



**SPECIFICATIONS FOR THE INSTALLATION OF
CONDUIT SYSTEM(S) FOR STREETLIGHTS**

<u>Section</u>	
1	Definitions
2	Scope of Work
3	Extent of Work
4	Inspection and Performance of Work
5	Trenching
6	Duct Installation
7	Backfilling
8	Acceptance
APPENDIX	Standard Specifications Drawings

**SPECIFICATION FOR THE INSTALLATION OF CONDUIT SYSTEM(S)
FOR STREETLIGHTS**

This document defines the specifications for installation of direct buried conduit systems for streetlight cable.

1.0 Definitions

- 1.1 Contractor – The party or parties installation conduit for the streetlight system.
- 1.2 Company – Ameren Missouri
- 1.3 Drawings-Approved conduit and electrical drawings provided by the Company indicating location and installation details for a specific streetlight installation. Any exceptions to this Specification shall be noted on the Drawings.
- 1.4 Specification – This specification and any additional Drawings of Standards supplied for a specific streetlight installation.
- 1.5 Standards – Company approved construction standards specifying material and installation details.

2.0 Scope of Work

2.1 New Subdivisions

The Contractor Shall:

- 2.1.1 Perform all work necessary to construct the conduit system in accordance with Drawings and Specifications furnished by the Company.
- 2.1.2 Furnish excavation and backfill for trenches for conduit system.
- 2.1.3 Install complete integrated conduit system as required.
- 2.1.4 Supply field surveying to locate easements, right-of-way, and property lines necessary for installation of conduit system as indicated on Drawings.
- 2.1.5 Obtain necessary permits for installation of conduit system and pay applicable fees.

The Company Shall:

- 2.1.6 Provide all material
- 2.1.7 Furnish Drawings indicating the installation of the conduit system.
- 2.1.8 Install Ameren Missouri streetlight cable and streetlights.

2.2 Other Streetlight Requests

The Contractor Shall:

- 2.2.1 Perform all work necessary to construct the conduit system in accordance with Drawings and Specifications furnished by the Company.
- 2.2.2 Provide conduit
- 2.2.3 Furnish excavation and backfill for trenches for conduit system.
- 2.2.4 Install complete integrated conduit system as required.
- 2.2.5 Supply field surveying to locate easements, right-of-way, and property lines necessary for installation of conduit system as indicated on Drawings.
- 2.2.6 Obtain necessary permits for installation of conduit system and pay applicable fees.

The Company Shall:

- 2.2.7 Furnish Drawings indicating the installation of the conduit system.
- 2.2.8 Install Ameren Missouri streetlight cable and streetlights.

3.0 Extent of Work

- 3.1 The detailed information for the work required shall be shown on the approved Drawings. During the progress of work, such additional detail Drawings as the Company may consider necessary for clarification will be furnished to the Contractor, and these additional Drawings shall be made a part of the Specification.
- 3.2 Where interpretation of Specification or clarification of intent of any Drawing is required, the determination of the Company Representative shall prevail.
- 3.3 The location of the conduit route will be shown on the Drawings.
- 3.4 Field determination of location and elevation of all foreign lines and obstructions to provide adequate space for duct and pullbox construction, as well as establishment of trench grade to insure the installation complies with Drawings and Specifications, is the responsibility of the Contractor and subject to the approval of the Company Representative.

4.0 Inspection and Performance of Work

- 4.1 Contractor shall notify the Company Representative with at least one full working day advance notice for commencing any item of construction or installation of material to enable proper inspection of materials and workmanship. Materials and/or workmanship failing to meet the

requirements of the specification, or installed without prior notice to Company Representative, will be subject to rejection. Any work rejected shall be immediately corrected at the Contractor's expense. Conduit installations made by the Contractor shall be subject to inspections by Company on a daily basis prior to backfilling, embedding in concrete, or otherwise covering or concealing.

5.0 Trenching

General Requirements

- 5.1 The route of the ducts shall be maintained as specified on the Drawings. Straight routes shall be maintained unless specified otherwise on the Drawings.
- 5.2 Turns and bends to avoid surface or hidden obstructions shall be made within the limits specified either on the Drawing or by approval of the Company Representative.
- 5.3 Deviations outside the boundaries of the easement or right-of-way are not allowed. Problems concerning the use of the easement or right-of-way shall be referred to the Company Representative for solution.
- 5.4 Clearances stated in the National Electric Safety Code shall be observed.
- 5.5 As a general rule, approximate final grade within 6 inches should be established before trenching is started.
- 5.6 The bottom of the trench shall be relatively smooth, and consist of well-compacted earth at an elevation necessary to establish the standard burial depths.
- 5.7 The minimum width of the trench shall be a measured two inches larger than the duct size used. If more than one duct size is used at the same elevation, the minimum width shall be two inches larger than the horizontal distance occupied by the ducts.
- 5.8 Burial Depths
Standard burial depth is 24" of cover from final grade for streetlight conduits. Any exceptions to the specified burial depths must be approved by the Company Representative.
- 5.9 If rock or untrenchable conditions are encountered consult with the Company Representative for alternatives.

