

ROUND MOUNTAIN WATER & SANITATION DISTRICT

RULES AND REGULATIONS

SECTION I

GENERAL - EXPLANATORY MATERIAL

1.1 POLICY AND PURPOSE. It is hereby declared that the Rules and Regulations hereinafter set forth will serve a public use and are necessary to insure and protect the health, safety, prosperity, security, and general welfare of the inhabitants of the Round Mountain Water and Sanitation District. The purpose of the fees and regulations is to provide for the control, management, and operation of the water and sewage systems of the District including additions, extensions, and connections thereto.

1.2 DEFINITIONS. Unless the context specifically indicates otherwise, the meaning of terms used herein shall be as follows:

"Actual Cost" shall mean all direct costs applicable to the construction, engineering, inspection plan approval fees, "as-built" drawings, and other costs necessary for completion.

"Board" and "Board of Directors" shall mean the governing body of the Round Mountain Water and Sanitation District.

"Building" shall be defined to be an enclosed habitable structure with outside walls and a roof designed and constructed for permanent shelter of persons and inhabitable as a dwelling or business. This includes Mobile Homes, which have been either recorded as an improvement with the County or possess valid license plates.

"Building Drain" shall mean that part of the lowest horizontal piping of a building drainage system from the stack or horizontal branch, exclusive of storm sewer, extending to a point not less than five feet outside of the building wall.

"Contractor" shall mean any person, firm, or corporation approved by the District to perform work and to furnish materials therefore within the District.

"Customer" shall mean any person, company, corporation, or governmental authority or agency authorized to connect to District water or sewer systems under a permit issued by the Board.

"District" shall mean the Round Mountain Water and Sanitation District.

"Industrial Wastes" shall mean the liquid wastes from industrial processes, as distinct from sanitary sewage.

"Owner" shall mean the person owning the real property served by water and sewer service.

"Permit" shall mean written permission of the Board to connect to a public sewer or public water main of the Round Mountain Water and Sanitation District and pursuant to the Fees and Regulations of the District.

"Person" shall mean any individual, firm, company, association, society, corporation or group.

"Public Sewer" shall mean a sewer main which is owned and controlled by the District and which is located on public streets or public rights-of-way.

"Sewage" shall mean any liquid waste containing animal or vegetable matter in suspension or solution from residences, business buildings, institutions, and industrial establishments.

"Sewer" shall mean a pipe or conduit for carrying sewage.

"Sewer Service Line" shall mean the extension from the building drain to the public sewer.

"Shall" is mandatory.

"Stub-in" shall mean that part of the service line lying within the public right-of-way. When installed in the public right-of-way, curb valves, curb boxes, meters, meter boxes, and the line itself shall all be considered a part of the stub-in.

"Tap" or "Connection" shall mean the connecting of the service line to the water main or sewer main.

"User" shall mean any person to whom water and/or sewer service is supplied.

"Water Main" shall mean a District-owned water pipeline, carrying potable water only and shall be installed in a public street or right of way.

"Water Service Line" shall mean the water line extending from the water main to the customer's building. This shall not include the tap on the main or the corporation cock.

ANY OTHER TERM not herein defined shall be defined as presented in the "Glossary-Water and Sewage Control Engineering," A.P.H.A., A.S.C.E. and W.P.C.E., latest edition.

SECTION 2

CONDITIONS OF USE OF WATER AND SEWER SYSTEMS

2.1 WHO MAY USE. Water and sewage service can be furnished only to properties included within, and subject to taxation, by the District, except as otherwise provided herein and approved by the Board of Directors (Board).

No person shall connect to or use the District's water or sewer system without obtaining a written permit from the District and paying all applicable District fees (including without limitation tap fees and connection charges) and complying with all applicable District Regulations. No water or sewer service will be provided until all past charges are paid.

The District shall not provide stand-alone water or sewer service unless both services are not reasonably available to the subject property.

Unless specifically exempted by the Board, any structure in the District requiring water or sewer service under the applicable building or zoning regulations that is within 400 feet of a District service line and capable of being served by the District may be required to connect to District service upon notice by the District. If the owner of such structure or the property upon which it is located fails to connect pursuant to the District's demand, the property shall be deemed to be utilizing District services and the property shall be subject to all applicable District fees, including any penalties, interest and late charges.

Except for those taps specifically provided or approved by the District for such purposes, water from the District's system shall not be used on property other than the property served by the subject tap. This prohibition applies to the sale, donation, deliver, or other conveyance of water to any location outside of District boundaries, to any location where water service has been terminated by the District, and to the delivery of water to neighboring properties by any means, including hoses, pipes or ditches. These prohibitions shall not apply to the use of water for their own personal consumption by persons residing on the property or to de minimis removal of water from a customer's property by others in small vessels or containers that can be carried by a single person.

2.2 RESPONSIBILITIES OF THE CUSTOMER AND OWNER. No person shall discharge or cause to be discharged any water bleeding flows, storm water, surface water, ground water, roof runoff, sub-surface drainage, cooling water, or unpolluted industrial process waters to any sanitary sewer.

No person shall discharge, or cause to be discharged, to any public sewer, any harmful water or wastes, whether liquid, solid or gas, capable of causing obstructions to the flow in sewers, damage or hazard to structures, equipment and personnel of the sewage works, or other interference with the proper operation of the sewage works.

Leaks or breaks in the customer-owned portion of the service lines shall be repaired by the owner within 72 hours after the customer has been given notification of such condition by



AMENDMENT TO ROUND MOUNTIAN WATER AND SANITATION DISTRICT RULES AND REGULATIONS

SECTION 2, PARAGRAPH 2.2

Paragraph 2.2 currently states: "Leaks or breaks in the customer-owned portion of the service lines shall be repaired by the owner within 72 hours after the customer has been given notification of such condition by the District. If satisfactory progress toward repairing the leak has not been made by the time specified, the District shall have the authority to repair or have repaired the lines at the cost of the owner, and all such costs shall constitute a lien against the subject property until paid. The customer is financially responsible for all water and/or sewer usage caused by leaks or breaks in the customer-owned portion of the service lines."

If the customer can prove to the District that a service line leak was unintentional, the District, at its discretion, will bill the customer at the following amended rates:

Water – The minimum monthly service fee will be required, and all metered water usage will be billed at the lowest tier of water usage rates.

Wastewater – The minimum monthly service fee will be required, and sewer usage will be billed based upon a monthly average unless it is proven that water from the service line leak entered the District's collection system. In that case, the customer will be charged the full amount of metered usage.

The District will allow charges incurred from a service line failure to be paid over a maximum period of 6 months, interest free.

the District. If satisfactory progress toward repairing the leak has not been made by the time specified, the District shall have the authority to repair or have repaired the lines at the cost of the owner, and all such costs shall constitute a lien against the subject property until paid. The customer is financially responsible for all water and/or sewer usage caused by leaks or breaks in the customer-owned portion of the service lines.

2.3 CONNECTION TO DISTRICT SYSTEM. No new structure requiring water or sewer service under the applicable building or zoning regulations shall be constructed within the District unless connected to the District's water and sewer system. However, the Board may permit the owner to install temporary individual disposal facilities providing that all the following conditions are met:

1. Extension to the District's system would create an unreasonable financial burden,
2. A private disposal system is constructed to meet all State Health Department requirements, and
3. The owner provides written agreement to connect to the District system when a District service line is within 400 feet of the structure.

All existing buildings capable of being served by the District shall connect to the District's water and sewer system when a District line is available within 400 feet of the buildings. All extensions and connections shall be in accordance with the practices contained hereinafter. No septic tank systems or other private sewage disposal facilities shall be constructed or used within the limits of the District unless specifically approved by the Board.

Prior to requesting a connection permit for water and/or wastewater service, an "Availability of Service" letter must be obtained. This letter will contain information regarding the availability of service(s), under what conditions the service can be made available and any special circumstances that pertain to the property. This letter will guarantee permit fees and water and sewer services to the property for a period of one year after the date of the letter. The property owner must obtain a permit for connection of services before beginning construction of a building. Changes to the original request for services may require adjustments to fees charged for the connection permits in accordance with the District's approved fee structure. If the "Availability of Service" letter expires prior to a connection permit being obtained, the letter is no longer valid. An application for a new "Availability of Service" letter will need to be submitted and reviewed and will be subject to the most current rules and availability of services.

All connection permits issued prior to August 2nd 2018, shall continue to be administered in accordance with previous regulations until such time these connections are made to buildings, or connection permits are transferred to another property, or connection permits are abandoned in accordance with Section 3.42.

Water and/or wastewater permits issued after the effective date of this resolution shall expire 365 days after the date of issuance. A permit may be extended by 180 days from the expiration date if construction of a building is currently underway at the permit location or a contract for construction of a building has been executed for the site.

If construction has not begun, or an extension to the permit not been requested by the 366th day after the permit was issued, the permit will expire. The District will refund the current property owner any system development fee and connection charge previously paid to the District within 30 days after the permit has expired. Once expired, a new permit must be acquired before any connection may be made. No refund will be made for application fees, design related fees, or for other similar fees. Any expenses incurred by the District related to the extension of water or wastewater service lines shall not be refunded. Refunds will be sent by first class mail to the address on the permit unless the District has received a written request notarized and signed (by the person(s) having title to the property) that provides a different address or different delivery method. Refunds will be made only to the person(s) who currently have title to the property to be served.

All permits shall be subject to the same minimum monthly water and/or wastewater service fees as though the service lines were connected and installed at that location. Minimum monthly fees shall start on the first day of the month following 90 days after a permit is issued or upon service line connection to a building, whichever occurs first. Minimum service fees charged after obtaining the permit and prior to connection of the building to the District's system will not be refunded for any reason.

If tap fees are amended after the date of permit issuance, no adjustment shall be made by means of a rebate or by additional charges unless a request is made for a change in tap size or if any other adjustment would impact flow or pressure through a connection. All connection permits shall be designated for a specific location and shall not be transferred to any other location unless specifically approved by the District.

Unless otherwise specifically approved by the District Board of Directors or their authorized representative, each separately owned parcel to be served shall be adjacent to both water and sewer mains in a public street, alley, easement, or right-of-way. Private easements or extending service lines lengthwise down any public street, alley, easement, or right-of-way will be prohibited unless an exception is approved by the District.

2.4 DAMAGE. No person shall maliciously, willfully, or negligently break, damage, destroy, uncover, obstruct, deface or tamper with any structure, appurtenance, or equipment that is a part of the water or sewage works.

2.5 WATER SYSTEM. The District's water system has been planned and constructed to provide potable water for conventional domestic and commercial uses and fire protection. Persons wanting to use the water system for an industrial water supply, which could be expected to require large quantities of water or unusual demand rates, shall be required to submit plans for the industry's water use before a permit will be issued; said permit may contain use limitations, as determined necessary by the Board.

2.51 WATERING AND IRRIGATION HOURS. The Board may from time to time find it necessary to control or restrict watering and irrigation (including limiting hours for watering and irrigation) within areas served by the District in order to maintain adequate water storage, water pressure and fire protection capabilities, or to cope with unusual supply

limitations, pumping limitations or other emergency situations. At such times, the Board shall have full authority to adopt watering restrictions (including restrictions on hours for watering and irrigation) by separate resolution, subject to fines for violators, together with provisions for penalizing, disconnecting, and collecting fees and charges from customers who fail to pay the fines, fees, or charges, in the same manner as provided herein for nonpayment of fees and violations of these regulations.

2.6 CUSTOMER PLUMBING. No cross-connections between the District water system and any other water supply or waste line shall be permitted. All customers' plumbing shall comply with the Colorado State Plumbing Code. The District authorized inspector shall have right of access to customers' premises for the purpose of inspecting customer plumbing. Failure of a customer to grant access to District inspectors shall be grounds for suspension and disconnection of service by the District.

No residential customers shall have floor drains connected to the sewer system, installed in garages, or other uninhabited areas.

Service stations, garages, schools and other commercial or industrial customers may install floor drains only by the express permission of the District. Approved grease and grit traps shall be provided and maintained for all such drains. Grease and grit traps must meet all specifications and design standards as deemed adequate and necessary by the District and must comply with the Colorado State Plumbing Code.

2.7 SWIMMING POOLS. All pools (connected or not connected to District infrastructure) must be registered with the District, showing the location and size of the pool before construction begins. A permanent sign must be placed prominently at all pool filter installations, stating that pools are not to be drained without the District's written permission and that pool draining shall be limited to the hours between 11 p.m. and 6 a.m. Pool backwash wastewater system design and operation are subject to the Colorado State Plumbing Code and to the approval of the District.

SECTION 3

SERVICE CONNECTIONS

3.1 INDIVIDUAL SERVICE LINES. Individual water and sewer taps are required for each individual residential or commercial structure. Separate service lines are required for each residential or commercial structure. Any requested variance from this requirement must be approved by the District.

Exceptions to this rule: Multi-unit buildings, building complexes or mobile home parks, including condominiums, apartments, shopping centers, motels, hotels, or any other improvement comprising two or more units shall be permitted to utilize a single water tap (and single water meter installed by the District), provided that the entire complex and/or improvement is owned by a single person.

Should it become necessary to terminate said services because of non-payment of fees and charges, said services shall be terminated to all units served by said single water and sewer taps (and water meter if applicable). In the event of such termination, the occupants, or owners of units within such multi-unit improvements, shall have no recourse against the District and shall seek recourse solely against the nonpaying owner.

In no case shall a single water tap, service line, or water meter serve separate parcels of property even if owned by a common owner. If a parcel of property is subdivided or otherwise divided into separate legal parcels or ownership units, separate taps, service lines and meters must be paid for and installed to serve the newly created parcels or ownership units so that each separate legal parcel or ownership unit has separate services.

For the purposes of this section, each non-contiguous lot, parcel, or property shall be considered a separate ownership, requiring separate service taps and separate service lines. Non-contiguous property is that which is separated by any public street, alley, right of way, lot line or by any other ownership.

3.2 SPECIFICATIONS. All materials and installation practices shall conform to the current Colorado State Plumbing Code, current Colorado Department of Public Health and Environment rules and regulations and shall be subject to the District's Technical Specifications for the Installation of Water and Sewer lines (Appendix B). Installation of all taps, service lines and meters shall be inspected and approved by the District before back fill and use.

3.3 COST AND MAINTENANCE RESPONSIBILITY. All cost and expense of the installation and connection of water and service lines, including the stub-in, shall be borne by the customer (including excavation, backfill, sidewalk and road surface restoration). All excavation practices, parts and materials shall be in conformance with Appendix B: Technical Specifications for the Installation of Water and Sewer Lines and will be approved by the District before installation.

If required by the District, the customer shall install a Pressure Reducing Valve to reduce excess water line pressure before connecting building plumbing to the incoming water service line.

After acceptance of the initial service line construction, the District shall assume the ownership of the water service tap, stub-in and meter, and shall maintain the same at District expense. The customer shall retain the ownership of and maintenance responsibility for the entire sewer service line from the tap to the customer's structure.

3.4 WATER AND SEWER SERVICE TAPS. The installation and maintenance of taps and stub-ins, including the exposure of mains, shall only be made by the District or by contractors approved by the District. The customer must confirm their installation contractor

is approved by the District before construction begins. New tap and stub-in installations may be postponed by the District until ground conditions are frost free.

All taps are owned by the District. The payment of tap fees and the signed acceptance of a tap installation agreement affords the property owner a right to connect to and use the publicly owned water and/or sewer system. The property owner's interest in the tap is usufructuary rather than legal. Usufructuary means the right to use something that belongs to others. This right applies for a specific tap size at a specific location, pursuant to the fees and regulations of the District.

Once placed in service, the tap becomes an appurtenance or privilege that runs with the property, either to be used at that location or abandoned. The right to use a tap may not be marketed as personal property nor sold by the property owner for use elsewhere. Only the District, as owner and public custodian of the tap, has the right to permit its relocation.

3.41 TRANSFER OF EXISTING TAPS. The District, at its sole discretion, may approve the transfer of taps previously purchased but uninstalled from one property to another within the District. Transferred taps will be subject to the most current installation policy.

3.42 ABANDONMENT OF SERVICE TAPS. Owners whose properties are vacant or whose buildings do not require water or sewer service under the applicable building or zoning regulations may petition the Board of Directors in writing for abandonment of water and/or sewer service taps. The Board at its next regular meeting will consider such petition, and if approved by majority vote, the Board shall declare the taps abandoned and shall provide the owner with a written certificate of abandonment.

Such abandonment will be made without refund of tap or connection fees. Upon abandonment of the taps, the property will cease to be subject to minimum service or availability fees.

Such property shall not be occupied until service is renewed by means of a new permit and full payment of tap and connection fees in effect at the time of permit approval. At such time, services will be made available, subject to all District rules and regulations then in effect.

3.5 WATER AND WASTEWATER DISCONNECT/RECONNECT. Water turn on/off service may be requested with prior notice. Wastewater service may not be turned off at any time unless by permit abandonment or lawful disconnection due to payment delinquency. Water service will not be turned on or off by the District at the request of the owner unless he, his agent, or his representative is present.

