

APPENDIX A

ST. VRAIN SANITATION DISTRICT

CONSTRUCTION STANDARDS

SECTION 1 ANNUAL LICENSING OF CONTRACTORS

Any contractor or company that performs construction, maintenance, or other services on District owned equipment, property, lines, easements, or right-of-ways that are the responsibility of the District shall provide supply the following documents and comply with the following requirements.

- A. Completed SVSD license application.
- B. Certificate of insurance specifying liability coverage and naming the District as additional insured set at one million dollars (\$1,000,000) minimum.
- C. Certificate of Insurance specifying workers compensation coverage.
- D. \$40.00 fee for first year license.
- E. \$20.00 fee for renewal after first year if renewed before expiration.

Inspections shall only be performed during regular business hours of the District, Monday through Friday excluding holidays except in emergencies. All inspections shall be scheduled at least 24 hours in advance. When District personnel are required to work outside of the regular business hours, it shall be at the contractor's expense, and the District shall be compensated at a rate of \$65.00/hour, with a two hour minimum. Contractor shall obtain written approval from the District prior to work being done outside these hours.

All contractor licenses expire one year from the date of issuance. It is the contractor's responsibility to renew the license before the expiration and provide new insurance forms. Failure to comply will terminate license. If the license has been terminated due to expiration, the \$40 fee will be charged and a new license will be issued.

If the license is renewed before the expiration, the contractor will submit the renewal form, new insurance forms, and \$20 to renew the license.

SECTION 2 CONSTRUCTION START-UP

No work shall commence on or off site until the installing contractor has an SVSD approved set of construction plans and current construction standards in their possession. The District Engineer's approval will be for general conformity to the plans and will not constitute blanket approval of all dimensions, quantities, and details of the material or equipment shown. Such approval does not relieve the contractor or consulting engineer of their responsibility for errors or omissions in the drawings.

In addition to all other construction requirements contained in these standards, the developer and their contractor shall also observe the following:

- A. SVSD Engineer shall sign the approved sewer design construction plans before beginning construction of sewer infrastructure.
- B. Prior to the commencement of any work, the contractor will arrange a pre-construction conference with District personnel. At the pre-construction conference the contractor will provide the District a list including the names and phone numbers of key personnel, a proposed schedule, approved traffic control plan where applicable, and documentation of notification of all affected parties.
- C. The project shall be surveyed and staked under the supervision of a licensed professional land surveyor in accordance with the approved plans.
- D. A silt fence shall be erected where needed or required.
- E. The District shall be notified forty eight (48) hours prior to the start of work, and all work relating to sanitary sewers shall be inspected by the District.
- F. Before the start of any excavation a plug will be installed in the down stream manhole and will remain in place until the initial acceptance letter has been received by the contractor/owner. At that time it will be the responsibility of the contractor to remove the plug. Failure to install and maintain the plug may result in the contractor being required to clean the existing lines at their expense. At no time will discharge into the existing sewer system be allowed.

SECTION 3 DISTRICT AUTHORITY

- A. Where a conflict occurs between or within standards, specifications, and drawings, the more stringent requirements shall apply.
- B. Installation of all new facilities within the District's service area shall be inspected and approved by District personnel.
- C. The contractor shall furnish all reasonable aid and assistance required by the District for the proper examination of the material and work. All work shall be performed in accordance with accepted workmanship practices and these construction standards. Any work not accepted by the District shall be redone until compliance with these standards is achieved. Inspection shall not relieve the contractor from any obligation to perform the work in accordance with the plans and specifications or any approved modifications thereof. Work not so constructed shall be removed and corrected by the contractor at their sole expense, whenever ordered by the District, without reference to any previous error or oversight in inspection.
- D. Inspections shall only be performed during the regular business hours of the District, Monday thru Friday excluding holidays except in emergencies. All inspections shall be scheduled at least 24 hours in advance. When District personnel are required to work outside of the regular business hours, it shall be at the contractor's expense and the District shall be compensated at a rate of \$65.00/hour, with a two (2) hour minimum. Contractors shall obtain written approval from the District prior to work being done outside these hours. Payment for such work shall be made to the District prior to initial acceptance.
- E. The District shall have final authority in the event of conflicting instructions when one or more inspectors representing private consulting engineering firms are also inspecting a project.

