

Division 33 – Utilities

33.1. General

- a. The contractor shall secure, at the contractor’s expense, all utilities hookups and access roads for all construction projects. The contractor shall be required to make all utility connections and is responsible for the removal of all connections and any repairs that may need to be made. Contractor shall be responsible for furnishing and installing water pipes, fittings, valves, hydrants and other necessary equipment in accordance with the requirements of the municipal water and fire departments. Prior to ordering materials, the Contractor to obtain the latest copy of the municipal water department’s standards and specifications and shall notify the A/E immediately if any discrepancies are found between those requirements and the Contract Documents.
- b. The contractor shall first notify the ODU Project Manager no later than 72 hours in advance of a potential utility disruption.
- c. A 48-hour notice shall be given to residents or businesses affected by the shut-down, and shall be done by the Contractor under the direction of the A/E. The municipal or private utility may require the work to be done at night.
- d. Connections made to existing campus systems shall require prior approval as to the location, manner and time of the connections. Connections and reinstatements requiring any shutdown of an existing ODU system shall require the shutdown to be done only by Facilities Management personnel. A 14-day advance written notice shall be submitted to ODU Project Manager and shall be approved prior to any connections being made. As soon as temporary connections are no longer required, they shall be immediately removed by the contractor.
- e. Existing services and equipment shall be specified to be removed from site and not be abandoned in place except with the written approval of Facilities Management.
- f. The Contractor shall adjust all existing and new utility structures (manholes, valve boxes, etc.) to meet new grades as required to complete this project at part of the Cost of the Work.
- g. The engineer shall provide underground profile drawings of all utilities to be installed on campus (steam, chilled water electrical duct bank, sewer, storm, etc.) clearly indicating depths of existing underground utilities and minimum clearance required.
- h. Where utility excavation will be required, the engineer shall specify “maximum limits of excavation.”
- i. Accessible isolation valves, identified as to function, shall be provided at new taps from existing utilities.

33.2. Warning and Tracer Tape

- a. Provide metal-backed warning tape a minimum of 6” wide, at all non-ferrous underground utility lines. Provide non-metallic multiple-bonded plastic layer tape. The tape shall bear the wording ‘BURIED DRAIN LINE BELOW’ (with ‘DRAIN’ replaced by ‘WATER’, ‘SEWER’, ‘ELECTRICAL’, ‘GAS’, ‘TELEPHONE’, or ‘CHEMICAL’ as appropriate), continuously repeated every 30 inches to identify the pipe.
- b. Tape colors shall be as follows as recommended by the American Public Works Association (APWA):

Electric	Red
Gas and Oil	Yellow
Communications	Orange
Water	Blue

Sewer and Drain	Green
Chemical	Red (not APWA)

- c. Tape shall be located the shallower of 3 feet or half the distance between the crown of the pipe or conduit and the finished grade.
- d. Prior to Material Completion, the Contractor shall camera all new sanitary sewer pipe installed exterior to the building perimeter, and 10' beyond the connection point with existing pipe. The Contractor shall provide the A/E and ODU Project Manager with an electronic copy of the video footage for review. Cost of videoing the system shall be included in the Cost of the Work.

33.3. Utility Separation

- a. Whenever possible water mains shall be laid at a minimum at least 10 feet, horizontally, from any existing or proposed sewer. Should local conditions prevent a lateral separation of 10 feet, a sewer may be laid closer than 10 feet to a water main if:
 - i. It is laid in a separate trench, or if;
 - ii. It is laid in the same trench with the water mains located at one side on a bench of undisturbed earth, and if;
 - iii. In either case, the elevations of the top (crown) of the sewer is at least 18 inches below the bottom (invert) of the water main.
- b. Whenever sewers must cross under water mains, the sewer shall be laid at such an elevation that the top of the sewer is at least 18 inches below the bottom of the water main. When the elevation of the sewer cannot be varied to meet the above requirements, the water main shall be relocated to provide this separation or reconstructed with mechanical-joint pipe for a distance of 10 feet on each side of the sewer. One full length of water main should be centered over the sewer so that both joints will be as far from the sewer as possible.
- c. When it is impossible to obtain horizontal and/or vertical separation as stipulated above, both the water main and sewer shall be constructed of mechanical-joint cement lined ductile iron pipe or other equivalent based on watertightness and structural soundness. Both pipes shall be pressure tested by an approved method to assure watertightness or both pipes shall be encased in concrete.
- d. For all other utilities, a minimum of twelve inches (12") vertically and five feet (5'-0") horizontally, wall-to-wall, shall be provided between any two utilities and utilities structures.