- 5.10 Where duct(s) are to be installed by boring, the soil and surface conditions must be such that the solid materials encountered do not subject the duct to undue stresses. Burial depths as stated previously shall be maintained.

6.0 Duct Installation

6.1 Bedding

The duct shall be bedded on firm, well compacted, undisturbed dirt or on well-tampered dirt or other backfill supplied for leveling or grading of the trench. Materials as described in Section 7 are acceptable.

6.2 Configurations

- 6.2.1 The Drawing will specify the configuration of multiple duct installations.
- 6.2.2 Sweep bends may be made with 5-degree couplings with a minimum radius of 36" subject to Company Representative approval.
- 6.2.3 Sweep bends must be staked to prevent opening of the couplings during installation. No other operations producing visible stress on the couplings will be allowed. Visible stress exists when there is more than two degrees of offset on the coupling or where significant in-line offset is observed. Care must be taken to prevent deformation of the duct at the stakes.

6.3 Joining

- 6.3.1 The ducts shall be joined with couplings and cement to assure a leak free continuous duct of the same internal diameter as the original ducts. No internal protrusions or obstructions are allowed.
- 6.3.2 The contractor shall make sure that no foreign material enters the ducts to be joined. The end of the duct shall be plugged with approved end plugs whenever installation work on the duct is stopped.
- 6.3.3 Joining and repair of ducts shall be done according to Company Standards.

6.4 Protection

- 6.4.1 Shallower than normal depths shall be protected if approved by Company Representative (see Section 5).
- 6.4.2 Special design for railroad, pipeline and other crossings may be required. These conditions will be covered on the Drawings. Any

permits and fees required for special crossings will be the responsibility of the Contractor.

6.4.3 Problems associated with unstable soil conditions shall be referred to the Company Representatives to obtain proper installation procedures.

6.5 Conduit

Conduit will be Schedule 40 PVC or coilable HDPE duct. Size will be specified on drawing.

6.6 Identification of Conduit Sections

If noted on Drawing or required by Company Representative, conduit runs will be identified as specified by Company Representative.

7.0 Backfilling

7.1 General

7.1.1 Local codes or ordinances will govern when these exceed the backfill requirements stated herein. Any permits or fees for street crossings will be the responsibility of the Contractor.

7.1.2 Except as noted on Drawings and Specifications, native spoil free of rock and debris may be used as backfill material unless disqualified by the Company Representative. The spoil should pass through a two inch screen.

7.1.3 Except as noted on Drawings and Specifications, limestone screenings – ¼” minus may be used as an alternate to soil when backfilling. Alternate backfill material for street crossings shall be in accordance with local codes or ordinances.

7.1.4 Voids where water can collect shall be avoided. Any conditions that produce crushing pressures on the duct are unacceptable. Trenches must be kept clear of foreign materials such as grease, hydrocarbons, wood, rotting vegetation, or other debris.

7.1.5 Where shale or rock is encountered, limestone screening must be placed above and below the ducts in a thickness adequate to protect the conduit. The minimum thickness shall be two inches.

7.2 Compaction

7.2.1 In established areas, compaction shall be obtained with hand or mechanical tampers to provide densities in excess of 90 percent of the density of the undisturbed soil.

- 7.2.2 The soil shall be placed back in the excavation in multiple passes of approximately 18 inch depth and compressed as necessary until final grade is re-established. No rock shall be placed in the bottom six inches of the backfill.
- 7.2.3 Hydro tamping is not acceptable.
- 7.2.4 During backfilling the duct(s) shall be restrained, if necessary, to prevent movement.
- 7.2.5 Areas supporting vehicular traffic and other areas may require special backfilling as prescribed by the Company Representative or local codes and ordinances.
- 7.2.6 Settlement of the backfill material above the duct(s) is an indicator of improper compaction. When required, the Contractor must re-establish final grade by placing additional backfill or by other methods as appropriate.

7.3 Resurfacing

- 7.3.1 Pavements, sod, or other surfaces shall be replaced with materials corresponding to those removed unless permission is granted by property owner to substitute other materials. Thickness, strength, and final appearance shall match the original materials as closely as possible.
- 7.3.2 Asphalt, concrete, or paving blocks shall be set in accordance with construction techniques proper to the placement of these materials.