- F. Any material rejected by the District shall be removed from the job site within a reasonable length of time. Failure to comply will result in the District arranging for such removal at the expense of the developer.

SECTION 4 SAFETY

Contractors shall follow OSHA approved safety standards at all times.

SECTION 5 TRAFFIC CONTROL

The contractor shall be responsible for the provision of a safe travel way on all roadways adjacent to or crossing the job site. The contractor shall erect or cause the erection of proper traffic control warning devices around all excavations, embankments and obstructions and shall be responsible for the proper maintenance of said erected devices.

It is the contractors' responsibility to obtain all licenses and permits from the appropriate governing body and to adhere to the same.

SECTION 6 STREET CUTS

The removal of pavement, sidewalks, driveways, or curb and gutter shall be performed in a neat and workmanlike manner. Street cuts made for utility installations or repairs shall include a repaving plan acceptable to the affected municipality.

SECTION 7 PROTECTION OF EXISTING FACILITIES

Existing power lines, telephone lines, trees, shrubbery, fences, water mains and services, gas mains, sewer mains and services, cables, conduits, drainage, irrigation ditches, pipes, embankments and any other structures in the vicinity of the work not authorized to be removed shall be supported and protected from damage or injury by the contractor during the construction and until completion of the work. The contractor shall preserve intact any underground pipes or other utilities encountered during construction. The contractor shall be liable for any and all damage done to such existing facilities and structures as herein provided and the District will not be held liable or incur expense for injuries, damage, or repairs to facilities or be held responsible for consequential damages. The type, size, approximate location and number of all known underground utilities shall be shown on all drawings. It shall be the responsibility of the contractor to verify the existence and location of all underground utilities along the route of the work. In the event that during construction it is determined that any underground utility conduit, including sewers, water mains, gas mains and drainage structures or any above ground utility facilities are required to be relocated, the contractor shall notify the utility owner at least forty-eight (48) hours in advance of his approach to such utility so that arrangements with the District for approval and/or owners of the affected utility can be made without delay to the work. All relocations will be done at the developer/contractor's expense and upon approval by the District personnel.

SECTION 8 SERVICE INTERRUPTION

No sewer service may be interrupted. The contractor shall take the necessary steps to ensure the appropriate temporary means are taken to provide sewer service. The sewer service and means of conveyance shall be approved by District personnel and supplied or provided by the contractor.

SECTION 9 INSTALLATION

9.1 Standards

Installation methods will be based on the criteria, standards and requirements established by the industry. Requirements shall be set forth in these specifications for the pipe and type of bedding, manholes and backfilling.

A pipe line laser will be used in all main line construction in accordance to the manufactures recommendations.

If construction defects exceed the manufacture's recommendation or the industry standards, the contractor shall be responsible for removing the existing pipe and installation of new pipe.

9.2 Trenching

- A. The width of the trench shall be ample enough to allow the pipe to be laid and jointed properly, and to allow the backfill to be placed and compacted as needed. The trench sides shall be kept as nearly vertical as possible for a distance of 1' above the top of the pipe. All existing asphalt or concrete surfacing shall be cut vertically and in a straight line and should be removed from the job site prior to starting the trench excavation. Asphalt, concrete or other surface material shall not be used in any fill or backfill. The trench shall be excavated so that a minimum clearance of six (6) inches is maintained on each side of the pipe for proper placement and compaction of the bedding or backfill material. The maximum trench width, measured at the top of the pipe, shall be the outside diameter of pipe plus twenty-four (24) inches. If the actual trench width exceeds the maximum allowable trench width, the contractor will take whatever measures necessary to insure the manufacturer's recommendations are met. This may require a pipe of a stronger class or additional bedding. The cost of such remedial measures shall be at the contractor's expense. Excavation in paved streets shall be confined to a minimum practical width. Any paving that is damaged by the contractor shall be replaced at the contractor's expense.
- B. Ledge rock, boulders, large stones and any other impediments or obstacles shall be removed to provide a minimum clearance of 6 inches below and on each side of all pipe(s).

