

PSEG LONG ISLAND LLC
On Behalf of and as Agent for the
LONG ISLAND LIGHTING COMPANY d/b/a LIPA

Syosset to Oakwood Project

EXHIBIT 5
DESIGN DRAWINGS

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Exhibit 5 - Design Drawings

5.1 Design Standards

The transmission structures and components will be designed in accordance with the Applicant's¹ standards that have been developed through decades of experience constructing, maintaining, and operating transmission in the region in addition to applicable industry standards.

The industry standards are produced by the following organizations:

- American Concrete Institute (“ACI”);
- American Institute of Steel Construction (“AISC”);
- American National Standards Institute (“ANSI”);
- American Society for Testing and Materials (“ASTM”);
- American Society of Civil Engineers (“ASCE”);
- Association of Edison Illuminating Companies (“AEIC”);
- Institute of Electrical and Electronic Engineers (“IEEE”);
- Insulated Cable Engineers Association (“ICEA”);
- International Building Code – New York State (“IBC”);
- International Electrotechnical Commission (“IEC”);
- National Electric Manufacturer’s Association (“NEMA”);
- National Electric Safety Code (“NESC”);
- National Fire Protection Association (“NFPA”); and
- Occupational Safety and Health Administration (“OSHA”).

5.2 Underground Design Drawings

The attached drawings identify the typical cables, conduits, cross sections, and splice vaults that are currently anticipated to be used for the Project. Additional designs may be added to the portfolio as the Project progresses from conceptual to final design. Further details to the underground design and construction are included in Exhibit E-1 Description of Proposed Transmission Line and Exhibit E-3 Underground Construction. Final design will be described in the EM&CP.

5.2.1 *Cable*

Figure 5-1 shows a typical cross section of 138kV underground insulated cable. The Project will utilize a 2,000 mm² copper conductor measuring approximately 4.90 inches in diameter. The system will operate as a single circuit with two cables per phase. The conductor will be comprised of annealed bare copper strands. The insulation will be XLPE with a thickness of approximately 870 mils, rated to an operating voltage of

¹ For clarity and consistency, the Application includes a Glossary that defines terms and acronyms used throughout the Application.

138kV. Metallic shielding will be plain annealed copper wires or equivalent, moisture impervious sheath that is designed for the fault current requirements and will prevent water migration into the cable. The jacket will be black LLDPE including a semi-conducting polyethylene layer.

5.2.2 Profile

Figure 5-2 shows the profile of the Project centerline with an exaggerated vertical scale. Woodbury Tap and the Oakwood Substation expansion are labeled. Preliminary splice vault locations are also shown.

5.2.3 Typical Duct Bank Cross-Section

Each sub-circuit will consist of three 10-inch SDR11 electrical grade rigid HDPE conduits in trefoil configuration to house the 138kV underground transmission cables and one four-inch SDR11 HDPE conduit to house a jacketed copper grounding cable. Figure 5-3 depicts typical duct bank cross-sections.

5.2.4 Typical Splice Vaults

The circuit will include splice vaults at approximate intervals of 2,000 to 2,500 feet along the duct bank. Two splice vaults are anticipated at each splice vault location, one for each partial phase. The splice vaults will consist of precast concrete designed for a load rating of HS-25. The conduit splice vault will contain power cable splices, cable racking, and grounding accessories. For construction flexibility, both one-piece and two-piece splice vaults are described below.

5.2.4.1 One-Piece Precast Concrete Splice Vault

The one-piece precast concrete splice vault exterior dimensions will be 18 feet in length by 10 feet in width and 11 feet in height. Two circular openings in the splice vault roof will be used to access the interior. The openings will be covered by 38-inch cast iron lids. Figure 5-4 depicts a typical one-piece splice vault layout and sections.

5.2.4.2 Two-Piece Precast Concrete Splice Vault

The two-piece precast concrete splice vault exterior dimensions will be 16 feet in length, 18 feet and 10 inches in width and eight feet and 11 inches in height. Two circular openings in the splice vault roof will be used to access the interior. The openings will be covered by 38-inch cast iron lids. Figure 5-5 depicts a typical two-piece splice vault layout and sections.

5.3 Overhead Design Drawings

The attached drawings identify the typical structures, wires, and cross sections that are currently anticipated to be used for the Project. Additional designs may be added to the portfolio as the Project progresses from conceptual to final design. Further details to the overhead design and construction are included in Exhibit E-1 Description of Proposed Transmission Facilities.

5.3.1 Overhead Conductor

Figure 5-6 shows a typical cross section of 138kV overhead conductor. The Applicant proposes a single 2300 thousands of circular mils, 61W, all-aluminum conductor (“AAC”), “Pigweed” with a non-specular finish.

5.3.2 Structures

The Applicant proposes galvanized or Natina Rustic Brown finish steel monopole structures, 75 to 110 feet in height, for the Project to connect the Woodbury overhead circuits to the Oakwood underground circuit. Figure 5-7 contains a set of cross section diagrams of the proposed overhead structure scope associated with the Project. Figure 5-8 includes details for typical overhead transmission structures and materials proposed. This drawing includes structure types, materials, configurations, insulators, dimensions, finish, and colors. Figure 5-9 includes details for the overhead to underground transition structure. The transition from overhead to underground will either be a single pole, with six underground cables, or three poles, each with two underground cables. Further engineering considerations, as well as municipal consultations, will determine whether one or three structures will be used.

5.3.3 Foundations

The Applicant proposes steel reinforced concrete drilled pier or direct embed foundations for the Project. Figure 5-10A and Figure 5-10B show the details for the two foundation options. The final base diameter on these structures may range from five to eight feet in diameter.

5.3.4 Insulators, Clamps, & Hardware

The Applicant proposes polymer insulators with compression clamp hardware to attach the conductor to the overhead structures. Figure 5-11 through Figure 5-13 shows the details for the typical conductor, shield wire, and grounding hardware. Polymer post insulators with trunnion clamp hardware may be used for the jumper sections to connect multiple spans at the dead-end structures. Dead-end tees will be used to modify any existing structures to remain, before attaching new insulators. The proposed shield wire will be supported by quadrant strain clamps.

