material and finish	Aluminum, powder-coat painted
Wind speed rating (aiming only)	150 mi/h (67 m/s)
UL ambient temperature rating, luminaire	50°C (122°F)

Photometric Characteristics

Projected lumen maintenance per IES TM-21-11

L90 (20k) (white only)	>120,000 h
L80 (20k) (white only)	>120,000 h
L70 (20k) (white only)	>120,000 h
CIE correlated color temperature (white only)	5700 K
Color rendering index (CRI) (white only)	75 typ, 70 min
Lumens ¹ , white	28,500
Lumens ¹ , red	8,000
Lumens ¹ , green	20,000
Lumens ¹ , blue	8,000
LED binning tolerance	7-step MacAdam Ellipse (white LEDs only)

Footnotes:

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

Datasheet: TLC for LED® RGBW Luminaire and Driver

Driver Data

Electrical Data

Rated wattage ¹	
Per luminaire, max	640 W
Number of drivers per luminaire	4
Starting (inrush) current	106 A, 5 ms
Fuse rating	20 A
UL, IEC ambient temperature rating, electrical components enclosure	50°C (122°F)
Ingress protection, electrical components enclosure	IP54
Efficiency	94%
Dimming mode	optional
Range, energy consumption	varies by color
Range, light output	varies by color

	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	480 Vac 60 Hz
Max operating current per luminaire ²	3.56 A	3.44 A	3.24 A	3.08 A	2.96 A	2.56 A	2.04 A	1.48 A

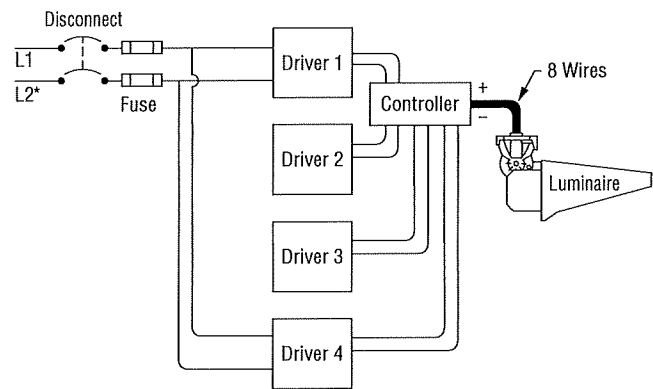
Footnotes:

- 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 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.

Typical Wiring



*If L2 is neutral then not switched or fused.



Safety: UL Product Certification

UL Product Certification for:

Musco Sports Lighting, LLC
 100 1st Ave W
 PO Box 808
 Oskaloosa, IA 52577
 USA



UL Category	Covers	UL Number
High-Intensity Discharge Surface-Mounted Luminaires	<ul style="list-style-type: none"> • Green Generation™ luminaires and remote ballast assemblies • SportsCluster[®] and SportsCluster-2[®] luminaires and remote ballast assemblies • Light-Structure 2™ and Light-Structure System™ luminaires and remote ballast assemblies • 1000 W Light-Pak™ and Light-Pak indoor luminaires with Multi-Watt™ control system • 1000 W Show-Light™ and Show-Light Green™ luminaires with hooded light actuator system and remote ballast assemblies • 2000 W Mirtran™ luminaire • Stadium 2K Fixture™ 2000 W luminaire and Hot Restrike Green™ 2000 W hot restrike luminaire 	E33316
Management Equipment, Energy	Lighting control systems for: <ul style="list-style-type: none"> • Control-Link[®] control and monitoring system • Control-Link retrofit control system 	E139944
Industrial Control Panels	Control panels and enclosures for: <ul style="list-style-type: none"> • Control-Link[®] control and monitoring system • Control-Link retrofit control system • Lighting contactor cabinets • Multi-Watt™ control systems 	E204954
Emergency Lighting and Power Equipment	<ul style="list-style-type: none"> • Auxiliary Lighting Interface Cabinet (ALIC) 	E311491
Luminaire Fittings	Galvanized steel poles 12 ft (3.7 m) or less for: <ul style="list-style-type: none"> • Poles for Mirtran™ luminaire mounting • Rooftop poles • Special applications 	E132445
Luminaire Pole in Excess of 12 ft (3.7 m)	Galvanized steel poles greater than 12 ft (3.7 m) for: <ul style="list-style-type: none"> • Light-Structure System™ luminaire mounting • Sportspole™ structure or mounting system and special applications 	E325078

Safety: UL Product Certification

UL Category	Covers	UL Number
Devices, Scaffolding	Service platforms for: <ul style="list-style-type: none">• Light-Structure System™ luminaires and remote ballast assemblies• SportsCluster® System luminaires and remote ballast assemblies	SA7004
Lightning Conductors, Air Terminals, and Fittings	<ul style="list-style-type: none">• Light-Structure System™ pole structure concrete base	E337467
Light-Emitting-Diode Surface-Mounted Luminaires	<ul style="list-style-type: none">• LED luminaires and driver assemblies• LED auxiliary luminaires	E338094

A copy of the UL Certificate of Compliance is available upon your request.