33.4. Utility Trench cuts in Roadways

- a. Utility trench cuts in roadways shall be limited to 200' maximum and shall be covered with traffic-rated steel plates at the close of construction activities each day.

33.5. Building and Roof Drainage

- a. Drainage piping shall be located as approved by the Director of Facilities Management and/or the city authorities when located in streets, right-of ways or easements and when not located on university property.
- b. All building roof drainage, including external downspouts, areaway drains, and foundation drains shall be connected to a storm water best management practice, or the storm sewer system.
- c. If connecting to the storm sewer system, connections shall preferably be made to a manhole or a drop inlet directly. Where the preferred connection is not feasible or economically justified, the connection

- shall be to the storm sewer with a “Y” a maximum of 50 feet away from the building. Provide cleanout at roof drain and at a change in direction of any drainage piping.
- 33.6. Storm Inlets and Structures
- a. The following requirements apply to storm inlets and structures:
 - i. VDOT standard structures are to be used.
 - ii. Curb inlets shall be used for all surface drainage for roadways and parking lots unless vegetated swales or bio retention filters are used
 - iii. All grates for yard inlets shall meet handicapped accessibility standards.
 - iv. Avoid grate or other type inlets in lawn areas designed for student activities.
 - v. Grate inlets shall be used for all lawn areas.
 - vi. Dome top inlets are preferred in landscaped areas.
 - vii. Inlet grates shall be bicycle-safe and orientated with the long axis perpendicular to the direction of traffic.
 - viii. The tops of all structures shall be flush with the pavement surface.
 - ix. Inlet structure grating shall be heavy-duty traffic rated providing a minimum 24” clear opening for access.
 - x. For pipe diameters up to eighteen inches (18”) or a depth of four feet (4’-0”), the minimum inside size for drop inlets shall be twenty-four inches (24”). For pipe diameters greater than eighteen inches (18”) or deeper than four feet (4’-0”), drop inlets shall be forty-eight inches (48”).
 - xi. Area drains, clean outs and yard drains with minimum pipe size and cover shall use shallow cast iron fittings or heavy-duty HS 20 traffic fittings.
- 33.7. Site Storm and Sanitary Systems
- a. Sanitary piping shall not be located within areas of flooding or drainage channels.
 - b. Storm mains eighteen inches (18”) and above should be Class III reinforced concrete pipe. All pipe 18 inches and smaller shall be Class V.
 - c. HDPE double wall corrugated pressure pipe or solvent weld jointed schedule 40 PVC may be used for mains under 24”. Foundation and retaining wall drains shall be perforated solid wall schedule 40 PVC with solvent joints wrapped in geotextile fabric with a stone dust bed and cover. Under slab drains can be flexible PVC.
 - d. Sanitary piping shall be cast iron (CI), ductile iron (DI), HDPE pressure pipe or solvent weld jointed schedule 40 PVC.
 - e. Specify a minimum cover of twenty-four inches (24”) for storm pipe and thirty-six inches (36”) for sanitary.
 - f. The minimum slope shall result in a self-cleaning velocity (2 fps minimum) for the diameter used. Pipe on a twenty percent (20%) or greater slope shall be secured with concrete anchors.
- 33.8. Manholes and Cleanouts
- a. Provide manholes on storm and sanitary systems adjacent to all buildings to which laterals from the building are directly connected. Laterals shall be a maximum of fifty feet (50’). Where sanitary laterals exceed twenty feet (20’), a clean out shall be provided just outside the building. The cleanouts shall be installed in a concrete pad flush with the surface and be HS 20 rated.

- b. Manholes shall occur at changes in direction and in straight runs at a maximum of 400 feet in storm lines and 200 feet (200') in sanitary lines.
- c. Sanitary manholes shall be precast concrete (4,000 psi minimum compression strength) units with a 4 foot minimum inside diameter precast concrete units with eccentric cone section tapering to 30-inch diameter, or flat top, and one pour monolithic base. All units to be designed for HS-20 loading.
- d. Manhole frame and cover shall be heavy-duty traffic rated, providing a minimum twenty-four inch (24") clear opening for access.
- e. Manhole covers shall be designed to VDOT load bearing requirements and shall include identification of the system involved (steam, sanitary sewer, storm drains, electric, telecom, etc.)
- f. Joints in precast manholes (inside and outside) shall be filled with non-shrink grout and finished smooth.
- g. Manholes shall be coated from inside with vapor/moisture penetration preventing epoxy coating and from the outside with 2 coats bitumastic waterproof coating.
- h. Pipe connections to manholes shall be made with flexible rubber boots. At existing structures install sleeve prior to connection. For sanitary manholes use flexible, mechanical clamps, grout and water stop for a leak-proof connection.

