

CITY OF GILROY
TECHNICAL SPECIFICATIONS

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NOTICE

The Public Works Director/City Engineer, on behalf of and as authorized by the City of Gilroy, State of California, requires that all public improvements within the City of Gilroy shall be constructed in accordance with the City Standard Details, General Guidelines, and these Technical Specifications. The Technical Specifications are defined as these Technical Specifications and supplemented by the State of California, Department of Transportation (Caltrans) Standard Plans and Specifications latest version.

In case of conflict, the order of priority of the standards and plans shall be as follows:

1. City of Gilroy Standard Details,
2. Technical Specifications
3. General Guidelines,
4. Project specific plans
5. Caltrans Standard Specifications.

The City Standard Details and Technical Specifications may be modified in special cases on a case-by-case basis by the Public Works Director/City Engineer.

Amendments to the Caltrans Standard Specifications may be issued by the State of California and will require adoption by the Public Works Director/City Engineer to become a part of the City of Gilroy Standard Specifications.

The Public Works Director/City Engineer may also issue clarifications and amendments to these Technical Specifications, the General Guidelines, and Standard Details as required. Interested parties who wish to suggest modifications or amendments to these Standard Details and Technical Specifications may contact the City Engineer. All proposed modifications may be submitted in writing and approved as appropriate by the Public Works Director/City Engineer in writing.

Interpretations of the Technical Specifications can be obtained from the Public Works Director/City Engineer.

It is the responsibility of all persons to utilize the Technical Specifications containing the latest revision.

Standard Details and Technical Specifications Purchase

Each set of Standard Details and Technical Specifications may be purchased from the City of Gilroy, Engineering Division. Each and every purchaser of these Standard Details and Technical Specifications shall be responsible for obtaining the revisions from the City of Gilroy, Engineering Division, 7351 Rosanna Street, Gilroy, California 95020.

Electronic copies of the Standard Details and Technical Specifications are available on-line at:

http://www.cityofgilroy.org/cityofgilroy/city_hall/community_development/engineering/standards/default.aspx

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Section 1
DEFINITIONS AND TERMS

1.01 General

Whenever the following terms occur in the Caltrans Standard Plans and Specifications, the meaning shall be interpreted as follows:

State of California - The City of Gilroy

Department of Transportation - The Engineering Division of the City of Gilroy

Division of Highways - The Engineering Division of the City of Gilroy

Director – The Public Works Director/City Engineer of the City of Gilroy

Engineer - The Public Works Director/City Engineer of the City of Gilroy, acting, either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

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Section 16
CLEARING AND GRUBBING

16-1.01 Description

The following shall apply in lieu of Sec. 16-1.01 of Caltrans Standard Specifications:

“This work shall consist of removing all objectionable material within the limits shown on the plans and as directed by the Engineer. Clearing and grubbing shall be performed in advance of grading operations and in accordance with the requirements of these specifications.”

16-1.02 Preservation of Property

The following shall be in addition to Caltrans Standard Specifications:

All existing street designation and traffic control signs and posts within the aforementioned limits of work shall be carefully removed, cleaned of excess earth and delivered to the City Corporation Yard at 613 Old Gilroy Street, except those required for traffic control as determined by the City Engineer.

16-1.03 Construction

The following shall be in addition to Caltrans Standard Specifications:

“The area to be cleared and grubbed shall be the area where facilities or improvements are to be constructed as shown on the plans.

All stumps, large roots and other objectionable material shall be removed to a depth of 3 feet below finished grade in the area between curbs, and to a depth of 12 inches below finished grade in the area between curb and property line. The resulting spaces shall be backfilled with suitable material placed and compacted in accordance with the applicable provisions of Section 19-6.02 “Compacting” within the latest version of the Caltrans Standards Specifications.”

16-1.04 Removal and Disposal of Materials

The following shall be in addition to Caltrans Standard Specifications:

“Combustible debris shall be disposed of away from the site of the work. Burning within the limits of the project shall not be allowed.”

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Section 19
EARTHWORK

19-1.01 Description

The following shall be in addition to Caltrans Standard Specifications:

“Unsuitable material may be removed and replaced, or may be stabilized in accordance with the provisions of Section 19-2.02 below, “Unsuitable Material”.

19-1.03 Grade Tolerance

The following shall be in addition to Caltrans Standard Specifications:

“Immediately prior to placing subsequent layers of material thereon, the grading plane shall conform to one of the following:

- A. When aggregate subbase or aggregate base are to be placed on the grading plane, the grading plane shall not vary more than 0.05' above or 0.1' below the grade established by the Design Engineer.
- B. When asphalt concrete base is to be placed on the grading plane, the grading plane shall not vary more than 0.05' above or below the grade established by the Design Engineer.
- C. Grading in landscape area shall be plus or minus 0.3'.”

19-2.02 Unsuitable Material

The following shall apply in lieu of Section 19-1.01B of Caltrans Standard Specifications:

“Material below the natural ground surface in embankment areas, and basement material below the grading plane in excavation areas, that is determined by the Engineer to be unsuitable for the planned use, shall be excavated and disposed of or stabilized as directed by the Project Geotechnical Engineer and approved by the City Engineer.

The removal and disposal of such unsuitable material will be paid for as roadway excavation for the quantities involved.

When unsuitable material is removed and disposed of, the resulting space shall be filled with material suitable for the planned use. Such suitable material shall be placed and compacted in layers as hereinafter specified for constructing embankments. Suitability shall be determined by the Project Geotechnical Engineer and approved by the City Engineer.

- A. Unsuitable material may be processed in place, may be excavated and placed on the grade or other locations suitable for further processing, or may be partially excavated and partially processed in place.
- B. Processing may consist of drying to provide a stable replacement material as determined by the Geotechnical Engineer and approved by the City Engineer.

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- C. Stabilized material shall be placed and compacted in layers as hereinafter specified for constructing embankments.
- D. Stabilization of unsuitable material shall comply with the following provisions:

Relative compaction of not less than 95 percent shall be obtained for embankment under bridge and retaining wall footings without pile foundations within the limits established by incline planes sloping 1.5:1 out and down from lines one foot outside the bottom edges of the footing.”

19-5.04 Relative Compaction

The following shall apply in lieu of Section 19-5.03B of Caltrans Standard Specifications (90 percent - California Test 216 and 231):

“Relative compaction of not less than 90 percent shall be obtained in all materials in embankment except as specified here to be 95 percent. Material placed in accordance with the provisions of Section 19 2.02, “Unsuitable Materials,” shall be compacted to not less than 90 percent relative compaction.”

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Section 25
AGGREGATE SUBBASE

25-1.01 Description

The following shall be in addition to Caltrans Standard Specifications:

“Aggregate Subbase shall be Class 4.”

25-1.02C Materials

The following shall be in addition to Caltrans Standard Specifications:

“Aggregate Subbase - Class 4 shall have a minimum sand equivalent value of 21, a minimum R-value of 50, and shall conform to the following gradings:

<u>Sieve Size</u>	<u>Percent Passing</u>
3”	100
1-1/2”	90-100
3/4”	50-90
#4	25-55
#200	2-11

The material retained on the #4 screen shall consist of 100% crushed particles.

The use of crushed miscellaneous base/recycled aggregate is encouraged so long as the material meets the same specifications.

25-1.03D Compacting

The following shall apply in lieu of Section 25-1.03D to Caltrans Standard Specifications:

“The subgrade to receive aggregate subbase, immediately prior to spreading, shall not vary more than 0.05-foot above or 0.1-foot below the grade established by the Engineer.

The surface of the finished aggregate subbase shall be firm and unyielding. Any visible movement vertically or horizontally of the aggregate subbase under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the aggregate subbase does not meet this requirement.”

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Section 26
AGGREGATE BASE

26-1.01A Description

The following shall be in addition to Caltrans Standard Specifications:

“Aggregate base shall be Class 2, and the combined aggregate shall conform to either of the gradings specified in Section 26-1.02B, “Class 2 Aggregate Base” located within the latest version of the Caltrans Standard Specifications.”

26-1.03D Compacting

The following shall apply in lieu of Section 26-1.03D to Caltrans Standard Specifications:

“The surface of the finished aggregate base shall be firm and unyielding. Any visible movement vertically or horizontally of the aggregate base under the action of construction equipment or other maximum legal axle loads shall be considered as evidence that the aggregate base does not meet this requirement.”

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Section 39

ASPHALT CONCRETE

39-1.02E Aggregate

The following shall be in addition to Caltrans Standard Specifications:

“The aggregate grading of the various types of Asphalt Concrete shall conform with the City of Gilroy Standard Details.”

39-1.09B Grade Tolerance

The following shall be in addition to Caltrans Standard Specifications:

“The subgrade to receive Asphalt Concrete or Asphalt Concrete Base immediately prior to applying prime coat, shall not vary more than 0.05-foot above or below the grade established by the Engineer.”

39-1.11 Transporting, Spreading and Compacting

The following shall be in addition to Caltrans Standard Specifications:

“The Asphalt Concrete shall be deposited from the haul vehicle into the hopper of the paving machine.

