Document Title:

Concrete Base for Pad Mounted Equipment

Document Type:	Document No.:
Material Specification	**4350.269**

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Distribution Standards & Materials	**December 16, 2022**	Dec 16, 2022

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Approver Ricardo Castro PE Manager, Distribution Standards & Materials	Signature and Date	Dec 16, 2022

Document History

Date	Revision Comments
December 16, 2022	Initial Release.

Warehouse Catalog	Item Version	Date
026-44635	1	9/12/2022
026-46566	1	9/12/2022
026-46140	1	9/12/2022
026-47208	1	9/12/2022
026-51009	1	9/12/2022

Concrete Base for Pad Mounted Equipment

1. Introduction

This is a general specification that covers the minimum requirements for concrete base for pad mounted equipment to be used in the distribution system in Puerto Rico. Further information will be provided by LUMA Energy at the time of order placement and will provide information on site specific conditions, quantity, and other requirements. This document includes the general electrical and mechanical characteristics of the material.

2. Special Requirements

Samples shall be furnished as requested by LUMA Energy. Vendors that have supplied this material to LUMA on previous orders, will not have to furnish samples at bid opening. The 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. Quantity/Literature

Descriptive and technical literature must be supplied by 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. For products described in this specification as requiring qualification, awards will be made only for such products that, prior to the time for opening of bids, had been tested and/or approved by LUMA. Evidence of PREPA's and/or LUMA Energy's approval of the equipment or material shall be supplied by 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. Equal or Approved Equal to

Precast Products Corp./Power Poles Inc. and Moca Concrete Poles.

6. Packaging

All material and equipment 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.

7. Number Per Package (Logistics)

Each manufacturer shall define the number of manholes per packages depending on the shipping containers and platforms for delivery or as requested by LUMA.

8. Acceptance Criteria

8.1. Test required: certified by external qualified laboratories.

8.2. Latest applicable codes, standards, and other regulations:

a. ACI American Concrete Institute

b. ANSI American National Standards Institute

c. ASCE American Society of Civil Engineers

d. ASTM American Society for Testing and Materials

e. AWS American Welding Society

f. NESC National Electrical Safety Code

g. IEEE Institute of Electrical and Electronic Engineers

h. PCI Prestressed Concrete Institute

9. Description

This specification is for the purpose of the concrete base for pad mounted equipment 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, drawings, final approval before manufacture, and failure to meet guarantees. The Special Conditions will be including the requirements, weight of the structures, dimension, delivery of material, and table of compliance.

Concrete Base for Pad Mounted Equipment

9.1. The Technical Specifications

a. **Material**

Main structure concrete shall be in accordance to 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**

The supplier is responsible of the design. The bidder will have to deliver the final computations and all design parameters considered. If the design was performed by a computer program, submit runs of the program.

c. **Drawings**

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

1. General dimensions of all the structural components.
2. Weight for each concrete base.
3. A bill of materials.
4. Details of all accessories.

d. **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 AutoCAD 3D (.DWG) shall be sent for our files. All drawings shall include our purchase order number.

e. **Failure to Meet Guarantees**

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. All expense 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.

Concrete Base for Pad Mounted Equipment

9.2. Special Conditions:

a. **The Requirements**

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

1. Concrete Base for Single-Phase Transformer - Appendix 1
2. Concrete Base for Three-Phase Transformer - Appendix 2
3. Concrete Base for Single Pole Manual Operated Switching Unit - Appendix 3
4. Concrete Base for Three-Phase Switching Unit - Appendix 4
5. Concrete Base for Dead Front Switching Unit - Appendix 5

b. **Weight of the structures**

1. The total weight of the Concrete Base for Single-Phase Transformer shall be no more than 2,600 lbs. (concrete and rebars)
2. The total weight of the Concrete Base for Three-Phase Transformer shall be no more than 3,960 lbs. (concrete and rebars)
3. The total weight of the Concrete Base for Single Pole Manual Operated Switching Unit shall be no more than 9,750 lbs. (concrete and rebars)
4. The total weight of the Concrete Base for Three-Phase Switching Unit shall be no more than 11,300 lbs. (concrete and rebars)
5. The total weight of the Concrete Base for Dead Front Switching Unit shall be no more than 10,600 lbs. (concrete and rebars)

c. **Dimension**

1. The dimension of the Concrete Base for Single-Phase Transformer shall be 60 in. x 52 in. x 10 in. (L x W x D) with an opening of 28 in. x 11 in. (L x W).
2. The dimension of the Concrete Base for Three-Phase Transformer shall be 76 in. x 77 in. x 10 in. (L x W x D) with an opening of 57 in. x 27 in. (L x W).
3. The dimension of the Concrete Base for Single Pole Manual Operated Switching Unit shall be 82 in. x 88 in. x 22 in. (L x W x D).
4. The dimension of the Concrete Base for Three-Phase Switching Unit shall be 88 in. x 104 in. x 22 in. (L x W x D).
5. The dimension of the Concrete Base for Dead Front Switching Unit shall be 90 3/4 in. x 99 in. x 22 in. (L x W x D).

d. **Delivery of material:**

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

e. **Table of Compliance**

The bid proposals shall include a summary table for each structure as per the template attached to this specification. The table shall be filled out in its entirety and comply with the metrics and conditions established. The answers should be supported by documents, such as drawings, computer drawings (software used if applicable), etc. **BIDDER SHALL BE DECLARED NON-RESPONSIVE IF THIS TABLE IS NOT INCLUDED WITH THE PROPOSALS.** (See Appendix 6)

10. Concrete Mixes

10.1. 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 all bases shall be 4,000 psi.

10.2. 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.

10.3. 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.

10.4. 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.

10.5. 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.

10.6. 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.

10.7. 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.

11. Formwork

11.1. 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.

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

11.3. 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.

11.4. Molds should preferably be made of steel.

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

11.6. 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.

11.7. 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.

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

12. Placing of Reinforcement

12.1. 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.

12.2. 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.

12.3. 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.

12.4. 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.

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

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

13. English System Unit

The English System Units shall be used on all calculations and drawings. Metric Units or other systems shall not be accepted in the evaluation and award of a bid.

14. Inspection

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.

15. Proposal Information

15.1. Submitted proposals must include:

a. Technical information
b. Table of Compliance completed by the bidder with reference. (See Appendix 1)

16. Table 1: Warehouse and Asset Suite Identification Number

Item	Warehouse #	Asset Suite #	Dimensions
Concrete Base for Single-Phase Transformer	026-44635	44635	60 in. x 52 in. x 10 in. (L x W x D) with an opening of 28 in. x 11 in. (L x W)
Concrete Base for Three-Phase Transformer	026-46566	46566	76 in. x 77 in. x 10 in. (L x W x D) with an opening of 57 in. x 27 in. (L x W)
Concrete Base for Single Pole Manual Operated Switching Unit	026-46140	46140	82 in. x 88 in. x 22 in.
Concrete Base for Three-Phase Switching Unit	026-47208	47208	88 in. x 104 in. x 22 in.
Concrete Base for Dead Front Switching Unit	026-51009	51009	90 3/4 in. x 99 in. x 22 in.

— End of Specification —

APPENDICES

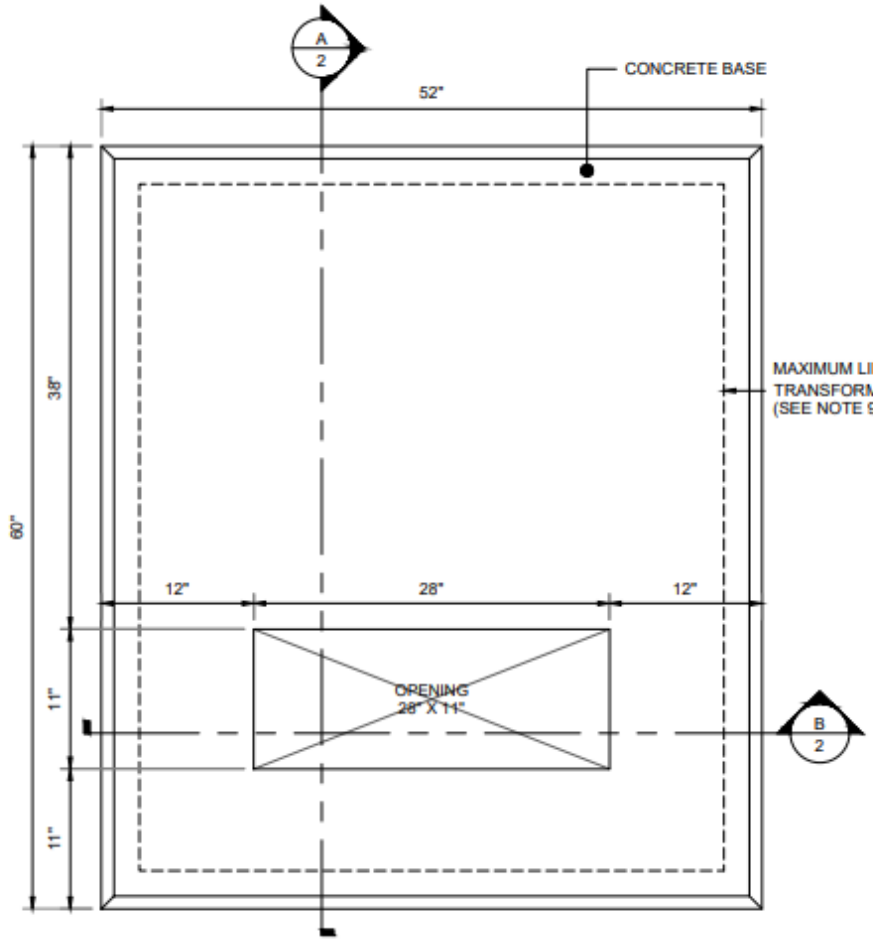
Concrete Base for Pad Mounted Equipment

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO. 1 VERSION 1
DOCUMENT NO. 4302.269
PAGE 1 OF 2 DATE OCT 05, 2022
SUBMITTED ROSALIA ALVERIO GONZALEZ
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

SINGLE PHASE DEAD FRONT TRANSFORMER
L 52" X W 60" X D 10"