8.0 Acceptance

8.1 General

- 8.1.1 A pulling tape, minimum 300 pounds pulling tension capability, shall be installed in all completed duct sections. The pulling tape shall be placed into the conduit after duct sections are complete and the conduit cement is dry. A minimum of 10 feet of pulling string shall be left at each duct end. During installation of the pulling tape, the reel of tape should be placed on a payout stand to allow the tape to payout flat into the duct. The pulling tape must be installed in continuous pieces, no knots are permitted.
- 8.1.2 Contractor shall notify Company Representative in writing when complete conduit sections have been installed and are ready for

Company to pull cable. A conduit section is defined as all conduits between, and associated with, streetlights. If Company attempts to pull cable in completed conduit section(s) and cannot successfully pull cable, Contractor shall be responsible for any repairs required due to poor workmanship on his part or the part of his subcontractors to allow Company to complete pull(s).

8.2 Certification

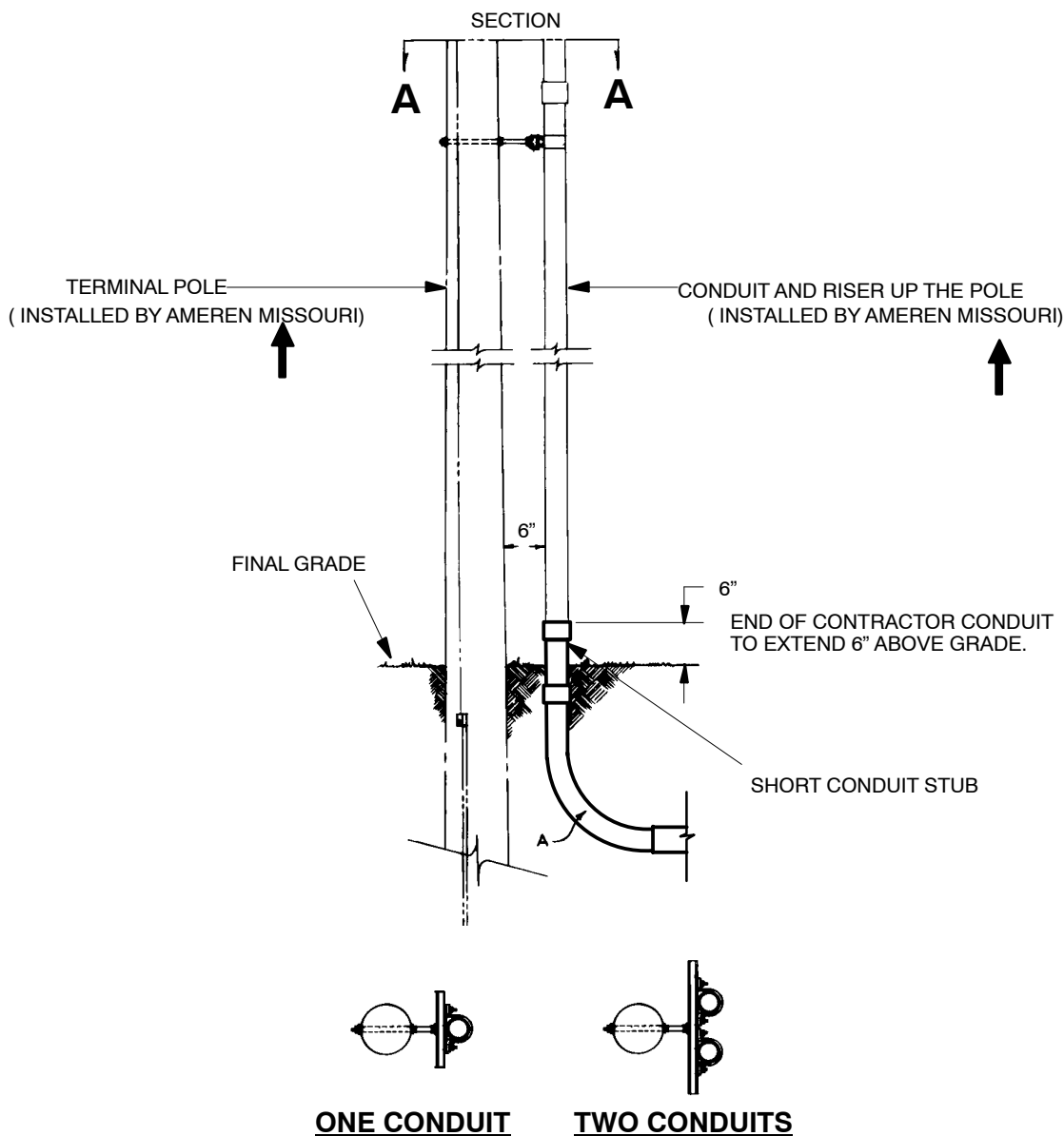
- 8.2.1 The Contractor shall certify at the completion of the project that all work has been performed according to the Drawings and Specifications. He shall guarantee the continuity and size of all conduits. He shall certify that all depth requirements have been met and that conduit system has been installed within easements and right-of-way as shown on Drawings.
- 8.2.2 Shortfalls in the specified construction practices in any area covered herein shall be reason for withdrawal of acceptance by the Company.

