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430 PIPE CULVERTS (REV 11-21-19) (FA 12-9-19) (7-20)

ARTICLE 430-2 is deleted and the following substituted:

430-2 Materials.

430-2.1 Pipe: Meet the following requirements:

Concrete Pipe	Section 449
Steel Pipe	556-2.1
Round Rubber Gaskets	Section 942
Resilient Connectors*	Section 942
Corrugated Steel Pipe and Pipe Arch.....	Section 943
Corrugated Aluminum Pipe and Pipe Arch	Section 945
Corrugated Polyethylene Pipe.....	Section 948
Steel Reinforced Polyethylene Ribbed Pipe	Section 948
Corrugated Polypropylene Pipe	Section 948
Corrugated Polyvinyl Chloride (PVC) Pipe	Section 948
Fiberglass Reinforced Polymer Pipe.....	Section 948
Liner Repair Systems.....	Section 948
Metal Grates.....	Section 962

*Use resilient connector products listed on the Department's Approved Product List (APL).

430-2.2 Joint Materials: Use joint materials specified in 430-7 through 430-9 according to type of pipe and conditions of usage.

430-2.3 Mortar: Use mortar composed of one part Portland cement and two parts of clean, sharp sand, to which mixture the Contractor may add hydrated lime in an amount not to exceed 15% of the cement content. Use mortar within 30 minutes after its preparation.

430-2.4 End Treatments: Meet the requirements of Section 425-3.1. For precast end treatments meet the requirements in 449-1. Use the concrete Class designated in the Plans and Standard Plans, and as specified in Section 346 and 347.

430-2.5 Grates: Use metal gratings that meet the requirements of 962-8.

SUBARTICLE 430-4.1 is deleted and the following substituted:

430-4.1 General: Lay all pipe, true to the lines and grades given, with bells upgrade and spigot end fully entered into the bell. When pipe with quadrant reinforcement or circular pipe with elliptical reinforcement is used, install the pipe in a position such that the manufacturer's marks designating "top" and "bottom" of the pipe are not more than five degrees from the vertical plane through the longitudinal axis of the pipe. Do not allow departure from and return to plan alignment and grade to exceed 1/16 inch per foot of nominal pipe length, with a total of not more than 1 inch departure from theoretical line and grade. Take up and relay any pipe that is not in true alignment or which shows any settlement after laying at no additional expense to the Department.

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Do not use concrete pipe with lift holes except round pipe which has an inside diameter in excess of 54 inches or any elliptical pipe.

Repair lift holes, if present, with hand-placed, stiff, non-shrink, 1-to-1 mortar of cement and fine sand, after first washing out the hole with water. Completely fill the void created by the lift hole with mortar. Cover the repaired area with a 24 inch by 24 inch piece of filter fabric secured to the pipe. Use a Type D-3 filter fabric meeting the requirements specified in Section 985.

Secure the filter fabric to the pipe using a method that holds the fabric in place until the backfill is placed and compacted. Use grout mixtures, mastics, or strapping devices to secure the fabric to the pipe.

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Do not cut or drill into or through the corrugations or ribs of plastic pipe except when necessary to meet the dimensional requirements shown in the Plans.

When installing pipes in structures, construct inlet and outlet pipes of the same size and kind as the connecting pipe shown in the Plans. Use the same pipe material within each continuous run of pipe. Extend the pipes through the walls for a distance beyond the outside surface sufficient for the intended connections, and construct the concrete around them neatly to prevent leakage along their outer surface as shown on Standard Plans, Index 425-001. Keep the inlet and outlet pipes flush with the inside of the wall. Resilient connectors as specified in 942-3 may be used in lieu of a masonry seal.

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Furnish and install a filter fabric jacket around all pipe joints and the joint between the pipe and the structure in accordance with Standard Plans, Indexes 425-001 and 430-001. Use fabric meeting the physical requirements of Type D-3 specified in Section 985. Extend the fabric a minimum of 12 inches beyond each side of the joint or both edges of the coupling band, if a coupling band is used. The fabric must have a minimum width of 24 inches, and a length sufficient to provide a minimum overlap of 24 inches. Secure the filter fabric jacket against the outside of the pipe by metal or plastic strapping or by other methods approved by the Engineer.

Meet the following minimum joint standards:

Pipe Application	Minimum Standard
Storm and Cross Drains	Water-tight
Gutter Drain	Water-tight
Side Drains	Soil-tight

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When rubber gaskets are to be installed in the pipe joint, the gasket must be the sole element relied on to maintain a tight joint. Soil tight joints must be watertight to 2 psi. Water-tight joints must be water-tight to 5 psi unless a higher pressure rating is required in the Plans.

When laying pipes that pass through mechanically stabilized earth (MSE) reinforced fill, connect the portion of the pipe within the wall to the external portion of the pipe run only after the full height of the wall supported embankment is in place.

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When Wall Zone Pipes are shown in the Plans, meet the following requirements:

1. Use resilient connectors on pipes entering and leaving drainage structures.

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2. Provide a 2 to 4 inch pipe overhang beyond the drainage structure internal walls.
 3. For pipes without welded joints, meet the following additional requirements:
 - a. Pipe joints must be watertight to 10.8 psi when pulled out 2 inches from the fully home joint alignment.
 - b. Do not allow the gap between sections of pipe to exceed 5/8 inch for all pipe diameters.

SUBARTICLE 430-4.6 is deleted and the following substituted:

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430-4.6 End Treatment: Place an end treatment at each storm and cross drain, and side drain as shown in the Plans. Sod around end treatments in accordance with Standard Plans, Index 570-001.