Figure 5-1

Typical Underground Cable Cross Section

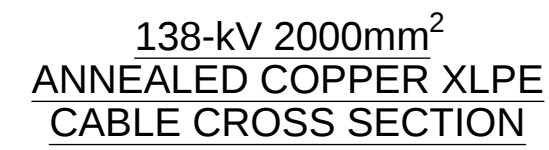
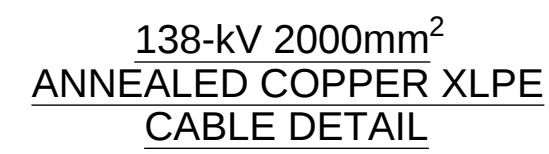
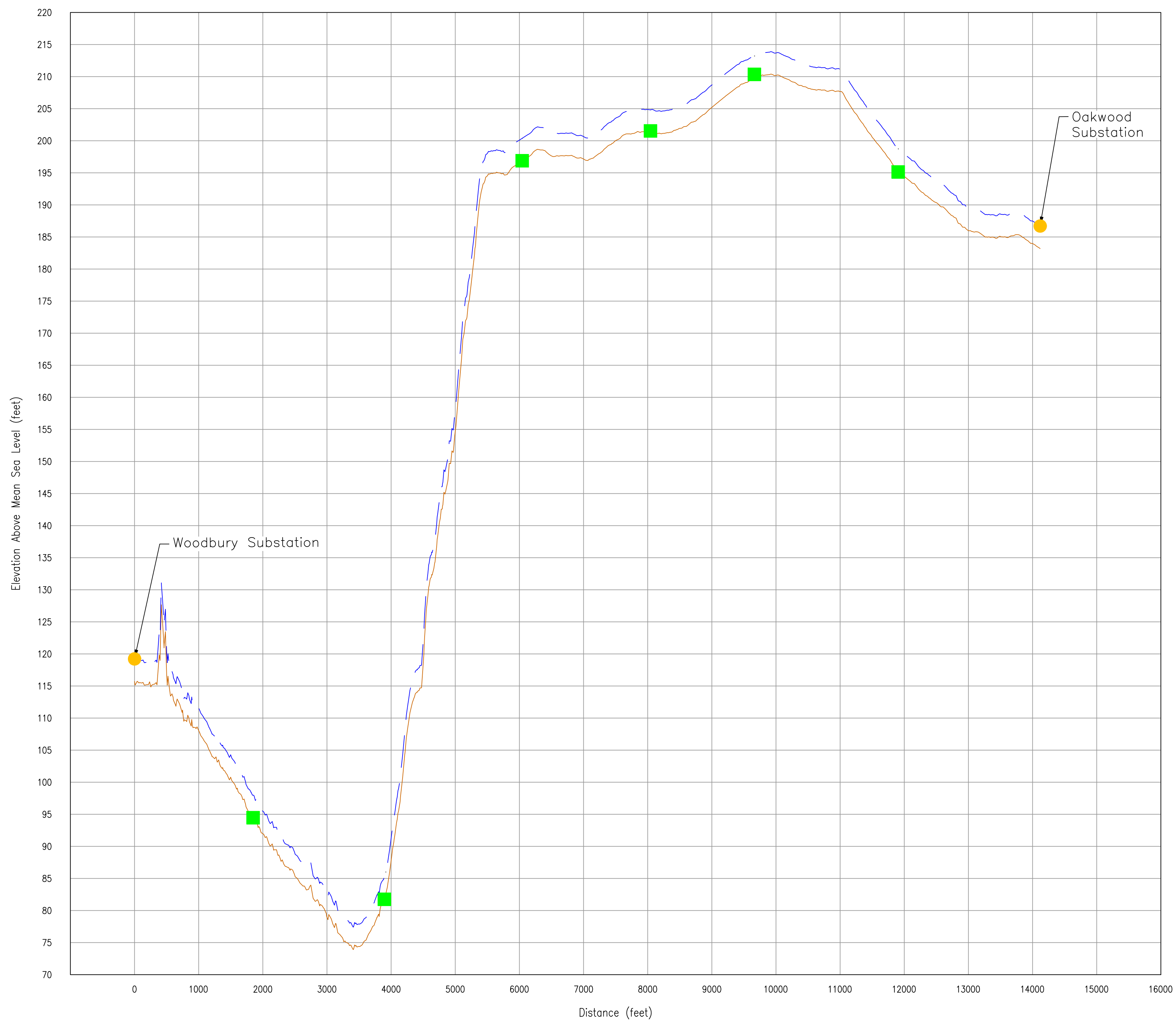
[illegible]

Figure 5-2

ROW Centerline Profile

Centerline Profile

— — — — Ground Elevation ■ Splice Vault ● Substation — Cable



NOTE:

1. CONDUIT SYSTEM SHALL MAINTAIN A MINIMUM 42" DEPTH OF COVER.
2. MINIMUM DEPTH OF COVER, AS MEASURED AT ANY POINT OF DIRECT BURED SPLICE VAULT, SHALL BE 2'-0".

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Figure 5-3

Typical Duct Bank Cross Section

A

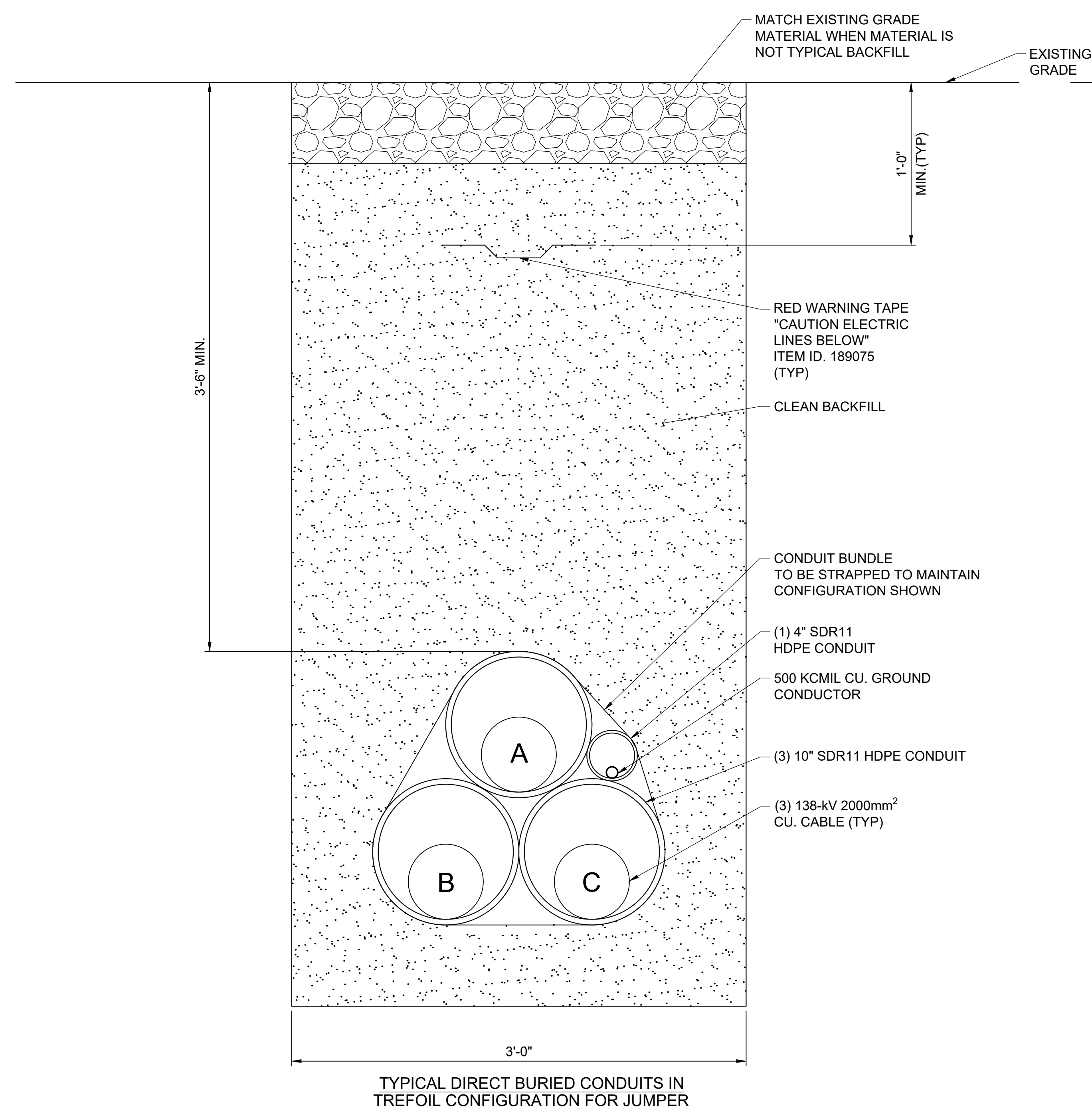
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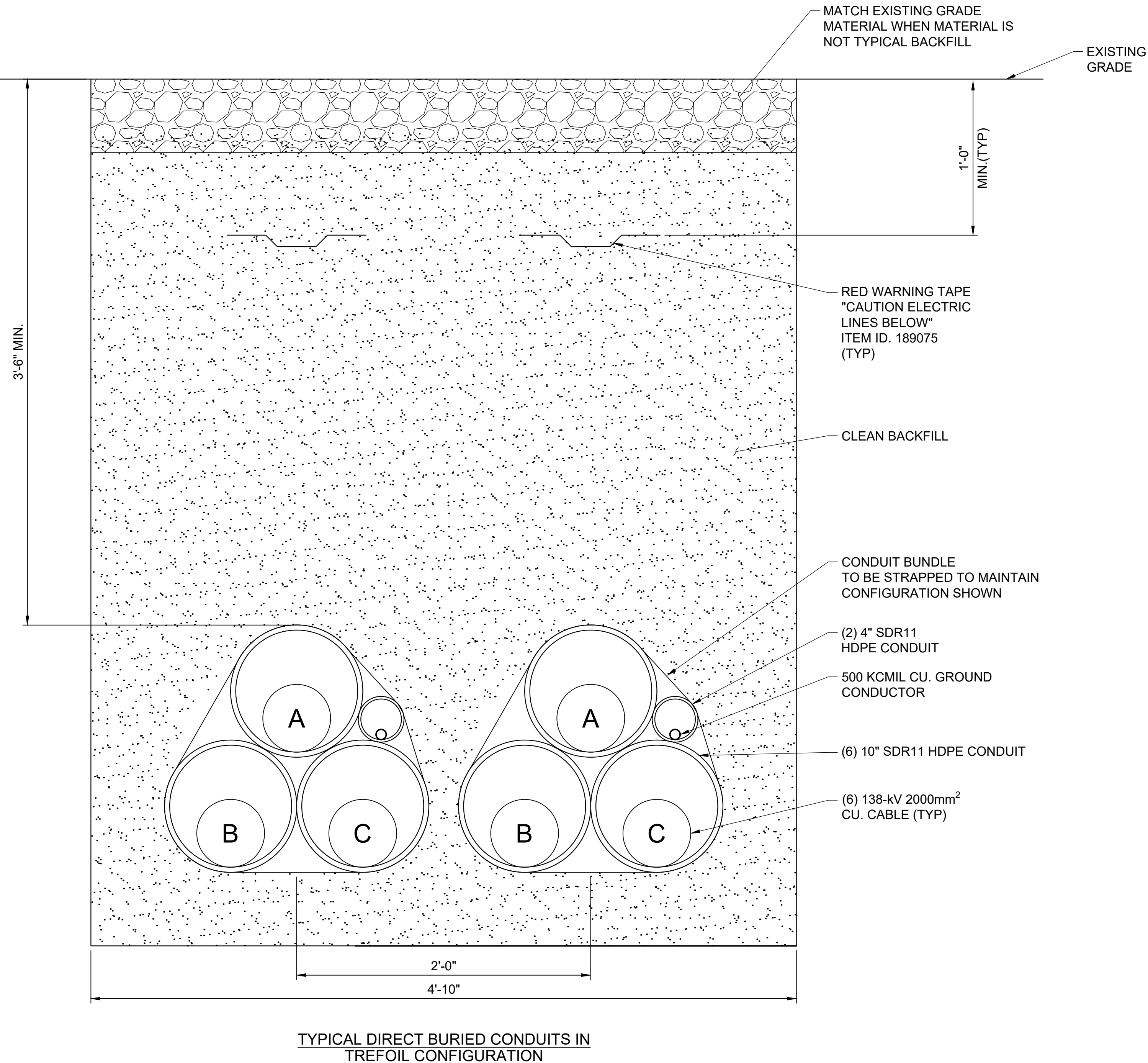
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TYPICAL DIRECT BURIED CONDUITS IN
TREFOIL CONFIGURATION FOR JUMPER