9.3 Bedding

- A. The type of bedding to be used depends on the soils report, and shall be specified in the construction documents.
- B. Unless conditions warrant otherwise, bedding for pipe diameters four inch (4") thru twelve inch (12") will be squeegee CDOT standard gradation #8, fifteen inch (15") and larger diameter pipe will be ¾ inch rock class #6. See detail at the end of this section.

9.4 Backfill

Suitable backfill material shall not include rubbish, stones larger than five (5) inches in diameter, dirt clods, frozen lumps of soil or any other foreign or unsuitable material. If the excavated material is not suitable backfill as determined by the District, suitable backfill material shall be made available and utilized and the rejected material shall be disposed of at the contractor's expense. Backfilling shall be conducted in a manner to prevent damage to or displacement of the pipe or its coating. Pipe installation shall not advance more than three hundred (300) feet ahead of backfilling. All backfill shall be compacted by mechanical methods. Water settling or jetting will not be allowed.

9.5 Dewatering

All pipe trenches or structure excavation shall be kept free from water during laying of pipe and other related work. The methods of dewatering shall provide for a completely dry foundation at the final lines and grades of the excavation. Pipe will not be installed with water present at or in the bell. All water shall be disposed of in a proper manner without being a menace to public health or causing a public inconvenience. When required, the contractor is responsible for obtaining a permit for ground water discharge. Dewatering shall be maintained until the trench is completely backfilled. The dewatering operation shall continue until such time it is safe to allow the water table to return to its natural state. Discharge of ground water into any sewer line is prohibited.

9.6 Excavation

All excavations shall be made to the lines and grades as established by the approved drawings in open cuts, through whatever material is encountered. All areas shall be excavated in such a manner as to provide adequate drainage. When material is encountered within the limits of the work that is considered unsuitable by the District, the material shall be excavated below the grade shown on the drawings to a depth necessary to ensure a stable, firm foundation and refilled with approved backfill uniformly graded to provide a firm, stabilized foundation. Surplus excavated material shall be disposed of by the contractor.

SECTION 10 MANHOLE CONSTRUCTION

Manholes shall be of the pre-cast concrete or poured-in-place concrete type on an existing sewer line.

Inlet and outlet pipes shall be joined to the manhole by a gasketed, flexible watertight connections.

Watertight manhole covers shall be used wherever the manhole lids may be flooded by street runoff, high water or any other water source. Bolt down manhole covers may be required at the discretion of the District. The assignment of these types of manholes is at the sole discretion of the District and at the developer's expense.

Sewer pipe connections to existing manholes where there is no existing pipe stubbed out shall be made in such a manner that the finished work will conform to the essential requirements specified for new manholes. The contractor shall core drill the existing manhole as necessary to insert a "Kor-N-Seal or approved gasket and new sewer pipe. The existing concrete foundation bench shall be ground to the cross-section of the new pipe in order to form a smooth, continuous invert similar to what would be formed in a new concrete base. Portland cement grout shall be used as necessary to smoothly finish the new invert.

If manholes are located in open fields, they shall be left six (6) inches above grade where practical unless directed otherwise. Bolt down ring and covers will be installed in all non surfaced areas. In cultivated areas, manholes shall be buried a minimum of eighteen (18) inches and a maximum of twenty-four (24) inches below grade, properly marked with a green carsonite post located by a fence line or other suitable site as close to the manhole as possible, with the off set marked in feet to the centerline of the manhole cover. When manholes are placed in dirt roads they will be buried six inches (6) below the final road surface.

The manhole barrels shall be sealed watertight at all joints and riser sections using a preformed bitumastic joint sealant. The pre-forming flexible plastic joint sealing compound shall be "Rub-r-Nek", or a similar equivalent compound. Two rings of preformed bitumastic joint sealant per joint shall be used, one and one half inch (1 ½) on four (4) foot diameter manholes and two (2) inch on five (5) foot diameter manholes. In locations where ground water is present an additional joint wrap will be required.

