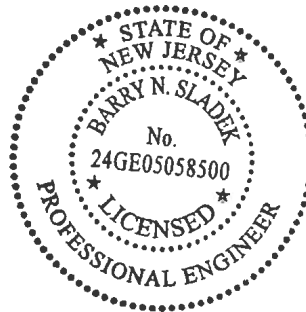




Valmont Industries, Inc.  
West Highway 275  
P.O. Box 358  
Valley, Nebraska 68064-0358 USA  
(402) 359-2201

A Light & Traffic Structure Proposal  
for  
50' Embedded Sport Lighting  
Lawrenceville, New Jersey

Valmont Order No.: 509120-P2



Prepared By:  
Skyler Ellefson  
June 7, 2021

Proprietary Information

These documents, drawings and/or calculations and all information related to them are the exclusive property and the proprietary information of Valmont Industries, Inc. and are furnished solely upon the conditions that they will be retained in strictest confidence and shall not be duplicated, used or disclosed in whole or in part for any purpose, in any way, without the prior written permission of Valmont Industries, Inc.



Valmont Industries, Inc.  
West Highway 275  
P.O. Box 358  
Valley, Nebraska 68064-0358 USA  
(402) 359-2201

## Table Of Contents

LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH ..... 1

### Proprietary Information

These documents, drawings and/or calculations and all information related to them are the exclusive property and the proprietary information of Valmont Industries, Inc. and are furnished solely upon the conditions that they will be retained in strictest confidence and shall not be duplicated, used or disclosed in whole or in part for any purpose, in any way, without the prior written permission of Valmont Industries, Inc.

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393 GUST FACTOR: 1.14

ELEVATION OF FOUNDATION ABOVE SURROUNDING TERRAIN = 0.0 (FT)  
 STEPS INCLUDED ? NO

RECURRENCE INTERVAL = 50  
 HMLT FATIGUE: NO  
 WIND VELOCITY = 90 MPH CRITERIA: AASHTO-2013  
 AASHTO ICE INCLUDED ? YES

DESIGN SUMMARY  
 POLE

=====

HEIGHT (FT)	POLE SHAFT WEIGHT (LBS)	GROUND LINE DIAMETER (IN)	TOP DIAMETER (IN)
50.00	1500	14.18	7.54

SECTION JOINTS	JOINT 1
HEIGHT	13.68 FT
TYPE	Slip Joint
OVERLAP LENGTH	32.3 IN

SECTION CHARACTERISTICS	SECTION 1	SECTION 2
SHAPE	ROUND	ROUND
BASE DIAMETER (IN)	15.30	13.00
TOP DIAMETER (IN)	12.26	7.54
THICKNESS (IN)	0.21875	0.17930
LENGTH (FT)	21.68	39.01
WEIGHT (LBS)	713	788
TAPER (IN/FT)	0.1400	0.1400
YIELD STRENGTH (KSI)	55	55
MATERIAL	S220 - 55	S105 - 55

=====

EMBEDMENT DEPTH = 8.00 (FT)

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393 GUST FACTOR: 1.14

ELEVATION OF FOUNDATION ABOVE SURROUNDING TERRAIN = 0.0 (FT)  
 STEPS INCLUDED ? NO

RECURRENCE INTERVAL = 50  
 HMLT FATIGUE: NO

WIND VELOCITY = 90 MPH CRITERIA: AASHTO-2013  
 AASHTO ICE INCLUDED ? YES

DESCRIPTION OF EPA LOADING \*

=====

POSITION OF LOAD	MOUNTING HEIGHT** (FT)	CENTROID HEIGHT** (FT)	DISTANCE TO CENT. FROM POLE (FT)	WEIGHT (LBS)	EFFECTIVE PROJECTED AREA SQ. (FT)
POLE	49.00	50.00	0.00	116	4.17
POLE	46.00	47.00	0.00	116	4.17
POLE	43.00	44.00	0.00	116	4.17
POLE	49.00	51.00	0.00	305	23.00
POLE	46.00	48.00	0.00	305	23.00
POLE	43.00	46.00	0.00	305	23.00

\* THE VALUES SHOWN IN THIS TABLE MUST NOT BE EXCEEDED  
 WITHOUT CONSULTING VALMONT. ANY SIZES OR OTHER  
 DIMENSIONS NOT PROVIDED BY THE SPECIFYING AGENCY  
 HAVE BEEN ESTIMATED BY VALMONT.

