

6-15-180	UNDERGROUND – STRUCTURAL Customer Reference Specification	6-15-180
Sheet 1		Sheet 1

Customer Installed Duct System

(Replaces 6-15-181)

THIS CUSTOMER REFERENCE SPECIFICATION (CRS) IS PART OF THE
RULES FOR ELECTRIC METER AND SERVICE INSTALLATION (REMSI) WEBSITE.

DISTRIBUTION CONSTRUCTION SPECIFICATIONS PPL ELECTRIC UTILITIES CORPORATION	Issue Date: <u>3/19/10</u> Typist: SLF Drafter: _____
	Sponsor: <u><i>Melanie A. Blawie</i></u> Approved: <u><i>Mark P. Remes</i></u> Manager – Distribution Maintenance

6-15-180	UNDERGROUND – STRUCTURAL Customer Reference Specification	6-15-180
Sheet 2		Sheet 2

This specification contains basic information which defines PPL EU material and design requirements for the construction of concrete encased duct systems.

All details of this specification shall be strictly followed. Any deviation must be approved by a PPL EU Engineer. Unapproved deviations are usually costly for the customer to correct and can result in delays or possible refusal to connect service.

Other Associated Specifications:

- A-190974 — Concrete materials specification
- A-190975 — Concrete placement specification
- CRS 6-18-115 — Installation instructions for customer-installed conduit systems on PPL EU terminal poles

Notes:

1. Construction Plan

PPL EU will provide the customer with a construction plan showing the proposed location of the underground duct system. Any deviations from the proposed duct route, due to on-site obstructions, must be approved by PPL EU. The customer is responsible for any necessary crossing permits.

2. Depth of Burial

Rough grading to within 6 inches of finished grade should be established before trench is dug. Trench must be free of high spots, rock projections, and debris. Minimum depth of cover shall be as follows:

Secondary/service ducts	24 inches
Primary ducts	30 inches
Ducts under roadway	36 inches

3. Clearance from Existing Underground Facilities

The clearance between duct systems and existing underground facilities (T.V. cable, telephone cable, gas and water, etc.), paralleling it shall in no case be less than 24 inches. Duct systems which parallel a steam line shall have a minimum 6 feet separation (can be reduced if ducts are properly insulated).

DISTRIBUTION CONSTRUCTION SPECIFICATIONS PPL ELECTRIC UTILITIES CORPORATION	Issue Date: <u>3/19/10</u> Typist: <u>SLF</u> Drafter: _____
	Sponsor: <u>Melanie S. Blawie</u> Approved: <u>Mark R. Bernier</u> Manager – Distribution Maintenance

6-15-180	UNDERGROUND – STRUCTURAL Customer Reference Specification	6-15-180
Sheet 3		Sheet 3

Notes continued:

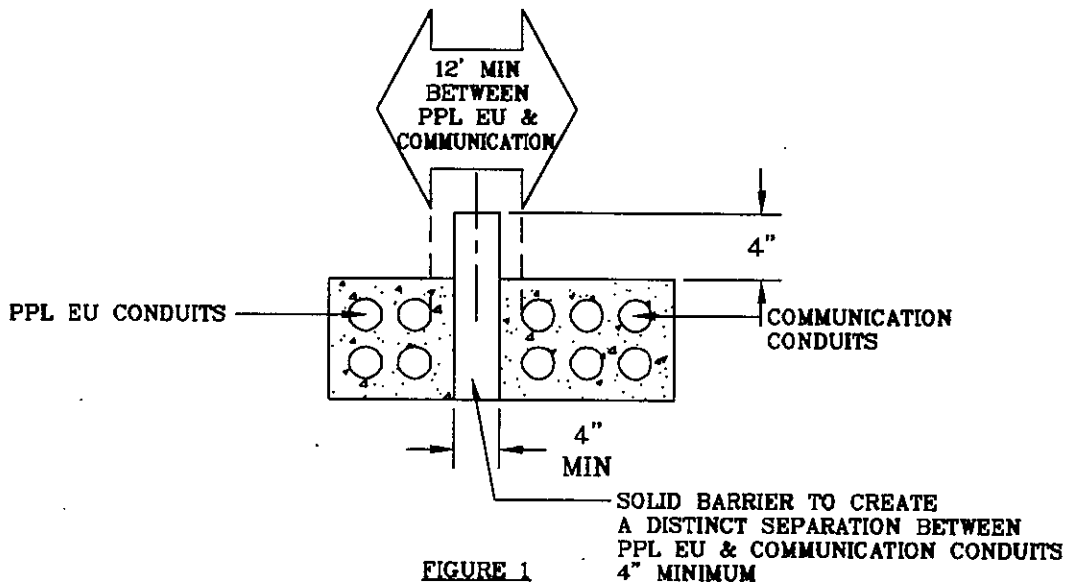
A duct system which crosses over or under existing underground facilities must have the following minimum clearance:

Telephone	3 inches of concrete or 12 inches of earth
Gas and water mains	12 inches of earth
Sewers	12 inches of earth
Steam lines	6 feet of earth (can be reduced if duct system is properly insulated)

If these clearances cannot be obtained, inform the PPL EU Engineer prior to construction.

