

PART V
TECHNICAL SPECIFICATIONS
SANITARY SEWER CONSTRUCTION

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TECHNICAL SPECIFICATIONS

SANITARY SEWER CONSTRUCTION

Section 1 – Materials for Construction of Sanitary Sewers

1.01 General

All materials shall conform to sizes, capacities, qualities and quantities as shown on the drawings or described in these specifications. Materials shall be from new stock, delivered in good condition and no damaged stock shall be used.

Where no method of test materials is specified, the latest method of test specified by the ASTM shall be followed.

Nothing in these specifications shall prevent the Contractor from using materials that exceed the minimum requirements set forth in the specifications, subject to approval of the Engineer.

After delivery to the site, all materials shall be properly protected against breakage, rusting, accumulation of foreign matter, disintegration and injury. The Contractor shall be responsible for all loss or damage to material supplied and work done under this contract. Piping shall be protected from sunlight, scoring, distortion, and discoloration.

1.02 Gravity Sewer Conduit – Polyvinyl Chloride Pipe (PVC)

Polyvinyl Chloride (PVC) Pipe shall be suitable for use as a gravity sewer conduit, have a maximum SDR of 35 and shall conform to and meet the requirements of ASTM, D-3034. The pipe shall be bell and spigot type.

Joints for PVC pipe shall be O-ring rubber gasket type equal to Certain-Teed "Fluid-Tite" or J-M "Ring-Tite". The rubber gasket shall be of special composition rubber recommended for sewer service.

Service connections shall consist of PVC fittings and rubber gasketed full line tees and shall conform to the requirements of ASTM, D-3034.

Manhole connections shall consist of PVC couplings precast into the manhole base.

1.03 Gravity Sewer Conduit – Ductile Iron Pipe (DIP)

Where designated on the plans, sewer lines shall be constructed of ductile iron pipe conforming to the requirements of ASA A21-51 Standards. The joint for ductile iron pipe and fittings shall be push-on type as manufactured by United States Pipe and Foundry Company, or equal, or mechanical joint where specified and shall be in accordance with ASA A21.11 Standards. Gaskets for joining ductile iron pipe shall be

neoprene and shall be lubricated with a lubricant recommended by the manufacturer of the gasket.

A maximum of 20 percent of the total number of pipe of each size or an order may be furnished as much as 24 inches shorter than the nominal laying length, and an additional ten percent may be furnished as much as six inches shorter than nominal laying length.

Bituminous outside and inside coating shall be in accordance with ASA A21.6. Pipe shall be protected during handling against impact shocks and free fall. Cement lined pipe may be furnished at the Contractor's option, conforming to ASA Specification A21.4, for Type II cement.

1.04 Flexible Couplings

Flexible Couplings shall be Smith-Blair Type 411, 431, 433, or approved equal, as shown on plans. Buried couplings shall be extra heavy, with stainless steel bolts and nuts.

1.05 Transition Joints

Transition Joints between different pipe materials shall be "Ceramicweld", "Calder", "Band-Seal", "Fernco", or other approved flexible coupling.

1.06 Castings

All castings for manhole rings and covers shall be tough gray iron, free from cracks, holes, swells and cold sheets and be of workmanlike finish. The cast iron shall meet the requirements of ASTM, A-48, Class 25. Manhole covers shall be turned in a lathe and the outer 1 1/2" dressed down to assure a tight fit and to prevent rocking. The seat for the manhole cover shall also be turned in a lathe to provide a true and smooth surface. All manhole covers which do not fit neatly and bear firmly in the ring will be rejected. Manhole frames and covers shall be Phoenix Ironworks, labeled "Sanitary Sewer", or equal. There shall be no pick hole or through holes in covers, but there shall be a blind pick hole approximately 5 1/2" from the edge. A neoprene sealing ring shall be placed in a groove in the side of the cover in such a manner as to make the whole assembly watertight. The manufacturer must prove water tightness before frame and cover will be allowed by subjecting the frame and cover to a 1-foot head of water for a period of one hour, without any loss of water. Shop drawings shall be submitted for approval on all castings.

Adjustable manhole frames as manufactured by Pinkerton Foundry or approved equal shall be installed where indicated on the plans.

1.07 Reinforced Concrete Manholes

Reinforced concrete manholes shall conform to the plans as to size, shape, elevations and details. Manholes shall be 4' inside diameter, unless otherwise indicated on the drawings. They shall consist of cylindrical sections, concentric tapered cones and ring sections, all with keyed joints. Manhole shafts shall conform in materials and design to applicable portions of ASTM, C-478. Manhole sections are to be manufactured without steps.

Pre-cast manhole bases are preferred. When approved by the Engineer, cast-in-place manhole bases may be used. Details of pre-cast base must be submitted to Engineer for approval.

Pipe stubs for future sewers shall be built into the structures as shown on the plans. The outer ends shall be sealed securely by a cap of the same material as the branch.

Unless otherwise indicated, flow channels shall be provided in the manhole base by fillets as shown on the drawings. Special care shall be taken to form smooth transitions between inlets and outlets, with good hydraulic properties. Any sharp corners or significant departure from dimensions indicated on plans shall be cause for reconstruction.

Pipe may be laid continuously through straight run manholes. The top half shall be cut away before the base is poured, and concrete base shall be formed cleanly to the cut surface as shown. If PVC pipe is used, O-ring rubber gasket type equal to Certain-Teed "Fluid-Tite" or J-M "Ring-Tite" of special composition recommended for sewer service shall be placed around pipe and embedded in manhole base.

Joints in precise manhole shafts shall be made by using double rows of Ram-Nek and Ram-Nek Primer. Joints shall be primed and the gasket installed and heated in accordance with manufacturer's instructions.

Exterior surface shall be coated with a water-proofing agent such as Fosroc Preco Epoxy Liner, Zypex, or approved equal. Exterior chimney seals, as manufactured by Cretex or approved equal, shall be installed where shown on the plans.

All manholes shall be constructed on a non-yielding firm bed. When water is encountered or in the opinion of the Engineer existing conditions are such that the excavated ground at the base of the manhole is not firm, a minimum of 12 inches of crushed rock will be required prior to manhole base construction.

Flexible joints shall be provided one foot from base on every inlet and outlet using Calder couplings or equal.

1.08 Portland Cement Concrete

Portland Cement Concrete shall conform to Section 90 of the State of California Standard Specifications for Class A, concrete unless otherwise specified.

1.09 Portland Cement

Portland Cement shall conform in all respects to the Standard Specifications and tests for Type II Portland Cement of the ASTM Designation C-150, and shall have a maximum alkaline content of 0.6% when tested in accordance with standard methods of the ASTM Designation C-114.

All cement used in the manufacture of concrete for exposed surfaces of a structure shall be of the same brand.

The cement shall be suitably protected from exposure to moisture until used. Sacked cement shall be so piled as to permit access for tally, inspection and identification of each shipment.