The practice of depositing the material on the roadbed in a windrow and subsequently using a pick-up machine to deposit the material in the hopper of the asphalt paver will not be allowed.

Asphalt Concrete shall not be placed after thirty (30) minutes before sunset, as established by weather bureau, except as otherwise authorized by the Engineer.

Asphalt Concrete or Asphalt Concrete Base shall not be placed during rainy weather or on a wet surface. Asphalt Concrete shall not be placed when the atmospheric temperature is below fifty (50) degrees Fahrenheit or conditions indicate it will drop below fifty (50) degrees Fahrenheit or conditions indicate it will drop below fifty (50) degrees Fahrenheit before the material can be satisfactorily compacted. Asphalt Concrete Base shall not be placed when the atmospheric temperature is below forty (40) degrees Fahrenheit or conditions indicate it will drop below forty (40) degrees Fahrenheit before the material can be satisfactorily compacted. Material which cannot be placed in compliance with these requirements shall be rejected.

The compacted thickness of Asphalt Concrete layers shall be as directed by the Engineer. The normal minimum and maximum compacted lift thickness for Asphalt Concrete surfacing are 0.17' and 0.25' respectively. The normal minimum and maximum compacted lift thickness for Asphalt Concrete Base are 0.25' and 0.33' respectively.”

39-5.01 Utilities

The following shall be in addition to Caltrans Standard Specifications:

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“Asphalt Concrete shall not be placed on any roadbed until all utility construction beneath the roadbed has been completed, sewer and water lines have been tested, and water lines chlorinated. The surface course of Asphalt Concrete shall not be placed until final utility connections have been made, unless otherwise permitted by the Engineer.”

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Section 71
STORM WATER

71-1.01 Materials

Storm water piping shall be Reinforced Concrete Pipe (RCP), Polyvinyl Chloride Pipe (PVC), or High Density Polyethylene Pipe.

71-1.-02 RCP Pipe

The Contractor shall provide RCP pipe conforming ASTM C76 and section 65 of the Caltrans Standard Specifications.

71-1.03 PVC Pipe

The Contractor shall provide PVC pipe SDR 26 conforming to ASTM D3034 (JM Eagle or approved equal).

Marking shall meet the requirements of ASTM D3034 and shall include: manufacturer's name, the nominal pipe size, the material designation code.

Fittings, reducers and joints shall be rubber gasket type conforming to ASTM F1336.

71-1.03 HDPE Pipe

The Contractor shall provide solid wall HDPE pipe, DR 17 conforming to the following. HDPE pipe shall have a smooth interior wall and be made of high density, extra high molecular weight polyethylene with a standard thermoplastic material designation code of PE3608 (PE3408) and having a cell classification of 345464E per ASTM D3350. The pipe shall be manufactured in accordance with ASTM F714 and/or ASTM D3035. The manufacturer's certification shall state that the pipe was manufactured from one specific resin. The Dimension Ratio (DR) and pressure rating of the pipe shall be DR 17. The outside diameter and wall thickness of pipe and fittings shall conform to ASTM D2122 when measured.

Pipe shall be marked at three-foot intervals or less with the manufacturer's name or trade mark, the designation ASTM D3350 and ASTM F714, including the year of issue, the letters "PE" followed by the cell classification number of the raw material compound used, the nominal pipe size in inches, the dimensional ratio, and the manufacturer's code identifying the resin manufacturer, lot number and date of manufacture. The pipes shall be properly stored and handled in accordance with the manufacturer's recommendations and shall be less than two (2) years old at the time of installation.

Joints shall be made by thermal butt fusion.

71-1.04 Manhole/Vaults

Sidewall modification materials shall be 3,500 psi concrete.

Material for channel modification and small patches shall be a cement mortar applied in accordance with manufacturer's recommendations. Cement mortar shall consist of a mixture of cement, sand and water. Cement and sand shall be combined in a proportion of 1 part cement to 2.5 parts sand by volume. Mortar shall be used as soon as possible

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after mixing and shall show no visible signs of setting prior to use. Retempering of mortar or use of admixtures will not be permitted.

Cement mortar placement within any manhole shall be as specified in Section 51-1.135, "Mortar," of the Standard Specifications.

Small holes and cracks shall be repaired with with a acrylic water based, environmentally-friendly elastometric crack filler conforming to ASTM C920.

71-1.05 Bedding and Backfill

Contractor shall meet all the bedding and backfill material requirements of these specifications.

71-1.06 Locator Wire

Install an 8 ga. Solid copper electrical wire, Type TW, solid blue jacket, or other approved material.

71-1.07 Submittals

Submit to the Engineer for review product literature for manufactured items such as pipe, pipe fittings, and manhole modifications/repairs. The Contractor shall submit materials and details of all manhole modification applications before construction for review by the Engineer. Contractor shall also submit test results and video recordings and logs of the completed piping system.

71-2.01 Pipe Installation

PVC Pipe & RCP: Installation shall be performed in accordance with the manufacturer's recommendations and these specifications by open trench method. Pipe laying shall begin at the lowest point and proceed upslope. Each joint of pipe shall be laid true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe and to prevent an offset in the flowline of the pipe. As work progresses, the interior of the sewer pipe shall be cleared of dirt and debris. Pipe shall not be laid in conditions of unsuitable weather or soil conditions. At times when work is not in progress, open ends of pipes and fittings shall be closed.

Before pipe is placed in position in the trench, the bottom and sides of the trench shall be carefully prepared, the required bedding placed, and bracing and sheeting installed where required. The trench shall be excavated to the required depths to match the invert of the existing pipes being replaced. Each pipe shall be accurately placed to the line and grade called for on the Plans.

All pipe and fittings shall be inspected by the Engineer before they are placed in the trench.

No connection shall be made where joint surfaces and joint materials have been soiled by earth or embedment in handling until such surfaces are thoroughly cleaned.

As the work progresses, the interior of all pipes shall be kept clean. After each line of pipe has been laid, it shall be carefully inspected and all earth, trash, rags, and other foreign matter removed from the interior.

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Backfilling of trenches shall not be started until the Engineer has inspected the pipe. Backfill material, compaction, installation of locator wire, and new asphalt concrete shall be placed in conformance with the City of Gilroy Standard Details.

HDPE Pipe: Installation of pipe and jointing shall be in accordance with the manufacturer's recommendations. Joints shall be made by butt fusion. The Contractor shall use a data logger to record critical fusion parameters for each joint. Do not bend pipe in excess of the maximum recommended by the pipe manufacturer.

Where pipes enter or emerge from a manhole or drain inlet, the opening in the precast concrete shall not be greater than two (2) inches larger than the outside diameter of the pipe, unless the manhole is being modified. Care shall be exercised in cutting these openings to prevent cracking or breaking said precast concrete. Promiscuous breaking of such openings shall not be permitted. Precast concrete broken in a ragged and un-workmanlike manner at pipe openings shall be rejected.

71-202 Manhole/Vault Installation

Specific attention is directed to OSHA safety rules, regulations and precautions to be taken by the Contractor before entering manhole structures with respect to physical and chemical hazards which may be present.

Modify and reform the manhole or vault channel and sidewalls for a smooth transition of flows into, through, and out of the existing manholes. Dispose of all waste materials. The channel shall be reformed such that the pipe is continuous through the manhole.

Connections to existing manholes or vaults shall be made by cutting a hole in the wall of the existing structure, inserting a length of pipe into the hole, filling around the pipe with mortar, and troweling the inside and outside surfaces of the joint to a neat finish.

Vaults: Reconstruction to existing vault to accommodate horizontal directional drilling or sliplining operations, or whatever nature, shall be made in "in-kind". Large repairs shall tie into existing rebar and/or dowel into the existing concrete. Repair small holes and cracks.

Manholes: Reconstruction to existing manholes to accommodate horizontal directional drilling or sliplining operations, or whatever nature, as well as modifications to the manhole channel, shall be made to conform to the City of Gilroy current standard details for new manholes. Repair small holes and cracks.

71.33 Flushing, Testing, and TV Inspection

After the storm drain system is installed, the Contractor shall flush the line of all debris to a downstream manhole, vault, or to the pipe end at the drainage ditch where debris shall be completely removed. Debris shall not be allowed to pass downstream into the actual drainage ditch.

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Section 73
CONCRETE CURBS AND SIDEWALKS

73-1.01A Summary

The following shall apply in lieu of Sec. 73-1.01A of Caltrans Standard Specifications:

“This work shall consist of the construction of curbs, sidewalks, gutter depressions, island paving, and driveways of the form and dimensions shown on the plans, and as specified in these Technical Specifications, General Guideline, General and Special Provisions. The concrete shall conform to Class 2 concrete as described in Sec. 90 of Caltrans Standard Specifications.

A handicap ramp shall be constructed in all curb returns in accordance with the City of Gilroy Standard Details.

Reinforcement shall conform to the provisions in Section 52, “Reinforcement” of the most recent version of the Caltrans Standards and specifications.”