4. Joint Trench Electric and Communication

When approved by PPL EU, new electric and communication concrete encased ducts may be installed in a joint trench (see Figure 1). A minimum of 12 inches must be maintained between facilities. A 4 inch solid barrier shall be centrally placed between the facilities to create a distinct separation. The barrier shall extend a minimum of 4 inches above the top of the concrete encased duct pack.



DISTRIBUTION CONSTRUCTION SPECIFICATIONS PPL ELECTRIC UTILITIES CORPORATION	Issue Date: <u>3/19/10</u> Typist: <u>SLF</u> Drafter: _____
	Sponsor: <u>[Signature]</u> Approved: <u>[Signature]</u> Manager – Distribution Maintenance

6-15-180	UNDERGROUND – STRUCTURAL Customer Reference Specification	6-15-180
Sheet 4		Sheet 4

Notes continued:

5. Conduit Types and Sizes

The minimum size conduit to be used for a duct system is 4 inches. PPL EU will specify the use of 5 or 6 inch conduit when customer installed system is for large diameter primary voltage cables. Aluminum conduits and fittings are not acceptable. The following types of conduits are acceptable for duct pack construction:

<u>Type</u>	<u>Size</u>	<u>Rating</u>
PVC	4", 5", & 6" 4", 5", & 6"	Type I, EB Type II, Gray Schedule 40
Steel	4", 5", & 6"	Rigid or Intermediate

6. Conduit Bends/Sweeps

Bends in 4 inch conduit systems shall be minimum 36 inch radius. Bends in 5 or 6 inch conduit systems shall be minimum 48 inch radius. The contractor may use preformed bends or bend conduits at the job site as required. All bends must be rigid or intermediate grade galvanized steel.

Sweeps, all gray Schedule 40 PVC sweeps must be a minimum 15 ft radius.

7. Couplings

All PVC conduit couplings must be solidly cemented. Threaded joints in steel conduit must be sealed using plumber's teflon tape.

8. Bell Ends

All PVC ducts entering manholes, vaults, or transformer foundations shall have bell ends. Steel conduits require grounding bushings.

9. Concrete

Concrete for encasing ducts shall be 1:2:4 mix (aggregate shall be #1B stone) with a 5 inch slump in accordance with Specification A-190974. High early concrete shall not be used when ambient temperature is above 40°F since the large amount of heat developed in curing may damage or deform the conduits. Allow at least 18 hours to elapse before backfilling trench.

DISTRIBUTION CONSTRUCTION SPECIFICATIONS PPL ELECTRIC UTILITIES CORPORATION	Issue Date: <u>3/10/10</u> Typist: <u>SLF</u> Drafter: _____ Sponsor: <u><i>M. J. Blawie</i></u> Approved: <u><i>Mark R. Blawie</i></u> Manager – Distribution Maintenance
--	---

6-15-180	UNDERGROUND – STRUCTURAL Customer Reference Specification	6-15-180
Sheet 5		Sheet 5

Notes continued:

10. Conduit Encasement

Multiple conduits in a duct pack must have base and intermediate spacers placed approximately every 5 feet. The spacers must provide both vertical and horizontal clearance between adjacent conduits (for concrete) of no less than 1-1/2 inches for 4 or 5 inch conduits and 2 inches for 6 inch conduits. PPL EU will inspect the conduit installation prior to conduit being poured.

The trench shall be dug wide enough to allow a minimum 3 inch thick concrete envelope around the conduits. Provide adequate bracing so conduits do not float in wet concrete. Use concrete vibrator tool or other means to ensure the conduits are fully encased in concrete. PPL EU may specify epoxy coated reinforcing rods where soil conditions are unstable. If concrete cannot be poured in one continuous run between ends, taper the first pour so the next pour will bond without creating a shear line.

Allow at least 18 hours to elapse before backfilling trench. Do not backfill with large rocks, broken sections of pavement, construction debris or trash.

11. Clean Ducts

All ducts shall be cleaned by pulling a mandrel or stiff bristled brush, followed by a ball of clean rags through the conduits. This procedure will remove earth, sand, stones, or water left in ducts. Seal ends after cleaning.

12. Pulling Line

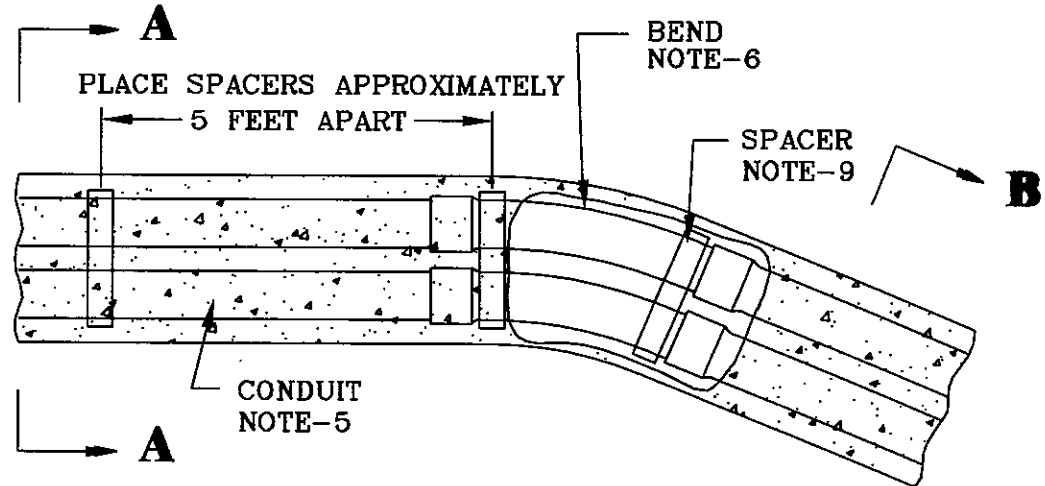
The only acceptable pulling line is a flat polyester, woven, prelubed tape, 1/2 inch in width with a minimum breaking strength of 1200 pounds.