All sampling and testing of cement shall be performed in accordance with standard methods of the ASTM. All cement not conforming to the specifications and cement damaged by exposure to moisture shall be removed immediately and permanently from the work. The Contractor shall replace at his own expense any cement which is non-conforming or damaged.

1.10 Cement Mortar and Grout

Mortar shall have an ultimate strength at least equal to that required for Type A-1 Mortar, ASTM, C-270. Mortar shall be freshly prepared and uniformly mixed in a ratio by volume as follows:

1 Part	Portland Cement
1/4 part	Hydrated Lime or Lime Putty
2 3/4 to 3 3/4	Mortar Sand
Varies	Binder Additive

Sufficient water for a workable mix with Portland Cement shall be added and such water shall not contain an amount of impurities that will cause a change in the setting time of Portland Cement of more than 25 percent nor a reduction in the compressive strength of the mortar at 14 days of more than 5 percent when compared to the results obtained with distilled water nor cause discoloration of the concrete or produce etching of the surface.

Sand shall be clean, well graded and free from loam, vegetative matter or deleterious matter of any kind and shall comply with the requirements of ASTM, C-14, except not less than 3% shall pass a #100 sieve. Binder additive shall be Bondcrete, Durabond or approved equal. Proportion shall be in accordance with manufacturer's directive.

Hydrated lime shall conform to "Standard Specifications for Hydrated Lime and Masonry Purposes", ASTM Designation C-207, Type S and shall not contain air-entrainment additives. Mortar materials shall be stored off the ground, under cover in a dry place.

Materials for such grout shall be as specified in ASTM, C-404 with 28-day compressive strength of 3,000 PSI, and the proportions per cubic yard shall be as follows:

7 sacks	Portland Cement
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With remaining volume as follows:

---	Water
50%	Sand
50%	Pea-Gravel

Pea-gravel shall be uniformly graded with not more than 5% passing a No. 8 sieve and all passing a 3/8" sieve.

Portland Cement shall be as specified in Section TS-1.09, mixed with sand, pea-gravel and water for a 6-inch slump mix.

1.11 Cleanout Boxes

Cleanout boxes shall be Christy Products, Inc., N-9 utility box or approved equal, with a cast iron cover marked "sewer".

Section 2 – Installation of Sanitary Sewers

2.01 Scope

This section covers the methods of installation and other requirements for construction of sanitary sewer lines and appurtenances. This work shall consist of performing all operations necessary to excavate earth and rock or other material, of whatever nature, including removing water, regardless of character and subsurface conditions necessary for the construction of the project facilities; to place backfill for all project facilities, including site grading, structures, transmission piping, electrical underground conduit, ditch and channel excavation, culverts, minor concrete structures, roadwork, removal and replacing unsuitable material and other work all as shown on the plans and indicated in the specifications. This work includes excavation and backfill of all structures, trenches and depressions resulting from the removal of obstructions; removal and replacement of unsuitable material and slide material which has come into trenches; all work as shown on the plans and as specified in these specifications and as directed by the Engineer; and furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work that may be required to construct and maintain excavation and backfill until it is accepted by the District.

2.02 Safety Requirements

The Contractor shall be responsible for and shall furnish such watchmen, guards, fences, railings, barricades, lights and other safety devices as necessary to prevent damage or injury to persons or property. Standard "Men at Work" signs, other appropriate signs, flags and barricades are to be placed to warn traffic of work zones. Flagmen shall be used as necessary to protect the public and prevent unnecessary delays in movement of traffic. Contractor shall comply with the requirements of the Construction Safety Orders of the State Division of Industrial Safety.

2.03 Bracing and Shoring

To insure the safety of workmen and protect and facilitate the work, sufficient bracing and shoring shall be installed in all excavations. All bracing and shoring shall comply with rules, orders and regulations of the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA). The District or Engineer shall in no way be responsible for supervising shoring installation or maintenance. Trenching below five feet (5') depth will require the Contractor to secure the appropriate D.I.S. permit and evidence said permit to the District. Insofar as possible, sheeting shall not extend below the bottom of pipe barrel. All sheeting, timbering, lagging and bracing shall, unless otherwise required by the Engineer, be removed during backfilling in such a manner as to prevent any movement of the ground or damage to the piping or to other structures. When the Engineer requires that sheet piling, lagging, and bracing shall be left in place, such materials shall be cut off where designated and the upper part withdrawn. If steel sheet piling is utilized, it may be withdrawn; compacting is to proceed as it is removed.

Attention is directed to the provisions of Section 6422 of the Labor Code of the State of California.

2.04 Use of Explosives

Use of explosives shall be prohibited unless express written permission is obtained from the Engineer.

2.05 Existing Utilities

In general, the locations of existing utilities are indicated on the drawings. This information has been obtained from sources of varying reliability and is not guaranteed as to accuracy or completeness.

Unless otherwise indicated on the drawings or specified herein, the Contractor shall maintain service in all water, gas or sewer lines; lighting power, telephone, cable television, and communications conduits; and other surface or subsurface structures of any nature that may be affected by the work. Should it be necessary in the performance of the work to disconnect or reroute any such facility, the Contractor shall make satisfactory arrangements with property owners and/or utility owners. Satisfactory arrangements shall include at least forty-eight (48) hours notice to property owners and utility companies. The Contractor will be held liable to the owners of utilities and other improvements and to property owners for any damage or interference with service resulting from the Contractor's operations. All expenses of whatever nature arising from disconnection, rerouting, damage or replacement of such facilities shall be borne by the Contractor.

The utility company will be required to locate its facilities only once at no cost to the Contractor. Additional locations may result in a charge by the utility company to the Contractor. When relocation of existing utilities is required as determined by potholing, the work will be done by Change Order and the agreed upon cost thereof will be paid by the District. Relocation of facilities shown on the plans, but not relocated in advance, will be the responsibility of the Contractor.

If existing facilities not shown on the plans are required to be relocated or replaced, the work will be done by Change Order and the agreed upon cost thereof will be paid by the District. The District may make minor adjustments in locations to avoid such conflicts. Whenever a domestic water line is installed, relocated, replaced, disconnected and reconnected, or altered in any way so as to expose the line to contamination, it shall be flushed and disinfected in accordance with the Standard Specifications of the North Tahoe Public Utility District, AWWA, and the California Department of Public Health.

2.06 Removal of Obstructions

The Contractor shall remove at the Contractor's expense all rock, stone, debris, and obstructions of all kinds and character, natural or artificial, as and when required by the plans or where required for the proper prosecution of work. Such material shall be disposed of by the Contractor at the Contractor's expense, unless it is designated on the plans to be saved or is obviously part of a structure or improvement installed for some purpose. All fences, posts, mail and paper boxes, culverts, structures, pipe lines and

miscellaneous improvements which are required to be removed shall be replaced by the Contractor to at least their original condition, unless otherwise indicated on the plans. Where items are indicated to be removed and saved they shall be carefully removed and stockpiled as directed by the Engineer. Lawns, hedges, shrubs, trees, etc., encountered in the line of work shall be carefully removed, kept moist, and returned to their former location and watered until well established, unless the plans indicate such items to be removed permanently, or unless some other satisfactory arrangement is made with the owner. Unless indicated on the plans, no trees, plants or other ornamental vegetation shall be removed without the express written permission of the Engineer. The Contractor shall comply with Section 4 – “Existing Vegetation” of these specifications.