33.9. Exterior Domestic and Chilled Water Piping

- a. The municipal water department shall be notified prior to starting construction of any portion of the municipal water system.
- b. The closing of valves necessary for making connections with existing municipal system(s) will be done by the local Water Department employees, assisted by the Contractor. Sufficient notice shall be given the Water Department of planned connection. No allowance will be made for any delay in closing of valves.
- c. Underground sanitary sewer pipe shall be double asphalt coated, cement lined ductile iron, Class 52 or higher with flexible restrained joints, furnished in 18-foot and 20-foot nominal lengths. PVC C900 is acceptable for water distribution piping.
- d. All fittings and hardware shall be epoxy coated. Branch lines two inch (2") and smaller can be type K copper. All mains shall be a minimum of six inch (6") diameter.
- e. The entry point into buildings shall be made with factory flanged ductile iron pipe, class 53 or higher.
- f. New chilled and domestic water branches shall preferably be connected to existing mains with full size tees; reducing tees or wet taps can only be used with prior approval of Facilities Management. Full size resilient seal gate valves shall be provided on both branches after tees (upstream of reducers).
- g. Buried chilled water supply pipes shall be insulated. Field installed rigid foam glass with a 50 mil poly jacket is preferred however a pre-insulated double wall pipe system can be used with prior approval of Facilities Management.
- h. Domestic water piping shall have a minimum three-foot (3') cover; chilled water lines shall have a minimum four-foot (4') cover. All buried domestic and chilled water lines shall have a stone dust or sand bed and cover.
- i. All buried domestic and chilled water lines shall be pressure tested at 200psig for two (2) hours. Domestic water lines shall be bacteria tested.
- j. Chilled Water Branches shall have a ductile iron valve box with lid marked "CHILLED WATER".

- k. Chilled water design pressure to be 150 psig. Direct Bury DIP Systems shall test pressure 1 times design pressure witnessed by Project Inspector.
- l. Long radius elbows are preferred
- m. All piping systems shall be protected against corrosion in accordance with AWWA standards.

33.10. Natural Gas

- a. The contractor is responsible for contacting Virginia Natural Gas (VNG) and notifying them prior to starting construction of any portion of the site gas lines (gas distribution system).
- b. The closing of valves necessary for making connections with the existing VNG system shall be done by VNG employees, assisted by the Contractor. Notify VNG at least 72 Hours in advance of any planned connection. The Contractor shall give a 48-hour notice to residents or businesses affected by the shut-down. VNG may require the work to be done at night during the low use time period, which shall be included in the base contract cost.
- c. In the event of contact with or damage to any VNG facilities, or interruption to gas service as a result of accidental breakage, the Contractor shall promptly notify VNG and shall cooperate fully with VNG in the restoration of service and repair of damage. Under no circumstances shall the excavator backfill or conceal any damaged area until the Private Gas Company reviews the damage and approves a procedure to affect repairs.
- d. If there is an escape of gas due to Contractor's work or negligent work, the Contractor shall immediately notify the appropriate VNG officials, the ODU Fire Safety Officer and the ODU Project Managers and shall make every effort to limit potential damage, including cordoning off the area and assisting in evacuation of adjacent people who may be harmed by the escaped gas.
- e. Natural Gas pipe shall be schedule 40 black pipe. Below ground pipe shall have welded seamless joints. Above ground pipe shall have threaded joints.
- f. When the project has an emergency generator, provide natural gas connection that is upstream of the building main gas shutoff valve. The A/E to indicate signage on the gas line to prevent confusion with regards to valve shut off to the building versus the generator for first responders. Review the reliability of the natural gas service and determine if an onsite backup fuel supply is required.

33.11. The A/E and the general contractor shall work with Dominion Energy to determine who will install electrical manholes and manhole covers on ODU property when required. The A/E shall incorporate Dominion Energy's standard specifications into the project specification for manholes and underground utilities when determined that the general contractor will be installing same.

33.12. Pond and Reservoir Liners

- a. Typically specified on the drawings, but due to the need for clarity and a tight specification, ODU requires a written specification section for liners.