A customer is entitled to one water disconnect and one water reconnect per year per account. Any additional disconnect or reconnect request will be charged for each occurrence as described in Appendix A. Water disconnect/reconnect will take place at the curb valve or water meter by the District only during normal working hours and only when at least twenty-four (24) hours advance notice has been given to the District. Although not obligated to do so, the on-call technician may turn service on or off outside of normal

working hours or without advance notice. An additional fee will be charged each time the service is performed outside of business hours and will be included as a special fee on the next monthly billing.

SECTION 4 CRITERIA FOR WATER AND SEWER MAIN EXTENSIONS

SERVICE AVAILABILITY. Water and sewer service extensions can be furnished only to properties included within the District and subject to taxation by the District, except as otherwise approved by the Board.

WATER SUPPLY. As a condition of serving a parcel of property, the District shall require an owner to convey by special warranty deed to the District all water and water rights historically used to irrigate the portion of the property to be developed or, in the District's sole discretion, a lesser amount as the District deems necessary for the provision of water services to the owner's property. In no event shall the amount of water dedicated to the District be less than the amount necessary to serve the proposed development. All water rights must be accompanied by a confirmed yield and/or demand report proving sufficiency to meet the expected demand of the new development. The District may require other documentation or information related to the water rights and the proposed development prior to extending service to the property. All water rights conveyances shall be free of all liens and encumbrances and in a form acceptable to the District.

SCOPE

The procedures, regulations and limitations of this policy apply to all requests for water and sewer main extensions in all areas, inside or outside of the District. Any variance from this policy requires Board approval.

SECTION 4.10 – GENERAL PROVISIONS

41.1 ENGINEERED DESIGN

A Registered Professional Engineer licensed to practice in the State of Colorado shall design all water and sewer public infrastructure extensions and any system modifications within the District.

A. PLAN SUBMISSION

All water and sewer designs shall be submitted to the District on either 11 x 17 inch or 24 x 36-inch sheets and electronic PDFs for review and approval prior to construction.

B. DISTRICT APPROVAL

All designs must be approved by the District before any construction begins. District approval will be given when, in the District's opinion, the proposed plans conform to District specifications and otherwise meet the

needs of the District and applicable engineering standards.

C. AS-BUILT DRAWINGS

When construction has been completed to the satisfaction of the District, the project engineer shall submit As-Built Drawings of the project to the District.

D. CERTIFICATE OF COMPLETION

Upon approval and acceptance of the As-Built Drawings, the District will issue a Certificate of Completion for the project. The system may then be placed in service.

E. NOTICE OF ACCEPTANCE

Upon request by the Contractor after completion of the warranty period, and after correction of any deficiencies, the District will issue a Notice of Acceptance, relieving the Contractor of any further responsibility for the work.

41.2 AS-BUILT DRAWINGS

Before the District issues a Certificate of Completion of improvements, the Developer or Contractor shall provide the District with two sets of "AS-BUILT" drawings, one on 24 x 36-inch sheets, the other in digital form. These drawings shall have been prepared and signed by the Project Engineer and shall show in sufficient detail all actual "as-constructed" station numbers, elevations, dimensions, offsets and details needed to locate, maintain and connect to the facilities. Manholes, valve boxes, buried tees, wyes, ells and services shall be located by station number and offset from centerline. Additionally, water and sewer line appurtenances shall be surveyed by a licensed surveyor. The basis shall be the District control points with northing and easting and elevation of the appurtenance. These data point shall be provided to the District in an electronic format.

Satisfactory "AS-BUILT" drawings must be delivered to the District before the District will accept the work and issue a Certificate of Completion. Failure to submit AS-BUILT drawings acceptable to the District may result in termination of District water and sewer service.

41.3 LOCATIONS OF WATER AND SEWER MAIN EXTENSIONS

Unless otherwise approved by the District, water distribution and sewer mains shall be installed in public rights-of way or easements over which the Town of Westcliffe, the Town of Silver Cliff, Custer County, or the State Highway Department has jurisdiction. Any easement shall be in a form and of a duration acceptable to the District. The costs for preparing and acquiring any such

easement shall be borne by the Developer unless otherwise agreed upon by the District.

41.4 IMPROVEMENTS AGREEMENT AND FINANCIAL GUARANTEE

Prior to commencement of construction of any such line or addition, the Developer shall deposit with the District security in the form of cash or a Letter of Credit in a form acceptable to the District in the amount of 120% of the estimated cost of the proposed construction. The purpose of such security is to enable the District to undertake or complete such construction utilizing the District's own forces or contractors in the event the Developer fails to complete the construction.

If cash is used as security, amounts shall be released by the District on the schedule pursuant to the District's cash in Lieu of Letter of Credit Financial Guarantee Agreement.

If a Letter of Credit is provided as security, at the time of 100% completion of construction and upon inspection and probationary acceptance of the construction by the District, presentation of evidence of full payment therefore by the Developer through canceled checks, lien waivers, or other evidence satisfactory to the Manager of the District, the District shall cause to be refunded to the Developer 100% of the cost of actual construction, with the District retaining 20% of the cost of construction until the expiration of the two-year warranty period applicable to such construction. At the completion of the two-year warranty period, the District shall return to the Developer all amounts remaining in possession of the District which have not been required to be expended by the District in repair of maintenance of said construction. No permission to connect to the water or sewer systems of the District shall be granted unless and until the provisions of this Section have been complied with.

The terms water main and sewer main shall be deemed to include any other facility related thereto including, without limitation, pumps pumping stations, wells, lift stations, metering devices and any other special structure which once constructed and/or installed will become a part of the District's water and/or sewer system.

SECTION 42.00 – WATER DISTRIBUTION SYSTEM MATERIAL AND INSTALLATION

42.1 SCOPE

Water distribution systems in the District shall be designed and constructed in accordance with the standards of the American Water Works Association (AWWA), the Ductile Iron Pipe Research Association (DIPRA), the pipe manufacturer's recommendations, and comply with the District's technical specifications. All applicable ANSI/AWWA standards apply including but not limited to: C150/A21.50, C150A21.51, C600, C651, AWWA C900 and

AWWA C905. The latest editions are applicable.

**American Water
Works Association**

Handbook of Ductile Iron Pipe, Sixth Edition

Ductile Iron Pipe
Research Association
245 Riverchase Parkway
East Birmingham,
Alabama 35244

42.2 GENERAL

- A. Materials used must comply with the District's Technical Specifications.
- B. Piping for water transmission, distribution and service lines to be installed in easements or public right-of-way under the jurisdiction of the towns of Westcliffe or Silver Cliff shall be designed, fabricated and installed per engineered plans as approved by the District and as hereinafter specified. The specific requirements for excavation and resurfacing over pipelines are detailed in the District's technical specifications. Select fill and bedding for water line installations shall be strictly adhered to and followed. The District will inspect all installations prior to backfill. **Failure to comply with inspection requirements will result in mandatory re-excavation of the pipeline before approval.**
- C. Private unmetered water mains and private hydrants shall be prohibited. Private mains constructed solely for fire line service to buildings may be reviewed and approved on a case by case basis.
- D. PVC main line and plastic service line piping shall include tracer wire.
- E. Water main line valves, tees and appurtenances shall be survey located and the coordinates provided to the District via the record drawings.

42.3 DESIGN CRITERIA

42.3.1 The District will designate connection points for new pipeline extensions and will provide the project engineer with available information on existing pipe size and system pressure at those connection points. The project engineer shall size the water main extensions to provide adequate flow rates to properly serve the population of proposed development. New distribution lines shall be no less than 8-inch diameter. All design calculations and design criteria shall be submitted to the District for

review and approval by the District Manager.

42.3.2 All offsite improvements necessary to accommodate new improvements shall be the responsibility of the developer/applicant.

42.3.2.1.1 Water mains shall generally be placed on street centerlines or as determined by the District. Water mains shall be installed to maintain 5 feet of cover from the top of the pipe to the final finished street or landscaped area grade.

42.3.2.1.2 Water main extensions for developments of 20 units or more shall be designed to make continuous loops, connecting to the District water system in at least two points to provide redundancy of supply.

42.3.2.1.3 In Residential Areas, fire hydrants shall be installed a maximum of 500 linear feet apart, measured along the street, generally at each intersection, with a travel distance of no more than 250 linear feet from any point on the street to the nearest hydrant. In Business, Commercial, Industrial, and High-Density Residential Areas, hydrants will be installed in conformance with the Uniform Fire Protection Code. Where practical, hydrants shall be set on the side of the street closest to an inbound fire truck. Hydrant locations must be approved by District and by the Fire Chief. The Project Engineer will stake the location and elevation for all hydrants. In general, hydrants should be centered between the curb and the sidewalk, with the bottom of the hydrant base flange set 1" to 3" above top back of curb.

42.3.3 Service line and meter sizing shall be in accordance with the District's technical specifications.

SECTION 43.00 – SANITARY SEWER SYSTEM MATERIALS AND INSTALLATION

43.1 SCOPE

Sewage collections systems in or for RMWSD shall be designed and constructed in accordance with the standards promulgated by the Water Quality Control Division of the Colorado Department of Public Health, by the Uni-Bell PVC Pipe Association, and by this specification.

Design Criteria Considered
in the Review of Wastewater
Treatment Facilities Policy

& Environment Water Quality Control

Division

Handbook of PVC

Pipe, Current Edition

Uni-Bell PVC Pipe

Association 2711 LBJ

Freeway, Suite 1000

Dallas, Texas 75234

43.2 GENERAL

- A. Materials shall be in accordance with the District's Technical Specifications.
- B. Mains and public facilities to be installed in easements or public right-of-way under the jurisdiction of the City of Westcliffe or the City of Silver Cliff shall be designed, fabricated and installed per engineered plans as approved by the District and as hereinafter specified. The specific requirements for excavation and resurfacing over pipelines are detailed in the District's technical specifications. Select fill and bedding for water line installations shall be strictly adhered to and followed. The District will inspect all installations before back-fill.
- C. All offsite improvements necessary to accommodate new improvements shall be the responsibility of the developer/applicant.
- D. Low-pressure sanitary sewer systems shall be approved on a case-by-case basis.
- E. Contractors and developers shall provide as-built record drawings for all public main installations. Mains, manholes, and appurtenances shall be survey located and the coordinates provided to the District via the record drawings.

43.3 DESIGN CRITERIA

The main collection system for all developments shall be designed and constructed by the developer. Design of the system shall be the responsibility of the developer (or owner) with all plans and design calculations subject to review and approval by RMWSD.

A. PIPELINE MATERIALS

1. All public sewerage collection pipelines shall be constructed of Polyvinyl Chloride (PVC) pipe manufactured in conformance with ASTM D-3034 (SDR 35), having a nominal inside diameter not less than 8 inches.

B. PIPELINE SIZES

1. Sewer collection pipelines shall be sized to carry the Design Flows based upon service area population estimates by the design engineer. Should the District conclude a proposed new pipeline will ultimately serve a larger area and population than is included in an individual project, the District may direct the design engineer to design a larger pipeline.
2. The project engineer shall design all sewer pipelines. In the absence of defensible design criteria to the contrary, the design shall be based upon the following sewage-flow criteria:
 - a. **Average flow** shall be determined by the following:
 - i. Residential - on a basis of 3.5 people per residence and 100 gallons per day per person
 - ii. Multi-family Areas - on a basis of 300 gallons per day per living unit.
 - iii. Commercial Areas - on a basis of 4600 gallons per day per acre or actual usage, whichever is greater. Design criteria for commercial areas shall meet International Plumbing Code requirements.
 - iv. Industrial Areas - on a basis of 5040 gallons per day per acre or actual usage, whichever is greater. Design criteria for industrial areas shall meet International Plumbing Code requirements.
 - b. **Peak Flow:** The average flow shall be multiplied by a peaking factor to obtain the peak design flow. The project engineer shall submit his peaking factor calculations and assumptions to the District with the plans.
 - c. **Infiltration** shall be estimated using the following method. The larger result obtained using these calculations shall be added to the peak flow to determine the design flow.
 - i. A factor of 75 gallons per inch diameter of pipe per day multiplied by the total length of pipe in miles and the diameter in inches.
 - ii. Engineering estimate based on soils report(s) and proximity of sewer lines to seasonal ground water table.
 - d. **Design Flow:** The sum of the peak flow and the infiltration allowance shall be used to calculate pipeline size.

C. CALCULATIONS

The design engineer shall provide RMWSD with copies of his estimates and calculations.

D. GREASE TRAP REQUIREMENTS

1. For all commercial developments concerning the preparing of food, all fats, oils, and grease (FOG) shall be directed through an appropriately designed interceptor or trap. Said device shall be designed and constructed according to the latest edition of the International Plumbing Code and subject to the rules, regulations and limitations of the District's Fats Oils and Grease Policy (Appendix C).

43.4 LOCATION, COVER AND SEPARATION

43.4.1 Sewer mains shall generally be located under streets, south and west of street centerlines, or on centerlines of alleys. Sewer mains shall not be designed or installed in easements outside of public rights of way unless written permission is obtained from the District and an easement is provided to the District for all appurtenances that may require District maintenance.

43.4.2 Sewer mains shall be located a minimum of 10 feet horizontally from existing or proposed water mains.

43.4.3 Sewer mains shall be designed deep enough to serve basements and lower level bathroom facilities wherever possible. The design engineer shall endeavor to place all sewers at least 7 feet below finished street grade. At a minimum, all sewers shall be at least 3-1/2 feet deep, measured from the top of the pipe to the proposed finish street grade. Where possible, sewers shall be installed deep enough to accommodate all foreseeable future extensions and connections.

43.5 ALIGNMENT AND SLOPE

43.5.1 Sewer mains shall be designed so the full flowing velocity is not less than 2 feet per second, or greater than 10 feet per second. Sewer mains shall be designed so the pipeline between any two adjacent manholes is on a straight line.

MINIMUM SEWER SLOPE

Minimum Slope in Feet

<u>Sewer Size</u>	<u>per 100 Feet</u>
8-inch	0.40
10-inch	0.30
12-inch	0.28
14-inch	0.25

43.5.2 The minimum slope of the sewer line shall be 0.5% within 200 linear feet both upstream and downstream of all manholes angled greater than 45 degrees.

4.4 WATER AND SEWER LINE EXTENSION REBATE POLICY

It shall be the policy of the District that developers extending water and sewer main lines 400 feet or farther, which meet the District's specifications for acceptance as a public line, will be allowed to collect a partial reimbursement for installation costs from persons connecting to the main that the developer has laid for a period of ten (10) years after the completion of the line. The District will collect this fee at the time of connection and will forward payment to the developer's last known address.

Only those owning property adjacent to a main will be required to pay this fee before connecting to the main.

Anyone extending a main from the endpoint of a developer's previous work will not be required to pay this fee. This exemption does not apply to an extension that serves any form of development that would prevent further extension of the main, limiting the new line to serve only one development (example: a cul-de-sac). Before construction begins, developers of such properties must pay their line installation reimbursement, based on the linear frontage of the development adjacent to the existing main.

The amount of fee to be charged will be calculated using the following method:

Step 1. Total Price per Foot = Total line construction cost ÷ Total linear feet of constructed line

Step 2. Price per Foot of Frontage = Total price per foot ÷ 2

Step 3. Contractor Capital Rebate Fee = Price per foot of frontage X Total linear feet of property to be served

Example:

Step 1. \$10,000 ÷ 500 ft = **\$20 total price per foot**

Step 2. \$20 ÷ 2 = **\$10 Per foot of frontage**

Step 3. \$10 X 100 ft of property frontage = **\$1000 Contractor Capital Rebate Fee**

In calculating the construction cost, the developer may use all costs associated with the installation of the permanent structure of pipe and appurtenances, including engineering costs and permit fees. Expenses such as equipment depreciation, interest on borrowed money or overtime for laborers will not be reimbursed. All costs must be verified and

approved by the District before calculation of the total construction cost. Any developer wanting to make use of this policy must approach the District and enter into an agreement with the District before completing the construction of the line.

Once an agreement is entered, it will be recorded against those adjacent parcels of property.

Each development and line extension are unique. As such, each agreement will be unique and may contain elements not within this general policy, but which are, in the District's sole opinion, appropriate for the development in question.

SECTION 5

RATES AND CHARGES

5.1 BASIS OF CHARGES

Sewer service charges for all customers shall be based on an equivalent residential unit (ERU) basis as shown below. Water service charges for customers subject to metered rates shall be based on gallons consumed, subject to a minimum fee. See Appendix A for the current rates and fees referenced herein.

