

WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS
DIVISION 26 – ELECTRICAL

SECTION 260540 – UNDERGROUND DUCTBANKS

PART 1 - GENERAL

- 1.1 Any deviance from the following instructions must be approved during design by WVU Facilities Management.

PART 2 - PRODUCTS

- 2.1 N/A

PART 3 - EXECUTION

- 3.1 See also Standard Ductbank Detail, Drawing ELEC-D05.
- 3.2 Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- 3.3 Duct Installation
- A. Slope: Pitch ducts a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two manholes to drain in both directions. All manholes shall be installed with gravity drains.
 - B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 12.5 feet, both horizontally and vertically, at other locations, unless otherwise indicated. Contractor may use field fabricating techniques per conduit manufacturer written instructions to achieve binds/curves as necessary.
 - C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
 - D. Duct Entrances to Existing Manholes: Use end bells, spaced approximately 10 inches o.c. for 5 inch ducts, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to end-bell spacing 10 feet from the end bell without reducing duct line slope and without forming a trap in the line.
 - 2. Direct Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to manhole or handhole.

WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS

DIVISION 26 – ELECTRICAL

3. Grout end bells into structure walls from both sides to provide watertight entrances.
- E. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15 psig hydrostatic pressure.
- F. Concrete-Encased Ducts: Support ducts on duct separators.
1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with no less than 4 spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 2. Concreting Sequence: Pour each run of envelope between manholes or other terminations in one continuous operation.
 - a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations, or use other specific measures to prevent expansion-contraction damage.
 - b. If more than one pour is necessary, terminate each pour in a vertical plane and install $\frac{3}{4}$ inch reinforcing rod dowels extending 18 inches into concrete on both sides of joint near corners of envelope.
 3. Pouring Concrete: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Use a plank to direct concrete down sides of bank assembly to trench bottom. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.
 4. Reinforcement: Reinforce concrete-encased duct banks where they cross sidewalks, roads, paved areas and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
 5. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
 6. Stub-Ups: Use manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise

WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS
DIVISION 26 – ELECTRICAL

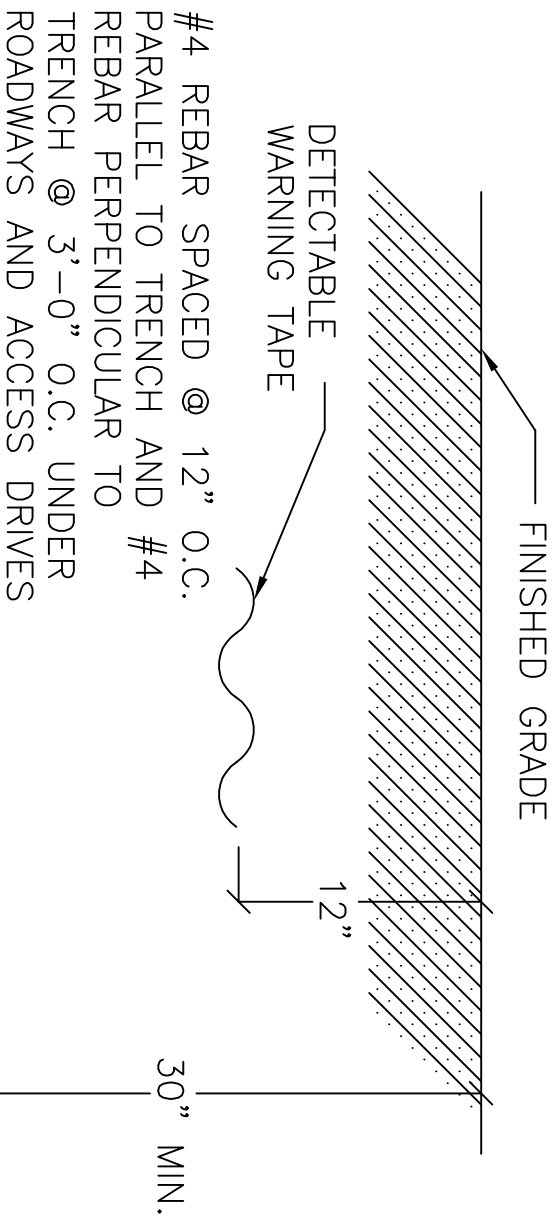
indicated. Extend concrete encasement throughout the length of the elbow.

