

CITY OF HEMET PUBLIC WORKS DEPARTMENT

STANDARD SPECIFICATIONS

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March 2011

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Text in ***underlined bold italics*** indicates 2011 revisions

CITY OF HEMET
PUBLIC WORKS DEPARTMENT

**STANDARD SPECIAL PROVISIONS
FOR USE IN CONJUNCTION WITH THE
ACG/APWA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION**

I. GENERAL PROVISIONS

I.1 DEFINITIONS

Acceptance - The formal written acceptance by the City of Hemet of those public improvements that are specified in the agreement between the City and the Developer to be accepted by the City if constructed in all respects in accordance with the plans and specifications and any modifications thereof previously approved by the City.

Agency - The legal entity to which the work is being performed.

Agreement - The written agreement with the City of Hemet covering the performance of the Developer's improvement work which shall include and make reference to plans, specifications, and faithful performance bonds; also, any and all supplemental agreements amending or extending the work contemplated and which may be required to complete the work in a substantial and acceptable manner. Supplemental agreements are written agreements covering alterations, amendments or extensions to the agreement and may include contract change order.

Assessment Act Contract - A contract financed by special assessments authorized under a State Act or procedural ordinance of the City or County.

Board - The officer or body constituting the awarding authority of the City Council.

Cash Contract - A contract financed by means other than special assessments.

City Council - Board

City Engineer - Engineer or his appointed representative.

Code - The terms of Government Code, Labor Code, etc. refer to codes of the State of California.

Contract - The written agreement covering performance of the work including, but not limited to, the formal contract, notice inviting bids, instructions to bidders, affidavit, proposal, specifications, special provisions, bonds, and plans.

Contract Price - The total amount of money for which the contract is awarded.

Contract Unit Price - The Contractor's original bid for a single unit of an item of work in the proposal.

Contractor - The individual, Developer, partnership, corporation, joint venture, or other legal entity entering into a contract with the Agency to perform the work. In the case of work being done under permit issued by the Agency, the Permittee shall be construed to be the Contractor.

County Sealer - The Sealer of Weights and Measures of the county in which the contract is let.

Days - Days shall mean consecutive calendar days unless otherwise specified.

Developer - The person or persons, firm partnership, corporation, joint venture, or combination thereof, who have entered into an agreement with the City of Hemet to construct public improvements.

Electrolier - Street light assembly complete, including foundation, standard, lumina arm, luminaire, etc.

Engineer - The City Engineer or other person designated by the City Council acting either directly or through authorized agents.

Greenbook - The Standard Specifications for Public Works Construction, latest edition.

House Connection Sewer - A sewer, within a public street or right-of-way, proposed to connect any parcel, lot, or part of a lot with the main sewer line.

House Sewer - A sewer, wholly within private property, proposed to connect any building to a house connection sewer.

Luminaire - The lamp housing including the optical and socket assemblies (and ballast if so specified)

Major Bid Item - A single contract item constituting 10 percent or more of the original contract price.

Person - Any individual, firm, association, partnership, corporation, trust, joint venture, or other legal entity.

Plans - The drawings, profiles, cross sections, working drawings, and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimension or details of the work.

Private Contract - Work subject to Agency inspection, control, and approval, involving private funds, not administered by the Agency.

Proposal - The offer of a bidder when submitted on the proposal form properly signed and guaranteed.

Proposal Guaranty - The cash, certified check or bidder's surety bond accompanying the proposal as a guaranty that the bidder will enter into a contract with the Board for the performance of the work.

Referenced Documents - The following documents form a part of these specifications:

- a. Standard Specifications, and Standard Plans for Public Works Construction, latest edition, authored by the American Public Works Association, Southern California Chapter, and the Associated General Contractors of California, Southern California Districts as a Joint Cooperative Committee.
- b. Standard Landscape Specifications and Design Guidelines, latest edition, authored by Valley-Wide Recreation and Park District.
- c. Those portions of the State of California Department of Transportation (Caltrans), Standard Specifications, latest edition, which do not conflict with the same Greenbook's specifications.
- d. The Development Plans prepared by the Developer's Engineer and approved by the City Engineer.
- e. The Conditions of Approval for the project, approved by the Planning Commission.
- f. The City-Developer Agreements setting forth the requirements for construction of the work shown on the Development Plans.

Reference Specifications - Those bulletins, standards, rules, methods of analysis or test, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the contract documents. These refer to the latest edition, including amendments in effect and published at the time of advertising the project or issuing the permit, unless specifically referred to by edition, volume, or date.

Roadway - The portion of a street reserved for vehicular use.

Service Connection - Service connections are all or any portion of the conduit, cable or duct, including meter, between a utility distribution line and an individual consumer.

Sewer - Any conduit, intended for the reception and transfer of sewage and fluid industrial waste.

Special Provisions - Any provisions, which supplement or modify these specifications.

Specifications - Standard specifications, reference specifications, Special Provisions and specifications in supplemental agreements between the Contractor and the Board.

Standard - The shaft or pole used to support street lighting luminaires, traffic signal heads, mast arms, etc.

Standard Plans - Details of standard structures, devices, or instructions referred to on the plans or in specifications by title or number.

State - The State of California

Storm Drain - Any conduit and appurtenances intended for the reception and transfer of storm water.

Street - Any road, highway, parkway, freeway, alley, walk, or way.

Subcontractor - The individual, partnership, corporation, or other legal entity entering into a contract with the Contractor to perform a portion of the work.

Supervision - Supervision, where used to indicate supervision by the City Engineer, shall mean the performance of obligations, and the exercise of rights, specifically imposed upon and granted to the Agency in becoming a party to the contract. Except as specifically stated herein, supervision by the Agency shall not mean active and direct superintendence of details of the work.

Surety - Any individual, firm or corporation, bound with and for the Contractor for the acceptable performance, execution, and completion of the work, and for the satisfaction of all obligations incurred.

Utility - Tracks, overhead or underground wires, pipe lines, conduits, ducts, or structures, sewers or storm drains owned, operated, or maintained in or across a public right of way or private easement.

Work - That which is proposed to be constructed or done under the contract or permit, including the furnishing of all labor and materials.

II. CONSTRUCTION MATERIALS

II.1 ROCK PRODUCTS

General

The following specifications set forth the requirements for crushed rock, rock dust, gravel, sand and stone for riprap. Sieve analyses and sand equivalents shall be determined as prescribed in Section 200 of the SSPWC.

All rock products shall be clean, hard, sound, durable, uniform in quality, and free of any detrimental quantity of soft, friable, thin, elongated, or laminated pieces, disintegrated material, organic matter, oil, alkali, or other deleterious substance. Unless otherwise specified, all percentages referred to in Section 200 of the SSPWC shall be determined by weight.

II.2 PIPE

Plastic Pipe

Water mains shall be polyvinyl chloride (PVC) pressure pipe and shall meet the minimum standards set fourth in American Water Works Association (AWWA) C-900 and American Society of Testing Materials (ASTM) C-1784, **200 PSI minimum rating, Class 20.**

Sewer mains shall be polyvinyl chloride (PVC) pipe SDR 35 and shall meet the minimum standards set fourth in ASTM 3034 and F-679.

Coating

All flange bolts and nuts shall be lubricated and coated with No-ox-id rust protection coating as manufactured by Dearborn Chemical Company or equal and then given a Bituminous Coating conforming to the requirements of AASHO M-190.

General

Unless otherwise specified, all pipe appurtenances shall comply with the appropriate standard drawings of the City of Hemet.

Gate Valves

Gate valves shall equal or exceed the requirements established by AWWA Specification C-515 and shall be resilient-seated per AWWA Standard C-509. All gate valves shall be of the same size as the mains in which they are installed, unless otherwise indicated on the plans as approved by the City Engineer. Valves four inches (4") and over shall be iron bodied, solid bronze internal working parts, resilient wedge gate valve, bottom wedging with non-rising stem, and shall open by turning counter-clockwise. The valves shall be furnished with triple "O" ring stem seal, with cadmium-plated bolts, hub or flanged. Rubber ring ends shall conform to the pipe manufacturer's specifications. Where hub and flange valves are designed on the plans, the Contractor may of his option, install flanged valves with hub and flange adaptors, Smith-Blair or approved equal. Valves installed at end of mains shall be

capped or blind flanged after test.

a. Three Inch (3") and Smaller Gate Valves: The body and all interior working parts, except the stem, shall be constructed of ASTM B-62 (85% copper, 5% tin, 5% zinc, 5% nickel) bronze. The stems shall be of bronze and have the additional strength requirements as specified below:

Minimum Tensile Strength	60,000 psi
Minimum Yield Strength	32,000 psi
Maximum % elongation in 2"	10%

b. Four Inch (4") and Larger gate Valves: Valves shall be iron body, bronze mounted, resilient wedge gate valve, bottom wedging with non-rising stem and shall open by turning counter-clockwise. Bronze for interior parts of valves shall be ASTM B-62 (85% copper, 5% tin, 5% zinc, 5% nickel) bronze and shall contain not more than two percent (2%) aluminum nor more than seven percent (7%) zinc. Stems shall meet the strength requirements specified below.

Minimum Tensile Strength	60,000 psi
Minimum Yield Strength	32,000 psi
Maximum % elongation in 2"	10%

Butterfly Valves

Butterfly valves shall be equal to or exceed the requirements established by the specifications of AWWA C-504. Unless otherwise specified, they shall be manually operated valves with enclosed operator, and if installed in a vault, shall be equipped with a handwheel and indicator. Valves shall have positive 100% shutoff and shall withstand a 450 ft./lb. input torque in fully opened and closed position without damage.

The shafts shall be hexagonal, fabricated from 18-8 stainless steel or other approved material and shall be connected to the disc without the use of pins or keys.

Valve Boxes

Valve boxes shall be Brooks Products, Inc., Valve Box No. 3RT or approved equal. All buried valves not in vaults shall be provided with valve boxes. Eight inch round caps with galvanized slip cans may be used with Water Division's approval.

