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***Select the Departments impacted by the document**			**For others, specify here**

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Management Approval (If apply)

Approver Name Position	Signature and Date N/A

Related/Referenced Documents

N/A

Document History

Version	Date	Revision Comments
1	January 30, 2023	Modification specification and additional poles 35 and 40. New catalog 026-84158 and 026-84159.
2	March 15, 2023	Modification Drawings and sections.
3	March 28, 2023	Modification Drawings and Section 9.1 (f).
4	September 21, 2023	General format modifications and sections.
5	January 22, 2024	Modification tables and sections.

Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
026-84158	84158	6	1/22/2024
026-84159	84159	6	1/22/2024
026-00294	55940	13	1/22/2024
026-00369	56194	11	1/22/2024
026-00302	56192	13	1/22/2024
026-00328	56193	13	1/22/2024
026-82880	82880	6	1/22/2024
026-00211	55937	13	1/22/2024
026-82881	82881	5	1/22/2024
026-00229	55938	13	1/22/2024
026-01094	57613	6	1/22/2024
026-00237	55939	13	1/22/2024
026-82882	82882	6	1/22/2024

1. Introduction

This specification describes the minimum requirements for square prestressed concrete poles for LUMA Energy approval. The document will serve as a basic for the manufacturing of poles to be used in the electrical distribution area with the best intention to improve the electrical system and offer better solutions to the system. The purpose of the document is to establish the basic criteria for the creation of poles and that they are in accordance with the norms, standards, and applied loads established according to Industrial Standards such as ASTM, PCI, ACI, ASCE, among others. In addition, we will be able to acquire a reliable and fully compliant system.

2. Special Requirements

Samples shall be furnished as requested by LUMA Energy. Vendors that have supplied this equipment/material to LUMA on previous orders will not have to furnish samples at bid opening. The equipment/material will be received at the LUMA's general warehouse (011) at Palo Seco, Puerto Rico. Shipping will include transportation and unloading at the indicated warehouse.

3. Literature

Descriptive and technical literature must be supplied by the vendor at time of bidding. This literature may include, but is not limited to details of material, drawings, documented testing, and instructions for use and installation. Failure to submit documents on time will cause bidder disqualification. Evidence of LUMA Energy's approval of the equipment/material shall be supplied by the vendor if requested by LUMA Energy.

4. Markings

4.1. Containers shall be marked outside with LUMA Energy's purchase order and item number.

4.2. Packaging labels and tags shall be waterproof.

5. Packaging

All equipment/material shall be packaged and marked in such a way as to facilitate handling and protection from damage and that the receiving warehouse can readily identify it and send it, in one complete unit, to a field location without opening crates or boxes to sort items and/or parts.

6. Number per Package (Logistics)

Each manufacturer shall define the number of poles per packages depending on the shipping containers and platforms for delivery according to LUMA requirements.

7. Acceptance Criteria

7.1. The manufacturers shall provide a mill certificate that shows the chemical composition and properties of the steel used to manufacture each batch of poles.

7.2. International Codes and Reference Standards:

ACI	American Concrete Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
NESC	National Electrical Safety Code
IEEE	Institute of Electrical and Electronic Engineers
PCI	Prestressed Concrete Institute

8. Description

This specification is for the purpose of the purchase of square prestressed concrete poles to support the electrical distribution system. The specifications are divided into two parts in the Technical Specifications and the Special Conditions. The Technical Specifications will include the material, design, minimum bending moment and minimum ultimate force, embedment length, deflection, drawings, final approval before manufacture, slots and holes, id plate and markings, and failure to meet guarantees. The Special Conditions will be including the requirements, weight of the structures, minimum top and bottom dimension, ground level mark, grounding connectors, delivery of material, and submitted proposal.

8.1. The Technical Specifications

a. **Material**

Main structure concrete shall be in accordance to Concrete Prestressed Institute (PCI), American Society for Testing and Material (ASTM), and other Standards and regulations. All material used to fabricate the structure in this specification shall be properly certified by the manufacturers.

b. **Design**

1. The supplier is responsible of the design.

2. All poles square with the minimum ultimate moment at ground-level for an applied minimum ultimate force of applied 2 ft from the top of the pole.
3. Designed for not cracking under a minimum force, equal to 50% of the minimum ultimate force. Both forces applied horizontally two (2) ft from pole top in any direction.
4. Center of gravity, points for handling, holding ground-level and erecting shall be properly identified.
5. Pole hole and slots as per attached drilling layout drawing. a no. 2 awg. minimum stranded copper pole ground provision shall be furnished.
6. Providing connection at 18 in. Below ground line at the beginning of drilling layout.

c. **The Minimum Bending Moment and Minimum Ultimate Force of the poles:**

Item	Description	Minimum Bending Moment of the ground level (ft.-kips)	Minimum Ultimate Force applied horizontally 2 ft. from the top. (pounds)
1	35-H4	162	5,900
2	40-H4	189	5,900
3	45-H4	215	5,900
4	45-H6	281	7,700
5	50-H4	242	5,900
6	50-H6	316	7,700
7	50-H8	385	9,400
8	55-H6	349	7,700
9	55-H8	426	9,400
10	60-H6	382	7,700
11	60-H8	466	9,400
12	65-H6	415	7,700
13	65-H8	507	9,400

d. **Embedment length**

1. The 35, 40, and 45' poles will have a depth at 10% plus 2 feet of their total length.
2. The 50’, 55’, 60’, and 65' poles will have a depth at 14% of their total length.

e. **Deflection**

The poles shall be designed to withstand the specified tip loading without exceeding a pole deflection of 15 % of the pole height above the point of fixity when tested under short term loading conditions in accordance with the horizontal test procedures described in the Guide for the Design of Prestressed Concrete Poles (ACSE/PCI joint Committee on Concrete Poles).

f. **Drawings**

Drawing for the bid proposal at PDF format shall include with the following information:

1. The assembled pole showing all its components and their location.
2. General dimensions of all the structural components.
3. Weight for each Pole.
4. A bill of materials.
5. Pole grounding attachment detail.
6. Details of all accessories.

g. **Final Approval before Manufacture**

1. Final design calculations shall be submitted before fabrication commences together with the shop drawing for LUMA approval.
2. After approval, a set of drawings and design calculations at PDF format plus a digital drawing in 2D and 3D (if available) AutoCAD (.DWG) shall be sent for LUMA's records. All drawings shall include LUMA purchase order number.

h. **Slots and Holes**

1. For 8-inch spacing side, the holes shall be 1 in. diameter and the slots shall be 1 in. diameter x 9 in. long (See Appendix Elevation A).
2. For 12-inch spacing side, the holes shall be 7/8 in. diameter (See Appendix Elevation B).

i. **ID Plate and Markings**

1. Each pole shall have an identification plate, legible and waterproof, fabricated from aluminum.
2. At approximately 5'-6" from ground line.
3. The plate shall be 5" x 4" in dimension, stamped with letters not less than ¼" in height.
4. The identification plate will be on the side of the 8" holes and slots.
5. The plate shall contain the following minimum information:
   a. Owner's name:
   b. Item Number:
   c. Length:
   d. Type Class:
   e. Weight:
   f. Ult. Moment Capacity:
   g. Manufacturer's name:

h. Fabrication Date: MM/YY

j. **Failure to Meet Guarantees**

1. Should any piece of equipment fail to meet the guarantees and the requirements of these specifications within the time covered by the guarantee, it shall be optional to the engineer to accept the pole or reject it and direct the manufacturer to at once proceed to make alterations or furnish such new parts as may be necessary to make it meet the guarantees and requirements.
2. All expenses of furnishing and installing new parts by failure of the pole to meet the guarantees and other requirements of the specifications will be manufacturer's responsibility.

8.2. Special Conditions:

a. **The Requirements**

The manufacturer shall submit drawings of each individual design for evaluation and approval:

1. Square Prestressed Concrete Poles: 35-H4, 40-H4, and 45-H4-H6-**Appendix-1**
2. Square Prestressed Concrete Poles: 50-H4-H6-H8, 55-H6-H8, and 60-H6-H8-**Appendix-2**
3. Square Prestressed Concrete Poles: 65-H6-H8-**Appendix-3**

b. **Weight of the structures**

Item	Description	Total Weight Approximately (pounds)
1	35-H4	5,300
2	40-H4	6,200
3	45-H4-H6	7,300
4	50-H4-H6	8,500
5	50-H8	11,000
6	55-H6	9,900
7	55-H8	12,000
8	60-H6	11,300
9	60-H8	13,500
10	65-H6	13,000
11	65-H8	15,500

c. **Minimum Top and Bottom Dimensions**

Item	Description	Top Dimension no more (in)	Bottom Dimension no more (in)
1	35-H4	9	16
2	40-H4	9	16.5
3	45-H4-H6	9	17
4	50-H4-H6	9	18
5	50-H8	10	19
6	55-H6	9	19
7	55-H8	10	19.5
8	60-H6	9	19.5
9	60-H8	10	20.5
10	65-H6	9	20.5
11	65-H8	10	21.5

d. **Ground Level Mark**

a. The pole will have a 3" wide yellow stripe around it, the stripe will indicate the depth limit to which the pole will be installed (Ground level).

b. The paint to be used shall be the equal or approved equal to catalog number: Sherwin-Williams (Pro-Park B97D2467).

e. **Grounding connectors**

Item	Description	Ground from the Top (ft.-in.)	Below the Ground Line (ft.-in.)
1	35-H4	8’-9”	1’-6”
2	40-H4	8’-9”	1’-6”
3	45-H4-H6	10’-9”	1’-6”
4	50-H4-H6-H8	14’-3”	1’-6”
5	55-H6-H8	16’-9”	1’-6”
6	60-H6-H8	20’-9”	1’-6”
7	65-H6-H8	24’-3”	1’-6”

f. **Delivery of material:**

1. The distribution poles will be delivered at the LUMA General Warehouse in Palo Seco (011), Puerto Rico, unless otherwise indicated and coordinated in another area provided by the company.

2. LUMA may take delivery at a designated location with the delivering carrier's equipment. The manufacturer shall coordinate with LUMA to ensure a smooth and efficient delivery of the poles.

3. LUMA shall provide all labor, equipment, and materials for unloading the poles at the project site. A pole is considered delivered when it is lifted from the delivery carrier's trailer or semi-trailer.

g. **Submitted Proposals**

1. The bid proposals shall include a summary table for each structure as per the template attached to this specification.
2. The table shall be filled out in its entirety and comply with the metrics and conditions established. **BIDDER SHALL BE DECLARED NON-RESPONSIVE IF THIS TABLE IS NOT INCLUDED WITH THE PROPOSALS. (See Appendix)**

9. Concrete Mixes

9.1. Concrete Mixes Concrete mixes shall be proportioned to produce the strength, durability and workability required by the approved mix design. The manufacturer shall submit his proposed mix designs to LUMA for approval at least six weeks before manufacturer is due to commence. LUMA may direct the manufacturer to undertake trial mixes and strength, durability, and workability tests to prove that the proposed mixes are acceptable. Such trial mixes and tests shall be carried out prior to placement of concrete in the works and their costs shall be borne by the manufacturer. Unless otherwise specified or approved by LUMA, concrete shall have the following properties:

a. Maximum Water Cement Ratio by Weight: 0.40

b. The minimum characteristic compressive strength for Prestressed F'c at 28 days shall be equal to and H4 and H6 shall be 6,000 psi, and for poles H8 and shall be 7,000 psi.

9.2. The manufacturer shall keep at the mixing site, records showing for each batch of concrete produced, the time and date of water addition, the weight of cement, weight of each grade of aggregate, weight of added water, results of tests made to determine the water contained in the aggregate, the results of any strength tests and the location of concrete in the works. These records shall be made available to LUMA.