CLASSIFICATION AND EQUIVALENT UNITS

CLASSIFICATION	ERU
A. Single-family residence, permanent trailer, town home, condominium unit, if billed individually (not to have more than one kitchen):	1.0
B. Multi-family residential units, duplexes, apartments, condominiums, when in one building and billed collectively (subject to a minimum of 1.0 ERU per tap):	
1. Buffet apartment	0.6
2. Up to and including 2 bedrooms and no more than 1 bathroom	0.8
3. Three bedrooms and over; or 2 or more baths	1.0
4. Each coin-operated washing machine or its equivalent	0.25
5. Mobile home (trailer) in court	0.8
C. Transient rental units, hotels, motels, or rental units in residence. Basic fee including manager's quarters:	1.0
1. Each additional rental room without cooking facilities	0.3
2. Each additional rental room with cooking facilities	0.4

3. Each coin-operated washing machine.	0.25
D. Recreational vehicle (RV) parks:	
1. Manager's unit	1.0
2. Any space with water and or wastewater hookups	0.5
3. All other spaces	0.25
4. Dump Station	1.0
E. Bars, restaurants	
1. For business with less than 25 seating capacity	1.0
2. For the second 25 seating capacity or part thereof	0.8
3. For each additional 25 seating capacity (after the first 50)	0.6
F. Service stations without wash rack:	1.0
1. Each additional wash rack	1.0
G. Commercial or public buildings such as stores, offices, warehouses and similar, having no process water or waste loads:	
1. Minimum for each building or customer up to 4,000 square feet per building area	1.0
2. For each additional 1,000 square feet building area or part thereof	0.2
3. Additional for each pair of public restrooms	0.4
H. Churches, non-profit organization halls (no residence or regular eating facilities):	1.0
I. Schools, public or private:	
1. Basic rate, per pupil capacity 0-40 students and less	2.0
2. Each additional (40) students or fraction thereof	1.0
3. Additional for gymnasium and showers	1.0
4. Additional for cafeteria	1.0
J. Outside customers: for customers outside the District limits, multiply all applicable in-District rates by 1.5.	
K. Swimming pools-for each 25,000 gallons or fraction thereof of swimming pool capacity:	1.0

- L. Public restrooms, showers, or laundromats not otherwise classified (subject to a minimum of 1.0 ERU per water tap):
- | | |
|-------------------------|------|
| 1. Each public restroom | 0.2 |
| 2. Each shower unit | 0.25 |
| 3. Each washing machine | 0.25 |

If the property use should change at any time, fees will be adjusted to coincide with the change in use.

5.2 WATER AND SEWER TAP FEES AND CONNECTION CHARGES

Tap fees, including system development fees and tap installation fees, for water and sewer service shall be computed as listed in Appendix A.

Additions or size increases to an existing water tap or increased pollutant loadings to the sewer system shall require payment of additional appropriate System Development Fees for both water and sewer.

Water and/or sewer tap fees may be set by the Board in the case of any unusual-type customer.

5.3 WATER AND SEWER SERVICE CHARGES

5.31 WATER SERVICE CHARGES

5.31.1 RESIDENTIAL SINGLE-FAMILY WATER SERVICE CHARGES

A minimum monthly water fee per tap shall apply whether the water is on or off. No gallons are included in the minimum fee. A tiered-usage charge shall be added for each 1,000 gallons of water, as measured by the water meter serving the property.

5.31.2 RESIDENTIAL MULTI-FAMILY WATER SERVICE CHARGES

A minimum monthly water fee per metered account shall apply whether the water is on or off. No gallons are included in the minimum fee. A tiered-usage charge shall be added for each 1,000 gallons of water, as measured by the water meter serving the property.

5.31.3 COMMERCIAL WATER SERVICE CHARGES

A minimum monthly water fee per metered account shall apply whether the water is on or off. No gallons are included in the minimum fee. A tiered usage charge shall be added for each 1,000 gallons of water, as measured by the water meter serving the property.

5.32 WASTEWATER SERVICE CHARGES

5.32.1 RESIDENTIAL SINGLE-FAMILY WASTEWATER SERVICE CHARGES

A minimum monthly wastewater fee per tap shall apply whether the water service is on or off. No gallons are included in the minimum fee. A usage charge shall be added for each 1,000 gallons of water, as measured by the water meter serving the property. Charges for metered water usage shall be capped at 5,000 gallons per month of water multiplied by the number of ERUs assigned by the District in accordance with Section 5.1 Basis of Charges.

5.32.2 RESIDENTIAL MULTI-FAMILY WASTEWATER SERVICE CHARGES

A minimum monthly wastewater fee per metered account shall apply whether the water service is on or off multiplied by the number of ERUs assigned to the account by the District in accordance with Section 5.1 Basis of Charges of these regulations. No gallons are included in the minimum fee. A usage charge shall be added for each 1,000 gallons of water used per month as measured by the water meter serving the property. Charges for metered water usage shall be capped at 5,000 gallons of water multiplied by the number of ERUs assigned by the District in accordance with Section 5.1 Basis of Charges.

5.32.3 COMMERCIAL WASTEWATER SERVICE CHARGES

A minimum monthly wastewater fee per metered account shall apply whether the water service is on or off multiplied by the number of Equivalent Residential Users assigned to the account by the district in accordance with Section 5.1 Basis of Charges of these regulations. No gallons are included in the minimum fee. A usage charge shall be added for each 1,000 gallons of water used per month, as measured by the water meter serving the property.

5.4 BILLING AND PAYMENT

Statements for all charges shall be prepared monthly in arrears. Printed statements, unless electronic statements by email are requested and authorized by the property owner, shall be sent by First Class mail the first full week of every month. All statements, whether mailed or emailed, are due on the dates they are sent to the customer and will be considered delinquent after close of business on the last business day of the month. A delinquency fee will be assessed to the unpaid charges and added to the next billing statement.

- 1) When an account has an unpaid balance after a new billing cycle, the first collection letter stating that a monthly payment is necessary is mailed that includes the date of customer's last payment and that the past due balance is due within 10 business days from date of first letter. The letter will also state the current billing amount is delinquent at close of business on the last business day of the month to avoid any additional late charges. In landlord/tenant situations, the property owner also receives a statement and/or letter that indicates the past-due balance.

- 2) If payment is still not received, a second letter is sent two to three days after due date specified in first collection letter. This letter states we did not receive a payment or phone call as requested in the first letter, and therefore the total balance of the account is due by last business day of the month. This second letter additionally states that if a payment is not received, the District will initiate steps to disconnect service. This letter also states that base water and sewer services will continue to accrue. This letter gives option to contact the District to set up a payment plan if entire amount cannot be paid. When a landlord/tenant account is not paid by the tenant after the due date specified in this second collection letter, the account will be transferred to the property owner's name.
- 3) If no response or payment is received and a new billing cycle has occurred, a third letter is sent immediately after new billing is processed. This is marked as "FINAL NOTICE" and instructs the minimum payment due within 10 business days. The letter will state the exact date service will be disconnected for non-payment and reiterates that base water and sewer charges will continue to accrue even though service has been disconnected. This letter states a reconnect fee will be charged, and service will not be restored until account is paid in full when disconnection of service has occurred.
- 4) "FINAL NOTICE" will state that the District will proceed with certifying the amount due to the County Treasurer's Office in accordance with C.R.S. 32-11101. (Statute requires that an account balance must exceed \$150 and shall be at least six months delinquent.) Therefore, if no payment is received after "FINAL NOTICE" is mailed, the District must wait to file a lien until statute requirements are met.
- 5) At any point during the collection process, the property owner may request a payment plan. Any payment plan request must:
 - a. Provide for the payment of all current charges each month
 - b. Include a minimum monthly payment or the amount past due incorporating any delinquent charges previously assessed, divided by twelve (12) months, whichever is greater.
 - c. Be signed by the property owner and an authorized District representative.

Once a payment plan has been approved, no further delinquent charges (late fees) shall be assessed.

If the property owner fails to make a payment as provided for in the payment plan agreement, the agreement shall be deemed null and void and the collection process shall be resumed at the point it was paused or the District may proceed to certify the past due amount without further notification.

5.5 SPECIAL BILLINGS

Flat rates or metered rates may be individually set by the Board for any unusual-type customer, for business and industries using process water or producing industrial wastes, and for the prevention of customer wastage.

SECTION 6

PENALTIES AND SEVERANCE

6.1 APPLICABILITY

These fees and regulations shall apply to all property owners within the boundaries of the District, and shall, in addition, apply to all property owners outside the District who are furnished water or sewer service by the District.

6.2 LIABILITY

Any person violating any of the provisions of these regulations shall be liable to the District for any expenses, loss or damage occasioned by reason of such violation.

6.3 VIOLATION NOTICE

a. Any person found to be in violation of the provisions of these regulations shall be served with written notice by the District. Such notice shall state the nature of the violation, the compliance required, and provide a reasonable time within which to comply. The time for compliance shall not exceed 30 days unless the circumstances justify a longer period in the District's sole judgement. The notice may be mailed by certified or registered mail to the owner or served upon the persons in possession of the premises cited or posted conspicuously upon the premises for a period of 10 days.

b. In the event of failure to comply with the requirements set forth in the notice, the District may take any lawful action deemed appropriate in their sole discretion to prevent or abate actual or anticipated damage or danger to the system and such costs shall be properly charged against the property served and constitute a lien thereon.

c. It shall be a violation of these regulations for any person to fail to comply with any notice given pursuant to this Section. Each and every day or portion thereof during which any such failure is committed, continued or permitted, shall constitute a separate violation.

6.4 DISCONNECTION

In addition to, and notwithstanding, any other provisions and regulations, the District may at its option, disconnect the water or sewer line from any property owned by any person violating any of the provisions of these regulations from the facilities of the District. The costs of the disconnection and severance shall be charged against the property formerly served by the District and, until paid, shall constitute a lien which shall be collected in the same manner as provided for herein for the collection of rates, tolls, fees and charges, or as otherwise provided by law.

6.5 SEVERABILITY

If any provisions of these Rules and Regulations or the application thereof to any person, situation or circumstance be held invalid, such invalidity shall not affect other provisions or applications of these Rules and Regulations which can be given effect without the invalid provisions or applications and the provisions of this Resolution are declared to be severable, the Board of Directors expressly declaring that it would have passed this Resolution and every paragraph, sub-paragraph, sentence, clause, phrase and word thereof irrespective of the fact that any one or more of the other paragraphs, sub-paragraphs, sentences, clauses, phrases, or words thereof may be declared invalid.

**TECHNICAL SPECIFICATIONS
AND CONDITIONS FOR THE
INSTALLATION OF WATER AND
SEWER LINES**



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PREPARED BY THE ROUND
MOUNTAIN WATER AND
SANITATION DISTRICT

Effective April 20, 2020

DOCUMENT 00010

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SECTION 01100
SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Scope
- B. Definitions.
- C. Authority of District.
- D. Work by the District.
- E. Contractor's Responsibility.
- F. Work sequence.

1.2 SCOPE

- A. Specifications and requirements set forth to be used in the design and construction or repair of water and sewer mains, including all associated appurtenances and connections for approval and acceptance by the District.
- B. Excavation and restoration standards are required to preserve the integrity, operational safety, and function of the rights-of-way located within the District.

1.3 DEFINITIONS

- A. District: Shall mean the Round Mountain Water and Sanitation District including personnel with the authority to act on behalf of the District.
- B. Engineer: Shall mean the authorized professional engineer and designated representatives acting on behalf of the District, including but not limited to inspectors in the field.
- C. Local Regulatory Agency (ies): Shall mean the governing body or authority having jurisdiction over or responsibility for a particular activity within the scope of a water or sewer line installation project. They may be defined specifically within these Technical Specifications, otherwise, the Contractor shall be responsible to determine same in the local area of the project.

- D. Right-of-Way (ROW or R-O-W): Shall mean the area on, below, or above a public roadway, highway, street, path way, bicycle lane and public sidewalk in which the District has an interest, including other dedicated rights of ways for utility easements of the District.
- E. Contractor: Shall mean a person, partnership, or corporation approved to work in the District in accordance with the requirements of the rules and regulations of the District.
- F. Excavate: Shall mean to dig into or in any way remove or physically disturb or penetrate any part of a right of way.
- G. Best Management Practices (BMPs): schedules of activities, prohibitions of practices, maintenance procedures, and other management practice to prevent or reduce the pollution of waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, waste disposal, or drainage from material storage.

1.4 AUTHORITY OF THE DISTRICT

- A. The District shall have authority to ascertain that all construction of water and sewer infrastructure is equal to or better than the minimum construction requirements set forth in these specifications.
- B. The District and Engineer have authority to assign an inspector to check any and all work, including materials to be incorporated in the work, excavation, bedding, backfill, and all construction methods and practice.
- C. Inspectors are assigned to assist the Contractor to comply with these specifications and have the authority to reject defective or inferior materials and workmanship and to suspend work until the conditions in question are corrected.

1.5 WORK BY THE DISTRICT

- A. Work includes:
 - 1. Installation of tapping saddles, corporation stops, and tapping of water mains (note that contractors installing infrastructure for new developments may be given approval to tap mains, install tapping saddles and corporation stops).
 - 2. Flushing and testing of chlorine residual for new water mains.
 - 3. Observe pressure testing of water mains, sewer mains, manholes and appurtenances to be accepted by the District.
 - 4. Operating valves and appurtenances in existing system required for construction, including filling and flushing mains to be accepted by the District.
 - 5. Note that the District retains the right at its discretion to hire a Geotechnical Engineer or Civil Engineer to provide inspection services for new infrastructure being installed in new developments and the cost of the services to be reimbursed by the development owner.

6. Provide Contractor with information to assist with notifying public of water interruption due to construction 24 hours prior to shut off.

1.6 CONTRACTOR RESPONSIBILITY

- A. Contractor shall be responsible to read and fully comply with all the provisions of these specifications and General Clauses.
- B. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to public and private facilities, people, and property.
- C. Contractor shall perform work in a manner subject to current Occupational Safety and Health Administration and State of Colorado safety requirements. It shall be the responsibility of the Contractor to fully comply with these regulations.
- D. Contractor shall provide adequate construction signing, flagmen, barricades, etc., to warn vehicular and pedestrian traffic of work in progress and divert traffic as may be required during the course of the construction per approved traffic plan. All signing shall conform to the Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD). Contractor shall notify the respective local and emergency response agencies 48 hours in advance of the closure of any street or access restrictions. This includes but is not limited to: Fire, Police, Town of Westcliffe, Town of Silver Cliff, School District, and other affected organizations such as CDOT or the County.
- E. Contractor shall notify the District at least 48 hours prior to a planned water service interruption, request for valve/hydrant operation, testing of mains, or other requested service provided by the District. The Contractor will be required to provide door hangers and coordinate shut-down times with affected property and/or business owners.
- F. Contractor shall protect all existing facilities and utilities within the work area and shall be liable for any damage to any such facilities and utilities due to Contractor's activities.
- G. Sanitary facilities for the use of project personnel shall be properly secured, located, erected and maintained by the Contractor.
- H. Contractor is responsible for Quality Control.
- I. Contractor shall provide the District with Material Submittals prior to the start of work.
- J. For infrastructure to be accepted by the District, the Contractor shall provide the District with Engineer Stamped Drawings prior to the start of construction that have been reviewed and approved by the District Engineer.

1.7 WORK SEQUENCE

- A. Coordinate construction schedule and operations with the District.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Product options
- B. Product submittals
- C. Product substitution procedures

1.2 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.3 PRODUCT SUBMITTALS

- A. The Contractor must submit the submittal signed, no submittals from vendors.
- B. Product submittals are required for all water and sewer main extensions and any other project the District deems is significant enough to warrant or as required by Specifications.
- C. All submittals shall be approved prior to construction of any water and sewer infrastructure. All submittals shall be submitted at the beginning of the project unless specifically approved for later submittal.
- D. Submittals include but are not limited to:
 - 1. All piping, fittings, appurtenances for water and sewer.
 - 2. Aggregate gradation and proctors to be used for bedding and backfill.
 - 3. Concrete and asphalt materials, if required.
 - 4. All other materials utilized during construction of infrastructure.
 - 5. Road closure plans and schedules.
 - 6. Draft press releases for work activities, if required.

1.4 PRODUCT SUBSTITUTION PROCEDURES

- A. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.
- B. Document each request with complete data substantiating compliance of proposed Substitution with Specifications.
- C. A request constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for Substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the District.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5. Will reimburse Engineer for review or redesign services associated with re-approval by the District.
- D. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Specifications or prior agreements and requirements.
- E. Substitution Submittal Procedure:
 - 1. Submit one electronic request for Substitution for consideration. Limit each request to one proposed Substitution.
 - 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
 - 3. The District will notify Contractor in writing of decision to accept or reject request.

END OF SECTION

SECTION 01500
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.

1.2 PRODUCTS

- A. Furnish products listed on the "Approved Materials List for Water and Sewer" suitable for intended use.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the District.
- C. When possible, furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide off-site storage and protection when site does not permit on-site storage or protection.

- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01700
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contractor Responsibilities.
- B. Construction Facilities.
- C. Protection of Utilities.
- D. Closeout procedures.
- E. Cleaning & site maintenance.
- F. Construction schedule, testing, and inspections.
- G. Restoration.
- H. Control of vehicular and pedestrian traffic.
- I. Construction site erosion.

1.2 CONTRACTOR RESPONSIBILITIES

- A. Contractor shall obtain an excavation permit with the Town of Westcliffe or Town of Silver Cliff (depending on project location) prior to the beginning of any work operations within the Town's rights of way.
- B. Contractor shall assume responsibility for disposing of removed vegetation, tree material, soil, asphalt, concrete, and other surplus materials not specifically identified to be retained by the Towns of Westcliffe or Silver Cliff per Federal, State and Local regulations at Contractor's expense.
- C. Contractor shall assume responsibility for performing all work in a workmanlike manner with due care being taken to avoid unnecessary damage to property. Contractor shall be responsible for all damage resulting from carelessness or work performed in an irresponsible or unworkmanlike manner.
- D. Contractor shall obtain all utility locates prior to excavating and shall be liable for all damages to existing structures and utilities and shall save the District harmless for any liability or expense for injuries, damages, or repairs.