Victaulic Couplings

Unless otherwise specified, victaulic couplings shall be designed for a working pressure of not less than 150 psi. They shall be equipped with rubber gaskets for water service and shall be designed for use with pipe, which has been banded and machined to the dimensions of Class A shoulder-end cast iron pipe. Bolts used in buried victaulic couplings shall be of stainless steel.

Sleeve-Type Couplings

Unless other specified, all sleeve-type couplings shall be cast iron and if buried, shall be provided with stainless steel bolts, or bolts otherwise protected from corrosion in a manner suitable to the City Engineer. Couplings shall be Dresser Style 53, Smith-Blair Cast

Couplings, or equal.

Thrust Blocks

Concrete thrust blocks shall be installed in every instance where the direction of the pipe changes 11-¼ degrees or more at any joint or fitting, at all fire hydrants, at stub-ends of pipes and at other locations as shown on the plans and standard drawings. Bearing areas of thrust blocks shall normally be computed on the basis of a 225 psi internal pipe pressure and soil bearing value of 2000 psf.

The dimensions of all thrust blocks shall be subject to the approval of the City Engineer. All concrete thrust blocks shall be constructed in such a manner that concrete does not cover any joint or cover any bolts or bear against any adjacent pipe. Thrust blocks shall be placed against undisturbed soil.

Concrete for thrust blocks shall be 5.5-G-2500 and shall be cured a minimum of three days before any loads are applied.

Locator Wire

When polyvinyl chloride pipe is used, the Contractor shall lay a continuous 14-1 solid copper wire directly over the pipe prior to backfill and compaction.

Steel Pipe

Design Criteria - Steel cylinder pipe shall be fabricated in accordance with AWWA C-200 and C-205 and shall be cement mortar-lined and coated. The cross-sectional area of steel in the wall of the pipe cylinder shall be computed on the basis of a minimum design safety factor of 2.0 of the ratio of yield point stress for that particular type steel used in the fabrication of the pipe, to the maximum design working stress in the pipe cylinder wall. Steel pipe shall be designed and installed per AWWA M11.

Steel cylinders shall have a wall thickness of not less than 10 gauge (0.135 inch).

II.3 ASPHALTIC CONCRETE PAVEMENT

General

Asphalt concrete pavement shall consist of one or more courses of a mixture of paving asphalt and graded aggregate as specified in Subsection 203-6, placed upon a prepared roadbed or base, or over existing pavement. The courses shall be of the type of mixture and the dimensions shown on the plans or Special Provisions.

Bituminous pavement shall be removed in accordance with Subsection 300-1.3.2.

All testing of underground installations at any given point shall be completed before the surface course is placed at that point.

Tack Coat

See Standard Specifications for Public Works Construction (latest Edition) Section 302-5.4.

Seal Coat

A fog seal in accordance with Section 37-1 of the latest edition of the Division of Highways Standard Specifications shall be applied to all new asphaltic concrete surfaces.

Distribution and Spreading

Asphalt concrete shall be laid in courses not exceeding 3-inches or to a dimension approved by the City Engineer.

Waiver of Requirement

The requirement in Subsection 302-5.9 for the weighmaster's certificate to be signed by a representative of the City Engineer at the plant is waived unless specifically requested by the City Engineer.

II.4 UNTREATED BASE MATERIALS

Requirements

The requirements of Subsection 200-2 shall apply except as hereafter provided.

Base Material

When base material, without further qualification or qualified as "Class II", is specified, the Contractor shall supply crushed aggregate base.

Crushed Aggregate Grading

The material shall conform to the following gradations:

<u>Sieve Sizes</u>	<u>Percentage Passing Sieve</u>
1-1/2"	100
3/4"	90-100
3/8"	50-80
#4	35-55
#30	10-30
#200	2-9
ASTM C131 Test Grading	B

Quality Requirements

The material shall also conform to the following requirements:

	<u>Test Method No.</u>	<u>Requirements</u>
R-Value	Calif. 301	80 Minimum
Sand Equivalent	Calif. 217	50 Minimum
Percentage Wear	ASTM C131	
100 Revolutions		15 Maximum
500 Revolutions		52 Maximum
Specific Gravity	ASTM C127	2.58 Minimum

III. CONSTRUCTION METHODS

III.1 PUBLIC CONVENIENCE AND SAFETY

Street Closures, Detours, Barricades

Traffic controls shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) latest edition, published by the Federal Highway Administration (FHWA). In the event that the Contractor fails to install barricades or such other warning devices as may be required by the City Engineer, the City may, at its sole option, install the warning devices and charge time and materials to the Contractor, for each warning device.

All trenches shall be backfilled and compacted at the end of each workday. All trenches shall be paved with temporary A.C. prior to any weekend or holiday.

At least 48 hours in advance of closing, or partially closing, or of reopening any street, alley or other public thoroughfare, the Contractor shall notify the Police, Fire, Traffic and Engineering Departments of jurisdictional agencies involved and comply with their requirements. Deviations must first be approved in writing by the City Engineer.

Hours of Work

All work shall normally be performed Monday through Friday between the hours of 6:00 AM and 6:00 PM from June to September, and between 7:00 AM and 6:00 PM from October to May. The Contractor shall obtain the approval of the City Engineer if he desires to work outside of the hours stated herein.

III.2 COMPACTION TESTS

Compaction tests shall be required on all trench lines, street sub-base, street base material and under curbs and gutters, sidewalk, drive approaches and parking lots at locations designed by the inspector. All expenses incurred for compaction testing shall be borne by the Developer/Contractor.

The top five feet shall be compacted to 90 percent minimum relative compaction except that the top 12-inches of subgrade material shall be compacted to 95 percent minimum relative compaction.

III.3 OPEN TRENCH OPERATIONS

Maximum and Minimum Width of Trench

For pipe (except corrugated steel pipe), the minimum and maximum width of trench permitted shall be as indicated on the plans or standard plans. For corrugated steel pipe, the trench shall be at least 16-inches wider than the diameter of the pipe to be installed.

If the maximum trench width is exceeded, the Contractor shall provide, at no additional cost to the Agency, additional bedding, another type of bedding, or a higher strength of pipe, as shown on plans approved by the Engineer.

Additional payments or deductions from the contract price for trench excavation for conduits will be based upon a calculated volume. The width used in calculating the volume of excavation for prefabricated conduit will be the maximum width of the trench shown on the plan and measured at the top of the pipe. In the case of sewers or storm drains formed and cast in place, such volume will be based upon the outside width of the structure being constructed plus three feet.

Additional payment or deductions from contract price for trench resurfacing will be based upon an area determined by the maximum width of trench as specified herein.

Unless specifically authorized by the City Engineer, trench width, measured at the top of the pipe, shall not exceed the outside diameter of the pipe plus 24-inches, nor shall it measure less than the outside diameter plus 12-inches.

All underground pipes to be abandoned, 6-inches or larger in diameter, shall be removed or crushed in place.

Field Jointing of Steel Pipe

All field-welded joints shall be in accordance with the Standard Specifications for Field Welding of Steel Water Pipe Joints: AWWA C-206.

III.4 BACKFILL AND DENSIFICATION

General

Backfill shall be considered as starting one foot above the pipe or conduit, or at the top of concrete bedding over the pipe or conduit. All material below this point shall be considered as bedding.

Backfill, or fill as the case may be, for cast-in-place structures such as, but not limited to, manholes, transition structures, junction structures, vaults, valve boxes and reinforced concrete box conduits shall start at the subgrade for the structure.

Except where the pipe must remain exposed for force main leakage tests and subject to the provisions herein, the Contractor shall proceed as soon as possible with backfilling operations. Care shall be exercised so that the conduit will not be damaged or displaced. If the pipe is supported by concrete, bedding placed between materials shall be placed to one foot over the top of the conduit. The backfill above the concrete bedding shall not be placed nor sheeting pulled until at least the minimum time after placement provided by the optional classes of concrete designated in Subsection 201-1 for such concrete bedding. Unless otherwise specified, the period of time set forth in the following table after which the Contractor may place fill or backfill against or over the top of any cast in-place structures are predicated on the use of concrete to which no admixture has been added for the purpose of obtaining a high early strength:

<u>OPERATION</u>	<u>LOCATION</u>	
	Against Sides of Structure (Days)	Over Top Structure (Days)
Placement of Loose Backfill	5	21
Densification of Backfill	7	28

The City Engineer may permit the use of admixtures or the use of additional cement in various parts of the structure in accordance with Subsection 201-1.2.4.

Rocks greater than 6 inches in any dimension will not be permitted in backfill placed between one foot above the top of any pipe or box and one foot below pavement subgrade.

When the trench is wider than three feet, rocks not exceeding 12-inches in greatest dimension, which originate from the trench, will be permitted in the backfill from one foot above the top of any pipe or box to five feet below the finished surface.

Rocks greater than 2-½ inches in any dimension will not be permitted in backfill placed within one foot of pavement subgrade.

Where rocks are included in the backfill, they shall be mixed with suitable excavated materials so as to eliminate voids.

Subject to the provisions specified herein, the material obtained from project excavations may be used as backfill provided that all organic material, rubbish, debris and other objectionable materials are first removed.

Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, the voids remaining after the removal of the boulders shall be backfilled with suitable material and densified as approved by the City Engineer.

It shall be understood that the removal of all boulders or other interfering objects and the backfilling of voids left by such removals shall be at the expense of the Contractor and no district payment for the cost of such work will be made. The cost of such work shall be included in the prices bid for the various items of work.

Voids left by the removal of sheeting, piles and similar sheeting supports shall be immediately backfilled with clean sand which shall be jetted into place to assure dense and complete filling of the voids.

After the placing of backfill has been started, the Contractor shall proceed as soon as practicable with densification. The top five feet of all trench backfill and all bedding shall be compacted to 90 percent minimum relative compaction except that the top 12-inches of subgrade material shall be compacted to 95 percent minimum relative compaction. Backfill below five feet shall be compacted to 85 percent minimum relative compaction.

Water Exfiltration Test

Water exfiltration test shall not be allowed except with prior approval of the City Engineer.

III.5 WATER PRESSURE TEST

Water Pressure Test

The Contractor shall furnish all equipment, labor and materials, and water, for testing and disinfecting the pipelines. The Contractor shall provide the necessary piping to deliver water from the nearest available connection to the points of use. All tests of pressure piping shall be made in the presence of the City Engineer. All pipelines and piping shall be thoroughly flushed out with water prior to testing.