9.3. The proportions of aggregate and cement for any concrete shall be such as to produce a mix which will work readily into corners and angles of the forms and around tendons and reinforcement with the method of placing employed on the work, but without permitting the materials to segregate or water to collect on the surface.

9.4. Water shall be accurately measured by a calibrated tank or by an approved type of calibrated water meter attached to the mixer. Certification of water meter calibration shall be supplied to LUMA upon request.

9.5. Mixing shall be by an efficient type of batch mixer operated at the speeds recommended by the manufacturer with particular regard to the use of low slump concrete. All concrete shall be mixed for a period of not less than 2 minutes after all materials including water are placed in the mixer.

9.6. No concrete that has reached its initial set (partially hardened) or that has left the mixer or agitator for more than 30 minutes shall be placed in the structure. Remixing shall not be permitted.

9.7. Ready-mixed concrete complying with ASTM C94 - Ready Mixed Concrete and the requirements of this Specification, whether manufactured in a plant operated by the manufacturer or approved Subcontractors, may be used.

10. Formwork

10.1. All forms shall be built mortar-tight, of sufficient rigidity and adequately supported to prevent distortion or displacement due to the pressure of the concrete and other loads incidental to the construction operations. Forms shall be constructed and maintained to prevent warping and the opening of joints due to shrinkage of the timber.

10.2. Forms shall be built with provision for easy inspection and cleaning out immediately before concrete is placed.

10.3. A high standard of finish is required, and surfaces of precast, spun, and prestressed concrete members shall be true, hard, smooth, and free from any defects due to leakage of mortar from the molds.

10.4. Molds should preferably be made of steel.

10.5. Every care shall be taken to ensure that no marks or fins appear on the finished surface.

10.6. The inside of forms shall be thoroughly wetted or coated with non-staining form release oil or other approved material. Where oil or surfacing material is used, it shall be applied before the reinforcement is placed.

10.7. When forms have become warped, damaged, or burred so that in the opinion of the Superintendent the surface or dimensional tolerances of the concrete will not be satisfactory, the manufacturer shall, when so directed by LUMA, remove such forms, and replace them with forms or form panels satisfactory in all respects.

10.8. Forms shall be removed so as not to damage the concrete.

11. Placing of Reinforcement

11.1. Steel shall be free from all loose rust, grease, tar, paint, oil, mud, mill scale or other coating which would tend to destroy its bond with the concrete. All reinforcing bars shall be bent as shown on the Drawings and shall be placed accurately and be well secured by tie wiring or welding were permitted so that no displacement can occur during placing of concrete. The specified clear cover shall be maintained. Tie wire of at least 18 s.w.g. soft iron wire shall be bent inwards or cut off.

11.2. Care shall be taken to ensure that the cage is correctly aligned and positioned in relation to the through-bolt holes, ferrules, and the pole axis, and that the cage reinforcement is not spirally deformed or displaced.

11.3. Bending and splicing of reinforcing shall be carried out as required by ASTM. Splices shall be of length sufficient to fully develop the capacity of the bars.

11.4. All prestressing tendons shall be accurately located and restrained in position. No welding will be permitted in close proximity to any prestressing tendon without suitable shielding.

11.5. Prestressing tendons, where supplied in coils, shall be of large enough diameter to be self-straightening. Kinked or damaged tendons will not be permitted.

11.6. Prestressing steel shall not be welded and shall be flame cut only with the approval of the LUMA.

11.7. Mixing water shall be free of oils, organic matter and other substances in amounts that may be harmful to concrete or reinforcement. It shall not contain chloride ions more than 500 ppm or sulfate ions more than 1000 ppm. In general, water from normal drinking supply will meet the requirements necessary to produce quality concretes. The poles shall have a pleasing and workmanlike appearance. Poles will have smooth, dense, and hard surfaces that will not deteriorate in the elements. The manufacturer shall in no way cut the prestressing strand before the concrete has reach the appropriate transferential strength. Chemical admixtures shall conform to ASTM C494. Admixtures shall not contain chloride ions in quantities that will cause the total water-soluble chloride ion content of the concrete to exceed 0.06% of the weight of the cement. Every manufacturer will submit the mix design including admixture.

11.8. The acceptance of any material or equipment shall in no way relieve the vendor from his responsibility to meet all the requirements of this specification, and it would not prevent subsequent rejection if such materials were found later to be defective.

11.9. The manufacturer shall make adequate tests and inspections to determine that each of the poles furnished is in strict accordance with the specification. Tests shall be in accordance with all applicable Standard Specifications and Codes.

11.10. Compressions tests on every concrete served. Each manufacturer shall have equipment to run their own tests.

11.11. Stress strain curves for all steel used in poles.

11.12. The tensioning machine should be calibrated frequently. (at least once a year).

12. Inspection

The acceptance of any equipment/material shall in no way relieve the vendor from his responsibility to meet all the requirements of this specification, and it would not prevent subsequent rejection if such equipment/material were found later to be defective.

13. Proposal Information

13.1. Submitted proposals must include:

a. Technical information

b. Table of Compliance completed by the bidder with reference. (See Appendix)

14. Table 1: Warehouse and Asset Suite Identification Information

Item	Pole Height (ft.)	Warehouse Number	Asset Suite
1	35-H4	026-84158	84158
2	40-H4	026-84159	84159
3	45-H4	026-00294	55940
4	45-H6	026-00369	56194
5	50-H4	026-00302	56192
6	50-H6	026-00328	56193
7	50-H8	026-82880	82880
8	55-H6	026-00211	55937
9	55-H8	026-82881	82881
10	60-H6	026-00229	55938
11	60-H8	026-01094	57613
12	65-H6	026-00237	55939
13	65-H8	026-82882	82882

— End of Specification —

Appendix

Appendix 1: Table of Compliance:

Line	Criteria	Description	Pass/Fail (P/F)	Comments
1	Specification	The Proponent complies with the corresponding specification document. (4350.043)		
2	Industry Standards	The Proponent complies with the industry standards established in the specification document. (ACI, ANSI, ASCE, ASTM, AWS, NESC, IEEE, and PCI))		
3	Certifications	Certified vertical and horizontal load resistance tests.		
4	Descriptions	All poles square with the minimum ultimate moment at ground-level for an applied minimum ultimate force of applied 2 ft from the top of the pole.		
5	Embedment length	The 35', 40', and 45' poles will have a depth at 10% plus 2 feet of their total length.		
		The 50', 55', 60', and 65' poles will have a depth at 14% of their total length.		
6	Deflection	The poles shall be designed to withstand the specified tip loading without exceeding a pole deflection of 15 % of the pole height above the point of fixity when tested under short term loading conditions.		
7	Holes and Slot Description	For 8" spacing side, the holes shall be 1" diameter and the slots shall be 1 in. diameter x 9 "long. (See Appendix Elevation A).		
		For 12" spacing side, the holes shall be 7/8" diameter. (See Appendix Elevation B).		
8	Pole Buried Description and Slots and Holes	35'/5'-6"/18/12		
		40'/6'/21/14		
		45'/6'-6"/21/14		
		50'/7'/31/21		
		55'/7'-9"/39/26		
		60'/8'-5"/39/26		
		65'/9'-1"/48/32		
9	ID Plate and Markings	At approximately 5'-6" from ground line.		
		The plate shall be 5" x 4" in dimension, stamped with letters not less than ¼" in height.		
		The identification plate will be on the side of the 8" holes and slots.		

10	Ground Level Mark	The pole will have a 3" wide yellow stripe around it, the stripe will indicate the depth limit to which the pole will be installed (Ground level).		
11	Minimum Bending Moment And Minimum Ultimate Force	35-H4-162 ft.-kips: 5,900 pounds		
		40-H4-189 ft.-kips: 5,900 pounds		
		45-H4-215 ft.-kips: 5,900 pounds		
		45-H6-281 ft.-kips: 7, 700 pounds		
		50-H4-242 ft.-kips: 5, 900 pounds		
		50-H6-316 ft.-kips: 7, 700 pounds		
		50-H8-385 ft.-kips: 9, 400 pounds		
		55-H6-349 ft.-kips: 7, 700 pounds		
		55-H8-426 ft.-kips: 9, 400 pounds		
		60-H6-382 ft.-kips: 7, 700 pounds		
		60-H8-466 ft.-kips: 9, 400 pounds		
		65-H6-415 ft.-kips: 7, 700 pounds		
		65-H8-507 ft.-kips: 9, 400 pounds		
12	Weight of the structures	35-H4: 5, 300 pounds		
		40-H4: 6, 200 pounds		
		45-H4-H6: 7, 300 pounds		
		50-H4-H6: 8, 500 pounds		
		50-H8: 11, 000 pounds		
		55-H6: 9, 900 pounds		
		55-H8: 12, 000 pounds		
		60-H6: 11, 300 pounds		
		60-H8: 13, 500 pounds		
		65-H6: 13, 000 pounds		
		65-H8: 15, 500 pounds		
13	Top Dimension and Bottom dimension	35-H4: no more 9”/no more 16”		
		40-H4: no more 9”/no more 16.5”		
		45-H4-H6: no more 9”/no more 17”		
		50-H4-H6: no more 9”/no more 18”		
		50-H8: no more 10”/no more 19”		
		55-H6: no more 9”/no more 19”		
		55-H8: no more 10”/no more 19.5”		
		60-H6: no more 9”/no more 19.5”		
		60-H8: no more 10”/no more 20.5”		
		65-H6: no more 9”/no more 20.5”		
		65-H8: no more 10”/no more 21.5”		
14	Grounding connectors	35-H4/8’-9”/1’-6”		
		40-H4/8’-9”/1’-6”		
		45-H4-H6/10’-9”/1’-6”		
		50-H4-H6-H8/14’-3”/1’-6”		
		55-H6-H8/16’-9”/1’-6”		
		60-H6-H8/20’-9”/1’-6”		
		65-H6-H8/24’-3”/1’-6”		

DISTRIBUTION ENGINEERING

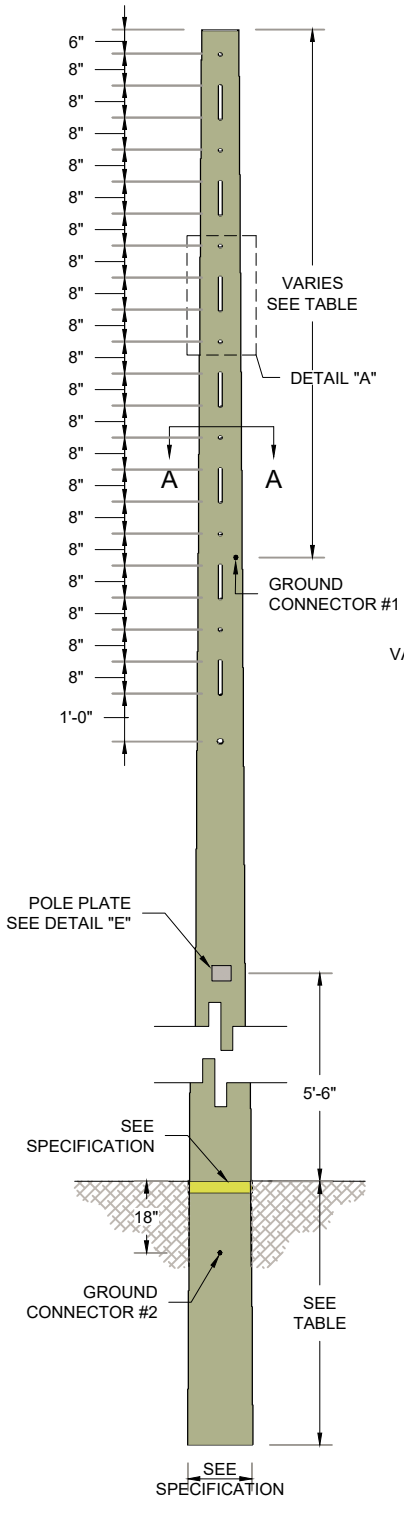
OVERHEAD DISTRIBUTION STANDARDS

TITLE:

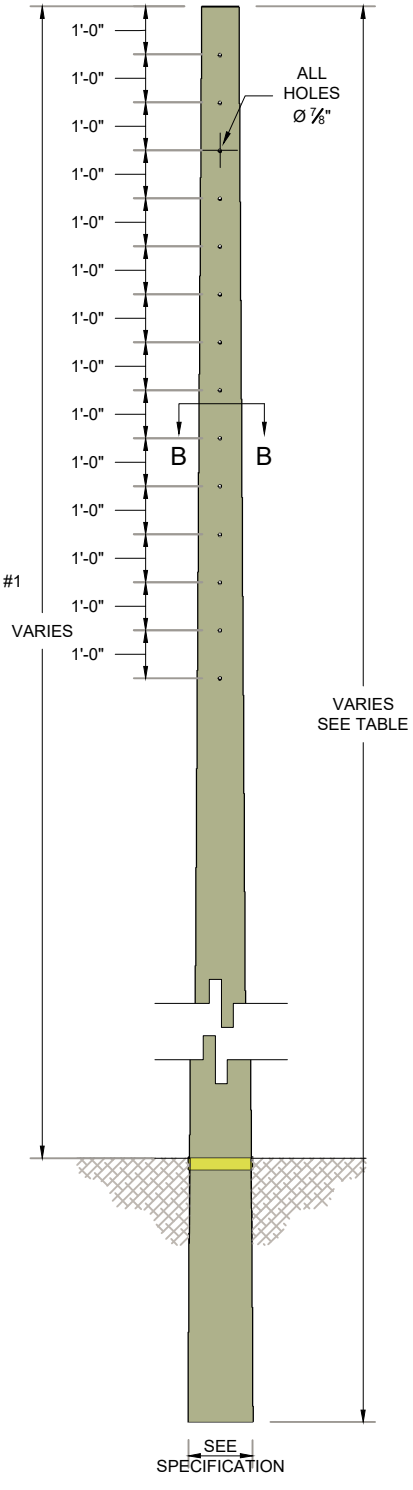
SLOTS AND HOLES PATTERN SQUARE FOR CONCRETE POLE STANDARD SPECIFICATION

35 - H4 / 40 - H4 / 45 - H4-H6

APPENDIX NO: 1
DOCUMENT NO. 4350.043
PAGE 1 DATE JAN 18, 2024
SUBMITTED ROSALIA ALVERIO GONZALEZ
REVIEWED RAFAEL TORRES LIC. 14593
APPROVED RICARDO CASTRO LIC. 12135
DIGITALIZED VICTOR R. FEBRES LIC. 3412



ELEVATION "A"



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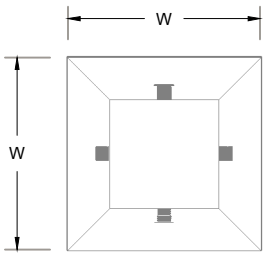
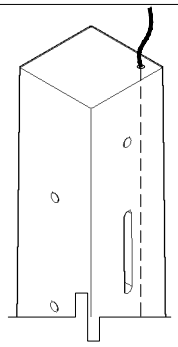


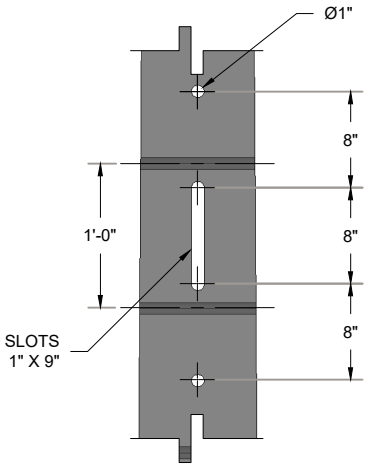
"B"

"A"

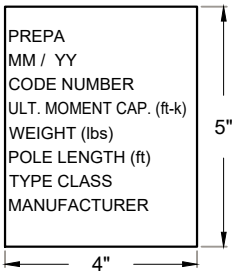
POLE SECTION DETAIL (A & B)



PROVIDE GROUND EXTENSION ON TOP



ELEVATION DETAILS "A"
(SLOT & HOLE PATTERN)



DETAIL "E"

SEE SPECIFICATION

POLE BURIED DESCRIPTION				
FT	BURIED	SLOTS AND HOLES "A"	HOLES "B"	GRND #1 FROM THE TOP
35'-0"	5'-6"	18	12	8'-9"
40'-0"	6'-0"	21	14	8'-9"
45'-0"	6'-6"	21	14	10'-9"

DISTRIBUTION ENGINEERING

OVERHEAD DISTRIBUTION STANDARDS

TITLE:

SLOTS AND HOLES PATTERN FOR SQUARE CONCRETE POLE STANDARD SPECIFICATION

50 - H4-H6-H8 / 55 - H6-H8 / 60 - H6-H8

APPENDIX NO: 2
DOCUMENT NO. 4350.043
PAGE 1 DATE JAN 18, 2024
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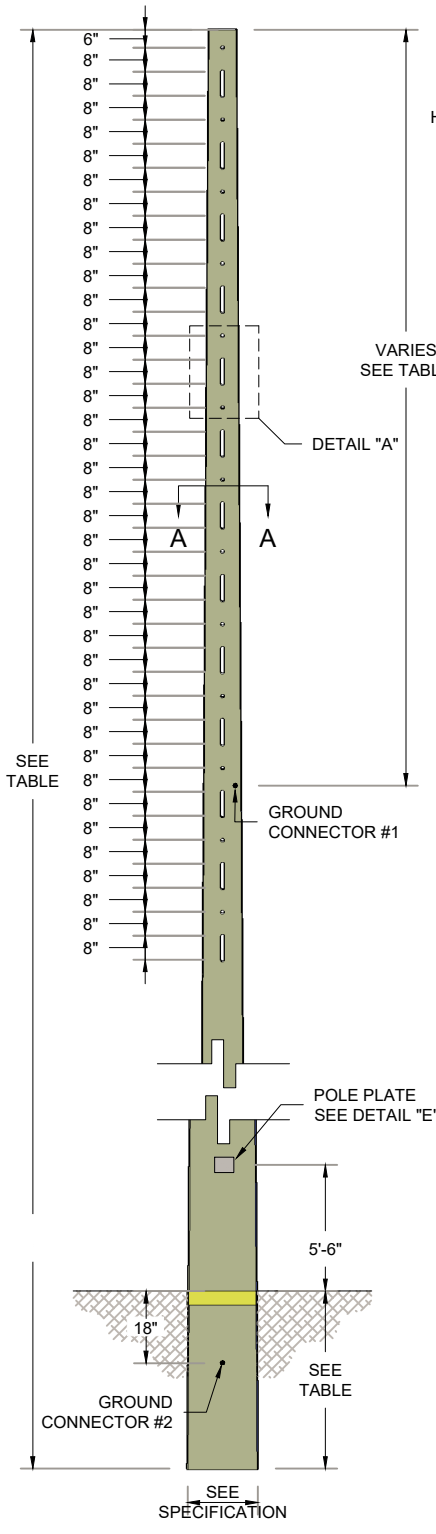
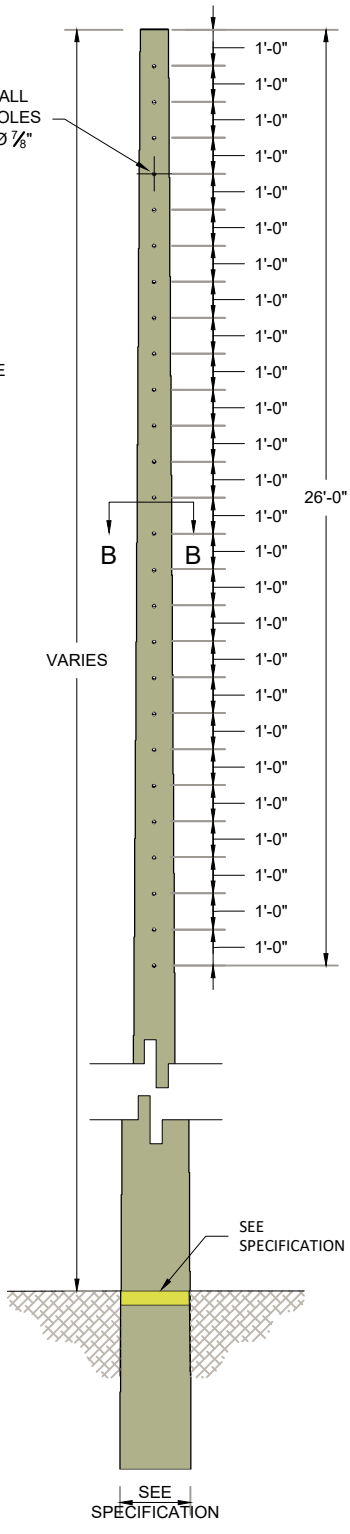
REVIEWED RICARDO CASTRO LIC. 12135
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412



ELEVATION "A"



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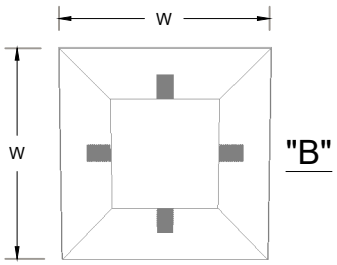
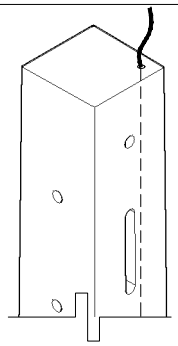
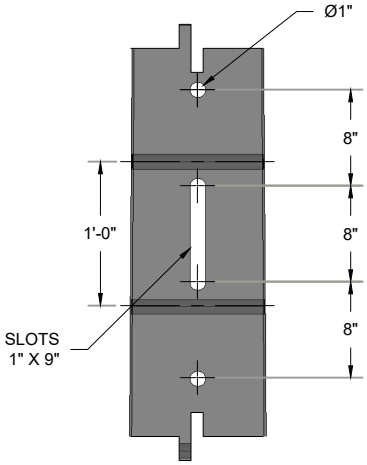


"A"

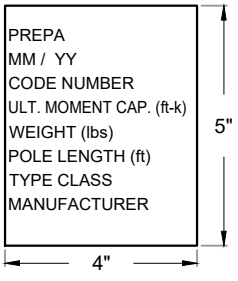
POLE SECTION DETAIL (A & B)



PROVIDE GROUND EXTENSION ON TOP



ELEVATION DETAILS "A"
(SLOT & HOLE PATTERN)



DETAIL "E"