TYPICAL DIRECT BURIED CONDUITS IN TREFOIL CONFIGURATION

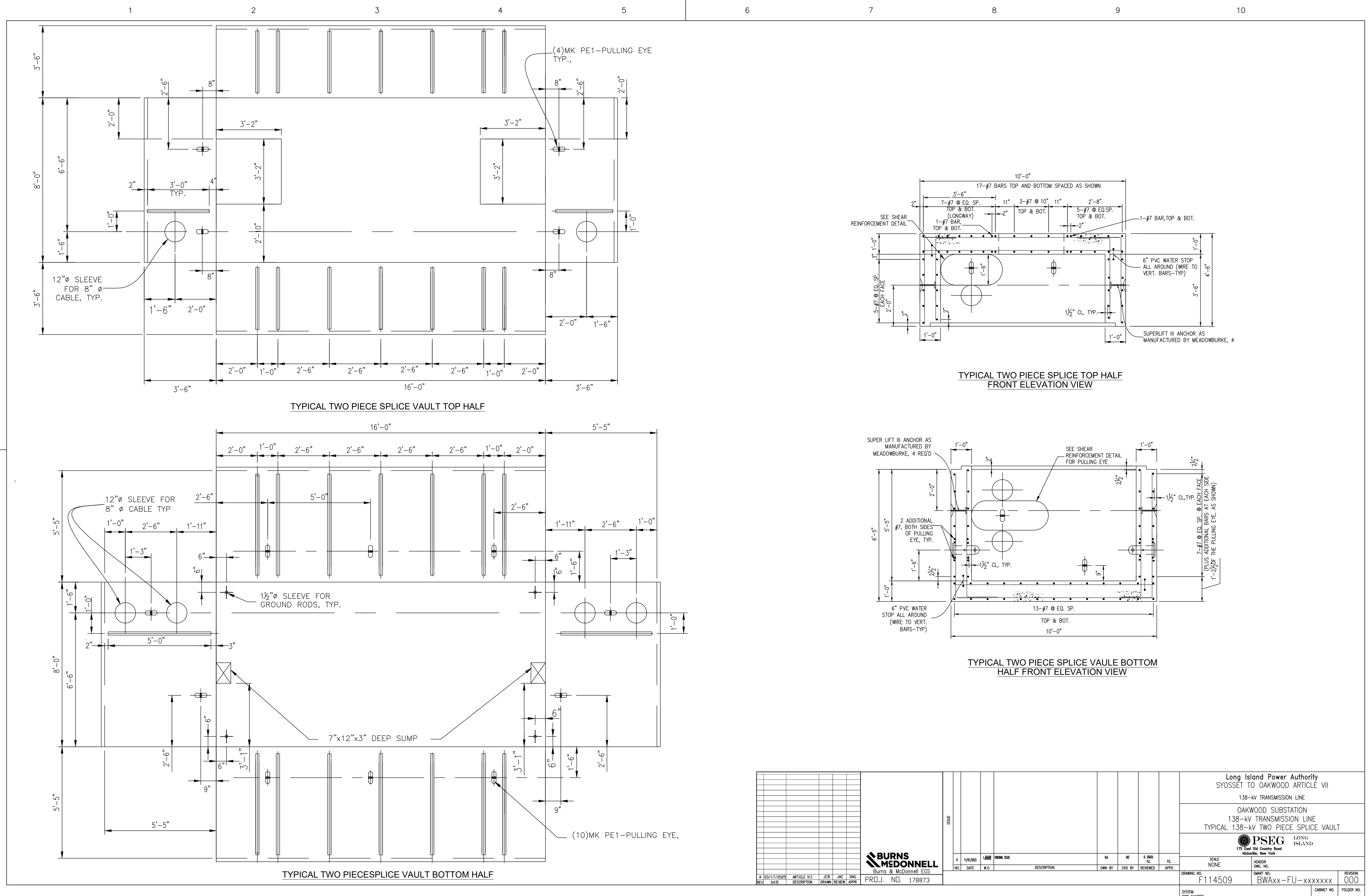
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Figure 5-4

Typical One-Piece Splice Vault

Figure 5-5

Typical Two-Piece Splice Vault



Long Island Power Authority SYOSSET TO OAKWOOD ARTICLE VII 138-kV TRANSMISSION LINE OAKWOOD SUBSTATION 138-kV TRANSMISSION LINE TYPICAL 138-kV TWO PIECE SPLICE VAULT									
 PSEG LONG ISLAND 175 East Old Country Road Hicksville, New York									
SCALE NONE		VENDOR DWC. NO.		DRAWING NO. F114509		SMART NO. BWAxx-FU-xxxxxxx		REVISION 000	
SYSTEM GRID NUMBER		CABINET NO.		FOLDER NO.					