Testing of water mains shall be done as follows:

Pressure and Leakage Test: After the pipe has been laid, backfilled and compacted as specified in Section 306-1.1 through 306-1.3, all pipe shall be subjected to hydrostatic pressure of 200 pounds per square inch. Tests shall be made only after complete backfill as previously specified and not until at least 36 hours after the last concrete thrust or reaction blocking has been cast, using High Early strength concrete or at least seven days after last concrete thrust or reaction blocking has been cast with standard cement.

The duration of the pressure test shall be four hours. The line shall be held within ten (10) psi of required pressure for the entire period. During filling of line and before applying the specified test pressure, all air shall be expelled from the line.

To accomplish this, taps shall be made, if necessary, at the point of highest elevation; such taps shall be tightly plugged upon completion of tests. Each selection of pipeline shall be slowly filled with water and the specified test pressure shall be applied at the point of lowest elevation. Such application shall be by means of a pump connected to the pipe through a corporation cock.

The pump, pipe connection and all measuring apparatus shall be furnished by the Contractor and approved by the Engineer. During test, all exposed pipes, fittings, valves, hydrants, and asbestos cement pipe couplings will be carefully examined. The Contractor shall replace any cracked or defective material with sound material without cost to the City and the satisfaction of the Engineer. The test shall then be repeated until no defects remain.

The water lost due to leakage shall be replaced immediately by pumping into the line water from calibrated tank. The maximum length of the line to be tested shall be as directed by the Engineer.

Preparatory to testing, the selection of the pipeline to be tested shall be filled with water and placed under slight pressure for at least 48 hours. The pipelines shall then be brought up to the test pressure specified and maintained on the section under test period of not less than four hours.

Accurate means shall be provided for measuring the quantity of water required to maintain full pressure on the line for the test period, which volume shall not exceed:

$$L = \frac{C N D P}{1850}$$

Where:

- L = Maximum allowable leakage in gallons per hour for section of pipeline tested.
- N = Number of joints in length tested.
- D = Diameter of pipe in inches.
- P = Test pressure in psi.
- C = 1.0 for reinforced concrete pressure pipe with rubber joints, cylinder type.
- C = 3.0 for reinforced concrete pressure pipe with rubber joints, non-cylinder type.
- C = 0.50 for cast iron pipe with mechanical or rubber gasket joints.
- C = 1.0 for other types of cast iron joints (caulked) and other types of pipe.

No leakage is allowed for welded steel pipe with welded joints.

III.6 MANDREL TEST OF ABS AND PVC PIPE

Mandrel Test of ABS and PVC Pipe

Rigid mandrel shall have nine blades.

III.7 DISINFECTING PIPELINES

Disinfecting Pipelines

When hydrostatic pressure testing is complete, disinfection of the pipelines shall be performed by the Contractor. The Contractor shall take every precaution to keep the interior of pipelines clean during installation. Disinfection will be performed in accordance with AWWA Standard C-601 "Standard for Disinfecting Water Mains" as currently amended.

- (a) General: Disinfection shall be accomplished by chlorination either at the same time or after the pipe has been tested, but the disinfection shall be completed before the pipe has been connected to the existing system.
- (b) Connections to Existing System: Where connections are made to the existing system or valves are installed on existing lines, H.T.H. shall be added at the points where the existing mains are cut.
- (c) Preliminary Flushing: Prior to chlorination, the piping and pipelines shall be thoroughly flushed.
- (d) Chlorination: a chlorine-water mixture shall be applied by means of a solution-feed chlorinating device. The chlorine solution shall be applied at one end of the piping or pipeline through a tap in such manner that the pipeline is filled with the

chlorine solution, the dosage applied to the water entering the pipe shall be at least 50 ppm. Care shall be taken to prevent the strong chlorine solution in the line being treated from flowing back into the line supplying the water. Calcium hypochlorite tablets or powder may be used in short lengths under the supervision of the Engineer, provided the 50 ppm minimum dosage is maintained.

(e) Retention Period: Chlorinated water shall be retained in the pipeline long enough to destroy all nonspore-forming bacteria. This period shall be at least 24 hours. At the end of this 24-hour period, the treated water shall contain no less than 25 ppm chlorine throughout the length of the main.

(f) Chlorinating Valves: During the process of chlorinating the piping and pipelines, all valves and other appurtenances shall be operated while the pipeline is filled with the heavily chlorinated water.

(g) Final Flushing: After the chlorine-treated water has been retained for the required time, all treated water shall be thoroughly flushed from piping and pipelines at their extremities. The chlorine residual at the pipe extremities and at other representative points shall be at least 1.0 ppm. Should the initial treatment fail to produce satisfactory disinfection of the piping and pipelines, as evidenced by the chlorine residual, the chlorination procedure shall be repeated until acceptable results are obtained. All bacteria and chlorine residue testing shall be done by a certified laboratory.

The Contractor shall provide all water used to sterilize the line.

Marker Posts

The location of water lines and appurtenances located other than in public streets shall be designated with marker posts as shown in the standard drawings.

III.8 LANDSCAPING AND IRRIGATION

Tree Specifications

Trees to be located in the public right-of-way shall be in accordance with the approved tree list shown on Section IV.10, Table "B".

Trees, vines, shrubs, and groundcover to be located in public parks shall be in accordance with the approved list shown in Valley-Wide Recreation and Park District's Standard Landscape Specifications and Design Guidelines, latest edition.

Tree sizes desired by the City shall be listed on the bid sheet and/or plans. Trees shall be well formed, single stemmed, unless otherwise specified, for the size specified and provided as follows:

- A. 1.5 Gallon Tree: Minimum ¾-inch caliper measured at 6-inches above ground level, with good taper for a strong trunk. Tree height shall be comparable with what is commonly available in the nursery trade, as solely determined by the City.
- B. 24-inches Box Tree: Minimum 1-¾-inch caliper (or larger) measured at 12-inches above ground level, with good taper for a strong trunk. Tree height shall be comparable with what is commonly available in the nursery trade, as solely determined by the City.
- C. 36-inches Box Tree: Minimum 3-inches caliper (or larger) measured at 12-inches above ground level, with good taper for a strong trunk. Tree height shall be comparable with what is commonly available in the nursery trade, as solely determined by the City.
- D. Brown Trunks (Palms): Height is measured from the ground up to the base of the first green/live frond. All portions of the trunk must be clean and free of any leaf parts. Additionally, the trunk should be straight and free of defects (i.e.: spike wounds, depressions).

The root ball of each tree must hold intact during planting and sized to contain adequate roots for good tree growth. Trees must not exhibit signs of being root bound. Additionally, all trees shall be certified insect and disease free by the nursery, have a clean even trunk, symmetrical, well balanced crown and be capable of standing without the nursery stake upon final inspection. At the time of final inspections, all trees shall be staked per City specifications.

Wounds from previously pruned branches should be calloused over, or well on their way to proper callousing. Branches should be distributed evenly throughout the tree, or otherwise displaying good scaffolding. Trees which are found to be root bound, or otherwise defective during or after planting shall be replaced by the Contractor, at no expense to the City, with an acceptable tree either before the project is completed or during any required warranty period.

Planting Materials

The City, prior to their delivery to the site, shall approve planting materials, unless inspection is waived by the City, in writing. Waiving inspection rights shall not preclude non-acceptance of the tree at any time during the project or within the warranty period at the end of the project. Trees found to be defective or not meeting City specifications after planting shall be removed at Contractor's expense regardless of any previous City inspections and approvals. Materials to be approved are:

- A. Trees: Trees in broken or damaged containers, root bound or with broken branches or injured trunks will be rejected. All plant material must be healthy, vigorous, pest free, void of any cambial wounds and otherwise fulfill all specifications. All trees must be established in their containers in which they are sold, however, trees with circling roots or poor root structure will be rejected. The tree trunk should not move independently of the root ball.

Root condition of trees furnished by the Contractor in containers may be determined by the removal of earth from the roots of not less than two trees nor more than two percent (2 %) of the total number of plants of each species, except than when container-grown stock are from several sources. The roots of not less than two trees may be inspected. Established container stock is defined as a tree transplanted into a container and grown in the container for a length of time sufficient to develop new fibrous roots so that the root mass will retain its shape and hold together when removed from the container.

Trees shall be true to name and variety and meet or exceed all requirements and recommendations of ANSI Z60.1 "Standard for Nursery Stock". In all cases, the botanical name shall take precedence over common name. The City shall make final determination of species or variety, and whether the tree meets specifications.

- B. Topsoil: Pulverized topsoil (or native soil) free from subsoil, noxious weeds, and/or seeds, stones or other foreign matter.
- C. Root Control Planters: The deep root control planter for installation in planting hole shall be manufactured by Deep Root Corp. (Westminster, CA), or an approved equal, as determined by the City. Root barriers must have a root deflection rib and a top edge. The root control panels or planters must not be altered without written approval from the City.
- D. Tree Stakes: The tree stakes shall be ten-foot (10') long and two-inch (2") diameter treated lodge pole stakes.
- E. Staking Ties: Ties shall be fastened to the stakes with an approved twist tie brace in a manner, which permits tree movement and supports the tree.
- F. Trunk Guard: An approved trunk guard shall be placed around the base of all trees planted, whenever the tree is planted in a turf area or other location where string trimmer damage is possible.

Prior to installation, the City shall inspect all planting materials. Contractor shall pay for all expenses relating to any plan material inspections that are outside the City limits. Payment for topsoil, root control planters or barriers, tree stakes, staking ties, trunk guard and other supplies needed for complete and proper tree planting shall be included in the bid item for the trees that they are installed with. Contractor shall pay for any returns necessary.

Layout and Plant Location

The location for all tree planting shall be spotted and marked in the field by the City, and/or be as indicated on the construction drawings. Spotting is usually done with green paint mark on the curb for street trees. No work shall be done in any area where there is a discrepancy, until approval has been given by the City.

Where a consecutive order of trees is shown, stock shall be selected for uniform height and spread to assure symmetry in planting.