73-1.03B Subgrade Preparation

The following shall apply in lieu of Sec. 73-1.03B of Caltrans Standard Specifications:

“The subgrade shall be constructed true to grade and cross section, as shown in the plans or directed by the Engineer. It shall be watered and thoroughly compacted, and unsuitable material removed and replaced, to provide a stable grade with above optimum moisture content for a minimum depth of 0.5-foot.

Base material under curb and gutter shall comply with the provisions of Section 26, “Aggregate Bases” of Caltrans Standard Specifications, and shall be a minimum of 6 inches in compacted thickness.

Sidewalk shall be placed on a 4 inch thick layer of clean sand or Class II aggregate base, thoroughly consolidated by watering. Sidewalks constructed across driveways, and driveway ramps constructed between curb and edge of sidewalk, shall be a six inch thick layer of Class 2 Aggregate Base and shall be placed directly on the prepared subgrade.

The completed subgrade shall be tested for grade and cross-section by means of a template supported on the side forms, and shall not project into the planned concrete cross-section at any point. The subgrade and forms shall be wet immediately in advance of placing concrete.”

73-2.03A Curb Construction General

The following shall be in addition to Caltrans Standard Specifications:

“Attention is directed to City of Gilroy Standard Details for Weakened Planes and Expansion Joints.

The finished surface of the top of curb shall not vary more than 0.01 foot above or below the staked grade.”

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73-3.03 Sidewalk, Gutter Depression, Island Paving, and Driveway Construction

The following shall be in addition to Caltrans Standard Specifications:

“The sidewalks shall include weakened planes, expansion joints, and score marks as shown on the City of Gilroy Standard Details.”

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Section 81
MONUMENTS

83-1.01 Summary

The following shall apply in lieu of Section 81 of Caltrans Standard Specifications:

This work shall consist of furnishing and installing cast-in-place survey monuments at the locations shown on the plans and in accordance with the City of Gilroy Standard Details.

The exact placement of the monuments will be established by the Design Engineer/Surveyor of Record. Monuments will be checked and the center point stamped by or under the direction of the Design Engineer/Surveyor of Record.

Standard City brass markers shall be furnished by the Contractor. They shall be placed in survey monuments before the concrete block has acquired its initial set and shall be firmly bedded in the concrete. The concrete block shall be so located that when the marker is installed, the reference point will fall within a one inch circle in the center of the marker.

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Section 100
SEWERS

100-1.01. Materials

Sewer pipe shall be vitrified clay pipe or ductile iron pipe.

100-1.02. Clay Sewer Pipe

Vitrified clay pipe and fittings shall be extra strength, plain end pipe conforming to ASTM C-700. Joints shall conform to the material and performance requirements of ASTM C4235 "Compression joints for Vitrified Clay Pipe and Fittings." All material shall be installed in strict conformance with the manufacturer's recommendations.

100-1.03. Ductile Iron Pipe

Ductile iron pipe shall be polyurethane lined, new pipe conforming to ANSI. A 21.51-1976 or most recent issue, if any, as sponsored by the American Water Works Association for thickness Class 50 Ductile Iron Pipe. The pipe shall be furnished with either bell and spigot ends, "Tyton Joints", or mechanical joints except where specifically specified on the plans.

All ductile iron pipe buried underground shall be encased in polyethylene film in the tube form. Polyethylene material and installation procedure for the encasement shall conform to ANSI/AWWA C105/A21.5-82 or most recent issue, if any. Installation Method "A" as described in aforementioned specification shall apply.

Couplings for connection to the sewer main shall be of a type approved by the City Engineer. All material shall be installed in strict conformance with the manufacturers recommendations.

100-1.04. Polyvinyl Chloride Pipe & Fittings

For pipe diameters of 24" or smaller, Polyvinyl Chloride pipe will be allowed. Larger diameter pipe shall be Vitrified Clay or Ductile Iron.

Polyvinyl Chloride gravity sewer pipe shall be SDR 26 and shall be made of compounds conforming to material requirements of ASTM D-3034 & F679 in accordance with ASTM D-1784. PVC Sewer Pipe shall meet all the dimensional, chemical and physical requirements as outlined in ASTM D-3034 or F-679.

The pipe shall be made with an integral bell to utilize the gasket for sealing which meets specifications defined in ASTM F-477.

Each male end shall be beveled to facilitate joining and reference marked to insure proper insertion depth. Lubricant is to be used in the joining process. All material shall be installed in strict conformance with the manufacturer's recommendations.

100-1.05. High Density Polyethylene Pipe & Fittings

High-density polyethylene (HDPE) pipe may be used for gravity sanitary sewer and force main sewers. Medium-density polyethylene (MDPE) pipe shall not be allowed. The sizing of HDPE pipe shall be in accordance with ASTM F714 and shall be based on

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DIPS, outside diameter sizing system. The dimension ratio (DR) of pipe to be installed shall also be shown on the drawings.

All HDPE pipes shall be of virgin material. No recycled material, except that obtained from the manufacturer's own production of the same formulation, shall be used. Resin compounds used in the manufacture of HDPE pipe shall be in accordance with the requirements of ASTM D3350. The cell classification of HDPE pipe used shall be PE315333C.

Pipe will be legibly marked in accordance with those requirements specified in ASTM F714. The pipe shall not be marked using the standard thermoplastic pipe materials designation code. Pipe not marked as directed will be rejected.

Site storage shall be in accordance with the manufacturer's recommendations.

Pipe installation shall be in accordance with the manufacturer's recommendations.

Connections to new HDPE pipe shall be made using sewer tapping methods.

Connection to new manholes shall be made using press seal boots.

Joints between mainline HDPE pipes shall be constructed by using butt fusion techniques in accordance with ASTM D2657. The recommendations of the pipe manufacturer shall govern the fusion process, including the specification of the ideal temperature for fusion. Fittings shall not be joined to the mainline piping using heat fusion joining techniques.

After the fusion process has been completed, beads and excessive cooled HDPE materials neat the pipe joints shall be removed using an internal bead remover for the purpose of reestablishing a smooth internal pipe wall. The internal bead remover shall be either the Bead Trimmer Two II, as manufactured by R & L Manufacturing, Inc., or the Internal Bead Remover, as manufactured by McElroy Manufacturing, Inc., or an equal approved by the Director of Public Works/City Engineer or his/her designee.

100-1.06. Excavation and Backfill

Excavation and backfill shall be as shown on the City of Gilroy Standard Details.

All stumps and large roots encountered during trenching operations shall be removed to the satisfaction of the Engineer.

The trench shall be opened no more than 200 feet ahead of the pipe laying operations to reveal obstructions. Trench crossings shall be provided to accommodate public travel and to provide convenient access to adjacent properties. Flow shall be maintained in any sanitary sewers, storm drains, water lines, or water courses encountered in trenching.

All cutting, handling and disposal of asbestos cement pipe shall be done in accordance with the Contractor's State Licensing Law and all applicable laws and regulations.

A permit to do the above described work must be obtained from the State of California, Division of Industrial Safety. Proof of such permit shall be submitted to the Engineer prior to starting the trench work.

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100-1.07. Existing Manholes

Existing manholes and cleanouts located within the street right of way shall be adjusted to conform to finished pavement grades in accordance with the details shown on the plans.

Prior to the removal of an existing manhole frame, a platform shall be constructed in the manhole above the top of the sewer to prevent any dirt or debris from falling into the sewer. The platform shall remain in place until all work on the manhole has been completed and the asphalt concrete has been placed around the manhole. Prior to the removal of the platform from the manhole, all dirt and debris shall be removed.

Lowering of the manhole ring and cover shall be accomplished by the removal of existing concrete grade rings below the manhole ring or by removing the upper section of manhole barrel and substituting therefore a shorter section of barrel.

At the Contractor's option, in lieu of removing and replacing barrel sections as above provided, the top of the existing upper barrel section may be trimmed and the taper section replaced on such trimmed surface provided, however, that such trimming shall not crack or otherwise damage the remaining portion of barrel section.

In the event that the portion of barrel section to remain is cracked or damaged or otherwise made unsuitable for use by such trimming, the entire section shall be removed and replaced with a new section of barrel. Trimming of taper sections will not be permitted.

All sections of the manhole shall be set in cement mortar or in approved gasket material. Trim excess gasket material and plaster inside joints smoothly. Manhole sections set in cement mortar shall be smoothly plastered inside and out.

After placing the surface course of asphalt concrete, all manholes and cleanouts shall be located and marked with white paint before the close of that work day.

Within two working days of paving, all manholes and cleanouts shall be adjusted to grade and inspected.

Existing grade adjustment rings in the adjustment of manhole frames shall become the property of the Contractor and, if undamaged and thoroughly cleaned of mortar, may be reused in the work. If not so used, they shall be disposed of away from the site of the work at the expense of the Contractor.

100-1.08. Pipe Laying

Pipe laying shall begin at lowest starting point and proceed upstream. Where ground water occurs, pumping shall continue until backfilling has progressed to a sufficient height to prevent flotation of the pipe. Water shall be disposed of in such a manner as to cause no property damage or not be a hazard to public health.