PLAN VIEW

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APPENDIX NO.	1 VERSION 1
DOCUMENT NO.	4302.269
PAGE	2 OF 2 DATE OCT 05, 2022
SUBMITTED	ROSALIA ALVERIO GONZALEZ
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
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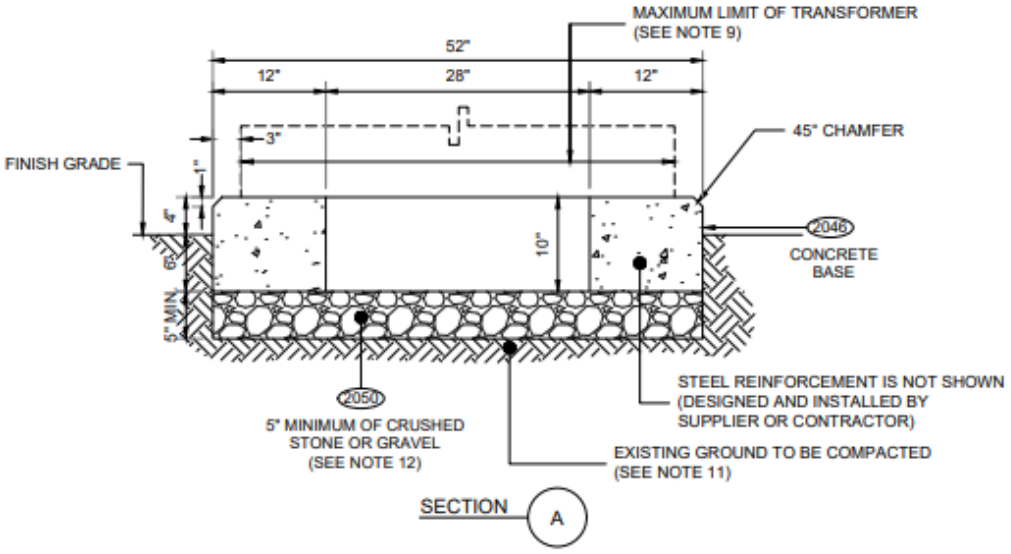
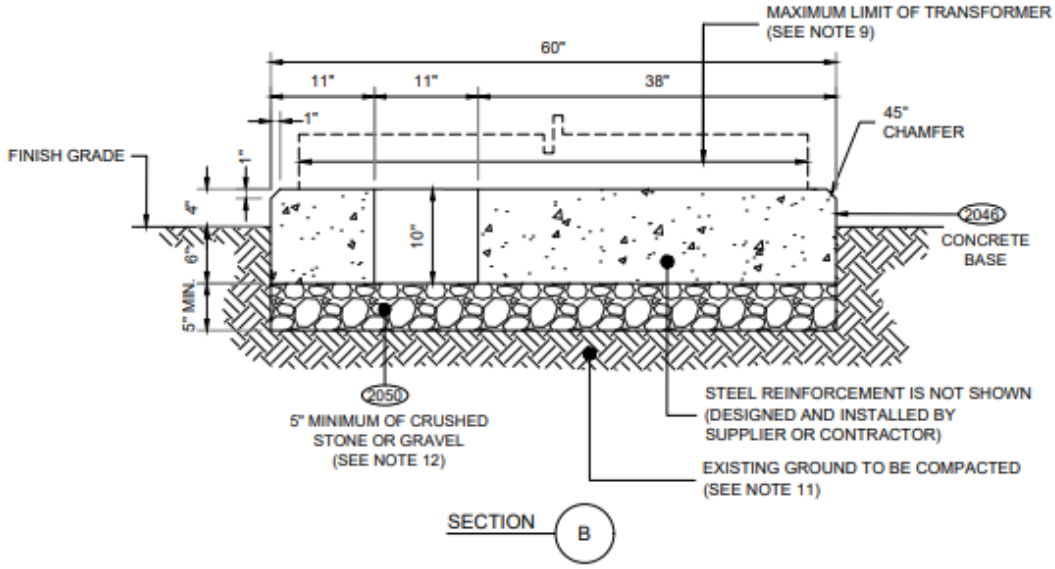
SINGLE PHASE DEAD FRONT TRANSFORMER
L 52" X W 60" X D 10"





Concrete Base for Pad Mounted Equipment

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CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO.	2
VERSION	1
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DATE	OCT 05, 2022
SUBMITTED	ROSALIA ALVERIO GONZALEZ
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
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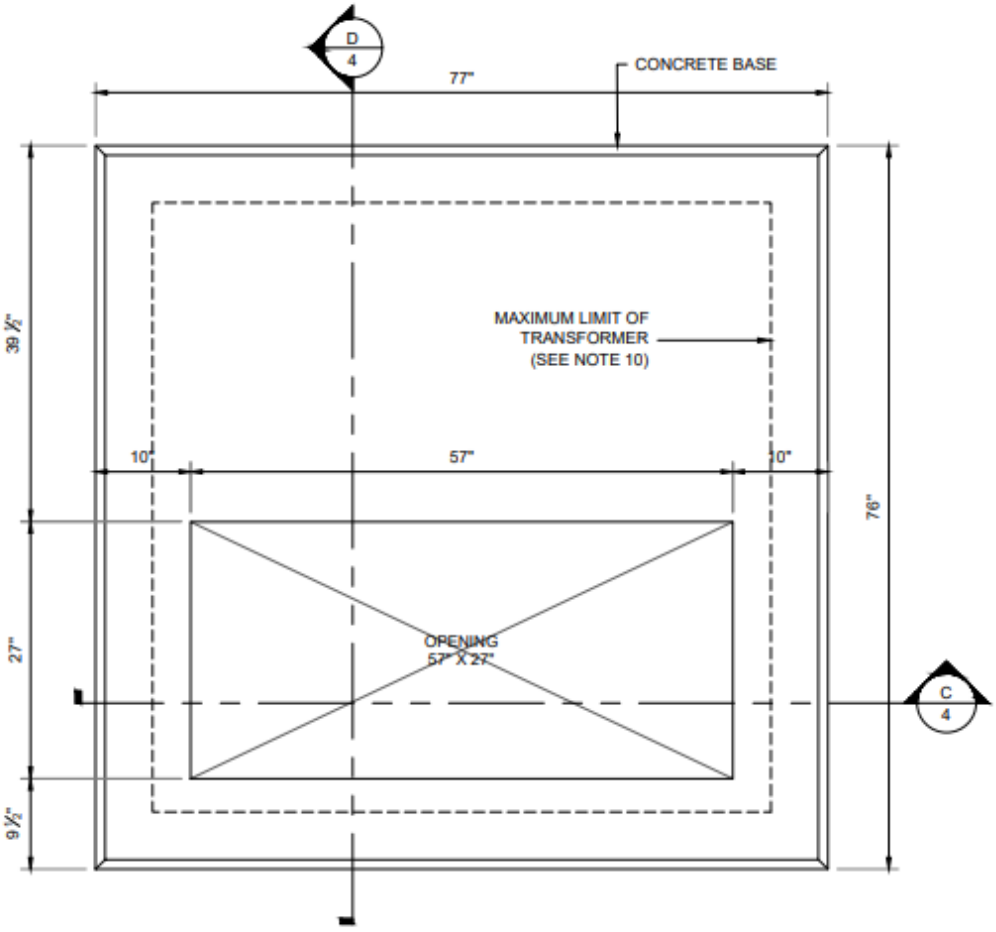
DIGITIZED	VICTOR R. FEBRES LIC. 3412

THREE PHASE DEAD FRONT TRANSFORMER
L 76" X W 77" X D 10"



PLAN VIEW

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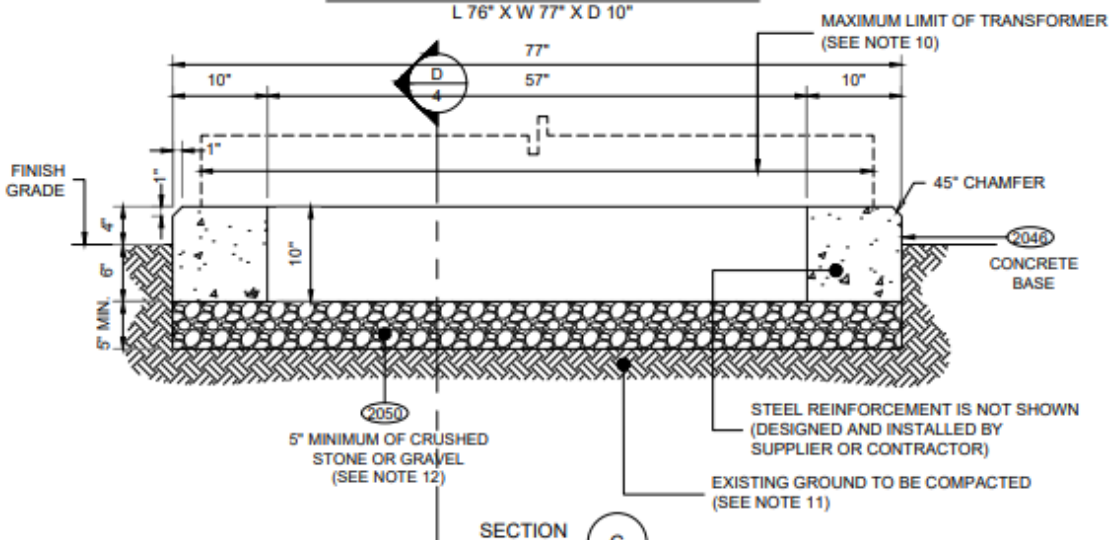
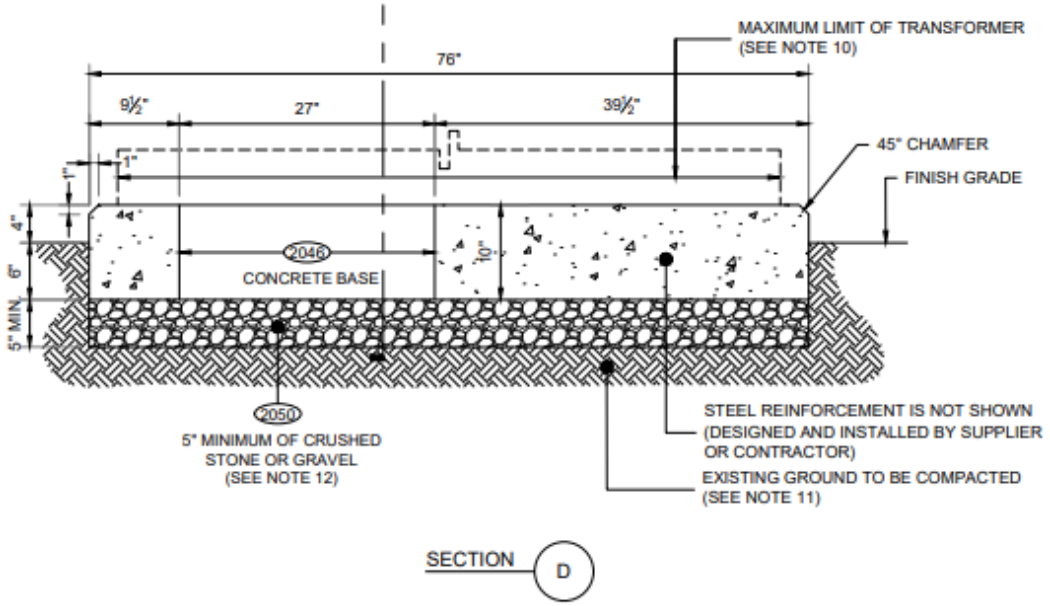