2.07 Hauling, Unloading, and Distributing Pipe

During loading, transportation and unloading, every precaution shall be taken to prevent injury to the pipe. No pipe shall be dropped from the cars or trucks or allowed to roll down slides without proper restraining ropes. Each pipe shall rest on suitable pads, strips, skids, or blocks during transportation and installation and shall be securely wedged or tied in place. Padding shall be used on car or truck stakes, skids, etc., to prevent damage to the pipe during transportation and handling. Any pipe damaged shall be replaced at the expense of the Contractor. Piping shall be protected from sunlight, scoring, distortion, and discoloration.

Pipe shall be delivered to the location directed by the Contractor. Pipe may be strung along the trench inside of the working area, provided the pipe is lifted and placed and no existing vegetation is present. If there is existing vegetation, the pipe may still be strung along the trench inside of the working area provided the pipe is lifted and placed on pallets, railroad ties or other similar devices that will give a maximum clearance of eight inches between the bottom of the pipe and the existing ground. All locations where the stringing of pipe is planned must have prior approval by the Engineer. Where it is necessary to move the pipe longitudinally along the trench, it shall be done in such a manner as not to damage the pipe. Pipe shall not be rolled or dragged on the ground. No equipment shall operate outside of the working area or highway traveled ways and shoulders.

2.08 Cutting of Pavement

When the trench is in an existing paved area, the pavement shall be saw cut ahead of the trenching operations. The proper tools and equipment shall be used so that the pavement will be cut accurately on neat and parallel lines. The width of the pavement cut shall be sufficient to avoid further pavement breakage during trenching operations.

2.09 Trench Excavation

Trench excavation shall include the removal of all materials or obstructions of any nature, except as otherwise specified to be protected, the installation and removal of all sheeting and bracing, and the control of water, necessary to construct the work as shown. Unless otherwise indicated on the drawings or permitted by the Engineer, excavation shall be by open cut. Trenching machines may be used, except where their use will result in damage to existing facilities or where hand trenching is required to prevent damage to trees, tree

roots, or other utilities. Trenches shall be excavated to provide for the bedding hereafter specified.

2.10 Trench Width for PVC Pipe

For a narrow, vertical wall, unsupported trench, the minimum trench width for PVC pipe shall be pipe outside diameter (O.D.) plus twelve inches (12"). The maximum trench width shall be pipe outside diameter (O.D.) plus twelve inches (24"). Trench width shall be measured at top of pipe. In supported trenches, the minimum trench widths must be increased to allow the same amount of clearance described above, between the pipe and the inner face of the trench support. In supported trenches, compaction of foundation and embedment materials should extend to the trench wall or sheeting left in place. When using movable sheeting, trench boxes or shields, care should be exercised not to disturb the pipe location, jointing or embedment. Any voids left in the embedment material as a result of trench protection removal should be carefully filled with granular material which is adequately compacted. Removal of bracing between sheeting should only be done where backfilling proceeds and bracing is removed in a manner that does not relax trench support. When advancing trench boxes or shields, care should be exercised to prevent longitudinal pipe movement or disjointing.

2.11 Trench Width for Ductile Iron Pipe

The maximum trench width for Ductile Iron Pipe shall be pipe O.D. plus twenty-four inches (24"). If this width is exceeded by any amount for any reason, the Contractor shall at his own expense provide stronger pipe or improved bedding conditions, as approved by the Engineer, to meet the load requirements of the changed condition. The minimum trench width shall be pipe O.D. plus twelve inches (12"). Trench width shall be measured at top of pipe. This shall only be applicable for pipe depths of twenty (20) feet or less.

2.12 Pipe Depth

Minimum depth to top of pipe shall be thirty-six inches (36"), unless noted on the plans. Installations outside this depth limitation shall require the approval of the Engineer unless such depths of installation are indicated on the drawings.

2.13 Maximum Length of Open Trench

At the end of each working day, the trench shall be completely backfilled, unless otherwise specified in the Special Provisions or directed by the Engineer. Approved open trenches shall be covered with steel sheeting or equal. Barricades and appropriate erosion control measures shall be installed and maintained.

2.14 Control of Water

When water is encountered, the Contractor shall furnish, install, maintain and operate all necessary machinery, appliances and equipment to keep excavations free from water until the placing of the bedding material, laying and jointing of the pipe, pouring of concrete, and placing of the bedding material has been completed, inspected and approved, and all danger of flotation and other damages is removed. Groundwater pumped from the trench shall be disposed of in such a manner as will not cause injury to public or private

property or constitute a nuisance or menace to the public, and shall be subject to the approval of the Engineer and the California Regional Water Quality Control Board, Lahontan Region. Dewatering and disposal of groundwater shall be in accordance with the Special Provisions.

2.15 Special Foundation Treatment

Whenever the bottom of the trench is soft, yielding or in the opinion of the Engineer otherwise unsuitable as a foundation for the pipe, the unsuitable material shall be removed to a depth such that when replaced with crushed rock or gravel as specified for Type II bedding (see Section 2.19 "Bedding and Haunching") and as determined by the Engineer, it will provide a stable and satisfactory foundation. Whenever the trench bottom is in **rocky material**, the trench shall be excavated to eight inches (8") below the flow line and backfilled with bedding material as herein specified. If material more than two feet below the flow line of the pipe is ordered removed by the Engineer, the excavation below that point and the imported material required to backfill the trench to that elevation shall be paid for as extra work. Special compaction of the imported material may be required.

The Contractor's attention is invited to the fact that the method of construction can affect the suitability of underlying material and the extent of required removal and replacement. Factors which are involved are as follows:

- A. The amount of water allowed to remain in the bottom of the trench immediately after excavation; the more water present, and the longer it remains, the greater amount of stabilization required.
- B. The greater the amount of traffic by workmen on the trench bottom, the greater the problem.
- C. The longer the trench is open, the greater the problem.

To prevent unnecessary problems and expense, the Contractor shall make every effort to dewater trenches which encounter groundwater and shall avoid unnecessary traffic by workmen on wet trench bottoms. Unsatisfactory trench conditions caused by unnecessary workmen traffic or improper dewatering, as determined by the Engineer, shall be corrected by the Contractor at his expense.

2.16 Over Excavation

If the trench is over excavated, the Contractor shall use bedding material as specified to bring the trench bottom to the elevation required, compacted to a density of at least ninety percent (90%) relative compaction.

2.17 Disposal of Excess Material

Excess excavated material, unsuitable backfill material or not, shall be the property of the Contractor and disposed of legally in a location that complies with the environmental requirements of these specifications and as outlined in the Special Provisions.