Where construction consists of constructing a new main or extension of an existing main, the downstream end of the new main shall be securely closed with a tight fitting plug until the construction is accepted by the City Engineer.

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Connection to existing sanitary sewer main shall utilize a manhole. If a new manhole is required, the Contractor shall pothole the existing sewer main to verify invert grades and locations.

Sewer pipe shall be installed on the alignment and grade as shown on the plans and in accordance with the Standard Specifications, or as directed by the Engineer. Existing sewer laterals shall be removed and replaced at the locations shown on the plans, or as directed by the Engineer.

Sewer pipe shall be laid in straight lines and on uniform rates of grade between points where changes in alignment or grade are shown on the plans. The interior of the pipe shall be free of foreign matter before lowering into the trench.

The pipe manufacturer's written instructions covering the installation of his pipe shall be closely followed unless otherwise directed by the Engineer or these Technical Specifications. The trench shall not be backfilled until authorized by the Engineer. Pipe laying shall proceed upgrade with the spigots pointing in direction of flow. The invert of the pipe shall be set at required line and grade as determined from batter boards set not over 25 feet apart.

Electro-optical grade setting devices may be used provided that the device will be operated by a person proficient in its operation.

Any section of pipe found to be defective or which has had grade or joints disturbed shall be re-laid by the Contractor at his expense.

Proper implements, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and efficient execution of the work. All pipe, fittings and accessories shall be carefully lowered into the trench by means of derrick, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. The pipe and accessories shall be inspected for visible defects prior to lowering into trench. Any visibly defective or unsound pipe shall be replaced.

The line and grade of existing utilities shall not be altered. Any leakage caused in existing utilities by reason of the Contractor's operations shall be immediately repaired at the Contractor's expense.

Existing storm drains shall be supported or removed and replaced at the Contractor's option. In any case, the Contractor shall be responsible for maintaining the existing line and grade of the storm drains.

Existing water lines shall be supported in place with service maintained during construction. The Contractor shall be responsible for any damage to the water lines during construction and any damage resulting from improper backfilling.

Existing sewer lines shall be supported in place with service maintained during construction. The Contractor may, at his option, remove and replace any sewer laterals which are not in use during construction. The Contractor shall be responsible for damage to sewer lines during construction and any damage resulting from improper backfilling.

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100-1.09. Sewer Structures

Manholes shall be standard precast concrete manholes as detailed on the City Standard Details. Precast concrete manhole bases must be from list approved by the City Engineer.

Manhole bases may be poured-in-place concrete on undisturbed earth. The bases shall be poured full thickness against the side of the manhole excavation or to dimensions shown on the Plans. The manhole excavation site shall be dewatered before pouring.

Pre-cast manhole bases, conforming to the City Standard Details in dimensions and the requirements outlined below for materials may be used. Such pre-cast bases shall be placed on a minimum 12-inch thick cushion of drain rock, as specified in the City Standard Details. The drain rock shall extend a minimum of 6 inches beyond the outside edges of the base.

Concrete for manhole bases shall be Class A Portland cement concrete conforming to the applicable requirements of Section 90 of the Standard Specifications. The Portland cement shall be Type V conforming to ASTM Designation: C 150 or low-alkali-Type II cement meeting the requirements for Type V cement.

Where steel reinforcement is required in manhole base construction, such reinforcement shall be furnished and placed as shown on the plans and in accordance with the applicable provisions of Section 52 of the Caltrans Standard Specifications.

The base slab and initial riser section shall be connected with integrally poured concrete to create a watertight joint. Flow channels shall be constructed as shown on the plans. Changes in size or grade shall be made gradually and changes in direction by smooth curves. All finished surfaces shall be smoothly troweled with a steel trowel. All manhole barrels and taper section shall be precast concrete sections using Type V Portland cement complying with ASTM Designation: C 150 or low-alkali Type II cement meeting the requirements for Type V cement.

The 48-inch and 60-inch diameter barrels and taper sections shall be constructed in accordance with the applicable provisions of ASTM Designation: C 478 and shall be inspected by the Engineer to determine that the interior surfaces are smooth and free of pockets or depressions.

Manhole frames and covers shall be in accordance with City Standard Details.

At locations where sewer is to be installed into or out of existing manholes the manhole wall and base shall be chipped or core drilled to accept the new size of pipe and to form a flow channel in the manhole base. The Contractor shall dry pack around the pipe between the pipe and the opening. The Contractor shall also backfill in the area around the pipe with concrete to insure a watertight connection.

Mainline cleanouts shall be installed per City Standard Detail at the locations shown on the Plans.

After placing the surface course of asphalt concrete, all manholes and cleanouts shall be located and marked with white paint before the close of that work day.

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Within two working days of paving, all manholes and cleanouts shall be adjusted to grade and inspected.

100-1.010. Testing of Sewers

Testing of all portions of the sewer including manholes will be required.

For either exfiltration or infiltration test, the maximum leakage shall not exceed 250 gallons per inch of pipe diameter per mile per twenty-four (24) hours as measured over a period of thirty (30) minutes minimum. Should the leakage exceed the maximum allowable rate, the Contractor shall repair, overhaul, or rebuild the defective portion of the sewer line to the satisfaction of the Engineer at no additional cost to the City. After repairs have been completed by the Contractor, the line shall be retested as specified above, all at no cost to the City.

The test shall be performed after the line has been laid and all backfill placed and compacted as specified elsewhere in these specifications. The Contractor, at his option, may test the line at any time during construction. However, the final test for acceptance shall be made only after all backfill is in place and compacted.

In the event that the exfiltration test prescribed above is impractical due to wet trench conditions, these portions of the sewer line where such conditions are encountered will be tested for infiltration. The Engineer shall determine whether the exfiltration or infiltration test will be used.

Even though the test for leakage is within the prescribed limits, the Contractor shall repair any obvious leaks.

Low pressure air testing may be used in lieu of water testing at the option of the Contractor. Water testing may be required by the Engineer. The following procedure shall be used for air testing:

- A. Clean pipe to be tested by propelling a snug fitting inflated rubber ball through the pipe with water. Remove any debris.
- B. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
- C. If the pipe to be tested is submerged in ground water, insert a pipe probe, by boring or jetting, into the backfill material adjacent to the center of the pipe, and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to ground water submergence over the end of the probe. All gauge pressures in the test should be increased by this amount.
- D. Add air slowly to the portion of the pipe installation under test until the internal pressure is raised to 4.0 p.s.i.g.
- E. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any leakage is observed, bleed off air and make necessary repairs.
- F. After an internal pressure of 4.0 p.s.i.g. is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.

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- G. After the two minute period, disconnect the air supply.
- H. When pressure decreases to 3.5 p.s.i.g. , start stopwatch Determine the time in seconds that is required for the internal air pressure to reach 2. 5 p.s.i.g. The minimum allowable time in seconds shall be based on the diameters and lengths of pipe under test.

Air test data sheets and nomograph with directions for computing the specification time are available at the office of the City Engineer.

The Contractor shall hire an independent television inspection service to perform a closed-circuit television inspection of all newly constructed sewers. A color DVD or portable drive (“thumb drive”) format of the television inspection shall be produced and delivered to the Engineer together with a typed log of the inspection.

The following conditions shall exist prior to the television inspection:

- A. All sewer lines shall be in installed, backfilled and compacted;
- B All structures shall be in place, all channeling complete and all pipelines accessible from structures;
- C. All other underground facilities, utility piping and conduit within two feet of the sewer main, shall be installed;
- D. All compaction required shall be completed;
- E. Pipelines to be inspected shall be balled, flushed and mandrel tested;
- F. The final air or water test shall have been completed.
- G. Immediately before the television inspection, run fresh water into the sewer until it passes through the downstream manhole.

When the above work has been completed, the Contractor shall notify the Engineer forty-eight (48) hours in advance of the date for television inspection. During this inspection, the Contractor or his authorized representative shall be present to observe the recorded pictures as provided by the television camera.

The following video tape observations shall be considered defects in the construction of the sewer pipelines and will require corrections prior to acceptance:

- A. Off grade - 0.08 foot, or over, deviation from grade;
- B. Joint separations
- C. Offset joints
- D. Chips in pipe ends
- E. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, roots, etc.);
- F. Infiltration;
- G. Debris or other foreign objects;
- H. Other obvious deficiencies when compared to Approved Plans and Specifications, these Standard Specifications and Standard Details.

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The contractor shall be notified in writing of any deficiencies revealed by the television inspection that will require repair, following which the Contractor shall excavate and make the necessary repairs and request a television re-inspection. Television re-inspection shall be at the contractor's expense.

100-1.011. Trench Resurfacing

Follow City of Gilroy Standard Details for trench resurfacing unless otherwise approved in writing by the Director of Public Works/City Engineer.

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Section 101

WATER MAIN CONSTRUCTION

101-1.01 Description

All water mains and related appurtenances shall be constructed in accordance to the American Water Works Association (AWWA) Standards; unless otherwise specified by the City of Gilroy Standard Specification and Details.