SECTION C



SECTION D

Concrete Base for Pad Mounted Equipment

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO.	3 VERSION 1
DOCUMENT NO.	4302.269
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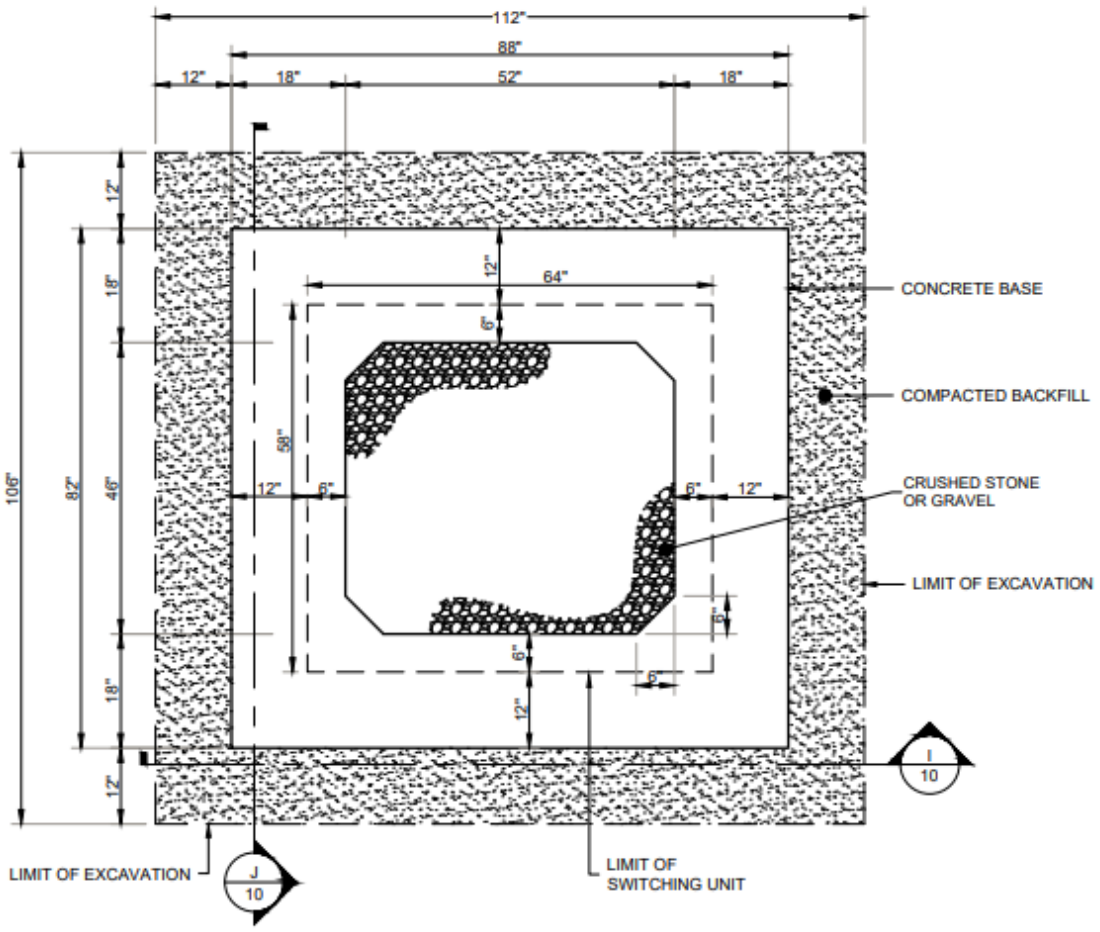
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412

LIVE FRONT SINGLE POLE SWITCHING UNIT
L 88" X W 82" X D 22"



PLAN VIEW

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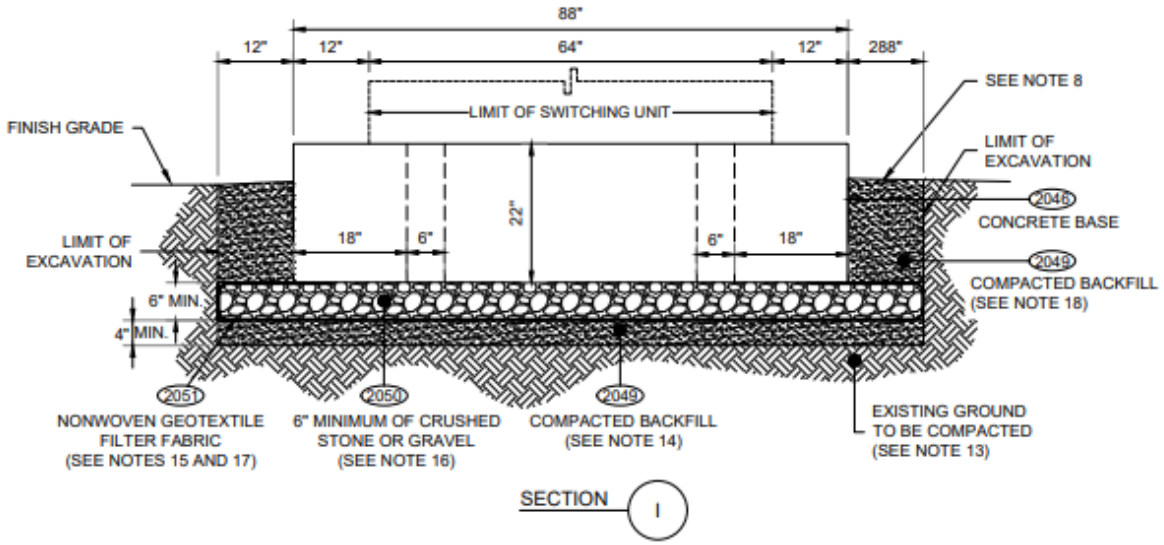

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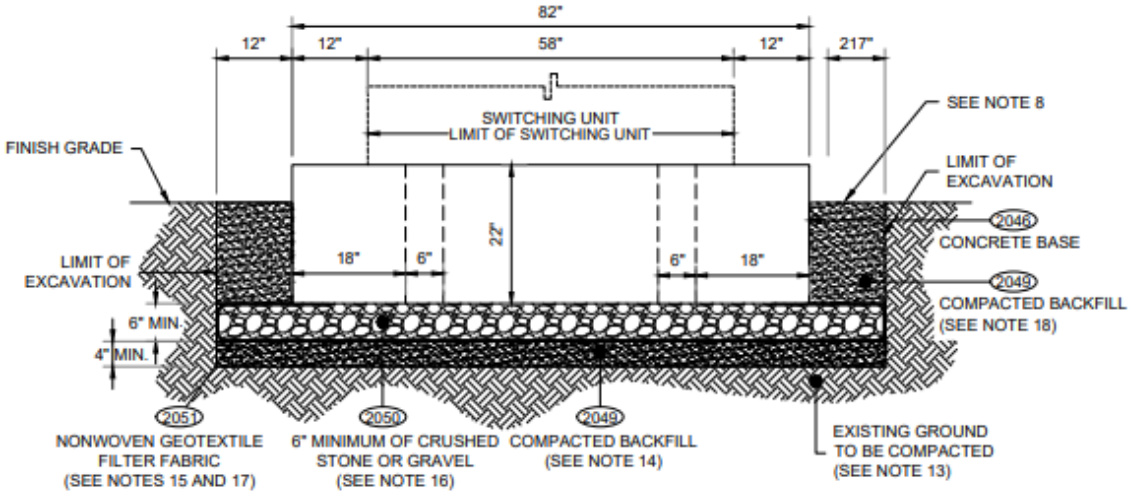

SECTION J

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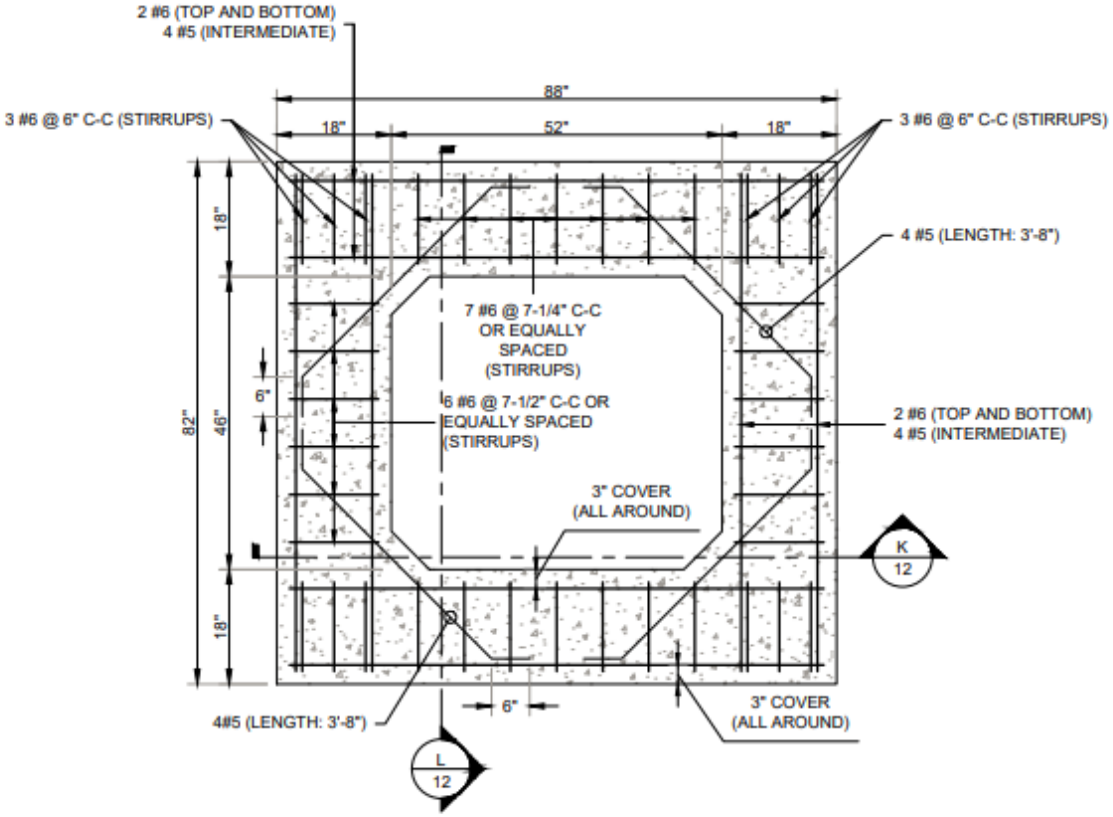

TOP VIEW

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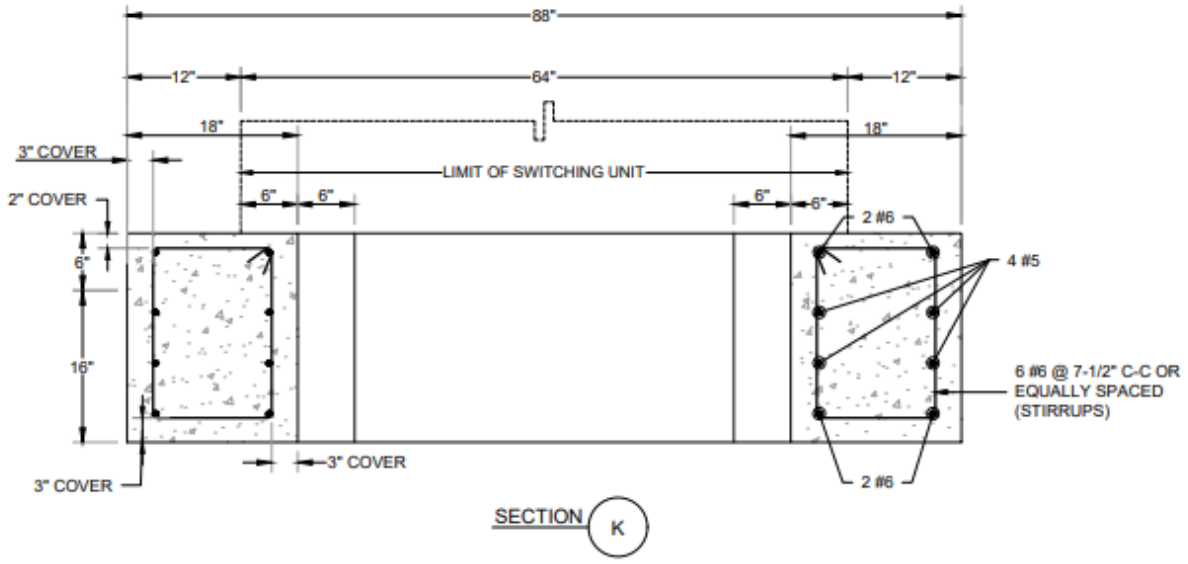

