

Spring Creek / Cow Creek Sanitary District

APPENDIX 1

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Design and Construction Standards For Water and Wastewater Piping and Appurtenances

PART 1 - GENERAL

1.1 Description

- A. This document applies to all underground potable water and wastewater systems and appurtenances installed within the jurisdictional boundaries of the Spring Creek / Cow Creek Sanitary District (SC/CCSD or District). References to plans shall include all plans and specifications necessary to complete the work.

1.2 Design Criteria, Specifications and Standards hereby referenced:

- A. City of Rapid City, South Dakota, Infrastructure Design Criteria Manual, 2012 Edition or most current edition.
- B. Recommended Design Criteria Manual for Wastewater Collection and Treatment Facilities, South Dakota Department Agriculture and Natural Resources, (DANR) current edition.
- C. Recommended Standards for Water Works, "Ten States Standards", current edition.
- D. National Standard Plumbing Code Illustrated, current edition.
- E. American Water Works Association, Applicable Manuals of Water Supply Practices, current editions.
- F. Uniform Fire Code, current edition.
- G. Handbook of PVC Pipe Design, Unibell, current edition.
- H. Gravity Sanitary Sewer Design and Construction, ASCE Manuals and Reports on Engineering Practice – No. 60 or current edition.
- I. Recommended Standards for Wastewater Facilities, "Ten States Standards", current edition.
- J. SC/CCSD Regulation of Sewer Use Ordinance, current edition.
- K. SC/CCSD Regulation of Water Use Ordinance, current edition.
- L. City of Rapid City Standard Plates. Specifically, but not exclusively, Sections 8, 9, and 11.
- M. City of Rapid City Standard Specifications for Public Works Construction, 2022 or current edition.
- N. Where discrepancies occur between SC/CCSD or other standards, the more restrictive shall apply. Changes, additions and/or clarifications are listed in Part 2 and Part 3 of this document.

1.3 Enforcement and Authority

- A. The Board of Trustees of SC/CCSD has the authority to interpret and enforce criteria, standards and construction requirements. Conflicts between specifications, design criteria manuals, codes and standards shall be resolved by the Board of Trustees or the Superintendent if the Board of Trustees elects to delegate said power.
- B. Administrative Rules of South Dakota, ARSD 74:53:04 and 74:53:05.
- C. This document is approved by the SC/CCSD Board of Trustees and is included as an Appendix to the current Regulation of System Expansion Ordinance.
- D. The Superintendent, District staff, the Board of Trustees, and their designated Engineer will provide review and enforcement of the requirements.

1.4 Plan Submittal and Review

- A. All plan submittals shall be made directly by the developer to the District Superintendent. Submittals from other agencies will not be accepted.
- B. Submittals shall include the following:
 - 1. Plan Sets: Two (2) paper sets and an electronic copy of the complete set of construction plans proposed for improvements within the District.
 - 2. Specifications: A complete set of specifications and all associated documentation for proposed system improvements.
- C. The submittals shall include complete construction plans, profiles, stationing, details, detailed specifications, general notes, reports and other information concerning the work. The submittals shall be prepared by a Registered Professional Engineer in the State of South Dakota. Such documents shall be complete, clear, neat, legible, detailed and in a form acceptable to SC/CCSD and any other local, city, county, state or federal review agency.
- D. The design report shall include a water and/or sewer planning report for the ultimate development to be served. The report shall cover the proposed full-build out of the proposed development and it shall also review how the surrounding areas will be affected. The reports shall also include wastewater design flows, pipe capacities, existing conditions, hydraulic network, available fire flows at peak day demands, projected water usage, system pressures and other information required.
- E. SC/CCSD Board of Trustees will approve the proposed water and sewer plans after all requirements of the development have been fulfilled. The SC/CCSD Board of Trustees may issue conditional approvals at the recommendation of the District's engineer, Superintendent, or district staff.
- F. SC/CCSD review and approval applies only to water and sewer facilities. The project must be reviewed and approved by all appropriate local, county, and state governing agencies prior to any construction.
- G. Plans will be reviewed and returned within thirty (30) days of submittal where the Superintendent does not require a review by the District's Engineer. Where review by the District's engineer is required, the review period shall be extended to sixty (60) days. Review comments will be made by the District where plans do not meet minimum requirements. Plans shall be resubmitted for review and comment after

modification. Comments made on the original submittal shall be returned with the new plan submittal. All questions or comments shall be addressed and noted as such in response by the developer.