- E. Contractor shall perform all work not covered in the Specifications to applicable industry standards.
- F. Contractor shall conform to all applicable State and local Codes and Ordinances.
- G. Contractor shall provide all construction surveying and/or staking as deemed necessary to complete the project as intended per the Specifications and approved plans.

1.3 CONSTRUCTION FACILITIES

- A. Provide and place all traffic control signs, barricades, and devices during the total construction time of the work, including time for concrete curing. Temporary fencing or other adequate measures to control pedestrian access to construction area shall be maintained.
- B. Contractor's construction activities are restricted to the area within the Towns of Westcliffe or Silver Cliff rights of way and Town owned property boundaries as near as practical and within any specified construction easements. All reasonable efforts shall be made to maintain access for property owners and residents and their business patrons to and from private property within the site.
- C. Protect all private and public property located within the construction site. All property disturbed by Contractor during construction will, at Contractor's expense, be repaired or replaced and left in as good a condition as originally found.
- D. All temporary utilities such as electricity, sanitation services, heating, or other services required for construction and other facilities such as safety equipment, fire extinguishers, warning signs, lights, or special equipment shall be supplied as needed by the Contractor at his expense.
- E. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment. Protect site from puddling or uncontrolled running water. Provide sumps, water barriers as required to protect site from soil erosion and other potential damage to work, such as storm water accumulating on site from upstream.

1.4 PROTECTION OF UTILITIES

- A. The Contractor shall protect all public utilities encountered. These may include telephone lines, culverts, buried cables, power lines, water lines, sewer lines, irrigation laterals, gas lines and other overhead and underground utilities.
- B. Before any excavation or work is begun in the vicinity of the above-named utilities, each utility company or department concerned must be notified in advance of such work.
- C. The Contractor shall be held liable for all damages to any and all public utilities encountered on this project, due to the Contractor's operations. Such damages shall include all physical damages to utilities and all damages due to the interruption of service of such utilities, when such damages and interruptions are caused by the Contractor's operations.

- D. Where alterations or moving of utilities is not required to permit construction of the work, the Contractor shall take such measures as the utility entity may direct to properly protect these utilities throughout his construction activities and shall cooperate at all times with the proper authorities and/or Owner in maintaining service of the above-named utilities affected by the work.
- E. The cost of damages due to the Contractor's operations, the cost of moving water or sewer service lines and the cost of protecting the utilities, where alteration or moving is not required to permit construction of the work, shall be paid for by the Contractor.
- F. Should any pipelines, water lines, gas mains, electrical conduits, sewer pipes, overhead wiring, telephone lines, buried cables, power lines, or any other such utilities not specifically mentioned and provided for elsewhere as a part of this document, have to be moved, repaired, reconditioned or revised due to construction, or moved temporarily to permit construction of work, the party or parties owning and operating such utilities shall perform the actual work of moving, repairing, reconditioning or revising such utilities, unless other agreements are reached with the utility companies involved.
- G. Local utility companies and contact information:
 - 1. Utility Notification Center of Colorado (UNCC)
12600 W. Colfax Ave. Ste: B310
Lakewood, Colorado 80215
Phone: 811
Admin: 303-232-1991
Fax: 303-234-1712
 - 2. Local Utility Companies Are:
 - a. Black Hills Energy (Electricity)
 - b. Century Link (Phone)
 - c. Round Mountain Water and Sanitation District (Water and Sewer)

1.5 CLOSEOUT PROCEDURES

- A. Contact District for final inspection.
- B. Provide submittals required by the District.
- C. Provide as-built plans required by the District:
 - 1. As-built plans shall be submitted for all water and sewer main extensions and any other project the District deems is significant enough to warrant.
 - 2. Two copies of as-built plans for completed construction shall be submitted on 24-inch X 36-inch sheets (minimum scale of drawing, 1 inch = 50 feet) along with a digital copy to the District.

D. Drawings of Record Criteria:

1. "As-Built/Drawing of Record" means a drawing, or series of drawings, that depict improvements as they were actually constructed, and that are drawn to the same scale, with the same detail, accuracy, format and form as the drawings that were submitted for original approval. Information on the project facilities shall indicate sufficient horizontal and vertical dimensional data so that the constructed improvements may be located and delineated.
2. "As-Built/Drawing of Records" are required of any set of plans approved by the District.
3. In order to effectively comply with this requirement, it will be necessary for the Engineer to provide a periodic review and inspection of the installation of those facilities within the project. The Engineer may supplement his review and inspection of the project by utilizing information taken from a valid survey.
4. The design engineer shall submit to the District the required number (no less than 3) of certified "As-built" or "As-Built/Drawing of Record" on media required by the District signed and stamped within 60 days of the final walk-through inspection.
5. If any errors or omissions are discovered by the District within the "As-Built/Drawing of Record", the design engineer shall make corrections and resubmit the plans within 30 days of notice by the District.
6. The "As-Built/Drawing of Record" shall contain a certification from an Engineer registered in the State of Colorado that indicates that the project has been substantially completed in accordance with the approved plans and specifications, or that the deviations noted on the "As-Built/Drawing of Record" will not prevent the project from complying with the design function of the project.
7. "As-Built/Drawing of Record" shall be submitted in the same page format as the original approved plans. If revision requires the addition of a new sheet, it shall be added to the back of the existing set and the entire set renumbered accordingly. All pages must be included in the same order as the original and marked "As-Built/Drawing of Record" regardless of whether any revision applies to any particular page or not. If no changes occurred, simply write "As-Built/Drawing of Record" on the drawing.

1.6 CLEANING & SITE MAINTENANCE

- A. Public streets within the work site must be washed and swept daily or otherwise, according to the discretion of the District. Anytime during the course of the Work, Contractor shall, at the discretion of the District, wash, sprinkle, or wet down streets or alleys, including areas affected by work detours and construction traffic.
- B. Execute final clean-up of site prior to final project inspection.
- C. Clean debris from right of ways and drainage systems.
- D. Clean work-site; sweep paved areas, rake landscaped surfaces clean; provide access at all driveways and cross streets.
- E. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.7 CONSTRUCTION SCHEDULE, TESTING, AND INSPECTIONS

- A. At least 24 hours prior to the start of any work, Contractor shall furnish a submittal of construction schedule to facilitate scheduling required inspections according to the specifications and to minimize the Contractor's wait time.
- B. Reports will be submitted by an approved inspector to District indicating observations and results of tests and indicating compliance or non-compliance with requirements. Testing will be done at Contractor's expense and does not relieve Contractor from performing Work to requirements.
- C. Retesting required because of non-conformance to specified requirements shall be performed on instructions by the District and will be done at Contractor's expense.
- D. If necessary, Contractor shall be responsible for supplying the District, at the Contractor's expense, with suitable soils tests from a licensed independent soils testing laboratory, with gradation and proctor density data for any material used in the work for backfill.

1.8 RESTORATION

- A. All excavations and improvements shall be completely restored within a period of twenty-one days subsequent to acceptance of backfill and compaction.
- B. If restoration is not complete by the end of the required time, the District will schedule to complete the restoration at Contractor's expense, after a nine-day advance notice to Contractor.
- C. Restoration during times of inclement weather may be delayed at the direction of the District. Temporary measures may be implemented, including but not limited to a cold asphalt patch to be replaced when weather permits.

1.9 CONTROL OF VEHICULAR AND PEDESTRIAN TRAFFIC

- A. Contractor shall obtain permission from Colorado CDOT and/or the towns of Westcliffe and Silver Cliff to close the roadways to traffic during construction activities, if it is necessary.
- B. Contractor shall accommodate adjacent property owners and businesses by providing access and parking within the street right-of-way as near to properties as possible, except during paving operations when residents will be expected to walk.
- C. Contractor shall be fully responsible for providing qualified personnel to provide and place all traffic control signs and devices during the total construction time of the project.
- D. Contractor shall provide traffic control that shall conform to the intent and instructions provided by the District, CDOT and the Manual of Uniform Traffic Control Devices (MUTCD).

- E. Contractor is responsible for notifying the Police Department, the Fire District, and all emergency and ambulance service providers of any street closures or blockages, due to construction, prior to beginning any such activity. Contractor shall also maintain the means at all times to provide emergency access routes to all properties located along the construction site when needed.

1.10 CONSTRUCTION SITE EROSION AND SEDIMENT CONTROL MEASURES

- A. Contractors and subcontractors must implement Best Management Practices (BMPs) to reduce pollutants in any storm water runoff from construction activities. Contractors are further required to control construction site waste such as discarded materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality. These activities must comply with all applicable State and local laws and regulations.

END OF SECTION

SECTION 02100

BACKFILL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fill under structures.
 - 2. Fill for over-excavation.

1.2 REFERENCES

- A. Colorado Department of Transportation:
 - 1. 2011 CDOT Standard Specifications for Road and Bridge Construction.
- B. American Society for Testing and Materials:
 - 1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).

1.3 SUBMITTALS

- A. Materials Source: Submit name of imported materials suppliers.
- B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Road Base: Type Class 6.

Coarse Aggregate Class 6 (Road Base): Aggregates for Class 6 base shall be crushed stone, or crushed gravel, natural gravel, material which conforms to the quality requirements of AASHTO M 147 except that the requirements for the ratio of minus 75 μm (No. 200) sieve fraction to the minus No. 40 sieve fraction, stated in 2.2.2 of AASHTO M 147, shall not apply. The requirements for the Los Angeles wear test (AASHTO T 96) shall apply to Class 6 Aggregate. Aggregate for class 6 base shall meet the grading requirements of Table 703-3 for the class specified for the project, unless otherwise specified. The liquid limit shall be as shown in Table 703-3 and the plasticity index shall not exceed six when the aggregate is tested in accordance with AASHTO T89 and T 90 respectively. See Table 1 for sieve size requirements. The Material sized between the #4 sieve and the 3/4" sieve must be a minimum of 60% angular material, i.e. crushed stone or gravel with angular surfaces. 60% of the material shall pass the Fractured Faces Test for which 2 or more faces shall be fractured surfaces.

- B. 3/4" Screened Crushed Rock
- C. Trench Backfill under existing and proposed streets: Type Class 6 or Class 1. Class 1 may be native materials crushed or screened to 2-inch minus.
- D. Ordinary Backfill: As specified on Drawings, only as directed by the District inspector.
- E. Stabilizing Material: Minimum of 1 ½ inch, uniformly graded, clean rock, or as directed by Engineer.
- F. Rip Rap: 12" minus well-graded rock.
- G. Flow-Fill: Structural Backfill that meets the requirements of 2011 CDOT Standard Specifications for Road and Bridge Construction, Section 206.02; within the following limits:
 - 1. Components per cubic yard

Fine Aggregates (Type A2 as specified in Section 02060)	1,845 lbs.
Coarse Aggregates (Type A1 as specified in Section 02060)	1,700 lbs.
Cement	50 lbs.
Water	325 lbs.
 - 2. Slump – 6 inch minimum, 8 inch maximum
 - 3. Strength – 10 psi minimum in 1 day, 60 psi maximum in 18 days.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify subgrade is suitable for placement of backfill.
- B. Verify structural ability of unsupported walls to support loads imposed by fill.

3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural fill approved by the Engineer and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Place aggregate in maximum 8 inch layers and compact to 95 percent, maximum dry density, ASTM 1557, Modified Proctor, except for the top 4 feet of trench, which shall be compacted to 95 percent, maximum dry density, ASTM D1557, Modified Proctor. Lift size may be increased when it is demonstrated that compaction requirements can be met using other methods. The District inspector will make final determination on the thickness of each lift in the field.

- D. Use smaller mechanical tamping equipment in areas inaccessible to compaction equipment.
- E. Place fill material in continuous layers and compact in accordance with schedule at end of this section.
- F. Employ placement method that does not disturb or damage other work.
- G. Maintain optimum moisture content of backfill materials to attain required compaction density.
- H. Make gradual grade changes. Blend slope into level areas.
- I. Remove surplus backfill materials from site.
- J. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Compaction Testing: In accordance with ASTM D1557.
- B. When tests indicate, Work does not meet specified requirements, remove Work, replace, compact, and retest
- C. Compaction Testing for Bedding and Backfill:
 1. The District may hire an independent, licensed engineer experienced soils analysis and evaluation to perform required tests in accordance with ASTM D1557 and charge the owner/contractor for the expense or require the owner/contractor to hire the licensed engineer and approve the direct distribution of test reports to the District for review. Copies of test results showing exact location of sample collection and test sites must be furnished to Engineer. Engineer shall be informed prior to testing and he may designate areas of testing.
 2. Testing is to be done at various elevations in trench, which may require excavation by Contractor after backfill is installed.
 3. Frequency of Compaction Tests will be specified by District inspector in the field but shall be no less than every 200 feet at every 1 foot of depth of the backfill or anytime the means and methods of compaction change. A lesser frequency may be approved by District if successful and consistent results are being achieved in the field.
 4. Testing shall use the Modified Proctor method. Alternatives such as Standard Proctor or Relative Density based on necessity due to material type may be used with the permission of the District so long as the necessary conversion data, testing, and information has been completed and submitted prior commencement of the work.
 5. The density test results shall be reported by the Geotechnical Engineer to the District and to the Contractor at the time of testing.

6. The Contractor shall report to the District when the work has progressed to a point where it is ready to be tested. The Contractor shall provide the District with adequate advance notice (generally 24 hours) to allow scheduling of testing. The District shall decide whether to take tests at any given depth or section and shall schedule testing so as to minimize interference with the Contractor's operations. The Contractor shall adjust his operations to allow access to the backfill for testing. Notwithstanding, the Contractor's opinion of readiness for testing, if a lift of backfill is being placed, the previous lift shall be considered ready to test, and may be tested at the District's discretion.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.6 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic during construction.

B. All areas showing signs of settlement shall be filled and maintained by Contractor during all construction phases and warranty period.

C. When Contractor is notified by the District that any backfill is hazardous, the condition shall be corrected at once.

D. Compacted fills must be adequately protected during cold weather construction activities. Any frozen fill should be thawed or removed, recompact and tested as directed by the project engineer or the District.

3.7 SCHEDULE

A. Fill Under Footings, Inlets, Manholes, Vaults, and other Concrete Structures:
1. Fill Flow Fill, 18 inch thick to required elevations for the width of the footing.

B. Fill to correct Over-excavation and Unstable Subgrades:
1. Flow Fill, flush to required elevation.

END OF SECTION

SECTION 02300
TRENCHING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Excavating trenches for site utility lines including domestic water lines.
 - 2. Compacted fill from top of utility bedding to top of trench.
 - 3. Backfilling and compaction of trenches.

- B. Related Sections:
 - 1. Section 02500– Site Sanitary Sewer.
 - 2. Section 02700 - Site Water Distribution: Site water lines including domestic water lines.

1.2 REFERENCES

- A. Colorado Department of Transportation:
 - 1. 2011 CDOT Standard Specifications for Road and Bridge Construction.

- B. American Society for Testing and Materials:
 - 1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 3. Road and Alleyway Maintenance Specifications of the Towns of Westcliffe and Silver Cliff.

1.3 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

- A. Obtain an Excavation Permit prior to any excavation from the Town of Westcliffe or the Town of Silver Cliff, depending on location of the project.

- B. Excavation Protection Plan: as required by applicable codes, laws, and standards.

- C. Materials Source: Submit name of imported fill materials suppliers.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with District and industry standards.

- B. Maintain one copy of each required document on site.

1.6 QUALIFICATIONS

- A. Contractor must be licensed, insured and approved by the District.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to work.

1.8 COORDINATION

- A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.
- B. Verify locations, types, and sizes of existing facilities that will be integrated with project Work.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Road Base: Type Class 6 as specified in Section 2100 or 3/4 Screened Crushed Rock.
- B. Trench Backfill under existing and proposed streets: Type Class 6 or Class 1. Class 1 may be native materials crushed or screened to 2-inch minus. Material must be approved prior to use by the District. A wheel roll test with a loaded single axle dump truck may be used to test trench compaction if approved by the District if not testable by nuclear gage.
- C. Stabilizing Material: Minimum of 1 ½ inch, uniformly graded, clean rock, or as directed by Engineer.
- D. Blended Aggregate: Type A3 as specified in Section 02060. This backfill shall be allowed under new streets in approved subdivisions. A geotechnical engineer shall design all backfill. The developer's engineer shall provide oversight of installation and compaction including compaction testing. Native soil shall be allowed for the top 2 foot of trench backfill when trench is under an open drainage/irrigation channel for the purpose of sealing the channel and minimizing leakage.
- E. Flow-Fill: Structural Backfill that meets the requirements of 2011 CDOT Standard Specifications for Road and Bridge Construction, Section 206.02; within the following limits:
 - 1. Components per cubic yard

Fine Aggregates (Type A2 as specified in Section 02060)	1,845 lbs.
Coarse Aggregates (Type A1 as specified in Section 02060)	1,700 lbs.
Cement	50 lbs.
Water	325 lbs.
 - 2. Slump – 6 inch minimum, 8 inch maximum
 - 3. Strength – 10 psi minimum in 1 day, 60 psi maximum in 18 days.

