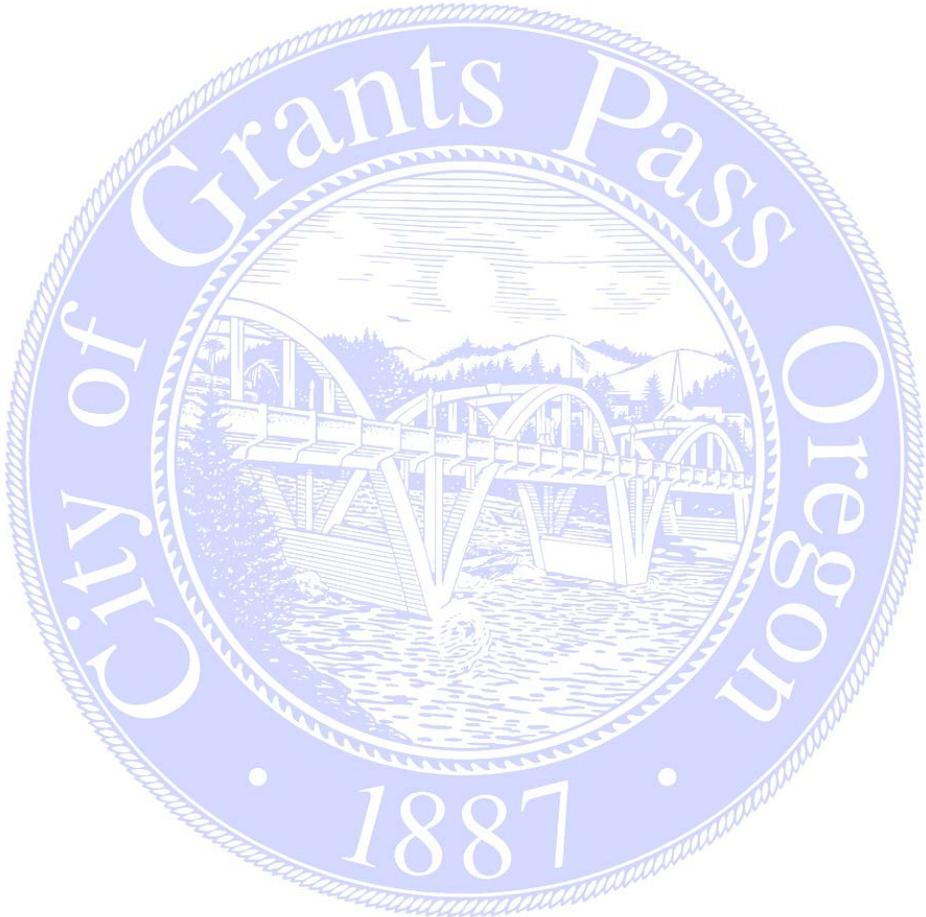


SANITARY SEWER STANDARDS & SPECIFICATIONS



CITY OF GRANTS PASS, OREGON
MARCH, 2013

INTRODUCTION

The need for standardization of sanitary sewer systems has long been a recognized requisite. In that there are numerous publications, governmental regulations and City ordinances that establish various and specific requirements for the design and construction of sanitary sewer systems, it is deemed imperative and to the best interest of the City to bring together into one manual these various requirements.

The City of Grants Pass is pleased to present this set of standards and specifications for future sanitary sewer improvements. The intent is to establish uniformity of designs and construction practices, reduce conflicts and provide ease in maintenance, thus providing for better sanitary sewer systems at a reduced cost.



Terry Haugen P.E.
Public Works Director

3/14/2013
Date



Aaron Cubic
City Manager

03/14/13
Date

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SECTION 100
GENERAL REQUIREMENTS

101 Definitions and Abbreviations

101.1.0 Definitions

Approved Equal

A product, material or method that, upon review of the City Engineer, is determined to meet or exceed the requirements called for by the specifications. Upon approval, the item or method will be allowed in lieu of the specified material, product or method. Approved equals are job specific. Each new project requires a new approval.

Check Valve

A valve that allows flow in only one direction.

City

The legally constituted municipal government of the City of Grants Pass, Oregon, its authorized agents or employees.

Contractor

The person, firm or corporation entering into an agreement with the City or Developer for the performance of work and the construction of facilities to be accepted by the City, or the agent appointed to act for said party in the performance of the work.

County

Josephine County, State of Oregon.

Customer Service Line

That part of the service piping on or off the customer's property, which connects the utility service to the customer's distribution or collection system. In the case of water service, the customer's service line extends from the meter box to the customer's premises. In the case of sewer service, the customer's service line extends from the sewer main connection to the customer's premises.

Developer

The person, firm or corporation proposing to subdivide or improve land within the City's jurisdiction.

Easement

A recorded document in which the land owner gives the City permanent rights to construct, maintain, repair and access sanitary sewer mains and their related appurtenances, and other utilities across private property.

Engineer

A professional engineer or a firm of professional engineers registered in the State of Oregon, and acting for the City of Grants Pass.

Engineering Division

City of Grants Pass Parks & Community Development Department division.

Inspector

An employee or agent of the City engaged to observe and record field compliance with design criteria, plans and construction standards.

Pipe Bedding

That material which fills the zone between the trench bottom and the bottom of the pipe.

Pipe Zone

The full width of the trench from the top of the bedding to a point 12 inches above the top outside surface of the barrel of the pipe.

Plans

The official plans, prepared by an Engineer registered in the State of Oregon, showing profiles, typical cross-section, working drawings, detail drawings, and supplemental drawings, or exact reproductions thereof, approved by the City Engineer. Plans shall show the location, character, dimensions and details of the work to be done.

Public Works Director

The Public Works Director of the City of Grants Pass, or their designated representative.

Sand Collars

A PVC Manhole adapter with a silica impregnated surface that allows grout to bond the adapter into the concrete manhole, assuring a solid, watertight seal.

Specifications

The direction, provisions, requirements and standard drawings pertaining to the method and manner of performing the work, and to the qualities of materials to be furnished for acceptance by the City.

Trench Backfill

That material which fills the zone between the top of the pipe zone and the bottom of the pavement base rock, ground surface, or surface material.

Water Stops

A watertight connection between the connector and the pipe that is flexible enough to permit lateral pipe movement without destroying seal integrity.

101.2.0 Abbreviations

ANSI	American National Standard Institutes
APWA	American Public Works Association
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
CGC	Commercial Grade Concrete
CLSM	Controlled Low Strength Material
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ODOT	Oregon Department of Transportation
OOSHC	Oregon Occupational Safety and Health Code
ORS	Oregon Revised Statutes
UNI-BELL	UNI-BELL Plastic Pipe Association
UPC	Uniform Plumbing Code

102 General Provisions

102.1.0 Scope

The design, construction and testing of sanitary sewer mains, facilities and other appurtenances which are, or will be incorporated into the City of Grants Pass sanitary sewer system, shall comply with these standard specifications and permit requirements of various governing bodies, except where specific modifications have been approved in writing by the Director. No work shall commence on sanitary sewer mains, facilities, or other appurtenances without a set of approved plans and required permits.

- a) All plans shall be engineered, stamped, and signed by a Civil Engineer registered in the State of Oregon.
- b) Only contractors who are approved and prequalified by the City of Grants Pass may perform work on sanitary sewer facilities. Work performed by other than approved contractors will not be allowed nor accepted.
- c) Prior to accepting bids and/or awarding a contract, the developer or his engineer shall inform the City Engineer of all the contractor and sub-contractor names intended for use to receive prior approval.

102.2.0 Standard Specifications, Codes, and Ordinances

City ordinances and resolutions, and applicable standards of governmental agencies having jurisdiction within the area served by the City's Sanitary Sewer Collection System shall be observed in the design and construction of sanitary sewer mains and facilities. Such requirements include, but are not limited to, latest editions of the following:

- a) Oregon Standard Specifications for Construction, including all applicable supplements, as prepared by the Oregon Chapter of the American Public Works Association (APWA) and Oregon Department of Transportation (ODOT).

- b) Oregon Occupational Safety and Health Code (OOSHC).
- c) Oregon Health Authority, Public Health Division, Oregon Drinking Water Program
- d) City of Grants Pass Municipal Code (GPMC)
- e) City of Grants Pass Development Code (GPDC)
- f) Oregon Department of Environmental Quality (ODEQ)
- g) American Water Works Association Standards (AWWA).
- h) City of Grants Pass Sanitary Sewer Collection System Master Plan
- i) Oregon Plumbing Specialty Code

102.3.0 Safety

Contractor and personnel engaged in construction work to be incorporated into the City of Grants Pass system shall comply with the minimum safety and health requirements prescribed in the Oregon Occupational Safety and Health Code (OOSHC).

102.4.0 Prequalification Requirements

To work on projects involving the construction of public facilities, a Contractor must be prequalified per the current Municipal Code Chapter 9.37.

102.5.0 Insurance

The contractor shall deposit with the City Finance Director a certificate of comprehensive public liability insurance covering the work to be done. Said policy shall be in the limits of not less than \$2,000,000 aggregate and \$1,000,000 for any one claim per City Resolution No. 5682. This policy shall protect and hold harmless the City, its officers and employees against all claims, demands or judgments. The policy shall further provide that the contractor and his insurance company shall defend at all costs of defending the City, its officers and employees, in any suit or action or other proceeding that may be filed against them, or any of them, because of the Contractor's work and activities.

102.6.0 Improvement Bonds

Capital Improvement Projects:

For Capital projects, contractor shall provide a performance and payment bond covering 100% of the contract amount. This bond shall remain in full force and effect for a 12 month period from the date final payment is issued to the contractor.

Developer Installed Projects:

Developments installed by private developers that meet the requirements to secure for uncompleted items will follow the guidelines in Articles 19 & 29 in the Grants Pass Development Code.

Prior to receiving Final Plat or issuance of Certificate of Occupancy for a development (whichever applies) the developer will provide a maintenance bond to remain in full force and effect for a 12 month period. Developer shall provide itemized costs to the City Inspector to determine the bond amount. The form of bonds will be as approved by the City Attorney. Maintenance bonds are set as follows:

<u>Construction Cost</u>	<u>Percent of Bond</u>
\$0 to \$25,000	100%
\$25,000 to \$50,000	50%
\$50,000 on up	25%

102.7.0 Defective Work

Any defective materials or workmanship that becomes evident during the 12 month maintenance bond period shall be replaced or repaired without cost to the City. In the case of pressure sanitary sewer system replacement or repairs, the City's Collection division must supervise the work. The contractor and the developer will be notified if such a case arises.

102.8.0 Utility Easements

When required by the Director, the owner shall provide an easement outside the right-of-way. Easements shall be shown on construction plans and conform to section 203.1.3 of these standards. No permanent construction may occur in easement areas nor may large-scale landscaping such as trees or significant shrubs be planted. No fences will be allowed that restrict access or impede maintenance within the easement.

102.8.1 Utility Easement Restrictions

Deeds for easements shall provide for restrictions of structures, significant shrubs or trees, construction and grading within the easement, and shall provide for an all weather drivable surface allowing 24 hour ingress and egress for maintenance. A current title report will be submitted prior to acceptance of the easement.

102.8.2 Utility Easement Dedications

Dedication of easements shall be provided as follows:

For subdivision tracts - the owners of land included within the subdivision shall dedicate for public use, the utility easements so designated on the Final Plat.

For other than subdivisions - dedication of utility easement(s) shall occur by means of deeds of conveyance to the City of Grants Pass and as approved by the Director and City Attorney.

102.9.0 Enforcement

The Director shall enforce adherence to these Design and Construction Standards.

SECTION 200 **DESIGN OF PUBLIC SANITARY SEWER MAINS AND** **INFRASTRUCTURE**

201 Plan Check Procedure and Fees

201.1.0 Scope

Pursuant to Ordinance No. 4290, which requires the developer provide the City with plans, specifications and cost estimates for all public improvements, the following procedures and fees shall be applicable.