When installing pulling line in PVC conduit, be sure conduit adhesive is dry before installing the pulling line to avoid gluing the pulling line to joint.

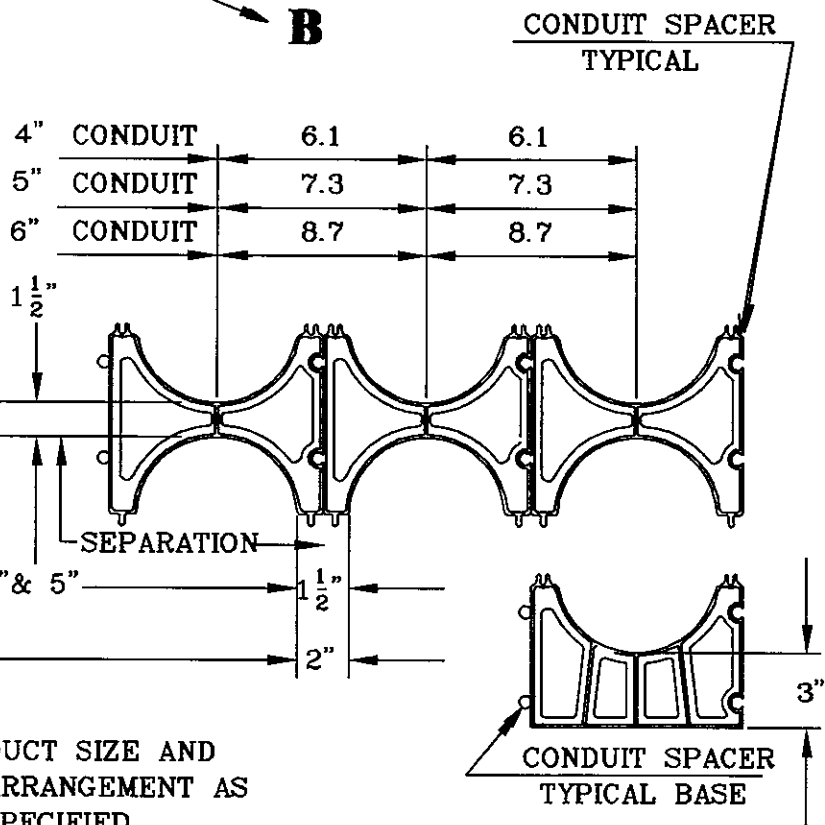
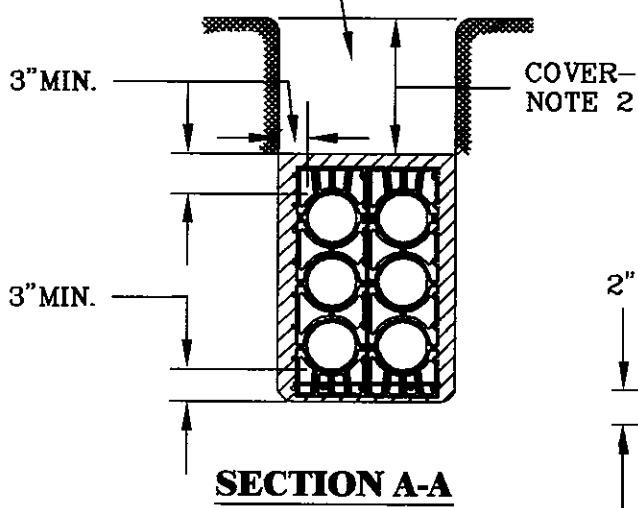
Allow a minimum of 24 inches of spare pulling line at each end of the conduit run.

DISTRIBUTION CONSTRUCTION SPECIFICATIONS PPL ELECTRIC UTILITIES CORPORATION	Issue Date: <u>3/19/10</u> Typist: <u>SLF</u> Drafter: _____
	Sponsor: <u>Melanie D. Blawie</u> Approved: <u>Mark R. Berner</u> Manager – Distribution Maintenance

UNDERGROUND - STRUCTURAL
CUSTOMER REFERENCE SPECIFICATION

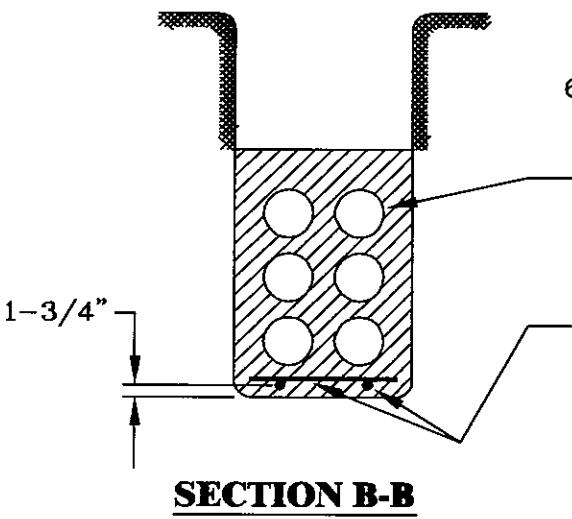


BACKFILL WITH EARTH OR GRAVEL
(NO DEBRIS)