**SPECIFICATIONS FOR THE INSTALLATION OF
CONDUIT SYSTEM(S) FOR STREETLIGHTS**

APPENDIX

STANDARD SPECIFICATION DRAWINGS

<u>NO.</u>	<u>DESCRIPTION</u>
1	Risers on Standoffs
2	Secondary Power Pedestal
3	Streetlight – Pole Installation
3A	Streetlight – Pole Installation – Alternate
3B	Pole/Splice Box Installation
4A	Customer Owned Lighting (6M) Un-Metered Installation



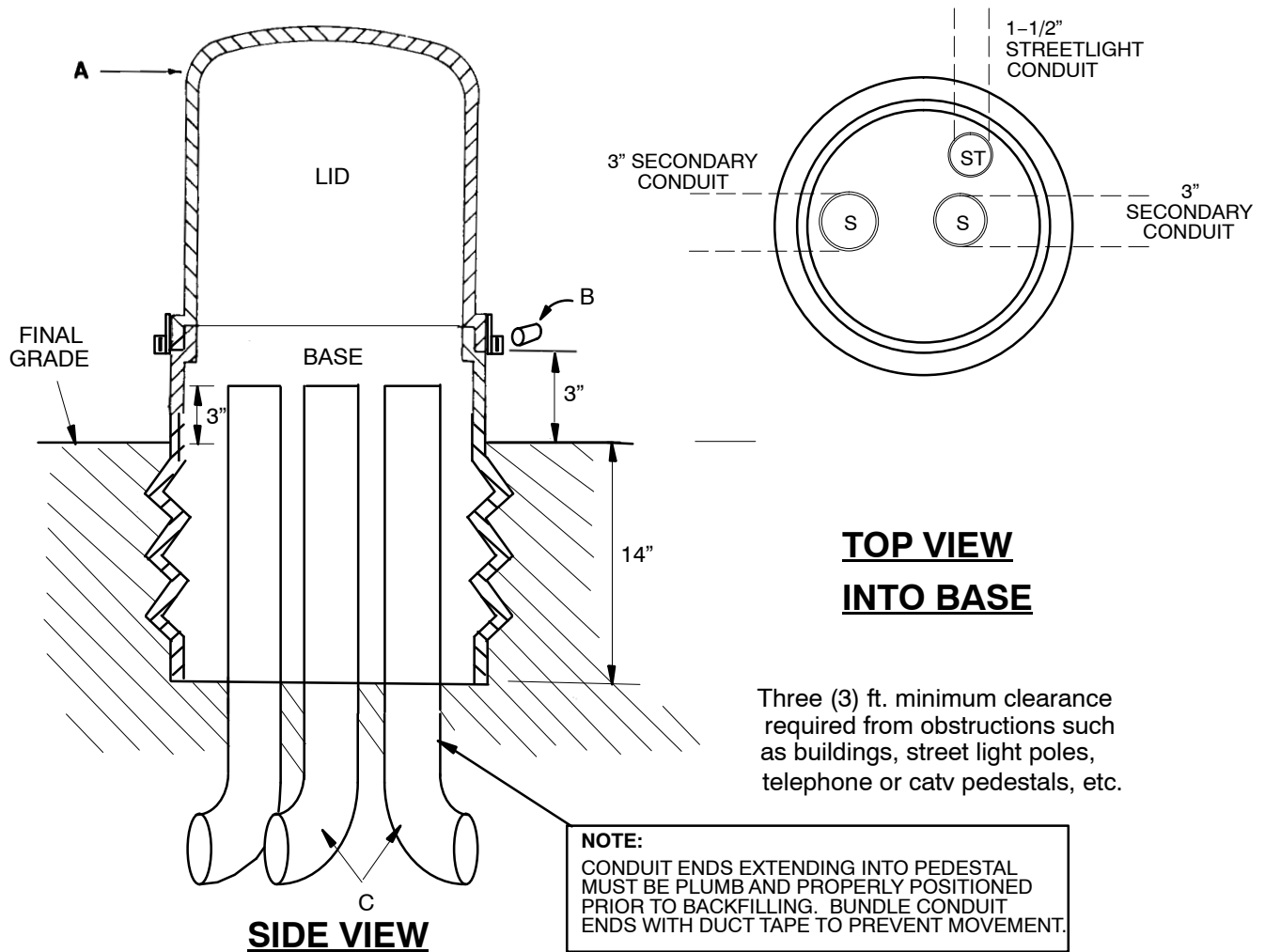
SECTION A A

NOTE: AMEREN UE REP. WILL DESIGNATE THE QUADRANT OF THE POLE WHERE THE CONDUIT IS TO BE INSTALLED.
 MATERIAL INSTALLED BY CONTRACTOR FOR ONE RISER
 (DERIVED FROM CONSTRUCTION STANDARD 14 00 26 **)