4	03/17/2023	ARTICLE VII	JCB	JAC	BAG
REV.	DATE	DESCRIPTION	DRAWN	REVIEW	APPR

BURNS McDONNELL Burns & McDonnell EGS		PROJ. NO. 178873	
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ISSUE	NO.	DATE	W.O.	DESCRIPTION	OWN BY	CHK BY	REVISED	APPD
0	11/01/2023	1/11/2024	ISSUE		KAL	JAS	0.000	PL

Figure 5-6

Typical Overhead Conductor Cross Section

A

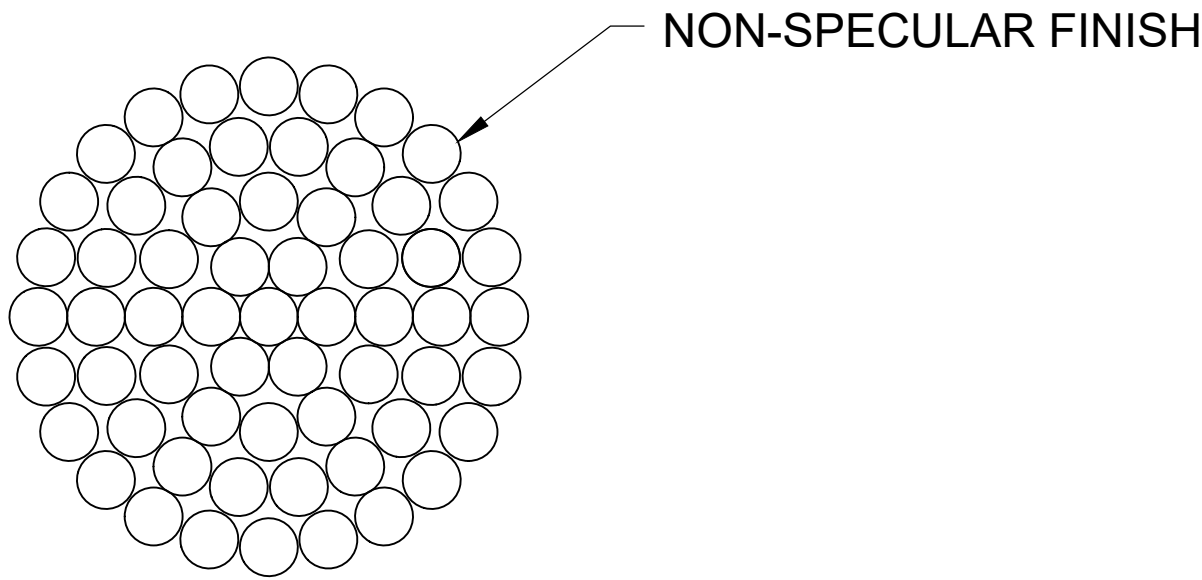
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2300 KCMIL 61W AAC "PIGWEED" CROSS SECTION

BURNS MEDONNELL						ISSUE						Long Island Power Authority WOODBURY TERMINAL SOUTH											
												138KV TRANSMISSION LINE											
												FIGURE 5-6 CONDUCTOR CROSS SECTION DRAWING											
												PSEG LONG ISLAND 175 East Old Country Road Hicksville, New York											
REV		DATE		DESCRIPTION		DRAWN		REVIEW		APPR		SCALE NONE		VENDOR DWG. NO.		DRAWING NO. Fxxxxxx		SMART NO. BWAxx-FU-xxxxxxx		REVISION 000			
PROJ. NO. -																SYSTEM GRID NUMBER				CABINET NO.		FOLDER NO.	

Figure 5-7

Overhead Structure Cross Section Diagrams

A

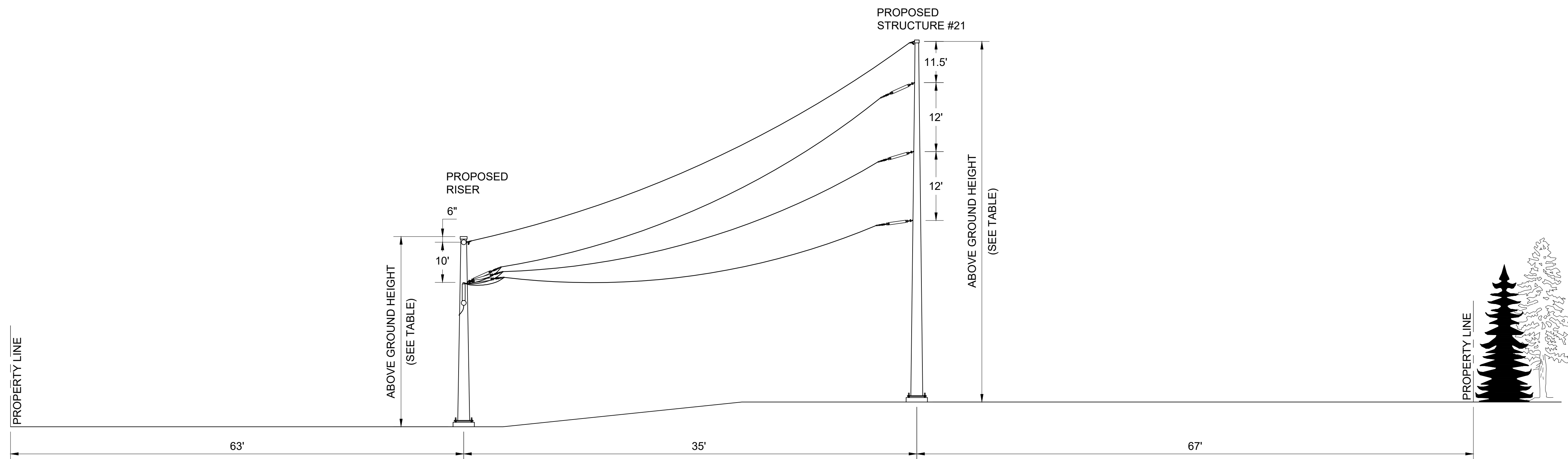
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PROPOSED LAYOUT CONFIGURATION OPTION 2

LINE 676 - 138KV
LOOKING WEST / SOUTHWEST

																				LONG ISLAND POWER AUTHORITY WOODBURY TERMINAL SOUTH 138KV TRANSMISSION LINE FIGURE 5-7C ALIGNMENT CROSS SECTION DRAWING  PSEG LONG ISLAND 175 East Old Country Road Hicksville, New York									
																				SCALE: NONE VENDOR DWS. NO.									
																				DRAWING NO. Fxxxxxx SMART NO. BWAxx-FU-xxxxxxx REVISION 000									
																				SYSTEM GRID NUMBER CABINET NO. FOLDER NO.									