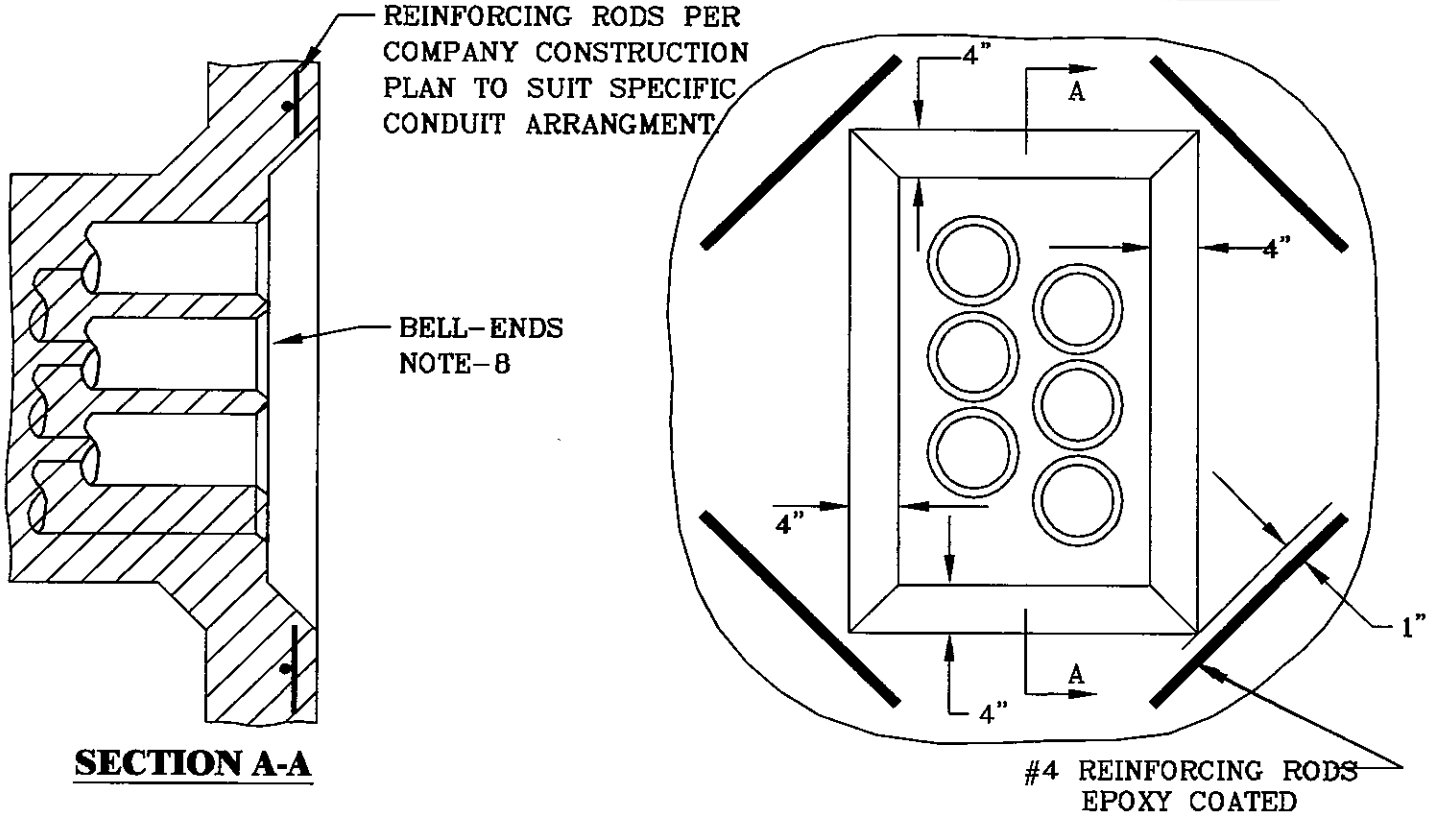
DUCT SIZE AND ARRANGEMENT AS SPECIFIED.

PLACE #4 REINFORCING RODS - 24" O.C.
(SPECIFIED BY PPL EU ENGINEER FOR UNSTABLE SOIL CONDITIONS)