PART 3 EXECUTION

3.1 LINES AND GRADES

- A. Lay pipes to lines and grades indicated on Drawings.
 - 1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
- B. Use staking for alignment and elevation of water mains to establish lines and grades.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.
- C. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Maintain and protect above and below grade utilities indicated to remain.
- E. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.
- F. Prior to excavation in paved areas, the pavement shall be cut in such a manner as to affect a smooth, straight edge and a vertical face 12 inches minimum beyond the trench wall.

3.3 TRENCHING

- A. Excavate subsoil by open cut to the depth required, unless written permission is given by District to do otherwise, for utilities at the required locations.
- B. Remove lumped subsoil, boulders, and rock.
- C. When rock or hard clay is encountered, the trench shall be over-excavated 6 inches.
- D. Excavation performed within 24 inches of existing utility service shall be done in accordance with utility's requirements.
- E. Do not advance open trench more than 200 feet ahead of installed pipe, unless the District determines a shorter length is necessary for the safety of the public.
- F. Cut trenches to the width necessary to permit the pipe to be laid, jointed properly, inspected, and backfilled properly. No trench shall have a width of less than the diameter of the pipe plus 12 inches. The maximum clear trench width, measured 1 foot above the top of the pipe barrel shall not be greater than that shown in the following table unless otherwise specified:

<u>Pipe Diameter (inches)</u>	<u>Maximum Trench Width (inches)</u>
6	36
8	36
10	36
12	36
16	36
20	44

- G. When maximum trench widths are exceeded and Engineer determines that the design load limits of the pipe are exceeded, the Contractor will be required to either cradle the pipe in concrete or to use a pipe of a stronger class.
- H. Remove water or materials that interfere with Work. Contractor shall provide and maintain at all times ample means and devices to promptly and properly dispose of all water entering trench excavation. Water shall be disposed of in a suitable manner without damage to adjacent property or without a menace to public health and convenience. Unless authorized, in writing, trench water shall not be allowed to enter any water or sewer lines. Protect pipeline against damage from water in the event of a storm or pump failure.
- I. Excavate trenches to depth indicated on Drawings. The trench shall be excavated to a depth below the established grade equal to 1/8 the outside diameter of the pipe, but not less than 4 inches. Provide uniform and continuous bearing and support for bedding material and pipe. A continuous trough shall be excavated to receive the bottom quadrant of the pipe barrel and bell ends. Excavate adequate space for required restraints, valves, and fittings prior to placing pipe in trench.
- J. Do not interfere with the bearing soil of foundations of existing structures.
- K. When Project conditions permit, slope side walls of excavation starting 1 foot above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.
- L. When subsurface materials at bottom of trench are loose, soft, or otherwise unsuitable, excavate to greater depth as directed by the District until suitable material is encountered.
It shall be replaced, as directed by Engineer, with approved backfill material and methods to provide a suitable foundation for the pipe, which may include 1 ½ inch clean rock.
- M. Trim excavation. Remove loose matter.
- N. Correct areas over-excavated with compacted backfill as specified for authorized excavation as directed by the District.
- O. Remove excess subsoil, not intended for reuse, from site. Topsoil shall be removed and piled separately for use in finish grading the site. Excavated material that is suitable for backfilling shall be piled in an orderly manner, a sufficient distance from the trench to avoid over-loading and to prevent slides or cave-ins.

- P. Boring, Tunneling, and Jacking:
1. Not permitted under existing sidewalk, curb and gutter, or other structures, where depth of trench and soil conditions permit.
 2. Written permission by the District is required.
 3. Tunneling will not be permitted for distances greater than 10 feet.
 4. When jacking is required, only persons experienced in such work, using suitable equipment, shall perform the operation.
 5. Flow-fill shall be used as backfill under any structure that has had material excavated from beneath them, been jacked, or for any tunnel.

3.4 SHEETING AND SHORING

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Design sheeting and shoring to be removed at completion of excavation work.
- C. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- D. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BEDDING

- A. Bedding installation and material shall be in accordance to Section 2100.

3.6 BACKFILLING

- A. Backfill trenches to contours and elevations with unfrozen, non-organic, or otherwise suitable fill materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place fill material in continuous layers and compact in accordance with the specifications of this document. Flow-fill may be used from 4 inches above the pipe barrel to the top of the trench.
- D. Compact backfill material to 95 percent, maximum dry density, ASTM D1557, Modified Proctor, except for the top 4 feet of the trench, which shall be compacted to 95 percent, maximum dry density, ASTM D1557 Modified Proctor. Wheel roll test may be approved by the District or the Engineer if nuclear gage is not usable for Class 1 material.
- E. Lifts will not exceed 8 inches in depth unless a sheep's foot compactor or a hydraulic plate compactor (headshaker) mounted on excavation equipment of adequate size is used. Lift size may be increased by using this compaction equipment when it is demonstrated that compaction requirements can be met. District will make final determination on the thickness of each lift in the field. Only equipment designed for the purposes of compaction shall be used.

- F. Employ placement method that does not disturb or damage utilities in trench, and other existing structures or facilities.
- G. Maintain optimum moisture content, plus or minus 3 percent, of fill materials to attain required compaction density.
- H. Do not leave more than 25 feet of trench open at end of working day.
- I. Protect open trench to prevent danger to the public.

3.7 SURFACE RESTORATION

- A. Pavement (either asphalt or concrete), curb and gutter, sidewalks, drainage culverts, headwalls, etc., or other improved surfaces that have been removed during the course of work shall be restored to a condition as equal to or better than that prior to removal and to the same elevation and alignment.
- B. The subgrade for all restored surfaces shall be thoroughly compacted by mechanical or hand tampers weighing not less 20 pounds, by vibratory rollers, or by other means of compaction approved by the District.
- C. Surface restoration shall be per current applicable Town of Westcliffe or the Town of Silver Cliff Specifications and Standards and subject to review by the District.
- D. Where excavation occurs in paved areas, the pavement shall be repaired as required in the Specifications and Standards of the Towns of Westcliffe or Silver Cliff.

3.8 FIELD QUALITY CONTROL

- A. Compaction Testing: In accordance with ASTM D698.
- B. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest
- C. Compaction Testing for Bedding and Backfill:
 1. The District may hire an independent, licensed engineer experienced in soil analysis and evaluation to perform required compaction tests and require the owner/contractor to reimburse the District for the expense or may require the owner/contractor to hire an independent testing firm. Copies of all Proctor curves and test results showing exact location of sample collection and test sites must be furnished to the District as directed. Engineer shall be informed prior to testing and he may designate areas of testing.
 2. Testing is to be done at various elevations in trench, which may require excavation by Contractor after backfill is installed.
 3. Frequency of Compaction Tests will be specified by inspector in field but shall be no less than every 200 feet at every 1 foot of depth of the trench or anytime the means and methods of compaction change.
 4. Testing shall use the Modified Proctor method. Alternatives such as Standard Proctor or Relative Density based on necessity due to material type may be used with the permission of the Engineer so long as the necessary conversion data, testing, and information has been completed and submitted prior commencement of the work.

3.9 PROTECTION OF FINISHED WORK

- A. Reshape and re-compact fills subjected to vehicular traffic during construction.
- B. All areas showing signs of settlement shall be filled and maintained by Contractor during all construction phases and for a period of 1 years following the date of final acceptance.
- C. When Contractor is notified by the District that any backfill is hazardous, the condition shall be corrected at once.

END OF SECTION

SECTION 02500
SITE SANITARY SEWER

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for site sewer lines including.
 - 2. Manholes
 - 3. Laterals
 - 4. Pipe markers.
 - 5. Bedding and cover materials.

- B. Related Sections:
 - 1. Section 02100 - Backfilling
 - 2. Section 02300 - Trenching: Execution requirements for trenching required by this section.

1.2 REFERENCES

- A. Colorado Department of Transportation:
 - 1. 2011 CDOT Standard Specifications for Road and Bridge Construction.

- B. American Society for Testing and Materials:
 - 1. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
 - 2. ASTM D1557 - Modified Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 3. ASTM D3034 – Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

1.3 SUBMITTALS

- A. Product Data: Submit data on pipe materials, pipe fittings, manholes, and accessories.
- B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents "AS BUILTS": Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with District standards.
- B. Maintain one copy of each document on site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01500 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Pipes, fittings, valves, and accessories shall be loaded and unloaded or otherwise handled in such a manner as to minimize the possibility of damage prior to installation. All materials shall be stored at the construction site in such a way as to prevent damage and to assure they are kept as clean as possible prior to installation.

PART 2 PRODUCTS

2.1 SEWER PIPING

- A. PVC Pipe: ASTM D-3034
 - 1. Fittings: SDR 35
 - 2. Couplings: Mission "Calder style" Shielded Sewer sleeve
 - 3. Joints: Pipe joint assemblies shall be bell and spigot with an O-ring rubber gasket, or solvent weld for clean-outs.
 - 4. Taps on new mains shall be Predco taps.
 - 5. Size:
 - a. The minimum size of any new sewer main within the collection system shall be eight (8) inches in diameter.
 - b. Larger sizes shall be required as needed to provide proper flow capacity or velocity.
 - 6. Thickness: SDR35 meeting ASTM D3034.
 - 7. Use/Location: Allowed for use in entire system.

2.2 MANHOLES

- A. GENERAL: Manholes shall be installed at the end of each line; at all changes in grade, size, or alignment; at all pipe intersections; and at intervals of not more than 400 feet apart. All dead-end manholes where future sewer main extension is anticipated shall have line laid through the manhole a maximum of one (1) pipe length with the size designated by the District and shall be plugged with an approved plug provided by the Contractor.
- B. BARREL SIZE: The internal diameter of the manhole barrel shall not be less than forty- eight (48) inches for sewers of sizes eighteen (18) inch or less; sixty (60) inches for sizes twenty-one (21) to forty-eight (48) inch; seventy-two (72) inches for sizes larger than forty-eight (48) inch.

- C. PRECAST MANHOLES: Precast manhole barrels and cones shall be manufactured in conformity with ASTM C478, and shall be so marked by the manufacturer.
- D. CAST-IN-PLACE MANHOLES: Concrete used in cast-in-place manholes and manhole bases shall have a twenty eight (28) day strength of 4000 psi and shall contain not less than six (6) sacks of Portland Cement per cubic yard.
- E. MANHOLE STEPS: Shall be provided.
- F. FRAMES AND COVERS: Manhole frames, rings and covers shall be HS-20 traffic rated, twenty-four (24) inch I.D., meet the standards of ASTM A48 class 35 as manufactured by the Neenah Foundry Company, Neenah Wisconsin or Castings Inc. Grand Junction Colorado, or approved equal. The cover shall fit the ring in accordance with the manufacturer's dimensions. Covers with more than one lifting hole will not be accepted. The lifting notch shall be on the covers edge and not in the center and shall not allow surface water to enter the manhole. Frames and grates shall meet an AASHTO HS20 traffic load rating.
- G. MANHOLE SEALANT: All joints between manhole sections and pipe openings shall be sealed with an approved watertight sealant ("Rub-R-Nek", or equal). Manholes in areas with high water tables shall be coated on the exterior with an approved watertight sealant. Grade rings and cover rings shall be sealed to the top of the cone with "Rub-R-Nek".
- H. CONCRETE COLLARS: All manholes in gravel roads shall have concrete collars installed per the Standard Detail. This includes manhole in areas such as alleys.

2.3 BEDDING AND COVER MATERIALS

- A. 3/4" Screened Crushed Rock
- B. Road Base: Type Class 6.
- C. Flow-Fill: Structural Backfill that meets the requirements of 2011 CDOT Standard Specifications for Road and Bridge Construction, Section 206.02; within the following limits:
 - 1. Components per cubic yard
 Fine Aggregates (Type A2 as specified in Section 02060) - 1,845 lbs.
 Coarse Aggregates (Type A1 as specified in Section 02060) 1,700 lbs. Cement - 50lbs.
 Water - 325 lbs.
 lbs.
 - 2. Slump – 6 inch minimum, 8 inch maximum
 - 3. Strength – 10 psi minimum in 1 day, 60 psi maximum in 18 days.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify connections and municipal utility water main size, location, and invert as indicated on Drawings.

3.2 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 02300 for Work of this Section.
- B. Minimum support for the pipe shall be directed by the design engineer to meet conditions in the field. No pipe shall be installed when the design engineer has determined that the trench conditions are unsuitable.
- C. Prior to placing concrete for cradles or encasements, temporary supports consisting of concrete blocks shall be used to support the pipe in place. Not more than two supports shall be used for each pipe length, one on either end. Inspection by the District is required prior to placement of concrete.
- D. Place bedding material at trench bottom, level fill materials under pipe in one continuous layer not less than 4 inches compacted depth. Place bedding material 6 inches above the top of the pipe; compact to 95 percent, maximum dry density, ASTM D1557, Standard Proctor.
- E. Place fill material in accordance with the Specifications of the Towns of Westcliffe and Silver Cliff.

3.4 PIPE

- A. Carefully lower pipe and fittings into trench in such a manner as to prevent damage to the water main materials and protective coatings and linings.
- B. Prevent foreign material from entering pipe or joint space while it is installed. During installation, no debris, tools, clothing, or other materials shall be placed in the pipe. At times when installation is not in progress, the open ends of the pipe shall be closed by a watertight plug or as directed by the Engineer. If water is in trench, the plug shall remain in place until the trench is pumped completely dry.

- C. VERTICAL CLEARANCE BELOW WATER LINES - Where sewer lines cross water mains or come within ten (10) horizontal feet of each other, the sewer pipe shall be a minimum of eighteen (18) inches clear distance vertically below the water main. If this clear distance is not feasible, the sewer pipe section must be designed and constructed so as to protect the water main.
- D. VERTICAL CLEARANCE ABOVE WATER LINE - Should a situation exist where a sewer main must be constructed crossing above a water main, the minimum clear distance vertically shall be eighteen (18) inches, and the sewer pipe section shall be designed & constructed so as to protect the water main.
- E. WATER LINE PROTECTION
The sewer pipe shall be sealed within another, larger continuous (joint free) pipe, for at least 10' horizontal perpendicular distance on either side of the water main. The sewer pipe shall be sealed within the encasement pipe with non-shrink concrete grout extending at least 6" into the larger pipe.
- F. SERVICE LINE PROTECTION
These requirements for water line protection from sewer lines shall be equally applicable to force mains and sewer service connections.
- G. Sewer mains shall be placed under traveled portion of roadway if possible. Provide staking for alignment and elevation a minimum of 50 feet apart and for location of manholes.
- H. Install pipe with a preferred 7-feet of cover, and a minimum of 3.5-feet of cover from top of the pipe to the final finished grade of street.
- I. If for any reason, required cover cannot be maintained over existing installed sewer mains and services; the mains and service lines so affected shall be relocated at the expense of the developer/owner.
- J. Push-On Joint Pipe:
1. Remove all oil, grit, excess coating, and foreign material from inside of bell and outside of spigot.
 2. Flex the circular rubber gasket inward and insert in the recess of the bell. Apply a thin film of gasket lubricant to the inside surface of the gasket and the spigot end of the pipe.
 3. Install the spigot end of pipe in bell without letting it contact the ground. Push the joint together. Pipe that is not furnished with a depth mark shall be marked prior to assembly to assure that spigot is installed to the proper depth.
 4. Field cut spigot ends shall be filed and ground smooth and angled to resemble the original manufactured end.

- K. Install pipe to allow for expansion and contraction without stressing pipe or joints per pipe specifications.
- L. Backfill trench in accordance with the Specifications of the Towns of Westcliffe and Silver Cliff.

3.5 INSTALLATION - MANHOLES

- A. CONSTRUCTION: Manholes shall be installed or constructed on undisturbed soil at the base. If soil is disturbed at the base, eighteen inches (18") of flowfill shall be placed at the base. Manholes shall be installed or constructed at the locations and to the elevations indicated on the drawings. Manholes shall be backfilled using a class 6 road base. The District's written approval shall be required prior to installation of any non-standard size, shape, or type manholes.
- B. ADJUST MANHOLE RING & COVER TO GRADE: The cone section shall not extend closer than eight (8) inches and not more than ten (10) inches from the top of the manhole cover. Precast concrete adjustment rings or HDPE adjusting rings meeting ASTM D- 4976 shall be used on top of the cone to support and adjust the manhole ring & cover to the required final grade.
- C. SEAL PIPE ENDS TO MANHOLE: Where the sewer main enters the manhole, appropriate measures shall be taken to prevent any infiltration of groundwater into the system.
- D. MANHOLE BASES: Manhole bases shall be constructed as shown on the Standard Manhole Detail drawing. Inverts shall be cast with uniform curves and smooth surfaces. The floor of the manhole outside of the channel shall be finished smooth surface and shall slope to the channel. The minimum thickness of the base shall not be less than eight (8) inches under the invert of the manhole channel.
- E. CONTINUOUS PIPE THROUGH MANHOLE (INVERTS): The PVC sewer line may be laid continuously through manhole locations wherever grade and alignment permit. After the invert has been cast, the upper half of the pipe shall be cut out, for at least 36" and the bottom cleaned. Precast inverts may be used when approved by the District. Inverts through the manhole shall be smooth and manhole bottoms shall slope to the sewer invert by a minimum of 2" from manhole wall. If the PVC pipe is not continuous through a manhole the invert shall provide a minimum of 0.1 ft. drop in a straight run, 0.2 ft. drop in a manhole angled at 45 degrees or less and a 0.3 ft. drop in manholes angled greater than 45 degrees.