Figure 5-8

Typical Overhead Structure Details

A

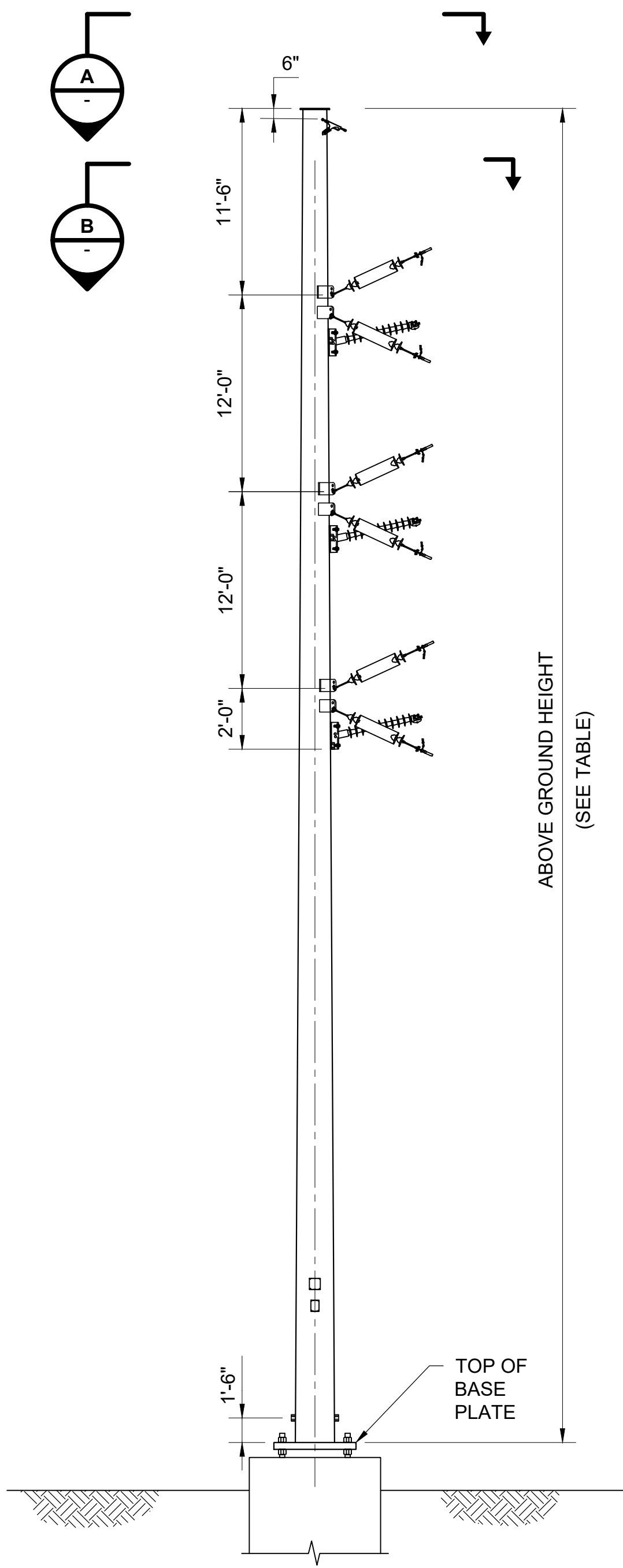
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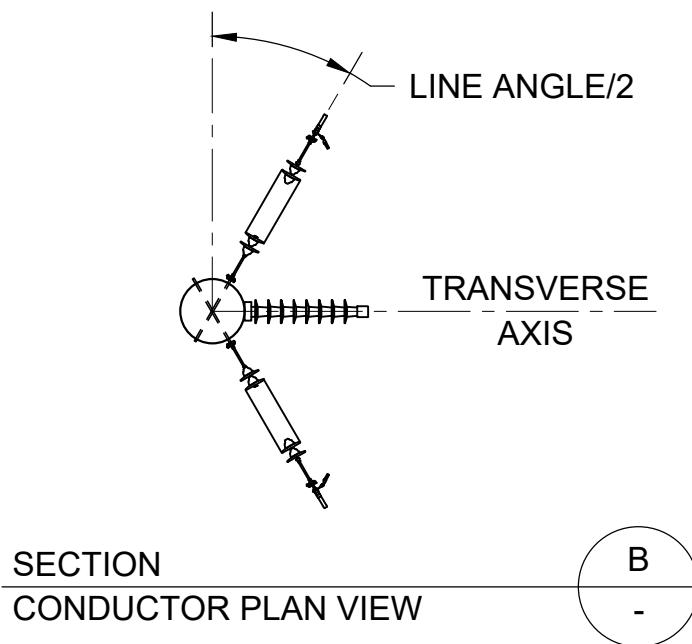
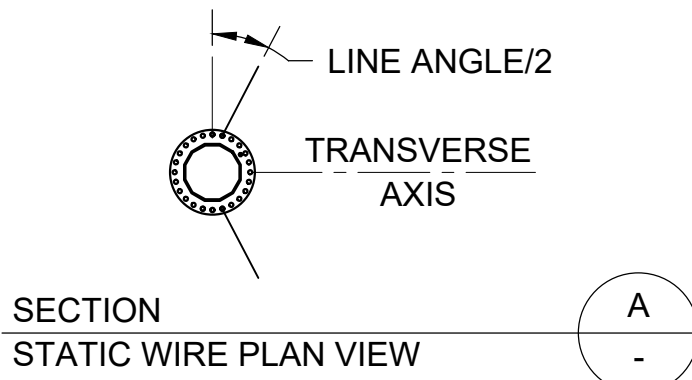
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PROPOSED STRUCTURE CONFIGURATION
LINE 676 - 138KV
LOOKING WEST / SOUTHWEST



LINE DATA TABLE				
ABOVE GROUND HEIGHT RANGE (FT)	STRUCTURE MATERIAL/COLOR/FINISH	INSULATOR TYPE	CONDUCTOR TYPE	SHIELD WIRE TYPE
75-110	SEE NOTE 1	POLYMER	2300 KCMIL 61W AAC "PIGWEEED"	7 #6 ALUMOWELD 7 STRANDS

NOTE:

1. THE STRUCTURE MATERIAL WILL HAVE EITHER A GALVANIZED OR NATINA RUSTIC BROWN FINISH AS DETERMINED IN THE EM&CP.

						ISSUE				Long Island Power Authority WOODBURY ROAD TERMINAL 138KV TRANSMISSION LINE			
										FIGURE 5-8 STRUCTURE CROSS SECTION DRAWING			
										 PSEG LONG ISLAND 175 East Old Country Road Hicksville, New York			
										SCALE NONE		VENDOR DWG. NO.	
0	4/14/2025	-	ISSUED FOR ARTICLE VI			-	-	-	-				
NO.	DATE	W.O.	DESCRIPTION			DWN BY	CKD BY	REVISED	APPD				
PROJ. NO. -						DRAWING NO.		SMART NO.		REVISION			
						Fxxxxxx		BWAxx-FU-xxxxxxx		000			
						SYSTEM GRID NUMBER				CABINET NO.		FOLDER NO.	