\*\* THESE HEIGHTS ARE THE GROUND LINE.

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

R E S U L T S S U M M A R Y

MAXIMUM COMBINED STRESS RATIO  
IN EACH MAJOR COMPONENT  
====(GROUPS I,II & III)====

POLE (AT 13.68 (FT)) = 0.98

MAXIMUM REACTIONS APPLIED TO FOUNDATION  
=====

BENDING MOMENT = 119578 FT-LBS  
TORSION = 0 FT-LBS  
SHEAR FORCE = 2582 LBS  
AXIAL FORCE = 4318 LBS

MAXIMUM BENDING + AXIAL DEAD WT. STRESS  
=====

POLE = 0.29 KSI

RESULTANT DEFLECTION OF POLE TOP  
CAUSED BY DEAD WEIGHT  
=====

0.00 DEGREES

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

POLE PROPERTIES

HEIGHT (FT)	DIAMETER (IN)	WALL THK. (IN)	ROUNDNESS RATIO %	D/T	MOMENTS OF INERTIA (IN <sup>4</sup> )	SECTION MODULUS (IN <sup>3</sup> )	AREA (IN <sup>2</sup> )
50.00	7.539	0.1793	100.00	42.05	28.03	7.62	4.14
49.00	7.679	0.1793	100.00	42.83	29.66	7.91	4.22
46.00	8.099	0.1793	100.00	45.17	34.93	8.82	4.46
45.00	8.239	0.1793	100.00	45.95	36.82	9.14	4.54
43.00	8.519	0.1793	100.00	47.51	40.79	9.78	4.70
40.00	8.939	0.1793	100.00	49.85	47.26	10.79	4.93
35.00	9.639	0.1793	100.00	53.76	59.52	12.58	5.33
30.00	10.339	0.1793	100.00	57.66	73.74	14.52	5.72
25.00	11.039	0.1793	100.00	61.57	90.05	16.58	6.12
20.00	11.739	0.1793	100.00	65.47	108.61	18.79	6.51
15.00	12.439	0.1793	100.00	69.38	129.56	21.14	6.90
13.68	12.623	0.1793	100.00	70.40	135.49	21.78	7.01
13.68	12.264	0.2188	100.00	56.06	149.93	24.89	8.28
10.99	12.641	0.2188	100.00	57.79	164.46	26.48	8.53
10.00	12.780	0.2188	100.00	58.42	170.02	27.07	8.63
5.00	13.480	0.2188	100.00	61.62	200.06	30.17	9.11
0.00	14.180	0.2188	100.00	64.82	233.44	33.44	9.59