Tree Planting Specifications

- A. All trees shall be planted immediately after the trees are removed from containers. Containers shall not be cut or otherwise damaged prior to delivery of the trees to the planting area. Circling roots are prohibited and will be cause for rejection. Nursery stakes, ties, and ribbons shall be removed. No stakes shall remain in the root ball after planting.
- B. Contractor shall immediately remove from the site, plants that are not true to name and materials, which do not comply with the specified requirements, and promptly, replace with plants and materials meeting the specified requirements. The Contractor shall return all plants and supplies, not accepted by the City, at no additional cost to the City.
- C. Trees shall not be placed in dry soil. Soil in muddy condition shall not be used for backfilling. Fill all plant pits with water and allow leach-out before adding the prepared soil mix for backfill.
- D. When planting container stock, position the plant in the hole so that the tree root crown shall be slightly exposed above the grade (not to exceed one inch) without exposing any roots or the root ball. Then backfill with native clean soil no higher than halfway up the root ball. Tamp in soil to remove air pockets. Complete the backfilling to finish grade, again tamping soil to remove air pockets.
- E. When planting 15-gallon trees, slice root ball two to three inches deep, in a downward direction on four sides. Smooth top, sides and bottom of root ball to take off any edges. After the hole is dug, where the tree is to be placed, utilize hand tools to aerate sides and bottom of hole to encourage outward and downward growth.
- F. Form a water basin (twelve inches outside of the root ball) with soil berms and immediately water. After preliminary watering, the trees shall again be watered. A trunk guard shall be placed around the base of the tree immediately after planting if tree is located in a grass or planted area. The well basin shall be left at least through the entire landscape maintenance period, unless otherwise specified.
- G. Trees will be staked and tied with two lodge pole pine stakes and a "V" twists brace or other acceptable product specified by the City.

Palm Procurement and Planting

All palms shall be procured from or by a State licensed nursery and shall be handled with the best and most current horticultural practices.

- A. Palms will be inspected, by the City, for health girth and overall form in meeting with the design intent of the project. The City reserves the right to reject any palms that do not meet the design intent of the project.
- B. All palms shall be insect and disease free with clean trunks void of any trunk injuries, such as spike wounds.
- C. An adequate number of live fronds shall remain to adequately shelter the apical meristem of the palm, and shall be lifted up and tied together in two locations around the crown in an upright manner. Due caution shall be taken not to bind or injure the crown. A lightweight cotton rope, twine or cord (biodegradable), not less than 1/8-inch diameter, shall be used in tying up the fronds. Pruning and tying up the remaining fronds shall be completed prior to digging the root ball.
- D. All trees shall be safely loaded and transported, taking care not to damage any part of the tree or soil ball. All consideration shall be given in the selection of the largest possible crane to facilitate loading, unloading and setting. This consideration shall vary based on any given site situation and is solely the liability and responsibility of the Contractor.

All excavated palm planting holes have vertical sides, roughened surfaces and shall be of size that is twice the diameter, and two (2) feet minimum to four (4) feet maximum deeper in the ground than the depth of the root ball. The palm shall be centered in the planting hole and in alignment with any other palms. The palms shall be set plum and held rigidly in position until the backfill has been tamped firmly around the root ball. The top of the root shall be equal to the level of the existing or proposed soil grade. The backfill mix for palms shall be 100 % washed concrete sand. Newly planted palms shall be immediately watered thoroughly and protected from compaction.

Homeowner Notification

For street tree planting, the Contractor shall deliver, when planting each tree, a flyer supplied by the City that reviews the project and outlines basic tree care, especially the need for proper aftercare.

Tree Pruning

All trees shall be properly pruned prior to final City inspection. The spacing, balance and attachment of limbs should be evaluated prior to pruning. All pruning cuts should be made to promote upright growth and minimize future branching that may impede vehicular or pedestrian traffic, or for structural stability or appearance. Properly pruned shall mean:

- a. Prune only what it needs to be pruned. No more than 20-percent of the live wood may be removed.
- b. All broken or otherwise damaged limbs shall be removed.
- c. All dead limbs or portions thereof shall be removed.

- d. All limbs less than two (2) feet from the ground shall be removed, unless doing such would cause irreparable damage or leave the tree unbalanced.
- e. All pruning cuts shall be made at the branch collar.
- f. The primary terminal bud shall not be removed.
- g. Any tree improperly pruned will be subject to removal and replacement by the Contractor, at no additional cost to the City.

Palms shall not be pruned after planting until established. The string tying the fronds shall be cut 45 to 60 days after planting during the summer months and after 90 days during the winter months. Do not prune palms for at least 30 days after untying the fronds.

Landscape Establishment and Maintenance Period

The landscape establishment period is hereby defined as starting with completion of planting operations and acceptance by the City, and continuing for 30 calendar days thereafter. Acceptance by the City shall be in writing in order for the establishment period to begin. At completion of the establishment period, trees shall not show evidence of die back, wilt or other signs or symptoms of decline. Where landscape dies or shows evidence of decline, weakness or damage, the Contractor shall promptly replace with new, vigorous and healthy selections, at no additional cost to the City.

When the Contractor believes he/she has completed the plant establishment period and the entire project is ready for acceptance, he/she shall request inspection for the project. The City will inspect the project for acceptance in a timely manner. Deficiencies noted during inspections shall extend the planned establishment period until all are corrected. Acceptance shall occur only upon written acceptance of the project by the City.

The landscape maintenance period is hereby defined as starting with completion of planting operations and acceptance by the City, and continuing for 60 calendar days thereafter. Acceptance by the City shall be in writing in order for the maintenance period to end. During the contract period, the Contractor shall provide all watering, weeding, fertilizing, cultivating and spraying necessary to keep the plants in a healthy growing condition and to keep the planted areas neat, edged and attractive. It is anticipated that the City shall inspect the work during the landscape maintenance, and the Contractor shall conduct all maintenance operations in such manner as to minimize inconvenience to the City and general public. The Contractor shall provide a level of maintenance, which presents a pleasing and desirable appearance at all times. The City may extend the landscape maintenance period beyond the specified period, when in the opinion of the City, landscapes or plantings have not reached establishment in accordance with the specifications. Final payment to the Contractor shall not be made until the end of the landscape maintenance period, and upon final acceptance by the City and finalizing the Notice of Completion process. All pest control, fertilizers or other materials used by the Contractor, in carrying out work related to the project, shall be approved by the City prior to its use.

Where landscape dies or shows evidence of decline, weakness or damage, the Contractor shall promptly replace with new, vigorous and healthy selections, at no additional cost to the City. At the end of the landscape maintenance period all plant materials shall be established and in a healthy growing condition and spaced as indicated in the plans or directed by the City. All areas shall be substantially clean and free of any debris and weeds. The Contractor shall contain written approval and release from the City before ending maintenance obligations. Trees shall be under warranty for a period of one (1) year after the designated maintenance period has been completed and approved by the City, in writing. Any tree found to be dead or in poor condition, as determined by the City, shall be replaced by the Contractor, at no cost to the City. There is no appeal to this decision.

Tree Guarantee and Replacement

All trees planted shall be guaranteed to be in excellent health and condition at least twelve (12) months after planting is complete (twenty four months for palm trees) or after the landscape maintenance period is complete, whichever occurs latter. Trees that die or are damaged as a result of vandalism or lack of care by the City are exempt from this specification. All replacement trees shall likewise be guaranteed to be in excellent health and condition at least twelve (12) months after planting, or twenty-four (24) months for palms.

Irrigation System

Irrigation systems shall be in accordance with Section 02700 of the Valley-Wide Recreation and Park District's Standard Landscape Specifications and Design Guidelines, latest edition. The City Engineer shall approve any deviation from these standards.

All electrical wiring between valves and time clock/controller shall be placed inside an underground conduit. The conduit shall be a one inch (min.) inside diameter, grey PVC Schedule 40 pipe.

Drip irrigation systems are not allowed in City's public right-of-way and public parks.

III.9 MONUMENTS

Materials

The concrete portion of monuments shall be constructed in accordance with the provisions in Sections 201-1 and 303 of the Greenbook.

Payment

The unit price paid for survey monuments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the survey monuments, complete in place, including necessary excavation and backfill as shown on the plans or directed be the City Engineer.

IV. DESIGN CRITERIA

IV.1 GENERAL

This criteria shall apply to all design for work within the City of Hemet, which is subject to the review of the City Engineer.

All drawings shall be on standard size sheets (24" x 36" or 8 ½ x 11") with standard City title block. All lettering shall be 1/8" or larger to permit photographic reduction.

All title sheets shall have an index or key map clearly indicating the sheet numbers issued.

Each sheet is to be signed by a Registered Civil Engineer. Complex structural, electrical, or mechanical installations shall also be signed by the Registered Engineer doing the design. When a soil report is required, grading plans shall be signed by the Soils Engineer and/or Geologist.

Revisions made after original approved by the City Engineer shall be initialed by a Registered Civil Engineer and submitted to the City Engineer for approval. Revisions shall be presented in the form outlined in Standard Drawing G-807.

All improvements are to be designed and constructed in accordance with this design criteria, City of Hemet Standard Specifications and appropriate standard drawings.

Large tracts shall have small scale maps showing overall layout of the water, sewer, storm drain, and street lighting systems. Public utility layout shall be shown on the as-builts for all tracts (gas, telephone, electric, television).

Profiles shall be shown on the top of sheets. Vertical curves shall show curve length and P.I. elevation, in addition to normal stationing and elevations.

Normally the scales for improvement plans shall be 1"= 40' for the horizontal and 1"=4' for the vertical. The vertical scale should be changed to 1"= 8' or other appropriate scale where grades are steep. For complex plans, the scale shall be 1"= 20' or larger as necessary for clarity.

Improvement plans shall be prepared in ink on drafting media, and shall be stamped and signed by a California registered professional.

Easements shall be a minimum of 15-feet in width unless a lesser width is specifically authorized by the City Engineer. Approved means of obtaining access to the easement must be provided. Utility and drainage easements parallel to side lot lines shall be laid out so that the easement is all on one lot.