101-1.02 Pipe

Use Ductile Cast Iron in accordance to the specifications of AWWA Standard C151 for main/transmission piping unless otherwise approved in writing by the Public Works Director/City Engineer.

Ductile Iron Pipe shall be a cast ferrous material in which a major part of the carbon content occurs as free graphite in a substantially nodular or spheroidal form.

Ductile Iron Pipe shall be cement lined, new pipe conforming to AWWA Standard C104/ANSI A 21.4 of the most recent issue, if any, as sponsored by the American Water Works Association for thickness Class 50 Ductile Iron Pipe and shall have an asphaltic coating as specified in AWWA Standard C151. The pipe shall be furnished with either Bell and spigot end, "Tyton Joints" or Mechanical Joints except where otherwise specified on the plans.

101-1.03 Copper Water Service Tubing

All copper water service tubing shall conform to the latest AWWA Standards as described in ANSI/AWWA C800 of the latest revision, and to ASTM B88, and shall be Type K soft temper tubing.

101-1.-04 Fittings

All fittings shall be new gray iron or ductile iron fittings conforming to ANSI/AWWA C110/C153 of latest revision and shall have the proper type of ends to match the type of pipe used.

Gray iron or ductile iron fittings shall be cement mortar lined in accordance with AWWA C104 of latest revision and shall have an exterior petroleum asphaltic coating conforming to AWWA C110. Ductile iron fittings shall have a minimum pressure rating of 250 P.S.I. and shall be of the thickness class as shown on the plans.

101-1.05 Gate Valves

Gate valves shall conform to AWWA Standard C509 of latest revision and shall be the resilient seat type with non-rising stem opening counter-clockwise with O-ring stem seal and suitable ends for connections to type of pipe or fitting used. The gate valve shall be used on pipes with nominal sizes equal to 12 inches and below. The working pressure rating of gate valves shall meet or exceed the pressure rating of the pipe specified on the plans. External bolts and nuts shall be 304 stainless or poly wrapped per standard. Valves shall be as shown on the City of Gilroy Standard Details.

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101-1.06 Butterfly Valves

Butterfly valves shall conform to AWWA Standard C504 of latest revision and shall be of the rubber seat type. Valve discs shall rotate 90 degrees from the full open position to the tight shut position. The butterfly valve shall be used on pipes with nominal sizes larger than 12 inches. The valve seat shall provide a tight shutoff at a pressure differential of 150 psi upstream and 0 psi downstream in either direction. The valve operator shall be the traveling nut type. Valve shall open with a counter-clockwise rotation of the operating nut.

101-1.07 Valve Boxes

Each valve shall be covered by a precast 8 inch valve box set flush with street surface with cast iron ring and cover marked "WATER". The valve boxes are to be Christy G 5, or approved equal.

101-1.08 Fire Hydrant and Lateral Assembly

At the location(s) shown on the plans, the Contractor shall provide and install a fire hydrant and lateral assembly per City of Gilroy Standard Details.

No bends will be allowed in fire hydrant laterals without approval of the City Engineer.

101-1.09 Water Meters

Water meters shall be placed by City water operations staff only after the curb and gutter is installed, backfill and grading is completed between the curb and sidewalk and the meter boxes are installed. In addition, water meters shall be installed in accordance to the City Standard Details.

The water meter box shall be installed at the back of curb except at the location(s) approved by the City Engineer.

The installation of the water meter shall follow the procedure below:

- Developer/contractor must obtain their encroachment permit or approved improvement plan.
- Developer/contractor must pay their fees as well as the water meter cost and its installation at the Finance Department.
- A ticket/tag will be issued to both the Water Operations and Engineering Inspection staff as notification that fees have been paid.
- The developer/contractor must provide the submittal of the water meter box to be installed to Engineering Inspection, if not according to the City Standard.
- Engineering Inspection will forward the submittal to Water Operations staff for review and approval.
- The water meter will not be installed unless the bacteriological test on the new main and its appurtenances has been certified and accepted. A copy of the lab report must be submitted to the Engineering Inspector and then it will be forwarded to Water Operations. The address and unit number to where the water meter box is connected to must be stenciled and painted in blue on top of the water meter box.

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- City inspector shall then inspect the installed water meter box and once approved; the City Inspector shall notify the Water Operations Department of its acceptance of the installed water meter box.
- The developer/contractor can make the request of the water meter installation to the Water Operations Department in writing at least three (3) days in advance.
- If a backflow device is required for 1-inch to 2-inch services, Water Operations shall install the water meter then lock it. After the contractor installs the backflow device and is ready to test the device, the contractor must call the Water Operations to open the lock and inspect the installation of the backflow device.
- Meters greater than 2 inches shall be installed by the contractor. Contractor shall call Water Operations three (3) days in advance to schedule pick-up at the Corporation Yard for large meters. Some special sizes need advance notice of 3-4 weeks for delivery. Contractor shall install meter with bypass assembly. The mainline valve to these services shall remain closed. Water Operations shall open the valve after backflow device is installed.
- After water has been turned on to a meter, Contractor has seven (7) days to have City-approved backflow tester to test the device and submit report to Water Operations.

Split service will be allowed if the street is new or has been recently overlaid. It will also be allowed if the water main is on the long side of the street and the street is main carrier of traffic. The existing service must be at least 1-inch and larger copper to split.

If a new residential home is built with an existing steel service, the existing service shall be upgraded to the current City Standard and the old service shall be abandoned at the main.

An existing steel service must be upgraded to current City Standard from the water meter to the main line whenever there is a request for additional water allocation or request to manifold the service.

No direct connection to a meter flange or angle stop shall be allowed without a meter.

No irrigation/domestic water services shall be allowed on a fire service.

101-1.10 Air Vacuum/Relief Valves

Air relief valves shall be installed at locations whenever high points occur caused by vertical grade change in the main. In addition, air relief valves shall be installed in accordance to the City Standard Details.

101-1.11 Blow-Offs

Blow offs shall be installed at the end of all dead-end runs. In addition, blow-offs shall be installed in accordance to the City Standard Details.

101-1.12 Asbestos Cement Pipe

The installation of asbestos cement pipe is prohibited.

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All cutting, handling and disposal of asbestos cement pipe shall be done in compliance with the Contractor's State Licensing Law and all applicable laws and regulations.

101-1.13 Excavation and Backfill

Excavation and backfill of the pipeline shall be as shown on the City of Gilroy Standard Details.

Excess material from excavation shall become the property of the Contractor and shall be disposed of to the satisfaction of the City Engineer.

Prior to disposal of any materials or operation of any equipment owned by the Contractor for the disposal of excess material from the trench excavation on site, the Contractor shall submit to the City Engineer written authorization for such disposal of materials and entry permission signed by the owners of the disposal site and the required permits.

101-1.14 Laying and Handling Pipe Materials

Proper implements, tools, and facilities satisfactory to the City Engineer shall be provided and used by the Contractor for safe, convenient, and workmanlike prosecution of the work. All pipe fittings and valves shall be carefully lowered into the trench in such a manner as to prevent damage to pipe coatings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. Before lowering and while suspended, the pipe shall be inspected for defects and the cast iron pipe rung with a light hammer to detect cracks. Any defective, damaged, or unsound pipe shall be rejected and sound material furnished. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to pipe. All pipe stockpiled on the job shall be stored with the ends covered to prevent the entrance of foreign matter.

Long radius curves in either the vertical or horizontal plane, must be approved in writing by the City Engineer.

Each length of pipe shall be free of any visible evidence of contamination, dirt, and foreign material before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying. At times when pipe laying is not in progress, the open ends of any pipe which have been laid shall be closed by approved means to prevent the entrance of small animals or foreign material. Trench water shall not be permitted to enter the pipe.

101-1.15 Installation of Ductile Iron Pipe

The flame cutting of pipe by means of oxyacetylene torch shall not be allowed.

Ductile iron pipe shall be as specified in and installed per AWWA C600 or latest revision and in accordance with the manufacturer's recommendations and the thickness class specified on the plans.

101-1.16 Thrust Blocking

All tees, bends, and plugs shall be provided with thrust blocking and/or harness as shown on the plans or in accordance with the City of Gilroy Standard Details.

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101-1.17 Disinfection of Pipeline

The work described in this section shall consist of disinfection of new and repaired potable water mains. The work involved in the disinfection of the main shall conform to the provisions of AWWA Standard C651, as specified herein and as directed by the City Engineer. All new water mains shall be disinfected before they are placed in service. All water mains taken out of service for inspection, repair, or other activities that might lead to contamination of water shall be disinfected before they are returned to service.

Multiple connections to the existing main are not allowed at all during initial charging of water into the new main to prevent any back flow to the existing main.

Water from the existing distribution system shall be controlled to flow very slowly in the newly laid pipe during the application of chlorine. Valves on existing mains in service shall be operated only by City water operations staff.

The forms of chlorine that may be used in the disinfection operations are liquid chlorine, sodium hypochlorite solution, and calcium hypochlorite granules or tablets.

