**Jefferson County School District No., R-1**
**Support Services**

# TECHNICAL GUIDELINES

# DIVISION 33 – UTILITIES

**AUGUST 2022**

## Table of Contents

# DIVISION 33 – UTILITIES

## 33 01 00 Operation and Maintenance of Utilities – August 2021

- Work in this section is open to any product or material meeting the requirement of this Technical Guideline.
- Tracer Wire:
  1. Comply with recommendations from the American Public Works Association (APWA) for type, size, and color of wire. Insulated copper wire, min. 12 AWG.
  2. Install warning caution tape above all underground utility lines.
  3. Install at all underground utility lines, to run with each utility, including electrical, sanitary, water, gas, low voltage, telecommunications fiber, irrigation main lines, and other utilities
  4. Standard Colors:
     a. Yellow: Natural Gas
     b. Green: Sanitary
     c. Blue: Potable water
     d. Purple: Reclaimed water, irrigation, or slurry lines
     e. Orange: Fiber Optic or telecommunications

END SECTION 33 01 00

## 33 05 13 Manholes and Structures – October 2010

- Work in this section is open to any product or material meeting the requirement of this Technical Guideline.
- Manhole:
  1. Precast stacking concrete concentric oblong cones with vertical profile at ladder.
  2. 36 inch minimum height per section
  3. With cast-in aluminum ladder rungs @ 16 inches o.c.
  4. Metal cast manhole frames and covers
     a. Non-rocking design with machined bearing surfaces to prevent movement or noise under traffic.

END SECTION 33 05 13

## 33 05 16 Utility Structures – October 2010

- Work in this section is open to any product or material meeting the requirements of this Technical Guideline.
- Hydrants:
  1. No requirements
- Meters:
  1. No requirements
- Utility boxes:
  1. No requirements

- Utility valves:
  1. Per utility
- Utility Vaults and terminations are required to serve future temporary classrooms at Elementary, Middle, and High School sites, unless directed otherwise by District personnel.
  1. Power Vault
  2. Low Voltage Vaults for Data, Communications, and Detection/Alarm Systems
  3. Gas
  4. Water Termination
  5. Sewer Termination
- Coordination
  1. Jefferson County School District, R-1 Data, Communications and Alarm Diagram (Technical Details Drawings) for:
     a. Types
     b. Sizes
     c. Routing of utility connections to and from vaults and terminations.
  2. See Divisions 20-32 of these Technical Guidelines
- Utility Vault Construction
  1. Vault:
     a. Precast concrete
        (1) 3 foot cube
        (2) With appropriately sized and located knockouts for utility sleeves
            (a) Mouseholes acceptable
            (i) Minimum size 6” x 6” x 4”
            (b) Wall knockouts acceptable
            (i) Minimum size 18” x 3” x 4”
        (3) Include standard galvanized steel hatch with hinged water rated cover
            (a) Non-skid surface on lid
            (b) Traffic rated, as required
  2. Cast-in-place concrete slab per Division 03 of these Technical Guidelines.
  3. Brass plate utility identification.
- Power Vault
  1. Vault:
     a. Precast concrete
        (1) 3 foot cube
        (2) With appropriately sized and located knockouts for utility sleeves
            (a) Mouseholes acceptable
            (b) Minimum size 6” x 6” x 4”
            (c) Wall knockouts acceptable
            (d) Minimum size 18” x 3” x 4”
        (3) Include standard galvanized steel hatch with hinged water rated cover
            (a) Non-skid surface on lid
            (b) Traffic rated, as required
  2. Location:
     a. At designated temporary classroom area.
     b. 15 feet minimum separation from Gas/Sewer/Water pads.
  3. Connections:
     a. 2 inch, 480 V conduit to Main Distribution Center.

   b. And/or 2 inch 120/208V conduit with pull string
4. Connection depth:
   a. 24 inches below grade.
5. Utility splice cabinet acceptable where required, based upon utility company direction