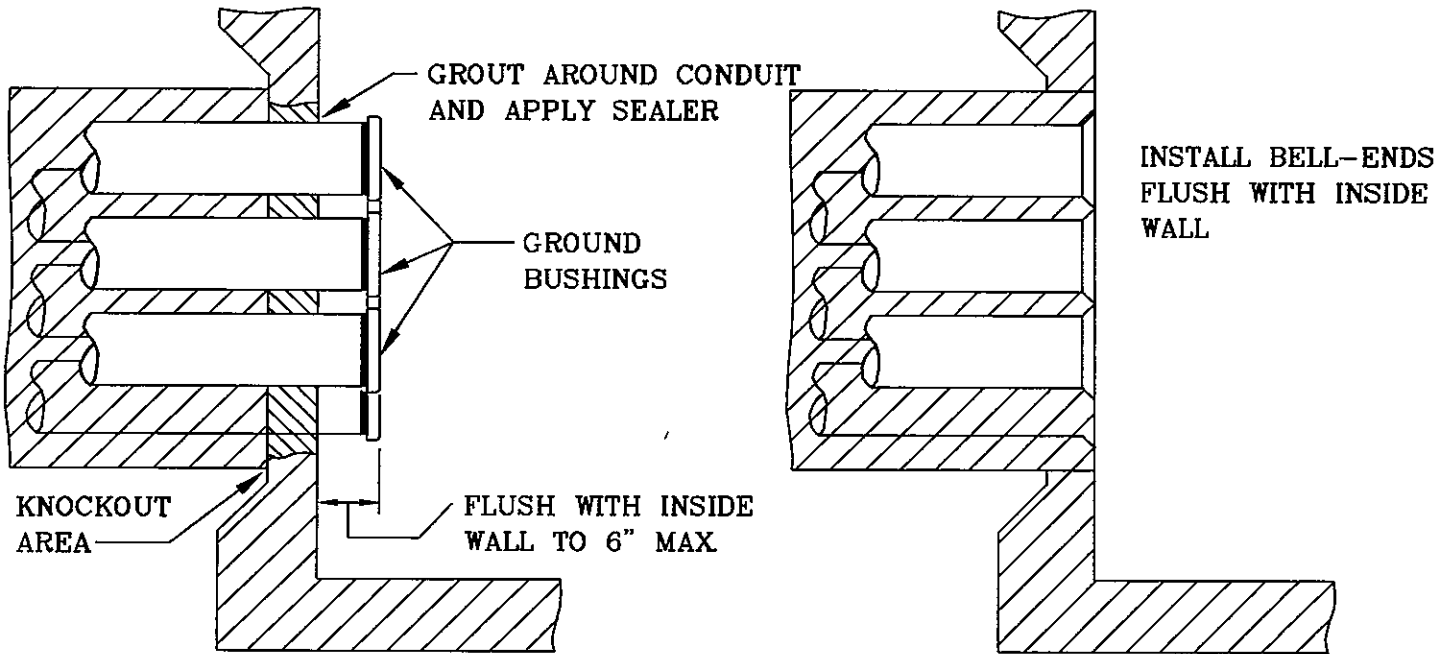


<p>DISTRIBUTION CONSTRUCTION SPECIFICATIONS</p> <p>PPL ELECTRIC UTILITIES CORPORATION</p>	Date: <u>3/19/10</u> Drafter: <u>RRC</u>
	Sponsor: <u>Melanie D. Blawie</u>
	Approved: <u>Mark R. Bernier</u> Manager-Distribution Maintenance

DUCT ENTRANCE AT FIELD POURED MANHOLES AND VAULTS



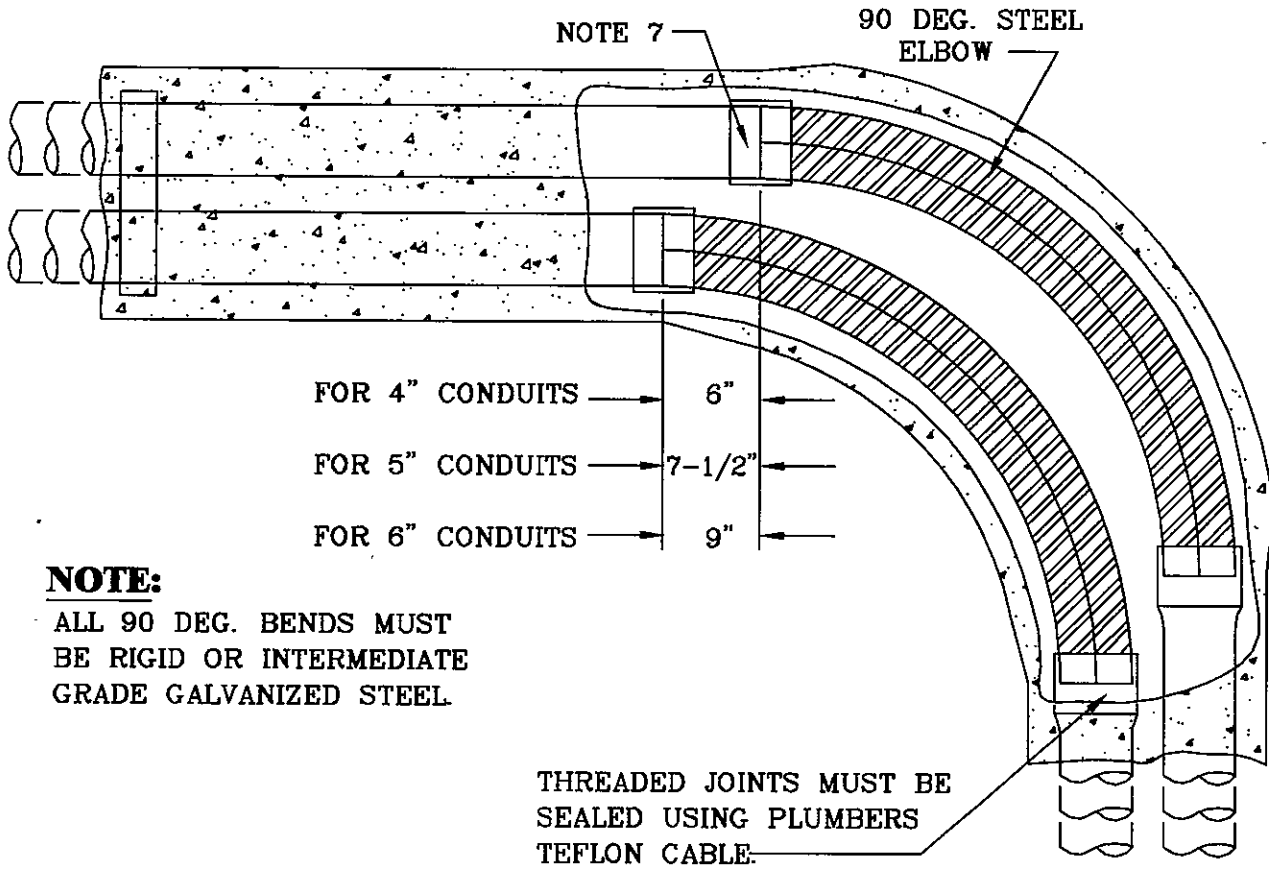
DUCT ENTRANCE AT PRECAST MANHOLES AND VAULTS