The application of liquid chlorine shall conform to the provisions of AWWA Standard B301. The applications of sodium hypochlorite and calcium hypochlorite shall conform to the provisions of AWWA Standard B300.

Chlorine may be applied by any of the standard methods specified herein, subject to the approval of the City Engineer.

Three methods of chlorination are described in this section that can be applied accordingly:

“101-1.17A Tablet Method – The tablet method consists of placing calcium hypochlorite tablets in the water main as it is being installed and filling the main with potable water when the installation is complete. The tablet method gives an average chlorine residual of approximately 25mg/L. This method is best suited for short extensions and smaller diameter pipes (up to 12 inches). This method may be used only if the pipes and appurtenances are kept clean and dry during the construction.

During construction, 5-g calcium hypochlorite tablets shall be placed in each section of the pipe. Also, one tablet shall be placed in each hydrant, hydrant branch, and other appurtenance. Table 1 shows the number of tablets required for commonly used size of pipe. The tablet shall be attached by a food-grade adhesive. The tablets shall be attached inside the pipes and at the top of the main, with approximately equal numbers of tablets at each end of a given length of pipe.

When the installation of the main has been completed, the main shall be filled with water with a rate not greater than 1 ft/s and the water shall remain in the pipe for at least 24 hours. The water used to fill the new main shall be supplied through a temporary connection or a jumper that shall include a backflow prevention device. The supply connection can be done by using a potable-water hose attached to a back flow prevention device with a control valve then connected to a fire hydrant. Similar jumper connections can be used upon

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approval of the City Engineer. However, if only a single connection is made from the existing to the new main within a one end run or a cul-de-sac then a jumper connection may not be required.

Hydrants and valves, to where the backflow prevention device is connected to, can be operated by City inspectors. If and only for acceptable reasons or constraints approved by the City Engineer, a jumper connection is not possible then connection to the existing main may be allowed with the condition that the new main is free from debris, foreign materials and proper handling of the pipe to avoid contamination was carefully performed. Valves on existing mains in service shall be operated only by the City water operations staff. City Inspectors may operate the existing valves only when in communication with Water Operations staff.

TABLE 1: REQUIRED NO. OF 5-g CALCIUM HYPOCHLORITE TABLETS FOR DOSE OF 25 mg/L

PIPE DIAMETER (inches)	LENGTH OF PIPE SECTION (ft)				
	13 or less	18 or less	20 or less	30 or less	40 or less
	NUMBER OF 5-g CALCIUM HYPOCHLORITE TABLETS				
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

* Referenced from AWWA C651 revised as of 2000.

101-1.17B Continuous Feed Method – The continuous feed method gives a 24-hour chlorine residual of not less than 10 mg/L. The new main shall be supplied and filled with water from a temporary connection, fire hydrant or other approved supply source. These sources shall be protected by an approved backflow assembly. The water shall flow at a constant, measured rate into the newly installed water main. At a point not more than 10 feet from the beginning of the new main, the water shall receive a dose of chlorine fed at a constant rate such that the water will not have less than 25 mg/L free chlorine. To ensure that this concentration is maintained, the chlorine concentration should be measured at regular intervals in accordance with the procedures described in the current edition of “Standard Methods for the Examination of Water and Wastewater” or “AWWA Manual M12”. The chlorinated water shall be retained in the main for at least 24 hours, during which time, hydrants to where the backflow prevention device is connected to can be operated by City inspectors.

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Table 2 shows the amount of chlorine required for each 100 feet of pipe of various diameters.

TABLE 2: CHLORINE REQUIRED TO PRODUCE 25 mg/L CONCENTRATION IN 100 FT. OF PIPE

PIPE DIAMETER		100% Chlorine		1% Chlorine Solution	
inches	(mm)	lb	(g)	gal	(L)
4	(100)	0.013	(5.9)	0.16	(0.6)
6	(150)	0.030	(13.6)	0.36	(1.4)
8	(200)	0.054	(24.5)	0.65	(2.5)
10	(250)	0.085	(38.6)	1.02	(3.9)
12	(300)	0.120	(54.4)	1.44	(5.4)
16	(350)	0.217	(98.4)	2.60	(9.8)

* Referenced from AWWA C651 revised as of 2000.

101-1.17C Slug Method – The slug method is suitable for main pipes with larger diameter because of the volumes of water involved, for which the continuous feed method is not practical. The new main shall be supplied and filled with water from a temporary connection, fire hydrant or other approved supply source. These sources shall be protected by an approved backflow assembly. The water shall flow at a constant, measured rate into the newly installed water main. At a point not more than 10 feet from the beginning of the new main, the water shall receive a dose of chlorine fed at a constant rate such that the water will not have less than 100 mg/L free chlorine. To ensure that this concentration is achieved, the chlorine concentration should be measured at regular intervals. The chlorine shall be applied continuously and for a sufficient period to develop a solid column, or a “slug” of chlorinated water that will, as it moves through the main, expose all interior surfaces to a concentration of approximately 100 mg/L for at least 3 hours. The free chlorine residual shall be measured in the slug as it moves through the main. If at any time it drops below 50 mg/L, the flow shall be stopped; chlorination equipment shall be relocated at the head of the slug; and, as flow resumes, chlorine shall be applied to restore the free chlorine in the slug to not less than 100 mg/L. As the chlorinated water flow past fittings and valves, related hydrants and valves to where the backflow prevention device is connected to can be operated by City inspectors so as to disinfect appurtenances and pipe branches. If and only for acceptable reasons or constraints approved by the City Engineer, a jumper connection is not possible then connection to the existing main may be allowed with the condition that the new main is free from debris, foreign materials and proper handling of the pipe to avoid contamination was carefully performed. Valves on existing mains in service shall be operated only by the City water operations staff. City Inspectors may operate the existing valves only when in communication with Water Operations staff.”

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101-1.18 Final Flushing

Discharge of chlorinated water shall be in accordance with local and state laws.

Following the applicable retention period, heavily chlorinated water should not remain in prolonged contact with pipe. All treated water shall be thoroughly flushed from the newly laid pipe line until chlorine measurements show that the concentration in the water leaving the main is no higher than the generally prevailing in the distribution system or that is acceptable for domestic use. The determination of chlorine residue shall be made to ensure that the heavily chlorinated water has been removed from the pipeline. All treated water can only be flushed in the City's sanitary sewer system.

101-1.19 Bacteriologic Tests

Following the final flushing, there shall be a waiting period of 24-hours prior to the collection of one sample in minimum from the new main. However, the City Engineer may determine and require the contractor to take two consecutive set of samples if necessary, taken at least 24 hours apart. At least one set of samples shall be collected from every 500 feet of the new water main, plus one set from the end of the line and at least one set from each branch. All samples shall be tested for bacteriological (chemical and physical) quality.

If trench water has entered the new main during construction or if, in the opinion of the City Engineer, excessive quantities of dirt or debris have entered the new main, bacteriological samples shall be taken at intervals of approximately 200 feet, and the location shall be identified by City forces.

Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate. No hose, or fire hydrant shall be used in the collection of samples except for pipe repairs, if no other sampling port is available, well-flushed fire hydrants may be used with the understanding that they do not represent optimum sampling conditions.

If the initial disinfection fails to produce satisfactory samples, the disinfection process shall be repeated either using continuous-feed or slug method until satisfactory samples have been obtained. After the main has been re-disinfected, two consecutive passing bacteria tests must be obtained prior to making the tie-in. Bacteria tests are valid for only 30 days. If there is more than a 30-day lapse between a passing bacteria test and the applicable tie-in, the bacteria test must be repeated prior to water main tie-in.

The testing and re-testing shall be performed by a Certified Laboratory approved by the City and at no cost to the City.

101-1.20 Disinfection Procedures When Cutting Into, Tying Into or Repairing Existing Main

The treatment procedure outlined in this section refers only to existing mains that have been partially or wholly dewatered. After the appropriate procedures have been performed, the existing main may be returned to service prior to the completion of bacteriological testing in order to minimize the waiting time for customers without water service.

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101-1.20A Trench Treatment – When an existing main is opened, either by accident or by design, the excavation will likely be wet and may be badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from this pollution. Tablets have the advantage in this situation, because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

101-1.20B Swabbing with Hypochlorite Solution – The interior of all pipe and fittings used in making the repair or tie-in (particularly couplings and tapping sleeves) shall be swabbed with a 1 percent hypochlorite solution (commercial bleach) before they are installed.

101-1.20C Flushing – Thorough flushing is the most practical means of removing contamination introduced during repairs. If valve and hydrant locations permit, flushing toward the work location from both directions is recommended. Flushing shall be started as soon as the repairs are completed and shall be continued until discolored water is eliminated.

101-1.20C Slug Chlorination – When practical, the section of the main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in Section 99-1.17C. The dose may be increased to 300 mg/L and the contact time may be reduced to 15 minutes. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.

101-1.20C Bacteriologic Sample – Bacteriological samples shall be taken after repairs are completed to provide a record for determining the procedure's effectiveness. If the direction of the flow is unknown, samples shall be taken on each side of the repair or tie-in. If positive bacteriological samples are recorded, then the situation shall be evaluated by the Water Operations who can determine corrective action. Daily sampling shall be continued until 2 consecutive non-detect samples are recorded.