Water, sewer, and drainage calculations and maps shall accompany all plans submitted for checking, unless the requirement is specifically waived

All plans are to be checked by the Engineer of work for consistency, accuracy, clarity and conformance with City Standard Specifications, drawings, and design criteria before submission for approval. If this obviously has not been done, the plans will be returned unchecked by the City.

A letter of transmittal shall accompany plans submitted for checking.

The original check prints shall accompany revised plans resubmitted for checking.

The design engineer shall submit a detailed cost estimate to the City Engineer prior to final approval of the plans if the project requires improvement security.

Original drawings shall become the property of the City upon being signed by the City Engineer.

The original drawing shall be revised to reflect as-built conditions by the Engineer of work prior to final acceptance of the work by the City.

The Engineer of work shall submit a reduced copy of the map (8-1/2" x 11") for any proposed subdivision, prior to City approval of the final map.

The number of sheets submitted should normally be limited to that required for clarity of presentation. Separate drawings for streets, water and sewers will not be necessary.

Improvement plans shall show all existing trees, power poles, gas boxes, electrical boxes, water meter boxes, street lights, telephone poles, telephone risers, traffic signal poles and boxes, electrical lines, water lines, gas lines, irrigation lines, telephone lines, and sewer lines within the street right-of-way and within 5 feet outside the right-of-way and specifically designate those to be removed, relocated, or adjusted.

All expenses incurred for the checking of tract maps, parcel maps and other engineering functions shall be borne by the Developer/Contractor.

As-Builts

When a project is completed, the Contractor and project engineer shall submit to the City "As-Built" drawings indicating all changes on the original plans. The plans shall be certified as to its accuracy and completion by the project engineer. The "As-Built" plans shall be submitted prior to the final acceptance of the project, by the City Engineer.

IV. 2 STREETS

WIDTHS

All street classification shall conform to the latest adopted Circulation Element of the City's General Plan.

Street widths shall be in accordance with Table "A" (Section IV.9) and the appropriate Standard Drawing ST-101 through ST-109B.

Intersection of arterial, depending on estimated traffic volumes, may require special design. The use of single and double left turn pockets, free right turn lanes, right turn islands, raised medians, etc., shall be investigated.

When streets are improved for only one-half widths, the unimproved half shall drain away from the paved section and shall be provided with a paved ditch.

GRADES

Longitudinal curb slopes shall be 0.5% (minimum).

Vertical curves are required when grade breaks exceed 0.60%.

Normal crown slope on asphalt concrete (AC) pavement shall be 2.0%.

Grades of 15% or greater shall not exceed 400-feet in length and shall be constructed of portland cement concrete unless otherwise approved by the City Engineer. A rough textured surface shall be provided.

ALIGNMENT

Streets shall normally intersect at right angles. Where feasible, local streets shall have at least 50-feet of tangent adjacent to an intersection, measured from **the beginning/end of curb return (BCR/ECR)**. Collectors should have at least 100-feet. Arterials will require a special design. An angle of intersection more than 10° from a right angle requires a special approval and design.

The centerline of streets entering upon opposite sides of any given street shall normally be offset by at least 150-feet for local residential streets and 300-feet for all other streets. Local streets shall normally be designed at "T" type intersections.

Cul-de-sacs shall not exceed 660-feet in length without special approval and shall have a 42-foot minimum curb line radius at the turnaround.

Minimum length of tangent between reversing curves shall be 50-feet. A lesser length may be used for local streets with the approval of the City Engineer.

STRUCTURAL SECTION

Design shall be in accordance with the California Division of Highways stabilometer method.

Design may be based on results of soil tests made before plans are prepared. The "R" value **for the subgrade** shall be verified after rough grading and prior to paving.

The structural section shall then be modified if necessary. In no case shall the structural section be less than 3" AC over 6" AB, Class II.

CURBS

Use 6-inches curb face with 24-inches gutter, unless 8-inches curb face is required to handle drainage.

Normally, 6-inches curb face will be used on North/South streets and 8-inches curb face will be used on East/West streets and streets with right-of-way equal to or greater than 88-feet.

The use of roll type curb shall be avoided.

SIDEWALKS

Sidewalks shall be installed at a maximum cross fall grade of 2.0% towards the curb along both sides of all streets and shall be located contiguous with the curb unless otherwise approved or conditioned.

Minimum widths:

1. Restricted local residential streets.... 5'-0"
2. Arterial Highway..... 9'-4"
3. Major Highway (scenic route)..... 6'-4"
4. Secondary Highway (w/bike lane)... 8'-6"
5. All other streets..... 6'-0" min.

Minimum thickness:

1. At residential driveway approaches: 6-inches
2. At commercial driveway approaches: 8-inches
3. All other locations: 4-inches

SIGHT DISTANCE

All sight distances shall be in accordance with Caltrans' Highways Design Manual.

For local streets, maintain triangular corner cut-off at intersection, established by connecting the points where the radial lines through the BCR and ECR intersect the right-of-way lines, free of any obstructions in excess of 30-inches in height measured from top of curb. Any variations will require the specific approval of the City Engineer.

For intersections involving collector or arterial streets provide clear sight distance as recommended in AASTHO "A Policy on Geometric Design of Rural Highways."

PRIVATE STREETS

These roads shall be designed and constructed following the same requirements applied to public streets.

Items such as, but not limited to, widths, alignment, curb and gutter, sidewalk, street name signs, and pavement thickness shall conform to City standards.

FRONTAGE ROADS

Frontage roads shall enter arterial streets through "Bulb-type intersections" capable of storing at least four cars between frontage road and major streets.

STREETLIGHTS

Streetlights shall be shielded to protect adjacent houses from direct light, as required by the City Engineer. Street light systems shall be designed, by a Registered Electrical Engineer, to meet standards established in ASA D12.1-1963 "American Standard Practice for Roadway Lighting" and the Department of Public Works Street Lighting Design Criteria. Examples of installations, which have provided satisfactory lighting, are included in Section IV.9, Table "A".

At intersections, the light shall be placed on the far right corners of the major street.

Streetlights shall normally be located on the outside of curves. Lights shall be located behind sidewalk when curb and sidewalk are contiguous.

MONUMENTATION

A standard surveyor monument, per Standard Drawings M-901 and M-900A, shall be installed at all section and quarter section corners and locations deemed necessary by the City Engineer. Standard centerline monuments, per Standard Drawings M-900 and M-900A, shall be installed at the B.C. and E.C. of all curves and at the P.I. of all intersecting streets.

STREET NAME SIGNS

Street name signs shall be provided and installed by the Contractor. Street name signs shall be mounted on Telespar poles, per Standard Drawings G-**810A**, and installed prior to construction of the sidewalks.

STREET TREES

Street trees, of the variety and size shown on the current street tree list, shall be placed in front of each residential lot (two, at corner lots), and every 40-feet in commercial, industrial, and residential developments along collector or higher designation streets.

Street trees shall be 24-inch box, minimum, unless otherwise approved by the City.

FENCES

A fence at least three and one half (3-½) feet in height shall be constructed at the top of any vertical cut or retaining wall exceeding four (4) feet in height, or at the top of any cut or fill exceeding fifteen (15) feet in height.

DRIVEWAYS

	<u>Maximum</u>	<u>Minimum</u>	<u>Type</u>
Commercial	40-feet	20-feet	8" P.C.C.
Residential	28-feet	14-feet	6" P.C.C.

Maximum Frontage:

Residential, commercial and manufacturing - 50%

Garages and service stations - 50%

- A. Minimum clear distance between driveways on same property: 20-feet.
- B. Minimum clear distance from property line: 2 ½-feet.
- C. Minimum clear distance from curb return:

Local Streets (Residential): 25-feet
Arterial Roads (Commercial): 200-feet

- D. Minimum clear distance from fire hydrant: 5-feet.
- E. No driveways will be permitted in curb returns.

All dimensions are to top of "X" unless otherwise noted.

*Clear width measured at bottom of "X."

Any deviations from the above dimensions must be approved by the City Engineer.

IV.3 WATER SYSTEM

GENERAL

Design shall conform to requirement of American Insurance Association.

Calculations supporting network design shall be submitted

Distribution lines shall be constructed of polyvinyl chloride (PVC) pressure pipe in compliance with the American Water Works Association (AWWA) Standard C-900.

Minimum steel plate thickness shall be 10 gauge for mortar lined and coated pipe, and 12 gauge for steel concrete cylinder pipe.

Cast iron and ductile pipe shall not be used without special permission.

DEMANDS

Domestic Demands

In residential areas assume 200 gallons per capita per day and 2.5 persons per unit for average day.

Maximum day = average day x 2.25.

Peak hour = maximum day x 2.50 - 24

Industrial and commercial demands require special design.

Fire demands (To be determined by Fire Marshall in accordance with the adopted fire code.)

Pressure

Minimum residual pressure shall be 20 psi at design fire flow plus maximum daily domestic demand.

Minimum residual pressure shall be 40 psi at peak hour domestic demand

Maximum design static pressure shall be 100 psi.

When static pressure exceeds 100 psi, reducing valves will be required.

When the area requiring pressure reduction is 25 or more residential lots, a pressure reducing valve and bypass shall be installed in the main.

When the area requiring reduction is less than 25 or more residential lots, individual pressure reducing valve shall be installed and maintained by property owners.

MAINS

Minimum size shall be 8-inches, inside diameter.

Locations shall be in accordance with the appropriate Standard Drawing.

All lines are to be looped. There are to be no dead end lines.

If approved by Water Department, temporary dead ends are to be capped and extended beyond pavement.

Depth of cover (measured from top of finish grade to top of pipe):

Pipes 12-inches and smaller require 36-inches of cover.

Pipes larger than 12-inches require 42-inches of cover.

Design shall be based on maximum day requirements plus fire flow; or peak hour, whichever is greater. For trunk water mains 12-inches or larger, design head loss shall not exceed 5-feet per 1000-feet. For distribution mains 8-inches or smaller, design velocity shall not exceed 5 F.P.S.

Thrust blocks shall be installed in accordance with appropriate Standard Drawing. If not applicable, special design is required.

All mains 12-inches and larger shall have profile shown on improvement plans accompanied with soils tests and engineering calculations. Smaller mains shall be shown where crossing other lines.