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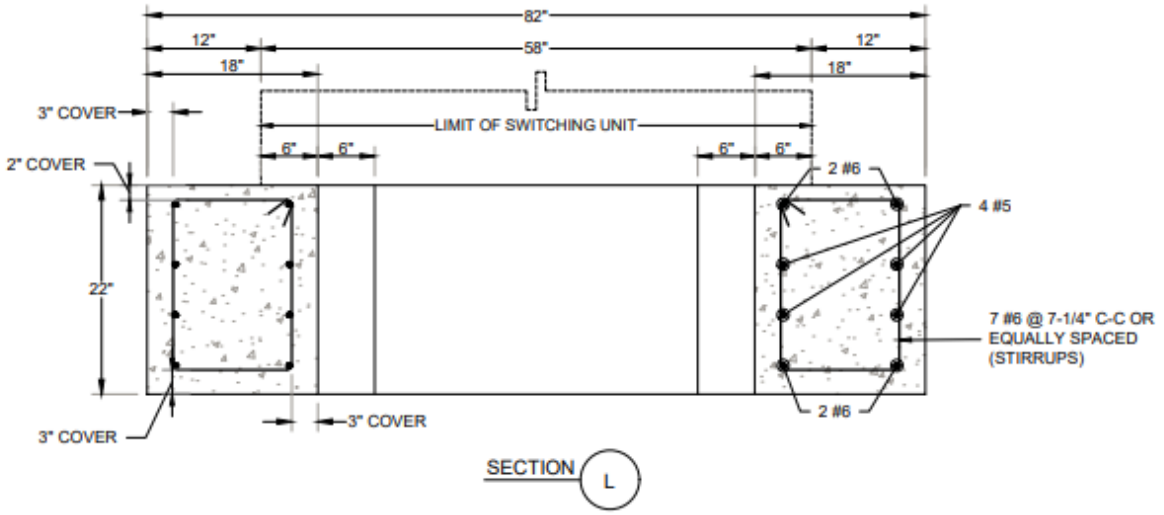

SECTION L

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APPENDIX NO. 4 VERSION 1
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REVIEWED IVETTE D. SANCHEZ LIC. 13837
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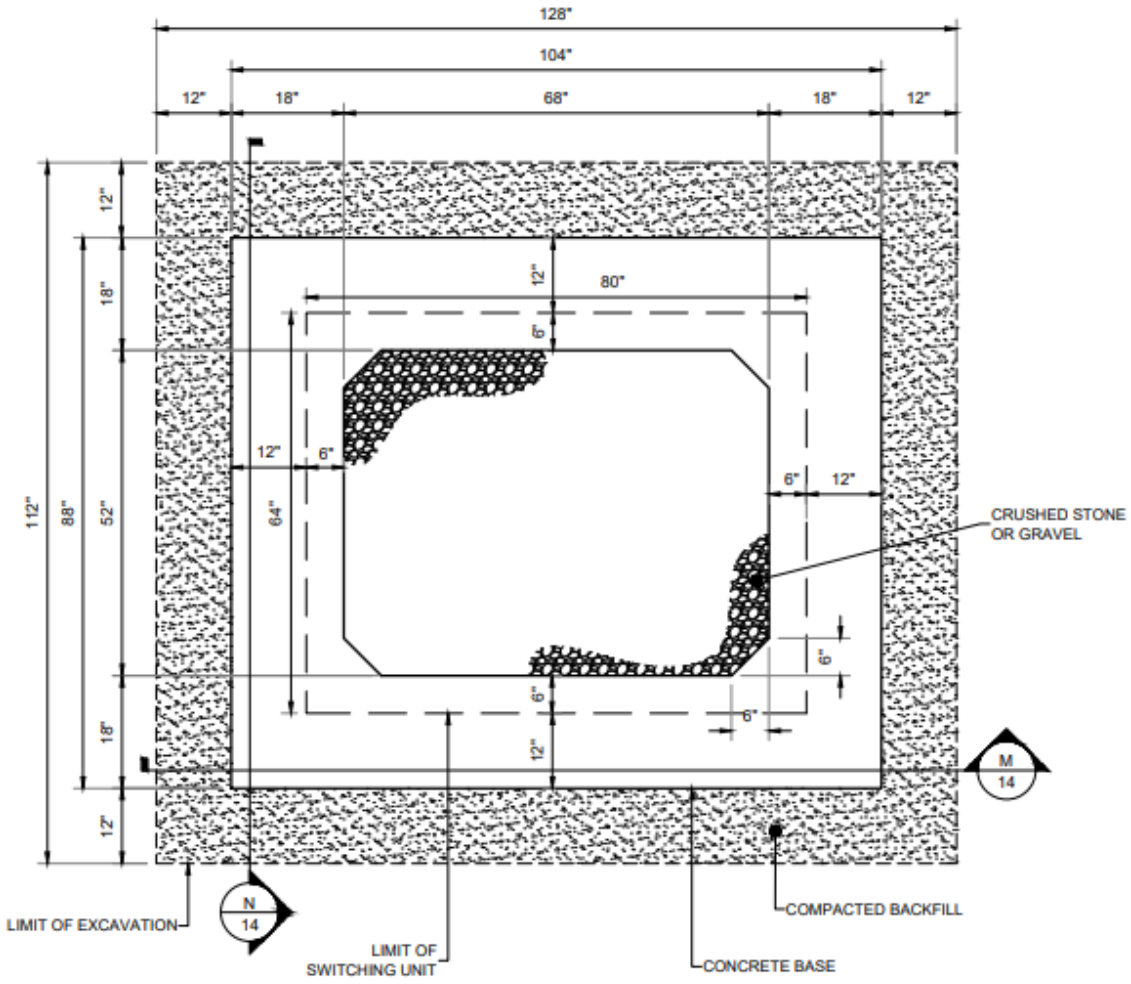
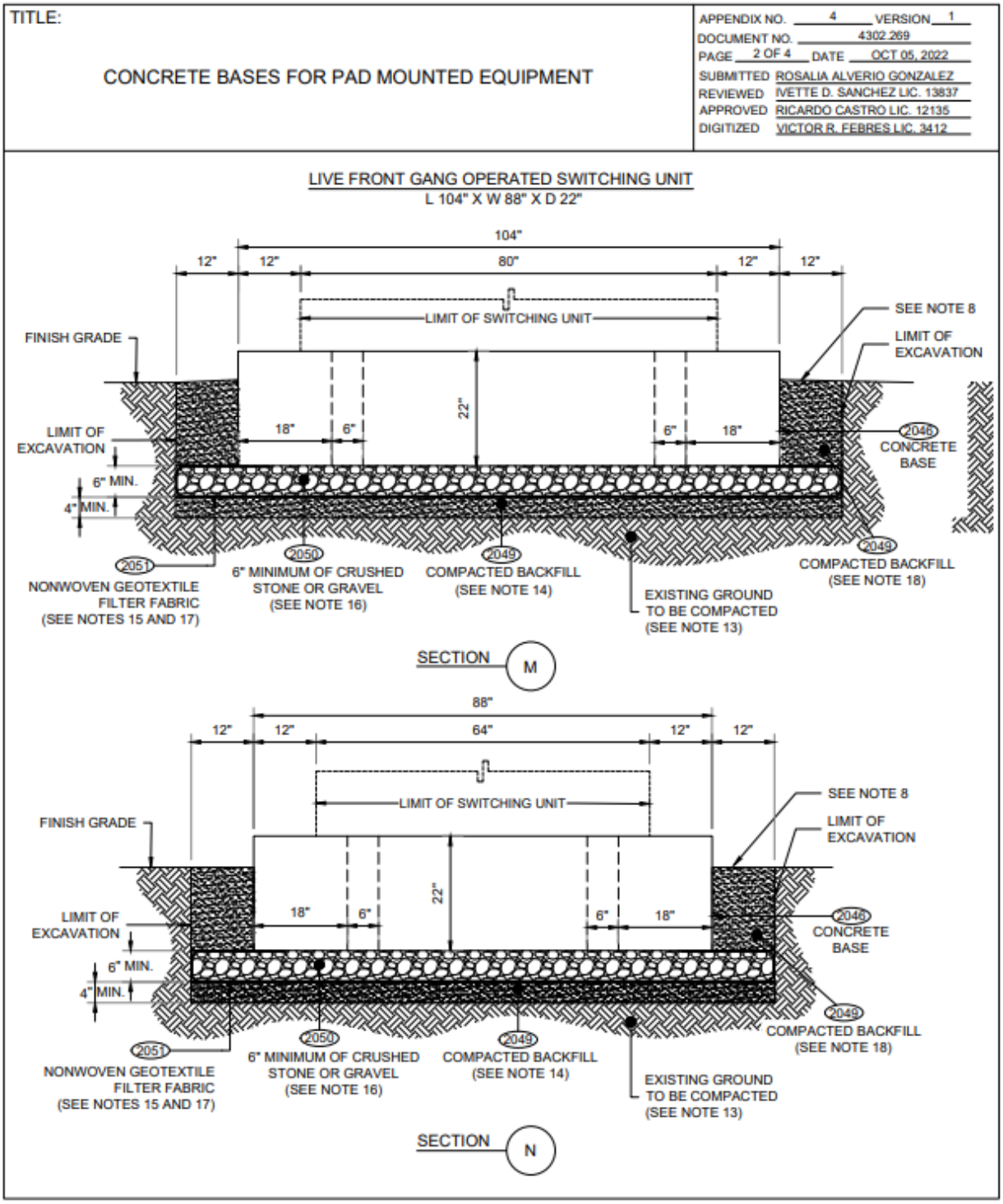
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT GANG OPERATED SWITCHING UNIT
L 104" X W 88" X D 22"



PLAN VIEW

Concrete Base for Pad Mounted Equipment



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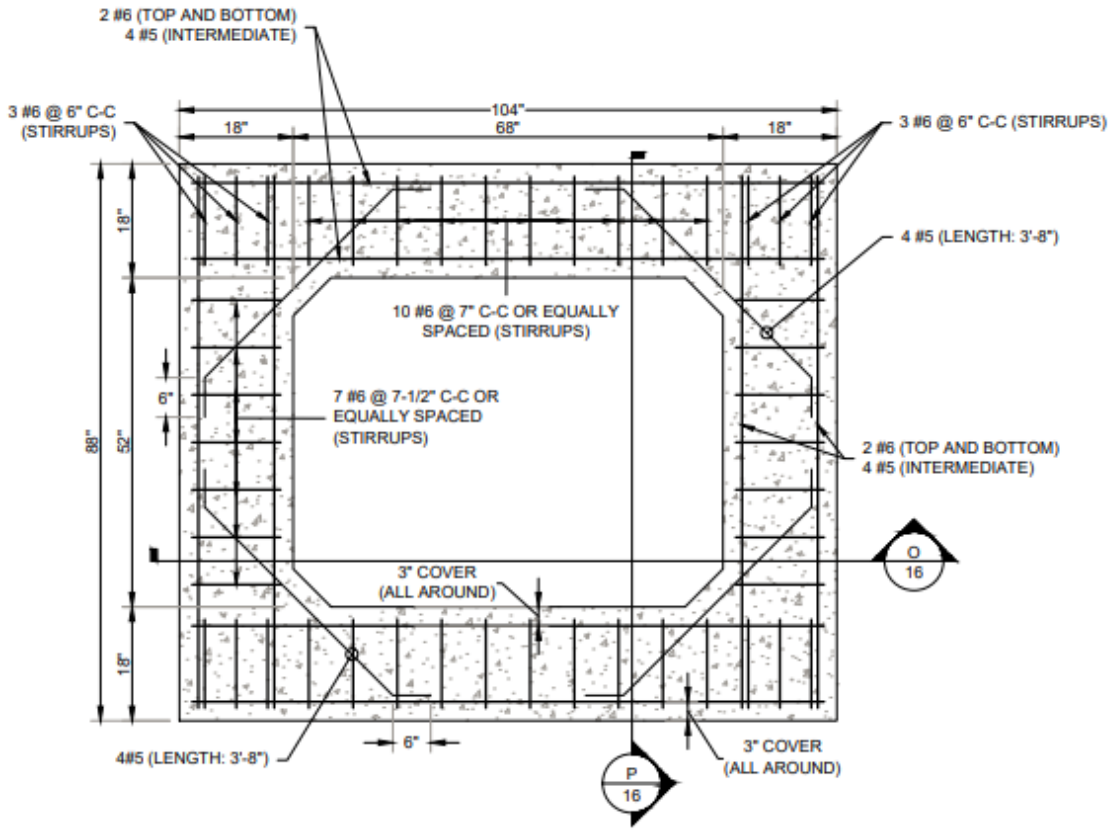