7. Warning Tape: Align tape parallel to and within 3 inches of the centerline of duct bank. Provide an additional warning tape for each 12 inch increment of ductbank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

G. Always provide a spare conduit for each conduit used.

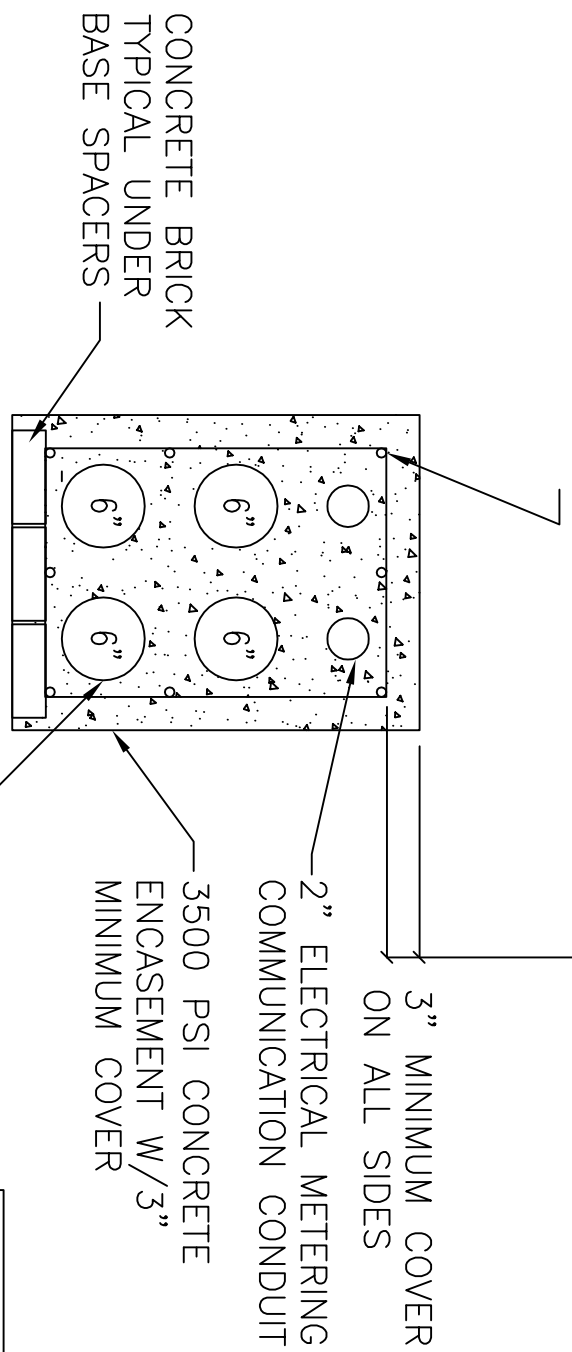
- 3.4 Pull aluminum or wooden test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80% fill of duct. If obstructions are indicated, remove obstructions and retest.

END OF SECTION 260540



ONE SPARE CONDUIT SHALL BE INSTALLED FOR EACH CONDUIT USED

A 4" RNC CONDUIT WITH SPARE SHALL BE INSTALLED FOR FIBER/TELECOMMUNICATION USAGE AS NEEDED



PROVIDE CONDUIT BASE SPACERS ON CONCRETE BRICK AND INTERMEDIATE SPACERS TO PROVIDE MINIMUM OF 3" CLEAR SPACE BETWEEN ALL CONDUITS @ 5' INTERVALS ALONG ENTIRE LENGTH OF DUCTBANK

WEST VIRGINIA UNIVERSITY

STANDARD DUCTBANK DETAIL

Drawing #:	ELEC-D05
DRAWN:	PAUL WHITEMAN
DATE:	12/17/09
REVISIONS:	