Pipe deflections for short radius curves and angle points shall normally be accompanied by means of standard fittings, the locations of which shall be detailed on the plans.

VALVES

Maximum valve spacing allowed:

600-feet in residential areas.

300-feet in commercial value areas.

¼-mile on arteries and secondary feeders.

½-mile on supply lines.

½-mile for combination artery and supply lines.

Valve locations required:

Flanged to main at street intersections.

Fire hydrant control valves shall be at least 4' out from curb line.

Resilient-seated gate valves shall be used for mains 12" and smaller.

Butterfly valves shall normally be used for mains 16" and larger if operation pressures do not exceed 150 psi. Pressures in excess of 150 psi require special design.

Valves 16-inches and larger are to be located in concrete vaults unless requirement is specifically waived. Vaults shall be detailed on the plans.

All high points shall be equipped with air vacuum and release valves. A release shall normally be placed on the downhill side of all valves. All low points and dead ends shall be equipped with blow offs. Fire hydrants may be substituted for air release and blow off valves if approved by the City Engineer.

Blow off assemblies shall be 2-inches diameter for 4-inches to 10-inches diameter mains and 4-inches diameter for mains 12-inches and larger.

VAULTS

Vaults shall be concrete and equipped with the following:

- Access opening and ladder.
- Removable cover adequate for equipment removal.
- Vents (high and low).
- Floor drainage.
- Victualic or flexible coupling.
- Lifting eyes.

Vaults to receive thrust require special design.

FIRE HYDRANTS

Hydrant spacing required:

1. 300-feet maximum spacing for residential (offsite)
2. 300-feet spacing maximum for commercial and industrial (offsite)
3. Onsite spacing shall be in accordance with fire code.

Hydrant locations:

4. On the prolongation of the B.C. radial or property line.
5. Near side of main.
6. Off largest main at intersection of mains.

Hydrants shall be installed in accordance with Std. Drawing W-700. If not applicable, special design is required.

If cul-de-sac is over 150-feet long, a fire hydrant is required on the cul-de-sac street; location approved by Fire Marshall.

Hydrants shall be painted with an approved reflective paint by the **Contractor**.

Blue reflective fire hydrant spotters shall be placed per Standard Drawing W-700A and shall comply with specifications thereon.

HOUSE SERVICES

One separate service shall be installed to each lot.

Minimum size shall be 1-inch copper unless otherwise specified.

Services shall be installed in accordance with Drawing No. W-701 & W-701A. If not applicable, special design is required.

No service shall be installed in a driveway.

When future lot widths are not known, a service shall be installed every 60-feet if street is to be paved.

PRESSURE BOOSTING STATIONS

Pressure boosting stations may be permitted only as temporary installation.

The use of variable speed pumping shall be investigated.

Hydro-pneumatic pumping systems requirements:

1. Tank shall be 10% full by volume at low water level.
2. Tank shall be 40% full volume at high water level.
3. Pump to operate at 6 pumping cycles per hour at average day.

IV.4 SEWER SYSTEM

MAINS

General

1. Minimum size shall be 8-inches, inside diameter.
2. Material shall be extra strength vitrified clay or approved equal.
3. Joints shall be plastic compression joint unless otherwise specified.
4. Submit design calculations to verify line size and bedding design. Normally a Manning "N" = 0.013 will be satisfactory.
5. All sewer mains must be inspected using an approved television inspection company using a color video system. The sewer main must be approved prior to paving of the street or City Engineer accepting the project.

Locations

1. Alley: mains shall be offset 3' min. from centerline to clear alley gutter.
2. Street: main locations shall be in accordance with appropriate Standard Drawing and State of California, Department of Health requirements.
3. Streets with more than 84' of R/W require special design.
4. Extend and cap all dead ends beyond pavement.
5. Sewers shall normally be placed at least 7' below finished grade.

Minimum Slopes

Maintain minimum velocity of 2 FPS (minimum). Special attention should be given to maintaining adequate velocities at low flows.

		<u>Minimum Grades</u>
1.	8-inches	0.40%
2.	10-inches	0.32%
3.	12-inches	0.32%

Demands

1. Domestic Demands
 - a. In residential areas, assume 200 gallons per capita per day and 2.5 persons per unit for average day.
 - b. Maximum flows should be based on ratio of 2.50 peak to average flows.
 - c. Industrial and commercial demands require special design.

MANHOLES

Sewer manholes shall be located as follows:

- A. At all changes of slope.
- B. At all changes of direction unless a special design is required by field conditions.

- C. At intersections of mains - match crown lines.
- D. Required spacing: 300-feet. Maximum spacing allowed: 400 feet.
- E. At ends of line unless a cleanout is provided.
- F. All manholes shall be numbered on the plans.

CLEAN OUT LOCATION

Permanent ends of line, not excess of 200' beyond last manhole.

LATERALS

A. Size

- 1. Single family: Minimum 4-inches.
- 2. All others: Minimum 6-inches.

B. Locations

- 1. Right angle or radial to street right-of-way.
- 2. Center of lot to 5' above downstream lot line (shown on as-built plans).
- 3. When future lot widths are not known, a service shall be installed every 60 feet in residential areas.
- 4. Service shall not be located in driveway without prior approval of City Engineer.

C. Depth: 5-feet (min.) at property line, or as approved by the City Engineer.

D. Taps: All taps shall be made by the "Shower" method or approved equal.

PUMP STATIONS

A. General

- 1. Wet wells shall be physically separated from pump area.
- 2. Provide an approved high-water and power failure alarm system.
- 3. Paint interior of structure, all machinery, and piping and exterior below grade in accordance with table of paint systems in Section 210 of the Standard Specifications.
- 4. The use of variable speed pumping shall be investigated.
- 5. City to be provided with complete manufactures' brochures, technical data, etc., for all equipment and controls.
- 6. An emergency bypass connection shall be provided adjacent to receiving manholes.
- 7. Investigating ejectors for flows less than 500 G.P.M. and 60-feet T.D.H.

B. Structural

1. Permanent structures shall be concrete.
2. In residential areas, structures shall be below ground.
3. Provide access other than vertical ladders for permanent stations.
4. Spring-loaded roof hatches with stainless steel or corrosion-proof hinges are required for entry.
5. Provide roof hatch adequate for replacement and removal of major equipment components.
6. Where applicable, provide lifting eyes in roof of station.
7. All structures shall have ample working room around machinery; minimum clearance to wall shall be 24' or greater, as needed for adequate maintenance.
8. Design of structures shall provide for adequate waterproofing.
9. Interior steel shall be hot dip galvanized after fabrications.

C. Pumps

1. Minimum desirable size: 4-inches
2. Max. velocity in suction: 5 FPS.
3. Max. velocity in discharge: 8 FPS.

D. Mechanical and Piping

1. All design shall satisfy minimum requirements of State Health Code.
2. An air gap is required on all domestic water connections
3. Provide an automatic blower system for all underground areas to exchange air each 6 minutes, minimum. Design system to exhaust air from lowest point in station.
4. Provide an automatic sump pump (slope floor to sump).
5. Provide standby capacity equal to largest single unit.
6. Use DeZurik or equal plug valves instead of gates.
7. Provide 2" metered fresh water service adjacent to each station.
8. In case of power failure or other emergency, make provision to bypass station.
9. Sump pumps and blowers should be easily removable for maintenance.
10. Metal structures and supports shall not be mounted directly on floor; provide concrete pedestals.
11. From each pump to sump, provide 1-inch diameter P.V.C. stuffing box drain line.
12. Piping layout shall provide for easy access to pumps for maintenance. Locate flexible coupling between valve and pump.
13. Provide guards for all moving parts of equipment, which are a safety hazard.
14. Use valves on both suction and discharge.

E. Actuation of Pumps

1. Provide manual switch to alternate lead pump in system.
2. The control system to actuate pumps is subject to approval of a specific design.
3. Bubbler pressure type controls shall be used.

F. Electrical

1. All electrical installation shall comply with Division of Industrial Safety requirements.
2. Use enclosed, prefabricated electrical panels.
3. Provide running-time meters for all motors (reset type).
4. Provide explosion-proof electrical appurtenances below ground or approved type disconnect and time delay.
5. Provide separate blower system within all electrical panels located below ground.
6. Provide an approved type alternator.
7. A manual switch adjacent to motors, which will override the control panel, shall be provided.
8. Adequate lighting shall be provided.
9. Color-code all wiring.

G. Painting

All painting work shall consist of three (3) coat minimum system, approved by the Engineer, and be applied in a manner to provide a uniform thickness and smooth appearance. The paints shall be both sulfide and mildew-resistant. All surfaces to receive paint shall be properly cleaned, washed, sand blasted, etched, and dry.

1. Interior walls - cream colored, semi-gloss enamel with dado 5 ½' consisting of light green semi-gloss enamel.
2. Exterior walls - below grade, three (3) coats hot mopped asphalt; above grade, cream colored, exterior masonry paint.
3. Ceiling - cream-colored, semi-gloss enamel.
4. All equipment and machinery including electrical conduit and fittings, motors, pumps, fans, sewage pipes, valves, etc. - light green, semi-gloss enamel.
5. Special treatment for floors shall be investigated.

H. Force Mains

1. Require special design.
2. Material shall be asbestos cement, mechanical joint cast iron pipe or Class 150 polyvinyl chloride pipe.
3. Minimum cover shall be 36-inches. The top of main elevation and profile shall be shown on the improvement plans.
4. Sulfide buildup in force mains should be investigated and provision for aeration and other protective measures taken as necessary.

IV, 5 DRAINAGE

GENERAL

All drainage design and requirements shall be in accordance with the latest City of Hemet “Master Flood Control and Drainage Plan”, and the “Storm Drain Development Standards, Storm Drain Criteria, and Drainage Design Manual”.

Design calculations and flow maps for all tributary areas shall be submitted with the plans.

The use of underground storm drain systems, in addition to standard curb and gutter, shall be required:

1. When flooding or street overflow will cause serious damage.
2. When future up-stream development will cause drainage problems.
3. When existing drainage facilities are adjacent to proposed development.
4. When more than one travel lane of arterial and collector streets would be obstructed by storm water based on “10-year storm”
5. In all street segments that have tributary flow from other street segments that cumulatively exceed 660-feet, the storm drain does not need to be larger than 18-inches diameter unless a larger size is required to meet the conditions listed above.