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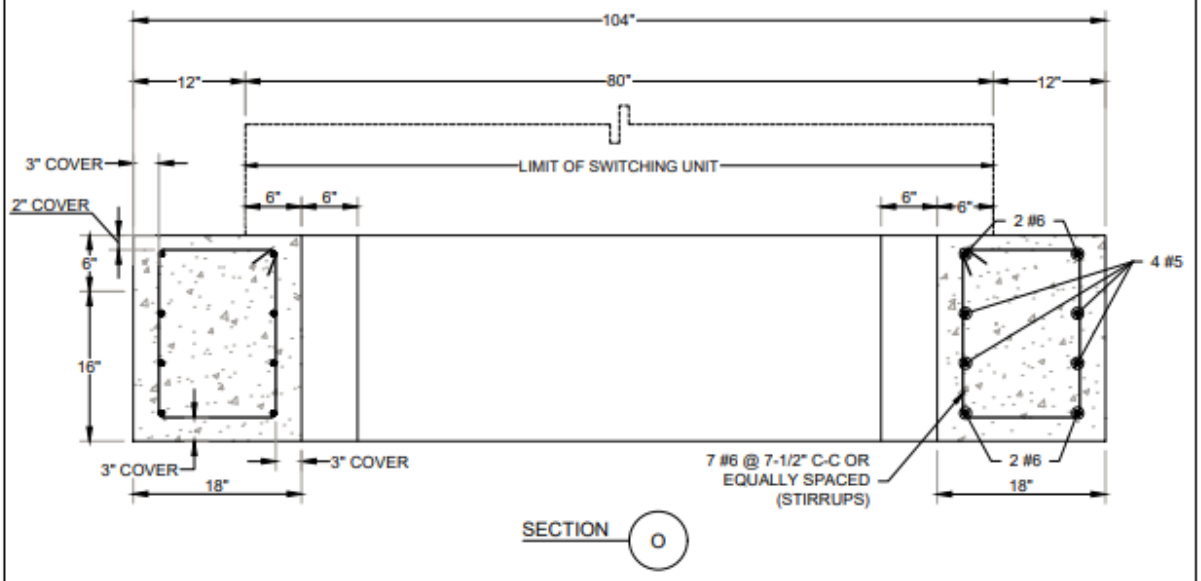
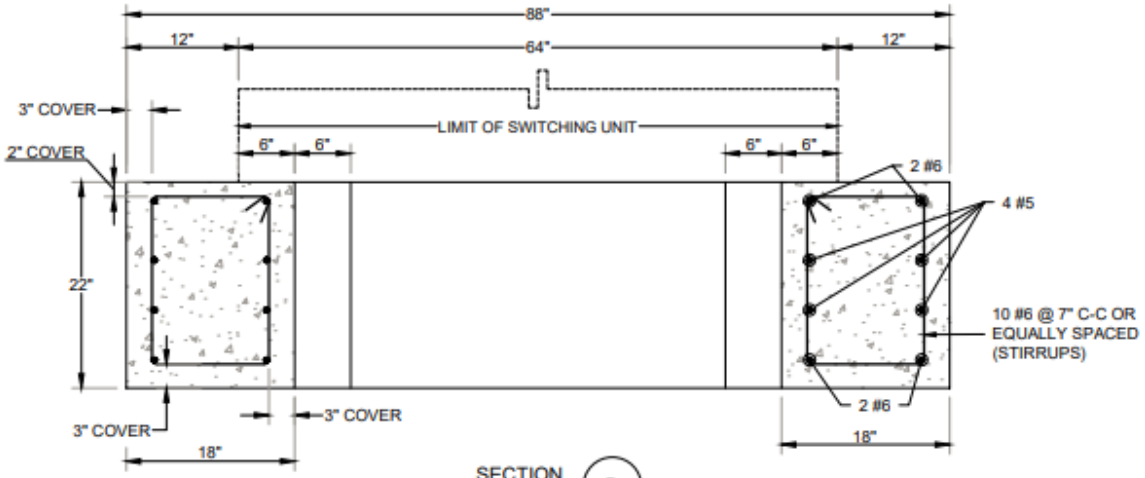


SECTION O



SECTION P

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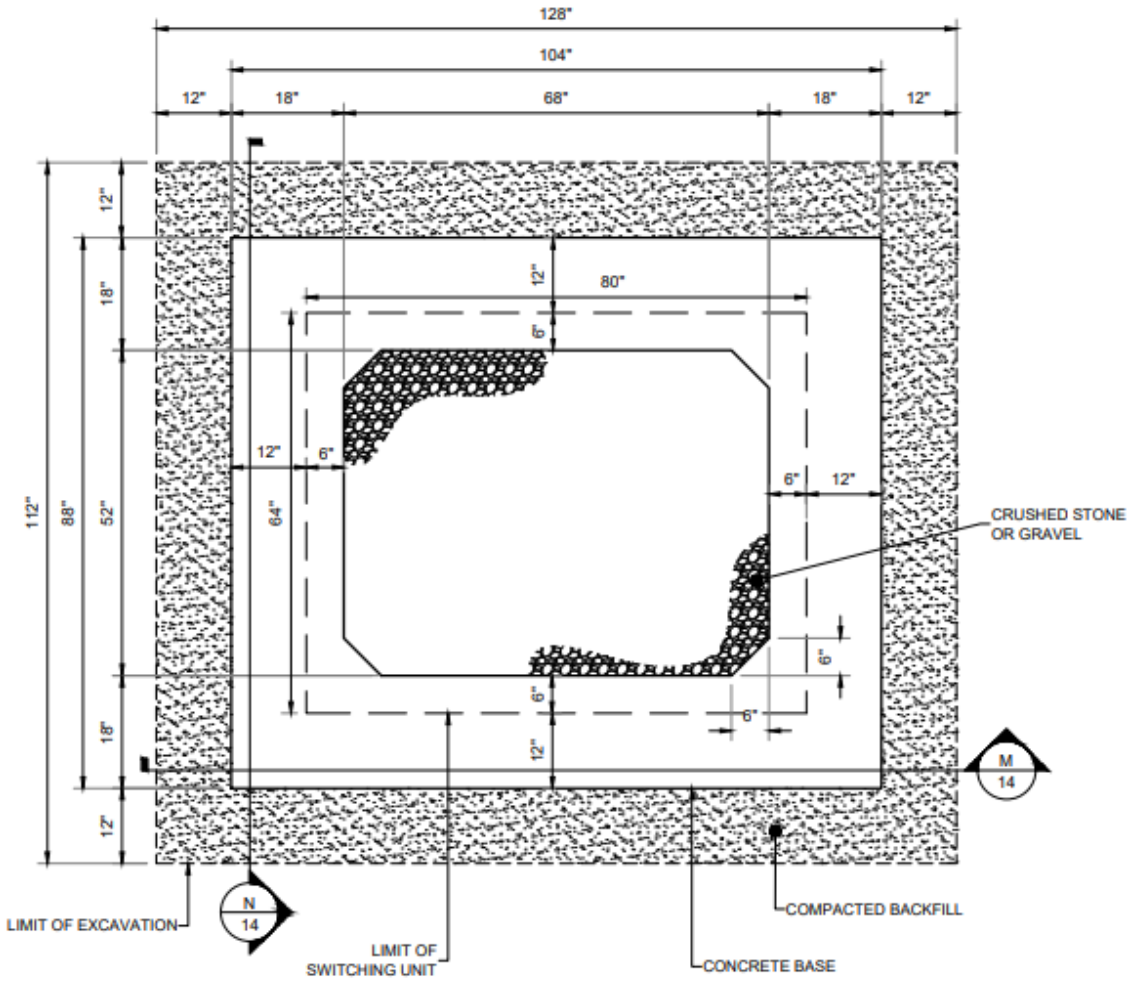
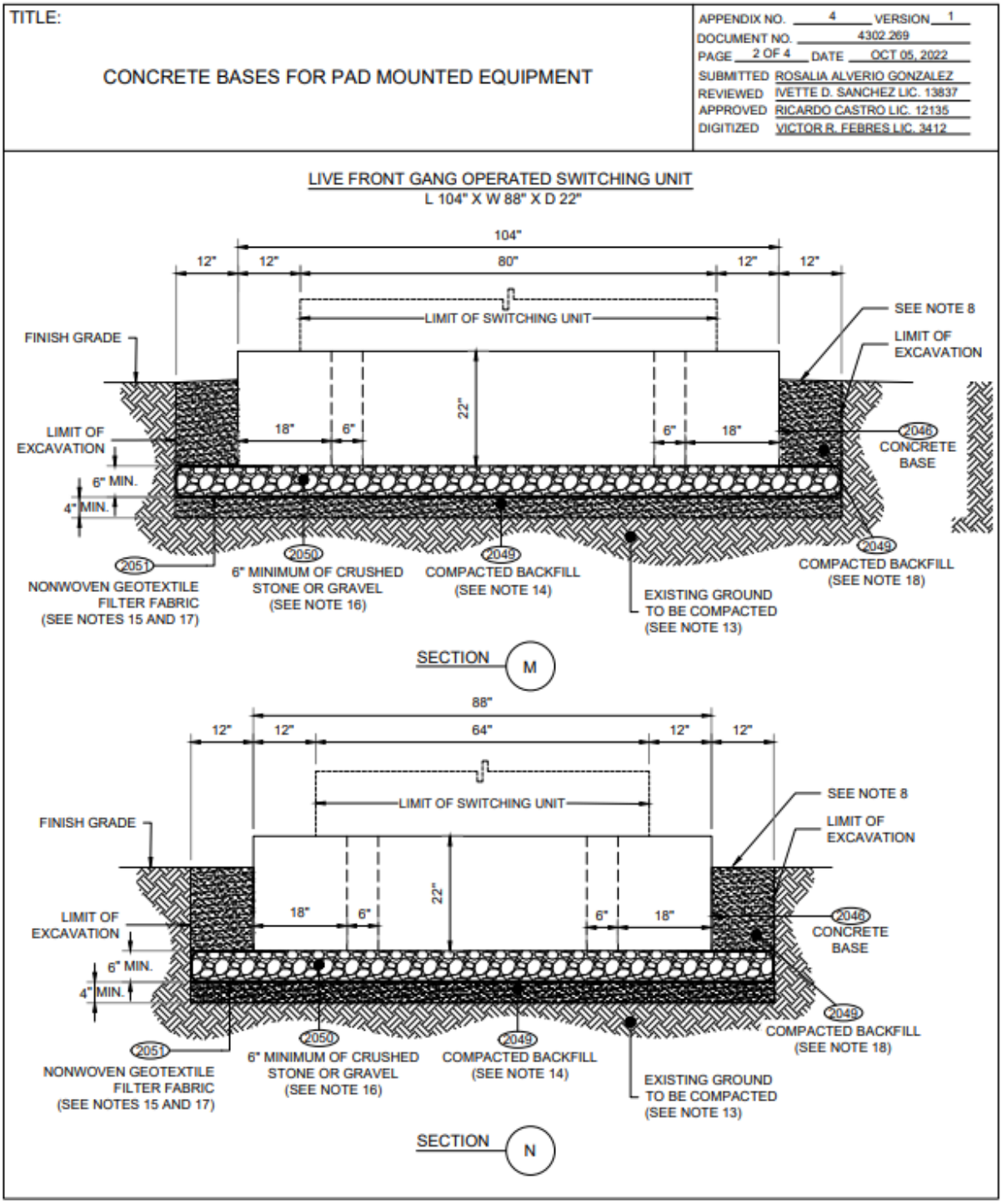