2.18 Pipe Laying Procedure

The pipe shall be laid in strict conformity to the prescribed line and grade. Three (3) consecutive points on the same rate of slope shall be used at all times to detect any variations for a straight grade. In case any discrepancy is discovered, the work shall be stopped and the discrepancy immediately reported to the Engineer. Each pipe length shall be checked for conformance to the prescribed line and grade.

The preferred methods of establishing and checking line and grade are by use of laser beam grade instrument or optical surveying instrument and sight rod.

Pipe laying shall proceed upgrade with the bell ends of the pipe placed upgrade, unless otherwise authorized by the Engineer. Each section of pipe shall be laid true to line and grade and in such a manner as to form a watertight, concentric joint with the adjoining pipe. The end of the pipe shall be protected at all times to prevent entrance of foreign matter and the pipe interior shall be continuously cleared of all dirt and debris as the work progresses. Pipe shall not be laid when the condition of the trench or the weather is unsuitable. All open ends of pipe and fittings shall be adequately and securely closed whenever the work is discontinued for more than one-half hour.

All pipe jointing, including the maximum deflection of joints in curved alignment, shall be in accordance with the manufacturer's recommended practice. Care shall be used to prevent chipping or cracking of either end of the pipe during installation. Both joint surfaces shall be clean before the joints are made.

2.19 Bedding and Haunching

Unless indicated otherwise on the drawings, pipe shall be placed on a firm, prepared bed. Bedding shall extend at least six inches (6") below the outside of the pipe barrel. In all cases, the bedding shall extend to a level at least six inches (6") below the outside surface of the pipe bell. Pipe shall be bedded uniformly throughout its length. The specified bedding shall be placed to give the required minimum thickness after placing the pipe and shall be compacted to give a uniform surface for laying the pipe. The Contractor shall place bedding material to the spring line of the pipe, compacting it to provide haunch support. Care shall be used to fill all spaces under the haunches while not disturbing the pipe. Pipe shall not bear on bells, couplings or joints. No wedging or blocking of the pipe will be permitted. The trench shall be excavated at these locations as necessary to provide at least six inches (6") of bedding material beneath the bells, couplings, or joints. Bedding material shall extend to both sides of the trench walls or side supports in the case of a supported trench. All bedding material shall be compacted to a relative density of ninety percent (90%) relative compaction, maximum. Where solid rock is encountered and blasting is necessary, the rock shall be excavated to a minimum depth of eight inches (8") below the bottom of the pipe, and the trench backfilled with bedding material. Flooding is permissible, but jetting is prohibited. This bedding procedure shall apply to main line construction as well as house service installation associated with such main line construction.

- A. Type I Bedding Material – Type I bedding material shall be imported clean sand. All material must pass a No. 35 sieve with no more than six percent (6%) passing

a No. 200 sieve. Excavated material may not be used as Type I bedding material. Material shall be free of ice, clay, organic matter or other objectionable material, and shall conform to the following standards:

1. Gradation per ASTM C136:

SIEVE SIZE	PERCENT BY WEIGHT PASSING SIEVE
3/8"	100%
#4	90-100%
#50	10-40%
#100	3-20%
#200	0-15%

2. Sand Equivalent per ASTM D2419: 25 minimum.
3. Plasticity Index per ASTM D4318: Non Plastic.
4. Moisture-Density per ASTM D1557: Max. +2% of optimum, Min. -5% of optimum.
5. Any sewer pipe sand bedding material retained on a #4 or #8 sieve shall not contain angular material as described in ASTM D2488. Sewer pipe sand bedding material that contains sub-angular, sub-rounded or rounded material, and conforms to Paragraphs 5.4.1.A and 5.4.1.B is acceptable.

- B. Type II Bedding Material -- The material used for Type II bedding material shall be imported crushed rocks or gravel of predominately granitic origin and shall be a grain size analysis within the following limits.

Passing 3/4 inch sieve	100%
Passing #4 sieve	90-100%
Passing #50 sieve	10-40%
Passing #100 sieve	3-20%
Passing #200 sieve	0-15%

Crushed gravel backfill shall be a crusher-run, mineral aggregate free of ice, clay, organic matter, or other objectionable material, and shall conform to the following standards:

1. Gradation per ASTM C136:

SIEVE SIZE	PERCENT BY WEIGHT PASSING SIEVE
1"	100%
3/4"	90-100%
# 4	35-65%
#16	15-40%
#200	2-10%

2. Liquid Limit per ASTM D423: 35 maximum

3. Plasticity Index per ASTM D424: Maximum Allowable Plasticity Index (PI) shall be determined by the formula: $PI = 15 - (S \times 100)$ where "S" is the percent by weight passing the # 200 sieve.
4. Resistance R-Value per ASTM D2844: 70 minimum.

Where designated on the drawings, the Contractor shall use the bedding material specified and no other. Type II bedding shall be used in all locations where the trench bottom is wet, or shows evidence of having been wet, rocky, cobbled or when directed by the Engineer, if trench conditions vary from that shown on drawings. In all other cases, Type I bedding may be used.

2.20 Initial Backfill

Initial backfill shall be the material placed on the bedding after pipe joints have been completed, inspected and preliminarily approved by the Engineer, and shall extend to a point 12 inches (12") above the top of the pipe. The material shall be carefully placed, brought up evenly on both sides of the pipe, and compacted to a relative density of 90 percent (90%) relative compaction, maximum, all done so as not to disturb or damage the pipe or joints. Jetting will not be allowed. The initial backfill shall be finely divided imported material free from debris, organic matter, and clods, rocks, or clumps larger than one inch (1") and conforming to the specifications herein set forth.

Where Type I bedding is used, the initial backfill shall be made with the same materials as specified for this type bedding.

Where Type II bedding is required for structural reasons, as shown on the plans, the initial backfill to at least the spring line of the pipe shall consist of material as specified for Type II bedding, placed with care to completely fill all spaces under the haunches. Compaction shall be to a relative density of 90 percent (90%) maximum, using care not to disturb the pipe. The remainder of the initial backfill shall be as specified for either Type I or Type II bedding, and shall be carefully placed, brought up evenly on both sides of the pipe, and compacted to a relative density of 90 percent (90%) maximum, all done so as not to disturb the pipe or damage it. Jetting will not be allowed.

Where Type II bedding is not required for structural reasons but is required because of wet or rocky trench conditions, initial backfill may be made with either Type I or II bedding material, placed as specified above for either case.

Bedding and initial backfill may deviate from the above only as described in the plans for specific locations, or as approved by the Engineer.