- F. CONNECTIONS TO EXISTING MANHOLES: Sewer pipe connection to existing manholes where there is no existing pipe stubbed out shall be made in such a manner that the finished work will conform as nearly as practicable to the requirements specified for new manholes. The new sewer shall be designed and located so flowline will be as close to possible to the top of the existing pipe. The Contractor shall break out as small an opening in the existing manhole as practical to insert the new sewer pipe. The existing concrete foundation bench shall be chipped to fit the new pipe. Non-shrink cement grout shall be used as necessary to smoothly finish the new invert and to seal the new line, so the junction is watertight. Flowlines shall be constructed in a professional manner, finished smooth, and shaped to provide directional control of the flow.
- G. OUTSIDE DROP MANHOLES: Whenever the elevation difference between the incoming sewer invert and the invert of the manhole cannot be accommodated to the District's satisfaction by a transition in the invert, an outside drop shall be constructed.

3.6 SERVICE CONNECTIONS

- A. SEWER SERVICE LATERALS: All sewer service laterals shall be installed by contractor. Tapping of live sewer mains shall be performed by the District. District may, at their discretion, allow a contractor to install sewer taps on new sewer main extensions before they are placed in service. All connections shall be inspected by the District during construction and while being tested.
- B. NEW LINE TAP: New sanitary sewer mains shall utilize Predco taps, so tap is at a location of 45 degrees to the horizontal. (See paragraph G in this section)
- C. SERVICE SIZE & SLOPE: Service laterals for individual residences, and for multi-family residences of up to 4 units, shall be 4" PVC, ASTM D 3034 Schedule 40, installed on a grade of not less than $\frac{1}{4}$ " in per foot. Service laterals for multi-family residences of more than 4 units, and for commercial or industrial usage, will be individually sized by the design engineer based on flow predictions and the International Plumbing Code. All service sizes larger than 4 inches shall be connected to the main by the installation of a manhole.
- D. SERVICE LOCATION: Service lines are to be installed at standardized locations throughout the subdivision, preferably near the center of the lot away from the power, phone, & TV utilities which tend to congregate at lot corners. Service lines shall be installed to a point inside the property line, and 2' beyond the dedicated easement, and shall be capped or plugged with a fitting suitable to withstand pressure testing.

- E. SERVICE LOCATIONS TO BE STAKED: The Contractor shall place a grade stake locating each sewer service before it is installed. Both the Tap and the end of the service shall be so staked. The actual installed location of service taps, and the ends of the service laterals shall be measured and recorded by the Project Engineer on the As- Built Drawings.
- F. SERVICE LOCATIONS TO BE MARKED: The end of the installed service line shall be marked with a 4" x 4" timber post or 4" PVC sewer pipe, painted green, extending from the bottom of the service line to a point approximately 18" above grade.
- G. EXISTING LINE TAP: New taps to an existing sewer line shall be done with Predco Hub Style Tap Saddle & Epoxy HUB TAP SADDLES (connect with donut) 4" HUB TAP SADDLE PART# HTS4/E - Hub saddle 4" with epoxy HTS4 or approved equal. Tap is to be made at an angle of 45 degrees to the centerline of the pipe unless approved otherwise by the in advance.
- H. DISCONNECTION OF EXISTING SEWER TAPS: Disconnection of sewer service lines shall be responsibility of the property owner. Disconnection shall take place within 2 feet of the main. The side closest to the main shall be plugged with concrete and capped. An inspection shall be performed by the District prior to backfill.

3.7 ABANDONMENT

- A. Existing sewer mains indicated by the Engineer shall be abandoned and pipe ends shall be plugged with 1-foot of concrete as directed.
- B. Existing manholes to be abandoned shall be removed as a whole, including invert, and shall be backfilled.

3.8 FIELD QUALITY CONTROL

- A. Contractor will perform Field inspecting under the direct supervision of the District inspector unless otherwise indicated.
- B. In addition to any deficiencies covered by ASTM D3034, PVC that has any of the following visual defects will not be accepted:
 1. Straightness: Any joint of pipe which has a camber (perpendicular offset from a straight line) of more than one half inch (1/2") in the length of the joint. Pipe with camber of less than 1/2" shall be installed with the curves laid horizontally alternating left and right.
 2. Pipe which is sufficiently out-of-round to prohibit proper jointing.
 3. Improperly formed bell and spigot ends.
 4. Fractured, cracked, chipped, or otherwise damaged pipe.
 5. Pipe that has been damaged during shipment or handling.
 6. The interior and exterior surfaces of all PVC pipe shall be uniform in color, shall not have been "sunburned" during long term outside storage, and shall be smooth and free of scratches or blisters.

- C. The District will not approve any pipeline installation if there is any infiltration along any length of the pipeline or at manholes. Approved testing method is pressure testing and visual observations prior to placing in service.
- D. Low Pressure test: All sections of sewer pipeline, including service laterals, shall be tested for integrity by low pressure air testing in accordance with the recommendations of the Uni-Bell 5th Edition (or latest version) Handbook of PVC Pipe Design and Construction guideline. Any section that fails to hold pressure within .5 psi for the test interval, in accordance with the test protocol, shall be repaired at the Contractor's expense.
- (a) Backfill: The pipeline shall be backfilled sufficiently to restrain the pipe laterally & vertically.
 - (b) Test Pressure: The sewer pipeline will be plugged at each pair of manholes and pressurized with compressed air to 3.6 psi +/- .1 psi above groundwater pressure, if any.
 - (c) Maximum Pressure Drop: Loss of air pressure during the test interval, defined below, shall not exceed .5 psi. The test interval shall be the sum of the test time for the main line plus test time for the service laterals, in accordance with the accompanying table:

MINIMUM TEST INTERVAL

(MINUTES)

SEWER MAIN AIR TEST FOR A 0.5 PSI MAXIMUM PRESSURE DROP

Pipe Diam.	Pipeline Length							
	100'	150'	200'	250'	300'	350'	400'	450'
4"	1:53	1:50	1:50	1:50	1:50	1:50	1:50	1:50
6"	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8"	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10"	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12"	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15"	7:05	7:05	8:54	11:00	13:21	15:35	17:48	20:02

- E. VERTICAL PIPE DEFLECTION: Prior to Final Acceptance of the project, the District inspector will require the testing of any new section of the sewer pipeline for vertical ring deflection. This is typically accomplished by pulling a mandrel through the pipeline. Maximum ring deflection of the pipeline under load shall be limited to 5% of the vertical internal pipe diameter. All pipe deflection exceeding 5% shall be repaired or replaced by the Contractor at no expense to the District.

- F. VIDEO INSPECTION: Prior to final acceptance the contractor shall submit to the District a copy of the video inspection of the sewer pipeline prior to being placed in service. The video inspection shall show footages and all taps and manholes. This video inspection shall become the property of the District and shall be used to determine condition of installation. Deficiencies discovered during the video inspection shall be the contractor's responsibility to correct.
- G. Manholes shall be vacuum tested to ensure no infiltration is permitted. A copy of test showing results shall be submitted prior to acceptance.
- H. Compaction testing for bedding and backfill in accordance with the "Trenching" section of this document.
- I. When tests indicate Work does not meet specified requirements, repair Work and retest.
- J. Before backfilling any sewer service line or new main line within the Towns right-of-way, the District must be contacted for an inspection. This applies to both new installation and repairs. Failure to call for an inspection will result in re-excavating and re-backfilling the line at the Contractor's or property owner's expense, in order that the work can be properly inspected.
- K. District personnel will make sewer taps and inspections between the hours of 8:00AM and 3:00PM, Monday through Friday. No taps or inspections will be done after 3:00PM.
- L. Pipe shall be installed at the depths, grades, and locations shown on the approved drawings. A pipeline laser shall be used to establish line and grade for the excavator and the pipe layers. Trained, qualified personnel using appropriate surveying equipment and methods shall set the laser to line and grade. The District may order cessation of work if the Contractor fails to provide trained and qualified personnel to set the laser.
- M. The pipeline may be placed in operation after all required cleaning, testing, and inspection have been completed and written permission has been granted by the District. During the warranty period, any defects in the system resulting from defective materials, poor workmanship, or any other cause attributable to the Contractor shall be corrected at his expense and to the satisfaction of the District. Should the Contractor fail to respond within 48 hours after written notification of any deficiency, the District may complete the work and bill the Contractor. In emergency situations, the District shall take whatever steps necessary to correct the problem.

END OF SECTION

SECTION 02700

SITE WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Pipe and fittings for site water lines including domestic water lines.
 - 2. Valves.
 - 3. Hydrants.
 - 4. Pipe markers.
 - 5. Precast concrete vault.
 - 6. Bedding and cover materials.
 - 7. Water System Accessories.

- B. Related Section:
 - 1. Section 02300 - Trenching: Execution requirements for trenching required by this section.

1.2 REFERENCES

- A. Colorado Department of Transportation:
 - 1. 2011 CDOT Standard Specifications for Road and Bridge Construction.

- B. American Society for Testing and Materials:
 - 1. ASTM A536 – Standard Specification for Ductile Iron Castings.
 - 2. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
 - 3. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - 4. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

- C. American Water Works Association:
 - 1. AWWA C104 - American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - 2. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 3. AWWA C153 – Ductile-Iron Compact Fittings, 3-inch Through 16-inch, for Water and Other Liquids.
 - 4. AWWA C207 – Steel Pipe Flanges for Waterworks Service – Sizes 4-inch Through 144-inch.
 - 5. AWWA C502 - Dry-Barrel Fire Hydrants.
 - 6. AWWA C509 - Resilient-Seated Gate Valves for Water-Supply Service.

7. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
8. AWWA C605 - Underground installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
9. AWWA C651 - Disinfecting Water Mains.
10. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., for Water Distribution.

- D. Underwriters Laboratories Inc.:
1. UL 246 - Hydrants for Fire - Protection Service.

1.3 SUBMITTALS

- A. Product Data: Submit data on pipe materials, pipe fittings, valves and accessories.
- B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Project Record Documents "AS BUILTS": Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with District standards.
- B. Maintain one copy of each document on site.
- C. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01500 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Pipes, fittings, valves, and accessories shall be loaded and unloaded or otherwise handled in such a manner as to minimize the possibility of damage prior to installation. All materials shall be stored at the construction site in such a way as to prevent damage and to assure they are kept as clean as possible prior to installation.

PART 2 PRODUCTS

2.1 WATER PIPING

- A. The District reserves the right to require ductile iron piping for sections of new watermain within the developed portion of the District that will connect to ductile iron on both ends.
- B. Water main extensions shall be designed to make continuous loops, connecting to the District water system in at least two points wherever possible to provide alternate sources of supply.
- C. Ductile Iron Pipe: AWWA C151 and C104, Pressure Class 350, exceptions by Engineer may include Class 50 Tyton Joint or Class 52.
 - 1. Fittings: Ductile iron, compact, AWWA C153, manufactured/cast in U.S.A.
 - 2. Joints: AWWA C110, C111, and C153, push on single rubber gasket, mechanical joint restraints ("Mega-lug", retainer gland) for all connections to valves and fittings.
 - 3. Jackets: AWWA C105 polyethylene jacket, half lapped, 8 mil (0.008 inch), polyethylene tape.
 - 4. Coatings & Linings: AWWA C205, cement-mortar lining, bituminous seal coating.
 - 5. Size:
 - a. The minimum size of any new water main within the distribution system shall be eight (8) inches in diameter.
 - b. In location where the design engineer determines that a water main must be larger than eight (8) inches in diameter, the water main shall be of such size as specified by the District or recommended by the design engineer.
 - c. Larger sizes shall be required as needed to provide proper distribution flow, pressure, and fire protection.
 - 6. Use/Location: Allowed for use in entire system.
- D. High Density Polyethylene
 - 1. Pipe shall be DR9 pressure class 200 psi, C.T.S.
 - 2. Fittings: Compression per Approved Materials List with stainless steel stiffener.
 - 3. Size: Up to 2-inch. Pipe shall be sized to maintain same I.D. as CTS and may require upsizing with reducers.
 - 4. All HDPE piping shall be installed with tracer wire per District specifications.
- E. PVC Pipe: AWWA C900 and C905,
 - 1. Fittings: AWWA C111, cast iron, wrapped, manufactured/cast in U.S.A.
 - 2. Joints: ASTM D3139 compression gasket ring, AWWA C153 and C900, mechanical joint restraints ("Mega-lug") for all connections to valves and fittings.

3. Jackets: Fittings and valves only, AWWA C105 polyethylene jacket, half lapped, 8 mil (0.008 inch), polyethylene tape.
4. Size:
 - a. The minimum size of any new water main within the distribution system shall be eight (8) inches in diameter.
 - b. In location where the design engineer determines that a water main must be larger than eight (8) inches in diameter, the water main shall be of such size as specified by the District or recommended by the design engineer.
 - c. Larger sizes shall be required as needed to provide proper distribution flow, pressure, and fire protection.
5. Thickness: DR-18.
6. Use/Location: Allowed for use in entire system.

2.2 VALVES

A. GATE VALVES

1. Valves: Manufactured/cast in U.S.A.
2. 4-12 inches: AWWA C509, iron body, resilient seat, open left, non-rising stem with 2 inch square nut, single wedge, MJ.
3. Accessories: Manufactured/cast in U.S.A.

B. BUTTERFLY VALVES

1. Valves: Manufactured/cast in U.S.A.
2. 16 inches or larger: AWWA C504, iron body, bronze disc, resilient replaceable seat, open left, non-rising stem with 2 inch square nut, MJ.
3. Accessories: Manufactured/cast in U.S.A.

C. CONCRETE COLLARS

1. All valves shall have concrete collars in gravel roads.

2.3 HYDRANT

- A. Manufacturers per Approved Materials List.
- B. Hydrants shall be domestic hydrants for casting, parts, and manufacturing.
- C. Hydrant: AWWA C502, UL 246, dry barrel type, traffic "break away" type, safety stem coupling, frangible bolts or safety flange allowing full rotation of nozzle section, main valve opening 5 ¼ inch minimum, 6-inch mechanical joint inlet, 1 ½ inch pentagon operating nut, open left.
- D. Hydrant Extensions: Fabricate in multiples of 6 inches with rod and coupling to increase barrel length.
- E. Hose Connection: 2 hose nozzles, 1 pumper nozzle, national standard threads, 1 ½ inch pentagon nut on caps.

- F. Finish: Factory applied powder coated Red in color to match existing hydrants in system.

2.4 PIPE MARKERS

A. UNDERGROUND

1. All piping shall be installed with a continuous, Direct Burial #12 AWG Solid (.0808" diameter) tracer wire, 45 mil high molecular weight-high density **blue polyethylene jacket** complying with ASTM-D-1248, 30 volt rating for location purposes by means of an electronic line tracer. Tracer wire installed in directional drill installations shall be steel core hard drawn 1,150 pounds average tensile break load. Tracer wire shall be Copperhead Industries, LLC, or approved equal by District.
2. The wire shall be placed above the water pipeline and HDPE service lines.
3. For open cut installation the wire shall be taped to the pipeline at 25-foot intervals. The wire shall be terminated at the tracer wire box. Tracer wire box shall be located within one foot of valve box and set to same grade as valve box, or as requested in the field by District. All splices in tracer wire shall be made with waterproof split bolt connectors.
4. All tracer wire terminals at valve locations shall be inserted into valve box one foot below grade. Valve box shall have ¼ hole and 18-inch of tracer shall be in box. All tracer wire terminals at hydrant locations shall be Copperhead Snakepit Magnetized Tracer Connection Cobra T3 (blue for potable water) manufactured by Copperhead Industries LLC, or approved equal by the Engineer; HDPE or SS bracket to mount to hydrant flange and 2 feet of ¾- inch stainless steel conduit.
5. Upon completion of the tracer wire installation, the Contractor shall demonstrate to the District that the wire is continuous and unbroken through the entire run of the pipe by providing full signal conductivity when energizing for the entire run. If the wire is broken, the Contractor shall repair or replace it.

2.5 BEDDING AND COVER MATERIALS

- A. Bedding: 3/4" Screened Crushed Rock.
- B. Road Base: Type Class 6.

C. Flow-Fill: Structural Backfill that meets the requirements of 2011 CDOT Standard Specifications for Road and Bridge Construction, Section 206.02; within the following limits:

1. Components per cubic yard

Fine Aggregates (Type A2 as specified in Section 02060)	1,845 lbs.
Coarse Aggregates (Type A1 as specified in Section 02060)	
1,700 lbs. Cement	50 lbs.
Water	325
lbs.	
2. Slump – 6 inch minimum, 8 inch maximum
3. Strength – 10 psi minimum in 1 day, 60 psi maximum in 18 days.