The cone section shall not extend closer than twelve (12) inches to the top of the manhole cover. Pre-cast concrete adjustment rings shall be used on top of the cone to support and adjust the manhole frame to the required final grade. All manholes in non-surfaced areas shall have a concrete collar poured encasing the ring and one (1) foot of the top cone section (See details in Appendix B). Preformed bitumastic joint sealant hanging inside of a manhole must be removed. Flat top sections must be used when the height from the flow line to the top of the cover is six (6) feet or less on shallow lines, where a cone section is impractical to use, or as specified by the District.

When connecting to an active line, the connecting manhole shall be poured in place, Class "B" 4000 psi concrete with a minimum thickness of eight inches (8) below the flow line of the pipe and four inches (4) above the crown is required. Manhole inverts shall be formed to the full diameter of the pipe to insure full and unobstructed flow. Each pipe must extend no more than four (4) inches into the manhole (See details in Appendix B) wall to a formed concrete invert. Pre-cast bases may be used when specifically authorized by the District. Pipes extended through manholes and cut to form an invert are not acceptable without prior written permission from the District.

All exterior surfaces of the manhole will be damp proofed regardless of the presence of ground water. Acceptable coating is Deco 20 or approved equal.

No existing manhole will be covered or left inaccessible for a period of more than 24 hours.

SECTION 11 TESTING

At the discretion of the District, the following tests will be required to be performed at the contractor's expense. The contractor shall be responsible for supplying all materials, labor and other equipment to perform testing. All testing will be done in the presence of District personnel.

Sewer lines:

- A. For line pressure testing refer to detail # 20 Appendix B.
- B. Any line that tests unsatisfactory shall be repaired and retested until satisfactory results are obtained.

Manholes:

- A. All manholes shall be vacuum tested. A vacuum equivalent of 10 inches of mercury shall be drawn. The time for the vacuum to drop ½ pound will be recorded. The time must exceed 60 seconds for four (4) foot diameter or 75 seconds for five (5) foot.
- B. Any manhole that tests unsatisfactory shall be repaired from the outside and retested until satisfactory results are obtained.

Deflection:

- A. At the discretion of the District deflection testing may be required. If deemed necessary the contractor will be required to pull a 5% mandrel through the line. The test will be on a go/no go basis.

SECTION 12 LINE CLEANING

All sewer lines shall be completely jetted and vacuumed to remove dirt and debris. Jetting shall be done after the first lift of asphalt is completed or when construction is finished whichever is later. The contractor will be responsible for removing all of the dirt and debris from the line and not allow any debris into any existing line. The original plug is to remain until initial acceptance, and flushing of the line is not permitted.

SECTION 13 VIDEO INSPECTIONS

All sewer mains will be videoed and approved as soon as possible after jetting is completed. A continuous stream of water will be maintained at all times during videoing. Video reports must detail service laterals, pipe run information, pipe condition, correct lineal footages and vertical manhole inspection. The original report and electronic copy must be in DVD format and Win Can is preferred.

If the District finds that any completed line or part thereof fails, the contractor will be required to repair the sewer line until it meets specifications of the District. The District will require additional video inspection for the sewer line segments in question. All costs of this work shall be at the expense of the contractor.

SECTION 14 POINT REPAIR

All point repairs on existing lines shall be made with air-tight closure couplers and inspected by the District. No rubber couplers may be used.

SECTION 15 CONNECTION

1. Where "Y's" have not been installed in the main line sewer, the contractor shall excavate around the main and prepare the main for tapping. No one is permitted to tap the existing sewer system except District personnel. Where tapping is necessary, the contractor shall apply for the tap and pay the prevailing fee. The only size taps directly allowed on a sanitary sewer pipe are four (4") inch or six (6") inch. Any larger size line must be brought into the District through a manhole.
2. Taps will be scheduled when the District is contacted by the contractor. No tap will be scheduled less than 48 hours, or two working days, from the time the District is contacted. No tap will be scheduled until all fees have been paid.
3. When the tapping crew arrives at the site, they will inspect the preparation of the trench for safety, as defined by current O.S.H.A. Standards.
4. The pipe must be sufficiently exposed to accommodate the tapping equipment.
5. When all conditions are deemed safe as described above, District Personnel will physically make the tap.
6. If the conditions are not satisfactory the District, will not perform the tap and all costs for time lost will be billed to the contractor, along with rescheduling the tap.
7. Taps are only made Monday through Thursday, excluding holidays.