Figure 5-9

Typical Riser Pole Structure

A

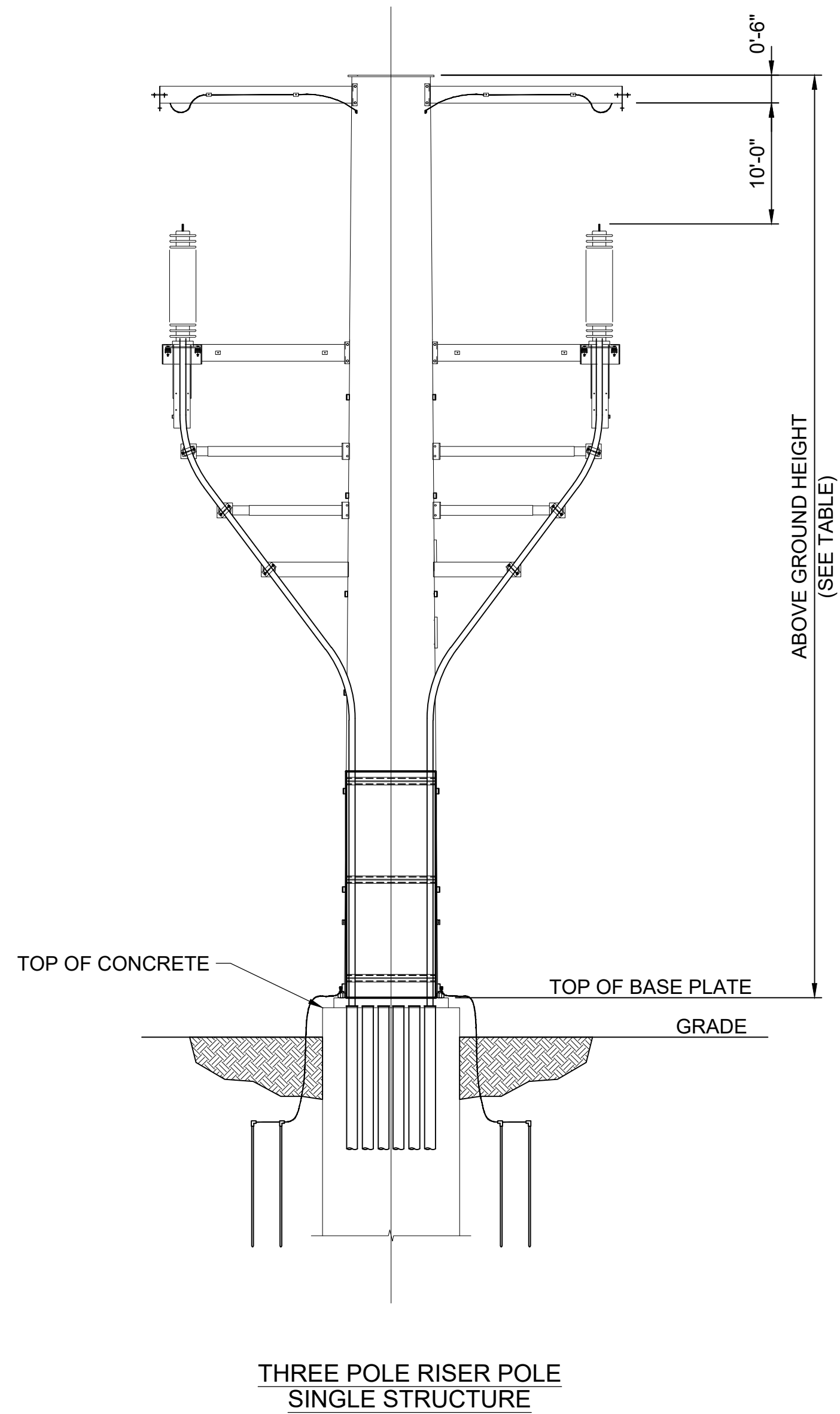
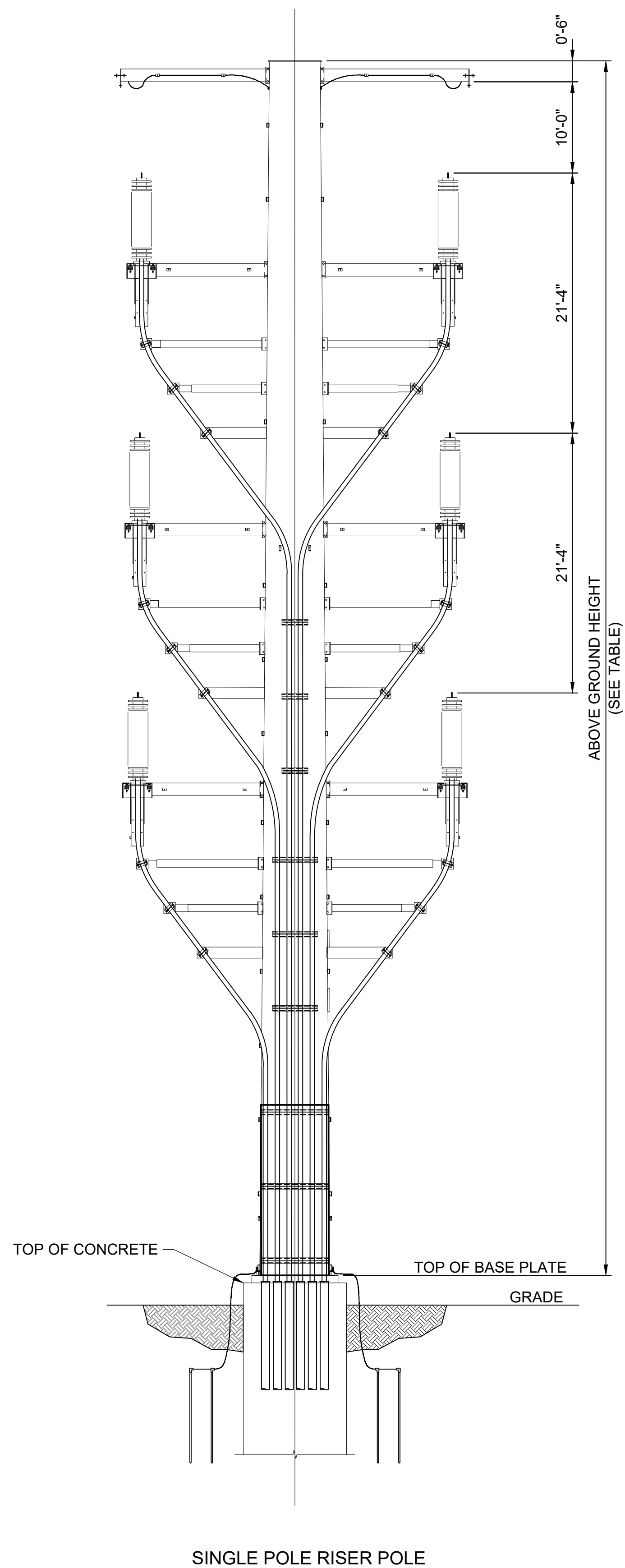
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LINE DATA TABLE				
ABOVE GROUND HEIGHT RANGE (FT)	STRUCTURE MATERIAL/COLOR/FINISH	INSULATOR TYPE	CONDUCTOR TYPE	SHIELD WIRE TYPE
75-110	SEE NOTE 1	POYMER	2300 KCMIL 61W AAC "PIGWEEED"	7 #6 ALUMOWELD 7 STRANDS

NOTE:

1. THE STRUCTURE MATERIAL WILL HAVE EITHER A GALVANIZED OR NATURAL RUSTIC BROWN FINISH AS DETERMINED IN THE EM&CP.

[illegible]