2.6 ACCESSORIES

- A. Concrete for Thrust Restraints, Cradles, Valve Blocking, and Encasements:
 1. Refer to District Standard Detail for restraint sizing.
 2. Concrete: compressive strength of 4000 psi in 28 days.
- B. Bell Joint Restraint: ductile iron, ASTM A536, split ring for sizes greater than 12 inch.
 1. PVC pipe: restraint mechanism shall consist of a plurality of individually activated gripping surfaces to maximize restraint capability, EBAA Iron series 1600 or 2800 respectively.
 2. DI pipe: restraint mechanism shall consist of a wedge action restraint ring on the spigot joint to a ductile iron follower gland behind the bell, EBAA Iron series 1700.
- C. Bolts: Cor-ten steel by U.S. Steel Company or approved equal.
- D. Tapping Saddles: Smith Blair Series 317 or better, epoxy coated ductile iron body with double stainless steel straps and NFS Buna-N Gasket. Saddles for PVC pipe must have straps a minimum of 1" in width.
- E. Valve boxes: 5 ¼ inch diameter screw type, per Approved Materials List, "WATER" shall be cast in valve box covers, bonnet required for valves 12 inches or larger.
- F. Corporations: Ball type, CC threaded, compression, per Approved Materials List.
- G. Curb Stops: Compression, per Approved Materials List.
- H. Valve Blocking: solid concrete blocks, 4-inch x 8-inch x 16-inch minimum.
- I. Meter Pits: The location of meter pits will be determined by the District based on a case by case basis.
 1. Meter pits shall be installed between the back edge of the curb and the front edge of the sidewalk in the parkway utility easement. Where no curb, gutter and sidewalk exist, the District shall determine the location of the meter pits.

2. Meter pits shall normally be 20' x 36" heavy plastic meter pits as manufactured by Midstates or approved equal.
3. Meter pits in traffic areas, parking areas or driveways shall have a H20 traffic rated lid and concrete collar or be integrated into the driveway concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify connections and municipal utility water main size, location, and invert as indicated on Drawings.

3.2 PREPARATION

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.3 BORING

- A. A qualified contractor shall perform boring with proper boring equipment.
- B. Water pipe shall be installed through a steel sleeve under irrigation canals, railroads, creeks, waterways, and other structures designated by the Engineer.
- C. Steel sleeve shall be of Standard Weight, Schedule 30 steel, with a diameter adequate to receive the pipe bells and insulators.
- D. Corrosion resistant coated casing insulators with steel bands and glass reinforced plastic runners shall be installed and centered within the sleeve according to the manufacturer's instructions at the maximum allowed spacing.
- E. Rubber end seals with stainless steel bands, clamps, and screws shall be installed on both ends of the sleeve

3.4 BEDDING

- A. Excavate pipe trench in accordance with Section 02300 for Work of this Section.
- B. Minimum support for the pipe shall be directed by the design engineer to meet conditions in the field. No pipe shall be installed when the District has determined that the trench conditions are unsuitable.

- C. Prior to placing concrete for cradles or encasements, temporary supports consisting of concrete blocks shall be used to support the pipe in place. Not more than two supports shall be used for each pipe length, one on either end. Inspection by District is required prior to placement of concrete.
- D. Place bedding material at trench bottom, level fill materials under pipe in one continuous layer not less than 4 inches. Place bedding material 6 inches above the top of the pipe; compact to 92 percent, maximum dry density, ASTM D698, Standard Proctor.
- E. Place fill material in accordance with the Specifications of the Towns of Westcliffe and Silver Cliff.

3.5 INSTALLATION - PIPE

- A. Carefully lower pipe and fittings into trench in such a manner as to prevent damage to the water main materials and protective coatings and linings.
- B. Prevent foreign material from entering pipe or joint space while it is installed. During installation, no debris, tools, clothing, or other materials shall be placed in the pipe. At times when installation is not in progress, the open ends of the pipe shall be closed by a watertight plug or as directed by the Engineer. If water is in trench, the plug shall remain in place until the trench is pumped completely dry.
- C. Maintain separation of water main from sewer piping a minimum of 10 feet horizontal and 2-ft vertical separation and shall meet local and state standards for separation requirements. At no time shall a bell or spigot PVC pipe joint be located within 5 feet of the centerline of a sanitary sewer pipe trench.
- D. When water pipeline crosses a sanitary service, perform work in accordance with District Standard Details. The Contractor shall physically locate the centerline of the existing sewer main and center of a full pipe joint (nominal joint length of 20 linear feet) across the sewer main (+/- 1-foot from the center of the joint). Crossings shall likely require the Contractor to cut and re-bevel the end of the previously laid pipe joint to fit. New water main shall be installed a minimum of 6-inches above the top of the existing sewer main pipe. The water main shall be blocked on both sides of the sewer pipe with concrete blocks resting on undisturbed native soil. Bedding and backfill materials within 3-feet either side of the intersection of water and sewer pipe shall be lightly compacted (less than 95% Standard Proctor density) until the water main is backfilled to approximately 6-inches above the top of the pipe, at which point normal compaction shall begin.
- E. Water mains shall be installed so that a continuous loop is provided for an alternate source of supply where deemed practical by the District.
- F. Water mains shall be placed under traveled portion of roadway if possible. Provide staking for alignment and elevation of water mains a minimum of 50 feet apart and for location of hydrants.

G. Install pipe with 5-feet of cover from top of the pipe to the final finished grade of street.

H. If for any reason, required cover cannot be maintained over existing installed water mains or water service lines; the mains and service lines so affected shall be relocated at the expense of the developer/owner.

I. Mechanical Joint Fittings:

1. Install ductile iron piping and fittings per AWWA C600 and PVC piping and fittings per AWWA 605.
2. All fittings and valves shall be wrapped/encased with polyethylene jacket per AWWA C105.
3. There shall be a minimum of 18 inches of pipe between all valves and fittings.
4. Remove all oil, grit, excess coating, and foreign material from inside the fitting. Slip the follower gland on the spigot end of the pipe with the lip extension of the gland toward the socket, or bell end. Place the rubber gasket on the spigot end with the thick edges toward the gland. Push the entire section of pipe forward to seat the spigot in the socket end of the fitting. Press the gasket into place within the socket. Move the follower gland along the pipe into position for bolting. Insert all the bolts and "finger" tighten nuts. Tighten nuts spaced 180 degrees apart alternately in order to produce an equal pressure on all parts of the gland. Tighten all nuts with a torque limiting wrench according to the following torques:

<u>Bolt Size (inch)</u>	<u>Torque (ft-lb)</u>
5/8	40-60
3/4	60-90
1	70-100
1 1/2	90-120

J. Push-On Joint Pipe:

1. Remove all oil, grit, excess coating, and foreign material from inside of bell and outside of spigot.
2. Flex the circular rubber gasket inward and insert in the recess of the bell. Apply a thin film of gasket lubricant to the inside surface of the gasket and the spigot end of the pipe.
3. Install the spigot end of pipe in bell without letting it contact the ground. Push the joint together. Pipe that is not furnished with a depth mark shall be marked prior to assembly to assure that spigot is installed to the proper depth.
4. Field cut spigot ends shall be filed and ground smooth and angled to resemble the original manufactured end.

K. Water mains shall be designed to be restrained mechanically without the use of thrust blocks when at all possible:

1. Design of number and placement of mechanical joint restraints shall be by a licensed professional engineer.

2. Install "Mega-Lug" fittings or retainer glands on all fittings and valves. Form and place concrete for thrust restraints at elbow or change of direction of pipe main in addition to mechanical restraints.
 3. At a minimum, install a bell joint restraint when a bell end is within 14 feet of a fitting or valve. Also, the last section of pipe at a dead end shall have a bell joint restraint, in addition to adequate blocking, if the section is less than 14 feet. Pipe sizes larger than 8 inches in diameter will have different requirements.
 4. A closed valve that will be pressure tested against shall be considered as a dead end.
 5. Locking gaskets (if available) may be substituted for bell joint restraints where applicable with the District's approval.
- L. Route pipe in straight line at a constant depth. When pipe is laid on a grade of 10 percent or greater, the laying shall start at the lower elevation and shall proceed uphill with the bell ends of the pipe uphill.
- M. Install pipe to allow for expansion and contraction without stressing pipe or joints per pipe specifications.
- N. Concrete Thrust Restraints (when applicable):
1. Form and place concrete for pipe thrust restraints at change of pipe direction when required by the design engineer or not otherwise restrained.
 2. Place concrete to permit full access to pipe and pipe accessories against undisturbed trench wall.
 3. Use plastic "bond breaker" between concrete restraint and pipe or fitting.
 4. Allow concrete restraint to cure for 12 hours before continuing backfill operations.
- O. Install trace wire continuously to the top of PVC pipe taped at intervals to keep it on top of pipe during backfill operations. Bring trace wire to surface at every hydrant and valve location and at locations indicated by Engineer.
- P. Backfill trench in accordance with Specifications of the Towns of Westcliffe and Silver Cliff.

3.6 INSTALLATION - VALVES AND HYDRANTS

- A. Install valves at locations indicated on Drawings.
- B. In gravel roads, Valve boxes shall have a square concrete collar installed flush with road surface. Collar shall be 8-inch x 16-inch x 16-inch and shall one diamond shaped #5 rebar with 3-in clearance.
- C. Set valves on blocking placed on subsoil.

- D. Valves up to and including 8 inch: install solid concrete blocks, 4-inch x 8-inch x 16-inch minimum.
- E. Valves 10 & 12 inch: blocks under 10-inch and 12-inch butterfly valves shall be pre-cast concrete 3-foot wide X 3-foot wide and 6-inches thick. The blocks shall be constructed with concrete of a compressive strength of 3500 psi at 28 days and reinforcement of #4, grade 40 deformed bar at 12-inch o.c. each way. Smaller blocks will be stacked tightly onto the pre-cast block up to the bottom of the valve operator nut of all butterfly valves. Flow-fill in addition to blocking shall be installed a minimum of 8 inches under valve up to the spring line of the pipe.
1. Valves greater than 12 inch: blocks under valves shall be pre-cast concrete 4-foot wide X 4-foot wide and 6-inches thick. The blocks shall be constructed with concrete of a compressive strength of 3500 psi at 28 days and reinforcement of #4, grade 40 deformed bar at 12-inch o.c. each way. Flow-fill in addition to blocking shall be installed a minimum of 8 inches under valve up to the spring line of the pipe.
 2. The Engineer may specify for valves of all sizes cast-in-place concrete blocking.
- F. Center and plumb valve box over valve. Set box cover flush with finished grade. Boxes in paved areas shall have a 2'x2' square concrete collar with #5 rebar, 2" clearance, and concrete jointing for each quadrant.
- G. Install hydrants at locations indicated on Plans and as required by the Fire Department and the District. Hydrants shall be a maximum of 500 feet apart, generally at each intersection, and located in conformance with the Uniform Fire Code.
- H. When a drainage ditch deeper than 2 feet exists between a hydrant and the roadway, a culvert of appropriate size of at least 10 feet in length shall be installed centered on the hydrant.
- I. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway.
- J. Set hydrants to grade, with nozzles at least 16 inches above ground. Breakaway flanges shall be at an approved height per manufacturer's recommendations.
- K. Connect hydrant to water main with a 6-inch branch line (using the least number of joints possible) controlled by an independent 6-inch gate valve. Locate control valve per Detail.
- L. Provide drain gravel 12 inches square by 12 inches deep (in clay or other impervious soil, pit shall be 36 inches square by 36 inches deep) filled with 1/2 inch washed gravel with a waterproof barrier on top between pit and backfill. Encase elbow of hydrant in gravel to 12 inches above drain opening.

3.7 INSTALLATION - METERS

- A. Install Work in accordance with District standards and Technical Specifications or as shown on Drawings.
- B. Meter pits shall be installed between the back edge of the curb and the front edge of the sidewalk in the parkway utility easement. Where no curb, gutter and sidewalk exist, The District shall determine the location of the meter pits.

3.8 SERVICE CONNECTIONS

- A. District personnel will perform the installation of taps on the water main. The District may, at their discretion, allow a sufficiently trained contractor to install taps on new water main extensions before they are put into service. All required shoring and safety measures shall be in place prior to District personnel entering the trench to make the taps. The Contractor shall perform excavation, backfill, compaction, and maintenance of trenches for the water main taps and service lines.
- B. Where it is required to reconnect the existing tap to the new water main, the Contractor shall extend the existing service line to the new main. Where the Contractor encounters existing galvanized steel or lead pipe water service lines, the Contractor shall completely replace such lines with high density polyethylene line, ¾" minimum. This work shall include miscellaneous fittings for connection to the existing curb stop or water meter or coupling connection at the edge of the street R-O-W, as approved by the District.
- C. No service line splices are be allowed to be installed under a newly constructed, reconstructed, or over-laid street.
- D. Service lines shall be placed with 5-ft of cover based on finished grade and shall be installed in tracer wire per District specifications. Depths less than 5-ft shall be insulated and receive prior written approval by the District.
- E. Tapping saddles are not required on ductile iron water mains.
- F. Taps will not be made by District until the water main has been tested and accepted.
- G. Taps will be placed in the water main at a 45-degree angle no closer than 18 inches to another tap, fitting, valve, or a spigot/bell end of pipe.

- H. Saddle nuts shall be tightened evenly with the following torque:

<u>Bolt Size (inch)</u>	<u>Torque</u>
5/16	10-12
1/2	25-30
5/8	50-60

3.9 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Flush and disinfect system per AWWA C651 and CDPHE standards before placing new water main in service. All new development shall pay the expense for any and all tests associated with a new line.
- B. Dry granular calcium hypochlorite containing 65% available chlorine by weight shall be used to disinfect water lines. Granules shall be placed in each section of laid pipe before the next section of pipe is installed. The number of granules needed will be calculated before installation and care will be taken to deposit granules past any bell connection to prevent damage. Each hydrant, hydrant branch, and other appurtenances shall also be disinfected.
- C. Chlorine residual shall not be less than 50 ppm in the water after 24 hours standing in the pipe. The line shall be re-chlorinated and re-tested until the residual requirement is met.
- D. All valves or other appurtenances shall not be operated while the line is filled with the chlorination agent.

3.10 FILLING AND FLUSHING DOMESTIC WATER PIPING SYSTEM

- A. If a fire hydrant is unavailable, it may be necessary to install temporary blow-offs to facilitate blowing off and disinfecting the new water mains before the mains can be tied into the District water system. The Contractor shall furnish all materials, labor, and equipment to install and remove the temporary blow-offs. For each blow-off, the Contractor shall install the required assembly as approved by the design engineer (as the blow-off is temporary).
- B. Taps shall be made to expel air in locations at high points where no hydrant or blow-off is installed. The design engineer shall specify the size and number of taps. Such taps shall be plugged when testing is complete. Permanent high points in the water main shall have air and vacuum valves and vaults installed.
- C. All dead-end portions of the main that are to be tied into existing mains after completion shall be fitted with temporary blocking of sufficient strength to withstand required test pressures.
- D. Filling and flushing of mains shall be performed by District personnel.
- E. All backfill operations shall be complete and all permanent concrete thrust blocks in place for a minimum of 24 hours prior to any filling or flushing operations.
- F. Following chlorination, all treated water shall be flushed from the pipeline until, upon test by District personnel, the water is proved comparable in quality to the water served to the public from the existing system.

3.11 ABANDONMENT

- A. Existing water mains indicated by the Design engineer shall be abandoned as directed.
- B. Existing water valves shall be removed if necessary, to install the new main or can be left in place. Valves left in place shall have their valve boxes removed and the resulting void filled with flow fill.
- C. Existing fire hydrants to be abandoned shall be removed as a whole assembly by disconnecting it at the lateral without damage to the assembly or surrounding structures and landscape. The hydrant shall be salvaged by delivering it to the District yard if directed, otherwise shall be disposed of at Contractor's expense.
- D. Services shall be abandoned by removing the corporation stop and installing a threaded plug. Work shall be inspected by the District.

3.12 FIELD QUALITY CONTROL

- A. The Contractor will provide trained personnel to perform line testing unless otherwise indicated.
- B. Bacteriological tests shall be paid for by the owner/developer prior to placing lines in service. The District shall observe tests and review results prior to placing lines in service.
- C. Pressure testing shall be scheduled upon receipt of a negative coliform bacteria test result.
- D. Pressure test system:
 - 1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, the Contractor will provide trained personnel to conduct, in presence of the District inspector, concurrent hydrostatic pressure and leakage tests in accordance with AWWA C600 & AWWA C605.
 - 2. The Contractor shall accept full responsibility for testing against any existing valves, fire hydrants, or other appurtenances.
 - 3. The Contractor will provide equipment required to perform leakage and hydrostatic pressure tests.
 - 4. Test Pressure: Not less than 150 psi or 1.5 times in excess of maximum static pressure, whichever is greater.
 - 5. Conduct hydrostatic test for at least two-hour duration.
 - 6. Pressure shall not vary by more than 5 psi during the hydrostatic pressure test.
 - 7. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks installed and plug pipe openings.