101-1.21 Hydrostatic Test

The test shall be performed after the line has been laid and all backfill placed and compacted but before the permanent paving is placed. The bacteriological test clearance shall be obtained before conducting the pressure and leakage tests. The Contractor, at his option, may test the line at any time during construction. However, the final test for acceptance shall be made only after all backfill is in place.

Each valved section of pipe, or combined sections, as approved by the City Engineer, shall be subjected to a hydrostatic pressure of not less than 150 psi, at any point on the main. The pressure test shall be at least a 2-hour duration. Valves on existing mains in service required to be operated in connection with this job shall be operated only by personnel of the City forces assigned by the City Engineer. Each valved section of pipe shall be slowly filled with water. Before applying the specified test pressure, air shall be expelled completely from the pipeline section under test. To accomplish this, taps shall be made, if necessary, at the points of the highest elevation, and afterwards, tightly plugged. The pipeline shall be allowed to stabilize at the test pressure before conducting the hydrostatic test. The specified test pressure shall be applied by means

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of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, and all necessary apparatus including new gauge and measuring devices shall be furnished by the Contractor. The Contractor shall make the taps into the pipe and shall furnish all necessary assistance for conducting the tests. The test pressure shall not vary by more than +5 psi (34.5 kpa) for the duration of the test. Test pressure shall be maintained within this tolerance by adding makeup water through the pressure test pump into the pipeline. The amount of makeup water added shall be accurately measured (in gallons or liters per hour) by suitable methods and shall not exceed the applicable testing allowance as specified in Table 3 or by the equation below.

No pipe installation will be accepted if the quantity of makeup water is greater than that determined by the following formula:

$$\text{In inch-pound units, } L = \frac{SD\sqrt{P}}{148,000}$$

Where:

- L = testing allowance (makeup water), 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 hydrostatic test, in pounds per square inch (gauge)

Suitable means shall be provided by the City for determining the quantity of water leakage under the test pressure. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section of it, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. The City Engineer shall designate the time at which the test shall be made. If the leakage rate is greater than the specified allowable limit, the Contractor shall, at his own expense, locate the cause and repair the defect until the leakage is within the specified allowance. After the leak or leaks are corrected to the satisfaction of the City inspector, the hydrostatic pressure and leakage test shall be repeated.

Also, the Contractor shall repair any obvious leaks even though the hydrostatic test results are within the prescribed limits above.

The contractor shall submit a written report of the results of the hydrostatic test. The report shall include: (1) date and time of test, (2) description of pipe section tested, (3) amount of measured leakage, (4) cause and location of leaks, if any and corrective action, (5) statement that the pipe tested passed the pressure and leakage tests. The tests report shall be signed by the contractor and the City inspector.

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TABLE 3: HYDROSTATIC TESTING ALLOWANCE PER 1,000 FT OF PIPELINE

PIPE DIAMETER (inches)	AVERAGE TEST PRESSURE (psi)								
	100	125	150	175	200	225	250	275	300
	HYDROSTATIC TESTING ALLOWANCE (gph)								
3	0.20	0.23	0.25	0.27	0.29	0.30	0.32	0.34	0.35
4	0.27	0.30	0.33	0.36	0.38	0.41	0.43	0.45	0.47
6	0.41	0.45	0.50	0.54	0.57	0.61	0.64	0.67	0.70
8	0.54	0.60	0.66	0.72	0.76	0.81	0.85	0.90	0.94
10	0.68	0.76	0.83	0.89	0.96	1.01	1.07	1.12	1.17
12	0.81	0.91	0.99	1.07	1.15	1.22	1.28	1.34	1.40
14	0.95	1.06	1.16	1.25	1.34	1.42	1.50	1.57	1.64
16	1.08	1.21	1.32	1.43	1.53	1.62	1.71	1.79	1.87
18	1.22	1.36	1.49	1.61	1.72	1.82	1.92	2.02	2.11
20	1.35	1.51	1.66	1.79	1.91	2.03	2.14	2.24	2.34
24	1.62	1.81	1.99	2.15	2.29	2.43	2.56	2.69	2.81
30	2.03	2.27	2.48	2.68	2.87	3.04	3.21	3.36	3.51
36	2.43	2.72	2.98	3.22	3.44	3.65	3.85	4.03	4.21
42	2.84	3.17	3.48	3.75	4.01	4.26	4.49	4.71	4.92

* Referenced from AWWA C600 revised as of 2005.

101-1.22 Water Main Tie-Ins

The Contractor shall notify the City Inspector forty-eight (48) hours prior to individual mainline shutdowns required to facilitate the tie-in operations. Tie-ins will not be scheduled until a written passing bacteria test has been received by City of Gilroy. A City Inspector must be present during all tie-in operations. No tie-ins shall be performed without prior authorization of the City. Valves on existing mains in service shall be operated only by City water operations staff.

Interruption of service to commercial customers shall, as much as practical, be coordinated with the customer's needs. The Contractor will contact the customers, consider the customer's interests and inform the City accordingly.

After hours work or weekend work is to be avoided whenever possible and any overtime costs shall be borne by the Contractor requesting such after-hours work. Normal working hours are: 7:00 A.M. to 3:30 P.M.

Contractors or parties requiring work of any kind by the City forces shall request such services a minimum of forty-eight (48) hours in advance of the time such services are desired. Work requests, which will involve City forces for more than 8 hours or an extensive number of City supplied parts, shall be requested a minimum of 7 calendar days in advance.

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If it is necessary to terminate service to any customer, the Contractor shall make the request for such work an additional seventy-two (72) hours (three additional working days for a total of five working days advance notice) in advance of the time such services are desired to allow the customers affected to have a minimum of seventy-two (72) hour notice.

During the work, the Contractor shall exercise all necessary precautions to prevent the entrance of trench water or any other foreign material into the water main and shall conduct all operations in accordance with the most stringent sanitation practices. The interior of all appurtenances being installed shall be thoroughly swabbed with a strong HTH solution prior to installation.

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Section 102
LANDSCAPE CONSTRUCTION

102-1.01 Planting

- A. Contractor shall supply all plants required to fulfill design intent as shown on the plans.
- B. Contractor shall protect and maintain all plant material from time of delivery to time of final acceptance. Owner shall not be responsible for losses due to vandalism, theft, or severe weather.
- C. Contractor shall place plant materials so they do not interfere with irrigation system or inhibit required coverage. Plant locations may be adjusted as long as design intent is not compromised. Contractor shall set out plant material as per plan and receive acceptance from owner's representative with respect to plant health and location prior to installation. Contractor shall give a minimum of two (2) working days notice for observation and shall have all plant material in specified locations for review at one time. Contractor shall replace any material as requested by owner's representative.
- D. All non-turf planting areas shall receive a 3" layer of bark mulch top dress (unless noted otherwise).
- E. When work has to occur under the drip line of existing trees not scheduled for removal, the contractor shall use all possible care to avoid injury to the trees and tree roots. Grade in lines radial to the existing trees rather than tangential. All partial cuts or tears through roots two inches in diameter and larger shall be cut clean. Trenches adjacent to trees shall be filled within 24 hours after excavation but where this is not possible, the side of the trench and adjacent to the tree and any exposed roots shall be kept shaded and moist with dampened burlap or canvas.

102-1.02 Maintenance

- A. All landscaping and irrigation shall be installed and maintained:
 - 1. In accordance with the approved landscape plan.
 - 2. With the use of only healthy, well formed and vigorous plant materials.
 - 3. With the use of adequate soil amendments where poor soil conditions exist.
 - 4. Continuously maintained so as not to restrict the required access to any public utility and easement.
 - 5. Maintained in a live and healthy condition free of weeds. The developer and/or owner shall be required to remove all weeds and

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replace all sick or dead plant materials for thirty-six (36) month (3 years) period after final installation.

6. Irrigation systems shall be monitored to ensure sufficient watering of planted areas.
7. General maintenance shall consist of regular watering, aerating, pruning, fertilizing, clearing of debris and weeds, and removal and replacement of dead plants.
8. Should the Contractor, or Developer/owner fail to maintain the project, they will provide the city with adequate funds to maintain the project.

102-1.03 Project Information

- A. Contractor or developer/owner shall provide information pertaining to the maintenance of all systems. This includes model numbers, warranties, manufacturer's specifications and instructions.
- B. The Contractor or developer/owner shall be responsible for providing a maintenance schedule for all elements following completion of the one year (unless otherwise specified) maintenance period. All pertinent information will be provided on the Project Material Information.
- C. Schedules that provide distinct maintenance periods and strategies should be provided to differentiate between different plant species. For example, turf, shrubs, and trees should have distinct maintenance schedules.

102-1.04 Warranty

- A. The Contractor or developer/owner shall provide a written guarantee covering all defects in workmanship, installation, and equipment for period of one year from the date of Final Acceptance.