STEEL CONDUITS

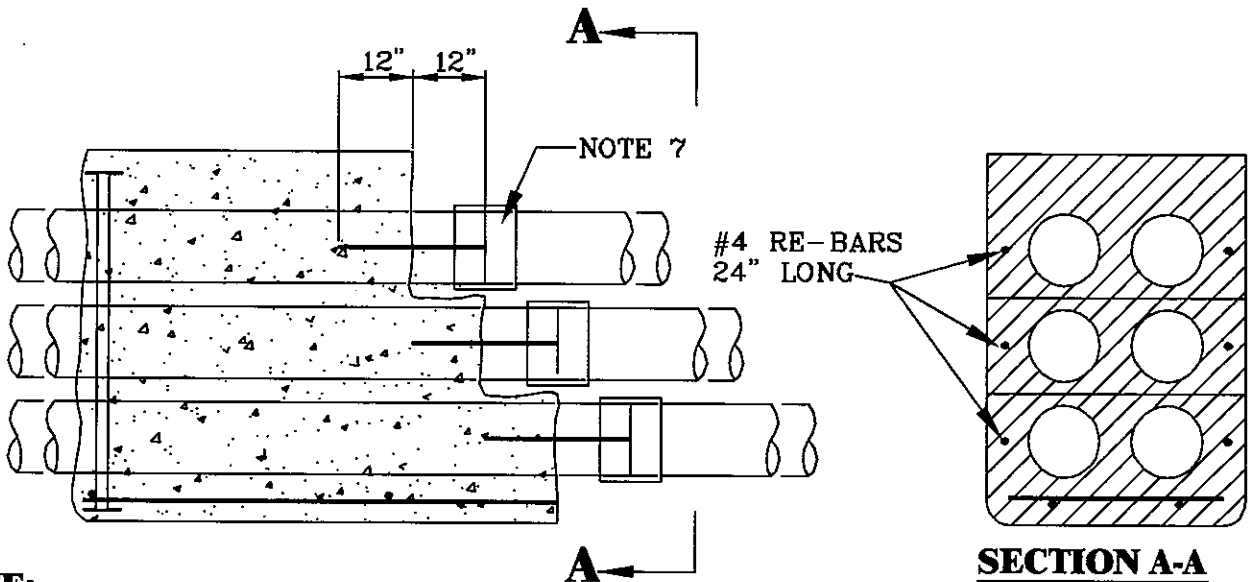
PVC CONDUITS

<p>DISTRIBUTION CONSTRUCTION SPECIFICATIONS</p> <p>PPL ELECTRIC UTILITIES CORPORATION</p>	<p>Date: <u>3/19/10</u> Drafter: RRC</p>
	<p>Sponsor: <u>Melanie J. Blawie</u></p>
	<p>Approved: <u>Mark E. Bennett</u> Manager-Distribution Maintenance</p>



NOTE:

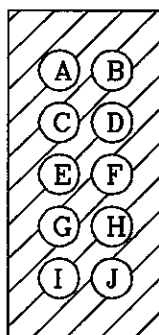
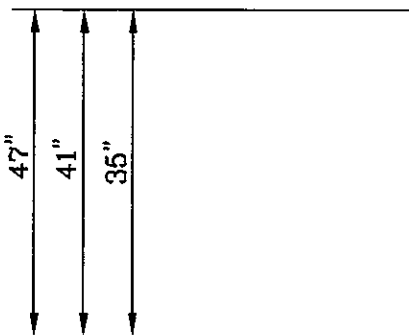
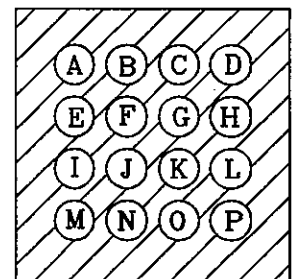
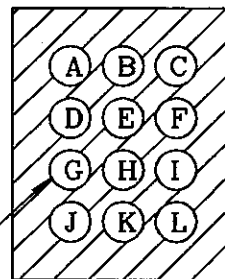
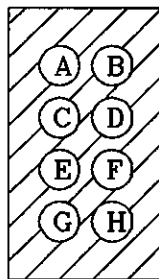
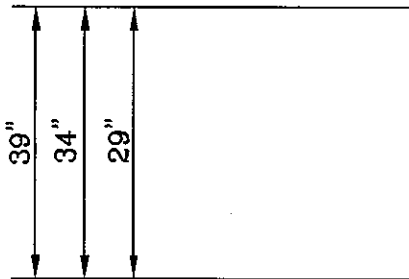
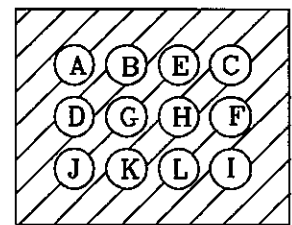
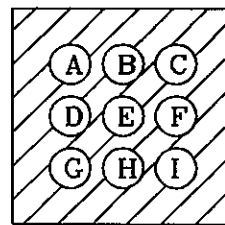
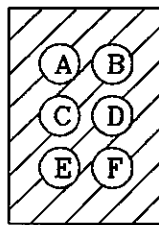
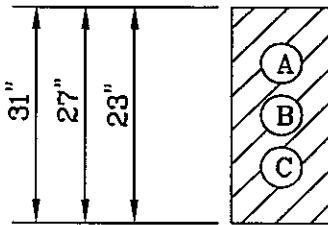
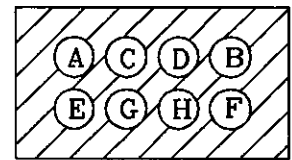
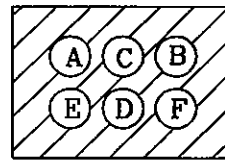
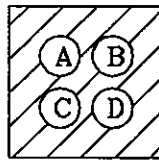
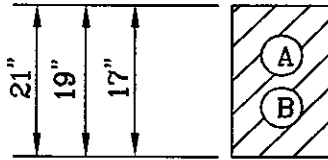
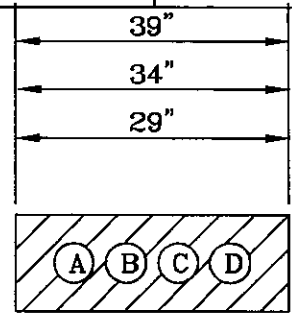
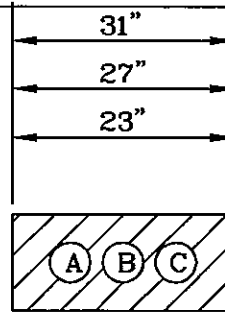
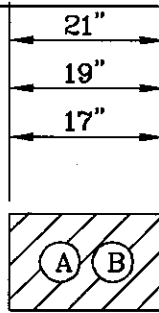
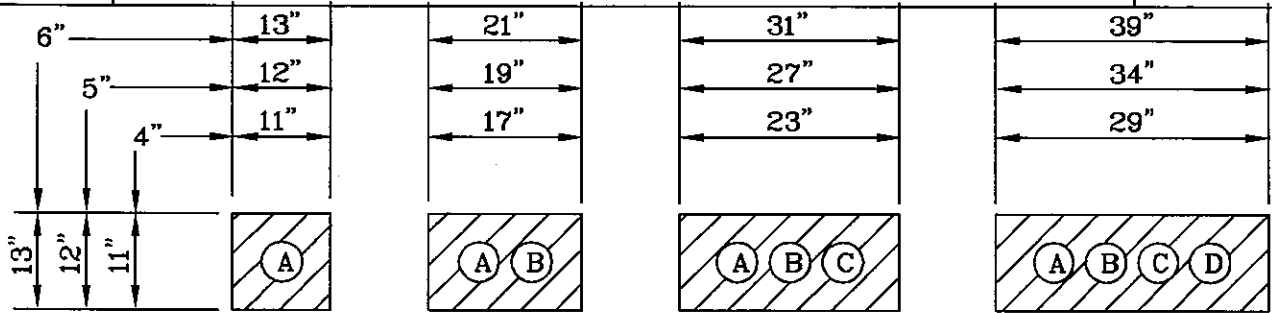
ALL 90 DEG. BENDS MUST BE RIGID OR INTERMEDIATE GRADE GALVANIZED STEEL.



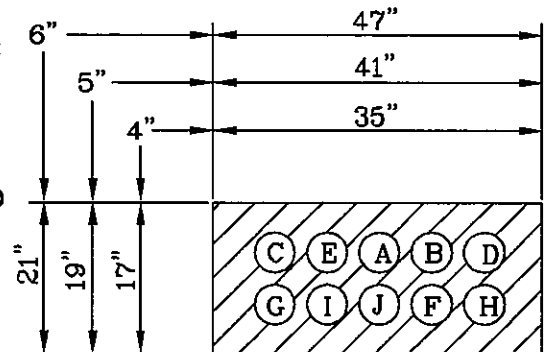
NOTE:

THE DUCT RUN SHOULD BE ENCASED BY MAKING ONE CONTINUOUS POUR. IF SEVERAL POURS ARE NECESSARY, TAPER THE END AS SHOWN ABOVE SO THE NEXT POUR WILL BOND WITHOUT CREATING A SHEAR LINE.