- H. The Pierre Rural Fire Department or the Onida Fire Department may also review all water projects and may make review comments available to SC/CCSD. This review will be performed during the review period listed above.
- I. Plans shall be submitted to the South Dakota Department of Agriculture and Natural Resources (DANR) by the Developer for review and approval prior to construction. SC/CCSD will not submit plans on behalf of the developer or the developer's engineer. A final set of plans approved by the DANR shall be received prior to approval by the SC/CCSD.
- J. Nothing in the above prohibits or otherwise limits a developer from seeking preliminary review of plans and specifications by the SC/CCSD. Preliminary review or preliminary approval shall not be considered a final action or approval by the SC/CCSD.

1.5 Construction

- A. Construction of the proposed water and sewer facilities must be constructed by a Contractor holding a current Water and Sewer Installer's License issued by the South Dakota Plumbing Commission.
- B. District personnel or agents acting on behalf of the District shall be given access to the work at all times to make inspections of the work. Inspections performed by the District or agents during the course of construction shall not constitute an acceptance of work performed or operate to relieve the developer's obligation to construct the project in compliance with the approved plans and specifications.
- C. The District will not accept facilities not in conformance with specified standards.
- D. Construction may not proceed until the District Board approves the final plans.
- E. Locations: Water and sewer facilities shall be located within the street, alley or right-of- ways unless topography dictates otherwise. Easements are required where the water and sewer facilities will be located outside of the rights-of-way.
- F. All water and sewer appurtenances such as manholes, cleanouts, valves and fire hydrants shall be accessible by motorized vehicle.
- G. The project will be accepted into the SC/CCSD system upon the following:
 - 1. Construction is complete and facilities can be placed into service for their intended use.
 - 2. All testing has been completed and the required results have been achieved.
 - 3. As-built drawings and electronic files are provided to SC/CCSD.
 - As-built drawings: Two (2) paper copies and an electronic copy in ACAD and PDF format shall be provided. Drawings shall include a complete set of drawings, including all plan and profiles of water, sewer, streets, storm water and standard details of all improvements within the boundaries of the District. Drawings shall depict lots, dimensions, right-of-way, easements, water and sewer infrastructure, including service lines, meters and any associated appurtenances.

- Notes shall be taken during construction and documented on the drawings depicting any and all changes made during construction that deviates from the originally approved drawings and/or the specifications.
 - The drawings shall be prepared by a licensed engineer and submitted from the developer to the District Superintendent.
4. Facilities are in conformance with plans, specifications and District standards.
 5. The engineer of record or the engineer providing construction administration for the project provides a signed and sealed Notice of Completion form provided by the District, verifying that the construction has been completed according to the approved drawings and specifications.

1.6 Quality Control

- A. Source Quality Control: Materials shall be clearly marked with size, class, type, test pressure and manufacturer's name.
- B. Regulatory Agencies: Pipe for potable water service shall bear the National Sanitation Foundation Seal. AWWA and ASTM standards shall be followed where applicable.
- C. Material testing during construction will be required- see referenced standards for details.

1.7 Product Submittals

- A. Shop Drawings and Product Data:
 1. Dimensional data for all pipe, fittings and appurtenances.
 2. Material description and conformance with standards.
 3. Affidavit certifying compliance with applicable standards and specifications.
 4. Other items required to review product conformance with standards.

PART 2 - WASTEWATER PIPING AND APPURTENANCES

2.1 Sewer Mains and Services

- A. Minimum sewer main size is 8" which shall have a minimum slope of 0.4%. If larger diameter pipe is required or is shown in the SC/CCSD Master Plan, the Developer/Contractor will incur the cost of up-sizing. Pipe material shall be ASTM D-3034, SDR-35 or SDR-26 gasket sewer pipe. All sanitary sewer mains shall terminate at a manhole. Cleanouts shall not be allowed on sewer mains in lieu of manholes. All new sewer service lines shall have a fabricated pipe wye on the sewer main, GPK gasketed sewer fitting or equal (8"x4" is GPK No. 107-0084). Direct sewer taps are not allowed on new sewer mains.
- B. Sewer services shall be installed to the property line and marked with a steel "T" post at the end of each service. Sewer services shall be installed to a maximum depth of 8' at the property line or at the proper depth to provide service to the proposed lot.
- C. External or internal chimney seals are required on all manholes.