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

WIND and WEIGHT FORCE DATA - GROUP LOAD 2

```
=====
```

ELEVATION TOP OF SEGMENT (FT)	CENTROID ABOVE BASE (FT)	WEIGHT FORCE (LBS)	PROJECTED AREA (FT^2)	DRAG COEFF	VELOCITY RESPONSE PRESSURE (PSF)	WIND FORCE (LBS)
ATTCHMT. 1	50.00	116.00	4.17	1.00	25.85	107.8
ATTCHMT. 2	47.00	116.00	4.17	1.00	25.52	106.4
ATTCHMT. 3	44.00	116.00	4.17	1.00	25.17	104.9
ATTCHMT. 4	51.00	305.00	4.60	1.00	25.96	597.1
ATTCHMT. 5	48.00	305.00	4.60	1.00	25.63	589.5
ATTCHMT. 6	46.00	305.00	4.60	1.00	25.40	584.2
50.00	49.50	14.24	0.63	0.67	25.80	11.0
49.00	47.49	44.32	1.97	0.64	25.58	32.3
46.00	45.50	15.31	0.68	0.61	25.35	10.6
45.00	43.99	31.42	1.40	0.59	25.17	20.8
43.00	41.49	49.15	2.18	0.56	24.86	30.5
40.00	37.47	87.28	3.87	0.52	24.34	48.8
35.00	32.47	93.99	4.16	0.47	23.61	46.4
30.00	27.47	100.69	4.45	0.45	22.80	45.7
25.00	22.47	107.40	4.75	0.45	21.85	46.7
20.00	17.48	114.11	5.04	0.45	20.73	47.0
15.00	14.34	31.14	1.37	0.45	20.45	12.6
13.68	12.33	262.71	2.80	0.45	20.45	25.7
10.99	10.49	28.91	1.05	0.45	20.45	9.6
10.00	7.48	150.92	5.47	0.45	20.45	50.3
5.00	2.48	159.10	5.76	0.45	20.45	53.0

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

WIND and WEIGHT FORCE DATA - GROUP LOAD 3

```
=====
```

ELEVATION TOP OF SEGMENT (FT)	CENTROID ABOVE BASE (FT)	WEIGHT FORCE (LBS)	PROJECTED AREA (FT^2)	DRAG COEFF	VELOCITY RESPONSE PRESSURE (PSF)	WIND FORCE (LBS)
ATTCHMT. 1	50.00	166.04	4.17	1.00	12.93	53.9
ATTCHMT. 2	47.00	166.04	4.17	1.00	12.76	53.2
ATTCHMT. 3	44.00	166.04	4.17	1.00	12.58	52.5
ATTCHMT. 4	51.00	581.00	4.60	1.00	12.98	298.6
ATTCHMT. 5	48.00	581.00	4.60	1.00	12.82	294.8
ATTCHMT. 6	46.00	581.00	4.60	1.00	12.70	292.1
50.00	49.50	20.07	0.63	0.67	18.60	7.9
49.00	47.49	62.48	1.97	0.64	19.50	24.7
46.00	45.50	21.58	0.68	0.61	20.40	8.5
45.00	43.99	44.30	1.40	0.59	21.09	17.5
43.00	41.49	69.29	2.18	0.56	22.24	27.3
40.00	37.47	123.04	3.87	0.52	24.11	48.4
35.00	32.47	132.50	4.16	0.47	26.50	52.0
30.00	27.47	141.95	4.45	0.45	27.78	55.7
25.00	22.47	151.41	4.75	0.45	27.78	59.3
20.00	17.48	160.86	5.04	0.45	27.78	63.0
15.00	14.34	43.89	1.37	0.45	27.78	17.2
13.68	12.33	350.94	2.80	0.45	27.78	35.0
10.99	10.49	38.62	1.05	0.45	27.78	13.1
10.00	7.48	201.60	5.47	0.45	27.78	68.4
5.00	2.48	212.54	5.76	0.45	27.78	72.0



ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

ANALYSIS OF POLE: FORCES AND MOMENTS - GROUP LOAD 2

```

=====
SECTION  GROUP      FORCES  (LBS)          MOMENTS  (FT-LBS)
HEIGHT*  LOAD  =====
(FT)     NO.   AXIAL      SHEAR          PRIMARY  SECONDARY  TOTAL
-----
50.00    2      0           0              0         0         0
49.00    2      306         781            1308      109      1416
46.00    2      646        1579           4790      422      5212
45.00    2      665        1591           6239      558      6797
43.00    2     1006        2363          11028      983     12011
40.00    2     1086        2388          17569     1588     19157

35.00    2     1221        2428          28668     2585     31253
30.00    2     1370        2459          40006     3535     43541
25.00    2     1529        2483          51574     4406     55979
20.00    2     1697        2502          63372     5164     68537
15.00    2     1852        2531          75405     5780     81185

13.68    2     1884        2546          78610     5914     84525
13.68    2     1906        2530          78610     5914     84525
10.99    2     2071        2548          85228     6158     91386
10.00    2     2131        2534          87677     6236     93914
 5.00    2     2336        2544         100197     6523    106720

 0.00    2     2500        2599         112975     6603    119578
  