430-4.6.1 U-Type Concrete Endwalls: Construct in accordance with the Plans and Standards Plans, Indexes 430-010 through 430-012 and Index 430-090.

430-4.6.2 Flared End Sections: Construct in accordance with the Plans and Standard Plans, Index 430-020. Use precast flared end sections only.

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430-4.6.3 Mitered End Sections: Construct in accordance with the Plans and Standard Plans, Indexes 430-021 and 430-022. Construct mitered end sections for corrugated high-density polyethylene (HDPE) pipe, polypropylene (PP) pipe, steel reinforced polyethylene ribbed (SRPE) pipe and polyvinyl-chloride (PVC) pipe as specified in Section 948 and as detailed in the Standard Plans.

430-4.6.4 Straight and Winged Concrete Endwalls: Construct in accordance with the Plans and Standard Plans, Indexes 430-030 through 430-040.

SUBARTICLE 430-11.1 is deleted and the following substituted:

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430-11.1 New Pipe Installed by Excavation or Trenching: The quantity of storm and cross drain pipe, storm drain trench, side drain and gutter drain pipe, installed by pipe culvert optional material - excavation or trenching, to be paid for will be plan quantity, in place and accepted. The plan quantity will be determined from the inside wall of the structure and from station/offset location for end treatments as shown in the Plans, along the centerline of the pipe.

Adjustment to bid quantities, prices and payment will not be allowed for increases, decreases or changes in material or installation requirements due to the use of any optional pipe materials.

If adjustments are required due to Plan errors or omissions or authorized field changes, the plotted material and not the material elected would be used to establish new pay quantities.

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Pipe sizes other than round (elliptical/arch) are summarized and paid for using equivalent round pipe diameter.

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SUBARTICLE 430-11.3 is deleted and the following substituted:

430-11.3 End Treatment: The quantity of all end treatments to be paid for will be the number completed and accepted. For mitered end sections the measurement will be per each end of pipe. Sod will be paid for in accordance with Section 570.

SUBARTICLE 430-12.1 is deleted and the following substituted:

430-12.1 General: Prices and payments will be full compensation for all work specified in this Section, including all excavation except the volume included in the items for the grading work on the project, and except for other items specified for separate payment in Section 125; all backfilling material and compaction; disposal of surplus material; and all clearing and grubbing outside of the required limits of clearing and grubbing as shown in the Plans.

No separate payment will be made for bituminous coating, concrete collars, or concrete jackets.

No payment will be made for failed bore paths, injection of excavatable flowable fill, products taken out of service, or incomplete installations. Payment will include all work and materials necessary for jack & bore, including boring, backfilling, flowable fill, and restoration materials necessary for a complete and accepted installation.

No payment will be made for jack & bore until a Bore Path Report has been submitted to the Engineer.

SUBARTICLE 430-12.7 and 430-12.8 is deleted and the following substituted:

430-12.7 Flared End Sections: Price and payment will be full compensation for all concrete, reinforcement, toe walls, and all work and materials required.

430-12.8 Mitered End Sections: Price and payment will be full compensation for all materials, pipe, grates when required, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bands, and all work required.

430-12.9 U-Type Endwalls: Price and payment will be full compensation for all materials concrete, reinforcement, grate, baffles, accessories, and all work required. Fencing, when called for in the Plans, will be paid for under Fencing, Type B, per foot. Rip rap will be paid for in accordance with Section 530.

430-12.10 Straight Endwalls: Price and payment will be full compensation for all concrete, reinforcement, grate, accessories, and all work and materials required.

SUBARTICLE 430-12.9 is deleted and the following substituted:

430-12.11 Railroad Requirements: Where pipe culvert is constructed under railroad tracks, the Contract unit price for the pipe culvert will include the costs of any jacking operations and the operation of placing the pipe by use of a tunnel liner, (except as specified for unanticipated tunnel liner, in 430-6.5, where reimbursement is to be made for such unanticipated liner), and all other work necessary to meet the requirements of the

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railroad company, excluding the costs of watchman or flagman services provided by the railroad company, except as provided below.

The Department will reimburse the Contractor for the actual costs of any trestle bridge work which is performed by the railroad's forces, as billed to him by the railroad, less the value of any salvage materials derived there from, whether such salvage materials are retained by the railroad company or by the Contractor. When the work of shoring and bracing is to be performed by the railroad, such fact will be stipulated in the Contract Documents and the Contractor will be required to pay to the railroad the amount of such costs, which amount will be reimbursed to him by the Department. The Contract unit price for the pipe culvert shall include the costs of all other work of shoring and bracing.

SUBARTICLE 430-12.10 is deleted and the following substituted:

430-12.12 Payment Items: Payment will be made under:

- Item No. 430- 17- Pipe Culvert Optional Material - Excavation or Trenching - per foot.
- Item No. 430- 18- Pipe Culvert Optional Material - Jack & Bore – per foot.
- Item No. 430- 94- Desilting Pipe – per foot.
- Item No. 430- 96- Polyvinyl Chloride Pipe - per foot.
- Item No. 430- 98- Mitered End Section - each.
- Item No. 430-200- Flared End Sections - each.
- Item No. 430-400 Winged Concrete Endwalls - each.
- Item No. 430-5- Straight Concrete Endwalls - each.
- Item No. 430-6- U-Type Concrete Endwalls - each.
- Item No. 430-830- Filling and Plugging Pipe – cubic yard.
- Item No. 430-950- Desilting Concrete Box Culvert – per cubic yard.