SEE SPECIFICATION

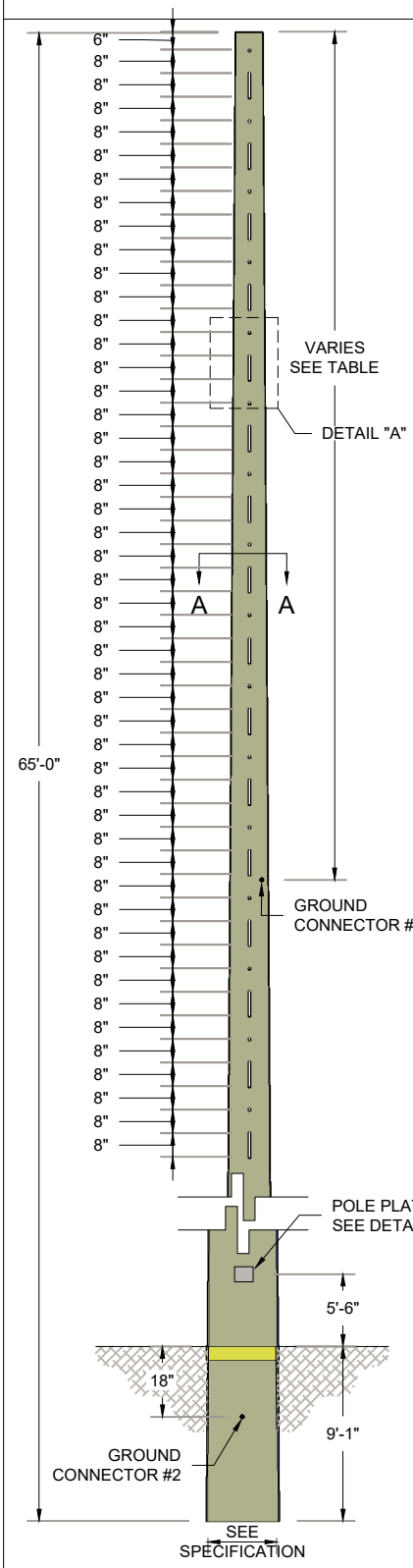
POLE BURIED DESCRIPTION				
FT	BURIED	SLOTS AND HOLES "A"	HOLES "B"	GRND #1 FROM THE TOP
50'-0"	7'-0"	31	21	14'-3"
55'-0"	7'-9"	39	26	16'-9"
60'-0"	8'-5"	39	26	20'-9"

DISTRIBUTION ENGINEERING

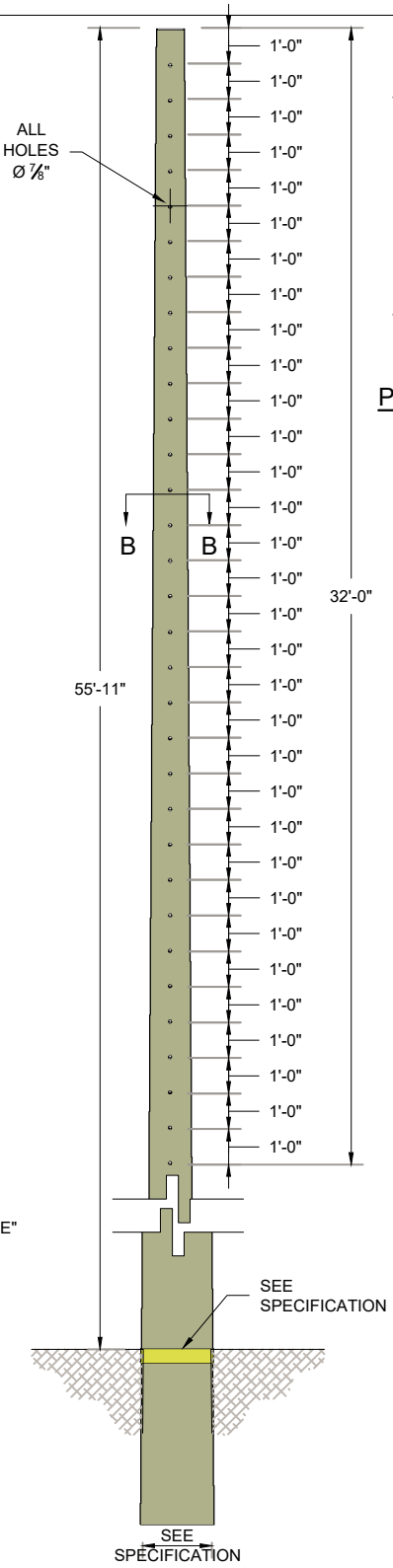
OVERHEAD DISTRIBUTION STANDARDS

SLOTS AND HOLES PATTERN SQUARE FOR CONCRETE POLE STANDARD SPECIFICATION 65 - H6-H8

APPENDIX NO: 3
DOCUMENT NO. 4350.043
PAGE 1 DATE JAN 23, 2024
SUBMITTED ROSALIA ALVERIO GONZALEZ
REVIEWED RAFAEL TORRES LIC. 14593
APPROVED RICARDO CASTRO LIC. 12135
DIGITALIZED VICTOR R. FEBRES LIC. 3412



ELEVATION "A"



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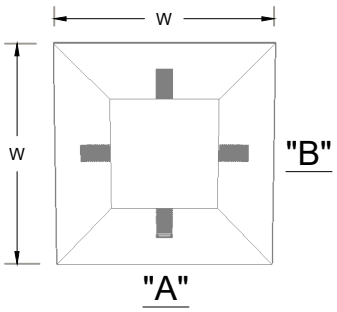
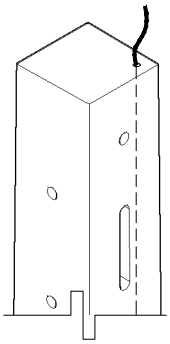
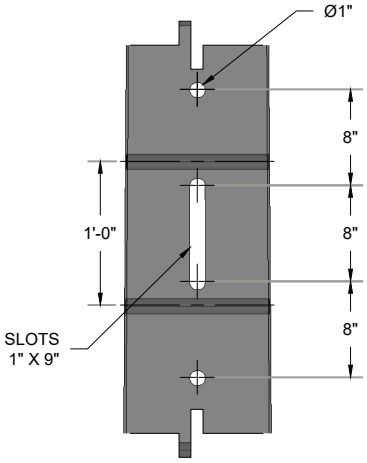


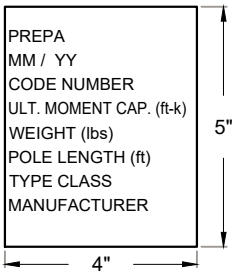
POLE SECTION DETAIL (A & B)



PROVIDE GROUND EXTENSION ON TOP



ELEVATION DETAILS "A" (SLOT & HOLE PATTERN)



DETAIL "E"