PLAN VIEW

Concrete Base for Pad Mounted Equipment



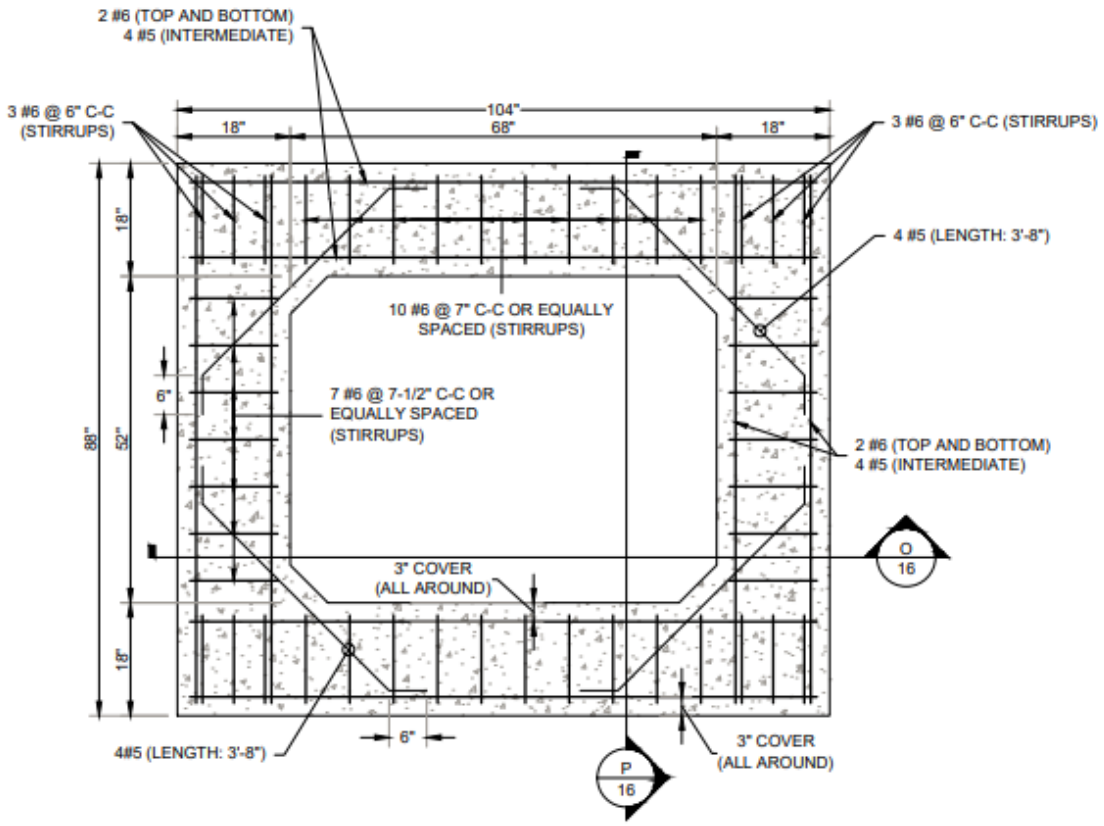
Concrete Base for Pad Mounted Equipment

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO. 4 VERSION 1
DOCUMENT NO. 4302.269
PAGE 1 OF 4 DATE OCT 05, 2022
SUBMITTED ROSALIA ALVERIO GONZALEZ
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

LIVE FRONT GANG OPERATED SWITCHING UNIT
L 104" X W 88" X D 22"



TOP VIEW

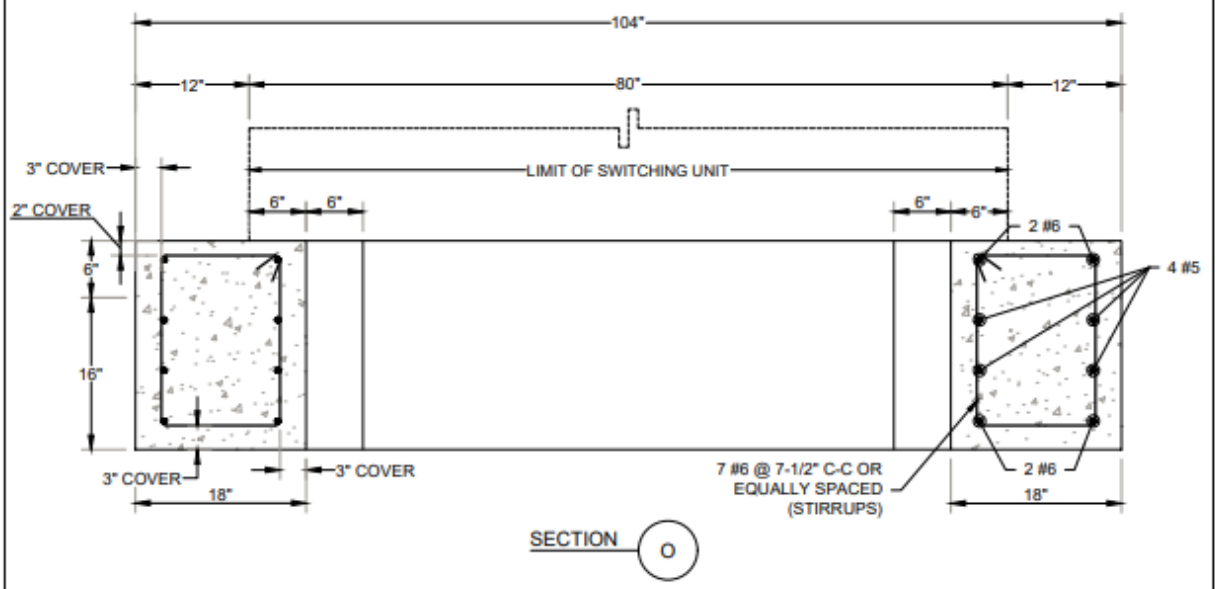
Concrete Base for Pad Mounted Equipment

TITLE:

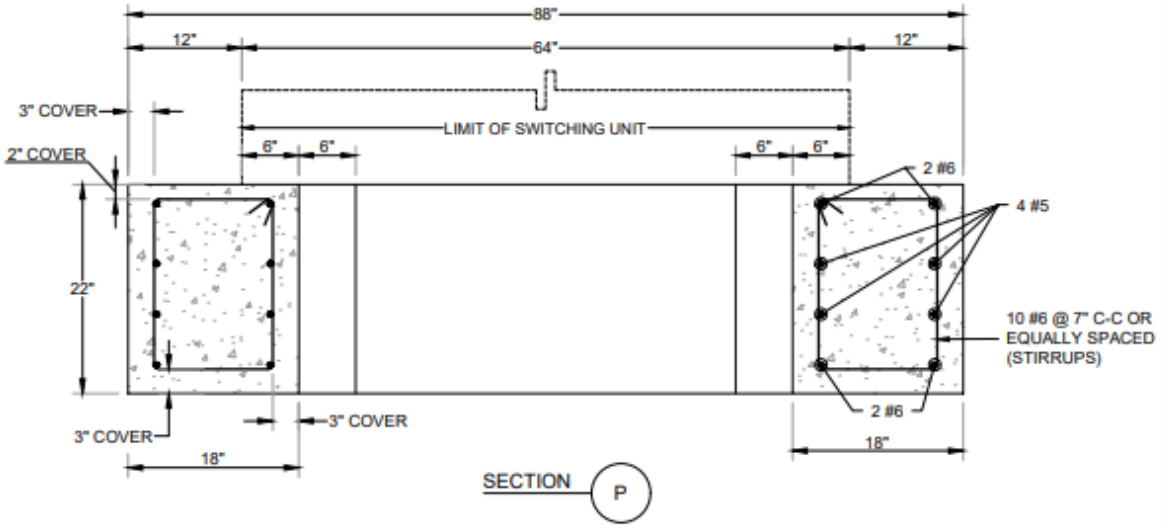
CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO.	4 VERSION 1
DOCUMENT NO.	4302.269
PAGE	4 OF 4 DATE OCT 05, 2022
SUBMITTED	ROSALIA ALVERIO GONZALEZ
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412

LIVE FRONT GANG OPERATED SWITCHING UNIT
L 104" X W 88" X D 22"



SECTION O



SECTION P

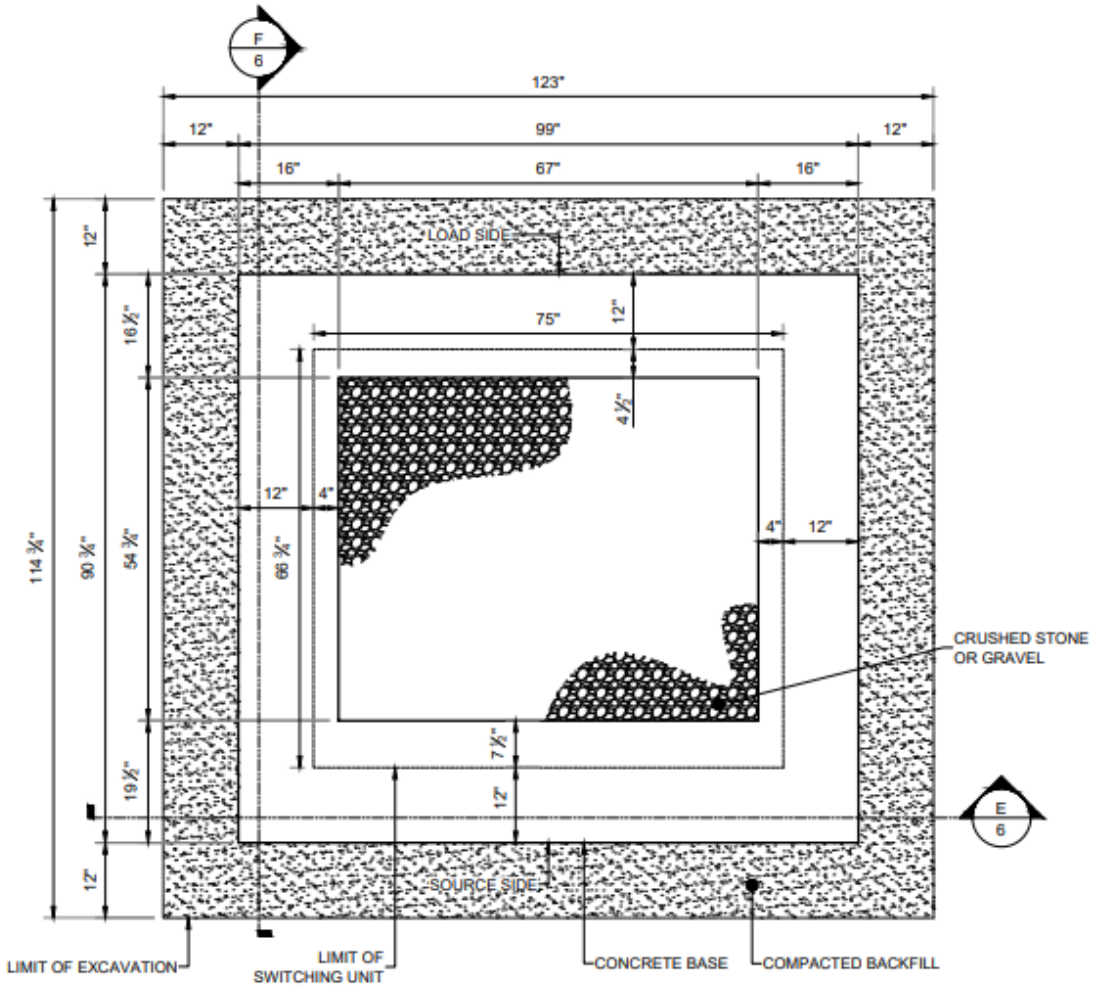
Concrete Base for Pad Mounted Equipment

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO.	5 VERSION 1
DOCUMENT NO.	4302.269
PAGE	1 OF 4 DATE OCT 05, 2022
SUBMITTED	ROSALIA ALVERIO GONZALEZ
REVIEWED	IVETTE D. SANCHEZ LIC. 13837
APPROVED	RICARDO CASTRO LIC. 12135
DIGITIZED	VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
L 90¾" X W 99" X D 22"