2.21 Intermediate Backfill

Intermediate backfill is above initial backfill and below top backfill and surface restoration. Intermediate backfill shall be placed at the various locations as shown on the plans and as follows:

- A. Within paved Placer County rights-of-way and within other paved areas, except for those within State rights-of-way, the intermediate backfill shall extend from

the top of the initial backfill to the bottom of the top backfill. Per Placer County requirements, the top nineteen inches (19”) of intermediate backfill shall be compacted to a density of not less than ninety-five percent (95%) relative compaction. Any intermediate backfill between the initial backfill and the top 19” of intermediate backfill shall be compacted to a density of not less than ninety-two percent (92%) relative compaction.

- B. Within unpaved Placer County rights-of-way and within all other unpaved areas, except for those within State rights-of-way, the intermediate backfill shall extend from the top of the initial backfill to the bottom of the top backfill. Per Placer County requirements, the intermediate backfill may be excavated native earth if it is friable and suitable for compaction. This backfill material shall be 100 percent (100%) less than three inches (3”) in diameter and shall be clean and free from vegetable matter, debris, and other deleterious substances and shall be of such a nature that it can be compacted to ninety-five percent (95%) relative compaction. If the excavated native material cannot be compacted to the required density, suitable material capable of such compaction will have to be imported.
- C. Within paved State rights-of-way, the intermediate/top backfill shall extend from the top of the initial backfill to the bottom of the structure (asphalt concrete or concrete) section. Per State requirements, the intermediate/top backfill shall consist of a minimum of twenty-one inches (21”) of concrete slurry, 2-sack mix.
- D. Within unpaved State rights-of-way, the intermediate backfill shall extend from the top of the initial backfill to the bottom of the top backfill. Per State requirements, the intermediate backfill may be excavated native earth if it is friable and suitable for compaction. This backfill material shall be 100 percent (100%) less than three inches (3”) in diameter and shall be clean and free from vegetable matter, debris, and other deleterious substances and shall be of such a nature that it can be compacted to ninety percent (90%) relative compaction. If the excavated native material cannot be compacted to the required density, suitable material capable of such compaction will have to be imported.
- E. In easements, not in traveled county road or street rights-of-way, the intermediate backfill may be excavated native earth if it is friable and suitable for compaction, else it shall consist of imported material. This backfill material shall be 100 percent (100%) less than three inches (3”) in diameter and shall be clean and free from vegetable matter, debris, and other deleterious substances.

2.22 Top Backfill

Top backfill shall be placed at the various locations as follows:

- A. Within paved Placer County rights-of-way and within other paved areas, except for those within State rights-of-way, the top backfill shall extend from the top of the intermediate backfill to the bottom of the structure (asphalt concrete or concrete) section. Per Placer County requirements, the top backfill shall consist of eight inches (8”) of Class 2 Aggregate Base compacted to a density of not less

than ninety-five percent (95%) relative compaction.

- B. Within unpaved Placer County rights-of-way and within all other unpaved areas, except for those within State rights-of-way, the top backfill shall extend from the top of the intermediate backfill to the top of the trench. Per Placer County requirements, the final eight inches (8") of backfill shall be of Class 2 Aggregate Base compacted to a density of not less than ninety-five percent (95%) relative compaction.
- C. Within paved State rights-of-way, the intermediate/top backfill shall extend from the top of the initial backfill to the bottom of the structure (asphalt concrete or concrete) section. Per State requirements, the intermediate/top backfill shall consist of a minimum of twenty-one inches (21") of concrete slurry, 2-sack mix.
- D. Within unpaved State rights-of-way, the top backfill shall extend from the top of the intermediate backfill to the top of the trench. Per State requirements, the final eight inches (8") of backfill shall be of Class 2 Aggregate Base compacted to a density of not less than ninety-five percent (95%) relative compaction.
- E. Within all other areas, the final 6 inches (6") of backfill shall be essentially the original top soil which shall have been removed and stockpiled separately. No specific compaction will be required. However, the Contractor will be required to wheel roll the backfill; the number of passes required will vary between two to five passes per tire width. Upon completion of wheel rolling, additional backfill material shall be placed and slightly mounded over trench (about 2" high) and contoured for proper drainage if appearance does not detract from surrounding area.

2.23 Trench Backfill Compaction

Compaction of backfill shall be performed in layers not exceeding eight inches (8") loose thickness and shall be compacted to a density as shown on the plans. Equipment to be used for compaction shall be approved by the Engineer. Wheel rolling shall not be a suitable means for compacting.

When mechanical means are used to obtain the required compaction, the Contractor must exercise extreme caution so as not to damage or disturb the pipe. This is particularly true when compacting directly over top of pipe in the placing of initial backfill.

When, in the opinion of the Engineer, compacting equipment is adversely affecting the pipe, the Contractor will be required to change his method of compaction and restore or replace any defective pipe at the Contractor's sole expense.

When excavated material cannot be compacted to the required compaction, imported material will have to be used. The type of imported material shall be at the Contractor's option as long as the required compaction can be achieved, except as noted in the following paragraph.

When groundwater is encountered and Type II bedding is required, imported material cannot be of such a nature that fines will wash into the initial backfill material, unless an impervious layer of imported material is placed immediately above the initial backfill material. Imported material, of which less than twenty percent (20%) will pass the Number 8 sieve, will be acceptable for use as imported material without the requirement of the impervious layer.

The Contractor's attention is directed to the type of material used for initial backfill; if crushed rock of the specified gradation is used, compaction by shovel slicing and light tamping may produce the desired compaction.

Compaction tests shall be performed by the Engineer. The Contractor shall cooperate with the Engineer in taking the tests. If a test fails, the area shall be reworked to the satisfaction of the Engineer. Two tests shall be allowed at any location of work. The Contractor shall be responsible for the cost of additional testing if required.

2.24 Testing

In connection with these specifications, tests shall be made in accordance with the State of California Standard specifications and the following requirements:

<u>Tests</u>	<u>ASTM</u>	<u>California Test Method</u>
Relative Compaction	D-1557-70	216 or 231
Sand Equivalent		217
Resistance (R-Value)		301
Sieve Analysis		202

2.25 Other Backfill Requirements

Where cribbing is used in the trench, the fill shall be carried to a height sufficient to prevent the surrounding ground from cracking or caving into the trench before the cribbing is removed. Backfill around valves, other structures, and the pit excavated for boring operations shall be made in the same manner as above specified for trenches. However, whenever the excavated space between the edge of a valve and the undisturbed earth is twelve inches (12") or less, the backfill will be sand, or well-compacted Type II bedding material.

2.26 Groundwater Cutoffs

Where indicated on the drawings or when groundwater is encountered within street rights-of-way, private traveled ways or parking areas to such a degree that water flows along the excavated trench, an impervious cutoff section shall be provided in the trench a short distance downstream from the source of the groundwater. If the groundwater is entering the trench more or less continuously along its length within a given reach, more than one cutoff section will be required. The spacing and location of such sections will be determined by the Engineer. The purpose of the cutoff section is to prevent the travel of water along the trench when Type II bedding material is required. The cutoff section shall consist of relatively impervious imported materials, approximately three feet (3') long at the bottom, placed at an interruption in the bedding and initial backfill material,

and extending to the full height of the trench. This cutoff section shall be placed as nearly as practicable at the middle of a pipe length and shall be compacted in place by hand tamping to a density of ninety-five percent (95%).