Figure 5-10A

Typical Drilled Pier Foundation

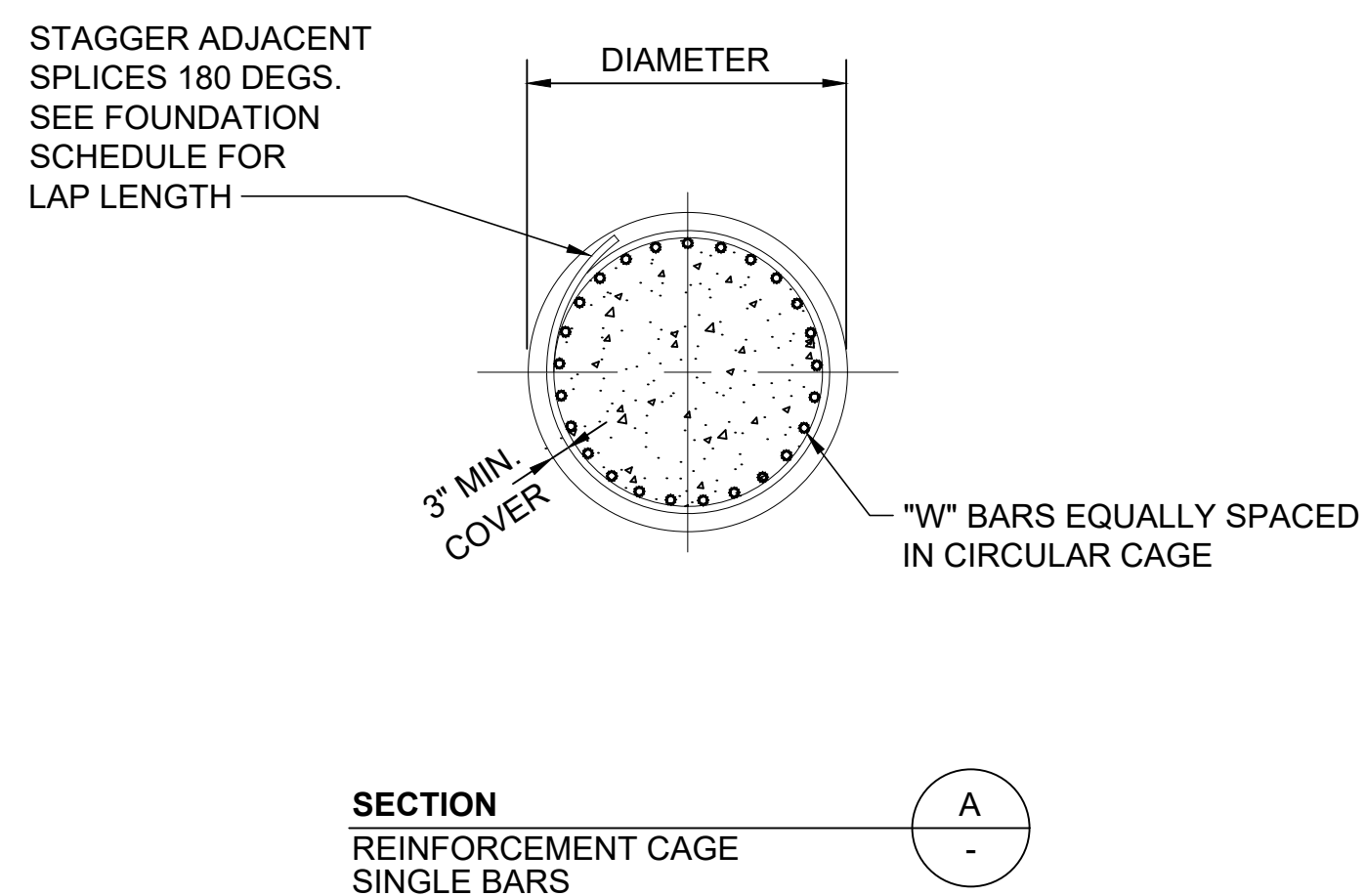
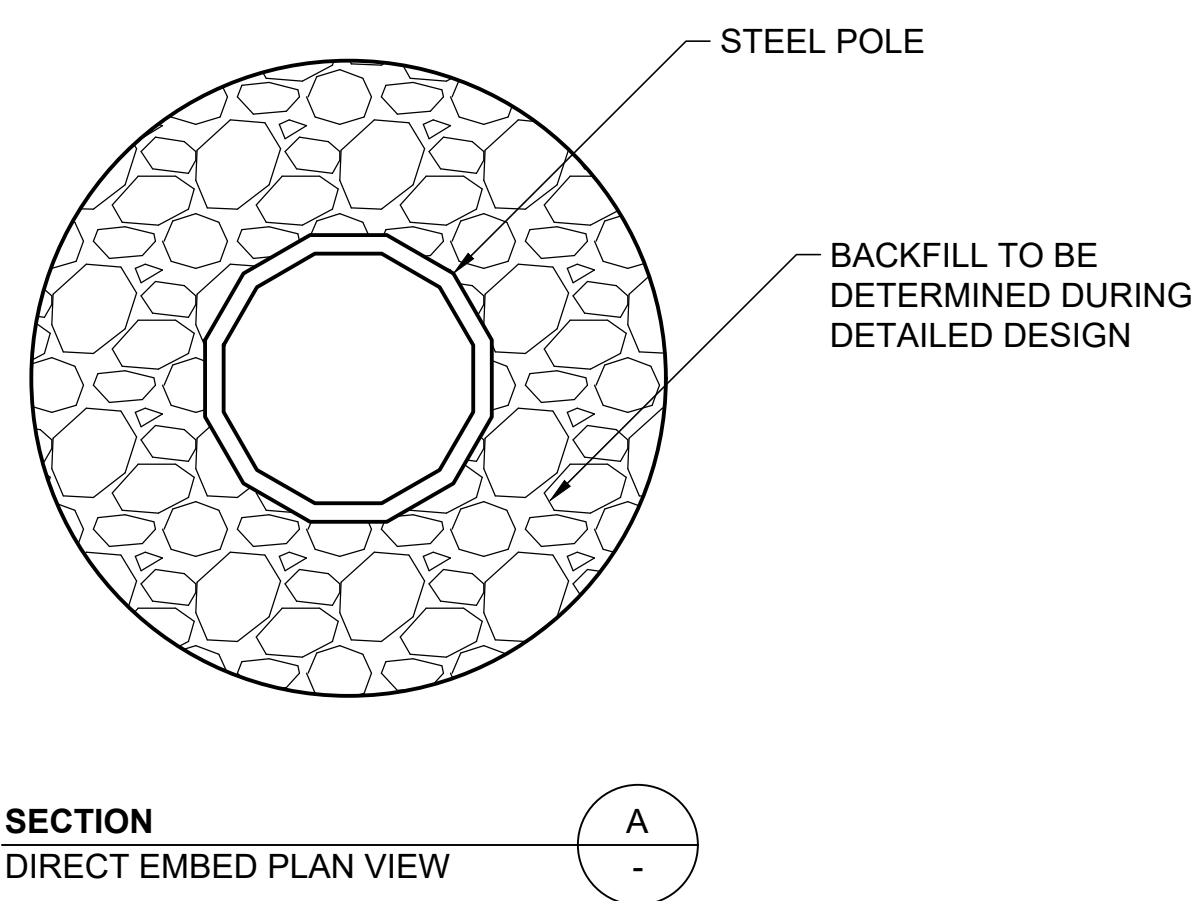
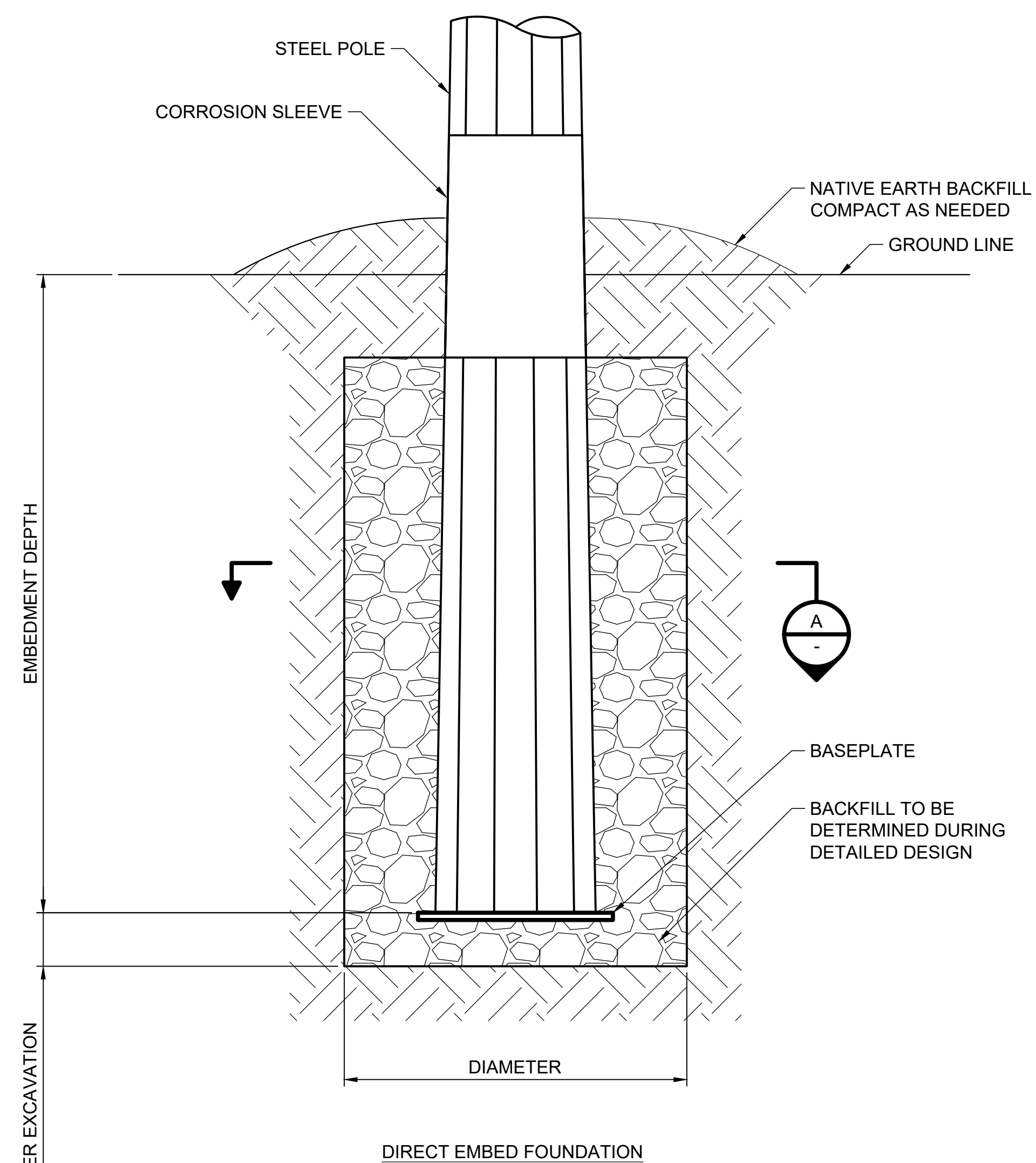