PLAN VIEW

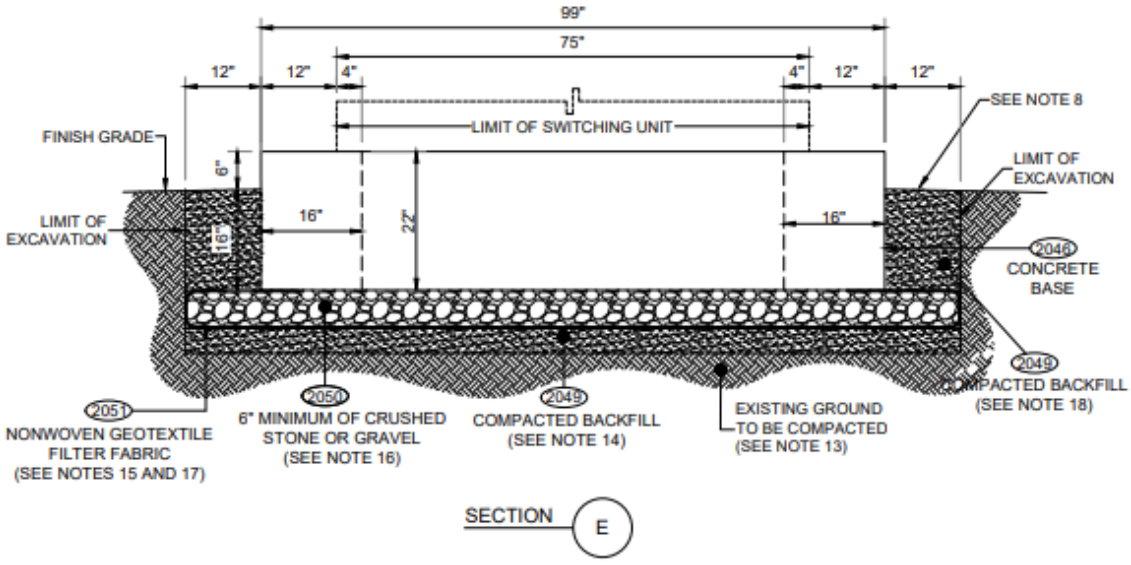
Concrete Base for Pad Mounted Equipment

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO. 5 VERSION 1
DOCUMENT NO. 4302.269
PAGE 2 OF 4 DATE OCT 05, 2022
SUBMITTED ROSALIA ALVERIO GONZALEZ
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
L 90¾" X W 99" X D 22"



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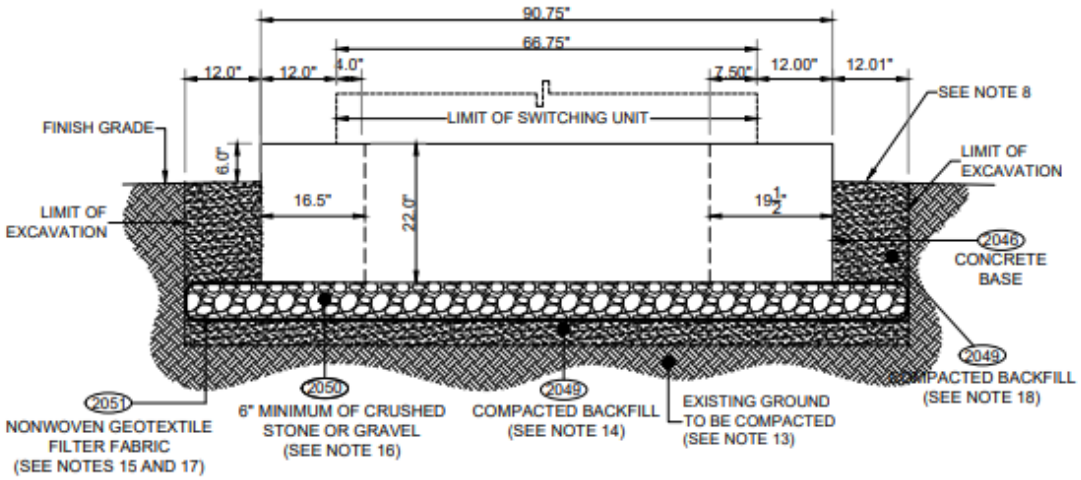


SECTION F

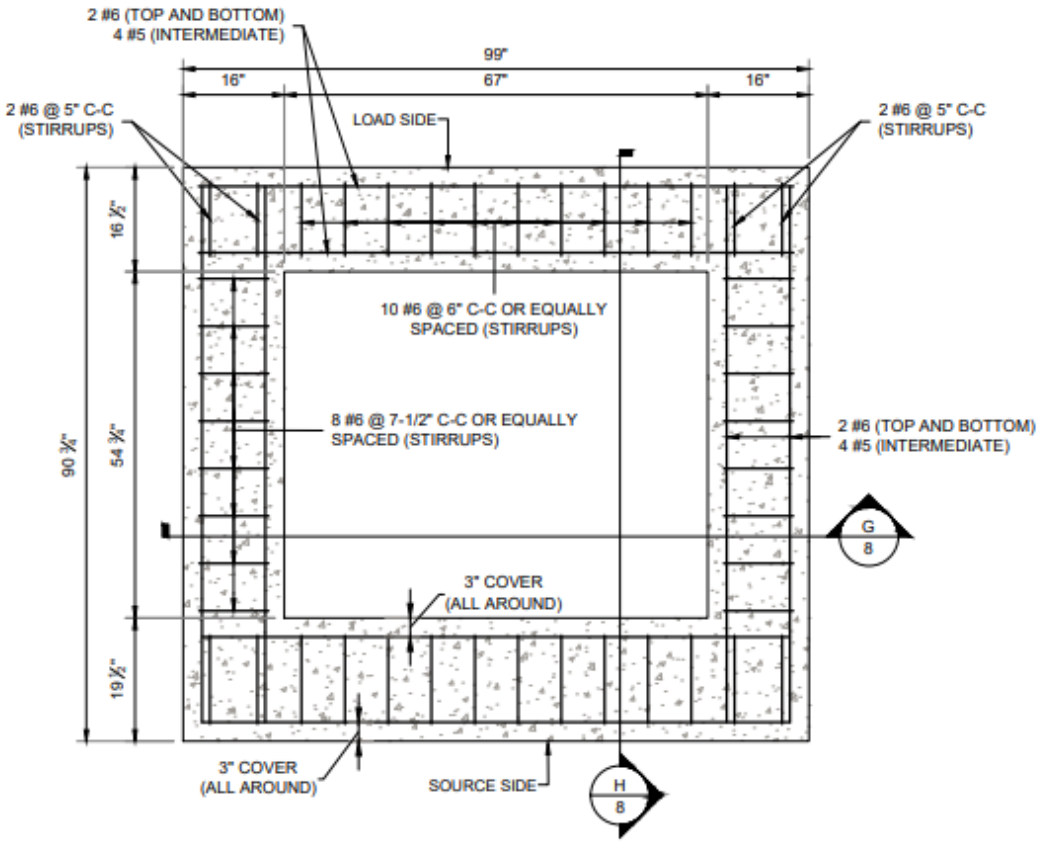
Concrete Base for Pad Mounted Equipment

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO. 5 VERSION 1
DOCUMENT NO. 4302.269
PAGE 3 OF 4 DATE OCT 05, 2022
SUBMITTED ROSALIA ALVERIO GONZALEZ
REVIEWED IVETTE D. SANCHEZ LIC. 13837
APPROVED RICARDO CASTRO LIC. 12135
DIGITIZED VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
L 90¾" X W 99" X D 22"



TOP VIEW

Concrete Base for Pad Mounted Equipment

TITLE:

CONCRETE BASES FOR PAD MOUNTED EQUIPMENT

APPENDIX NO. 5 VERSION 1
DOCUMENT NO. 4302.269
PAGE 4 OF 4 DATE OCT 05, 2022
SUBMITTED ROSALIA ALVERIO GONZALEZ
REVIEWED IVETTE D. SANCHEZ LIC. 13837
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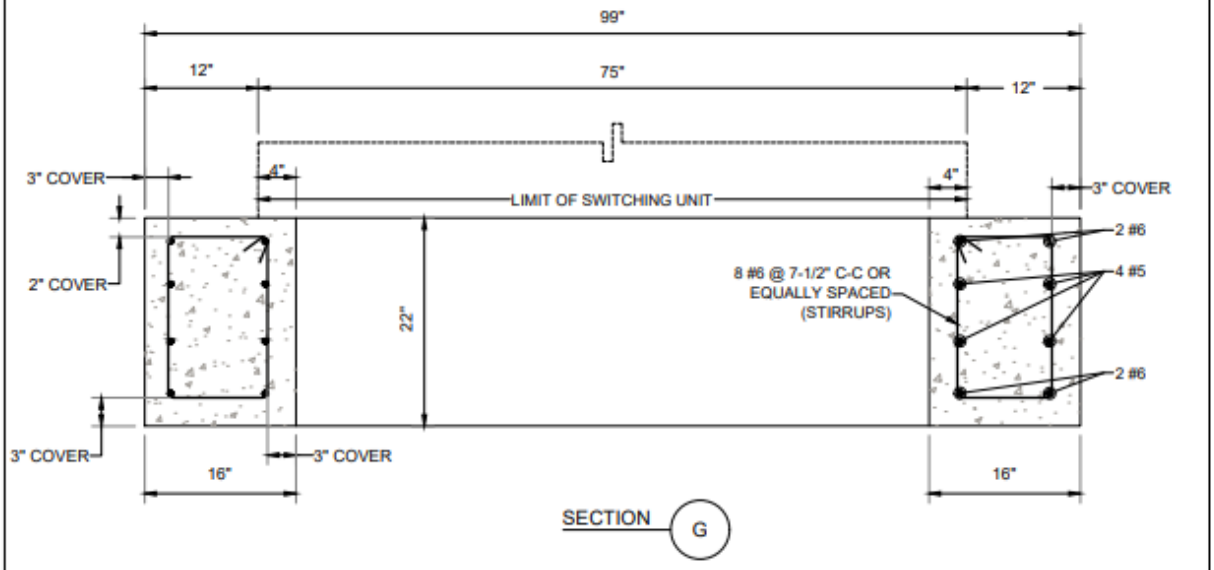
DIGITIZED VICTOR R. FEBRES LIC. 3412

DEAD FRONT SWITCHING UNIT
L 90¾" X W 99" X D 22"