<p>DISTRIBUTION CONSTRUCTION SPECIFICATIONS</p> <p>PPL ELECTRIC UTILITIES CORPORATION</p>	Date: 3/19/10	Drafter: RRC
	Sponsor: <i>Melanie D. Blausen</i>	
	Approved: <i>Mark R. Bennis</i> Manager - Distribution Maintenance	



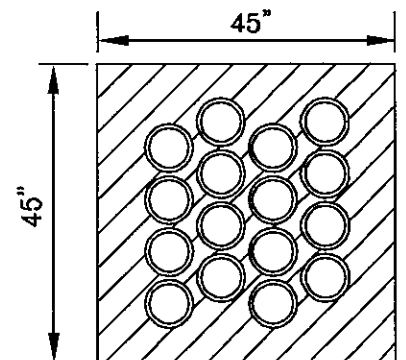
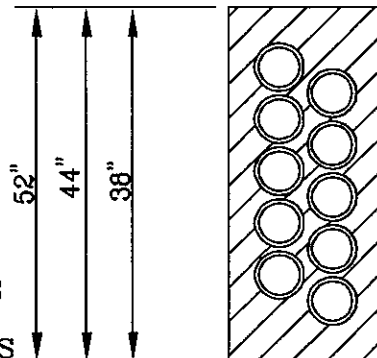
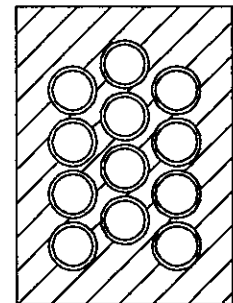
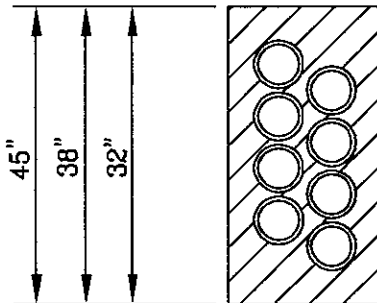
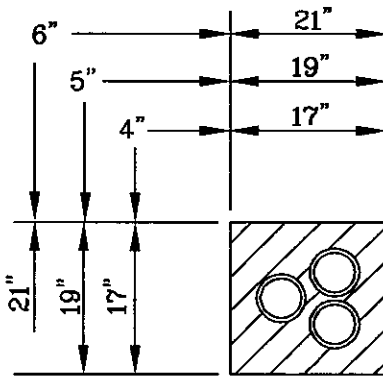
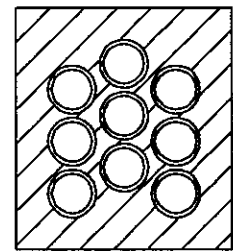
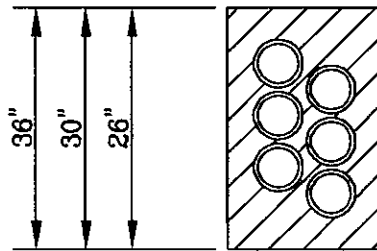
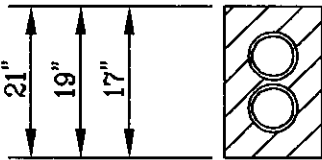
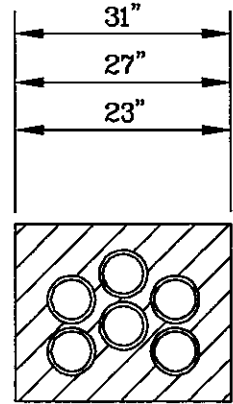
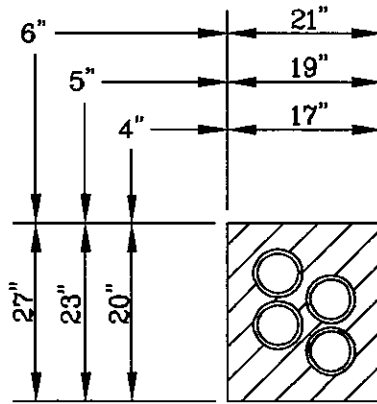
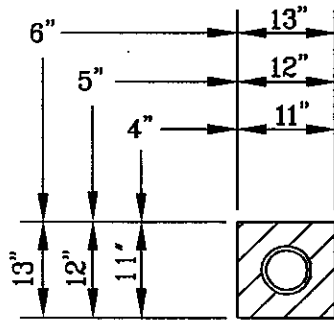
LETTERS INDICATE METHOD TO BE USED TO ROLL FROM ONE CROSS SECTION TO ANOTHER



TYPICAL DUCT CROSS SECTION

DISTRIBUTION CONSTRUCTION SPECIFICATIONS
PPL ELECTRIC UTILITIES CORPORATION

Date: 3/19/10 Drafter: RRC
Sponsor: *Melanie J. Blawie*
Approved: *Mark R. Roman*
Manager-Distribution Maintenance



NOTE:

CONDUITS ARE STAGGERED AT MANHOLE AND VAULT ENTRANCES TO PROVIDE ADDITIONAL CLEARANCE FOR TRAINING CABLES

TYPICAL DUCT ENTRANCES AT MANHOLES AND VAULTS

<p>DISTRIBUTION CONSTRUCTION SPECIFICATIONS</p> <p>PPL ELECTRIC UTILITIES CORPORATION</p>	Date: <u>3/19/10</u> Drafter: <u>RRC</u>
	Sponsor: <u>Michael J. Blausen</u>
	Approved: <u>Mark S. Berry</u> Manager-Distribution Maintenance