SECTION 16 ABANDONED INFRASTRUCTURE

Unless otherwise approved, service lines to be abandoned shall be excavated and plugged at the connection to the main with an approved watertight plug. District personnel must inspect all capped services before they are covered.

SECTION 17 RECORD DRAWINGS

The contractor shall take measurements of distances from manholes to indicate location of service taps. This information will be conveyed to the drafter of the record drawings. If "As-Built" data indicates a stretch of pipe (manhole to manhole) is less than minimum slope for its diameter, the developer will pay SVSD \$1,000 for the additional sewer maintenance that will be required for said stretch of pipe.

SECTION 18 ACCEPTANCE OF WORK

For initial acceptance for a filing or phase, the following requirements shall be met:

- A. Full completion of platted filing or phase.
- B. All lines must pass pressure test.
- C. All manholes must pass the vacuum test.
- D. All manholes and lines must be jetted and the debris removed.
- E. All lines must be videoed, reviewed and accepted.
- F. All manholes must be free from preformed bitumastic joint sealant hanging out of seams.
- G. All manhole troughs must be free of obstructions and grouted smooth.
- H. The first lift of asphalt must be completed.
- I. All manholes shall be at final grade. When in non surfaced areas all manholes shall have concrete collars encasing the ring, all risers and one foot of the cone. (See Appendix B for Detail).
- J. All manhole lids shall be Denver pick slot style and have the SVSD insignia.
- K. All service laterals shall be marked with an "S" on the curb and the end marked with a green 2x4.
- L. All manholes in non surfaced areas shall be marked with carsonite markers.
- M. All engineering paperwork must be submitted and approved.

After paving operations have been completed, a punch list shall be formulated by the District and sent to the contractor and developer. Once this punch list has been completed and all other conditions have been met, an initial acceptance letter will be issued to the contractor or developer stating the date the two (2) year warranty period begins. Once the two (2) year warranty period begins, the District shall be responsible for locating the main lines only. The District is not responsible for locating service laterals.

SECTION 19 WARRANTY OF WORK

The developer/owner shall warrant to the District that all work is free from defects in workmanship or materials for a period of two (2) years commencing upon the date set by the initial acceptance. The developer shall maintain and repair any trench settlement which may occur and shall make suitable repairs to any pipes, fittings, manholes, pavement, sidewalks or other structures which may be damaged as a result of backfill settlement, faulty construction or defective materials as determined by the municipality or the District. The contractor shall further indemnify and hold harmless the District from and against any loss, claim or demand for damage arising out of defective workmanship or materials, during said two (2) year warranty period.

Any repairs needed on any installation after the lines have been approved for service shall be performed by the contractor or developer. If the contractor or developer does not start repairs within two (2) months of the request from the District the District will not sell any sewer service connections within said subdivision until all repairs have been made and accepted by the District.

Twenty months following commencement of the two year warranty period, a letter will be sent to the owner/developer requiring video inspection of the lines prior to the end of the warranty period. The District will review the video and generate a punch list. Once all items on the punch list are addressed, and the warranty period has expired a final acceptance letter will be sent to the owner/developer.

If the above conditions are not met, the bonding company will be notified and the warranty period and bond will be extended until all conditions are met.

SECTION 20 MISCELLANEOUS

Where special conditions not covered by these standards exist, detailed drawings and specifications shall be submitted to the District for approval before contracts are awarded or work can begin. Written approval from the District must be obtained before any materials other than those specified in these standards may be employed in the construction of sewer lines connected to or made a part of the District system.