ITEM	DESCRIPTION	QTY
A	Bend - 1-1/2", 24" Rad.	1

UNDERGROUND EQUIPMENT
Secondary Power Pedestal
Above Grade – Polyethylene

SPEC 2
Sheet 1 of 1



NOTES:

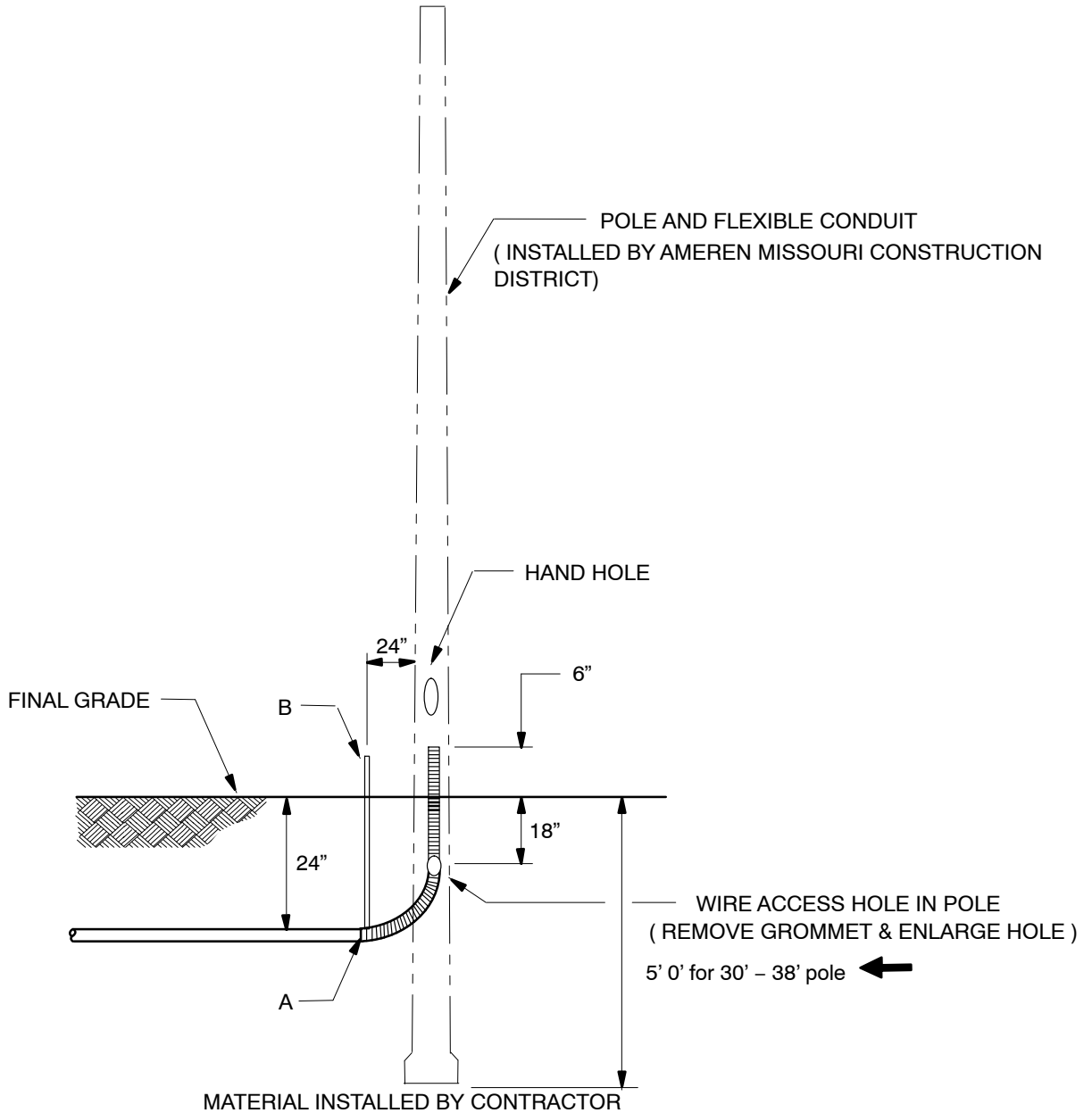
1. All conduits shall be cut off level, 3 inches above final grade.
2. All conduits shall be sealed with duct tape marked with permanent marker as follows:
 S = secondary, ST = Streetlight
3. Temporary hole to face away from street.
4. Lid is secured with two 3/8" Penta head bolts.
5. Proper compaction of backfill is important to prevent settling. Backfill with limestone screening is recommended.