201.2.0 Improvement Plan Checking Fee

At time of receipt of the proposed improvement plan, a fee shall be paid in the amount as established by the City. The amount established shall be determined from Resolution No. 4045, or current amended resolution. Under no circumstances shall refund of the above fee be made unless approved by the Director.

201.3.0 Improvement Plan Submittal Requirement

The following submittals will be required for the initial plan check:

a) In addition to the Parks & Community Development's required submittals, provide four complete sets of sanitary sewer improvement plans, including the most current site plan approved by City Planning to the City Engineering Division. More plan sets may be required for reasons such as right-of-way jurisdiction.

City staff shall review the plans and materials as submitted and will prepare and send a copy of comments and a marked up set of plans to the developer's engineer for revisions. The initial two-week review period begins when the City Engineering Division has received all required submittals.

Subsequent reviews of submitted plans shall continue until the plans are satisfactory to the City. The in-house review periods for subsequent reviews are estimated to be one week from the time of resubmitted plans for each subsequent review. The estimated one week review period will not begin until all required submittal materials have been provided to the City, including, but not limited to, the marked up set of plans from prior review, or other items or calculations as requested by the engineering division.

If the marked up set of plans returned to the developer's engineer is not returned to the City for the subsequent review, then the plans submitted will be treated as a new plan review submittal, subject to an initial review period and the appropriate fees for a new plan submittal.

202 Plan Criteria for Sanitary Sewer Lines and Appurtenances

202.1.0 Plan Approval

Approval by the City Engineer does not imply approval of the technical accuracy of the design. Responsibility for the design lies strictly with the developer and his engineer. Any changes to the drawings after approval by the City Engineer shall be shown as revisions and shall be approved by the City Engineer prior to construction.

202.2.0 Construction Plans (Typical)

- a) Sheet Size: Overall dimensions 24" x 36"
- b) Margins: 2" on left, all others 1"
- c) Typical Scales: 1" = 10, 20, 30, 40, 50 or 60 feet

All construction drawings will be a standard scale. Standard engineering scales will be required except in cases of building designs, where architectural scales will be allowed. Scales shall be consistent throughout the drawings.

Typical horizontal scales range anywhere from 1" = 10' to 1" = 60' depending on the complexity of the design, whether multiple utilities are being designed or exist, or if there is street design involved. The City Engineer may require additional smaller scale details of large-scale drawings.

Typical vertical scales range anywhere from 1" = 1' to 1" = 5'. Factors that determine this are the amount of elevation differential on the profiles and scalability. In some cases, the City may prefer a larger vertical scale to "breaking" the profiles.

The City Engineer has final authority of the scales to be used.

202.3.0 Construction Plan Elements

The construction plans shall conform to and contain the following standards:

202.3.1 Cover Sheet

This sheet shall contain an overall plan at a minimum scale of 1" = 400', showing general project site layout, all utilities, street names, lot boundaries, surrounding and affected property identification and numbers, map legends, general notes, north arrow, scale used, general notes and a sheet index.

A schedule listing the quantities of sewer pipe listed by size and material shall be included.

A vicinity map with a minimum scale of 1" = 1,000' showing tract boundary, streets, adjacent tracts, major streets outside tract boundaries and location of the bench marks.

At least two benchmarks used for the project shall be graphically shown on this sheet and the elevations, descriptions, locations, etcetera, spelled out as illustrated below:

Location _____

B.M. No. _____ Elev. _____ Type of Marker _____

All elevations used in preparation of standard plans shall be based on benchmarks and/or temporary benchmarks tied to NGVD 29 Source Data (i.e.: tied to known published monuments).

202.3.2 General Notes

Can be shown on the Cover Sheet and need not be shown on other sheets. The General Notes shall include the following, but are not limited to:

1. Work and materials shall conform to the provisions of the current “Standard Specification for Construction”, ODOT/APWA, unless otherwise covered by the specifications written for this project or the Water Standards and Specifications, the Sewer Standards and Specifications or the Standard Drawings (GPSD) of the City of Grants Pass.
2. In the event of conflict in regulations and specifications governing this project, the order of precedence is as follow:
 - a) Contract Special Provisions
 - b) Construction Plans
 - c) City of Grants Pass Standards and Specifications
 - d) General Notes
 - e) ODOT/APWA Specifications for Construction
3. All construction shall be subject to inspection and compliance with the above applicable regulations and specifications.
4. All contractors and subcontractors shall possess a valid state contractor’s license and a valid City of Grants Pass business license prior to commencing work on this project. All contractors and subcontractors must also be currently prequalified with the City of Grants Pass for the class(es) of work required prior to any construction.
5. A mandatory pre-construction conference of all parties shall be held prior to any construction.
6. Call “One Call” 1-800-332-2344 (or 811) for utility locations, forty-eight (48) hours before digging.
7. The City of Grants Pass Engineering Division and Collection Division (541-474-6060) shall be notified 48 hours in advance of any stage of construction. The City shall inspect the contractor’s activities to ensure compliance with the approved plans.

8. Contractor shall obtain an Encroachment Permit from the appropriate agency(s) prior to commencing any work.

9. There shall be no deviation from the approved plans unless requested in writing by Contractor and approved in writing by the City Engineer.

10. All underground utilities and service laterals are to be installed prior to construction of curb and gutters.

11. Crushed rock base material shall comply with APWA/ODOT Sections 00641 and 02630 and shall be placed in maximum lifts of 6 inches and be compacted to 95% of maximum relative density at optimum moisture in accordance with AASHTO T-99 Method D procedure for the determination of 100% relative maximum density of granular materials.

12. The sampling and testing of materials for use on the jobsite shall be at the expense of the Contractor. All testing of materials and workmanship shall be performed by an independent, ODOT certified technician and testing laboratory. Results of the tests shall be sent directly to the City or County as required, as well as the Contractor, by the laboratory. Location and frequency of tests shall be designated by the City Engineer and coordinated by the Contractor.

13. A copy of the approved plans, specifications and standard drawings shall be on the job site at all times while work is in progress.

202.3.3 Sanitary Sewer Notes

Can be shown on the Cover Sheet and need not be shown on other sheets. The Sanitary Sewer Notes shall include the following, but are not limited to:

1. Work on this sewer system shall conform to current City of Grants Pass standards and specifications.

2. All sanitary sewer services to be 4 inches unless otherwise noted. See GPSD #s 304, 306 and 307 per applicable field condition.

3. All pipe and manhole testing shall be per current City standards and specifications.

4. Sewer line shall be constructed to current City standards and specifications. A maximum of 0.5 inches standing water in pipes shall be allowed as determined by City TV inspection report.

5. All manholes shall be tested by vacuum method. Mandrel testing for PVC and ABS pipe shall conform to City standards.

6. Where sewer laterals are to cross under new curb construction, an "S" shall be stamped on top of the curb, directly above the sewer lateral.

7. Prior to acceptance of the sewer main installation and other improvements, the Contractor shall coordinate with the City to attain video inspection tapes of the new sewer main (video of laterals is not required for main line acceptance) performed by City crews. This video inspection shall be in color and be of sufficient resolution to allow the engineer to clearly see all pipe joints, wyes, manhole connections and other fittings.

8. All defects in construction discovered during City acceptance testing shall be satisfactorily corrected prior to acceptance by the City. All new inspections or testing performed by the City due to a failed test is to be reimbursed to the City by the Owner of the development.

9. The Contractor is solely responsible for maintaining existing wastewater flows through the project area at all times during the project. The Contractor's operations shall not cause a public health hazard or discharge of untreated wastewater to the ground surface, groundwater or surface water at any time during the project. The Contractor shall take all necessary precautions, including constant monitoring of bypass pumping, to ensure that no private residences or properties are subjected to a sewage backup or spill, and that the Contractor shall be liable for all cleanups, damages and any fines in the event of a spill. After the work is completed, flow shall be restored to normal. When a bypass is required, the contractor shall submit a sewage bypass plan to the Collection Division prior to commencement of sewer line work. The bypass plan shall be subject to approval by the City Engineer and shall ensure that all bypass pumping shall be performed in such a manner as not to damage public or private property or create a public nuisance.

10. With the written approval of the property owner, flows from service laterals maybe blocked for a period of time not to exceed 8 hours. The contractor shall be responsible for coordinating with property owners to obtain approval for blockages and to ensure that any backups in the service laterals do not result in overflow or sewage spill. The Contractor shall be responsible for all cleanups, damages and any fines in the event of a spill. Service laterals that are blocked shall be re-opened immediately upon completion of the lateral installation work.

202.3.4 Utilities Sign-Off Block

All constructions plans shall have a Utility Sign-Off block on the Cover Sheet. This block also serves as the City Engineer's final approval sign off for the construction plans. The sign off block shall appear as follows:

UTILITY	AGENCY	APPROVED BY	DATE
POWER	PP&L		
TELEPHONE	QWEST		
GAS	AVISTA		
CABLE TV	CHARTER		
U.S. POST OFFICE	USPS		
IRRIGATION	GPID		
DOMESTIC WATER	CITY OF GP		
SANITARY SEWER	CITY OF GP		
STORM DRAINAGE	CITY OF GP		
STREETS – City	CITY OF GP		
PLANNING	CITY OF GP		
STREETS - County	JCPW		
STREETS – State	ODOT		

CONSTRUCTION AUTHORIZED TO PROCEED IN ACCORDANCE WITH APPROVED PLANS WHEN ALL PERMITS HAVE BEEN ISSUED AND PRE-CONSTRUCTION MEETING HAS CONCLUDED.

BY TITLE DATE

THESE PLANS ARE APPROVED FOR CONSTRUCTION BY:

BY CITY ENGINEER DATE

202.4.0 Plan and Profile Sheet Elements

202.4.1 Graphic Scale and North Arrow

All scales on the plans shall be illustrated graphically so that a true representation is produced when the plans are reduced in size. Every plan drawing shall include a North arrow. The north arrow should be directed to the top or to the left on the plan sheets.

202.4.2 Plan of Sanitary Sewer Main

Plan drawings shall show the location of sanitary sewer mains. These drawings shall include sanitary sewer line stationing (increase from left to right across sheet where possible); line bearings in easements only; curve data; show and station manholes and cleanouts and any other miscellaneous appurtenances; sanitary sewer service lines; street or roadway center lines; curb lines, boundary lines; lot boundary lines, numbers, and elevations. Show all sanitary sewer line easement boundaries and locate any prominent surface feature or structure. List the Township, Range, Section and Tax Lot numbers for areas to be served and adjacent properties.

A table listing the station and offset of each sanitary service lateral, with reference to the profile stationing (street centerline is typical), shall be included for laterals shown on the sheet.

Further, the upstream distance and offset from the sanitary sewer main for each sanitary sewer service lateral shall be listed on the plan view. This station and offset is in reference to the sanitary sewer main only and references the nearest downstream manhole for each lateral. Example: a service lateral that is 20 feet upstream and 15 feet to the right of the main line will be listed as 0+20 15'R.

202.4.3 Underground Pipes and Utilities

Show and label on the plans and profile the size and ownership of all existing underground utilities that cross or parallel the sanitary sewer main. Non-existing, but planned improvements for underground utilities shall also be shown. All conduits, pipes and cables, which crosses the sanitary sewer main and including, but not limited to water, sewer, storm drains, open channels, gas, irrigation, telephone, power, and cable lines, shall be shown and labeled on the profile with station and elevation.

202.4.4 Profile of Sanitary Sewer Main

The profile portion of the sanitary sewer line drawings shall show existing and proposed ground and/or street surface profiles, including, but not limited to, curbs and gutters, with appropriate designations of actual surface elevations. A profile shall be created for all sanitary sewer mains, and other important sanitary sewer lines as designated by the Director. The profile shall show the sanitary sewer line, its size, material makeup, pressure class, lineal footage, type of backfill material to be placed over sewer, stationing, and grade. On the profile, show, number and locate all manholes, cleanouts, center lines of intersecting streets and other appurtenances with both station and elevation where applicable as well as all utilities within 5 feet. Show the elevations to nearest 0.01 foot of bottom of pipe (invert). Manholes shall have callouts for the rim elevation and all pipe inverts. The type of bedding and encasement required to carry loads on the pipe shall also be shown and specified.