8. The District personnel will slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.
9. Examine exposed piping, fittings, valves, hydrants, and joints carefully during hydrostatic pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.
10. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$$L = \frac{ND\sqrt{P}}{7,400}$$

- L = allowable, in gallons per hour
- N = number of joints in section to be tested
- D = nominal diameter of pipe, in inches
- P = average test pressure during leakage test, in pounds per square inch (gauge)

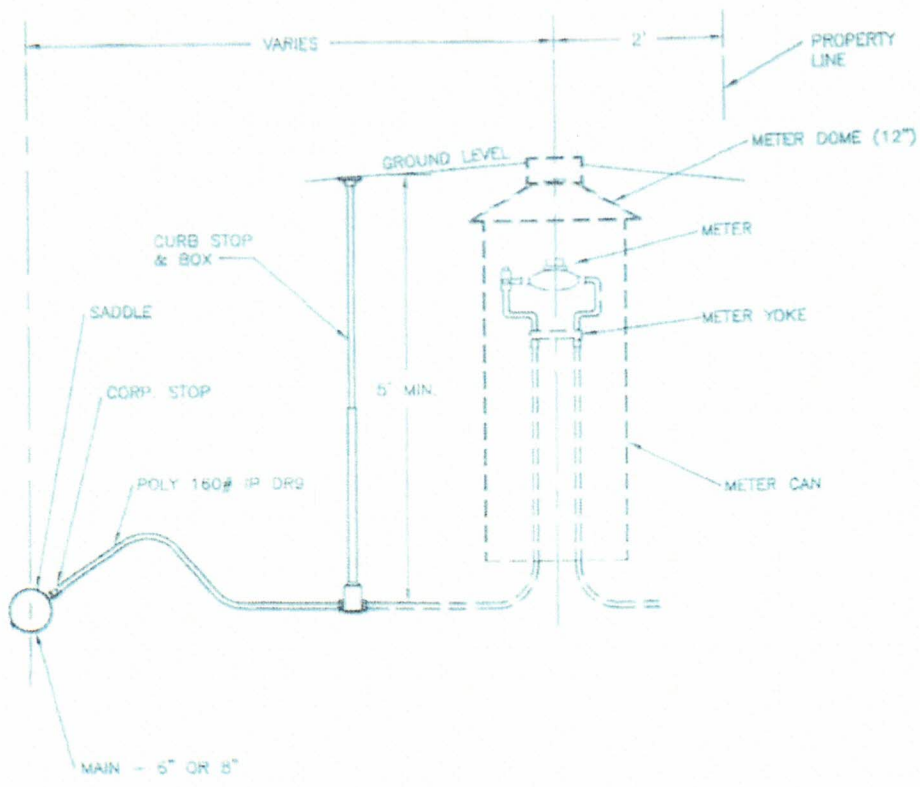
11. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.
- E. Compaction testing for bedding and backfill in accordance with Section 02100.
 - F. When tests indicate Work does not meet specified requirements, repair Work and retest.
 - G. The pipeline may be placed in operation after all required cleaning, testing, and inspection have been completed and written permission has been granted by the District. During the warranty period, any defects in the system resulting from defective materials, poor workmanship, or any other cause attributable to the Contractor shall be corrected at his expense and to the satisfaction of the District. Should the Contractor fail to respond within 48 hours after written notification of any deficiency, the District may complete the work and bill the Contractor. In emergency situations, the District shall take whatever steps necessary to correct the problem.

END OF SECTION

Approved Materials List for Water and Sewer

Part/Manufacturer	Part Number	Description
<u>Meter Pit Assembly</u>		
Mid State Plastics Meter Pit	MS2036B	20" x 36" heavy plastic
Aluminum Dome w/Cast Iron Lid	M70	20" AL dome, CI lid, AL inner lid
<u>Meter Setters</u>		
Ford or McDonald vertical setter	Series 37	** <u>Service Lines and Appurtances will be CTS</u> Built-in check valve, Pack Joint connections Ball valve shut-off, Pack Joint connections Built-in check valve, Pack Joint connections
Ford or McDonald angled meter connector	7460B-22	
Ford or McDonald angled meter connector	7112-3H26	
<u>Water Service Line</u>		
High Density Polyethylene, 3/4" minimum	PE-3408	SDR-9,200psi,CTS
<u>Insert Stiffener</u>		
McDonald, 3/4" minimum	6133T	Stainless Steel
<u>Curb Valve</u>		
Ford or McDonald, 3/4" minimum	76100-22	Pack Joint connections
<u>Corporation Valve</u>		
Ford or McDonald, 3/4" minimum	74701B-22	Pack Joint connections
<u>Water Tap Saddle</u>		
Smith -Blair/Equal, epoxy coated, ductile iron	Series 317	Minimum 1" SS straps, NSF Buna-N gasket
<u>Valve Boxes</u>		
Service Line - McDonald	5601-5	1" Arch Style
Main Line - Tyler Union/Equal 5 1/4"	6850	Screw Type, Cast Iron, "water" on lid
<u>Sanitary Sewer Fittings</u>		
Mission/Equal Non Shear Couplings	N/A	Stainless Steel band coupling
8x4 Flange Tap Saddle w/adapter	GPK 136-L084CR	Epoxy resin adhesive
<u>Sanitary Service Line</u>		
PVC 4"	N/A	ASTM D 3034 Schedule 40
<u>Main Line Valves</u>		
AVK/Mueller - non rising stem, open left	C509/515	Iron Body, Resilient Seat, 2" Square nut
<u>Fire Hydrants</u>		
AVK, Mueller - Dry Barrel Type	N/A	AWWA C502, "break away" type, open left
<u>Locator Wire</u>		
Copperhead/Equal - 12 AWG	9612TWCCS500	Blue - Water, Green - WW, ASTM-D1248

Contact RMWSD for information on materials not listed.



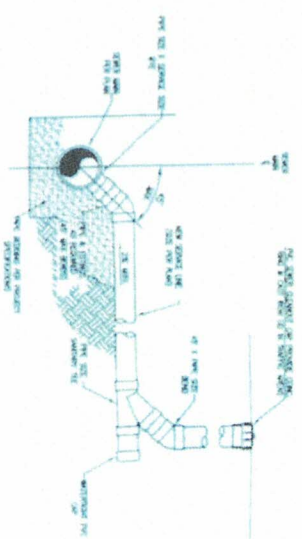
TYPICAL SECTION
WATER SERVICE
METER SET

Clyde B. Young & Co.
Consulting Engineers
 ENGINEERING—SURVEYING—PLANNING
 225 COLORADO AVE., SUITE B
 PUEBLO, COLORADO 81004
 (719) 843-1941

Round Mountain Water & Sanitation District

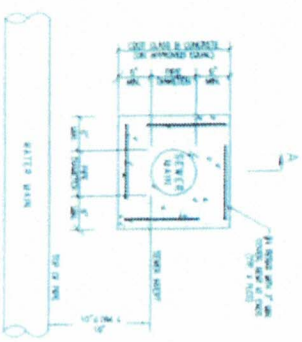
DETAIL

Job No.	Scale	DATE	Dr. By	LT	Sheet No.
9831	NONE	10/02/88	Cr. By	CBY	

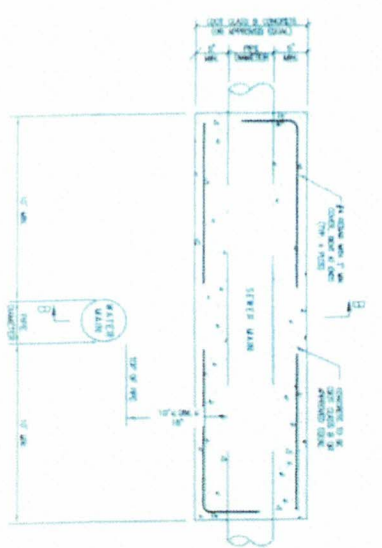


STEEL MANHOLE RING & COVER
 COVER 200 OR APPROX. EQUAL
 Street Man Ring & Cover 200 LB Wt.
 Street Manhole Ring & Cover to be installed
 in accordance with A.S.T.M. Specification C 476, with
 Reinforcement
 - SAWTOOTH OR STEEP BEVEL

SEWER SERVICE TAP
 DETAIL



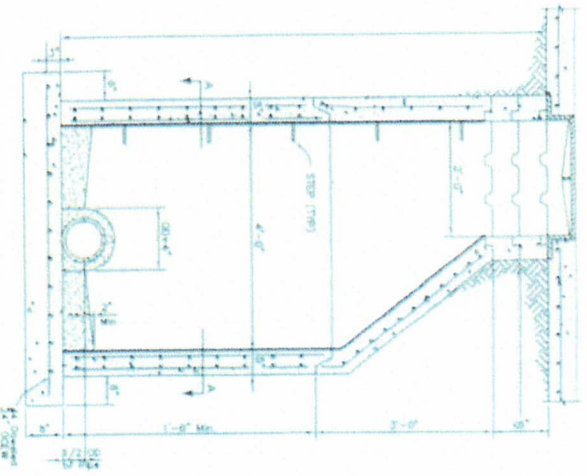
SECTION B-B



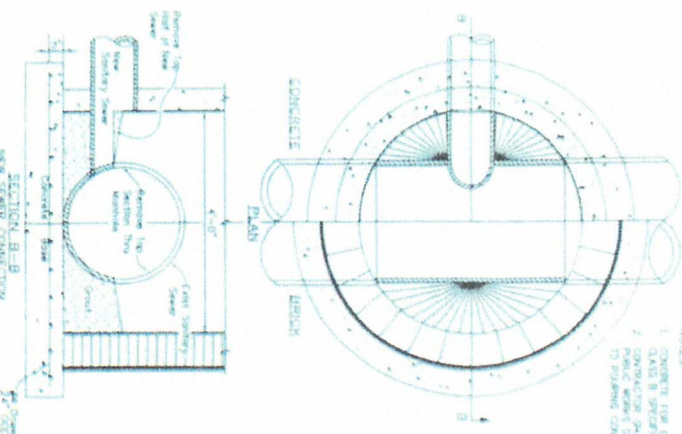
SECTION A-A

NOTES
 1. CONCRETE FOR ENCASUREMENT SHALL BE OF THE
 CLASS B SPECIFICATION
 2. CONCRETE SHALL CONTACT THE CITY OF TALLAH
 3. JOINTS SHALL BE REINFORCED WITH 2 #4 BARS
 4. JOINTS SHALL BE REINFORCED WITH 2 #4 BARS
 5. JOINTS SHALL BE REINFORCED WITH 2 #4 BARS

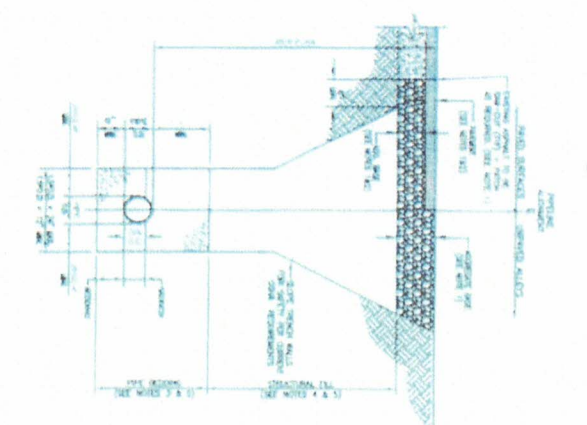
CONCRETE SEWER ENCASUREMENT
 DETAIL



MANHOLE STANDARD DETAIL
 DETAIL



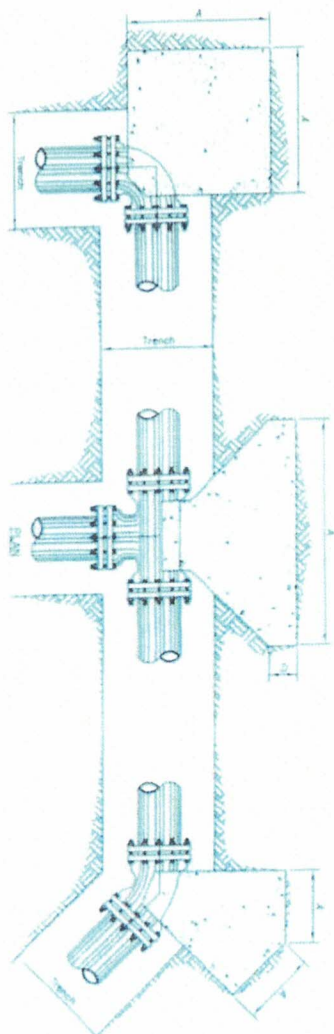
SECTION B-B
 SEWER SERVICE CONNECTION
 Manhole Connected over Pipe 20" Dia.



TRENCH CROSS-SECTION
 DETAIL

- GENERAL NOTES
1. ALL WORK SHALL BE IN ACCORDANCE WITH THE APPROVED CITY OF TALLAHASSEE SPECIFICATIONS.
 2. ALL MATERIALS SHALL BE OF THE HIGHEST QUALITY AVAILABLE AND SHALL BE SUBJECT TO INSPECTION AND TESTING BY THE CITY OF TALLAHASSEE.
 3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF TALLAHASSEE SPECIFICATIONS.
 4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF TALLAHASSEE SPECIFICATIONS.
 5. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF TALLAHASSEE SPECIFICATIONS.
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 9. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF TALLAHASSEE SPECIFICATIONS.
 10. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CITY OF TALLAHASSEE SPECIFICATIONS.

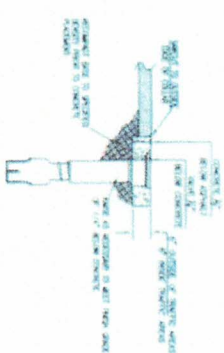
DATE	NO.	BY	FOR
10/21/11	1	J. J. J.	CITY OF TALLAHASSEE
10/21/11	2	J. J. J.	CITY OF TALLAHASSEE
10/21/11	3	J. J. J.	CITY OF TALLAHASSEE
10/21/11	4	J. J. J.	CITY OF TALLAHASSEE
10/21/11	5	J. J. J.	CITY OF TALLAHASSEE
10/21/11	6	J. J. J.	CITY OF TALLAHASSEE
10/21/11	7	J. J. J.	CITY OF TALLAHASSEE
10/21/11	8	J. J. J.	CITY OF TALLAHASSEE
10/21/11	9	J. J. J.	CITY OF TALLAHASSEE
10/21/11	10	J. J. J.	CITY OF TALLAHASSEE



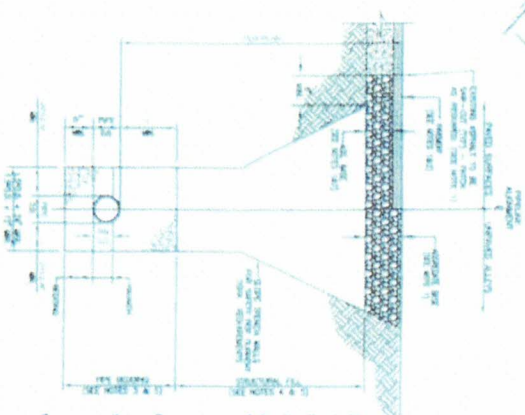
BLOCKING SCHEDULE
WATER DISTRIBUTION FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT
1	1/2" DIA. 10' LONG	1	LINEAL FT.
2	1/2" DIA. 10' LONG	1	LINEAL FT.
3	1/2" DIA. 10' LONG	1	LINEAL FT.
4	1/2" DIA. 10' LONG	1	LINEAL FT.
5	1/2" DIA. 10' LONG	1	LINEAL FT.
6	1/2" DIA. 10' LONG	1	LINEAL FT.
7	1/2" DIA. 10' LONG	1	LINEAL FT.
8	1/2" DIA. 10' LONG	1	LINEAL FT.
9	1/2" DIA. 10' LONG	1	LINEAL FT.
10	1/2" DIA. 10' LONG	1	LINEAL FT.
11	1/2" DIA. 10' LONG	1	LINEAL FT.
12	1/2" DIA. 10' LONG	1	LINEAL FT.
13	1/2" DIA. 10' LONG	1	LINEAL FT.
14	1/2" DIA. 10' LONG	1	LINEAL FT.
15	1/2" DIA. 10' LONG	1	LINEAL FT.
16	1/2" DIA. 10' LONG	1	LINEAL FT.
17	1/2" DIA. 10' LONG	1	LINEAL FT.
18	1/2" DIA. 10' LONG	1	LINEAL FT.
19	1/2" DIA. 10' LONG	1	LINEAL FT.
20	1/2" DIA. 10' LONG	1	LINEAL FT.

WATER TRENCH
DETAIL



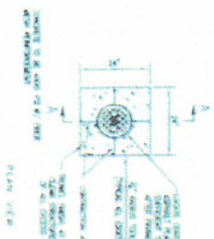
SECTION A-A



TRENCH CROSS-SECTION
DETAIL

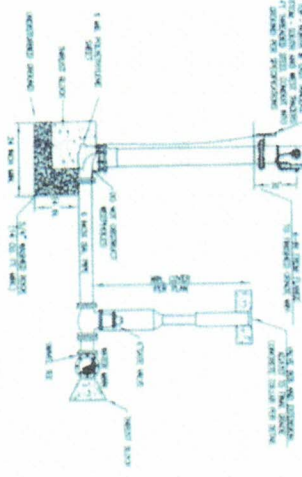
- GENERAL NOTES**
1. SEE PLAN FOR TRENCH WIDTH, LOCATION, AND DEPTH.
 2. ALL JOINTS OF PIPES & FITTINGS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 3. THE SIZE OF TRENCH SHALL BE AS SHOWN ON THE PLAN UNLESS OTHERWISE NOTED.
 4. TRENCH SHALL BE BACKFILLED WITH THE BEST AVAILABLE MATERIAL.

WATER VALVE CONCRETE COLLAR
DETAIL



PLAN VIEW

FIBRE HOBRANT ASSEMBLY
DETAIL



STANDARD DETAILS
WATER DISTRIBUTION DETAILS

DATE	NO.	REV.	BY
01/15/2018	001	1	J.M.