SEE SPECIFICATION

POLE BURIED DESCRIPTION				
FT	BURIED	SLOTS AND HOLES "A"	HOLES "B"	GRND #1 FROM THE TOP
65'-0"	9'-1"	48	32	24'-3"

PROPOSAL SUMMARY DOCUMENT

STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 **Originating Department:Distribution Engineering**

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 35-H4

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	35'-0"	
2	EMBEDMENT LENGTH	FEET	5'-6"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	18 /12/8'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	5,300	
7	MINIMUM BENDING MOMENT	FT.-KIPS	162	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	POUNDS	5,900	
10	TOP DIAMETER NO MORE	INCHES	9	
11	BOTTOM DIAMETER	INCHES	16	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT

STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043

Originating Department:Distribution Engineering

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 40-H4

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	40'-0"	
2	EMBEDMENT LENGTH	FEET	6'-0"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	21/14/8'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	6,200	
7	MINIMUM BENDING MOMENT	FT.-KIPS	189	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	5,900	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	16.5	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT

STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 Originating Department:Distribution Engineering

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 45-H4

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	45'-0"	
2	EMBEDMENT LENGTH	FEET	6'-6"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	21/14/10'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	7,300	
7	MINIMUM BENDING MOMENT	FT.-KIPS	215	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	5,900	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	17	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT

STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 Originating Department:Distribution Engineering

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 45-H6

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	45'-0"	
2	EMBEDMENT LENGTH	FEET	6'-6"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	21/14/10'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	7,300	
7	MINIMUM BENDING MOMENT	FT.-KIPS	281	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	7,700	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	17	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 **Originating Department:Distribution Engineering**

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 50-H4

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	50'-0"	
2	EMBEDMENT LENGTH	FEET	7'-0"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	31/21/14'-3"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	8,500	
7	MINIMUM BENDING MOMENT	FT.-KIPS	242	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	5,900	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	18	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 **Originating Department:Distribution Engineering**

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 50-H6

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	50'-0"	
2	EMBEDMENT LENGTH	FEET	7'-0"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	31/21/14'-3"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	8,500	
7	MINIMUM BENDING MOMENT	FT.-KIPS	316	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	7,700	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	18	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043

Originating Department:Distribution Engineering

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 50-H8

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	50'-0"	
2	EMBEDMENT LENGTH	FEET	7'-0"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	31/21/14'-3"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	11,000	
7	MINIMUM BENDING MOMENT	FT.-KIPS	385	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	9,400	
10	TOP DIAMETER	INCHES	10	
11	BOTTOM DIAMETER	INCHES	19	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 **Originating Department:Distribution Engineering**

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 55-H6

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	55'-0"	
2	EMBEDMENT LENGTH	FEET	7'-9"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	39/26/16'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	9,900	
7	MINIMUM BENDING MOMENT	FT.-KIPS	349	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	7,700	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	19	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 Originating Department:Distribution Engineering

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 55-H8

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	55'-0"	
2	EMBEDMENT LENGTH	FEET	7'-9"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	39/26/16'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	12,000	
7	MINIMUM BENDING MOMENT	FT.-KIPS	426	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	9,400	
10	TOP DIAMETER	INCHES	10	
11	BOTTOM DIAMETER	INCHES	19.5	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 **Originating Department:Distribution Engineering**

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 60-H6

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	60'-0"	
2	EMBEDMENT LENGTH	FEET	8'-5"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	39/26/20'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	11,300	
7	MINIMUM BENDING MOMENT	FT.-KIPS	382	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	7,700	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	19.5	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043

Originating Department:Distribution Engineering

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 60-H8

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	60'-0"	
2	EMBEDMENT LENGTH	FEET	8'-5"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	39/26/20'-9"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	13,500	
7	MINIMUM BENDING MOMENT	FT.-KIPS	466	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	9,400	
10	TOP DIAMETER	INCHES	10	
11	BOTTOM DIAMETER	INCHES	20.5	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 **Originating Department:Distribution Engineering**

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 65-H6

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	65'-0"	
2	EMBEDMENT LENGTH	FEET	9'-1"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	48/32/24'-3"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	13,000	
7	MINIMUM BENDING MOMENT	FT.-KIPS	415	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	7,700	
10	TOP DIAMETER	INCHES	9	
11	BOTTOM DIAMETER	INCHES	20.5	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

PROPOSAL SUMMARY DOCUMENT
STANDARDS & MATERIALS DISTRIBUTION DEPARTMENT

Revision: January 2024

Document No.: 4350.043 **Originating Department:Distribution Engineering**

MANUFACTURER: _____

FACTORY LOCATION: _____

Square Prestressed Concrete Poles: 65-H8

ITEM	DESCRIPTION	UNIT	LUMA SPECIFICATION	PROPOSAL
1	TOTAL LENGTH	FEET	65'-0"	
2	EMBEDMENT LENGTH	FEET	9'-1"	
3	# OF POLE SECTION	1		
4	CROSS SECTION	TRAPEZOIDE		
5	SLOT AND HOLES "A" / HOLES "B" / GRND FROM TOP	48/32/24'-3"		
6	MAXIMUM TOTAL WEIGHT	POUNDS	15,500	
7	MINIMUM BENDING MOMENT	FT.-KIPS	507	
8	MAXIMUM DEFLECTION	%	15	
9	MINIMUM ULTIMATE FORCE	FT.-KIPS	9,400	
10	TOP DIAMETER	INCHES	10	
11	BOTTOM DIAMETER	INCHES	21.5	
12	NATIONAL PRECAST CONCRETE ASSOCIATION	CERTIFICATION DOCUMENT		YES/NO
13	DESIGN AND DRAWINGS INCLUDED			YES/NO
14	DESIGN APPROVED BY LUMA			YES/NO

4350.043 Concrete Poles (1-22-2024)

Final Audit Report 2024-01-25

Created:	2024-01-25
By:	Rosalia Alverio (rosalia.alverio@lumapr.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAACHMyFwCmsLUinbGDVZTU1fg1hz80AHS0

"4350.043 Concrete Poles (1-22-2024)" History

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