For a utility crossing, where there is 1 foot of separation or less between the sewer and the other utility, the clearance at the crossing will be called out. A 6 inch minimum separation should be maintained at all times, except for water where a minimum 18 inch separation is required.

202.4.5 Map Legends

Shall be shown on plans and as shown on GPSD #201 or approved equal.

202.5.0 Drawings of Record

As-Built Surveys for all sanitary sewer installations are required and shall be prepared by a Professional Engineer or Surveyor registered in the State of Oregon. The As-Built drawings shall determine "record" elevations at the invert of every pipe at the centerline at each manhole or cleanout and the invert elevation of each sanitary sewer service at the right-of-way boundary.

As-Built drawings are to be 36"x24" landscape, ink on Mylar, with every sheet stamped "As-Built" and signed by the Project Engineer or Surveyor of Record. An electronic set of As-Built Drawings, in AutoCAD 2004 or newer format, shall be submitted on CD or flash drive.

All facilities shown on the As-Built drawings are to be accurately shown and field verifiable to within 0.5 foot horizontally, and within 0.1 foot vertically (NGVD 29), with a permanent or temporary benchmark that is survey grade quality, within 1000 feet of the facility. The benchmark locations and information are to be shown on the As-Built drawings.

A Certification of Accuracy statement signed by the Project Engineer shall be included on all As-Built sheets. The Certification of Accuracy statement shall include the following:

I hereby submit that this project was constructed to the lines, grade and section as shown on these plans and that all materials and workmanship are in conformance with these plans and applicable specifications.

P.E. Signature

Date

As-Built Drawings and the electronic drawings shall be submitted within 60 days of the final inspection. Final plats will not be approved without approved As-Built drawings for the installation of facilities other than those that may be secured for under GPDC Article 29.

203 Sanitary Sewer Design

203.1.0 Sanitary Sewer Main Location and Alignment

203.1.1 Sanitary Sewer Main Location in Roads or Streets

The centerline of sanitary sewer mains shall be the centerline of the public street wherever possible. If not possible due to separation requirements between the sanitary sewer and water mains, or for other reasons, then the sewer main shall be designed to be parallel to 7 feet east or 7 feet south of the road centerline.

203.1.2 Curved Sanitary Sewer Main Prohibition

No horizontal or vertical curvature will be allowed in the sanitary sewer main. Any required change in depth or alignment shall be done inside a sanitary sewer manhole.

203.1.3 Sanitary Sewer Main Location in Private Property

Easements shall be entitled "City Sanitary Sewer Easement" and shall be a minimum of 20 feet in width, unless otherwise approved by the Director. City Utility Easements shall conform to the requirements set forth in City Ordinance No. 5197. Two or more utilities in a combined utility easement shall require additional width, typically 30 feet.

The sanitary sewer main shall be centered on the centerline of the easement except as otherwise approved by the Director. In cases where there is both a water and sewer main in the same easement, additional width, to exceed the minimum 20 foot width will be

required. Additional width as directed by the Director. When a water and sewer main are to both be located in the same easement, locate the water main five feet north or west of the centerline of the easement and the sewer main 5 feet south or east of the easement centerline. For any situation, the water and sewer main are to maintain a 10 foot minimum separation per OAR Chapter 333.

Where easements follow common lot lines, the full easement width shall be on one lot, in such a manner that walls, trees, fences or other permanent improvements will not obstruct access to sanitary sewer lines. Where this requirement cannot be met without interfering with existing buildings, easements may straddle lot lines, but the sanitary sewer main shall not be located on the lot lines. Exceptions may be granted for private streets. All easements shall be accessible on a 24 hour basis and constructed with all weather drivable surfaces. Overhangs, awnings, or overhead lines shall not impede easements.

203.1.4 Sanitary Sewer Mains in Private Streets

Sanitary sewer mains are not allowed in private streets unless they are to be used to supply sanitary sewer service to a lot that cannot connect to a main located in a public right-of-way, or to provide interconnectivity to sanitary sewer mains in adjacent streets as required by the Director. Any sewer mains installed in a private street shall have an easement as described in 203.1.3.

203.1.5 Sanitary Sewer / Water Separation

(See Oregon Administrative Rules, Chapter 333, Oregon Health Authority, Public Health Division, Oregon Drinking Water Program)

Compliance with OAR, Chapter 333, Division 61 shall be met when designing and/or constructing new sanitary sewer facilities. Sanitary Sewer main lines shall be located at least 10 feet edge to edge horizontally from water main lines and laterals. Crossings of sewer and water main lines shall be made at approximately 90 degrees. Sanitary Sewer main lines shall be designed so that the sewer line has 18 inches of vertical clearance under the water line. If it is impractical to achieve 18 inches of vertical clearance under the water line, or if the sewer must pass over the water line, a full length of ductile-iron (Class 50, AWWA C-51) shall be used for the sewer line, centered on the crossing, with a minimum pipe length of 18 feet.

If any unknown situation is discovered, where there is not a minimum of 10 feet horizontal and 18 inches vertical separation between the water and sewer, the Engineer shall be responsible for the decision matrix in (a) and (b) below. These options were written assuming a new water main is in close proximity to or crossing an existing sewer but also applies to new water and new sewer being installed concurrently, or to a new sewer in close proximity to or crossing an existing water main. The contractor shall notify the Engineer in cases of (a) and (b). In no case shall the contractor make this decision.

- (a) Where the water line crosses over the sewer line but with a clearance of less than 18 inches, the sewer line shall be exposed to the sewer line joints on both sides of the crossing to permit examination of the sewer pipe. If the sewer pipe is

in good condition and there is no evidence of leakage from the sewer line, the 18 inch separation may be reduced. However, in this situation, the contractor must center one length of the water line at the crossing. If conditions are not favorable or there is evidence of leakage from the sewer line or if the sewer is not a plumbing code sewer approved material, the sewer line shall be replaced with a full length of pipe centered at the crossing point of PVC pressure pipe (ASTM D-2241, SDR 32.5), ductile-iron Class 50 (AWWA C-51), or other acceptable pipe. The sewer couplers shall be City standard Romac SS1 per GPSD #307.

(b) Where the water line crosses under the sewer line, the contractor shall expose the sewer line for examination as indicated in (a). If the sewer line is not pressure rated pipe, an 18 foot length of sewer pipe centered over the water line at 90 degrees shall be replaced with either C900 or DI pipe. The sewer line must be supported with steel or reinforced concrete beam or other means of preventing settlement when it spans the water line trench. Special precautions must be taken to assure that the backfill material over the water line near the crossing is thoroughly tamped in order to prevent settlement that could result in the leakage of sewage. In this situation, the contractor must center one length of the water line at the crossing. If conditions are not favorable, evidence of leakage from the sewer line is found or if the sewer is not plumbing code sewer approved material, the contractor shall reconstruct the sewer line per provision (a).

203.1.6 Sanitary Sewer Separation from Other Utilities

The minimum horizontal separation from other utilities and structures shall be 3 feet measured from edge to edge. The minimum vertical separation from other utilities shall be 6 inches. The minimum horizontal separation from city structures (i.e. manholes, catch basins, etc.) is 18 inches measured from edge to edge.

203.1.7 Backflow

Sewers shall be designed to prevent the backflow of sewage into laterals. Backflow of sewage into laterals may occur in any building that has waste-receiving inlets that are lower than the rim elevation of the next downstream manhole. Where required, a sewer backflow device shall be installed.

203.1.8 Connection to Cesspools or Septic Tanks

No person shall connect or cause to be connected any cesspool seepage pit or septic tank to any main line sewer or to any service lateral leading thereto.

203.2.0 Structural Requirements

203.2.1 Buried Facilities

All structures, pipe, backfill, and trench restoration shall be of sufficient strength to support with an adequate factor of safety, an HS-20 truck loading with impact. Calculations showing factor of safety may be required by the City Engineer.

203.2.2 Other Utilities and Structures

Sanitary sewer lines designed to cross under other pipes or structures shall be protected from damage and shall be constructed so as not to endanger the other pipe or structure. The Engineer shall clearly indicate acceptable methods for protection of other utilities and structures.

203.3.0 Sanitary Sewer Service Design

203.3.1 Sanitary Sewer Service Location

All service lines shall be located in the serviced property's adjacent right-of-way. Locations of service lines shall avoid driveways and roof drains. Sanitary sewer service lines shall be installed in a straight-line perpendicular to the sanitary sewer line. Service line connections shall not be combined nor have less than 2 feet of separation between each other. In no case shall a service connection be made in a main closer than 18 inches to a joint or fitting. A 10 foot horizontal separation shall be required between public water services and private sewer services within the right-of-way. Private sewer laterals will not be connected directly into manholes or cleanouts. Refer to GPSD #304. Private sewer systems will not be permitted.

203.3.2 Sanitary Sewer Service Sizing

Service laterals for single dwellings and small single stores or offices shall be 4 inches or larger, provided the current Plumbing Code does not require the building sewer to be larger than 4 inches. All other service laterals shall be 6 inches or larger and at least equal to the size of the building sewer.

203.4.0 Sanitary Sewer Manhole Design, Location and Spacing

203.4.1 Manhole Design

Manholes shall be constructed in accordance with GPSD #301. Manhole designs that provide access to the sewers, a stable working platform and freedom from splash and turbulence, equivalent to or better than the design shown herein, may be approved by the Director. Manholes located outside of a paved surface shall be surrounded with a concrete pad.

(a) Flat Top Manholes

Flat Top Manholes may be installed in accordance with GPSD #309 when distance from the rim to flow line is less than 4 foot 6 inches and prior approval has been obtained from the Director.

(b) Drop Manholes

Drop Manholes, GPSD #302, shall be used wherever sewers enter manholes at 24 inches or more above the outlet elevation of the manhole.

(c) Private Line Manholes

Manholes shall be required for private sanitary sewer lines that are 8 inches in diameter or larger. Private line manholes shall not be constructed upon public sewer mains.

203.4.2 Manhole Location

Manholes shall be located at all changes in pipe size, alignment or grade and at all junctions or changes in elevation.

203.4.3 Manhole Spacing

Manholes shall be located at least every 400 feet for pipes smaller than 24 inches in diameter. Manholes for larger pipes will usually be at 400 feet, but may be extended subject to the approval of the Director. Manholes shall be installed on all terminating sewer mains that are 200 feet or longer.

203.5.0 Sanitary Sewer Cleanout Design and Spacing

Sanitary sewer cleanouts are required in cul-de-sacs and end of streets less than 200 feet long, except as noted herein. End of street main runs 200 feet or longer shall terminate in standard manholes unless future extension of said end will include a manhole within 400 feet of the upper-most manhole, in which case a temporary cleanout is permitted. Where ends are on a slope of 0.01 ft/ft or greater, the length for use of a cleanout may be extended to 300 feet if approved by the Director and City Engineer. The cleanout shall comply with GPSD #303.

203.6.0 Sanitary Sewer Main Sizing and Design

The standard sanitary sewer main size shall be a minimum of 8 inches diameter. Where an 8 inch gravity main line is inadequate to serve the current or future project area, design calculations shall be submitted for review and approval. Situations requiring calculations are collection system modeling, pipe size increases to accommodate larger current or future populations, siphons, or any other irregularity in the design of the sewer.

203.6.1 Design Flow Rate

The design of sewer system facilities shall be based on a design flow rate of 360 gallons per day, per dwelling unit. Commercial uses shall be converted to equivalent dwelling units. Industrial flow rates shall be based on the design flows for the particular industry. A Peaking Factor (PF) shall be used in the calculations. The peaking factor used shall be submitted along with the calculations, along with a reference or sufficient data to justify its value. The total design flow shall be obtained by using the peak factor and average daily flow rate.

Typical flow ranges are shown below. These may be used as a guide, but flows outside these ranges may occur:

- (a) Residential: 360 gal/dwelling unit/day
- (b) Commercial: 3,000 gal/acre/day
- (c) Industrial: 5,000 gal/acre/day

The City Engineer’s approval of the average sewage flow rates to be used must be obtained in advance of design.

