Special Specification 6130
Underground Cable Vault

1. DESCRIPTION

Construct, furnish, install, repair, replace and adjust underground cable vault (UCV), complete in place including cable racks, duct terminators, drain, frame and cover.

Unless otherwise shown on the plans, the Contractor may furnish precast UCV units. Alternate designs for precast construction must be acceptable to the Engineer and not deviate from the functional dimensions shown on the plans. Alternate designs must be designed, signed and sealed by a Licensed Professional Engineer.

Terminate duct bank as described in Special Specification 6129, “Concrete Encased Duct Bank,” conduits as described in Item 618, “Conduit,” and ducts as described in Item 622, “Duct Cable” when shown on the plans. Prevent debris from entering duct bank, conduits, and ducts during placement and installation.

2. MATERIAL

Provide new materials that comply with the details shown on the plans, the requirements of this Item, and to the material requirements of the following Items:

- Item 421, “Hydraulic Cement Concrete”
- Item 465, "Junction Boxes, Manholes, and Inlets"
- Item 618, “Conduit”
- Item 622, “Duct Cable”
- Item 624, "Ground Boxes"

Provide heavy duty, non-metallic, non-corrosive cable racks. Provide cable racks without grounding or insulation requirements. Cable rack materials cannot be affected by oils, hydrocarbons, common esters, ketones, ethers, or amides. Provide cable racks with adjustment range between 8 in. and 14 in. in height and capable of supporting at least 300 lbs. of dead load.

Consider UCV units as manholes only for the purposes of interpreting the material requirements of Item 465, "Junction Boxes, Manholes, and Inlets."

Construct UCV units in accordance with the latest revision of RUS Bulletin 1751F-643, Underground Plant Design. TxDOT specifications govern in case of discrepancy between TxDOT and RUS Bulletin requirements.

Provide materials listed in United States Department of Agriculture (USDA), Rural Utilities Service (RUS), List of Materials, Informational Publication 344-2, whenever possible. Material information for RUS materials need only include manufacturer data sheet indicating RUS Accepted for Engineer approval. Provide complete material properties and fabrication data, as well as, justification for not utilizing RUS accepted materials listed in RUS publications.

Permanently mark all UCV covers with manufacturer's name or logo and manufacturer's model number. Clearly and permanently mark all covers with the description designated on the plans.

Provide a hinged single cover. Provide covers operating freely for at least 180°. Provide drop handles with each cover. Provide frame with neoprene gasket seal upon which the cover is seated. Provide each UCV unit and cover capable of withstanding a test load of 22,568 lb. over any 8 in. x 20 in. area or meet an

AASHTO H10 design except that covers subjected to daily traffic must be capable of withstanding a test load of 45,136 lb. over any 8 in. x 20 in. area or meet an AASHTO H20 design. Provide an appropriate means to secure the cover in place. Provide self-draining bolt holes that will drain dirt. Furnish washers with all bolts. Provide a grounding lug with 1/2 - 13 NC female threads on the underside of all steel or cast iron covers.

Unless otherwise shown on the plans, molded duct terminator banks conforming to the configuration shown in the plans may be used. Furnish duct terminators and fittings that conform to the material requirements of Item 618, "Conduit" and ASTM F 512.

Place a gravel fill under each UCV as shown on the plans prior to placement. Provide gravel material of the grade shown on the plans and in conformance to the pertinent requirements of Item 421, “Hydraulic Cement Concrete.”

3. CONSTRUCTION

Construct UCV units in accordance with the construction method requirements of the following Items:

- Item 400, “Excavation and Backfill for Structures”
- Item 465, "Manholes and Inlets"
- Item 471, "Frames, Grates, Rings, and Covers"

Construct UCV units in accordance with the latest revision RUS Bulletin 1751F-644, Underground Plant Construction, and RUS Bulletin 1753F-151, RUS Form 515b, Specifications and Drawings for Construction of Underground Plant. TxDOT specifications govern in case of discrepancy between TxDOT and RUS Bulletin requirements.