- D. Minimum sewer main cover depth from the top of the pipe to finished grade shall not be less than 5.0 ft. Provide insulation per the standard detail in cases where minimum cover cannot be provided. Insulation may be required between storm sewer and sanitary sewers.
- E. Minimum sewer service cover depth from the top of the pipe to the finished grade shall not be less than 5.0 ft.

2.2 Lift Stations and Force mains

- A. Lift stations shall be required where gravity flow of wastewater cannot be maintained. Where lift stations are required, the developer and the design engineer shall coordinate with the Superintendent to match the type of controls, pumps, and other appurtenances to provide continuity with existing systems to the extent possible. Where new technologies or systems with improved performance can be installed, the Superintendent may recommend installation of such technologies or systems for approval from the SC/CCSD Board of Trustees.
- B. Lift stations approved for construction after March 1, 2024, shall be designed and include backup power generation equipment suitable to operate the lift station at full capacity. The controls shall integrate with the existing lift stations. The location of the lift station shall be such that District staff are provided a minimum clear distance around the facility of four feet for performing maintenance. The easement shall be adequate to allow for servicing of the equipment within the easement bounds and provide a minimum distance from any property line of 10 feet. A minimum 6 ft high solid fence shall be provided around any lift station with a lockable gate.
- C. All lift stations shall include plans and specifications for the pumps, guide rails, structure, building, fencing, back-up power, control systems and all electrical components. Plans and specifications shall be prepared by a Registered Professional Engineer licensed in the state of South Dakota.

2.3 Sewer Testing and Inspection

- A. Closed Circuit Television (CCTV) Inspection.
 - 1. The Contractor shall arrange and pay for internal CCTV inspection of the completed sewer mains.
 - 2. The CCTV inspection shall be performed by an SC/CCSD approved contractor.
 - 3. Upon completion of the inspection, an electronic copy of the videos and pictures shall be provided to the District Superintendent. The District will review the video for approval prior to acceptance of the system. The inspections shall be completed in accordance with NASSCO standards for documentation.

PART 3 - WATER PIPING AND APPURTENANCES

3.1 Water Mains, Fittings, and Appurtenances

- A. Fittings shall be fusion bonded epoxy ductile iron AWWA C-153, Class 350 mechanical joints with retainer glands or approved joint restraining devices shall be used where joint restraint is required by the plans or in this specification. Mechanical joint restraints are required at all fittings and pipe bells within the restraining length.
- B. All ductile iron fittings and joint restraining devices shall be encased in 8 mil polyethylene per the Standard Specifications.
- C. All metallic water fittings/services in contact with potable water shall be “No Lead” brass alloy and “NL” shall be cast or permanently stamped on the fitting or valve. Fittings and valves shall comply with the USA Safe Drinking Water Act, and US EPA.
- D. All pipe couplings shall be restrained mechanical joint sleeves with restraints allowing a maximum of 5-degree deflection.
- E. Existing mains must remain in-service until the new water main is complete, disinfected, and pressure tested.
- F. Water mains shall be a minimum PVC AWWA C-900 or C-905, DR 18, Pressure Class 235. Minimum main size is 6”. If larger diameter is required for fire flow purposes or for future development the Developer/Contractor will incur the cost of up-sizing. When looping piping where pipe sizes differ, the loop shall be constructed of the larger size piping or as approved by the District.
- G. All main valves shall be mechanical joint non-rising stem resilient seat gate valves. Butterfly valves are not allowed.
- H. Fire hydrants shall be American Darling model B-84, American Flow Control, or Mueller, or as approved by the District.
- I. Ductile iron fittings shall be mechanical joint and fusion-bonded epoxy coated. Use of American-made products is recommended.
- J. Concrete thrust restraints are considered permanent restraint and required. Mechanical restraints are considered temporary.
- K. Fittings shall be mechanically restrained at all vertical bends, all fittings on lowering’s, reducers, tees and valves. Restraints are not required on horizontal bends of 45 degrees or less where properly thrust blocked. Acceptable joint restraining devices shall be EBBA, Uni-Flange , Romac Field Flange or Alpha Fittings.
- L. Pipe joints for PVC water main shall be push-on bell and spigot. Where water main pipe joints are located closer than the restraining length to a restrained valve or fitting, the bell joint shall be restrained with a bell restraint fitting. The designer shall provide restraining length designs.
- M. Bolts for mechanical joints shall be NSS “Cor-Ten Blue” corrosion resistant type or stainless with a minimum of 304 rating. (Type 304 stainless will be used if soil test is moderate-to-severe for being corrosive)
- N. Tapping sleeves shall be stainless steel construction with a minimum 200 psi rating. The branch end shall be flanged and stainless-steel bolts and nuts shall be provided. A flange by mechanical joint valve shall be installed on the tapping sleeve.
- O. Testing and disinfection per standard specifications. The Contractor is responsible for all testing, tapping, disinfection and water sampling.