MATERIAL INSTALLED BY CONTRACTOR

(DERIVED FROM CONSTRUCTION STANDARD 52 11 01 01)

ITEM	DESCRIPTION	QTY
A	Pedestal – Above Ground, Polyethylene	1
B	Cap, Pedestal Latch, 1.5", Dark Green	2
C	Bend-Plastic, 1-1/2", 24" Rad. (Streetlight)	As Req'd
	Bend-Plastic, 3", 24" Rad. (Secondary)	As Req'd

OUTDOOR LIGHTING – STREETLIGHT
Pole
 (Except For 17 Ft. Fiberglass Pole)



(DERIVED FROM CONSTRUCTION STANDARD 15 75 05 **)

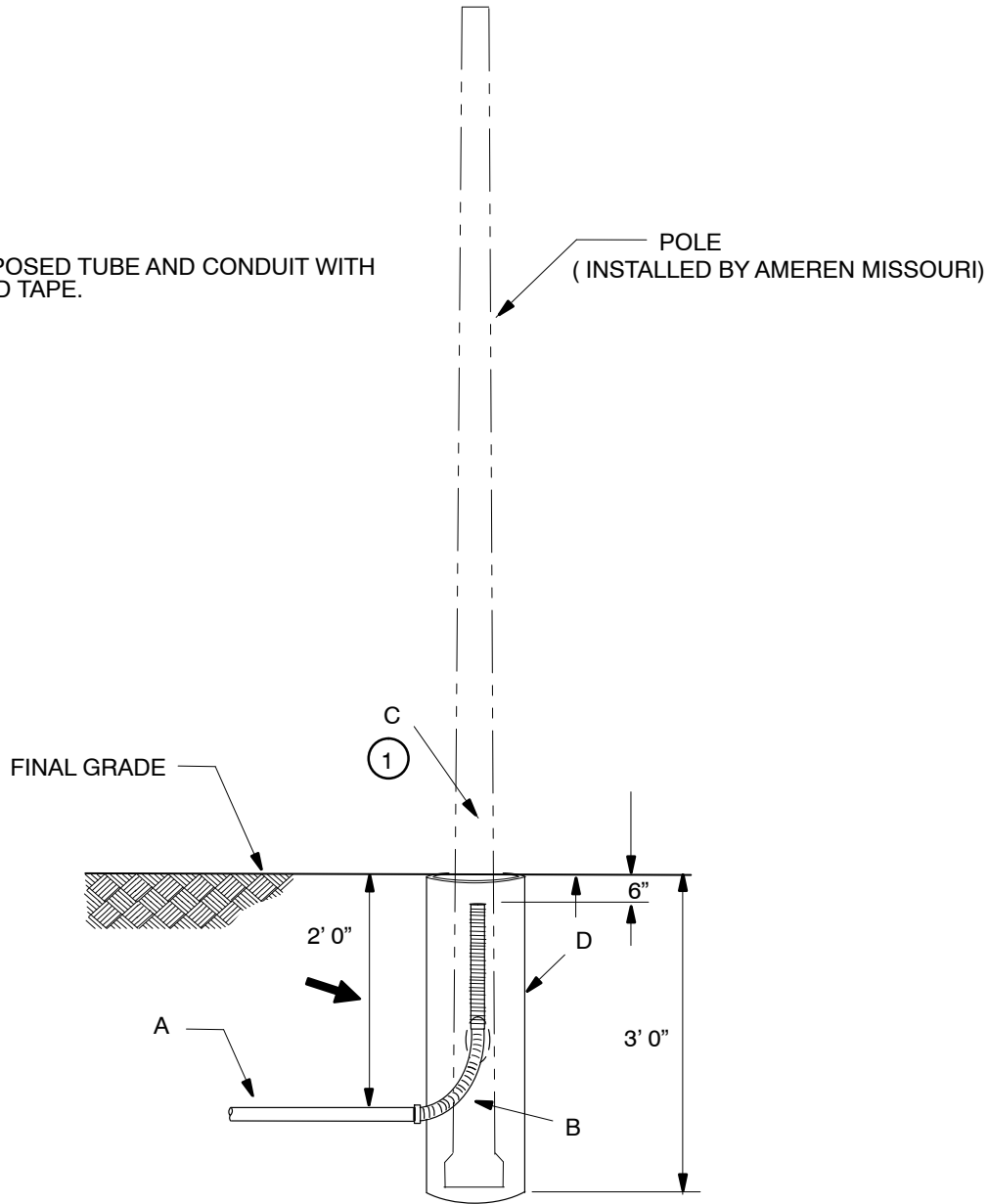
ITEM	DESCRIPTION	QTY
A	Plug – Conduit 1-1/2"	1
B	Marker – Buried Conduit	1

OUTDOOR LIGHTING – STREETLIGHT
Pole
 Alternate – For Use W / 17 Ft. Fiberglass Pole

SPEC 3A
 Sheet 1 of 1

NOTE:

- ① SEAL EXPOSED TUBE AND CONDUIT WITH PLUG AND TAPE.

