26 05 44 Medium Voltage Ducts and Manholes

1. General:
   A. The University of Alabama has its own 12,470 volt underground distribution system which serves most of the campus from four switchhouses, each adjacent to an Alabama Power Company substation. Many of the circuits through campus are looped and/or fed from two different substations for redundancy tie switches normally remain open, but can be fed concurrently from two substations to allow changing tie points without an outage. This must be scheduled in advance through the UA Electrical shop for coordination with Alabama Power Company.
   B. Individual demand meters on each MV circuit are read each month.

2. Modifications And Additions:
   A. All proposed additions and modifications to the Medium voltage system shall be coordinated with the UA Project Manager, Electrical Engineer, and Electrical Shop Manager.

3. Outages:
   A. Due to the nature of University operations, electrical system outages typically require extensive planning. All outages must be coordinated well in advance through the UA Project Manager.

4. Underground MV Distribution Ducts:
   A. All medium voltage underground power conductors shall be routed in 5" Schedule 40 PVC ducts fully encased in concrete, minimum 3" coverage all sides. Spacers shall be employed for required separation and coverage. Duct banks shall have 48” cover minimum.
   B. A continuous #6 THWN trace wire with shall be routed with each duct bank, near the top of the duct bank and fully and encased within the concrete (no conduit). Where splices are unavoidable, they shall be made with exothermic welds and insulated. Trace wires shall be marked with purple electrical tape on ends, and shall be solidly supported and readily accessible within equipment. At manholes, trace wire shall enter the manhole through a penetration at the top of the duct bank entry and shall be strapped on 12” centers and routed to just beneath the cast iron entry frame. Ends of trace wire shall be marked with purple tape.
   C. Trenches shall be excavated to no more that the approximate width of the required duct. Excessive extent of concrete shall not be acceptable; contractors shall install forms in over-excavated areas.
   D. Duct banks passing under drives and walks shall have longitudinal #4 steel reinforcement bars on 12” centers and #4 steel reinforcement hoops on 12” centers.
E. MV duct banks shall be colored red with red iron oxide concrete pigment, 8 lbs. per cubic yard of concrete.

F. All MV ducts terminations shall be fitted with bell end fittings.

G. A minimum of six 5” ducts shall be routed for each major branch.

H. A minimum of four 5” ducts shall be routed to each switch.

I. A minimum of two 5” ducts shall be routed to the transformer.

J. All duct banks shall contain spare duct(s).

K. All ducts shall be proofed by having a standard duct mandrel passed through them. Testing shall be witnessed by UA personnel.

L. Two 2” PVC conduits shall be routed on top of each duct bank for future auxiliary systems. These conduits shall be in addition to all other necessary raceways. The 2” conduits shall turn up into an 11” x 18” polymer concrete in-ground junction box at each end of the duct and at each manhole. Each junction box shall have “ELEC” cast into the lid. Where allowed by the scope of construction, two 2” shall be extended from the end junction box into an accessible location in the electrical room of buildings. All conduits shall be fitted with full-length polypropylene pull lines.

5. Manholes:

A. MV ducts shall have manholes adjacent to each switch, at maximum 500’ intervals on long runs, and elsewhere as required by site conditions and to keep conductor pulling tension within acceptable limits. Pull or junction boxes for MV ducts are prohibited.

B. Manholes shall have the following features:

1) Heavy duty (H-20) rating.

2) Positive sealing elastomeric gasket between upper and lower sections.

3) Cast iron grade ring and 36” cast iron lid with “ELECTRICAL” cast into the top.

4) Sump cast into the center of the floor of the manhole.

5) Duct terminations for duct entry cast into all sides.

6) Pulling irons opposite all duct entries.

7) Full height, non-metallic stanchions with 15” minimum non-metallic racks, equal to Underground Devices Inc. BNT-A3. Provide 3 racks minimum for each standard.
C. Manholes connecting duct banks 6 way and smaller shall be 8’ x 8’ octagonal.

D. Manholes connecting duct banks larger than 6 way shall be 8’ x 12’ rectangular. Duct openings shall be offset from the center to allow easier routing of conductors.

E. Each manhole shall be grounded with two 10’ copper-clad steel rods driven through holes in the bottom (or low in the side if manhole is set in rock) with #2/0 bonding conductor thermowelded to rods.

Note: Refer to Section III of the Design Guidelines for 02249 Trenching, Backfill, Compaction.