- P. Tracer wire is required on all water main and locator boxes will be placed at all fire hydrant locations. The Contractor shall coordinate all tracer wire splice locations with District staff or agents.
- Q. Water mains shall be bedded with a type 1 or type 2 bedding material, a minimum of 4" above and below the water main.
- R. Water mains shall be laid in straight lines with deflection or curving of the pipe accomplished by appropriate fittings only.

3.2 Water Service Lines

- A. Minimum service line size is 1".
- B. Direct tapping into the water main is not allowed. A tapping saddle must be used.
- C. Tapping saddles and corporation stops are required. Tapping and all materials are the responsibility of the Contractor. The District reserves the right to observe all water main taps. For all taps to existing pressurized lines under the operational control of the District, the Contractor shall contact and schedule the proposed tap with the District a minimum of 2 working days prior to anticipated tap.
- D. Tapping saddles shall be solid band 304 stainless steel construction with stainless steel nuts and bolts. Tapered Buna-N ASTM D-2000 rubber gasketed (Ford FS303 or equal).
- E. One inch (1") through two-inch (2") diameter shall be iron pipe size (IPS) poly SDR 7, 250 psi minimum rating; with stiffener inserts at each curb stop, fittings, and corporation stop. Tubing shall meet the requirements of AWWA C901, NSF Standards 14 and 61, and shall have the material designation of PE3608 by the Plastic Pipe Institute.
- F. Compression type connections with inserts are required. (No yellow brass allowed. Red brass only).
- G. Splices are not allowed along the service line. Service line must be continuous. .
- H. Piping over 2" and less than 4" shall be PVC service line pipe and shall comply with ASTM D-2241, 200 psi minimum rating, SDR 21. 4" and larger shall be C-900 PVC.
- I. Tracer wire shall be installed at each service line and be exposed at the curb box. A ¼" hole will be drilled in the lid of the curb box and tracer wire ran through. Do not cut the tracer wire when continuing to house. On new construction of service lines to the house a tracer wire is required from the curb box to the water meter or valve inside the meterpit with a tracer wire exposed at the curb box lid through the ¼" hole or holes that are drilled in the curb box lid.
- J. Curb stops with boxes shall be placed on each new service line as close as practicable to the property line on the lot side of the line or as shown on the plans.
- K. Curb boxes shall be marked with a steel fence post.
All curb boxes shall be adjustable and installed to finish grade. Finished grade is defined as the top of finished and graded topsoil. All curb boxes shall be wrapped in 8mil plastic.
- L. Curb boxes shall be Minneapolis pattern No. 5622 (1-1/2") or Buffalo style 100E curb box with bushings added to curb stop or as approved by the Superintendent.
- M. Water services shall be bedded in the same manner as the water main the service is connected to.

- N. Select soil material is required for a minimum of 18" above the pipe and shall include no rocks 2" or larger in nominal diameter.

3.3 Design Standards for Spring Creek / Cow Creek Sanitary District Water Systems

- A. Minimum working pressure at peak hour demand shall be 35 psi.
- B. Shut off valves shall be installed on each leg of a branch or tee and at a maximum spacing of 1,000 feet.
- C. Pipe looping is required and shall be at the developer/contractor's cost unless a cost share agreement is entered into by the District and approved by the Board of Trustees prior to construction.
- D. Maximum fire hydrant spacing shall be 400 feet and at all intersections and high points. Fire hydrants shall be preceded by a gate valve.
- E. Minimum burial depth shall be 6 feet to the crown of the pipe. Insulation may be required at storm sewer crossings and ditch crossings where 6 feet of cover cannot be maintained.

PART 4 – LOCATION AND CORROSION PROTECTION SYSTEMS

4.1 Corrosion Protection Systems

- A. Corrosion protection systems as included in the City of Rapid City Standard Specifications for Public Works Construction, 2023 edition, shall not be required unless otherwise discussed by the District at time of submittal.

4.2 Location Systems

- A. Tracer wire shall be as required by the standard specifications and details. The Superintendent may approve use of alternative wire, connection, and termination components.

**** END OF SECTION ****