```

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

ANALYSIS OF POLE: FORCES AND MOMENTS - GROUP LOAD 3

```

=====
SECTION  GROUP      FORCES  (LBS)          MOMENTS  (FT-LBS)
HEIGHT*  LOAD
(FT)     NO.      AXIAL      SHEAR      PRIMARY  SECONDARY  TOTAL
50.00    3         0          0          0         0         0
49.00    3         729        436        655        132        787
46.00    3        1502        887        2416        498        2914
45.00    3        1525        896        3153        653        3806
43.00    3        2285       1328        5583       1148        6731
40.00    3        2366       1345        8935       1830       10765

35.00    3        2508       1379       14711       2930       17641
30.00    3        2662       1410       20738       3953       24691
25.00    3        2828       1439       27034       4868       31902
20.00    3        3004       1468       33617       5650       39268
15.00    3        3184       1512       40507       6277       46783

13.68    3        3229       1531       42372       6413       48784
13.68    3        3237       1515       42372       6413       48784
10.99    3        3439       1542       46264       6658       52922
10.00    3        3490       1532       47718       6737       54455
 5.00    3        3715       1562       55267       7027       62294

 0.00    3        3935       1635       63167       7121       70288
  
```

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

ANALYSIS OF POLE: STRESSES - GROUP LOAD 2

```
=====
```

SECTION HEIGHT* (FT)	GROUP LOAD NO.	COMB. STR. RATIO	APPLIED STRESS (KSI)			ALLOW. STRESS (KSI)		
			AXIAL	BEND.	SHEAR	AXIAL	BEND.	SHEAR
50.00	2	0.00	0.00	0.00	0.00	33.00	48.28	24.14
49.00	2	0.05	0.07	2.15	0.37	33.00	48.28	24.14
46.00	2	0.15	0.14	7.09	0.71	33.00	48.28	24.14
45.00	2	0.19	0.15	8.93	0.70	33.00	48.28	24.14
43.00	2	0.31	0.21	14.74	1.01	33.00	48.28	24.14
40.00	2	0.45	0.22	21.30	0.97	33.00	48.28	24.14
35.00	2	0.63	0.23	29.80	0.91	33.00	48.28	24.14
30.00	2	0.75	0.24	35.99	0.86	33.00	48.28	24.14
25.00	2	0.85	0.25	40.50	0.81	33.00	48.28	24.14
20.00	2	0.92	0.26	43.77	0.77	33.00	48.28	24.14
15.00	2	0.97	0.27	46.09	0.73	33.00	48.04	24.14
13.68	2	0.98	0.27	46.58	0.73	33.00	47.76	24.14
13.68	2	0.85	0.23	40.74	0.61	33.00	48.28	24.14
10.99	2	0.87	0.24	41.42	0.60	33.00	48.28	24.14
10.00	2	0.87	0.25	41.63	0.59	33.00	48.28	24.14
5.00	2	0.89	0.26	42.44	0.56	33.00	48.28	24.14
0.00	2	0.90	0.26	42.91	0.54	33.00	48.28	24.14