2.27 Surface Restoration

Surface restoration shall be defined as that work necessary to restore the excavated area above intermediate backfill and the scarred surrounding work areas to a condition equivalent or better than existing prior to the construction. This may include pavement replacement as shown on the plans, or mentioned in these specifications, seeding, shrub and plant replacement, and restoration of ditches and drainage areas. All surface restoration shall be done to the satisfaction of the Engineer.

- A. All curbs, gutters, driveways, sidewalks, road shoulders and pavement which are broken or damaged by the installation or construction of the work shall be reconstructed by the Contractor. Reconstruction shall be as specified herein, in Section 2.28 "Roadway Structure Sections", or as shown on the plans. If an item is not covered elsewhere, the reconstruction shall be of the same kind of material and at least the same dimensions as the original work. All work shall match the appearance of the existing improvements as nearly as practicable. When pavement restoration is shown as a lump sum bid item, it shall be understood that payment for this item shall include compensation for damaged or broken pavement caused directly or indirectly by the work.

All concrete pavement crossings shall be neatly saw cut with a pavement saw. Asphalt pavement crossings shall be trimmed to neat lines parallel and perpendicular to the trench prior to pavement replacement. The width shall be the minimum width necessary to excavate the required trench depth. Pavement replacement shall be made flush to the saw line with a slight crown to ensure drainage. The saw lines shall receive a final bituminous seal coat, material, and application rate to be approved by the Engineer.

- B. The replacement of grass shall be accomplished by seeding. The kind and type of seed is to be determined by the Engineer. Replacement of plants and shrubs shall be required only where the easement travels through a developed parcel. In this case, the Engineer, Owner, and Contractor shall agree before proceeding as to which plants and shrubs shall be saved or replaced.
- C. The restoration of trench surfaces shall include measures to prevent surface erosion of the trench. This shall include seeding, cutoff walls, surface header board, interceptor dike, gravel filter dike, or rip rap energy dissipater. These measures shall be used as required or as directed by the Engineer to prevent surface erosion.

2.28 Roadway Structure Sections

Structure sections shall conform to the indicated sections of the State Specifications as to materials and application, and shall be placed at the various locations as follows:

- A. Within paved Placer County rights-of-way, the minimum structure section shall consist of not less than three inches (3") of asphaltic concrete, or match the existing thickness of asphaltic concrete, whichever is greater, and a fog seal coat; the latter applied to the full width of the asphaltic concrete replacement required for the trench excavation plus twelve inches on each side. The asphaltic concrete shall extend in neat lines parallel to the trench excavation. The limits of asphaltic concrete replacement will vary according to field conditions and damage caused to existing pavement by the Contractor's operations. The minimum replacement must be in accordance with trench construction as called for on the drawings.

Aggregate base shall be Class II, conforming to Section 26 of State Specifications. Asphaltic concrete shall be Type B, 1/2 inch maximum, conforming to Section 39, fog seal coat shall conform to Sections 37 and 94.

- B. Within paved State rights-of-way, the minimum structure section shall consist of not less than three inches (3") of asphaltic concrete, or match the existing thickness of asphaltic concrete, whichever is greater, and a fog seal coat; the latter applied to the full width of the asphaltic concrete replacement required for the trench excavation plus twelve inches on each side. The asphaltic concrete shall extend in neat lines parallel to the trench excavation. The limits of asphaltic concrete replacement will vary according to field conditions and damage caused to existing pavement by the Contractor's operations. The minimum replacement must be in accordance with trench construction as called for on the drawings.

Aggregate base shall be Class II, conforming to Section 26 of State Specifications. Asphaltic concrete shall be Type B, 1/2 inch maximum, conforming to Section 39, fog seal coat shall conform to Sections 37 and 94.

- C. Within private traveled ways or parking areas, the structure section shall be equal to or better than the existing structure section.

2.29 Repairs Required for Trench Settlement

If at any time during a period of two years from the date of final acceptance of the project, there shall be any settlement of the trenches requiring repairs to be made, or should any other defect appear in the system due to negligence or carelessness on the part of the Contractor, the Engineer shall notify the Contractor to immediately make such repairs as may be deemed necessary, at the Contractor's expense. If the Contractor fails to undertake the repairs with due diligence, the District is authorized to make said repairs and bill the Contractor for the District's efforts.

2.30 Connection to Existing Manholes

Pipe connections to existing manholes shall be as shown. Where holes are broken in existing manhole barrels, work shall be carefully done. After insertion, the annular space shall be tightly packed with a dry cement mortar. Surfaces to be in contact with the mortar shall be thoroughly moistened and then scrubbed with Portland cement paste. Inside of manhole barrel shall be neatly finished. Manhole bottoms shall be rechanneled as necessary to provide smooth transitions with good hydraulic properties.

The manhole interior shall be coated with a waterproofing agent such as Fosroc Preco Epoxy Liner, Zypex or approved equal. Interior chimney seals as manufactured by Cretex or equal shall be installed where shown on the plans.

When connection is to be made to an existing stub the Contractor must verify location in both direction and elevation prior to construction in the vicinity of the existing manhole to allow for minor movements of the proposed line so that connection can be made without unnecessary difficulty.

2.31 Connection to Existing Sewerage Systems

The existing sewers are shown on the drawings at the points where the new sewers are to be connected thereto. It shall be the responsibility of the Contractor to determine the exact location and depth of existing sewers prior to the laying of any sewer pipe.

The Contractor shall also determine the elevation of the plumbing outlet of the structure to be connected and decide whether required grade can be maintained between the outlet and the main sewer prior to construction of any portion of the side sewer. Where the connection is to be made in an existing manhole, the Contractor shall make the connection by breaking through the manhole wall, cutting the floor, installing the pipe and forming a new channel and repairing any damage to the structure in accordance with the Standard Drawings. Where the connection is to be made by constructing a new manhole on an existing sewer, the connection and manhole shall conform to the details shown on the Standard Drawings.

Any line to be connected to an existing manhole shall, unless otherwise shown on the plans, be installed by forming a new channel with the top invert of the new installed pipe to the same elevation as the top invert of the existing main sewer.

2.32 Service Laterals

Service laterals shall be replaced or installed to the property line where shown on the plans. The installation shall include the property line cleanout and box, complete in place. Service laterals shall also be tested per TS-3.01A. The Contractor has the option of testing the laterals when testing the main, or testing the laterals individually. Individual testing may be accomplished by the use of packing bladders in the main. Such bladders shall be positioned upstream and downstream of the lateral connection and testing performed to the standards in Section 3.01A of these Specifications. The Contractor shall coordinate installation of the bladders with District staff and shall use such bladders in a fashion that will not create a sewer overflow.