The use of underground storm drain systems shall be investigated:

1. When the water level in streets at the design storm reaches top of curb.
2. When velocity of water in streets exceeds 8 F.P.S.

Permanent open drainage ditches shall not be permitted in public right-of-way.

The type of drainage facility shall be selected on the basis of physical and cultural adaptability to the proposed land use. Open channels may be considered in lieu of underground systems when the peak flow exceeds the capacity of a 48-inch diameter reinforced concrete pipe (RCP).

Permanent drainage facilities and right-of-way shall be provided from development to point of satisfactory disposal.

The use of cross gutters on collectors and arterials requires special approval.

Where the development density is one lot per acre or greater, all drainage channels shall be improved.

Concentrated drainage shall not be discharged to City streets unless specifically approved by the City Engineer.

Open channels shall be fenced.

DESIGN

The methods outlined in the Riverside County Flood Control and Water Conservation District will be used when applicable.

CATCH BASINS

All catch basins shall have a manhole opening in the top, unless access through the grate section satisfactory to the City Engineer is provided.

Side-opening catch basins with rounded, bulb face angle inlets shall be used. Local depressions in pavement area and grates may be used only with the approval of the City Engineer.

Catch basins shall be located so as to eliminate, whenever possible, open concrete cross gutters.

Minimum size connector pipe shall be 18-inches **RCP**.

Inlet sizing shall be done by use of City of Los Angeles design charts.

City of Hemet standard designs shall be used unless otherwise specified. Reinforced steel in all walls and slabs is required and shall be detailed on the drawing.

STORM DRAINS

Location shall be in accordance with appropriate Standard Drawing.

Minimum pipe size, in public right-of-way, shall be 18-inches.

The material for storm drains shall be reinforced concrete pipe, corrugated steel pipe, or cast-in-place pipe designed in conformance with Riverside County Flood Control and Water Conservation District design criteria, as modified by Hemet Standard Specifications.

Corrugated steel pipe (CSP) shall not be used in areas to be paved without the approval of the City Engineer. Any request to use corrugated steel pipe shall be accompanied by a report from a qualified testing laboratory showing the Ph and minimum resistivity of the soils in which the pipe will be placed.

The use of cast-in-place pipe shall be subject to the specific approval of the City Engineer.

The pipe invert elevations, slope, hydraulic grade line (HGL), D-load, and pipe profile shall be shown on the improvement plans.

RETENTION/DETENTION BASINS

Detention of the incremental increase in runoff due to development is required.

Detention basins shall be designed with **an** emergency overflow one (1) foot below the elevation of finished floor of any adjacent structures.

A **12**-foot wide access road will be required on the perimeter of all basins, with a 25-ft radius at the corners. The access road shall have an access ramp to the bottom of the basin, on a grade not to exceed 15%.

In those cases where the basin is also used as a park, the side slopes shall not exceed 4:1, and an 18-inches low-flow underground pipe, with inlets, shall be required.

All basins shall have a minimum of two (2) discharge pumps, one for back-up purposes, capable of emptying the basin in a 72-hour period, for flooding and mosquito control purposes. The pumps shall be located in a receptacle/wet well that provides easy access for maintenance and removal. The corresponding electrical panel, to control the pumps, shall be located **a minimum of 4-feet above** the basin's banks.

All storm drain discharge lines shall end into a concrete headwall with removable steel grate for safety reasons. Also a concrete, or rock aprons are required at these locations.

All basins shall be fenced with 6-foot decorative block wall, or wrought iron fence. Wooden fences are not allowed. A twelve-foot, double access gate and concrete driveway approach are required.

A detention basin schematics is shown in Standard Drawing D-319.

An underground retention/detention facility is preferred for commercial and industrial developments.

Install "NO TRESPASSING/NO DUMPING" sign, per Standard Drawing G-803, **every 100-ft on small basins (<= 1/2-acre) and every 300-feet on large basins (> 1/2-acre).**

Prior to final acceptance, the pumps shall be in working conditions, and the basin shall be clean of any weeds and debris.

Prior to final acceptance of any development, title to the detention basin shall be conveyed to the City of Hemet.

The City Engineer shall approve any deviation from the above criteria.

IV.6 STREET LIGHTING

LOCATION OF STREETLIGHTS

Intersections

- a. One (minimum), where streets have a curb separation of less than 64-feet.
- b. Two (one each on opposite corners), where both streets have a curb separation of 64-feet or greater.

Between intersections

Staggered spacing, in accordance with Table "A" of Standard Specifications.

Alleys

Where warranted by extreme situations resulting in severe problems.

STREETLIGHT TYPE

All City street light installations shall be low-pressure sodium (SOX) on prestressed concrete poles. Except in special cases and as approved by the City Engineer, all services shall be 240 volt, single phase and metered.

High-pressure sodium luminaires (HPS) shall be used only at signalized intersections on combined traffic signal/street light standards.

In commercial and industrial developments, where full-width sidewalk is required, lighting standards shall be set in sidewalk and located two (2) feet behind curb face to centerline of standard. Mast arms will be six (6) feet.

In all other installations, lighting standards shall be installed 18-inches behind sidewalk and provided with an eight (8) foot mast arm.

STANDARD SPECIFICATIONS

General

Street lighting systems shall conform to these specifications and City Standard Drawings.

All material shall be new, and shall bear the label of the Underwriter's Laboratories, where applicable.

All work shall be done in compliance with the latest edition of Standard Specifications for the Public Works Construction, the National Electric Code, the California State Safety Orders and all other codes, rules and requirements of authorities having jurisdiction. Particular attention is directed to Section 2 and 307 Standard Specifications for Public Works Construction.

- a. On State Highways all work shall be done in compliance with the latest edition of Standard Specifications, Department of Transportation, State of California.
- b. In case of conflict between any Standard Specification and these policies and procedures, these policies and procedures shall take precedence over and be used in lieu of such conflicting portions except for work on State Highways.

Street lighting systems shall be installed in conformity with the following specifications:

- c. All street lighting systems shall be metered systems and shall become, upon acceptance, the sole property of the City of Hemet.
- d. Installations shall mean the excavation and backfill of trenches, installing conduit and conductors, lighting standards, foundations, luminaires and lamps, service panel, and all other related devices and fittings necessary for a complete and operable street lighting system.

Luminaires

Streetlight installations shall be on an octagonal, tapered, exposed aggregate concrete pole of sufficient length to provide the proper mounting height designated for the specific location and wattage of the installation.

A pull box shall be installed at the base of each streetlight standard to facilitate maintenance of the individual luminaires. Conduit sweeps between the pull box and the pole shall be PVC, Schedule 40, of not less than 1-inch inside diameter.

Fuse holder shall be provided in the hand hole of each pole.

Conduit and Conductors

Conduit

Materials shall conform to the Underwriter's Laboratory, Inc., as having suitable characteristics when properly formed and treated, including rigid polyvinyl chloride (Schedule 40) for underground use, and rigid polyvinyl chloride (Schedule 80) for use above ground and passing under roadways. PVC conduit shall be grey in color. Rigid metal galvanized conduit shall be wrapped with 20-mil tape.

Conduit or duct passing under roadways shall be installed prior to final paving, otherwise jacking or drilling methods shall be employed, utilizing only galvanized steel conduit. Conduit shall be two (2) inches diameter minimum.

All conduits shall sweep into pull boxes and poles with 90-degree factory bends.

Conduit or duct shall be placed at a minimum depth of 24-inches below grade, at all locations:

Existing conduit in areas where street improvements are being made shall be relocated to depths below grade as indicated above.

Conduit shall be 1-¼" diameter minimum. Determination of conduit size (based on number and size of wires) shall be according to conduit and wire tables of the National Electric Code and the California State Safety Orders.

Galvanized rigid conduit shall be reamed when cut and shall be capped to prevent foreign objects from falling into the pipe openings. The conduit shall remain capped until wire is pulled.

All conduit in the base of the poles shall lean toward the hand hole and the ends shall not extend more than ¾" above the bottom of the hand hole nor be terminated more than 2" below the bottom of the hand hole.

Conduit shall be bent without crimping or flattening and shall have a radius of at least six times the diameter of the conduit.

Contractor shall place pull box within 10-feet of light pole where water runoff will not collect and fill pull box with standing water.

Conductors

Shall be stranded copper and installed in conduit.

Shall be minimum No. 10 AWG.

Contractor shall install enough wire inside the streetlight pole, connected to fuse holder, to allow fuse holder to be removed a minimum of 10-inches from pole, for servicing.

Contractor shall install enough wire inside the pull box, to allow the connector to be removed a minimum of 24-inches from pull box, for servicing.

Contractor shall install connectors inside the pull box, using "ILSCO" Part #PED 5-350-SS-DB or approved equal, with minimum 5 ports (each phase, neutral and grounding). Only one wire shall be installed per connecting port, and shall be sealed with approved electrical waterproof sealant.

Conductors shall maintain a voltage drop no greater than 5% of the serving voltage for low-pressure sodium vapor. Splices shall be made only in pull boxes, pole bases or service panels, using approved connectors.

Bonding and Grounding

Street lighting systems shall provide for electrical ground continuity.

Systems utilizing metallic conduit shall have all conduit, electroliers, and all metallic components of the system.

Systems utilizing non-metallic conduit shall have a continuous conductor bonding together all streetlights, and all metallic components of the system.

Bonding conductors shall be solid copper wire with a minimum cross-sectional area equal to No. 8 AWG, or larger. All connections shall utilize UL approved ground clamps and brass nuts and bolts. One bonding conductor in each concrete street light base shall be looped up to a point two inches above the bottom of the hand hole opening.

Systems shall be bonded to a ground electrode at the service neutral, and at such additional locations as specified by the City Engineer.

Bonding at street lighting standards and service pedestals shall be by means of a bonding wire shall be accomplished as required by the National Electrical code and serving utility.