203.6.2 Pipe Size and Slope

For pipes 15 inches in diameter and smaller, the pipe should be designed so that peak flow is passed when pipe is flowing at one half (1/2) depth.

For pipes 18 inches in diameter and larger, the pipe should be designed to pass the peak flow when the pipe is flowing at three fourths (3/4) depth.

The minimum inner diameter pipe size, regardless of flow rate, shall be 8 inches.

203.6.3 Hydraulic Design

For all sanitary sewer pipes, use a Manning’s ‘n’ coefficient of 0.013, or Hazen-Williams “C” value of 130.

203.6.4 Minimum Sewer Slopes

Minimum slope requirements are necessary to assure self-cleansing and self-oxidizing velocities in order to avoid significant generation of hazardous, odorous, and corrosive sulfur compounds.

Slopes of sewers shall equal, or be greater than the following:

<u>Pipe Diameter</u>	<u>Grade</u>
4"	0.020
6"	0.006
8"	0.005
10"	0.0028
12"	0.002
15"	0.0016
16"	0.0016
18" and Over	0.0012

203.6.5 Substandard Slopes

Slopes below the minimum slopes may be used in order to avoid pumping only upon specific approval of the City Engineer. Such approval must be obtained well in advance of completion of design.

203.6.6 Steep slopes

Sewers laid on grades steeper than 25%, which are not under pavements, shall be anchored in place and protected from erosion in a manner approved by the City Engineer. See GPSD #210. Public sewer lines shall not exceed 18% without approval of the City Engineer. Such approval must be obtained well in advance of completion of design.

203.6.7 Future Extensions

When an area outside the tract can be logically served by future extension of tract sewer, the tract sewer shall extend to the tract boundary or to the end of the paved street in a manner to facilitate future extension. A cleanout or manhole must be installed at the end of the line per the spacing requirements of 203.5.0 and 203.4.3, respectively.

203.6.8 Depth of Sewer

Sewer mains shall be designed at a depth that will provide gravity flow to all properties within a proposed service area. The Director must approve the service area before final design is approved. Proper depth will be achieved if the following conditions are met:

- (a) The sewer main will allow for subsequent installation in accordance with the Water/Sewer Separation requirements.
- (b) The main sewer is located 7 feet lower than the flow line of the existing or proposed gutter. (If no gutter exists, then from the elevation of the edge of the traveled way).
- (c) The house laterals are designed 6 feet below finish surface at the property line to the top of the service pipe.
- (d) The house laterals are at a depth below the finish surface at the property line that will provide for installation of a straight run of the service lateral at a slope of 0.02. (Measured from 1 foot below the finish surface at any point within the established building setback lines, excluding any areas steeper than 5 feet horizontally to one vertically (5:1), whichever depth is greater).

All sewers designed in streets shall have at least 3 feet or more of cover or be otherwise protected against damage by traffic (Ductile Iron Pipe or concrete encasement). Prior approval of minimum depth sewers must be obtained by the City Engineer.

203.6.8 Trench Depth

All main and service line pipe shall be laid to the depth so that the top of the pipe is a minimum of 3 feet below finished grade. Any part of the bottom of the trench excavated below the specified grade in plans shall be filled with approved material and thoroughly compacted. Any variations in trench depth shall be approved by the City Engineer prior to construction.

203.7.0 Sanitary Sewer Manholes

Manholes shall be located at all sewer main intersections, at all changes in vertical or horizontal alignment or grade, and at the allowable spacing for sanitary sewer manholes.

203.7.1 Manhole spacing

See Section 203.4.2

203.7.2 Manhole Diameter

Manholes 48 inches in diameter may be used for sewer mains up to 18 inch diameter and up to 15 feet deep.

Manholes 60 inches in diameter may be used for sewer mains up to 42 inch diameter and up to 22 feet deep, or where the alignment of the main lines is such that the distance between openings would be less than 1.5 feet with a smaller manhole.

203.7.3 Drop Manholes

Drop through manholes shall be a minimum of 0.1 feet for straight runs or 0.2 feet for all others. Drops of 24 inches or greater shall be constructed with outside drop structures. If the drop through the manhole is less than 2 feet, a beaver slide may be used. All beaver slides must be channeled with shoulders in a directional flow.

203.7.4 Flat Top Manholes

Flat Top manholes shall be used where the distance from the invert to the rim is less than 4.5 feet and prior approval from the City Engineer has been obtained. Manholes greater than 6 feet deep shall have a standard cone section.

203.7.5 Manhole Cone

Manhole necks shall be adjusted to finished grade by the use of concrete grade rings with approved sealant between each ring. The maximum height of grade rings shall be 8 inches for new construction and 12 inches for modifications to existing manholes. Adjustments beyond these limits shall be made with full barrel sections. Eccentric manholes shall be installed with vertical side over the lowest pipe invert.

203.7.6 Cleanouts

End of line cleanouts may be used when the terminal reach of the sewer main is less than 200 feet long. In applications where crew safety is an issue during cleaning upstream, an additional manhole may be required.

203.7.7 Access

All manholes and cleanouts shall be located in such a way that maintenance vehicles will have year round, 24 hour, and unobstructed access.

203.7.8 Hydrogen Sulfide Protection

Downstream transition manholes originating from a pump station or manholes where turbulence is a factor shall be required to be coated with hydrogen sulfide resistant material.

203.7.9 Lockdown Manhole Covers

Manholes located outside of the paved surface shall be fitted with lockdown, watertight covers. Refer to GPSD #313.

203.7.10 Connection to Existing Manholes or Structures

All rigid pipes shall be provided with flexible joints within 1 foot of concrete structures, manholes, and ends of encasements or cradles.

A concrete core saw and neoprene adapter boot as recommended by the pipe manufacturer will be used for connecting PVC pipe to manholes or other rigid structures. At no time shall a service line connect directly to a public manhole or cleanout.

203.7.11 Watertight Manhole Covers

Where a manhole is in a sump or other area that is prone to flooding, watertight covers shall be used. Manhole cones may be rotated, with City Engineer approval, to avoid areas of standing water to the maximum extent possible.

203.7.12 Monitoring (Sampling) Manholes

A minimum of one monitoring manhole shall be required on all commercial, industrial or light-industrial property. Additional monitoring manholes may be required to comply with the City’s pre-treatment ordinance (Municipal Code, Title 8), or as determined by the Director. Private monitoring manholes will not be constructed on public sewer mains.

Development or building use on property zoned other than listed above may also be required to install a monitoring manhole as determined necessary by the Director.

203.7.13 Beaver Slide Manholes

Beaver Slide Manholes will be considered for use on a case by case basis.

203.8.0 Ground Water Barriers

When the sewer main is to be installed in a “sensitive area”, such as next to a wetlands or pond, the City Engineer may require the installation of ground water barriers. In these cases, the sewer main line shall be designed and constructed with low permeability barriers to prevent ground water from traveling in the trench line. Outside of road areas, the barriers shall be constructed of compacted native material, free of organic matter, debris, or other deleterious material. The pipe zone shall be free from all rocks or stones larger than ¾ inch. The barriers shall be a minimum of 2 feet and maximum 4 feet in length, for the full width of the trench. There shall be a minimum of two and a maximum of three barriers in each pipe reach from manhole to manhole and a maximum distance between barriers of 200 feet. In roadway areas, the barrier shall be constructed using native material in the pipe zone and CLSM above the pipe zone.

203.9.0 Force Mains and Lift Station Requirements

All sewage shall reach the system by gravity flow, in a condition susceptible to conventional sewage treatment processes. Where extreme hardship conditions prevail and gravity sewers in accordance with these requirements cannot serve a substantial area, a sewage pumping station may be allowed. No pumping facilities shall be incorporated in sewer plans without prior approval of the Director and City Engineer.

203.9.1 Lift / Pump Station Design

Lift / pump station designs shall be meet the requirements of ORDEQ Guidelines for Design and Construction of Waste Water Pump Stations. All designs shall be reviewed and approved by ORDEQ and shall include the following:

- (a) A station with firm capacity to pump the peak hourly and peak instantaneous flows associated with the 5 year, 24 hour storm intensity of its tributary area, without overflows from the station or its collection system.
- (b) A design consistent with EPA Class I reliability standards for mechanical and

Electrical components and alarms.

- (c) A pumping system consisting of multiple pumps, with one spare pump sized for the largest series of same-capacity pumps to provide for system redundancy.
- (d) Pumps with a minimum of 5 years service history for a similar duty and size unless otherwise approved by the City Engineer or Public Works Director. To ensure a valid warranty, pumps shall be supplied either directly by the manufacturer, or by suppliers who are authorized and licensed by the manufacturer to provide manufacturer's warranty services for the pumps to be furnished.
- (e) Inlet, station, and force main piping with all necessary pressure control and measurement features, surge protection systems, air-vacuum/release valves, isolation valves, couplings, odor control systems, cleaning/pigging ports and other appurtenances required by the City for a complete and operable system.
- (f) Force mains will be constructed with a means for dewatering/parking.
- (g) Mechanical systems for heating and ventilating as required by the selected station equipment, local climatic conditions, and applicable codes.
- (h) Plumbing systems for potable water, wash down, and drainage, unless otherwise approved by the City Engineer or Public Works Director.
- (i) Appropriate sound attenuation for noise created by pumping, mechanical, or electrical systems, including a standby generator.
- (j) Electrical systems for lighting, power, communications, security, control and instrumentation. A motor control center is to be provided for motor starters, accessories and devices. The motor control center shall provide an isolated, ultra-filtered power, 120 VAC section designed with separate branch circuits for microprocessor-based instrumentation, controls, etc.
- (k) A secondary source of electrical power. Standby generators shall be of sufficient size to start and run the Firm Pumping Capacity of the station, along with all other associated electrical loads necessary to keep the station operational and functioning. At the City Engineer or Public Works Director's discretion, a secondary power feeder from an independent substation may be required as a redundant power source. With the City Engineer's or Public Works Director's approval, the requirement for standby power may be satisfied by providing a trailer-mounted generator and an emergency power connection with manual transfer switch meeting the City's specifications.
- (l) A complete system of alarms and alarm telemetry to facilitate operation and maintenance of the station at all hours, including auto-dialer or radio telemetry.

- (m) Where required by the City, a design to allow remote monitoring of the station through a connection with a Supervisory Control and Data Acquisition (SCADA) system so the City can remotely control and monitor station activities. Programmable logic controllers and alarm telemetry must meet the City's preferences and standards.
- (n) Structures of adequate size, with interior and exterior clearances to facilitate 24 hour access for ease of operation and maintenance of all systems. Architectural aspects shall be subject to the City's approval.
- (o) Site development including an access road and parking, security, lighting, drainage, signs and landscaping meeting the City's requirements.
- (p) Lift / pump stations shall be sited on City owned property. Lift / pump stations may be located within the right-of-way if approved by the City Engineer or Public Works Director.

SECTION 300

MATERIALS

301 General Requirements

301.0.0 General Requirements

Unless otherwise specified on the plans or in the special provisions, all materials shall be new and in new unblemished condition.

301.1.0 Pipe Materials

The use of all pipe and fittings shall conform to the size, strength, material and joint type as specified herein and on the Plans. Each length of pipe shall be clearly identified as to its manufacturer, size, strength, class and date of manufacture. If requested by the City Engineer, the manufacturer or fabricator shall furnish appropriate certification, based on the manufacturer's quality control tests, that the materials for the pipe and fittings meet the requirements as specified herein. The design engineer shall determine the materials suitable for the project. Unless otherwise specified, the same type of material shall be used throughout a project and all fittings shall match the material and strength of the pipe being used. No interchanging of pipe and fittings will be allowed.

301.1.1 Sewer Mains

Sewer mains shall be Polyvinyl Chloride (PVC) sewer pipe complying with ASTM D 3034, having a minimum dimension ratio (SDR) of 35 and minimum pipe stiffness (PS) of 46 psi. All PVC pipe and fittings are to be watertight with bell and spigot joints. No glued pipe connections or joints will be allowed.

301.1.2 Gaskets

Rubber gaskets shall comply in all respects with the physical requirements, specified in ASTM 1869.