UCV units formed by any means other than the placing of concrete against the sides of the excavation must be backfilled as soon as possible after the time required for the concrete to gain sufficient strength, which will be a period of not less than 72 hr. after the time of placing concrete. Excavate and backfill in accordance with the latest revision of RUS Bulletin 1751F-644, Underground Plant Construction, and the construction requirements of Item 400, “Excavation and Backfill for Structures.” Backfill disturbed surface with material equal in composition and density to the surrounding area. Replace surfacing material with similar material to an equivalent condition.

Do not place UCV units in the pavement unless specifically shown on the plans. Do not place UCV units in the traveled way of highways, streets, bridges, or driveways. Place UCV units level to provide proper drainage. Place UCV covers in alignment with final surrounding grade. Remove, dispose, and install UCV or manhole covers as shown on the plans or as directed. Adjust UCV or manhole covers as shown on the plans or as directed. Adjustment may include welding, raising, or lowering.

Backfill disturbed surface with material equal in composition and density to the surrounding area. Replace surfacing material with similar material to an equivalent condition.

Ensure that covers do not protrude more than 6 in. nor less than 3 in. from the final surrounding grade. Do not place UCV cover below the final surrounding grade. Bond cover frame to the UCV with cement mortar and/or concrete. Bricks and mortar may be used to adjust the cover to grade.

Cast the frame separately from the UCV. Ensure that the frame and cover is removable and replaceable should damage occur or adjustment be needed. Anchor the frame in concrete. Do not use adhesives to secure the frame to the UCV.

Cast duct terminators and terminator banks in the walls of the UCV at the time of fabrication. Knock out panels for field installation is not acceptable. Place tapered plugs with pull cord tabs in all unused duct terminators inside the UCV. Place fitting plugs in all duct terminators that do not terminate a duct on the outside of the UCV.

Lightly tamp the gravel fill immediately prior to placement of the UCV to reduce settlement.

Store UCV units on level blocking at all times prior to placement. Provide self-draining UCV units to avoid accumulations of water and debris.

Install cable rack assembly to permit coiling of conductors or cables without violating the manufacturer's minimum bending radius. Install assemblies consisting of 2 cable rack supports and 4 adjustable levels on each support, at a minimum, on each wall of the UCV as shown on plans or as directed. Anchor the cable rack support permanently to the UCV wall with mechanical or powder actuated fasteners. Use fasteners with an ultimate pull out strength of at least 2500 lb. and ultimate shear strength of at least 3000 lb. Provide sufficient cable supports for the particular number of conductors or cables coiled or passing through the UCV as shown on the plans or as directed.

Remove silt and debris from UCV units or manholes prior to installing cable.

3.1. **Maintenance.** Whether newly installed or existing material, provide periodic and non-periodic maintenance as described in this Special Specification and when directed by the Engineer. For UCV material provided by referenced specification, provide maintenance in accordance with the referenced specification and any additional requirements provided in this Special Specification.

Periodic maintenance of furnished and existing UCV material consists of all testing described in this Item, inclusive of all referenced specifications, as shown on the plans, and as directed by the Engineer. Perform UCV maintenance at intervals not exceeding 12 mo. unless otherwise shown on the plans. Provide periodic maintenance with new material and include in price for new material.

Provide non-periodic maintenance of furnished and existing UCV materials to remove, relocate, replace, and adjust any or all material described in this Special Specification when shown on the plans or as directed by the Engineer. Replace is defined as furnishing new material and removing existing material.

Perform periodic cleaning of the UCV to provide proper drainage during project construction and as directed. Perform final cleaning prior to final acceptance of the project in accordance with Article 4.6, “Final Clean Up.”

4. MEASUREMENT

This Item will be measured as each underground cable vault (UCV) fabricated, installed, repaired, replaced or adjusted with frame, cover, duct terminators, and cable rack as shown on the plans.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "UCV” of the various types, construction methods, and installations, UCV, UCV (Periodic Maintenance), UCV (Remove), UCV (Relocate), UCV (Adjust), UCV (Replace) of the various types and sizes shown on the plans. This price is full compensation for furnishing and placing all materials; excavating and backfilling; cable racks; maintenance; disposal of unsalvageable material; and all labor, tools, equipment and incidentals.