2.33 Repair of Pipelines

Repair of breaks in existing pipe lines shall be made by inserting new straight sections of pipe with plain ends in line and connecting ends with sewer repair aka stop repair aka through couplings similar and equal to the couplings manufactured by J-M Pipe. Maximum trench width limitations at top of pipe must be observed during repairs as well as original construction. This article shall not be applicable to new installation of main line sewer made pursuant to these specifications.

2.34 Jointing

Jointing of all sewer pipe shall be done in accordance with the manufacturer's recommendations for the type of joint being used.

2.35 Clean Up

During the progress of the work the Contractor shall keep the entire job site in a clean and orderly condition. Excess or unsuitable backfill material, broken pipe or other waste material shall be removed from the job site within one week. Spillage resulting from hauling operations along or across existing streets or roads shall be removed immediately by the Contractor. All gutters and roadside ditches shall be kept clean and free from obstructions. Any deviation from this practice shall have prior approval from the Engineer. In areas where excessive dust is a nuisance to property owners, the Contractor shall, as often as necessary, wet down the area to prevent dusty conditions. This includes weekends and holidays.

Before final acceptance of the work, the Contractor shall carefully clean up the work and the premises, remove all temporary structures built by or for him, remove all surplus construction materials and rubbish of all kinds from the grounds which he has occupied and leave them in a neat condition.

Section 3 – Performance Specifications for Sanitary Sewers

3.01 Tests for Leakage in Pipelines

After laying, backfilling and compacting, all sewers shall be tested for leakage. The Contractor shall furnish all labor, tools and equipment necessary to make the tests and to perform any work incidental thereto. The Contractor shall take all necessary precautions to prevent any joints from drawing while the pipelines or their appurtenances are being tested. He shall, at his own expense, correct any excess leakage and repair any damage to the pipe and its appurtenances or to any structures resulting from or caused by these tests. The Contractor shall air test sanitary sewers in accordance with the procedure set forth in the Specifications.

A. Air Test - Air test shall be applied to a single pipeline length between adjacent manholes.

1. Procedure and Allowable Leakage - Pressurize the test section to 3.5 psi and hold above 3.0 psi for not less than 5 minutes. Add air if necessary to keep the pressure above 3.0 psi. At the end of this 5 minute saturation period, note the pressure (must be 3.0 psi) and begin the timed period. If the pressure drops 0.5 psi in less than the time given in the following table, the section of pipe shall not have passed the test.

<u>Size</u>	<u>Minimum Time in Seconds</u>	<u>Minutes</u>
4 inch	125	2
6 inch	185	3
8 inch	245	4
10 inch	310	5
12 inch	370	6
15 inch	460	7 1/2
18 inch	555	9

If the time for the pressure to drop 0.5 psi is 125% of the time indicated, the line shall immediately be repressurized to 3.0 psi and the test repeated. If during the 5 minute saturation period, the pressure drops less than 0.5 psi after the initial pressurization and air is not added, the section undergoing the test shall have passed.

If the test is not passed, the leak shall be found and repaired to the satisfaction of the Engineer, and the section retested.

2. Correction for Groundwater - When the prevailing ground water is above the line being tested, air pressure shall be increased 0.43 psi for each foot the water table is above the invert of the line.

3.02 Manhole Testing

After completion of manhole construction, all manholes shall be tested for leakage. The Contractor shall furnish all labor, tools and equipment necessary to make the tests and to perform any work incidental thereto. He shall, at his own expense, correct any excess leakage and repair any damage to the pipe and its appurtenances or to any structures resulting from or caused by these tests.

A. Procedure - Each manhole shall be tested by inserting inflatable plugs in all sewer inlets and outlets of the manhole, and filling the manholes with water to a point six (6) inches below the base of the manhole frame.

The manhole shall be filled at least one hour in advance of the official test period to allow time for absorption. The level shall not be allowed to fall more than 25% of the manhole depth during the presoak.

B. Allowable Leakage - The allowable leakage shall be determined by the following formula:

$$E_m = .00017LH^{1/2}$$

Where E_m = amount of leakage in gallons per minute
 L = depth of manhole from top to bottom
 H = head of water in feet, as measured from the sewer line invert or prevailing ground water against outside of manhole barrel. The lesser height governs.

The loss of water may be determined by measuring additions of water required to maintain the specified water level. Where the actual leakage in a manhole exceeds the allowable, the Contractor shall discover the cause, remedy it and retest the manhole before the manhole is accepted. If the leakage is less than allowable and leaks are observed, such leaks shall be repaired.

The manhole shall be filled and tested and repairs accomplished prior to backfilling. Alternative methods of manhole testing may be considered by the Engineer. Backfill shall be placed in even lifts around the manhole to prevent shifting.

Vacuum test by using acceptable equipment approved by the District. Vacuum test equipment shall be used per the manufacturers' specifications. A vacuum of 10-inches of mercury (5 psi) should be drawn on the manhole. The time, in seconds, for the vacuum to drop to 9-inches of mercury (4.5 psi) shall be measured and shall not be less than the times listed below for various manholes and interceptors. Testing shall include the frame rim and grade rings.

Time (sec)	Manhole Diameter (in)	Interceptor Size (gal)
60	48	
75	60	
90	72	
80		500 to 999

120		1,000 to 1,499
150		1,500 to 1,999
180		2,000 to 2,499

Note: Grease interceptors and sand/oil interceptors shall be completely drained and cleaned before initiation of the water or vacuum test.

3.03 Force Main Testing

Force mains shall be tested hydrostatically at 100 psi unless otherwise noted. The allowable leakage shall not exceed 25 gallons per day per inch diameter per mile of pipe.

3.04 Deflection Test

After compliance with Section TS 3.01, all PVC pipe shall have a mandrel pulled through to detect deflection, joint offset, and lateral pipe intrusions. A rigid nine point mandrel with an effective circular cross section having a diameter of at least ninety six percent (96%) of the specified average inside diameter shall be pulled through the pipe by the Contractor. The mandrel shall be supplied by the District. Any pipe failing to pass the mandrel pull through shall be deemed to have a defect and shall be refused acceptance by the District. Upon completion of deflection testing, the mandrel shall be returned to the District.

3.05 Remote Television Inspection

Each section of sewer greater than or equal to six (6) inches nominal inside diameter shall undergo a final inspection by the use of a television (T.V.) camera. Use of the T.V. inspection shall not relieve the Contractor of the responsibility for performing the lieu thereof.

- A. Pre-inspection Preparation – T.V. inspection will not be scheduled or made until the following operations are complete:
 1. All sewer pipelines are installed and backfilled to finished grade, or, if pavement will be finished grade, to the final street subgrade, but prior to paving.
 2. All structures are in place, all channeling is complete and pipelines are accessible from structures.
 3. All lines have been balled and flushed or hydroflushed.
 4. All lines have been tested for deflection.
 5. All lines have been successfully air tested.