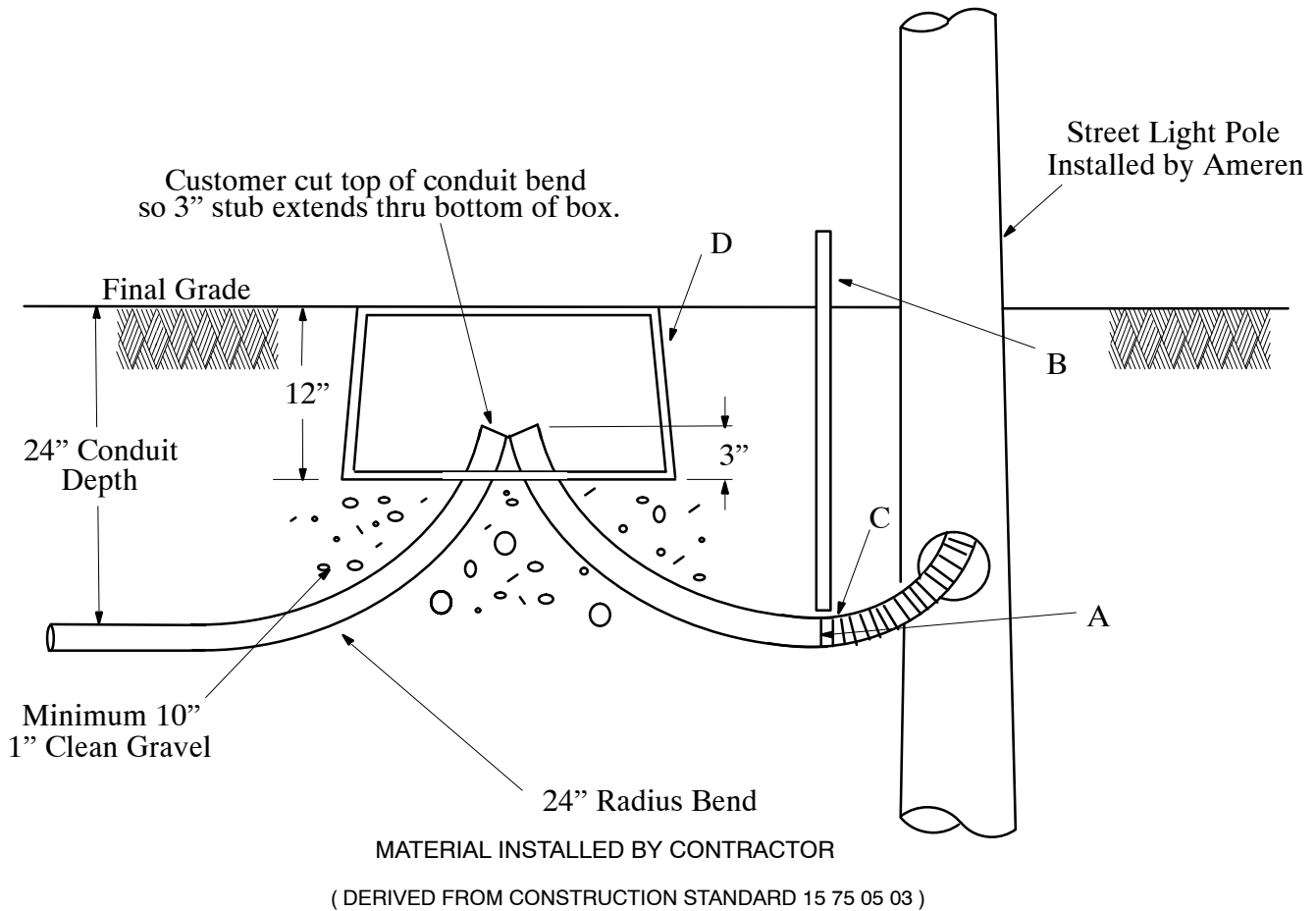


MATERIAL INSTALLED BY CONTRACTOR

(DERIVED FROM CONSTRUCTION STANDARD 15 75 05 **)

ITEM	DESCRIPTION	QTY
A	Conduit – Plastic, PVC, Sch. 40, 1 1/2"	As Req'd
B	Flex – Conduit, Plastic, 1-1/2" , 24" Rad.	1
C	Plug – Conduit, Plastic, 1-1/2"	1
D	Pipe – Plastic Culvert, 18" I.D.	3'