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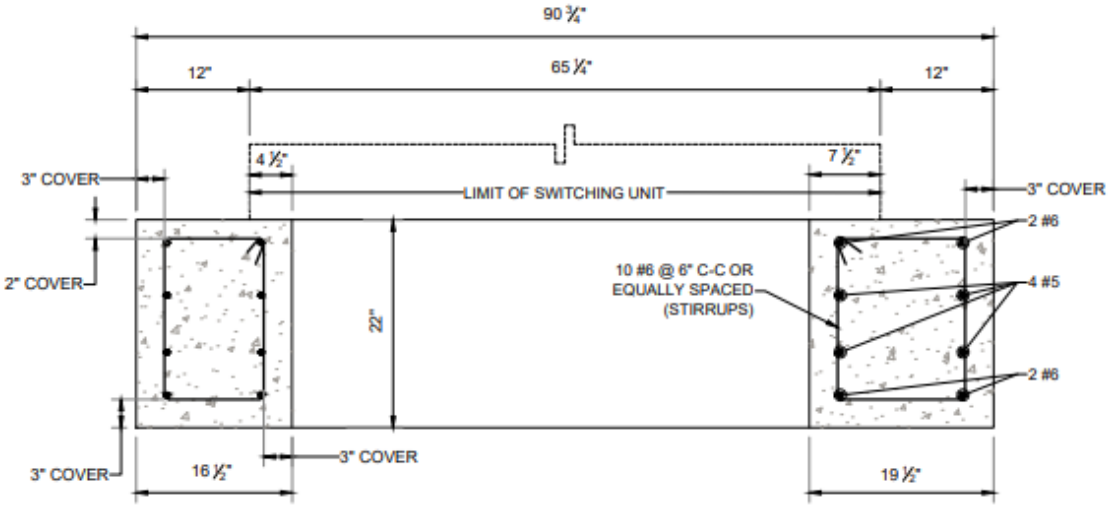

SECTION H

Concrete Base for Pad Mounted Equipment

TITLE:	APPENDIX NO. 0 VERSION 1
CONCRETE BASES FOR PAD MOUNTED EQUIPMENT GENERAL NOTES	DOCUMENT NO. 4302.269 PAGE 1 OF 1 DATE OCT 05, 2022 SUBMITTED ROSALIA ALVERIO GONZALEZ REVIEWED IVETTE D. SANCHEZ LIC. 13837 APPROVED RICARDO CASTRO LIC. 12135 DIGITIZED VICTOR R. FEBRES LIC. 3412

GENERAL NOTES FOR PAD MOUNTED EQUIPMENT CONCRETE BASE

1. THE SUPPLIER IS RESPONSIBLE FOR THE DESIGN OF THE PRECAST CONCRETE BASE, INCLUDING THE REINFORCING STEEL, COMPLYING WITH ALL STANDARDS AND CODES APPLICABLE FOR THIS TYPE OF PRODUCT AND THEIR CORRESPONDING INSTALLATION.
2. THE SUPPLIER SHALL SUBMIT THE SHOP DRAWINGS, CALCULATIONS AND ANY SUPPORTING DOCUMENT REQUIRED FOR THE CORRESPONDING LUMA EVALUATION AND APPROVAL, PRIOR TO SELL THIS PRODUCT. ALL DOCUMENTATION PROVIDED SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, AS REQUIRED BY LAWS OF PUERTO RICO.
3. IF THE CONCRETE BASE IS NOT A PRECAST ELEMENT AND WILL BE CONSTRUCTED ON SITE, THE CONTRACTOR WILL BE RESPONSIBLE TO BUILD IT IN ACCORDANCE WITH THE DETAILS AND NOTES OF THIS STANDARD.
4. THE CONCRETE MIX SHALL MEET THE REQUIREMENTS OF STANDARD NO. ASTM C94 - STANDARD SPECIFICATION FOR READY-MIXED CONCRETE. THE MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 4,000 PSI AT 28 DAYS, AS TESTED IN ACCORDANCE WITH STANDARD NO. ASTM C39 – STANDARD TEST METHOD FOR COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
5. THE REINFORCING STEEL SHALL BE FABRICATED AND PLACED IN CONFORMANCE WITH THE SPECIFICATION OF STANDARD NO. ACI 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE. THE REINFORCING STEEL SHALL BE DEFORMED BAR AND GRADE 60 (MINIMUM YIELD STRENGTH EQUAL TO 60,000 PSI), ACCORDING TO STANDARD NO. ASTM A615 – STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT, AND IT SHALL BE NEW BILLET-STEEL, AS REQUIRED. THIS INFORMATION SHALL BE INCLUDED IN THE SUPPLIER'S DRAWINGS.
6. THE REINFORCING STEEL SHALL BE PLACED AND ADEQUATELY SUPPORTED TO PROVIDE THE MINIMUM CONCRETE COVER REQUIRED, AND IT SHALL BE SECURE AGAINST DISPLACEMENT BY STANDARD NO. ACI 318, LATEST EDITION.
7. THE SURFACE OF THE CONCRETE BASE SHALL BE SMOOTH AND LEVELED, AND IT SHALL HAVE A SLIGHT SLOPE IN THE OFFSET OF 6" FROM EDGES. ALL EDGES SHALL BE CHAMFERED.
8. THE FINAL GRADE OF THE GROUND AROUND THE CONCRETE BASE SHALL HAVE A SLOPE FROM THE CONCRETE BASE TO THE GROUND AND BE WELL DRAINED AT ALL TIMES.

TRANSFORMER CONCRETE BASE NOTES

9. AFTER THE SINGLE PHASE DEAD FRONT TRANSFORMER IS INSTALLED ON THE CONCRETE BASE, A SPACE OF 3" MINIMUM SHALL REMAIN FREE AROUND THE TRANSFORMER, FROM THE EXTERIOR WALL OF THE TRANSFORMER TO THE EDGE OF THE CONCRETE BASE. THE MAXIMUM TOTAL WEIGHT OF SINGLE PHASE TRANSFORMER SHALL BE 2,500 POUNDS.
10. AFTER THE THREE PHASE DEAD FRONT THREE PHASE TRANSFORMER IS INSTALLED ON THE CONCRETE BASE, A SPACE OF 6" MINIMUM SHALL REMAIN FREE AROUND THE TRANSFORMER, FROM THE EXTERIOR WALL OF THE TRANSFORMER TO THE EDGE OF THE CONCRETE BASE. THE MAXIMUM TOTAL WEIGHT OF TRANSFORMER SHALL BE 4,200 POUNDS.
11. AFTER DUCTS ARE IN PLACE, THE EXISTING GROUND IN THE AREA BELOW THE CONCRETE BASE FOR THE TRANSFORMER, SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL.
12. #67 CRUSHED STONE OR GRAVEL SHALL BE USED FOR THE INSTALLATION OF PRECAST CONCRETE BASE FOR THE TRANSFORMER. THIS MATERIAL SHALL BE UNIFORMLY GRADED AND THE SIZES ARE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.

SWITCHING UNIT CONCRETE BASE NOTES

13. AFTER DUCTS ARE IN PLACE, THE EXISTING GROUND IN THE AREA BELOW THE CONCRETE BASE FOR THE SWITCHING UNIT, CRUSHED STONE OR GRAVEL, AND BACKFILL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT OF THE UNDISTURBED SOIL. THE MINIMUM AREA OF EXCAVATION WILL INCLUDE 12" AROUND THE CONCRETE BASE.
14. PLACE BACKFILL OVER THE COMPACTED EXISTING GROUND WITH A MINIMUM THICKNESS OF 4". THE BACKFILL SHALL BE A-2-4 MATERIAL (STANDARD NO. ASTM D3282, LATEST EDITION), AND IT SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
15. INSTALL THE NONWOVEN GEOTEXTILE FILTER FABRIC (8 OUNCES PER SQUARE YARDS), SIMILAR OR EQUAL TO REGISTERED PRODUCT MIRAFI S800 OR SKAPS GT-180, OVER THE COMPACTED BACKFILL.
16. PLACE CLEAN #67 CRUSHED STONE OR GRAVEL OVER THE NONWOVEN GEOTEXTILE FILTER FABRIC WITH A MINIMUM THICKNESS OF 6". THIS MATERIAL SHALL BE UNIFORMLY GRADED AND SIZE FROM ¾" DOWN TO FINE PARTICLES. IT SHALL BE FREE FROM SOFT AND DISINTEGRATED PIECES, CLAY, ORGANIC OR OTHER DELETERIOUS MATTER. THE CRUSHED STONE OR GRAVEL SHALL BE COMPACTED TO A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698, LATEST EDITION) AT THE PROPER MOISTURE CONTENT.
17. THE GEOTEXTILE FABRIC SHALL WRAP PARTIALLY THE CRUSHED STONE OR GRAVEL TO A MINIMUM DISTANCE OF 18" FROM LIMIT OF AREA OF EXCAVATION. THE MINIMUM WIDTH FOR OVERLAPPING OF GEOTEXTILE FABRIC SHALL BE 6".
18. INSTALL THE CONCRETE BASE IN THE CENTER OF THE EXCAVATED AREA, AND PLACE THE BACKFILL (A-2-4 MATERIAL, AS PER STANDARD NO. ASTM D3282, LATEST EDITION) AROUND THE CONCRETE BASE. THE BACKFILL SHALL BE COMPACTED EVERY 6" OF THICKNESS UP TO FINAL GRADE WITH A MINIMUM OF 95% OF STANDARD MAXIMUM DENSITY (STANDARD NO. ASTM D698) AT THE PROPER MOISTURE CONTENT.

Concrete Base for Pad Mounted Equipment

Appendix 6: Table of Compliance

Line	Criteria	Description	Pass/Fail (P/F)	Comments
1	Specification	The Proponent complies with the corresponding specification document (4350.269)		
2	Industry Standards	The Proponent complies with the industry standards established in the specification document. (ASTM, ACI, ANCI, ASTM, PCI)		
Characteristics				
3	Concrete Base for Single-Phase Transformer	• Weight of the structures: shall be no more than 2,600 lbs. (concrete and rebars) • Dimension: Shall be 60 in. x 52 in. x 10 in. (L x W x D) with an opening of 28 in. x 11 in. (L x W)		
4	Concrete Base for Three-Phase Transformer	• Weight of the structures: Shall be no more than 3,960 lbs. (concrete and rebars) • Dimension: Shall be 76 in. x 77 in. x 10 in. (L x W x D) with an opening of 57 in. x 27 in. (L x W)		
5	Single Pole Manual Operated Switching Unit	• Weight of the structures: Shall be no more than 9,750 lbs. (concrete and rebars) • Dimension: Shall be 82 in. x 88 in. x 22 in. (L x W x D)		
6	Three-Phase Switching Unit	• Weight of the structures: Shall be no more than 11,300 lbs. (concrete and rebars) • Dimension: Shall be 88 in. x 104 in. x 22 in. (L x W x D)		
7	Concrete Base for Dead Front Switching Unit	• Weight of the structures: Shall be no more than 10,600 lbs. (concrete and rebars) • Dimension: Shall be 90 3/4 in. x 99 in. x 22 in. (L x W x D)		
8	Minimum Compressive Strength for Prestressed F ’c at 28 days	4,000 psi.		

4350.269 Concrete BAse for Pad Mounted Equipment

Final Audit Report 2022-12-16

Created:	2022-12-16
By:	Rosalia Alverio (rosalia.alverio@lumapr.com)
Status:	Signed
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Signer ricardo.castro@lumapr.com entered name at signing as Ricardo Castro Gómez
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Document e-signed by Ricardo Castro Gómez (ricardo.castro@lumapr.com)

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Agreement completed.

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