301.1.3 Ductile Iron Pipe (DI)

When specified for sanitary sewer pipe construction, ductile iron pipe shall be Class 50 and conform to the requirements of ANSI A21.51 or AWWA C151, with joints as specified, conforming to federal specification WW-P-421c and ANSI A21.11.

Ductile iron pipe shall be lined with cement mortar or PVC and seal coated in accordance with ANSI standard A21.4 and AWWA C104. The fittings shall be mechanical or push-on of the class specified. Mechanical joint cast iron fittings shall conform to AWWA C110 and shall be of a class at least equal to that of the adjacent pipe. Push-on joint fittings shall be gray iron with body thickness and radii of curvature conforming to ANSI A21.10.

301.1.4 Pressure Rated PVC Pipe

When pressure Polyvinyl Chloride Pipe (PVC) sewer mains are specified, the PVC pipe shall conform to the requirements of AWWA C900. The gaskets shall conform to the requirements of ASTM F477 and ASTM D1869. The pressure class shall be as specified. All other pressure sewer mains shall be Ductile Iron Pipe. The sewer mains shall pass a minimum 1 hour, 100 psi pressure test unless otherwise approved by the City Engineer.

301.1.5

301.2.0 Quality Control of Materials

The quality control of materials shall conform to the applicable sections of the most current version of the Oregon Standard Specifications for Construction and the American Public Works Association.

301.3.0 Submittals

Submit to the City Engineer, two copies of the manufacturer's standard drawings, catalog cuts, specifications, and data sheets for all materials and specific equipment for approval. All materials, products and methods requiring City Engineer approval must be approved prior to installation. The Contractor shall bear all costs related to uncovering or replacing items not pre-approved by the City Engineer.

302 Trench Materials

302.1.0 Trench Materials

302.1.1 Class "B" Backfill

Class "B" Backfill shall be 3/4" – 0 crushed rock per the Oregon Standard Specifications for Construction. This material shall be used within the pipe zone. Refer to GPSD #107 and 107-A.

302.1.2 Class "A" Backfill

Class "A" Backfill shall be approved native material per the Oregon Standard Specifications for Construction. Class "A" backfill shall be considered only if optimum moisture and compaction can be achieved. This material shall not be used within the pipe zone. Refer to GPSD #107 and 107-A.

302.1.3 Controlled Low Strength Materials (CLSM)

CLSM shall be a highly flowable lean concrete mix per the Oregon Standard Specifications for Construction. Design mixes shall be supplied prior to construction. Refer to GPSD #107 and 107-A.

302.1.4 Other Backfill Materials

Other backfill materials may be used only on a case-by-case basis and as approved by the City Engineer. The City will require that the contractor submit mix designs, test results, and any other pertinent information relating to the material to determine its suitability as a backfill. Refer to GPSD #107 and 107-A.

302.1.5 Asphalt Patching

Trench restoration shall be either 1/2” dense Level 3 Hot Mixed Asphalt Concrete (HMAC) per the Oregon Standard Specifications for Construction. Refer to GPSD #107 and 107-A.

302.1.6 Sand Collars

Sand collars are a short section of the bell end of a PVC pipe with a gasket. The collar has sand embedded on the outside for grout adhesion. The sand collars are grouted into manhole openings for pipe penetrations.

303 Miscellaneous Materials

303.1.0 Concrete

Concrete for manholes and minor structures shall be Commercial Grade Concrete (CGC), per the Oregon Standard Specifications for Construction. Absolutely no use of field-mixed concrete will be allowed.

SECTION 400
CONSTRUCTION STANDARDS

401 General Requirements

401.0.0 Scope

These standards are intended to describe the workmanship to be used in construction of a sanitary sewer system operated in the City and Urban Growth Boundary. It is presumed the Engineer has prepared such general and special specifications as are necessary to define the nature and location of the work, contractual arrangements, payment for work, and any other matters concerning the owner and his contractor.

401.1.0 Standard Specifications

Unless otherwise noted on plans, specifications, or contained within these standards, the Oregon Standard Specifications for Construction and the American Public Works Association Standards shall set precedence for construction procedures and standards.

401.2.0 Safety

All construction work shall be done in conformance with the Occupational Health and Safety Administration regulations and standards.

401.3.0 Workmanship

All work will be done by persons experienced in the specific work required, and must be prequalified with the City of Grants Pass. All work shall be under competent supervision. All work must conform to these standards, including all referenced standards and manufacturer's recommendations, and in a first class manner. Unsatisfactory workmanship shall be immediately remedied to the Director's complete satisfaction.

401.4.0 Public Relations

The contractor shall conduct his affairs in such a manner that will cause the least disturbance to traffic and residents/businesses near the work. Contractor shall maintain the job site in a condition that shall bring no discredit to the City or its personnel. Contractor shall restore all affected private improvements to at least the original condition. The work areas shall be maintained in a reasonable clean state including all street areas. No tracking of rock, mud or other debris will be allowed per GPMC, Section 5.36.030 Debris on Streets, Sidewalks or any other Public Way.

401.5.0 Existing Sanitary Sewer Facilities

Unless otherwise directed by the City, no work shall be performed on an existing pressure sewer facility by anyone other than the City's Sewer Division Personnel. No work shall be performed on the existing public gravity sewer system without providing prior notification to the City of Grants Pass Wastewater Collection Division.

401.6.0 Construction Water

Construction water may be obtained from the City. Contractor shall be responsible for all hookup and usage fees. Water is available from the City in two sources, Fire hydrant connections and the Bulk Water Station.

Fire Hydrant Connections - A hydrant meter permit must be obtained from the City Building Department prior to connection to a fire hydrant. With the permit, City-supplied hydrant meter, backflow device, and control valve, the City will allow the contractor to use water from a fire hydrant. Access to construction water from a fire hydrant shall only be obtained by the operation of the City supplied control valve. Operation of fire hydrants by private contractors is otherwise prohibited. Application for the installation of bulk water fire hydrant meters shall be submitted to the Community Development Department. Twenty-four (24) hour advance notice shall be provided to the Water Distribution Department prior to the request for installation.

Bulk Water Stations - Currently, the City has bulk water available at one station located at 2480 Williams Hwy.

401.7.0 Delivery, Storage, and Handling of Materials

Contractor shall be responsible for inspecting materials delivered to site for damage. When applicable, materials shall be stored on site in enclosures or under protective coverings. Materials shall not be stored directly on ground. PVC pipe shall be stored under cover, out of direct sunlight. Pipe, fittings, valves, and other accessories shall be handled in such a manner as to ensure delivery to the job site in sound, undamaged condition. Damaged materials shall be immediately removed from the jobsite or immediately and clearly marked as being “Unsuitable Material”.

401.8.0 Traffic Control

Prior to construction, the contractor shall provide to the City a traffic control plan. The plan shall conform to ODOT Section 00225.00 and MUTCD. Road closures are permitted on a case-by-case basis.

401.9.0 Construction Staking

A licensed surveyor shall stake all sanitary sewer line construction prior to construction. Construction stakes will be set parallel to the sewer main alignment at an offset distance and direction agreed upon with the contractor, but in no case shall construction be offset more than 10 feet. All stakes shall have information regarding the horizontal position of the sewer line as well as information for grades. Stakes will be set at no greater interval than 50 feet on straight alignments. For close slope tolerances, maximum stake interval shall be 15 feet.

No work shall commence prior to preparation of the sewer cut sheets and duplicate copies supplied to the inspector. The cut sheets shall be prepared by a land surveyor or civil engineer licensed in the State of Oregon. The cut sheets shall include the location of tees and wyes for house laterals at the property line and manhole rim elevations by sewer stationing. House lateral stakes shall be marked to indicate cut grade, sewer stationing and lot number.

402 Installation Requirements

402.1.0 Trenching and Excavation

All utility trenches shall be constructed per GPSD #107 or 107-A.

402.1.1 Trench Width

The minimum trench width in the pipe zone must provide a clear 9 inches outside the maximum outside diameter of the pipe. Extra width is required to permit the convenient placing of fittings and other accessories, and is subject to the approval of the City Engineer. All trenches shall have a flat bottom.

402.1.2 Open Trench

The length of the trench excavated shall not exceed 100 feet unless prior approval is obtained. Related trench construction, such as pavement, road gravel, and concrete restoration shall be completed within 800 feet of the open trench limit unless otherwise authorized. Trench that has been excavated shall be backfilled prior to the end of the

day's work. All open trenches shall be kept clear of foreign debris (i.e. trench sloughing). The maximum working area allowed without the first course of pavement is 1,300 feet.

402.1.3 Trench Grade

The bottom of the trenches shall be graded to the specified line and grade with proper allowance for 4 inches of specified bedding. Grade shall not vary by more than 1/10th of 1 foot from that shown on the plans. Any variations in grade shall be approved by the City Engineer.

402.1.4 Trench Foundation

The bottom of the trench shall be firm, stable, and capable of supporting the load of the pipe, backfill, and traffic loading. The bottom of the trench shall be compacted to 90% relative density of the native material. If the trench bottom is soft, spongy or unsuitable, trench stabilization shall be as required by the Engineer. Typically, this stabilization will be in the form of overexcavation and compaction of a free draining backfill. Dewatering of the trench may also be necessary.

402.1.5 Shoring, Sloping, and Benching

Unstable trenches or trenches in excess of 5 feet in depth shall be shored, sloped, or benched per OSHA requirements. Ladders shall be utilized for employee access in all trenches which are 4 foot or greater in depth.

402.1.6 Trench Dewatering

The contractor shall at all times provide proper means and equipment to remove and dispose of all water entering the trench excavation during pipe installation. No pipe shall be laid in water or when, in the opinion of the Engineer, trench conditions are unsuitable. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by the Engineer, and no trench water shall be permitted to enter the pipe. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry. At no time shall the sewer collection system be used for the disposal of water or materials resulting from dewatering.

402.2.0 Mainline Pipe Installation

The construction and installation of sanitary sewer pipe shall be in accordance with these specifications, as approved by the Engineer and as recommended by the pipe manufacturer.

402.2.1 Safety

Contractor and personnel engaged in construction work shall comply with the minimum safety and health requirements prescribed in the Oregon Occupational Safety and Health Code. The contractor will be solely and completely responsible for conditions on the job site, including safety of all persons and property during the performance of the work. This requirement will apply continuously and not be limited to normal working hours.

402.2.2 Sanitary Provisions

The contractor shall provide and maintain in a neat and sanitary condition such accommodations for the use of his employees, as may be necessary to comply with all

applicable laws, ordinances and regulations pertaining to public health and sanitation. The contractor shall provide enclosed toilets.

402.2.3 Quality Control of Materials

The quality control of materials shall conform to the current edition of the Oregon Standard Specifications for Public Works Construction.

402.2.4 Quality of Workmanship

All work will be done by persons experienced in the specific work, under competent supervision and in a first class manner to the Director's complete satisfaction.

402.2.5 Placing Pipe in Trench

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. If the pipe laying crew cannot put the pipe into the trench and in place without getting debris into it, the Engineer may require that, before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe. Trenches are to be kept free of water during the laying operation. During the installation operations, no debris, tools, clothing, or other materials shall be placed in the pipe. If an object is accidentally lost in the pipe, contact the Collection Division immediately.

402.2.6 Handling Material

Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the contractor for the safe and convenient achievement of the work. All pipe, fittings, and other appurtenances shall be carefully lowered into the trench, with suitable equipment, in such a manner as to prevent damage to the materials. Under no circumstances shall pipeline materials be dropped or dumped into the trench.

402.2.7 Pipe Laying

All pipes shall be laid without grade break, upgrade from structure to structure. Pipe shall be laid to the line and grade, centered in the trench in such a manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the flow line. Wyes or tees shall be laid so that the branch of the fitting is inclined upward between 20 degrees to 70 degrees from the horizontal.

402.2.8 Vertical and Horizontal Grade Tolerance

Vertical deviation from the true grade line shall be 0.02 feet and shall not exceed 0.5 inches. Horizontally, pipe shall not deviate from the alignment nor exceed 0.5 inches.