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

ANALYSIS OF POLE: STRESSES - GROUP LOAD 3

=====

SECTION HEIGHT* (FT)	GROUP LOAD NO.	COMB. STR. RATIO	APPLIED STRESS (KSI)			ALLOW. STRESS (KSI)		
			AXIAL	BEND.	SHEAR	AXIAL	BEND.	SHEAR
50.00	3	0.00	0.00	0.00	0.00	33.00	48.28	24.14
49.00	3	0.03	0.17	1.19	0.21	33.00	48.28	24.14
46.00	3	0.09	0.34	3.96	0.40	33.00	48.28	24.14
45.00	3	0.11	0.34	5.00	0.39	33.00	48.28	24.14
43.00	3	0.19	0.49	8.26	0.57	33.00	48.28	24.14
40.00	3	0.26	0.48	11.97	0.55	33.00	48.28	24.14
35.00	3	0.36	0.47	16.82	0.52	33.00	48.28	24.14
30.00	3	0.44	0.47	20.41	0.49	33.00	48.28	24.14
25.00	3	0.49	0.46	23.08	0.47	33.00	48.28	24.14
20.00	3	0.53	0.46	25.08	0.45	33.00	48.28	24.14
15.00	3	0.57	0.46	26.56	0.44	33.00	48.04	24.14
13.68	3	0.58	0.46	26.88	0.44	33.00	47.76	24.14
13.68	3	0.50	0.39	23.52	0.37	33.00	48.28	24.14
10.99	3	0.51	0.40	23.98	0.36	33.00	48.28	24.14
10.00	3	0.51	0.40	24.14	0.36	33.00	48.28	24.14
5.00	3	0.53	0.41	24.77	0.34	33.00	48.28	24.14
0.00	3	0.54	0.41	25.22	0.34	33.00	48.28	24.14

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

POLE DEFLECTION INFORMATION - GROUP LOAD 2

```
=====
```

ELEVATION	ROTATION	SLOPE	DEFLECTION	DEFLECTION
FT	DEGREES	IN/FT	FT	IN
50.00	6.99	1.48	3.45	41.41
49.00	6.99	1.48	3.33	39.95
46.00	6.92	1.47	2.97	35.60
45.00	6.88	1.45	2.85	34.16
43.00	6.75	1.43	2.61	31.32
40.00	6.45	1.36	2.27	27.19
35.00	5.78	1.22	1.73	20.78
30.00	4.98	1.05	1.26	15.14
25.00	4.12	0.87	0.86	10.37
20.00	3.23	0.68	0.54	6.51
15.00	2.33	0.49	0.30	3.59
13.68	2.10	0.44	0.25	2.98
13.68	2.10	0.44	0.25	2.98
10.99	1.67	0.35	0.16	1.92
10.00	1.51	0.32	0.13	1.59
5.00	0.74	0.16	0.03	0.40
0.00	0.00	0.00	0.00	0.00

ANALYSIS OF VALMONT INDUSTRIES LIGHTING STRUCTURE  
 IN ACCORDANCE WITH AASHTO-2013 RQMTS. (FINAL DEFLECTED POSITION)  
 BY SE70 06/07/2021 VERSION Fuse 1.13.0.0

SUBJECT: LAWRENCEVILLE NJ-50' AG 8' EMB CR5/CR5/CR5 AASHTO 2013 90MPH

FOLDER: WLLSPT FILE: P50EMBCR15A1393

POLE DEFLECTION INFORMATION - GROUP LOAD 3

```
=====
```

ELEVATION	ROTATION	SLOPE	DEFLECTION	DEFLECTION
FT	DEGREES	IN/FT	FT	IN
50.00	4.00	0.84	1.99	23.90
49.00	4.00	0.84	1.92	23.06
46.00	3.97	0.83	1.71	20.56
45.00	3.94	0.83	1.64	19.74
43.00	3.87	0.81	1.51	18.10
40.00	3.70	0.78	1.31	15.72
35.00	3.32	0.70	1.00	12.04
30.00	2.87	0.60	0.73	8.78
25.00	2.38	0.50	0.50	6.03
20.00	1.87	0.39	0.32	3.79
15.00	1.36	0.28	0.17	2.10
13.68	1.22	0.26	0.15	1.74
13.68	1.22	0.26	0.15	1.74
10.99	0.97	0.20	0.09	1.12
10.00	0.88	0.19	0.08	0.93
5.00	0.43	0.09	0.02	0.23
0.00	0.00	0.00	0.00	0.00