Grounding of metal conduit, service equipment, and the grounded conductor at service point shall be accomplished as required by the National Electrical Code and serving utility.

For bonding purposes in all non-metal type conduits, a bare or green insulated No. 8 copper wire shall be run continuously. Insulation must be stripped back a minimum of 10-inches at termination.

Bonding of metallic conduit in concrete pull boxes shall be by means of galvanized grounding bushings and bonding jumpers.

Service and Feed Points

Electrical service shall be provided at locations designated jointly by the City Engineer and the serving utility. Service shall be 240 volt, single phase, City owned, and metered.

INSPECTION AND TESTING

Inspection

All street lighting systems shall be inspected by the City Engineer or his designated representative at the following specified times:

When service is installed, services must be inspected and cleared through the service utility.

After conduit is installed, with all ditches open and foundations ready for pouring or backfilling.

Contractor shall properly identify each conductor throughout electrical system.

At the completion of wiring, final rough inspection, at which time Contractor shall have all pull boxes and connection points open for inspection.

Contractor shall provide an updated set of "as-built" plans to the personnel inspecting the electrical system.

All street lighting installation and electrical materials are subject to inspection and approval of the City Engineer or his designated representatives during all phases of construction. The Contractor shall notify the City Engineer at least 24 hours before any inspection is required, and 24 hours before any scheduled plan to place concrete. The Contractor shall be solely responsible for notifying the City Engineer where and when such work is in readiness for inspection. Should such work be covered up without inspection and approval, it shall be uncovered, inspected and approved, or redone at the Contractor's expense, as the case may be.

Testing

Prior to the completion of the work, the Contractor shall cause the following tests to be made in the presence of the City Engineer or a designated representative on all lighting circuits:

Continuity tests for each circuit.

Ground tests for each circuit.

A megger test at 500 volts DC shall be made on each circuit between the circuit and a ground. The insulation resistance shall be not less than 10 megohms on all circuits.

A 72-hour functional test shall be conducted to demonstrate that each and every part of the system functions as specified or intended.

All lighting equipment shall be energized, under as near actual service conditions as possible, for three successive nights. During the third night of the test, the Contractor shall patrol all circuits, at least once, and any inoperative equipment replaced or repaired.

The Contractor in a manner approved by the City Engineer shall correct any fault in any material or in any part of the installation, which may be revealed by these tests, and the same tests shall be repeated.

IV.7 PARKING LOTS

General

Structural pavement section shall be based on results of soils test made before plans are approved.

The "R" value shall be verified after rough grading and prior to paving. The structural section shall then be modified, if necessary.

In no case shall the structural section be less than:

Parking areas:	3-inches of A.C. over 4-inches of A.B. (Class II)
Drive aisles:	3-inches of A.C. over 6-inches of A.B. (Class II)

All parking lot subgrade and A.B. material shall be compacted to 95% relative density. Compaction test shall be taken at locations designated by the City's Public Works Inspector.

All A.C. paving shall be fog sealed at a rate of 0.05 gallon per square-yard.

Asphalt concrete used in parking lots shall comply with Section 92 of Caltrans Specifications, latest edition. Mix shall be PG 70-10 (AR 8000).

The final paving course for A.C. surface shall be one tenth (0.10) of a foot in thickness and a minimum of eight (8) feet in width. The final paving course shall be laid with a self-propelled mechanical spreading and finishing machine, equipped with tamper bars and an automatic screed (Barber-Green, or approved equal).

All parking lots shall drain through an approved drainage structure.

Parking lot striping shall be in accordance with Standard Drawing No. P-401.

IV.8 TRAFFIC SIGNALS

Design Criteria

Traffic signals shall be designed in accordance with the requirements of Caltrans, except for the type of controller to be used.

Dedicated right turn lanes shall be included, wherever possible.

Loop or video detectors are acceptable.

New traffic signals shall be interconnected with existing signals. If there are no existing signals in the proximity, the construction of new traffic signals shall include all necessary underground conduits for future interconnection.

All traffic signals within the city limits shall include, but not limited to, the following items:

1. LED indicators
2. Emergency vehicle pre-emptying device
3. Reflectorized street name signs
4. Controller type Econolite 100
5. **Pedestrian countdown heads**

IV.9 TABLE "A"

CITY OF HEMET ENGINEERING DEPARTMENT SUMMARY OF MINIMUM STREET DESIGN STANDARDS

Design Criteria		Arterial Highway	Major Highway	Secondary Highway	Collector	Local Street	Restricted Local Street	
1.	Estimated 24 hr. traffic (volume)	14,000 to 30,000	10,000 to 24,000	10,000 to 20,000	5,000 to 10,000	4,000 to 8,000	Max. 20 dwellings	
2.	Design Speed (MPH)	55	55	50	40	30	25	
3.	Spacing of Intersections	1,320	660	330	200	200	150	
4.	Right of Way (ft.)	110	100	88	66	60	56	
5.	Access to adjoining property	Intersection only	Intersection only	Intersection only	Avoid where possible	OK	OK	
6.	Curb to Curb (ft.)	90	84	64	44	40	36	
7.	Median	0' – 12'	0' – 12'	0' – 14'	-	-	-	
8.	Traffic Index TI	Special (9 min.)	Special (7 min.)	Special (7 min.)	7.0	5.5	4.5	
9.	Min. Thickness of Pavement (inches)	3AC/8AB	3AC/6AB	3AC/6AB	3AC/6AB	3AC/6AB	3AC/6AB	
10.	Stopping sight dist. (summits) (feet)	660	525	350	275	200	160	
11.	Head Light dist. (sags) (feet)	600	475	350	275	200	160	
12.	Min. Horizontal Radius (feet)	1,500	1,200	1,000	600	500	200	
13.	Max. Grade (%)	AC	6	7	7	7	9	12
		PCC	6	7	7	7	9	16
14.	Min. Grade (%)	0.5	0.5	0.5	0.5	0.5	0.5	
15.	Street lights							
	Mounting height	40'	35'	31'	28'	26'	26'	
	Lamp Capacity (lumens)	22,500	22,500	22,500	8,000	8,000	8,000	
	SOX Wattage	135 W	135 W	135 W	55 W	55 W	55 W	
	Spacing (ft.)	160'	160'	250'-300'	280'-300'	200'	250'	

TABLE "A" (cont.)

**CITY OF HEMET ENGINEERING DEPARTMENT SUMMARY
OF MINIMUM STREET DESIGN STANDARDS**

Design Criteria		Residential Loop Street	Residential Cul-de-sac	Industrial Street	Frontage Road	Hillside or dbl. Frontage Lots	Alley	
1.	Estimated 24 hr. traffic (volume)	-	-	-	-	-	-	
2.	Design Speed (MPH)	25	25	25	25	25	25	
3.	Spacing of Intersections	250	-	250	250	250	-	
4.	Right of Way (ft.)	52	52	66	52	52	Res.- 20' Com- Ind-30'	
5.	Access to adjoining property	OK	OK	OK	OK	OK-1 ftg.	OK	
6.	Curb to Curb (ft.)	36	36	44	36	36	Res.- 20' Com- Ind-30'	
7.	Median	-	-	-	-	-	-	
8.	Traffic Index	4.5	4.0	(7) min.	special	4.5	special	
9.	Min. Thickness of Pavement (inches)	3AC/6AB	3AC/6AB	3AC/6AB	3AC/6AB	3AC/6AB or 6" PCC	3AC/6AB or 6" PCC	
10.	Stopping sight dist. (summits) (feet)	160	160	160	160	160	-	
11.	Head Light dist. (sags) (feet)	160	160	160	160	160	-	
12.	Min. Horizontal Radius (feet)	200	200	300	300	150	-	
13.	Max. Grade (%)	AC	12	12	6	8	12	-
		PCC	16	16	6	8	16	16
14.	Min. Grade (%)	0.5	0.5	0.5	0.5	0.5	0.5	
15.	Street lights:							
	Mounting height	26'	26'	30'	30'	26' or special	special	
	Lamp Capacity in lumens	8,000	8,000	8,000	8,000	8,000	4,500	
	SOX Wattage	55 W	55 W	55 W	55 W	55 W		
	Spacing (ft.)	250'-300'	250'-300'	250'-300'	250'-300'	250'-300'	250'-300'	

IV.10 TABLE “B”

APPROVED STREET TREE LIST

COMMON NAME	BOTANICAL NAME	EVERGREEN	DECIDUOUS	FALL COLOR	3' x 3' CUTOUT	5' x 5' CUTOUT	2' to 3' PARKWAY.	5' INTERIOR PKWY	5' EXTERIOR PKWY	4' FROM SIDEWALK (MIN.)	AGE 55+ COMMUNITIES	BENEATH UTILITY WIRES	MIN. TREE CALIPER AT 1' FROM GROUND (INCHES)
African Sumac	Rhus Lancea	X				X		X	X		X	X	1.75
Australian Willow	Geijera Parviflora	X				X		X	X		X		1.75
Bottle Brush	Callistemon Citrinus or Viminalis	X							X				1.75
Camphor Tree	Cinnamomum Camphora	X								X			1.75
Chinese Elm	Ulmas Parvifolia		X					X	X				1.75
Chinese Flame Tree	Koelreuteria Integrifolia		X	X					X				1.75
Chinese Pistache	Pistachia chinensis		X	X		X		X	X				1.75
Crapemyrtle	Lagerstroemia Indica		X	X	X		X				X	X	1
Desert Willow (White)	Chitalpa Tashkentensis		X		X	X	X	X	X		X	X	1.75
Flowering Pear	Pyrus Calleryana "Aristocrat"		X	X	X	X	X		X		X		1.75
Goldenrain Tree	Koelrueteria Paniculata		X	X					X			X	1.75
Honey Locust	Gleditsia Tricanthus "Sunburst"		X			X			X				1.75
Liquidambar	Liquidambar Styraciflua		X	X					X	X			1.75
Magnolia Grandiflora "Alta"		X				X		X	X				1.75
Photinia	Photinia Fraseri	X		X	X		X				X	X	1
Raywood Ash	Fraxinus Angustifolia		X	X	X		X	X			X	X	1.75
Ulmus Paravifolia "Alle'e"			X	X									1.75