402.2.9 Bell (Joint) Holes

These holes shall be dug at each joint in the bottom of the trench. These joint holes permit the entire length of the pipe to rest on the bedding material instead of just the pipe bells, and allow for easy visual inspection of the entire joint.

402.2.10 Cleaning Pipe and Fittings

All foreign material shall be removed from the bell and spigot ends of each pipe. The outside of the spigot and the inside of the bell shall be wiped clean, dry, and free from dirt, grease and foreign matter before the pipe is installed.

402.2.11 Push-On Joint Pipe

Unless otherwise directed, pipe shall be laid with bell end facing in the direction of installation.

There shall be no use of air power for connecting push-on joints. The contractor shall provide all special tools and devices such as special jacks, chokers, and similar items required for the installation. The pipe manufacturer shall furnish lubricant for the pipe gaskets. No substitutes will be permitted under any circumstances. Contractor shall take the necessary precautions to ensure an undamaged pipe installation.

402.2.12 Cutting Pipe

The cutting of pipe for inserting tees/connections shall be done neatly without damage to the pipe, leaving a smooth end at right angles to the axis of the pipe.

When mechanical joint or push-on pipe is cut in the field, it shall be cut as recommended by the pipe manufacturer, and the cut end shall be beveled and dressed so that it may be used for the next joint.

402.2.13 Connections to Existing Mains and Laterals

Use material as approved by the current APWA Specifications. Materials should be of the same type and class when connecting to existing mains and laterals wherever possible as long as the existing pipe is of an approved material. Connections to existing mains using 3034, C900, DI pipe or other approved materials shall utilize Romac SS1 or Romac SS2 sewer transition couplings or approved equal. Calder style, such as Fernco couplings, shall not be utilized in the public right-of-way for the connection of mains or sewer laterals.

402.2.14 Protection of Existing Mains

Where new sewer mains are to be connected into a manhole that is in active use, the designer shall call for such protection as is necessary to prevent construction debris from being washed into the active sewers. Plugged inlets or other suitable protection shall be called for in the active manhole before beginning manhole modifications or tract sewer cleaning.

402.2.15 Manhole Rim Elevations

Finished elevations of manhole frames and covers shall be set in relation to finished grades of the completed road surface or one foot above finished surrounding grade when outside of roads.

402.2.16 Flexible Joints

Flexible joints shall be provided for rigid pipe, which allows for differential settlements or other movement of sewer pipe. Sewer structures, adjacent pipe, and adjacent

structures shall be provided where sewer line enters encasement, cradles, manholes, or other structures. Flexible joints shall be within 1 foot of such structures. Flexible joints are not required when PVC pipe is installed.

402.2.17 Water Stops

Rubber seals shall be embedded in concrete around all sewer lines entering manholes or other concrete structures. An adapter recommended by the pipe manufacturer shall be used for connecting PVC pipe to manholes.

402.3.0 Service Lateral Installation Within Public Right of Way

The contractor shall install house laterals and wye or tee branch fittings of the size and location as indicated on the plans. The contractor shall not proceed with placement of the private laterals until the surveyor has staked the laterals at the sewer center and property lines. No bends greater than 1/4 (90 degree) shall be used in the construction of the house laterals within the public right-of-way. Laterals shall be joined to wye or tee branch fittings at the sewer main by the use of 1/8th (45 degree) bends positioned to obtain the desired lateral slope. All fittings or laterals that are not connected at the time of construction to existing sewer users shall be plugged with an expandable rubber, gasket style plug. Refer to GPSD #304 or 306. New laterals are to be TV inspected. When there are more than 4 laterals, inspect 25% of all laterals.

402.3.1 Sewer Lateral Tracer Wire

Service laterals shall be constructed in general conformity with GPSD #304 and #306. Tracer wire shall be installed as shown and shall be 18 gauge insulated copper, or heavier, green in color.

402.3.2 Depth of Service Laterals

Minimum cover over house laterals at the property line shall be 6 feet. The slope of house laterals shall be 0.25 inches per foot minimum. In cases where property grades relative to the sewer are critical, the City Engineer may approve a lesser slope.

402.3.3 Abandoned Sewer Service Laterals

A TV inspection of all unutilized sewer laterals shall be required prior to abandonment. A TV tape of each lateral inspection shall be submitted to the City of Grants Pass Collection Division for review. The results of the TV inspection shall be utilized to determine the extent of abandonment required between the public right-of-way and the public mainline. Sewer laterals composed of substandard materials or determined to be of poor condition shall be abandoned at their point of connection to the public mainline. All sanitary sewer services not abandoned at the main shall be plugged by exposing the sanitary sewer service at the right-of-way line with an approved watertight cap. All sewer lateral abandonments shall be field verified by the City of Grants Pass Plumbing Inspector or City of Grants Pass Collection Division crews.

402.3.4 Location Marking

The ends of all house laterals shall be marked as followed:

- (a) In cases where laterals are to be connected to the dwelling unit during the same phase of construction, and where curb improvements are included,

the contractor shall stamp the letter "S" on top of curb that overlies each house lateral or by chiseling the letter "S" 1.5 inches high on the top of the curb.

- (b) In cases where laterals are to be connected to the dwelling unit during the same phase of construction or where no curb improvements are included, the contractor shall furnish and install a marker consisting of a metal fence post, green with top 6 inches painted white and extending from the tee or side sewer plug to a point 12 inches above the surface. Where the depth is greater than can be marked with a single typical 6 foot long fence post, more than one post will be spliced together by wiring securely with galvanized wire.

402.3.5 Connections to Existing Laterals

Use material as approved by the Oregon Plumbing Specialty Code. Materials should be of the same type and class when connecting to existing laterals wherever possible as long as the existing pipe is of an approved material. Orangeburg pipe shall be replaced entirely. Connections to existing laterals using a different material (when permitted) shall utilize Romac LSS1 sewer transition couplings in the public right-of-way.

402.4.0 Concrete Work

Concrete shall be Commercial Grade Concrete (CGC) per Oregon Standard Specifications for Construction latest edition, including all applicable supplements, and shall conform to Grants Pass Concrete Standards and drawings.

402.5.0 Trench Backfilling

402.5.1 Trench Width

Trench width will be in accordance with GPSD #107, #107A or #310 as applicable.

If the maximum trench width is exceeded at the top of the pipe, the contractor, at his own expense, shall be required to backfill the trench area around the pipe with CGC to form a cradle for the pipe or use a higher strength pipe, as approved by the City Engineer, to resist the additional load placed on the pipe by the wider trench.

402.5.2 Dewatering

The contractor shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and promptly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods that will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Said methods may include well points, sump points, suitable rock or gravel placed below the required bedding for the drainage and pumping purposes, temporary pipelines and other means. Dewatering for the structures and pipelines shall commence when ground water is first encountered and shall be continuous until water can be allowed to rise in accordance with the provisions of this section.

402.5.3 Pipe Bedding

Pipe bedding shall be Class “B” material. Pipe bedding construction shall be per Oregon Standard Specifications for Construction Sec. 00405.45:

“Spread the bedding smoothly to the proper grade so that the pipe is uniformly supported along the barrel. Excavate bell holes at each joint to permit proper assembly and inspection of the joint. Bedding under the pipe shall provide a firm, unyielding support along the entire pipe length.”

The installation of pipe bedding under the pipe while the pipe rests on blocks in the trench will not be allowed.

402.5.4 Unsuitable Material

Any material deemed to be unsuitable by the City Engineer or his representative, shall be removed from the excavation and replaced with select backfill. Examples of unsuitable material includes soil that is excessively wet, soft, spongy, or consisting of too much clay material. Depth of removal of unsuitable materials shall be as directed by the City Engineer or his representative.

402.5.6 Backfilling

Backfill with specified material. Backfill construction shall be per Oregon Standard Specification for Construction Sec. 00405.46.

402.5.5 Pipe Zone

Pipe zone shall be Class “B” material. Pipe bedding construction shall be per Oregon Standard Specifications for Construction Sec. 00405.46 (b):

“As required under the haunches of pipe and in areas not accessible to mechanical tamper or to testing, compact with hand methods to ensure intimate contact between the backfill material and the pipe or structure. Provide thorough compaction.”

Pipe zone shall be considered to extend from the pipe bedding to 12 inches above the top of the outside diameter of the pipe bell. Pipe zone backfill to be placed simultaneously in trench on both sides of pipe in 6 inch layers compacted to 90% maximum dry density with top 3 feet of trench compacted to not less than 95% of maximum density AASHTO T99, Method D. Two density tests shall be taken within the trench every 300 feet, one density test at a minimum of 3 feet below grade and one density test at finished grade. There shall be a minimum of two tests per project (at a minimum of 3 feet below grade and at finished grade).

402.5.6 Backfilling

Backfill with specified material. Backfill construction shall be per Oregon Standard Specification for Construction Sec. 00405.46.

402.5.7 Trench Restoration

Trench restoration shall be in conformance with GPSD #107 or 107-A, the Oregon Standard Specification for Construction Sec. 00495-Trench Resurfacing and as required by the current City Pavement Cut Policy.

402.5.8 Bypass Pumping

When a bypass is required, the contractor shall submit a sewage bypass plan to the Collection Division prior to commencement of sewer line work. The bypass plan shall be subject to approval by the City Engineer and shall ensure that all bypass pumping shall be performed in such a manner as not to damage public or private property or create a public nuisance.

402.6.0 Manholes

Sewer manholes shall be constructed in accordance with the Standard Drawings and the locations shown on the plans. The manholes may be constructed of precast eccentric concrete manhole units or cast in place units. Manholes shall be built without steps.

402.6.1 New Sewer Manholes

The manhole floor shall be poured on compacted base (95% Relative Density per AASHTO T99, 3/4"- 0 crushed rock, min. 6 inches thick) or other base rock approved by the engineer. Concrete shall be CGC. See GPSD #308.

The manhole stubs and sewer main shall be set before the concrete is placed and shall be rechecked for alignment and grade before the concrete has set. The various inlets and outlets to the manhole shall be located as indicated on the plans and as detailed in the Standard Drawings. All transitions shall be smooth and of proper radius to give an uninterrupted transition of flow. The concrete base shall be shaped with a wood float and hard steel trowel finish prior to the concrete setting. In the event additional mortar is required after initial set has taken place, the surface to receive the mortar shall be primed, and the mortar mixed with approved adhesive in the amounts and proportions as recommended by the manufacturer and as directed by the inspector in order to secure as chip-proof a result as possible. The bases shall be set a minimum of 12 hours before the manhole construction is continued. In certain critical situations, the time of setting may be reduced upon approval of the City Engineer.

Manhole shafts and grade rings shall be joined with a minimum thickness of 0.5 inches of cement mortar or a 1 inch wide butyl joint sealer, meeting federal specifications 00210 (CSA-FSS) SS-S to form a watertight and smooth joint. A repair approved by the City Engineer shall stop any infiltration of ground water. Whenever new manholes are constructed in unpaved areas, the manhole cover shall be set 1 foot above finish grade, or as directed by the City Engineer.

Whenever grading or paving operations follow pipe break out, the contractor shall place minimum 0.5 inch plywood inserts on the manhole shelf to prevent debris from entering the sewer in the event the manhole protective cover is disturbed.

402.6.2 Manhole Installation on Existing Public Main Lines

The contractor, while excavating near the existing sewer, shall use extreme care to prevent damage to the sewer pipe.

The floor shall be poured on compacted base (95% Relative Density per AASHTO T99, 3/4"- 0" crushed rock, minimum 6 inches thick) or other base rock approved by the engineer. Concrete shall be CGC. See GPSD #308.

Manhole stubs shall be provided on both sides of the main and shall be rechecked for alignment and grade before concrete has set.

Sand Collars shall be installed on all existing lines entering "poured in place" manholes per GPSD #301.

Manhole stubs shall be plugged with a watertight cap or with an approved plug prior to connecting the incoming sewer. This plug shall not be removed until the off-site work has been completed and the sewer cleaned, and with the approval of the City Engineer.