Figure 5-10B

Typical Direct Imbed Foundation



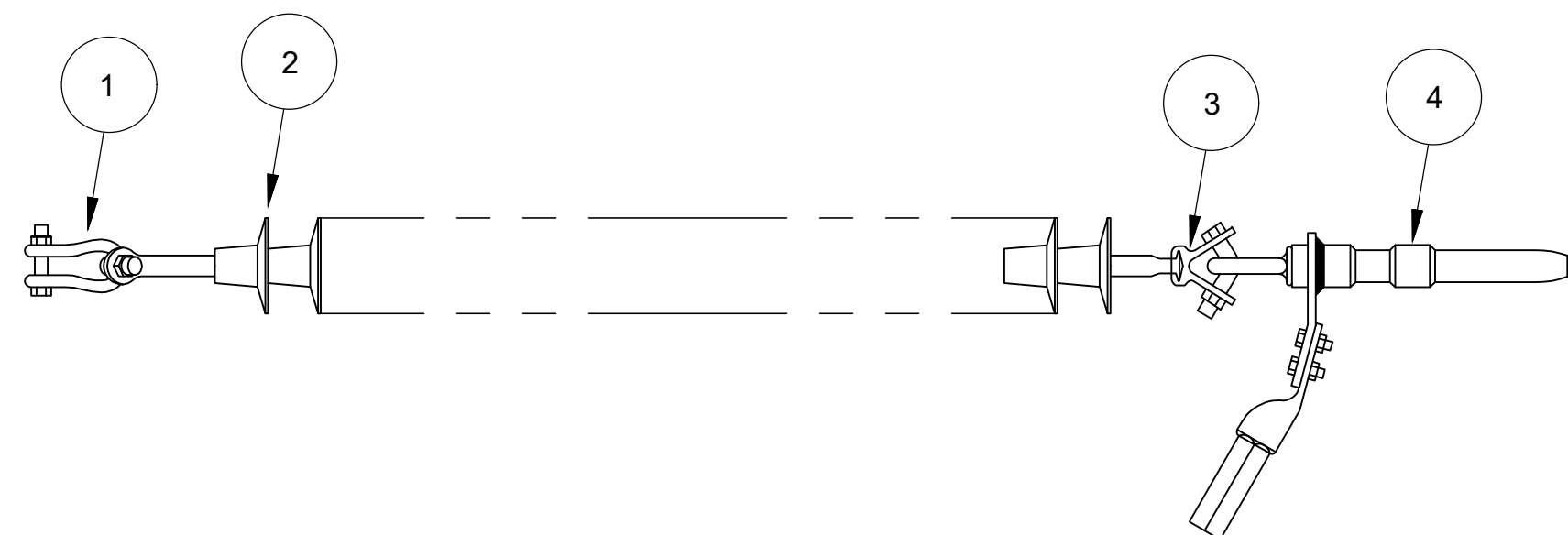
SECTION
DIRECT EMBED PLAN VIEW

[illegible]

Figure 5-11

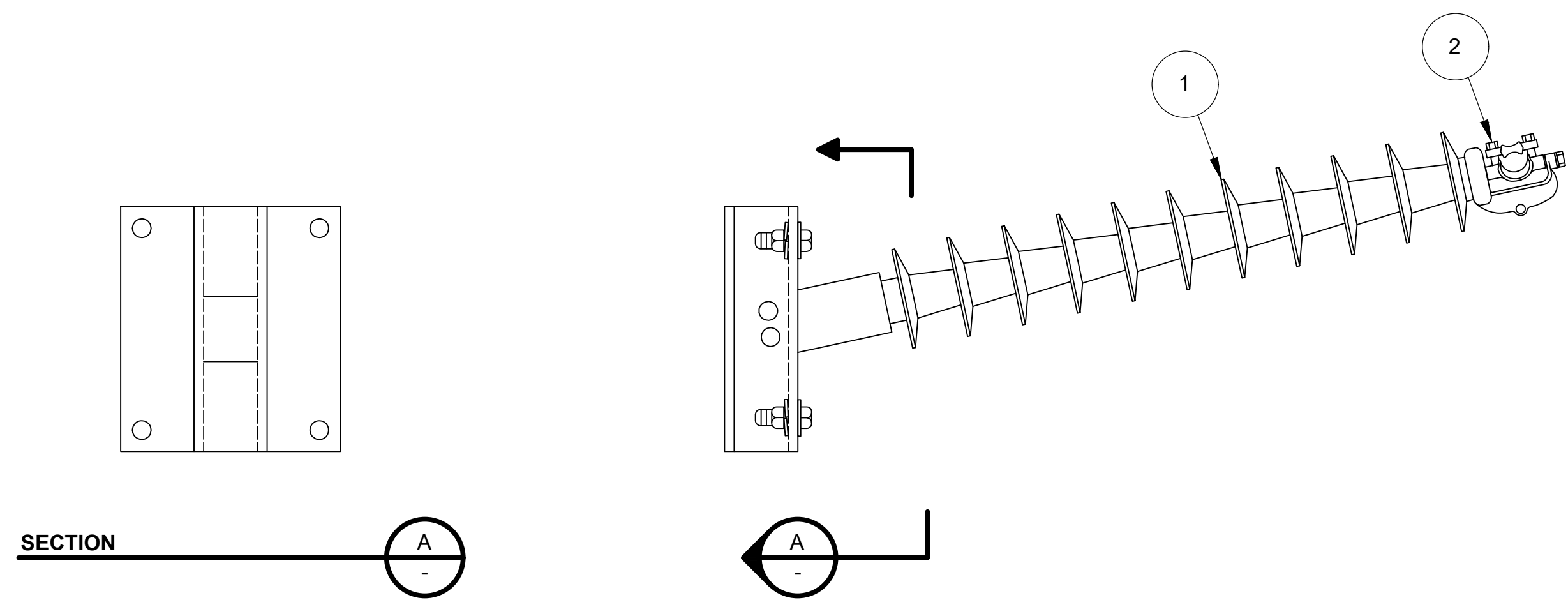
Typical Insulator Hardware Details

ITEM	DESCRIPTION
1	ANCHOR SHACKLE
2	POLYMER INSULATOR, Y CLEVIS-BALL
3	SOCKET-Y CLEVIS
4	COMPRESSION DEADEND



138kV DEADEND ASSEMBLY

ITEM	DESCRIPTION
1	POLYMER POST INSULATOR, CLAMP TOP
2	TRUNNION CLAMP



138kV JUMPER ASSEMBLY

[illegible]

Figure 5-12

Typical Shield Wire Hardware Details

Figure 5-13

Typical Grounding Details