Corrosion Protection

Manufacturer's Certification of Corrosion Protection for Light-Structure System™ and SportsCluster® Lighting Systems

The following standard corrosion protection is provided on your equipment:

- All exposed components are constructed of corrosion-resistant material and/or coated to protect against corrosion.
- All exposed carbon steel is hot-dip galvanized, meeting ASTM A123 and ISO/EN 1461.
- All exposed aluminum is powder-coated with high-performance polyester or anodized. All exterior reflective inserts are anodized, coated with a clear, high-gloss, durable fluorocarbon, and protected from direct environmental exposure to prevent reflective degradation or corrosion.
- All exposed hardware and fasteners are stainless steel, passivated, and coated with an aluminum based thermosetting epoxy resin for protection against corrosion and stress corrosion cracking. Alternately, for hardware in non-stressed applications, an electroless nickel coating meeting ASTM B733 may be used. Pole strapping used to mount certain equipment to light poles is annealed grade 304 stainless steel and passivated.
- Certain structural fasteners are carbon steel, galvanized meeting ASTM A153 and ISO/EN 1461 (for hot-dip galvanizing), or ASTM B695 (for mechanical galvanizing).

This corrosion protection package only applies to equipment manufactured by Musco.

Musco Sports Lighting, LLC

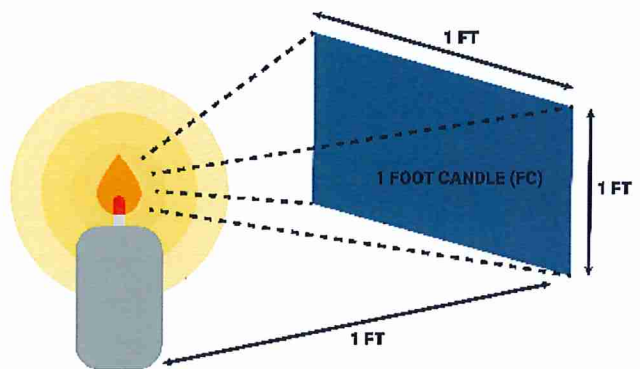


Greg Kubbe
Director of Product Performance

Foot Candle Reference Guide

A foot-candle is a form of measurement that is commonly used to determine sufficient lighting levels for our LED lighting projects. One foot-candle can stand for the amount of one lumen per square foot or about 10.764 lux. Being that it isn't particularly easy to measure the lighting levels above $\pm 10\%$, it is acceptable to consider one foot-candle as 10lux.

Foot Candle ranges provided are general recommendations. For specific project recommendations, consult a Light Poles Plus product specialist.

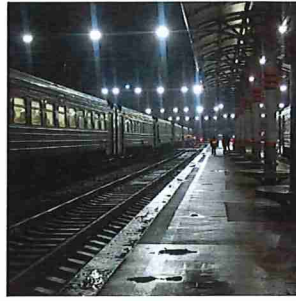


Application Examples

2-10 Foot Candles



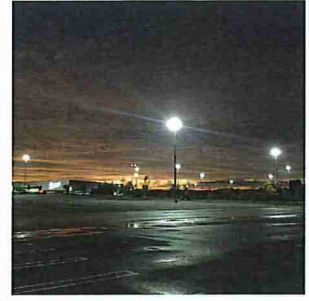
Walkway



Train Station



Parking Garage



Parking Lot

10-25 Foot Candles



Multi-Purpose Room



Parcel Distribution



Gun Range



Auto Dealership

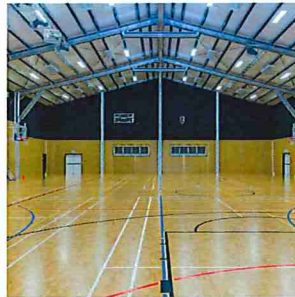
25-40 Foot Candles



Airport



Workshop



Gymnasium



Fieldhouse

40-55 Foot Candles



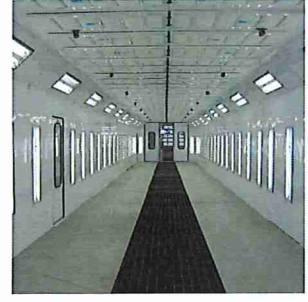
Factory



Gym



Gymnastics Gym



Paint Booth

60+ Foot Candles



Commercial Kitchen



Office



Chemical Laboratory



Operating Room