Pipe break out shall only take place under the inspection of the City Engineer and only after the manhole on-site sewer has been completed and cleaned. Sewer main sizes 24 inches and larger shall be saw cut to remove the top portion of the pipe. Care shall be taken to prevent cuttings from entering the existing sewer. After pipe break out, all rough edges shall be worked to produce a true and neat opening. The edges of the pipe shall then be filled and smoothed with mortar. The surface to receive mortar shall be primed, and the mortar mixed with an approved adhesive in the amounts as recommended by the manufacturer and as directed by the City Engineer.

402.7.0 Jacking and Boring

All work shall conform to the permit requirements of the agency having jurisdiction, such as ODOT, Railroad, or Josephine County Public Works.

403 Public Relations and Traffic Control

403.1.0 Public Relations

The contractor shall conduct his operations to cause the minimum disturbances to traffic and residents near the work. Contractor shall maintain the job site in a condition that will not bring discredit to the City or himself, and he shall restore all disturbed areas to at least the original condition.

403.2.0 Traffic Control

Contractor as approved by the City Engineer shall install standard traffic signs and or devices complying with the Manual on Uniform Traffic Control Devices.

A proposed Traffic Control plan shall be submitted when required by the City Engineer.

Certified flag persons shall be provided by contractor when required by the traffic control plan or the City Engineer.

403.2.1 Fire Hydrants

The contractor shall provide 24 hour, unobstructed access to all fire hydrants at all times.

403.2.2 Pedestrian Access

Safe, adequate pedestrian access to all residences, places of business, and other establishments affected by the work shall be provided and maintained by the contractor at all times.

The contractor shall provide safe, adequate crossings for pedestrians at each street intersection, cross street, pedestrian crossing and at bus and other forms of public transportation stops.

Where the work is in the right of way, the contractor shall provide adequate pedestrian crossings at street crossings or intervals not exceeding 300 feet as required, unless otherwise approved by the City Engineer.

403.2.3 Vehicular Access

Unobstructed, 24 hour vehicular access shall be provided and maintained by the contractor at all times to fire stations, police stations, hospitals, and other similar establishments engaged in work of an emergency nature or in work directly connected with the public safety.

Unobstructed, 24 hour vehicular access shall be provided to public water and sewage pump stations and existing public sewer system manholes.

The contractor shall be required to provide and maintain safe, adequate vehicular access to driveways for residences when, in the opinion of the City Engineer, unusual conditions or emergencies make such access necessary. If however, backfill has been completed to the extent that safe access may be provided and the street is open to local traffic, the contractor shall immediately clear the street and driveways so that access may be provided and maintained.

Unless the contractor makes other arrangements satisfactory to the owners, he shall provide and maintain safe, adequate vehicular access to places of business and public gathering as stated herein below:

- (a) For each establishment (such as, but not limited to, gas stations, markets, and other "drive-in" businesses) on the corner of an intersection, which has a driveway (or driveways) on each intersecting street, the contractor shall provide vehicular access to at least one driveway on each intersecting street during business hours.
- (b) For each establishment (such as, but not limited to, motels, parking lots and garages) which have a one-way traffic pattern, the contractor shall provide vehicular access to the entrance and the exit driveways during business hours.

- (c) The contractor shall provide vehicular access to all schools and parking lots including, but not limited to apartment building parking lots.
- (d) The contractor shall provide vehicular access to all establishments requiring such access for receiving or delivering materials or supplies.
- (e) The contractor shall make every reasonable effort to provide maximum access to churches on their Sabbath days. The contractor shall not park or store equipment at the site of a church on their Sabbath days without written permission of the property owner. In addition, the contractor shall cooperate with the various forces involved in mail delivery, the collection and removal of trash and garbage from residences and businesses adjacent to the work, to the extent that the existing schedules for these services can be maintained.

SECTION 500

SANITARY SEWER INSPECTION, TESTING AND ACCEPTANCE

501 Inspection

The City shall at all times have access to work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship and character of materials used and employed in the work. All work shall be subject to inspection by the City and shall be left open and uncovered until the installation is approved by the City Inspector. The contractor shall not proceed with any subsequent phase of work until the previous phase has been inspected and approved by the City. When the contractor's work force on the sewer becomes less than a full day's activity, it shall be the contractor's responsibility to notify the City Inspector, on a daily basis, of the work requiring inspection.

The contractor shall notify the City Engineering office 48 hours in advance of the start of construction, and not less than 24 hours in advance of each construction inspection stage. Advance noticing of construction areas needing traffic control, road closures, etc., require four or more working days. The City, meaning any representative thereof, shall have the right to inspect all work at any time. In case of Developer-Installed Improvements, the Developer's Engineer has the sole responsibility to have a representative present during the City inspections.

Construction inspection stages shall include, but may not be limited to the following:

- (a) All mainline installation. Inspection of mainlines shall be accomplished prior to placement of the pipe zone material.
- (b) Service line installation. Inspection of service lines shall be accomplished prior to placement of the pipe zone material.
- (c) Manhole installation. Inspection of manhole required prior to backfill.

- (d) Trench backfill construction. Trench backfill shall be inspected at the time of construction. Random testing shall be accomplished during construction on successive lifts.
- (e) Paving construction. Final paving shall be inspected at the time of paving construction.
- (f) Mandrel testing: All installed sanitary sewer mains shall pass an appropriately sized mandrel through the main with no noticeable sag or deformity. Mandrel to be passed after all backfill and road structural section has been placed and compacted. Jet clean mains prior to mandrel test.
- (g) Pressure testing: All sanitary sewer mains shall be pressure tested. No sanitary sewer mains will be accepted nor allowed into service unless it has passed the pressure test.
- (h) Vacuum testing: All sanitary sewer manholes shall be vacuum tested per ASTM C1244. No sanitary sewer manholes will be accepted nor allowed into service unless it has passed testing.
- (i) TV inspections. TV inspections must be completed and approved on all main lines prior to paving and after pressure testing. TV inspections must be completed and approved on all new laterals. When there are more than 4 laterals, 25% of the new laterals will be TV inspected.
- (j) Final completion. Prior to tentative acceptance of the project, the Contractor shall request from the City a Final Inspection. Once approved, the City and Contractor will enter into the 12 month Maintenance Bond period, during which a maintenance bond is held by the City. Refer to section 102.6.0

None of the applicable above items shall be backfilled prior to an inspection from the City. It is the Contractor's sole responsibility to notify and coordinate inspection with the City. If items are backfilled over prior to inspection, they will be required to be excavated and exposed for inspection by the City at no cost to the City.

502 Testing

502.0.0 General

The specifications constituting this section designate the requirements for the procedure, materials, and performance for testing of sanitary sewer mains and appurtenances intended for the conveyance of sanitary sewer.

The contractor shall furnish all labor, materials, tools and equipment necessary to perform all the operations required to complete the testing as herein specified.

The work shall include providing complete tests and documentation to the City upon completion. The City Inspector is to witness all acceptance testing.

502.1.0 Mandrel Testing

All new sanitary sewer lines shall be mandrel tested for acceptance. This pipe deflection test is to be conducted after the pipe has been installed and the backfill placed and compacted. Conduct the testing by pulling an approved mandrel through completed pipeline. Use a mandrel that has at least 6 vanes and a diameter 95% of the pipe's initial inside diameter.

Conduct testing on a manhole-to-manhole basis after the line has been completely flushed out with water. Conduct the tests after the trench backfill and compaction have been completed.

502.2.0 Television Inspection

Prior to finish surfacing or final paving, the Contractor shall request a television inspection and written report of all sanitary sewer pipes. If deficiencies requiring correction are discovered, television inspection of additional runs of pipe may be required. For private development projects, the Contractor shall be responsible for costs associated with this inspection. For City projects, the City will be responsible for costs associated with the first inspection and the Contractor will be responsible for costs associated with any necessary subsequent inspections.

Cleaning and TV inspection of new public sewer lines shall only be performed by City of Grants Pass Collection Crews.

Any pipe having 0.5 inches of standing water or more will not be accepted and must be repaired. Prior to the end of the 15 month Maintenance Bond period, the City will again perform a television inspection. The City will be responsible for costs associated with this inspection. Any defects found shall be corrected to the City's satisfaction, prior to the release of the Maintenance Bond.

502.3.0 Air Pressure Testing of Sanitary Sewer Mains

After completing installation of the system, including all service connections, backfilling and compacting, and pipe cleaning, conduct a low-pressure air test. Contractor is to provide all equipment and personnel for the test. Conduct tests during normal working hours. The City Engineer may require testing of manhole-to-manhole sections as they are completed in order to expedite the acceptance of the system and allow connections. Any re-compaction over the sewer or repair of the sewer shall invalidate previous testing in the section of pipe involved. Each section of pipe between two manholes, or between an end-line cleanout and manhole, shall be tested.

The pressure gauge used in air testing shall have minimum divisions of 0.1 psi and an accuracy of 0.0625 psi. The compressor used to add air shall have a pressure relief valve set at 8 psi to ensure that at no time will the pressure exceed 8 psi. All air testing shall be by the Time Pressure Drop Method. The test procedure is as follows:

- (a) The Contractor may wet the lines prior to testing.

- (b) Determine the average height of the groundwater over the line. The test pressures required shall be increased 0.433 psi for each foot of average water depth over the exterior crown of the pipe.
- (c) Add air slowly to the section of system being tested until the internal air pressure is raised to 4 psi greater than the average backpressure due to groundwater.
- (d) After the test pressure is reached, allow at least 3 minutes for the air temperature to stabilize, adding only the amount of air required to maintain pressure.
- (e) After the temperature stabilization period, disconnect the air supply.
- (f) Record the time in seconds that is required for the internal air pressure to drop from 3.5 to 2.5 psi greater than the average backpressure due to groundwater.

The tested section will be acceptable if the time recorded in (f) above is not less than the time in seconds (T) computed by the formula:

$$T = K/C$$

Where:

- K = the sum of the computations for each size of pipe and its length in the section. $[K=0.011*d^2*L]$
- C = the sum of the computations for each size of pipe and its length in the section, except that the minimum value for C shall be 1. $[C=0.0003882*d*L]$
- d = inside diameter of the pipe in inches
- L = length of pipe in feet

The following table, developed from the above formula is provided for convenience for 8 inch pipes:

TEST TIME (Min-Sec)	DISTANCE BETWEEN MANHOLES (Feet)
1 – 10	100
1 – 28	125
1 – 45	150
2 – 03	175
2 – 20	250
TEST TIME (Min-Sec)	DISTANCE BETWEEN MANHOLES (Feet)
3 – 13	275
3 – 31	300
3 – 48	325
4 – 06	350
4 – 23	375
4 – 41	400

Following a successful air test, visible infiltration of ground water in any section will be considered evidence that the original test was in error and that failure of the section has occurred. Correct such failures and retest the repaired sections, at no expense to the City of Grants Pass.

If the time recorded for the pressure drop from 3.5 to 2.5 psi occurs in less time than what is calculated above, then the pipe has failed and must be corrected and retested by contractor at his expense.

502.3.1 Safety Precautions

Only qualified personnel shall be permitted to conduct the test. All plugs used to close the system for testing shall be capable of resisting the expected internal pressures. Securely brace plugs, if necessary.

502.3.2 Ground Water

The presence of ground water will affect the results of the test. Determine the average height of groundwater over the lines immediately before starting the test, using an approved method.

502.3.3 Plugging Lines

Plug all wyes, tees, stubs and service connections with gasketed caps or plugs securely fastened or blocked to withstand test pressures.

502.3.4 Testing Equipment

Furnish all necessary testing equipment and perform the tests in a manner that provides observable and accurate measurements of either air or water leakage under the specified conditions. Calibrate and certify gauges at the direction of the City Engineer. Provide the certification with the gauge.

502.3.5 Cleaning

Prior to the testing and inspection of the system, flush and clean all parts of the system and remove all debris. Cleaning of all new sewer mains shall be performed by City of Grants Pass Collection Crews utilizing a water jet cleaner. For private development projects, the Contractor shall be responsible for costs associated with the cleaning. For City projects, the City will be responsible for costs associated with the cleaning and the Contractor will be responsible for costs associated with any necessary subsequent cleanings

If the time recorded for the pressure drop from 3.5 to 2.5 psi occurs in less time than what is calculated above, then the pipe has failed and must be corrected and retested by contractor at his expense.