- Low Voltage Vault
  1. Vault:
     a. Precast concrete
        (1) 3 foot cube
        (2) With appropriately sized and located knockouts for utility sleeves
            (a) Mouseholes acceptable
            (b) Minimum size 6” x 6” x 4”
            (c) Wall knockouts acceptable
            (d) Minimum size 18” x 3” x 4”
        (3) Include standard galvanized steel hatch with hinged water rated cover
            (a) Non-skid surface on lid
            (b) Traffic rated, as required
  2. Location:
     a. At designated temporary classroom area.
     b. Within 5 feet of Power Vault.
     c. 15 feet minimum separation from Gas/Sewer/Water pads
  3. Connections for Fire Alarm, Intercom, Security, Data, CATV, Telephone:
     a. Conduits to communication room per Data, Communications, and Alarm Diagram (Technical Details Drawings).
     b. Conduits to Fire Alarm Control Panel per Data, Communications, and Alarm Diagram (Technical Details Drawings).
     c. Connection depth:
        (1) 24 inches.
- Domestic Water
  1. Terminal:
     a. Line size shut-off valve complete with curb stop
     b. Set curb stop sleeve in 24 inches x 24 inches x 6 inch concrete pad on grade at a point 5’-0”± upstream of termination.
  2. Location
     a. Near designated temporary classroom area.
     b. 15'-0" minimum separation to Power or Low Voltage Vault.
  3. Utility Extension
     a. 1 inch cold water line to originate inside the main building.
     b. Shutoff isolation valve is required at the connection to main.
     c. Install safety marker tape above water line.
  4. Identification:
     a. Brass plate labeled ‘water’.
- Natural Gas
  1. Terminal:
     a. Capped, buried 2 inch valved line utility extension directly under 24 inches x 24 inches x 6 inches concrete pad on grade with cast lettering designating "NAT GAS."
  2. Location
     a. Locate pad 5’-0” ± upstream of termination.

b. Near designated temporary classroom area.
c. 15'-0" minimum separation to Power or Low Voltage Vault

3. Utility Extension
   a. Install safety marker tape above line
   b. Cast Iron pipe is required under vehicle areas and concrete pavement.
   c. Cleanouts are required at 100'-0" maximum interval.

- Sewer Termination
  1. Terminal:
     a. 4 inch sewer for future connection.
     b. Terminate with a grade cleanout in a 24 inches x 24 inches x 6 inches concrete pad.
  2. Install safety marker tape above line.

END SECTION 33 05 16

## 33 08 00 Commissioning of Utilities – October 2010

- No requirements

END SECTION 33 08 00

## 33 09 00 Instrumentation and Control for Utilities – October 2010

- Work in this section is open to any product or material.

END SECTION 33 09 00

## 33 10 00 Water Utilities – October 2010

- Coordinate design capacity calculations with water purveyor to establish tap fee.
- In the absence of other information, standards of the following organizations apply:
  1. Colorado Department of Health Cross Connection Manual
- Submittals
  1. Product Data:
     a. Required
  2. Shop Drawing:
     a. Preferred
  3. Test Reports, Certificates:
     a. Written evidence of backflow prevention test
  4. Closeout:
     a. Submittals listed above
        (1) Updated to record status.
- Building water service:
  1. Backflow preventer required
- Fire Hydrants
  1. Open to any product or material.
  2. 6 inch water main extension

3. Continuous loop system design

END SECTION 33 10 00

## 33 20 00 Wells – October 2010

- Work in this section is open to any product or material.
- Only in coordination with District Project Manager and Environmental Services

END SECTION 33 20 00

## 33 30 00 Sanitary Sewerage Utilities – August 2015

- Work in this section is open to any product or material
- Restrictions:
  1. Avoid lift stations, if possible.
  2. Use only with approval of District Project Manager
- Sanitary Sewerage Pipe:
  1. 6-inch minimum pipe size
  2. Recommended minimum slope:
     a. ¼ inch per lineal foot.
  3. Minimum Slope:
     a. 1/8 inch per lineal foot is permitted only with Jefferson County School District, R-1 authorization.