1. Conduit must be centered in tube and both conduit and tube must be plumb before backfilling.

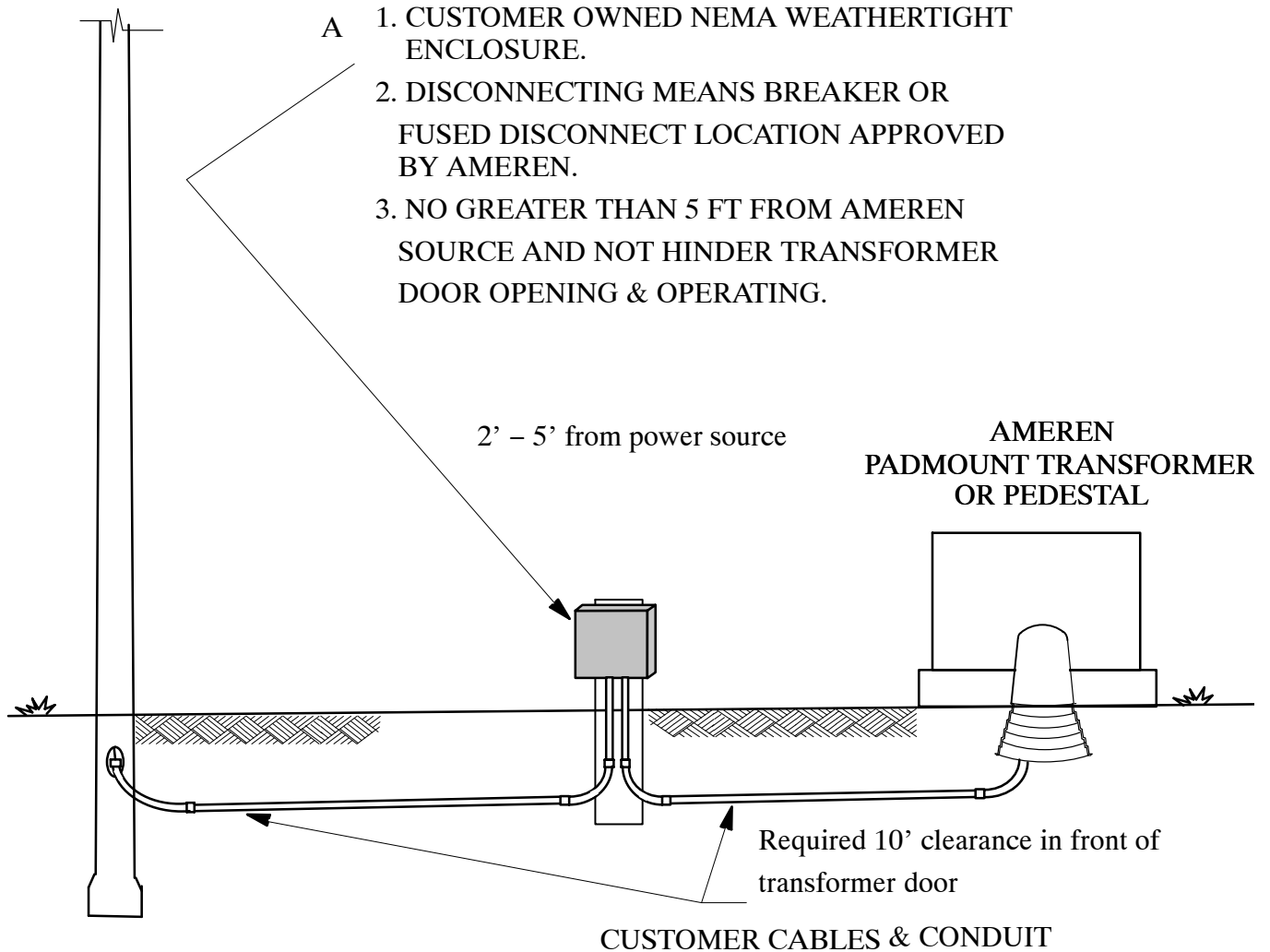


NOTES:

1. Customer installs Ameren supplied box.

ITEM	DESCRIPTION	QTY
A	Plug – Conduit, 1 1/2"	1
B	Marker – Buried Conduit	1
C	Conduit Reducer – 2" to 1 1/2"	1
D	Poly Splice box 9 3/4" (W) x 14" (L) X 12" (D)	1

CUSTOMER OWNED
 LIGHT STANDARD



CUSTOMER TO INSTALL UG CABLE OR CONDUIT AND CABLE INTO AMEREN TRANSFORMER OR PEDESTAL. AMEREN TO CONNECT WITH PLUG FUSE.

ITEM	DESCRIPTION	QTY
A	NEMA 3R UL Listed Enclosed Pullout Switch–Milbank 30–60Amp, Fusible and Non-Fusible, 1PH, 240VAC Disconnects	1