1.02-1.05 Demolition and Tree Protection

- A. Follow the tree protection guidelines in the City of Gilroy Street Tree Program and the Consolidated Landscaping Policy.
- B. Reference the city standard specifications for all project related demolition information.

1.02-1.05 General Irrigation

- A. Contractor shall verify pressure prior to beginning work. Contact owner immediately should discrepancy arise and re-direct work to avoid delay.
- B. Contractor shall coordinate electrical supply with general contractor. General contractor shall stub appropriate power supply in vicinity of controller location.
- C. Contractor shall adjust irrigation heads for optimum coverage while reducing over-spray onto walkways and adjacent structures. Valves shall be adjusted to avoid misting as applicable.

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- D. Irrigation system design is diagrammatic. Where piping, valves, quick couplers, etc., are shown outside planting areas, or limit of work, intent is for piping, valves, etc., to be installed within planting areas of property. Indicate exact locations of irrigation equipment on record drawings.
- E. Contractor shall program controller to insure proper irrigation based on plant type, exposure and season.
- F. Contractor shall use pressure-compensating screens (rainbird “PCS” or acceptable equal) as necessary to obtain proper spray head radius. The “PCS” screens are color coded by radius for ease of use.
- G. Contractor shall use extreme care where it is necessary to trench near existing trees. Excavation in areas exhibiting root 3” and larger shall be done by hand. Roots 2” or larger in diameter damaged in construction shall be cleanly cut.
- H. Contractor shall make minor adjustments to head locations in field as necessary.
- I. Contractor shall refer to details and specifications for additional information.

102-1.06 Irrigation Equipment

The following irrigation materials are standard for products that will be maintained by the city.

1.	Irrigation Controllers	Rainmaster Evolution DX2 w/ PMR + communications Controller shall have a permanent mount remote receiver. Communications mode (radio, hardwire, phone) and other options (flow monitoring, other sensors, etc) will be specified on per project basis.
2.	Remote Control Valve	Rainbird PFB. Contact the City for other specifications if system hydraulics will be outside the specs for this valve or if recycled water will be used. (One valve per box unless otherwise specified) Valves shall be centered in valve box to allow for servicing. A polyurethane valve tag (as specified) shall be affixed to each remote control valve indicating controller and station number. Install a threaded PVC schedule 80 union on the upstream and downstream side of each valve. Install a threaded PVC schedule 80 ball valve upstream of each valve or manifold.
3.	Quick Coupling Valves	Buckner QB44LRC-10, or Rainbird 44LRC. Valves shall be installed in approved ten inch

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		<p>(10”) round valve boxes with green locking cover. Should the box be subject to heavy loads, the box shall be suitably supported.</p> <p>Top of valve shall be one inch (1”) below bottom of lid. Sand may be used for backfill.</p> <p>In turf: box shall be flush with grade, In planted areas: top of box shall be one inch (1”) above grade.</p> <p>For projects with four or more quick coupler valves installed, Contractor shall provide two (2) quick coupler keys with swivel hose ells, upon City acceptable of project.</p>
4.	Gate Valves	Mueller or Niabco resilient wedge Gate Valve with 2”operating nut.
5.	Ball Valves	<ul style="list-style-type: none"> • Mueller ball curb valve full ports, iron pipe thread. • Spears Sch 80 threaded PVC. • Watts or Nibco brass <p>Specific valve depends on application</p>
6.	Backflow Preventers	Watts 009 or as specified by City
7.	Backflow Preventer Enclosures	Hubble Lok Box flip top enclosure
8.	Pop-up Rotor Heads	As specified by City
9.	Fixed Spray Heads	<p>Rainbird #1800 PRS-SAM. All heads shall be installed on triple swing joints.</p> <p>Turf: #1806 SAM PRS or #1806 Sam P45 if using rotators; heads shall be installed two inches (2”) from pavement.</p> <p>Groundcover, annual color, shrub beds: #1812 SAM PRS or #1812 SAM P45 if using rotators; heads shall be a minimum of six to twelve inches (6-12”) in from pavement or buildings. Distance shall be dependent on the distance to the first row of plant material.</p>
10.	Remote Control Valve Box	26.3” x 19.8” x 12” rectangular plastic valve box with bolt-down green lid, as approved by City.
11.	Gate Valve and Quick Coupling Valve Box	Brooks #1100, Carson #910, or equal, 10" deep round plastic valve box with bolt-down green lid. Tan lid for Gate and ball valves.

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12.	Wire Splice	3M DB4 or approved equal All splices shall be located in splice boxes or valve boxes. Each splice shall have a 24" expansion coil to allow future maintenance. No splices are allowed to be directly buried or located in sleeves.
13.	Low Voltage Irrigation Control Wire	Type UF or Type PE Irrigation Control Wire, U/L approved for direct burial, #14 AWG. All wires will be looped up into each valve or splice box, through which the wires pass
14.	Irrigation Control Wire Colors	Single Controller Installations: Common wire - white Pilot Wires - red Master Valve Pilot - yellow Spare - black Trace - green Multiple Controller Installations: contact city for details All field wires will be labeled with the corresponding station number.
15.	Main Line Piping	4" size and smaller: Schedule 40 PVC with Schedule 40 Solvent-weld fittings; 6" and larger: Twin-gasketed P.R. 200—SDR 21 PVC (> 2.5 may use 315).
16.	Lateral Line Piping	Class 200 PVC with Schedule 40 solvent-weld fittings
17.	Sleeve Material	Schedule 40 PVC, two pipe sizes (minimum) larger than line size.
18.	Conduit for Control Wires	Schedule 40 PVC U/L electrical conduit. All knock outs into the controller shall be sealed (duct seal, silicon, or Urethane foam) to prevent insects from entering the unit. Do not use urethane foam in PVC conduits. The conduit sweep for the field wires shall terminate in a pull box (Christy N9 or FL9) and may be called for on the 120VAC conduit prior to entering the controller.
19.	Filter for Drip Station	Amiad wye filters. Contact the City for information if the site requires flows greater than twenty gallons per minute.
20.	Utility Box Covers (City Maintained)	Should comply with the following standard colors: A. Shut-off valves: Tan B. Splice boxes: Black

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		C. Coupler boxes: Green D. Recycled water: Purple
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102-1.06 Planting Guidelines

A. Summary

1. Trees and shrubs should be clustered together for accent in order to form aesthetically pleasing groupings and patterns.
2. The density and placement of plants are to be determined by the plant size at maturity. When initially installed, ground cover shall give enough coverage for a pleasing appearance in all landscaped areas.
3. Drought tolerant planting requiring little irrigation is strongly encouraged.
4. Existing trees and shrubs in good condition shall be saved whenever possible. New plant materials shall be carefully selected in accord with the following criteria:
 - a. The overall compatibility of the ultimate form, size, density, and color of trees, shrubs, and ground cover at maturity shall be considered.
 - b. The tolerance of the plant materials to existing physical conditions, and resistance to insect pests and disease shall be considered.
 - c. The intended use (such as shade, screening, windbreak, erosion control, etc.) as well as the ease of maintenance shall be considered.
 - d. The mutual compatibility of the water needs for the various plan materials shall be considered.
5. During Project preliminary review, staff shall determine if existing trees shall be designated significant. This determination shall be based upon the following guidelines:
 - a. Existing native trees (naturally occurring species in Gilroy) six (6") inches or more in diameter, at a point four and one half (4 1/2") feet above the ground.
 - b. Important to the historical or visual aspect of Gilroy (the hillside tree stands).
6. If a significant tree is present, the applicant may be required to hire a certified consulting arborist for the entire span of the project. All arborist recommendations shall be listed on the final landscape plans.
7. The consulting arborist shall sign the Final Landscape Plans certifying that the plan is consistent with the recommendations made in the arborist's report.
8. All significant trees shall be maintained by the property owner until deemed insignificant by a public hearing or deemed a threat to the public health, safety, and welfare, by the Director of Planning.

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2. Trees
 - A. Refer to the Master Street Tree Planting Plan (City Code, Sec. 26.5-1) for species selection guidelines for street trees.
 - B. Watering and Tree Staking
 - a. Refer to Section VI. A, of the Street Tree Program booklet
 - b. Refer to Details
3. Shrubs, Perennials & Groundcovers
 - A. All shrubs, perennials, & groundcovers should be drought tolerant and have a proven record for success in the planting zones appropriate for Gilroy.
 - B. Trees and shrubs should be clustered together for accent in order to form aesthetically pleasing groupings and patterns.
 - C. Careful consideration shall be taken for all potentially toxic plant material, in regards to site usage.
4. Turf
 - A. Grass sod shall be healthy, well-established mown lawn grass turf and shall be free of weeds and any other harmful or deleterious matter.
 - B. At least 80 percent of the grass plants in the cut sod shall be composed of the species or varieties specified in the standard specifications.

102-1.07 Site Furnishings

The specific models listed here should be used for city owned and maintained property. These models are recommended as they are tried and proven. Private residential and other private non-city maintained property are not required to use these models.

- A. Drinking fountains – Haws 3202
- B. Trash can – Dumor # 87