- B. Arrangements for Inspection – When the Contractor determines that the line is ready for inspection, the Contractor shall notify the Engineer and request a date for the T.V. inspection. The Engineer shall notify the Contractor of the scheduled date. If it is determined by the Contractor that the job site will not be ready or accessible for the T.V. inspection on the scheduled date, as notified, the Contractor shall notify the Engineer of the necessary cancellation at least 48 hours in advance of the scheduled inspection. Rescheduling shall be accomplished in the same manner as for the initial inspection.

- C. Hourly Charges – The District shall bear the cost of the first T.V. inspection made pursuant to this Section for the purpose of determining acceptance. Subsequent inspections and TV camera assistance rendered by the District shall be charged at two-hundred twenty dollars (\$220.00) per hour including labor, materials, equipment, and travel time. The minimum charge shall be based on a two (2) hour minimum. The amount estimated for subsequent inspections and assistance shall be paid in advance by the Contractor. This Section shall not be applicable to in-tract sewer lines installed by subdividers or developers.
- D. Service Charge for Aborted Inspection – If arrangements are made pursuant to Sections TS-3.05B or C and the District T.V. crew arrives at the job site and the work is not ready or accessible due to fault of the Contractor, the District will deduct the amount of two-hundred twenty dollars (\$220.00) from any payment due to Contractor as damages to the District for loss of crew time.
- E. Grounds for Refusal of Acceptance – All lines that have been televised will be evaluated by the Engineer for deficiencies. If no deficiencies are noted, the sewer installation portion of the work will be considered satisfactory. The following conditions are considered unacceptable for sewer lines and will result in refusal of acceptance:
1. Visible standing water.
 2. Joint separations greater than recommended by manufacturer.
 3. Cocked joints present in straight runs or on wrong side of pipe curve.
 4. Chipped pipe.
 5. Cracked pipe.
 6. Infiltration or exfiltration.
 7. Debris or other foreign matter.
 8. Protrusions or excessive roughness in pipe.
 9. Offset joint.
 10. Out of round or deflected pipe.
 11. Improper alignment or curves not conforming to specified line.
 12. Upset in normal hydraulic regime.
 13. Any condition that prevents the economical, safe or reasonable use of the sewer.
- F. Video Tape/DVD – Televised T.V. inspections and assistance will be recorded onto a videotape or DVD. The Contractor may view videotapes/DVDs within two (2) working days at District Offices by making an appointment with the Engineer. All videotapes/DVDs produced as a result of the work shall be the sole property of North Tahoe Public Utility District and shall remain under its care and custody at all times.
- G. Reinspection – If the sewer line offered for acceptance fails to meet applicable specifications, District shall have a right to reinspect after correction of defects and to charge a re-televising fee in accordance with the rate listed in Section TS-

3.05C. Arrangements for re-televising shall be made pursuant to Section TS-3.05B. This process shall be repeated as necessary until all defects have been corrected to the satisfaction of the Engineer.

3.06 Line and Grade

The finished sewer line shall be true to specified line and grade from the center of each adjacent manhole or sewer access box. This shall be interpreted as requiring the realignment of any misaligned manhole stubs and rechanneling of the manhole base by the Contractor. The cost of any such realignment or rechanneling shall be included in the Contractor's bid price for appropriate bid items and no extra compensation will be allowed.

3.07 Notification of Defects

Upon offering of the work for acceptance and after all inspections are made by the District, the Engineer shall prepare a written list of defects in the work and present such list to the Contractor within five (5) working days.

Section 4 – Existing Vegetation

No grading or operation of heavy equipment shall take place within the area bounded by the drip line of any tree on or off the property. This does not apply to those trees which are within the actual construction area and are to be removed according to the plans.

Work within easements shall be performed with the utmost care. Under no circumstances are trees to be removed unless so noted on the plans, without express written permission from the Owner and/or Engineer. Equipment used in easement areas will be limited to the smallest practicable size necessary for the job. Trucks delivering pipe and other materials shall be of the minimum practicable size and will be restricted to areas where they will not damage existing vegetation and foliage. All operations within easements will be subject to prior approval of Engineer to the end that a minimum disturbance to the existing terrain and culture results.

Only those trees designated on the plans to be removed or those mentioned in written authorization from the Engineer, shall be removed to facilitate project construction. Any fees or fines imposed on the District for unauthorized tree removal shall be borne by the Contractor. The above penalty shall apply to all trees fourteen inches (14”) or greater in diameter measured at a breast height, four and a half feet (4.5’) above the ground.

The Contractor must take extreme care to prevent permanent damage to root systems of trees to be saved.

Major roots (four inches (4”) or greater in diameter) encountered in the course of excavation from trees which are not to be removed shall be exposed but not severed and they shall be wrapped in burlap as a protective measure while exposed. Minor roots (two to four (2” to 4”) inches in diameter) that are severed in the course of excavation, and major roots that are accidentally cut, shall be neatly trimmed back to an undamaged area and coated with a heavy coat of approved tree seal.

When working through manzanita the following procedure is suggested and shall be used unless an alternative procedure is approved by the Engineer:

An eight to ten foot wide path shall be cut to the ground, disturbing the roots as little as possible. The centerline of the pipe shall be located approximately 2.5 feet from the downslope side of the path so that the excavated material can be placed on the uphill side of the path. During excavation, a reasonable attempt shall be made to separate the major roots from the material that is to be used for backfill.

Equipment may work or drive over standing manzanita if necessary, provided that upon completion of the work broken branches are removed.

Work within manzanita shall be confined so as to cause a minimum amount of disturbance. After operations are completed, the area shall be cleaned up and left in a neat and satisfactory condition and revegetated as detailed herein.

Section 5 – Erosion Control

Temporary erosion control facilities shall be in place prior to the start of construction or grading and shall remain in place and be maintained until slope stabilization has been completed. The Contractor is responsible for installing and maintaining Temporary BMPs within the project area and any staging areas used as a part of this project. Temporary BMPs shall be a type and configuration approved by the Engineer and the Tahoe Regional Planning Agency.

Straw bales or other straw materials are no longer preferred for temporary erosion control.

During construction, soil disturbances shall be minimized and limited to those areas specifically required for the project as shown on the plans. Disturbed areas shall be stabilized as soon as completed. Stockpiled materials shall be centralized in an area free from potential flooding or washout and able to be protected from scattering by the elements in anticipation of a storm or temporary cessation of construction activities.

Upon completion of the improvements, all trenches within the roadway section shall be patched with asphalt concrete according to the plans. All trenches outside the roadway section shall be replaced to the original condition or better as determined by the Engineer. All other areas disturbed by construction activities shall be stabilized as called out on the plans or within these specifications.

The Contractor shall not deposit surplus or waste material in street or highway right-of-way without written permission from the County or State. Waste disposal sites shall be approved in writing by TRPA prior to construction.

No construction activities involving ground disturbance shall take place between October 15th and May 1st.

Section 6 – Water Quality

Work under this Contract shall comply with applicable requirements of the California Regional Water Quality Control Board, Lahontan Region.