502.5.0 Vacuum Testing Sanitary Sewer Manholes

Perform vacuum testing according to ASTM C 1244. Plug and brace all pipes entering the manhole. Place the test head in or on top of the manhole ring. Draw a vacuum of 10 inches of mercury on the manhole, close the valve on the vacuum line of the test head, and shut off the vacuum pump. Measure the time for the vacuum to drop to 9 inches of

mercury (a 1 inch drop in pressure). The manhole is acceptable if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches of mercury meets or exceeds the values indicated in the table below:

Depth* (Feet)	<u>Diameter (inches)</u>								
	30"<	33"	36"	42"	48"	54"	60"	66"	72"
8' <	11	12	14	17	20	23	26	29	33
10'	14	15	18	21	25	29	33	36	41
12'	17	18	21	25	30	35	39	43	49
14'	20	21	25	30	35	41	46	51	57
16'	22	24	29	34	40	46	52	58	67
18'	25	27	32	38	45	52	59	65	73
20'	28	30	35	42	50	53	65	72	81
22'	31	33	39	46	55	64	72	79	89
24'	33	36	42	51	59	64	78	87	97
26'	36	39	46	55	64	75	85	94	105
28'	39	42	49	59	69	81	91	101	113
30'	42	45	53	63	74	87	98	108	121

*Depth is measured from the top of the manhole to the lowest invert.

Test times for manhole depths between those shown in this table may be calculated by interpolation.

502.6.0 Sanitary Sewer Pressure Main Testing

The specifications constituting this section designate the requirements for the procedure, materials, and performance for testing of pressure sanitary sewer mains and appurtenances intended for the conveyance of sanitary sewerage under pressure.

The contractor shall furnish all labor, materials, tools and equipment necessary to perform all the operations required to complete the testing as herein specified.

502.6.1 Pigging

All new pressurized sanitary sewer main lines shall be pigged prior to pressure testing.

502.6.2 Installation of Poly Pigs

“Poly Pigs” shall be supplied and installed by the contractor during installation of the pipeline. Number, sizes and locations shall be as determined and recorded by the Engineering Division. After meeting predetermined pipe restraint requirements, the “poly pigs” shall be moved through the pipeline system by the use of water pressure. City of Grants Pass Sewer Collection Division personnel will perform Flushing operations. All “poly pigs” shall be removed from the pipeline system prior to hydrostatic pressure testing. The project inspector shall determine reuse of “poly pigs”.

502.6.3 Poly Pig Materials

“Poly Pigs” shall be constructed of flexible open cell polyurethane foam and with a center hole to allow water to precede pig, preventing the embedding of debris. They shall be able to pass through reductions of up to 60% of cross sectional area of nominal pipe. They shall have the ability to negotiate short radius bends, elbows, tees, crosses, wyes, multi-dimensional piping and reduced port valves. “Poly pigs” shall be a municipal series, bare type, 5 to 7 lbs. per cubic foot density, and generally be for a light cleaning or gauging application.

502.6.4 Joint Restraint for Pig Flushing

All concrete thrust blocks shall be required to cure for a minimum of 72 hours prior to pig flushing on any segment of water line.

Upon approval by the City, the Contractor may, under special circumstances, install mechanical joint restraints for flushing the pig immediately after construction. Typical conditions that may apply are when pigging under heavy traffic conditions where safety may be an issue. All mechanical joint restraints shall be designed and diagramed by the project Engineer and approved by the City prior to installation.

502.6.5 Line Filling

The pipeline shall be filled with water prior to testing. Water supplied from the City’s existing potable water supply mains shall be done by City of Grants Pass Water Distribution Division personnel only. While filling, and immediately prior to testing, all air shall be expelled from the pipeline. Where air valves or other suitable outlets are not available for introducing water or releasing air for test purposes, approved taps and fittings shall be installed and later securely plugged.

502.6.6 Pressure Test

All air is to be expelled from the pipe prior to beginning the test by slowly filling the line with water. Contractor shall install taps at high points of the line for expelling air. All internal valves shall be open prior to beginning this test. A 2 hour test shall be performed in accordance with AWWA C600 or as approved by the Oregon DEQ on the pipeline between valves or temporary plugs at a test pressure of 1.5 times the working pressure of the pipe, or 100 psi, whichever is greater. The pressure rating of the pipe, fittings, valves and thrust restraints shall be at least 1.5 times the working pressure of the pipe. Any leaks evident on the surface shall be uncovered, repaired and retested at the contractor’s expense. Any pipe, fittings, valves and other materials found to be defective under this test shall be removed and replaced at the contractor’s expense.

502.6.7 Testing Allowance

No pipe shall be accepted if the amount of makeup water is greater than that determined by the following formula as found in AWWA C-600 Sec. 5.2:

$$L = \frac{SD\sqrt{P}}{148,000}$$

Where:

L = allowable leakage, in gallons per hour

S = length of pipe tested, in feet

D = nominal diameter of the pipe, in inches

P = average test pressure during the leakage test, in p.s.i. (pounds per square inch) (gauge pressure)

502.6.8 Hydrostatic Valve Testing

In addition to determining the total testing allowance loss, all valves will be hydrostatically tested, by the contractor, to ensure valve seal integrity. Each valve shall be closed and isolated so that the test pressure as described in 502.6.6 is applied to one side of the valve only. The valve test shall be for no less than 30 minutes. Testing allowance shall be in accordance to 502.6.7 for that section of mainline that is isolated by that valve.

502.6.9 Failed Hydrostatic Tests

If for any reason the hydrostatic test fails, the contractor shall determine the problem and notify the City. The contractor shall hydrostatically retest the entire system per section 502.6.0 until the loss does not exceed the maximum testing allowance.

502.7.0 Testing Equipment

502.7.1 Pressure Gauges

Pressure gauges shall read in 1 psi increments (gauge pressure).

502.7.2 Water Loss Measuring Equipment

The contractor shall provide the City with suitable means in which to measure the water loss. In some instances, such as very low allowances or when the main is very close to losing its allowable leakage, the City may require the Contractor to install an approved gallon-read water meter to measure the leakage.

502.8.0 Defective Work

Any defective materials or workmanship becoming evident within 15 months after the City assumes tentative acceptance of the completed work, shall be replaced or repaired without cost to the City.

502.8.1 Pipe Rejection

The following imperfections in a pipe or special fitting will be considered injurious and cause for rejection without consideration of any previous tests results.

(a) Cracked Pipe

Cracked pipes will be rejected.

(b) Surface Imperfections

Surface imperfections such as lumps, blisters, pits or flakes on the interior of the surface of a pipe or fitting will cause rejection.

(c) Socket Out-Of-Round

When the bore or socket of the pipe varies from a true circle more than 5% its normal diameter, it will cause rejection.

(d) Straight Pipe

The pipefitting will be rejected if it is designated to be straight and it deviates from a straight line more than 1/8 inch per lineal foot. The deviation shall be measured from a straight edge at a point midway between the ends of the pipe.

(e) Broken Pipe

A joint of pipe with a piece broken from either the socket or the spigot end will be rejected.

(f) Foreign Matter Fused To The Pipe

Pipe joints that have foreign matter fused permanently to the exterior or interior surface of the pipe or fittings will be rejected.

(g) Broken mainline service tees and wyes

Cracked or broken service tees or wyes shall be rejected.

(h) Leaking mainline fittings or unutilized service lateral stub-outs

Leaking pipe and fittings shall be rejected.

(i) Leaking Manholes

Leaking manholes shall be rejected until properly sealed.

(j) Failed asphalt paving surrounding manholes and cleanouts.

Failed asphalt paving shall be removed and replaced.

503.0.0 Private Sewer Lateral Abandonments

Unutilized private sewer laterals shall be properly abandoned at their point of connection to the public mainline. This includes all unutilized laterals fronting the tax lot and/or laterals which have or were intended to serve the tax lot previously.

When a private sewer lateral is replaced with a new connection to the public sewer main, the original sewer lateral shall be properly abandoned at its point of connection to the public sewer main.

Private sewer laterals not abandoned at their point of connection to the public sewer main shall be TV inspected to determine their condition. **All TV inspections shall be conducted utilizing guidelines established by the City of Grants Pass Collection Division for the TV inspection of private laterals***. The TV inspection shall include all private piping from the right-of-way line to the laterals point of connection to the public sewer main. In cases where the private sewer lateral is located with a public sewer easement, the TV inspection shall include all piping from the edge of the easement to the

lateral's point of connection to the public mainline. A copy of the TV inspection tape or DVD shall be submitted to the wastewater collection division for review to determine the extent of lateral abandonment required by the utility.

The extent of abandonment required shall be based upon a combination of information obtained from **both private and public TV inspection data** of the lateral's condition and its point of connection at the public mainline.

Private sewer laterals which cannot be TV inspected to determine their condition due to multiple bends, restricted pipe sizes, and/or other structural reasons shall be abandoned at their connection to the public sewer main.

Private sewer laterals composed of non-approved or sub-standard materials such as Orange Burg pipe shall be properly abandoned at the lateral's point of connection to the public sewer main.

Private sewer laterals containing the following defects shall be properly abandoned at the laterals point of connection at the public sewer line:

- Root intrusion
- Water leakage
- Missing pipe
- Broken pipe
- Crushed pipe
- Defective pipe/repair couplings
- Protruding taps
- Non-gasketed or defective plumber taps

All abandonments at the main line shall be performed in a manner which is acceptable to the wastewater collection division. The materials and procedures utilized for a particular abandonment will vary and shall be dependent upon the type of pipe connection present and the connection's structural condition.

On-site inspection and verification of all lateral abandonments shall be required. Inspections shall be conducted by the City of Grants Pass Plumbing Inspector or the City of Grants Pass Wastewater Collection Division.

The segment of private sewer piping remaining, between the abandoned connection and the edge of the right-of-way or public sewer easement, shall be capped and filled with 1 sack sand slurry mix to prevent future surface subsidence within the right-of-way or easement.

Private sewer laterals completely abandoned at the public mainline are no longer the responsibility of the property owner.

503.1.1 Partial Sewer Lateral Abandonment

Private sewer laterals, TV inspected and found to be composed of approved materials and free of defects as listed above, may be plugged or capped at back of the street curb. An “S” marking (if not already present) shall be ground or stamped on the face of the curbing to mark the location of the abandoned lateral.

In instances, where capping at the back of curbing is not technically feasible due to utility conflicts, the lateral shall be abandoned as close to the back of curb as possible.

In cases where curbing is absent, the location of the remaining portion of the lateral shall be surveyed by the City of Grants Pass Engineering Department and entered into the GIS data base for future reference.

Private sewer laterals partially abandoned, in the manner described above, remain the responsibility of the property owner to repair or totally abandon in the future if the lateral fails for any reason.

503.1.2 Trenchless Abandonment of Private Sewer Laterals

In instances, where conventional abandonment of a private sewer lateral is not feasible due to such factors as extreme mainline depths, major utility conflicts (such as fiber optic lines), heavy traffic areas, and/or “no cut” streets, the use of an internal pipe line repair sleeve may be utilized if approved by the wastewater collection division. The use of trenchless methods for the abandonment of sewer lateral connections shall only be considered on public mainlines 8 to 12 inches in size. Sewer lateral connections with defects at the public main line, such as protruding taps, root intrusion, or mineral deposits, will not be considered as acceptable candidates for abandonment by trenchless methods.

The installation of internal pipe sleeves shall only be performed by the City of Grants Pass Wastewater Collection Division. The type of pipe sleeve utilized shall be a “**Link Pipe**” grouting or structural pipe sleeve. All internal pipe sleeves shall be composed of 18 gauge stainless steel with a minimum length of 24 inches.

Private sewer laterals abandoned utilizing trenchless methods shall be filled with 1 sack sand slurry from the edge of the public right of way or utility easement to the public main line after installation of the internal pipe sleeve.