END SECTION 33 30 00

## 33 40 00 Storm Drainage Utilities – August 2015

- Work in this section is open to any product or material.
- Positive surface drainage away from the building is required on all sides, 10’ - 0" minimum perimeter
- Submittals
  1. Regulatory compliance documents
  2. O & M data required
  3. Closeout:
     a. Submittals listed above
        (1) Updated to record status
- Restrictions
  1. Discharge across pedestrian and vehicle pavement is prohibited
  2. Sheet flow is permitted across pavement.
  3. Swales:
     a. Grass swales and drainage channels are not recommended.
     b. Avoid creating areas of standing water
  4. Exposed corrugated culvert is prohibited
  5. "Dead-end" systems (i.e. French Drain) are prohibited.

- Protect inlet and outflow with tamper resistant screen to prevent passage of objects larger than eight inches in diameter.
- Provide safety protection planting, fence, or structures at headwalls

END SECTION 33 40 00

## 33 47 00 Storm Drainage Ponds – August 2015

- Construction of detainage ponds shall comply with all Federal and Local Regulations
- If site and soil characteristics allow, provide the following water quality pond design:
- Shallow surface drainage pond for ease of landscape and sod maintenance
  1. Maximum 1:4 slope at banks transitioning into flattened pond bottom
  2. Pond design:
     a. General Description: Layered sand/peat layer, gravel layer, perforated drainage piping, and geotextile fabric composition on undisturbed soil.
     b. Bottom of Pond: 18-inch thick sand/peat
     c. Below Sand/Peat Layer: Non-woven geotextile fabric – ASTM D4751; Sieve #40 - #60 ASTM D4632; Minimum grab strength = 120 lbs.
     d. Drainage Bed: 14-inch thick gravel
     e. Within Gravel Layer: Drainage/collection pipe: Min. 4-inch diameter perforated PVC – quantity and lengths as required to drain pond surface.
     f. Below Gravel Layer: Geotextile fabric, 16 mil impermeable liner, geotextile fabric on undisturbed or compacted soil.
     g. All three trench geotextile fabric and impermeable liner shall extend a minimum of 12-inches horizontal then vertical past end of sand/peat layer around pond rim.
  3. Water Quality Outlet Box
     a. Grated inlet structure with PVC solid drainage pipe inlet at low-point of drainage bed.
     b. Connect outlet box to facility-wide or municipal stormwater infrastructure to drain.
  4. Over-seed or sod sand/peat layer to stabilize surface
     a. See Division 32

## 33 70 00 Electrical Utilities – October 2010

- Work in this section is restricted to specific products of specific manufacturers that have been previously approved by Jefferson County School District, R-1 Facilities Services Department.
- Submittals
  1. Product Data:
     a. Per Utility Company
  2. Shop Drawing:
     a. Per Utility Company
  3. Design Data, Test Reports, Certificates, Manufacturer Instruction, Manufacturer Field Reports:
     a. Per Utility Company

4. Closeout:
    a. Submittals listed above
        (1) Updated to record status

- Meter:
    1. Furnished by the public power utility
    2. High Schools and Middle Schools will also have pulse meters so that the district can monitor and control electrical demand provided by utility via contractor.
    3. Meter Base:
        a. Furnished by Division 26 contractor, in accordance with the public utility's standards.
    4. Metering Transformer Compartment:
        a. Integral component of switchboard.
    5. Splice Cabinet
- Execution Summary
    1. Make arrangements with the utility company to obtain permanent electric service to the project
    2. Install underground service entrance conduits and wire from utility company's pad mounted transformer to building service entrance equipment.
    3. Installation must comply with the utility company's requirements for cold sequencing i.e., disconnect before metering issues.
    4. Meter via current transformer(s) supplied by utility company and located in main distribution center (MDC).
    5. Typical system voltages for Jefferson County School District, R-1 facilities:
        a. 480Y/277 volts, 3 phase, 4 wire, 60 hz.
        b. 208Y/120 volts, 3 phase, 4 wire, 60 hz.

END SECTION 33 70 00

## 33 80 00 Communications Utilities – October 2010

- Work in this section is open to any product or material.

END SECTION 33 80 00